



The Catalogue



The Catalogue

Safety

for man and machine
in **industry.**

Rely on our expertise and know-how in industrial safety.

You identify the requirements. We provide advice and develop convincing solutions. Economically. Reliably. From one source.

Complete safety systems. Perfect safety applications for the most demanding environments.

A spectrum of components with intelligent added-value advantages for your use. In breadth and depth.



CANsafe – a jump to the future.

Automation and safety in one Bus



Systems and component solutions for **selected** industries.

Meet our industry specialists.
They talk your language and understand your business.

We enjoy considerable success when building partnerships with our customers. We share development, idea-exchanges and knowledge to realise industry specific applications and systems.

We are particularly strong in

- Lift/Escalators
- Automobile production
- Packaging systems



Systems and component solutions
for lift and escalators



Systems and component solutions
for automobile production



Systems and components for
Packaging machines/equipment

**We are only satisfied
when you are.**



Our service to you begins at the moment of first contact.

Thereafter we ensure all questions and enquiries are dealt with swiftly and accurately.

To do so we rely on our long experience, know-how, development capabilities and world-wide proven systems, application and components.



We ensure our products meet all applicable standards and legislation. Their cost-effectiveness is also a primary objective helping to minimise these concerns for our customers.

Our team is always on hand to provide competent advice and support for order processing, delivery enquiries and after-sales service.

Take us at our word and try our service for yourself. You will not be disappointed.



Page 8

Switches



Page 118

Sensors



Page 286

Enclosures

Switches

Plastic-bodied limit switches

Metal-bodied limit switches

Footswitches

Model	Page	Model	Page	Model	Page
 <p>C2 Compact limit switches</p> <ul style="list-style-type: none"> • For confined spaces • Short contact travel • 6 switching versions • IP 30 	10	 <p>GCI & B</p> <ul style="list-style-type: none"> • Very compact • Multiple contact options • IP 65 • EEx certified versions available acc. ATEX 100 a 	30	<p>Footswitches</p> <ul style="list-style-type: none"> • Contact configuration • Ordering instructions 	54
 <p>B2 Compact limit switches</p> <ul style="list-style-type: none"> • Compact design • Locking lid • 6 switching versions • IP 65 	13	 <p>SN 2</p> <ul style="list-style-type: none"> • 3 cable entries • Forward adjustable mounting • IP 65 	36	 <p>Single pedal Types F1 & F1 UN</p> <ul style="list-style-type: none"> • Available with or without guard • Heavy duty version available • IP 65 • EEx certified versions available acc. ATEX 100 a 	56
 <p>I 88</p> <ul style="list-style-type: none"> • DIN EN 50 047 compliant • Self-retaining snap lid • IP 65 	17	 <p>ENM 2</p> <ul style="list-style-type: none"> • DIN EN 50 041 compliant • IP 65 • EEx certified versions available acc. ATEX 100 a 	40	 <p>Dual pedal Types F2 & F2 UN</p> <ul style="list-style-type: none"> • Available with or without guard • IP 65 • EEx certified versions available acc. ATEX 100 a 	61
 <p>Biggy</p> <ul style="list-style-type: none"> • Four mounting options • 2 lateral cable entries • IP 65 	23	 <p>D 1</p> <ul style="list-style-type: none"> • Suitable for heavy duty applications • IP 65 (IP 43) 	46	 <p>Triple pedal Types F3 & F3 UN</p> <ul style="list-style-type: none"> • Available with or without guard • IP 65 	63
 <p>ENK</p> <ul style="list-style-type: none"> • DIN EN 50 041 compliant • Self-retaining snap lid • IP 65 • EEx certified versions available acc. ATEX 100 a 	26	<ul style="list-style-type: none"> <input type="checkbox"/> Actuator selection table <input type="checkbox"/> Assembly instruction for turret head functions <input type="checkbox"/> Accessories 	50 52 53		

Safety switches

CATEGORY 2: Safety switches with separate actuator

Model	Page
 Plastic-bodied SKT <ul style="list-style-type: none"> • Rotating head, 4 x 90° • Small design • IP 65 	64
 Plastic-bodied SKI <ul style="list-style-type: none"> • Rotating head, 4 x 90° • Mounting acc: EN 50047 • IP 65 	66
 Plastic-bodied SKG/SK <ul style="list-style-type: none"> • Triple coded actuator • DIN VDE 0660 T 200 and IEC 947-5-1 compliant • Tested to GS-ET-15 • IP 65 	68
 ENK...VTU safety switch with separate actuator <ul style="list-style-type: none"> • Plastic-bodied • 2 actuating directions • Mounting to EN 50041 	72
 Metal-bodied ENM-VTW GC-VT <ul style="list-style-type: none"> • Standard mounting • IP 65 	74
 Plastic-bodied interlock switches SLK <ul style="list-style-type: none"> • Power to lock or unlock • Rotating head, 4 x 90° • IP 67 	75
 Metal-bodied interlock switches SLM <ul style="list-style-type: none"> • Power to lock or unlock • Industry standard mounting • IP 67 	78

Safety switches

CATEGORY 1: Safety switches for hinged guards

Model	Page
 I 88 VKS/VKW <ul style="list-style-type: none"> • Suitable for hinged lids/doors • IP 65 	88
 GC-VKS/VKW <ul style="list-style-type: none"> • Suitable for hinged lids/doors • IP 65 	88
 I 88-AHDB <ul style="list-style-type: none"> • Hinge operated • IP 65 	90
 ENM-AHZ <ul style="list-style-type: none"> • Safety switch with personnel protection function in forward and reverse movement • IP 65 	91
 SHS Safety-Hinge Switch <ul style="list-style-type: none"> • Integrates safety switch and load hinge • Adjustable from 0-180° • IP 67 	92
 S/Sa Rope Pull switches <ul style="list-style-type: none"> • Plastic-bodied • Metal-bodied • IP 65 	96
 SR Rope Pull safety switches <ul style="list-style-type: none"> • EMERGENCY STOP function according to EN 60947-5-5 • Quick rope connection clamp • Contacts: 2NC+2NO (standard) • Visual rope tension and EMERGENCY OFF function • Rope tension monitoring • IP 67 	102

Safety switches

Model	Page
 SRK Rope Pull safety switches <ul style="list-style-type: none"> • Insulation encapsulated • Two-sided spanning (max 2 x 75 mm) • IP 65 	104
 SIZ Corovor belt monitoring switch <ul style="list-style-type: none"> • Misalignment detection • IP 65 	107
 SNA Emergency-stop button <ul style="list-style-type: none"> • Tamper-proof • According to EN 418 • Installation diameter 22.5 mm • IP 65 	108
 SCR Safety relay <ul style="list-style-type: none"> • Control category 3 and 4 according to EN 954-1 • With extended output functions • Up to 4 switching paths 	112
See sensor section	Electronic safety modules 202

Appendix

	Page
<input type="checkbox"/> Rope Pull switch <ul style="list-style-type: none"> • accessories 	106

Plastic-bodied compact limit switches

Combi C2

For confined spaces
With two mounting options
Protection class IP 30
Hinged snap lid



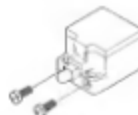
- Compact switches for safety or control applications
- 3 different contact configurations available as slow-action and snap-action
- All normally-closed contacts are positive break \ominus
- Two channel safety control possible
- Galvanically isolated terminals, type Zb
- Approvals UL, CSA, BG (pending)
- Rectangular cable entries (8.5 x 3.5 mm) for 4 x 1-mm² flexible lead
- 4 screw-type connections (M3,5) with self-lifting clamps
- PBT enclosure, glass-fibre reinforced, self-extinguishing UL 94-V0
- Lid, PC UL 94-V0
- 2 mm contact opening of slow-action system according to EN 81-1 for lift applications



Mounting



a) 2 holes for M4 screws



b) 2 captive M3 nuts for end mounting (depending on type)

Contact configuration

Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	changeover	1NC/1NO	U1Z	250 V	10 A
Snap-action	changeover	1NC/1NO	SU1Z	250 V	10 A
Slow-action	normally-closed	2NC	A2Z	250 V	10 A
Snap-action	normally-closed	2NC	SA2Z	250 V	10 A
Slow-action	normally-open	2NO	E2	250 V	10 A
Snap-action	normally-open	2NO	SE2	250 V	10 A

CE



Designation

Part number

Switching diagram

⊕ positive break according to IEC 947-5-1 Chap. 3

Za: changeover contact is not galvanically isolated

Zb: changeover contact is galvanically isolated

slow-action contact/snap-action contact

Gasket inside (in)/outside (o)

Contact travel mm
Tol. ± 0.25 mm

Actuating force N
Tol. $\pm 10\%$

Switch angle degree
Tol. $\pm 3.5^\circ$

Actuating torque Nm
Tol. $\pm 10\%$

In Out

Voltage max

Continuous current max

Making current, acc. to IEC 947-5-1 AC ISDC 13

Switching frequency max

Mech. operational life – number of switching cycles max

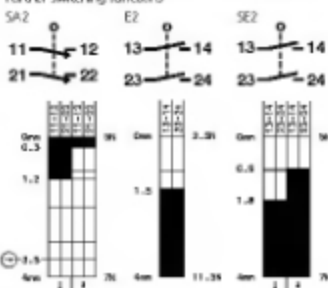
Ambient temperature min./max

Approvals

Weight

Delivery ex-stocked to order

Further switching functions

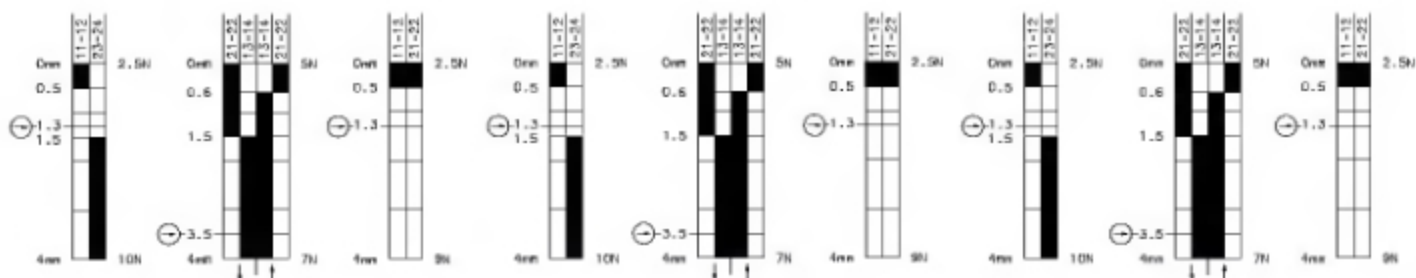


Dimensions

All dimensions in mm

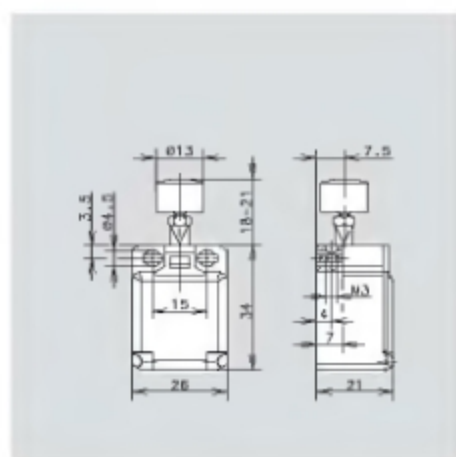
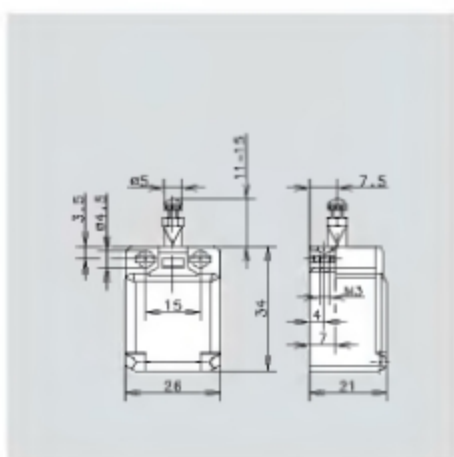
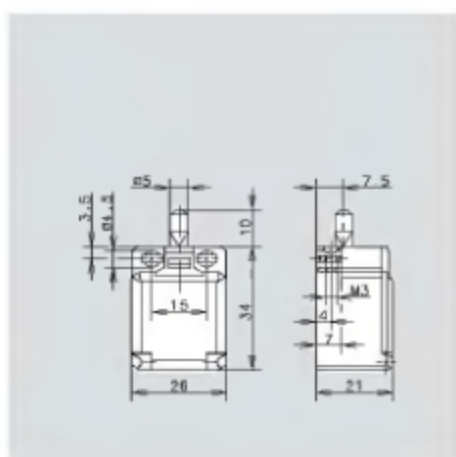


C2-U1Z	C2-SU1Z	C2-A2Z	C2-U1Z St	C2-SU1Z St	C2-A2Z St	C2-U1Z K	C2-SU1Z K	C2-A2Z K
600.8101.001	600.8351.002	600.8801.003	600.8104.025	600.8354.026	600.8804.027	600.8107.019	600.8357.020	600.8807.021
\oplus Zb	\oplus Zb	\oplus Zb	\oplus Zb	\oplus Zb	\oplus Zb	\oplus Zb	\oplus Zb	\oplus Zb
\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -
+ / -	+ / -	+ / -	+ / -	+ / -	+ / -	+ / -	+ / -	+ / -



250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A
\bullet	\bullet	\bullet	\bullet	\bullet	\bullet	\bullet	\bullet	\bullet
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
3×10^6	3×10^6	3×10^6	3×10^6	3×10^6	3×10^6	3×10^6	3×10^6	3×10^6
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.02 kg	0.02 kg	0.02 kg	0.02 kg	0.02 kg	0.02 kg	0.02 kg	0.02 kg	0.02 kg
\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -	\bullet / -

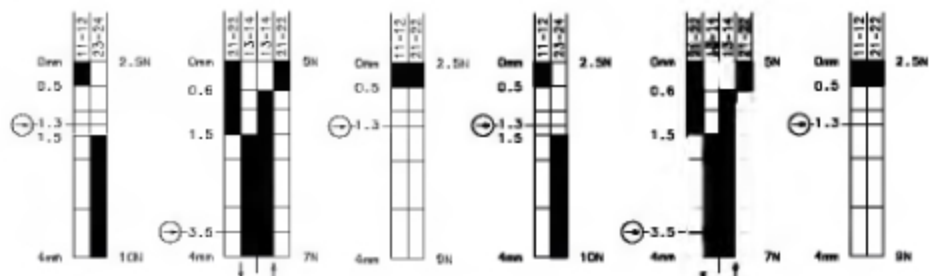




Designation
Switch part number
Actuator part number
 Switching diagram
 ⊕ positive break according to IEC 947-5-1 Chap. 3
 Za: changeover contact is not galvanically isolated
 Zb: changeover contact is galvanically isolated
 Slow-action contact/snap-action contact
 Gasket inside (w)/outside (w)

C2-U1Z R	C2-SU1Z R	C2-AZZ R	C2-U1Z o M + H	C2-SU1Z o M + H	C2-AZZ o M + H
600.8116.013	600.8366.014	600.8816.015	600.8101.007 391.0190.259	600.8351.008 391.0190.259	600.8801.009 391.0190.259
⊕ Zb	⊕ Zb	⊕ Zb	Zb	Zb	Zb
•/-	-•	•/-	•/-	-•	•/-
-/+	-/+	-/+	-/+	-/+	-/+

Contact travel mm
 Tol. ± 0.25 mm
 Actuating force N
 Tol. ± 10%
 Switch angle degree
 Tol. ± 3.5°
 On Off

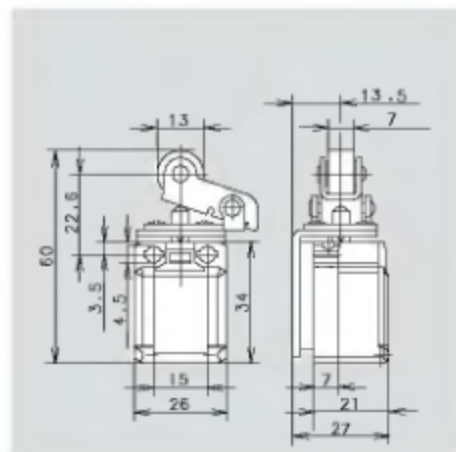
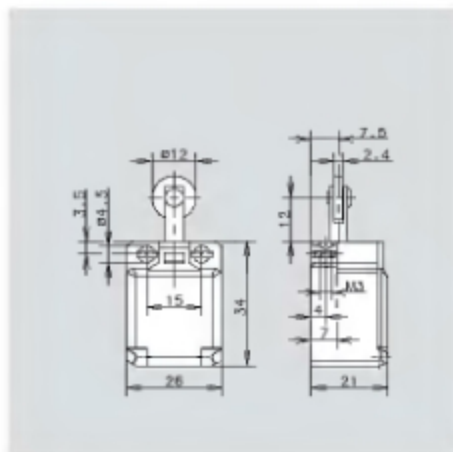
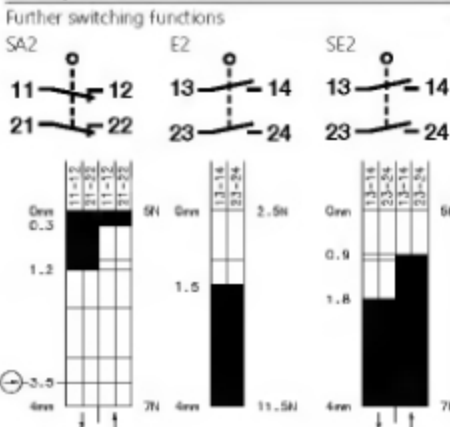


Voltage max.
 Continuous current max.
 Making current, acc. to IEC 947-5-1 AC 15/DC 13
 Switching frequency max.
 Mech. operational life – number of switching cycles
 Ambient temperature min./max.

250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
10 A	10 A	10 A	10 A	10 A	10 A
•	•	•	•	•	•
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals
 Weight
 Delivery: ex-stock/built to order

UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.02 kg	0.02 kg	0.02 kg	0.03 kg	0.03 kg	0.03 kg
•/-	•/-	•/-	•/-	•/-	•/-



Dimensions
 All dimensions in mm

Plastic-bodied compact limit switches

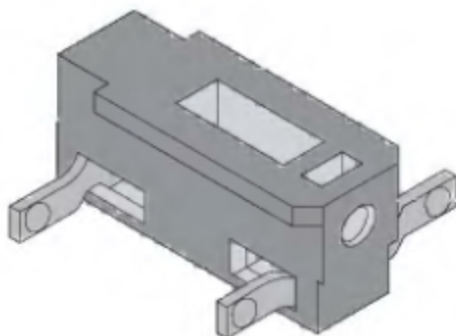
Tiny Ti2

Compact design
Protection class IP 65
Mounting measurements according to DIN EN 50047
Hinged snap lid

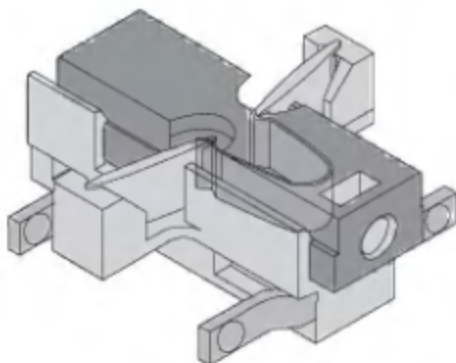


The switching system for C2 and Ti2

- Small hysteresis on the snap-action system
- Large variety of contact functions
- Optimized size utilising proven terminal technology
- Snap-action type prevents undefined status even with very slow actuation



Slow-action device



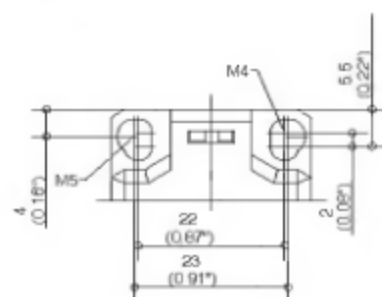
Snap-action device

- Compact switches for safety or control applications in protection class IP 65
- 3 different contact configurations available as slow-action or snap-action devices
- Positive break \ominus
- Two channel safety monitoring possible
- Galvanically isolated terminals, type Zb
- Approvals UL, CSA, BG
- Cable entries M 16 x 1.5
- 4 screw terminals M3.5 with self-lifting clamps
- PBT enclosure, fiberglass reinforced, self-extinguishing UL 94-V0
- Lid, PA 6.6 UL 94-V0
- 2 mm contact opening of slow-action system according to EN 81-1 for lift construction
- Actuator mounting in 4 x 90°



Mounting

- adjustable mounting with two M4 screws (22 mm centres)
- fixed positioning with two M5 screws (23 mm centres) for safety applications



Contact configuration

Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	changeover	1NC/1NO	U1Z	250 V	10 A
Snap-action	changeover	1NC/1NO	SU1Z	250 V	10 A
Slow-action	normally-closed	2NC	A2Z	250 V	10 A
Snap-action	normally-closed	2NC	SA2Z	250 V	10 A
Slow-action	normally-open	2NO	E2	250 V	10 A
Snap-action	normally-open	2NO	SE2	250 V	10 A

Plastic-bodied compact limit switches

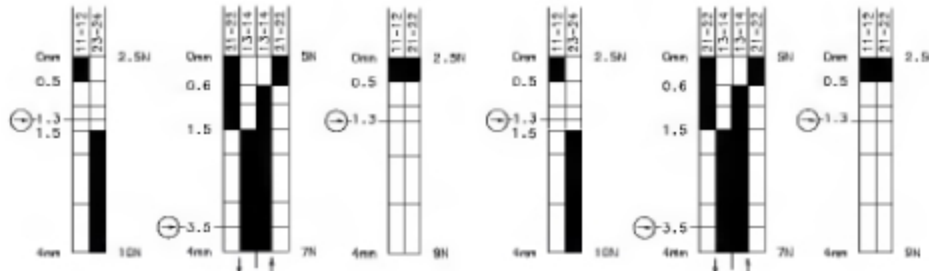
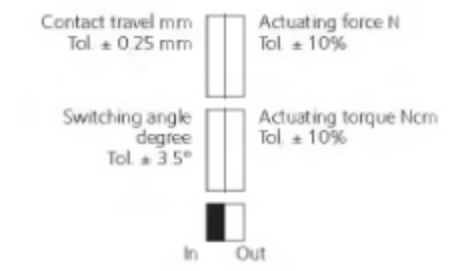
Tiny Ti2

Compact design
Protection class IP 65
Mounting measurements according to DIN EN 50047
Hinged snap lid



Designation
Part number
Switching diagram
⊕ positive break according to IEC 947-5-1 Chap. 3
Za: changeover contact is not galvanically isolated
Zb: changeover contact is galvanically isolated
Slow-action contact/snap-action contact
Gasket inside (iw)/outside (w)

Ti2-U1Z w	Ti2-SU1Z w	Ti2-AZZ w	Ti2-U1Z iw	Ti2-SU1Z iw	Ti2-AZZ iw
608.8103.001	608.8153.002	608.8803.003	608.8117.007	608.8167.008	608.8817.009
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb
●/-	-●	●/-	●/-	-●	●/-
w	w	w	iw	iw	iw

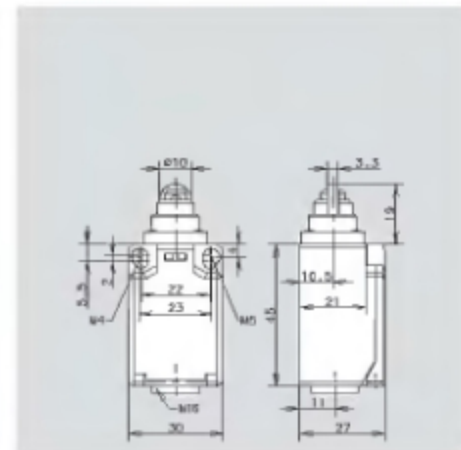
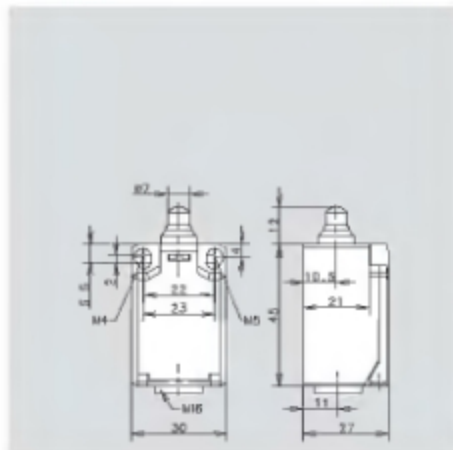
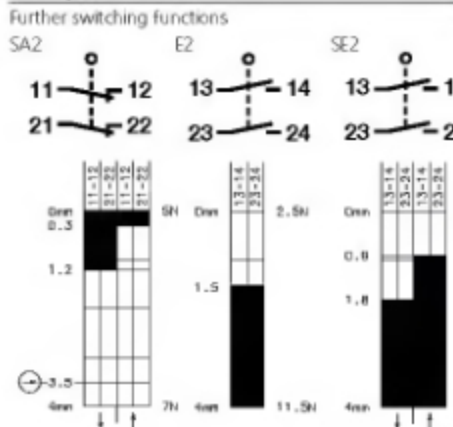


Voltage	max.
Continuous current	max.
Making current, acc. to IEC 947-5-1 AC 15/DC 13	
Switching frequency	max.
Med. operational life – number of switching cycles	
Ambient temperature	min./max.

250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
10 A	10 A	10 A	10 A	10 A	10 A
●	●	●	●	●	●
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals
Weight
Delivery: ex-stock/built to order

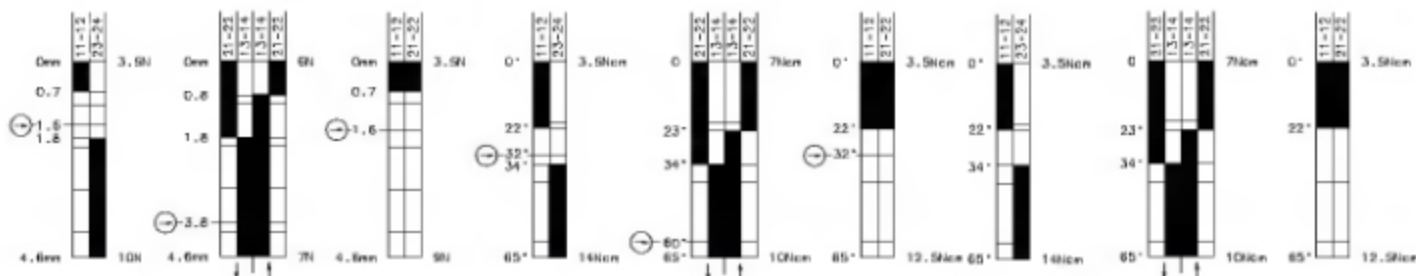
BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
0.04 kg	0.04 kg	0.04 kg	0.05 kg	0.05 kg	0.05 kg
●/-	●/-	●/-	●/-	●/-	●/-



Dimensions
All dimensions in mm

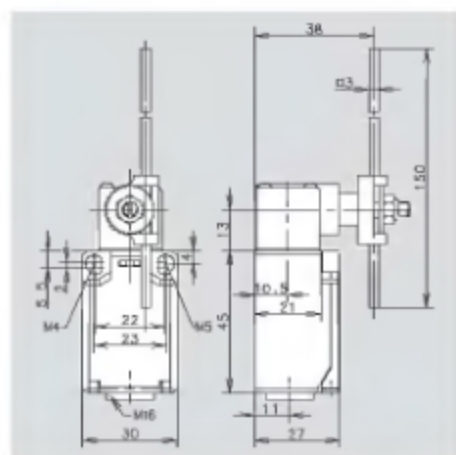
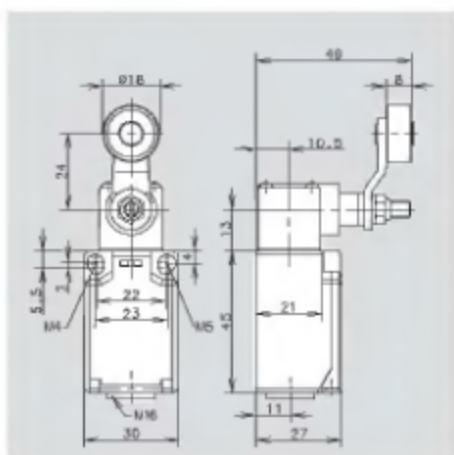
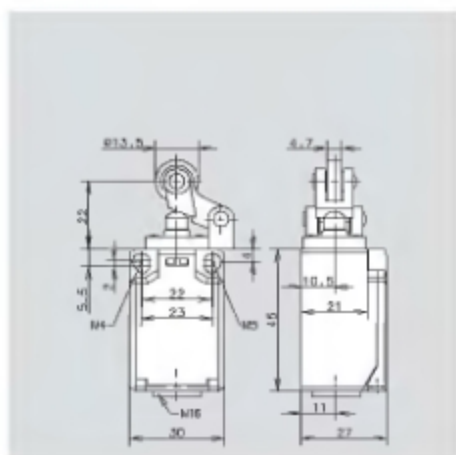


Ti2-U1Z Hw	Ti2-SU1Z Hw	Ti2-A2Z Hw	Ti2-U1Z AH	Ti2-SU1Z AH	Ti2-A2Z AH	Ti2-U1 AD	Ti2-SU1 AD	Ti2-A2 AD
608.8121.015	608.8171.016	608.8821.017	608.8135.021	608.8185.022	608.8835.023	608.8137.027	608.8187.028	608.8837.029
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	Zb	Zb	Zb
●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-
W	W	W	W	W	W	W	W	W



250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A
●	●	●	●	●	●	●	●	●
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶	3 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
0.05 kg	0.05 kg	0.05 kg	0.07 kg	0.07 kg	0.07 kg	0.07 kg	0.07 kg	0.07 kg
●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-	●/-



Plastic-bodied limit switches

188

Euronorm standard switch to
DIN EN 50047
Protection class IP 65
Hinged snap lid



- Standard actuators to DIN EN 50047 type A, B, C, E
- Large range of actuators
- Snap action or slow make & break contacts
- Galvanically separated contacts
- Forced disconnection of NC contacts
- Protection class IP 65
- Body and lid PA 6 which is self extinguishing
- 4 x 90° actuator positions
- Cable entry M 20 x 1.5
- Terminals numbered in accordance with DIN EN 50013
- International approvals

Mounting

- Adjustable – Two slots for M 4 screws (22 mm centres)
- Fixed – Two holes for M 5 screws for safety applications without additional fixings (fig. 1)
- Additional positive location with guide discs (fig. 2)
- Front mounting (type dependant) (fig. 3)



Fig. 1



Fig. 2



Fig. 3



Benefits

- Hinged snap lid for quick and easy access (screwdriver release)
- Lid hinges open to 135° (can also be easily detached)
- Internal cover protects the contacts during mounting
- Screw terminals with self-lifting clamps for easy wiring
- Transparent cover for easy adjustment and inspection

Options

- Contact lock (safety pull button reset)
- Contact LED display (LED protected within terminal chamber)
- Cable entry M 16 x 1.5
- Additional lid security with fixing screw

Standard actuators DIN EN 50047



Type A



Type B



Type C



Type E

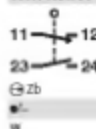
Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. Voltage	Max constant current
Slow make & break	Changeover	1NC/1NO	UM1Z	500 V	10 A
Slow make & break	Changeover	1NC/1NO	UM1Z	500 V	10 A
Slow make & break	Changeover	2NC/1NO	UM1SZ	400 V	6 A
Slow make & break	Changeover	1NC/2NO	UM1GZ	400 V	6 A
Slow make & break	NC	2NC	A2Z	400 V	6 A
Slow make & break	N/O	2NO	BZ	400 V	6 A
Snap action	Changeover	1NC/1NO	SU/VSU1Z	500 V	10 A

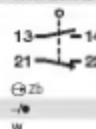


Designation
Part number
 Circuit diagram
 ⊖ Forced disconnect to IEC 947-5-1 chapter 3
 Za: not galvanically separated contacts
 Zb: galvanically separated contact
 Slow make & break snap-action
 Internal seal (w)/external seal (w)

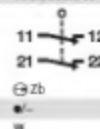
888-U1Z w
 608.6103.008



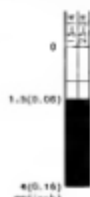
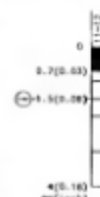
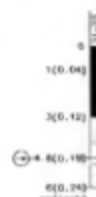
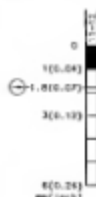
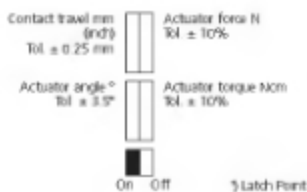
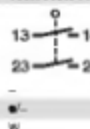
888-U1Z w
 608.6153.012



888-A2Z w
 608.6803.013



888-E2 w
 608.6803.014



Voltage max
 Permanent current max
 Inrush current complies with standards
 IEC 947-5-1 AC 15DC 13
 Switching frequency max
 Mechanical life – number of switching actions
 Operating temperature min./max

Standard actuator form
 Approvals
 Weight
 Delivery, ex-stock/built to order

500 V AC
 10 A

●
 ●
 ●
 ●

500 V AC
 10 A

●
 ●
 ●
 ●

400 V AC
 6 A

●
 ●
 ●
 ●

400 V AC
 6 A

●
 ●
 ●
 ●

B
 UL, CSA

0.06 kg/0.13 lb

B
 UL, CSA

0.06 kg/0.13 lb

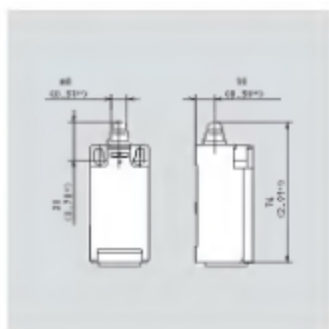
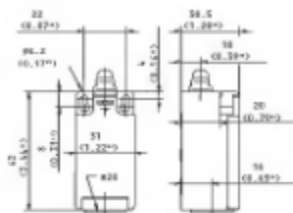
B
 UL, CSA

0.06 kg/0.13 lb

B
 UL, CSA

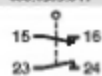
0.06 kg/0.13 lb

All dimensions in mm (inch)





88-UV12 w
608.6403.011



⊖ Zb
W

88-UV12 w
608.6403.046



⊖ Zb
W

88-UV12 w
608.6403.047

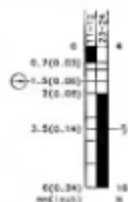
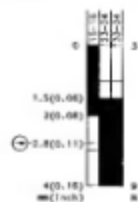
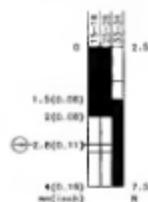
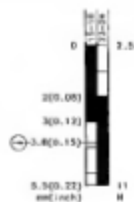


⊖ Zb
W

88-U12 w Fast
608.6403.005



⊖ Zb
W



500 V AC
10 A



400 V AC
6 A



400 V AC
6 A



500 V AC
10 A



100min

10 x 10°

-30 °C/+80 °C

-22 °F/+176 °F

100min

1 x 10°

-30 °C/+80 °C

-22 °F/+176 °F

100min

1 x 10°

-30 °C/+80 °C

-22 °F/+176 °F

60min

1 x 10°

-30 °C/+80 °C

-22 °F/+176 °F

B

UL, CSA

0.06 kg/0.13 lb



B

UL, CSA

0.06 kg/0.13 lb



B

UL, CSA

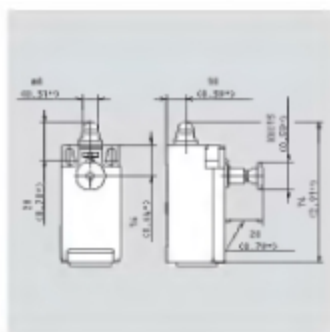
0.06 kg/0.13 lb



B

UL, CSA

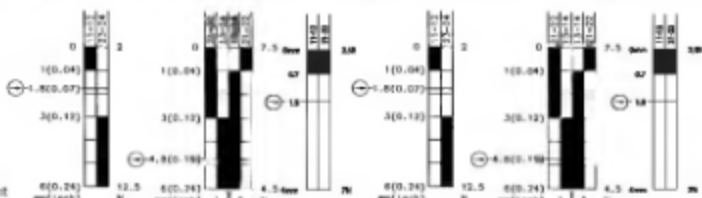
0.06 kg/0.13 lb





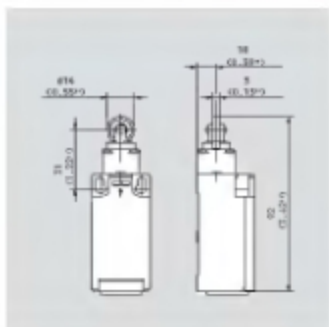
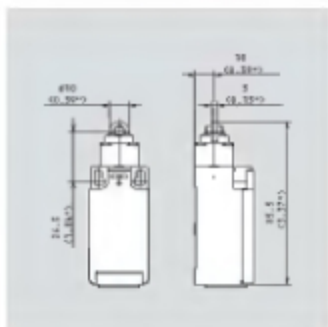
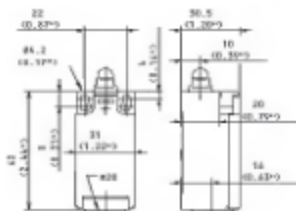
Designation	888-U1Z Faw K	888-SU1Z Faw K	888-A2Z Faw K	888-U1Z Faw L	888-SU1Z Faw L	888-A2Z Faw L
Part number	608.6117.017	608.6167.016	608.6017.007	608.6117.050	608.6167.051	608.6017.072
Circuit diagram						
⊖ Forced disconnect to IEC 947-5-1 chapter 3	Za: not galvanically separated contacts					
Zb: galvanically separated contact	⊖ Zb					
Slow make & break snap-action	⊖ Zb					
Internal seal (w)/external seal (x)	⊖ Zb					

Contact travel mm (ind)	Actuator force N
Tol ± 0.25 mm	± 10%
Actuator angle °	Actuator torque Nm
Tol ± 3.5°	± 10%
On	Off
Latch Point	



Voltage	max	500 V AC	500 V AC	400 V AC	500 V AC	500 V AC	400 V AC
Permanent current	max	10 A	10 A	5 A	10 A	10 A	5 A
Inrush current complies with standards		●	●	●	●	●	●
IEC 947-5-1 AC 15DC 13							
Switching frequency	max	100/min	100/min	100/min	100/min	100/min	100/min
Mechanical life – number of switching actions		10 x 10 ⁶	10 x 10 ⁶	1 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	1 x 10 ⁶
Operating temperature	min/Amx	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
Standard actuator	form	C	C	C	-	-	-
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb
Delivery: ex-stock/built to order		⊖/⊖	⊖/⊖	⊖/⊖	⊖/⊖	⊖/⊖	⊖/⊖

All dimensions in mm (ind)





88-U1Z HW
608.6121.021

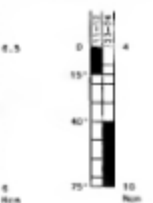
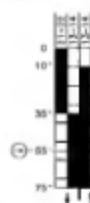
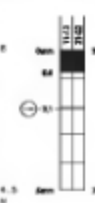
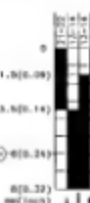
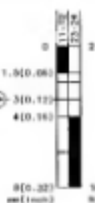
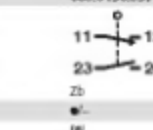
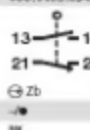
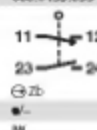
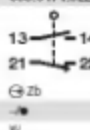
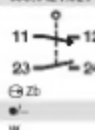
88-SU1Z HW
608.6171.022

88-A2Z HW
608.6R21.099

88-U1Z AH
608.6135.033

88-SU1Z AH
608.6185.034

88-U1 AV
608.6136.037



500 V AC
10 A

500 V AC
10 A

400 V AC
5 A

500 V AC
10 A

500 V AC
10 A

500 V AC
10 A

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100min
1 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

E
UL, CSA

E
UL, CSA

E
UL, CSA

A
UL, CSA

A
UL, CSA

-
UL, CSA

0.07 kg/0.15 lb

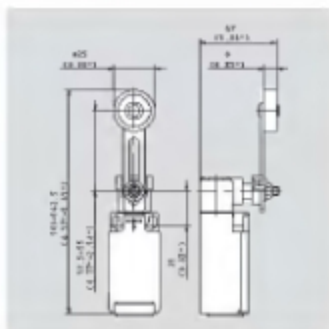
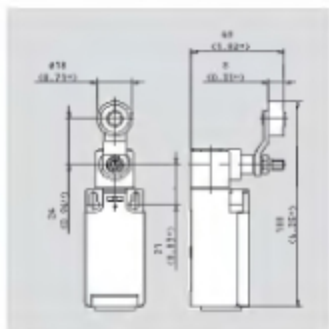
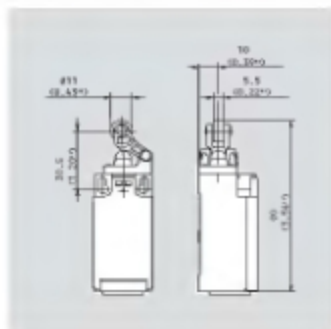
0.07 kg/0.15 lb

0.07 kg/0.15 lb

0.30 kg/0.22 lb

0.10 kg/0.22 lb

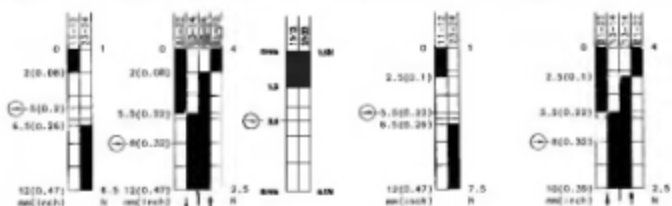
0.11 kg/0.24 lb





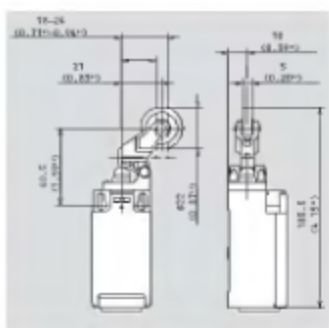
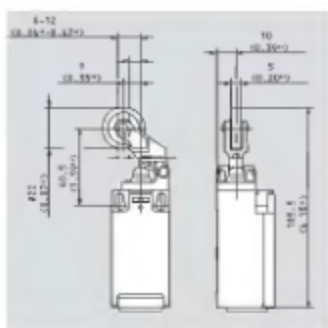
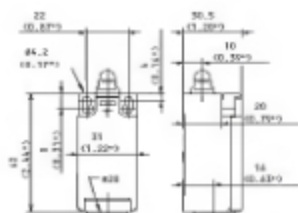
Designation	188-U1Z DGH w	188-SU1Z DGH w	888-A2Z DGH w	888-U1Z DGK w	888-SU1Z DGK w
Part number	608.6121.029	608.6171.030	608.6821.120	608.6127.025	608.6177.026
Circuit diagram					
⊖ Forced disconnect to IEC 947-5-1 chapter 3					
Za: not galvanically separated contacts					
Zb: galvanically separated contact					
Slow make & break/ snap-action					
Internal seal (w)/external seal (w)	w	w	w	w	w

Contact travel mm (ind)	Actuator force N
Tol ± 0.25 mm	±10%
Actuator angle °	Actuator torque Nm
Tol ± 3.5°	±10%
On	Off



Voltage	max	500 V AC	500 V AC	400 V AC	500 V AC	500 V AC
Permanent current	max	10 A	10 A	5 A	10 A	10 A
In-rush current complies with standards		●	●	●	●	●
IEC 947-5-1 AC 15DC 13						
Switching frequency	max	100/min	100/min	100/min	100/min	100/min
Mechanical life – number of switching actions		10 x 10 ⁶	10 x 10 ⁶	1 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
Operating temperature	min/ max	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
Standard actuator	form	-	-	-	-	-
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb	0.07 kg/0.15 lb
Delivery: in-stock/built to order		●/–	●/–	●/–	●/–	●/–

All dimensions in mm (ind)



Plastic-bodied limit switches

Biggy

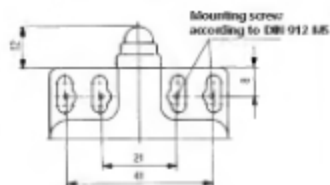
With four different mounting holes,
Protection class IP 65
Hinged snap lid
Two cable entries M 16 x 1.5



- Wide selection of actuators
- Snap action or slow make & break
- Galvanically separated contacts
- Forced disconnection of NC contacts (type dependant)
- Protection class IP 65
- Body and lid PA 6 which is self extinguishing (UL-94 V0) cover PC (UL-94 V0)
- 4 x 90° actuator positions
- Adjustment of the AH lever arm position in 90° increments
- Two cables entries M 16 x 1.5
- Terminals numbered in accordance with DIN EN 50013
- International approvals

Mounting

- Adjustable – two slots for M 4 screws (22 mm centres)
- Adjustable – two slots for M 4 screws (42 mm centres)
- Fixed – two holes for M 5 screws for safety applications (21 mm centres)



- Fixed - two holes for M 5 screws for safety applications (41 mm centres)

Benefits

- Two cable entries allow "through wiring"
- Hinged snap lid for quick and easy access (screwdriver release)
- Lid hinges open to 135° (can also be simply detached)
- Internal cover protects the contacts during mounting
- Screw terminals with self lifting clamps for easy wiring
- Transparent cover for easy adjustment and inspection



Options

- Contact lock (safety pull button reset)
- Contact LED display (LED protected within terminal chamber)
- Additional lid security with fixing screw

Contact configuration

Contact type	Switch function	Switch contacts	Reference	Nom. Voltage	Nom. constant current
Slow make & break	Changeover	1NF/1NO	USA1Z	500 V	10 A
Snap action	Changeover	1NF/1NO	SU1Z	500 V	10 A

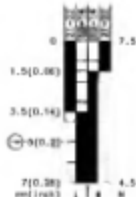
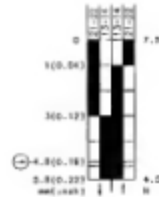
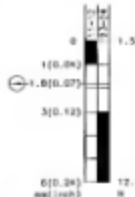
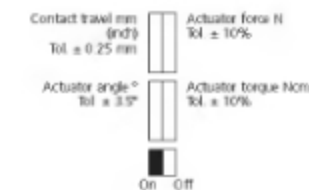
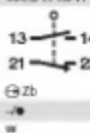
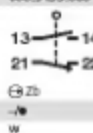
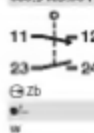


Designation
Part number
 Circuit diagram
 ⊕ Forced disconnect to
 IEC 947-5-1 chapter 3
 Za: not galvanically separated contacts
 Zb: galvanically separated contact
 Slow make & break snap-action
 Internal seal (w)/external seal (H)

B-U12 w
 608.5163.001

B-U12 w
 608.5153.006

B-U12 Hw
 608.5171.017



Voltage max
 Permanent current max
 In-rush current complies with standards
 IEC 947-5-1 AC 15DC 13
 Switching frequency max
 Mechanical life – number of switching actions
 Operating temperature min./max

500 V AC
 10 A

500 V AC
 10 A

500 V AC
 10 A

100/min
 10 x 10⁶
 -30 °C/+80 °C
 -22 °F/+176 °F

100/min
 10 x 10⁶
 -30 °C/+80 °C
 -22 °F/+176 °F

100/min
 10 x 10⁶
 -30 °C/+80 °C
 -22 °F/+176 °F

100/min
 10 x 10⁶
 -30 °C/+80 °C
 -22 °F/+176 °F

Approvals
 Weight
 Delivery, ex-stock/built to order

UL, CSA

UL, CSA

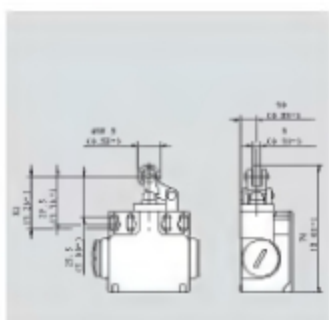
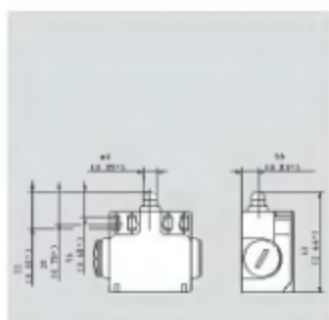
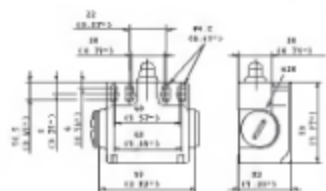
UL, CSA

0.08 kg/0.18 lb

0.08 kg/0.18 lb

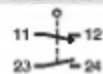
0.09 kg/0.20 lb

All dimensions in mm (ndf)





B-U1Z Fw
608.5117.002

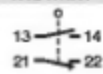


Zb

W



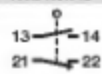
B-SU1Z Fw
608.5167.009



Zb

W

B-SU1Z AH
608.5185.012

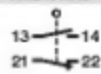


Zb

W

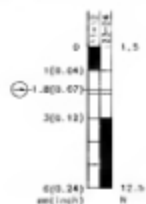


B-SU1 AV
608.5186.013



Zb

W



500 V AC
10 A

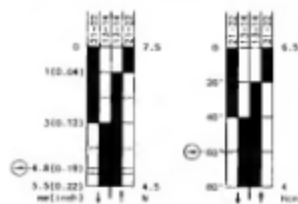
●

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.08 kg/0.18 lb

W



500 V AC
10 A

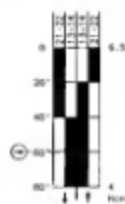
●

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.08 kg/0.18 lb

W



500 V AC
10 A

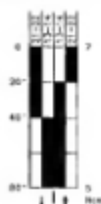
●

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.12 kg/0.26 lb

W



500 V AC
10 A

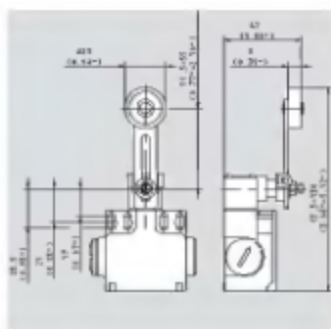
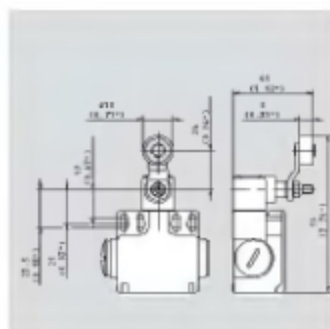
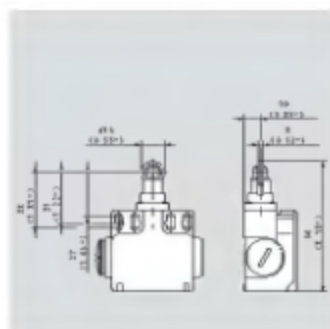
●

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.13 kg/0.29 lb

W



Plastic-bodied limit switches

ENK

Euronorm standard switch according to
DIN EN 50041
Protection class IP 65
Hinged snap lid



- Standard actuators to DIN EN 50041 form A, B, C, D, F, G
- Large range of actuators
- 4 x 90° actuator positions
- Snap action or slow make & break contacts
- Galvanically separated contacts
- Forced disconnection of NC contacts
- Metal actuators for heavy duty applications
- Cable entry M 20 x 1.5
- Protection class IP 65
- Body and lid IFA 6 which is self extinguishing (UL-94-V0)

Mounting

- Adjustable – two slots for M 5 screws
- Fixed – two holes for M 5 screws for safety applications

Benefits

- Hinged snap lid for quick and easy access (screwdriver release)
- Lid hinges open to 150° (can also be simply detached)
- Internal cover protects the contacts during mounting
- Screw terminals with self lifting clamps for easy wiring
- Transparent cover for easy adjustment and inspection



Options

- Contact lock (safety pull button reset)
- Contact LED display (LED protected within terminal chamber)
- WK actuator (form F) can be supplied to order
- WR actuator (form G) can be supplied to order
- EEx certified versions available acc. ATEX 100 a

Standard actuators DIN EN 50041



Type A



Type B



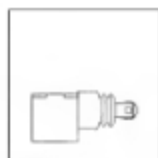
Type C



Type D



Type F
(built to order)



Type G
(built to order)

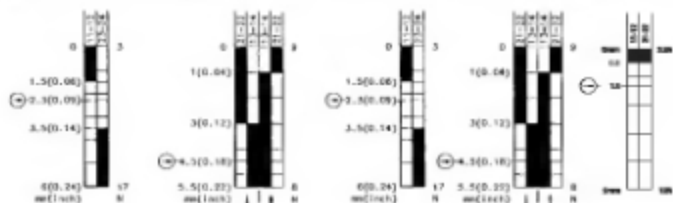
Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. Voltage	Max. constant current
Slow make & break	Changeover	1NC/1NO	U1/U1Z	500 V	10 A
Slow make & break	Changeover overlapping	1NC/1NO	UV1Z	500 V	10 A
Slow make & break	NC	2NC	A2Z	400 V	6 A
Slow make & break	NC	3NC	A3Z	400 V	6 A
Snap action	Changeover	1NC/1NO	SU1/SU1Z	500 V	10 A



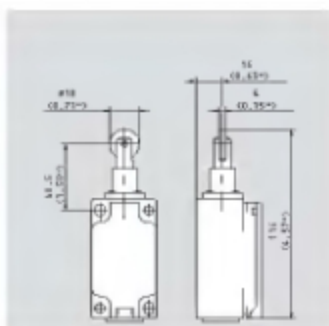
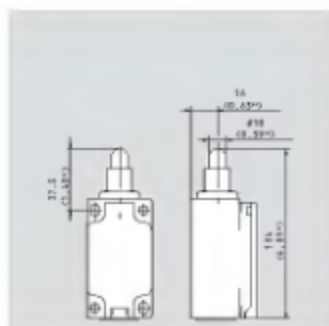
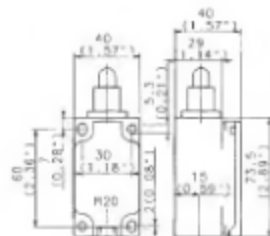
Designation	ENK-U12 rw	ENK-SU12 rw	ENK-U12 Fw	ENK-SU12 Fw	ENK-A22 Fw
Part number	608.1102.001	608.1152.007	608.1117.002	608.1167.008	608.1817.281
Circuit diagram					
⊖ Forced disconnect to IEC 947-5-1 chapter 3					
Za not galvanically separated contacts					
Zb galvanically separated contacts					
Slow make & break/stop-action					
Internal seal (w)/external seal (e)	w	w	w	w	w

Contact travel mm (ind) Tol. ± 0.25 mm	Actuator force N Tol. ± 10%
Actuator angle ° Tol. ± 35°	Actuator torque Nm Tol. ± 10%
On	Off



Voltage	mk	500 V AC	500 V AC	500 V AC	500 V AC	400 V AC
Permanent current	mk	10 A	10 A	10 A	10 A	5 A
In-rush current complies with standards		●	●	●	●	●
IEC 947-5-1 AC 15/DC 13						
Switching frequency	mk	100/min	100/min	100/min	100/min	100/min
Mechanical life – number of switching actions		10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	1 x 10 ⁶
Operating temperature	min/max	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
Standard actuator	form	B	B	C	C	C
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.15 kg/0.33 lb	0.15 kg/0.33 lb	0.16 kg/0.33 lb	0.16 kg/0.33 lb	0.16 kg/0.33 lb
Delivery: ex-stock/built to order		●	●	●	●	●

All dimensions in mm (ind°)

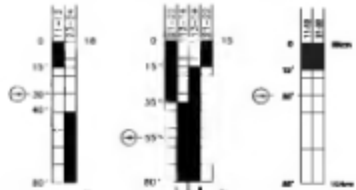




Designation
Part number
 Circuit diagram
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3
 Za: not galvanically separated contacts
 Zb: galvanically separated contact
 Slow make & break snap-action
 Internal seal (w)/external seal (w)

ENK-SU1 FF	ENK-UTZ AP5-V	ENK-SU1Z AP5-V	ENK-A22 AP5-V
608.1190.045	608.1135.003	608.1195.009	608.1635.323
Zb	Zb	Zb	Zb
w	w	w	w

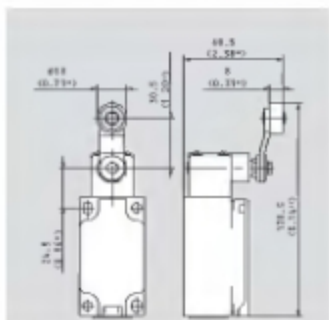
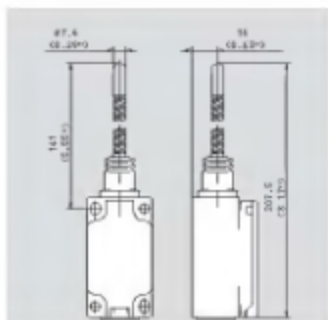
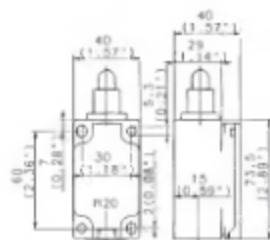
Contact travel mm (incl. Tol. ± 0.25 mm)	Actuator force N Tol. ± 10%
Actuator angle ° Tol. ± 3.5°	Actuator torque Nm Tol. ± 10%
On	Off



Voltage	max
Permanent current	max
Inrush current complies with standards IEC 947-5-1 AC 15DC 13	
Switching frequency	max
Mechanical life – number of switching actions	
Operating temperature	min./max
Standard actuator	form
Approvals	
Weight	
Delivery: ex-stock/built to order	

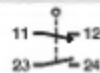
500 V AC	500 V AC	400 V AC
10 A	10 A	5 A
●	●	●
100/min	100/min	100/min
10 x 10 ⁶	10 x 10 ⁶	1 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
-	A	A
UL, CSA	UL, CSA	UL, CSA
0.15 kg/0.35 lb	0.23 kg/0.51 lb	0.23 kg/0.51 lb
●	●	●

All dimensions in mm (incl.)





ENK-UT AV
608.1136.012



Zb
W



ENK-U1Z AD
608.1137.011



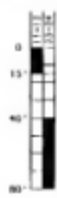
Zb
W



ENK-U1Z Hw
608.1121.095



Zb
W



500 V AC
10 A

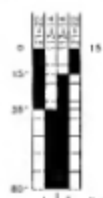
●

100min
10 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.24 kg/0.53 lb

W



500 V AC
10 A

●

100min
10 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.24 kg/0.53 lb

W



500 V AC
10 A

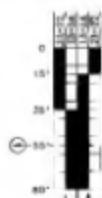
●

100min
10 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.23 kg/0.51 lb

W



500 V AC
10 A

●

100min
10 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.23 kg/0.51 lb

W



500 V AC
10 A

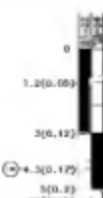
●

100min
10 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.16 kg/0.35 lb

W



500 V AC
10 A

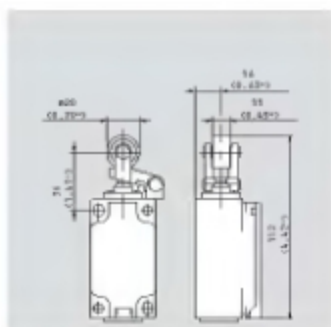
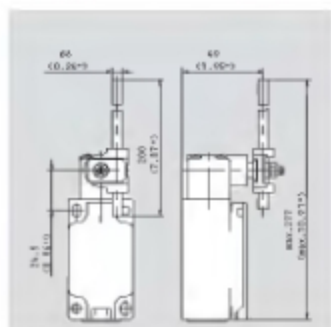
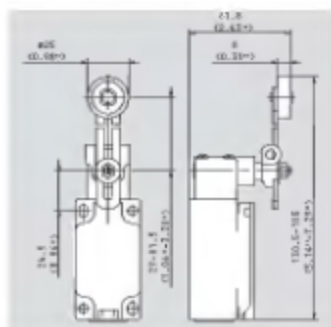
●

100min
10 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.16 kg/0.35 lb

W



Metal-bodied limit switches

GC I

Slim design
Protection class IP 65
Very large range of actuators
Multiple pole contacts



CE



- Snap action or slow make & break contacts
- Galvanically separated contacts (type dependant)
- Forced disconnection of NC contacts
- Protection class IP 65
- Aluminum body and lid
- 4 x 90° actuator positions
- Adjustment of the AH lever arm position in 90° increments
- Single direction operation of contacts with AH actuator (user selectable)
- Cable entry M 20 x 1.5
- Terminals numbered in accordance with DIN EN 50013
- International approvals
- Model range GC II for additional switch functions (on request)

Mounting

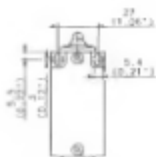
- Adjustable – two slots for M 4 screws

Benefits

- Screw terminals with self-lifting clamps for easy wiring
- Easily exchanged contact block with latch holding device
- Contact switch point adjustable with adjusting screw

Options

- Contact lock (button reset)
- Housing size I
Slots for M 5 fixing screws (27 mm pitch)
- EEx certified versions available acc. ATEX 100 a



(For safety applications use 4 mm \varnothing dowel in pre-formed blind hole on underside of switch body or select body with M 5 round holes)

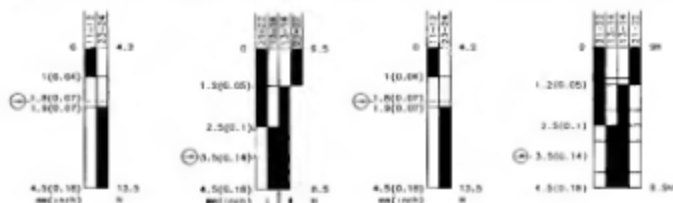
Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. voltage	Max. constant current
Slow make & break.	Changeover	1NG/1NO	U1U1Z	500 V	10 A
Slow make & break.	Changeover	2NG/2NO	U2Z	400 V	6 A
Slow make & break.	Changeover overlapping	1NG/1NO	UV1Z	500 V	10 A
Slow make & break.	Changeover	2NG/1NO	U15Z	400 V	6 A
Slow make & break.	Changeover	1NG/2NO	U16Z	400 V	6 A
Slow make & break.	Changeover overlapping	2NG/1NO	UV15Z	400 V	6 A
Slow make & break.	Changeover overlapping	1NG/2NO	UV16Z	400 V	6 A
Slow make & break.	NC	2NC	A2Z	400 V	6 A
Slow make & break.	NO	2NO	E2	400 V	6 A
Snap action	Changeover	2NG/2NO	SKZ	250 V	6 A
Snap action	Changeover	1NG/1NO	SU15U1Z	500 V	10 A



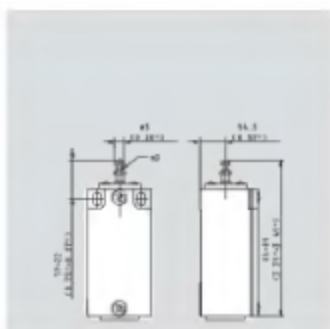
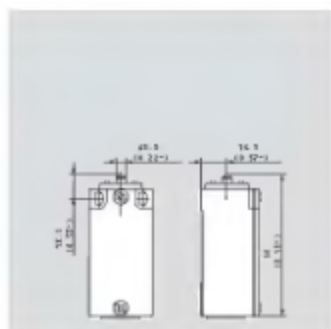
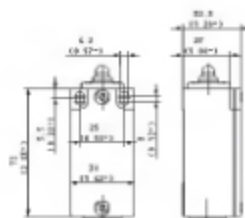
Designation	GC-U1Z IW	GC-U1Z SW	GC-U1Z SW	GC-U1Z SW
Part number	602.1102.001	602.1152.620	602.1105.015	602.1155.017
Circuit diagram				
⊖ Forced disconnect to IEC 947-5-1 chapter 3				
Za not galvanically separated contacts				
Zb galvanically separated contacts				
Slow make & break/stop-action				
Internal seal (sw)/external seal (w)				

Contact travel mm (incl)	Actuator force N
Tol. ± 0.25 mm	Tol. ± 10%
Actuator angle °	Actuator torque Nm
Tol. ± 3°	Tol. ± 10%
On	Off



Voltage	max	500 V AC	500 V AC	500 V AC	500 V AC
Permanent current	max	10 A	10 A	10 A	10 A
In-rush current complies with standards		●	●	●	●
IEC 947-5-1 AC 15/DC 13					
Switching frequency	max	100/min	100/min	100/min	100/min
Mechanical life – number of switching actions		10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
Operating temperature	min/max	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.14 kg/0.31 lb	0.14 kg/0.31 lb	0.14 kg/0.31 lb	0.14 kg/0.31 lb
Delivery: ex-stock/built to order		●	●	●	●

All dimensions in mm (incl)

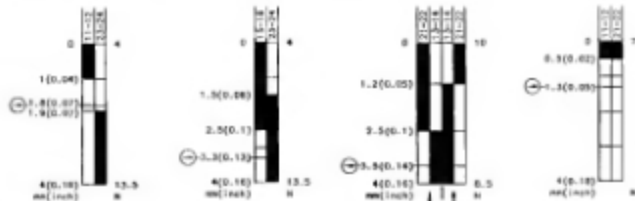




Designation
Part number
Circuit diagram
⊖ Forced disconnect to IEC 947-5-1 chapter 3
Za: not galvanically separated contacts
Zb: galvanically separated contact
Slow make & break/action
Internal seal (w)/external seal (x)

GC-U1Z Fw	GC-U1/2 Fw	GC-SU1Z Fw	GC-A2Z Fw
602.1117.029	602.1317.030	602.1367.626	602.1617.172
⊖ Zb	⊖ Zb	⊖ Zb	⊖ Za
w	w	w	w

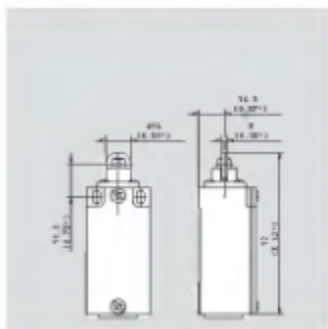
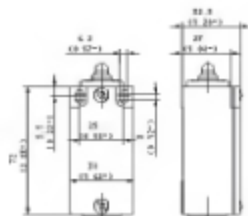
Contact travel mm (ind)	Actuator force N
Tol ± 0.25 mm	tol ± 10%
Actuator angle °	Actuator torque Nm
Tol ± 3.5°	tol ± 10%
On	Off



Voltage	max
Permanent current	max
Inrush current complies with standards	
IEC 947-5-1 AC 15DC 13	
Switching frequency	max
Mechanical life – number of switching actions	
Operating temperature	min/Amx
Approvals	
Weight	
Delivery: ex-stock/built to order	

500 V AC	500 V AC	500 V AC	400 V AC
10 A	10 A	10 A	6 A
●	●	●	●
100/min	100/min	100/min	100/min
30 x 10 ⁶	30 x 10 ⁶	30 x 10 ⁶	3 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
UL, CSA	UL, CSA	UL, CSA	-
0.15 kg/0.33 lb	0.15 kg/0.33 lb	0.15 kg/0.33 lb	0.15 kg/0.33 lb
⊖	⊖	⊖	⊖

All dimensions in mm (inch)





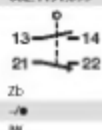
GC-U12 HW
602.1120.057



HW



GC-U12 DR
602.1191.099



DR

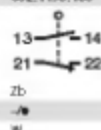


GC-U1 FF
602.1160.476

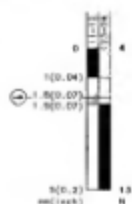


FF

GC-U1 FF
602.1190.100



FF



500 V AC
10 A

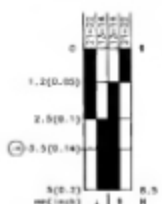
●

100/min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.16 kg/0.35 lb

●



500 V AC
10 A

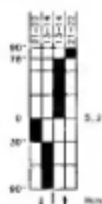
●

100/min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.16 kg/0.35 lb

●



500 V AC
10 A

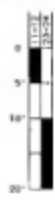
●

100/min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.18 kg/0.40 lb

●



500 V AC
10 A

●

100/min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.17 kg/0.37 lb

●



500 V AC
10 A

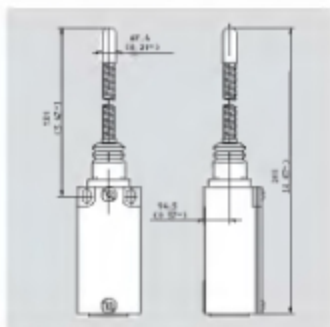
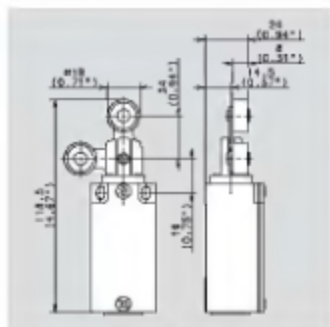
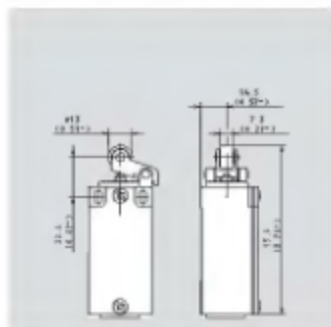
●

100/min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.17 kg/0.37 lb

●





Designation
Part number
 Circuit diagram
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3
 Za: not galvanically separated contacts
 Zb: galvanically separated contact
 Slow make & break snap-action
 Internal seal (w)/external seal (x)

GC-U1Z AH	GC-U1/2 AH	GC-SU1Z AH
602.1135.102	602.1335.133	602.1345.634
⊕ Zb	⊕ Zb	⊕ Zb
⊖	⊖	⊖
W	W	W

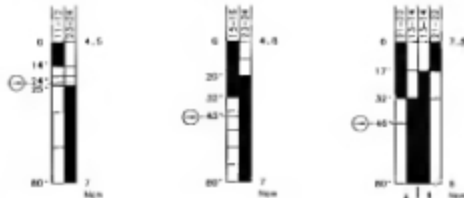
Contact travel mm
 Tol ± 0.25 mm

Actuator force N
 Tol ± 10%

Actuator angle °
 Tol ± 3.5°

Actuator torque Nm
 Tol ± 10%

On Off



Voltage max
 Permanent current max
 In-rush current complies with standards
 IEC 947-5-1 AC 150C 13
 Switching frequency max
 Mechanical life – number of switching actions
 Operating temperature min./max

500 V AC	500 V AC	500 V AC
10 A	10 A	10 A
●	●	●
100/min	100/min	100/min
10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

Approvals

UL, CSA

Weight
 Delivery: ex-stock/built to order

UL, CSA

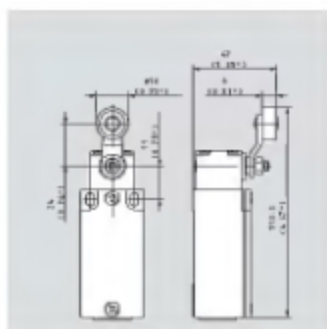
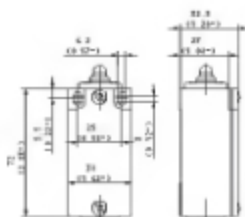
0.20 kg/0.44 lb

0.20 kg/0.44 lb

0.20 kg/0.44 lb

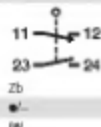
●

All dimensions in mm (inch)





GC-U1 AV
602.1136.104



500 V AC
10 A

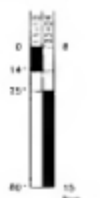
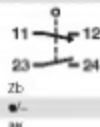
100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.23 kg/0.51 lb



GC-U1 AD
602.1137.303



500 V AC
10 A

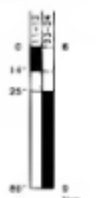
100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.22 kg/0.49 lb



GC-U1 AF
602.1139.106



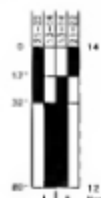
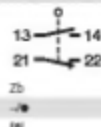
500 V AC
10 A

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.21 kg/0.46 lb

GC-SU1 AV
602.1186.118



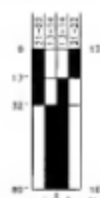
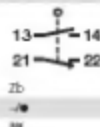
500 V AC
10 A

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.23 kg/0.51 lb

GC-SU1 AD
602.1187.125



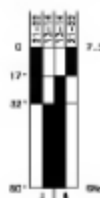
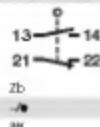
500 V AC
10 A

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.22 kg/0.49 lb

GC-SU1 AF
602.1189.128

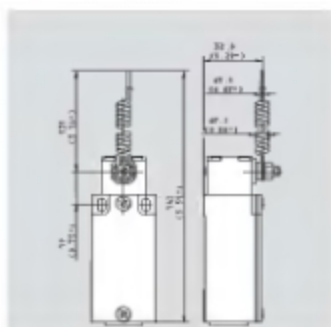
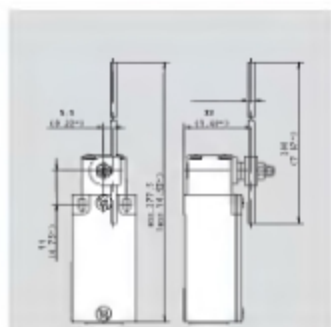
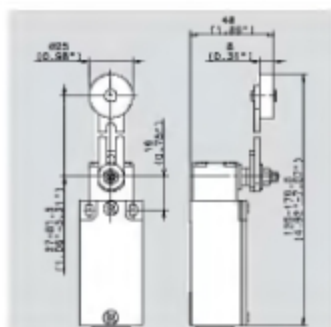


500 V AC
10 A

100min
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

0.21 kg/0.46 lb



Metal-bodied limit switches

SN 2

Versatile mounting options
Protection class IP 65



- Large range of actuators
- Snap action/slow make & break contacts
- Galvanically separated contacts
- Forced disconnection of NC contacts (type dependant)

- Protection class IP 65
- Aluminum body and lid

- 4 x 90° actuator positions
- Single direction operation of contacts with AH actuator (user selectable)
- Three cable entries M 20 x 1.5
- Adjustment of the AH lever arm position in 90° increments
- Terminals numbered in accordance with DIN EN 50013
- International approvals

CE



Mounting



Fig. 1

- a) Adjustable – two slots for M 4 screws
b) Fixed – two holes for M 5 screws for safety applications

Benefits

- Three cable entries allow "through wiring"

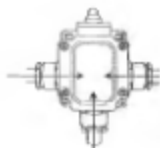


Fig. 2

- Two earth connection points



Fig. 3

- Spacious connection area
- Screw terminals with self lifting clamps for easy wiring
- Easily exchanged contact block with latch holding device
- Contact switch point finely adjustable with adjusting screw



Options

- Contact status display with LED (LED protected within terminal chamber)
- Three contact slow make & break 2NC/1NO, U15, 400 V, 6 A (fig. 4)
- Three contact slow make & break 1NC/2NO, U16, 400 V, 6 A (fig. 4)



Fig. 4

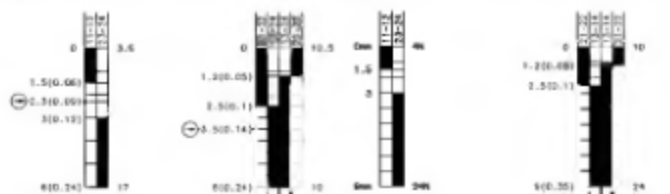
Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. voltage	Max. constant current
Slow make & break	Changeover	1NC/1NO	U1/U1Z	400 V	10 A
Slow make & break	Changeover overlapping	1NC/1NO	UV/1Z	400 V	10 A
Slow make & break	Changeover	1NC/1NO	SU1/SU1Z	400 V	10 A



Designation	SN2-U12 w	SN2-U12 w	SN2-U1 Uw	SN2-U1 Uw
Part number	603.3303.025	603.3353.016	603.3144.024	603.3194.022
Circuit diagram				
⊖ Forced disconnect to IEC 947-5-1 chapter 3				
Za not galvanically separated contacts				
Zb galvanically separated contacts				
Slow make & break/stop-action				
Internal seal (w)/external seal (w)	W	W	W	W

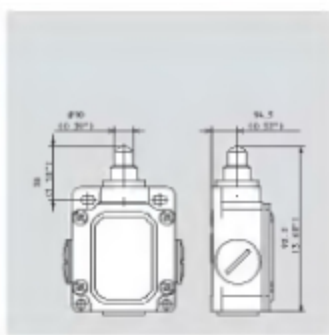
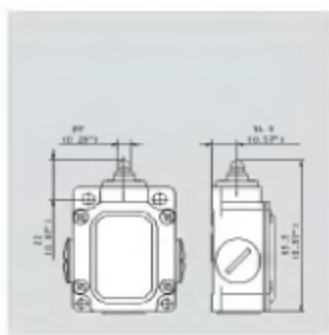
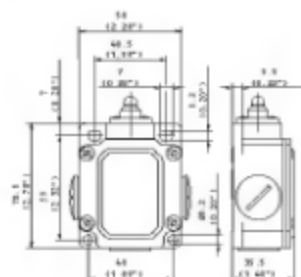
Contact travel mm (incl) Tol. ± 0.25 mm	Actuator force N Tol. ± 10%
Actuator angle ° Tol. ± 35°	Actuator torque Nm Tol. ± 10%
On	Off



Voltage	max	400 V AC	400 V AC	400 V AC	400 V AC
Permanent current	max	30 A	10 A	30 A	10 A
In-rush current complies with standards IEC 947-5-1 AC 15/DC 13		●	●	●	●
Switching frequency	max	100/min	100/min	100/min	100/min
Mechanical life – number of switching actions		10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
Operating temperature	min/max	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F

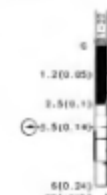
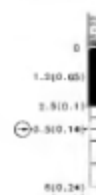
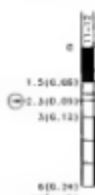
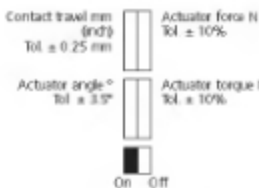
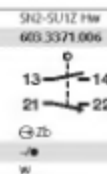
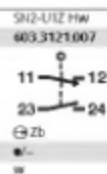
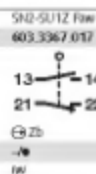
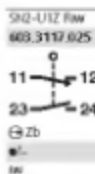
Approvals		UL, CSA	UL, CSA	UL, CSA	UL, CSA
Weight		0.17 kg/0.37 lb	0.17 kg/0.37 lb	0.15 kg/0.42 lb	0.15 kg/0.42 lb
Delivery: ex-stock/built to order		→	→	→	→

All dimensions in mm (incl)





Designation
Part number
 Circuit diagram
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3
 Zc: not galvanically separated contacts
 Zb: galvanically separated contact
 Slow make & break/ snap-action
 Internal seal (w)/external seal (w)



Voltage	max
Permanent current	max
In-rush current complies with standards	
IEC 947-5-1 AC 15DC 13	
Switching frequency	max
Mechanical life – number of switching actions	
Operating temperature	min./max
Approvals	
Weight	
Delivery, ex-stock/built to order	

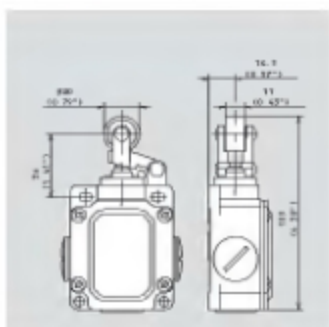
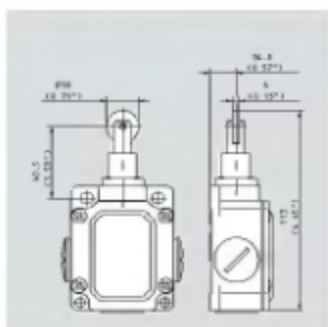
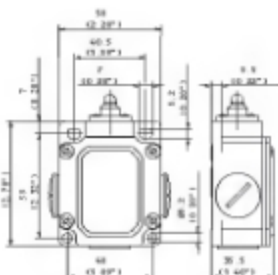
400 V AC	max
10 A	max
100/min	
10 x 10 ⁶	
-30 °C/+80 °C	
-22 °F/+176 °F	
UL, CSA	
0.20 kg/0.44 lb	

400 V AC	max
10 A	max
100/min	
10 x 10 ⁶	
-30 °C/+80 °C	
-22 °F/+176 °F	
UL, CSA	
0.20 kg/0.44 lb	

400 V AC	max
10 A	max
100/min	
10 x 10 ⁶	
-30 °C/+80 °C	
-22 °F/+176 °F	
UL, CSA	
0.22 kg/0.49 lb	

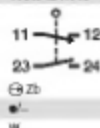
400 V AC	max
10 A	max
100/min	
10 x 10 ⁶	
-30 °C/+80 °C	
-22 °F/+176 °F	
UL, CSA	
0.22 kg/0.49 lb	

All dimensions in mm (inch)

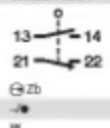




5N2-U1Z DGHW
603.3121.005



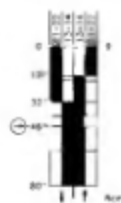
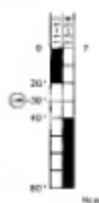
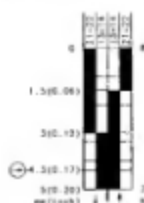
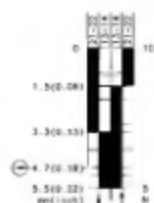
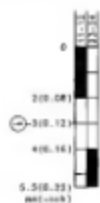
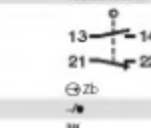
5N2-SU1Z DGHW
603.3371.004



5N2-U1Z AHS
603.3135.002



5N2-SU1Z AHS
603.3385.018



400 V AC
10 A

400 V AC
10 A

400 V AC
10 A

400 V AC
10 A

400 V AC
10 A

400 V AC
10 A

100mm
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100mm
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100mm
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100mm
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100mm
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

100mm
10 x 10°
-30 °C/+80 °C
-22 °F/+176 °F

UL, CSA

UL, CSA

UL, CSA

UL, CSA

UL, CSA

UL, CSA

0.23 kg/0.51 lb

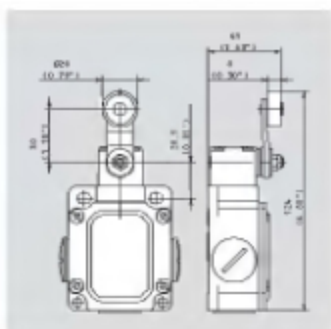
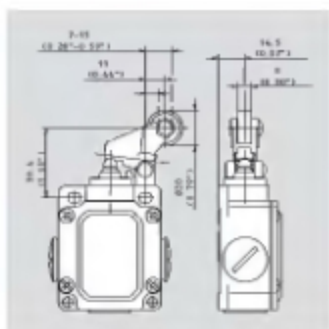
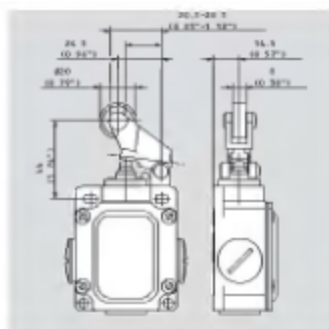
0.23 kg/0.51 lb

0.23 kg/0.51 lb

0.23 kg/0.51 lb

0.25 kg/0.55 lb

0.25 kg/0.55 lb



Metal-bodied limit switches

ENM 2

Standard switch according to DIN EN 50041
Protection class IP 65



CE



- Increased number of switching functions for safety applications
- Galvanically separated contacts
- Forced disconnection of NC contacts (type dependant)
- Person-protection function \ominus (depending on model)
- Protection class IP 65
- Aluminum body and lid
- Operating device: 4 x 90° actuator positions
- Cable entry M 20 x 1.5
- International approvals

Mounting

- 2 x M 5 screws, adjustment via elongated holes
- 2 x M 5 screws for safety applications without additional attachment

Mounting advantages

- Increased wiring space
- Earthing surface on same level as switching system
- Turret
- Lever: 7.5° / 15° adjustable
- Contact made independent of direction
- Screw terminals with self lifting clamps for easy wiring
- Fine adjustment of switching point via adjusting screw
- Captive lid screws

Options

- Latching with contact locking (strain lock-release for safety reasons)
- LED indication of switching status
- EEx certified versions available acc. ATEX 100 a



Standard actuating element DIN EN 50041



Form A



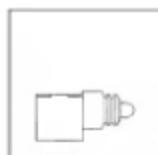
Form B



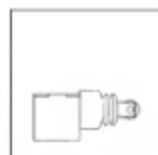
Form C



Form D



Form F
(available upon request)



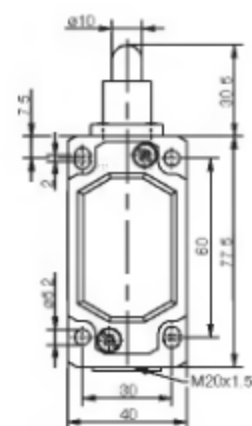
Form G
(available upon request)

Standard contact configuration

Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	changeover	1NC/1NO	U1/U1Z	400 V	10 A
Snap-action	changeover	1NC/1NO	SU1/SU1Z	400 V	10 A
Slow-action	normally-closed	2NC	A2/A2Z	400 V	10 A
Snap-action	normally-closed	2NC	SA2/SA2Z	250 V	10 A
Slow-action	changeover	1NC/1NO	UV1/UV1Z	400 V	10 A
Slow-action (overlapping)	changeover	2NC/1NO	UV15/UV15Z	400 V	5 A

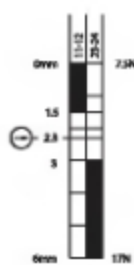
Optional contact configuration

Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	normally-open	2NO	E2	250 V	10 A
Snap-action	normally-open	2NO	SE2	250 V	10 A
Slow-action	changeover	2NC/1NO	U15/U15Z	400 V	5 A
Slow-action	changeover	1NC/2NO	U16/U16Z	400 V	5 A
Slow-action (overlapping)	changeover	1NC/2NO	UV16/UV16Z	400 V	5 A

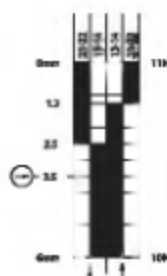
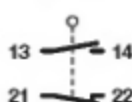


Contact travel diagrams and graphic symbols

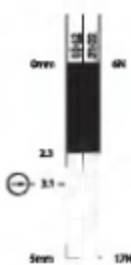
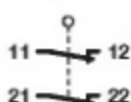
U1Z



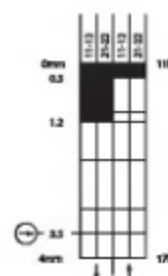
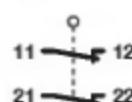
SU1Z



A2Z



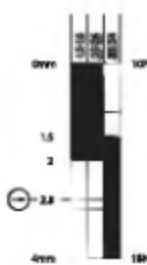
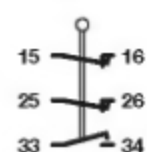
SA2Z



UV1Z

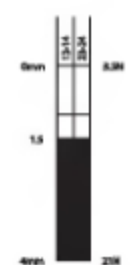
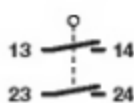


UV15Z

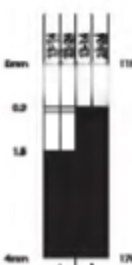
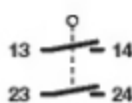


On request

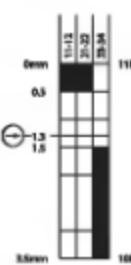
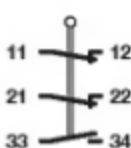
E2



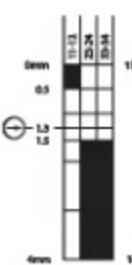
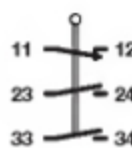
SE2



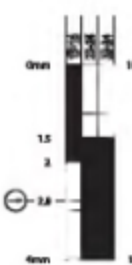
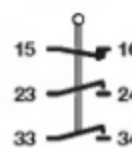
U15Z



U16Z



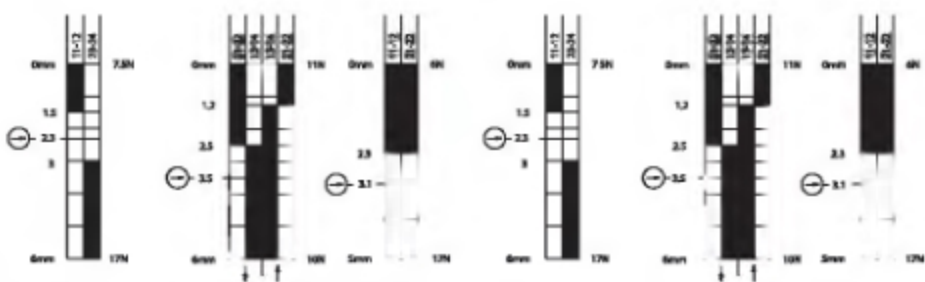
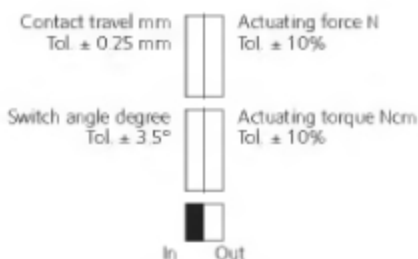
UV16Z





Designation
Part number
 Switching diagram
 ⊕ Positive break according to IEC 947-5-1 Chap. 3
 Za: changeover contact is not galvanically isolated
 Zb: changeover contact is galvanically isolated
 Slow-action contact / snap-action contact
 Gasket inside (iw)/outside (w)

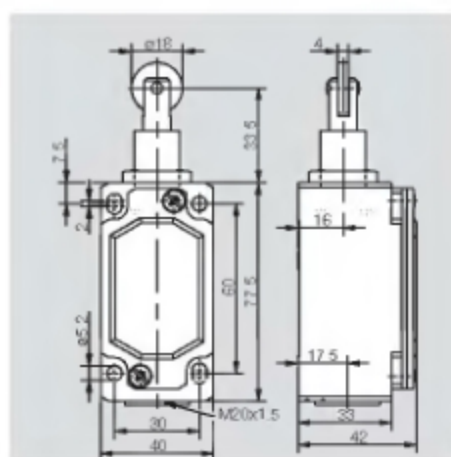
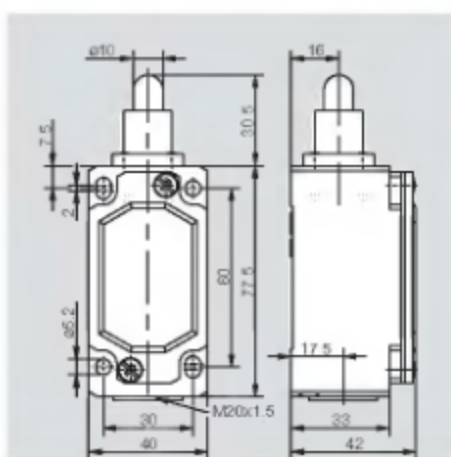
ENM2-U1Z iw	ENM2-SU1Z iw	ENM2-A2Z iw	ENM2-U1Z Riw	ENM2-SU1Z Riw	ENM2-A2Z Riw
608.7102.001	608.7352.002	608.7802.003	608.7117.004	608.7367.005	608.7817.006
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb
●/-	-●	●/-	●/-	-●	●/-
iw	iw	iw	iw	iw	iw



Voltage	max.	400 V AC
Continuous current	max.	10 A
Making current, acc. to IEC 947-5-1 AC 15/DC 13		●
Switching frequency	max.	100/min.
Mech. operational life – number of switching cycles		10 x 10 ⁶
Ambient temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F
Standard actuating element	Form	B
Approvals (applied for)		UL, CSA
Weight		0.20 kg
Delivery: ex-stock/built to order		●/-

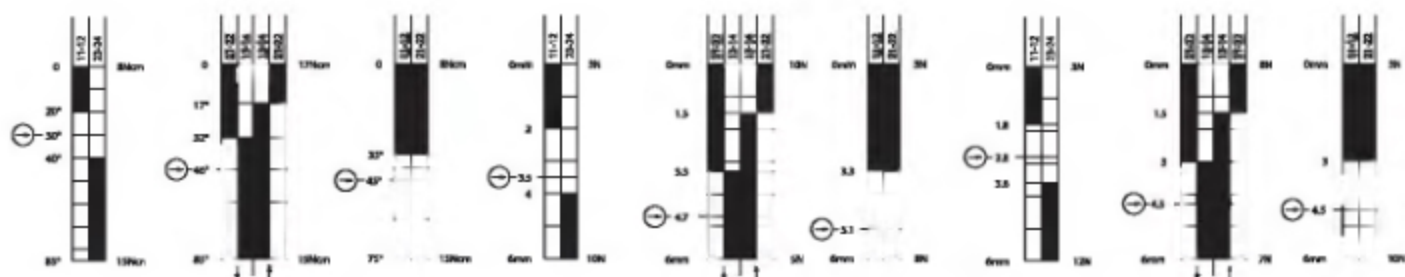
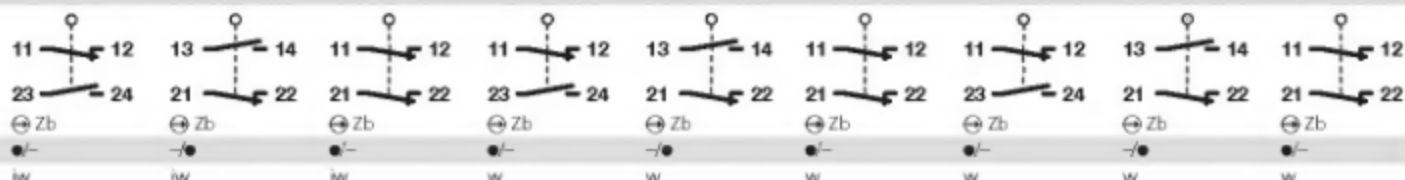
400 V AC	400 V AC	400 V AC	400 V AC	400 V AC	400 V AC
10 A	10 A	10 A	10 A	10 A	10 A
●	●	●	●	●	●
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
B	B	B	C	C	C
UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.20 kg	0.20 kg	0.20 kg	0.21 kg	0.21 kg	0.21 kg
●/-	●/-	●/-	●/-	●/-	●/-

All dimensions in mm





ENM2-U1Z AHS-V 608.7135.013	ENM2-SU1Z AHS-V 608.7385.014	ENM2-AZZ AHS-V 608.7835.015	ENM2-U1Z DGHW 608.7121.007	ENM2-SU1Z DGHW 608.7371.008	ENM2-AZZ DGHW 608.7821.009	ENM2-U1Z DGKW 608.7127.010	ENM2-SU1Z DGKW 608.7377.011	ENM2-AZZ DGKW 608.7827.012
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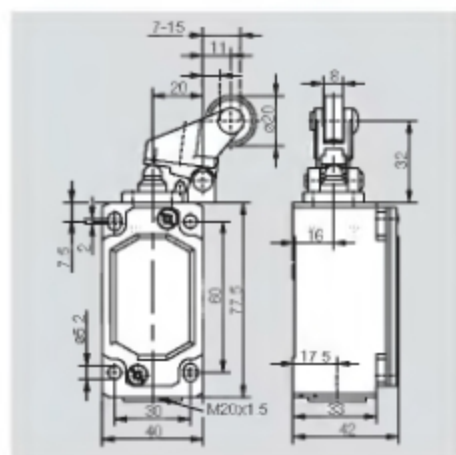
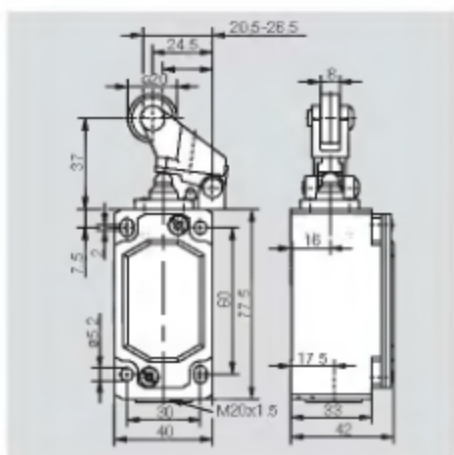
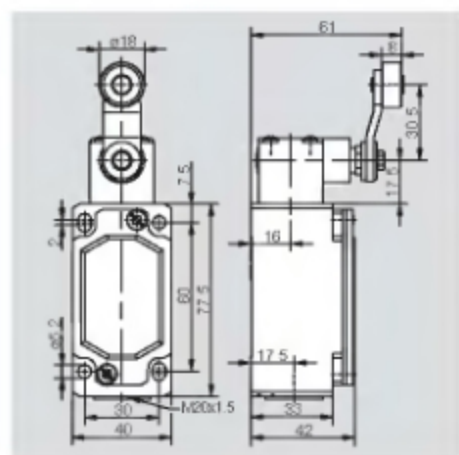


400 V AC 10 A	400 V AC 10 A	400 V AC 10 A	400 V AC 10 A	400 V AC 10 A	400 V AC 10 A	400 V AC 10 A	400 V AC 10 A	400 V AC 10 A
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100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F	100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F	100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F	100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F	100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F	100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F	100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F	100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F	100/min. 10 x 10° -30 °C/+80 °C -22 °F/+176 °F
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A UL, CSA	A UL, CSA	A UL, CSA	- UL, CSA	- UL, CSA	- UL, CSA	- UL, CSA	- UL, CSA	- UL, CSA
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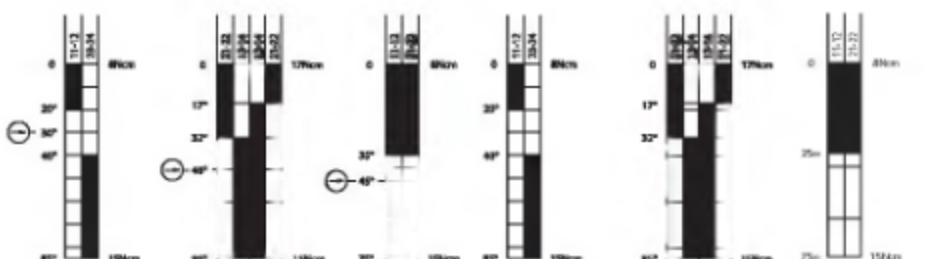
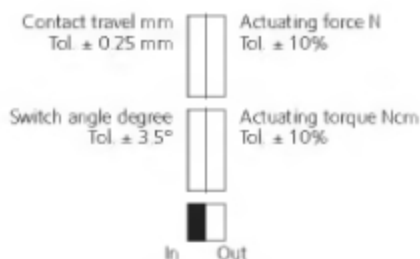
0.28 kg	0.28 kg	0.28 kg	0.23 kg	0.23 kg	0.23 kg	0.23 kg	0.23 kg	0.23 kg
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Designation
Part number
 Switching diagram
 ⊕ Positive break according to IEC 947-5-1 Chap. 3
 Za: changeover contact is not galvanically isolated
 Zb: changeover contact is galvanically isolated
 Slow-action contact / snap-action contact
 Gasket inside (iw)/outside (w)

ENM2-U1 AD	ENM2-SU1 AD	ENM2-A2 AD	ENM2-U1 AV	ENM2-SU1 AV	ENM2-A2 AV
608.7137.018	608.7387.019	608.7837.029	608.7136.016	608.7386.017	608.7836.028
(*)YZb	(*)YZb	(*)YZb	(*)YZb	(*)YZb	(*)YZb
●/-	-●	●/-	●/-	-●	●/-
iw	iw	iw	iw	iw	iw



Voltage	max.	400 V AC
Continuous current	max.	10 A
Making current, acc. to IEC 947-5-1 AC 15/DC 13		●
Switching frequency	max.	100/min.
Mech. operational life – number of switching cycles		10 x 10 ⁶
Ambient temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F

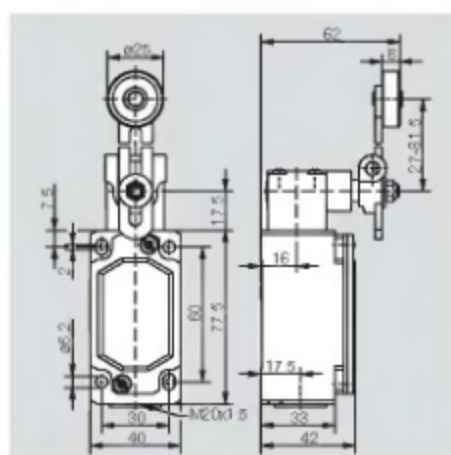
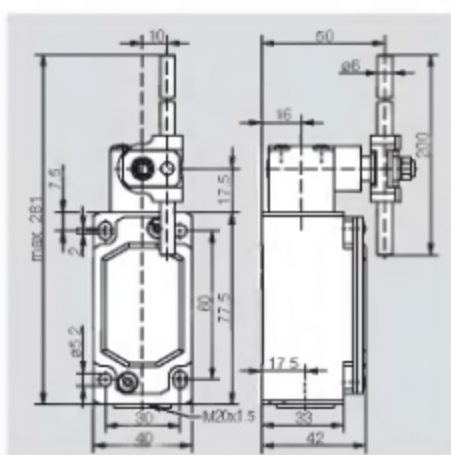
400 V AC	400 V AC	400 V AC	400 V AC	400 V AC	400 V AC
10 A	10 A	10 A	10 A	10 A	10 A
●	●	●	●	●	●
100/min.	100/min.	100/min.	100/min.	100/min.	100/min.
10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F

Standard actuating element	Form	D
Approvals (applied for)		UL, CSA
Weight		0.29 kg
Delivery: ex-stock/built to order		●/-

D	D	D	-	-	-
UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA	UL, CSA
0.29 kg	0.29 kg	0.29 kg	0.30 kg	0.30 kg	0.30 kg
●/-	●/-	-●	●/-	●/-	-●

All dimensions in mm

(*) Adjustable operating devices are not recommended for safety applications.



Metal-bodied limit switches

D I

Heavy duty housing
For harsh operating environment
Robust design of actuator assembly
and contact systems
Protection class IP 65

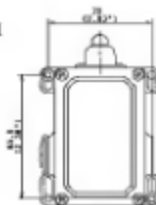
CE



- Robust contact assembly
- Guide bushings resistant to wear & tear
- Large range of actuators
- Snap action or slow make & break contacts
- Extended body (D II) for multiple pole contact versions
- Forced disconnections of NC contacts (type dependant)
- Protection class IP 65
- Aluminum body and lid
- 4 x 90° actuator positions (type dependant)
- Two cable entries M 20 x 1.5 (type D II)
- International approvals

- On request: Two cable entries M 20 x 1.5 (type D II) for increased contact functions

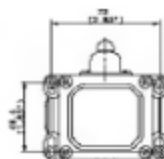
Type D II



Installation benefits

- Two cable entries for easy "through wiring"
- Spacious connection area
- Captive lid screws
- Slotted mounting holes

Type D I



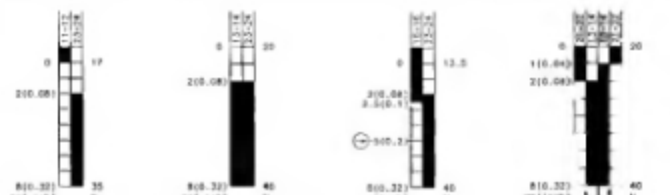
Contact configuration

Contact type	Switch function	Switch contacts	Reference	Max. voltage	Max. constant current
Slow make & break	Changeover	1NC/1NO	U1	500 V	16 A
Slow make & break	Changeover	1NC/1NO	U11	500 V	16 A
Slow make & break	Changeover overlapping	1NC/1NO	UV 1A/N/1Z	400 V	16 A
Slow make & break	Changeover	2NC/2NO	L2	500 V	16 A
Slow make & break	NO	2NO	E2	400 V	16 A
Slow make & break	NC	1NC	A1Z	400 V	16 A
Slow make & break	NC	3NC	A3Z	400 V	16 A
Snap action	Changeover	1NC/1NO	SU1	500 V	16 A
Snap action	Changeover	2NC/2NO	SU2	500 V	16 A



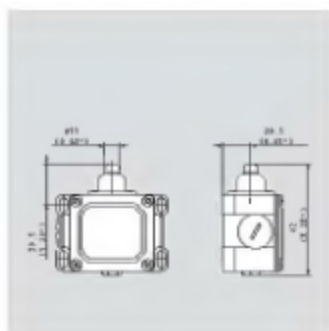
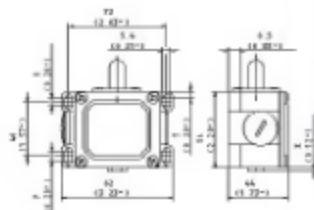
Designation	D-U1 w	D-E2 w	D-U12 w	D-SU1 w
Part number	604.1303.002	604.1603.046	604.1303.134	604.1153.156
Circuit diagram				
⊖ Forced disconnect to IEC 947-5-1 chapter 3				
Za not galvanically separated contacts				
Zb galvanically separated contacts			⊖ Zb	
Slow make & break/stop-action				
Internal seal (w)/external seal (e)	w	w	w	w

Contact travel mm (nd)	Actuator force N
Tol. ± 0.25 mm	Tol. ± 10%
Actuator angle °	Actuator torque Nm
Tol. ± 3.5°	Tol. ± 10%
On	Off



Voltage	max	500 V AC	400 V AC	400 V AC	500 V AC
Permanent current	max	16 A	16 A	16 A	16 A
In-rush current complies with standards		●	●	●	●
IEC 947-5-1 AC 15/DC 13					
Switching frequency	max	100/min	100/min	100/min	100/min
Mechanical life – number of switching actions		10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
Operating temperature	min/max	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
Approvals		CSA	CSA	CSA	CSA
Weight		0.27 kg/0.60 lb	0.27 kg/0.60 lb	0.27 kg/0.60 lb	0.27 kg/0.60 lb
Delivery: ex-stock/built to order		●/-	●/-	●/-	●/-

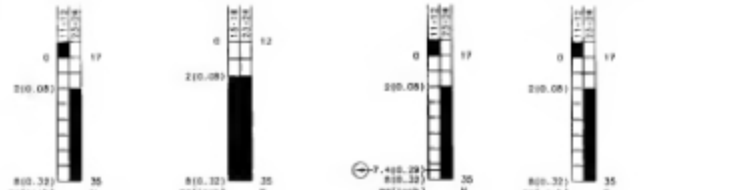
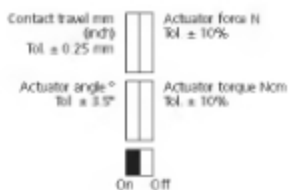
All dimensions in mm (nd)





Designation
Part number
 Circuit diagram
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3
 Za: not galvanically separated contacts
 Zb: galvanically separated contact
 Slow make & break/ snap-action
 Internal seal (w)/external seal (w)

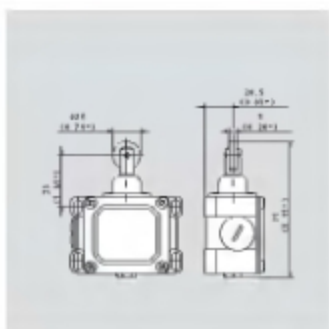
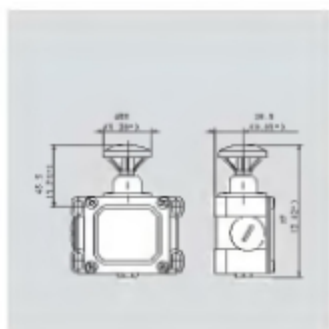
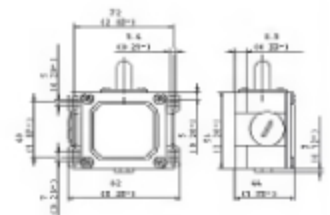
D-U1 Pw	D-E2 Pw	D-U1Z Pw	D-U1 Pw
604.1113.006	604.1813.050	604.1118.229	604.1118.008
-	-	⊕ Za	-
w	w	w	w



Voltage	max	500 V AC
Permanent current	max	16 A
In-rush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Switching frequency	max	100/min
Mechanical life – number of switching actions		10 x 10 ⁶
Operating temperature	min./max	-30 °C/+80 °C
		-22 °F/+176 °F
Approvals		CSA
Weight		0.28 kg/0.62 lb
Delivery: in-stock/built to order		•/–

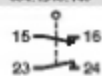
Voltage	max	500 V AC
Permanent current	max	16 A
In-rush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Switching frequency	max	100/min
Mechanical life – number of switching actions		10 x 10 ⁶
Operating temperature	min./max	-30 °C/+80 °C
		-22 °F/+176 °F
Approvals		CSA
Weight		0.28 kg/0.62 lb
Delivery: in-stock/built to order		•/–

All dimensions in mm (nd)





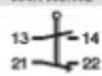
D-UV1Z 16A
604.1318.140



Zb

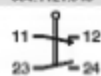
W

D-SU1 16A
604.1168.162



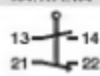
W

D-U1 16A
604.1121.010



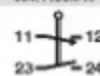
W

D-SU1 16A
604.1171.164



W

D-U1 16A
604.1135.019

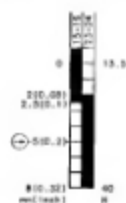


W

D-SU1 16A
604.1185.173



W



400 V AC
16 A

W

100mm

10 x 10°

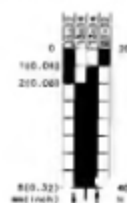
-30 °C/+80 °C

-22 °F/+176 °F

CSA

0.28 kg/0.62 lb

W



500 V AC
16 A

W

100mm

10 x 10°

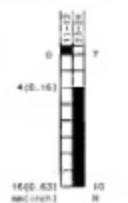
-30 °C/+80 °C

-22 °F/+176 °F

CSA

0.28 kg/0.62 lb

W



500 V AC
16 A

W

100mm

10 x 10°

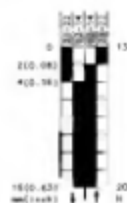
-30 °C/+80 °C

-22 °F/+176 °F

CSA

0.33 kg/0.73 lb

W



500 V AC
16 A

W

100mm

10 x 10°

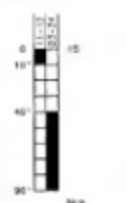
-30 °C/+80 °C

-22 °F/+176 °F

CSA

0.33 kg/0.73 lb

W



500 V AC
16 A

W

100mm

10 x 10°

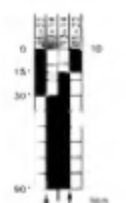
-30 °C/+80 °C

-22 °F/+176 °F

CSA

0.40 kg/0.88 lb

W



500 V AC
16 A

W

100mm

10 x 10°

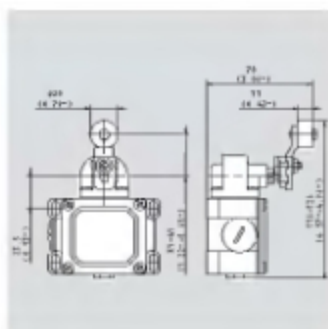
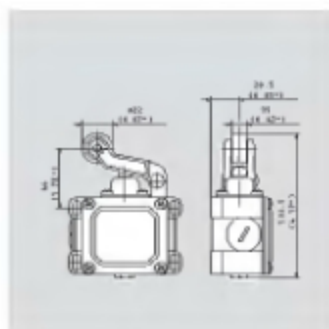
-30 °C/+80 °C

-22 °F/+176 °F

CSA

0.40 kg/0.88 lb

W



Actuator selection table

Actuator	Code	Seal iw = internally w = externally	Plastic bodied					Metal bodied				
			COMBI Page 10	TINY Page 14	I 88 Page 19	BIGGY Page 25	ENK Page 28	GCI Page 32	SN 2 Page 38	ENM 2 Page 42	D I Page 46	
Plunger	-	iw	-	-	-	-	●	-	-	-	-	
	-	w	-	●	●	●	-	-	-	-	-	
	-	IP 30	●	-	-	-	-	-	-	-	-	
	-	IP 43	-	-	-	-	-	-	-	-	○	
Roller ball	KU	iw	-	-	-	-	-	○	○	○	-	
Mushroom	P	w	-	-	-	-	-	-	-	-	●	
Telescopic plunger	L	iw	-	-	-	-	-	●	○	○	-	
Plunger (adjustable)	ST	w	-	-	-	-	-	●	○	○	●	
	ST	iw	-	-	-	-	-	●	○	○	-	
	ST	IP 30	●	-	-	-	-	-	-	-	-	
Button	K	IP 30	●	-	-	-	-	-	-	-	-	
Roller plunger	R	IP 30	●	-	-	-	-	-	-	-	-	
	R	iw	-	●	○	●	●	●	●	●	-	
		w	-	-	-	-	-	-	-	-	●	
		IP 43	-	-	-	-	-	-	-	-	○	
Roller plunger (long)	R...L	iw	-	○	●	○	-	-	-	-	-	
Roller plunger (short)	R...K	iw	-	○	●	○	-	-	-	-	-	
Roller lever	H	IP 30	●	-	-	-	-	-	-	-	-	
	H	w	-	●	●	●	●	-	-	-	-	
	H, HT	iw	-	-	-	-	-	●	○	○	-	
	H/D-WI	w	-	-	-	-	-	●	●	○	●	
Roller lever (long)	HL	iw	-	-	-	-	-	●	○	○	-	
	HL/D-H	w	-	-	-	-	-	●	○	○	●	
	D-H	IP 43	-	-	-	-	-	-	-	-	○	
	DGH	w	-	○	●	○	○	○	●	●	-	
Roller lever (adjustable)	DGH	w	-	○	●	○	○	○	●	●	-	
Roller lever (adjustable)	DGK	w	-	○	●	○	○	○	●	●	-	
Angled roller lever	KN	iw	-	-	-	-	-	●	○	○	-	
	KN	w	-	○	●	○	-	●	○	○	○	
Roller lever (directional)	KG	iw	-	-	-	-	-	●	○	○	-	
	KG	w	-	○	●	○	-	●	○	○	-	
Bi-stable roller lever	DR	iw	-	-	-	-	-	●	○	○	-	
Wobble stick	FF	iw	-	-	-	-	-	●	●	○	-	
	FF	w	-	●	○	●	●	-	-	-	-	
Wobble stick (long)	FFL	w	-	-	-	-	-	●	○	○	-	
Turret head	AH	iw	-	●	●	●	-	●	○	○	●	
Turret head (star clamp)	AHS	iw	-	●	●	●	-	○	●	○	-	
Turret head (positive drive)	AHS-V	iw	-	-	-	-	●	○	●	●	-	
Turret head (for force disconnection in forward & return travel)	AHZ	iw	-	-	-	-	-	○	○	●	-	
Turret head (adjustable)	AV	iw	-	●	●	●	●	●	○	●	●	
Turret head (adjustable rod)	AD	iw	-	●	●	●	●	●	○	●	○	
Turret head (spring)	AF	iw	-	○	●	○	○	●	●	○	-	

● Catalogue model (stock item or to order)

○ Technically possible (on request)

- Not available

Operating direction	Plunger direction		Approach speed/angle					Notes		
			m/s	0.1	0.5	1	2		5	
	↓	Metal	A	20°	20°	10°	5°	<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid in plunger direction. 		
			B	20°	20°	10°	5°			
		Plastic	A	20°	20°	10°	5°			
			B	20°	20°	10°	5°			
	↓	Metal	A	30°	5°	-	-		<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid in plunger direction. Plunger tip is adjustable on type ST 	
			B	30°	5°	-	-			
		Plastic	A	30°	5°	-	-			
			B	30°	5°	-	-			
	↓	Metal	A	30°	30°	20°	10°	<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid in plunger direction. 		
			B	30°	30°	20°	10°			
		Plastic	A	30°	30°	20°	10°			
			B	30°	30°	20°	10°			
	↓	Metal	A	-	30°	30°	20°		10°	<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid in plunger direction.
			B	20°	20°	10°	-		-	
		Plastic	A	-	30°	30°	20°		10°	
			B	40°	40°	30°	20°		10°	
	↓	Metal	A	-	30°	30°	20°	10°	<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid in plunger direction. Upper part of the actuator with roller – adjustable 	
			B	20°	20°	10°	-	-		
		Plastic	A	-	30°	30°	20°	10°		
			B	40°	40°	30°	20°	10°		
	↓	Metal	A	-	-	-	-	<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid 90° to the plunger direction. Upper part of the actuator with roller – adjustable 		
			B	30°	30°	20°	10°			-
		Plastic	A	-	-	-	-			-
			B	40°	40°	40°	30°			20°
	↓	Metal	A	-	-	-	-		<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid 90° to the plunger direction. 	
			B	30°	30°	20°	10°			-
		Plastic	A	-	-	-	-			-
			B	40°	40°	40°	30°			20°
	↓	Metal	A	-	-	-	-	<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid in plunger direction. 		
			B	40°	40°	30°	20°			-
		Plastic	A	-	-	-	-			-
			B	40°	40°	40°	30°			20°
	↓	Metal	A	45°	45°	40°	30°		<ul style="list-style-type: none"> The information shown in the diagrams for contact travel / switching force is valid in direction of rotation. Switch position will remain until return actuation 	
			B	45°	45°	40°	30°			
		Plastic	A	-	-	-	-			-
			B	-	-	-	-			-
	↓	Metal	A	60°	50°	45°	-	<ul style="list-style-type: none"> The information shown in the diagrams for switching angle/actuator torque is valid for any operating direction. Not suitable for operators protection 		
			B	-	-	-	-			-
		Plastic	A	20°	20°	10°	5°			-
			B	-	-	-	-			-
	↓	Metal	A	45°	45°	45°	40°		30°	<ul style="list-style-type: none"> The information shown in the diagrams for switching angle/actuator torque is valid in direction of rotation. Roller lever adjustable on the shaft gradually (step by step) in radial direction and can be turned by 180°
			B	45°	45°	45°	40°		30°	
		Plastic	A	45°	45°	45°	40°		30°	
			B	45°	45°	45°	40°		30°	
	↓	Metal	A	45°	45°	45°	40°	30°	<ul style="list-style-type: none"> The information shown in the diagrams for switching angle/actuator torque is valid in direction of rotation. Roller lever adjustable in longitudinal & radial direction on the shaft and can be turned by 180° Not suitable for operators protection 	
			B	45°	45°	45°	40°	30°		
		Plastic	A	45°	45°	45°	40°	30°		
			B	45°	45°	45°	40°	30°		
	↓	Metal	A	45°	45°	40°	30°	20°		<ul style="list-style-type: none"> The information shown in the diagrams for switching angle/actuator torque is valid in direction of rotation. Rod adjustable in longitudinal & radial (step by step) direction
			B	45°	45°	40°	30°	20°		
		Plastic	A	45°	45°	40°	30°	20°		
			B	45°	45°	40°	30°	20°		
	↓	Metal	A	45°	45°	40°	30°	20°	<ul style="list-style-type: none"> The information shown in the diagrams for switching angle/actuator torque is valid in direction of rotation. Spring adjustable in radial direction on the shaft Not suitable for operators protection 	
			B	45°	45°	40°	30°	20°		
		Plastic	A	45°	45°	40°	30°	20°		
			B	45°	45°	40°	30°	20°		

Limit switches

Technical data

Switches with turret head housing

When supplied the contacts work in both directions according to the contact travel diagrams

Adjustment of the actuator standard position on the shaft:

The standard position of the unit can be changed and fixed step by step for exact positioning.

– AH, AHS, AHZ, AF, AD, AV:
Adjustment in 15° steps (fig. 1)

– AHS-V
Adjustment in 7,5° increments or 15° positive drive steps selected by reversing the drive washer between the lever and head (fig. 2)

– Adjustment AV, AD
Adjustment in radial direction

– AH, AHS, AHS-V, AHZ, AV:
By rotating 180° the roller lever is usable at a different axial level (fig. 3. and 4)

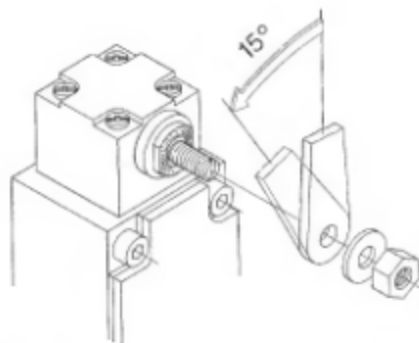


Fig. 1

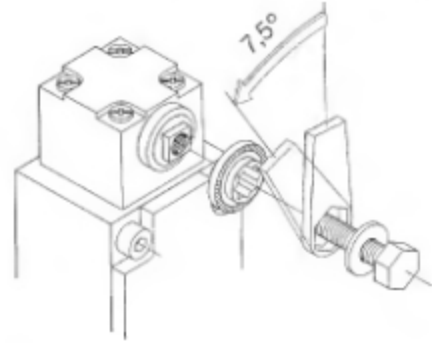


Fig. 2

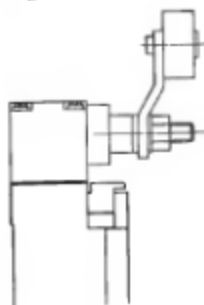


Fig. 3

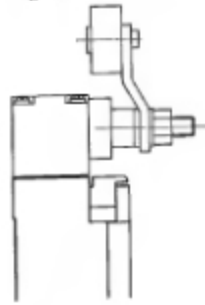


Fig. 4

Adjustment for switching (dependent on direction)

With actuators AHS, AHS-V, AV, AD

When supplied as standard the contacts work in both directions according to the contact travel diagrams. By simply changing the actuator push rod, an idle run function can be achieved in the chosen direction (fig. 5. and 6). The idle run function may be used in control systems, which cannot handle successive signals due to the return "over swing" of very long actuators AV/AD.

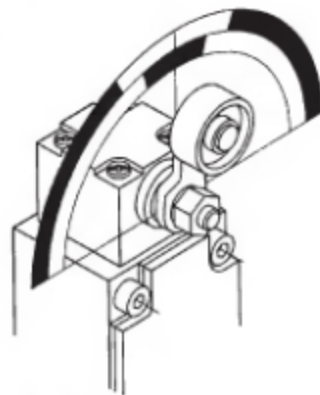


Fig. 5

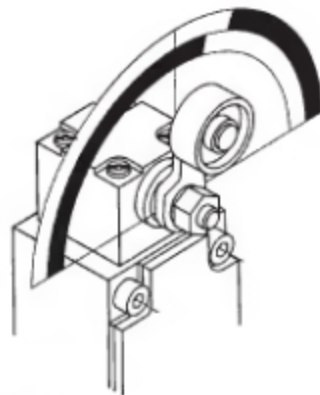


Fig. 6

Forced disconnect

Forward and return movement AHZ

For special safety applications the forced disconnection of the NC contacts may be required in the forward movement (moving in one direction) as well as in the return movement (back to normal position). For operator safety applications the roller must be positively guided in both directions (see fig. 7 and 8).

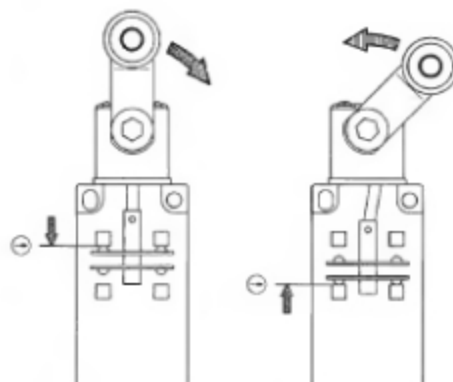


Fig. 7

Fig. 8

Note – when altering actuators AH, AHS, AHS-V, AHZ, AF, AD, AV, DGH, DGK
– the assured conditions of supply will change.

After the adjustment, the user must make sure that the part reaches the necessary safety levels.

Accessories for plastic bodied limit switches

Fixing support



For type

Part number

Stock status: Ex stock / Built to order

I 88

319.1871.157

-/●

Bi

319.1871.158

-/●

ENK

319.1871.154

-/●

Finger protection



For type

Part number

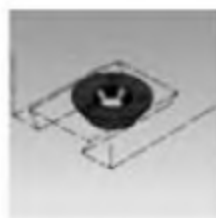
Stock status: Ex stock / Built to order

I 88, Bi, ENK

359.5900.060

●/-

Guide disc



For type

Part number

Stock status: Ex stock / Built to order

I 88

351.5900.209

●/-

Footswitches

Selection table: contact arrangements

- Catalogue model (stock item or to order)
- Technically possible (to special order)
- not available

Options

- EEx certified versions available
acc. ATEX 100 a



Contacts/Pedals

Additional features

Function	Contacts	Circuit diagram	Contacts Ref.	Additional features	Ref.
Slow make & break	1NC/1NO	1	U1/U1Z		
Slow make & break	1NC/1NO	2	U1	Latch switch	
Slow make & break	1NC/1NO	8	U1	Emergency stop button	HAZ
Snap action	1NC/1NO	4	SU/SU1Z		
Snap action	1NC/1NO	5	SU/Z	Pressure point	D
Snap action	1NC/1NO	6	SU/1	Latch switch	Y
Snap action	1NC/1NO	7	SU/Z	Power contactor	LS 22
Snap action	1NC/1NO	8	SU/Z	Latch switch-power contactor	YLS 22
Snap action	2NC/2NO	9	SU1 M	Potentiometer	PG
Snap action/slow make & break	1NC/2NO	10	SU/Z/U1	Safety function with pressure point	D
Slow make & break	2NC/2NO	11	U2Z		
Slow make & break	2NC/2NO	12	U2Z	Pressure point	D
Snap action	2NC/2NO	13	SU2Z		
				Electronic output	ES
				Pedal protection	PS
				Pedal latch	AT
				Foot support	FS
				Drop-down pedal guard	UK

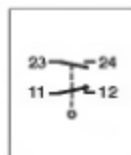
Circuit diagrams



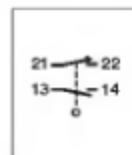
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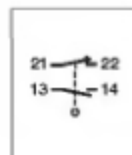
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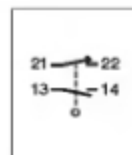
3



4



5



6

Ordering instructions for footswitches

The following part numbers or type references of our catalogue versions are sufficient to place an order for a Bernstein footswitch. To ensure correct supply of footswitches with non-standard contact combinations or accessories, which are not shown in the catalogue we require the exact type reference.

- Type** of footswitch requested – F1, F2, F3 or FG
- Number and type of contact inserts** for multiple-pedal switches, list in order from left to right.
Example: F3-U1Z/SU1Z/UZZ

3 Information about additional functions, design or pedal accessories

This must be indicated in the type reference directly after the appropriate contact element.
Example: With latch & pressure point – F3-U1Z/SU1Z/UZZD

Type	Pedal 1	Pedal 2	Pedal 3	Pedal independent add-on
F1	– Contact type	Additional function		Accessory
F2	– Contact type	Additional function	Contact type	Accessory
F3	– Contact type	Additional function	Contact type	Accessory

Example

F3	– U1	SU1Y	U2D	UN
----	------	------	-----	----



Type F1
Page 56



Type F1 UN
Page 58



Type F2
Page 61



Type F2 UN
Page 62

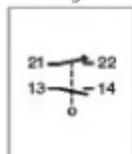


Type F3
Page 63

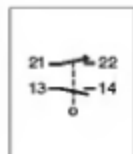


Type F3 UN
Page 63

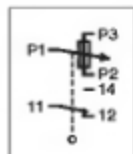
●	●	●	●	●	●
●	●	○	○	○	○
–	●	–	○	–	○
●	●	○	●	○	○
○	○	○	●	○	○
○	○	○	○	○	○
–	○	–	○	–	○
–	○	–	○	–	○
●	○	○	○	○	○
–	●	–	○	–	–
●	●	●	●	○	○
●	●	○	●	○	○
○	○	○	○	○	○
○	○	○	○	○	○
○	○	○	○	○	○
○	● U1Z	○	○	○	○
○	○	○	○	○	○
○	–	–	–	–	–

Circuit diagrams

7



8

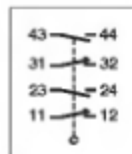


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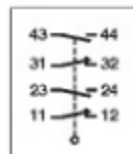


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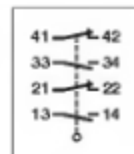
↳ Pressure point
↳ Latch



11



12



13

Footswitches with single pedal

F1

Protection class IP 65



Designation	F1-U1Z	F1-U1V	F1-SU1Z	F1-SU1M BG
Part number	606.1100.005	606.1100.001	606.1300.011	616.1300.327
Circuit diagram				
Pressure point	↳			
Slow make & break/snap action	●	●	●	●
Pressure point	-	-	-	-
Latching switch	-	●	-	-
Potentiometer	-	-	-	● 10 kΩ 2 W ½
Pedal interlocking	-	-	-	-
Emergency stop function	-	-	-	-
Power contact	-	-	-	-
Voltage	max. 500 V AC	500 V AC	500 V AC	250 V AC DC
Permanent current	max. 10 A	16 A	10 A	5 A
In-rush current complies with standards	●	●	●	●
IEC 947-5-1 AC 15DC 13				
Switching frequency	max. 50/min	50/min	50/min	20/min
Mechanical life – number of switching actions	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
Mechanical life – number of revolutions	-	-	-	50 x 10 ³ ½
Operating temperature	min./max. -30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals	BG, CSA, UL	BG, CSA, UL	BG, CSA, UL	-
Cable entry	1 x M 20	1 x M 20	1 x M 20	1 x M 20
Weight	0.60 kg/1.3 lb	0.60 kg/1.3 lb	0.60 kg/1.3 lb	0.75 kg/1.65 lb
Delivery, ex-stock/built to order	●	●	●	●

All dimensions in mm (inch)

½ other resistance figures on request
 ½ number of revolutions available up to 5 x 10⁶



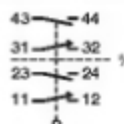


F1-U2Z

606.1200.003

F1-U2Z D

606.1200.007



●

●

-

-

-

-

-

-

-

-

500 V AC

16 A

●

500 V AC

10 A

●

50mm

10 x 10°

-

-30 °C/+80 °C

-22 °F/+176 °F

50mm

10 x 10°

-

-30 °C/+80 °C

-22 °F/+176 °F

BG, CSA, UL

BG, CSA, UL

3 x M 20

3 x M 20

0.60 kg/1.3 lb

●

0.70 kg/1.5 lb

●



Footswitches with single pedal (guarded)

F1 UN

Protection class IP 65



Designation
Part number
Circuit diagram

F1-U12 UN
606.1600.006

F1-U14 UN
606.1600.002

F1-SU12 UN
606.1600.012

↳ pressure point
↳ Emergency stop
button – self latching



Slow make & break/snap action
Pressure point
Latching switch
Potentiometer
Pedal interlocking
Emergency stop function
Power contact

●-
-
-
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●-
-
●
-
-
-

●-
-
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-

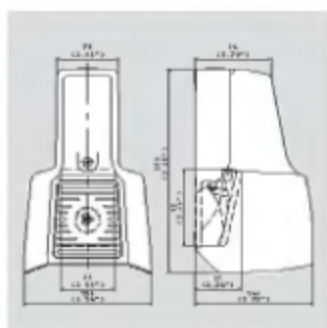
Voltage max
Permanent current max
In-rush current complies with standards
IEC 947-5-1 AC 15DC 13
Switching frequency max
Mechanical life – number of switching actions
Mechanical life – number of revolutions
Operating temperature min./max
Approvals
Cable entry
Weight
Delivery, ex-stock/built to order

500 V AC
10 A
●
50/min
10 x 10⁶
-
-30 °C/+80 °C
-22 °F/+176 °F
BG, CSA, UL
1 x M 20
1.50 kg/3.3 lb
●-
●-
●-

500 V AC
16 A
●
50/min
10 x 10⁶
-
-30 °C/+80 °C
-22 °F/+176 °F
BG, CSA, UL
1 x M 20
1.50 kg/3.3 lb
●-
●-
●-

500 V AC
10 A
●
50/min
10 x 10⁶
-
-30 °C/+80 °C
-22 °F/+176 °F
BG, CSA, UL
1 x M 20
1.50 kg/3.3 lb
●-
●-
●-

All dimensions in mm (inch)



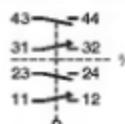


F1-U/2Z UN
606.1700.004

F1-U/2ZD UN
606.1700.006

F1-U/1Z NA2 UN
606.1600.435

F1-U/1Z AT UN
616.1600.400



●	●	●		●
-	-	-	-	-
-	-	-	-	-
-	-	-	-	●
-	-	●	-	-
-	-	-	-	-

500 V AC
16 A

500 V AC
10 A

500 V AC
10 A

600 V AC
10 A

500 V AC
10 A

50mm
10 x 10°

50mm
10 x 10°

50mm
10 x 10°

50mm
10 x 10°

50mm
10 x 10°

-30 °C/+80 °C
-22 °F/+176 °F

-30 °C/+80 °C
-22 °F/+176 °F

-30 °C/+80 °C
-22 °F/+176 °F

-30 °C/+80 °C
-22 °F/+176 °F

-30 °C/+80 °C
-22 °F/+176 °F

BG, CSA, UL

BG, CSA, UL

BG, CSA, UL

BG, CSA, UL

3 x M 20

3 x M 20

3 x M 20

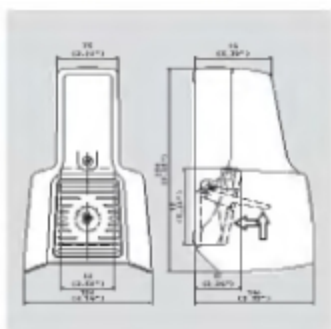
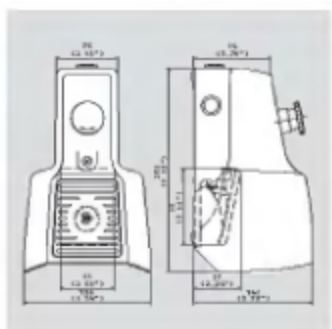
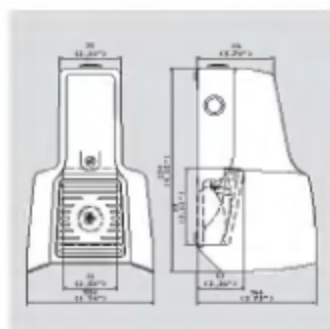
1 x M 20

1.50 kg/3.3 lb

1.60 kg/3.5 lb

1.60 kg/3.5 lb

1.50 kg/3.3 lb



Safety footswitch

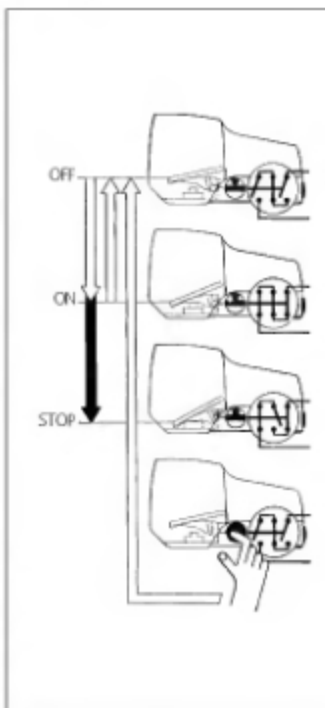
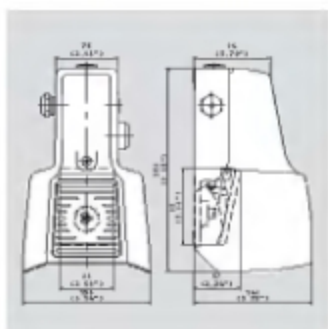
Safety latch with manual reset

Protection class IP 65



Designation	F1-SU12AV1 DUN
Part number	616.1000.203
Circuit diagram	
Slow make & break/ snap action	•••
Pressure point	•
Latching switch	•
Potentiometer	-
Pedal interlocking	-
Emergency stop function	•
Power contact	-
Voltage	max. 500 V AC
Permanent current	max. 30 A
In-rush current complies with standards	•
IEC 947-5-1 AC 15DC 13	
Switching frequency	max. 50/min
Mechanical life – number of switching actions	10 x 10 ⁶
Mechanical life – number of revolutions	
Operating temperature	min./max. -30 °C/+80 °C -22 °F/+176 °F
Approvals	UL, UL, CSA
Cable entry	1 x M 20
Weight	1.50 kg/3.3 lb
Delivery	ex-stock/built to order

All dimensions in mm (inch)



- 1 **Depressing the pedal to the pressure point** closes the contact and the operating process starts.
- 2 **In an emergency situation the pressure point is overcome** – the contact is opened and locked – the operating process is then interrupted. The latching mechanism holds the contact in the off position ensuring that an uncontrolled restart or new start of the machine cannot happen.
- 3 **Interlocking:** Only by releasing the locking device manually (reset button on the side of the housing), after the dangerous situation has been cleared, can the contacts be set to normal again. The operating process can then be repeated by operating the pedal to the pressure point.

Footswitches with two pedals

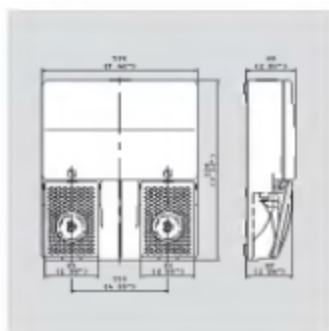
F2

Protection class IP 65



Designation	F24 U2/U 12	F2-U2ZA/02
Part number	606.2110.013	606.2220.015
Circuit diagram		
Slow make & break/snap action	●	●
Pressure point	-	-
Latching switch	-	-
Potentiometer	-	-
Pedal interlocking	-	-
Emergency stop function	-	-
Power contactor	-	-
Voltage	max. 500 V AC	500 V AC
Permanent current	max. 16 A	10 A
In-rush current complies with standards	●	●
IEC 947-5-1 AC 15-DC 13		
Switching frequency	max. 50/min	50/min
Mechanical life – number of switching actions	10 x 10 ⁶	10 x 10 ⁶
Mechanical life – number of revolutions	-	-
Operating temperature	min/max -30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals	BG, CSA, UL	BG, CSA, UL
Cable entry	1 x M 20	1 x M 20
Weight	1.70 kg/3.7 lb	1.70 kg/3.7 lb
Delivery ex-stock/built to order	●	●

All dimensions in mm (inch)



Footswitches with two pedals (guarded) F2 UN

With three pedals F3

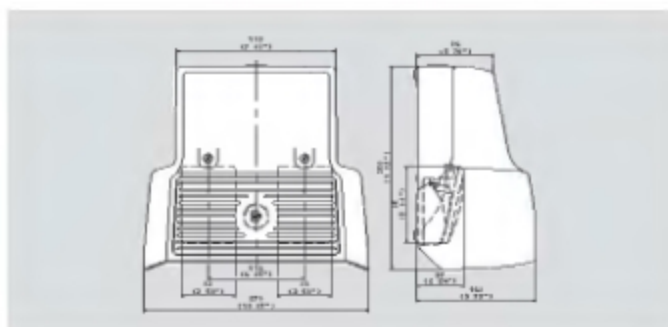
With three pedals (guarded) F3 UN

Protection class IP 65



Designation	F2-U12A/12 UN	F2-SU12SU 12 UN	F2-U22A/22 UN	F2-U22DA/22 UN
Part number	606.2630.014	606.2630.022	606.2720.016	606.2720.020
Circuit diagram				
Slow make & break/snap action	●/—	●/—	—/●	—/●
Pressure point	—	—	—	—
Latching switch	—	—	—	●
Rotenometer	—	—	—	—
Pedal interlocking	—	—	—	—
Emergency stop function	—	—	—	—
Power contact	—	—	—	—
Voltage	max. 500 V AC	500 V AC	500 V AC	500 V AC
Permanent current	max. 10 A	16 A	10 A	10 A
In-rush current complies with standards	●	●	●	●
IEC 947-5-1 AC 15DC 13				
Switching frequency	max. 50/min	50/min	50/min	50/min
Mechanical life – number of switching actions	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
Mechanical life – number of revolutions	—	—	—	—
Operating temperature	min./max. -30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals	BG, CSA, UL	BG, CSA, UL	BG, CSA, UL	BG, CSA, UL
Cable entry	1 x M 20	1 x M 20	1 x M 20	1 x M 20
Weight	2.60 kg/5.7 lb	2.60 kg/5.7 lb	2.60 kg/5.7 lb	2.80 kg/6.2 lb
Delivery	●/—	●/—	●/—	●/—

All dimensions in mm (inch)

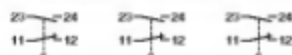




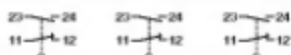
F2-SU12DVSU12D UN
606.2630.417



F3-U12U12U12
606.3111.025



F3-U12U12U12 UN
606.3611.026



•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

500 V AC
16 A

50min
10 x 10°

-30 °C/+80 °C
-22 °F/+176 °F

BG, CSA, UL

1 x M 20

2.80 kg/6.2 lb

•

500 V AC
10 A

50min
10 x 10°

-30 °C/+80 °C
-22 °F/+176 °F

BG, CSA, UL

2 x M 20

3.10 kg/6.8 lb

•

500 V AC
10 A

50min
10 x 10°

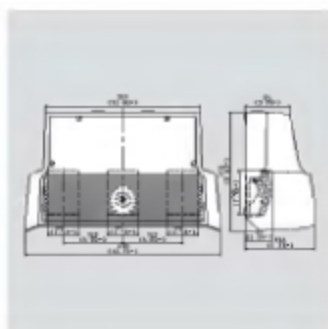
-30 °C/+80 °C
-22 °F/+176 °F

BG, CSA, UL

2 x M 20

5.40 kg/11.9 lb

•



Interlocking safety switches

SKT

Protection class IP 65



The SKT is the smallest safety switch with a separate actuator offering the same features, relating to safety, as all other products in this range. The SKT is perfect for applications that require a particularly slim and compact switching device. The rotating head, two actuator openings and different switching functions are proof of its versatility.

The SKT offers further options enabling it to suit a wide variety of applications.

- **Integrated forced ejection function (FE):** The actuator is ejected from the switch:
 - preventing unauthorized use of a spare actuator to defeat the safety function
 - ensuring the guard must be closed securely to enable the machine to run
- **Integrated actuator holding force (F150 = 50 N):** Guard doors which may open due to vibration can be held shut by using the SKT with increased actuator holding force up to 50 N, without the need for bulky external latches. In addition several doors mounted in a straight line on one machine are kept closed.
- **Universal radius actuator (MRU):** In addition to the standard straight-on actuator made from stainless steel (operating radius 150 mm), the universal radius actuator offers an adjustable operating radius to a minimum 50 mm both horizontally and vertically.

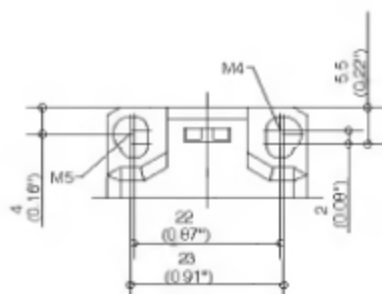
The SKT offers a variety of different switching functions in a highly compact enclosure. All systems are fitted with galvanically isolated contacts, the normally-closed being positive break. Snap-action contacts have been designed for control systems that require a simultaneous signal.

Available are:

- 1 NC ⊕/1 NO slow-action device
- 1 NC ⊕/1 NO snap-action device
- 2 NC ⊕ slow-action device
- 2 NC ⊕ snap-action device

Mechanical data

- Enclosure and lid made from highly durable fiberglass reinforced thermoplastic (UL 94-VO)
- Operating mechanism: head made from PA, clasp from Zn, rivets from stainless steel
- Actuator made from stainless steel
- Cable entry M 16 x 1.5



Mounting and installation

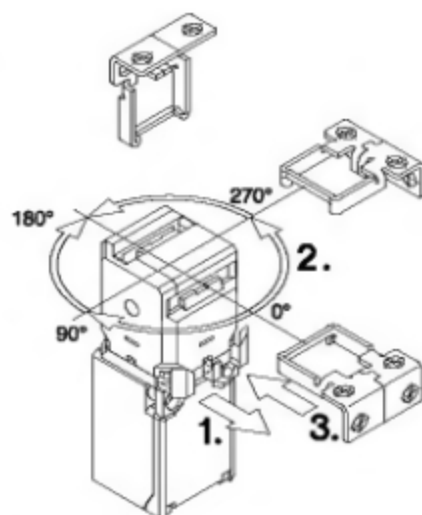
- The safety switch is mounted using 2 x M5 screws in the provided locating and mounting holes (23 mm centres).
- The separate actuator is attached using 2 x M4 screws (20 mm centres).

The safety switch and the actuator should be secured well, in order to prevent unintentional loosening (one-way and break-off screws, rivets etc.)



Positioning the actuator head

- Rotation in 4 x 90° increments: when mounted, the head is fixed into position by the clasp
- Horizontal or vertical operation



Warning

- **The safety switch must not be used as a mechanical end stop.**
- To preserve the level of safety, the safety switch must only be used in conjunction with the correct actuator.

Contact configuration

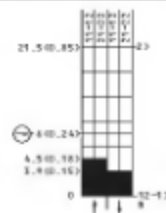
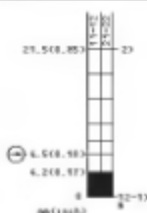
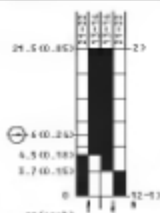
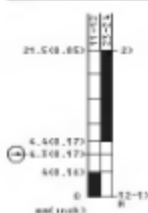
Switching element	Switch function	Switch contact	Designation	Voltage	Continuous current
Slow-action	changeover	1 NC/1 NO	U1Z	250 V	10 A
Snap-action	changeover	1 NC/1 NO	SU1Z	250 V	10 A
Slow-action	normally-closed	2 NC	A2Z	250 V	10 A
Snap-action	normally-closed	2 NC	SA2Z	250 V	10 A



Designation	SKT-U1Z M3	SKT-SU1Z M3	SKT-AZZ M3	SKT-SA2Z M3
Part number	601.6419.059	601.6409.060	601.6409.064	601.6469.067
Switching diagram				
⊖ positive break, according to IEC 947-5-1 Chap. 3				
Za changeover contact is not galvanically isolated				
Zb changeover contact is galvanically isolated				
Slow-action contact/rapid-action contact				
Gasket inside (w)/outside (w)				

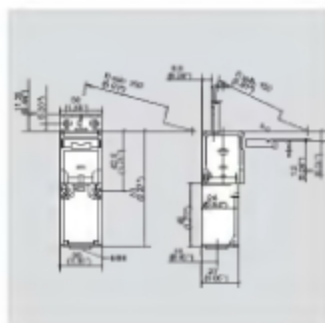
Contact travel mm

Tol. ± 0.25 mm

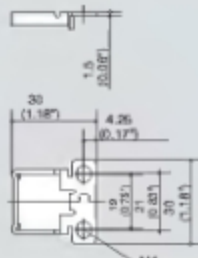
Actuating force N
Tol. ± 10%Switch angle degree
Tol. ± 3°Actuating torque Ncm
Tol. ± 10%↗ actuator in
↘ actuator out

Voltage	max	250 V AC	250 V AC	250 V AC	250 V AC
Continuous current	max	10 A	10 A	10 A	10 A
Making current, acc. to IEC 947-5-1 AC 15DC 13		●	●	●	●
Switching frequency	max	30/min	30/min	30/min	30/min
Med. operational life – number of switching cycles		1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶
Ambient temperature	min/max	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
Approvals		BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
Weight		0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb
Delivery: ex-stock/built to order		●	●	●	●

All dimensions in mm (inches)



Alternative M 2



Interlocking safety switches

SKI

Protection class IP 65



The slim design and dimensions of the SKI (according to EN 50047) allow it to be mounted onto narrow profile systems and in confined spaces. Operation can be performed both horizontally and vertically. This flexible form of mounting is supported by the ability to position the actuating head in 4 x 90° increments.

The SKI has the option of two new built-in operating functions.

- **Integrated forced ejection function (FE):**
The actuator is ejected from the switch:
 - preventing unauthorized use of a spare actuator to defeat the safety function
 - ensuring the guard must be closed securely to enable the machine to run
- **Integrated actuator holding force (FI 50 = 50 N):**
Guard doors which may open due to vibration can be held shut by using the SKI with increased actuator holding force of 50 N, without the need for bulky external latches. In addition several doors mounted in a straight line on one machine are kept closed.

The SKI is equipped with positive-break and galvanically-isolated contacts.

Available are:

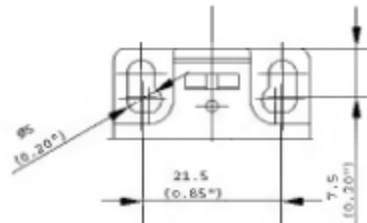
- 1 NC \leftrightarrow / 1 NO slow-action device
- 1 NC \leftrightarrow / 1 NO snap-action device
- 2 NC \leftrightarrow slow-action device
- 2 NC \leftrightarrow / 1 NO slow-action device

Mechanical data

- Enclosure and lid made from glass-fibre reinforced PA 6 (UL 94-V0)
- Switching device made from PA/St and stainless steel
- Actuator made from stainless steel
- Cable entry M 20 x 1.5 (optional: M 16 x 1.5)

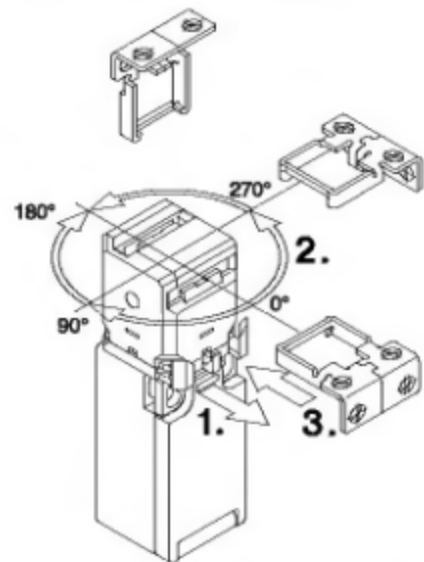
Mounting and installation

- The safety switch is mounted using 2 x M5 screws in the locating and mounting holes.
- The separate actuator is mounted using 2 x M4 screws. The safety switch and the actuator should be secured well, in order to prevent unintentional loosening (one-way and break-off screws, rivets etc.).



Positioning the actuator head

- Rotation in 4 x 90° increments: when mounted, the head is fixed into position by the clasp
- Horizontal or vertical operation



Warning

- **The safety switch must not be used as a mechanical end stop.**
- To preserve the level of safety, the safety switch must only be used in conjunction with the correct actuator.

Contact configuration

Switching element	Function	Contacts	Designation	Voltage	Continuous current
Slow-action	changeover	1 NC/1 NO	U1Z	250 V	10 A
Snap-action	changeover	1 NC/1 NO	SU1Z	250 V	10 A
Slow-action	normally-closed	2 NC	A2Z	250 V	10 A
Slow-action	changeover, overlapping	2 NC/1 NO	UV15Z	400 V	6 A



Designation	50-U1Z M3	50-SU1Z M3	50-AZZ M3	50-UV1SZ M3
Part number	601.6819.052	601.6809.057	601.6809.056	601.6869.058
Switching diagram				
⊕ positive break, according to IEC 947-5-1 Chap. 3				
Za changeover contact is not galvanically isolated				
Zb changeover contact is galvanically isolated				
Slow-action contact/rapid-action contact				
Gasket inside (w)/outside (w)				

Contact travel mm

Tol. ± 0.25 mm



Actuating force N

Tol. ± 10%

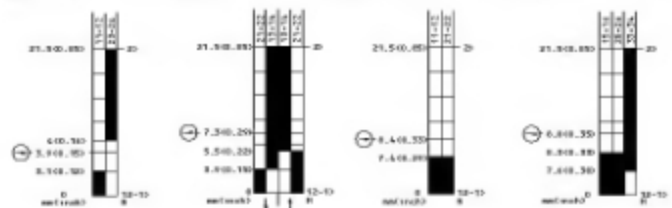
Switch angle degree

Tol. ± 3°



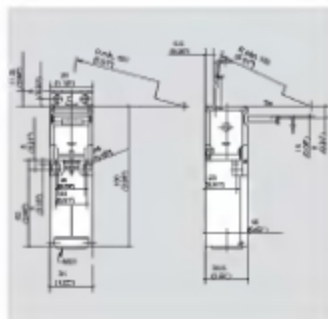
Actuating torque Ncm

Tol. ± 10%

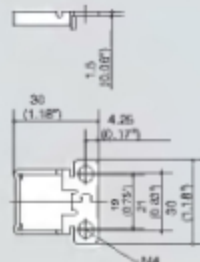
 actuator in
 actuator out


Voltage	max	250 V AC	250 V AC	250 V AC	400 V AC
Continuous current	max	10 A	10 A	10 A	6 A
Making current, acc. to IEC 947-5-1 AC 15DC 13		●	●	●	●
Switching frequency	max	30/min	30/min	30/min	30/min
Med. operational life – number of switching cycles		1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶
Ambient temperature	min/max	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
Approvals		BG, UL, CSA	BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
Weight		0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb	0.13 kg/0.29 lb
Delivery: ex-stock/built to order		●	●	●	●

All dimensions in mm (incl.)



Alternative M 2



Plastic-bodied interlocking safety switch

**SKC
SK**

Protection class IP 65

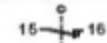


Designation
Part number
 Circuit diagram
 ⊕ Forced disconnect to IEC 947-5-1 chapter 3
 Za: not galvanically separated contacts
 Zb: galvanically separated contacts
 Slow make & break/snap-action
 Internal seal (iw)/external seal (w)

SKC-A1Z M
601.6169.039

SK-U1Z M
601.6119.016

SK-UV1Z M
601.6139.034



⊕ Zb

⊕ Zb

⊕ Zb

●/-

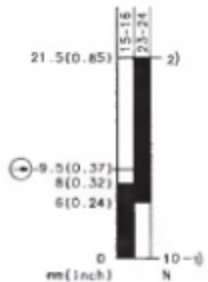
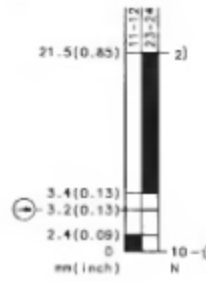
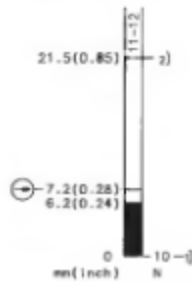
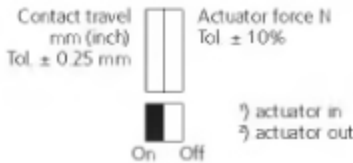
●/-

●/-

iw

iw

iw



Voltage max. 500 V AC
 Permanent current max. 10 A
 In-rush current complies with standards IEC 947-5-1 AC 15/DC 13
 Switching frequency max. 30/min.
 Mechanical life – number of switching actions 1 x 10⁶
 Operating temperature min./max. -30 °C/+80 °C
 -22 °F/+176 °F

500 V AC
 10 A
 ●
 30/min.
 1 x 10⁶
 -30 °C/+80 °C
 -22 °F/+176 °F

500 V AC
 10 A
 ●
 30/min.
 1 x 10⁶
 -30 °C/+80 °C
 -22 °F/+176 °F

500 V AC
 10 A
 ●
 30/min.
 1 x 10⁶
 -30 °C/+80 °C
 -22 °F/+176 °F

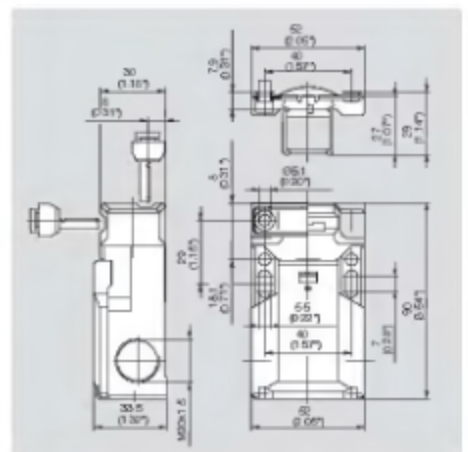
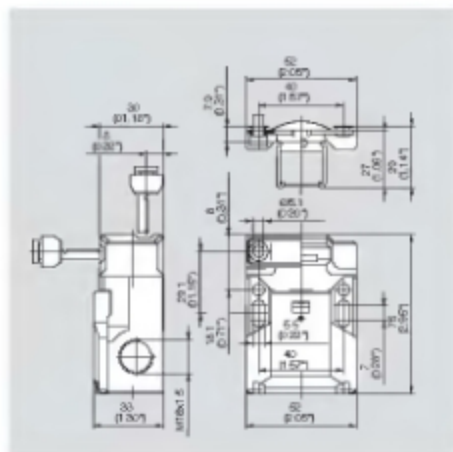
Approvals BG, UL, CSA
 Weight 0.11 kg/0.24 lb
 Delivery: ex-stock/built to order

BG, UL, CSA
 0.11 kg/0.24 lb
 ●/-

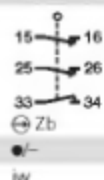
BG, UL, CSA
 0.13 kg/0.29 lb
 ●/-

BG, UL, CSA
 0.13 kg/0.29 lb
 ●/-

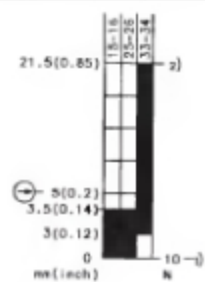
All dimensions in mm (inch)



SK-UV15Z M
601.6169.026



UV



400 V AC
6 A



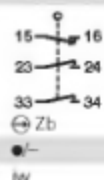
30/min.
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

BG, UL, CSA

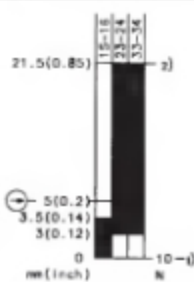
0.13 kg/0.29 lb



SK-UV16Z M
601.6169.027



UV



400 V AC
6 A



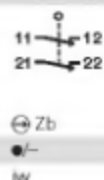
30/min.
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

BG, UL, CSA

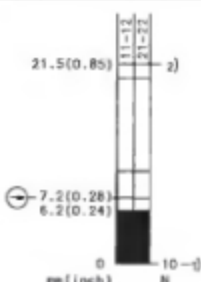
0.13 kg/0.29 lb



SK-AZZ M
601.6169.036



UV



500 V AC
10 A



30/min.
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

BG, UL, CSA

0.13 kg/0.29 lb



Actuator selection table

SKC/SK

Safety switch DIN EN 60947-5-1

- ⊕ Forced disconnection of NC contacts
- Galvanically separated contacts according to 2b form

Approvals

- UL, CSA
- BG



Actuator M

- Metal
- Stainless steel



Actuator P

- Thermoplastic
- Polyamide

Standard models Single & double poles	Actuator retention force	Contact diagram
SKC-A1Z	10N	
SKC-A1Z F30	30N	
SKC-A1Z F100	100N	
SK-U1Z	10N	
SK-U1Z F30	30N	
SK-U1Z F100	100N	
SK-UV1Z	10N	
SK-UV1Z F30	30N	
SK-UV1Z F100	100N	
SK-AZZ	10N	
SK-AZZ F30	30N	
SK-AZZ F100	100N	
SK-SU1Z	10N	
SK-SU1Z F30	30N	
SK-SU1Z F100	100N	

Part number Designation	Part number Designation
601.6169.039 SKC-A1Z M	601.6169.054 SKC-A1Z P
o	o
601.6169.003 SKC-A1Z F100 M	-
601.6119.016 SK-U1Z M	601.6119.035 SK-U1Z P
611.6119.109 SK-U1Z F30 M	o
601.6119.001 SK-U1Z F100 M	-
601.6139.034 SK-UV1Z M	o
o	o
o	-
601.6169.036 SK-AZZ M	o
601.6169.053 SK-AZZ F30 M	o
601.6169.024 SK-AZZ F100 M	-
o	o
o	o
o	-

Standard models Three poles	Actuator retention force	Contact diagram
SK-UV1SZ	10N	
SK-UV1SZ F30	30N	
SK-UV1SZ F100	100N	
SK-UV16Z	10N	
SK-UV16Z F30	30N	
SK-UV16Z F100	100N	

Part number Designation	Part number Designation
601.6169.026 SK-UV1SZ M	o
601.6169.061 SK-UV1SZ F30 M	o
601.6169.025 SK-UV1SZ F100 M	-
601.6169.027 SK-UV16Z M	o
o	o
o	-

o technically possible (on request)
- not available



Actuator F

- Spring loaded to accommodate over-travel
- Stainless steel or polyamide

Part number	Part number
Designation	Designation
0	601.6169.087
0	SKC-A 1Z MRU
0	0
0	0
601.6119.074	601.6119.084
SK-U1Z PF	SK-U1Z MRU
0	0
0	0
0	0
0	0
0	0
0	601.6169.085
0	SK-A2Z MRU
0	0
0	601.6169.032
0	SK-A2Z F100 MRU
0	0
0	0
0	0

Part number	Part number
Designation	Designation
601.6169.063	601.6169.086
SK-U1S2 MF	SK-U1S2 MRU
0	0
0	0
0	0
0	0
0	0
0	0



Actuator MRU

- Adjustable horizontally & vertically
- Flexible
- Stainless steel
- Spring loaded to accommodate over-travel

Technical data Standard models single & double poles

Insulation voltage: $U_i = 500$ V
Thermal constant current $I_{th} = 10$ A
Switching frequency: Max. 30/min.
Mechanical life: 1×10^6 strokes
Operating temperature: -30 °C/+80 °C
Weight 0.13 kg/0.29 lbs

Technical data Standard models three poles

Insulation voltage: $U_i = 400$ V
Thermal constant current $I_{th} = 6$ A
Switching frequency: Max. 30/min.
Mechanical life: 1×10^6 strokes
Operating temperature: -30 °C/+80 °C
Weight 0.13 kg/0.29 lbs

- **Forced Ejection (FE):**
The actuator mechanism is spring loaded to forcibly eject the actuator.
- **Actuator Retention (F 30, FI 100)**
This model retains the actuator with the indicated force in Newtons.
- **MRU Actuator:**
This actuator is spring mounted to accommodate some misalignment as well as over travel.

Important note:

To ensure safety integrity, actuators should only be purchased together with the safety switch.

Plastic-bodied safety switch with separate actuator

ENK ... VTU

Protection class IP 65

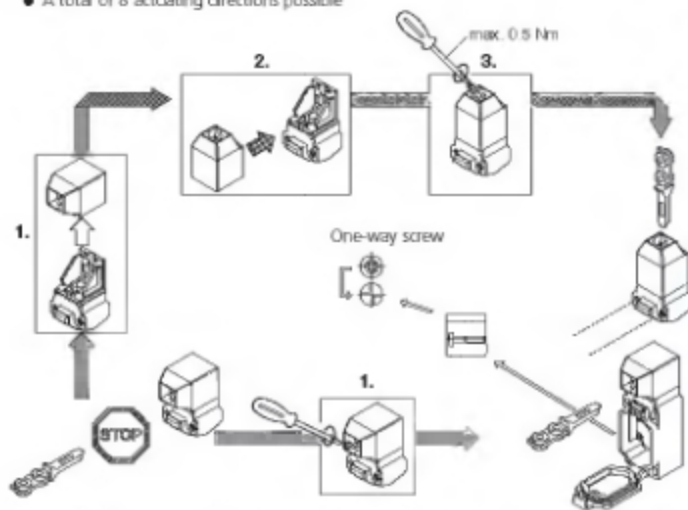


The safety switch ENK ...VTU offers the optimum combination of a cost-reducing plastic-bodied housing and an actuating system for difficult industrial demands.

The housing, made of glass-fibre reinforced polyamide, fulfils the demands required for isolated low-voltage switching and contact devices. Due to its pin shaped geometry, the particularly robust, separate actuator is suitable for use in tolerance-burdened protective equipment. Optional actuators, which can be adjustable or flexibly mounted, guarantee a high mechanical loading capacity.

- Safety contacts with positive break and galvanic isolation
- Contacts: 1NC+1NO, 2NC or 2NC+1NO (with overlapping contacts)
- Wiring space with hinged, self-locking lid
- Protection class IP 65
- Radius actuator and lateral actuator optional

- Mounting dimensions according to EN 50041
- Integrated mounting plate made of metal
- Actuation in horizontal and vertical directions
- A total of 8 actuating directions possible



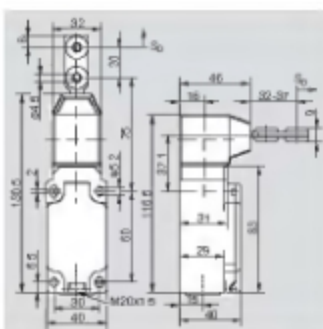
The positioning of the actuating head in either a horizontal or vertical actuating direction offers the choice of 8 actuating directions for the actuator.

Designation	
Part number	
Switching diagram	
⊖ Forward disconnect	
IEC 947-5-1 Chap. 3	
Za: changeover contact is not galvanically isolated	
Zb: changeover contact is galvanically isolated	
Slowaction contact/impaction contact	
Gasket inside (W)/outside (W)	

Contact travel mm	
Tol. ± 0.25 mm	
Actuating force N	
Tol. ± 10%	

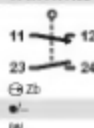
Voltage	max
Continuous thermal current	max
Making current, acc. to IEC 947-5-1 AC 15DC 13	
Switching frequency	max
Mech. operational life – number of switching cycles	
Ambient temperature	min./max

Approvals	
Pending Approvals	
Weight	
Delivery ex-stock/built to order	



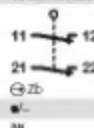


ENK-UVZ VTU
601.6619.132



W
W

ENK-A2Z VTU
601.6669.133

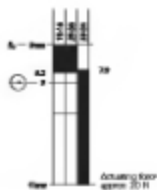
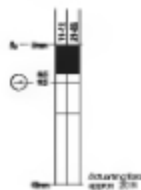
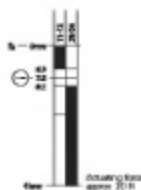


W
W

ENK-UV15Z VTU
601.6669.154



W
W



250 VAC
10 A
240 W/3 A
(AC 15) A300
30min
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

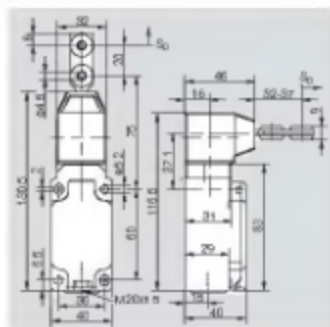
250 VAC
10 A
240 W/3 A
(AC 15) A300
30min
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

400 VAC
6 A
240 W/1,5 A
(AC 15) A300
30min
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

-
BG
0.2 kg
W

-
BG
0.2 kg
W

-
BG
0.2 kg
W



All dimensions in mm

Metal-bodied interlocking safety switches

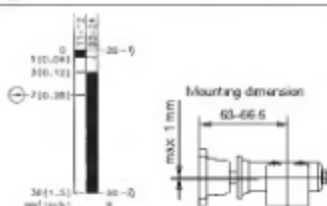
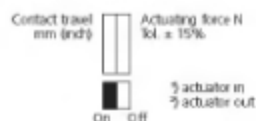
ENM2 GC

Protection class IP 65



Designation	ENM2-U/IZ VTW
Part number	601.629.100
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contact	
Slow make & break/stop-action	
Internal seal (w)/external seal (e)	

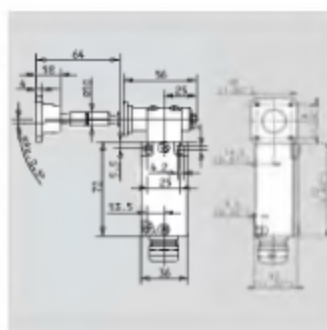
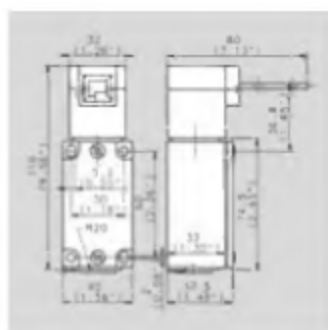
Designation	GC-U1 VT 50°
Part number	612.1100.555
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contact	
Slow make & break/stop-action	
Internal seal (w)/external seal (e)	



Voltage	max	500 V AC
Permanent current	max	10 A
Inrush current complies with standards IEC 947-5-1 AC 15DC 13		
Switching frequency	max	50/min
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min./max	-30 °C/+80 °C -22 °F/+176 °F
Approvals		BC, UL, CSA (in preparation)
Weight		0.34 kg/0.75 lb
Delivery: ex-stock/built to order		●

Voltage	max	500 V AC
Permanent current	max	10 A
Inrush current complies with standards IEC 947-5-1 AC 15DC 13		
Switching frequency	max	50/min
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min./max	-30 °C/+80 °C -22 °F/+176 °F
Approvals		BC, UL, CSA
Weight		0.31 kg/0.68 lb
Delivery: ex-stock/built to order		●

All dimensions in mm (inch)



Interlocking solenoid safety switches with plastic body

SLK

Safelock *Ready*
 Plastic body
 Protection class IP 67
 Power to lock or unlock



Product advantages

- **Safety** built into the system through two independent safety circuits, flexible contact assembly with max. 4 NC ⊕
- **Universal** integration into system due to multiple voltage supply 24–48 V DC and 24–230 V AC (Standard: 24 V AC/DC)
- **Flexible** integration due to rotatable actuating head (4 x 90°) and horizontal or vertical operation
- **Compact** design with slim dimensions with total length of 170 mm
- **Innovative** installation due to cage-clamp connection technology
- **Function** according to GS ET 19, EN 60 204-1 and EN 60 947-5-1.

Safe application



The actuator made from stainless steel guarantees reliable operation. The coding prevents manipulation and bypassing in the "simplest possible way". The optional radius actuator allows smaller safety doors to be monitored. It can be installed horizontally or vertically, and is also made from stainless steel.

Innovative installation



The electrical connection of the SLK is safe and reliable. A terminal block with cage-clamp terminal connectors is used. The terminal compartment is separate from all working parts ensuring that the connections are safely made. A terminal block with conventional screw-type connections is available as an option.

The terminal compartment is designed according to protection class IP 67.

The LED indicator showing the actual status is optional.

Flexible application



The SLK can be operated both horizontally and vertically. The necessary pre-setting is carried out before mounting by simply adjusting the actuating head. This flexible method of mounting is supported by the ability to position the actuating head in 4 x 90° increments.

Safety in demanding environmental conditions



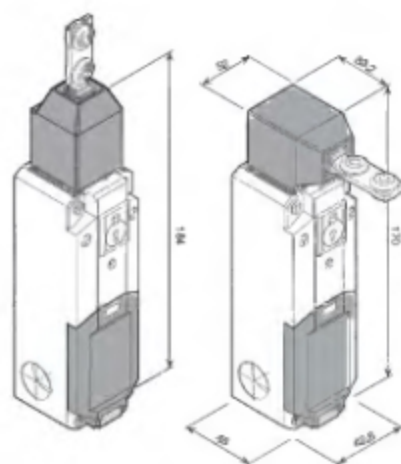
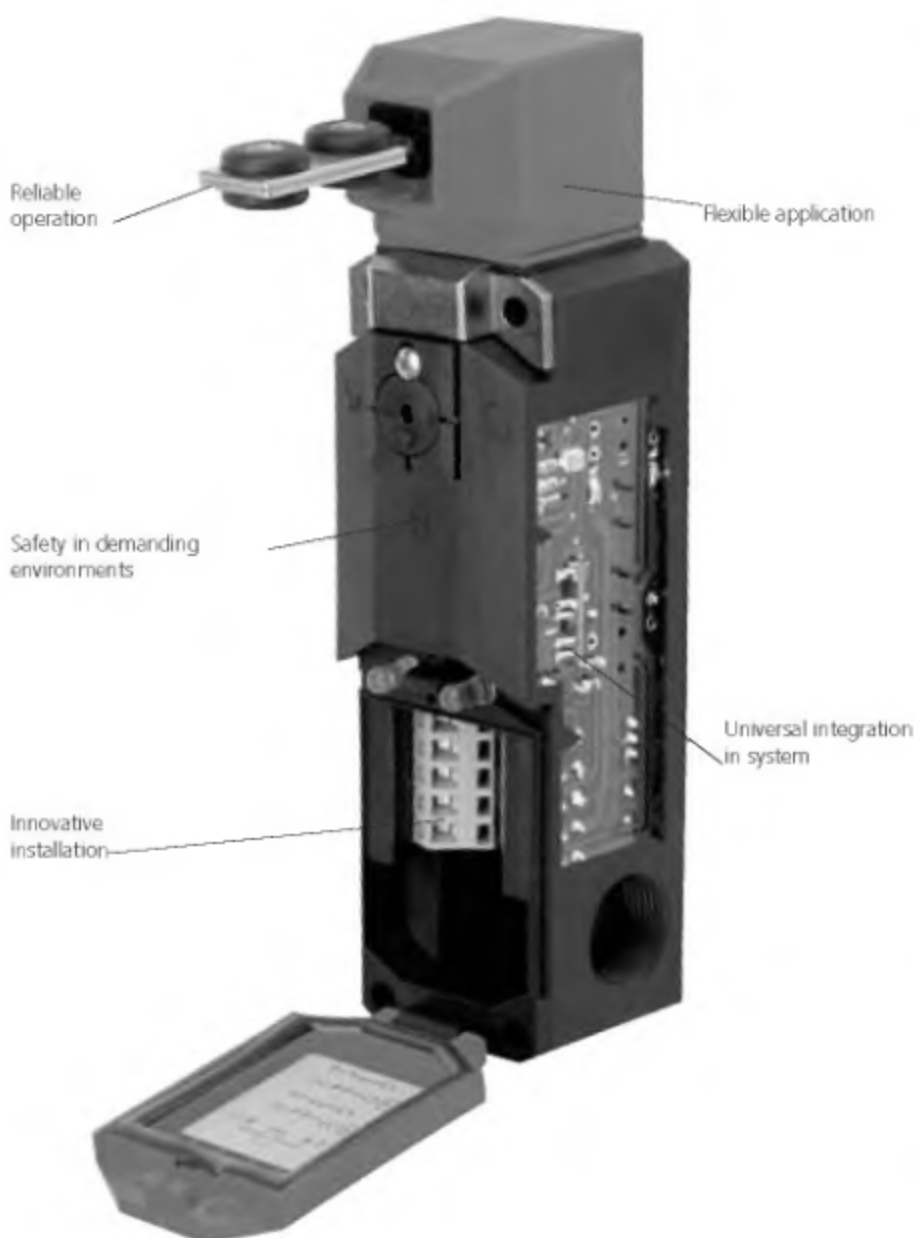
The use of an innovative electromechanical system (Berrstein patent) consisting of a solenoid actuator, electro-magnetic retention system and electronic controller, results in a very low power consumption. This allows reliable continuous operation even in high ambient temperatures.

Universal integration in system



In the multiple voltage version, the SLK can be connected to all control voltages from 24 to 48 V DC as well as from 24 to 230 V AC. The standard SLK is equipped for a control voltage of 24 V DC/AC.

High-level safety at low cost



Mounting

- The safety switch is mounted using a minimum of two M5 screws in the mounting holes.
- The separate actuator is to be suitably secured to prevent unintentional loosening (one-way and break-off screws, rivets).
- The user sets the actuating head to either horizontal or vertical operation before installation.
- This is achieved by changing the alignment of the actuating head and the upper and lower parts are then secured together using a security screw.
- The four operating directions are selected by pulling forward the clasp and turning the actuating head.

Warning

- **The safety switch must not be used as a mechanical end stop.**
- The interlock of the safety device is maintained on power failure only with the types SLK-FVTU... (spring-locking).
- To operate the auxiliary release, first loosen the screw and turn the actuating lever.
- To maintain the safety level, the safety switch may only be used in conjunction with the corresponding actuator.

Product designation system for SLK safety switches

Switch	Locking principle	Actuating device	Operating voltage	Two-digit contact code: 1st digit = Actuator contact(s) 2nd digit = Solenoid contact(s)	Auxiliary release function	Additional function
SLK	F Spring force M Magnet force	VTU	24UC- 24-230MC	1 = 1NF ⊕ 2 = 2NF ⊕ 3 = 1NO ⊕ 4 = 2NO ⊕ 5 = 1NF ⊕ 1NO 6 = no contact	AR Auxiliary release	L = LED R = Radius actuator S = Plug-in connector A = Adaptor X = Special design

Example: SLK FVTU24UC-55-ARR = type F, 24 V AC/DC, 1 NF ⊕ 1 NO on the interlock, 1 NF ⊕ 1 NO on the safety equipment, auxiliary release, radial actuator

Table of standard products

SLK

Part number	Designation	Locking Spring force Magnet force	Connection assembly		Control voltage	Add. functions		Actuator Standard Radius actuator
			Safety equipment	Locking		Auxiliary release (AR)	LED (L)	
601.8119.001	SLK-FVTU24UC-55-AR	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	AR	–	Standard
601.8119.002	SLK-FVTU24-230MC-55-AR	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24-48 V DC + 24-230 V AC	AR	–	Standard
601.8119.003	SLK-MVTU24UC-55	Magnet force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	–	–	Standard
601.8119.004	SLK-MVTU24-230MC-55	Magnet force	1NF ⊕ 1NO	1NF ⊕ 1NO	24-48 V DC + 24-230 V AC	–	–	Standard
601.8169.005	SLK-FVTU24UC-21-AR	Spring force	2NF ⊕	1NF ⊕	24 V AC/DC	AR	–	Standard
601.8169.006	SLK-FVTU24-230MC-21-AR	Spring force	2NF ⊕	1NF ⊕	24-48 V DC + 24-230 V AC	AR	–	Standard
601.8119.009	SLK-FVTU24UC-55-ARL	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	AR	L	Standard
601.8169.010	SLK-FVTU24UC-21-ARL	Spring force	2NF ⊕	1NF ⊕	24 V AC/DC	AR	L	Standard
601.8119.012	SLK-FVTU24-230MC-55-ARL	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24-48 V DC + 24-230 V AC	AR	L	Standard
601.8169.013	SLK-FVTU24-230MC-21-ARL	Spring force	2NF ⊕	1NF ⊕	24-48 V DC + 24-230 V AC	AR	L	Standard
601.8119.015	SLK-FVTU24UC-55-ARR	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	AR	–	Radius actuator
601.8169.016	SLK-FVTU24UC-21-ARR	Spring force	2NF ⊕	1NF ⊕	24 V AC/DC	AR	–	Radius actuator
601.8119.018	SLK-FVTU24-230MC-55-ARR	Spring force	1NF ⊕ 1NO	1NF ⊕ 1NO	24-48 V DC + 24-230 V AC	AR	–	Radius actuator
601.8169.019	SLK-FVTU24-230MC-21-ARR	Spring force	2NF ⊕	1NF ⊕	24-48 V DC + 24-230 V AC	AR	–	Radius actuator
601.8119.021	SLK-MVTU24UC-55-L	Magnet force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	–	L	Standard
601.8169.022	SLK-MVTU24UC-21-L	Magnet force	2NF ⊕	1NF ⊕	24 V AC/DC	–	L	Standard
601.8119.024	SLK-MVTU24UC-55-R	Magnet force	1NF ⊕ 1NO	1NF ⊕ 1NO	24 V AC/DC	–	–	Radius actuator
601.8169.025	SLK-MVTU24UC-21-R	Magnet force	2NF ⊕	1NF ⊕	24 V AC/DC	–	–	Radius actuator

According to the part designation systematic, customer specific versions (i.e. different contacts) are possible (see page 76)

Electrical characteristics

Switching devices

Rated isolated voltage Ui:	250 V
Application category:	AC 15 230 V/4 A
Thermal current Ith:	10 A
Short-circuit protection:	DIAZED - DIN VDE 0636 Part 1 6 A/inert gL/gG

Electronic magnets

Duration of current:	3.4 / 100% ED
Temperature class:	E (120 °C)
Pulse power:	56 VA (0.2 s)
Holding power:	1.1 VA (constant)
Switching frequency:	600 / h max.

Mechanical characteristics

Enclosure:	PA 6 GV (UL94-V0)
Lid:	PA 6 GV (UL94-V0)
Actuating device:	PA 6 GV / GD
Separate actuator:	St/PA
Ambient temperature:	-25 °C to + 70 °C
Switching function:	2 NC; 2 NO z. B.
Switching principal:	4 push-button devices
Mechanical life:	1 million cycles
Actuating radius:	R = 400 mm min.
Approach speed:	V = 0.5 m/s max.
Mounting:	4 x M5 screws
Connection cross section:	1.5 mm ² flex. max.
Connection type:	cage clamp
Cable entries:	3x M 20 x 1.5
Weight:	approx. 0.3 kg
Protection class:	IP 67
Mounting position:	variable
Locking:	Power to lock or unlock
Locking force:	2 000 N
Isolated:	☐

Interlocking solenoid safety switches with metal body

SLM

Protection class IP 67



Machines, which have a "run down time" after they have been switched off, are often part of automatic production processes.

Safety devices should prevent access by the operator and must be kept locked until the dangerous movement has stopped. The safety-position switch (with suitable control) will ensure that safety guards, doors and other covers are kept closed as long as there is danger.

The safety switch has three main functions:

- Allowing the machine to operate while the guard is closed and locked
- Isolating the machine when the guard is open
- Monitoring the position of the guard and the actuator (open or closed)

With the safety switch SLM the user has a position switch with separate actuator and built in locking device, which meets the criteria of interlocking devices, according to EN 1088, the EN 292 part 1 and 2 are also valid since 01.01.1995 complying to the necessary machine guide-lines.

System description

The safety switch SLM with lock is available in spring and solenoid interlocking design. The separate actuator is securely mounted to the closing guard. When the actuator is inserted into the switch the guard door position is then monitored and either locked or released (dependant on control system/status of machine).

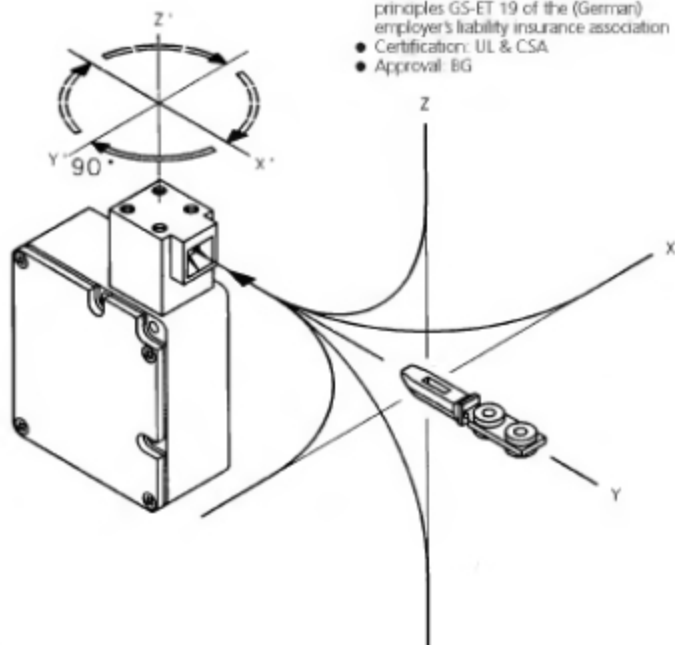
The separate actuator provides a very high level of "operator interference" protection because of its triple coding.

The locking device in the safety switch SLM is integrated into the switch housing. In the spring latch version locking is achieved with a spring mechanism, in the solenoid latch version locking is achieved by energizing an electromagnet. Both types link the actuator with a switch mechanism for position indication.



Benefits of this system

- All elements are enclosed in one metal housing
- High resistance to heavy industrial use
- Compact housing for space saving installation
- Triple coded actuator with high interference protection
- Simple alteration of actuator approach direction in 90° positions (adjust only with actuator fitted)
- All switch functions enclosed in inner module
- Safe and easy wiring due to terminals in separate connection area
- Individual contact configurations possible
- Integrated safety circuit protects against voltage peaks and incorrect termination
- Mounting with M 5 screws according to DIN EN 50041
- Construction design according to VDE 0660 part 200 IEC 947-5-1 control principles GS-ET 19 of the (German) employer's liability insurance association
- Certification: UL & CSA
- Approval: BG

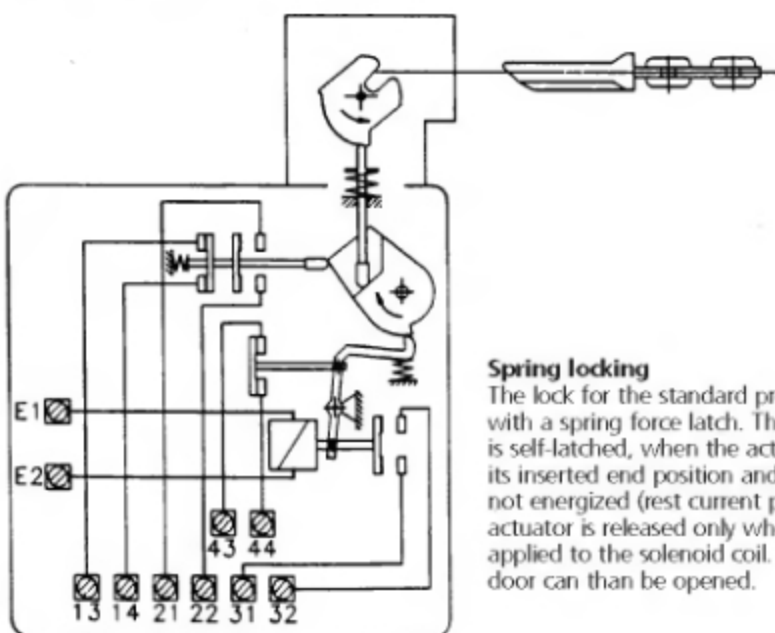


Important note:

The actuator head position may only be changed with the actuator inserted.

Locking systems

SLM metal-bodied safety switches with separate actuators are available with spring locking as well as solenoid locking.



Spring locking

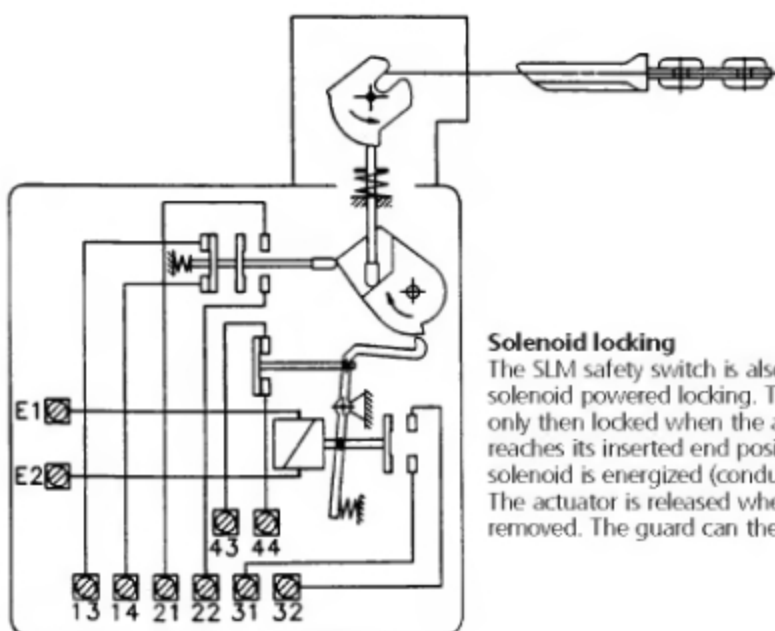
The lock for the standard product operates with a spring force latch. The safety device is self-latched, when the actuator reaches its inserted end position and the solenoid is not energized (rest current principle). The actuator is released only when current is applied to the solenoid coil. The guard door can then be opened.

Options

- Individual contact configurations possible
- Radius actuator for actuating radius lower than 400 mm
- Auxiliary unlock
- Key override
- Emergency stop override
- Visual indication of operating status of the guard and lock
- Actuator for operating with head rotated 180° from standard
- Customised solutions

Important note:

Safety switch model SLM with emergency stop override must be installed **inside** the guarded (dangerous) area. The emergency stop should only be able to be activated to ensure escape from a dangerous area in case of a system error.



Solenoid locking

The SLM safety switch is also available with solenoid powered locking. The guard is only then locked when the actuator reaches its inserted end position and the solenoid is energized (conducting). The actuator is released when power is removed. The guard can then be opened.

Interlocking solenoid safety switch SLM selection table: standard models

Type	Locking type		Actuator head	Operating voltage						Contact type: Actuator (guard) position			Contact type: Solenoid status			
	Spring locking	Solenoid locking		12 V DC	24 V DC	24 V AC	24 V UC	48 V AC	120 V AC	230 V AC	1NC	2NC	1NC 1NO	1NC	2NC	1NC 1NO
SLM			VTW													
●	●	-	●	-	●	-	-	-	-	-	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	●	-	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	●	-	-	-	-	-	-	-	●	●	-	-
●	●	-	●	-	-	-	-	-	-	●	-	-	●	●	-	-
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	●	-	●	-	-	-	-	-	-	●	-	-	●	-	-	●
●	-	●	●	-	●	-	-	-	-	-	-	-	●	-	-	●
●	-	●	●	-	-	-	-	-	●	-	-	-	●	-	-	●
●	-	●	●	-	●	-	-	-	-	-	-	-	●	●	-	-
●	-	●	●	-	-	-	-	-	-	●	-	-	●	●	-	-

Description/Reference

SLM	F	M	VTW	12 DC	24 DC	24 DC	24 UC	48 AC	120 AC	230 AC	1	2	5	1	2	5
-----	---	---	-----	-------	-------	-------	-------	-------	--------	--------	---	---	---	---	---	---

Example for Type description: Spring lock mechanism (F)

●	●	-	●	○	○	○	○	●	○	○	○	○	●	○	●	○	○
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Example for Type description: Solenoid lock mechanism (M)

●	-	●	●	●	○	○	○	○	○	○	○	○	●	○	○	●	○
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

● Standard functions

○ Technically possible function combination

- Not available

Auxiliary unlock function				Additional functions	Additional functions	Additional functions	Additional functions	Additional functions	Designation	Part number	Page
– without	AR Auxiliary unlock	KR Key override	ER Emergency stop override	LED	Radius actuator	Plug connector	Adapter 1/2" NPT	Actuator for 180° head rotation			
–	●	–	–	–	–	–	–	–	SLM-F/TW 24DC-55-AR	601.7119.020	74
–	●	–	–	–	–	–	–	–	SLM-F/TW 120AC-55-AR	601.7119.032	74
–	●	–	–	–	–	–	–	–	SLM-F/TW 230AC-55-AR	601.7119.022	75
–	●	–	–	–	–	–	–	–	SLM-F/TW 24DC-51-AR	601.7119.028	75
–	●	–	–	–	–	–	–	–	SLM-F/TW 230AC-51-AR	601.7119.029	75
–	–	●	–	–	–	–	–	–	SLM-F/TW 230AC-55-KR	601.7119.057	76
–	–	–	● ^{*)}	–	–	–	–	–	SLM-F/TW 230AC-55-ER	601.7119.058	76
–	●	–	–	●	–	–	–	–	SLM-F/TW 120AC-55-ARL	601.7119.051	77
–	●	–	–	–	–	–	–	●	SLM-F/TW 230AC-55-AR180	601.7119.060	77
●	–	–	–	–	–	–	–	–	SLM-MVTW 24DC-55	601.7119.023	78
●	–	–	–	–	–	–	–	–	SLM-MVTW 120AC-55	601.7119.033	78
●	–	–	–	–	–	–	–	–	SLM-MVTW 230AC-55	601.7119.024	79
●	–	–	–	–	–	–	–	–	SLM-MVTW 24DC-51	601.7119.030	79
●	–	–	–	–	–	–	–	–	SLM-MVTW 230AC-51	601.7119.031	79
–	AR	KR	ER	L	R	S	A	180			
–	○	●	○ ^{*)}	○	○	●	○	○	SLM-F/TW 48AC-21-KRS	on request	
●	–	–	○ ^{*)}	○	●	○	○	○	SLM-MVTW 12DC-22-R	on request	

^{*)} Important note: Safety switch model SLM with emergency stop override must be installed **inside** the guarded (dangerous) area. The emergency stop should **only** be able to be activated to ensure escape from a dangerous area in case of a system error.

Interlocking solenoid safety switch – spring force version –

SLM

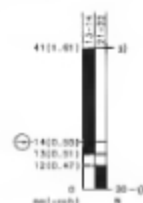
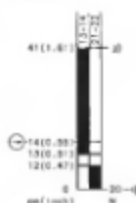
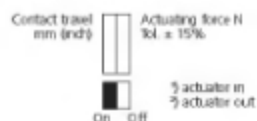
Protection class IP 67



Designation	SUM-FVTW 24DC-55-AR
Part number	601.7119.020
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contact	
Slow make & break/snag-action	
Internal seal (w)/external seal (x)	

Designation	SUM-FVTW 120AC-55-AR
Part number	601.7119.032
Circuit diagram	
⊕ Zb	
1000 N	

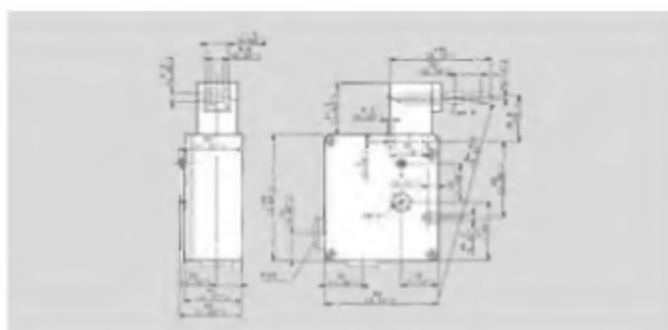
Designation	SUM-FVTW 120AC-55-AR
Part number	601.7119.032
Circuit diagram	
⊕ Zb	
1000 N	



Voltage	max	250 V
Permanent current	max	10 A
Inrush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min/max	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.81 kg/1.79 lb
Delivery: ex-stock/built to order		

Voltage	max	250 V
Permanent current	max	10 A
Inrush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min/max	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.81 kg/1.79 lb
Delivery: ex-stock/built to order		

All dimensions in mm (inch)



SLM-FVTW 230AC-55-AR

601.7119.022



⊕ Zb

⊕ Zb

●/—

●/—

1000 N

SLM-FVTW 24DC-51-AR

601.7119.028



⊕ Zb

⊕ Zb

●/—

●/—

1000 N

SLM-FVTW 230AC-51-AR

601.7119.029



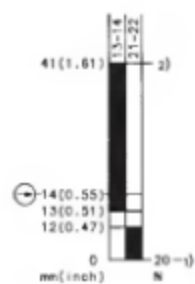
⊕ Zb

⊕ Zb

●/—

●/—

1000 N



250 V

10 A

●

1 x 10⁶

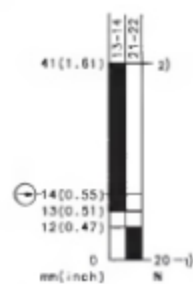
-30 °C/+60 °C

-22 °F/+140 °F

BG, UL, CSA

0.81 kg/1.79 lb

●/—



250 V

10 A

●

1 x 10⁶

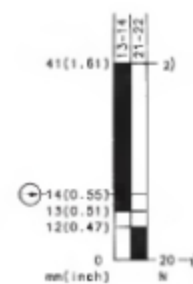
-30 °C/+60 °C

-22 °F/+140 °F

BG, UL, CSA

0.81 kg/1.79 lb

—●



250 V

10 A

●

1 x 10⁶

-30 °C/+60 °C

-22 °F/+140 °F

BG, UL, CSA

0.81 kg/1.79 lb

—●

Interlocking solenoid safety switch – spring force version –

SLM

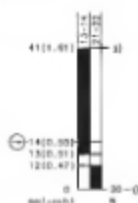
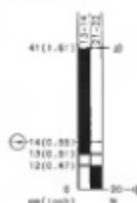
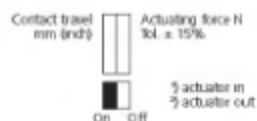
Protection class IP 67



Designation	SUM-FVTW 2.30AC-55-KR
Part number	601.7119.057
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contact	
Slow make & break snap-action	
Internal seal (w)/external seal (e)	

Designation	SUM-FVTW 2.30AC-55-ER
Part number	601.7119.058
Circuit diagram	
⊕ Zb	⊕ Zb
1000 N	1000 N

Designation	SUM-FVTW 2.30AC-55-ER
Part number	601.7119.058
Circuit diagram	
⊕ Zb	⊕ Zb
1000 N	1000 N

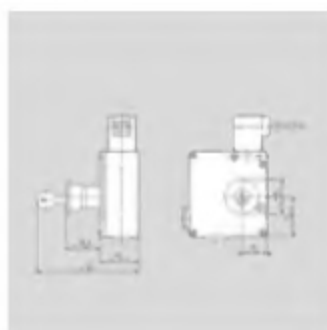


Voltage	max	250 V
Permanent current	max	10 A
Inrush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min/max	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.88 kg/1.95 lb
Delivery: ex-stock/built to order		●

Voltage	max	250 V
Permanent current	max	10 A
Inrush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min/max	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.88 kg/1.95 lb
Delivery: ex-stock/built to order		●

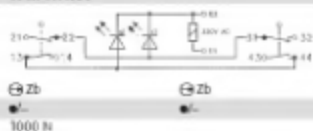
Voltage	max	250 V
Permanent current	max	10 A
Inrush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min/max	-30 °C/+60 °C -22 °F/+140 °F
Approvals		BG, UL, CSA
Weight		0.88 kg/1.95 lb
Delivery: ex-stock/built to order		●

All dimensions in mm (inch)

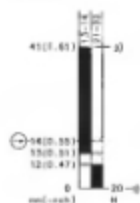




SLM-FV1W 120AC-55-ARL
601.7119.051



SLM-FV1W 230AC-55-AR180
601.7119.060



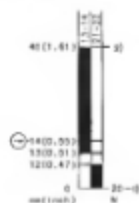
250 V
10 A

1 x 10°
-30 °C/+60 °C
-22 °F/+140 °F

BG, UL, CSA

0.83 kg/1.83 lb

●



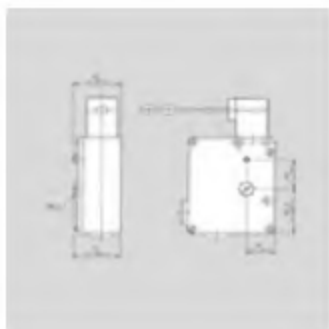
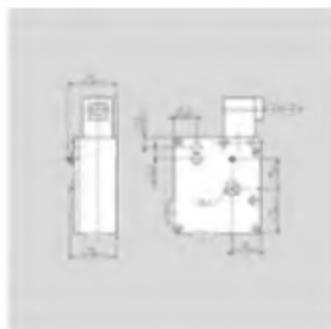
250 V
10 A

1 x 10°
-30 °C/+60 °C
-22 °F/+140 °F

BG, UL, CSA

0.83 kg/1.83 lb

●



Metal bodied safety switches with separate actuator and solenoid latch interlocking

SLM

Protection IP 67



Reference type

Part number

Circuit diagram

⊕ Forced disconnect to

IEC 947-5-1 chapter 3

Za: not galvanically separated contacts

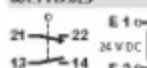
Zb: galvanically separated contact

Slow make & break/snag-action

Internal seal (w)/external seal (x)

SUM-MVW 24DC-55

601.7119.023



⊕ Zb

●

1000 N

SUM-MVW 120AC-55

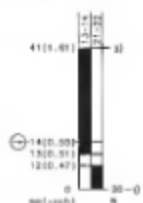
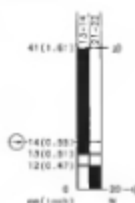
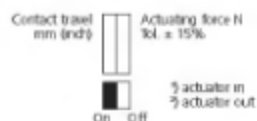
601.7119.033



⊕ Zb

●

1000 N



Voltage max 250 V

Permanent current max 30 A

Inrush current complies with standards

IEC 947-5-1 AC 15DC 13

Mechanical life – number of switching actions

Operating temperature min/max 1 x 10⁶
-30 °C/+60 °C
-22 °F/+140 °F

250 V

30 A

●

1 x 10⁶

-30 °C/+60 °C

-22 °F/+140 °F

Approvals UL, CSA

Weight 0.81 kg/1.79 lb

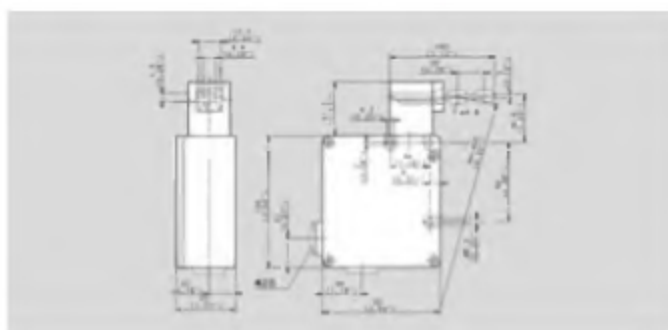
Stock status: In stock/Built to order

UL, CSA

0.81 kg/1.79 lb

●

All dimensions in mm (inch)



SLM-MVTW 230AC-55

601.7119.024



⊕ Zb

⊕ Zb

●/—

●/—

1000 N

SLM-MVTW 24DC-51

601.7119.030



⊕ Zb

⊕ Zb

●/—

●/—

1000 N

SLM-MVTW 230AC-51

601.7119.031



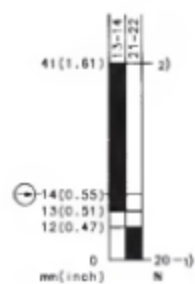
⊕ Zb

⊕ Zb

●/—

●/—

1000 N



250 V

10 A

●

1 x 10⁶

-30 °C/+60 °C

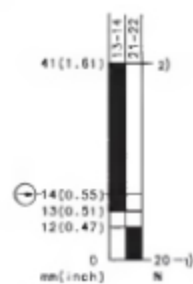
-22 °F/+140 °F

UL, CSA

BG

0.81 kg/1.79 lb

●/—



250 V

10 A

●

1 x 10⁶

-30 °C/+60 °C

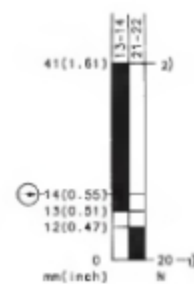
-22 °F/+140 °F

UL, CSA

BG

0.81 kg/1.79 lb

●/—



250 V

10 A

●

1 x 10⁶

-30 °C/+60 °C

-22 °F/+140 °F

UL, CSA

BG

0.81 kg/1.79 lb

—●

Plastic-bodied safety switches for hinged lids/guards I88-VKS, I88-VKW

Protection class IP 65



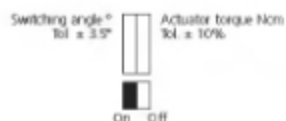
Metal-bodied safety switches for hinged lids/guards GC-VKS, GC-VKW

Protection class IP 65



Designation	I88-U12 VKS
Part number	608.6100.093
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contact	
Slow make & break/action	
Internal seal (w)/external seal (w)	

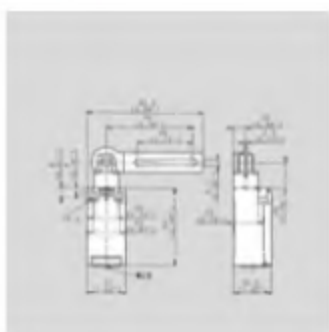
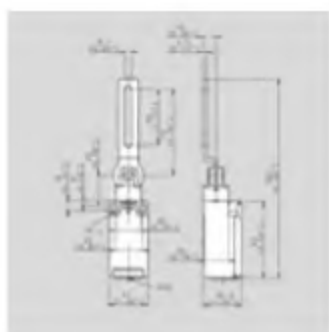
Designation	I88-U12 VKW FE
Part number	608.6100.094
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contact	
Slow make & break/action	
Internal seal (w)/external seal (w)	



Voltage	max	500 V AC
Permanent current	max	10 A
In-rush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Switching frequency	max	50/min
Mechanical life – number of switching actions		1×10^6
Operating temperature	min./max	$-30^\circ\text{C}/+80^\circ\text{C}$ $-22^\circ\text{F}/+176^\circ\text{F}$
Approvals		BG, UL, CSA
Weight		0.09 kg/0.20 lb
Delivery: ex-stock/built to order		➔

Voltage	max	500 V AC
Permanent current	max	10 A
In-rush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Switching frequency	max	50/min
Mechanical life – number of switching actions		1×10^6
Operating temperature	min./max	$-30^\circ\text{C}/+80^\circ\text{C}$ $-22^\circ\text{F}/+176^\circ\text{F}$
Approvals		BG, UL, CSA
Weight		0.09 kg/0.20 lb
Delivery: ex-stock/built to order		➔

All dimensions in mm (inch)





IB9-U12 VKW U
60R.6100.095



500 V AC
10 A

50min
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

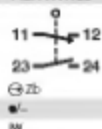
BG, UL, CSA

0.05 kg/0.20 lb

W



GC-U12 VKS
612.1100.622



500 V AC
10 A

20min
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

BG, UL, CSA

0.20 kg/0.44 lb

W



GC-U12 VKW
612.1100.623



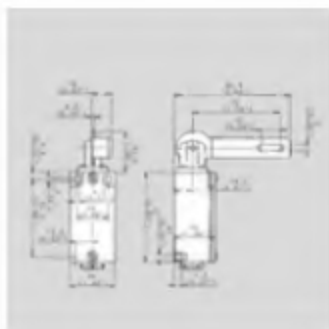
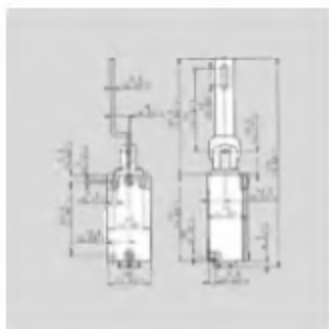
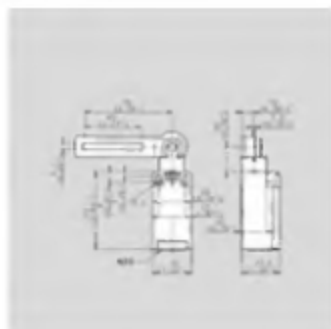
500 V AC
10 A

20min
1 x 10⁶
-30 °C/+80 °C
-22 °F/+176 °F

BG, UL, CSA

0.20 kg/0.44 lb

W



Plastic-bodied safety switches I88-AHDB

For installation to hinged axis
Protection class IP 65



Designation	I88-U1Z AHDB
Part number	638.6100.267
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contact	
Slow make & break snap-action	
Internal seal (w)/external seal (x)	

I88-U1Z AHDB

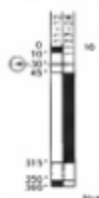
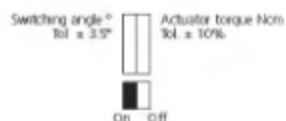
638.6100.267



⊕ Zb

⊕

⊕



Voltage	max	500 V AC
Permanent current	max	10 A
In-rush current complies with standards		
IEC 947-5-1 AC 15DC 13		
Switching frequency	max	50/min
Mechanical life – number of switching actions		3×10^6
Operating temperature	min/Amx	$-30^\circ\text{C}/+80^\circ\text{C}$
		$-22^\circ\text{F}/+176^\circ\text{F}$

500 V AC

10 A

50/min

3×10^6

$-30^\circ\text{C}/+80^\circ\text{C}$

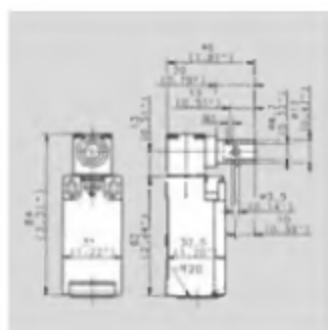
$-22^\circ\text{F}/+176^\circ\text{F}$

Approvals	IEC, UL, CSA
Weight	0.09 kg/0.20 lb
Delivery: ex-stock/built to order	

IEC, UL, CSA

0.09 kg/0.20 lb

All dimensions in mm (inch)



Metal-bodied safety switch with personnel protection function in forward and reverse movement

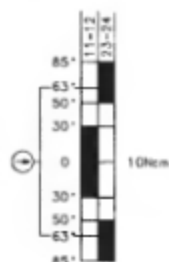
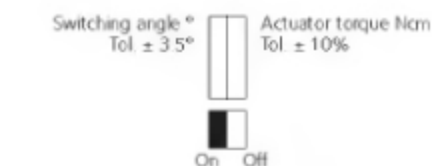
ENM2-AHZ

Protection class IP 65



Designation	ENM2-U1Z AHZ
Part number	608.7135.030
Circuit diagram	
⊕ Forced disconnect to IEC 947-5-1 chapter 3	
Za: not galvanically separated contacts	
Zb: galvanically separated contacts	
Slow make & break/Snap-action	
Internal seal (w)/external seal (w)	

ENM2-U1Z AHZ	
608.7135.030	
11	12
23	24
⊕ Zb	
●/-	
NV	



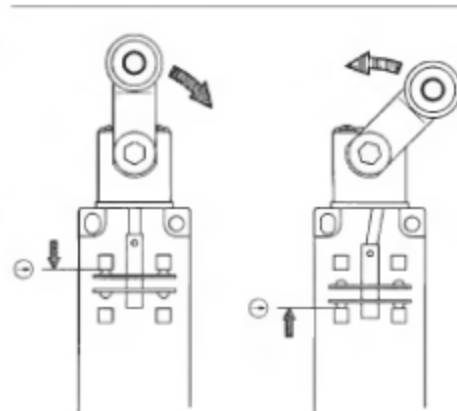
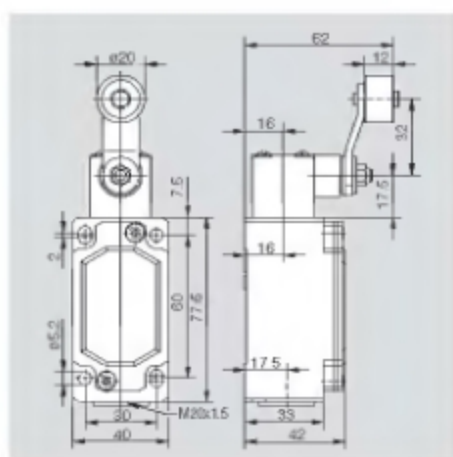
Voltage	max.	400 V AC
Permanent current	max.	10 A
In-rush current complies with standards		
IEC 947-5-1 AC 15/DC 13		
Switching frequency	max.	100/min.
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min./max.	-30 °C/+80 °C -22 °F/+176 °F

400 V AC	
10 A	
●	
100/min.	
1 x 10 ⁶	
-30 °C/+80 °C	
-22 °F/+176 °F	

Approvals	BG, UL, CSA
Weight	0,28 kg/0,62 lb
Delivery: ex-stock/built to order	●/-

BG, UL, CSA	
0,28 kg/0,62 lb	
●/-	

All dimensions in mm (inch)



Forced disconnect in forward and reverse travel AHZ

For special safety applications the forced disconnection of the NC contacts is not only achieved in the forward direction, but also in the reverse direction (back to standard position). For operator safety applications the roller must be positively guided in both directions.

Safety Hinge Switch

SHS

IP 67 Metal housing



design award
winner
2002



Hinged machinery guards and covers as well as safety fence doors may be found in every type of industry.

The safety hinge switch SHS is the logical integration of the safety switch and load-bearing hinge for industrial applications.

Designed to facilitate mounting onto extruded aluminium profiles, steel or plastic doors, the slim profile of the SHS even when fully closed, allows the hinge to be readily mounted where space is constrained.

Traditional safety switches with separate actuator keys are often subject to mechanical wear, particularly when mounted on the closing edge of guards where accumulated tolerances can cause misalignment. The SHS removes this problem with the safety contact mounted internally, inaccessible to the user and therefore providing excellent tamper protection. One or more switches may be used dependent on the category of safety protection required. Matching hinges without safety contacts are also available, allowing the style to be standardised for general use. In operation, consideration must simply be given to the required contact operation angle, which is determined by guard size and the maximum allowable guard opening distance before actuation.



(approval pending)

Safe:

- 2 SHS hinge switches each with a force disconnect safety contact allow safety category 4 systems to be configured subject to the required risk analysis and safety contact monitoring.

Flexible:

- The hinge operating angle is 0–180°.
- The switch point may similarly be selected through 180°.
- AC/DC to 250 V or 60 V DC versions available.

Fast:

- Industry standard M12 x 1 connectors with axial and radial (rear) mounting available as well as fixed cable version.

Reliable:

- A cast Zinc alloy body allows the SHS a high degree of mounting freedom.
- In its hinge capacity the SHS can bear up to 750 N axially and over 1000 N radially, after the switching point has been set.
- Ingress protection to IP 67.

SHS configuration summary

With M12x1 connector, for 60 V DC applications, without earth connection

SHS-A1Z-SR	DC	601 9261 010	Radial Plug	Ex-stock
SHS-A1Z-SA	DC	601 9261 015	Axial Plug	Ex-stock

With M12x1 connector, for AC/DC applications to 250 V, with earth connection

SHS-A1Z-SA	AC/DC	601 9261 009	Axial Plug	Ex-stock
SHS-A1Z-SR	AC/DC	601 9261 016	Radial Plug	Ex-stock

With fixed cable

SHS-A1Z-KR5	AC/DC	601 9261 014	fixed cable radial	To order
SHS-A1Z-KA5	DC	601 9261 011	fixed cable axial	To order

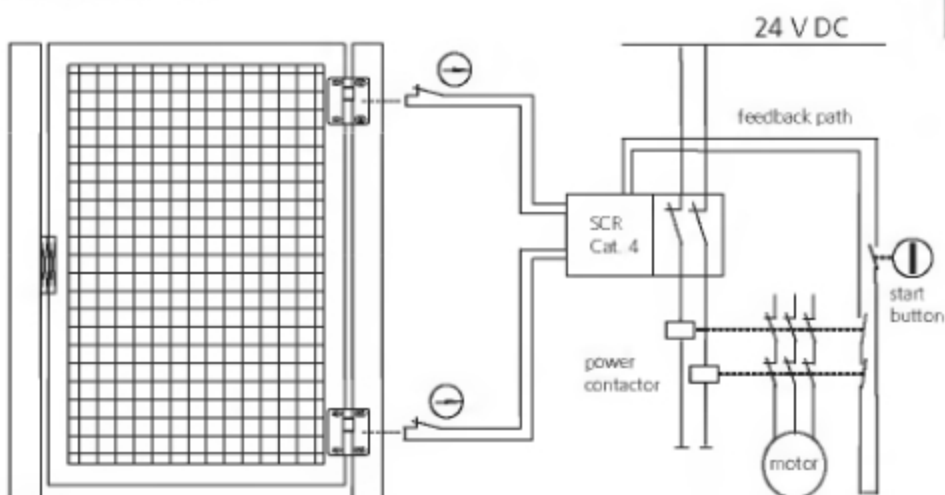
Standard hinge

SHS-OZ		601 9291 013	No connection	Ex-stock
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True Category 4 (EN 954-1/2)

- true electrical redundancy
- true mechanical redundant safety
- avoids mechanical common mode failure

Installation example:



Plug

M 12 x 1

with moulded cable

**Terminal code,
DC configuration**

- 1 = brown
2 = –
3 = blue
4 = black

**Terminal code,
AC/DC configuration**

- 1 = brown
2 = black
3 = blue
4 = green-yellow

DC configuration



AC/DC configuration



Cable length	Model description
2 m	Part number
Cable length	Model description
5 m	Part number
Cable length	Model description
10 m	Part number

Material of cable sleeve	PVC/PVC
Material body/Contact carrier	PUR/PUR
Rated voltage	max. 60 V AC/75 V DC
Current carrying capacity	max. 1.5 A
Temperature range	min./max. -25 °C/+70 °C -13 °F/+158 °F
Cable structure	mm ² 3 x 0.34
Protection class after installation	IP 67

Straight line	Right-angled
AN-KAB.SHS 2M DC	AN-KAB.SHS 2M DC
325.1003.221	325.1003.224
AN-KAB.SHS 5M DC	AN-KAB.SHS 5M DC
325.1003.222	325.1003.225
AN-KAB.SHS 10M DC	AN-KAB.SHS 10M DC
325.1003.223	325.1003.226

Straight line	Right-angled
on request	on request
AN-KAB.SHS 5M AC	AN-KAB.SHS 5M AC
325.1004.219	325.1004.220
on request	on request

Material of cable sleeve	PVC/PVC
Material body/Contact carrier	PUR/Nylon 6.6
Rated voltage	300 V AC
Current carrying capacity	4.0 A
Temperature range	-5 °C/+70 °C +23 °F/+158 °F
Cable structure	4 x 0.34
Protection class after installation	IP 68

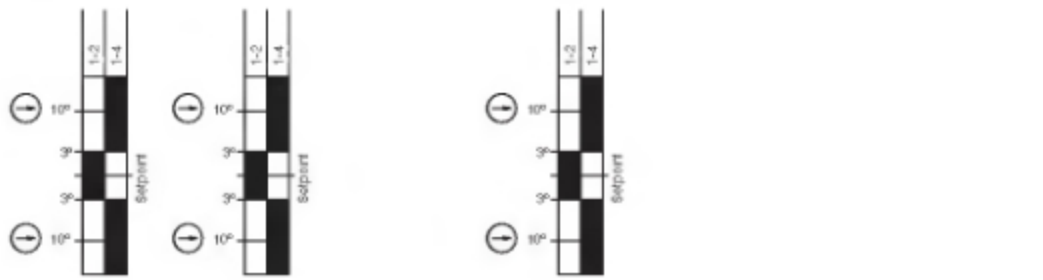
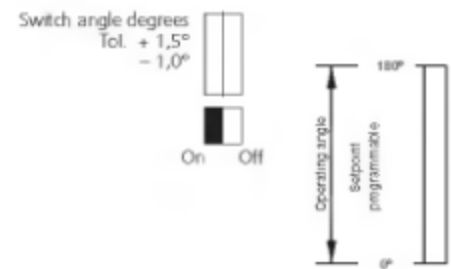
Safety Hinge Switch

SHS



Designation
Part number
 Contact diagram
 ⊕ Forced disconnect to IEC 947-5-1 annex k
 Za: non-galv. separated contact
 Zb: galv. separated contact
 Slow make and break/Snap action
 Sealed internally (iw)/externally (w)

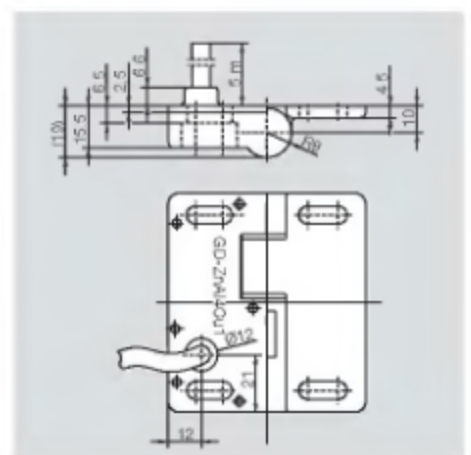
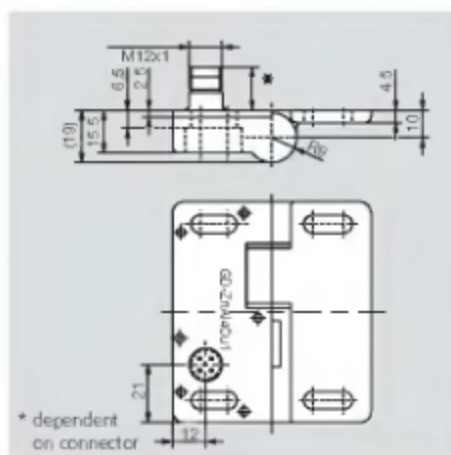
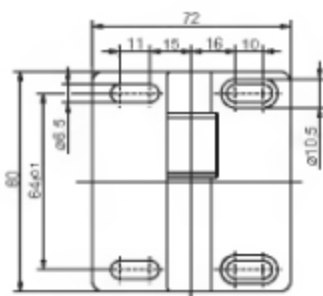
SHS-A1Z-SR	SHS-A1Z-SR	SHS-A1Z-KR 5
601.9261.010	601.9261.016	601.9261.014
⊕ C	⊕ C	⊕ C
iw	iw	iw



Voltage	max.
Thermal current	max.
Utilization category per IEC 947-5-1 AC 15/DC 13	
Switching frequency	max.
Mechanical life – switching operations	
Operating temperature	min./max.
Approvals	
Approvals pending	
Weight	
Delivery: ex-stock/built to order	

250 VAC	250 VAC	250 VAC
3 A	3 A	3 A
60 W/0.5 A	60 W/0.5 A	230 W/1.5 A
(DC 13)	(DC 13)	(AC 15)
1200h	1200h	1200h
1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶
-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C
-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F
BG, UL, CSA	BG, UL, CSA	BG, UL, CSA
0.4 kg	0.4 kg	0.4 kg
●/-	●/-	-●

All dimensions in mm





SHS-A 12-SA
601.9261.015



⊖ C
● L
● N

FW



SHS-A 12-SA
601.9261.009



⊖ C
● L
● N
● PE

FW

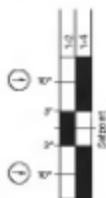
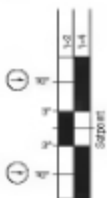
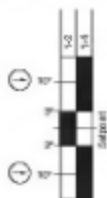


SHS-A 12-KA.5
601.9261.011



⊖ C
● L
● N
● PE

FW



250 VAC
3 A
60 W/0.5 A
DC 13
1200h
1 x 10°
-25 °C/+70 °C
-13 °F/+158 °F

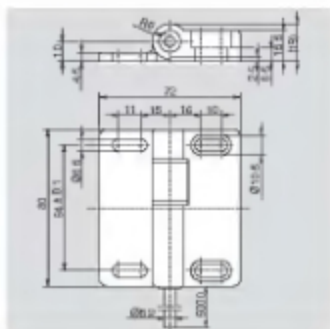
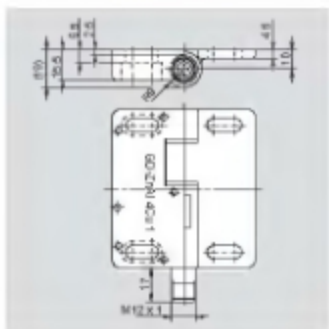
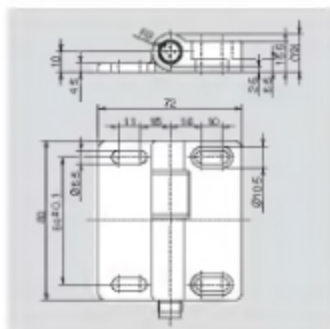
250 VAC
3 A
60 W/0.5 A 230 V/1.5 A
DC 13 (AC 15)
1200h
1 x 10°
-25 °C/+70 °C
-13 °F/+158 °F

250 VAC
3 A
60 W/0.5 A
DC 13
1200h
1 x 10°
-25 °C/+70 °C
-13 °F/+158 °F

-
BG, UL, CSA
0.4 kg

-
BG, UL, CSA
0.4 kg

-
BG, UL, CSA
0.4 kg



Plastic-bodied Rope Pull switch S/Si

Protection class IP 65



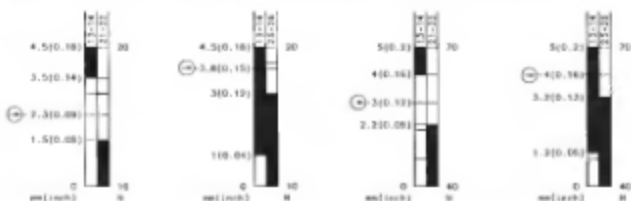
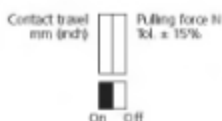
Metal-bodied Rope Pull switch S/Si

Protection class IP 65



Designation	S4-U12	S4-U12	SEK-U12	SEK-U12
Part number	601.3812.075	601.3832.076	601.1611.133	601.1631.134
Circuit diagram				
⊕ Forced disconnect to IEC 947-5-1 chapter 3				
Za: not galvanically separated contacts				
Zb: galvanically separated contacts				
Slow make & break/action				
Internal seal (w)/external seal (x)				

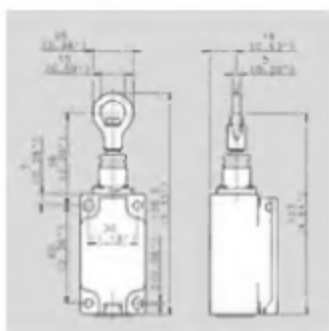
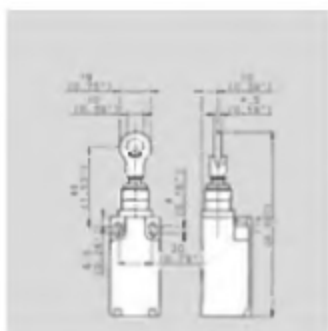
⊕ Zb	⊕ Zb	⊕ Zb	⊕ Zb
⊖	⊖	⊖	⊖

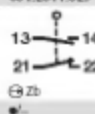


Voltage	max	500 V AC
Permanent current	max	10 A
In-rush current complies with standards		
Maximum rope length		2 m
Switching frequency	max	50/min
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min./max	-30 °C/+80 °C -22 °F/+176 °F
Approvals		UL, CSA
Cable entry		1 x M 20 x 1.5
Weight		0.09 kg/0.20 lb
Delivery, ex-stock/built to order		●

500 V AC	500 V AC	500 V AC	500 V AC
10 A	10 A	10 A	10 A
●	●	●	●
2 m	2 m	5 m	5 m
50/min	50/min	50/min	50/min
1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶
-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F	-30 °C/+80 °C -22 °F/+176 °F
UL, CSA	UL, CSA	BQ, UL, CSA	BQ, UL, CSA
1 x M 20 x 1.5	1 x M 20 x 1.5	1 x M 20 x 1.5	1 x M 20 x 1.5
0.09 kg/0.20 lb	0.05 kg/0.20 lb	0.17 kg/0.37 lb	0.17 kg/0.37 lb
●	●	●	●

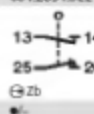
All dimensions in mm (inch)



SEM2-U1Z
601.2811.029

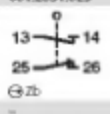
Zb

-

SEM2-UV1Z
601.2831.022

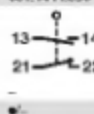
Zb

-

SEM2-UV1Z Fast
601.2831.023

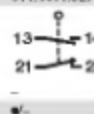
Zb

-

SD-U1
601.1411.854

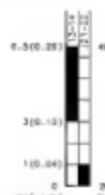
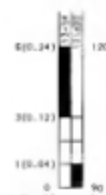
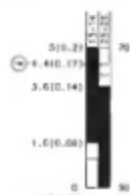
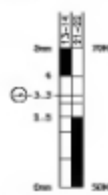
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-

SD-U1
611.1411.029

-

-

400 V AC
10 A

●

5 m

50min

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

BG, UL, CSA

1 x M 20 x 1.5

0.22 kg/0.49 lb

Zb

-

400 V AC
10 A

●

5 m

50min

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

BG, UL, CSA

1 x M 20 x 1.5

0.22 kg/0.49 lb

Zb

-

400 V AC
10 A

●

5 m

12min

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

BG, UL, CSA

1 x M 20 x 1.5

0.26 kg/0.57 lb

Zb

-

500 V AC
16 A

●

5 m

50min

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

UL, CSA

2 x M 20 x 1.5

0.33 kg/0.73 lb

Zb

-

500 V AC
16 A

●

5 m

50min

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

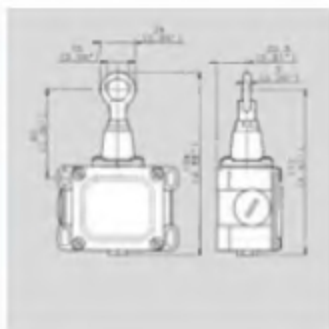
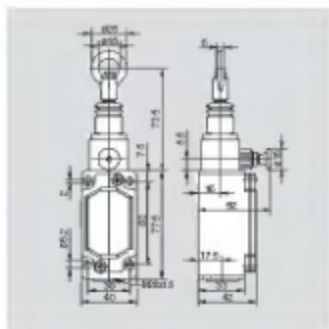
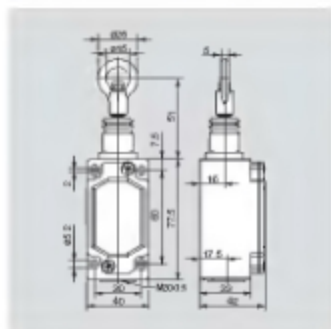
UL, CSA

2 x M 20 x 1.5

0.33 kg/0.73 lb

Zb

-



Metal-bodied Rope Pull switch S/Si

Protection class IP 65

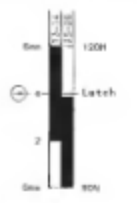
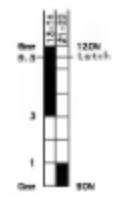
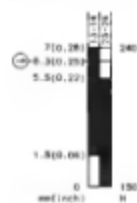
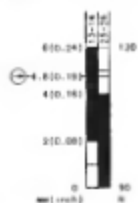
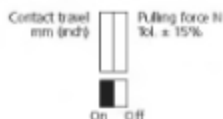


Designation	SD-UV12	SD-UV12	SD-U1	SD-UV12 Fast
Part number	601.1431.857	611.1431.022	601.1411.846	601.1431.869
Circuit diagram				
⊕ Forced disconnect to IEC 947-5-1 chapter 3				
Za: not galvanically separated contacts				
Zb: galvanically separated contact				
Slow make & break/action				
Internal seal (w)/external seal (e)				



SD-UV12	SD-UV12	SD-U1	SD-UV12 Fast
601.1431.857	611.1431.022	601.1411.846	601.1431.869
⊕ Zb	⊕ Zb	-	⊕ Zb
•	•	•	•

SD-U1	SD-UV12 Fast
601.1411.846	601.1431.869
-	⊕ Zb
•	•

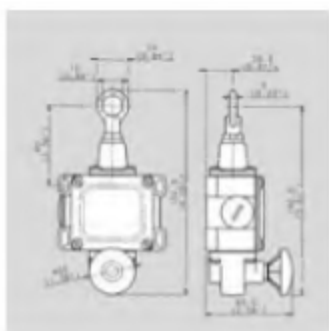
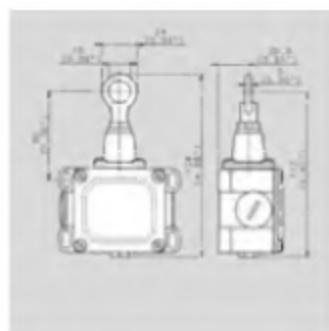
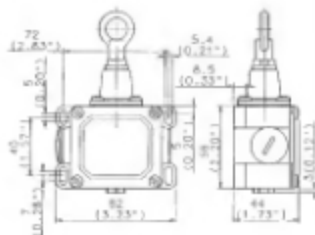


Voltage	max	400 V AC
Permanent current	max	16 A
In-rush current complies with standards		
Maximum rope length		5 m
Switching frequency	max	50/min
Mechanical life – number of switching actions		1 x 10 ⁶
Operating temperature	min/ max	-30 °C/+80 °C
		-22 °F/+176 °F
Approvals		UL CSA
Cable entry		2 x M 20 x 1.5
Weight		0.33 kg/0.73 lb
Delivery, ex-stock/built to order		•

400 V AC	400 V AC	500 V AC	400 V AC
16 A	16 A	16 A	16 A
•	•	•	•
5 m	10 m	10 m	10 m
50/min	50/min	20/min	20/min
1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
UL CSA	UL CSA	UL CSA	UL CSA
2 x M 20 x 1.5	2 x M 20 x 1.5	2 x M 20 x 1.5	2 x M 20 x 1.5
0.33 kg/0.73 lb	0.33 kg/0.73 lb	0.49 kg/1.08 lb	0.49 kg/1.08 lb
•	•	•	•

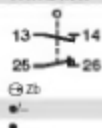
500 V AC	400 V AC
16 A	16 A
•	•
10 m	10 m
20/min	20/min
1 x 10 ⁶	1 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F
UL CSA	UL CSA
2 x M 20 x 1.5	2 x M 20 x 1.5
0.49 kg/1.08 lb	0.49 kg/1.08 lb
•	•

All dimensions in mm (inch)



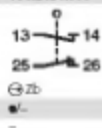


5D-UV12 Rast
611.1431.040



●
●

5D-UV12
601.2431.877



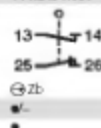
●
-

5D-UV12 Fast
601.2431.883

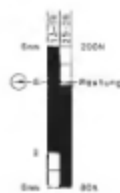
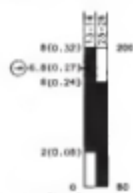
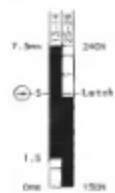


●
●

5D-UV12 Rast
611.2431.050



●
●



400 V AC
16 A

●

20 m

20min

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

UL CSA

2 x M 20 x 1.5

0.53 kg/1.17 lb

●
●

500 V AC
16 A

●

50min

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

UL CSA

2 x M 20 x 1.5

0.47 kg/1.04 lb

●
●

500 V AC
16 A

●

20min

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

UL CSA

2 x M 20 x 1.5

0.70 kg/1.54 lb

●
●

500 V AC
16 A

●

20min

1 x 10⁶

-30 °C/+80 °C

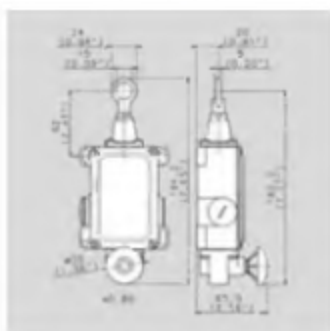
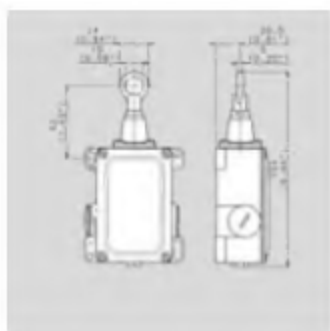
-22 °F/+176 °F

UL CSA

2 x M 20 x 1.5

0.64 kg/1.41 lb

●
●



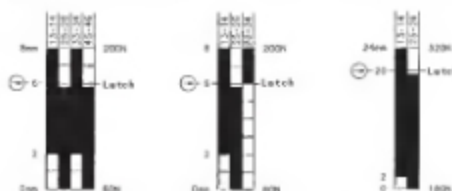
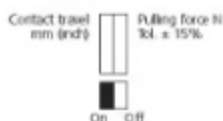
Metal bodied Rope Pull switches S/Si

Protection class IP 65



Designation	SD-UVZ2 Fast	SD-UVZ/E1 Fast	SH-UVZ P-Fast
Part number	601.2461.907	611.2861.041	601.3531.367
Circuit diagram			
⊕ Forced disconnect to IEC 947-5-1 chapter 3			
Za: not galvanically separated contacts			
Zb: galvanically separated contact			
Slow make & break snap-action			
Internal seal (w)/external seal (x)			

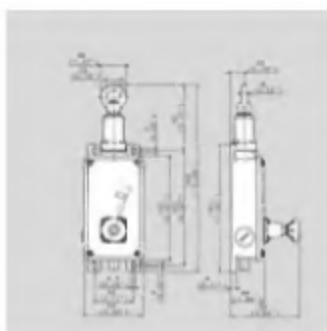
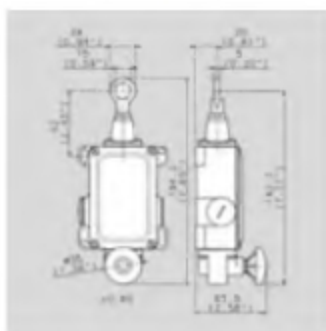
400 V AC	400 V AC	500 V AC
16 A	16 A	16 A
●	●	●
30 m	10 m	50 m
20/min	20/min	20/min
1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
UL CSA	UL CSA	UL CSA
2 x M 20 x 1.5	2 x M 20 x 1.5	2 x M 20 x 1.5
0.70 kg/1.54 lb	0.70 kg/1.54 lb	1.30 kg/2.87 lb
●	●	●



Voltage	max	400 V AC	400 V AC	500 V AC
Permanent current	max	16 A	16 A	16 A
In-rush current complies with standards		●	●	●
Maximum rope length		30 m	10 m	50 m
Switching frequency	max	20/min	20/min	20/min
Mechanical life – number of switching actions		1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶
Operating temperature	min./max	-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
		-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
Approvals		UL CSA	UL CSA	UL CSA
Cable entry		2 x M 20 x 1.5	2 x M 20 x 1.5	2 x M 20 x 1.5
Weight		0.70 kg/1.54 lb	0.70 kg/1.54 lb	1.30 kg/2.87 lb
Delivery: ex-stock/built to order		●	●	●

400 V AC	400 V AC	500 V AC
16 A	16 A	16 A
●	●	●
30 m	10 m	50 m
20/min	20/min	20/min
1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶
-30 °C/+80 °C	-30 °C/+80 °C	-30 °C/+80 °C
-22 °F/+176 °F	-22 °F/+176 °F	-22 °F/+176 °F
UL CSA	UL CSA	UL CSA
2 x M 20 x 1.5	2 x M 20 x 1.5	2 x M 20 x 1.5
0.70 kg/1.54 lb	0.70 kg/1.54 lb	1.30 kg/2.87 lb
●	●	●

All dimensions in mm (inch)





51-UZZ AK R-Fast
601.4735.001

20-24 24

11-14 14

11-14 14

11-14 14

11-14 14

11-14 14

11-14 14

11-14 14

11-14 14

11-14 14

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51-U1Z/U1Z AK R-Fast
601.4735.025

20-24 24

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52-UZZ AK R-Fast
601.5735.002

20-24 24

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11-14 14

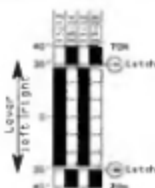
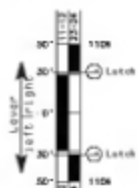
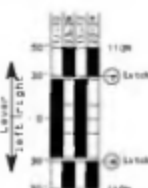
11-14 14

11-14 14

11-14 14

11-14 14

11-14 14



250 V AC
10 A

100 m

10mm

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

UL CSA

1 x M 20 x 1.5

1.60 kg/3.53 lb

11-14 14

250 V AC
10 A

100 m

10mm

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

BQ, UL CSA

1 x M 20 x 1.5

1.60 kg/3.53 lb

11-14 14

500 V AC
10 A

100 m

10mm

1 x 10⁶

-30 °C/+80 °C

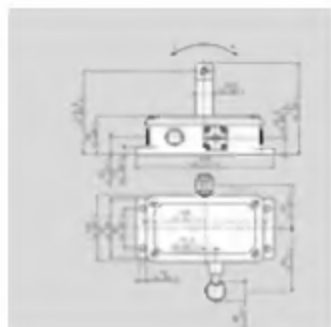
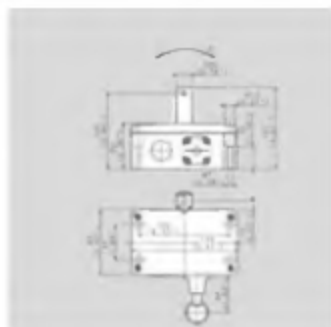
-22 °F/+176 °F

UL CSA

3 x M 20 x 1.5

3.80 kg/8.38 lb

11-14 14



Safety Rope Pull switches

SR

Plastic housing
Protection class IP 67

EMERGENCY STOP switch gear
acc. IEC 947-5-5

Integrated EMERGENCY STOP
push button

Quick mounting device for
rope installation



(in preparation)

Safe:

- The EMERGENCY STOP function is enabled by positive-break safety contacts following actuation or failure of the rope-pull system.
- The SR ... NA QF has an integrated EMERGENCY STOP push button, which, due to its design, is particularly well protected against external mechanical influences and blocking.

Flexible:

- 2 NC and 2 NO contacts is the standard contact configuration. According to customer preference, separate specification of the 4 switching elements is possible, thus allowing system integration close to the application.

Fast:

- The fast rope attachment of the SR ... NA QF is shown in the drawing on the left. The rope-pull system is quickly installed thanks to the quick-change clamping device.

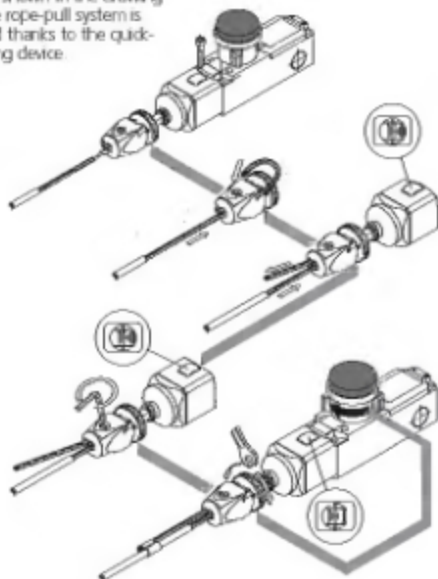
- The correct rope tension is clearly and visibly indicated.
- Also clearly recognisable is the circuit status indication, combined with the reset function, of the E-STOP device.
- The electrical connection is made via "cage clamp"-connection terminals.

Reliable:

- The glass-fibre reinforced polyamide housing can cope with the roughest operating conditions. The SR is mounted using a mounting plate made of metal.
- Protection class IP 67.

In the future:

- Two integrated diffuse reflective sensors are to be offered, which will signal if the rope tension is exceeded. This facilitates "preventative maintenance".



Designation

Part number

Switching diagram

☞ Forward disconnect

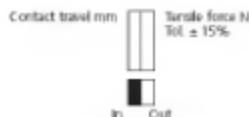
IEC 947-5-1 Chap. 3

Za: changeover contact is not galvanically isolated

Zb: changeover contact is galvanically isolated

Slow-action contact/stop-action contact

Latching mechanism



Voltage	max
Continuous terminal current	max
Utilization category acc. to IEC 947-5-1 AC 15/DC 13	
Switching frequency	max
Mech. operational life acc. to IEC 947-5-5	
Ambient temperature	min./max

Approvals

Pending Approvals

able conduit

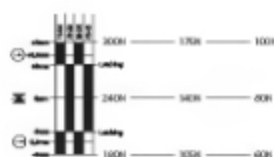
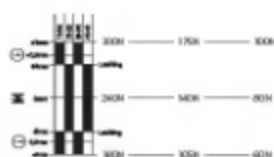
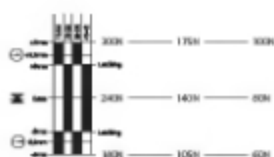
Weight

Delivery ex stock/built to order

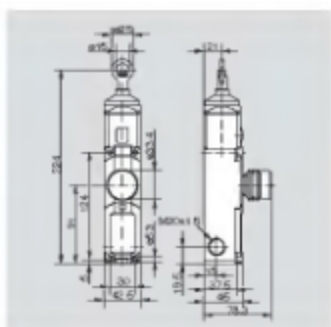
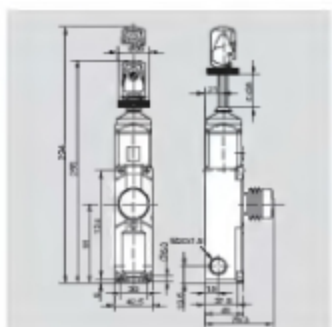
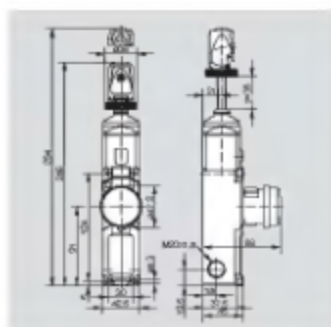
All dimensions in mm



SF-U22-NA-QF 300 601.1629.019	SF-U22-NA-QF 175 601.1629.027	SF-U22-NA-QF 100 601.1629.031	SF-U22-QF 300 601.1629.028	SF-U22-QF 175 601.1629.024	SF-U22-QF 100 601.1629.032	SF-U22 300 601.1620.020	SF-U22 175 601.1621.026	SF-U22 100 601.1621.030
● -	●	●	●	●	●	●	●	●



250 VAC 10 A 230 W4 A (AC 15) 20min	250 VAC 10 A 230 W4 A (AC 15) 20min	250 VAC 10 A 230 W4 A (AC 15) 20min	250 VAC 10 A 230 W4 A (AC 15) 20min	250 VAC 10 A 230 W4 A (AC 15) 20min	250 VAC 10 A 230 W4 A (AC 15) 20min	250 VAC 10 A 230 W4 A (AC 15) 20min	250 VAC 10 A 230 W4 A (AC 15) 20min	250 VAC 10 A 230 W4 A (AC 15) 20min
●	●	●	●	●	●	●	●	●
-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F	-25 °C/+70 °C -13 °F/+158 °F
-	-	-	-	-	-	-	-	-
BG, UL, CSA 3x M20 x 1.5 0.6 kg	BG, UL, CSA 3x M20 x 1.5 0.6 kg	BG, UL, CSA 3x M20 x 1.5 0.6 kg	BG, UL, CSA 3x M20 x 1.5 0.6 kg	BG, UL, CSA 3x M20 x 1.5 0.6 kg	BG, UL, CSA 3x M20 x 1.5 0.6 kg	BG, UL, CSA 3x M20 x 1.5 0.5 kg	BG, UL, CSA 3x M20 x 1.5 0.5 kg	BG, UL, CSA 3x M20 x 1.5 0.5 kg



Rope Pull safety switches

SiRK

Plastic body
Two-sided spanning (max. 2x 75 m)
Protection class IP 65



Application

The SiRK rope pull safety switch has been developed for larger system spans in a corrosion free material. The SiRK can also be delivered with an indicator lamp.

Utilization

When larger machines or entire installations are to be protected, the emergency-stop command can be initiated from any point in the plant using rope-pull safety switches. This can be advantageous compared to individually mounted emergency-stop buttons when preventing injury to persons and damage to machinery. The SiRK can be adapted to suit a wide range of applications thanks to the individual selection of rope lengths and various mounting positions.

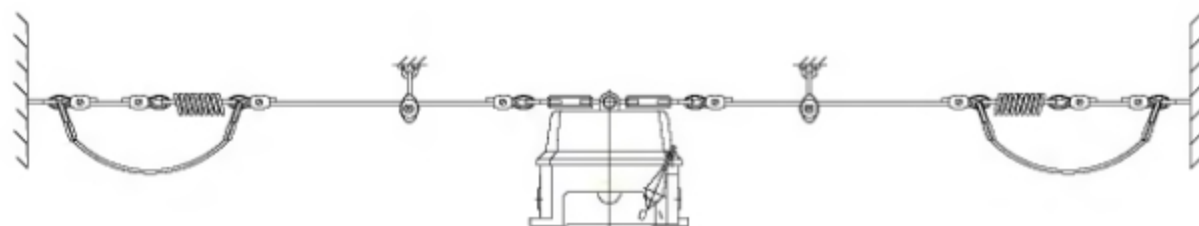
Construction

The plastic insulated body offers superior electrical protection for the user. The switching parts allow for wide range of multi-pole protective circuits. The switching mechanism has been constructed so that the switch remains in function even when the spring element has broken. Construction and function fulfil all requirements according to EN 418 and EN 60947-5-5.

Product characteristics

- Tamper-proof switching mechanism (EN 418)
- Automatic latching when pulled and by slack or broken rope
- Low actuating force
- Available with or without multi-voltage indicator lamp
- 6-pole terminal for daisy-chaining
- Maintenance-free construction
- Switching device simple to mount with 2 x M10 screws
- Enclosure lid simple to attach with 2 x M5 screws (captive)
- Protection class IP 65

System configuration



Switch	Contacts	Function	Voltage	Current
SiRK - UZZ R	2NC/2NO	Latch function	250 V	10 A
SiRK - UZZ R MLED	2NC/2NO	Latch function/indicator lamp*	250 V	10 A

* Indicator lamp for multiple voltages with additional 6-pole terminal for daisy-chaining.



Designation

Part number

Switching diagram

⊕ positive break according to IEC 947-5-1 Chap. 3

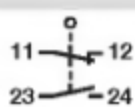
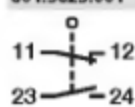
Zb: changeover contact is galvanically isolated

Slow-action contact/snap-action contact

Locking device

Indicating lamp

SiRK-U2Z R

601.5625.001

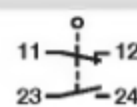
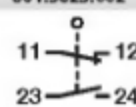
⊕ Zb

●/-

●

-

SiRK-U2Z R MLED

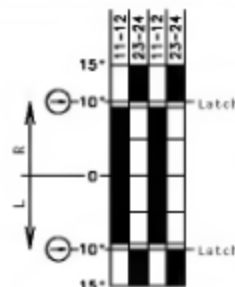
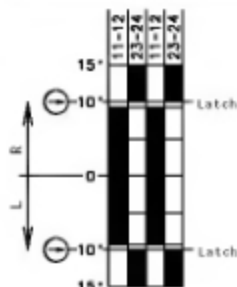
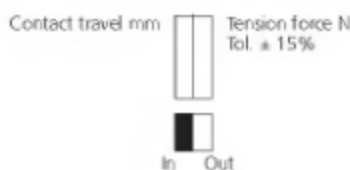
601.5625.002

⊕ Zb

●/-

●

●



Voltage max.

Continuous current max.

Making current, acc. to IEC 947-5-1 AC 15/DC 13

Switching frequency max.

Mech. operational life – number of switching cycles

Ambient temperature min./max.

Approvals

Pending Approvals

Cable inlet

Weight

Delivery: ex-stock/built to order

250 V AC

10 A

●

30/min.

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

BG, UL, CSA

2x M 20 x 1.5

0.8 kg/1.8 lb

●/-

250 V AC

10 A

●

30/min.

1 x 10⁶

-30 °C/+80 °C

-22 °F/+176 °F

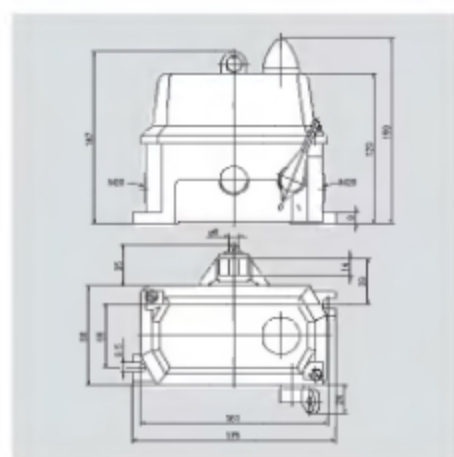
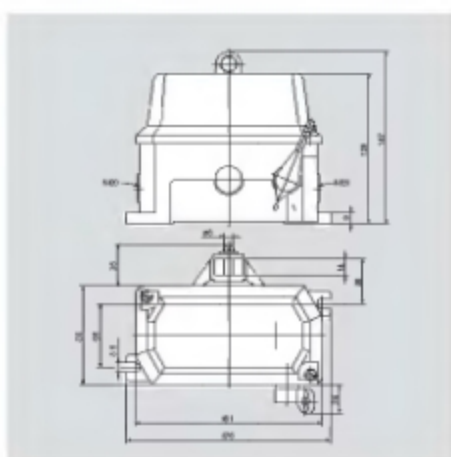
BG, UL, CSA

2x M 20 x 1.5

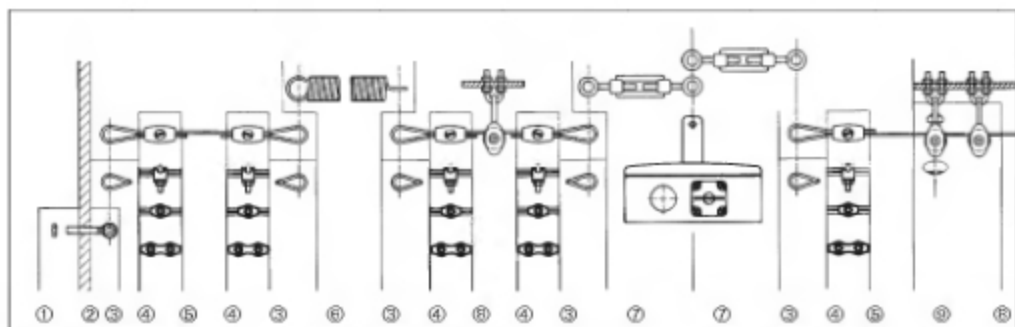
0.9 kg/2 lb

●/-

All dimensions in mm



Rope Pull switch accessories



① Nut	
M 6	260.0439.090
M 8	260.0439.187
M 10	260.0934.092



② Rope clamp	
D 2	269.0000.004
D 3	269.0000.005
D 4	269.0000.006



⑦ Tension adjuster	
M 5 x 50	269.1480.016
M 6 x 60	269.1480.017
M 6 x 110	269.1480.025



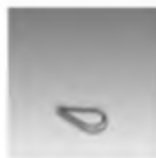
③ Eye bolt	
M 10 x 50	260.0444.076
M 6 x 50	260.0444.185
M 8 x 50	260.0444.186



④ Rope clamp (duplex)	
D 2	269.0000.007
D 3	269.0000.008
D 4	269.0000.009



⑧ Turnbuckle nut	
M 6	260.1479.188
M 8	260.1479.189



⑤ Thimble	
D 2.5	269.6899.013
D 3	269.6899.014
D 4	269.6899.015
D 5	269.6899.001



⑥ Rope clamp (duplex)	
D 2	269.0000.010
D 3	269.0000.011
D 4	269.0000.012



⑨ Pulley block	
	269.0000.022



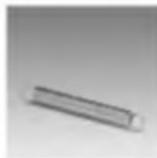
⑩ Rope clamp	
D 5	269.0741.002



⑪ Rope Uni-arsee-e	
D 1.8/0.5	369.9100.008
D 2/0.25	369.9100.024
D 3/0.4	369.9100.025
D 4/0.5	369.9100.026



⑫ Pulley block	
swivel	269.0000.023



⑬ Spring	
18 N	365.2100.331
24 N	365.2100.332

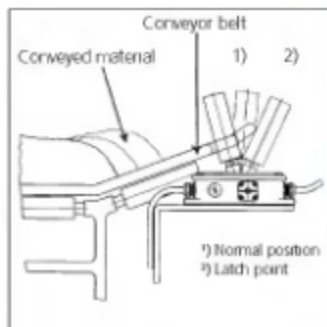


Pulley block clamp for ⑨ and ⑫	
	391.1751.437

Metal-bodied conveyor control switches for monitoring conveyor belts

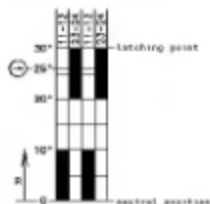
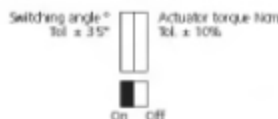
Si2

Protection class IP 65



Designation	SQ-U1Z AW
Part number	601.5796.003
Circuit diagram	
⊖ Forced disconnect to	IEC 947-5-1 chapter 3
Za	not galvanically separated contacts
Zb	galvanically separated contacts
⊖	Slow make & break/stop-action
⊖	Internal seal (sk)/external seal (sk)

The safety switch, in combination with the conveyor control system, protects the conveyor belt from damage or destruction in the event of belt misalignment. The pressure of the cylindrical roller against the conveyor belt allows for detection of incorrect alignment in either direction and assures a shut down by latching the safety contacts.



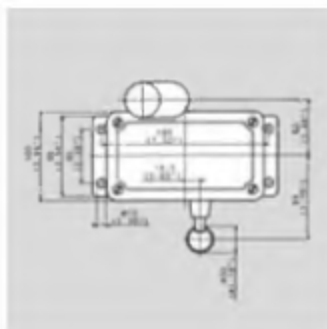
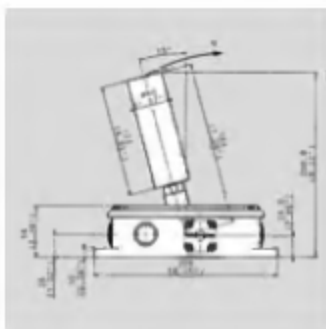
After solving the problem, the plant can be re-started by pulling the reset plunger (key ring). The cylindrical roller is mounted on ball bearings.

The cast housing is supplied with three cable entries (M 20 x 1.5) for easy "through wiring" (display lamps available on request).

Voltage	mak	500 V AC
Permanent current	mak	30 A
In-rush current complies with standards		•
IEC 947-5-1 AC 15/DC 13		
Switching frequency	mak	10/min
Mechanical life—number of switching actions		2 x 10 ⁶
Operating temperature	min/mak	-30 °C/+80 °C
		-22 °F/+176 °F
Approvals		UL CSA
Cable entry		3 x M 20
Weight		4.10 kg/9.02 lb
Delivery ex-stock/built to order		•

This switch allows reliable and trouble-free operation, in extreme conditions because of its robust assembly

All dimensions in mm (inch)



Emergency-stop button with turn and key release

SNA

Tamper-resistant according to EN 418
Protection class IP 65



Every moving part of plant or machinery should be brought to a halt as soon as there is danger to man or machine. The trigger for this often life-saving action can be, in addition to electronic safety equipment, the emergency-stop button. The SNA product range fulfills all safety relevant requirements, for example, an automatic latch as soon as the clearly defined pressure point is exceeded. The control device locks itself into an off position, the contacts of switching device open simultaneously. They thereby fulfil all the requirements of EN 418 "Emergency-Stop Devices", i.e. each operation of the emergency-stop button is latched, and is preceded by the opening of the safety contacts.

No manipulation can lead to the contacts being closed again. The button is released by turning the key or the mushroom-head slam button. The specially formed slam button cannot be blocked by any objects positioned under the button.

- Tamper-proof according to EN 418
- Red \varnothing 37 mm latching push button, released by turning in direction of arrow or by turning key in direction of arrow.
- Standard design front fitting
1 normally-closed contact \ominus
Standard design enclosure assembly
1 normally-closed contact \ominus ,
1 normally-open contact
Extending possible by mounting further NO/NC devices, max. 3 elements.
- Terminal labelling according to DIN EN 50013
- Terminal cross-section:
Solid core: 0.50 mm² to 2.5 mm²
Stranded core: 0.75 mm² to 1.5 mm²
Stranded core with wire-end ferrules: 0.50 mm² to 2.5 mm²
- Materials:
(UL-listed plastics, Cd-free)

Control device:
PA 6, PA 12, PC

Switching devices:
PC, PA 6.6 self-extinguishing

Contact material:
Ag-Ni compound

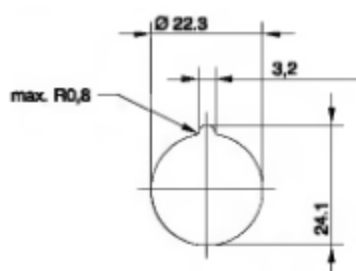
Built-on enclosure, yellow
PC
- Cable entries/knockouts on base
- Protection class IP 65 according to IEC 529
- International certification:
UL, CSA

Complete devices for front installation

Construction:
The switching contacts are clipped on the button assembly by means of a latching bar through the front adapter.

Mounting:

Mounting hole



Mounting hole with notch to prevent rotation according to IEC 947-5-1.
Mounting hole without rotation protection can be accomplished by removing the lug from the attachment elements.
The grid dimensions for the emergency-stop button should measure at least 40 x 50 mm.

Complete devices with enclosure

Construction:
The different switching elements are locked onto the standard base adaptors in the enclosure. This allows wiring to be connected independently from the control device.

Mounting enclosure:
2 x M5 screws for safety devices without additional fixing, and 2 additional M5 screws for adjustment purposes in both horizontal directions.

Emergency-stop button with turn and key release for front-side mounting

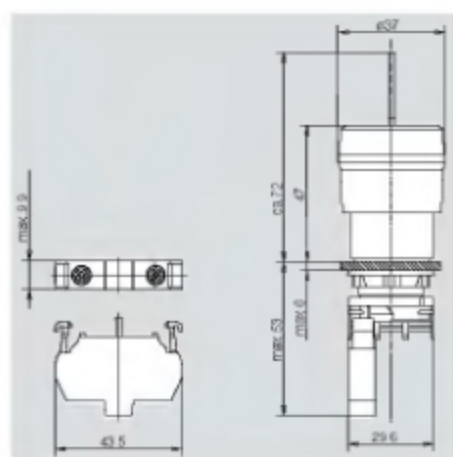
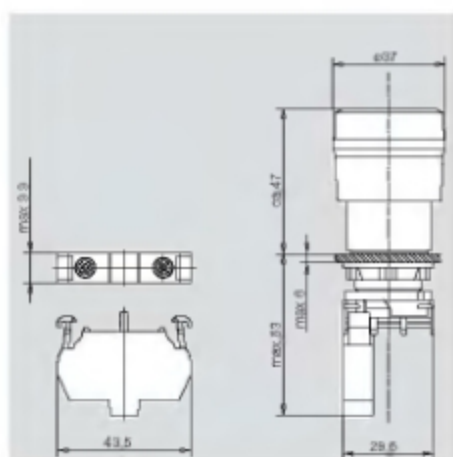
SNA

Tamper-resistant according to EN 418
Protection class IP 65



Designation	SNA-A1Z P	SNA-A1Z K
Part number	601.9169.001	601.9169.002
Switching diagram		
⊕ positive break according to IEC 947-5-1 Chap. 3	⊕	⊕
Slow-action contact/snap-action contact	●/—	●/—
Lock-in function	●	●
Turn-to-release/key-release	●/—	—●
Contact travel mm	approx 6 mm	6 mm
Actuating force	≤ 70 N	≤ 70 N
Rated voltage isolation U_i	660 V	660 V
Rated thermal current I_{th}	10 A	10 A
Making current acc. to IEC 947-5-1 AC 15/DC 13		
Mech. operating life – Number of switching cycles	0.5×10^6	0.5×10^6
Ambient temperature	min / max – 25 °C/ + 60 °C – 13 °F/ + 140 °F	min / max – 25 °C/ + 60 °C – 13 °F/ + 140 °F
Approvals	UL, CSA, GL, VDE	UL, CSA, GL, VDE
Weight	0.06 kg	0.08 kg
Delivery: ex-stock/built to order	●/—	●/—

All dimensions in mm



Emergency-stop button with turn and key release complete with enclosures

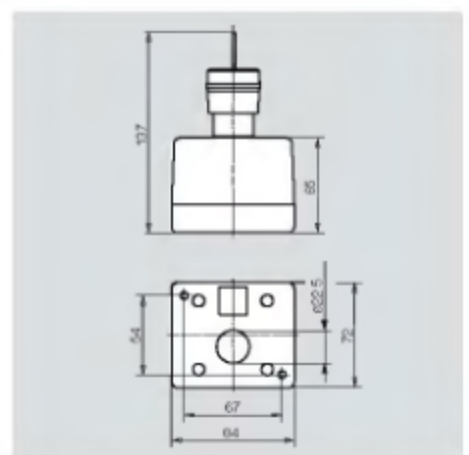
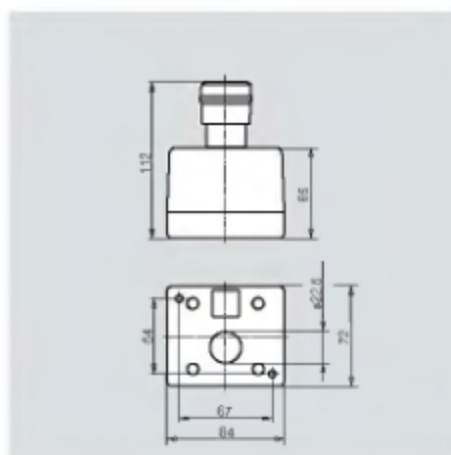
SNA

Tamper-resistant according to EN 418
Protection class IP 65



Designation	SNA-A1Z/E1 AP	SNA-A1Z/E1 AK
Part number	601.9169.003	601.9169.004
Switching diagram		
⊕ positive break according to IEC 947-5-1 Chap. 3		
Slow-action contact/snap-action contact	●/-	●/-
Lock-in function	●	●
Turn-to-release/key-release	●/-	-/●
Contact travel mm	approx. 6 mm	6 mm
Actuating force	≤ 70 N	≤ 70 N
Rated voltage isolation U_i	660 V	660 V
Rated thermal current I_{th}	10 A	10 A
Making current acc. to IEC 947-5-1 AC 15/DC 13		
Mech. operating life – Number of switching cycles	0.5×10^6	0.5×10^6
Ambient temperature min./max.	- 25 °C/+ 60 °C - 13 °F/+ 140 °F	- 25 °C/+ 60 °C - 13 °F/+ 140 °F
Approvals	VDE	VDE
Weight	0.23 kg	0.25 kg
Delivery: ex-stock/built to order	●/-	●/-

All dimensions in mm



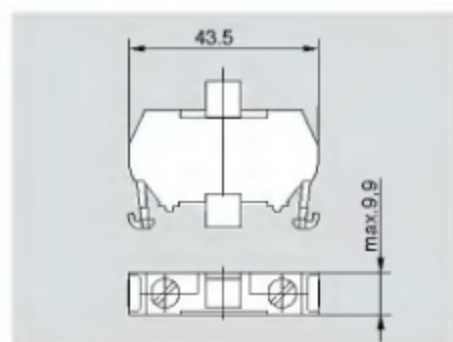
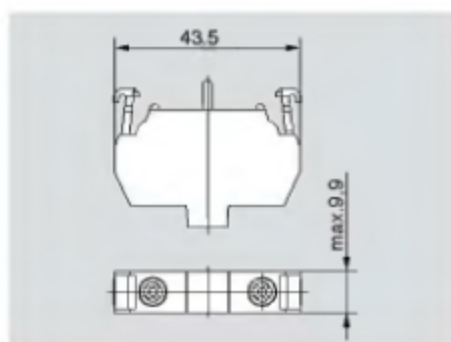
Accessories

Switching elements for emergency stop button



For type range	Emergency stop button Front attachment	Emergency stop button Front attachment	Emergency stop button Built-on enclosure	Emergency stop button Built-on enclosure
Part number	601.9169.005	601.9169.006	601.9169.007	601.9169.008
Slow-action contact/snap-action contact	●/—	●/—	●/—	●/—
Switching diagram				
⊕ positive break according to IEC 947-5-1 Chap. 3	⊕		⊕	
Contact travel mm (inch)				
Delivery: ex-stock/built to order	●/—	●/—	●/—	●/—

All dimensions in mm



Accessories



Legend plate for emergency-stop button/front-side attachment
Self-adhesive, yellow
Protection class IP 65 is guaranteed after the removal of the protective film

Legend plate for emergency-stop button/built-on encl.
Plastic (alu-coated)
self-adhesive, not labelled

For type range	Emergency stop button Front-side mounting Ø 45 mm	Emergency stop button Front-side mounting Ø 60 mm	Emergency stop button Front-side mounting Ø 90 mm	Emergency stop button Built-on enclosures 19 x 19 mm
Label language	Part number			
without labelling	321.4000.037	321.4000.041	321.4000.045	321.4000.049
NOT-AUS	321.4000.038	321.4000.042	321.4000.046	
Emergency Stop	321.4000.039	321.4000.043	321.4000.047	
ARRÊT D'URGENCE	321.4000.040	321.4000.044	321.4000.048	
Delivery: ex-stock/ built to order	●/—	●/—	●/—	●/—

Safety relay

SCR

Control category 3 and 4
according to EN 954-1
With extended output functions
and up to 4 safety outputs



(in preparation)

The SCR safety relay is another new member of the Safelock *Family*, designed to monitor, for example, safety position switches and emergency-stop buttons. It thereby makes it possible to build safety systems up to control category 4 with Bernstein safety switches. Bernstein now offers all necessary safety components for monitoring safety doors or guards outside of the power stage.

The SCR module monitors the position and function of the safety sensing equipment including the safety contacts of the position switches. Control system devices such as frequency converters or power contactors are driven according to the safety evaluation. Additionally, the actual status of the power contactors are verified and compared to the input position in order to monitor their correct function. To meet the requirements of safety category 4, each fault has to be recognised immediately or at the next machine start. For this reason, it is necessary to perform a start-up test.

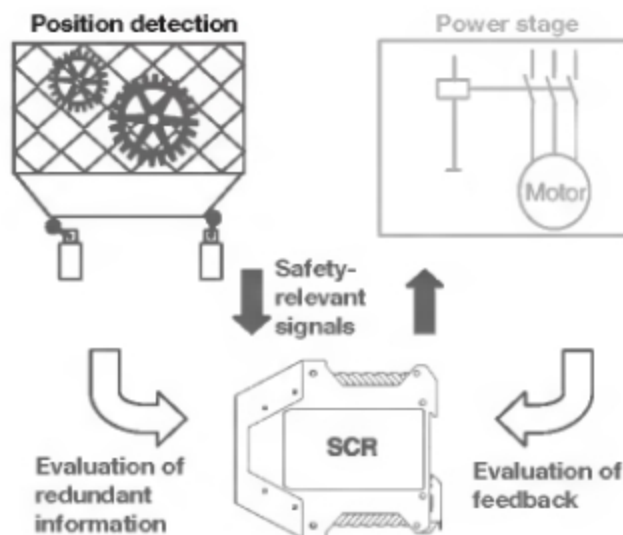
Operating method

The SCR continuously analyses two galvanically-isolated, normally-closed contacts that are operated in a synchronised manner within the system (i.e. the normally-closed contacts belonging to two position switches on the same door). The power device can only be operated when both normally-closed contacts are actually closed. As soon as one of the two input circuits is interrupted, by the opening of a safety contact or a fault occurs, the safety outputs open and the machine is turned off.

Should the switch-off be due to a fault in one of the input circuits or in the output device in the control system, then the SCR prevents a renewed start-up, until the fault has been repaired.

The SCR 4 modules also have a status indicator for both channels to simplify the task of maintenance personnel in identifying the fault.

All SCR modules are optionally suitable for automatic or manual starts. The SCR 4 modules also allow the start button to be monitored.





System advantages

- Monitoring of two independent, galvanically-isolated safety circuits.
- Cross-connection safety, i.e. possible cross-connections between the cables to the safety position switches will be recognised and the green LED "Power" extinguishes. This is made possible because both input circuits work on different operating voltages. A faulty cross-connection leads to a short-circuit and the triggering of the internal fuse.
- Start-up testing, i.e. before the machine can be restarted by means of a start button, a start-up test ascertains that no fault exists in the control system.
- Safety outputs, i.e. at least 2 safety outputs made up of normally-open contacts are available to redundantly drive two power contactors.
- Feedback circuit or external device monitoring (EDM), i.e. correct operation of the power contactors is monitored by wiring the "EDM loop" through the auxiliary NC contacts. This means: should a power contactor fail to release, the normally-closed contacts, connected in series to the start button, prevent a renewed machine start.
- As well as the two standard LEDs for indicating the voltage supply (Pow) and output status (out), the SCR 4 has two additional yellow LEDs (Ch1 and Ch2). These are lit when a fault occurs, and indicate which channel is faulty.
- The SCR safety relays have the following approvals UL, CSA and BG.
- Standardised enclosure widths 22.5 and 52.5 mm.
- Mounting on TS35 mounting rails.

The SCR family

SCR 3-W22-3 6-D:
The SCR 3 has been designed for category 3 control systems according to EN 954-1. The control module guarantees one-fault safety for the entire system, i.e. the occurrence of a single fault does not place the entire system into a dangerous state.

SCR 4-W22-2 6-SD:
In addition to the safety function of SCR 3, the SCR 4 recognises each fault either immediately or on the next attempt to re-start the machine. This characteristic corresponds to control systems for category 4 according to EN 954-1. An additional programmable option allows for the start button to be monitored.

SCR 4-W52-4 10-SD:
Incorporating all of the features of SCR 4-W22, the SCR 4-W52 has additional safety outputs.

Possible SCR connections

Two-channel circuit with monitored start

- Connect a safety switch to each of the terminals S11/S12 and S21/S22
- Connect the start button and the feedback contacts from an external contactor to terminals X1/X2

The green LED "POWER" is lit when voltage is applied. When the start button is pushed, the green LED "Output" lights and the safety outputs are closed.

The machine must be restarted following each opening and closing of the safety door.

For emergency-stop applications, both safety-switches are replaced by an emergency-stop button or a rope-pull safety switch with two positive break contacts.

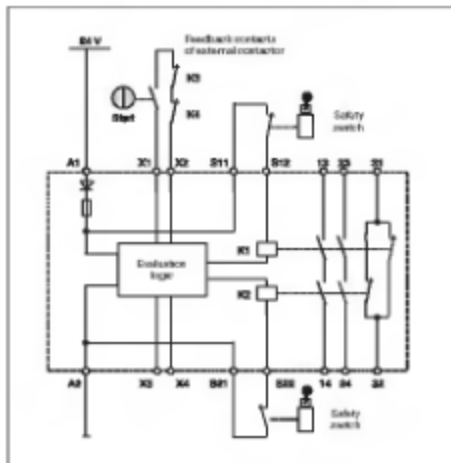
Two-channel circuit with automatic start

- Connect a safety switch to each of the terminals S11/S12 and S21/S22
- Connect the feedback contacts to terminals X1/X2
- Bridge the terminals X1/X2 and X3/X4

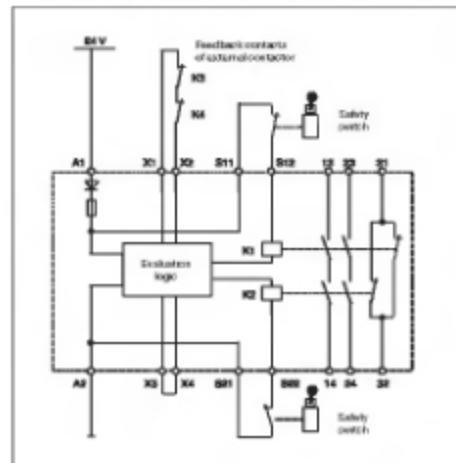
The green LED "POWER" lights up when voltage is supplied. The safety outputs close immediately and the green LED "Output" lights up.

The machine starts up immediately following each opening and closing of the protective door.

Two-channel circuit with monitored start



Two-channel circuit with automatic start



Designation
Part number
Control category
Enabling path
Function
Analysable contact-pair
Start function
automatic
manual
manual (start button monitored)
Data outputs (normally-closed contact)
Voltage supply
Operating voltage
Max. power consumption
Outputs, user categories
Switching voltage
Switching current
Power rating
LED: Operating voltage (green)
Switching output (green)
Error diagnosis (2 x yellow)
Switching cycles, mechanical
Ambient conditions
Temperature range
Protection class (according to DIN 40050)
for terminal range
Enclosure material
Mounting possibilities
Connection type: terminal block/cable (braided)
Weight
Dimensions (W x H x D)
Approvals
Pending Approvals
Delivery: ex-stock/built to order

- Safety output 1
- Safety output 2
- Safety output 3
- Safety output 4
- Data output (normally-closed contact)
- + - Voltage supply 24 V AC/DC
- Connection for safety contact 1
- Connection for safety contact 2
- ★ Connection for feedback (EDM) and start button
- ◆ Program input: Change from monitored start to automatic start achieved by bridging the terminals



SCR 3-W22-3 6-D

SCR 4-W22-2 6-SD

SCR 4-W52-4 10-SD

607.5111.003

607.5111.001

607.5141.002

3

4

4

3

2

4

2 O

2 O

2 O

●

●

●

●

●

●

-

●

●

1

1

1

24 V AC/DC

24 V AC/DC

24 V AC/DC

60 mA

60 mA

150 mA

AC 15 250 V/6 A DC 13 24 V/6 A

AC 15 250 V/6 A DC 13 24 V/6 A

AC 15 250 V/5 A DC 13 24 V/2 A

250 V 24 V

250 V 24 V

250 V 24 V

6 A 6 A

6 A 6 A

10 A 10 A

1500 VA 150 W

1500 VA 150 W

2500 VA 240 W

●

●

●

●

●

●

-

●

●

10 x 10⁶10 x 10⁶30 x 10⁶

0-70 °C

0-70 °C

0-55 °C

+ 32 °F/+ 158 °F

+ 32 °F/+ 158 °F

+ 32 °F/+ 131 °F

IP 40

IP 40

IP 40

IP 20

IP 20

IP 20

FA 6.6

FA 6.6

FA 6.6

TS 35

TS 35

TS 35

2.5 mm

2.5 mm

2.5 mm

0.2 kg

0.2 kg

0.4 kg

22.5 x 99 x 114.5

22.5 x 99 x 114.5

52.5 x 99 x 114.5

BG

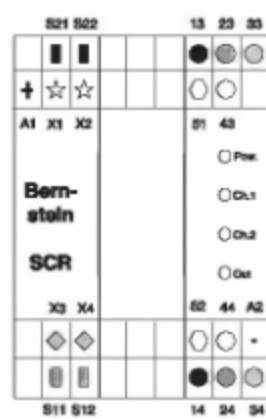
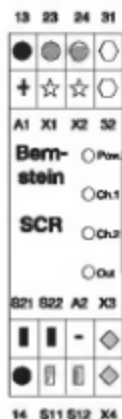
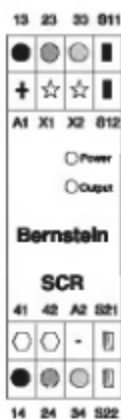
BG

BG

●/-

●/-

●/-



Safety Control Relay

SCR

Control categories 2 up to 4 (EN 954-1)

SCR 4-W70-3.8-DT

Safety relay with integrated, reliable timer

SCR 4-W22-2.4-S

Safety relay in compact design

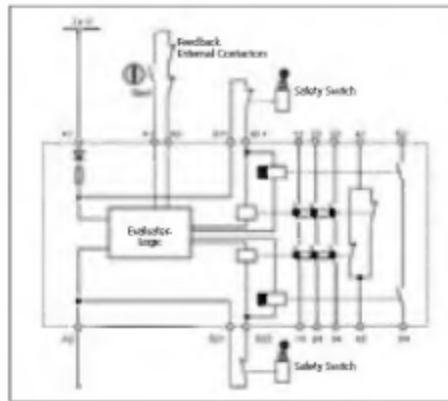
SCR 2-W22-3.5-D

Low-cost safety relay up to SK2

SCR 4-W70-3.8-DT features

Control category according to regulations:
– EN 954 Category 4

- Monitoring of “safety” guard and EMERGENCY STOP devices
- Monitoring of two redundant “safety” input signals
- Monitoring of short-circuiting in the “safety” input circuits
- Safe start up via monitored start button
- 3 enabling paths and 1 data output
- Monitoring of the power contactors via feedback circuit
- 1 enabling path with 10 s time delay, control category according to EN 954 Category 3

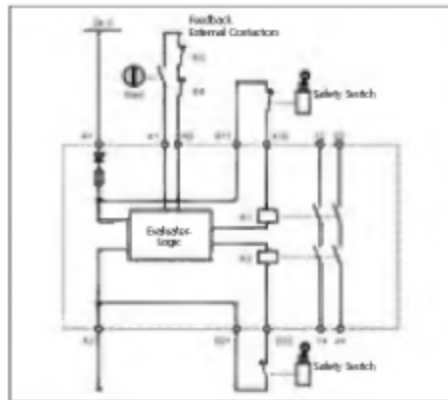


Circuitry: SCR 4-W70-3.8 DT

SCR 4-W22-2.4-S features

Control category according to regulations:
– EN 954 Category 4

- Monitoring of safety guard and EMERGENCY STOP devices
- Monitoring of two redundant “safety” input signals
- Monitoring of short-circuiting in the “safety” input circuits
- Safe start up via monitored start button
- 2 enabling paths
- Monitoring of the power contactors via feedback circuit

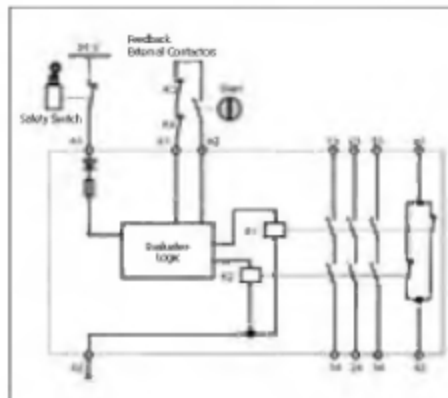


Circuitry: SCR 4-W22-2.4-S

SCR 2-W22-3.5-D features

Control category according to regulations:
– EN 954 Category 2

- Monitoring of safety guard and EMERGENCY STOP devices
- Testing of safety control at every machine start
- One-channel “safety” input signal
- Automatic or manual machine starts possible
- 3 enabling paths
- Monitoring of the power contactors via feedback circuit



Circuitry: SCR 2-W22-3.5 D

Designation

Part number

Control category

Enabling path (not delayed/delayed)

Function

Contacts to be monitored

Start function

automatic

manual

manual (start-button monitored)

Data outputs (normally-closed contact)

Electrical ratings

Operating voltage

Max. power consumption

Outputs, ratings

Switching voltage max.

Switching current max.

Power rating max.

LED: Operating voltage (green)

Switching output (green)

Function indication (green)

Mechanical life, switching cycles

Ambient conditions

Temperature range min./max.

Protection class (acc. to IEC 529) housing

terminals

Housing material

Installation

Connection type: terminal block (cable/stranded wire)

Weight

Dimensions (W x H x D) max.

Approvals (in preparation)

Delivery: ex-stock/built to order

- Enabling path 1: (13/14)
- Enabling path 2: (23/24)
- Enabling path 3: (33/34)
- Enabling path 4: (53/54) delayed
- Data output (normally-closed contact)
- ◆ - Supply voltage 24 V AC/DC
- Connection for safety contact 1
- Connection for safety contact 2
- ☆ Connection for feedback and start button



SCR 4-W70-3.8-0T

607 5151 006

4/3

31 with 10 s

2 O

-

-

●

1

24 V AC/DC

180 mA

AC 15 230 V/5 A

DC 13 24V/2 A

250 V

24 V

8 A

8 A

2000 VA

200 W

●

-

● (2 x 2)

30 x 10⁶

0-55 °C

+32 °F/+131 °F

IP 40

IP 20

FA 6.6

TS 35

2.5 mm²

0.5 kg

70 x 99 x 114.5

BG

●-



SCR 4-W22-2.4-5

607 5111 005

4

2/-

2 O

-

-

●

-

24 V AC/DC

60 mA

AC 15 230 V/4 A

DC 13 24 V/4 A

250 V

24 V

4 A

4 A

1900 VA

150 W

●

-

-

10 x 10⁶

0-70 °C

+32 °F/+158 °F

IP 40

IP 20

FC

TS 35

2 x 2.5 mm²

0.2 kg

22.5 x 82 x 98.8

BG

●-



SCR 2-W22-3.5 0

607 5111 007

2

2/-

1 O

-

-

●

-

24 V AC/DC

60 mA

AC 15 230 V/5 A

DC 13 24 V/4 A

250 V

24 V

5 A

5 A

1500 VA

150 W

●

-

● (2)

10 x 10⁶

0-70 °C

+32 °F/+158 °F

IP 40

IP 20

FC

TS 35

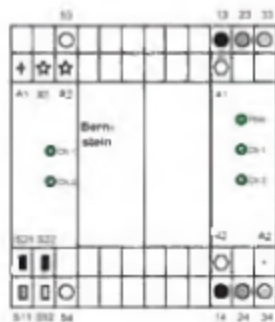
2 x 2.5 mm²

0.2 kg

22.5 x 82 x 118

BG

●-



Sensors

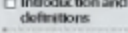



Inductive sensors

Model	Page
 Introduction and definitions	120
 $\varnothing 3$ $\varnothing 4$ $\varnothing 6.5$	122
 M4 x 0.5 M5 x 0.5 M8 x 1	124
 M12 x 1	126
 M18 x 1	132
 M30 x 1.5	135
 5 x 5 x 25 8 x 8 x 40 8 x 8 x 47 12 x 12 x 55	138
 27 x 10 x 5 28 x 16 x 11 40 x 26 x 12 50 x 25 x 10	140
 Multinorm	142
 Globaline	144
 Programmable inductive sensors • Teach-in function • Programmable operating distance 20–40 mm • Programmable speed monitoring 1–5000 Hz • Simple mounting and adjustment	148

Photoelectric sensors

Model	Page
 Introduction and definitions	166
 OT12 RT OAT12 RT • Diffuse reflective sensors • M12 • IP 67	168
 M18 series • Length < 60 mm • All important function types • Programmable output function	170
 O220 • Smooth stainless steel housing • All important function types • Programmable output function	174
 Analog output sensors • Programmable sensing distances • Voltage output 0–10 V • Current output 0–20 mA, 4–20 mA • Housing in plastic brass, or stainless steel	175
 OR05 • Through-beam sensors • Retroreflective sensors, polarized • Diffuse reflective sensors • Fibre optic controls • IP 67	177
 OR10 • Through-beam sensors • IP 67	180
 OR12 • Through-beam sensors • Through-beam sensors with reduced inferior beam • Laser-through-beam sensors • Retroreflective sensors • Diffuse reflective sensors • IP 65	182
 OR17 • Through-beam sensors • Retroreflective sensors, polarized • Diffuse reflective sensors	186

Capacitive sensors

Model	Page
 Introduction and definitions	160
 M12 x 1 M18 x 1 M30 x 1.5 M32 x 1.5	164
 RD 20 RD 34	165
 Multinorm E 50 E 68 N 44	165

Photoelectric sensors

Model	Page
□ Introduction and definitions	166



OR20	188
<ul style="list-style-type: none"> Through-beam sensors Retroreflective sensors Diffuse reflective sensors, polarized Diffuse reflective sensors Diffuse reflective sensors with background suppression 	



OR90	192
<ul style="list-style-type: none"> Through-beam sensors Retroreflective sensors 	

Photoelectric safety devices

Model	Page
□ Introduction and definitions	194



Light barrier OSG 4	194
<ul style="list-style-type: none"> Type 4 Compact design EDS (external device monitoring) Machine restart, automatic/manual Muting controller 	



Light barrier OSS2	198
<ul style="list-style-type: none"> Type 2 to EN 61496-1 Sensing distance max. 20 m Automatic restart or restart prohibition Connects up to 3 light barriers to the control device Permanent self-monitoring 	



Light barrier OSS4	198
<ul style="list-style-type: none"> Type 4 to EN 61496-1 Sensing distance max. 40 m Automatic restart or restart prohibition Integrated evaluation electronics Permanent self-monitoring 	

Safety magnetic controller

Model	Page
□ General table	202



System type 4	204
<ul style="list-style-type: none"> According to EN 554-1 in safety category 4 Double-falsafe system with selfcontrol IP 20 	



System type 3	206
<ul style="list-style-type: none"> According to EN 554-1 in safety category 3 Single-falsafe system with partial fault recognition IP 20 	



System type 1	209
<ul style="list-style-type: none"> According to EN 554-1 in safety category 1 Standard, integrated redundancy IP 20 	



Coded magnetic switches	210
<ul style="list-style-type: none"> IP 67 	

□ Magnetic monitoring systems	212
<ul style="list-style-type: none"> Connection diagrams 	

Magnetic switches

Model	Page
□ General table	214



Electromechanical magnetic switches	216
<ul style="list-style-type: none"> Plastic Metal IP 67 	



Electronic magnetic switches	226
<ul style="list-style-type: none"> Plastic Metal IP 67 	

Float switches

Model	Page
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Standard float switches	240
<ul style="list-style-type: none"> Stainless steel Brass PVC 	



Mini level float switches	248
<ul style="list-style-type: none"> Stainless steel Brass PP PVC 	



Adjustable float switches	252
<ul style="list-style-type: none"> Stainless steel Brass PVC 	



Accessories	256
<ul style="list-style-type: none"> Floats Technical data Order form and questionnaire 	

Appendix

	Page
□ Inductive sensors	262
<ul style="list-style-type: none"> Type matrix Connection diagrams Flange material 	

□ Capacitive sensors	267
<ul style="list-style-type: none"> Type matrix Connection diagrams 	

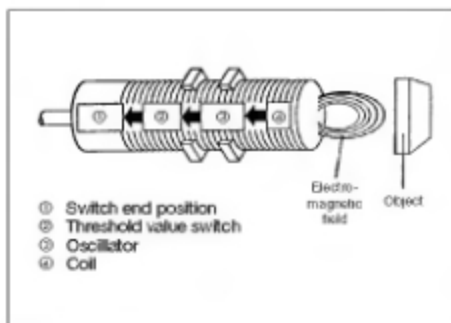
□ Opto-electronic sensors	270
<ul style="list-style-type: none"> Type matrix Connection diagrams Reflectors 	

□ Accessories	276
<ul style="list-style-type: none"> Plugs Sensor testing unit 	

Inductive sensors

Principle of operation

In general, inductive proximity switches consist of four basic elements: the coil, an oscillator, a triggering circuit and an output switching device with short-circuit protection. The oscillator generates a high-frequency electromagnetic field, which is emitted from the coil, this in turn radiates from the sensor's sensing surface. When a metallic object enters this electromagnetic field, eddy currents are induced within the material. These eddy currents draw energy from both the electromagnetic field and the oscillator. This withdrawal of energy is called damping and increases when the metallic object is moved closer to the sensing surface. The trigger circuit activates the output switching device when a defined damping value is exceeded. For proximity switches in DC voltage units, the output switching device can be either an NPN transistor, which switches the connected load to the negative pole, or a PNP transistor, which switches the load to the positive pole. In AC voltage units a thyristor or triac can be the trigger circuit.

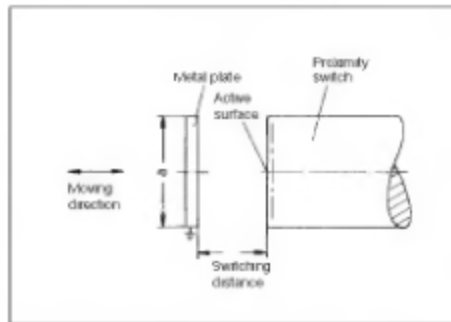


Sensing distance

The sensing distance of a proximity sensor is determined by the diameter of the coil used. This means that the larger the coil and diameter of the sensor, the longer the sensing range will be. The size and material of the object to be detected also affects the sensing distance.

Measuring plates

The measuring plate used to specify the sensing distance of a proximity sensor consists of a steel square (ST37) with a thickness of 1 mm. The side length is equal to the diameter of the active surface of the sensor, or three times the operating distance, whichever is greater.



Nominal sensing distance: S_n

The nominal sensing distance of different models is a function of the diameter of the sensing coil.

Real sensing distance: S_r

The real sensing distance is the sensing distance measured with nominal voltage and temperature. It must be between 90% and 110% of the nominal sensing distance.

Effective sensing distance: S_e

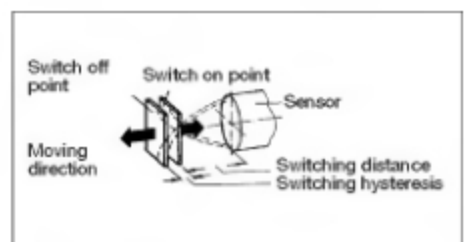
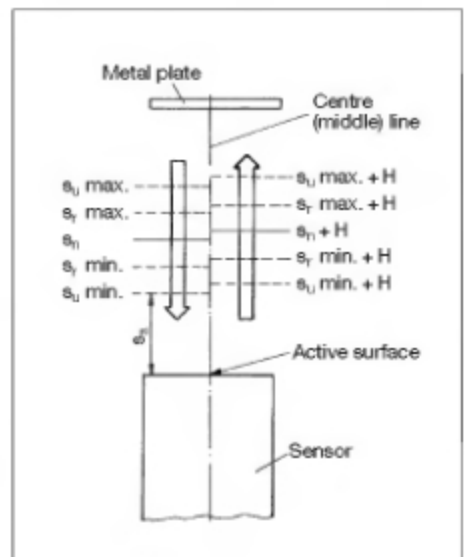
The effective sensing distance is measured within the range of the admissible temperatures and voltages and must be between 90% and 110% of the real sensing distance.

Working sensing distance: S_a

(Secured sensing distance)
The working sensing distance heeds the effects of temperature, supply voltage and unit-to-unit variations. Within 0–80% of the nominal sensing distance is guaranteed if all permissible operating conditions are fulfilled.
 $S_a \leq 0.8 S_n$

Hysteresis: H

Hysteresis is the difference between the switch-on point as the object approaches the sensor, and the switch-off point as the object moves away. Hysteresis is stated as a percentage of the nominal sensing distance. Hysteresis is needed to keep proximity sensors from output "chattering" when subjected to vibration, slowly approaching objects, temperature drift or electrical interferences. Hysteresis is typically 10% of the nominal sensing distance.

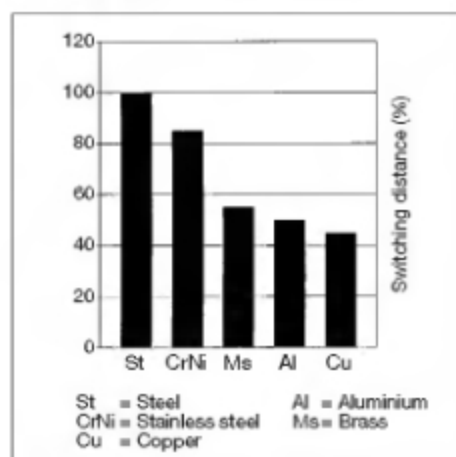


Repeat accuracy

The ability of a sensor to repeatedly detect an object at the same distance away from the sensing surface. Normally there will be a deviation of <5%.

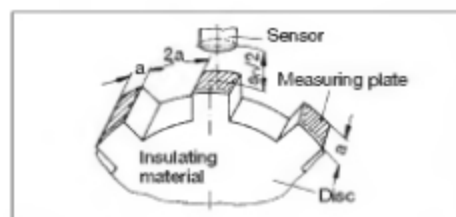
Reduction factors

The definition of the sensing distance is based on the measurement of standardised square steel target plates. For other materials with the same dimensions, the sensing distances are reduced as displayed in the following figure:



Switching frequency

A rotating, non-conductive disk on which the standard target plates are situated (size of plates as defined above) measures the switching frequency.



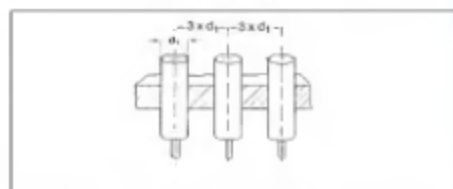
The distance between the measurement plates and the sensor is half of the nominal sensing distance. The maximum switching frequency is achieved when the switch-off output signal falls below 50 ms.

Temperature range

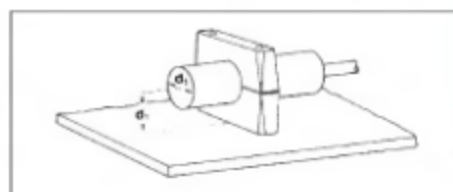
The normal temperature range for most sensors is from -25°C to $+70^{\circ}\text{C}$ (-13°F to $+158^{\circ}\text{F}$). Some sensors are available for use in higher temperature applications.

Installation

Inductive sensors contain coils which are wound in ferrite cores to point the radiated electromagnetic field in the direction of use. The core is built in to the enclosure in such a way that the field exits from the active surface. A portion of the magnetic field exits laterally. This is sufficient to prevent the sensor from being flush-installed in metal because it would activate the sensor. If a flush installation in metal is desired, a metal ring is placed around the ferrite core to restrict the lateral radiation of the field. This type of sensor is called a shielded/flush mounted sensor and will have a reduced sensing range compared to that of the unshielded/non-flush mounted type.

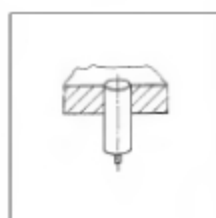


Minimum distance for the non-flush installation of sensors.

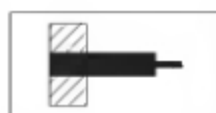


Installation with mounting flange parallel to a steel wall or surface.

Flush installation

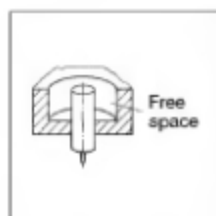


The active surface may be flush with metal surfaces.



Catalogue symbol for flush installation.

Non-flush installation



Sensors for non-flush installation must be provided with a free zone, which is three times greater than the diameter of the active surface and 25 mm thick.



Catalogue symbol for non-flush installation.

Protection types

IP 65
IP 67

Materials

The sensors are encapsulated in thermoplastic housings that are reinforced by glass fibre. The power cable has a PVC or PU sheath.

Weld field immune sensors

Weld field immune sensors have the ability not to false trigger in the presence of strong electromagnetic fields. These special models are ideal for welding environments as well as other applications where strong magnetic fields are present.

Standards

All sensors correspond to the specifications of the following European standards, as devised by the European Committee for the Standardisation of Electrotechnology:

EN 60947-5-2	CE	
IEC 255-5	Level 2	
ENV 50140	Level 3	
EN 61000-4-2	Level 2 Metal housing	
	Level 3 Plastic housing	
EN 61000-4-4	Level 2	

Inductive sensors

Ø 3
Ø 4
Ø 6.5



Rated operating distance	
Mounting	flush / non-flush
Switching functions	
	Model description Part number Normally open (NO) Wiring diagram (page/pos.) Stod. status: Ex stod./Built to order
	Model description Part number Normally closed (NC) Wiring diagram (page/pos.) Stod. status: Ex stod./Built to order
	Model description Part number Normally closed (NOC) selectable Wiring diagram (page/pos.) Stod. status: Ex stod./Built to order
	Model description Part number Complementary Wiring diagram (page/pos.) Stod. status: Ex stod./Built to order
Electrical data	
Voltage range	
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max.
Protection type	
Housing material	
Termination	cable 2 m/5 ft min. plug (page)
Accessories	(page/pos.)

Ø 3

0.6 mm (Ø 0.2")

	PNP	AC
-	KIB-D03PS	-
-	0.6-KL2PU	-
	650.2999.019	
	26.31	
-	KIB-D03PV	-
-	0.6-KL2PU	-
	650.2799.007	
	26.32	
-	-	-
-	-	-
-	-	-

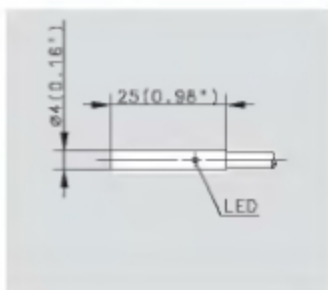
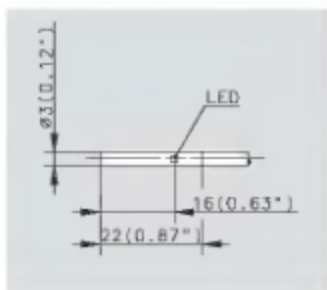
Ø 4

0.8 mm (Ø 0.3")

	PNP	AC	PNP	AC
-	KIB-D04PS	-	KIB-D04PS	-
-	0.8-KL2PU	-	0.8-KL2PU	-
	650.2999.004		650.2999.004	
	26.34		26.31	
-	KIB-D04PV	-	KIB-D04PV	-
-	0.8-KL2PU	-	0.8-KL2PU	-
	650.2799.002		650.2799.002	
	26.32		26.32	
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Dimension diagrams

All dimensions in mm (inch)



**0.4**

0.8 mm (0.03")

●-	●-	-
NPN	PNP	AC
K18-D04HS	K18-D04PS	-
0.8-KLSM8	0.8-KLSM8	-
650.2399.015	650.2399.017	-
2634	2631	-
-	●-	-

**0.65**

1.5 mm (0.06")

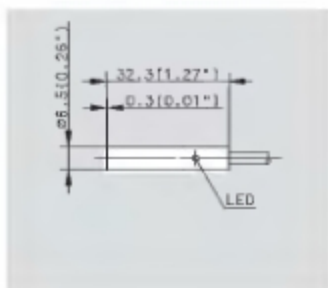
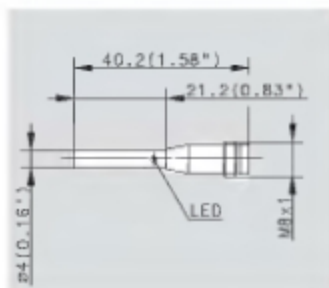
●-	●-	-
NPN	PNP	AC
K18-D06HS	K18-D06PS	-
1.5-KL2	1.5-KL2	-
650.2399.009	650.2399.010	-
2634	2631	-
-	●-	-
-	K18-D06PV	-
-	1.5-KL2	-
-	650.2799.011	-
-	2632	-
-	-	-

**0.65**

1.5 mm (0.06")

-	●-	-
NPN	PNP	AC
-	K18-D06PS	-
-	1.5-K2VU	-
-	650.2399.034	-
-	2631	-
-	●-	-

10-30 V	10-30 V	-	10-30 V	10-30 V	-	-	10-30 V	-
-200 mA	-200 mA	-	-200 mA	-200 mA	-	-	-200 mA	-
3000 Hz	3000 Hz	-	1000 Hz	1000 Hz	-	-	1000 Hz	-
●	●	-	●	●	-	-	●	-
●-	●-	-	●-	●-	-	-	●-	-
-	-	-	-	-	-	-	-	-
-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-	IP 67/EMA 4	IP 67/EMA 4	-	-	IP 67/EMA 4	-
Stainless Steel 1.4305	Stainless Steel 1.4305	-	Stainless Steel 1.4401	Stainless Steel 1.4401	-	-	Stainless Steel 1.4401	-
-	-	-	PVC 380 34	PVC 380 34	-	-	PVC 380 34	-
278/279	278/279	-	-	-	-	-	-	-
266/3	266/3	-	266/5	266/5	-	-	266/5	-



Inductive sensors

M 4 x 0.5
M 5 x 0.5
M 8 x 1



Rated operating distance	
Mounting	flush / non-flush
Switching functions	
	Model description
	Part number
Normally open (NO)	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Normally closed (NC)	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Normally closed (NC) selectable	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Complementary	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	10–30 V
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max.
Protection type	
Housing material	
Termination	cable 2 m/6.5 ft min. plug (page)
Accessories	(page/pos.)

M 4

0.6 mm (0.02")

●-	●-	-	●-	●-	-
NPN	PNP	AC	NPN	PNP	AC
KIB-M04HS/	KIB-M04PS/	-	KIB-M04HS/	KIB-M04PS/	-
0.6-KL2PU	0.6-KL2PU	-	001-KL2PU	001-KL2PU	-
650.2399.018	650.2999.020	-	650.2399.003	650.2999.003	-
263/4	263/1	-	263/4	263/1	-
→	→	-	→	→	-
-	KIB-M04PC/	-	KIB-M04HC/	KIB-M04SPV	-
-	0.6-KL2PU	-	001-KL2PU	001-KL2PU	-
-	650.2799.008	-	650.2399.001	650.2799.001	-
-	263/2	-	263/5	263/2	-
-	→	-	→	→	-
-	-	-	-	-	-

M 5

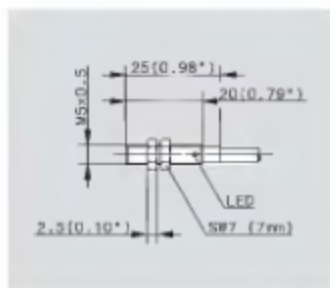
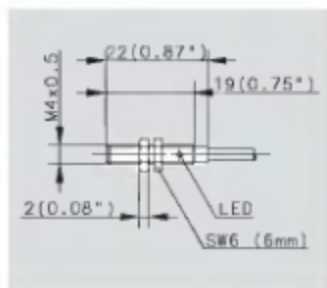
1 mm (0.04")

10–30 V	10–30 V	-	10–30 V	10–30 V	-
-100 mA	-100 mA	-	-200 mA	-200 mA	-
3000 Hz	3000 Hz	-	3000 Hz	3000 Hz	-
●	●	-	●	●	-
●-	●-	-	●-	●-	-
-	-	-	-	-	-

-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-	IP 67/EMA 4	IP 67/EMA 4	-
CuZn39Pb3	CuZn39Pb3	-	CuZn39Pb3	CuZn39Pb3	-
PUR 3x0.65	PUR 3x0.55	-	PUR 3x0.14	PUR 3x0.14	-
-	-	-	-	-	-
266/3	266/3	-	266/4	266/4	-

Dimension diagrams

All dimensions in mm (inch)



**M5**

1 mm (0.04")

	●-	-	
NPN	PNP	AC	
	K08-M08PS/		
	001-KLSM8		
	650.2999.010		
	2631		
	●-		

**M8 x 1**

15 mm (0.06")

	●-	●-	-
NPN	PNP	AC	
	K08-M08G/	K08-M08PS/	
	1 S-KL2	1 S-KL2	
	650.2901.003	650.2901.003	
	2634	2631	
	●-	●-	
	K08-M08G/	K08-M08PG/	
	1 S-KL2	1 S-KL2	
	650.2701.001	650.2701.001	
	2635	2632	
	●-	●-	

**M8 x 1**

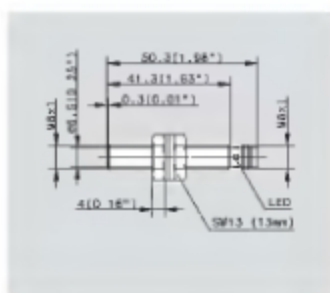
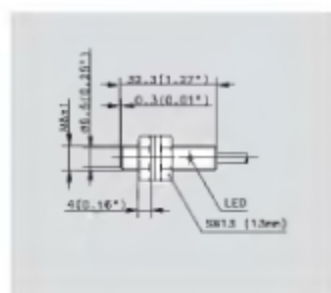
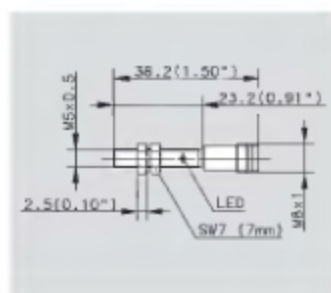
15 mm (0.06")

	●-	●-	-
NPN	PNP	AC	
	K08-M08G/	K08-M08PS/	
	1.5-KLSM8	1.5-KLSM8	
	650.2342.003	650.2942.005	
	2634	2631	
	●-	●-	
	K08-M08G/	K08-M08PG/	
	1.5-KLSM8	1.5-KLSM8	
	650.2742.001	650.2742.001	
	2632	2632	
	●-	●-	

-	10-30 V	-
-	-200 mA	-
-	3000 Hz	-
-	●	-
-	●-	-
-	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-
-	IP 67/IEEMA 4	-
-	CuZn39Pb3	-
-	PVC 300 34	-
-	278/279	-
-	265/4	-

10-30 V	10-30 V	-
-200 mA	-200 mA	-
3000 Hz	3000 Hz	-
●	●	-
●-	●-	-
-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/IEEMA 4	IP 67/IEEMA 4	-
Stainless steel 1.4305	Stainless steel 1.4305	-
PVC 300 34	PVC 300 34	-
278/279	278/279	-
-	-	-

10-30 V	10-30 V	-
-200 mA	-200 mA	-
3000 Hz	3000 Hz	-
●	●	-
●-	●-	-
-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/IEEMA 4	IP 67/IEEMA 4	-
Stainless steel 1.4305	Stainless steel 1.4305	-
278/279	278/279	-
-	-	-



Inductive sensors

M 12 x 1



Rated operating distance	
Mounting	flush / non-flush
Switching functions	
	Model description
	Part number
Normally open (NO)	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Normally closed (NC)	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Normally closed (NC) selectable	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Complementary	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	10–30 V
Output current	–200 mA min./max.
Switching frequency	800 Hz max.
Short-circuit protection	●
LED: yellow = switched / green = power	●
Sensitivity adjustment	–
Mechanical data	
Temperature range	min./max.
Protection type	IP 67/IEEMA 4
Housing material	CuZn35Pb3
Termination	cable 2 m/5 ft min. plug (page)
Accessories	(page/pos.)

M 12 x 1

2 mm (0.08")

●	●	●	●	●	●
NPN	PNP	AC	NPN	PNP	AC
KIB-M12HS/002-KL2	KIB-M12PS/002-KL2	KIB-M12AS/002-L2	KIB-M12HS/004-KL2	KIB-M12PS/004-KL2	KIB-M12AS/004-L2
650.2903.001	650.2903.003	650.3503.001	650.2904.001	650.2904.002	650.3504.001
263/4	263/1	265/4	263/4	263/1	265/4
–	●	●	●	●	●
–	KIB-M12PS/002-KL2	KIB-M12AS/002-L2	KIB-M12HS/004-KL2	KIB-M12PS/004-KL2	KIB-M12AS/004-L2
–	650.2703.001	650.3803.001	650.2704.001	650.2704.001	650.3804.001
–	263/2	265/5	263/5	263/2	265/5
–	–	–	–	–	–

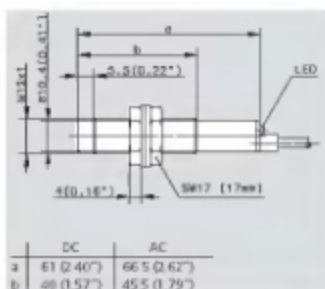
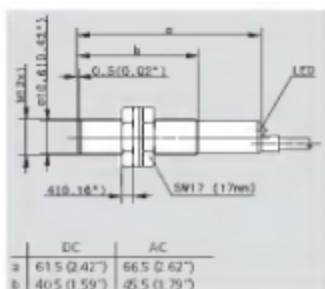
M 12 x 1

4 mm (0.16")

●	●	●	●	●	●
NPN	PNP	AC	NPN	PNP	AC
KIB-M12HS/002-KL2	KIB-M12PS/002-KL2	KIB-M12AS/002-L2	KIB-M12HS/004-KL2	KIB-M12PS/004-KL2	KIB-M12AS/004-L2
650.2903.001	650.2903.003	650.3503.001	650.2904.001	650.2904.002	650.3504.001
263/4	263/1	265/4	263/4	263/1	265/4
–	●	●	●	●	●
–	KIB-M12PS/002-KL2	KIB-M12AS/002-L2	KIB-M12HS/004-KL2	KIB-M12PS/004-KL2	KIB-M12AS/004-L2
–	650.2703.001	650.3803.001	650.2704.001	650.2704.001	650.3804.001
–	263/2	265/5	263/5	263/2	265/5
–	–	–	–	–	–

Dimension diagrams

All dimensions in mm (inch)



**M 12 x 1**

2 mm (0.08")

●-	●-	-
NPN	PNP	AC
K0B-M12HS/ 002-KLS12	K0B-M12PS/ 002-KLS12	-
650.2343.003	650.2343.012	-
26.34	26.31	-
-	●-	-
-	K0B-M12CV/ 002-KLS12	-
-	650.2343.003	-
-	26.32	-
-	-	-

**M 12 x 1**

4 mm (0.16")

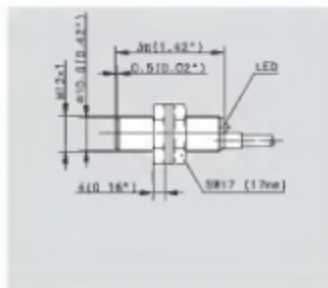
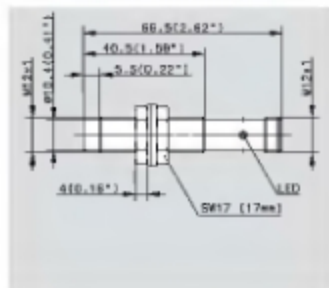
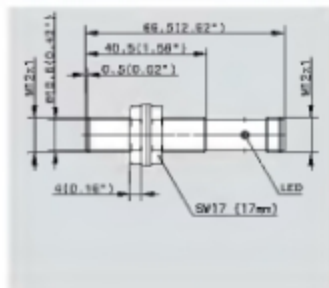
-	-	-
NPN	PNP	AC
-	K0B-M12PS/ 004-KLS12	-
-	650.2344.012	-
-	26.31	-
-	●-	-
-	K0B-M12CV/ 004-KLS12	-
-	650.2344.003	-
-	26.32	-
-	-	-

**M 12 x 1**

2 mm (0.08")

●-	●-	-
NPN	PNP	AC
-	K0B-M12PS/ 002-KL2V	-
-	650.2303.016	-
-	26.31	-
-	●-	-
-	K0B-M12CV/ 002-KL2V	-
-	650.2303.003	-
-	26.35	-
-	26.32	-
-	-	-

10-30 V	10-30 V	-	-	10-30 V	-	-	10-30 V	10-30 V	-
-200 mA	-200 mA	-	-	-200 mA	-	-	-200 mA	-200 mA	-
800 Hz	800 Hz	-	-	400 Hz	-	-	800 Hz	800 Hz	-
●	●	-	-	●	-	-	●	●	-
●-	●-	-	-	●-	-	-	●-	●-	-
-	-	-	-	-	-	-	-	-	-
-25 °C/+70 °C	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-	-	IP 67/EMA 4	-	-	IP 67/EMA 4	IP 67/EMA 4	-
CuZn39Pb3	CuZn39Pb3	-	-	CuZn39Pb3	-	-	CuZn39Pb3	CuZn39Pb3	-
-	-	-	-	-	-	-	PVC 380.14	PVC 380.14	-
280/281/282	280/281/282	-	-	280/281/282	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-



Inductive sensors

M 12 x 1



Rated operating distance	
Mounting	flush / non-flush
Switching functions	
	Model description
Part number	
Normally-open (NO)	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
Part number	
Normally-closed (NC)	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
Part number	
Normally-closed (NC) selectable	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
Part number	
Complementary	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	10–30 V
Output current	min./max. -200 mA
Switching frequency	max. 400 Hz
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max. -25 °C/+70 °C
Protection type	IP 67/IEC 68 4
Housing material	CuZn39Pb3
Termination	cable 2 m/5 ft min. plug (page)
Accessories	(page/pos.)

M 12 x 1

4 mm (0.16")

-/•	-/•	-
NPN	PNP	AC
KH-M12HS	KH-M12PS	-
004-KL2V	004-KL2V	-
650.2904.007	650.2904.014	-
263/4	263/1	-
-/•	•-	-

M 12 x 1

4 mm (0.16")

-	-/•	-
NPN	PNP	AC
KH-M12HS	KH-M12PS	-
004-KS12V	004-KS12V	-
650.2944.006	650.2944.006	-
263/1	263/1	-
-	•-	-

10–30 V	10–30 V	-	-	10–30 V	-
-200 mA	-200 mA	-	-	-200 mA	-
400 Hz	400 Hz	-	-	400 Hz	-

•	•	-	-	•	-
•-	•-	-	-	•-	-

-	-	-	-	-	-
---	---	---	---	---	---

-25 °C/+70 °C	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-
---------------	---------------	---	---	---------------	---

-13 °F/+158 °F	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-
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IP 67/IEC 68 4	IP 67/IEC 68 4	-	-	IP 67/IEC 68 4	-
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CuZn39Pb3	CuZn39Pb3	-	-	CuZn39Pb3	-
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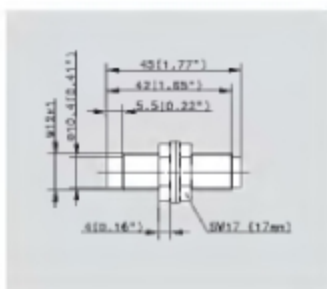
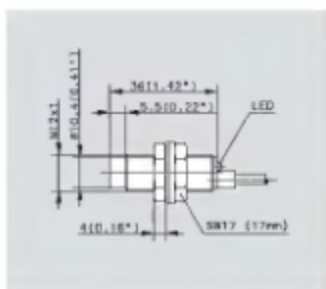
PVC 3x0.14	PVC 3x0.14	-	-	-	-
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-	-	-	-	280281/282	-
---	---	---	---	------------	---

-	-	-	-	-	-
---	---	---	---	---	---

Dimension diagrams

All dimensions in mm (inch)





M 12 x 1

2 mm (0.08")

	●	—	
NPN	PNP	AC	
	K3B-M12PS/		
	002-KS12V		
	650.2903.006		
	263V1		
	●	—	
	K3B-M12PC/		
	002-KS12V		
	650.2903.005		
	263V2		
	—	●	



M 12 x 1 extended sensing distance

4 mm (0.16")

	●	—	
NPN	PNP	AC	
	K3B-M12PS/		
	004-KL2E		
	650.2903.014		
	263V1		
	●	—	

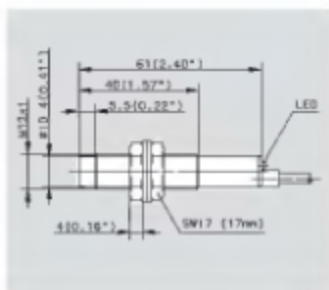
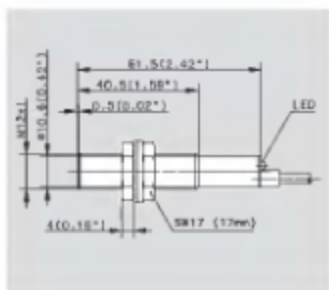
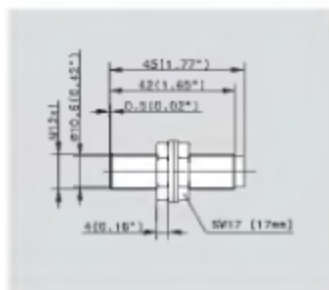


M 12 x 1 extended sensing distance

6 mm (0.24")

	●	—	
NPN	PNP	AC	
	K3B-M12HS/		
	006-KL2E		
	650.2304.012		
	263V4		
	—	●	
	K3B-M12PC/		
	006-KL2E		
	650.2704.005		
	263V2		
	—	●	

—	10–30 V	—	—	10–60 V	—	10–60 V	10–60 V	—
—	–200 mA	—	—	–200 mA	—	–200 mA	–200 mA	—
—	800 Hz	—	—	800 Hz	—	400 Hz	400 Hz	—
—	●	—	—	●	—	●	●	—
—	—	—	—	●	—	●	●	—
—	—	—	—	—	—	—	—	—
—	–25 °C/+70 °C	—	—	–25 °C/+70 °C	—	–25 °C/+70 °C	–25 °C/+70 °C	—
—	–13 °F/+158 °F	—	—	–13 °F/+158 °F	—	–13 °F/+158 °F	–13 °F/+158 °F	—
—	IP 67/IECMA 4	—	—	IP 67/IECMA 4	—	IP 67/IECMA 4	IP 67/IECMA 4	—
—	CuZn39Pb3	—	—	CuZn39Pb3	—	CuZn39Pb3	CuZn39Pb3	—
—	—	—	—	PVC 380.14	—	PVC 380.14	PVC 380.14	—
—	280/281/282	—	—	—	—	—	—	—



Inductive sensors

M 12 x 1



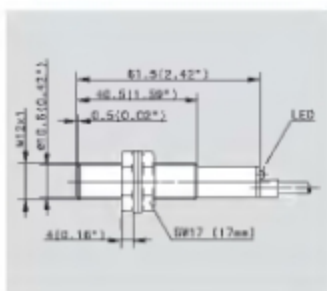
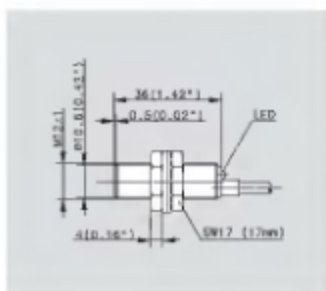
Rated operating distance	
Mounting	flush non-flush
Switching functions	
	Model description
	Part number
Normally open (NO)	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Normally closed (NC)	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Normally closed (NC) selectable	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Complementary	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	min./max.
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max.
Protection type	
Housing material	
Termination	cable 2 m/5 ft min. plug (page)
Accessories	(page 205)

M 12 x 1	extended sensing distance	M 12 x 1	higher temperature range
4 mm (0.16")		2 mm (0.08")	

NPN	PNP	AC	NPN	PNP	AC
-	●/-	-	-	●/-	-
-	K08-M 12PSV 004-KL2VE 650.2903.023 26.31	-	-	K08-M 12PSV 002-KL2T 650.2903.013 26.31	-
-	●/-	-	-	-●	-
-	-	-	-	K08-M 12PSV 002-KL2T 650.2703.004 26.32	-
-	-	-	-	-●	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	10-30 V	-	-	10-30 V	-
-	-200 mA	-	-	-200 mA	-
-	800 Hz	-	-	800 Hz	-
-	●	-	-	●	-
-	●/-	-	-	●/-	-
-	-	-	-	-	-
-	-25 °C/+70 °C	-	-	0 °C/+100 °C	-
-	-13 °F/+158 °F	-	-	-32 °F/+212 °F	-
-	IP 67/EMA 4	-	-	IP 67/EMA 4	-
-	CuZn39Pb3	-	-	CuZn39Pb3	-
-	PVC 3x0.14	-	-	PVC 3x0.14	-
-	-	-	-	-	-
-	-	-	-	-	-

Dimension diagrams

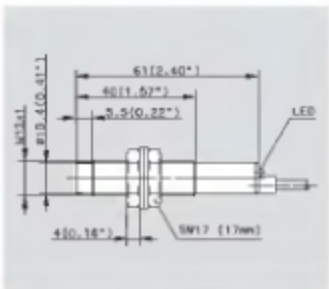
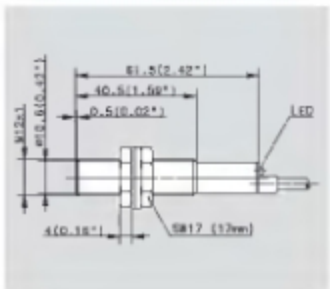
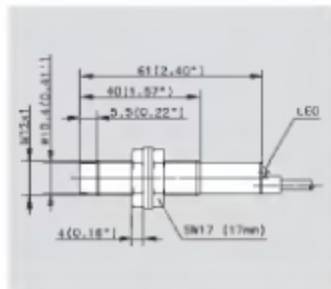
All dimensions in mm (inch)





M 12 x 1 higher temperature range **M 12 x 1 higher switching frequency** **M 12 x 1 higher switching frequency**

4 mm (0.16")			2 mm (0.08")			4 mm (0.16")		
	NPN	PNP AC		NPN	PNP AC		NPN	PNP AC
	KH-M12PS/004-KL2T			KH-M12PS/002-KL2F			KH-M12NS/004-KL2F	
	650.2904.011			650.2903.012			650.2904.006	
	263V1			263V1			263V1	
	-			-			-	
	KH-M12PS/004-KL5T							
	650.2704.006							
	263V2							
	-							
	-							
	-							
	10-30 V			10-60 V			10-60 V	
	-700 mA			-700 mA			-700 mA	
	400 Hz			4000 Hz			3000 Hz	
	•			•			•	
	•			•			•	
	0 °C/+100 °C			-25 °C/+70 °C			-25 °C/+70 °C	
	-32 °F/+212 °F			-13 °F/+158 °F			-13 °F/+158 °F	
	IP 67/EMA 4			IP 67/EMA 4			IP 67/EMA 4	
	CuZn39Pb3			CuZn39Pb3			CuZn39Pb3	
	PVC 300.14			PVC 300.14			PVC 300.14	
	-			-			-	
	-			-			-	
	-			-			-	
	-			-			-	
	-			-			-	



Inductive sensors

M 18 x 1



Rated operating distance	
Mounting	flush non-flush
Switching functions	
	Model description
	Part number
Normally open (NO)	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Normally closed (NC)	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Normally closed (NC) selectable	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
	Model description
	Part number
Complementary	Wiring diagram (page/pos.)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	10-60 V
Output current	-200 mA min./max
Switching frequency	500 Hz max
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max
Protection type	
Housing material	
Termination	cable 2 m/6.5 ft min. plug (page)
Accessories	(page/pos.)

M 18 x 1

5 mm (0.20")

NPN	PNP	AC
KIB-M18BV	KIB-M18PV	KIB-M18AV
005-KL2	005-KL2	005-L2
650.2905.134	650.2905.850	650.3505.004
263/4	263/1	265/4
-	KIB-M18BV	KIB-M18AV
	005-KL3	005-L2
	650.2705.172	650.3805.001
	263/2	265/5
-	-	-
-	KIB-M18PV	-
	005-KL2	
	650.2805.001	
	264/4	

M 18 x 1

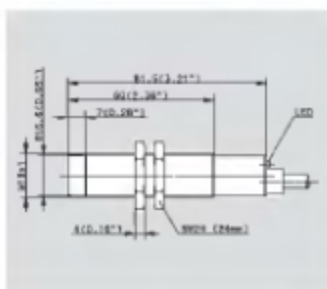
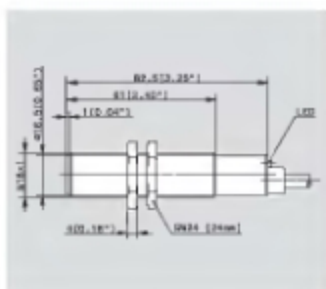
8 mm (0.32")

NPN	PNP	AC
KIH-M18BV	KIH-M18PV	KIH-M18AV
008-KL2	008-KL2	008-L2
650.2906.194	650.2906.200	650.3506.002
263/4	263/1	265/4
-	KIH-M18BV	KIH-M18PV
	008-KL2	008-L2
	650.2706.191	650.2706.001
	263/5	263/2
-	-	-
-	KIH-M18PV	-
	008-KL2	
	650.2806.001	
	264/4	

10-60 V	10-60 V	20-250 V	10-60 V	10-60 V	20-250 V
-200 mA	-200 mA	4/400 mA	-200 mA	-200 mA	4/400 mA
500 Hz	500 Hz	10 Hz	200 Hz	200 Hz	10 Hz
		-			-
-	-	-	-	-	-
-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C
-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F
IP 67/IEEMA 4	IP 67/IEEMA 4	IP 67/IEEMA 4	IP 67/IEEMA 4	IP 67/IEEMA 4	IP 67/IEEMA 4
CuZn35Pb3	CuZn35Pb3	CuZn35Pb3	CuZn35Pb3	CuZn35Pb3	CuZn35Pb3
PVC 3x0.5/4x0.5	PVC 3x0.5/4x0.5	PVC 2x0.5	PVC 3x0.5/4x0.5	PVC 3x0.5/4x0.5	PVC 2x0.5
266/6	266/6	266/6	266/6	266/6	266/6

Dimension diagrams

All dimensions in mm (inch)



**M 18 x 1**

5 mm (0.20")

-	●-	-	-
NPN	PNP	AC	-
-	K08-M18PS/	-	-
-	005-KL2V	-	-
-	650.2905.000	-	-
-	263/1	-	-
-	●-	-	-
-	K08-M18PCV/	-	-
-	005-KL2V	-	-
-	650.2705.006	-	-
-	263/2	-	-
-	-●	-	-

**M 18 x 1**

8 mm (0.32")

-	-●	-●	-
NPN	PNP	AC	-
-	K08-M18PS/	K08-M18PS/	-
-	008-KL2V	008-KL2V	-
-	650.2906.004	650.2906.006	-
-	263/4	263/1	-
-	●-	●-	-
-	K08-M18PCV/	K08-M18PCV/	-
-	008-KL2V	008-KL2V	-
-	650.2706.002	650.2706.002	-
-	263/2	263/2	-
-	-●	-●	-

**M 18 x 1**

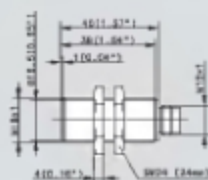
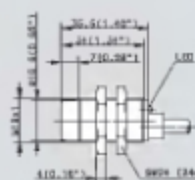
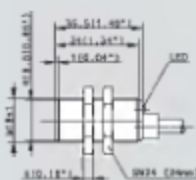
5 mm (0.20")

-	●-	-	-
NPN	PNP	AC	-
-	K08-M18PS/	-	-
-	005-KS12V	-	-
-	650.2905.012	-	-
-	263/1	-	-
-	●-	-	-
-	K08-M18PCV/	-	-
-	005-KS12V	-	-
-	650.2705.007	-	-
-	263/2	-	-
-	-●	-	-

-	10-60 V	-	-
-	-700 mA	-	-
-	500 Hz	-	-
-	●	-	-
-	●-	-	-
-	-	-	-
-	-25 °C/+70 °C	-	-
-	-13 °F/+158 °F	-	-
-	IP 67/EMA 4	-	-
-	CuZn35Pt3	-	-
-	PVC 30 5	-	-
-	-	-	-
-	266/6	-	-

-	10-60 V	10-60 V	-
-	-700 mA	-700 mA	-
-	200 Hz	200 Hz	-
-	●	●	-
-	●-	●-	-
-	-	-	-
-	-25 °C/+70 °C	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-13 °F/+158 °F	-
-	IP 67/EMA 4	IP 67/EMA 4	-
-	CuZn35Pt3	CuZn35Pt3	-
-	PVC 30 5	PVC 30 5	-
-	-	-	-
-	266/6	266/6	-

-	10-60 V	-	-
-	-700 mA	-	-
-	500 Hz	-	-
-	●	-	-
-	-	-	-
-	-25 °C/+70 °C	-	-
-	-13 °F/+158 °F	-	-
-	IP 67/EMA 4	-	-
-	CuZn35Pt3	-	-
-	-	-	-
-	260/261/262	-	-



Inductive sensors

M 18 x 1
M 30 x 1.5



Rated operating distance	
Mounting	flush / non-flush
Switching functions	
	Model description
Part number	
Normally open (NO)	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
Part number	
Normally closed (NC)	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
Part number	
Normally closed (NC)	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
Part number	
Normally closed (NC)	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
Part number	
Complementary	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max.
Protection type	
Housing material	
Termination	cable 2 m/6.5 ft min. plug (page)
Accessories	(page 205)

M 18 x 1
5 mm (0.20")

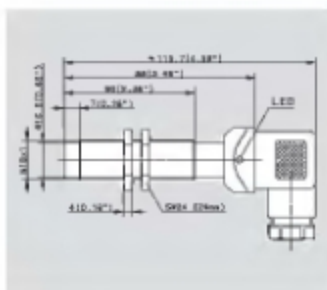
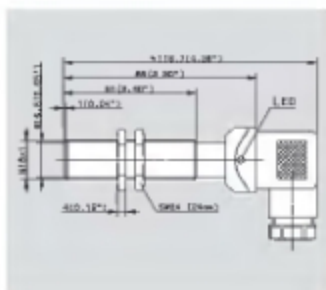
	●/-	●/-		●/-	
NPN	PNP	AC		NPN	PNP AC
	K18-M 18PS/ 005-KLSD	K18-M18AS/ 005-LSO		K18-M18PS/ 008-KLSD	
	660.2905.662	650.3505.003		650.2941.001	
	?	?		?	
	●/-	●/-		●/-	
	K18-M 18PO/ 005-KLSD			K18-M18PO/ 008-KLSD	
	650.2705.001			650.2741.001	
	?			?	
	●/-			●/-	

M 18 x 1
8 mm (0.32")

	●/-	●/-		●/-	
NPN	PNP	AC		NPN	PNP AC
	K18-M 18PS/ 005-KLSD	K18-M18AS/ 005-LSO		K18-M18PS/ 008-KLSD	
	660.2905.662	650.3505.003		650.2941.001	
	?	?		?	
	●/-	●/-		●/-	
	K18-M 18PO/ 005-KLSD			K18-M18PO/ 008-KLSD	
	650.2705.001			650.2741.001	
	?			?	
	●/-			●/-	

Dimension diagrams

§ DC-3-wire § AC-2-wire
1 = + 1 = L1
2 = - 2 = Output
3 = Output



All dimensions in mm (inch)

**M 30 x 1.5**

10 mm (0.39")

NPN	PNP	AC
KB-M30NS/010-KL2	KB-M30PS/010-KL2	KB-M30AS/010-L2
650.2307.135	650.2307.068	650.3507.378
2634	2631	2654
-	-	-
-	-	KB-M30AS/010-L2
-	-	650.3407.280
-	-	2655
-	-	-

**M 30 x 1.5**

15 mm (0.59")

NPN	PNP	AC
KB-M30NS/015-KL2	KB-M30PS/015-KL2	KB-M30AS/015-L2.5
650.2308.001	650.2308.002	650.3508.216
2634	2631	2654
-	-	-
-	-	-
-	-	-

**M 30 x 1.5**

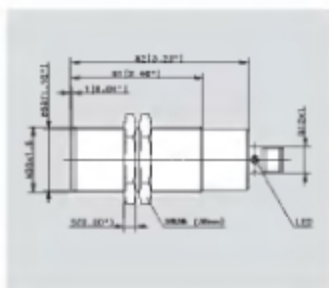
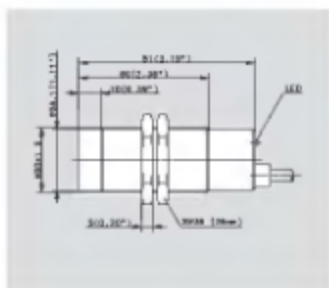
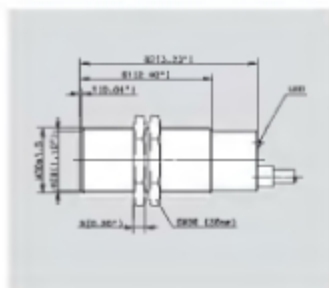
10 mm (0.39")

NPN	PNP	AC
-	KB-M30PS/010-KL512	-
-	650.2309.004	-
-	2631	-
-	-	-
-	-	-

KB-M30NF/010-KL2	-	-	-	KB-M30FL/015-KL2	-	-	-
650.2307.001	-	-	-	650.2808.001	-	-	-
2645	-	-	-	2644	-	-	-
-	-	-	-	-	-	-	-

10-60 V	10-60 V	20-250 V	10-60 V	10-60 V	20-250 V	-	10-60 V
-7200 mA	-7200 mA	4000 mA	-7200 mA	-7200 mA	4000 mA	-	-7200 mA
300 Hz	300 Hz	10 Hz	100 Hz	100 Hz	10 Hz	-	300 Hz
●	●	-	●	●	-	-	-
●	●	●	●	●	●	-	●
-	-	-	-	-	-	-	-

-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C
-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F
IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	-	IP 67/EMA 4
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	-	CuZn39Pb3
PVC 380 S480 S	PVC 380 S480 S	PVC 280 S	PVC 380 S480 S	PVC 380 S480 S	PVC 280 S	-	-
266 B	266 B	266 B	266 B	266 B	266 B	-	260/261/262
-	-	-	-	-	-	-	-



Inductive sensors

M 30 x 1.5



Rated operating distance	
Mounting	flush / non-flush
Switching functions	
	Model description
Normally open (NO)	Wiring diagram (page 203)
Stod. status: Ex stod./Built to order	
	Model description
Normally closed (NC)	Wiring diagram (page 203)
Stod. status: Ex stod./Built to order	
	Model description
Normally closed (NC) selectable	Wiring diagram (page 203)
Stod. status: Ex stod./Built to order	
	Model description
Complementary	Wiring diagram (page 203)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	min./max.
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max.
Protection type	
Housing material	
Termination	cable 2 m/6.5 ft min. plug (page)
Accessories	(page 203)

M 30 x 1.5

15 mm (0.59")

	-/●	-	-	-	●/-	-
NPN		AC		NPN	PNP	AC
	KBH-M30PS/				KBH-M30PS/	
	015-KL512				010-KL2V	
	650.2935.005				650.2907.003	
	26.31				26.31	
	●/-				●/-	
	-	-	-	-	KBH-M30PV	-
	-	-	-	-	010-KL2V	-
	-	-	-	-	650.2707.001	-
	-	-	-	-	26.32	-
	-	-	-	-	-/●	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

M 30 x 1.5

10 mm (0.39")

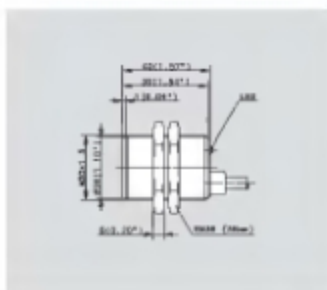
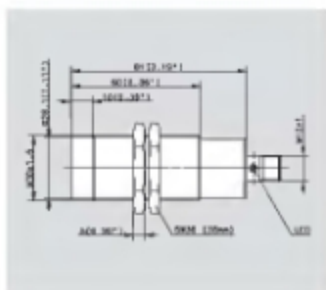
	-/●	-	-	-	●/-	-
NPN		AC		NPN	PNP	AC
	KBH-M30PS/				KBH-M30PS/	
	015-KL512				010-KL2V	
	650.2935.005				650.2907.003	
	26.31				26.31	
	●/-				●/-	
	-	-	-	-	KBH-M30PV	-
	-	-	-	-	010-KL2V	-
	-	-	-	-	650.2707.001	-
	-	-	-	-	26.32	-
	-	-	-	-	-/●	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

Dimension diagrams

§ DC-3-wire	§ AC-2-wire
1 = +	1 = L1
2 = -	2 = Output
3 = Output	

§ Cable length 2.5 m/9ft

All dimensions in mm (inch)





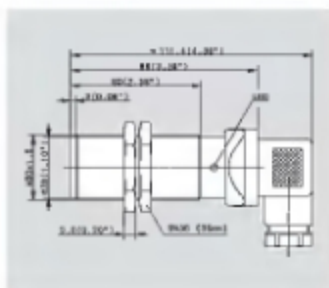
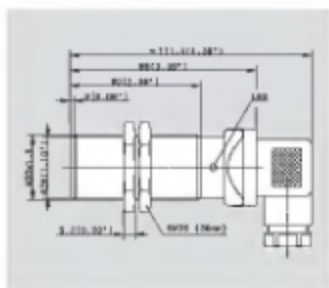
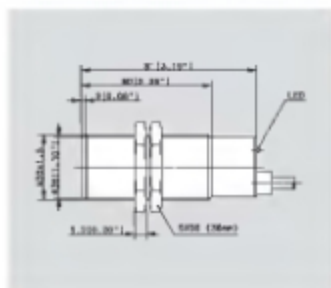
M 30 x 1.5
15 mm (0.59")

M 30 x 1.5
10 mm (0.39")

M 30 x 1.5
15 mm (0.59")

M 30 x 1.5 15 mm (0.59")			M 30 x 1.5 10 mm (0.39")			M 30 x 1.5 15 mm (0.59")		
–	–/–	–/–	–	–/–	–	–	–/–	–/–
NPN	PNP	AC	NPN	PNP	AC	NPN	PNP	AC
–	KH-T30PS/ 015-KL2 650.2923.981 2631	KH-T30AS/ 015-L2.5.3 650.3523.956 2654	–	–	–	–	KH-T30PS/ 015-KL3D 650.2935.001 3	–
–	–	–	–	–	–	–	–	–
–	–	KH-T30AQ/ 015-L2 650.3423.955 2655	–	–	–	–	–	–
–	–	–	–	KH-T30PF/ 010-KL3D 650.2822.862 3	–	–	KH-T30PF/ 015-KL3D 650.2836.840 3	KH-T30AF/ 015-L3D 650.2836.868 3
–	–	–	–	–	–	–	–	–

–	10–60 V	20–250 V	–	10–60 V	–	–	10–60 V	20–250 V
–	–200 mA	4000 mA	–	–200 mA	–	–	–200 mA	4000 mA
–	100 Hz	10 Hz	–	300 Hz	–	–	100 Hz	10 Hz
–	•	–	–	•	–	–	•	–
–	–/–	–/–	–	–/–	–	–	–/–	–/–
–	–	–	–	–	–	–	–	–
–	–25 °C/+70 °C	–25 °C/+70 °C	–	–25 °C/+70 °C	–	–	–25 °C/+70 °C	–25 °C/+70 °C
–	–13 °F/+158 °F	–13 °F/+158 °F	–	–13 °F/+158 °F	–	–	–13 °F/+158 °F	–13 °F/+158 °F
–	IP 67/EMA 4	IP 67/EMA 4	–	IP 65/EMA 12	–	–	IP 65/EMA 12	IP 65/EMA 12
–	PA 6	PA 6	–	PA 6	–	–	PA 6	PA 6
–	PVC 30.5	PVC 20.5	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	266/B	266/B	–	266/B	–	–	266/B	266/B



Inductive sensors

5 x 5 x 25

8 x 8 x 40

8 x 8 x 47

12 x 12 x 55



Rated operating distance

Mounting flush flush / non-flush non-flush

Switching functions

Model description

Part number

Normally-open (NO) Wiring diagram (page 20)

Stod. status: Ex stod./Built to order

Model description

Part number

Normally-closed (NC) Wiring diagram (page 20)

Stod. status: Ex stod./Built to order

Model description

Part number

Normally-closed (NC) selectable Wiring diagram (page 20)

Stod. status: Ex stod./Built to order

Model description

Part number

Complementary Wiring diagram (page 20)

Stod. status: Ex stod./Built to order

Electrical data

Voltage range

Output current min./max.

Switching frequency max.

Short-circuit protection

LED: yellow = switched / green = power

Sensitivity adjustment

Mechanical data

Temperature range min./max.

Protection type

Housing material

Termination cable 2 m/5 ft min. plug (page)

Accessories (page/Pos.)

5 x 5 x 25

1 mm (0.04")

NPN PNP AC

KIB-Q05PV 001-K2BU

650.2999.026 26.31

KIB-Q05PCV 001-K2BU

650.2799.010 26.32

8 x 8 x 40

1.5 mm (0.06")

NPN PNP AC

KIB-Q08V 1.5-K2

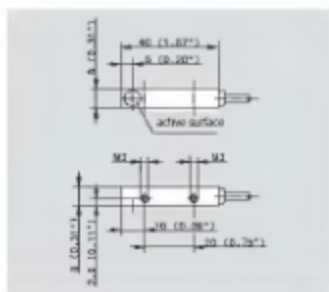
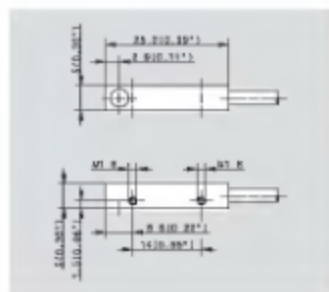
650.2980.001 26.34

KIB-Q08CV 1.5-K2

650.2780.001 26.31

Dimension diagrams

All dimensions in mm (inch)





8 x 8 x 47

1.5 mm (0.06")

12 x 12 x 55 extended sensing distance

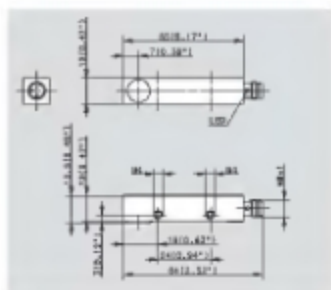
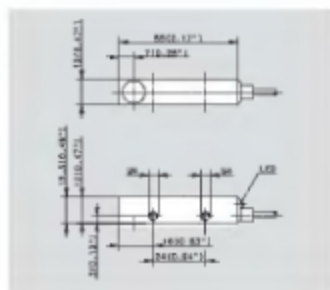
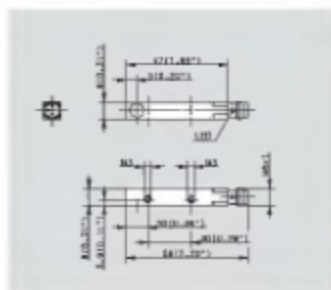
4 mm (0.16")

12 x 12 x 55 extended sensing distance

4 mm (0.16")

	●-	-			●-	-			●-	●-	-
NPN	PNP	AC	NPN	PNP	AC	NPN	PNP	AC	NPN	PNP	AC
-	KB-Q08PS	-	-	KB-Q12PS	-	KB-Q12HS	KB-Q12FS	-	KB-Q12HS	KB-Q12FS	-
-	1.5-KLSM8	-	-	004-KL2E	-	004-KLSH8E	004-KLSH8E	-	004-KLSH8E	004-KLSH8E	-
-	650.2900.002	-	-	650.2999.028	-	650.2399.021	650.2999.030	-	650.2399.021	650.2999.030	-
-	2631	-	-	2631	-	2634	2631	-	2634	2631	-
-	●-	-	-	→	-	→	●-	-	→	●-	-
-	KB-Q08PS	-	-	-	-	-	-	-	-	-	-
-	1.5-KLSM8	-	-	-	-	-	-	-	-	-	-
-	650.2780.002	-	-	-	-	-	-	-	-	-	-
-	2632	-	-	-	-	-	-	-	-	-	-
-	→	-	-	-	-	-	-	-	-	-	-

-	10-30 V	-	-	10-60 V	-	10-30 V	10-30 V	-	10-30 V	10-30 V	-
-	-200 mA	-	-	-200 mA	-	-200 mA	-200 mA	-	-200 mA	-200 mA	-
-	1000 Hz	-	-	800 Hz	-	800 Hz	800 Hz	-	800 Hz	800 Hz	-
-	●	-	-	●	-	●	●	-	●	●	-
-	●-	-	-	●-	-	●-	●-	-	●-	●-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-25 °C/+70 °C	-	-	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-	-25 °C/+70 °C	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-	-	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-	-13 °F/+158 °F	-13 °F/+158 °F	-
-	IP 67/IECNA 4	-	-	IP 67/IECNA 4	-	IP 67/IECNA 4	IP 67/IECNA 4	-	IP 67/IECNA 4	IP 67/IECNA 4	-
-	CuZn39Pb3	-	-	CuZn39Pb3	-	CuZn39Pb3	CuZn39Pb3	-	CuZn39Pb3	CuZn39Pb3	-
-	-	-	-	PVC 300 34	-	-	-	-	-	-	-
-	-	-	-	-	-	278/279	278/279	-	278/279	278/279	-



Inductive sensors

27 x 10 x 5
28 x 16 x 11
40 x 26 x 12
50 x 25 x 10



Rated operating distance

Mounting flush non-flush

Switching functions

Model description



Part number

Normally open (NO) Wiring diagram (page 105)

Stod. status: Ex stod./Built to order

Model description



Part number

Normally closed (NC) Wiring diagram (page 105)

Stod. status: Ex stod./Built to order

Model description



Normally closed (NC) /

Part number

Normally closed (NC) / Wiring diagram (page 105)

Stod. status: Ex stod./Built to order

Model description



Complementary

Part number

Complementary Wiring diagram (page 105)

Stod. status: Ex stod./Built to order

Electrical data

Voltage range

Output current

Switching frequency

Short-circuit protection

LED: yellow = switched / green = power

Sensitivity adjustment

Mechanical data

Temperature range

Protection type

Housing material

Termination

Accessories

27 x 10 x 5

1.5 mm (Ø.06")

•- •- -

NPN PNP AC

KIB-E27HS/ KIB-E27PS/ -

1.5-KL2PU 1.5-KL2PU

650.2393.001 650.2993.001

263V4 263V1

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28 x 16 x 11

2 mm (Ø.08")

•- •- •-

NPN PNP AC

KIB-E28HS/ KIB-E28PS/ KIB-E28AS/

002-KL2 002-KL2 002-KL2

650.2373.001 650.2973.001 650.3573.001

263V4 263V1 265V4

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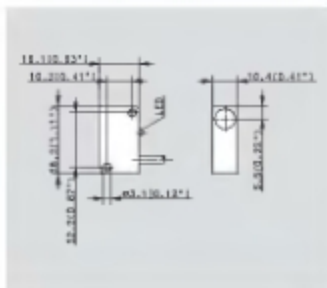
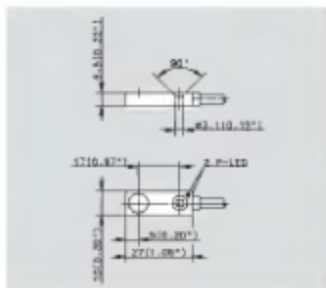
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Dimension diagrams

All dimensions in mm (inch)





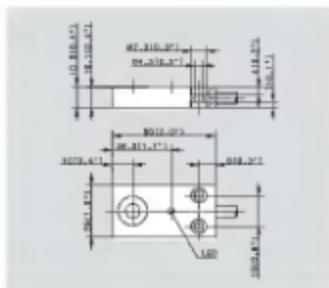
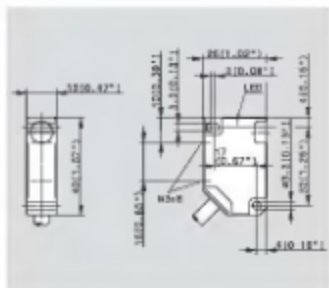
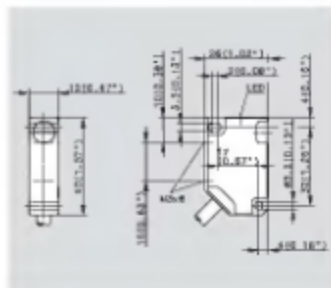
40 x 26 x 12
2 mm (Ø.08")

40 x 26 x 12
4 mm (Ø.16")

50 x 25 x 10
5 mm (Ø.20")

	●-	●-	-/●	-/●	-/●	●-	●-	-	
	NPN	PNP	AC	NPN	PNP	AC	NPN	PNP	AC
-	KB-E00PS	KB-E00AS	-	KB-E00PS	KB-E00AS	-	KB-E50PS	KB-E50PS	-
-	002-KL2	002-L2	-	004-KL2	004-L2	-	005-KL2	005-KL2	-
-	650.2968.023	650.3584.004	-	650.2968.024	650.3584.005	-	650.2390.001	650.2990.001	-
-	2631	2654	-	2631	2654	-	2634	2631	-
-	●-	●-	●-	●-	●-	●-	●-	●-	-
-	KB-E00PS	KB-E00AS	-	KB-E00PS	KB-E00AS	-	-	-	-
-	002-KL2	002-L2	-	004-KL2	004-L2	-	-	-	-
-	650.2784.006	650.3484.003	-	650.2784.007	650.3484.004	-	-	-	-
-	2632	2655	-	2632	2655	-	-	-	-
-	-/●	-/●	-	-/●	-/●	-	-	-	-

-	10-36 V	20-250 V AC	10-36 V	10-36 V	20-250 V AC	10-60 V	10-60 V	-
-	-200 mA	-200 mA	-200 mA	-200 mA	-200 mA	-200 mA	-200 mA	-
-	800 Hz	10 Hz	400 Hz	400 Hz	10 Hz	500 Hz	500 Hz	-
-	●	-	●	●	-	●	●	-
-	●-	●-	●-	●-	●-	●-	●-	-
-	-	-	-	-	-	-	-	-
-	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-
-	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-
-	IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	IP 67/EMA 4	-
-	PA 6.6	PA 6.6	PA 6.6	PA 6.6	PA 6.6	PA 6.6	PA 6.6	-
-	PVC 380.5	PVC 280.5	PVC 380.5	PVC 380.5	PVC 280.5	PVC 380.5	PVC 380.5	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-



Inductive sensors Multinom

41.5 x 41.5 x 120



Rated operating distance	
Mounting	flush / non-flush
Switching functions	
	Model description
Normally-open (NO)	Wiring diagram (page 305)
Stod. status: Ex stod./Built to order	
	Model description
Normally-closed (NC)	Wiring diagram (page 305)
Stod. status: Ex stod./Built to order	
	Model description
Normally-closed (NC) selectable	Wiring diagram (page 305)
Stod. status: Ex stod./Built to order	
	Model description
Complementary	Wiring diagram (page 305)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	10-60 V
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max.
Protection type	
Housing material	
Termination	cable 2 m/6.5 ft min. plug (page)
Accessories	(page/Pos)

41.5 x 41.5 x 120

15 mm (0.59")

•-	•-	-
NPN	PNP	AC

41.5 x 41.5 x 120

20 mm (0.78")

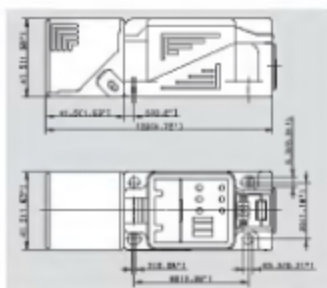
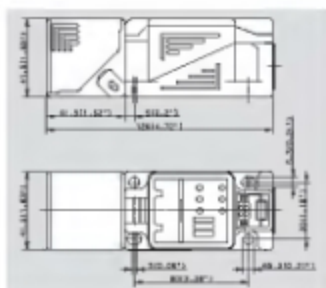
•-	•-	-
NPN	PNP	AC

KBI-N40BY	KBI-N40PY	KBI-N44AY	KBI-N40BY	KBI-N40PY	KBI-N44BY
015-KL5	015-KL5	015-LS	020-KL5	020-KL5	020-LS
650.2354.011	650.2954.011	650.3554.009	650.2954.012	650.2954.012	650.3554.010
263/6	263/3	265/6	263/6	263/3	265/6
•-	•-	•-	•-	•-	•-

10-60 V	10-60 V	20-250 V	10-60 V	10-60 V	20-250 V
-400 mA	-400 mA	4/500 mA	-400 mA	-400 mA	4/500 mA
100 Hz	100 Hz	15 Hz	50 Hz	50 Hz	15 Hz
•	•	-	•	•	-
••	••	••	••	••	••
-	-	-	-	-	-
-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C	-25 °C/+70 °C
-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F	-13 °F/+158 °F
IP 65/EMA 12	IP 65/EMA 12	IP 65/EMA 12	IP 65/EMA 12	IP 65/EMA 12	IP 65/EMA 12
FR 6.6	FR 6.6	FR 6.6	FR 6.6	FR 6.6	FR 6.6
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

Dimension diagrams

All dimensions in mm (inch)



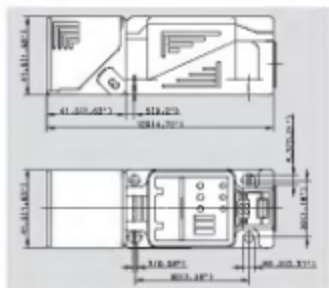
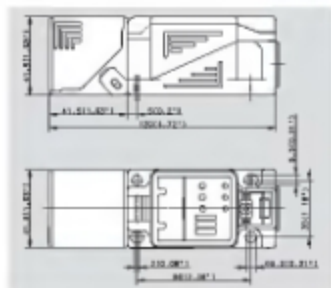


41.5 x 41.5 x 120 extended sensing distance
20 mm (0.78")

41.5 x 41.5 x 120 extended sensing distance
40 mm (1.57")

20 mm (0.78")			40 mm (1.57")		
NPN	PNP	AC	NPN	PNP	AC
KIB-N440F			KIB-N440F		
020-KLSE			040-KLSE		
650.2054.004			650.2054.005		
2637			2637		
●/-			●/-		
		KIB-N440F			KIB-N440F
		020-LSE			040-LSE
		650.3554.001			650.3554.002
		2656			2656
		●/-			→

	10-60 V	20-250 V		10-60 V	20-250 V
	-400 mA	-500 mA		-400 mA	-500 mA
	50 Hz	15 Hz		50 Hz	15 Hz
	●			●	
	●/●	●/●		●/-	●/●
	-25 °C/+70 °C	-25 °C/+70 °C		-25 °C/+70 °C	-25 °C/+70 °C
	-13 °F/+158 °F	-13 °F/+158 °F		-13 °F/+158 °F	-13 °F/+158 °F
	IP 65/EMA 12	IP 65/EMA 12		IP 65/EMA 12	IP 65/EMA 12
	FR 6.6	FR 6.6		FR 6.6	FR 6.6



Inductive sensors Globaline

M 8 x 1
M 12 x 1



Rated operating distance		
Mounting	flush	non-flush
Switching functions		
	Model description	
Normally open (NO)	Wiring diagram (page/pos.)	
Stod. status: Ex stod./Built to order	Part number	
	Model description	
Normally closed (NC)	Wiring diagram (page/pos.)	
Stod. status: Ex stod./Built to order	Part number	
	Model description	
Normally closed/NO (N.O./C.O.)	Wiring diagram (page/pos.)	
Stod. status: Ex stod./Built to order	Part number	
	Model description	
Complementary	Wiring diagram (page/pos.)	
Stod. status: Ex stod./Built to order	Part number	
Electrical data		
Voltage range	10–30 V	10–30 V
Output current	–200 mA min./max.	–200 mA min./max.
Switching frequency	1000 Hz max.	1000 Hz max.
Short-circuit protection	•	•
LED: yellow = switched / green = power	•	•
Sensitivity adjustment	–	–
Mechanical data		
Temperature range	–25 °C/+70 °C min./max.	–25 °C/+70 °C min./max.
Protection type after installation	IP 67/IEC A 4	IP 67/IEC A 4
Housing material	PVC 3rd 14	PVC 3rd 14
Termination	cable 2 m/5.5 ft min* (plug) (page/Pos.)	278279 (page/Pos.)
Accessories	–	–

M 8 x 1

1.5 mm (0.06")

	NPN	PNP	AC
100-M0005/	100-M0005/	–	–
1.5-KL2	1.5-KL2	–	–
693.2901.001	693.2901.001	–	–
2634	2631	–	–
•	•	–	–

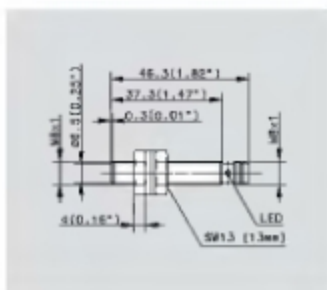
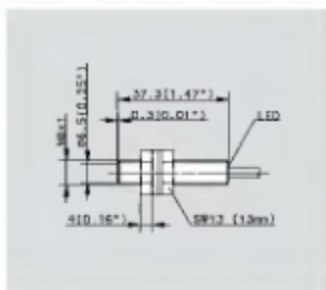
M 8 x 1

1.5 mm (0.06")

	NPN	PNP	AC
100-M0005/	100-M0005/	–	–
1.5-KLSM8	1.5-KLSM8	–	–
693.2942.001	693.2942.001	–	–
2634	2631	–	–
•	•	–	–

Dimension diagrams

All dimensions in mm (inch)



**M 12 x 1**

2 mm (0.08")

●-	●-	-
NPN	PNP	AC
K0-M12HS/002-KL2	K0-M12PS/002-KL2	-
693.2903.001	693.2903.001	-
2634	2631	-
●-	●-	-

**M 12 x 1**

2 mm (0.08")

●-	●-	-
NPN	PNP	AC
K0-M12HS/002-KL512	K0-M12PS/002-KL512	-
693.2943.001	693.2943.001	-
2634	2631	-
●-	●-	-

**M 12 x 1**

4 mm (0.16")

●-	●-	-
NPN	PNP	AC
K0-M12HS/004-KL2	K0-M12PS/004-KL2	-
693.2904.001	693.2904.001	-
2634	2631	-
●-	●-	-

10-30 V	10-30 V	-
-200 mA	-200 mA	-
800 Hz	800 Hz	-
●	●	-
●-	●-	-

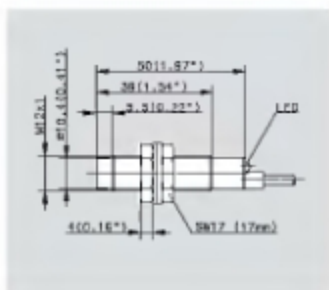
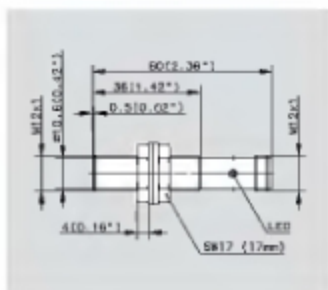
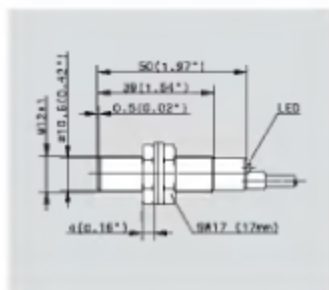
10-30 V	10-30 V	-
-200 mA	-200 mA	-
800 Hz	800 Hz	-
●	●	-
●-	●-	-

10-30 V	10-30 V	-
-200 mA	-200 mA	-
400 Hz	400 Hz	-
●	●	-
●-	●-	-

-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-
PVC 3x0.14	PVC 3x0.14	-
-	-	-

-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-
-	-	-
280/28 V282	280/28 V282	-
-	-	-







-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-
PVC 3x0.14	PVC 3x0.14	-
-	-	-



Inductive sensors Globaline

M 12 x 1
M 18 x 1



Rated operating distance	
Mounting	flush  non-flush 
Switching functions	
	Model description
Normally-open (NO)	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
Normally-closed (NC)	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
Normally-closed (NC) selectable	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
	Model description
Complementary	Wiring diagram (page 205)
Stod. status: Ex stod./Built to order	
Electrical data	
Voltage range	10–30 V
Output current	min./max.
Switching frequency	max.
Short-circuit protection	
LED: yellow = switched / green = power	
Sensitivity adjustment	
Mechanical data	
Temperature range	min./max.
Protection type after installation	
Housing material	
Termination	cable 2 m/6.5 ft min. plug (page 205) (page 205)
Accessories	(page 205)

M 12 x 1

4 mm (0.16")

–/–	–/–	–
NPN	PNP	AC
K04-M12HS/004-KLS12	K04-M12PS/004-KLS12	–
693.2944.001	693.2944.001	–
263/4	263/1	–
–/–	–/–	–

M 18 x 1

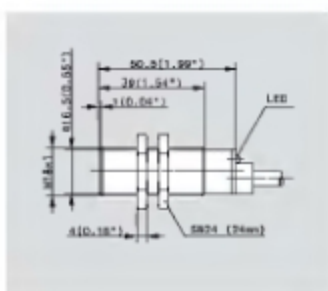
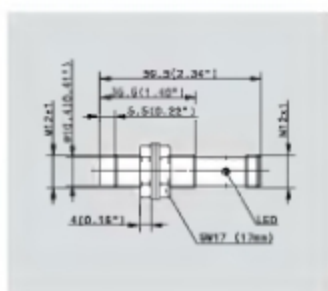
5 mm (0.20")

–/–	–/–	–
NPN	PNP	AC
K04-M18HS/005-KL2	K04-M18PS/005-KL2	–
693.2905.001	693.2905.001	–
263/4	263/1	–
–/–	–/–	–

10–30 V	10–30 V	–	10–30 V	10–30 V	–
–200 mA	–200 mA	–	–200 mA	–200 mA	–
400 Hz	400 Hz	–	500 Hz	500 Hz	–
•	•	–	•	•	–
–/–	–/–	–	–/–	–/–	–
–	–	–	–	–	–
–25 °C/+70 °C	–25 °C/+70 °C	–	–25 °C/+70 °C	–25 °C/+70 °C	–
–13 °F/+158 °F	–13 °F/+158 °F	–	–13 °F/+158 °F	–13 °F/+158 °F	–
IP 67/IEC-EX 4	IP 67/IEC-EX 4	–	IP 67/IEC-EX 4	IP 67/IEC-EX 4	–
–	–	–	–	–	–
–	–	–	PVC (3x) 5	PVC (3x) 5	–
280/281/282	280/281/282	–	–	–	–
–	–	–	266/6	266/6	–

Dimension diagrams

All dimensions in mm (inch)



**M 18 x 1**

5 mm (0.20")

●	●	-
NPN	PNP	AC
K08-M18NS/	K08-M18PS/	-
005-KLS12	005-KLS12	-
693.2905.004	693.2905.004	-
263/4	263/1	-
●	●	-

**M 18 x 1**

8 mm (0.32")

●	●	-
NPN	PNP	AC
K08-M18NS/	K08-M18PS/	-
008-KL2	008-KL2	-
693.2906.001	693.2906.001	-
263/4	263/1	-
●	●	-

**M 18 x 1**

8 mm (0.32")

●	●	-
NPN	PNP	AC
K08-M18NS/	K08-M18PS/	-
008-KLS12	008-KLS12	-
693.2906.004	693.2906.004	-
263/4	263/1	-
●	●	-

10-30 V	10-30 V	-
-200 mA	-200 mA	-
500 Hz	500 Hz	-
●	●	-
●	●	-

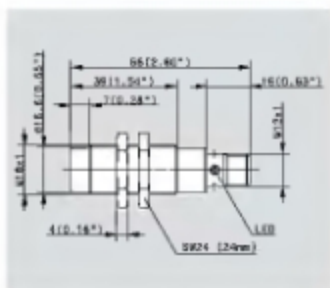
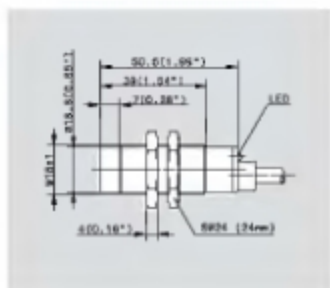
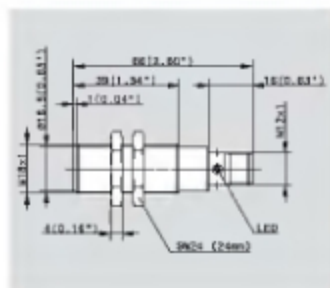
-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-
-	-	-
-	-	-
280/281/282	280/281/282	-
266/6	266/6	-

10-30 V	10-30 V	-
-200 mA	-200 mA	-
200 Hz	200 Hz	-
●	●	-
●	●	-

-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-
-	-	-
PVC 300 5	PVC 300 5	-
-	-	-
280/281/282	280/281/282	-
266/6	266/6	-

10-30 V	10-30 V	-
-200 mA	-200 mA	-
200 Hz	200 Hz	-
●	●	-
●	●	-

-25 °C/+70 °C	-25 °C/+70 °C	-
-13 °F/+158 °F	-13 °F/+158 °F	-
IP 67/EMA 4	IP 67/EMA 4	-
-	-	-
-	-	-
280/281/282	280/281/282	-
-	-	-



Programmable inductive sensors



Principle

These sensors work on the conventional inductive principle, nevertheless they can, thanks to their adaptable properties, be universally adapted for many applications.

With this learning capability (the so-called teach-in function), the sensors can be split into two groups.

- Sensors with teach-in-function for distance sensing
- Sensors with teach-in-function for speed monitoring

The following demonstrates two application examples:

A practical application is the sensing range of targets, which due to changing conditions, e.g. operating conditions or wear and tear, would require a constant re-adjustment.

Through a simple voltage pulse or PLC the necessary programmable pulse can be directed to the sensor and the learning process initiated. The programmable pulse can vary within the voltage range of U_b .

A further application for teach-in sensors is the speed monitoring of rotating shafts (detection by gear wheels) with changing rotational frequencies. Here a simple voltage pulse or PLC can be used to set the necessary programmable pulse to "learn" the maximum operating frequency. Additional control devices with power supply and complicated evaluating electronics are not necessary.

Mode of operation

The teach-in function is achieved by an A/D-converter which permanently stores and compare the values in EEPROM (Electrical Erasable Read Only Memory).

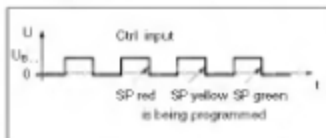
The EEPROM data can be safely stored for at least 40 years with the number of read/write-operations said to be 1.000.000.

By using a micro-controller for signal processing, Bernstein sensors can also be re-programmed to meet specific customer requirements for especially difficult tasks.

Variations

BERNSTEIN delivers the programmable inductive sensor in different enclosure designs and with a varying range of technical features.

The multi-norm version has three programmable switching outputs. With this type of sensor, four positive impulse signals are expected one after the other on the control line. At the first impulse signal, the sensor switches to the programming mode. After each following impulse signal, the actual distance to the targeted object is assigned to an output (Teach-in sensing distance).



Programming for multi-norm version

The teach-in speed monitor sensors are available in M12 and M18 enclosures in plug and cable versions and PNI-version (special types on request).

General data

Enclosure material	FR6.65 / CuZn39Pb39
Protection class according to IEC	IP 65 / IP 67
Operating temperature	-25 °C bis +70 °C
Storage temperature	-40 °C bis +80 °C
Sensing distance	programmable, 20..40 mm / Ø: 36 mm

Teach-in distance sensing sensors

FR6.65 / CuZn39Pb39	CuZn39Pb3
IP 65 / IP 67	IP 67
-25 °C bis +70 °C	-25 °C bis +70 °C
-40 °C bis +80 °C	-40 °C bis +80 °C
programmable, 20..40 mm / Ø: 36 mm	2 mm / 5 mm

Teach-in speed monitoring sensors

FR6.65 / CuZn39Pb39	CuZn39Pb3
IP 65 / IP 67	IP 67
-25 °C bis +70 °C	-25 °C bis +70 °C
-40 °C bis +80 °C	-40 °C bis +80 °C
programmable, 20..40 mm / Ø: 36 mm	2 mm / 5 mm

Electrical data

Switching frequency	3 Hz
Hysteresis	≤ 10% (from programmed sensing distance)
Open-circuit current	≤ 10 mA / < 11 mA
Voltage drop	≤ 1.5 V
Polarity protection	yes
Overload/short-circuit withstand capability	yes
Repeat accuracy	≤ 5%

FR6.65 / CuZn39Pb39	CuZn39Pb3
3 Hz	programmable, 1...5000 Hz
≤ 10% (from programmed sensing distance)	≤ 15% (from prog. switching frequency)
≤ 10 mA / < 11 mA	< 11 mA
≤ 1.5 V	≤ 2.5 V
yes	yes
yes	yes
≤ 5%	≤ 5%

§ European standard enclosure (M12 series Multinorm)
 § Metric design (M12 / M18)

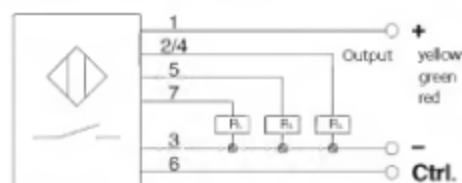
§ Metric design M12
 § Metric design M18

Advantages

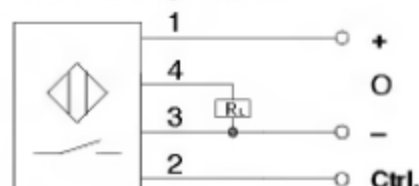
- Sensor adjustment is easy
- Calibration in the application
- Sensors can be re-programmed without additional mounting effort
- One sensor can scan a number of switching points
- Programming from control panel possible
- High process safety due to tolerance minimisation
- High repeat accuracy

Teach-in distance sensing sensors

Connection diagram, N44

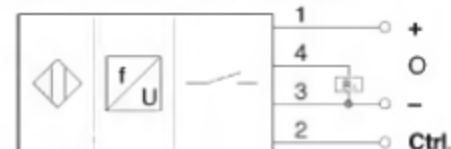


Connection diagram, M18



Teach-in speed monitoring sensors

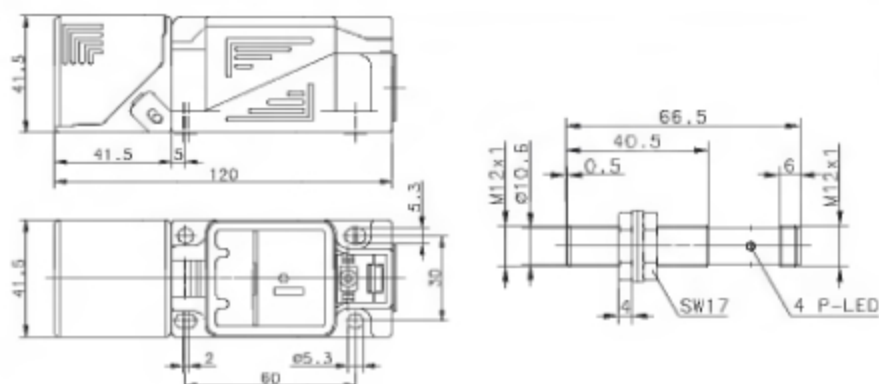
Connection diagram, M12/M18



Version

Designation	KIN-N44PS040-KLSE	KIB-M12PS002-KLS12I	KIB-M12PS002-KL2I
Part number	650.2954.015¹⁾	650.2943.014¹⁾	650.2903.024¹⁾
Operating voltage	10 – 30 V DC	10 – 36 V DC	10 – 36 V DC
Switching current	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching distances / prog. switching frequencies	20...40 mm / –	– / 1...5000 Hz	– / 1...5000 Hz

Dimensions

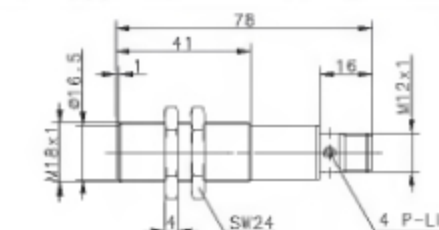


Version



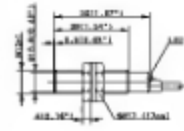

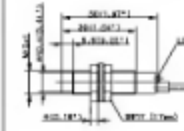
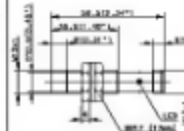
Designation		KIB-M18PS005-KLS12I	KIB-M18PS005-KL2I
Part number		650.2940.004¹⁾	650.2905.021¹⁾
Operating voltage		10 – 30 V DC	10 – 30 V DC
Switching current		≤ 200 mA	≤ 200 mA
Switching distance/frequency programmable		– / 1...5000 Hz	– / 1...5000 Hz



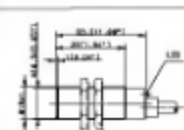
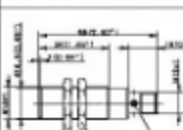

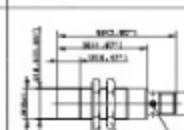
Dimensions

- ¹⁾ S12 plug version
for connection coupling 413 9100 299
- ²⁾ Cable type 2 m



Inductive sensors with increased sensing distances

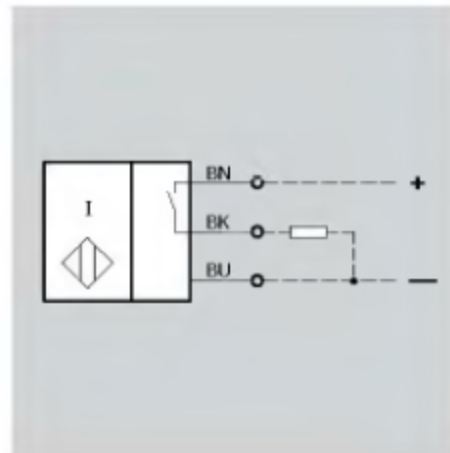
Type M12	4 mm sensing distance		8 mm sensing distance	
				
	flush metal design		non-flush metal design	
	2 m cable	M12 plug	2 m cable	M12 plug
PNP normally-open contact*)	KIB-M12PS/004-KL2E 650.2903.025	KIB-M12PS/004-KLS12E 650.2943.015	KIB-M12PS/008-KL2E 650.2904.021	KIB-M12PS/008-KLS12E 650.2944.013
Dimensions				

Type M18	8 mm sensing distance		16 mm sensing distance	
				
	flush metal design		non-flush metal design	
	2 m cable	M12 plug	2 m cable	M12 plug
PNP normally-open contact*)	KIB-M18PS/008-KL2E 650.2905.022	KIB-M18PS/008-KLS12E 650.2940.005	KIB-M18PS/016-KL2E 650.2906.018	KIB-M18PS/016-KLS12E 650.2941.004
Dimensions				

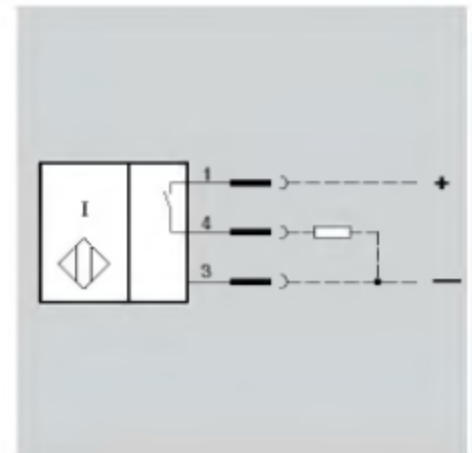
*) Order only with part number, NPN- and normally-closed version on request

Wiring diagrams

Type M12/M18, cable version



Type M12/M18, plug version



Accessories

Cable couplings see page 280 ff.







General data




	M12		M18	
	flush	non-flush	flush	non-flush
Operating voltage	10–36 V			
Rated operating voltage	≤ 200 mA			
Switching hysteresis	10% from rated switching distance			
Reproducibility	≤ 5%			
Switching frequency	800 Hz	400 Hz	500 Hz	200 Hz
Output	short circuit- and overload proof			
Polarity reversal protection	yes			
Rated switching distance	4 mm	8 mm	8 mm	16 mm
Functions-/operating voltage display	●/-	●/-	●/-	●/-
Ambient temperature	– 25 °C to + 70 °C			
Protection class	IP 67 according to IEC 529, EN 60 529			
Enclosure	nickel-plated brass (CuZn39Pb3)			
Cable PVC	3 x 0.14		3 x 0.5	

Inductive sensors

Temperature range

-40 °C to +100 °C

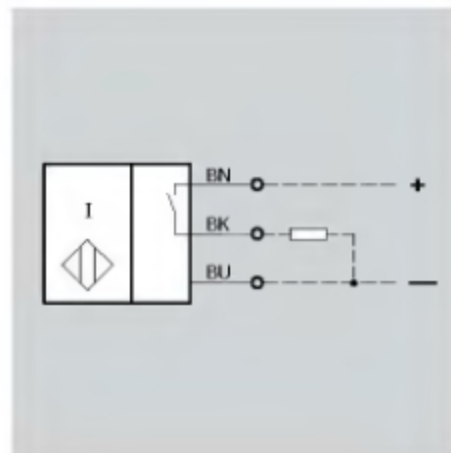
Type M12 M18	2 mm sensing distance M12		5 mm sensing distance M18	
				
PNP normally-open contact*)	flush metal design		flush metal design	
	2 m cable	M12 plug	2 m cable	M12 plug
Model description Part number	KIB-M12PS002-KL2T 650.2903.026	KIB-M12PS002-KL512T 650.2943.016	KIB-M18PS005-KL2PUT 650.2905.023	KIB-M18PS005-KL512T 650.2940.006
Dimensions				

Type M30	10 mm sensing distance		
			
PNP normally-open contact*)	flush metal design		
	2 m cable	M12 plug	
Model description Part number	KIB-M30PS010-KL2PUT 650.2907.013	KIB-M30PS010-KL512T 650.2939.006	
Dimensions			

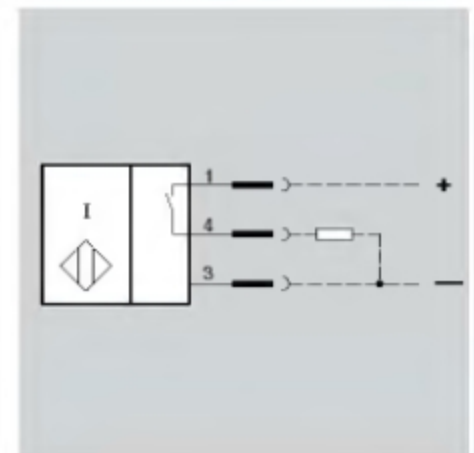
*) Order only with part number, NPN- and normally-closed version on request

Wiring diagrams

Type M12/M18/M30, cable version



Type M12/M18/M30, plug version



Accessories



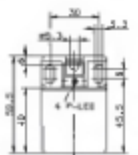
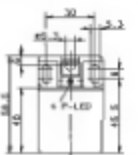
Cable couplings see page 280 ff.



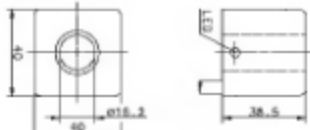
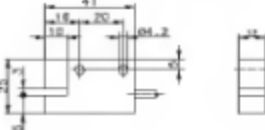
General data

	M12 flush	M18 flush	M30 flush
Operating voltage	U_E	10–30 V	
Rated operating voltage	I_E	≤ 200 mA	
Switching hysteresis	H	10% from rated switching distance	
Reproducibility	R	$\leq 5\%$	
Switching frequency	F	800 Hz	300 Hz
Output		short circuit- and overload proof	
Polarity reversal protection		yes	
Rated switching distance	S_n	2 mm	10 mm
Functions-/operating voltage display	●/–	●/–	●/–
Ambient temperature		– 40 °C to + 100 °C	
Protection class		IP 67 according to IEC 529, EN 60 529	
Enclosure		nickel-plated brass (CuZn39Pb3)	
Cable PVC	mm ²	3 x 0.14	3 x 0.5

Inductive sensors

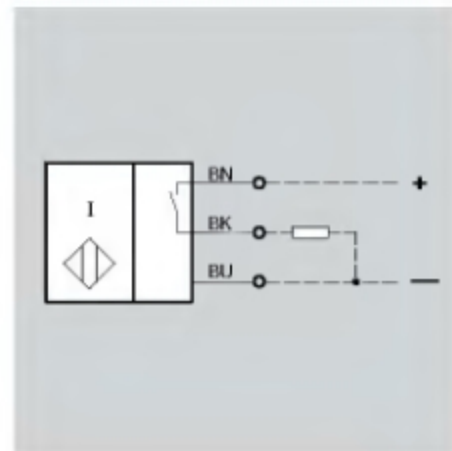
Special-purpose design

Type N40	15 mm sensing distance		20 mm sensing distance	
				
	Flush design		Non-flush design	
	M12 plug/PNP NO contact	M12 plug/PNP NC contact	M12 plug/PNP NO contact	M12 plug/PNP NC contact
Model description Part number	KB-N40PS/015-KLS12 650.2988.001	KB-N40PO/015-KLS12 650.2788.001	KB-N40PS/020-KLS12 650.2982.003	KB-N40PO/020-KLS12 650.2782.001
Dimensions				

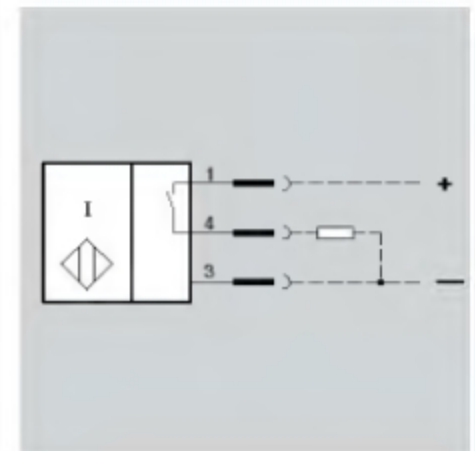
Type N40 – Ring sensor Type S03 – Slot sensor	Ring sensor 3 mm		Slot sensor 3 mm slot x 16h	
				
	6 m cable		2 m cable	
	PNP-NO contact	NPN-NC contact	PNP-NO contact	NPN-NO contact
Model description Part number	KB-N40PS/000-KL6 650.2999.036	KB-N40NS/000-KL6 640.2399.375	KB-S03PSC03C2 650.2999.035	-
Dimensions				

Wiring diagrams

Type N40, cable version
Type SO3, slot sensor



Type N40, plug version



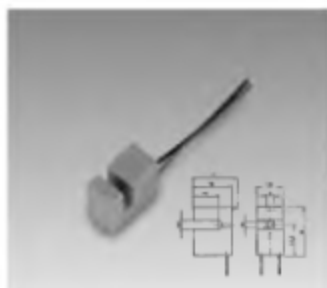
Accessories

Cable couplings see page 280 ff.

General data

	N40 flush	N40 non-flush	N40 Ring sensor	N40 Slot sensor
Operating voltage	10–36 V			10–30 V
Rated operating voltage	≤ 200 mA			
Switching hysteresis	10% from rated switching distance			–
Reproducibility	≤ 5%			
Switching frequency	100 Hz	50 Hz		4000 Hz
Output	continuous short-circuit- and overload proof			
Polarity reversal protection	yes			
Rated switching distance	15 mm	20 mm	Immersion approx. 20 mm	Immersion approx. 7 mm
Functions-/operating voltage display	●/–	●/–	●/–	–/–
Ambient temperature	–25 °C to +70 °C			
Protection class	IP 67 according to IEC 529, EN 60 529			
Enclosure	PA6			PA6
Connection	S12 plug		cable 3 x 0.5 mm ²	cable 3 x 0.14 mm ²

Inductive sensors



19 x 17 x 10

Slot 3.5 mm (Ø.137)

■-

NAMUR / B

KIB-503EA

3.5-0.5

650.1675.001

263/B

→

* some
M1.6 x 12 DIN 963
and nut
M1.6 DIN 964
are included



Ø 6.5; 25 mm length

1.5 mm (Ø.06")

■-

NAMUR / A

KIB-006EA

1.5-2

650.1699.002

263/B

→

Rated operating distance	
Mounting	flush / non-flush
Switching functions	
Model description	
Part number	
Wiring diagram	(pagePos)
Std. status: Ex std./Built to order	
Mechanical data	
Housing material	FR 6
Cable length 2 m/6.5 ft min	PVC 2 x 0.14 single core
Accessories	(pagePos)



M 5; 25 mm length

1 mm (Ø.04")

■-

NAMUR / B

KIB-M05EA

001-2

650.1699.008

263/B

■-

CuZn39Pb3

PVC 2 x 0.14

-

Electrical data

Nominal input voltage 8.2 V DC

Input resistance 1 kΩ

Output current

Diagram A

damped ≤ 1 mA

untamped ≥ 4 mA

Diagram B

≤ 1.1 mA

≥ 2.2 mA



M 8 x 1; 32 mm length

1.5 mm (Ø.06")

■-

NAMUR / A

KIB-M08EA

1.5-2

650.1601.003

263/B

■-

stainless steel 1.4305

PVC 2 x 0.25

-

Mechanical data

Temperature range min/max

-25 °C/+70 °C

-13 °F/+158 °F

Protection class IP 67/NEMA 4

Rated operating distance	
Mounting	flush / non-flush
Switching functions	
Model description	
Part number	
Wiring diagram	(pagePos)
Std. status: Ex std./Built to order	
Mechanical data	
Housing material	CuZn39Pb3
Cable length 2 m/6.5 ft min	PVC 2 x 0.14
Accessories	(pagePos)
Electrical and mechanical data	
for NAMUR inductive sensors	

**M 8 x 1; 32 mm length**

2 mm (0.08")

-N

NAMUR / A

KH-M10EA/

002-2

650.1601.005

263/8

-N

stainless steel 1.4305

PVC 2 x 0.25

-

**M 12 x 1; 30 mm length**

2 mm (0.08")

-N

NAMUR / A

KH-M12EA/

002-2

650.1626.760

263/8

-N

CuZn35Pb3

PVC 2 x 0.25

-

**M 12 x 1; 32 mm length**

4 mm (0.16")

-N

NAMUR / A

KH-M12EA/

004-2

650.1625.761

263/8

-N

CuZn35Pb3

PVC 2 x 0.25

-

**M 18 x 1; 35 mm length**

5 mm (0.20")

-N

NAMUR / A

KH-M18EA/

005-2

650.1626.762

263/8

-N

CuZn35Pb3

PVC 2 x 0.5

-

**M 18 x 1; 35 mm length**

8 mm (0.32")

-N

NAMUR / A

KH-M18EA/

008-2

650.1627.763

263/8

-N

CuZn35Pb3

PVC 2 x 0.5

-

**FEA-T22NR/202-B085**

FEA-T22NR

202-B085

661.2208.012

Intrinsically safe (EEx ia) I C

PTB-No.: Ex-93 C 4001

2-channel switching amplifier with fault condition

monitor for short-circuit and wire breakage

230 V* \pm 10%, 45–60 Hz8 V, 12.6 V_{max}; R_i = 1 k Ω

2 x 5 A, 250 V AC, 100 VA normally-closed (NC)

Mounting: TS 35 DIN rail

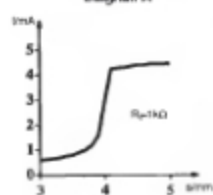
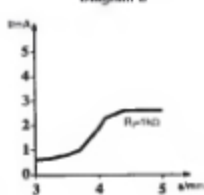
Temperature range: -25 °C/+50 °C

IP ZONE/MA 1

Input signals: NAMUR sensors, variable resistances,

mechanical contacts

* Other voltages on request

Diagram A**Diagram B**

Programmable universal switching device

PCS-T75UR/205-D



Main fields of applications

- Rotational speed monitor
- Analogue signal evaluation
- Level and position evaluation
- Switching point evaluation

Main features

- Programmable Control System (PCS)
- Programming via menu
- Teach-in function
- Universal
- Easy to operate

With state of the art evaluation electronics PCS-T75UR/205D, BERNSTEIN introduces a new Programmable Control System into automation technology that offers the user a high degree of flexibility and configuration options.

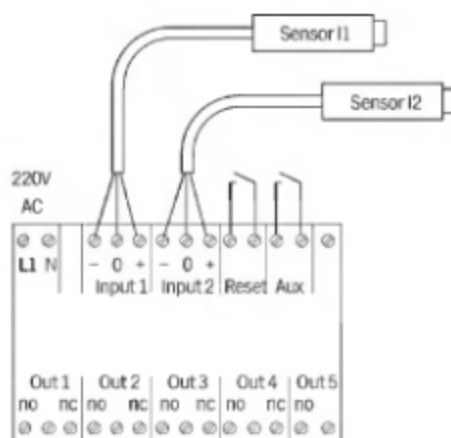
The PCS is controlled via a menu for applications that require rotational speed queries, evaluation of analogue signals, levels or positions, and switching points. The sensor inputs are wired to standard sensors, NAMUR sensors or analogue sensors with current or voltage output from 5/24 V.

In addition to the menu controlled programming function, the PCS can learn pre-defined switching points or rotational speeds (teach-in function). This enables the user to minimise tolerances when setting or programming applications.

5 potential-free relay contacts are available as outputs. If required, the evaluation electronics can be divided in to 2 functional units, which means the user has two separate configurations available.

This innovative feature ensures a high degree of flexibility when configuring and installing. Despite its comprehensive functions of the PCS, the evaluation electronics can be operated without the need for previous experience.

Wiring diagram



Output Relay:
 NO = Normally-Open Contact
 NC = Normally-Closed Contact

**Technical data****Electrical data**

Supply voltages

85–265 V AC

Sensor voltages

3.2 V DC (NAMUR)

24 V DC (standard sensor)

5 V DC

Relay outputs

(divides in to 2 functions)

5 relay outputs

– 4x CO

– 1x NO

Input signal

– current 2 A, voltage 200 V DC, power 60 W

NAMUR sensors

PNP/NPN sensors 0...24 V

Analog sensors 0...24 mA, 0...5 V

Auxiliary inputs

tx reset (start-up delay)

Hysteresis

programmable 2–20 %

Protection class

IP 20/NEMA 1

Mechanical data

Temperature range

–20 °C...+70 °C (0 °C...+60 °C legible display)

Enclosure, see-through cover

PC black, PC

Connection

Rigid 0.2...4 mm²Flexible 0.2...2.5 mm²

AWG 24–11

Mounting

Mounts on to mounting rail according to EN 50022

Function and programming

Mode

Programmable

Mean-value generation

Level or position evaluation

Programming

Default by entering the values

Adaptive programming

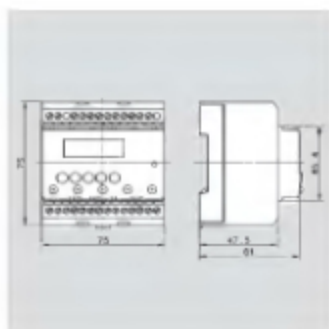
Visualisation/operator guidance

Start-up override

Adjustable from 1 to 100 s

Rotational speed monitoring

Programmable from 2 Hz–10 kHz

Dimensions

Capacitive sensors

Introduction

Capacitive sensors can sense conducting and non-conducting materials in solid or liquid form. They have various uses including level control in tanks, as well as detection of container contents on filling and packaging machinery. Other uses include positioning and counting of materials within transportation and storage systems, for example conveyor belts, and steering mechanisms.

Typical materials which can be sensed:

Solids:

Wood, ceramic, glass, piles of paper, plastic, stone, rubber, ice, non-ferrous materials and vegetable matter.

Liquids:

Water, oil, glue and paint.

Granular:

Plastic granules, seed, feed and salt.

Powder:

Dyes, soap-powder, sand, cement, fertilizer, sugar, flour and coffee

Technical specifications

The function of a capacitive sensor is to signal a change of state based on the evaluation of the stimulus from an electrical field. Capacitive sensors detect metallic or non-metallic objects by measuring the change in capacitance, which is dependent upon the dielectric constant of the material being sensed, its mass, size and distance from the active surface of the sensor.

Capacitive sensors are built around an RC-oscillator. Due to the influence of the target and the change in capacitance, the amplification becomes stronger causing the oscillator to oscillate. The exact start of that function can be adjusted by means of a potentiometer, which controls the feedback to the oscillator. The sensing distance of a certain material can therefore be adjusted by the potentiometer. The output signal of the oscillator feeds another amplifier, which in turn feeds the signal to the output stage.

If a conductive target approaches the active face of the switch the target becomes a capacitor. The change in capacitance is

significant resulting in a long sensing distance. If a non-conductive target approaches the switch (>1) there is only a small change in the dielectric constant and the rise in capacitance is quite small compared to conductive materials. Correction factors therefore have to be noted when comparing quoted sensing distances.

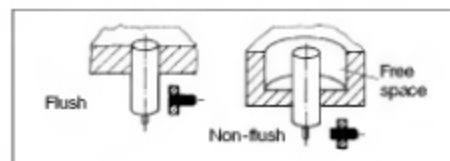
Correction factors

Steel or other grounded metals	1.00
Surface of water	1.00
Steel 150 x 150 x 1 mm (5.9" x 5.9" x 0.03") not grounded	0.85
Marble 150 x 150 x 12.5 mm (5.9" x 5.9" x 0.49")	0.65
Glass 150 x 150 x 7.5 mm (5.9" x 5.9" x 0.29")	0.55
Pile of paper (500 sheets)	0.55
Pressed wood 150 x 150 x 16 mm (5.9" x 5.9" x 0.62")	0.45
Ceramic tile 150 x 150 x 6 mm (5.9" x 5.9" x 0.23")	0.25
PVC 150 x 150 x 4 mm (5.9" x 5.9" x 0.15")	0.15

The factors given are average values, as the sensing distance is influenced by individual features of the target and the environment in which the sensor is installed. In all applications, it is important to note the influence of humidity around the switch and target. High moisture content, in wood or paper for example, increases sensing distance.

Capacitive switches are available for:

- Flush mounting or shielded
- Non-flush mounting or non-shielded.



Around a non-flush mounting capacitive switch a free zone must be made available so no influencing material can affect the sensor. Because of the sensitivity control

adjustment, non-flush capacitive sensors can be mounted in areas where the "Free Zone" is restricted. These sensors are less sensitive to dust or moisture in the atmosphere than flush-mounting sensors.

Flush-mounting sensors have an in-built shielding electrode, which is connected to earth. As both electrodes are very near to each other, the flush-mounting sensors are especially efficient in sensing different dielectrics. However, this makes them more prone to sensing dust or moisture in the atmosphere.

If capacitive sensors are mounted next or opposite to one another they can also influence each other. Flush mounting switches are much less sensitive in such applications than non-flush mounting. If the required sensing distance between sensors is >2 <8 times the housing diameter an application test is necessary. It is not necessary to test applications where the sensing distances between sensors is >8 times the housing diameter.

Specifications

Active-face

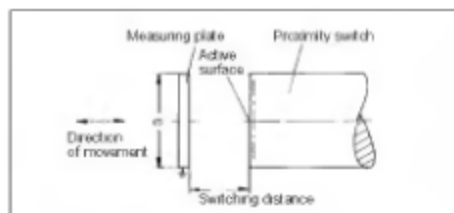
Active-face is the capacitive sensor's housing surface where the electrical field emerges. To ensure correct installation, cylindrical housings are mostly front sensing, while rectangular housings generally have the position marked with a line or a cross.

Actuation

To actuate means to bring the material in front of the active face of the capacitive sensor so that the output changes.

Standard targets

The standard target is square, 1 mm thick and made from steel (FE 360).



The front face of the square target is identical to the diameter of the active face. If the sensing distance were three times greater than the diameter of the active face, the target would have to be this size. In order to ensure accurate sensing distances, the target needs to be grounded. The sensing distance of a rectangular capacitive sensor is aligned with a grounded plate the same size as the active face.

Real sensing distance

Real sensing distance is the distance between the target and the active-face when the sensor switches and gives a change in output, while mounted in a specific application.

Nominal sensing distance: s_n

Nominal sensing distance is the sensing distance shown without taking into account tolerances and influences from temperature or power supply.

Standardised sensing distance: s_s

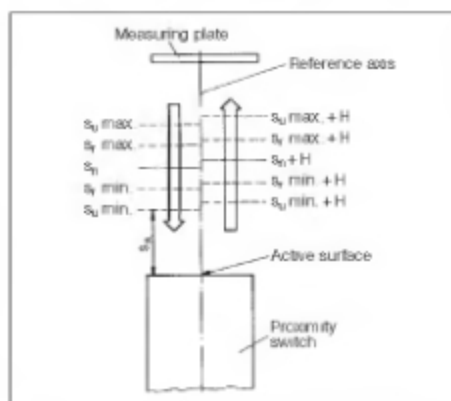
Standardised sensing distance is the distance aligned at 23 °C \pm 5 °C. It has to be between 90% and 110% of the nominal sensing distance.

Effective sensing distance: s_n

This includes all tolerances of temperature and voltage supply. It has to be between 80% and 120% of the standardised sensing distance.

Usable sensing distance

(Working sensing distance). The usable sensing distance should be calculated for applications under the worst circumstances. This is calculated to be between 0-72% of the nominal sensing distance.

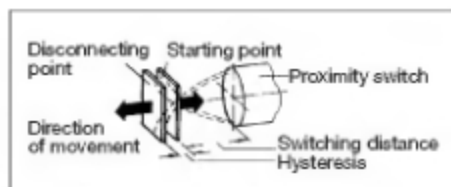


Repeatability

This is the accuracy between the first and second switching, within 8 hours of each other and with a temperature band of 18 °C to 28 °C. The maximum difference of the voltage supply may vary only by 5%. The difference between both measurements may not be more than 10% of the standardised sensing distance.

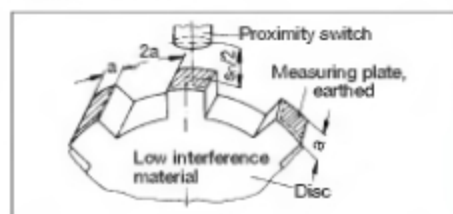
Hysteresis

This is the difference between the switch-on point when approaching the switch and the switch-off point when leaving the switch. The value is given as a percentage of the standardised sensing distance.



Switching frequency

The switching frequency is measured according to EN 60947-5-2. The standard targets with the side length "a" are mounted at intervals of 2 times "a" on a disc which does not influence the sensor when the disc starts rotating. If the on-off signal of the sensor is shorter than 50 ms the maximum switching frequency of the sensor is reached. For AC sensors the maximum switching frequency of the sensor is reached when the on-off time equals half one sine wave.



Temperature range

The temperature range for sensors is measured according to the EN-DIN at -25 °C to +75 °C. In this range the sensors will work with a tolerance of +10%.

Protection class

IP 65
IP 67

Cable

The standard cable has PVC insulation. Silicon cable, Polyurethane cable, special stabilised PVC- or PTFE-cable is available upon request.

Plug and socket

For electronic products today the plug and socket are just as important as the cable. The Bernstein capacitive proximity switches are available with several plug and socket variations.

Standards

All sensors are in accordance with EN 60947-5,2.



The way to the right sensor

Using the selection matrix

To assist the user in selecting the right capacitive sensor for their application, Bernstein developed the selection matrix below. The colours of the individual fields match those in the product index to allow rapid selection of the most suitable sensor (by part number) starting with the most important criteria, switching distance. By not using detailed technical descriptions the selection is considerably simplified, but our engineers are always available to answer any technical questions.

Important notes

Capacitive sensors are able to sense conducting and non-conducting materials in solid, liquid, granular or powder form. In operation however, a number of criteria must be taken into account.

Switching distance

The rated switching distance is shown (according to DIN EN 6947-5-2/97) and adjusted on site. The greatest switching distance is reached with an approaching conducting target of a certain size. With a non-conducting material, knowledge of the specific inductive capacity of the target is important as the switching distance will vary by a factor dependent on material and application (see fig. 1 and 2).

The factors indicated in the table show an expected approximation of the reacting sensitivity, since specific characteristics of the target objects (especially cross section, thickness and moisture content) and the surrounding area (earthing) have a major influence on the sensing distance. Compensation for most applications can be made by adjustment of the built-in potentiometer.

Free zone

Non-flush mounting capacitive sensors are less sensitive to dust or condensation than flush mounting versions, but a free zone must be established around the sensor, clear of materials that could influence it.

Selection matrix – capacitive sensors

Rated sensing distance	Housing metal/plastic	Mounting	Supply	Output	Switching	Connection
3 mm 4 mm	M12 M M12 K	flush mounted non-flush mounted	10 - 36 V DC	NPN 3L PNP 3L	NC NO	plug M8 cable 2 m
5 mm 8 mm	M18 M M18 K	flush mounted non-flush mounted	10 - 60 V DC 10 - 60 V DC / 20 - 250 V AC	NPN 3L PNP 3L AC 2L	NC NO	plug M8 cable 2 m
10 mm 20 mm	M30 M M30 K	flush mounted non-flush mounted	10 - 60 V DC 10 - 60 V DC / 20 - 250 V AC	NPN 3L PNP 3L AC 2L	NC NO	plug M12 cable 2 m
15 mm 30 mm	M32 M M32 K	flush mounted non-flush mounted	10 - 60 V DC	NPNP prog 3L NPNP pos 3L AC 2L	Complementary prog NO / NC prog	plug M12 cable 2 m
15 mm	Ø 20 K	non-flush mounted	10 - 60 V DC 20 - 250 V AC	NPN 3L PNP 3L AC 2L	NC NO	plug M12 cable 2 m
20 mm 30 mm	Ø 34 M Ø 34 K	flush mounted non-flush mounted	10 - 36 V DC 10 - 60 V DC / 20 - 250 V AC	PNP 3L NPN 3L PNP 3L AC 2L	NC NO	plug M12 cable 2 m
8 mm	E 50 50 x 25 x 10 mm P	flush mounted	10 - 36 V DC	NPN 3L PNP 3L	NC on request NO	cable 2 m
10 mm	E 68 68 x 30 x 15 mm P	flush mounted	10 - 36 V DC	PNP 3L PNP 3L	NC on request NO	cable 2 m
15 mm 30 mm	N 44 40 x 40 x 120 mm P	flush mounted non-flush mounted	10 - 60 V DC	NPNP prog 3L	NC / NO prog	terminal chamber

Flush mounting capacitive sensors have, by design, higher sensitivity to a variety of materials, so care must be taken to ensure the sensing face is kept free of contamination by dust or moisture.

If capacitive sensors are mounted within a distance of 2 - 8 housing diameters of one another, they can influence each other and testing under real conditions is strongly recommended. The aforementioned adjustment capability however, allows a solution to be found for virtually every application.

Glass	3... 14
Rubber	2.5... 3
Hard paper	3.5... 6
Wood	2.5... 6.8
Marble	8.4... 14
Mineral oil	2... 15
Epoxy resin	3.3... 3.6
Petroleum	2... 2
Plexiglas	3... 6
Polyamid	3... 8
PVC	3.3... 4.1
China	4.2... 6.5
Teflon PTFE	2
Air	1
Water	80... 8
Paper (dry)	2

Fig. 1 Dielectric Factor

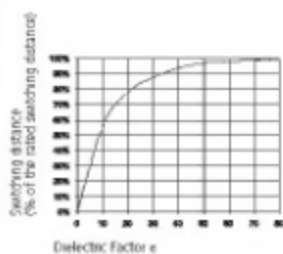


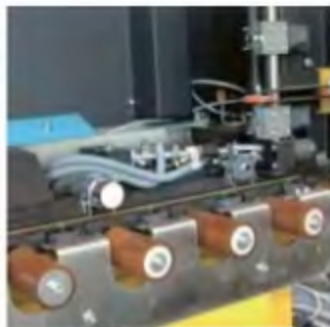
Fig. 2 Variation of the switching distance depending on Dielectric Factor ϵ

Applications

Capacitive proximity sensors are particularly useful for sensing fill levels through non-metallic container walls.

Advantage:

The container wall does not have to be breached and the sensed material will not come in contact with the sensor. A requirement for this application is that the Dielectric Factor of the target material is higher than that of the container. Using the potentiometer the sensitivity of the sensor is reduced until it responds to the target medium but not the container wall. See below for further applications.



Top: insulating glass-production line fitted with Bernstein capacitive sensors



Level monitoring through non-metallic containers



Level control for granulate or feed hoppers



Pallet height sensing e.g. paper



Level control in paint and glue containers



Registration, counting, sorting or control of conveyor belt systems



Position sensing in continuous processing



Detection at wood processing



Tear sensing



Level control in cardboard packaging

Standard-models		2 mm switching distance				4 mm switching distance			
M12									
		flush mounted metal design				non-flush mounted plastic design			
		2 m cable, length = 61.5 mm		Plug M8, length = 61.8 mm		2 m cable, length = 61 mm		Plug M8, length = 61.3 mm	
		N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	N.C.
DC	SPH	650.7903.001	650.7903.001	650.7903.004	650.7903.004	650.7919.001	650.7919.001	650.7919.004	650.7919.004
	PHF	650.7903.001	650.7903.001	650.7903.004	650.7903.004	650.7919.001	650.7919.001	650.7919.004	650.7919.004

Standard-models		5 mm switching distance				8 mm switching distance			
M18									
		flush mounted metal design				non-flush mounted plastic design			
		2 m cable, length = 81.7 mm		Plug S12, length = 81.7 mm		2 m cable, length = 81 mm		Plug M8 (DC), Plug S12 (AC), length = 81 mm	
		N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	N.C.
DC	SPH	650.7905.001	650.7905.001	650.7905.004	650.7905.004	650.7921.723	650.7921.722	650.7921.002	650.7921.002
	PHF	650.7905.001	650.7905.001	650.7905.004	650.7905.004	650.7921.724	650.7921.001	650.7921.002	650.7921.002
AC						650.8521.001	650.8421.001	650.8521.004	650.8421.004

Standard-models		10 mm switching distance				20 mm switching distance			
M30									
		flush mounted metal design				non-flush mounted plastic design			
		2 m cable, length = 82 mm		Plug S12, length = 82 mm		2 m cable, length = 81 mm		Plug S12, length = 81 mm	
		N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	N.C.
DC	SPH	650.7907.001	650.7907.001	650.7907.004	650.7907.004	650.7923.001	650.7923.001	650.7923.004	650.7923.004
	PHF	650.7907.001	650.7907.001	650.7907.004	650.7907.004	650.7923.727	650.7723.001	650.7923.004	650.7723.004
AC						650.8523.001	650.8423.001	650.8523.004	650.8423.004

Standard-models		15 mm switching distance				30 mm switching distance			
M32									
		flush mounted metal design				non-flush mounted plastic design			
		2 m cable, length = 70 mm		Plug S12, length = 70 mm		2 m cable, length = 70 mm		Plug S12, length = 70 mm	
		N.O./N.C. prog.	Complementary	N.O./N.C. prog.	Complementary	N.O./N.C. prog.	Complementary	N.O./N.C. prog.	Complementary
DC	SPH	650.7013.011	650.7013.012	650.7013.015	650.7013.016	650.7013.001	650.7013.002	650.7013.004	650.7013.005
	PHF prog.								
AC	Relay Timer					650.8613.001			

Standard-models	15 mm switching distance				20 mm switching distance				30 mm switching distance			
	non-flush mounted plastic design				flush mounted metal design				non-flush mounted plastic design			
	2 in cable, length ≥ 25 mm		flak 312, length ≥ 25 mm		2 in cable, length ≥ 50 mm		flak 312, length ≥ 50 mm		2 in cable, length ≥ 25 mm		flak 312, length ≥ 25 mm	
	N.O.	N.C.	N.O.	N.C.	N.O.	N.O.	N.O.	N.F.	N.O.	N.F.	N.O.	N.F.
DC	NPN	650.7310.001	650.7310.001	650.7310.004				650.7315.001	650.7315.001	650.7315.004	650.7315.004	650.7315.004
	PNP	650.7310.001	650.7310.001	650.7310.004	650.7315.005		650.7315.006	650.7315.001	650.7315.004	650.7315.004	650.7315.004	650.7315.004
AC		650.8510.001	650.8510.001					650.8515.001	650.8515.001	650.8515.005	650.8515.005	650.8515.005

Standard-models	8 mm switching distance		10 mm switching distance		15 mm sw. dist.		30 mm sw. dist.		
	flush mounted metal design		flush mounted plastic design		flush mounted plastic design		non-flush plastic design		
E50 (50 x 25 x 10)	2 in cable		2 in cable		terminal chamber				
E68 (68 x 30 x 15)	N.O.		N.O.		N.O./N.C. prog.		N.O./N.C. prog.		
N44 (40 x 40 x 120)									
DC	NPN	650.7390.001		650.7356.001		650.7054.001		650.7054.002	
	PNP	650.7390.001		650.7356.001					

Technical data

	DC-data									
	M12	M18	M30	M32	Ø 20	Ø 34	E50	E68	N44	
Operating voltage	U ₀	10 - 36 V	10 - 60 V	10 - 60 V	10 - 60 V	10 - 36 V	10 - 36 V	10 - 36 V	10 - 60 V	
Operating current	I ₀	≤ 200 mA	≤ 200 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA	
Switch hysteresis	H	20% of rated switching distance								
Repeatability	R	≤ 10%								
Switching frequency	F	≈ 25 Hz								
Output	Sustained short circuit and overload protection									
Reverse voltage protection	yes									

	AC-data					
	M16	M30	M32	Ø 20	Ø 34	N44
Operating voltage	U ₀	20 - 250 V				
Operating current	I ₀	≤ 300 mA (M32 version with relay output 8 A)				
Switch hysteresis	H	20% rated switching distance				
Repeatability	R	≤ 10%				
Switching frequency	F	≈ 15 Hz				
Output	Ø32 version with adjustable off-delay 3-600 µs					
Reverse voltage protection	yes					

	general technical data								
	M12	M18	M30	M32	Ø 20	Ø 34	E50	E68	N44
Rated switching distance									
(flush mounted/non-flush mounted) s	2/5 mm	5/8 mm	10/20 mm	15/30 mm	-/15 mm	20/30 mm	2/- mm	10/ mm	15/30 mm
Adjustable switching distance	yes with potentiometer (apart from M12 plug version)								
Function/operating voltage indication	●/-	●/●	●/●	●/●	●/●	●/●	●/-	●/-	●/●
Operating temperature	-25°C... +70°C								
Ingress protection	IP 65/67 according to CE 529/EN 60529								

Photoelectric sensors

Bernstein photoelectric sensors can be divided into four basic types:

- Through-beam
- Retro-reflective
- Diffuse reflective
- Fibre optic

The specifications of the above mentioned sensors are defined in the standard EN 60947-5-2.

The use of these systems depends primarily on the application and the operating environment. On the following pages you can find a number of application examples which demonstrate the advantages and disadvantages of the individual sensing types.

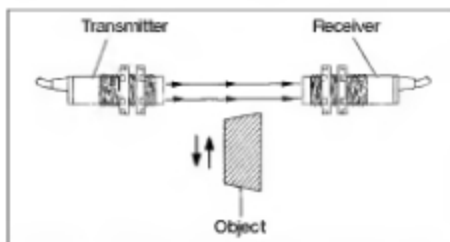
The division of photoelectric sensors into type/model helps make selection easier, the housing style and material distinguish the different type groups. You will find the available sensing options of the individual type groups in the data section of this catalogue.

In general, Bernstein photoelectric sensors operate using pulsating red or infrared light. This technology offers the following benefits:

- High immunity to ambient light
- Maximum sensing range
- Reduced temperature, resulting in longer operational life of transmitter diodes

Sensing types

Through-beam sensors (ES)



Through-beam sensors have the light source and receiver in separate heads. The light emitted by the source is analysed by the receiver. Interruption of the light path (caused by an object) is evaluated and results in switching of the output.

Advantages:

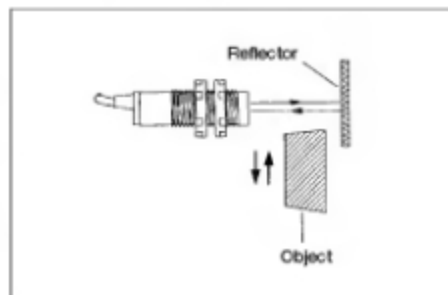
- Long sensing distance; the light beam needs only to travel in one direction from the transmitter to the receiver

- High operational safety, interference reflections rarely trigger the receiver
- Detection of very small objects, possible by the additional use of lenses or filters

Disadvantage:

- High installation cost with two devices having to be mounted, wired and adjusted

Retroreflective sensors (RS)



Retroreflective sensors have the light source and the receiver in the same head. The light beam emitted by the source is reflected back to the receiver by a reflector (e.g. triple reflector or reflective foil). Any break in the light path is evaluated by the receiver and in turn results in a change of the output mode.

Advantages:

- Easy installation of sensor head and reflector
- Reflector can be fixed to a moving target, e.g. conveyor belt installations

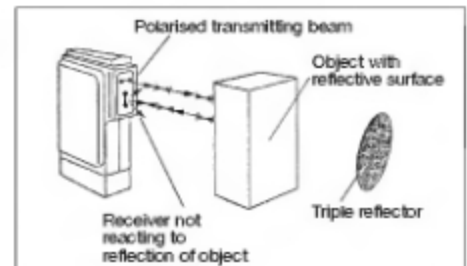
Disadvantages:

- Shorter sensing range than a through-beam system since the light beam has to travel from the light source to the reflector and back to the receiver
- High-gloss objects can function as reflectors and may cause malfunctions

Note:

The sensing ranges specified in the data section of this catalogue refer to use with a triple reflector with a diameter of 83 mm. Changes in the sensing range due to the use of other reflector types are available on request (see page 274).

Polarised retroreflective sensors (PS)



This device is a special type of retro-reflective sensor. Special linear or circular polarised filtering elements (foils) are mounted between the reception/transmission elements and the lens of the sensor.

Advantage:

- Reflections of mirroring or transparent objects are reliably ignored

Disadvantage:

- The sensing distance is shorter compared to standard devices without polarisation filters

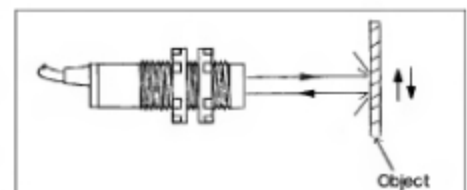
Special types with autocollimation

Transmission/reception channels use the same lens

Advantage:

- No dead zone with reflectors in short distance ranges

Diffuse reflective sensors (RT)



Diffuse reflective sensors have the light source and receiver in the same head. The light emitted by the source is diffusely reflected by the detected object. A part of this reflection returns to the receiver and changes the switching status of the output when a certain intensity is exceeded. Thus the texture and colour of the object's surface has a great effect on the detection (presence/absence) of objects.

The sensing distances indicated in the data section of this catalogue are defined as follows in accordance with EN 60947-5-2. Sensing distances of up to 400 mm refer to a 100x100 mm white paper test card from Kodak. For sensing distances of more than 400 mm, 200x200 mm test cards are to be used.

The reflectivity of the object surface to be sensed affects the sensing distance, so that a correction factor or re-emission factor has to be specified. This value may vary from less than 10% for matt-black plastic to 200% for raw aluminium sheet metal (special values on request). Usually we recommend an application-dependent test of the specific object to take ambient conditions, such as dust and humidity, into consideration for the selection of the optimum sensor.

Advantages:

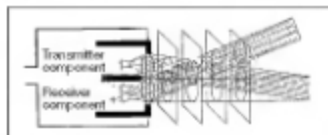
- Easiest installation
- No reflector necessary

Disadvantage:

- Different sensing distances and sensitivity settings are required for different objects (surface, colour)



Diffuse reflective sensors with background suppression (RH)



This type of sensor is a special type of diffuse reflective sensor. It is based on two receptive elements (segmented receivers). Using the triangulation principle, reflections of objects beyond the target do not reach the active surface of the receiver modules.

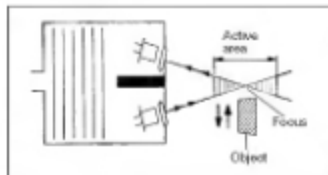
Advantage:

- No background effect on object detection (e.g. a faintly reflecting object may be detected in front of a high-gloss background)

Disadvantages:

- Short sensing distance
- Higher technical expense

Convergent beam sensors, fixed focus (FF)



The transmission and reception elements of convergent beam sensors are arranged in a defined angle to each other. The light cone of the source and the receiver are joined in a fixed focal point. This results in the active zone for the detection of objects being defined around this focal point.

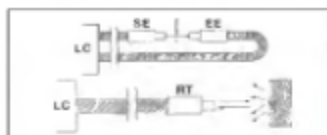
Advantages:

- Background/foreground suppression
- Defined active zone

Disadvantage:

- Short sensing distances (due to limited base width of sensor housing)

Fibre optic controls (LC) for the connection of fibre optics



Fibre optic controls with corresponding fibre optics can be used for the through-beam and diffuse reflective principle, fibre optics for sensor applications consist of bundled glass fibres or one or more transparent plastic fibres. The light falling below the limit angle of the total reflection forms the basis of the light transportation principle. In the interior of the fibre, which has a higher refraction index than the sleeve, the light is conducted in a zigzag course from the transmitter on the switching amplifier to the fibre end. The material of the surrounding sleeve can either be plastic or metal, depending on the application type. In addition, a wide selection of fibre ends of different types are available to the operator.

Advantages:

- Use in confined areas
- Not effected by electrical and magnetic fields
- High temperature range
- Detection of very small objects possible



Photoelectric sensors

OT12 OM12

OT12 RT Diffuse reflective sensors

OM12 RT Diffuse reflective sensors



M 12 x 61.5 mm

Diffuse reflective sensors

60 mm (2.36") 200 mm (7.87")



M 12 x 74.5 mm

Diffuse reflective sensors

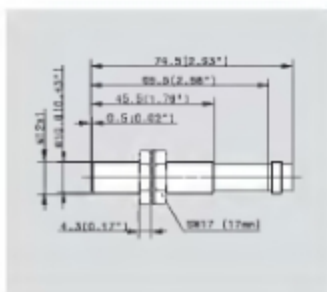
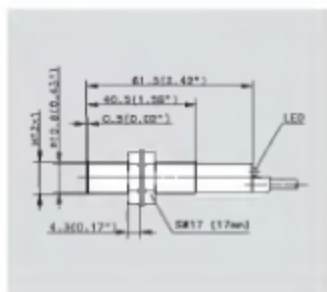
60 mm (2.36") 200 mm (7.87")

Sensing type	M 12 x 61.5 mm		M 12 x 74.5 mm	
Sensing distance / range	Diffuse reflective sensors		Diffuse reflective sensors	
	60 mm (2.36")	200 mm (7.87")	60 mm (2.36")	200 mm (7.87")
RP	Model description			
LA	Part number			
	Weing diagram (page/pos)			
Stod. status: Ex stod./Built to order				
	Model description			
RP	-			
DA	Part number			
	Weing diagram (page/pos)			
Stod. status: Ex stod./Built to order				
	Model description			
NP	-			
DA	Part number			
	Weing diagram (page/pos)			
Stod. status: Ex stod./Built to order				
	Model description			
Transmitter	-			
	Part number			
	Weing diagram (page/pos)			
Stod. status: Ex stod./Built to order				
Voltage range	10–36 V DC	10–36 V DC	10–36 V DC	10–36 V DC
Short-circuit protection	●	●	●	●
Output current	200 mA	200 mA	200 mA	200 mA
Switching frequency	>100 Hz	>100 Hz	>100 Hz	>100 Hz
LED for output function/supply voltage/diagnostic	•/•	•/•	•/•	•/•
Adjustable sensitivity	—	—	—	—
Timer function	—	—	—	—
Diagnostic function	—	—	—	—
Temperature range	min/max	0 °C/+70 °C	0 °C/+70 °C	0 °C/+70 °C
		+32 °F/+158 °F	+32 °F/+158 °F	+32 °F/+158 °F
Protection type	IP 67/ENEMA 4	IP 67/ENEMA 4	IP 67/ENEMA 4	IP 67/ENEMA 4
Screw-clamp termination	⌀page/pos			
Cable length (2 m)	⌀mm			
Plug	⌀page/pos			
Accessories	⌀page/pos			

Dimensions

On request transmitter and receiver in a single packing unit (ES)

All dimensions in mm (inch)



**M 12 x 66.5 mm**

Diffuse reflective sensors

60 mm (2.36") 200 mm (7.87")

OM12 RT-DHTP-0060-CL	OM12 RT-DHTP-0200-CL
655.7928.002	655.7928.004
271/4	271/4

—	—
---	---

**M 12 x 74.5 mm**

Diffuse reflective sensors

60 mm (2.36")

OM12 RT-DHTP-0060-S
655.7927.001
271/4

—

**M 12 x 76 mm**

Diffuse reflective sensors

200 mm (7.87")

OM12 RT-DHTP-0200-CL
655.7928.003
271/4

—

10–36 V DC

●

200 mA

>100 Hz

—/—

—

—

—

0 °C/+70 °C

+32 °F/+158 °F

IP 67/EMA 4

3 x 0.14

—

10–36 V DC

●

200 mA

>100 Hz

—/—

—

—

—

0 °C/+70 °C

+32 °F/+158 °F

IP 67/EMA 4

3 x 0.14

—

10–36 V DC

●

200 mA

>100 Hz

—/—

—

—

—

0 °C/+70 °C

+32 °F/+158 °F

IP 67/EMA 4

280/282, 281/3, 4

—

10–36 V DC

●

200 mA

>250 Hz

—/—

—

—

—

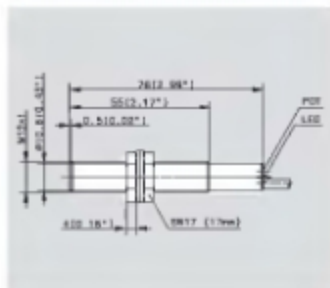
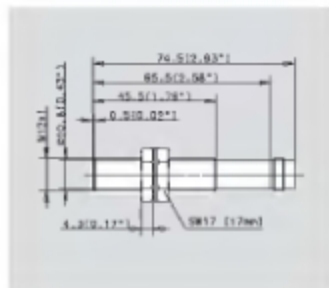
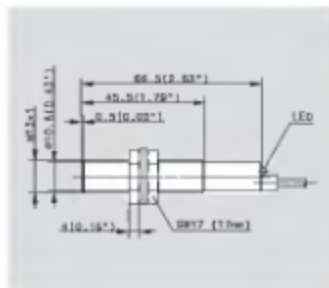
0 °C/+70 °C

+32 °F/+158 °F

IP 65/EMA 12

3 x 0.14

—



The new M18 product line of photoelectric sensors

Using the selection matrix

To assist the user in selecting the right photoelectric sensor for their application, Bernstein developed the selection matrix below.

The colour of the individual fields matches those in the product index to allow rapid selection of the most suitable sensor (by part number) starting with the most important criteria switching distance. By not using detailed technical descriptions the selection is considerably simplified, but our engineers are always available to answer any technical questions.

Variants and Highlights

The new photoelectric sensors of the M18 product line are available in three different housing materials: Plastic, nickel-plated brass and stainless steel.

The new product line covers all the most popular function types. *Diffuse reflective sensors* are available with different sensing distances. One variant has a fixed sensing distance of 100 mm, two further diffuse reflective sensors have an adjustable sensing distance of 300 mm and 500 mm. An integral part of this product line is also a *convergent beam sensor* with 40 mm fixed sensing distance.

The transmission and reception elements of convergent beam sensors are arranged in a defined angle to each other. This results in an active detection zone being defined around this focal point.

In addition to the *retroreflective sensor* with 3 m fixed range, the product line includes a polarized retroreflective sensor with 2.5 m adjustable range. The *polarized retroreflective sensor* is an autocollimation type. The advantage of this technology is, that the transmission and reception channel have the same light emitting surface, and therefore no dead detection zone.

Selection matrix photoelectric sensors product line M18

Function type	Sensing range-/ distance	Housing material	Output	Connection
Diffuse reflective (R T)	100 mm fixed 300 mm adjustable 500 mm adjustable	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m
Convergent beam (P-Focus) (PF)	40 mm fixed	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m
Retroreflective (R S)	3 m fixed	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m
Polarized retroreflective (PS) Transparent sensor (PS)	2.5 m adjustable 0.8 m adjustable	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m
Through-beam Transmitter (SE) Set (ES) Through-beam Receiver (EE)	8 m fixed	Plastic Nickel plated brass Stainless steel	NPN PNP	plug M12 cable 2 m

Specific for the detection of translucent materials, e.g. film, plastic cans, bottles, etc., a transparent sensor was developed. From a technical point of view, a polarized retroreflective sensor is equipped with enhanced optical qualities. By the implementation of this technique into a M18 housing, this variant provides, in conjunction with a MICROTUBE-reflector (Part-No. 657 2100 011), an ideal solution to detect objects which could hardly have been registered previously. The M18 product line also includes a through-beam sensor with 8 m range. The transmitter and the receiver are available separately or as a set (simple stockkeeping).

The photoelectric sensors have either a 2 m cable or an M12 connector, both versions are available with PNP or NPN output.

To simplify the stockkeeping and the selection of the correct sensor, all sensors have a programmable switching output. The dark activated output (standard for diffuse reflective and convergent beam sensors) and the light activated output (standard for retroreflective and through-beam sensors) can be chosen by means of a programming wire.



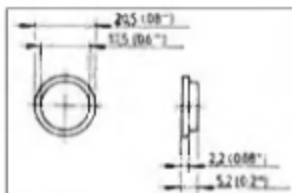
Picture above: Transparent sensor for the detection of film (packaging industry)

Reflectors

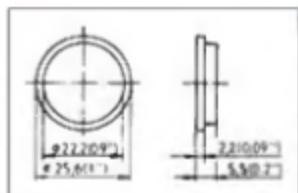
The BERNSTEIN reflectors, which consist of several triple mirrors standing pyramid-shaped, are best suited for retro and polarised retro applications. The pyramid-shaped structure of these triple mirrors allows a variation of the reflector of up to 30° to the optical axis (e.g. caused by vibration or slight movements at the application).

The ranges of the retroreflective sensors refer to the Ø 83 mm type (657 2107 003), use of reflectors with smaller surface area will result in a reduction of the stated sensing distance.

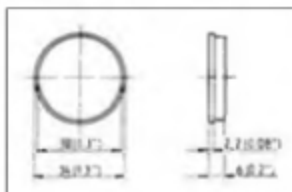
The reflector diameter should be selected in terms of the range and the size of the object to be detected. The ideal case is, the object should be larger than the reflector, which is then "shadowed" completely.



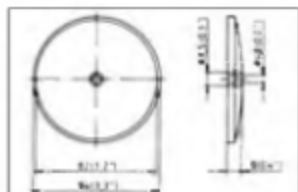
Part number 657.2108.008
Diameter 17.5 mm



657.2109.009
22 mm



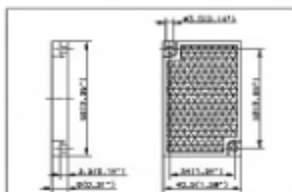
Part number 657.2110.010
Diameter 32 mm



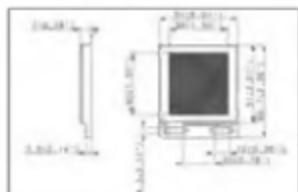
657.2107.003
83 mm

Accessory

You find further accessories on page 274 ff.



Part number 657.2100.007
Dimensions 60 x 41 mm



657.2100.011
60 x 51 mm





Overview diffuse reflective/retroreflective sensors M 18





Type OT, Plastic housing								
	PA 12-front cap				glass lens			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 58.5 mm		plug M12, length = 67.5 mm	
Sensing range/distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
RT 100 mm fixed	655.7819.004	655.7219.004	655.7818.002	655.7218.001				
RT 300 mm adjustable	655.7819.005	655.7219.005	655.7818.003	655.7218.005				
RT 500 mm adjustable	655.7819.006	655.7219.006	655.7818.006	655.7218.006				
RF 40 mm fixed	655.8819.001	655.8219.001	655.8818.002	655.8218.001				
RS 3 m fixed	655.4819.003	655.4219.002	655.4818.001	655.4218.001				
PS 2.5 m adjustable					655.5819.003	655.5219.001	655.5818.001	655.5218.001
PS 0.8 m adjustable					655.5819.004	655.5219.002	655.5818.002	655.5218.002





Type OM, Nickel plated brass housing								
	PA 12-front cap				glass lens			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 58.5 mm		plug M12, length = 67.5 mm	
Sensing range/distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
RT 100 mm fixed	655.7817.002	655.7217.001	655.7816.001	655.7216.001				
RT 300 mm adjustable	655.7817.003	655.7217.002	655.7816.002	655.7216.003				
RT 500 mm adjustable	655.7817.004	655.7217.003	655.7816.006	655.7216.004				
RF 40 mm fixed	655.8817.001	655.8217.001	655.8816.001	655.8216.001				
RS 3 m fixed	655.4817.001	655.4217.001	655.4816.001	655.4216.001				
PS 2.5 m adjustable					655.5817.001	655.5217.001	655.5816.001	655.5216.001
PS 0.8 m adjustable					655.5817.002	655.5217.002	655.5816.002	655.5216.002

Type ON, Stainless steel housing								
	PA 12-front cap				glass lens			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 58.5 mm		plug M12, length = 67.5 mm	
Sensing range/distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
RT 100 mm fixed	655.7822.001	655.7222.001	655.7821.001	655.7221.001				
RT 300 mm adjustable	655.7822.002	655.7222.002	655.7821.002	655.7221.002				
RT 500 mm adjustable	655.7822.003	655.7222.003	655.7821.003	655.7221.003				
RF 40 mm fixed	655.8822.001	655.8222.001	655.8821.001	655.8221.001				
RS 3 m fixed	655.4822.001	655.4222.001	655.4821.001	655.4221.001				
PS 2.5 m adjustable					655.5822.001	655.5222.001	655.5821.001	655.5221.001
PS 0.8 m adjustable					655.5822.002	655.5222.002	655.5821.002	655.5221.002

Overview through-beam sensors M 18

Type OT, Plastic housing								
	Receiver				Set			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 56 mm		plug M12, length = 65 mm	
Sensing distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
8 m	655 1019 001	655 1219 002	655 1018 001	655 1218 001	655 1019 301	655 1219 302	655 1018 301	655 1218 301
	Transmitter							
	655 1019 001		655 1018 001					

Type OM, Nickel plated brass housing								
	Receiver				Set			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 56 mm		plug M12, length = 65 mm	
Sensing range/distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
8 m	655 1017 001	655 1217 001	655 1016 001	655 1216 001	655 1017 301	655 1217 301	655 1016 301	655 1216 301
	Transmitter							
	655 1017 001		655 1016 001					

Type ON, Stainless steel housing								
	Receiver				Set			
	2 m cable, length = 56 mm		plug M12, length = 65 mm		2 m cable, length = 56 mm		plug M12, length = 65 mm	
Sensing range/distance	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
8 m	655 1022 001	655 1222 001	655 1021 001	655 1221 001	655 1022 301	655 1222 301	655 1021 301	655 1221 301
	Transmitter							
	655 1022 001		655 1021 001					

General data

Operating voltage	U ₀	10–36 V DC	Ambient light resistance	10 lux
Max. switching current	I	200 mA	Operating temperature	-20°C...+70°C
Switch hysteresis	H	≤ 15%	Ingress protection	IP67
Repeatability	R	≤ 10%	Protection class	II, protective insulation
Switching frequency	f	500 Hz	Cable PVC	0.34 mm ²
Output	Voltage reversal protection, short-circuit protection light/dark activated programmable		Housing material (Type)	PEI (118), nickel plated brass (M12), 1.4305 (ON18)

Photoelectric sensors

Type OZ20 – stainless steel

The photoelectric range has been further extended by the housing OZ20.

A smooth stainless steel barrel with a 20 mm diameter that has been specially designed for use in hygienic areas. The food industry requires that installations and components are easy to clean. The smooth barrel form offers bacteria no hiding places.

Many different functional types are available.

The sensors are connected via 2 m fixed cable or an M 12 plug.

Overview design OZ20

Design OZ, stainless steel housing Ø 20 mm, 2 m cable



Function type, detection range	Part number	Designation
Sensor, 100 mm fixed	655.7800.001	OZ20F3-DPTP-0100-CL
Sensor, 300 mm adjustable	655.7800.003	OZ20F3-DPTP-0300-CLE
Sensor, 500 mm adjustable	655.7800.005	OZ20F3-DPTP-0500-CLE
Fa-focus, 40 mm fixed	655.8800.001	OZ20FF-DPTP-0040-CL
Retroreflective beam, 3 m fixed	655.4800.001	OZ20FS-DPTP-03 0-CL
Pole filter beam, 2.5 m adjustable	655.5800.001	OZ20FS-DPTP-02 5-CLE
Transparent sensor, 0.8 m adjustable	655.5800.003	OZ20FS-DPTP-0800-CLE
Transmitter, 8 m	655.7000.002	OZ20SE-DCCS-08 0-CC
Receiver, 8 m	655.7800.001	OZ20EE-DPTP-08 0-CL

Design OZ, stainless steel housing Ø 20 mm, plug M12



Function type, detection range	Part number	Designation
Sensor, 100 mm fixed	655.7800.002	OZ20F3-DPTP-0100-SL
Sensor, 300 mm adjustable	655.7800.004	OZ20F3-DPTP-0300-SLE
Sensor, 500 mm adjustable	655.7800.006	OZ20F3-DPTP-0500-SLE
Fa-focus, 40 mm fixed	655.8800.002	OZ20FF-DPTP-0040-SL
Retroreflective beam, 3 m fixed	655.4800.002	OZ20FS-DPTP-03 0-SL
Pole filter beam, 2.5 m adjustable	655.5800.002	OZ20FS-DPTP-02 5-SLE
Transparent sensor, 0.8 m adjustable	655.5800.004	OZ20FS-DPTP-0800-SLE
Transmitter, 8 m	655.7000.001	OZ20SE-DCCS-08 0-SC
Receiver, 8 m	655.7800.002	OZ20EE-DPTP-08 0-SL

Photoelectric sensors

Analog output sensors

Bernstein has extended its M 18 photoelectric range through a diffuse-reflective sensor with an analog output. Suitable for sensing distances between 30 and 200 mm, the required sensing distance can easily be set within this range via a programming wire.

The sensor sets a new amplification, by means of a brief connection to the positive operating voltage (0.1 - 10 s). Parameters such as the steepness of the characteristic curve and direction can be factory programmed.

The following voltage and current signals are available on the output side: 0-10 V, 0-20 mA and 4-20 mA.

The new diffuse-reflective sensor with analog output is available in the following housing variants:

Threaded design in plastic, brass, stainless steel and in smooth stainless steel barrels with a 20 mm diameter.

An M 12 x 1 plug was chosen for the connection.

Overview of analog output sensors

Design O1, plastic housing



Output	Part number	Designation
0-20 mA	655.7018.001	OT18RT-D1RP-0200-SE
4-20 mA	655.7018.002	OT18RT-D1RP-0200-SE
0-10 V	655.7018.003	OT18RT-D1RP-0200-SE

Design O1L, metal housing



Output	Part number	Designation
0-20 mA	655.7016.001	OM18RT-D1RP-0200-SE
4-20 mA	655.7016.002	OM18RT-D1RP-0200-SE
0-10 V	655.7016.003	OM18RT-D1RP-0200-SE

Design O1N, stainless steel housing



Output	Part number	Designation
0-20 mA	655.7021.001	ON18RT-D1RP-0200-SE
4-20 mA	655.7021.002	ON18RT-D1RP-0200-SE
0-10 V	655.7021.003	ON18RT-D1RP-0200-SE

Design O2, stainless steel housing Ø 20 mm



Output	Part number	Designation
0-20 mA	655.7000.002	OZ20RT-D1RP-0200-SE
4-20 mA	655.7000.003	OZ20RT-D1RP-0200-SE
0-10 V	655.7000.004	OZ20RT-D1RP-0200-SE

Photoelectric sensors

OR05

OR05 ES	Through-beam sensors
OR05 PS	Polarised retroreflective sensors
OR05 RT	Diffuse reflective sensors
OR05 LC	Fibre optic controls



30 x 30 x 15 mm

Through-beam sensors
12 m (39.4 ft)

30 x 30 x 15 mm

Polarised retroreflective sensors
4 m (13.1 ft)

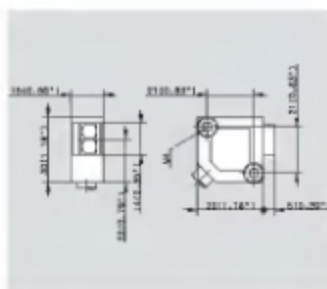
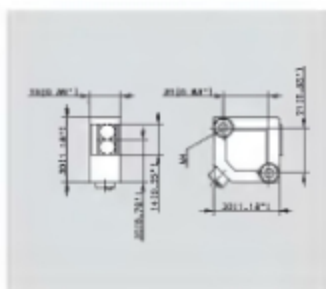
Sensing type	
Sensing distance / range	
PNP	Model description
LA	Part number
	Wiring diagram (pagePos)
Stock status	Ex stock/Built to order
PNP	Model description
ambivalent	Part number
	Wiring diagram (pagePos)
Stock status	Ex stock/Built to order
Transmitter (Connector)	Model description
	Part number
	Wiring diagram (pagePos)
Stock status	Ex stock/Built to order
Transmitter (Cable)	Model description
	Part number
	Wiring diagram (pagePos)
Stock status	Ex stock/Built to order
Voltage range	
Short-circuit protection	
Output current	max
Switching frequency	max
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min/max
Protection type	
Screw-clamp termination	(pagePos)
Cable length (2 m)	Cross section (mm ²)
Plug	(pagePos)
Accessories	(pagePos)

30 x 30 x 15 mm		30 x 30 x 15 mm	
Through-beam sensors		Polarised retroreflective sensors	
12 m (39.4 ft)		4 m (13.1 ft)	
			OR05 PS-DHTP-04 0-3UPE
			655.5975.002
			271/6
			☛
OR05 EE-DATP-12 0-3DE	OR05 EE-DATP-12 0-SDE	OR05 PS-DATP-04 0-3DE	
655.1875.003 [2]	655.1875.004 [1]	655.5875.001	
271/5	271/5	271/5	
☛	☛	☛	
	OR05 SE-DOOS-12 0-5C		
	655.1075.004		
	271/3		
	☛		
OR05 SE-DOOS-12 0-3C			
655.1075.003			
271/3			
☛			
SE: 10–36 V DC	EE: 10–36 V DC	PS: 10–36 V DC	
–	●	●	
–	200 mA	200 mA	
–	>1000 Hz	>1000 Hz	
–/–/–	☛/●	☛/●	
–	●	●	
–	–	–	
●	–	–	
–25 °C/+70 °C	–25 °C/+70 °C	–25 °C/+70 °C	
–13 °F/+158 °F	–13 °F/+158 °F	–13 °F/+158 °F	
IP 67/ENEMA 4	IP 67/ENEMA 4	IP 67/ENEMA 4	
3 m/4 x 0.14	–	3 m/4 x 0.14	
–	277	–	
273/1	273/1	273/1, 274	

Dimensions

All dimensions in mm (inch)

- [1] Connector
[2] Cable



Photoelectric sensors OR05

OR05 ES	Through-beam sensors
OR05 PS	Polarised retroreflective sensors
OR05 RT	Diffuse reflective sensors
OR05 LC	Fibre optic controls



30 x 30 x 15 mm

Polarised retroreflective sensors

4 m (13.1 ft)

30 x 30 x 15 mm

Diffuse reflective sensors

1.2 m (3.94 ft)

Sensing type	
Sensing distance / range	
	Model description
PIP	
LA	Part number
	Wiring diagram (page/pos)
Stock status: Ex stock/Built to order	
	Model description
PIP	
ambivalent	Part number
	Wiring diagram (page/pos)
Stock status: Ex stock/Built to order	

CR05 PS-DHTP-

04.0-SLFE

655.5975.001

271/6

●/-

-

CR05 PS-DHTP-

01.2-SLFE

655.7975.004

271/6

●/-

-

CR05 PS-DHTP-

01.2-3DE

655.7875.003

271/6

●/-

Voltage range	
Short-circuit protection	
Output current	max
Switching frequency	max
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min/max
Protection type	
Screw-clamp termination	(page/Pos)
Cable length (2 m)	Cross section (mm ²)
Plug	(page/Pos)
Accessories	(page/Pos)

10-36 V DC

●

200 mA

>1000 Hz

●/-●

●

-

-25 °C/+70 °C

-13 °F/+158 °F

IP 67/IKEMA 4

-

-

3 m/4 x 0.14

277

273/1, 274

10-36 V DC

●

200 mA

>1000 Hz

●/-●

●

-

-25 °C/+70 °C

-13 °F/+158 °F

IP 67/IKEMA 4

-

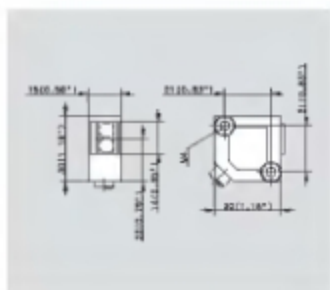
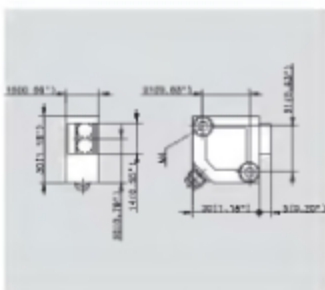
-

3 m/4 x 0.14

273/1

Dimensions

All dimensions in mm (inch)





30 x 30 x 15 mm

Diffuse reflective sensors

1.2 m (3.94 ft)

OF05 RT-DHTP-
01 2-SLFE
655.2975.003
271/6

●/-

-



30 x 30 x 15 mm

Fibre optic controls
depending on fibre type

OF05 LC-DHTP-
0000-3LFE
655.2975.004
271/6

●/-

-

OF05 LC-DHTP-
0000-3DE
655.2875.002
271/5

●/-



30 x 30 x 15 mm

Fibre optic controls
depending on fibre type

OF05 LC-DHTP-
0000-SLFE
655.2975.003
271/6

●/-

-

10-36 V DC

●
200 mA
>1000 Hz

●/-●

●

-

-25 °C/+70 °C

-13 °F/+158 °F

IP 67/EMA 4

-

277

273/1

10-36 V DC

●
200 mA
>250 Hz

●/-●

●

-

-25 °C/+70 °C

-13 °F/+158 °F

IP 67/EMA 4

3 mV_A x 0.14

-

275

10-36 V DC

●
200 mA
>250 Hz

●/-●

●

-

-25 °C/+70 °C

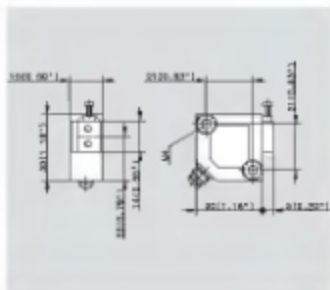
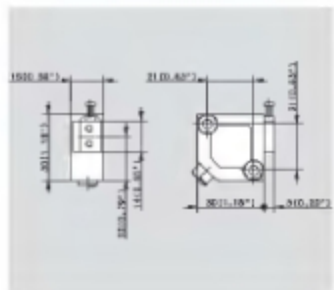
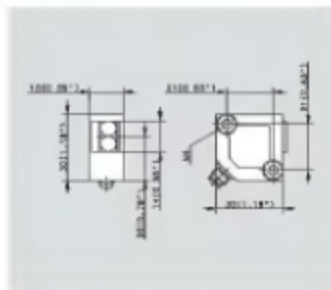
-13 °F/+158 °F

IP 67/EMA 4

-

277

275



Photoelectric sensors OR10

OR10 ES Through-beam sensors



Sensing type	
Through-beam sensors*)	
Sensing distance / range	
6 m (19.7 ft)	
Light output: lens	
-	
RF#	Model description
DA	Part number
	Wiring diagram (page/pos)
Stok. status: Ex stok./Built to order	
Transmitter	
Model description	
Part number	
Wiring diagram (page/pos)	
Stok. status: Ex stok./Built to order	

9 x 10 x 82 mm	
Through-beam sensors*)	
6 m (19.7 ft)	
Light output: lens	
-	OR10 EE-DDTP-06 0-5 655.1757.001 271/4 -➔
OR10 SE-DDCS	
06 0-5C	-
655.1057.001	
271/3	-➔

9 x 10 x 82 mm	
Through-beam sensors*)	
6 m (19.7 ft)	
Light output: lens	
-	OR10 EE-DDTP-06 0-6 655.1757.002 271/4 -➔
OR10 SE-DDCS	
06 0-6C	-
655.1057.002	
271/3	-➔

Voltage range	
Short-circuit protection	
Output current	max
Switching frequency	max
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min/max
Protection type	
Screw-clamp termination	(page/Pos)
Cable length (2 m)	Cross section (mm ²)
Plug	(page/Pos)
Accessories	

SE: 10-36 V DC	EE: 10-36 V DC	SE: 10-36 V DC	EE: 10-36 V DC
-	●	-	●
-	200 mA	-	200 mA
-	>100 Hz	-	>100 Hz
-/-/-	-/-/-	-/-/-	-/-/-
-	-	-	-
-	-	-	-
●	●	●	●
-5 °C/+70 °C	-5 °C/+70 °C	-5 °C/+70 °C	-5 °C/+70 °C
+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F
IP 67/IKEMA 4	IP 67/IKEMA 4	IP 67/IKEMA 4	IP 67/IKEMA 4
-	-	3 x 0.34	3 x 0.14
276/1, 2	276/1, 2	-	-
-	-	-	-

Dimensions

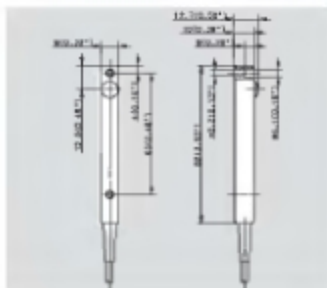
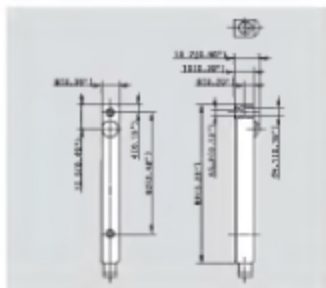
‡ On request transmitter and receiver in a single packing unit (ES)

Installation accessories on request

- Adhesive mounting
- Screw mounting
- Single-hole mounting

NR# or LA on request

All dimensions in mm (inch)





9 x 10 x 82 mm

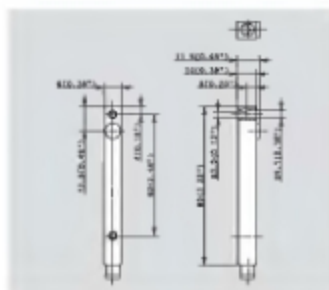
Through beam sensors¹⁾

6 m (19.7 ft)

Light output plane

—	CR10 EE-00TP-06 0-5 655.1757.003 271A1
●—	—
CR10 SE-0005-06 0-5C 655.1057.003 271/3	—
●—	—

SE 10-36 V DC	EE 10-36 V DC
—	●
—	200 mA
—	>100 Hz
- - -	- - -
—	—
●	—
-5 °C/+70 °C	-5 °C/+70 °C
+23 °F/+158 °F	+23 °F/+158 °F
IP 67/EMA 4	IP 67/EMA 4
—	—
—	—
276/1, 2	276/1, 2
—	—



Photoelectric sensors OR12

OR12 ES	Through-beam sensors
OR12 ES	Through-beam sensors with reduced interior beam
OR12 RS	Retroreflective sensors
OR12 RT	Diffuse reflective sensors



12 x 12 x 55 mm

Through-beam sensors
6 m (19.7 ft)

12 x 12 x 55 mm

Through-beam sensors
1 m (3.28 ft)

Sensing type	
Sensing distance / range	
	Model description
RIP	
LA	Part number
	Wiring diagram (page/pos)
Stock status: Ex stock/Built to order	
	Model description
RIP	
DA	Part number
	Wiring diagram (page/pos)
Stock status: Ex stock/Built to order	
	Model description
[1] NPN	
LA	Part number
[2] Transmitter	Wiring diagram (page/pos)
Stock status: Ex stock/Built to order	
	Model description
NPN	
DA	Part number
	Wiring diagram (page/pos)
Stock status: Ex stock/Built to order	
Voltage range	
Short-circuit protection	
Output current	max
Switching frequency	max
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min/max
Protection type	
Screw-clamp termination	(page/Pos)
Cable length (2 m)	Cross section (mm ²)
Plug	(page/Pos)
Accessories	(page/Pos)

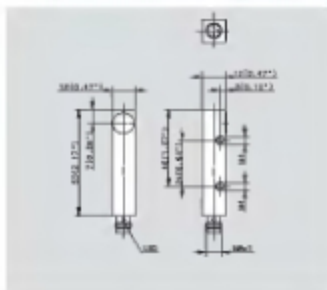
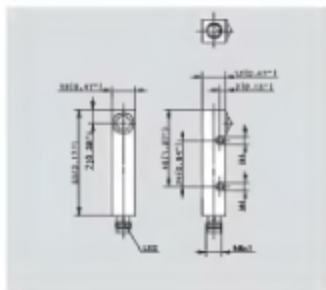
12 x 12 x 55 mm		12 x 12 x 55 mm	
Through-beam sensors		Through-beam sensors	
6 m (19.7 ft)		1 m (3.28 ft)	
	Model description		Model description
	OR12-EE-DHTP-06 0-SL		OR12-EE-DHTP-01 0-SL
	655.1955.001		655.1955.002
	271/4		271/4
●		●	
	OR12-EE-DDTP-06 0-SL		OR12-EE-DDTP-01 0-SL
	655.1755.001		655.1755.002
	271/4		271/4
●		●	
	OR12-SE-DCCS-06 0-SVC		OR12-SE-DCCS-01 0-SVC
	655.1055.002		655.1055.003
	271/3		271/3
●		●	
	OR12-EE-DDTP-06 0-SL		OR12-EE-DDTP-01 0-SL
	655.1955.001		655.1955.002
	271/7		271/7
●		●	
SE: 10–36 V DC	EE: 10–36 V DC	SE: 10–36 V DC	EE: 10–36 V DC
–	●	–	●
–	200 mA	–	200 mA
–	>100 Hz	–	>100 Hz
–/●	●/–	–/●	●/–
–	–	–	–
–	–	–	–
●	●	●	●
–5 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C
+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F
IP 65/NIEMA 12	IP 65/NIEMA 12	IP 65/NIEMA 12	IP 65/NIEMA 12
–	–	–	–
–	–	–	–
276/1, 2, 278	276/1, 2, 278	276/1, 2, 278	276/1, 2, 278
–	273/5	–	273/5

Dimensions

§ Range 10 m and 60 m LASER on request

§ Adjustable sensitivity

All dimensions in mm (inch)





12 x 12 x 65 mm

Retroreflective sensors

4 m (13.1 ft)

OR12 RS-DHTP-
04 0-SL
655.4955.001
271/4
-N

OR12 RS-DDTP-
04 0-SL
655.4755.001
271/4
-N

OR12 RS-DHTP- [1]
04 0-SL
655.4355.001
271/7
-N

OR12 RS-DDTP-
04 0-SL
655.4155.001
271/7
-N

10-36 V DC

●

200 mA

>100 Hz

●/-

●

-

-

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/EMA 12

-

-

276/1, 2, 278

273/5, 274



12 x 12 x 60 mm

Diffuse reflective sensors

200 mm (7.87')

OR12 RT-DHTP-
0200-SLE
655.7955.001
271/4
-N

OR12 RT-DDTP-
0200-SLE
655.7755.001
271/4
-N

OR12 RT-DHTP- [1]
0200-SLE
655.7355.001
271/7
-N

OR12 RT-DDTP-
0200-SLE
655.7155.001
271/7
-N

10-36 V DC

●

200 mA

>100 Hz

●/-

●

-

-

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/EMA 12

-

-

276/1, 2, 278

273/5



12 x 12 x 65 mm

Diffuse reflective sensors

1.2 m (3.94 ft)

OR12 RT-DHTP-
01.2-SLE
655.7955.002
271/4
-N

OR12 RT-DDTP-
01.2-SLE
655.7755.002
271/4
-N

OR12 RT-DHTP- [1]
01.2-SLE
655.7355.002
271/7
-N

OR12 RT-DDTP-
01.2-SLE
655.7155.002
271/7
-N

10-36 V DC

●

200 mA

>100 Hz

●/-

●

-

-

-5 °C/+70 °C

+23 °F/+158 °F

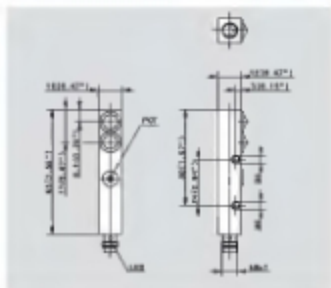
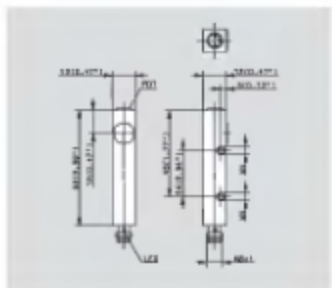
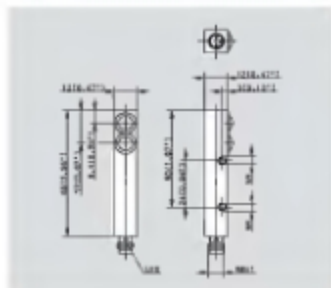
IP 65/EMA 12

-

-

276/1, 2, 278

273/5



Photoelectric sensors OR12

OR12 ES Laser-through-beam sensors
OR12 FF Convergent beam sensor
(Fixed-Focus)



12 x 12 x 55 mm

Laser-through-beam sensors
60 m (197 ft)

12 x 12 x 65 mm

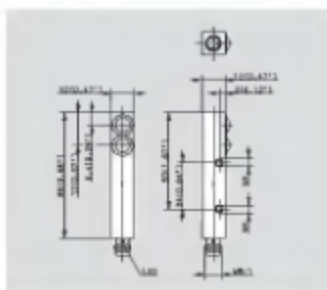
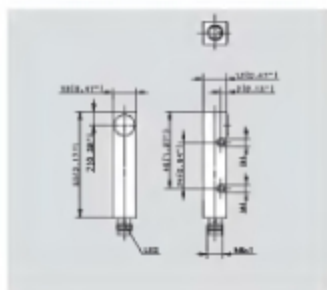
Convergent beam sensor (Fixed-Focus)
50 mm

Sensing type			
Sensing distance / range			
	Model description	-	OR12-EE-DDTP-60-0-SL
RF	Part number		655.1755.005
DA	Wiring diagram (page/pos)		-
Stock status: Ex stock/Built to order			-
	Model description		OR12 FF-EHTP-0050-SL
RF	Part number		655.8955.001
LA	Wiring diagram (page/pos)		27.140
Stock status: Ex stock/Built to order			-
	Model description	OR12 SE-DCOS-60-0-SVC	
Transmitter	Part number		655.1055.004
	Wiring diagram (page/pos)		-
Stock status: Ex stock/Built to order			-

Voltage range	SE: 10-36 V DC	EE: 10-36 V DC	10-36 V DC
Short-circuit protection	-	●	●
Output current	-	55 mA	200 mA
Switching frequency	-	>1000 Hz	>100 Hz
LED for output function/supply voltage/diagnostic	-	●	●
Adjustable sensitivity	-	-	-
Timer function	-	-	-
Diagnostic function	●	-	-
Temperature range	min/max		
	-10 °C/+50 °C	-10 °C/+50 °C	-5 °C/+70 °C
	+14 °F/+122 °F	+14 °F/+122 °F	-
Protection type	IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
Screw-clamp termination	(page/Pos)	-	-
Cable length (2 m)	(mm)	-	-
Plug	(page/Pos)	276/1, 2, 278	276/1, 2, 278
Accessories	(page/Pos)	273/5	273/5

Dimensions

All dimensions in mm (inch)



Photoelectric sensors OR17

Multinorm

OR17 ES	Through-beam sensors
OR17 RT	Diffuse reflective sensors
OR17 PS	Polarised retroreflective sensors



120 x 41.5 x 41.5 mm

Through-beam sensors

25 m (82.0 ft)



120 x 41.5 x 41.5 mm

Diffuse reflective sensors

500 mm (19.7')

Sensing type	
Sensing distance / range	
PNH/NH $\frac{1}{2}$	Model description
Changeover switch	Part number
	Wiring diagram (page/pos)
Stod. status: Ex stod./Built to order	
PNP	Model description
selectable	Part number
	Wiring diagram (page/pos)
Stod. status: Ex stod./Built to order	
NPN	Model description
selectable	Part number
	Wiring diagram (page/pos)
Stod. status: Ex stod./Built to order	
Transmitter	Model description
	Part number
	Wiring diagram (page/pos)
Stod. status: Ex stod./Built to order	
Voltage range	
Short-circuit protection	
Output current	max
Switching frequency	max
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min/max
Protection type	
Shock-damp termination	(page/Pos)
Cable length (2 m)	Cross section (mm ²)
Plug	(page/Pos)
Accessories	(page/Pos)

–	OR17 EE-DPTL-25.0-AHE	OR17 RT-DPTL-0500-AHE $\frac{1}{2}$	–
–	655.1060.001	655.7860.001	–
–	2729	2729	–
–	–	–	–
–	–	–	OR17 RT-DPTL-0500-ACEC
–	–	–	655.7860.001
–	–	–	2724
–	–	–	–
–	–	–	–
–	OR17 SE-0005-25.0-A/C	–	–
–	655.1060.001	–	–
–	2724	–	–
–	–	–	–
SE: 10–60 V DC	EE: 10–60 V DC	10–60 V DC	10–60 V DC
–	●	●	●
–	400 mA	400 mA	400 mA/50 mA ¹⁾
–	>50 Hz	>50 Hz	>50 Hz
–	●/● ¹⁾	●/● ¹⁾	●/● ¹⁾
–	●	●	●
–	–	–	–
–	–	–	–
●	–	–	–
0 °C/+70 °C	0 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C
+32 °F/+158 °F	+32 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F
IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
2724	2729	2729	2724
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–

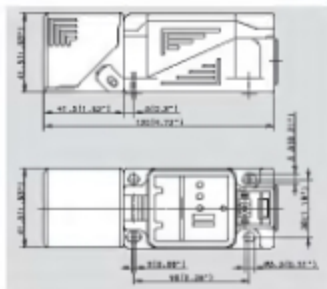
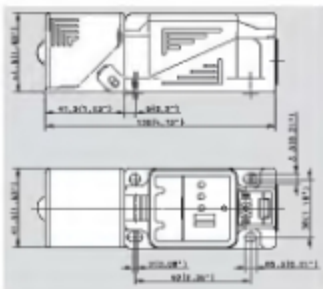
Dimensions

$\frac{1}{2}$ Two integrated DIP switches allow to select between light or dark activation (LADA) and between PNH or PNP

$\frac{1}{2}$ 50 mA output current for activated diagnostic signal

$\frac{1}{2}$ Red LED flashes in unsafe operation mode (e.g. misalignment, diagnostic output (see 2) is static

All dimensions in mm (inch)





120 x 41.5 x 41.5 mm

Diffuse reflective sensors

2 m (6.56 ft)

CR17 FT-DFTU-
02 0-AHE
655.7060.002
272/9

●/●

CR17 FT-DFTP-
02 0-AGEC
655.7860.002
272/4

●/●



120 x 41.5 x 41.5 mm

Polarized retroreflective sensors

8 m (26.2 ft)

CR17 PS-DFTU-
08 0-AHE
655.5060.001
272/9

●/●

CR17 PS-DFTP-
08 0-AGEC
655.5860.001
272/4

●/●

10-60 V DC

●

400 mA

>50 Hz

●/●

●

●

●

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/EMA 12

272/9

●

●

●

10-60 V DC

●

400 mA/50 mA¹⁾

>50 Hz

●/●

●

●

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/EMA 12

272/4

●

●

●

10-60 V DC

●

400 mA

>50 Hz

●/●

●

●

-5 °C/+70 °C

+23 °F/+158 °F

IP 65/EMA 12

272/9

●

●

274

10-60 V DC

●

400 mA/50 mA¹⁾

>50 Hz

●/●

●

●

-5 °C/+70 °C

+23 °F/+158 °F

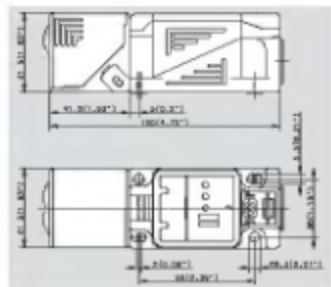
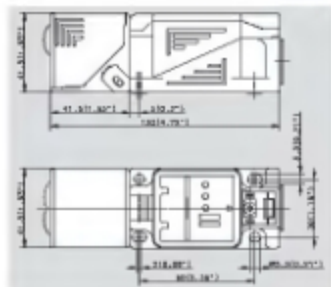
IP 65/EMA 12

272/4

●

●

274



Photoelectric sensors OR20

DC types

OR20 ES	Through-beam sensors
OR20 RS	Retroreflective sensors
OR20 PS	Polarised retroreflective sensors
OR20 RT	Diffuse reflective sensors
OR20 RH	Diffuse reflective sensors with background suppression



Sensing type	
Sensing distance / range	
Model description	
Part number	
Wiring diagram (page/pos)	
Stock status: Ex stock/Built to order	
Model description	
Part number	
Wiring diagram (page/pos)	
Stock status: Ex stock/Built to order	
Model description	
Part number	
Wiring diagram (page/pos)	
Stock status: Ex stock/Built to order	

88 x 63 x 24 mm
Through-beam sensors
20 m (65.6 ft)

88 x 63 x 24 mm
Retroreflective sensors
8 m (26.2 ft)

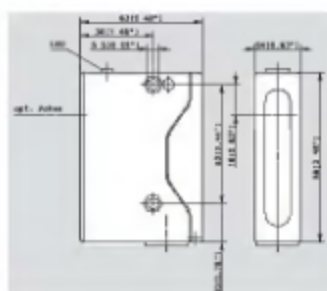
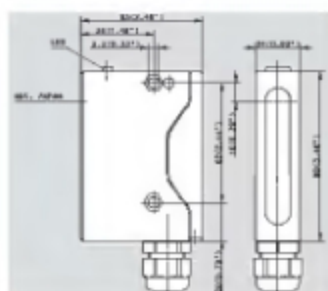
Model description	OR20 EE-DPTP-20 0-ALET	OR20 RS-DPTP-08 0-ALET
Part number	655.1086.003	655.6086.001
Wiring diagram (page/pos)	272/5	272/5
Stock status: Ex stock/Built to order	●	●
Model description	OR20 SE-DCCS-20 0-AV	
Part number	655.1086.003	
Wiring diagram (page/pos)	272/1	
Stock status: Ex stock/Built to order	●	

Stock status: Ex stock/Built to order	
Voltage range	
Short-circuit protection	
Output current	max
Switching frequency	max
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min/max
Protection type	
Screw-clamp termination	(page/Pos)
Cable length (2 m)	(mm/ft)
Plug	(page/Pos)
Accessories	(page/Pos)

SE: 10-36 V DC	EE: 10-36 V DC	RS: 10-36 V DC
-	●	●
-	200 mA	200 mA
-	>100 Hz	>100 Hz
●	●	●
-	●	●
-	-	-
-20 °C/+70 °C	-20 °C/+70 °C	-20 °C/+70 °C
-4 °F/+158 °F	-4 °F/+158 °F	-4 °F/+158 °F
IF 65A/BA 12	IF 65A/BA 12	IF 65A/BA 12
272/1	272/5	272/5
-	-	-
273/2, 3	273/2, 3	273/2, 3, 274

Dimensions

All dimensions in mm (inch)





88 x 63 x 24 mm

Polarised retroreflective sensors

6 m (19.7 ft)

OR20 PS-DFTB-
06-0-ALET
655.5886.001
272/5

➡-
-➡



88 x 63 x 24 mm

Diffuse reflective sensors

600 mm (1.97 ft)

1.5 m (4.92 ft)

OR20 RT-DFTB-
0600-ALET
655.7886.001
272/5

➡-
-➡



88 x 63 x 24 mm

Background suppression

400 mm (1.31 ft)

OR20 RH-DFTB-
0600-ALET
655.8886.002
272/5

➡-
-➡

10–36 V DC

●
200 mA
>100 Hz

➡-
-➡

●
●

●
●

-20 °C/+70 °C

-4 °F/+158 °F

IP 65/EMA 12

272/5

272/2, 3, 274

10–36 V DC

●
200 mA
>100 Hz

➡-
-➡

●
●

●
●

-20 °C/+70 °C

-4 °F/+158 °F

IP 65/EMA 12

272/5

272/2, 3

10–36 V DC

●
200 mA
>100 Hz

➡-
-➡

●
●

●
●

-20 °C/+70 °C

-4 °F/+158 °F

IP 65/EMA 12

272/5

272/2, 3

10–36 V DC

●
200 mA
>100 Hz

➡-
-➡

●
●

●
●

-20 °C/+70 °C

-4 °F/+158 °F

IP 65/EMA 12

272/5

272/2, 3

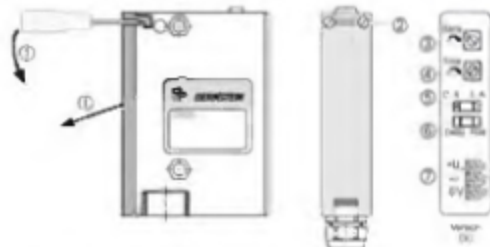
Notes on operation of OR20 series (DC types)

Housing types:

- ① Strap-cover housing (to be opened with screwdriver)
- ② Snap-cap housing (with M 16-cable gland)

Operating elements:

- ① Sensitivity potentiometer
- ② Time potentiometer
- ③ Operation-mode micro switch
- ④ Delay-type micro switch
- ⑤ Connection terminals



Photoelectric sensors OR20

AC/DC types

OR20 ES	Through-beam sensors
OR20 RS	Retroreflective sensors
OR20 PS	Polarised retroreflective sensors
OR20 RT	Diffuse reflective sensors
OR20 RH	Diffuse reflective sensors with background suppression



88 x 63 x 24 mm

Through-beam sensors

20 m (66.2 ft)

88 x 63 x 24 mm

Retroreflective sensors

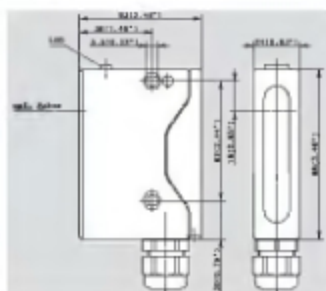
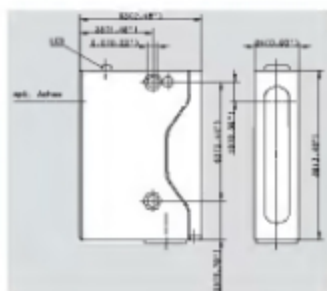
8 m (26.2 ft)

Sensing type	
Sensing distance / range	
Model description	
Relay output	Part number
- Contacts: change-over (1 x)	Wiring diagram (page/pos)
- Switching current 3 A	Storage/deliv. on requ.
- Connection compartment cover with quad. snap release	Model description
	Part number
	Wiring diagram (page/pos)
	Storage/deliv. on requ.
	Model description
Relay output	Part number
- Contacts: change-over (1 x)	Wiring diagram (page/pos)
- Switching current 3 A	Storage/deliv. on requ.
- Connection compartment cover with screws	Model description
- Cable gland	Part number
	Wiring diagram (page/pos)
	Storage/deliv. on requ.
Voltage range	
Short-circuit protection	
Output current	max.
Switching frequency	max.
LED for output function/supply voltage/diagnostic	
Adjustable sensitivity	
Timer function	
Diagnostic function	
Temperature range	min/max.
Protection type	
Screw-clamp termination	(page/pos)
Cable length (2 m)	(mm)
Plug	(page/pos)
Accessories	

CF20 SE-MOOS-20 0-AV	-	-
655.1086.001		
272/1		
☛		
-	CF20 EE-MAPS-20 0-ALET	CF20 FS-MAPS-08 0-ALET
	655.1686.003	655.6086.001
	272/3	272/3
	☛	☛
CF20 SE-MOOS-20 0-AV	-	-
655.1086.002		
272/1		
☛		
-	CF20 EE-MAPS-20 0-ALET	CF20 FS-MAPS-08 0-ALET
	655.1686.004	655.6086.002
	272/3	272/3
	☛	☛
SE: 12-240 V AC/DC	EE: 12-240 V AC/DC	FS: 240 V AC/DC
-	-	-
-	3 A	3 A
-	>50 Hz	>90 Hz
☛	☛	☛
-	●	●
-	●	●
-	-	-
-	-20 °C/+70 °C	-20 °C/+70 °C
-	-4 °F/+158 °F	-4 °F/+158 °F
IP 65/NIH-VA 12	IP 65/NIH-VA 12	IP 65/NIH-VA 12
272/1	272/3	272/3
-	-	-
273/2, 3	273/2, 3	273/2, 3, 274

Dimensions

All dimensions in mm (inch)





88 x 63 x 24 mm

Polarised retroreflective sensors
6 m (19.7 ft)



88 x 63 x 24 mm

Diffuse reflective sensors
600 mm (1.97 ft) 1.5 m (4.92 ft)



88 x 63 x 24 mm

Background suppression
400 mm (1.31 ft)

OR20 PS-MARS-
06 0-ALET
655.5686.001
272/3
●-
-

OR20 RT-MARS-
0600-ALET
655.7686.001
272/3
●-
-

OR20 RT-MARS-
01 5-ALET
655.7686.003
272/3
●-
-

OR20 RH-MARS-
0400-ALET
655.8686.002
272/3
●-
-

OR20 PS-MARS-
06 0-ALET
655.5686.002
272/3
●-
-

-
-

OR20 RT-MARS-
01 5-ALET
655.7686.004
272/3
●-
-

-
-

12-265 V AC/DC
-
3 A
>50 Hz
●-/-
●
●
-20 °C/+70 °C
-4 °F/+158 °F
IP 65/ENEMA 12
272/3
-

12-265 V AC/DC
-
3 A
>50 Hz
●-/-
●
●
-20 °C/+70 °C
-4 °F/+158 °F
IP 65/ENEMA 12
272/3
-

12-265 V AC/DC
-
3 A
>50 Hz
●-/-
●
●
-20 °C/+70 °C
-4 °F/+158 °F
IP 65/ENEMA 12
272/3
-

12-265 V AC/DC
-
3 A
>50 Hz
●-/-
●
●
-20 °C/+70 °C
-4 °F/+158 °F
IP 65/ENEMA 12
272/3
-

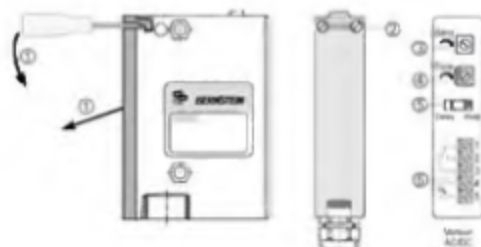
Notes on operation of OR20 series (AC/DC types)

Housing types:

- ① Strap-cover housing (to be opened with screwdriver)
- ② Snap-cap housing (with M 16 cable gland)

Operating elements:

- ① Sensitivity potentiometer
- ② Time potentiometer
- ③ Delay-type micro switch
- ④ Connection terminals



Photoelectric sensors OR90

AC/DC types
AC types
DC types

OR90 ES Through-beam sensors
OR90 RS Retroreflective sensors



85 x 50 x 23 mm

Through-beam sensors

12 m (39.4 ft)

85 x 50 x 23 mm

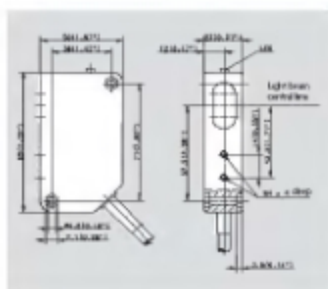
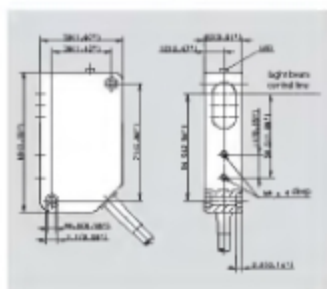
Retroreflective sensors

8 m (26.2 ft)

Sensing type	Model description		
Sensing distance / range	-		
Relay output	-		
- Contacts dangerous (D) / Part number	OR90 EE-AARS-12 0-4L	655.1096.001	OR90 RS-MAFS-08 0-CL
- Switching current I _A / Wiring diagram (page/pos)	272/B		272/B
Stod. status: Ex stod./Built to order	●/-		●/-
Transmitter	CF90 SE-ACCS-12 0-4V		
Part number	655.1096.002		
Wiring diagram (page/pos)	271/2		
Stod. status: Ex stod./Built to order	-/●		
PIF antisolant	-		
Part number	-		
Wiring diagram (page/pos)	-		
Stod. status: Ex stod./Built to order	-		
PIF antisolant	-		
Part number	-		
Wiring diagram (page/pos)	-		
Stod. status: Ex stod./Built to order	-		
MPH antisolant	-		
Part number	-		
Wiring diagram (page/pos)	-		
Stod. status: Ex stod./Built to order	-		
Voltage range	SE: 185-242 V AC	EE: 185-242 V AC	12-245 V AC/DC
Short-circuit protection	-	-	●
Output current	max. 3 A	3 A	200 mA
Switching frequency	max. >50 Hz	>80 Hz	>100 Hz
LED for output function/supply voltage/diagnostic	-/●/-	●/-/-	●/-/-
Adjustable sensitivity	-	-	-
Timer function	-	-	-
Diagnostic function	-	-	-
Temperature range	min/max. 0 °C/+70 °C	0 °C/+70 °C	-20 °C/+70 °C
	+32 °F/+158 °F	+32 °F/+158 °F	-4 °F/+158 °F
Protection type	IP 65/NEMA 12	IP 65/NEMA 12	IP 65/NEMA 12
Screw-clamp termination	(page/Pos)		
Cable length (2 m)	(mm/ft)		
Plug	(page/Pos)		
Accessories	(page/Pos)		
	273/4	273/4	273/4L, 274

Dimensions

All dimensions in mm (inch)



Opto-electronic safety devices

Light barrier OSG 4

Apropos safety

Safety at work is an everyday task – ethically as well as economically. Annually, the number of accidents at work resulting in personal injury (and more than three days sick leave) costs the economy tens of millions of Pounds.

This does not have to be the case. Technological advancement and innovative products now offer a higher level of protection than was ever previously available.

Safety light barriers protect machine and plant operators from accidents. Reliable and safe, i.e. safe from manipulation, but also functionally safe. The safety category type 4 demands full internal monitoring. So that even when a piece of equipment malfunctions, the machine receives a stop command and personnel remain protected.

Non-contact transmitters

The best safety environment is of no value if it obstructs the personnel. On one hand, it disrupts operating procedures, therefore reducing efficiency, and even worse, operators are tempted to remove the obstruction which means trying to outwit or manipulate the safety device.

Safety light barriers operate contact-free. An encroachment into the protected area initiates the stop signal for the machine or plant. The OSG-4 from BERNSTEIN reacts to an object larger than 14 mm or 29 mm. This represents finger protection or hand protection (just one finger or one hand initiates the stop signal). This means that the safety light barrier initiates the stop signal so effectively that (bearing in mind the machines run-down time) very short distances between the safety light barrier and points of hazard are possible.



High resolution, therefore finger protection is achieved

Transistor-output or relay?

The OSG-4 safety light barriers are available with relay or transistor outputs. The safety relays (positive break contacts) are mounted in a robust, industrial enclosure measuring 54 x 57 mm. These can then directly trigger the power contactors of a machine.

The semi-conductor outputs deliver signals which are reliably recognised by a PLC.



Despite small dimensions: relay outputs are possible



Picture left: Safety provisions for a production conveyor at an automobile manufacturer by means of a safety light barrier

Dialogue modules

LEDs on the OSG-4 indicate the actual operating function (output active, output passive and waiting for start command).



Alphanumeric display and LEDs for clear communication

An alphanumeric display (four digit) aids in problem solving, e.g. indicates rising levels of contamination, helps the technician when making alignment adjustments (without additional tools such as laser-alignment equipment) and by helping to identify faults.

It also serves as a display for entering a password when making changes to the settings.

Adjustment buttons

Two push-buttons (protection class IP 65) allow individual configuration of the safety equipment (e.g. safety mode with or without restart protection, with or without – external – safety control).

Safety-relevant settings can be password protected.



Saves time: PC diagnostics via RS-485 interface

Diagnostics

The RS 485 interface enables diagnostics and configuration with the aid of a PC.

Muting controller

It is not always desirable that safety equipment simply stops plant or machinery without pre-conditions. In many cases, it is often necessary that the machine is continually supplied with material without stopping the production process. Depending on certain circumstances, the material may have to pass through the sensor field of the safety light barrier (protected field).

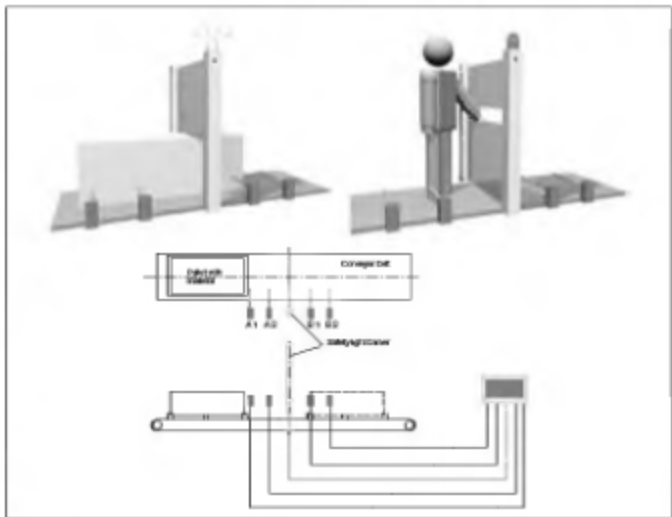
The task is therefore to distinguish between man and material. This distinction is achieved by the appropriate installation of either optical, inductive or capacitive sensors or mechanical limit switches, and allowing the muting controller to logically interpret their signals.

Should material be detected by this device, it short-circuits ("mutes") the OSG-4 safety light barrier using a relay controller. The detection of, for example, pallets can be achieved by using mechanical limit switches or sensors from the BERNSTEIN product range.

The safety light barrier is not in operation during the muting process. This reduction to the operators safety must be indicated by a supervised, clearly visible warning light (external short-circuit indication)



Extended features thanks to muting controller



Distinction between man and material thanks to logical interpretation of sensor information

Light barrier OSG 4

Protection at points of hazard...

...the classical application for a safety light barrier. The operator has to be protected against being able to reach a point of danger with his hands – if there is the possibility of injury.

A mechanical protection device is not always practicable, because it can hinder the production process.

Conventional two-handed operation can prevent the operator from causing injury to himself during hazardous machine-movements. Should he let go of the switches, the machine stops. Accident prevention is guaranteed. However, during machine operation, the operator cannot carry out any additional tasks.

Operation can be greatly simplified, if it is sufficient to take the hands out of the hazard zone in order to press the start button – and the danger point in question is secured by opto-electronic safety equipment.



Short installation distances thanks to high resolution

Muting controller

Type	Voltage	Part number
Muting controller	24 V DC	656.2322.001
	24 V AC	656.2322.002
	230 V AC	656.2322.003
	115 V AC	656.2322.004

Securing hazardous areas...

...that are to be periodically entered – if (contrary to access control) valuable space is to be saved.



Helps save space by securing hazardous areas

With and without restart protection

The OSG-4 safety light barrier can be used with or without restart protection. A light barrier normally works in "automatic mode", i.e. when just one light beam is interrupted, the output is deactivated. The device goes to "red". Should the protected area be given free, the output is reactivated or the relays are made. The device "goes to green".

Safety light barrier, 14 mm, Range 0.35... 6 m

Type	Protected field height	Part number
Fail-safe output	mm	
OSG 4-14 ES-06-0254-DPA	254	654.1323.001
OSG 4-14 ES-06-0374-DPA	374	654.1323.002
OSG 4-14 ES-06-0494-DPA	494	654.1323.003
OSG 4-14 ES-06-0614-DPA	614	654.1323.004
OSG 4-14 ES-06-0734-DPA	734	654.1323.005
OSG 4-14 ES-06-0854-DPA	854	654.1323.006
OSG 4-14 ES-06-0974-DPA	974	654.1323.007
OSG 4-14 ES-06-1094-DPA	1094	654.1323.008
OSG 4-14 ES-06-1214-DPA	1214	654.1323.009
OSG 4-14 ES-06-1334-DPA	1334	654.1323.010
OSG 4-14 ES-06-1454-DPA	1454	654.1323.011
Transistor output		
OSG 4-14 ES-06-0254-DPA	254	654.1321.001
OSG 4-14 ES-06-0374-DPA	374	654.1321.002
OSG 4-14 ES-06-0494-DPA	494	654.1321.003
OSG 4-14 ES-06-0614-DPA	614	654.1321.004
OSG 4-14 ES-06-0734-DPA	734	654.1321.005
OSG 4-14 ES-06-0854-DPA	854	654.1321.006
OSG 4-14 ES-06-0974-DPA	974	654.1321.007
OSG 4-14 ES-06-1094-DPA	1094	654.1321.008
OSG 4-14 ES-06-1214-DPA	1214	654.1321.009
OSG 4-14 ES-06-1334-DPA	1334	654.1321.010
OSG 4-14 ES-06-1454-DPA	1454	654.1321.011

The OSG-4 safety light barrier can be set to operate in this way – however, it doesn't have to be. Besides automatic activation, there is also the manual mode. In this case, the device operates with start-up and restart protection.

The machine can only be started (when the hazard area is free) by pressing a push-button (start-up protection) if the safety light barrier halts the machine (because of an encroachment into the hazard area), then it remains in this status until the hazard area is free. The device can only be set to "green" by pressing a push-button (restart protection).

Availability...

...is an important criterion for industrial production. No company can afford to have its production stopped for no apparent reason. Modern safety light barriers have to be able to cope with disruptive conditions in the working environment. The OSG-4 complies with all EMC regulations, is protected against foreign light sources and can also not be influenced by stroboscope or welding sparks.

This is achieved by "double scanning".

Safety light barrier, 29 mm, Range 0.5... 9 m

Type	Protected field height	Part number
Fail-safe output	mm	
OSG 4-29 ES-09-0509-DPA	509	654.2323.001
OSG 4-29 ES-09-0749-DPA	749	654.2323.002
OSG 4-29 ES-09-0989-DPA	989	654.2323.003
OSG 4-29 ES-09-1229-DPA	1229	654.2323.004
OSG 4-29 ES-09-1469-DPA	1469	654.2323.005
OSG 4-29 ES-09-1709-DPA	1709	654.2323.006
OSG 4-29 ES-09-1949-DPA	1949	654.2323.007
Transistor output		
OSG 4-29 ES-09-0509-DPA	509	654.2321.001
OSG 4-29 ES-09-0749-DPA	749	654.2321.002
OSG 4-29 ES-09-0989-DPA	989	654.2321.003
OSG 4-29 ES-09-1229-DPA	1229	654.2321.004
OSG 4-29 ES-09-1469-DPA	1469	654.2321.005
OSG 4-29 ES-09-1709-DPA	1709	654.2321.006
OSG 4-29 ES-09-1949-DPA	1949	654.2321.007

Easy mounting

Attachment brackets are supplied with the safety light barrier. These allow four possible 90° angles of rotation, fine adjustment of $\pm 5^\circ$ possible within these settings.

A coding screw inserted into the attachment bracket ensures that the device's alignment is maintained even when a new device is fitted. Re-adjustment is not necessary.

An additional method of mounting is provided by the T-slot in the enclosure which can be used to fit sliding nuts.



The attachment bracket provides universal mounting options. Patent: the mechanical alignment tool for quick replacement of devices

Appropos maintenance

All devices from BERNSTEIN are of course designed to industrial standards and undergo strict quality controls during manufacturing. This does not protect the devices from harsh, everyday industrial conditions. Therefore, the front cover can be replaced without having to undo screws, each individual optical module can be replaced with ease and the plug-in terminal blocks in the connection compartment make device replacement straight forward.



Huggable terminal blocks enable devices to be replaced in just seconds

Protection control, test input, alarm-output

The receiver unit has an input terminal which can monitor, when required, the correct operation of both positively-breaking power contactors, e.g. if the contacts weld shut. This function also checks the relay's response time.

Although the OSG-4 is a self-checking device, a complete systems check can be initiated through a test-signal from the sender unit.

Alarm outputs signal to remote monitoring points when the light barrier's light reserve is too low due to contamination and cleaning is necessary.



For maintenance purposes, the optical modules are easy to dismount

Technical data

	OSG 4-14...DPA	OSG 4-14...DRA	OSG 4-29...DPA	OSG 4-29...DRA
Resolution	14 mm	14 mm	29 mm	29 mm
Protected field, height (dep. on type)	254 ... 1454 mm	254 ... 1454 mm	509 ... 1549 mm	509 ... 1549 mm
Protected field, width	0,35 ... 6 m	0,35 ... 6 m	0,5 ... 9 m	0,5 ... 9 m
Output	transistor	relay	transistor	relay
Output power	1 A / 24 V DC	2 ... 4 A / 24 ... 250 V AC	1 A / 24 V DC	2 ... 4 A / 24 ... 250 V AC
Response time (dep. on type)	15-53 ms	28-86 ms	15-30 ms	28-51 ms
Galvanic isolation	—	●	—	●
Output status indicator	●	1 NC	—	1 NC
Operation			Start and restart protection	
Supply voltage			24 V DC	
Contamination signal output			●	
Protection class			type 4 (self checking)	
Protection type			IP 65	
Test input			●	
Communication connection			RS 485	
Connection			pluggable terminal block	
Cable input			Pg 13.5	

Light barriers

OSS 2 and OSS 4



Opto-electronic protective equipment from BERNSTEIN safely and reliably protects the operator against workplace injuries that occur in dangerous installations and systems.

An EC-type examination certificate was issued for the light barriers by the Experts Committees for Iron and Metal III, the Workers Compensation Board (Berufsgenossenschaft), the Examination and Certification Body (Prüf- und Zertifizierungsstelle).

Examination basis: Council Directive 98/37/EC, EN 61496-1 issued 02.1998 and IEC 61496-2 issued 44/208/FDIS 11.1997

The main fields of use for the light barriers OSS2 and OSS4 are:

- Protective equipment for operating personnel on machines and installations
- Protection of the working area of a robot, entire production lines or of loading and handling systems, storage and feeding systems, paletting and depalleting, pallet and packaging installations ...
- Protection of entrances
- Building a safety area
- Additional protection with light barriers
- Prevention of collisions

The light barriers are divided into two categories: commensurate with the risk analysis of a machine or installation, light barriers type 2 from the OSS2 range or light barriers type 4 from the OSS4 range may be required.

OSS2

Light barrier type 2 consisting of a control device OSS2, a transmitter OSS2-01SE and a receiver OSS2-01EE

Functions

Two independent safety relays with positively driven contacts
Both contacts are open if the IR beam is interrupted.

Two different means of restarting after the IR beam is again intact

Possibility of programming wiring on the control device

Automatic restart

The outputs are closed once the IR beam is again intact.

Restart protection

The contacts remain closed after first being turned on as well as whenever the IR beam is intact.

This function is also named 'manual release'.

The release is realised through an external start button.

OSS4

Light barrier type 4, consisting of a transmitter and a receiver, placed together in one delivery unit OSS4-01ES

Possibility of selecting a variety of devices upon ordering

Light barrier OSS2

Type 2 according to EN 61496-1

EC-type examination certificate
EN 61496-1/IEC 61496-2
BG Iron and Metal III
No. 01 021



Technical Data			
Supply voltage	24 VDC, 24 VAC, 115 VAC, 230 VAC		
Output	Two safety relays with positively driven contacts, contact rating (resistive load) max 2A, 250 VAC		
Temperature range	Operating temperature -10 °C ... +50 °C Storage temperature -25 °C ... +85 °C		
Response time	≤ 40 ms		
Sensing distance	max. 20 m		
Protection class	Control device IP 20 Transmitter and receiver: plug connection IP 65, cable connection IP 67		
Dimensions	Control device 75 x 100 x 110 mm Transmitter and receiver 80 x 89 x 25.4 mm		
Designation			
Transmitter	Cable connection area	Designation	Part number
Transmitter	plug M12	OSS2-01SE-20-0000-FB	654.6101.001
		OSS2-01SE-20-0000-PS	654.6101.002
Receiver	Cable connection area	Designation	Part number
Receiver	plug M12	OSS2-01EE-20-0000-FB	654.6201.001
		OSS2-01EE-20-0000-PS	654.6201.002
Control device		Designation	Part number
		Control device OSS2 24 VAC	656.2322.006
		Control device OSS2 115 VAC	656.2322.008
		Control device OSS2 230 VAC	656.2322.007
		Control device OSS2 24 VDC	656.2322.005

Light barrier OSS4

Type 4 according to EN 61496-1

EC type examination certificate
EN 61496-1/EC 61496-2
BG Iron and Metal III
No. 01 019 and 01 020



Technical data	
Supply voltage	24 VDC, 24 VAC, 110 VAC, 230 VAC
Output	Two safety relays with positively driven contacts, contact rating (resistive load) max 2A, 250 VAC
Temperature range	Operating temperature -20 °C ... +50 °C Storage temperature -25 °C ... +85 °C
Response time	35 ms
Sensing distance	max. 40 m
Protection class	Transmitter and receiver IP 65
Dimensions	Transmitter 78 x 104 x 211 mm Receiver 78 x 104 x 219 mm

Light barrier with automatic restart

Supply voltage	Designation	Part number
24 V AC	OSS4-01ES-40-AUTO-ARS	654 6313.001
48 V AC	OSS4-01ES-40-AUTO-ARS	654 6313.002
110 V AC	OSS4-01ES-40-AUTO-ARS	654 6313.003
230 V AC	OSS4-01ES-40-AUTO-ARS	654 6313.004
24 V DC	OSS4-01ES-40-AUTO-DRS	654 6323.001

Light barrier with restart protection/manual release

Supply voltage	Designation	Part number
24 V AC	OSS4-01ES-40-MANU-ARS	654 6313.005
48 V AC	OSS4-01ES-40-MANU-ARS	654 6313.006
110 V AC	OSS4-01ES-40-MANU-ARS	654 6313.007
230 V AC	OSS4-01ES-40-MANU-ARS	654 6313.008
24 V DC	OSS4-01ES-40-MANU-DRS	654 6323.002

Safety magnetic controller

General table



Designation	MUZ-102/24	MUZ-102/24-UM	MUZ-102/24-FL	MUZ-202/24-FL	MUZ-202/24-UM
Part number	639 2701 006	639 2701 010	639 2701 306	639 2702 307	639 2702 301
Operating data	AC 230 V	–	–	–	–
	AC 24 V	●	–	–	–
	DC 24 V	–	●	●	●
Division into safety category	Safety category I	■	■	■	■
	Safety category II	■	■	■	■
	Safety category III	■	■	■	■
	Safety category IV	●	●	–	–
Approval	● BIA	● BA	● 10v	● 10V	–
BA-risk evaluated	–	–	–	–	●
BE-risk evaluated	–	–	–	–	–
Max. connectable Sensor units					
	1 Sensor (switch)	●	●	■	■
	2 Sensor (switch)	–	–	●	●
	6 Sensor (switch)	–	–	–	–
Suitable sensor units					
Magnet TIC-42-CD	●	●	–	–	–
Switch MAK-4237	–	–	–	–	–
Magnet TIC-42-CD	–	–	●	●	●
Switch MAK-4236	–	–	–	–	–
Magnet TIC-52-CD	–	–	●	●	●
Switch MAK-5236	–	–	–	–	–
Magnet TIC-43-CD	–	–	●	●	●
Switch MAK-5336	–	–	–	–	–

● normal category for the risk level
 ■ possible application (possibly over-qualified)



MÜZ-602/D24-UM
639.2706.302

MÜZ-202/024
639.2702.008

MÜZ-202/230
639.2702.007

MÜZ-602/024
639.2706.005

MÜZ-602/230
639.2706.001

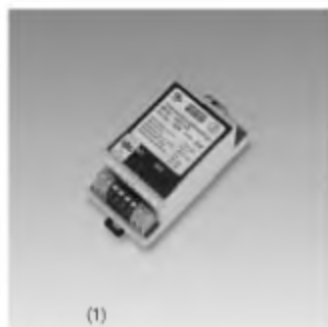
-	-	●	-	●
-	●	-	●	-
●	●	-	●	-
#	●	●	●	●
#	-	-	-	-
●	-	-	-	-
-	-	-	-	-
-	-	-	-	-
●	-	-	-	-
-	●	●	●	●
#	#	#	#	#
#	●	●	#	#
●	-	-	●	●
-	-	-	-	-

●	●	●	●	●
●	●	●	●	●
●	●	●	●	●
●	●	●	●	●

Safety magnetic controller

According to VDE 0660 Part 209

BIA-certified
System type 4
consists of
magnetic monitoring system (1)
coded magnet (2)
coded magnetic switch (3)



(1)



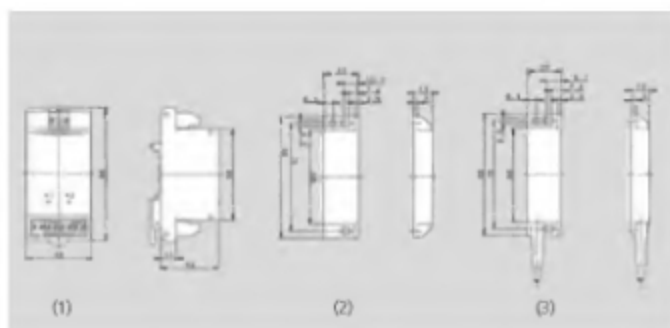
(2)

(3)

Model description	MJZ-102/24	TK-42-CD	MAK-4237-3
Part number	639.2701.006	640.2042.015	649.0742.008
Max. connectable sensor units	1	-	-
Normally-open contact	●	-	-
Combined normally-open/normally-closed contact	-	-	●
Changeover contact	-	-	-
Operating voltage			
AC 230 V	-	-	-
AC 24 V	●	-	-
DC 24 V	-	-	-
Input current	0.1 A	-	-
Switching capacity, safety contact			
Switching voltage	max. AC 250 V	-	DC 30 V
Switching current	max. 5 A	-	-
Switching capacity	max. 1500 VA	-	250 mW
LED: Status of hazard/switching status	●/●	-	-
Relay: forced disconnect/standard	●/-	-	-
Ambient conditions			
Temperature range	min./max. 0 °C/+55 °C 32 °F/+131 °F	-20 °C/+70 °C -4 °F/+158 °F	-20 °C/+70 °C -4 °F/+158 °F
Protection type (according to DIN 40050)	IP 20	IP 67	IP 67
Humidity class (according to DIN 40040)	E	-	-
Housing material	FR 6.6	FR 6.6	FR 6.6
Attachment option	T5 35 (DIN 50022)	M 4	M 4
Connection type: terminal block/cable	max. 2.5 mm ²	-	-4 x 0.25 mm ²
Connection diagram (page 105)	212/1	-	-
Sensing distance	S on min	-	3 mm
	S off max	-	14 mm
Approvals	BSA/SLA	BSA/SLA	BSA/SLA
Stock status: Ex stock/Built to order	●/-	●/-	●/-

All dimensions in mm

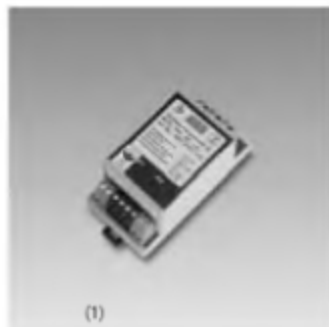
All sensor units refer to the standard cable length of 3 m



(1)

(2)

(3)



(1)



(2) (3)

MUZ-102244UM	TK-42-CD	MAK-4237-3
639.2201.030	640.2042.015	649.0742.008

1	-	-
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•	-	-
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-	-	-
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0.1 A	-	-
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-	-	-
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AC 250 V	-	DC 30 V
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8 A	-	-
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1500 VA	-	250 mW
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•	-	-
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•-	-	-
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-	-	-
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0 °C/+55 °C	-20 °C/+70 °C	-20 °C/+70 °C
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32 °F/+131 °F	-4 °F/+158 °F	-4 °F/+158 °F
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IP 20	IP 67	IP 67
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E	-	-
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PA 6.6	PA 6.6	PA 6.6
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TS 35 (DIN 50022)	M 4	M 4
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max. 2.5 mm ²	-	-4 x 0.25 mm ²
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212/2	-	-
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-	-	3 mm
---	---	------

-	-	14 mm
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BA/S/A	BA/S/A	BA/S/A
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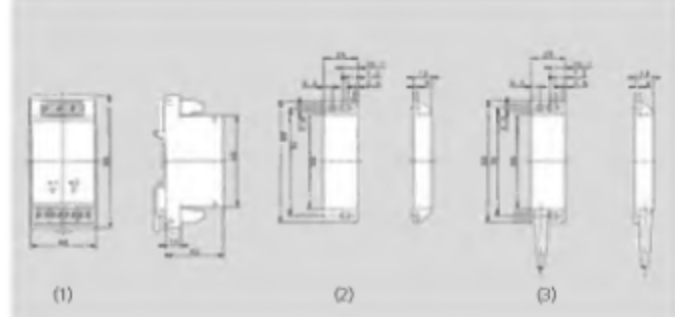
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(1)

(2)

(3)

Safety magnetic controller

TUV certified

System type 3
according to EN 954-1
in safety category 3

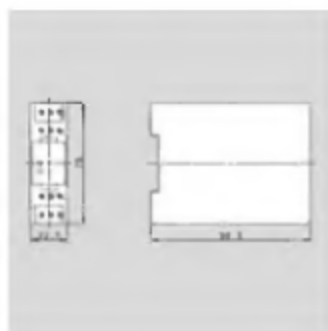
Single fault tolerance S to IEC 60947-5-3



Designation	MUZ-102/024-FL-0A	MUZ-20/2024-FL
Part number	639.2701.306	639.2702.307
Max. connectable sensor units	1	2
safety output, N.O.	●	●
Feedback circuit	●	—
Data output, N.C.	●	—
Operating voltage		
AC 230 V	—*	—*
AC 24 V	—	—
DC 24 V	●	●
Input current	60 mA	60 mA
Switching capacity, safety contact		
Switching voltage	max. AC 250 V	AC 250 V
Switching current	max. 8 A	8 A
Switching capacity	max. 1700 VA	1700 VA
LED: Status of hazard/switching status	●/—	●/—
LED: supply voltage	●	—
Relay: forced disconnection/standard	●/—	●/—
Ambient conditions		
Temperature range	min./max. 0 °C/+55 °C 32 °F/+131 °F	0 °C/+55 °C 32 °F/+131 °F
Protection class (according to IEC 529, EN 60529)	IP 20	IP 20
Housing material	PC	PC
Attachment option (DIN 50022)	T5 3S	T5 3S
Connection type: terminal block	max. 2.5 mm ² 212/7	max. 2.5 mm ² 212/8
Applicable sensor units see page 203		
Delivery: ex-stock/built to order	●/—	●/—

All dimensions in mm

* By using separate power supply (housing with same width 22.5 mm), available on request



Coded magnetic switches

3 m PVC cable	
Designation	
Part number	
Delivery: ex-stock/built to order	
Ambient conditions	
Temperature range	min./max.
Protection type (according to IEC 529, EN 60529)	
Housing material	
Sensing distance	S on min. S off max.
Operating magnet	
Designation	
Part number	
to be used MUZ	
Part number	

All dimensions in mm

Other versions available on request



MAK-4236-3
649.0642.315



MAK-5236-3
609.0452.316



MAK-5336-3
609.0653.317



-5 °C/+70 °C
+23 °F/+158 °C
IP 67
FR 6.6
4 mm
14 mm

-5 °C/+70 °C
+23 °F/+158 °C
IP 67
PET
3 mm
14 mm

-5 °C/+70 °C
+23 °F/+158 °C
IP 67
FR 6.6
3 mm
14 mm

TK-40-CD
640.2042.310

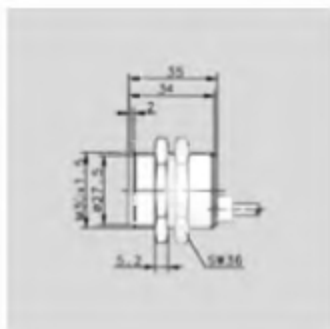
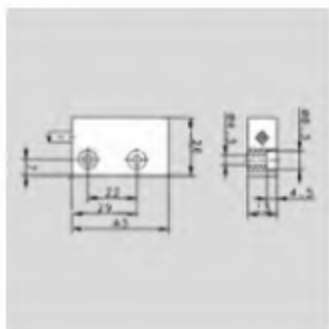
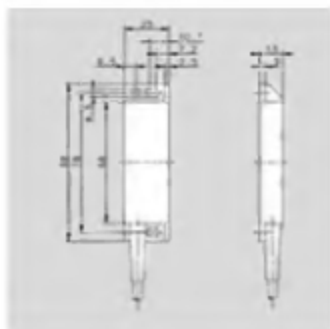
639.2701.306
639.2702.307

TK-52-CD/2
640.2052.311

639.2701.306
639.2702.307

TK-43-CD
640.2043.312

639.2701.306
639.2702.307



Safety magnetic controller

BIA risk-evaluated

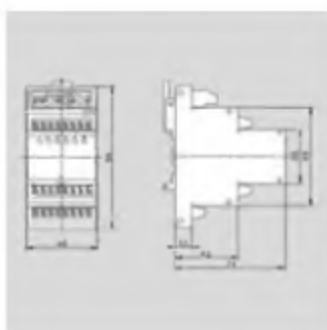
System type 3
according to EN 954-1
in safety category 3



Designation	MJZ-202/D24-UM	MJZ-602/D24-UM
Part number	639.2702.301	639.2706.302
Max. connectable sensor units	2	6
Normally-open contact	-	-
Combined normally-open/normally-closed contact	-	-
Changeover contact	●	●
Operating voltage		
AC 230 V	-	-
AC 24 V	-	-
DC 24 V	●	●
Input current	0.1 A	0.1 A
Switching capacity, safety contact		
Switching voltage	max. AC 250 V	AC 250 V
Switching current	max. 8 A	8 A
Switching capacity	max. 1700 VA	1700 VA
LED: Status of hazard/switching status	●/-	●/-
Relay: forced disconnect/standard	●/-	●/-
Ambient conditions		
Temperature range	min./max. 0°C/+55°C 32°F/+131°F	0°C/+55°C 32°F/+131°F
Protection class (according to DIN 40050)	IP 20	IP 20
Housing material	FR 6.6	FR 6.6
Attachment option (DIN 50022)	TS 35	TS 35
Connection type: terminal block	max. 2.5 mm ² 212/3	max. 2.5 mm ² 212A
Applicable sensor units		
Switch	MAK-xx36	MAK-xx36
Magnet	TK-xx-CD	TK-xx-CD
see page	210-211	210-211
Approvals		
BIA risk-evaluated in safety category	II	II
Delivery: in stock/built to order	●/-	●/-

All dimensions in mm

Other versions available on request



Safety magnetic controller

Bernstein risk-evaluated

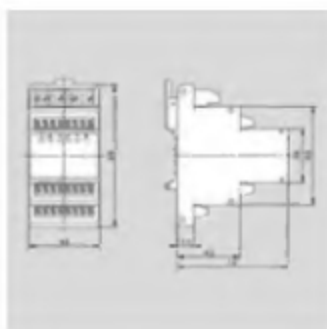
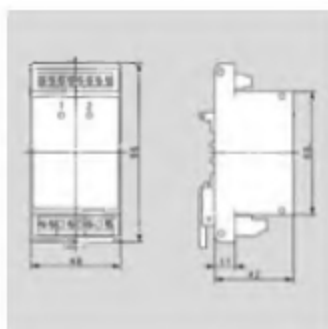
System type 1
according to EN 954-1
in safety category 1



Designation	MLU-202/024	MLU-202/230	MLU-602/024	MLU-602/230
Part number	639.2702.008	639.2702.007	639.2706.005	639.2706.001
Max. connectable sensor units	2	2	6	6
Normally-open contact	—	—	—	—
Combined normally-open/normally-closed contact	—	—	—	—
Changeover contact	●	●	●	●
Operating voltage				
AC 230 V	—	●	—	●
AC 24 V	● AC/DC universal	—	● AC/DC universal	—
DC 24 V	●	—	●	—
Input current	0.1 A	0.1 A	0.1 A	0.1 A
Switching capacity, safety contact				
Switching voltage	max. AC 250 V/DC 30 V	AC 250 V/DC 30 V	AC 250 V/DC 30 V	AC 250 V/DC 30 V
Switching current	max. 15 A	15 A	15 A	15 A
Switching capacity	max. 2000 VA/150 W	2000 VA/150 W	2000 VA/150 W	2000 VA/150 W
LED: Status of hazard/switching status	●—	●—	●—	●—
Relay: forced disconnection/standard	—●	—●	—●	—●
Ambient conditions				
Temperature range	min/max –25 °C/+55 °C –13 °F/+131 °F	–25 °C/+55 °C –13 °F/+131 °F	–25 °C/+55 °C –13 °F/+131 °F	–25 °C/+55 °C –13 °F/+131 °F
Protection class (according to DIN 40050)	IP 20	IP 20	IP 20	IP 20
Housing material	PA 6.6	PA 6.6	PA 6.6	PA 6.6
Attachment option (DIN 50022)	TS 35	TS 35	TS 35	TS 35
Connection type: terminal bloc	max. 2.5 mm ² 212/5	max. 2.5 mm ² 212/6	max. 2.5 mm ² 212/9	max. 2.5 mm ² 212/10
Applicable sensor units				
Switch	MFK-xx36	MFK-xx36	MFK-xx36	MFK-xx36
Magnet	TK-xx-CD	TK-xx-CD	TK-xx-CD	TK-xx-CD
see page	210–211	210–211	210–211	210–211
Approvals				
EE-risk-evaluated in safety category	I	I	I	I
Delivery: ex-stock/built to order	●—	●—	●—	●—

All dimensions in mm

Other versions available on request



Coded switches



3 m PVC cable

Designation

Part number

Delivery as stock/built to order

6 m PVC cable

Designation

Part number

Delivery as stock/built to order

9 m PVC cable

Designation

Part number

Delivery as stock/built to order

Plug RD 6.5 mm/4 poles

Designation

Part number

Delivery as stock/built to order

Switching capacity

Operating voltage

Switching capacity

Ambient conditions

Temperature range

Protection class (according to IEC 529, EN 60529)

Housing material

Sensing distance

S on

S off

min

max

Operating magnet

Designation

Part number

To be used MUX

See page

Other versions available on request

SW wrench size

MAK-4236-3

649 0642 301

MAK-5236-3

649 0652 306

MAK-4236-6

649 0642 302

MAK-5236-6

649 0652 307

MAK-4236-9

649 0642 303

MAK-5236-9

649 0652 308

MAK-4236-STK

649 0642 305

MAK-5236-STK

649 0652 309

DC 30 V

250 mW

-5 °C/+70 °C

+23 °F/+158 °C

IP 67

FR 6.6

5 mm

8 mm

3 mm

14 mm

16 mm

TK-42-CD

TK-42-CD-918

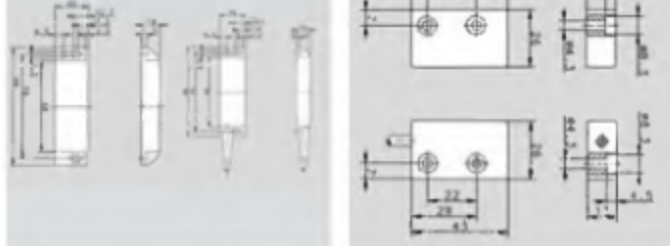
TK-52-CDV2

208-209

208-209

208-209

208-209



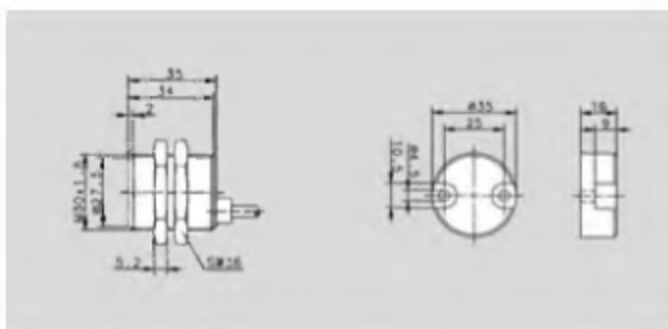
Coded switches



3 m PVC cable		
Designation		MAK-5336-3
Part number		649.0653.310
Delivery	ex-stock/built to order	●/-
6 m PVC cable		
Designation		MAK-5336-6
Part number		649.0653.311
Delivery	ex-stock/built to order	●/-
9 m PVC cable		
Designation		MAK-5336-9
Part number		649.0653.312
Delivery	ex-stock/built to order	●/-
Plug M 12/4 poles		
Designation		MAK-5336-STK
Part number		649.0653.313
Delivery	ex-stock/built to order	●/-
Switching capacity		
Operating voltage	max	DC 30 V
Switching capacity	max	250 mW
Ambient conditions		
Temperature range	min/max	-5 °C/470 °C +23 °F/4150 °C
Protection class (according to IEC 529, EN 60529)		IP 67
Housing material		PA 6.6
Sensing distance	S on	min 3 mm
	S off	max 10 mm
Operating magnet		
Designation		TK-43-CD
Part number		640.2043.025
To be used M12		
see page		208-209

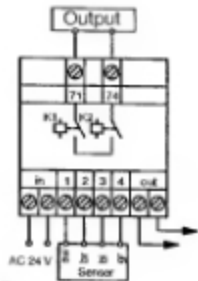
All dimensions in mm

Other versions available on request.

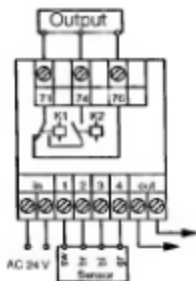


Magnetic switch Monitoring relays

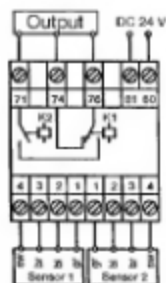
Wiring diagrams



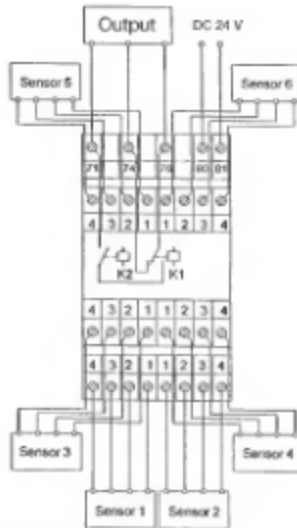
① MÜZ-102



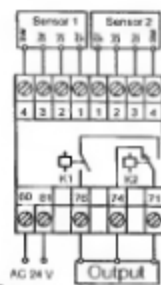
② MÜZ-102Um



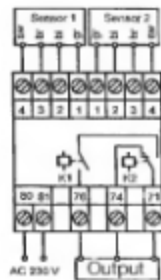
③ MÜZ-202Um



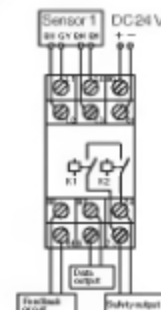
④ MÜZ-602Um



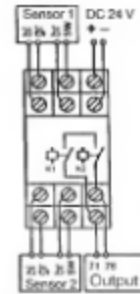
⑤ MÜZ-202



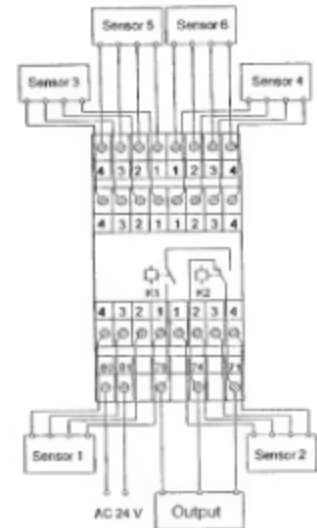
⑥ MÜZ-202



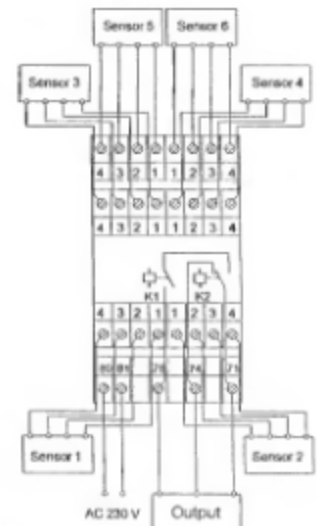
⑦ MÜZ-102FI



⑧ MÜZ-202FI



⑨ MÜZ-602



⑩ MÜZ-602

Table of contents

Magnetic switches – General features			Page 215
Electromechanical magnetic switches	Page 216	Electronical magnetic switches	Page 226
- Selection aid cylindrical and metric housing	Page 218	- Selection aid cylindrical and rectangular housings	Page 227
- Selection aid rectangular housing	Page 221		

Overview

Electromechanical magnetic switches

Cylindrical and metric housings



Page 219

Rectangular housings



Page 222

Overview

Electronic magnetic switches

Cylindrical and metric housings



Page 228

Rectangular housings



Page 229

Magnets

Page 232

Accessories

- Overview magnets	Page 234
- Mounting brackets	Page 238
- Connecteurs	Page 239
Output diagrams	Page 223
Dimension diagrams/Magnetic switches	Page 230
Model code	Page 232
Wiring diagrams	Page 224

Magnetic switches – General features

Electromechanical and electronic models

BERNSTEIN has extended its range of electromechanical magnetic switches with electronic versions which operate according to the Hall and magnetoresistive principle.

Electromechanical and electronic magnetic switches have special properties which ensure optimal use in their respective environments.

The electronic versions are characterised by their improved mechanical characteristics (high resistance to vibration, shock or impact) and are absolutely wear-free.

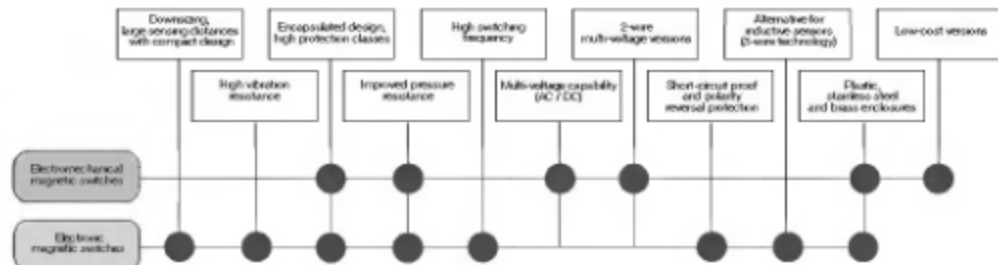
The traditional electromechanical switches have a very high operational reliability thanks to the use of only one single "active" component (reed contact). The multi-voltage capability and low procurement costs allow these switches to be used in a wide range of applications.

The matrix below highlights the main features for each principle of function and helps you to decide on which magnetic switch to use for your application.



Technical features and fields of use

More detailed information about the technical features and fields of use for the two principles of function is available in the following chapters.



Electromechanical magnetic switches

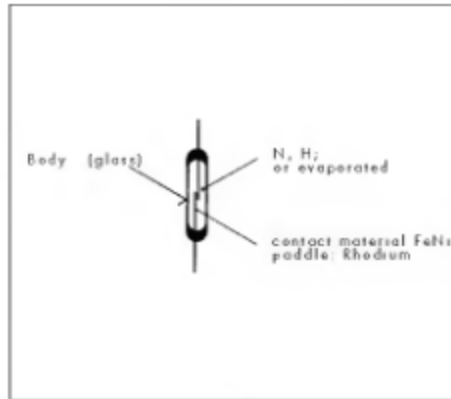
Bernstein magnetic switches – the advantages

- reliability even under extreme ambient conditions. They are unaffected by dirt, humidity, gases, dust, etc. and operate completely free from wear and tear
- IP 67 protection
- repeatable switching point precision of approx. 0.1 mm
- may be operated from several directions
- can be mounted in any position
- electromechanical magnetic switches normally contain only a single component, thus ensuring high reliability
- easy to mount
- long electrical life (> 10⁸ switching cycle lifetime if contacts are suitably protected)
- special types available for extreme temperature ranges (- 40° C to + 150° C)
- AC/DC switching

Design, function and effect of an electromechanical magnetic switch

The basic elements of this type of switch are the components which change their behaviour when approaching a magnet. The contact paddles invert their polarity (north and south pole) under the influence of a magnetic field. The approach can be made by either permanent magnets or electromagnets; the sensitivity of the switch and the field strength of the magnet determine the sensing distance. Correspondingly the approach or moving away of the magnet controls the opening and closing of the reed contacts. Normally-closed, normally-open and changeover contacts are available in our range of products.

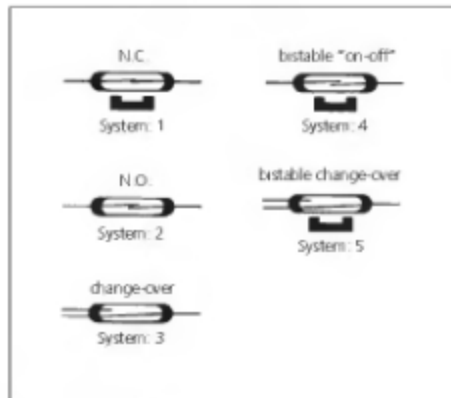
The magnetic switches and their auxiliary components (resistors, diodes, triacs, output stages etc.) are cast in high-quality isolating material or casting compound to increase their resistance to vibration and to guarantee the protection class up to IP 67. For use under extreme ambient conditions such as wider temperature ranges, metal versions (non-corrosive steel, aluminium and brass) as well as standard plastic versions are available.



Construction of a reed contact

Biasing

Bias magnets energise or hold the bistable or normally-closed contact closed, until a stronger magnet with opposite polarity neutralises the biasing.



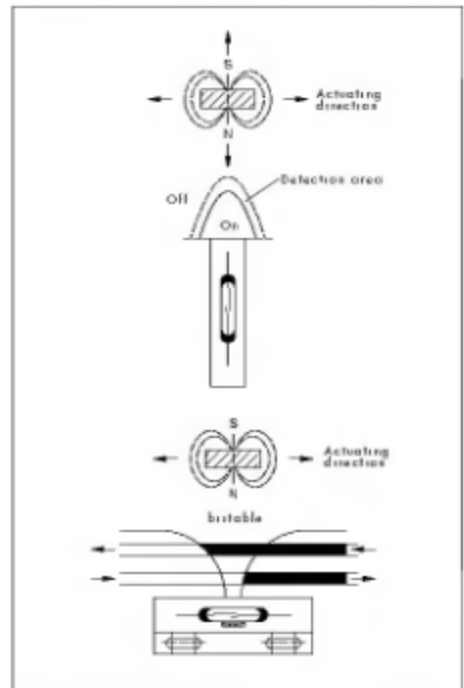
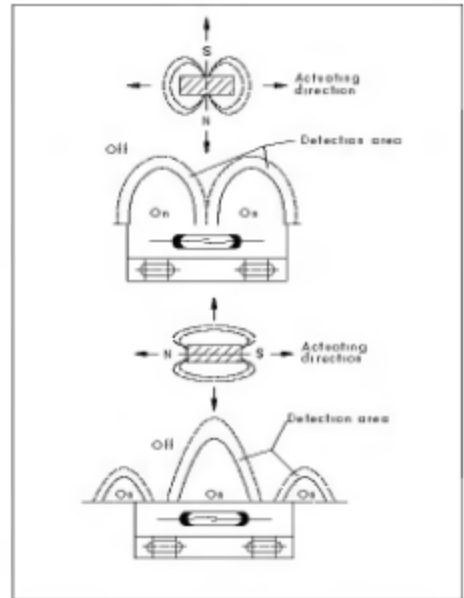
Types of reed contacts

Actuation and switching behavior

Switching behavior is principally determined by the movement and polarity of the magnet. The following drawings show typical characteristics. Body material and external dimensions are specified in the product overview. The magnetic switches with reed-contact output are identified by an „A“ in the second position of the type code (MA...).

Switching frequency

Up to 200 Hz, depending on the size of load to be switched (i. e. considerably faster than relays, contactors, etc.).



Switching distances

Refer to tables of this catalogue to identify which switching magnet may be used and therefore which minimum switching distance will be realised.

Temperature ranges

The standard version may be used in environments from -5°C to $+70^{\circ}\text{C}$. Special types are also available offering an extended operating temperature range of -40°C to $+150^{\circ}\text{C}$.

Electrical life

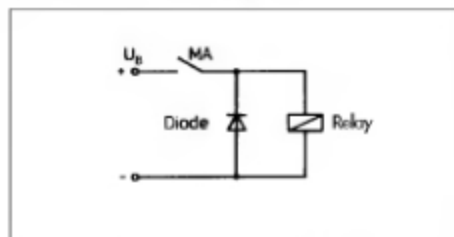
To maintain the long operational life of the electrical contacts, it is important to ensure the maximum supply voltage and maximum switching current are not exceeded. The following graphs show the load values for different contacts.

Guidelines for reed contact protection

The values for current, performance and voltage specified in the catalogue are valid only for resistive loads. Very often however, these loads will be used in conjunction with inductive or capacitive components when it is advisable to protect the reed contacts against voltage and current spikes. Whilst it is not possible to recommend a safe contact protection that applies to all load ranges (each individual case will require its own evaluation) we would like to present a general introduction to how reed contacts may be connected to different loads for improved operation.

1. Inductive loads

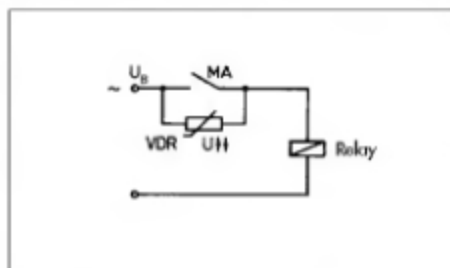
In DC voltage applications, contact protection is realised relatively easily with the help of a reverse polarity diode connected in parallel to the load. The diode polarity is selected so that it will block the normal operating voltage applied but will short-circuit any reverse voltage resulting from the switch being opened. (Note: these reverse voltage peaks can significantly exceed the normal operating voltage.)



Suppression of reverse voltage peaks with a reverse polarity diode

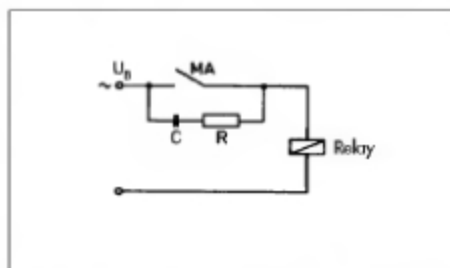
In AC voltage applications, two solutions may be applied.

1) Voltage peaks induced by switching off inductive loads are suppressed by connecting a Voltage Dependent Resistor (VDR) in parallel to the reed contact.



Suppression of reverse voltage peaks with a VDR

2) A Resistive/Capacitive (RC) element is connected in parallel to the contact, thus being in series with the load (vice versa is also possible).

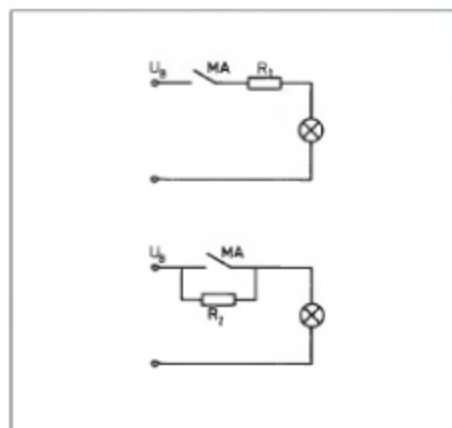
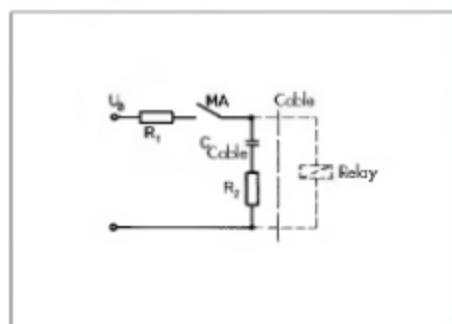


Suppression of reverse voltage peaks with RC network

2. Capacitive loads

In contrast to inductive loads, increased making currents can occur in connection with capacitive loads and lamp loads. If charged capacitors are switched (including inherent cable capacities), a sudden discharge occurs that can damage and even weld contacts closed. The intensity of this discharge depends on the capacity and length of the cable leading to the switch but may be decreased by inserting a series resistor. The size of the resistor is determined by the characteristics of the corresponding switching circuit.

It should however be as large as possible to reduce the discharge current to a permissible value to ensure reliable contact protection. These considerations are also valid for charging capacitors.



Contact protection with resistors

Using the selection matrix

To assist the user in selecting the right sensor for their application, Bernstein developed the following selection matrix. The individual fields match those in the product index to allow rapid selection of the most suitable sensor starting with the model description. By not using detailed technical descriptions the selection is considerably simplified. The corresponding output diagrams are shown on page 223.

Selection guide electromechanical magnetic switches in threaded and smooth barrels

Model	Switching capacity S/I_{max}	Switching voltage U_{max}	Switching distance S_{an}	Output	Housing material	Connection
MA-30 ø 6 x 28 mm	10 VA/0.5 A	250 V	19 mm	N.O.	plastic PA 6.6	cable
	5 VA/0.25 A	100 V	19 mm	change over		
MA-46 ø 6.5 x 40 mm	20 VA/0.5 A	250 V	18 mm	N.O.	plastic PA 6	cable
	20 VA/1 A	150 V	on request	change over		
MA-06 ø 12 x 86 mm	100 VA/3 A	250 V	7 mm	N.O.	aluminium	cable
	60 VA/1 A		10 mm	change over		
	250 VA/5 A		18 mm	bistable		
MA-16 ø 12 x 86 mm	100 VA/3 A	250 V	7 mm	N.O.	stainless steel	cable
	60 VA/1 A		12 mm	change over		
MA-26 ø 12 x 92 mm	100 VA/3 A	250 V	7 mm	N.O.	plastic PA 6	cable
	60 VA/1 A		12 mm	change over		
MA-36 ø 13 x 108 mm	250 VA/5 A	250 V	13 mm	bistable	plastic PA 6.6	cable
MA-04 ø 15.5 x 145 mm	80 VA/1 A	250 V	6 mm	change over	plastic PC	plug
MA-08 M8 x 1 x 32 mm (Cable) M8 x 1 x 40 mm (Plug)	10 VA/3 A	250 V	18 mm	N.O.	stainless steel	cable
	20 VA/1 A	100 V	13 mm	change over		
		30 V		plug		
MA-18 M 12 x 1 x 60 mm	10 VA/0.5 A	250 V	18 mm	N.O.	brass, nickel-plated	cable
	60 VA/1 A		12 mm	change over		
MA-28 M 12 x 1 x 60 mm	60 VA/1 A	250 V	15 mm	N.O.	plastic PA	cable
MA-23 M 12 x 1 x 80 mm	100 VA/3 A	250 V	6 mm	N.O.	brass, nickel-plated	cable
MA-33 M 12 x 1 x 80 mm	100 VA/3 A	250 V	7 mm	N.O.	plastic PA 6	cable
	60 VA/1 A		10 mm	change over		
	250 VA/5 A		22 mm	bistable		
MA-17 Pg 9 x 60 mm	30 VA/0.5 A	250 V	12 mm	change over	plastic PA 6	cable
MA-43 Pg 9 x 80 mm	60 VA/1 A	250 V	17 mm	change over	brass, nickel-plated	cable









Overview electromechanical magnetic switches in smooth barrels

Smooth barrels	MA-30, Ø 6 x 28 mm PA 6.6		MA-46, Ø 6.5 x 39 mm PA 6		MA-06, Ø 12 x 86 mm Al		
Switching distance (S ₉₀)	19 mm	19 mm	18 mm	on request	7 mm	10 mm	18 mm
Referring magnet (page)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)		T-62N5 (228)	T-62N5 (228)	T-62N5 (228)
Switching capacity (diag.-no.)	10 VA (4)	5 VA (2)	20 VA (7)	20 VA (6)	100 VA (11)	60 VA (8)	250 VA (12)
Max. switching voltage	250 V	100 V	250 V	150 V	250 V	250 V	250 V
Switching function	N.O.	change over	N.O.	change over	N.O.	change over	bistable
Special features	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Designation	MAK-3012-4-1	MAK-3013-X-1	MAK-0612-A-2	MAK-4613-3	MAA-0612-F-1	MAA-0613-L-1	MAA-0614-P-1
Part number	621.1230.571	621.0330.572	621.0246.500	641.0346.336	621.4206.246	621.6306.248	621.0406.554

Smooth barrels	MA-06, Ø 12 x 86 mm Al		MA-16, Ø 12 x 86 mm Stainless steel 1.4305		MA-16, Ø 12 x 86 mm Stainless steel 1.4305		
Switching distance (S ₉₀)	16 mm	10 mm	7 mm	12 mm	7 mm		
Referring magnet (page)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)		
Switching capacity (diag.-no.)	60 VA (8)	60 VA (8)	100 VA (11)	60 VA (8)	100 VA (11)		
Max. switching voltage	250 V	250 V	250 V	250 V	250 V		
Switching function	N.O.	change over	N.O.	change over	N.O.		
Special features	Temp. range -40°C, +150°C	Temp. range -40°C, +150°C	Standard	Standard	Temp. range -40°C, +150°C		
Designation	MAA-0612-M1-4	MAA-0613-L1-1	MAN-1612-F-3	MAN-1613-L-1	MAN-1612-F18		
Part number	641.0206.399	621.6306.001	621.4216.476	621.6316.259	621.4216.585		

Smooth barrels	MA-26, Ø 12 x 92 mm PA 6		MA-36, Ø 13 x 108 mm PA 6.6		MA-04, Ø 15.5 x 145 mm PC		
Switching distance (S ₉₀)	7 mm	12 mm	13 mm		6 mm		
Referring magnet (page)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)		T-62N5 (228)		
Switching capacity (diag.-no.)	100 VA (11)	60 VA (8)	250 VA (12)		80 VA (10)		
Max. switching voltage	250 V	250 V	250 V		250 V		
Switching function	N.O.	change over	bistable		change over		
Special features	Standard	Standard	Standard		plug Amphenol		
Designation	MAK-2612-F-1	MAK-2613-L-1	MAK-3636-P-2		MAK-0413-M-5		
Part number	621.4226.423	621.6326.426	621.0406.553		621.7304.283		

Overview electromechanical magnetic switches in threaded barrels

Threaded barrels	MA-06, M6 x 1 x 32 mm Stainless steel 1.4305		MA-06, M6 x 1 x 39 mm Stainless steel 1.4305		MA-16, M12 x 1 x 60 mm CuZn39Pb3	
						
Switching distance (S_{sw})	18 mm	13 mm	13 mm		18 mm	12 mm
Referring magnet (page)	T-62NS (228)		T-62NS (228)		T-62NS (228)	
Switching capacity (diag.-no.)	10 VA (4)	10 VA (5)	20 VA (5)		10 VA (4)	60 VA (8)
Max switching voltage	250 V	100 V	30 V		250 V	250 V
Switching function	N.O.		change over		N.O.	
Special features	Standard	Standard	plug Ø 6.5		Standard	Standard
Designation	MAN-0612-0-1 MAN-0613-Y-1		MAN-0613-STK		MAN-1612-0-1 MAN-1613-L-1	
Part number	631.1208.596 631.0308.597		631.0308.595		631.1208.291 631.6308.002	
Threaded barrels	MA-26, M12 x 1 x 60 mm PA		MA-23, M12 x 1 x 60 mm CuZn39Pb3		MA-33, M12 x 1 x 60 mm PA 6	
						
Switching distance (S_{sw})	15 mm		7 mm		7 mm	10 mm 22 mm
Referring magnet (page)	T-62NS (228)		T-62NS (228)		T-62NS (228)	
Switching capacity (diag.-no.)	60 VA (5)		100 VA (11)		100 VA (11)	60 VA (8) 250 VA (12)
Max switching voltage	250 V		250 V		250 V	
Switching function	N.O.		N.C.		N.O.	
Special features	Standard		Standard		Standard	Standard Standard
Designation	MAK-2612-L-3		MAN-2312-F-1		MAK-3312-F-2	MAK-3313-L-1 MAK-3314-P-2
Part number	641.6228.260		631.4223.268		631.4233.002	631.6333.005 641.0423.350
Threaded barrels	MA-17, Pg 9 x 60 mm PA 6		MA-43, Pg 9 x 80 mm CuZn39Pb3			
						
Switching distance (S_{sw})	12 mm		17 mm			
Referring magnet (page)	T-62NS (228)		T-62NS (228)			
Switching capacity (diag.-no.)	30 VA (8)		60 VA (8)			
Max switching voltage	250 V		250 V			
Switching function	N.O.		change over			
Special features	Standard		Standard			
Designation	MAN-1713-E-1		MAN-4313-L-2			
Part number	631.5217.001		631.6313.544			

Selection guide electromechanical magnetic switches in rectangular housings

Model	Switching capacity S/I_{max}	Switching voltage U_{max}	Switching distance S_{on}	Output	Housing material	Connection
MA-11 28.6 x 6.4 x 18 mm	10 VA/0.5 A	250 V	10 mm	N.O.	plastic PA 6.6	cable
	3 VA/0.25 A	130 V	8 mm	change over		
	10 VA/0.5 A	250 V	on request	bistable		
MA-01 45 x 9 x 13 mm	10 VA/0.5 A	250 V	10 mm	N.O.	plastic PA 6.6	cable
MA-45 45 x 9 x 25.5 mm	10 VA/0.5 A	250 V	10 mm	N.O.	plastic PA 6.6	cable
	60 VA/1 A		5 mm	change over		
MA-13 68 x 30 x 15 mm	10 VA/0.5 A	250 V	18 mm	N.O.	plastic PC	cable
	60 VA/1 A		12 mm	change over		
MA-02 80 x 15 x 20 mm	100 VA/3 A	250 V	21 mm	N.O.	plastic PA 6	cable
	30 VA/0.5 A		18 mm	change over		
	250 VA/5 A		on request	bistable		
MA-12 80 x 15 x 20 mm	100 VA/3 A	250 V	21 mm	N.O.	plastic PA 6.6	cable
	60 VA/1 A		24 mm	change over		
			25 mm	bistable		
MA-44 80 x 15 x 30 mm	100 VA/3 A	250 V	19 mm	N.O.	plastic PA 6.6	plug
	80 VA/1 A		22 mm	change over		
	250 VA/5 A		20 mm	bistable		
MA-32 85 x 24 x 26 mm	250 VA/5 A	250 V	16 mm	bistable	plastic PBT	cable plug
MA-42 88 x 13 x 25 mm	100 VA/3 A	250 V	25 mm	N.O.	plastic PA 6.6	cable
	80 VA/1 A		28 mm	change over		
	250 VA/5 A		5 mm	bistable		
MA-03 105 x 25.5 x 58 mm	100 VA/3 A	250 V	10 mm	N.O.	aluminium die casting	screw termination
	80 VA/1 A		10 mm	change over		
	250 VA/5 A		15 mm	bistable		

Overview electromechanical magnetic switches in rectangular housings

Rectangular housings	MA-11, 28.6 x 6.4 x 18 mm PA 6.6			MA-01, 45 x 9 x 13 mm PA 6.6			MA-45, 45 x 9 x 25.5 mm PA 6.6		
									
Switching distance (S_{sw})	10 mm	8 mm	on request	10 mm			10 mm	5 mm	
Referring magnet (page)	TK-11-11 (228) TK-11-11 (228)			TK-11-01 (228)			TK-45 (228) TK-45 (228)		
Switching capacity (diag.-no.)	10 VA (4)	3 VA (7)	10 VA (4)	10 VA (4)			10 VA (4)	60 VA (8)	
Max. switching voltage	250 V	130 V	250 V	250 V			250 V	250 V	
Switching function	N.O.	change over	bistable	N.O.			N.O.	change over	
Special features	Standard	Standard	Standard	Standard			Standard	Standard	
Designation	MAK-1112-0-1	MAK-1112-1-5	MAK-1110-0-5	MAK-0112-0-1			MAK-4512-0-1	MAK-4513-L-1	
Part number	631.1211.541	641.0311.368	631.1411.603	631.1201.288			631.1245.539	631.6345.540	
Rectangular housings	MA-13, 68 x 30 x 15 mm PC			MA-02, 80 x 15 x 20 mm PA 6.6			MA-02, 80 x 15 x 20 mm GDANS 12		
									
Switching distance (S_{sw})	8 mm			21 mm	18 mm	auf Anfrage	10 mm	30 mm	
Referring magnet (page)	T-62N5 (228)			TK-21-02 (228) TK-21-02 (228)			T-62N5 (228) T-62N5 (228)		
Switching capacity (diag.-no.)	60 VA (5)			100 VA (11)	30 VA (8)	250 VA (12)	100 VA (11)	60 VA (8)	
Max. switching voltage	250 V			250 V	250 V	250 V	250 V	250 V	
Switching function	N.O.			N.O.	change over	bistable	N.O.	change over	
Special features	Standard			Standard	Standard	Standard	Temp. range	Temp. range	
							-40°C +150°C	-40°C +150°C	
Designation	MAK-1313-L-1			MAK-0212-0-1	MAK-0213-K-1	MAK-0214-P-3	MAA-0212-FT5	MAA-0213-LT-1	
Part number	631.6313.004			631.4202.204	631.5302.309	641.9402.397	631.4202.522	631.6302.389	
Rectangular housings	MA-12, 80 x 15 x 20 mm PA 6.6			MA-44, 80 x 15 x 30 mm PA 6.6			MA-32, 85 x 24 x 26 mm PBT		
									
Switching distance (S_{sw})	21 mm	24 mm	25 mm	19 mm	22 mm	20 mm		16 mm	
Referring magnet (page)	TK-21-12 (228) TK-21-12 (228) T-62N5 (228)			TK-44 (228) TK-44 (228) T-62N5 (228)			T-62N5 (228)		
Switching capacity (diag.-no.)	100 VA (11)	60 VA (8)	60 VA (8)	100 VA (11)	80 VA (10)	250 VA (12)		250 VA (12)	
Max. switching voltage	250 V	250 V	250 V	250 V	250 V	250 V		250 V	
Switching function	N.O.	change over	bistable	N.O.	change over	bistable		bistable	
Special features	Standard	Standard	Standard	Standard	Standard	Standard		Standard	
Designation	MAK-1212-F-1	MAK-1213-L-1	MAK-1210-L-2	MAK-4412-F-1	MAK-4413-M-1	MAK-4414-P-2		MAK-3210-P-1	
Part number	631.4212.217	631.6312.220	641.0412.143	631.4244.536	631.7344.538	631.0444.562		631.0432.598	

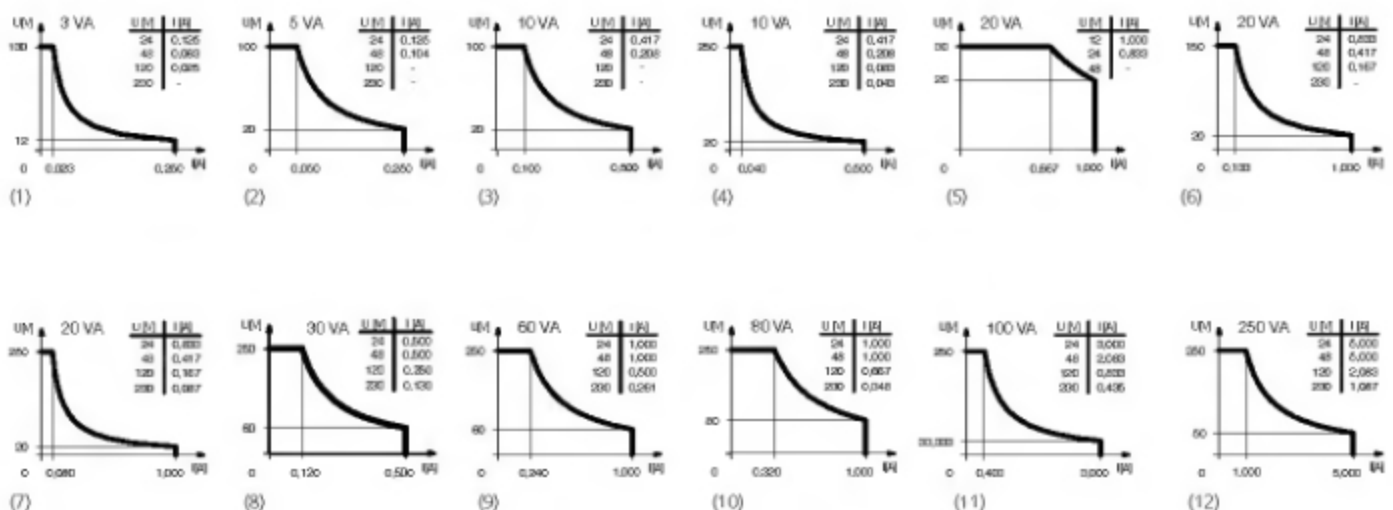
Overview electromechanical magnetic switches in rectangular housings

Rectangular housings	MA-32, 85 x 24 x 26 mm PBT	MA-42, 88 x 13 x 25 mm PA 6.6			MA-03, 100 x 29.5 x 58 mm GK-AISI 12		
Switching distance (S_{gr})	16 mm	25 mm	22 mm	5 mm	10 mm	10 mm	15 mm
Referring magnet (page)	T-62N/S (228)	TK-42 (229)	TK-42 (229)	T-62N/S (228)	TA-31 (230)	TA-31 (230)	T-62N/S (228)
Switching capacity (diag.-no.)	250 VA (12)	100 VA (11)	80 VA (10)	250 VA (12)	100 VA (11)	80 VA (10)	250 VA (12)
Max. switching voltage	250 V	250 V	250 V	250 V	250 V	250 V	250 V
Switching function	bistable	N.O.	change over	bistable	N.O.	change over	bistable
Special features	plug flat plug 4.8	Standard	Standard	Standard	Standard	Standard	Standard
Designation	MAK-3214-P-STK 4.8	MAK-4212-F-1	MAK-4213-M-1	MAK-4214-P-2	MAA-0312-F	MAA-0313-M	MAA-0314-P
Part number	631.0432.590	631.4242.533	631.7342.535	631.0442.564	631.4203.232	631.7303.312	631.9403.532

Technical data standard versions electromechanical magnetic switches

Switching current	see output diagram
Temperature range	-5 °C ... +70 °C
Protection class (IEC 529, EN 60 529)	IP 67
Repeatable accuracy	± 0.1 mm
Mech. operational life	> 3 x 10 ⁶ switching cycles

Output diagrams electromechanical magnetic switches



Contact types

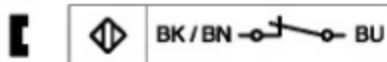
Electrical loading capacity of reed contacts

Contact type ID	Performance	Voltage	Current
R	3 VA	28 V	0.25 A
X	5 VA	100 V	0.25 A
B	10 VA	250 V	0.5 A
Y	10 VA	100 V	0.5 A
A	20 VA	250 V	0.5 A
K	30 VA	250 V	0.5 A
H	60 VA	250 V	1.0 A
L	60 VA	250 V	1.0 A
M	80 VA	250 V	1.0 A
F	100 VA	250 V	3.0 A
G	250 VA*	250 V	5.0 A*
P	250 VA*	250 V	5.0 A*

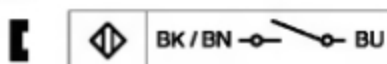
* max. making current of 2.5 A for duration of 2 ms;
100 WVA in permanent operation

Wiring diagrams electromechanical magnet switches

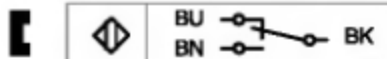
Normally closed



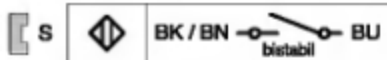
Normally open



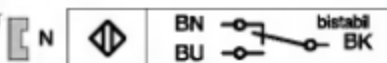
Change over



Bistable ON-OFF

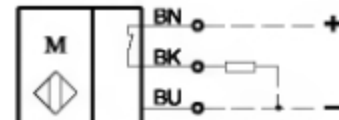


Bistable Change over



Wiring diagrams electronic magnet switches

Normally closed, PNP



Normally open, PNP/ PNP, bistabil



Normally closed, NPN



Normally open, NPN



Electronic magnetic switches

Electronic magnetic switches

The electronic magnetic switches from Bernstein are based on two different physical operating principles: the Hall effect and magneto-resistive (MR) effect. The sensors are characterised by their high sensing range and the absolute non-sensitivity to mechanical influences.

MR sensor technology

The prime elements of MR sensors are magnetic field dependent, ferromagnetic thin-film resistors. The base material of such a unit is made from silicon to which the ferromagnetic film is applied using electron gun vaporisation.

Fields of use for MR sensors

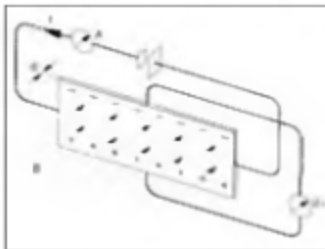
The main application areas for MR sensors are in the detection of current, angles, speed of rotation, position and magnetic fields. Detecting very low magnetic fields is possible with such sensors. An output voltage proportional to the magnetic field can be electrically conditioned. The ability to set the sensitivity or hysteresis allows these sensors to be used in a wide range of applications.



Hall element technology

The Hall effect is defined as the generation of a voltage difference on the opposing sides of a thin gold wafer through which a current is flowing. This effect also occurs in some semiconductors when certain geometrical conditions are fulfilled. The thickness of the wafer must be very small in relation to the length and width.

Signal Hall elements are used in all types of controllers as contact-free signal sensors. Since the signal voltage is independent of the speed of motion, and in contrast to inductive systems, targets with a very low speed, almost stopped, can be detected.



Schematic description of the Hall effect

Fields of use for Hall sensors

Since, when the sensor is suitably installed, only the polarity of the Hall voltage or the zero crossing is evaluated, InSb is used as the sensitive material for these Hall elements as its high sensitivity to temperature is not a problem for this application. Having designed the Hall elements for various application areas, they can be used for:

- measuring induction
- measuring tangential and axial components of magnetic induction
- measurements at low temperatures
- contact-free signal generation
- replacing inductive sensors (large sensing distance)

Selection guide electronic magnetic switches in smooth and threaded barrels and rectangular housings




Designation	Switching current I_{max}	Operating voltage U_b	Switching distance S_n^*	Activity: N = North Pole S = South Pole O = Omnipolar	Output- and switching function: N.O. N.C. bi = bistable	Housing material	Connection
MA-70 ø 6.5 x 25 mm	200 mA	10...30 V	45 mm	O	PNP N.O.	stainless steel 1.4401	cable
MA-61 M 10 x 1 x 40 mm	200 mA	10...30 V	17 mm	N N	PNP N.O. PNP N.C.	plastic PFE, red brass, nickel-plated	cable
MA-62 M 12 x 1 x 46 mm	400 mA	10...30 V	17 mm 35 mm	N N NS***	PNP N.O. PNP N.C. PNP bi	plastic FA 6, red brass, nickel-plated	cable**
MA-63 M 18 x 1 x 35 mm	400 mA	10...30 V	17 mm 35 mm	N N NS***	PNP N.O., MNNO PNP N.C., MNNC PNP bi	plastic FA 6, red brass, nickel-plated	cable**
MA-80 8 x 8 x 40 mm	200 mA	10...30 V	45 mm	O	PNP N.O.	brass, nickel-plated	cable
MA-55 12 x 12 x 55 mm	400 mA	10...30 V	17 mm 35 mm	N N NS***	PNP N.O. PNP N.C. PNP bi	brass, nickel-plated	cable**
MA-52 26 x 13 x 43 mm	200 mA	10...30 V	60 mm	O O	PNP N.O. PNP N.O. PNP N.C. PNP N.C.	plastic FA 12, black	cable**



* Switching distance referring to magnet T-62NS
for magnet T-67NS approx. 10 % lower switching distance
for magnet T-69NS approx. 30 % higher switching distance



** Plug on request

*** Activity:
south-pole – switches on
north-pole – switches off

Overview electronic magnetic switches in smooth and threaded barrels

Smooth and threaded barrels	MA-70, Ø 4.5 x 25 mm Stainless steel 1.4401	MA-61, M 10 x 1 x 40 mm PEE, red	MA-61, M 10 x 1 x 40 mm CuZn39Pb3, nickel-plated			
						
Switching distance (S_{sw})	45 mm	17 mm	17 mm	17 mm	17 mm	17 mm
I_{mag} sensitivity	0.5 mT	10 mT	10 mT	10 mT	10 mT	10 mT
Referring magnet (page)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)
Switching function	N.C.	N.C.	N.O.	N.C.	N.C.	N.O.
PNP	Designation	MEH-70CP2-Ø1.2-2KL	MEK-61NP1-10.2-2KL	MEK-61NP2-10.2-2KL	MEM-61NP1-10.2-2KL	MEM-61NP2-10.2-2KL
	Part number	637.3270.067	637.1161.040	637.1261.041	637.1161.043	637.1261.042

Smooth and threaded barrels	MA-62, M 12 x 1 x 46 mm PA 6, red			MA-62, M 12 x 1 x 46 mm CuZn39Pb3, nickel-plated		
						
Switching distance (S_{sw})	17 mm	17 mm	35 mm	17 mm	17 mm	35 mm
I_{mag} sensitivity	10 mT	10 mT	2.5 mT	10 mT	10 mT	2.5 mT
Referring magnet (page)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)
Switching function	N.C.	N.O.	bistable	N.C.	N.O.	bistable
PNP	Designation	MEK-62NP1-10.4-2KL	MEK-62NP2-10.4-2KL	MEK-62SP4-Ø1.4-2KL	MEM-62NP1-10.4-2KL	MEM-62NP2-10.4-2KL
	Part number	637.1162.047	637.1262.048	637.3462.049	637.1162.044	637.1262.045

Smooth and threaded barrels	MA-63, M 18 x 1 x 35 mm PA 6, red			MA-63, M 18 x 1 x 35 mm CuZn39Pb3, nickel-plated		
						
Switching distance (S_{sw})	17 mm	17 mm	35 mm	17 mm	17 mm	35 mm
I_{mag} sensitivity	10 mT	10 mT	2.5 mT	10 mT	10 mT	2.5 mT
Referring magnet (page)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)	T-62N5 (228)
Switching function	N.C.	N.O.	bistable	N.C.	N.O.	bistable
PNP	Designation	MEK-63NP1-10.4-2KL	MEK-63NP2-10.4-2KL	MEK-63SP4-Ø1.4-2KL	MEM-63NP1-10.4-2KL	MEM-63NP2-10.4-2KL
	Part number	637.1163.053	637.1263.054	637.3463.055	637.1163.050	637.1263.051
NPN	Designation	MEK-63NP1-10.4-2KL	MEK-63NP2-10.4-2KL		MEM-63NP1-10.4-2KL	MEM-63NP2-10.4-2KL
	Part number	637.1563.069	637.1663.070		637.1563.071	637.1663.072

Overview electronic magnetic switches in rectangular housings

Rectangular housings

MA-80, 8 x 8 x 40 mm
CuZn39Pb3, nickel-plated



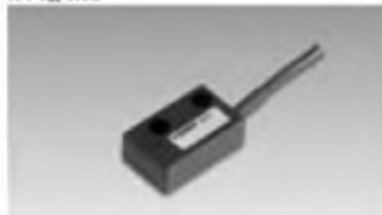
MA-55, 12 x 12 x 55 mm
CuZn39Pb3, nickelé



Switching distance (S_{gr})		45 mm	17 mm	17 mm	35 mm
Mag. sensitivity		0.5 mT	10 mT	10 mT	2.5 mT
Referring magnet (page)		T-62N/S (228)	T-62N/S (228)	T-62N/S (228)	T-62N/S (228)
Switching function		N.O.	N.C.	N.O.	bistable
PNP	Designation	MEM-80P2-01 2-2/KL	MEM-55NP1-10 4-2/KL	MEM-55NP2-10 4-2/KL	MEM-55SP4-03 4-2/KL
	Part number	637.3280.057	637.1155.058	637.1255.059	637.3455.060

Rectangular housings

MA-52, 43 x 26 x 13 mm
PA 12, noir

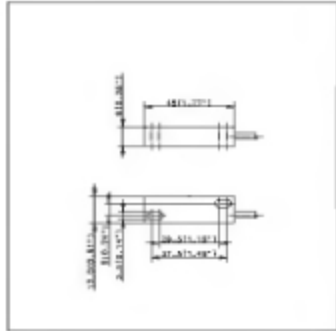


Switching distance (S_{gr})	60 mm	60 mm	
Mag. sensitivity	0.1 mT	0.1 mT	
Referring magnet (page)	T-62N/S (228)	T-62N/S (228)	
Switching function	N.C.	N.O.	
PNP	Designation	MEK-52OP1-00 4-2/KL	MEK-52OP2-00 4-2/KL
	Part number	637.3152.075	637.3252.068
NPN	Designation	MEK-52ON1-00 4-2/KL	MEK-52ON2-00 4-2/KL
	Part number	637.3552.073	637.3652.074

Technical data standard versions electronic magnetic switches

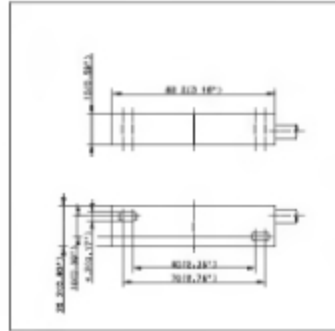
		MA-70	MA-61	MA-62	MA-63	MA-80	MA-55	MA-52
Operating voltage	U_B	10 V...30 V	10 V...30 V	10 V...30 V	10 V...30 V	10 V...30 V	10 V...30 V	10 V...30 V
Rated operating current	I_B	≤ 200mA	≤ 200mA	≤ 400mA	≤ 400mA	≤ 200mA	≤ 200mA	≤ 200mA
Switching frequency		≥ 5000 Hz						
Output		short-circuit and overload protection						
Reverse polarity protection		yes						
LED for output function		•	•	•	•	•	•	•
Temperature range		-20 °C/+70 °C						
Protection class		IP 65/IP 67						
Cable (2 m)		•	•	•	•	•	•	•
Plug on request				•	•	•	•	•

Dimension diagrams magnetic switches



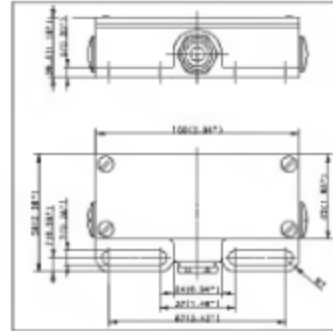
MA-01

Page 222



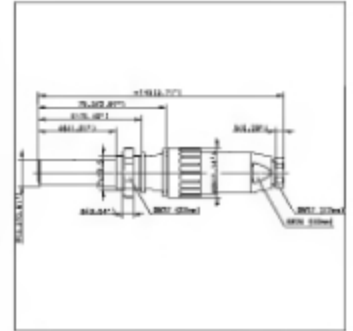
MA-02

Page 222



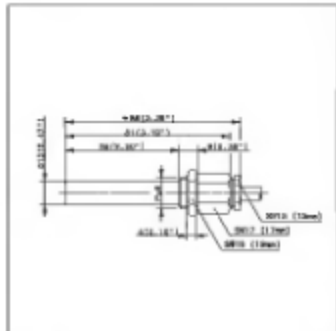
MA-03

Page 223



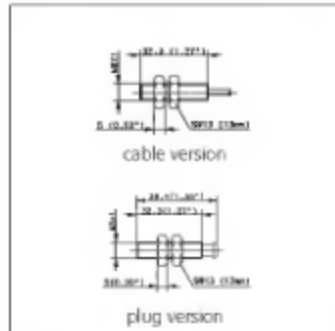
MA-04

Page 219



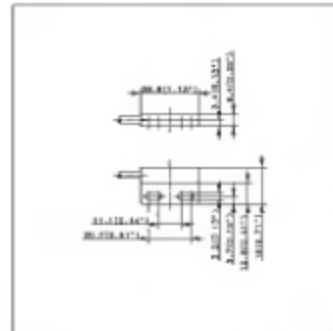
MA-06

Page 219



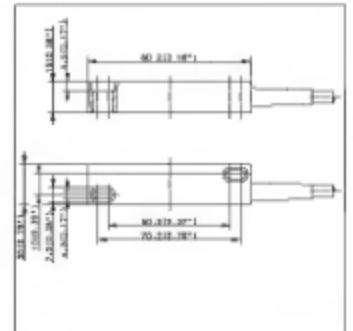
MA-08

Page 220



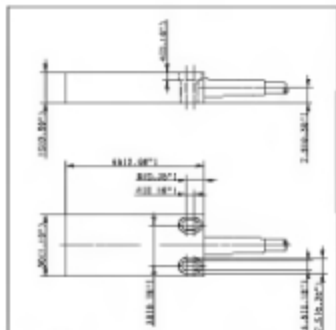
MA-11

Page 222



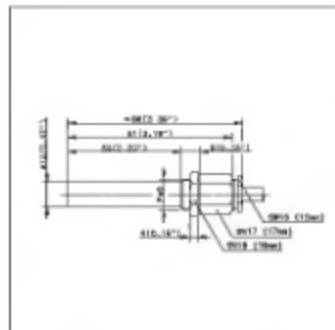
MA-12

Page 222



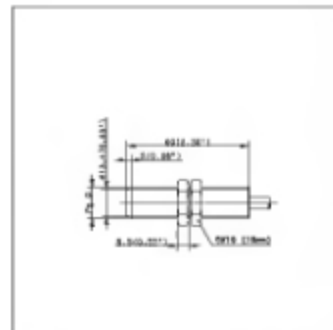
MA-13

Page 222



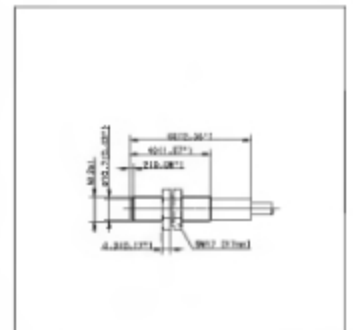
MA-16

Page 219



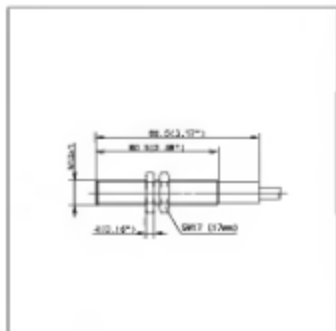
MA-17

Page 220



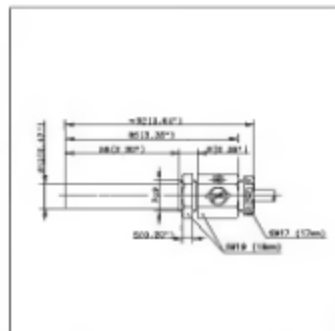
MA-18

Page 220



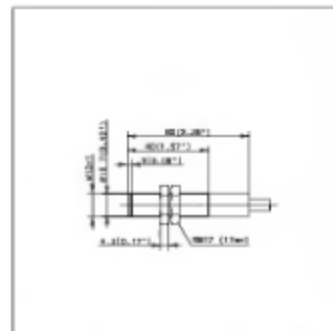
MA-23

Page 220



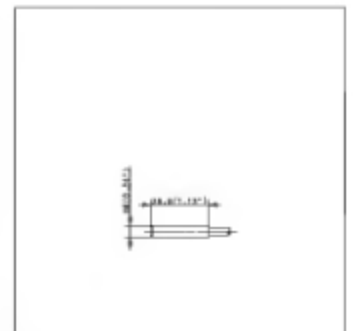
MA-26

Page 219



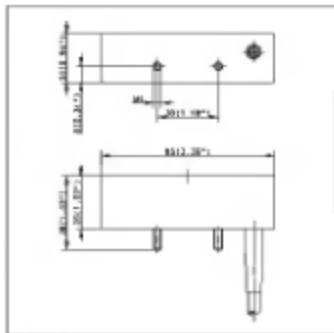
MA-28

Page 220

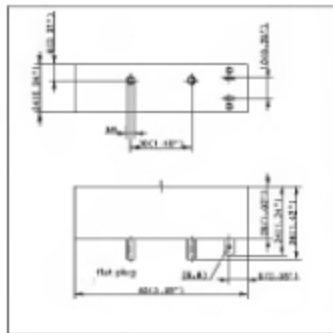


MA-30

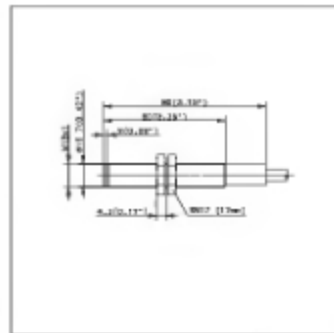
Page 219



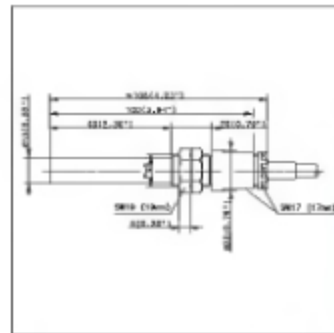
MA-32 (cable) Page 222



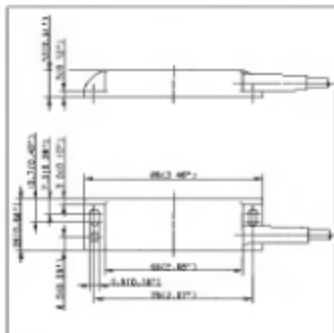
MA-32 (plug) Page 223



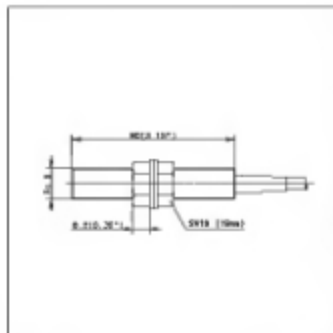
MA-33 Page 220



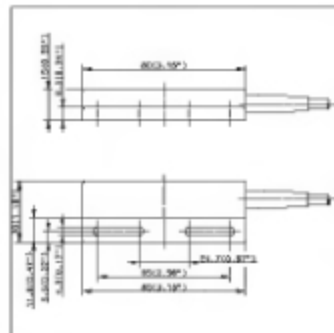
MA-36 Page 219



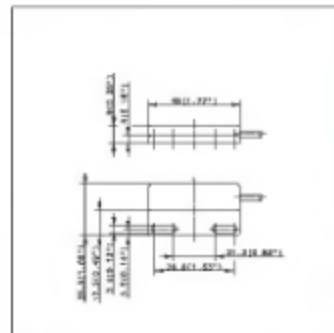
MA-42 Page 223



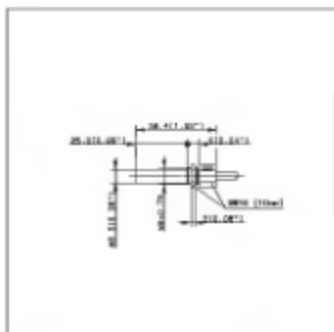
MA-43 Page 220



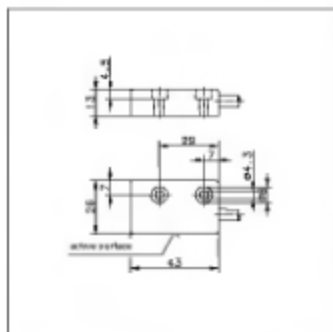
MA-44 Page 222



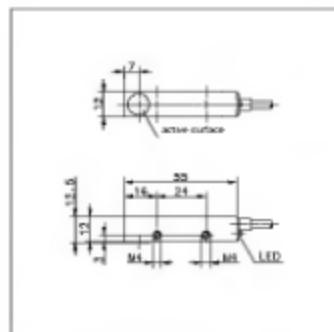
MA-45 Page 222



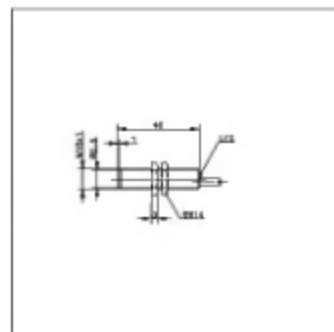
MA-46 Page 219



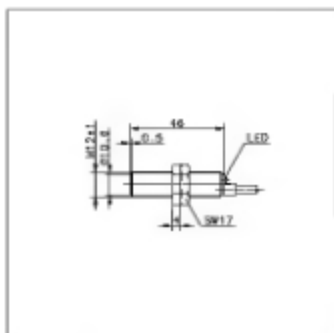
MA-52 Page 229



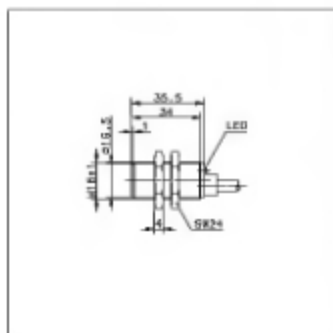
MA-55 Page 229



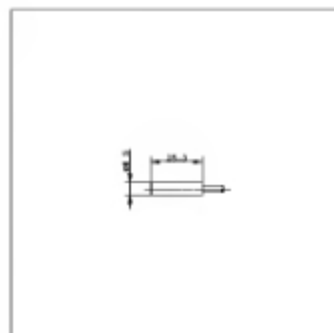
MA-61 Page 228



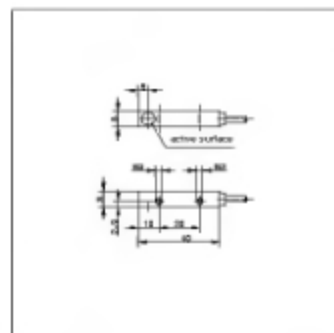
MA-62 Page 228



MA-63 Page 228



MA-70 Page 228



MA-80 Page 229

Designation code Electromechanical magnetic switches

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
M	A	K	-	0	8	1	2	-	D	-	1	-	S	O	K	
Product group			Design		Contact specifications				Cable length		Special features					

Product group

- 1** M = Magnetic switch, general
- 2** Output type
A = reed contact
I = TRIAC
M = mechanical usage
Q = mercury contact
R = relay
- 3** Housing material
A = aluminium
N = stainless steel
M = brass, nickel-plated
K = plastic
O = other materials

Design

- 4** Dash
- 5/6** Designation description
01 = 45 x 9 x 13 mm
02 = 80 x 15 x 20 mm
03 = 100 x 29.5 x 58 mm
04 = RD 15.5 x 145 mm
06 = RD 12 x 86 mm
08 = M 8 x 1 x 32 mm
11 = 28.6 x 6.4 x 18 mm
12 = 80 x 15 x 20 mm
13 = 68 x 30 x 15 mm
16 = RD 12 x 86 mm
17 = Pg 9 x 60 mm
18 = M 12 x 1 x 60 mm
23 = M 12 x 1 x 80 mm
26 = RD 12 x 92 mm
28 = M 12 x 1 x 60 mm
30 = RD 6 x 28 mm
31 = Pg 9 x 100 mm
32 = 85 x 24 x 26 mm
33 = M 12 x 1 x 80 mm
36 = RD 13 x 108 mm
42 = 88 x 13 x 25 mm
43 = Pg 9 x 80 mm
44 = 80 x 15 x 30 mm
45 = 45 x 9 x 25.5 mm
46 = RD 6.5 x 40 mm

Contact specifications

- 7** Number of contacts
e. g. 1 = 1 reed contact
2 = 2 reed contacts
etc.
- 8** Contact function
1 = N.C.
2 = N.O.
3 = change over
4 = bistable (on-off)
5 = bistable (change over)
6 = N.C., N.O.;
separate contacts
7 = coded, BG
8 = not used at present
9 = not used at present
0 = other outputs
- 9** Dash
- 10** Performance of reed contacts
A = 250 VDC; 0.5 A; 20 VA
B = 250 VDC; 0.5 A; 10 VA
C = 250 VDC; 0.5 A; 30 VA
D = 250 VDC; 0.5 A; 30 VA
E = 250 VDC; 1.5 A; 30 VA
F = 250 VDC; 3 A; 100 VA
G = 250 VDC; 5 A; 250 VA
H = 250 VDC; 1 A; 60 VA
K = 250 VDC; 0.5 A; 30 VA
L = 250 VDC; 1 A; 60 VA
M = 250 VDC; 1 A; 80 VA
N = 250 VDC; 1 A; 60 VA
O = 120 VDC; 0.5 A; 10 VA
P = 250 VDC; 5 A; 250 VA
R = 28 VDC; 0.25 A; 3 VA
W = 250 VDC; 1.0 A; 60 VA
X = 100 VDC; 0.25 A; 5 VA
Y = 100 VDC; 0.5 A; 10 VA

TRIAC usage:

- K = 24 - 250 VDC; 1.5 A
a. 300 VA
b. 330 VA

11 Dash

- 12** Cable length in metres
e. g. 1 = 1 m cable
2 = 2 m cable
etc.

13 Dash

14-17 Special features

- EX = explosion-protected
T = temperature resistance
from
- 40 °C to + 150 °C
- SI = with fine-wire fuse
VDR = with VDR
VID = with resistor
LED = with LED
Diode = with diode
SPK = spiral cable
SK = special cable
SOK = plug type without head
(without device
connector)
- SMK = plug type with head
(without device
connector)
- Pg 11 = Pg11 screw thread
version
- SSW = downtime connector
with relay
- RZ = time delay
with relay
- RE = relay
- 220V = 220V version
24 V = 24V version

Designation code Electronic magnetic switches

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
M	E	K	-	0	2	N	P	2	-	1	0	.	4	-	5	/	L
Product group				Design		Polarity	Output	Function		Magnetic sensivity		Output current		Options			

Product group

- 1 M = Magnetic switch, general
- 2 E = electronic type
- 3 Housing material
 - A = aluminium
 - N = stainless steel
 - M = brass, nickel-plated
 - K = plastic
- 4 Dash

Design

- 5/6 Designation description
 - 52 = 43 x 26 x 13 mm
 - 55 = 12 x 12 x 55 mm
 - 61 = M 10 x 1 x 40 mm
 - 62 = M 12 x 1 x 46 mm
 - 63 = M 18 x 1 x 35 mm
 - 70 = RD 6,5 x 25 mm
 - 80 = 8 x 8 x 40 mm

Polarity

- 7 N = north pole
- S = south pole
- O = omnipolar (north and south pole)

Bistable types:
The polarity describes the pole, which switches on the device.

Output

- 8 P = PNP
- N = NPN
- R = Relay
- G = complementary

Function

- 9 1 = N.C.
- 2 = N.O.
- 3 = not used at present
- 4 = bistable
- 5 = not used at present
- 6 = not used at present
- 7 = not used at present
- 8 = not used at present
- 9 = not used at present
- 0 = other

10 Dash

Magnetic sensivity

- 11/12 Average value in mT:
 - e. g. 10 = 10 mT
 - 05 = 5 mT
 (the lower the value, the higher the sensivity)

13 Dot

Output current

- 14 4 = 400 mA
- 2 = 200 mA
- 0 = other

15 Dash

Options

- 16 Cable length in metres
 - S = plug
- 17 Dash
- 18 L = LED
- K = short circuit proof
- X = customer specific features
- A = 10 - 30 VDC

Magnets

1. Hard Ferrite Magnets

Barium and strontium hard ferrites are economical, reliable components that are also used in automation, control and measurement applications. If operated in higher temperature ranges, the specified switching distance will decrease by a factor of 0.2% per 1°C.

Chemical characteristics:

Ferrite magnets are oxide ceramics. They are made from approx. 80% iron oxide and 20% barium- or strontium oxide. The magnets are resistant to a large number of chemicals including solvents, dyes and weak acids. If strong organic and inorganic acids (e.g. hydrochloric, sulphuric and hydrofluoric acid) are used, their resistance is basically determined by the temperature, concentration and reaction time of the medium. In general, the resistance should first be determined using longterm tests.

Mechanical characteristics:

Due to their ceramic character, ferrites are brittle and are sensitive to shock and bending loads.

2. Rare-earth magnets

Permanent magnets that are made from samarium cobalt and neodymium iron boron are high-performance and high-quality components that are especially used in drive and control engineering.

If used in higher temperature ranges, the specified switching distance has to be decreased by a factor of 0.02% per 1°C.

Chemical characteristics:

All rare-earth magnets are metallic materials and show the corresponding characteristics associated with these materials (e.g. the polished shine immediately after being processed). The magnets will oxidise in moist surroundings and acidic environments may decompose them. Conversely, the magnets are extremely resistant to alkaline environments. In water with a pH-value of 7, rare-earth magnets will show only slight surface oxidation but otherwise are resistant.

Mechanical characteristics:

Minor chips may occur if rare-earth magnets are submitted to impact stress. They respond very sensitively to vibrations and may become demagnetised.

3. Plastic magnets

Plastic-bound permanent magnets have an interesting cost-performance ratio and can be produced in a large variety of shapes. Sprayed magnets are typical composite materials. The magnetic powder is embedded in thermoplastics (polyamides), allowing the most diverse shapes to be created.

Chemical characteristics:

Surface corrosion can rarely be found on plastic-bound magnets. For this reason, they can be used in most application fields without additional coating.

Mechanical characteristics:

Plastic magnets can be submitted at any time to bending and vibrations without breaking or chipping.

Application in explosion-hazardous surroundings

Magnets must not be handled in explosion-hazardous surroundings since they can cause sparks. Grit and chips from rare earth magnets are self-igniting and burn off with very high temperatures. They should therefore only be machined using a lot of water and never in dry conditions since even dried grinding dust can ignite.

Strong magnetic fields

Strong magnetic fields can interfere or even damage electronic or mechanical equipment. This includes cardiac pacemakers. Appropriate safety clearances are specified in the corresponding manuals or may be requested from the manufacturers.



Radioactive radiation

Permanent magnets must not be submitted to long term radioactive radiation or they may lose their magnetisation.

General stability

Rare earth magnets must be stored in dry conditions in order to avoid oxidation. They are not suitable for all environments since they are also partially soluble.

Effects on persons

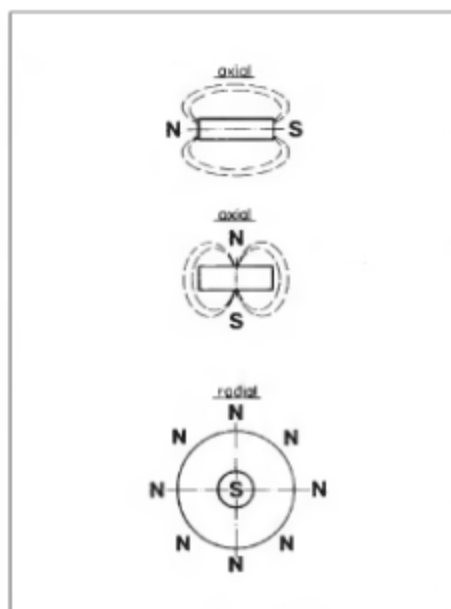
There are no known side-effects caused by touching magnet materials.

Magnet shapes

Rectangular, circular and cylindrical magnets are the most common shapes of permanent magnets. In addition to these standard shapes, permanent magnets may be manufactured in many other shapes. The shape is in most cases designated during the pressing of the magnet, since any later shaping can only be performed using complex diamond tools. Holes and openings can only be inserted in line with the pressing direction.

Magnetisation direction

Magnetisation in alignment with the formed magnetic crystals is preferred since this allows the highest magnetic values to be achieved.



The preferred direction is achieved by submitting the magnetic powder to a strong external magnetic field (coil) during the pressing process. As magnets have no preferred direction the magnetisation direction and type can be selected freely.

Instructions for mounting a magnetic switch-system on ferromagnetic materials

If magnetic limit switches and their corresponding magnets are mounted on magnetisable material (Fe, etc.), the nominal distance may be reduced. To ensure error-free operation, a minimum gap of 15 mm between the magnetic switch and any material which can be magnetised should be maintained as a guide value. The same applies to magnets.

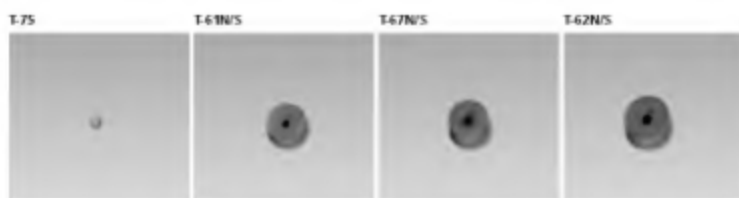
Applications

- counting
- position indication in lifts
- end-stop switches in pneumatic and hydraulic installations
- indication on claps, sliders and valves
- conveyors in high-bay shelving
- position detection in textile, packaging and meat-cutting machines
- run-time and down-time monitoring of machines
- control of machine tools
- level control of liquids (see page 240 ff. for more details)

Accessories

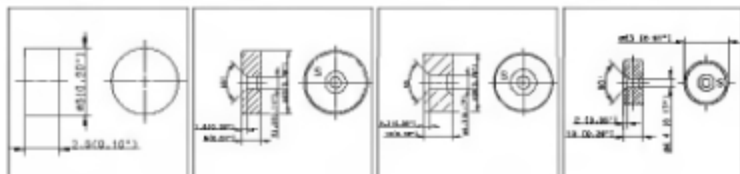
Magnets without encapsulation

Magnets without encapsulation

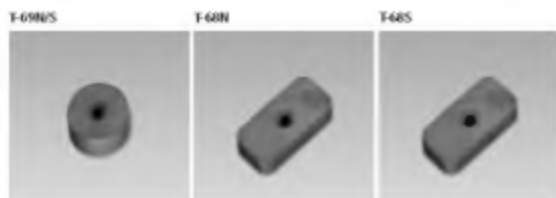


	T-75	T-61N/S	T-67N/S	T-62N/S
Magnet material	Ferrite	Bariumferrite	Bariumferrite	Bariumferrite
Temperature range (in relation to magnetic switch application)	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	-	-	-	-
Part number	630.1175.057	630.1261.005	630.1167.054	630.1262.039

All dimensions in mm (inch)

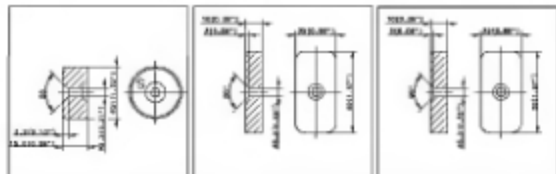


Magnets without encapsulation



	T-69N/S	T-60N	T-68S
Magnet material	Bariumferrite	Bariumferrite	Bariumferrite
Temperature range (in relation to magnetic switch application)	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F	-40 °C...+150 °C -40 °F...+302 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	-	-	-
Part number	630.1269.021	630.1268.026	630.1268.033

All dimensions in mm (inch)



90° chamfering
on north pole side

90° chamfering
on south pole side

Accessories

Magnets in plastic housings

Magnets in plastic housings

TK-11-11



TK-11-01



TK-21-02

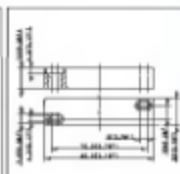
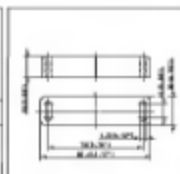
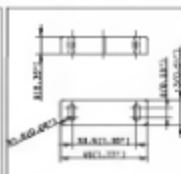


TK-21-12



Magnet material	AlNiCo-500	AlNiCo-500	AlNiCo-500	AlNiCo-500
Temperature range (in relation to magnetic switch application)	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	FR 6.6	FR 6.6	FR 6.6	FR 6.6
Part number	630.2111.047	630.2111.001	630.2121.002	630.2121.030

All dimensions in mm (incl.)



Magnets in plastic housings

TK-45



TK-42



TK-44

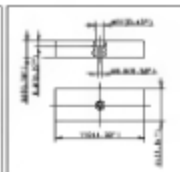
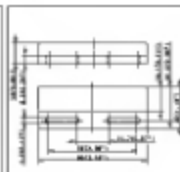
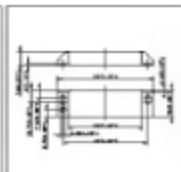


TK-50



Magnet material	AlNiCo-500	AlNiCo-500	AlNiCo-500	Barium ferrite
Temperature range (in relation to magnetic switch application)	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F	-20 °C...+80 °C -4 °F...+176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	FR 6.6	FR 6.6	FR 6.6	FR 6.6
Part number	630.2145.048	630.2142.040	630.2144.050	630.2100.053

All dimensions in mm (incl.)



Accessories

Magnets in metal housings

Mounting brackets

Magnets in metal housings

TA-21-02



TA-31

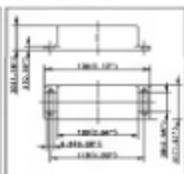
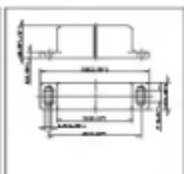
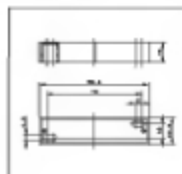


TA-33



Magnet material	AlNiCo-500	AlNiCo-500	Bariumferrit
Temperature range (in relation to magnetic switch applicator)	-40 °C ... +150 °C -40 °F ... +302 °F	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K
Housing material	Al	Al	Al
Part number	630.5121.064	630.3131.005	630.3133.034

Dimension diagrams



Mounting brackets

BVN-M06NI/40 x 47



BVN-M06NI/MAGNET



BVN-M06NI/27 x 38

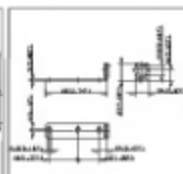
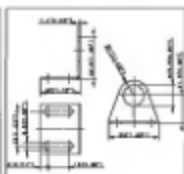


BVN-M06NI



Material	Niro 1.4301	Niro 1.4301	Niro 1.4301	Niro 1.4301
for models	MA-06, MA-16, MA-26, MA-15	MA-06, MA-16, MA-26, MA-15	MA-06, MA-16, MA-26, MA-15	MA-06, MA-16, MA-26, MA-15
Part number	410.2802.001	490.4702.006	410.2802.002	490.4700.035

Dimension diagrams



Accessories

Miniature snap-in connectors

Miniature snap-in connectors

Terminal code

- 1 = brown
- 2 = black
- 3 = blue



GDK-R06US/S00-2.5PU



GDK-R06US/S00-5PU



WDK-R06US/S00-2.5PU



WDK-R06US/S00-5PU



Material of cable sheath

PLR

PLR

PLR

PLR

Material of coupling

FR 12

FR 12

FR 12

FR 12

Material of body

PCM

PCM

PCM

PCM

Operating voltage

60 VAC/75 VDC

60 VAC/75 VDC

60 VAC/75 VDC

60 VAC/75 VDC

Current-carrying capacity

3A

3A

3A

3A

Temperature range

-25 °C...+50 °C

-25 °C...+50 °C

-25 °C...+50 °C

-25 °C...+50 °C

-13 °F...+194 °F

-13 °F...+194 °F

-13 °F...+194 °F

-13 °F...+194 °F

Cable length

2.5 m

5 m

2.5 m

5 m

Cable structure

3 x 0.25 mm²

3 x 0.25 mm²

3 x 0.25 mm²

3 x 0.25 mm²

Protection class after installation

IP67/NEMA 4

IP67/NEMA 4

IP67/NEMA 4

IP67/NEMA 4

Part number

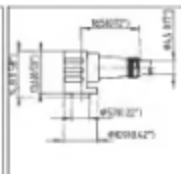
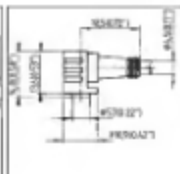
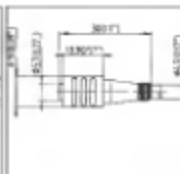
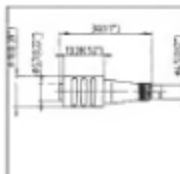
413 9100.219

413 9100.220

413 9100.221

413 9100.222


Dimension diagrams



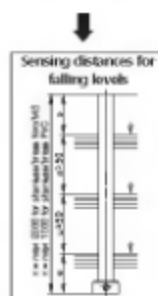
Standard float switches

Type code

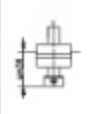
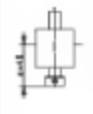
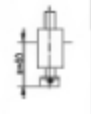
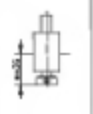
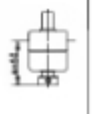
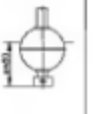
Ordering example
s. page 206

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/float	
Typ	M	A		-

Min./max. dimensions



Combination switching tube/float

Material floats	POM Ø40 x 27	PVC Ø42 x 44	PP Ø30 x 44	NER Ø30 x 44	1.4571 Ø45 x 47	1.4571 Ø52
Material connecting head						
Material switching tube						



1.4571	1.4571	A	V	T	R	N	E
MS 59	MS 63	M	L	C	S	P	F
PVC	PVC	K	D	I	U	—	—



1.4571	1.4571	A	V	T	R	N	E
MS 58 / gal. Zn25C	MS 63	M	L	C	S	P	F
PVC	PVC	K	D	I	U	—	—

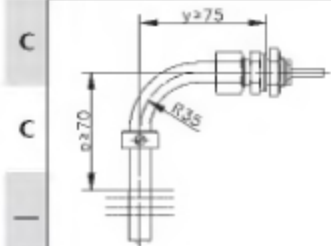
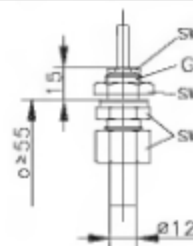


PC	1.4571	A	V	T	R	N	E
PC	MS 63	M	L	C	S	P	F
PC	PVC	K	D	I	U	—	—

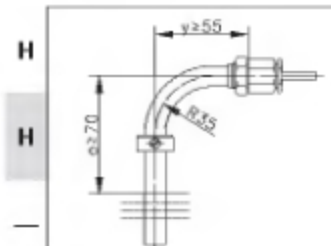
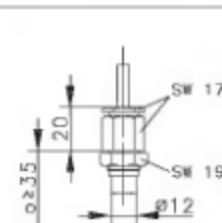
5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching capacity	Connecting head	Standard programme		Special features (see page 247)
7	□	□		□	□	S		□

		Number of switching points	Switching function	Switching capacity	Connecting head	
1.4571 Ø62	1.4571 Ø84	1 switching point 2 switching points 3 switching points	1 normally-closed contact 2 normally-open contact 3 changeover contact 4 mixed version (CO, NC, NO)	max. 0.5 A - 30VA - 250 V max. 1A - 60VA - 250 V	straight type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) ver- sions.	bent type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) ver- sions.
					ID letter connecting head	ID letter connecting head

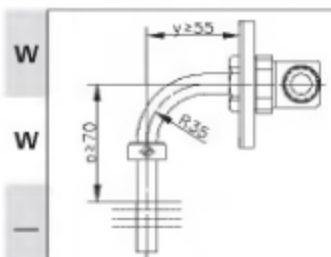
B	G	1/2/3	1/2/3/4	K	L	A
O	H	1/2/3	1/2/3/4	K	L	A
—	—	1/2/3	1/2/3/4	K	L	A



B	G	1/2/3	1/2/3/4	K	L	V
O	H	1/2/3	1/2/3/4	K	L	V
—	—	1/2/3	1/2/3/4	K	L	V




B	G	1/2/—	1/2/3/4	K	L	T
O	H	1/2/—	1/2/3/4	K	L	T
—	—	1/2/—	1/2/3/4	K	L	T



Standard float switches

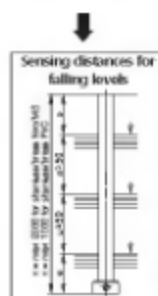
Type code

Ordering examples
s. page 206

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/float	
Type	M	A		-

Min./max. dimensions

Combination switching tube/float - float 242



Material floats

Material connecting head

Material switching tube

PCIM
040 x 27



PVC
042 x 44



PP
030 x 44



NER
030 x 44



1.4571
045 x 47



1.4571
052



Flange enclosures with plug



PC	1.4571	A	V	T	R	N	E
PC	MS 63	M	L	C	S	P	F
PC	PVC	K	D	I	U	—	—

Flange enclosures Ø80



G-AI Si 12	1.4571	A	V	T	R	N	E
G-AI Si 12	MS 63	M	L	C	S	P	F
G-AI Si 12	PVC	K	D	I	U	—	—

Flange enclosures Ø120



G-AI Si 12	1.4571	A	V	T	R	N	E
G-AI Si 12	MS 63	M	L	C	S	P	F
G-AI Si 12	PVC	K	D	I	U	—	—

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching capacity	Connecting head	Standard programme		Special features (see page 247)
7	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	S		<input type="checkbox"/>


		Number of switching points	Switching function	Switching capacity	Connecting head	
1.4571 Ø62	1.4571 Ø84	1 switching point 2 switching points 3 switching points	1 normally-closed contact 2 normally-open contact 3 changeover contact 4 mixed version (CO, NC, NO)	max. 0.5 A - 30VA - 250 V max. 1A - 60VA - 250 V	straight type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.	bent type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.
					ID letter connecting head	ID letter connecting head

B	G	1/2	1/2/3/4	K	L	TO		
O	H	1/2	1/2/3/4	K	L	TO		
—	—	1/2	1/2/3/4	K	L	TO		
B	G	1/2/3	1/2/3/4	K	L	S		
O	H	1/2/3	1/2/3/4	K	L	S		
—	—	1/2/3	1/2/3/4	K	L	S		
B	G	1/2/3	1/2/3/4	K	L	FL 120		
O	H	1/2/3	1/2/3/4	K	L	FL 120		
—	—	1/2/3	1/2/3/4	K	L	FL 120		

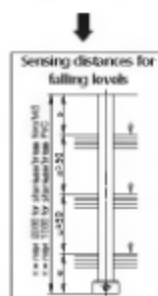
Standard float switches

Type code







Ordering examples
s. page 206

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/float	
Type	M	A		-

Min./max. dimensions



Combination switching tube/float

Material floats	POM Ø40 x 27	PVC Ø42 x 44	PP Ø30 x 44	NER Ø30 x 44	1.4571 Ø45 x 47	1.4571 Ø52
Material connecting head						
Material switching tube						



1.4571 / G-AI SI 12	1.4571	A	V	T	R	N	E
—	MS 63	—	—	—	—	—	—
PVC / G-AI SI 12	PVC	K	D	I	U	—	—

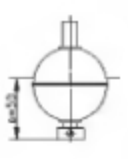
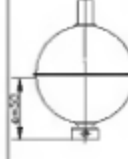


1.4571 / G-AI SI 12	1.4571	A	V	T	R	N	E
—	MS 63	—	—	—	—	—	—
PVC / G-AI SI 12	PVC	K	D	I	U	—	—

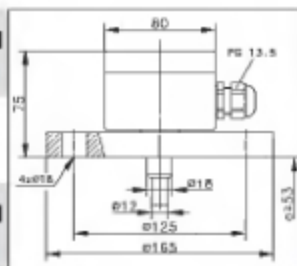


1.4571 / G-AI SI 12	1.4571	A	V	T	R	N	E
—	MS 63	—	—	—	—	—	—
PVC / Polyester	PVC	K	D	I	U	—	—

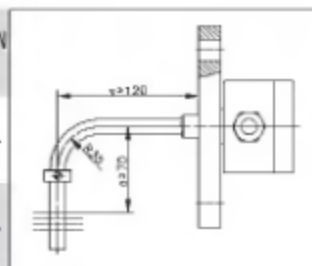
5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching capacity	Connecting head	Standard programme		Special features (see page 247)
7	□	□		□	□	S		□

		Number of switching points	Switching function	Switching capacity	Connecting head	
1.4571 Ø62	1.4571 Ø84	↓	↓	↓	↓	
		1 switching point 2 switching points 3 switching points	1 normally-closed contact 2 normally-open contact 3 changeover contact 4 mixed version (CO, NC, NO)	max. 0.5 A - 30VA - 250 V max. 1A - 60VA - 250 V	straight type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) ver- sions.	bent type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) ver- sions.
					ID letter connecting head	ID letter connecting head

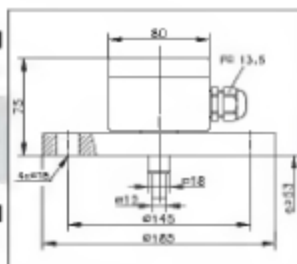
B	G	1/2/3	1/2/3/4	K	L	DN 50
---	---	-------	---------	---	---	----------



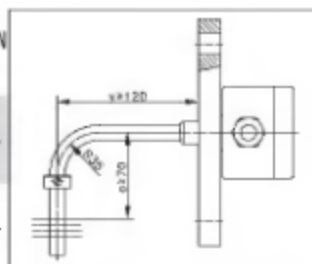
WDN 50



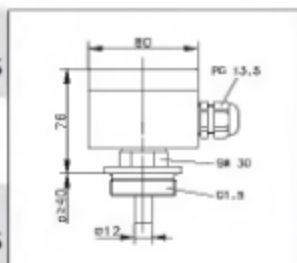
B	G	1/2/3	1/2/3/4	K	L	DN 65
---	---	-------	---------	---	---	----------



WDN 65



B	G	1/2/3	1/2/3/4	K	L	R 1.5
---	---	-------	---------	---	---	----------



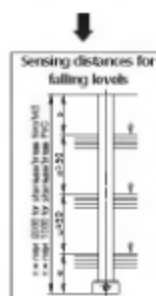
		1/2/3	1/2/3/4	K	L	R 1.5
--	--	-------	---------	---	---	----------

Standard float switches

Type code

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/float	
Type	M	A	Ⓚ	-

Min./max. dimensions



Combination switching tube/float

Material floats	POM 040 x 27	PVC 042 x 44	PP 030 x 44	NER 030 x 44	1.4571 045 x 47	1.4571 052
Material connecting head						
Material switching tube						

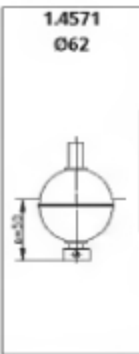



1.4571 / G-AI SI 12	1.4571	A	V	T	R	N	E
—	MS 63	—	—	—	—	—	—
PVC / polyester	PVC	Ⓚ	D	I	U	—	—

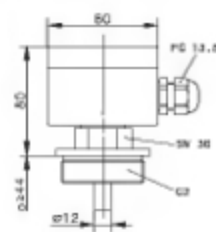
Ordering examples MAK-721 KR25

with specification o=____; u=____ (see order form page 261)

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching capacity	Connecting head	Standard programme		Special features (s. below)
7	②	①		Ⓚ	Ⓜ	S		

		Number of switching points	Switching function	Switching capacity	Connecting head	
		↓	↓	↓	↓	↓
1.4571 Ø62	1.4571 Ø84	1 switching point 2 switching points 3 switching points	1 normally-closed contact 2 normally-open contact 3 changeover contact 4 mixed version (CO, NC, NO)	max. 0.5 A - 30VA - 250 V max. 1A - 60VA - 250 V	straight type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.	bent type type in illustration in 1.4571 material. Slight variations may occur for PVC and MS (brass) versions.
		ID letter connecting head			ID letter connecting head	

B	G	1 ② 3	① 2 / 3 / 4	Ⓚ	L	Ⓜ
—	—	—	—	—	—	—
—	—	1/2/3	1/2/3/4	K	L	R2



Special features

- Temperature monitoring
PT 100 (P1) / PT 1000 (P10)
- Bi-metal switch

We can produce tailor-made designs for specific applications to suit individual customer requirements.

4	5	6	7	8	9	10
Endure material		Terminal housing		Switching function		Characteristics (see page 247)
□	-	□	-	□		□

Endure material	Terminal housing	Switching function			
↓	↓	↓			
<p>Ni = 1.4571</p> <p>MS = MS 63</p> <p>PP = polypropylene</p> <p>PVC = polyvinyl chloride version</p>	Version	see page 6			
		<p>S = Normally-open contact (250 V-0.5 A-10 VA)</p> <p>O = Normally-dosed contact (250 V-0.5 A-10 VA)</p> <p>U = Changeover contact (100 V-0.3 A-3 VA)</p>			
			X = max. total length	max. number of switching points	Cable length in m

Ni		S	O	U	1000	3	1
MS		S	O	U	1000	3	1
PP		S	O	U	40.5	1	1
PVC		S	O	U	500	3	1
Ni		S	O	U	1000	3	1
MS		S	O	U	1000	3	1
PP		S	O	U	40.5	1	1
PVC		S	O	U	500	3	1
Ni		S	O	U	1000	3	—
MS		S	O	U	1000	3	—
PP		S	O	U	40.5	1	—
PVC		S	O	U	500	3	—

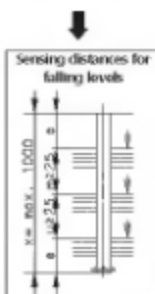
Mini-level float switches

Type code

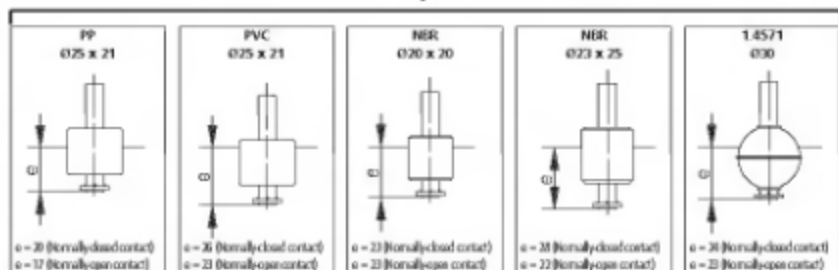
Ordering examples
s. page 246

Position	1	2	3
Version	Mini level float switch	Float	
Type	MS	□	-

Min./max. dimensions



Float



Connection thread

Pg 7



MS-01-PA-FL36-05



MS-01-PA-FL36-05



	K1	K2	K3	K4	N1
	K1	K2	K3	K4	N1
	K1	—	K3	K4	—
	—	K2	K3	K4	—
	—	—	—	—	—
	—	—	—	—	—

4	5	6	7	8	9	10
Endure material		Terminal housing		Switching function		Characteristics (see page 247)
□	-	□	-	□		□

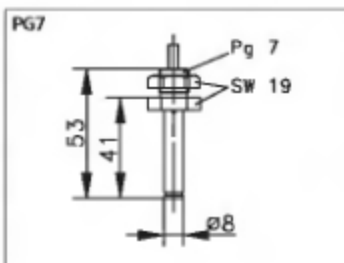
Endure material	Terminal housing	Switching function			
↓	↓	↓			
<p>Ni = 1.4571</p> <p>MS = MS 63</p> <p>PP = polypropylene</p> <p>PVC = polyvinyl chloride</p> <p>Version</p>	Version	<p>see page 6</p> <p>S = Normally-open contact (250 V-0.5 A-10 VA)</p> <p>O = Normally-dosed contact (250 V-0.5 A-10 VA)</p> <p>U = Changeover contact (100 V-0.3 A-3 VA)</p>	X = max. total length	max. number of switching points	Cable length in m

Ni

MS

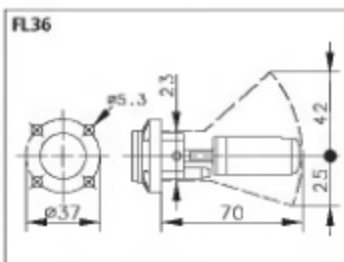
PP

PVC



S	O	U	1000	3	1
S	O	U	1000	3	1
S	O	U	40.5	1	1
S	O	U	500	3	1

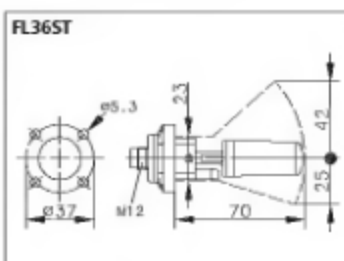
PA12
(Enclosure & float)



S O —
(with 1 m cable)

for lateral
mounting

PA12
(Enclosure & float)




S O —
(with plug)

for lateral
mounting

Adjustable float switches

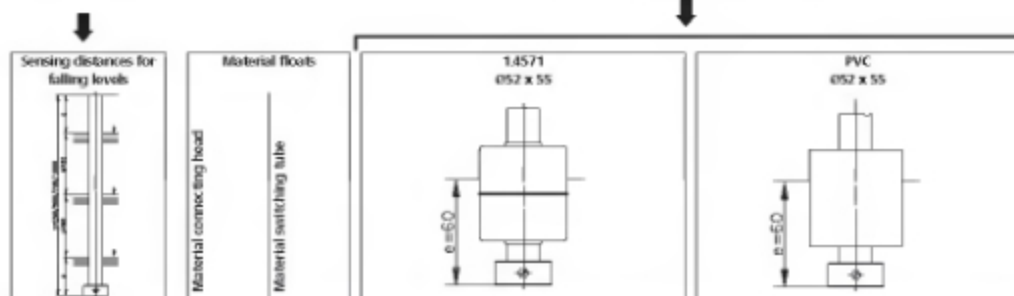
Type code

Ordering examples
s. page 206

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/floats	
Type	M	A		-

Min./max. dimensions

Combination switching tube/float
(technical data see page 258 ff)





1.4571 / G-Al SI 12	1.4571	N	V
—	MS 63	—	—
PVC / Polyester	PVC	—	D




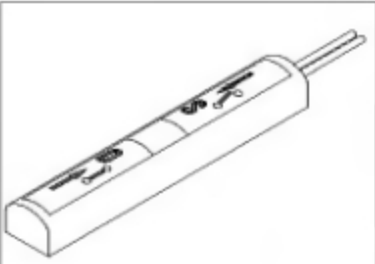
1.4571 / G-Al SI 12	1.4571	N	V
—	MS 63	—	—
PVC / Polyester	PVC	—	D



1.4571 / G-Al SI 12	1.4571	N	V
—	MS 63	—	—
PVC / Polyester	PVC	—	D

5	6	7	8
Adjustable	Connecting head		Length
VST		/	

Note!
Switching devices
without switching
modules!
Order separately,
please!


Terminal housing	Length	Switching module	Max. number switching modules/ switching units												
<p>↓</p> <p>Version</p> 	<p>↓</p> <p>Other lengths (mm) on request</p>	 <p>Normally-closed contact/ normally-open contact Changeover contact</p>	<table border="1"> <thead> <tr> <th>Normally-closed contact/ normally-open contact</th> <th>Changeover contact</th> </tr> </thead> <tbody> <tr> <td>Lengths</td> <td>Lengths</td> </tr> <tr> <td>250 mm</td> <td>250 mm</td> </tr> <tr> <td>500 mm</td> <td>500 mm</td> </tr> <tr> <td>750 mm</td> <td>750 mm</td> </tr> <tr> <td>1000 mm</td> <td>1000 mm</td> </tr> </tbody> </table>	Normally-closed contact/ normally-open contact	Changeover contact	Lengths	Lengths	250 mm	250 mm	500 mm	500 mm	750 mm	750 mm	1000 mm	1000 mm
Normally-closed contact/ normally-open contact	Changeover contact														
Lengths	Lengths														
250 mm	250 mm														
500 mm	500 mm														
750 mm	750 mm														
1000 mm	1000 mm														

Version	Other lengths (mm) on request	Switching module	Max. number switching modules/ switching units
FL165 	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3
FL185 	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3
R1.5 	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069 491.6007.075	2 / 3 / 4 / 4 2 / 3 / 3 / 3

Adjustable float switches

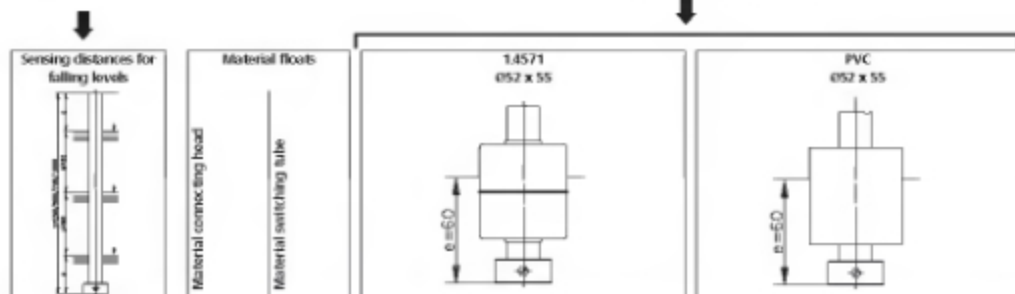
Type code

Ordering examples
s. page 206

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Combination switching tube/floats	
Type	M	A		-

Min./max. dimensions

Combination switching tube/float
(technical data see page 258 ff)





1.4571 / G-AI Si 12	1.4571	N	V
—	MS 63	—	—
PVC / Polyester	PVC	—	D




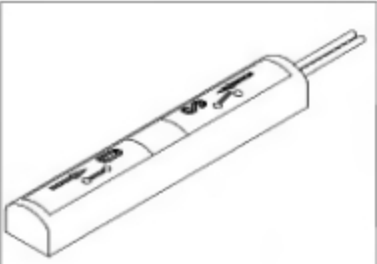
G-AI Si 12	1.4571	N	V
G-AI Si 12	MS 63	P	L
G-AI Si 12	PVC	—	D

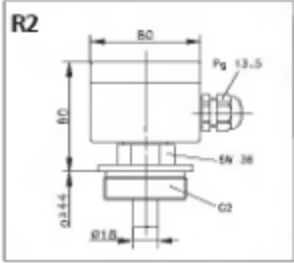
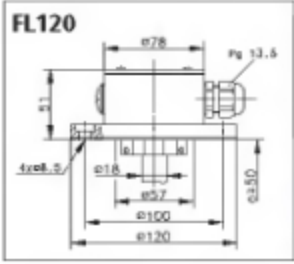
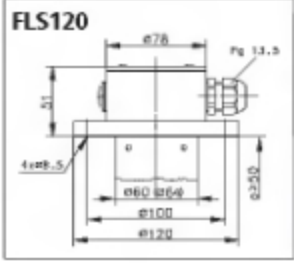


G-AI Si 12	1.4571	—	—
G-AI Si 12	MS 63 protect: CuZn37	P	L
G-AI Si 12	PVC	—	—

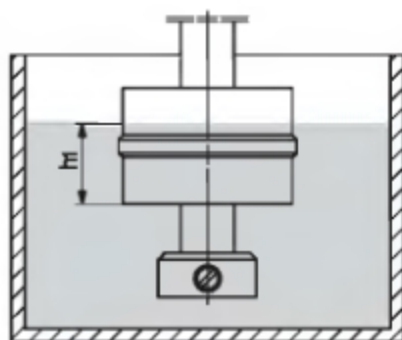
5	6	7	8
Adjustable	Connecting head		Length
VST		/	

Note!
Switching devices
without switching
modules!
Order separately,
please!

Terminal housing	Length	Switching module	Max. number switching modules/ switching units												
<p>↓</p> <p>Version</p> 	<p>↓</p> <p>Other lengths (mm) on request</p>	 <p>Normally-closed contact/ normally-open contact</p> <p>Changeover contact</p>	<table border="1"> <thead> <tr> <th>Normally-closed contact/ normally-open contact</th> <th>Changeover contact</th> </tr> </thead> <tbody> <tr> <td>Lengths</td> <td>Lengths</td> </tr> <tr> <td>250 mm</td> <td>250 mm</td> </tr> <tr> <td>500 mm</td> <td>500 mm</td> </tr> <tr> <td>750 mm</td> <td>750 mm</td> </tr> <tr> <td>1000 mm</td> <td>1000 mm</td> </tr> </tbody> </table>	Normally-closed contact/ normally-open contact	Changeover contact	Lengths	Lengths	250 mm	250 mm	500 mm	500 mm	750 mm	750 mm	1000 mm	1000 mm
Normally-closed contact/ normally-open contact	Changeover contact														
Lengths	Lengths														
250 mm	250 mm														
500 mm	500 mm														
750 mm	750 mm														
1000 mm	1000 mm														

Terminal housing	Length	Switching module	Max. number switching modules/ switching units		
<p>R2</p> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
<p>FL120</p> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
<p>FLS120</p> 	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	491.0007.069	491.6007.075	2 / 3 / 4 / 4	2 / 3 / 3 / 3

Float standard programme



ID letter: A/M/K
Dimension (mm) Ø40 x 27
Material PCM

Depth of immersion ht(mm)	Weighting y (g/cm ³)
18	1
20	0.9
22.5	0.8
26	0.7

Part No.: 494.5206.009



ID letter: T/C/I
Dimension (mm) Ø30 x 44
Material PP

Depth of immersion ht(mm)	Weighting y (g/cm ³)
27.5	1
30.5	0.9
34.5	0.8
39.5	0.7

Part No.: 494.5203.019



ID letter: I/U/S/U
Dimension (mm) Ø30 x 44
Material HR

Depth of immersion ht(mm)	Weighting y (g/cm ³)
19.5	1
22	0.9
24.5	0.8
28	0.7

Part No.: 494.5203.031



ID letter: W/L/D
Dimension (mm) Ø42 x 44
Material PVC

Depth of immersion ht(mm)	Weighting y (g/cm ³)
25	1
27.5	0.9
30.5	0.8
35	0.7

Part No.: 494.5215.029



ID letter: N/P
Dimension (mm) Ø44 x 45
Material 1.4571

Depth of immersion ht(mm)	Weighting y (g/cm ³)
32	1
35	0.9
39	0.8
45	0.7

Part No.: 494.2101.002



ID letter: E/F
Dimension (mm) Ø52
Material 1.4571

Depth of immersion ht(mm)	Weighting y (g/cm ³)
32	1
34	0.9
37	0.8
43	0.7

Part No.: 494.2105.003



ID letter: E/P
Dimension (mm) Ø62
Material 1.4571

Depth of immersion ht(mm)	Weighting y (g/cm ³)
33	1
35	0.9
38	0.8
42	0.7

Part No.: 494.2102.001



ID letter: G/H
Dimension (mm) Ø84
Material 1.4571

Depth of immersion ht(mm)	Weighting y (g/cm ³)
33	1
35	0.9
38	0.8
42	0.7

Part No.: 494.2101.004



Adjustable floats

ID letter:	V/U/D
Dimension (mm):	052 x 55
Material:	PVC
Depth of immersion	Weighting
ht(mm)	y (g/cm ³)
29	1
32	0.9
36	0.8
42	0.7
Part No.:	494.5216.002




ID letter:	N/P
Dimension (mm):	052 x 55
Material:	1.4571
Depth of immersion	Weighting
ht(mm)	y (g/cm ³)
33	1
36	0.9
40.5	0.8
46	0.7
Part No.:	494.2299.023



Miniature floats

ID letter:	K1
Dimension (mm):	025 x 21
Material:	PP
Depth of immersion	Weighting
ht(mm)	y (g/cm ³)
12	1
13	0.9
14.5	0.8
16.5	0.7
Part No.:	494.5207.021




ID letter:	K2
Dimension (mm):	025 x 21
Material:	PVC
Depth of immersion	Weighting
ht(mm)	y (g/cm ³)
15	1
16	0.9
18.5	0.8
-	0.7
Part No.:	494.5207.022




ID letter:	K4
Dimension (mm):	022 x 25
Material:	NBR
Depth of immersion	Weighting
ht(mm)	y (g/cm ³)
16	1
17.5	0.9
19.5	0.8
22	0.7
Art. Nr.:	494.5211.024



ID letter:	K3
Dimension (mm):	020 x 20
Material:	NBR
Depth of immersion	Weighting
ht(mm)	y (g/cm ³)
15	1
17	0.9
-	0.8
-	0.7
Part No.:	494.5210.020



ID letter:	N1
Dimension (mm):	030
Material:	1.4571
Depth of immersion	Weighting
ht(mm)	y (g/cm ³)
18	1
19	0.9
21	0.8
24	0.7
Art. Nr.:	494.2309.016



Technical data

Standard magnetic float switches



Electrical data

Switching function	Changeover contact /normally-closed contact/normally-open contact	Changeover contact /normally-closed contact/normally-open contact
Contact ID letter	K	L
Rated voltage (max)	250 V AC/DC	250 V AC/DC
Rated current (max)	0.5 A	1 A
Switching capacity (max)	30 VA	60 VA

Mechanical data

Container connection options	Flange enclosures FD 120 mm Flange enclosures FD 77 mm Flange enclosures FD 165 mm Flange enclosures FD 185 mm Cable gland PG 9 Cable gland R3/8" Cable gland R1/5" with plug connection DIN 43650 Oval flange 75 x 50 mm with plug-in connec. DIN 43650	Flange enclosures FD 120 mm Flange enclosures FD 77 mm Flange enclosures FD 165 mm Flange enclosures FD 185 mm Cable gland PG 9 Cable gland R3/8" Cable gland R1/5" with plug connection DIN 43650 Oval flange 75 x 50 mm with plug-in connec. DIN 43650
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Materials (welding tube)

	Stainless steel 1.4571	Stainless steel 1.4571
	MS 63	MS 63
	PVC	PVC

Float variants

A / M / K	Cylinder float	FD 40 x 27 mm (PCM)	A / M / K	Cylinder floats	FD 40 x 27 mm (PCM)
T / C / I	Cylinder float	RD 30 x 44 mm (PP)	T / C / I	Cylinder floats	RD 30 x 44 mm (PP)
V / D	Cylinder float	RD 42 x 44 mm (NBR)	V / D	Cylinder floats	RD 42 x 44 mm (NBR)
R / S	Cylinder float	RD 30 x 44 mm (NBR)	R / S	Cylinder floats	RD 30 x 44 mm (NBR)
N / P	Cylinder float	RD 44 x 45 mm (stainless steel)	N / P	Cylinder floats	RD 44 x 45 mm (stainless steel)
E / F	Ball float	RD 52 mm (stainless steel)	E / F	Ball floats	RD 52 mm (stainless steel)
B / O	Ball float	RD 62 mm (stainless steel)	B / O	Ball floats	RD 62 mm (stainless steel)
G / H	Ball float	RD 84 mm (stainless steel)	G / H	Ball floats	RD 84 mm (stainless steel)

Ambient conditions

Protection type (DIN 40050)	IP 65 (up to IP 68, on request)	IP 65 (up to IP 68, on request)
Temperature range	-5°C to 60°C (from -30°C to 150°C, on request)	-5°C to 60°C (from -30°C to 150°C, on request)
Pressure	5 bar (up to 25 bar, on request)	5 bar (up to 25 bar, on request)

Technical data

Miniature magnetic float switches



Electrical data

Switching function	Normally-closed contact/ normally-open contact	Changeover contact/ normally-closed contact/ normally-open contact
Contact ID letter	B	X
Rated voltage (max)	250 V AC/DC	100 V AC/DC
Rated current (max)	0.5 A	0.3 A
Switching capacity (max)	10 VA	3 VA

Mechanical data

Container connection options	Cable gland Pg 7	Cable gland Pg 7
	Cable gland R1/8"	Cable gland R1/8"
	Cable gland R3/8"	Cable gland R3/8"
	Cable gland R3/8" with plug	Cable gland R3/8" with plug

Materials: switching tube	Stainless steel 1.4571	Stainless steel 1.4571
	PP	PP
	PVC	PVC
	MS 63	MS 63

Float variant	K1 / Cylinder floats FD 25 x 20 mm (PP)	K1 / Cylinder floats FD 25 x 20 mm (PP)
	K2 / Cylinder floats FD 25 x 20 mm (PVC)	K2 / Cylinder floats FD 25 x 20 mm (PVC)
	K3 / Cylinder floats FD 20 x 20 mm (NBR)	K3 / Cylinder floats FD 20 x 20 mm (NBR)
	K4 / Cylinder floats FD 23 x 25 mm (NBR)	K4 / Cylinder floats FD 23 x 25 mm (NBR)
	H1 / Ball floats FD 30 mm (stainless steel)	H1 / Ball floats FD 30 mm (stainless steel)

Ambient conditions

Protection type (DIN 40050)	IP 65 (up to IP 68, on request)	IP 65 (up to IP 68, on request)
Temperature range	-5°C to 60°C (from -30°C to 150°C, on request)	-5°C to 60°C (from -30°C to 150°C, on request)
Pressure	5 bar (up to 15 bar, on request)	5 bar (up to 15 bar, on request)

Technical data

Adjustable magnetic float switches



Electrical data

Contact ID letter	F	L
Switching module type	FEEDK KPL F NA	FEEDK KPL F MA
Part No.	491.0007.046	491.6007.075
Switching function	Normally-open contact / normally-closed contact Φ	Changeover contact Φ
Rated voltage (max)	250 V AC/DC	250 V AC/DC
Rated current (max)	5 A	1 A
Switching capacity (max)	250 VA	60 VA

Mechanical data

Container connection options	Range DN 50 (PVC / stainless steel) Range DN 65 (PVC / stainless steel) Cable gland R1.5" (PVC / stainless steel) Cable gland R2" (PVC / stainless steel) Range end. RD 120 mm (with gush protect. possible)	Range DN 50 (PVC / stainless steel) Range DN 65 (PVC / stainless steel) Cable gland R1.5" (PVC / stainless steel) Cable gland R2" (PVC / stainless steel) Range end. RD 120 mm (with gush protect. possible)
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Materials switching tube	Stainless steel 1.4571 MS 63 PVC	Stainless steel 1.4571 MS 63 PVC
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Float variants	N / P Cylinder floats RD 52 x 55 mm (stainless steel) V / D / L Cylinder floats RD 52 x 55 mm (PVC)	N / P Cylinder floats RD 52 x 55 mm (stainless steel) V / D / L Cylinder float: RD 52 x 55 mm (PVC)
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Ambient conditions

Protection class (DIN 40050)	IP 65 (up to IP 68, on request)	IP 65 (up to IP 68, on request)
Temperature range	-5°C to 60°C (from -30°C to 150°C, on request)	-5°C to 60°C (from -30°C to 150°C, on request)
Pressure	5 bar (up to 15 bar, on request)	5 bar (up to 15 bar, on request)

FAX

**Order form and questionnaire
for magnetic float switches**

Standard tube diameter 12 mm

Page _____ from _____
Date: _____

Address:

Sender:

Bernstein AG
Tieloser Weg 6
D-32457 Porta Westfalica

Phone: +49-(0)5 71/7 93-0

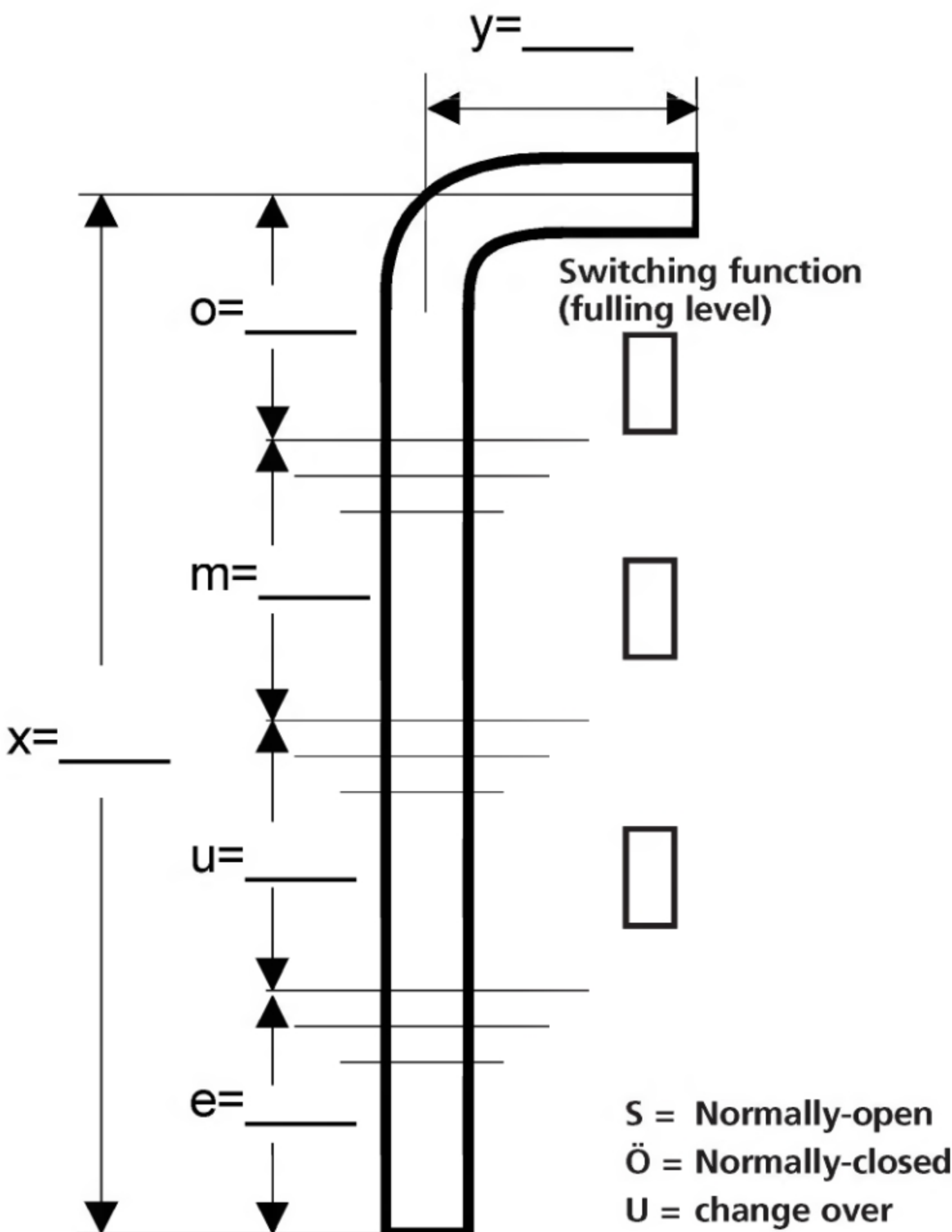
Fax: +49-(0)5 71/7 93-5 55

Company: _____
Customer No.: _____
Contact: _____
Department: _____
Street: _____
Town: _____
Phone: _____
Fax: _____

Type _____
Position 1 2 3 4 5 6 7 8 9 10 11 12 13

Enquiry _____ pieces

Order _____ pieces



Operational environment:
Pressure: _____ bar Temperature: _____ °C
Container dimens.: _____ mm Medium: _____
Cable length: _____ m Separate contact type
Mounting options: from above
 from below
 lateral

Other comments:

Type matrix of inductive sensors

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
K	I	N	-	T	1	2	N	S	/	0	0	4	-	K	L	2		
Product group				Housing design			Output		Sensing distance				Options					

1 K = Non-contact proximity switch

2 I = Inductive

3 B = flush installation
N = non-flush installation
R = Ring sensor

4 Always a dash

5 M = metric threaded barrel (metal)

T = metric threaded barrel (plastic)

D = smooth barrel (metal)

R = smooth barrel (plastic)

Q = rectangular housing (metal)

P = PG threaded barrel (metal)

E = rectangular housing (plastic)

S = Slot sensor (plastic)

N = standard fixing (in accordance with DIN 50025/50037)

6/7 two-digit number

- Smooth barrel types = diameter in mm
- Threaded barrel types = standard designation
- Rectangular devices = continuing design numbers

Design Examples:

- S03 = Slot type sensor
- Q08 = 8 x 8 x 49 mm, side sensing
- M32 = M32 x 1.5 mm, threaded barrel
- D08 = 8 mm diameter (metal)
- R22 = 22 mm diameter (plastic)
- E68 = 68 x 30 x 15 mm
- N44 = 41.5 x 41.5 x 120 mm (Euro standard housing)

8 P = PNP

N = NPN

A = AC 2-wire

E = NAMUR

Z = DC 2-wire

Q = AC triac

T = Thyristor (AC 3-wire)

G = Push/pull

D = Dual output NPN/PNP switching device

9 S = Normally open contact

O = Normally closed contact

P = Programmable

A = Analogue

U = Complementary

10 Slash

11/12/13 Sensing distance

- Examples: 1.5 = 1.5 mm
002 = 2 mm
040 = 40 mm

14 Always a dash

15 K = Short-circuit protected

16 L = LED

17... Cable length
Examples: 2 = 2 m
6 = 6 m

E = Extended sensing distance

V = Short body design

P = Potentiometer

PU = Polyurethane cable

S = Screw termination (terminal compartment)

SD = Plug connection, according to DIN with screw termination

SM = Mini socket snap fit

S8 = M8 quick disconnect screw connector

SM8 = M8 quick disconnect snap or screw connector

S12 = M12 quick disconnect screw type

N = Stainless steel housing

F = High switching frequency

T = High temperature resistance

I = teach in

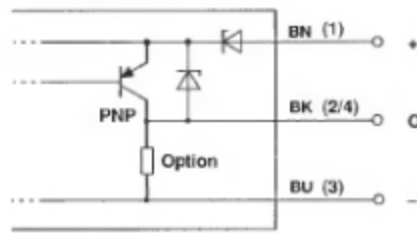
Wiring diagrams electrical outputs DC

Definition of cable colours

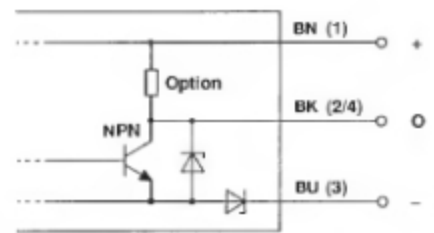
BN = brown
BU = blue
BK = black (Output)

Association of the cable colours to the connection pins of the cable couplings see page 276 ff.
This association is not valid for all plugs and couplings

PNP output (Principle wiring diagram)



NPN output (Principle wiring diagram)



1) PNP normally open

PNP transistor switches the output high.



2) PNP normally closed

PNP transistor disconnects the positive supply to output.



3) PNP programmable

With the built-in switch the position PNP N/O 1) or PNP N/C 2) can be chosen.



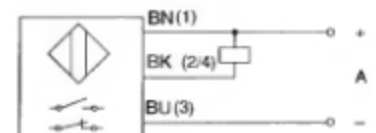
4) NPN normally open

NPN Transistor switches the output low.



5) NPN normally closed

NPN transistor disconnects the negative supply to output.



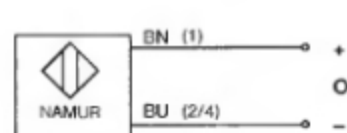
6) NPN programmable

With the built-in switch the function NPN N/O 4) or NPN N/C 5) can be chosen.



7) PNP/NPN programmable

With two built-in switches PNP or NPN and between NO or NC function can be chosen.



8) NAMUR

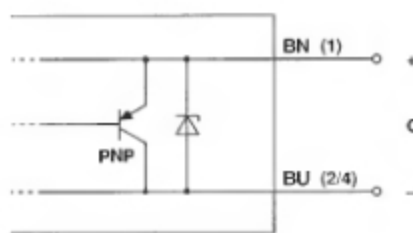
Current change according to DIN EN 60947-5-6.

Wiring diagrams of DC output types

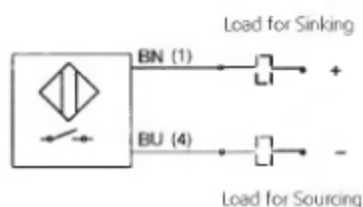
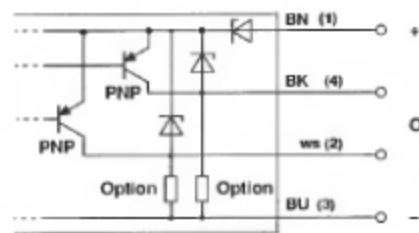
Key to colour coding of cable

BN = brown
 BU = blue
 BK = black (switching output)
 WH = white (switching output)

DC 2-wire
 (Principle wiring diagram)

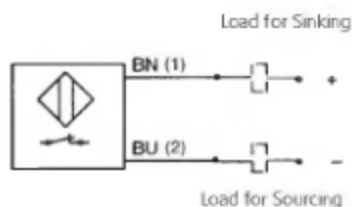


DC 4-wire
 (Principle wiring diagram)



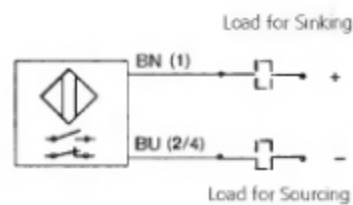
1) Normally open DC 2-wire

During operation, the contacts are bonded.



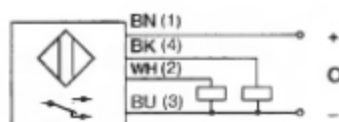
2) Normally closed DC 2-wire

During operation, the contacts are separated.



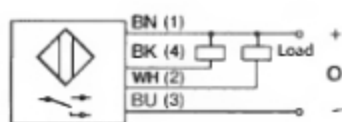
3) Switch selectable DC 2-wire

The 1) normally-open and 2) normally closed functions can be selected via an integrated switch.



4) Complementary output DC PNP 4-wire

During operation, the positive operating voltage is applied alternatively to both outputs.



5) Complementary output DC NPN 4-wire

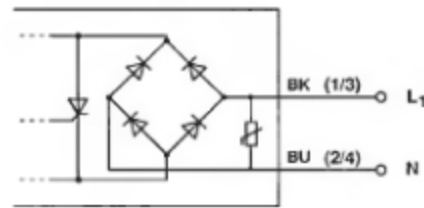
During operation, the negative operating voltage is applied alternatively to both outputs.

Wiring diagrams of AC output types

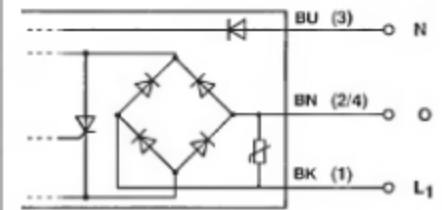
Key to colour coding of cable

BN = brown
BU = blue
BK = black

AC 2-wire (Principle wiring diagram)



AC 3-wire (Principle wiring diagram)



1) Normally open AC 3-wire

During operation, a thyristor which is positioned above a rectifier bridge applies the operating voltage to the output.



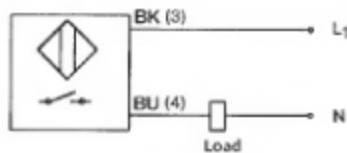
2) Normally closed AC 3-wire

During operation, a thyristor which is positioned above a rectifier bridge separates the operating voltage from the output.



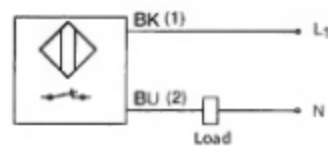
3) Switch selectable AC 3-wire

The 1) normally open and 2) normally-closed AC functions can be selected via an integrated switch.



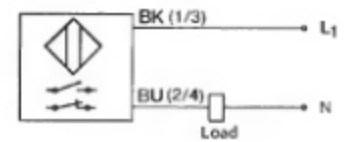
4) Normally open AC 2-wire

During operation, a thyristor which is positioned above a rectifier bridge applies the load to the operating voltage.



5) Normally closed AC 2-wire

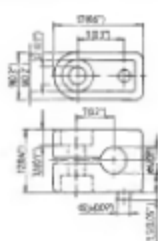
During operation, a thyristor which is positioned above a rectifier bridge separates the load from the operating voltage.



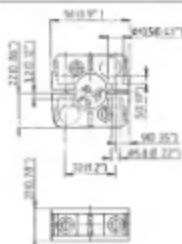
6) Switch selectable AC 2-wire

The 4) normally-open and 5) normally-closed AC functions can be selected via an integrated switch.

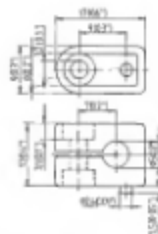
Mounting brackets



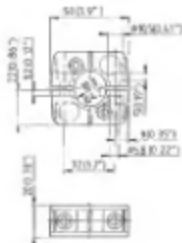
③ Type BKB-D04FA
Part number 596.0223.069



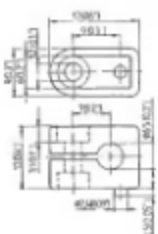
⑥ Type BKS-D20FA
Part number 596.0223.085



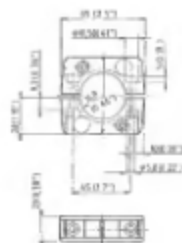
④ Type BKB-D05FA
Part number 596.0223.070



⑦ Type BKS-D22FA
Part number 596.0223.040



⑤ Type BKB-D06FA
Part number 596.0223.071



⑧ Type BKS-D34FA
Part number 596.0223.041

Type matrix of capacitive sensors

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
K	C	N	-	T	1	2	N	S	/	0	0	4	-	K	L	P
Product group			Housing design			Output		Sensing distance			Options					

1 K = Non-contact proximity switch

2 C = Capacitive

3 B = Flush installation
N = Non-flush installation

4 Dash

5 M = Metric threaded barrel (metal housings)
T = Metric threaded barrel (plastic housings)
D = Cylindrical housings (metal)
R = Cylindrical housings (plastic)
Q = Rectangular housings (metal)
E = Rectangular housings (plastic)
N = Standard attachment according to DIN 50025/50037)

6/7 Two-digit number
12 = M 12 x 1 mm threaded barrel
18 = M 18 x 1 mm threaded barrel
30 = M 30 x 1.5 mm threaded barrel
32 = M 32 x 1.5 mm threaded barrel
20 = 20 mm diameter
22 = 22 mm diameter
34 = 34 mm diameter
44 = 40 x 40 x 120 mm
68 = 68 x 30 x 15 mm

8 P = PNP
N = NPN
A = AC 2-wire
R = Relay
G = Push/pull
D = Dual output switching device

9 S = Normally-open contact
Ö = Normally-closed contact
P = Programmable switch
A = Analogue
U = Complementary

10 Slash

11/12/13 Sensing distance

Examples: 1.5 = 1.5 mm
002 = 2 mm
040 = 40 mm

14 Slash

15 K = Short-circuit proof

16 L = LED

17... Cable length
Examples: 2 = 2 m
6 = 6 m

E = Extendible sensing distance
V = Short body design
P = Potentiometer
PU = Polyurethane cable
S = Detachable connection (terminal compartment)
SD = Plug connectors, according to DIN with fitted cable socket
SM = Mini socket snap fit
S8 = M 8 quick disconnect screw type
SM8 = M 8 quick disconnect universal snap and screw
S12 = M 12 quick disconnect screw type
N = Stainless steel housing
F = High switching frequency
T = High temperature resistance

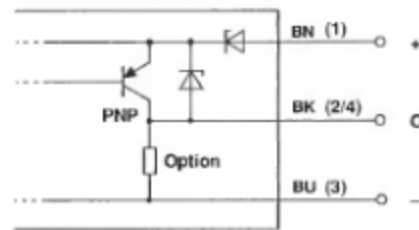
Wiring diagrams of DC output types

Key to colour coding of cable

BN = brown
BU = blue
BK = black

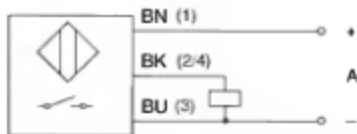
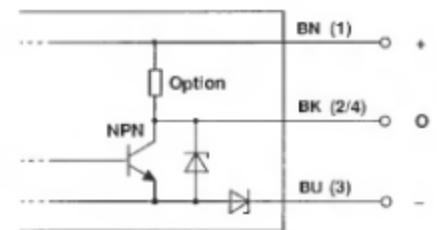
PNP output

(Principle wiring diagram)



NPN output

(Principle wiring diagram)



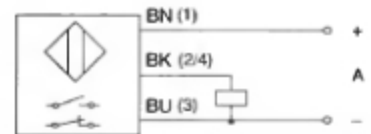
1) PNP Normally open

During operation, output of PNP transistor is switched to positive.



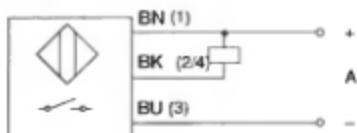
2) PNP Normally closed

During operation, output of PNP transistor is separated from positive pole.



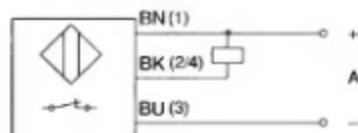
3) PNP Switch selectable

The 1) PNP normally-open and 2) PNP normally-closed functions can be selected via an integrated switch.



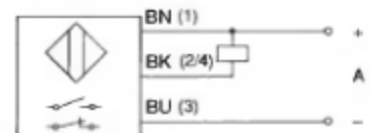
4) NPN Normally open

During operation, output of NPN transistor is switched to negative.



5) NPN Normally closed

During operation, output of NPN transistor is separated from negative pole.



6) NPN Switch selectable

The 4) NPN normally-open and 5) NPN normally-closed functions can be selected via an integrated switch.



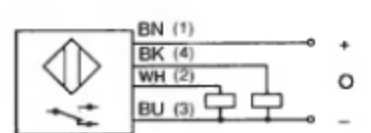
7) PNP/NPN Switch selectable

Two integrated switches selection between PNP/NPN switching and normally-open/closed functions.



8) Push/Pull-programmable

During operation, the output changes from negative to positive pole, invertible by integrated switch.



9) Complementary output PNP 4-wire

During operation, the positive operating voltage is applied alternatively to both outputs.

Wiring diagrams of AC output types

Key to colour coding of cable

BN = brown

BU = blue

BK = black



10) Normally open AC 2-wire

During operation, a thyristor which is positioned above a rectifier bridge separates the load from the operating voltage.

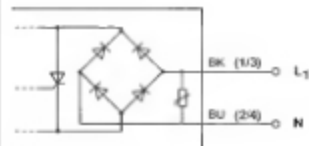


11) Normally closed AC 2-wire

During operation, a thyristor which is positioned above a rectifier bridge separates the load from the operating voltage.

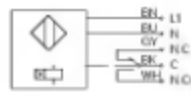
AC 2-wire

(Principle wiring diagram)



12) AC Switch selectable

The 10 normally-open, and 11 normally closed functions can be selected via an integrated switch.



13) AC-Relay

with adjustable operate lag.

Mounting brackets

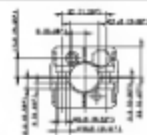
Polyamid

All dimensions in mm (inch)



14) TYPE BKS D20 PA

Part number: 596.0223.005
incl. 2 screws M 5 x 35 mm, DIN 912



15) TYPE BKS D22 PA

Part number: 596.0223.040
incl. 2 screws M 5 x 35 mm, DIN 912



16) TYPE BKS D32 PA

Part number: 596.0223.002
incl. 2 screws M 6 x 45 mm, DIN 912



17) TYPE BKS D34 PA

Part number: 596.0223.041
incl. 2 screws M 5 x 50 mm, DIN 912

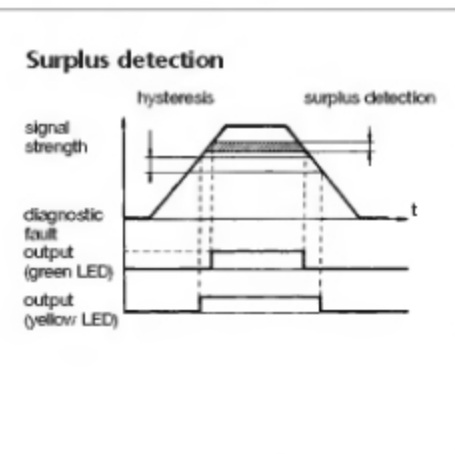
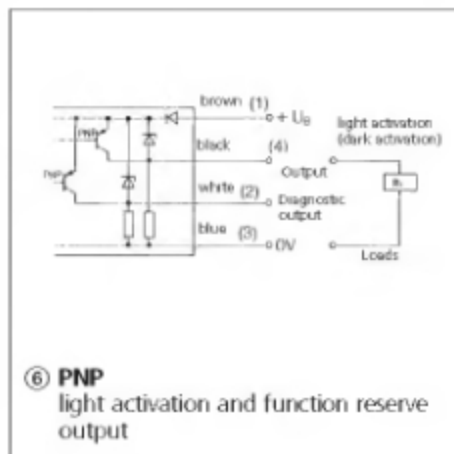
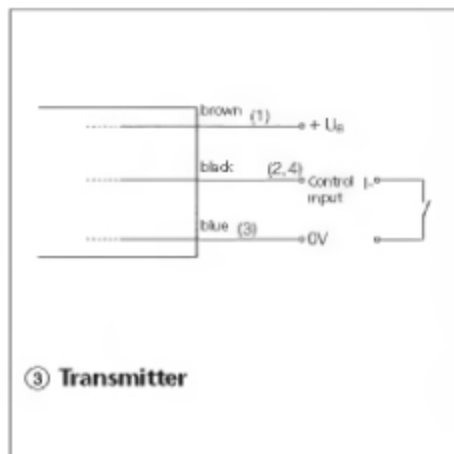
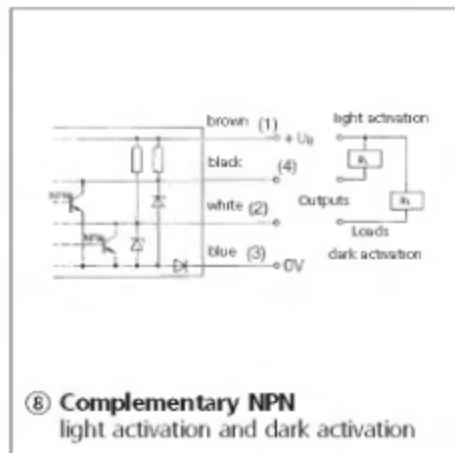
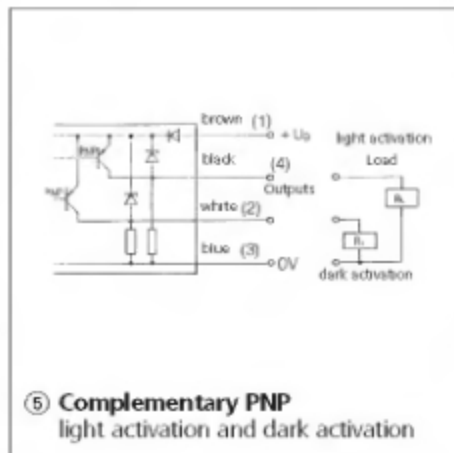
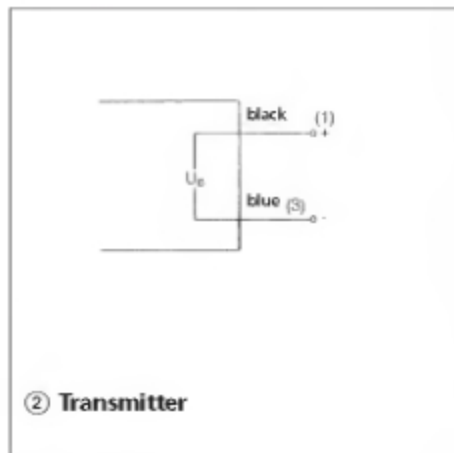
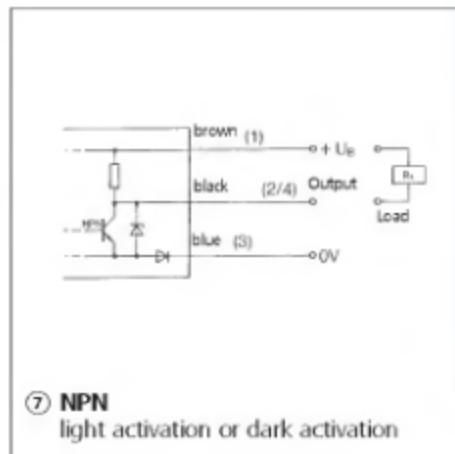
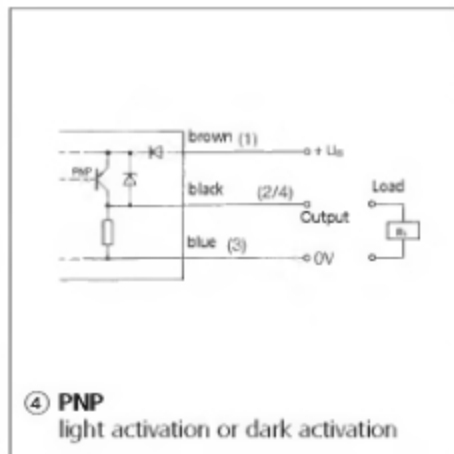
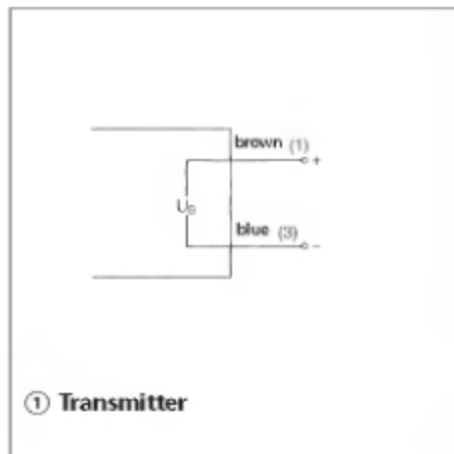


Photoelectric identification codes

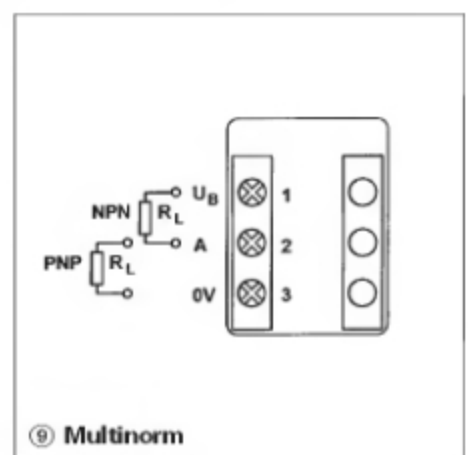
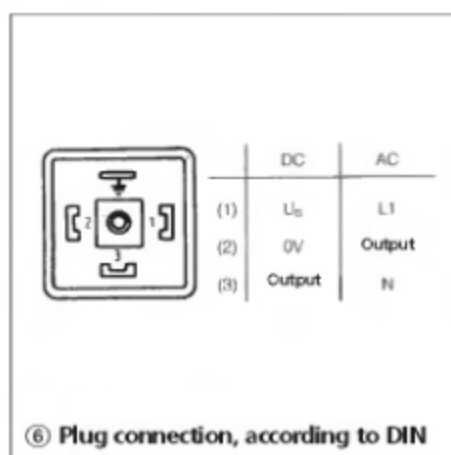
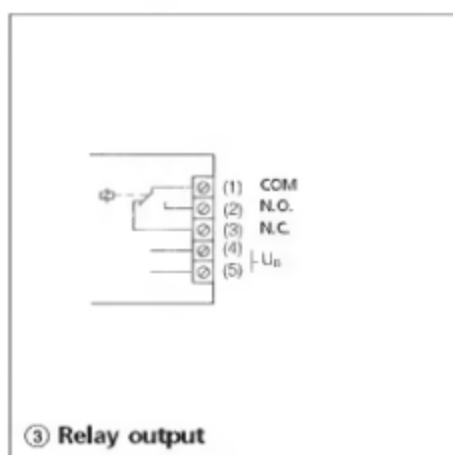
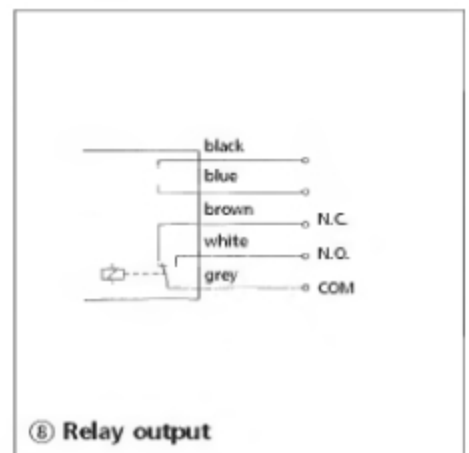
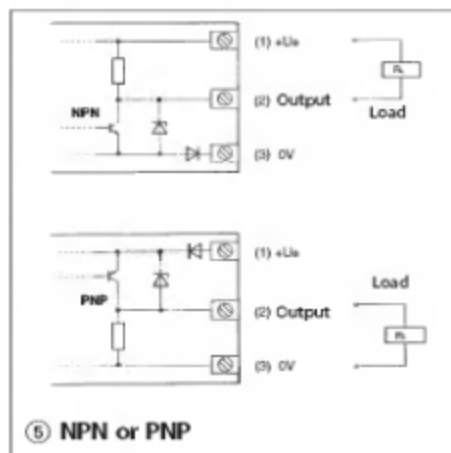
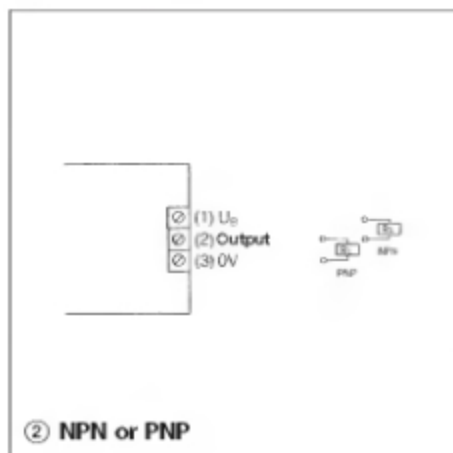
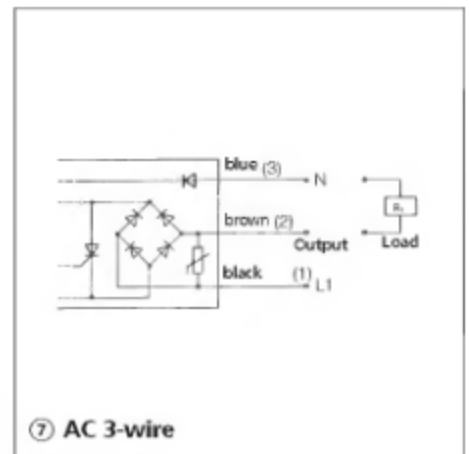
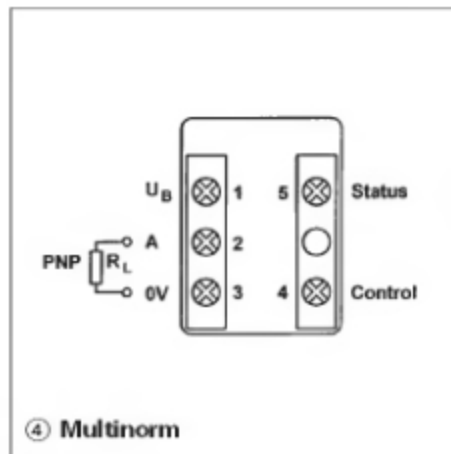
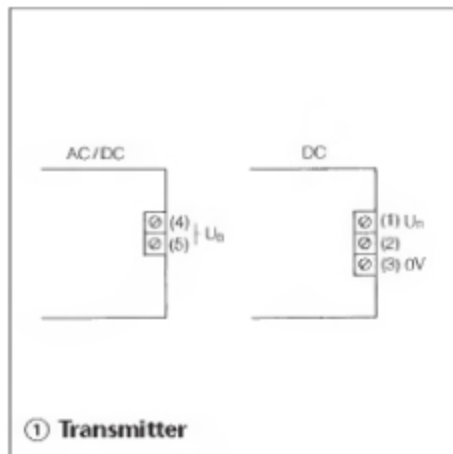
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
O	M	1	2	R	T	-	D	H	T	P	-	0	2	0	0	-	C	L

- 1** O = Photoelectric sensor
- 2** M = Metric metal housing
T = Metric thermoplastic housing
R = Rectangular design
P = Pg. thread size
Z = Cylindrical design
- 3/4** Specification of housing dimensions
e. g. 12 = M 12
18 = M 18
20 = 20 series
90 = 90 series
- 5/6** ES = Through-beam sensor (Complete set)
EE = Through beam, receiver only
SE = Through beam, transmitter only
LC = Fibre optic control (sensor with fibre optics connection)
RH = Diffuse reflective sensors with background suppression)
RS = Retroreflective sensor
RT = Diffuse reflective sensor
FF = Convergent beam sensor, fixed focus
PR = Print registration sensor
PS = Polarised retro sensor
- 7** Dash
- 8** Voltage type
A = AC
D = DC
M = Multivoltage
P = Programmable voltage (AC or DC)
- 9** Output function
A = Complementary L/ADA (light activated / dark activated)
D = Dark activated (DA)
H = Light activated (LA)
O = No output (through-beam transmitter)
P = Selectable L/ADA (light activated / dark activated)
X = Customer-specified output
- 10** Output type
A = Analogue output
N = NAMUR
O = No output
Q = Triac
R = Relay
S = Others
T = Transistor
Y = Thyristor
- 11** N = NPN transistor output (switched to negative)
P = PNP transistor output (switched to positive)
G = Push/pull
S = Through-beam light source
U = Switch selectable PNP/NPN
2 = 2-wire output
3 = 3-wire output
4 = 4-wire output
- 12** Dash
- 13-16** Sensing distance
Sensing distance specifications are always indicated by 4 digits
– mm: without decimal point
– m: with decimal point
e. g. 06.0 = 6 m
e. g. 15.0 = 15 m
e. g. 0500 = 500 mm
- 17** Dash
- 18** Connection type
A = Screw termination
B = Plug with screw terminals
C = Cable (standard C = 2 m or length in m)
S = Plug-in connector
- 19...** Options
C = Control/diagnostic input
D = LED for output indication
E = Adjustable sensitivity
F = Diagnostic circuit with output and LED for indicator
G = LED for output mode, supply voltage and beam control indication
H = LED for supply voltage and output mode indication
L = LED for output indicator
T = Adjustable timer circuit
V = LED for operating voltage indication
X = Customer-specific options
Z = Fixed timer

Wiring diagrams

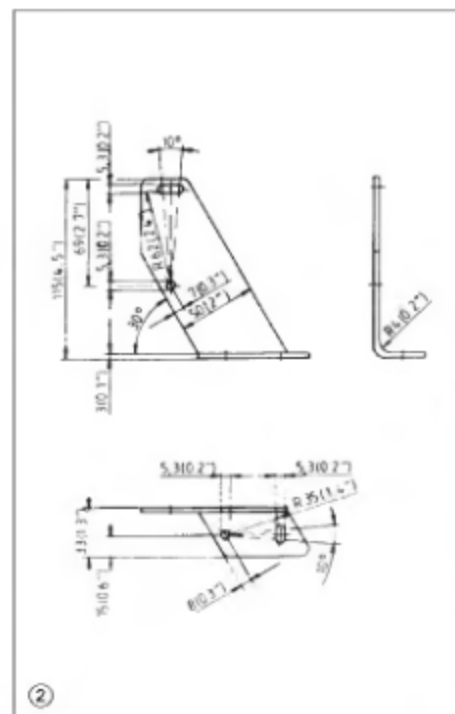
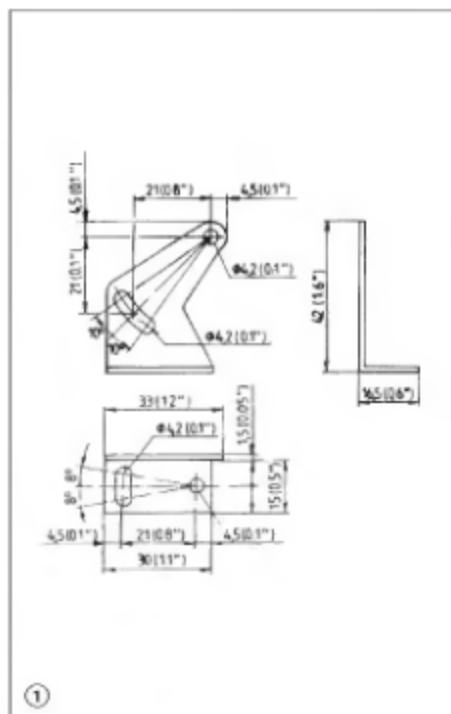


Wiring diagrams

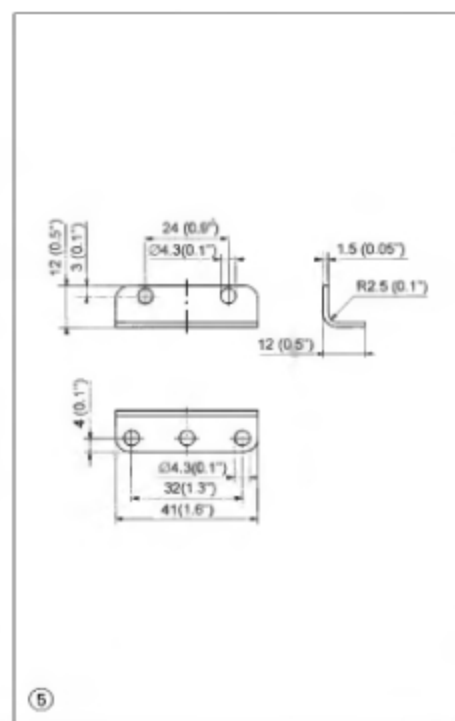
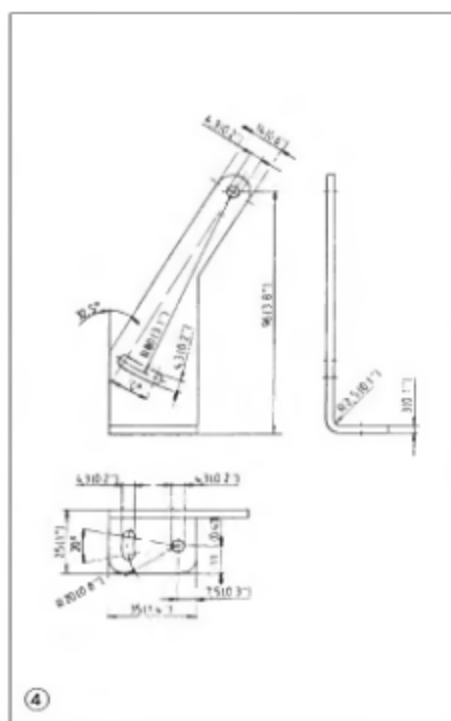
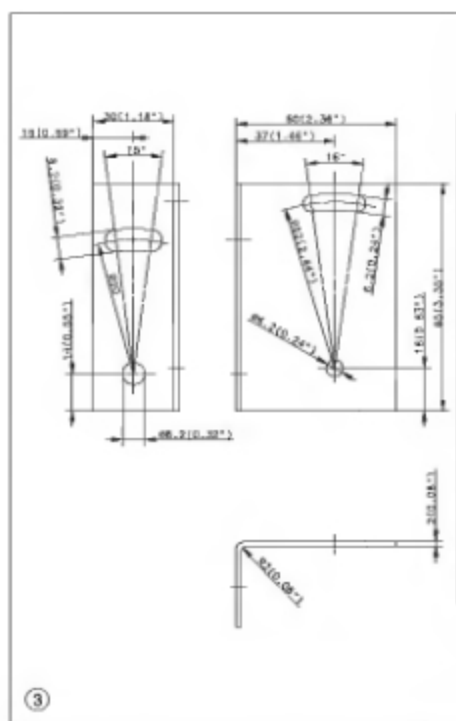


Fixing material

Other mounting brackets on request



Model description	BWN-L05ST KPL	BWN-L20NI KPL
Part number	657.1300.003	657.1200.002
Stock status: Ex stock/Built to order	●/—	●/—



Model description	BWN-L20NI KPL	BWN-L90NI KPL	BWN-L12AL KPL
Part number	657.1200.007	657.1100.001	657.1500.006
Stock status: Ex stock/Built to order	●/—	●/—	●/—

Reflectors

A device called triple reflector is the best solution for the reflection in light barriers. Reflective foils play only a secondary role. Triple reflectors are pyramid-shaped small triple mirrors that are combined to make a single reflecting surface. These three reflecting surfaces are arranged in pyramid shape and in an angle of 90° to each other. They reflect the arriving light beam three times on a single mirroring surface and permit to return it into its original direction (180° reversion). Vibrations, minor movements and variations of up to 30° in relation to the optical axis of the triple reflector do not break the light beam.

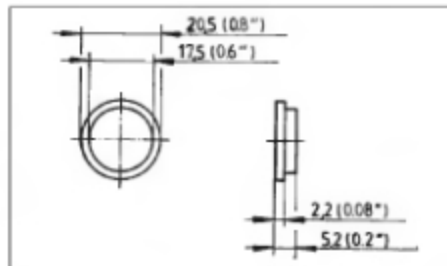
Reflective foils may also be horizontally swung or tilted. However, compared to triple reflectors, their degree of reflection is much decreased as their operation principle is based on small mirrors in connection with micro glass beads. An advantage of reflective foil is its high degree of mounting flexibility. Its reflective performance may be increased by using foil with triple structure, however it does not come near the reflection degree of triple reflectors. In principle a plane mirror should not be used, except when the light beam's angle of incidence corresponds with a high precision to the angle of reflection. Only then a reflection of the light beam can be assured.

The sensing distance specifications of retro-reflective sensors refer to reflectors from the RTS-083 KK or RTS-060 KK series. Basically, the reflector diameter should be selected with regard to the sensing distance and the size of the object to be detected. The ideal case is when the object is larger than the reflector, which is then "shadowed" completely.

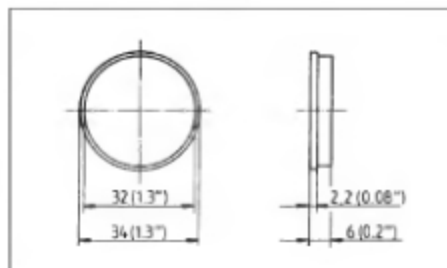
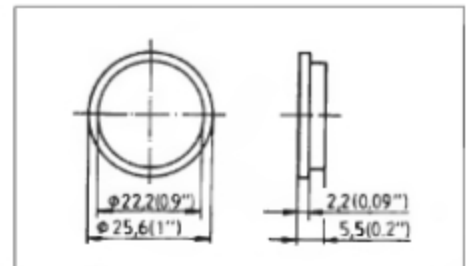
Example: OR20RS

Reflector	Sensing distance
RTS-D17 KK	3.2 m
RTS-D22 KK	3.5 m
RTS-D32 KK	4.0 m
RTS-D83 KK	8.0 m
RTS-60 KK	8.0 m
RFS-100 KK	6.0 m
RTS-120 KK	3.5 m
RTS-500 KK	7.0 m

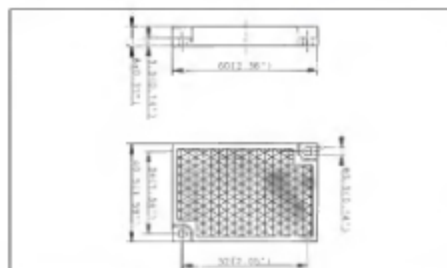
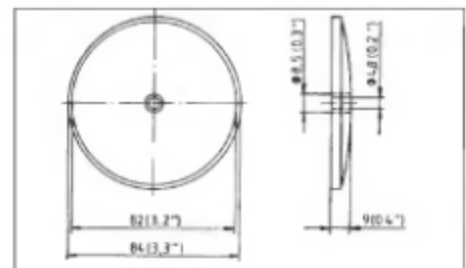
Contact our technical marketing service to obtain information on the sensing distances of other convergent-beam light barriers.



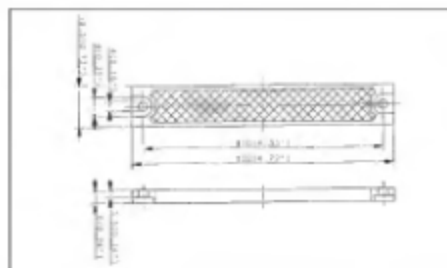
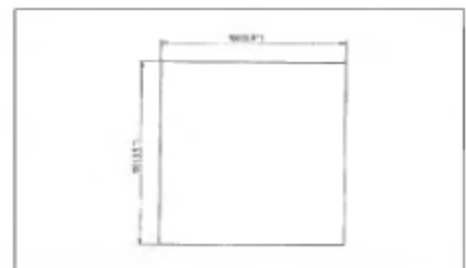
Model description	RTS-D17 KK	RTS-D22 KK
Part number	657.2108.008	657.2109.009
Diameter	17.5 mm (0.69")	22 mm (0.86")
Stock status	Ex stock/Built to order ●/–	●/–



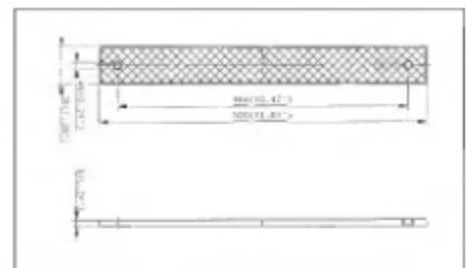
Model description	RTS-D32 KK	RTS-D83 KK
Part number	657.2110.010	657.2107.003
Diameter	32 mm (1.14")	83 mm (3.14")
Stock status	Ex stock/Built to order ●/–	●/–



Model description	RTS-60 KK	RFS-100 KK
Part number	657.2100.007	657.2300.001
Dimensions	60x41 mm (2.36"x1.61")	100x100 mm (3.9"x3.9") foil with self adhesive backing
Stock status	Ex stock/Built to order ●/–	●/–



Model description	RTS-120 KK	RTS-500 KK
Part number	657.2100.006	657.2100.002
Dimensions	120x18 mm (4.72"x0.71")	500x35 mm (19.7"x1.38") plastic
Stock status	Ex stock/Built to order ●/–	●/–



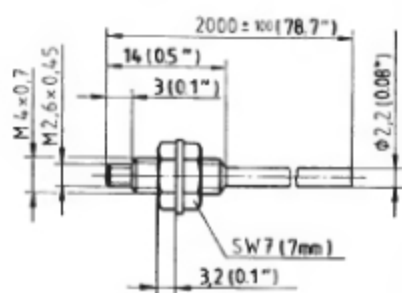
Fibre optics for OR05 series

-40 °C/+ 75 °C
-40 °F/+167 °F

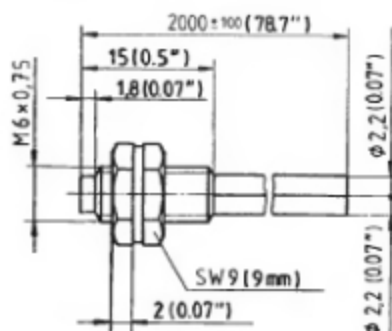
with plastic sleeve

All plastic fibre deliveries include a cutting tool.

Through-beam sensors, straight tip

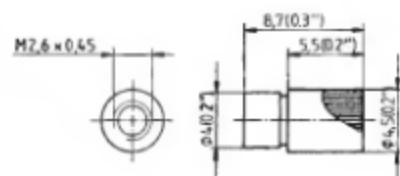


Diffuse reflective sensors, straight tip



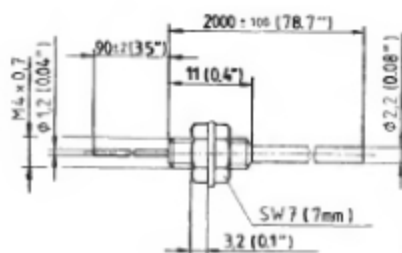
Front lens, 3000 mm range

For use with FES-L05 fibre
Part number 657.9111.002

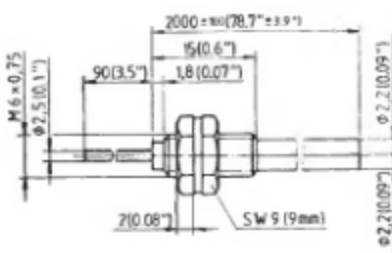


Sensing distance/range	200 mm (7.87")	120 mm (4.72")	
2 single fibres, type can be cut	Ø 2.2 mm (0.09")	Ø 2.2 mm (0.09")	
Model description	FES-L05KK/2.0-V	FES-L05KK/2.0-V	VLS-L05GM/000-4x2.6
Part number	657.9111.002	657.9711.001	657.0022.011 (1 unit)
Stock status: Ex stock/built to order	●/-	●/-	-●

Through-beam sensors, flexible tip

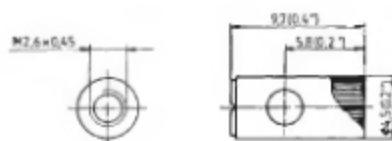


Diffuse reflective sensors, flexible tip



Front lens 90°, 500 mm range

For use with FES-L05 fibre
Part number 657.9111.002



Sensing distance/range	120 mm (4.72")	120 mm (4.72")	
2 single fibres, type can be cut	Ø 2.2 mm (0.09")	Ø 2.2 mm (0.09")	
Model description	FES-L05KK/2.0-BV	FES-L05KK/2.0-BV	VLS-L05GM/000-M2.6W
Part number	657.9111.001	657.9711.002	657.0022.008 (1 unit)
Stock status: Ex stock/built to order	-●	●/-	-●

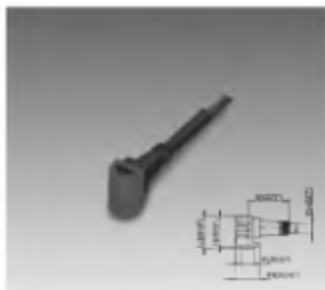
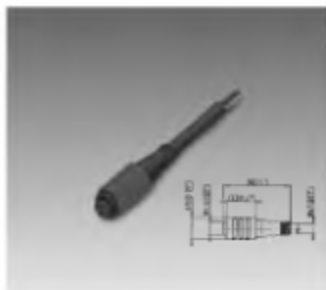
Miniature snap-in plugs Ø 6.5

with moulded cable

All dimensions in mm (inches)

Terminal code

1 = brown
2 = black
3 = blue



		3-wire	3-wire
Cable length	Model description	① CDK-ROBUS00-2-SPU	② WDK-ROBUS00-2-SPU
2.5 m/8.2 ft	Part number	413.9100.219	413.9100.221
Cable length	Model description	① CDK-ROBUS00-SPU	② WDK-ROBUS00-SPU
5 m/16.4 ft	Part number	413.9100.220	413.9100.222
Material of cable sleeve		PUR	PUR
Material body/contact carrier		PUR	PUR
Material of pull protection		PCB	PCB
Operating voltage	max.	60 V AC/75 V DC	60 V AC/75 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		-	-
Operating voltage indication		-	-
Cable structure	mm ²	3 x 0.25	3 x 0.25
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

Miniature snap-in plugs Ø 6.5

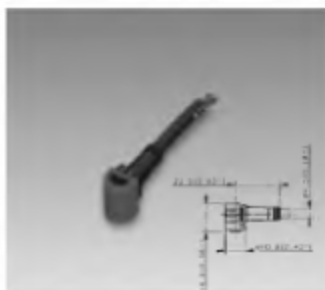
with moulded cable

Double LED

All dimensions in mm (inch)

Terminal code

1 = brown
2 = black
3 = blue



		PNP 3-wire	NPN 3-wire
Cable length	Model description	③ WDK-ROBUSL2-2-SPU	④ WDK-ROBUSL2-2-SPU
2.5 m/8.2 ft	Part number	413.9100.223	413.9100.225
Cable length	Model description	③ WDK-ROBUSL2-SPU	④ WDK-ROBUSL2-SPU
5 m/16.4 ft	Part number	413.9100.224	413.9100.226
Material of cable sleeve		PUR	PUR
Material body/contact carrier		PUR	PUR
Material of pull protection		PCB	PCB
Operating voltage	max.	36 V DC	36 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		●	●
Operating voltage indication		●	●
Cable structure	mm ²	3 x 0.25	3 x 0.25
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

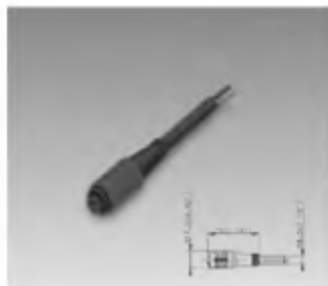
Miniature snap-in plugs Ø 6.5

with moulded cable

All dimensions in mm (inch)

Terminal code

- 1 = brown
- 2 = white
- 3 = blue
- 4 = black



		4-wire	4-wire
Cable length	Model description	① CDIC-R06UA/S00-2-SPU	② WDK-R06UA/S00-2-SPU
2.5 m/8.2 ft	Part number	413 9100 228	413 9100 230
Cable length	Model description	① CDIC-R06UA/S00-SPU	② WDK-R06UA/S00-SPU
5 m/16.4 ft	Part number	413 9100 229	413 9100 231
Material of cable sleeve		PUR	PUR
Material body/contact carrier		PUR	PUR
Material of pull protection		POM	POM
Operating voltage	max	60 V AC/75 V DC	60 V AC/75 V DC
Current carrying capacity	max	2 A	2 A
Temperature range	min / max	-25 °C/+90 °C -13 °F/+194 °F	-25 °C/+90 °C -13 °F/+194 °F
Function indication		-	-
Operating voltage indication		-	-
Cable structure	mm ²	4 x 0.14	4 x 0.14
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

Plug M 8 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

Terminal code

- 1 = brown
- 2 = black
- 3 = blue



		3-wire	
Cable length	Model description	① WDK-MOBUS/S00-2-SPU	
2.5 m/8.2 ft	Part number	413 9100 278	
Cable length	Model description	② WDK-MOBUS/S00-5PU	
5 m/16.4 ft	Part number	413 9100 279	
Material of cable sleeve		PVC	
Material body/contact carrier		PVC	
Material of pull protection		Cl ₂ Zn ₃ Sn ₆ 3	
Operating voltage	max	60 V AC/75 V DC	
Current carrying capacity	max	4 A	
Temperature range	min /max	-40 °C/+80 °C -40 °F/+176 °F	
Function indication		-	
Operating voltage indication		-	
Cable structure	mm ²	3 x 0.25	
Protection type after installation		IP 67/NEMA 4	

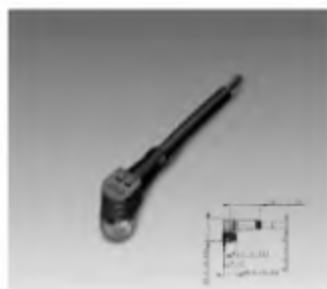
Plug M 8 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

Terminal code

- 1 = brown
- 2 = black
- 3 = blue



		3-wire		3-wire	
Cable length	Model description	① CDK-MOBUS/S00-2-SPU		② WDK-MOBUS/S00-2-SPU	
2.5 m/8.2 ft	Part number	413 9100 261		413 9100 264	
Cable length	Model description	① CDK-MOBUS/S00-5PU		② WDK-MOBUS/S00-5PU	
5 m/16.4 ft	Part number	413 9100 263		413 9100 265	
Material of cable sleeve		PLR		PLR	
Material body/contact carrier		PLR		PLR	
Material of pull protection		Cl ₂ Zn ₃ Sn ₆ 3		Cl ₂ Zn ₃ Sn ₆ 3	
Operating voltage	max	60 V AC/75 V DC		60 V AC/75 V DC	
Current carrying capacity	max	4 A		4 A	
Temperature range	min /max	-40 °C/+80 °C -40 °F/+176 °F		-40 °C/+80 °C -40 °F/+176 °F	
Function indication		-		-	
Operating voltage indication		-		-	
Cable structure	mm ²	3 x 0.25		3 x 0.25	
Protection type after installation		IP 67/NEMA 4		IP 67/NEMA 4	

Plug M 8 x 1 with lock nut

with moulded cable

Double LED

All dimensions in mm (inches)

Terminal code

- 1 = brown
- 2 = black
- 3 = blue



		PNP 3-wire	NPN 3-wire
Cable length	Model description	WDC-MC8PSLL2-2	WDC-MC8ISLL2-2
2 m/6.56 ft	Part number	413 9100 213	413 9100 214
Cable length	Model description	WDC-MC8PSLL2-5	WDC-MC8ISLL2-5
5 m/16.4 ft	Part number	413 9100 216	413 9100 217
Material of cable sleeve		PUR	PUR
Material body/contact carrier		PUR	PUR
Material of pull protection		CuZn39Pb3	CuZn39Pb3
Operating voltage	max.	30 V DC	30 V DC
Current carrying capacity	max.	2 A	2 A
Temperature range	min./max.	-25 °C/+90 °C -13 °F/+194 °F	-25 °C/+90 °C -13 °F/+194 °F
Function indication		●	●
Operating voltage indication		●	●
Cable structure	mm ²	3 x 0.25	3 x 0.25
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

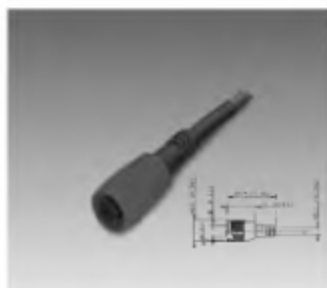
Plug M 12 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

Terminal code

1 = brown
2 = –
3 = blue
4 = black



		3-wire		3-wire	
Cable length	Model description ①	GDK-M12US/S00-2	②	WCK-M12US/S00-2	
2 m/6.56 ft	Part number	413.9100.232		413.9100.234	
Cable length	Model description ①	GDK-M12US/S00-5	②	WCK-M12US/S00-5	
5 m/16.4 ft	Part number	413.9100.233		413.9100.235	
Material of cable sleeve		PVC		PVC	
Material body/contact carrier		PA6		PA6	
Material of pull protection		PA		PA	
Operating voltage	max.	250 V AC/300 V DC		250 V AC/300 V DC	
Current carrying capacity	max.	4 A		4 A	
Temperature range	min./max.	-40 °C/+80 °C		-40 °C/+80 °C	
		-40 °F/+176 °F		-40 °F/+176 °F	
Function indication		–		–	
Operating voltage indication		–		–	
Cable structure	mm ²	3 x 0.34		3 x 0.34	
Protection type after installation		IP 67/NEMA 4		IP 67/NEMA 4	

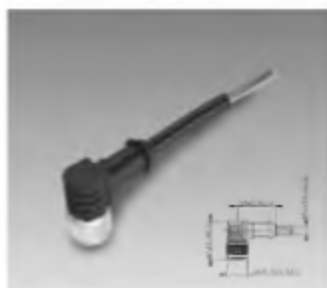
Plug M 12 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

Terminal code

1 = brown
2 = –
3 = blue
4 = black



		3-wire	
Cable length	Model description ②	WCK-M12US/G00-2	
2 m/6.56 ft	Part number	413.9100.280	
Cable length	Model description ②	WCK-M12US/G00-5	
5 m/16.4 ft	Part number	413.9100.281	
Material of cable sleeve		PVC	
Material body/contact carrier		PA6	
Material of pull protection		CaZn35Pb3	
Operating voltage	max.	250 V AC/300 V DC	
Current carrying capacity	max.	4 A	
Temperature range	min./max.	-40 °C/+80 °C	
		-40 °F/+176 °F	
Function indication		–	
Operating voltage indication		–	
Cable structure	mm ²	3 x 0.34	
Protection type after installation		IP 67/NEMA 4	

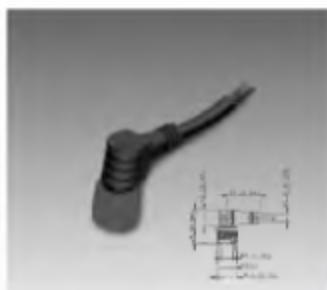
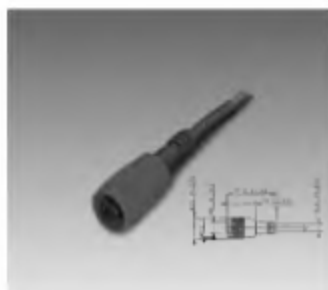
AC plug M 12 x 1 with lock nut

with moulded cable

All dimensions in mm (inches)

Terminal code

1 = black
2 = blue
3 = -
4 = -



		2-wire	2-wire
Cable length	Model description	① CDIC-M12AS500-2	② WDK-M12AS500-2
2 m/6.56 ft	Part number	413 9100 248	413 9100 250
Cable length	Model description	① CDIC-M12AS500-5	② WDK-M12AS500-5
5 m/16.4 ft	Part number	413 9100 249	413 9100 251
Material of cable sleeve		PVC	PVC
Material body/contact carrier		PLR	PLR
Material of pull protection		FR	FR
Operating voltage	max	250 V AC/300 V DC	250 V AC/300 V DC
Current carrying capacity	max	4 A	4 A
Temperature range	min / max	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		-	-
Operating voltage indication		-	-
Cable structure	mm ²	2 x 0.5	2 x 0.5
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

Plug M 12 x 1 with lock nut

with moulded cable

Double LED

All dimensions in mm (inches)

Terminal code

1 = brown
2 = -
3 = blue
4 = black



		PNP 3-wire	NPN 3-wire
Cable length	Model description	① WDK-M12PS/SL2-2	④ WDK-M12NS/SL2-2
2 m/6.56 ft	Part number	413 9100 240	413 9100 242
Cable length	Model description	② WDK-M12PS/SL2-5	⑤ WDK-M12NS/SL2-5
5 m/16.4 ft	Part number	413 9100 241	413 9100 243
Material of cable sleeve		PVC	PVC
Material body/contact carrier		PLR	PLR
Material of pull protection		FR	FR
Operating voltage	max	30 V DC	30 V DC
Current carrying capacity	max	4 A	4 A
Temperature range	min / max	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		●	●
Operating voltage indication		●	●
Cable structure	mm ²	3 x 0.34	3 x 0.34
Protection type after installation		IP 67/NEMA 4	IP 67/NEMA 4

Plug M 12 x 1 with lock nut

with moulded cable

Double LED

All dimensions in mm (inches)

Terminal code

- 1 = brown
2 = white
3 = blue
4 = black



		PNP 4-wire	NPN 4-wire
Cable length	Model description	① WDC-M12FM/SL2-2PU	② WDC-M12NA/SL2-2FU
2 m/6.56 ft	Part number	413.9100.244	413.9100.246
Cable length	Model description	① WDC-M12FM/SL2-5PU	② WDC-M12NA/SL2-5FU
5 m/16.4 ft	Part number	413.9100.245	413.9100.247
Material of cable sleeve		PUR	PUR
Material body/contact carrier		PA	PA
Material of pull protection		FR	FR
Operating voltage	max.	30 V DC	30 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-40 °C/+80 °C -40 °F/+176 °F	-40 °C/+80 °C -40 °F/+176 °F
Function indication		●	●
Operating voltage indication		●	●
Cable structure	mm ²	4 x 0.25	4 x 0.25
Protection type after installation		IP 67/EMA 4	IP 67/EMA 4

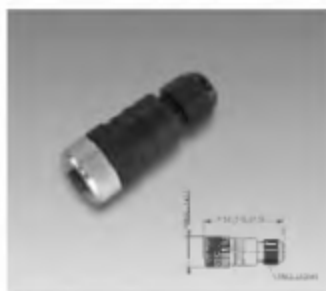
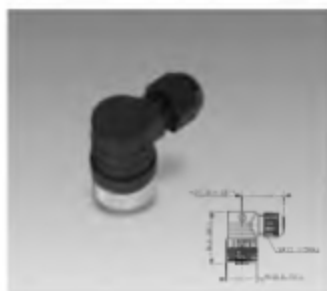
Plug M 12 x 1 with lock nut

provide own cable

All dimensions in mm (inches)

Terminal code

- 1 = Plus
2 = NC
3 = Minus
4 = NO



		WDA-M12U/ALD	GDA-M12U/ALD
Female plug	Model description	① WDA-M12U/ALD	② GDA-M12U/ALD
	Part number	413.9100.101	413.9100.102
Max. cable diameter	mm	3-6.5	3-6.5
Cross section mm ²	max.	0.75	0.75
Material body/contact carrier		PA	PA
Material of pull protection		Cl2r35Rt3	Cl2r35Rt3
Operating voltage	max.	125 V AC/150 V DC	125 V AC/150 V DC
Current carrying capacity	max.	4 A	4 A
Temperature range	min./max.	-25 °C/+80 °C -13 °F/+194 °F	-25 °C/+80 °C -13 °F/+194 °F
Function indication		-	-
Operating voltage indication		-	-
Cable structure	mm ²	-	-
Protection type after installation		IP 67/EMA 4	IP 67/EMA 4

Sensor testing unit



Sensor testing unit

Technical data

Model description

Part number

Stod. status: In stock/Built to order

Function

Supply voltage

Output voltage

Housing

Temperature range

min./max.

Input signals

Sensortester

651.0000.048



Sensor testing units for proximity sensors in DC-2-wire and 3-wire technology.

Testing function: Indication of switching condition of the sensor via visual and acoustic signal.

9 V monobloc battery (SR61)

15 V DC, 20 mA stabilised

Modified housing from the CI20 series

-25 °C/+70 °C

NPN/PP-3-wire, DC-2-wire, NAMUR

The sensor testing unit is suitable for checking proximity sensors in DC 2-wire and 3-wire technology. To indicate the switching conditions, colour LEDs and an acoustic signal are used.

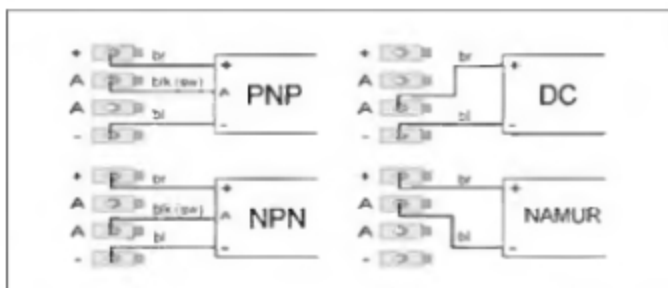
LED green: Operating voltage indication

LED red: Weak battery

LED yellow: Switching condition of sensor

The sensor testing units is provided with an automatic switch-off mechanism, deactivating the device (if not in operation) after approx. 30 s.

Terminal assignment



Enclosures

Industrial enclosures

Control enclosures

Suspension systems

Model Page

Selection criteria and additional enclosure information 288



Aluminum enclosures 294

- CA Series**
- High mechanical strength
 - High corrosion resistance
 - Perfect for external applications
 - IP 65 rated
 - Accessories
 - Component aluminum enclosures

296



Polycarbonate enclosures 312

- CA Series**
- Good mechanical strength
 - Suitable for external applications
 - IP 65 rated
 - Accessories

314

ABS enclosures

- CT series**
- Lower mechanical strength
 - Limited external applications
 - IP 65 rated
 - Accessories



CT-Module 326

- Adaptable before, during and after installation
- Variety of options
- No machining required
- Reduced stock holding



Polyester enclosures 360

- CP Series**
- High mechanical strength
 - Very high corrosion resistance
 - Excellent for external applications
 - IP 65 rated
 - Accessories
 - Component polyester enclosures

362



Enclosures for Ex-applications 373

Model Page



CC-10 compact control enclosures 374

- Cast aluminum design
- Aluminum cover frames
- Front plates
- Modern industrial design



Lightweight control enclosure series CC-2000 SL 382

- Modular slim-line aluminum concept
- Direct installation of industry standard controls
- Various front plate mounting options
- Standard and customer specific sizes available
- Check list CC-2000 SL

388



Control enclosures 390

- Type CC-4000**
- Modular aluminum enclosure concept
 - Direct mounting of industry standard controllers
 - Various front plate-mounting options
 - Standard and customer specific sizes
 - Pedestal
 - Check list CC-4000

396

Model Page

Selection criteria for suspension systems 400



Lightweight suspension system series CS-2000 SL 45/60 402

- Modular suspension system for light loads
- All-connection profiles with or without cable channels
- Assembly access points on connecting components



Medium load suspension system series CS-2000 50/60/80 408

- Modular suspension system for medium loads
- Steel connection profiles and cable channels
- Assembly access points on connecting components



Heavy load suspension system series CS-2000 80/100 422

- Modular suspension systems for very high loads
- Steel connection profiles and cable channels
- Assembly access points on connecting components

Suspension system accessories 426

Stainless products

Appendix

Model	Page	Model	Page
 <p>Compact control enclosures Type CC-480 NR</p> <ul style="list-style-type: none"> Material B.S.I. 304 Removal hinged front door 	428	 <p>Cable glands</p>	446
 <p>Control enclosures CC-600/CC-600 NR</p> <ul style="list-style-type: none"> Material painted mild steel or stainless steel B.S.I. 304 IP 65/66 ingress protection Front plate and hinged rear door 	430		
 <p>Suspension system for light to medium loads Type CS-480 NR</p> <ul style="list-style-type: none"> Material B.S.I. 304 IP 65 ingress protection 	434		
 <p>Suspension system for medium to heavy loads Type CS-600 NR</p> <ul style="list-style-type: none"> Material B.S.I. 304 or anodised Al IP 66 ingress protection Modular system 	438		
<p><input type="checkbox"/> Available on request:</p>			
 <p>Terminal boxes Type CV-NR</p> <ul style="list-style-type: none"> Material 1.4301 IP 66 ingress protection Framed gasket 			
 <p>Wall cabinets Type CW-NR</p> <ul style="list-style-type: none"> Material 1.4301 IP 66 ingress protection Includes mounting plate 			

Selection criteria for enclosures

The following questions will help you to select the most appropriate enclosure for your type of application from the wide range of the BERNSTEIN product line:

1. What are the dimensions of the required enclosure?

E.g. dimensions of printed circuit board, number of terminals, mechanical machining for cable glands, etc.
> [select the required external dimensions](#)

2. What is the operating environment?

E.g. moisture, climate, temperature, high-frequency radiation, etc.
> [select enclosure material, surface composition, gasket material](#)

3. What mechanical stress will occur?

E.g. impact stress, pressure, bending, etc.
> [select enclosure material](#)

4. What chemical resistance is required?

E.g. cleaning agents, oils, lubricants, etc.
> [select enclosure material](#)

5. What mechanical machining is necessary?

E.g. plugs, cable glands, windows, etc.
> [draw up a model sketch for mechanical machining](#)

6. Which accessories are required?

E.g. mounting plate, mounting rail, terminals, windows, external hinges, internal hinges, etc.
> [select required accessories](#)

7. Are any special made-to-order items necessary?

E.g. specific company colours, screen-printings of logos or symbols, etc.
> [select and determine colour, screen-printing, etc.](#)

Customised service

What does the BERNSTEIN customised service include?

This service can save you the inconvenience of machining and enables you to use the enclosure - as delivered by BERNSTEIN - directly in the production process.

- Mechanical machining, even intricate outlines, using modern CNC machining centres
- Special coatings in accordance with customer specifications
- HF-proof designs, given special coatings and conductive gaskets
- Screen-printings and engravings on the enclosure surface
- Mounting of individual components from the wide range of BERNSTEIN accessories (external and internal hinges, mounting plates, mounting rails, terminals, cable glands)
- If required, BERNSTEIN aluminium enclosures can be further protected by applying the environmentally-friendly C 6100 Alodine yellow-passivating method, for use in corrosive surroundings. The application of an additional primer and final coat further guarantee resistance to corrosion.

The BERNSTEIN quick release screw

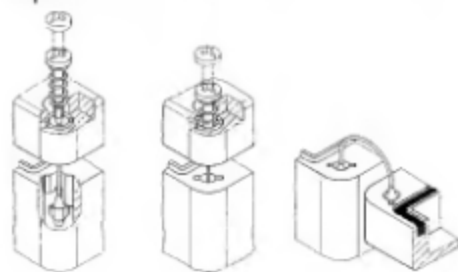


Invented and patented by BERNSTEIN, the quick release capability offers a useful innovation to our customers. The quick release screws save time and money if the enclosure is frequently opened and closed and comes with the following features:

1. Released through just a 90° turning action – dosing and opening the enclosure with the quick release screws is considerably faster than with any other standard locking system (e.g. lid screws). This saves time and therefore money. All other mechanical characteristics of the enclosure and the IP 65 protection class are unaffected.
2. Easy lock/release – at a glance the user can check whether the quick release is open or closed. This check does not involve any mechanical testing.
3. No accidental opening caused by vibration or shock. The quick release locks into place and is held there by a spring action. Accidental opening is impossible, thus increasing safety.
4. Easy mounting – for any machining, coating or labelling that may be required by the customer at a later date, the quick release can be easily removed and then re-fitted. The screws are self-retaining in the lid.

BERNSTEIN quick-release internal hinge. Simple, convenient, cost effective in addition to the quick release screws, BERNSTEIN offers the practical quick-release internal hinge for mounting enclosure lids on bases.

The alternative flexible internal hinges can be easily mounted on the enclosure without mechanical machining and can hold the enclosure lid after opening. In this way, the enclosure lid is both strain-relieved and captive.



Protection class specification In accordance with IEC 529, EN 60529, VDE 470 P 1

The protection class of a closed device indicates the level of protection from external factors. It includes the degree of protection afforded to personnel (from touching live parts) and protection of the device from the ingress of particles and water. BERNSTEIN standard enclosures generally conform to the protection class IP 65.

1 st number	Meaning
Code	Degree of protection from shock and against particles
0	non-protected
1	protected against solid particles < 50 mm Ø
2	protected against medium-sized particles < 12 mm Ø
3	protected against small particles < 2.5 mm Ø
4	protected against small particles < 2.5 mm Ø
5	protected against dust ingress
6	dust-proof and complete protection from accidental contact
2 nd number	Meaning
Code	Degree of protection against water
0	non-protected
1	protected against vertically dripping water
2	protected against dripping water, when tilted up to 15 degree
3	protected against spraying water
4	protected against splashing water
5	protected against water jets
6	protected against heavy seas or powerful jets of water
7	protected against water immersion
8	protected against submersion
BERNSTEIN-Enclosure standard IP 65	
BERNSTEIN-Enclosure in IP 66, IP 67 on request	

Protection class specification

In accordance with IEC 529, the specification of the protection class consists of a two-digit number.

Meaning of the 1st number:

Protection from accidental contact and ingress of foreign particles

Meaning of the 2nd number:

Protection against water ingress

Example: Protection class IP 65

1st number (6):
complete protection from accidental contact with live elements or from moving parts = protection from dust ingress

2nd number (5):

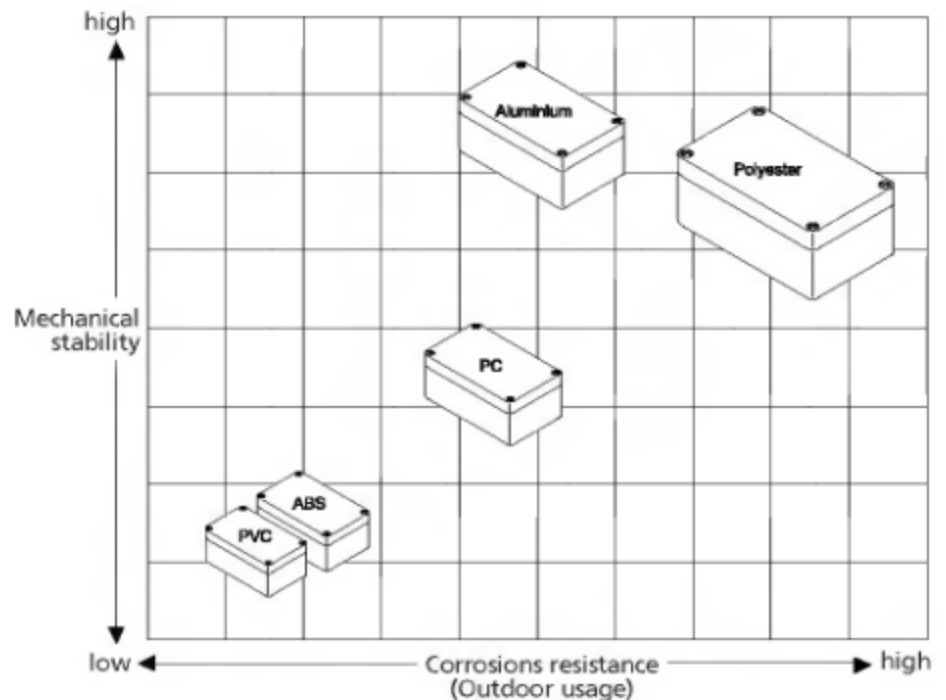
a jet of water from any direction will not damage the enclosure = protection against water jets

Mechanical stability

Mechanical stability is a major factor in determining the appropriate material. The following table specifies the essential properties of aluminium, polycarbonate, ABS and polyester.

Material property	Standard	Unit	Aluminium	Polycarbonate	ABS	Polyester
Density	DIN 53 479	g/cm ³	2.65	1.2	1.05	1.8
Impact strength	DIN 53 453	mJ/mm ²	150-300	65	60	80
Impact value	DIN 53 453	mJ/mm ²	90-200	20	10	4
Tensile strength	DIN 53 455	N/mm ²	180-300	65	43	45
Elongation at tear	DIN 53 455	%	60-90	90	20	20
Young's modulus (bending test)	DIN 53 457	N/mm ²	75 000	2300	2100	6500
Limiting bending stress	DIN 53 452	N/mm ²		55	90	100
Burning behaviour	UL 94	Class		V 2	HB	V 0
Spec. contact resistance	DIN 53 482	Ω x cm		10 ¹⁵	10 ¹²	3 x 10 ¹⁴
Surface resistance	DIN 53 482	Ω		≥ 10 ¹⁵	4 x 10 ¹⁴	> 10 ¹²
Dielectric strength	DIN 53 481	kV/mm		25-40	24	25-40
Thermal conductivity (20 °C)	DIN 52 612	W/mK	120-160	0.21	0.18	0.25
Electr. conduct. capacity (20 °C)		mΩ mm ²	15-22			

This diagram shows how different enclosure materials react under mechanical stress and in a harsh operating environment.



Chemical resistance

The degree of resistance to specific chemical substances depends on the material used for the enclosure. The following table specifies the resistance of BERNSTEIN aluminium, polycarbonate, ABS and polyester enclosures to certain chemicals frequently used in industrial surroundings. Please note that the table only gives standard values, since materials react differently to variations in chemical concentration or ambient temperatures. Furthermore, materials may react differently when exposed to several chemicals simultaneously. Appropriate preliminary tests are therefore recommended.

Our customers also have access to our in-house information service.

Chemicals	ABS	Polycarbonate	Polyester	Aluminium
Acetic acid	10% ○	10%	40%	+
Acetone	-	-	-	+
Acid	□	○	+	+
Ammonia	-	-	-	+
Benzene	-	-	+	+
Brake fluid	□	-	+	+
Butane	□	□	+	
Butanol	□	□	+	+
Calcium chloride	□	+	+	+
Carbon disulphide	□	-	-	+
Carbon tetrachloride	-	□	+	+
Caustic soda	-	-	40%	°
Chlorobenzene	-	-	+	+
Citric acid	10%	10%	+	+
Detergent	□	+	□	+
Diesel oil	+	○	+	+
Engine oils	□	+	+	+
Formaldehyde	+	□	30%	+
Formic acid	-	30%	10%	°
Freon 113	□	+	+	+
Fruit juice	□	+	+	+
Fuel oil	○	○	+	-
Glycerine	+	○	+	○
Hydraulic oil	□	+	+	+
Hydrochloric acid	10% ○	20%	+	+
Lactic acid	+	10%	+	+
Linseed oil	□	+	+	○
Lubricating oil	□	+	+	+
Methanol	□	-	-	○
Methylene chloride	□	-	-	+
Mineral oil	+	+	+	+
Nitric acid	30%	10%	10%	+
Oil of turpentine	□	□	+	○
Petrol	-	○	+	+
Potash lye	□	-	-	+
Potassium chloride	□	+	+	+
Potassium hydroxide	+	□	-	+
Soda ash	○	+	+	+
Sodium chloride	○	+	+	+
Sodium hydrate	+	□	-	+
Sulphuric acid	30%	50%	70%	+
Tartaric	□	10%	+	
Toluol	-	-	+	+
Trichloroethylene	-	□	-	+
Water (dist. water, river, tap, sea water)	+	+	+	+
Xylene	-	-	+	+
Zinc sulphate	□	+	+	○

The tests were performed at room temperature, if no other value is specified. If different substances are mixed, resistance may alter. No responsibility can therefore be accepted for the accuracy of specifications.

- +
 - %
 -
 -
 -
- resistant to all concentrations
resistant to max. % concentrations
limited resistance
non-resistant
not known

Customised service

Advantages

The extensive BERNSTEIN customising service for standard enclosures offers some distinct advantages:

- The custom-made enclosure can be used immediately in the production process.
- Reducing production time and range, transferring risk to the supplier.
- Saving time by minimised handling and reduced logistics expenditure.
- Economical machining by BERNSTEIN specialists, using up-to-date equipment and thereby lowering costs.
- The customer benefits from BERNSTEIN's wealth of experience in providing a customised service.

What does the BERNSTEIN customised service include?

This service can save you the inconvenience of machining and enables you to use the enclosure – as delivered by BERNSTEIN – directly in the production process.

- Mechanical machining, even intricate outlines, using modern CNC machining centres
- Special coatings in accordance with customer specifications
- HF-proof designs, given special coatings and conductive gaskets
- Screen-printings and engravings on the enclosure surface
- Mounting of individual components from the wide range of BERNSTEIN accessories (external and internal hinges, mounting plates, mounting rails, terminals, cable glands)

The BERNSTEIN comprehensive customising service meets all requirements

Drilling

We can drill holes in all enclosure materials to meet your own specifications.

Threading

We can cut metric screw threads from M 12 x 1.5 to M 63 x 1.5. We can, if required, also provide special thread types (PG threads, imperial threads and NPT threads).

Milling

The experts in our CNC machining centres can also undertake complicated milling on your behalf. All machining procedures are archived for each individual customer so that they then can be repeated whenever necessary. This ensures that a consistently high standard is maintained.

Passivating

If required, BERNSTEIN aluminium enclosures can be further protected by applying the environmentally-friendly C 6100 Alodine yellow-passivating method, for use in corrosive surroundings. The application of an additional primer and final coat further guarantee resistance to corrosion.

Coating

We can supply enclosures in any colour or shade both RAL and non-standard colours. Standard and special colours are applied as wet or powder coating.

Screen-printing

We can print your enclosure surfaces and front plates in single-colour or multi-colour, as required, using durable colours suitable for industrial usage.

Engraving

Our computer-controlled engraving machines engrave all types of fonts and outlines.

Assembly

Components are, of course, assembled to meet your own individual requirements. Just select the mounting plates, mounting rails, terminal blocks, cable glands etc. from the wide range of BERNSTEIN accessories.

BERNSTEIN manufacturing standard

Technical information for enclosure machining

As an ISO 9001 certified company, BERNSTEIN has defined a manufacturing standard that is applied to all machining orders without alternative customer specification.

Dimension tolerances

When preparing details for enclosure machining (see following drawings, showing orientation of enclosure when set up for machining), tolerances used for the first machining operation on each set up, are according to ISO 2768-mH.

If other dimensions or reference edges are used, the following maximum general tolerances are applicable for the first machining operation on each enclosure per set up (see table below).

Tolerances between further machining operations compared to each other can be limited to ± 0.1 mm.

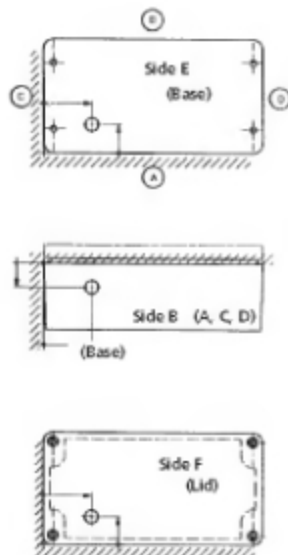
General tolerances Standard programme

Die-casting (dc)	DIN 1688
CA-020 to CA-310	Part 4 GTA 13/5
CA-350, CA-370,	(August 1986)
CA-380, CA-400,	
CA-450	
Chilled casting (cc)	DIN 1688
CA-330, CA-360	Part 3 GTA 14/5
CA-390, CA-420,	(October 1980)
CA-460, CA-470,	
CA-480	
Resin-impregnated polyester moulding compounds	DIN 16901-130 (November 1982)
CP-140 to CP-280	
Resin-impregnated polyester mats	DIN 16901-140 (November 1982)
CP-300 to CPS-590	
PC/AES	DIN 16901-130
CT-50 to CT-91	(November 1982)
Sand casting (G)	DIN 1688
	Part 1 GTA 15/5
	(October 1980)

Reference edges for BERNSTEIN machining standards

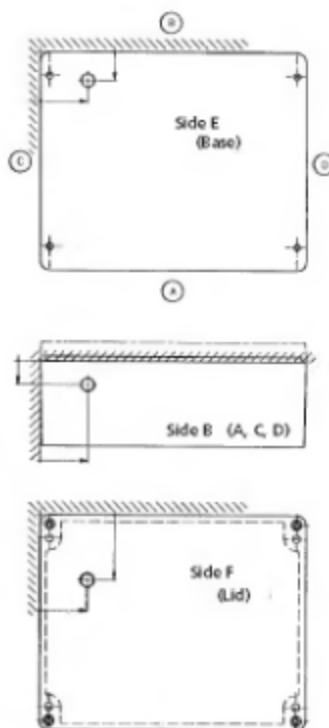
Series

CA-020 to CA-240, CA-270 to CA-300
CT-50 to CT-82, CP-140 to CP-300



Series

CA-250, CA-310 to CA-480
CT-84 to CT-91, CP-320 to CPS-590



Minimum quantities

In order to keep enclosure machining as cost-effective for the user as possible, the following minimum purchase quantities are suggested:

Name	Minimum
CA-020 ... CA-080	20 pieces
CA-100 ... CA-190	10 pieces
CA-210 ... CA-310	10 pieces
CA-330 ... CA-480	5 pieces
CC-280 ... CC-480	5 pieces
CP-140 ... CP-195	20 pieces
CP-220 ... CP-320	10 pieces
CP-330 ... CP-460	5 pieces
CT-50 ... CT-76	20 pieces
CT-78 ... CT-89	10 pieces

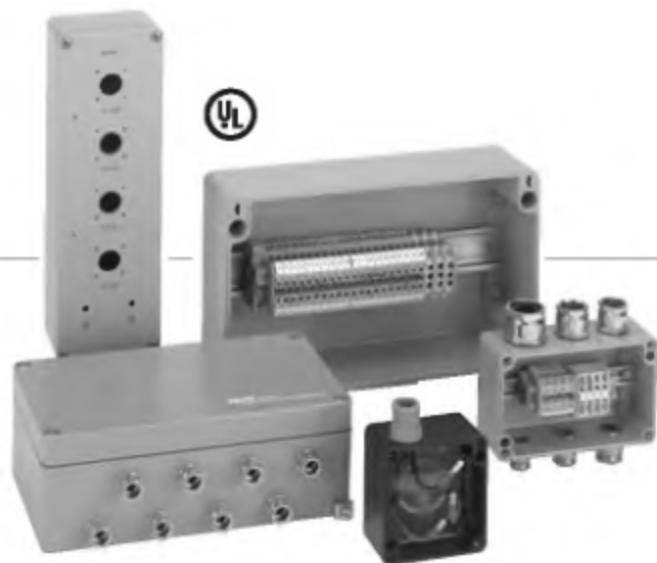
These quantities should be regarded as the minimum, if the customised enclosures are to be produced economically. Production includes mechanical machining, special coating, screen-printing, engraving or assembly of accessories. BERNSTEIN distributors will of course be pleased to advise you.

Aluminium enclosures CA series

BERNSTEIN aluminium enclosures are ideally suited to housing electrical, electronic or pneumatic components. Their high mechanical strength ensures excellent protection against impact and all sizes are sealed to IP 65, according to IEC 529.

BERNSTEIN aluminium enclosures are fitted with copper earthing screws (M4 or M6) in both the base and lid, the surface below the screws is unpainted allowing a good earth connection to be made. The captive lid screws are made of stainless steel and are held in place by a lock integrated in the lid. A gasket (for standard enclosures) is factory-fitted, and ensures conformance with the protection class. BERNSTEIN aluminium enclosures are surface-coated in RAL 7001 (silver-grey), as standard.

BERNSTEIN aluminium enclosures are either die-cast or chill-cast. The dimension table shows the production method used for each respective enclosure.



Attachment points inside the enclosure can be used to hold equipment in place (mounting rail, mounting plate, printed circuit board etc.). Alternatively, the earthing points may be used. These inner attachment points are situated at different heights and positions. (Refer to the illustrations for detailed positions.)

Technical data

Material

Die-cast aluminium or AISI 12 (Cu) chill-cast

Gasket

Neoprene round seal (silicrised)
alternative:
Neoprene round seal (silicone-free)
Silicone round seal

Lid screws

Stainless steel, captive, multi-purpose cross head
alternative:
- Stainless steel quarter turn quick release (die-cast types only)
- Stainless steel hexagonal socket head screws
- Lead-sealed steel lid screws (9 S 20 K), slotted head

Coating

RAL 7001 (silver-grey)
alternative:
- Special RAL colours
- Special coatings

Temperature range

-40 °C to +80 °C (neoprene gasket)
alternative:
-50 °C to +130 °C (silicone gasket)
or -30 °C to +100 °C (explosion-hazardous area)

Protection class

IP 65
alternative:
higher protection class by request

Approval

FTB No. Ex 83/3120
FTB No. Ex-90C 3119
FTB No. Ex-90 C 3117 U

German Lloyd No. 91 187-84HH

SEV 97.1 10396

UL File E 168772 (H)

Accessories for aluminium enclosures



External hinges

For hinged attachment of the enclosure lid. Sawtooth angle of lid approx. 155°. Aluminium casting, RAL 7001 coating. Machining required to fit. Drill template is supplied.



Mounting plates

Galvanised sheet steel (thickness CA-060 to CA-310, CA-350 to CA-400: 1.5 mm, CA-330, CA-420 to CA-480: 2.5 mm) allows mounting of additional equipment.



Internal hinges

For hinged attachment of the enclosure lid. Sawtooth angle of lid approx. 99°. Made of stainless steel. Machining required to fit.



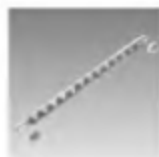
Silicone lid gasket

Improved temperature range (-50 °C to +130 °C). Standard type made of silicone foam.



Mounting rails

Standard rails TS-15, TS-32 or TS-35 (steel), yellow-passivated for attachment of terminal blocks.



Earthing rails

Galvanised steel for connecting and routing of protective earth connection.



External attachment brackets

Stainless steel for mounting enclosures without opening the lid. Can be mounted in 90° steps at the base of the enclosure.

Aluminium enclosures - product line

Dimensions/mm	Aluminium enclosures		Cast type
L x W x H	Part number	Type	dc = die casting cc = chilled casting
50 x 45 x 30	102.0.0000.00	CA-020	dc
58 x 64 x 36	106.0.0000.00	CA-060	dc
58 x 64 x 36	108.0.0000.00	CA-080	dc
150 x 64 x 36	110.0.0000.00	CA-100	dc
75 x 80 x 57	113.0.0000.00	CA-130	dc
85 x 80 x 57	114.0.0000.00	CA-140	dc
125 x 80 x 57	115.0.0000.00	CA-150	dc
125 x 80 x 57	116.0.0000.00	CA-160	dc
175 x 80 x 57	117.0.0000.00	CA-170	dc
175 x 80 x 57	118.0.0000.00	CA-180	dc
250 x 80 x 57	119.0.0000.00	CA-190	dc
122 x 122 x 80	121.0.0000.00	CA-210	dc
122 x 122 x 90	121.0.0000.50	CA-215	dc
122 x 122 x 80	122.0.0000.00	CA-220	dc
220 x 122 x 80	123.0.0000.00	CA-230	dc
220 x 122 x 90	123.0.0000.50	CA-235	dc
220 x 122 x 80	124.0.0000.00	CA-240	dc
360 x 122 x 80	125.0.0000.00	CA-250	dc
160 x 160 x 90	127.0.0000.00	CA-270	dc
160 x 160 x 90	128.0.0000.00	CA-280	dc
260 x 160 x 90	129.0.0000.00	CA-290	dc
260 x 160 x 90	130.0.0000.00	CA-300	dc
360 x 160 x 90	131.0.0000.00	CA-310	dc
560 x 160 x 90	133.0.0000.00	CA-330	cc
200 x 230 x 110	135.0.0000.00	CA-350	dc
200 x 230 x 180	136.0.0000.00	CA-360	cc
280 x 230 x 110	137.0.0000.00	CA-370	dc
330 x 230 x 110	138.0.0000.00	CA-380	dc
330 x 230 x 180	139.0.0000.00	CA-390	cc
401 x 230 x 110	140.0.0000.00	CA-400	dc
600 x 230 x 110	142.0.0000.00	CA-420	cc
402 x 310 x 110	145.0.0000.00	CA-450	dc
402 x 310 x 180	146.0.0000.00	CA-460	cc
600 x 310 x 110	147.0.0000.00	CA-470	cc
600 x 310 x 180	148.0.0000.00	CA-480	cc

Component overview for aluminium enclosures CA series

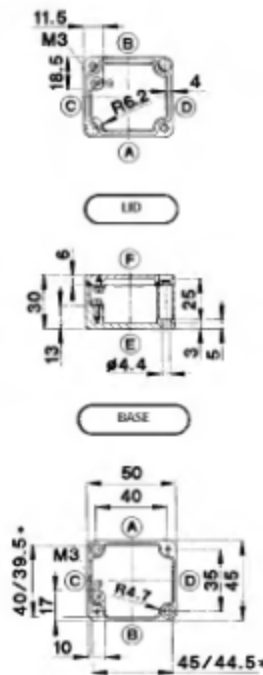
*) Assembled on 2 mounting rails
**) Assembled on 3 mounting rails
The number of terminals is reduced
when partitions are used.

Model	Weidmüller	Phoenix	Wieland	Entelec	Phoenix
	Block terminal	Block terminal	Block terminal	Terminal block	Terminal block
Terminal width (mm):				5.2 6.2 8.2 10.2 12.2	5.2 6.2 7.5 5.2 6.2 8.2 10.2
Single core mm ²	4 4 4 2.5	4 4 4	2.5 2.5 2.5 2.5	2.5 4 4 4 10 16 25	2.5 4 10 4 4 10 16
Stranded mm ²	4 4 4 2.5	4 4 4	2.5 2.5 2.5 2.5	1.5 4 2.5 4 6 10 16	1.5 4 6 2.5 4 6 10
Nominal voltage V	380 380 380 380	500 500 500	500 500 500 500	250 380 750 750 750 750 750	500 500 500 750 750 750 750
Loading capacity A	36 36 36 25	36 36 36	25 25 25 25	20 35 26 35 46 63 85	27 36 65 36 36 65 87
Terminal bridging	- - - -	- - - -	- - - -	- 0 0 0 0 0 0	- 0 - 0 0 0 0
Mounting rail TS 15	- - - -	- - - -	- - - -	0 0 - 0 - - -	0 0 0 - - - -
TS 32	0 - - -	- - - -	- - - -	- - 0 0 0 0 0	- - - 0 0 0 0
TS 35	0 - - -	- - - -	- - - -	- - 0 0 0 0 0	- - - 0 0 0 0
Part number	9.40.1.0100.00 9.40.1.0090.00 9.40.1.0130.00 9.40.1.0010.00	9.40.1.0020.00 9.40.1.0030.00 9.40.1.0040.00	9.40.1.0050.00 9.40.1.0060.00 9.40.1.0070.00 9.40.1.0080.00	9.40.2.1270.00 9.40.2.0940.00 9.40.2.1090.00 9.40.2.1030.00 9.40.2.1040.00 9.40.2.1050.00 9.40.2.1060.00	9.40.2.0010.00 9.40.2.0020.00 9.40.2.0030.00 9.40.2.0050.00 9.40.2.0070.00 9.40.2.0090.00 9.40.2.0110.00
Type	BK 4 BK 6 BK 12 MK 3/4	G 5/4 G 5/6 G 5/12	KL-16/8 KL-16/12 KL-16/16 KL-16/20	DR 1 5/5 DR 4/6 MA 2 5/5 NI 4/6 NI 6/8 M 10/10 M 16/12	MBK MBK 5/E MBK 10 UK 3 N UK 5 N UK 10 UK 16
CA-020	- - - - 1	- - - - -	- - - - -	- - - - 1	- - - - 1
CA-060	1 - - - -	1 - - - -	- - - - -	4 - - - -	4 - - - -
CA-080	- 1 - - -	- 1 - - -	1 1 - - -	10 - - - -	12 - - - -
CA-100	- - 1 - -	- - 1 - -	- - 1 1 -	20 - - - -	20 - - - -
CA-130	1 1 - - -	1 1 - - -	1 - - - -	6 4 - - -	6 4 - - -
CA-140	1 1 - - -	1 1 - - -	1 - - - -	6 4 - - -	6 4 4 - -
CA-150	- 1 1 - -	- 1 1 - -	1 - - - -	16 13 - - -	16 13 - - -
CA-160	- 1 1 - -	- 1 1 - -	1 - - - -	16 13 - - -	16 13 10 - -
CA-170	- - 1 - -	- - 1 - -	- - 1 - -	26 21 - - -	26 21 - - -
CA-180	- - 1 - -	- - 1 - -	- - 1 - -	26 21 - - -	26 21 17 - -
CA-190	- - 2 - -	- - 2 - -	- 2 - - -	39 33 - - -	39 33 27 - -
CA-210/215/220	- - - - -	- - - - -	- - - - -	- - 12 10 8 6 5	- - - 12 10 8 6
CA-230/235/240	- - - - -	- - - - -	- - - - -	- - 31 26 19 15 13	- - - 31 26 19 15
CA-250	- - - - -	- - - - -	- - - - -	- - 58 49 37 29 24	- - - 58 49 37 29
CA-270/280	- - - - -	- - - - -	- - - - -	- - 19 16 12 9 8	- - - 19 16 12 9
CA-290/300	- - - - -	- - - - -	- - - - -	- - 38 32 24 19 16	- - - 38 32 24 19
CA-310	- - - - -	- - - - -	- - - - -	- - 57 48 36 29 24	- - - 57 48 36 29
CA-330	- - - - -	- - - - -	- - - - -	- - 96 80 61 48 40	- - - 96 80 61 48
CA-350	- - - - -	- - - - -	- - - - -	- - 27 22 17 13 11	- - - 27 22 17 13
CA-350*)	- - - - -	- - - - -	- - - - -	- - 54 44 34 26 -	- - - 54 44 34 26
CA-360	- - - - -	- - - - -	- - - - -	- - 27 22 17 13 11	- - - 27 22 17 13
CA-360*)	- - - - -	- - - - -	- - - - -	- - 54 44 34 26 -	- - - 54 44 34 -
CA-370	- - - - -	- - - - -	- - - - -	- - 42 35 27 21 18	- - - 42 35 27 21
CA-370*)	- - - - -	- - - - -	- - - - -	- - 84 70 54 42 -	- - - 84 70 54 42
CA-380	- - - - -	- - - - -	- - - - -	- - 52 43 33 26 22	- - - 52 43 33 26
CA-380*)	- - - - -	- - - - -	- - - - -	- - 104 86 66 52 -	- - - 104 86 66 52
CA-390	- - - - -	- - - - -	- - - - -	- - 52 43 33 26 22	- - - 52 43 33 26
CA-390*)	- - - - -	- - - - -	- - - - -	- - 104 86 66 52 -	- - - 104 86 66 52
CA-400	- - - - -	- - - - -	- - - - -	- - 66 55 41 33 27	- - - 66 55 41 33
CA-400*)	- - - - -	- - - - -	- - - - -	- - 132 110 82 66 -	- - - 132 110 82 66
CA-420	- - - - -	- - - - -	- - - - -	- - 104 87 65 53 44	- - - 104 87 65 53
CA-420*)	- - - - -	- - - - -	- - - - -	- - 208 174 130 106 -	- - - 208 174 130 106
CA-450	- - - - -	- - - - -	- - - - -	- - 65 55 41 33 28	- - - 65 55 41 33
CA-450*)	- - - - -	- - - - -	- - - - -	- - 130 110 82 66 56	- - - 130 110 82 66
CA-450**)	- - - - -	- - - - -	- - - - -	- - 195 165 123 99 -	- - - 195 165 123 99
CA-460	- - - - -	- - - - -	- - - - -	- - 65 55 41 33 28	- - - 65 55 41 33
CA-460*)	- - - - -	- - - - -	- - - - -	- - 130 110 82 66 56	- - - 130 110 82 66
CA-460**)	- - - - -	- - - - -	- - - - -	- - 195 165 123 99 -	- - - 195 165 123 99
CA-470	- - - - -	- - - - -	- - - - -	- - 104 87 65 53 44	- - - 104 87 65 53
CA-470*)	- - - - -	- - - - -	- - - - -	- - 208 174 130 106 88	- - - 208 174 130 106
CA-470**)	- - - - -	- - - - -	- - - - -	- - 312 261 195 159 -	- - - 312 261 195 159
CA-480	- - - - -	- - - - -	- - - - -	- - 104 87 65 53 44	- - - 104 87 65 53
CA-480*)	- - - - -	- - - - -	- - - - -	- - 208 174 130 106 88	- - - 208 174 130 106
CA-480**)	- - - - -	- - - - -	- - - - -	- - 312 261 195 159 -	- - - 312 261 195 159

	Siemens				WAGO												Weidmüller											
	Terminal block		Terminal block		Terminal block												Terminal block											
	Screw terminals				Caged tension spring		6.2	10.2	6.2	10.2	4.2	5.2	5.2	6.2	6.2	8.2	10.2	12.2	5.2	6.2	6.2	6.5	8.2	10.2	12.2	5.2	6.2	
	4	4	10	25	4	4	10	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	2.5	4	4	6	10	16	25	4	6
	2.5	4	6	16	2.5	4	6	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	1.5	4	2.5	4	6	10	15	2.5	4
	750	750	750	750	750	750	750	800	800	800	800	800	800	800	800	800	800	800	800	250	380	750	750	750	750	750	750	750
	26	35	46	85	36	36	65	26	26	26	26	18	26	26	34	34	44	61	82	27	36	27	36	47	65	87	26	34
	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
	-	o	-	-	-	-	-	o	o	-	-	-	-	-	-	-	-	-	-	o	o	o	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	o	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	-	-
	o	o	o	o	o	o	o	-	-	o	o	o	o	o	o	o	o	o	o	-	-	-	-	-	-	-	-	o
	9.40.2.4000.00	9.40.2.4010.00	9.40.2.4020.00	9.40.2.4030.00	9.40.2.4040.00	9.40.2.4050.00	9.40.2.4060.00	9.40.2.3020.00	9.40.2.3030.00	9.40.2.3210.00	9.40.2.3220.00	9.40.2.3230.00	9.40.2.0930.00	9.40.2.3240.00	9.40.2.3250.00	9.40.2.3260.00	9.40.2.3270.00	9.40.2.3280.00	9.40.2.3290.00	9.40.2.0500.00	9.40.2.0130.00	9.40.2.0140.00	9.40.2.0150.00	9.40.2.0160.00	9.40.2.0470.00	9.40.2.0170.00	9.40.2.1460.00	9.40.2.1470.00
	8WA1011-IDF11	8WA1011-IDG11	8WA1011-IDH11	8WA1204	8WA2011-IDF20	8WA2011-IDG20	8WA2011-IDH20	264-701	264-721	264-711	264-731	279-621	280-601	280-901	281-601	281-901	282-601	284-601	283-601	AKZ 2.5 PA	AKZ 4 PA	SAK 2.5 PA	SAK 4 PA	SAK 6 NPA	SAK 10 PA	SAK 16 PA	WDU 2.5	WDU 4
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	5	3	-	-	-	-	-	-	-	-	-	-	6	4	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	5	3	-	-	-	-	-	-	-	-	-	-	6	4	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	13	8	-	-	-	-	-	-	-	-	-	-	16	12	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	13	8	-	-	-	-	-	-	-	-	-	-	16	12	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	21	13	-	-	-	-	-	-	-	-	-	-	26	20	-	-	-	-	-	-	-
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	32	30	24	19	38	32	24	-	-	33	20	50	40	40	33	33	25	20	16	-	-	33	30	25	19	16	38	32
	49	45	37	29	57	48	36	-	-	50	30	76	60	60	50	50	37	30	28	-	-	48	45	36	29	24	57	48
	83	76	62	49	96	80	60	-	-	83	50	125	100	100	83	83	62	50	41	-	-	86	74	61	48	40	96	80
	22	21	17	13	26	22	17	-	-	23	14	35	28	28	23	23	17	14	11	-	-	22	20	17	13	11	26	22
	44	42	34	26	52	44	34	-	-	46	28	70	56	56	46	46	34	28	-	-	44	40	34	26	-	52	44	
	22	20	17	13	26	22	10	-	-	23	14	35	28	28	23	23	17	14	11	-	-	22	20	17	13	11	26	22
	44	40	34	26	52	49	32	-	-	46	28	70	56	56	46	46	34	28	-	-	44	40	34	26	-	52	44	
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	72	66	54	42	84	70	52	-	-	72	44	110	88	88	74	74	54	44	-	-	70	64	52	42	-	84	70	
	44	51	33	26	51	43	32	-	-	45	27	68	54	54	45	45	33	27	22	-	-	43	40	32	26	22	51	43
	88	82	66	52	102	86	64	-	-	90	54	136	108	108	90	90	66	54	-	-	86	86	64	52	-	102	86	
	44	40	33	26	51	43	32	-	-	45	27	68	54	54	45	45	33	27	22	-	-	43	40	32	26	22	51	43
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	112	104	84	66	130	108	82	-	-	114	68	172	136	136	114	114	84	68	-	-	108	100	-	66	-	130	108	
	89	82	67	53	103	86	65	-	-	90	54	135	108	108	90	90	67	54	45	-	-	87	80	65	52	44	103	86
	178	164	134	106	206	172	130	-	-	180	108	270	216	216	180	180	134	108	-	-	174	160	-	104	-	206	172	
	56	52	42	34	65	55	41	-	-	57	34	86	69	69	57	57	43	34	28	-	-	54	50	41	33	27	65	54
	112	104	84	68	130	110	82	-	-	114	68	172	138	138	114	114	86	68	56	-	-	108	100	82	66	54	130	108
	163	156	126	102	195	165	123	-	-	171	102	258	207	207	171	171	129	102	-	-	162	150	-	99	-	195	162	
	56	52	42	33	65	54	41	-	-	57	34	86	68	68	57	57	42	34	28	-	-	54	50	41	33	27	65	54
	112	104	84	66	130	108	82	-	-	114	68	172	136	136	114	114	84	68	56	-	-	108	100	82	66	54	130	108
	163	156	126	99	195	162	123	-	-	171	102	258	204	204	171	171	126	102	-	-	162	150	-	99	-	195	162	
	89	82	67	53	103	86	65	-	-	90	54	135	108	108	90	90	67	54	45	-	-	87	80	65	52	44	103	86
	178	164	134	106	206	172	130	-	-	180	108	270	216	216	180	180	134	108	90	-	-	174	160	130	104	88	206	172
	267	246	201	159	309	258	195	-	-	270	162	405	324	324	270	270	201	162	-	-	261	240	-	156	-	309	258	
	89	82	67	53	103	86	65	-	-	90	54	135	108	108	90	90	67	54	45	-	-	87	80	65	52	44	103	86
	178	164	134	106	206	172	130	-	-	180	108	270	216	216	180	180	134	108	90	-	-	174	160	130	104	88	206	172
	267	246	201	159	309	258	195	-	-	270	162	405	324	324	270	270	201	162	-	-	261	240	-	156	-	309	258	

50 x 45 x 30 mm

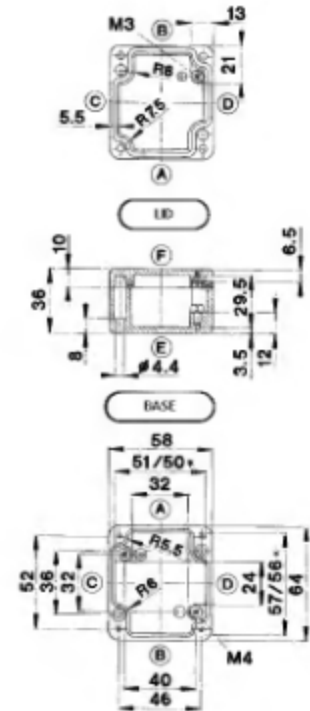
CA-020
Aluminium enclosure



* minimum dimensions at level of mounting plate support

58 x 64 x 36 mm

CA-060
Aluminium enclosure



* minimum dimensions at level of mounting plate support

Type	CA-020
Weight (g)	70
External dimensions (mm)	50 x 45 x 30
Complete enclosures	Part number
Coated, with gasket and lid screws	102.0.0000.00 ●
Coated, with gasket and hex socket head screws	-
Coated, with silicone gasket and lid screws	-
Coated, with HF gasket and lid screws	-
Saltwater-proof coating, with gasket and lid screws	102.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	102.0.0060.00
Unwashed, unpainted, no accessories	102.0.0340.00
Accessories (separate or as a mounting set)	
Mounting plate	-
TS 15 mounting rail	-
TS 32 mounting rail	-
TS 35 mounting rail	-
Grounding rail	-
External attachment brackets	-
External hinges side	-
Internal hinges with lid guiding**	-
Silicone gasket for wider temperature range (piece goods)	-

Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	1	0	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

Type	CA-060
Weight (g)	160
External dimensions (mm)	58 x 64 x 36
Complete enclosures	Part number
Coated, with gasket and lid screws	106.0.0000.00 ●
Coated, with gasket and hex socket head screws	-
Coated, with silicone gasket and lid screws	106.0.0940.00
Coated, with HF gasket and lid screws	106.0.0080.00
Saltwater-proof coating, with gasket and lid screws	106.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	106.0.0060.00
Unwashed, unpainted, no accessories	106.0.0380.00
Accessories (separate or as a mounting set)	
Mounting plate	951.1.0010.00 ●
TS 15 mounting rail	982.0.0000.00 ●
TS 32 mounting rail	-
TS 35 mounting rail	-
Grounding rail	-
External attachment brackets	-
External hinges side	-
Internal hinges with lid guiding**	-
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●

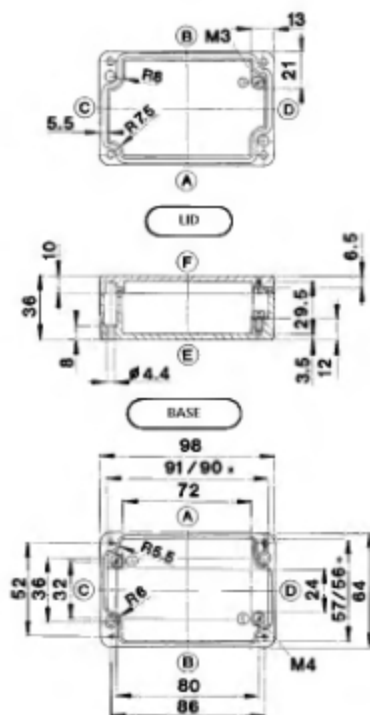
ISO M	12	16	20	25	32	40	50	63
Side A/B	2	1	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

98 x 64 x 36 mm

CA-080
Aluminium enclosure

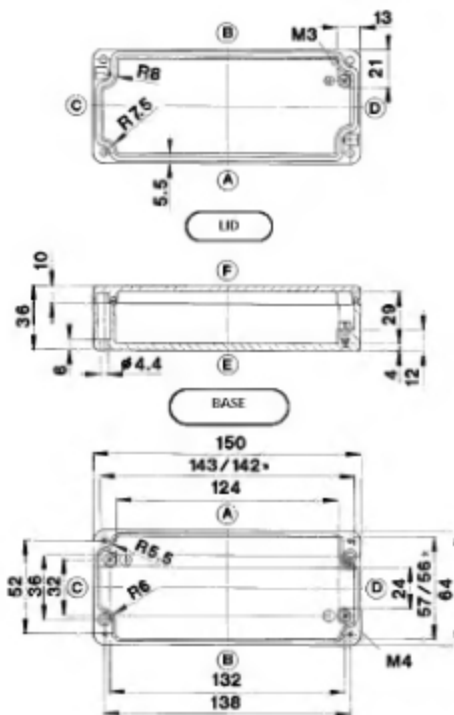


* minimum dimensions at level of mounting plate support

CA-080
220
98 x 64 x 36
Part number
108.0.0000.00 ●
-
108.0.0090.00
108.0.0080.00
108.0.0100.00
108.0.0060.00
108.0.0420.00
-
951.1.0020.00 ●
982.0.0050.00 ●
-
-
-
-
-
923.1.0050.00 ●
-
ISO M 12 16 20 25 32 40 50 63
Side A/B 4 3 0 0 0 0 0 0
Side C/D 1 0 0 0 0 0 0 0
** mechanical enclosure machining required
● = kept in stock

150 x 64 x 36 mm

CA-100
Aluminium enclosure

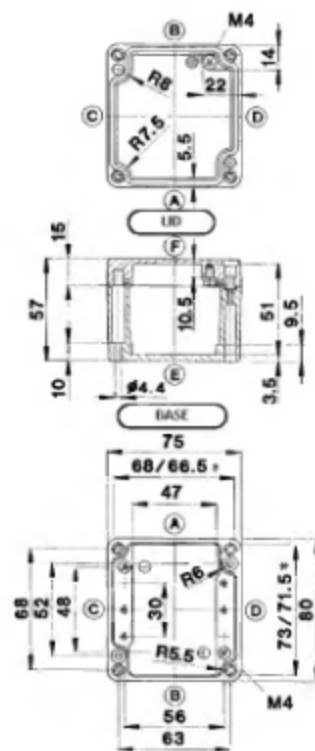


* minimum dimensions at level of mounting plate support

CA-100
330
150 x 64 x 36
Part number
110.0.0000.00 ●
-
110.0.0760.00
110.0.0080.00
110.0.0100.00
110.0.0060.00
110.0.0530.00
-
951.1.0030.00 ●
982.0.0110.00 ●
-
-
-
-
-
923.1.0050.00 ●
-
ISO M 12 16 20 25 32 40 50 63
Side A/B 6 4 0 0 0 0 0 0
Side C/D 1 0 0 0 0 0 0 0
** mechanical enclosure machining required
● = kept in stock

75 x 80 x 57 mm

CA-130
Aluminium enclosure

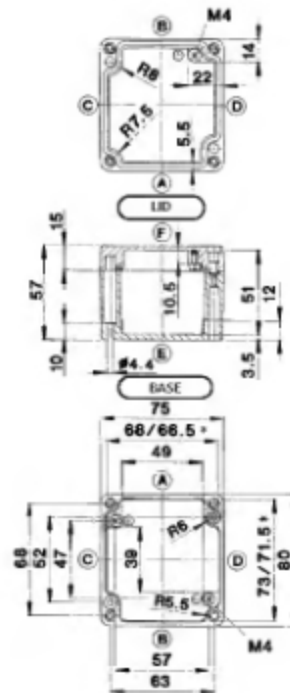


* minimum dimensions at level of mounting plate support

CA-130
280
75 x 80 x 57
Part number
113.0.0000.00 ●
-
113.0.0820.00
113.0.0080.00
113.0.0100.00
113.0.0060.00
113.0.0570.00
-
982.3.0150.00 ●
982.0.0020.00 ●
-
-
-
980.1.0440.00 ●
-
923.1.0050.00 ●
-
ISO M 12 16 20 25 32 40 50 63
Side A/B 5 2 1 0 0 0 0 0
Side C/D 3 2 1 0 0 0 0 0
** mechanical enclosure machining required
● = kept in stock

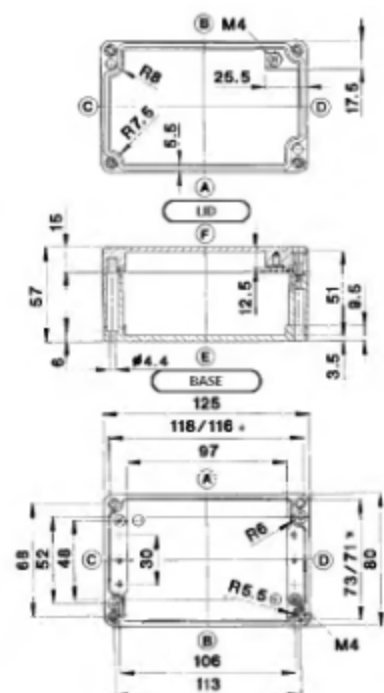
75 x 80 x 57 mm

CA-140
Aluminium enclosure



125 x 80 x 57 mm

CA-150
Aluminium enclosure



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	CA-140
Weight (g)	280
External dimensions (mm)	75 x 80 x 57
Complete enclosures	Part number
Coated, with gasket and lid screws	114.0.0000.00 ●
Coated, with gasket and hex socket head screws	–
Coated, with silicone gasket and lid screws	114.0.0860.00
Coated, with HF gasket and lid screws	114.0.0080.00
Saltwater-proof coating, with gasket and lid screws	114.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	114.0.0060.00
Unwashed, unpainted, no accessories	114.0.0800.00
Accessories (separate or as a mounting set)	
Mounting plate	951.1.0040.00 ●
TS 15 mounting rail	982.0.0350.00 ●
TS 32 mounting rail	–
TS 35 mounting rail	–
Grounding rail	–
External attachment brackets	–
External hinges side	980.1.0440.00 ●
Internal hinges with lid guiding**	–
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●

Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	1	1	0	0	0	0
Side C/D	3	2	1	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

Type	CA-150
Weight (g)	435
External dimensions (mm)	125 x 80 x 57
Complete enclosures	Part number
Coated, with gasket and lid screws	115.0.0000.00 ●
Coated, with gasket and hex socket head screws	–
Coated, with silicone gasket and lid screws	115.0.0090.00
Coated, with HF gasket and lid screws	115.0.0080.00
Saltwater-proof coating, with gasket and lid screws	115.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	115.0.0060.00
Unwashed, unpainted, no accessories	115.0.0190.00
Accessories (separate or as a mounting set)	
Mounting plate	982.3.0160.00 ●
TS 15 mounting rail	982.0.0100.00 ●
TS 32 mounting rail	–
TS 35 mounting rail	–
Grounding rail	–
External attachment brackets	–
External hinges side	980.1.0440.00 ●
Internal hinges with lid guiding**	–
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●

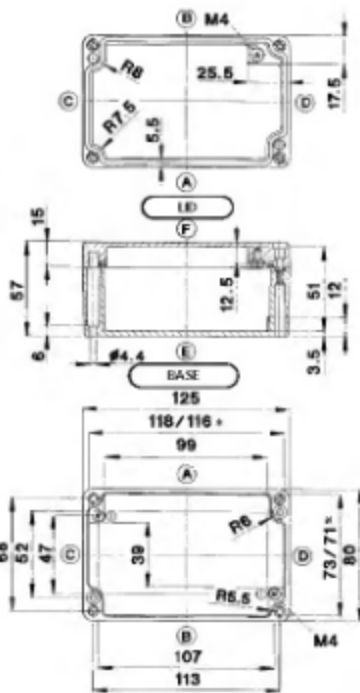
ISO M	12	16	20	25	32	40	50	63
Side A/B	10	4	3	2	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

125 x 80 x 57 mm

CA-160
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-160	
435	
125 x 80 x 57	
Part number	
116.0.0000.00 ●	
-	
116.0.1380.00	
116.0.0080.00	
116.0.0100.00	
116.0.0060.00	
116.0.0450.00	
-	
951.1.0050.00 ●	
982.0.0360.00 ●	
-	
-	
-	
980.1.0440.00 ●	
-	
923.1.0050.00 ●	

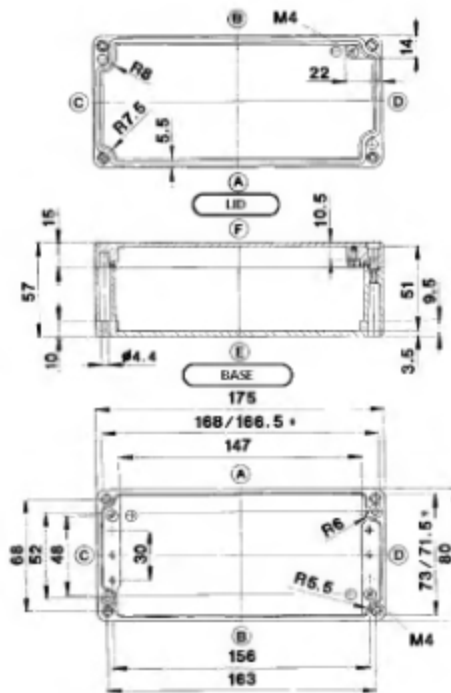
ISO M	12	16	20	25	32	40	50	63
Side A/B	10	4	3	2	0	0	0	0
Side C/D	4	2	1	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

175 x 80 x 57 mm

CA-170
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-170	
530	
175 x 80 x 57	
Part number	
117.0.0000.00 ●	
-	
117.0.0090.00	
117.0.0080.00	
117.0.0100.00	
117.0.0060.00	
117.0.0160.00	
-	
982.3.0170.00 ●	
982.0.0140.00 ●	
-	
-	
-	
980.1.0440.00 ●	
-	
923.1.0050.00 ●	

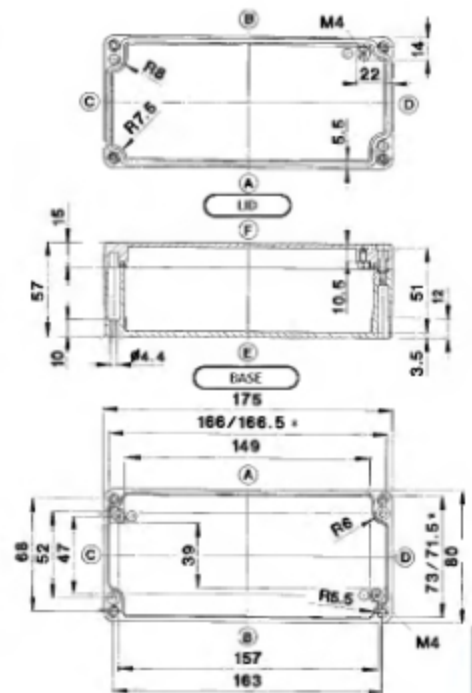
ISO M	12	16	20	25	32	40	50	63
Side A/B	14	6	4	4	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

175 x 80 x 57 mm

CA-180
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-180	
530	
175 x 80 x 57	
Part number	
118.0.0000.00 ●	
-	
118.0.0440.00	
118.0.0080.00	
118.0.0100.00	
118.0.0060.00	
118.0.0400.00	
-	
951.1.0060.00 ●	
982.0.0370.00 ●	
-	
-	
-	
980.1.0440.00 ●	
-	
923.1.0050.00 ●	

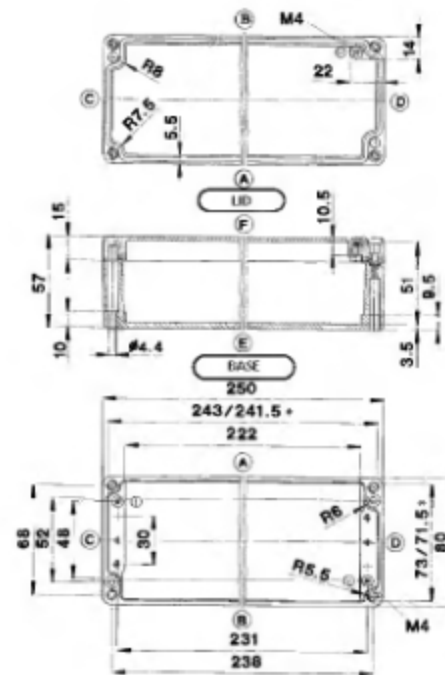
ISO M	12	16	20	25	32	40	50	63
Side A/B	14	6	4	4	0	0	0	0
Side C/D	4	2	1	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

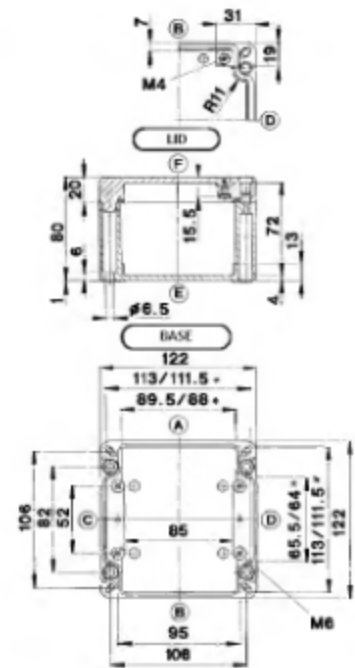
250 x 80 x 57 mm

CA-190
Aluminium enclosure



122 x 122 x 80 mm

CA-210
Aluminium enclosure



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight	(g)
External dimensions	(mm)
Complete enclosures	
Coated, with gasket and lid screws	
Coated, with gasket and hex socket head screws	
Coated, with silicone gasket and lid screws	
Coated, with HF gasket and lid screws	
Saltwater-proof coating, with gasket and lid screws	
Saltwater-proof coating, passivated, lid screws with gasket	
Unwashed, unpainted, no accessories	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges side	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

CA-190	
710	
250 x 80 x 57	
Part number	
119.0.0000.00 ●	
–	
119.0.0480.00	
119.0.0080.00	
119.0.0100.00	
119.0.0060.00	
119.0.0260.00	
982.3.0210.00 ●	
982.0.0190.00 ●	
–	
–	
–	
980.1.0440.00 ●	
–	
923.1.0050.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	22	9	7	5	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

CA-210	
940	
122 x 122 x 80	
Part number	
121.0.0000.00 ●	
121.0.0010.00	
121.0.0150.00	
121.0.0080.00	
121.0.0100.00	
121.0.0060.00	
121.0.0160.00	
951.1.1500.00 ●	
–	
982.1.0000.00 ●	
982.2.0010.00	
981.0.0020.00	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00	
923.1.0060.00 ●	

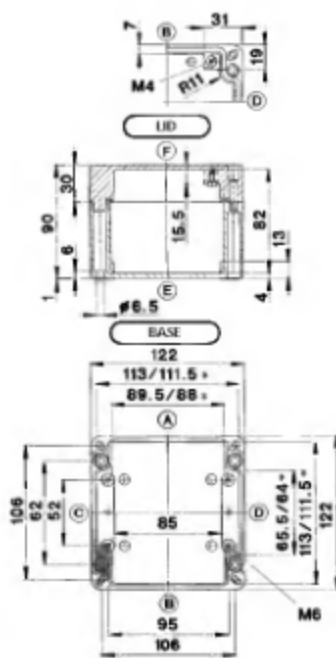
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

122 x 122 x 90 mm

CA-215
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-215	
920	122 x 122 x 90
Part number	
121.0.0000.50 ●	
121.0.0010.50	
121.0.0110.50	
121.0.0080.50	
121.0.0100.50	
121.0.0060.50	
121.0.0120.50	
951.1.1500.00 ●	
-	
982.1.0000.00 ●	
982.2.0010.00 ●	
981.0.0020.00 ●	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00 ●	
923.1.0060.00 ●	

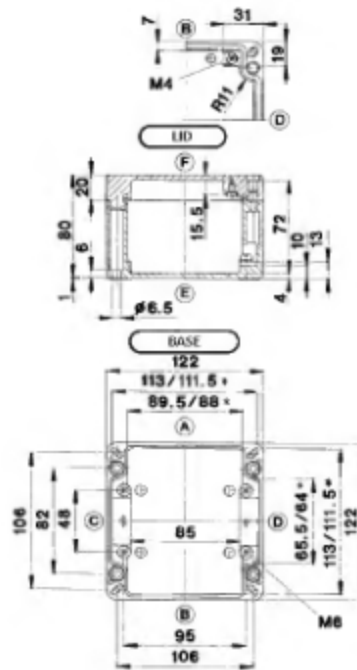
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

122 x 122 x 80 mm

CA-220
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-220	
940	122 x 122 x 80
Part number	
122.0.0000.00 ●	
122.0.0010.00	
122.0.0270.00	
122.0.0080.00	
122.0.0100.00	
122.0.0060.00	
122.0.0610.00	
951.1.0080.00 ●	
-	
982.1.0000.00 ●	
982.2.0010.00 ●	
981.0.0020.00 ●	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00	
923.1.0060.00 ●	

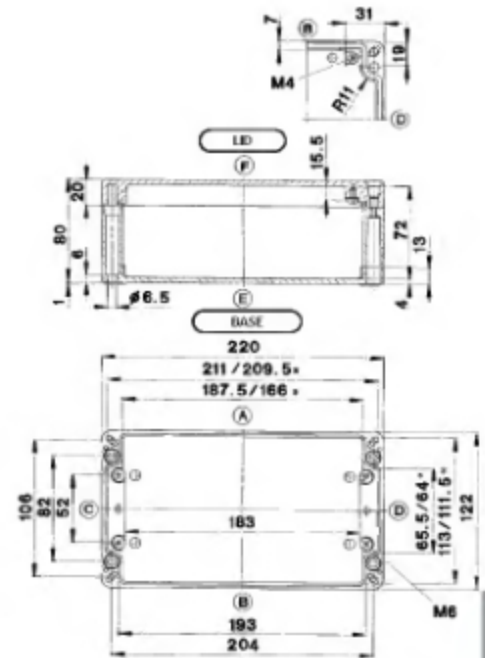
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

220 x 122 x 80 mm

CA-230
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-230	
1410	220 x 122 x 80
Part number	
123.0.0000.00 ●	
123.0.0010.00	
123.0.0160.00	
123.0.0080.00	
123.0.0100.00	
123.0.0060.00	
123.0.0150.00	
951.1.0950.00 ●	
-	
982.1.0050.00 ●	
982.2.0070.00 ●	
981.0.0080.00 ●	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00	
923.1.0060.00 ●	

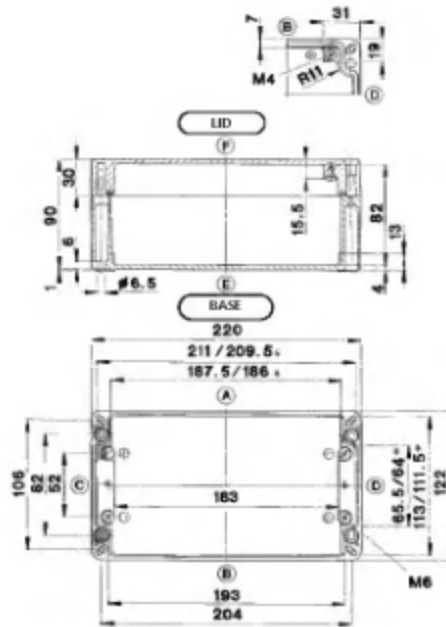
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

220 x 122 x 90 mm

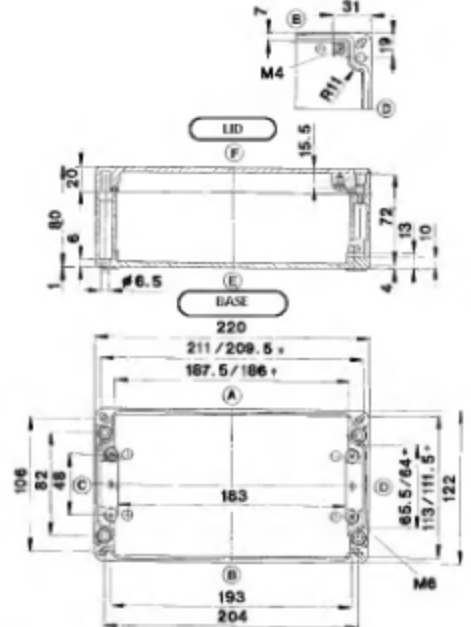
CA-235
Aluminium enclosure



* minimum dimensions at level of mounting plate support

220 x 122 x 80 mm

CA-240
Aluminium enclosure



* minimum dimensions at level of mounting plate support

Type	
Weight	(g)
External dimensions	(mm)
Complete enclosures	
Coated, with gasket and lid screws	
Coated, with gasket and hex socket head screws	
Coated, with silicone gasket and lid screws	
Coated, with HF gasket and lid screws	
Saltwater-proof coating, with gasket and lid screws	
Saltwater-proof coating, passivated, lid screws with gasket	
Unwashed, unpainted, no accessories	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges side	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

Max. Pg threads

CA-235	
1410	
220 x 122 x 90	
Part number	
123.0.0000.50 ●	
123.0.0010.50	
123.0.0110.50	
123.0.0080.50	
123.0.0100.50	
123.0.0060.50	
123.0.0120.50	
951.1.0950.00 ●	
—	
982.1.0050.00 ●	
982.2.0070.00 ●	
981.0.0080.00 ●	
982.4.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00 ●	
923.1.0060.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

CA-240	
1410	
220 x 122 x 80	
Part number	
124.0.0000.00 ●	
124.0.0010.00	
124.0.0970.00	
124.0.0080.00	
124.0.0100.00	
124.0.0060.00	
124.0.0820.00	
951.1.0090.00 ●	
—	
982.1.0050.00 ●	
982.2.0070.00 ●	
981.0.0080.00 ●	
982.0.0240.00 ●	
980.1.0470.00 ●	
980.1.0310.00 ●	
923.1.0060.00 ●	

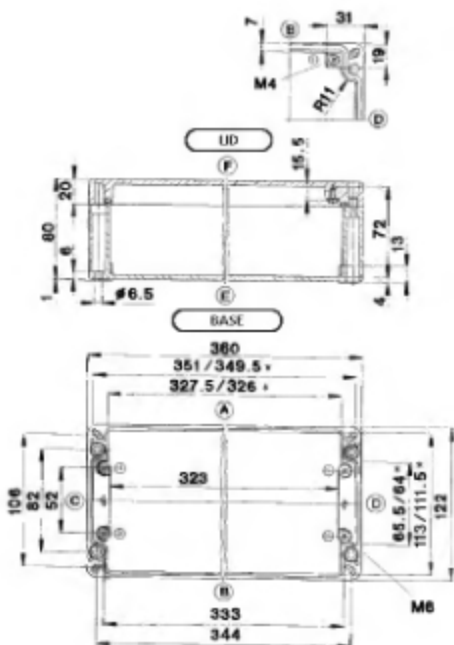
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

360 x 122 x 80 mm

CA-250
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-250

1860

360 x 122 x 80

Part number

125.0.0000.00 ●
125.0.0010.00
125.0.1240.00
125.0.0080.00
125.0.0100.00
125.0.0060.00
125.0.0110.00

951.1.1740.00 ●

-

982.1.0120.00 ●

982.2.0150.00 ●

981.0.0140.00 ●

982.4.0240.00 ●

980.1.0470.00 ●

980.1.0310.00 ●

923.1.0060.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 48 21 16 9 6 0 0 0

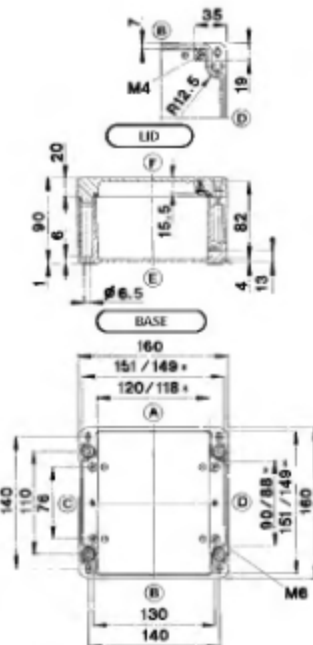
Side C/D 5 2 2 1 0 0 0 0

** mechanical enclosure machining required

● = kept in stock

160 x 160 x 90 mm

CA-270
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-270

1410

160 x 160 x 90

Part number

127.0.0000.00 ●
127.0.0010.00
127.0.0120.00
127.0.0080.00
127.0.0100.00
127.0.0060.00
127.0.0130.00

951.1.1490.00 ●

-

982.1.0020.00 ●

982.2.0030.00 ●

981.0.0040.00 ●

982.4.0240.00 ●

980.1.0470.00 ●

980.1.0300.00 ●

923.1.0060.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 20 9 6 4 2 2 1 0

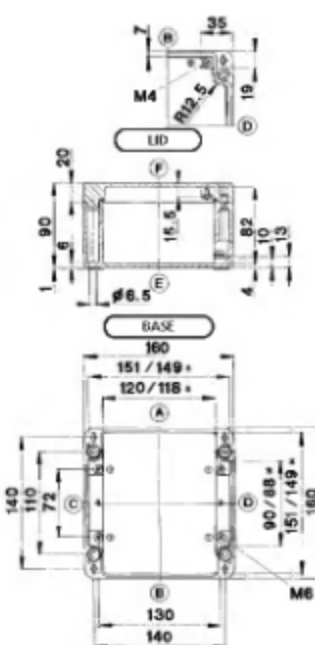
Side C/D 8 4 3 2 2 0 0 0

** mechanical enclosure machining required

● = kept in stock

160 x 160 x 90 mm

CA-280
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-280

1410

160 x 160 x 90

Part number

128.0.0000.00 ●
128.0.0010.00
128.0.0590.00
128.0.0080.00
128.0.0100.00
128.0.0060.00
128.0.0330.00

951.1.0110.00 ●

-

982.1.0020.00 ●

982.2.0030.00 ●

981.0.0040.00 ●

982.4.0240.00 ●

980.1.0470.00 ●

980.1.0300.00 ●

923.1.0060.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 20 9 6 4 2 2 1 0

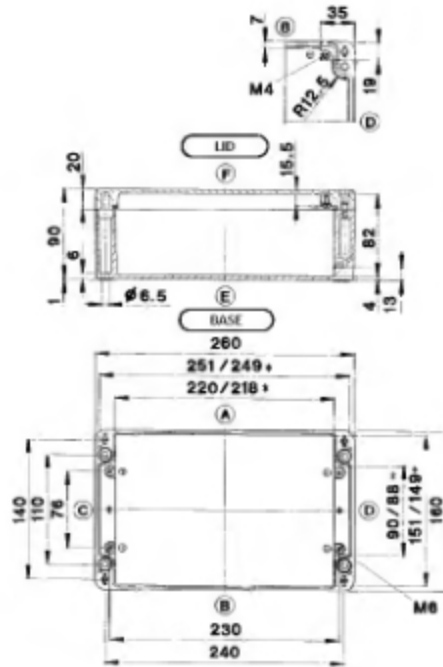
Side C/D 8 4 3 2 2 0 0 0

** mechanical enclosure machining required

● = kept in stock

260 x 160 x 90 mm

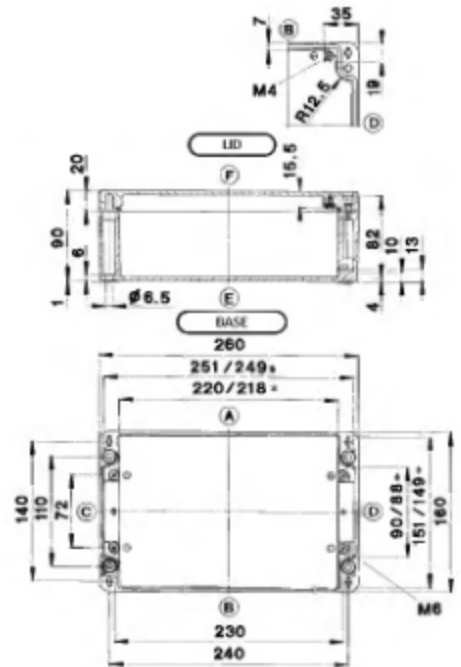
CA-290
Aluminium enclosure



* minimum dimensions at level of mounting plate support

260 x 160 x 90 mm

CA-300
Aluminium enclosure



* minimum dimensions at level of mounting plate support

Type	CA-290
Weight (g)	1960
External dimensions (mm)	260 x 160 x 90
Complete enclosures	Part number
Coated, with gasket and lid screws	129.0.0000.00 ●
Coated, with gasket and hex socket head screws	129.0.0010.00
Coated, with silicone gasket and lid screws	129.0.0470.00
Coated, with HF gasket and lid screws	129.0.0080.00
Saltwater-proof coating, with gasket and lid screws	129.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	129.0.0060.00
Unwashed, unpainted, no accessories	129.0.0110.00
Accessories (separate or as a mounting set)	
Mounting plate	951.1.0960.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0080.00 ●
TS 35 mounting rail	982.2.0110.00 ●
Grounding rail	981.0.0100.00 ●
External attachment brackets	982.4.0240.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	36	17	12	7	4	3	3	0
Side C/D	8	4	3	2	2	0	0	0

** mechanical enclosure machining required

● = kept in stock

Type	CA-300
Weight (g)	1960
External dimensions (mm)	260 x 160 x 90
Complete enclosures	Part number
Coated, with gasket and lid screws	130.0.0000.00 ●
Coated, with gasket and hex socket head screws	130.0.0010.00
Coated, with silicone gasket and lid screws	130.0.0640.00
Coated, with HF gasket and lid screws	130.0.0080.00
Saltwater-proof coating, with gasket and lid screws	130.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	130.0.0060.00
Unwashed, unpainted, no accessories	130.0.0410.00
Accessories (separate or as a mounting set)	
Mounting plate	951.1.0120.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0080.00 ●
TS 35 mounting rail	982.2.0110.00 ●
Grounding rail	981.0.0100.00 ●
External attachment brackets	982.4.0240.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

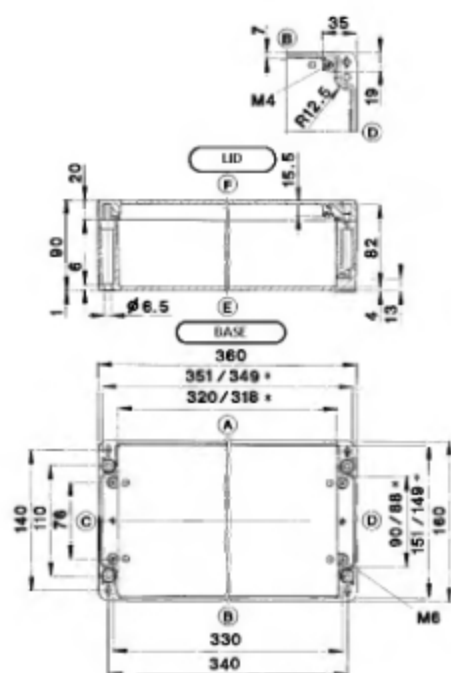
ISO M	12	16	20	25	32	40	50	63
Side A/B	36	17	12	7	4	3	3	0
Side C/D	8	4	3	2	2	0	0	0

** mechanical enclosure machining required

● = kept in stock

360 x 160 x 90 mm

CA-310
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-310

2550

360 x 160 x 90

Part number

131.0.0000.00 ●
131.0.0010.00
131.0.1580.00
131.0.0080.00
131.0.0100.00
131.0.0060.00
131.0.0710.00

951.1.1750.00 ●

982.1.0120.00 ●

982.2.0150.00 ●

981.0.0420.00 ●

982.4.0240.00 ●

980.1.0470.00 ●

980.1.0300.00 ●

923.1.0060.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 54 26 18 11 6 5 4 0

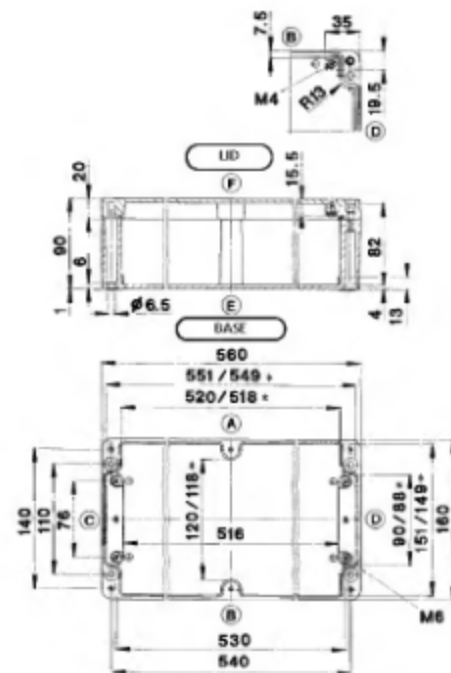
Side C/D 8 4 3 2 2 0 0 0

** mechanical enclosure machining required

● = kept in stock

560 x 160 x 90 mm

CA-330
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-330

4310

560 x 160 x 90

Part number

133.0.0000.00 ●
133.0.0010.00
133.0.0560.00
133.0.0080.00
133.0.0100.00
133.0.0060.00
133.0.0220.00

951.1.0140.00 ●

982.1.0150.00 ●

982.2.0180.00 ●

981.0.0160.00 ●

982.4.0240.00 ●

980.1.0470.00 ●

980.1.0300.00 ●

923.1.0090.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 84 40 28 16 10 8 6 0

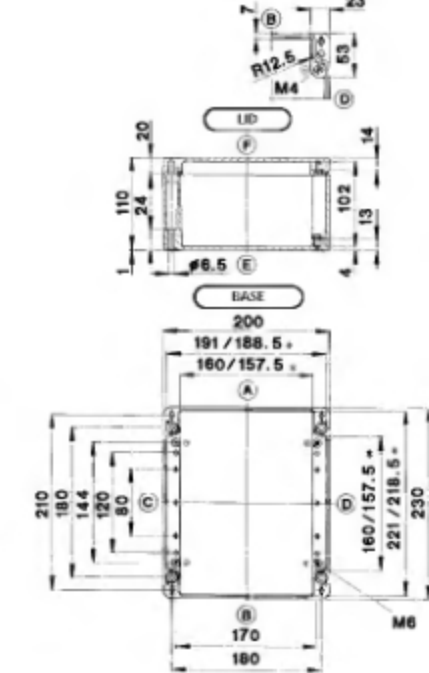
Side C/D 8 4 3 2 2 0 0 0

** mechanical enclosure machining required

● = kept in stock

200 x 230 x 110 mm

CA-350
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-350

2730

200 x 230 x 110

Part number

135.0.0000.00 ●
135.0.0010.00
135.0.0780.00
135.0.0080.00
135.0.0100.00
135.0.0060.00
135.0.0170.00

951.1.0150.00 ●

982.1.0030.00 ●

982.2.0050.00 ●

981.0.0070.00 ●

982.4.0230.00 ●

980.1.0470.00 ●

980.1.0300.00 ●

923.1.0060.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 35 15 12 8 4 3 2 2

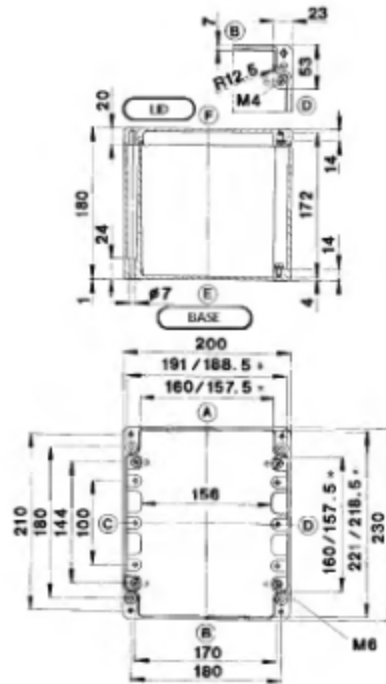
Side C/D 26 12 8 5 3 2 2 1

** mechanical enclosure machining required

● = kept in stock

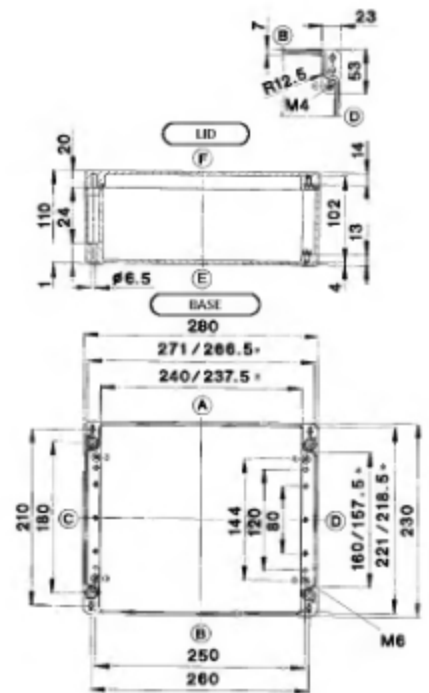
200 x 230 x 180 mm

CA-360
Aluminium enclosure



280 x 230 x 110 mm

CA-370
Aluminium enclosure



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	3680
External dimensions (mm)	200 x 230 x 180
Complete enclosures	Part number
Coated, with gasket and lid screws	136.0.0000.00 ●
Coated, with gasket and hex socket head screws	136.0.0010.00
Coated, with silicone gasket and lid screws	136.0.0440.00
Coated, with HF gasket and lid screws	136.0.0080.00
Saltwater-proof coating, with gasket and lid screws	136.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	136.0.0060.00
Unwashed, unpainted, no accessories	136.0.0430.00
Accessories (separate or as a mounting set)	
Mounting plate	951.1.0150.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0030.00 ●
TS 35 mounting rail	982.2.0050.00 ●
Grounding rail	981.0.0070.00 ●
External attachment brackets	982.4.0230.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	56	32	20	13	9	5	4	4
Side C/D	52	27	18	12	8	5	3	3

** mechanical enclosure machining required

● = kept in stock

Type	
Weight (g)	3840
External dimensions (mm)	280 x 230 x 110
Complete enclosures	Part number
Coated, with gasket and lid screws	137.0.0000.00 ●
Coated, with gasket and hex socket head screws	137.0.0010.00
Coated, with silicone gasket and lid screws	137.0.0730.00
Coated, with HF gasket and lid screws	137.0.0080.00
Saltwater-proof coating, with gasket and lid screws	137.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	137.0.0060.00
Unwashed, unpainted, no accessories	137.0.0150.00
Accessories (separate or as a mounting set)	
Mounting plate	951.1.0160.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0090.00 ●
TS 35 mounting rail	982.2.0120.00 ●
Grounding rail	981.0.0110.00 ●
External attachment brackets	982.4.0230.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

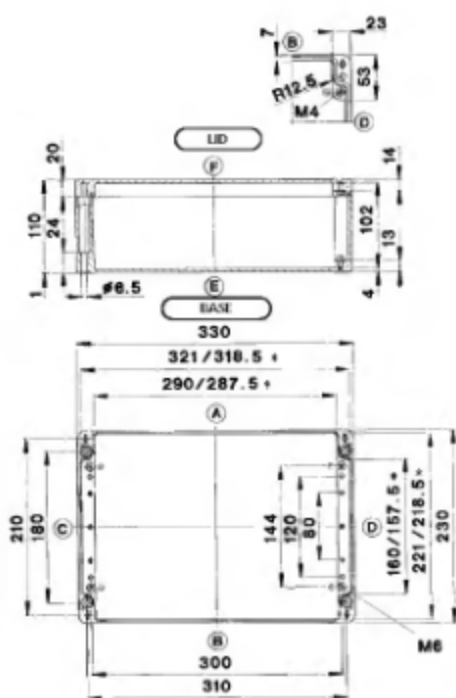
ISO M	12	16	20	25	32	40	50	63
Side A/B	53	25	18	11	7	4	3	3
Side C/D	26	12	8	5	3	2	2	1

** mechanical enclosure machining required

● = kept in stock

330 x 230 x 110 mm

CA-380
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-380	
4270	
330 x 230 x 110	
Part number	
138.0.0000.00 ●	
138.0.0010.00	
138.0.0520.00	
138.0.0080.00	
138.0.0100.00	
138.0.0060.00	
138.0.0140.00	
951.1.0170.00 ●	
-	
982.1.0110.00 ●	
982.2.0140.00 ●	
981.0.0130.00 ●	
982.4.0230.00 ●	
980.1.0470.00 ●	
980.1.0300.00 ●	
923.1.0060.00 ●	

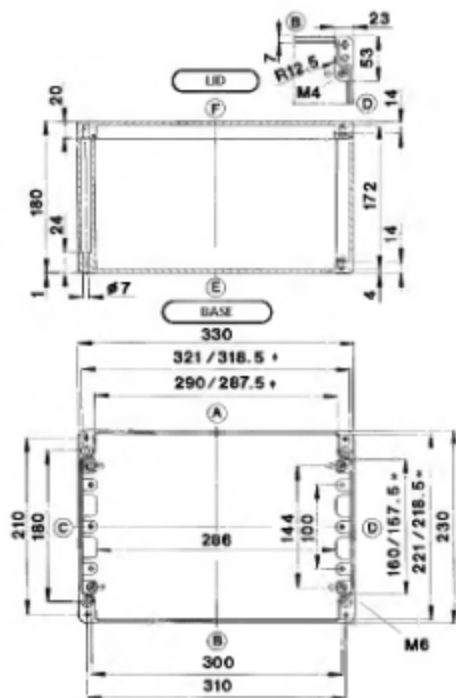
ISO M	12	16	20	25	32	40	50	63
Side A/B	65	30	23	12	9	5	4	3
Side C/D	24	12	8	5	3	2	2	1

** mechanical enclosure machining required

● = kept in stock

330 x 230 x 180 mm

CA-390
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-390	
5300	
330 x 230 x 180	
Part number	
139.0.0000.00 ●	
139.0.0010.00	
139.0.0200.00	
139.0.0080.00	
139.0.0100.00	
139.0.0060.00	
139.0.0120.00	
951.1.0170.00 ●	
-	
982.1.0110.00 ●	
982.2.0140.00 ●	
981.0.0130.00 ●	
982.4.0230.00 ●	
980.1.0470.00 ●	
980.1.0300.00 ●	
923.1.0060.00 ●	

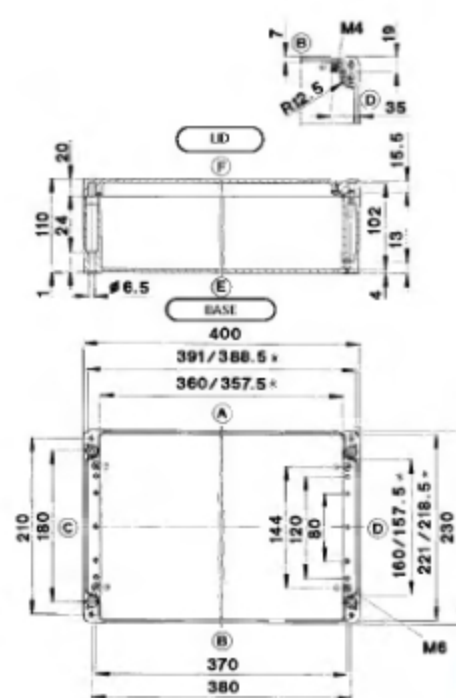
ISO M	12	16	20	25	32	40	50	63
Side A/B	108	54	40	25	15	9	8	6
Side C/D	52	27	18	12	8	5	3	3

** mechanical enclosure machining required

● = kept in stock

400 x 230 x 110 mm

CA-400
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-400	
4870	
400 x 230 x 110	
Part number	
140.0.0000.00 ●	
140.0.0010.00	
140.0.0620.00	
140.0.0080.00	
140.0.0100.00	
140.0.0060.00	
140.0.0130.00	
951.1.2940.00 ●	
-	
982.1.0140.00 ●	
982.2.0170.00 ●	
981.0.0150.00 ●	
982.4.0230.00 ●	
980.1.0470.00 ●	
980.1.0300.00 ●	
923.1.0060.00 ●	

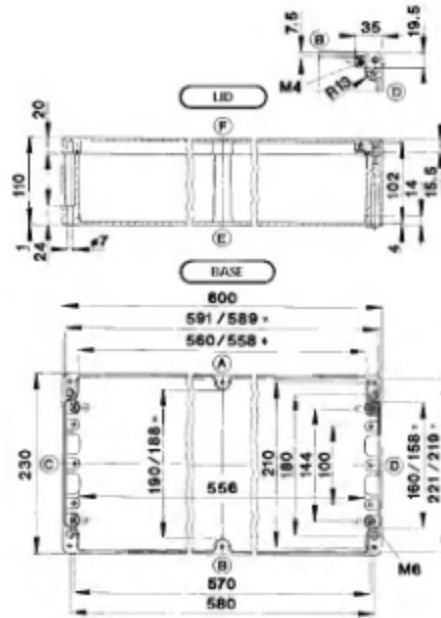
ISO M	12	16	20	25	32	40	50	63
Side A/B	80	38	27	17	11	6	5	4
Side C/D	26	12	8	5	3	2	2	1

** mechanical enclosure machining required

● = kept in stock

600 x 230 x 110 mm

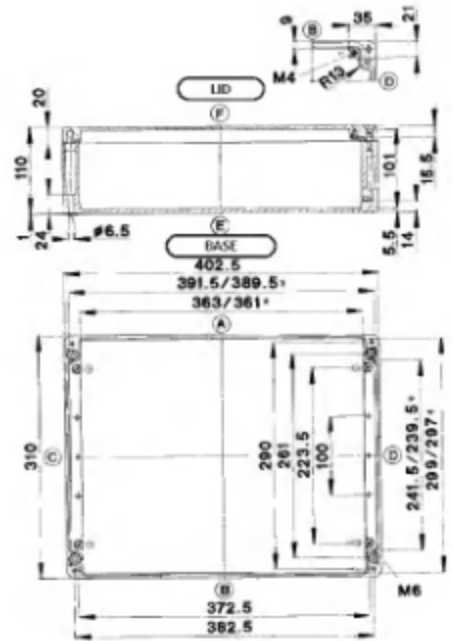
CA-420
Aluminium enclosure



* minimum dimensions at level of mounting plate support

402.5 x 310 x 110 mm

CA-450
Aluminium enclosure



* minimum dimensions at level of mounting plate support

Type	CA-420
Weight (g)	6380
External dimensions (mm)	600 x 230 x 110
Complete enclosures	Part number
Coated, with gasket and lid screws	142.0.0000.00 ●
Coated, with gasket and hex socket head screws	142.0.0010.00
Coated, with silicone gasket and lid screws	142.0.0550.00
Coated, with HF gasket and lid screws	142.0.0080.00
Saltwater-proof coating, with gasket and lid screws	142.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	142.0.0060.00
Unwashed, unpainted, no accessories	142.0.0110.00
Accessories (separate or as a mounting set)	
Mounting plate	951.1.0190.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0160.00 ●
TS 35 mounting rail	982.2.0190.00 ●
Grounding rail	981.0.0170.00 ●
External attachment brackets	982.4.0230.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●

Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	120	56	42	24	16	8	8	6
Side C/D	28	13	8	5	3	2	2	1

** mechanical enclosure machining required

● = kept in stock

Type	CA-450
Weight (g)	5810
External dimensions (mm)	402.5 x 310 x 110
Complete enclosures	Part number
Coated, with gasket and lid screws	145.0.0000.00 ●
Coated, with gasket and hex socket head screws	145.0.0010.00
Coated, with silicone gasket and lid screws	145.0.0520.00
Coated, with HF gasket and lid screws	145.0.0080.00
Saltwater-proof coating, with gasket and lid screws	145.0.0100.00
Saltwater-proof coating, passivated, lid screws with gasket	145.0.0060.00
Unwashed, unpainted, no accessories	145.0.0250.00
Accessories (separate or as a mounting set)	
Mounting plate	951.1.0200.00 ●
TS 15 mounting rail	-
TS 32 mounting rail	982.1.0140.00 ●
TS 35 mounting rail	982.2.0170.00 ●
Grounding rail	981.0.0150.00 ●
External attachment brackets	982.4.0230.00 ●
External hinges side	980.1.0470.00 ●
Internal hinges with lid guiding**	980.1.0300.00 ●
Silicone gasket for wider temperature range (piece goods)	923.1.0090.00 ●

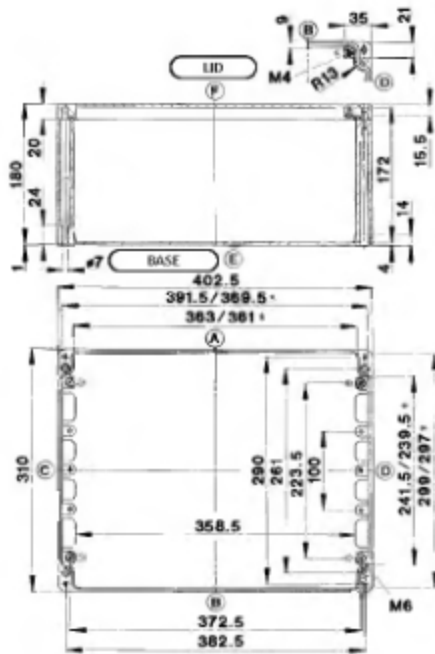
ISO M	12	16	20	25	32	40	50	63
Side A/B	80	38	27	17	11	6	5	4
Side C/D	38	21	13	7	5	4	3	2

** mechanical enclosure machining required

● = kept in stock

402.5 x 310 x 180 mm

CA-460
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-460

7420

402.5 x 310 x 180

Part number

146.0.0000.00 ●
146.0.0010.00
146.0.0130.00
146.0.0080.00
146.0.0100.00
146.0.0060.00
146.0.0490.00

951.1.0200.00 ●

-

982.1.0140.00 ●

982.2.0170.00 ●

981.0.0150.00 ●

982.4.0230.00 ●

980.1.0470.00 ●

980.1.0300.00 ●

923.1.0090.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 136 68 50 30 21 12 10 8

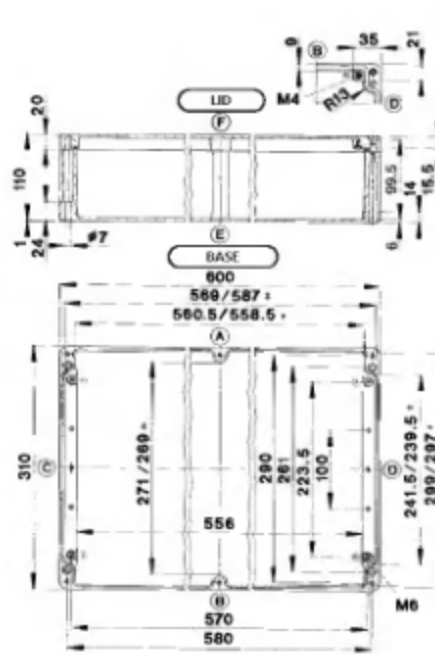
Side C/D 74 38 28 18 12 8 6 3

** mechanical enclosure machining required

● = kept in stock

600 x 310 x 110 mm

CA-470
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-470

8480

600 x 310 x 110

Part number

147.0.0000.00 ●
147.0.0010.00
147.0.0560.00
147.0.0080.00
147.0.0100.00
147.0.0060.00
147.0.0620.00

951.1.0210.00 ●

-

982.1.0160.00 ●

982.2.0190.00 ●

981.0.0170.00 ●

982.4.0230.00 ●

980.1.0470.00 ●

980.1.0300.00 ●

923.1.0090.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 120 56 42 24 16 8 8 6

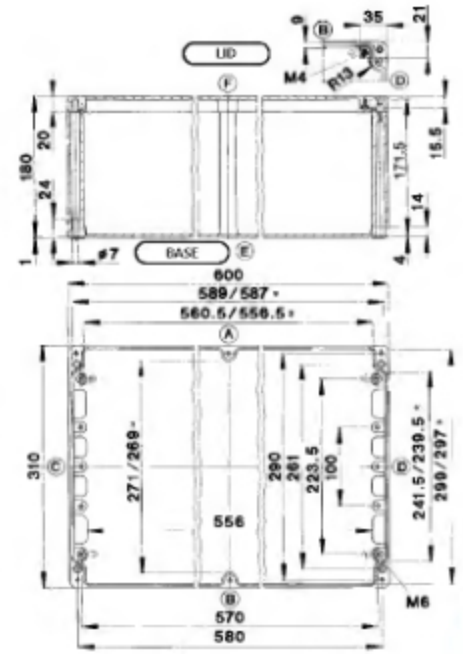
Side C/D 38 17 13 7 5 4 3 2

** mechanical enclosure machining required

● = kept in stock

600 x 310 x 180 mm

CA-480
Aluminium enclosure



* minimum dimensions at level of mounting plate support

CA-480

10840

600 x 310 x 180

Part number

148.0.0000.00 ●
148.0.0010.00
148.0.0450.00
148.0.0080.00
148.0.0100.00
148.0.0060.00
148.0.0170.00

951.1.0210.00 ●

-

982.1.0160.00 ●

982.2.0190.00 ●

981.0.0170.00 ●

982.4.0230.00 ●

980.1.0470.00 ●

980.1.0300.00 ●

923.1.0090.00 ●

ISO M 12 16 20 25 32 40 50 63

Side A/B 200 100 76 46 30 18 14 12

Side C/D 74 38 28 18 12 8 6 5

** mechanical enclosure machining required

● = kept in stock

Polycarbonate and ABS enclosures with quick release lid screws CT series

The CT series of BERNSTEIN plastic enclosures are made from high-quality Polycarbonate or ABS. They are especially suitable for encapsulating electrical and electronic components or for use as complete compact control housings. All enclosures are optionally available with a transparent Polycarbonate lid. The enclosures meet protection class IP 65 as standard.

All CT enclosures are provided with mounting bosses moulded directly into the base. Components, mounting rails or other assemblies may be easily secured using the self-tapping screws provided. BERNSTEIN CT enclosures always contain centrally positioned bosses to attach DIN rails.

BERNSTEIN enclosures are also supplied with patented stainless steel quick release screws as standard (a unique BERNSTEIN innovation). The screw is simply pressed into the holes in the lid where they are automatically retained and a quarter turn firmly secures the lid to the base. A gasket is factory-fitted (for standard enclosures) to ensure IP 65 protection. BERNSTEIN Polycarbonate and ABS enclosures are supplied in RAL 7035 (light grey) as standard.

Technical data

Material
Polycarbonate, transparent
Polycarbonate or ABS

Gasket
Neoprene round seal (silicised)
alternative:
Neoprene round seal (silicone-free)
Silicone round seal

Quick release screws
Stainless steel, self-locking, multi-purpose cross-head alternative:
Stainless steel lid screw, multi-purpose cross-head
Lead-sealed steel lid screws (9 S 20 K) galvanised, slotted head

Colour
RAL 7035 (light grey)
alternative:
other colours on request

Temperature
-40 °C to +80 °C (neoprene gasket)
alternative:
-40 °C to +120 °C (silicone gasket)

Protection class
IP 65
alternative:
higher protection classes on request

Approval
UL File E 182264 (only Polycarbonate enclosures)



Accessories Polycarbonate and ABS enclosure



Mounting plates

Laminated paper (Partmat) (thickness: CF-50 to CF-60: 1.5 mm, CF-62 to CF-78: 2.0 mm, CF-80 to CF-91: 2.5 mm), can be used for subsequent mounting of equipment.



Mounting rails

Standard TS-15, TS-32 and TS-35 rails (steel), yellow-passivated for terminal block attachment.



Earthing rails

Galvanised steel for connecting and routing protective earth-connectors.



External hinges

Polycarbonate, for the hinged mounting of enclosure lids. Opening angle of lid approx. 195°, easy lock-in mechanism at 170°, easy assembly press-fit hinges (CF-88 screw attachment).



External attachment brackets

Polycarbonate, for mounting enclosures without opening the lid. Colour: RAL 7035.



Silicone lid gasket

Improved temperature range (-40 °C to +120 °C). Standard type made of silicone foam.



Flexible quick-release internal hinges

For enclosure lids, captive and strain-relieved. Opening angle of lid > 180°. Stainless steel with polyamide ends.



Brass press-fit bushes

With metric M3 attachment screws for mounting equipment with metric screws in the mounting bosses of the base (Ø4 for CF-88).

Product line overview of polycarbonate and ABS enclosures

Dimensions/mm L x W x H	Polycarbonate enclosures		Polycarbonate enclosures with transparent lid (PC)		ABS enclosures		ABS enclosures with transparent lid (PC)	
	Part number	Type	Part number	Type	Part number	Type	Part number	Type
52 x 50 x 35	250.0.0000.00	CF-501	250.1.0000.00	CF-501 T	350.0.0000.00	CF-502	350.1.0000.00	CF-502 T
65 x 50 x 35	252.0.0000.00	CF-521	252.1.0000.00	CF-521 T	352.0.0000.00	CF-522	352.1.0000.00	CF-522 T
82 x 80 x 55	254.0.0000.00	CF-541	254.1.0000.00	CF-541 T	354.0.0000.00	CF-542	354.1.0000.00	CF-542 T
82 x 80 x 85	256.0.0000.00	CF-561	256.1.0000.00	CF-561 T	356.0.0000.00	CF-562	356.1.0000.00	CF-562 T
120 x 80 x 55	258.0.0000.00	CF-581	258.1.0000.00	CF-581 T	358.0.0000.00	CF-582	358.1.0000.00	CF-582 T
120 x 80 x 85	260.0.0000.00	CF-601	260.1.0000.00	CF-601 T	360.0.0000.00	CF-602	360.1.0000.00	CF-602 T
160 x 80 x 55	262.0.0000.00	CF-621	262.1.0000.00	CF-621 T	362.0.0000.00	CF-622	362.1.0000.00	CF-622 T
160 x 80 x 85	264.0.0000.00	CF-641	264.1.0000.00	CF-641 T	364.0.0000.00	CF-642	364.1.0000.00	CF-642 T
122 x 120 x 55	266.0.0000.00	CF-661	266.1.0000.00	CF-661 T	366.0.0000.00	CF-662	366.1.0000.00	CF-662 T
122 x 120 x 85	268.0.0000.00	CF-681	268.1.0000.00	CF-681 T	368.0.0000.00	CF-682	368.1.0000.00	CF-682 T
160 x 120 x 90	272.0.0000.00	CF-721	272.1.0000.00	CF-721 T	372.0.0000.00	CF-722	372.1.0000.00	CF-722 T
200 x 120 x 75	276.0.0000.00	CF-761	276.1.0000.00	CF-761 T	376.0.0000.00	CF-762	376.1.0000.00	CF-762 T
200 x 120 x 90	278.0.0000.00	CF-781	278.1.0000.00	CF-781 T	378.0.0000.00	CF-782	378.1.0000.00	CF-782 T
240 x 120 x 100	280.0.0000.00	CF-801	280.1.0000.00	CF-801 T	380.0.0000.00	CF-802	380.1.0000.00	CF-802 T
200 x 150 x 75	282.0.0000.00	CF-821	282.1.0000.00	CF-821 T	382.0.0000.00	CF-822	382.1.0000.00	CF-822 T
240 x 160 x 90	284.0.0000.00	CF-841	284.1.0000.00	CF-841 T	384.0.0000.00	CF-842	384.1.0000.00	CF-842 T
240 x 160 x 120	286.0.0000.00	CF-861	286.1.0000.00	CF-861 T	386.0.0000.00	CF-862	386.1.0000.00	CF-862 T
250 x 160 x 90	290.0.0000.00	CF-901	290.1.0000.00	CF-901 T	390.0.0000.00	CF-902	390.1.0000.00	CF-902 T
250 x 160 x 120	291.0.0000.00	CF-911	291.1.0000.00	CF-911 T	391.0.0000.00	CF-912	391.1.0000.00	CF-912 T
360 x 200 x 150	288.0.0000.00	CF-881	288.1.0000.00	CF-881 T	388.0.0000.00	CF-882	388.1.0000.00	CF-882 T
300 x 230 x 86	287.0.0000.00	CF-871	287.1.0000.00	CF-871 T	387.0.0000.00	CF-872	387.1.0000.00	CF-872 T
300 x 230 x 110	289.0.0000.00	CF-891	289.1.0000.00	CF-891 T	389.0.0000.00	CF-892	389.1.0000.00	CF-892 T

Component overview polycarbonate/ABS enclosures

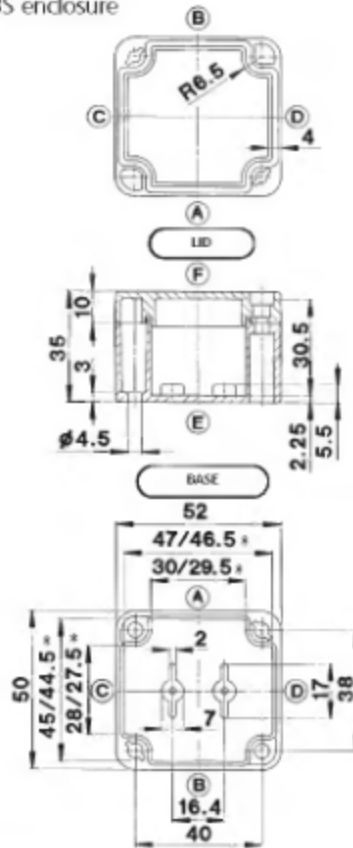
Model	Weidmüller			Phoenix				Wieland					Entelec						Phoenix					
	Block terminal			Block terminal				Block terminal					Terminal block						Terminal block					
Terminal width (mm):													5.2	6.2	5.2	6.2	8.2	10.2	5.2	6.2	7.5	5.2	6.2	8.2
Single-core mm ²	4	4	4	4	4	4	4	2.5	2.5	2.5	2.5	2.5	2.5	4	4	4	10	16	2.5	4	10	4	4	10
Stranded mm ²	4	4	4	4	4	4	4	2.5	2.5	2.5	2.5	2.5	1.5	4	2.5	4	6	10	1.5	4	6	2.5	4	6
Nominal voltage V	380	380	380	500	500	500	500	500	500	500	500	500	250	380	750	750	750	750	500	500	500	750	750	750
Loading capacity A	36	36	36	36	36	36	36	25	25	25	25	25	20	35	26	35	46	85	27	36	65	36	36	65
Terminal bridging	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	o	-	o	-	o	o	o
Mounting rail TS 15	-	-	-	-	-	-	-	-	-	-	-	-	o	o	-	-	-	-	o	o	o	-	-	-
TS 32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	-	-	-	o	o	o
TS 35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	-	-	-	o	o	o
Part number	9.40.1.0100.00	9.40.1.0090.00	9.40.1.0130.00	9.40.1.0180.00	9.40.1.0020.00	9.40.1.0030.00	9.40.1.0040.00	9.40.1.0140.00	9.40.1.0050.00	9.40.1.0060.00	9.40.1.0070.00	9.40.1.0080.00	9.40.2.1270.00	9.40.2.0940.00	9.40.2.1090.00	9.40.2.1030.00	9.40.2.1040.00	9.40.2.1050.00	9.40.2.0010.00	9.40.2.0020.00	9.40.2.0030.00	9.40.2.0050.00	9.40.2.0070.00	9.40.2.0090.00
Type	BK 4	BK 6	BK 12	G 5/8	G 5/4	G 5/6	G 5/12	KL-16/4	KL-16/8	KL-16/12	KL-16/16	KL-16/20	DR 1.5/5	DR 4/6	MA 2.5/5	M 4/6	M 6/8	M 10/10	MBK	MBK 5/E	MBK 10	UK 3 N	UK 5 N	UK 10
CT-50	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CT-52	1	-	-	-	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CT-54	-	1	-	-	-	1	-	1	1	-	-	-	7	6	-	-	-	-	7	6	5	-	-	-
CT-56	-	-	-	-	-	1	-	1	1	-	-	-	7	6	4	4	-	-	7	6	5	4	4	-
CT-58	-	-	-	-	-	-	1	-	1	1	-	-	15	12	-	-	-	-	15	12	10	-	-	-
CT-60	-	-	-	-	-	-	1	-	1	1	-	-	15	12	10	10	6	6	15	12	10	10	10	6
CT-62	-	-	-	-	-	-	-	-	-	1	1	1	22	19	-	-	-	-	22	18	15	-	-	-
CT-64	-	-	-	-	-	-	-	-	-	1	1	1	22	19	16	16	10	10	22	19	15	16	16	10
CT-66	-	-	-	-	-	-	-	-	1	1	1	1	15	13	-	-	-	-	15	13	11	-	-	-
CT-68	-	-	-	-	-	-	-	-	1	1	1	1	15	13	15	13	10	8	15	13	11	15	13	10
CT-72	-	-	-	-	-	-	-	-	-	1	1	1	22	19	22	19	4	11	22	19	15	22	19	14
CT-76	-	-	-	-	-	-	-	-	-	-	-	1	30	25	30	25	19	15	30	25	21	30	25	19
CT-78	-	-	-	-	-	-	-	-	-	-	-	-	30	25	30	25	19	15	30	25	21	30	25	19
CT-80	-	-	-	-	-	-	-	-	-	-	-	-	38	32	38	32	24	19	38	32	26	38	32	24
CT-82	-	-	-	-	-	-	-	-	-	-	-	-	27	23	27	23	17	14	27	23	19	27	23	17
CT-84	-	-	-	-	-	-	-	-	-	-	-	-	38	32	38	32	24	19	38	32	26	38	32	24
CT-86	-	-	-	-	-	-	-	-	-	-	-	-	38	32	38	32	24	19	38	32	26	38	32	24
CT-87	-	-	-	-	-	-	-	-	-	-	-	-	50	40	50	40	31	25	50	40	34	50	40	31
CT-87*)	-	-	-	-	-	-	-	-	-	-	-	-	100	80	100	80	62	50	100	80	68	100	80	62
CT-88	-	-	-	-	-	-	-	-	-	-	-	-	60	50	60	50	38	30	60	49	40	47	47	29
CT-88*)	-	-	-	-	-	-	-	-	-	-	-	-	120	100	120	100	76	60	120	98	80	94	94	58
CT-89	-	-	-	-	-	-	-	-	-	-	-	-	50	40	50	40	31	25	50	40	32	50	46	31
CT-89*)	-	-	-	-	-	-	-	-	-	-	-	-	100	80	100	80	31	25	100	80	64	100	-	62
CT-90/91	-	-	-	-	-	-	-	-	-	-	-	-	38	32	38	32	24	19	38	32	26	38	32	24

*) Assembled on 2 mounting rails
 **) Assembled on 3 mounting rails
 The number of terminals is reduced when partitions are used.

	Siemens				WAGO												Weidmüller										
	Terminal block		Terminal block		Terminal block												Terminal block										
	Screw terminals				Caged torsion spring		6.2	10.2	6.2	10.2	4.2	5.2	5.2	6.2	6.2	8.2	10.2	12.2	5.2	6.2	6.2	6.5	8.2	10.2	5.2	6.2	
4	4	10	25	4	4	10	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	2.5	4	4	6	10	16	4	6	
2.5	4	6	16	2.5	4	6	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	1.5	4	2.5	4	6	10	2.5	4	
750	750	750	750	750	750	750	800	800	800	800	800	800	800	800	800	800	800	250	380	750	750	750	750	750	750		
26	35	46	85	36	36	65	26	26	26	26	18	26	26	34	34	44	61	82	27	36	27	36	47	65	26	34	
o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o		
-	-	-	-	-	-	-	o	o	-	-	-	-	-	-	-	-	-	o	o	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	-	-		
o	o	o	o	o	o	o	-	-	o	o	o	o	o	o	o	o	o	-	-	-	-	-	-	o	o		
	9.40.2.4000.00	9.40.2.4010.00	9.40.2.4020.00	9.40.2.4030.00	9.40.2.4040.00	9.40.2.4050.00	9.40.2.4060.00	9.40.2.3020.00	9.40.2.3030.00	9.40.2.3210.00	9.40.2.3220.00	9.40.2.3230.00	9.40.2.0930.00	9.40.2.3240.00	9.40.2.3250.00	9.40.2.3260.00	9.40.2.3270.00	9.40.2.3280.00	9.40.2.3290.00	9.40.2.0500.00	9.40.2.0130.00	9.40.2.0140.00	9.40.2.0150.00	9.40.2.0160.00	9.40.2.0470.00	9.40.2.1460.00	9.40.2.1470.00
	8WA1011-IDH11	8WA1011-IDG11	8WA1011-IDH11	8WA1204	8WA2011-IDF20	8WA2011-IDG20	8WA2011-IDH20	264-701	264-721	264-711	264-731	279-621	280-601	280-901	281-601	281-901	282-601	284-601	283-601	AKZ 2.5 PA	AKZ 4 PA	SAK 2.5 PA	SAK 4 PA	SAK 6 NPA	SAK 10 PA	WDU 2.5	WDU 4
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	7	4	-	-	-	-	-	-	-	-	-	-	7	6	-	-	-	-	-	-
	6	5	-	-	7	6	-	7	4	-	-	-	-	-	-	-	-	-	-	7	6	4	-	-	-	-	-
	-	-	-	-	-	-	-	13	8	-	-	-	-	-	-	-	-	-	-	15	12	-	-	-	-	-	-
	12	11	-	-	15	12	-	13	8	-	-	-	-	-	-	-	-	-	-	15	12	10	9	6	6	-	-
	-	-	-	-	-	-	-	20	12	-	-	-	-	-	-	-	-	-	-	22	19	-	-	-	-	-	-
	19	18	14	11	22	18	14	20	12	-	-	-	-	-	-	-	-	-	-	22	19	16	15	10	10	-	-
	-	-	-	-	-	-	-	13	8	-	-	-	-	-	-	-	-	-	-	15	13	-	-	-	-	-	-
	13	12	10	8	15	13	10	-	-	13	8	21	16	16	13	14	10	8	6	15	13	13	12	10	8	15	13
	19	17	14	11	22	19	14	-	-	19	11	30	24	24	20	20	14	12	9	22	19	19	17	14	11	22	19
	26	24	19	15	30	25	19	-	-	26	15	40	32	32	26	26	19	16	13	30	25	25	24	19	15	30	25
	26	24	19	15	30	25	19	-	-	26	15	40	32	32	26	26	19	16	13	30	25	25	24	19	15	30	25
	33	30	24	19	38	32	24	-	-	33	20	50	40	40	33	33	25	20	16	38	32	32	30	24	19	38	32
	23	21	17	14	27	22	17	-	-	26	16	40	32	32	26	27	20	16	13	27	23	23	21	17	14	27	23
	32	30	24	19	38	31	24	-	-	33	20	50	40	40	33	33	25	20	16	38	32	32	30	24	19	38	32
	32	30	24	19	38	31	24	-	-	33	20	50	40	40	33	33	25	20	16	38	32	32	30	24	19	38	32
	42	39	31	25	49	41	31	-	-	43	25	65	52	52	43	43	32	26	21	50	40	40	39	31	25	50	40
	84	78	62	50	98	82	62	-	-	86	50	130	104	104	86	86	64	52	-	100	80	80	78	62	50	100	80
	50	46	37	32	58	48	36	-	-	51	30	77	61	61	51	51	38	30	25	60	50	50	47	38	30	60	50
	100	92	74	64	116	96	72	-	-	102	60	144	122	122	102	102	76	60	-	120	100	100	94	76	60	-	-
	42	39	31	25	49	41	31	-	-	43	25	65	52	52	43	43	32	26	21	50	40	40	39	31	25	50	40
	84	78	62	50	98	82	62	-	-	86	50	130	104	104	86	86	64	52	-	100	80	80	78	62	50	100	80
	32	30	24	19	38	31	24	-	-	33	20	50	40	40	33	33	25	20	16	38	32	32	30	24	19	38	32

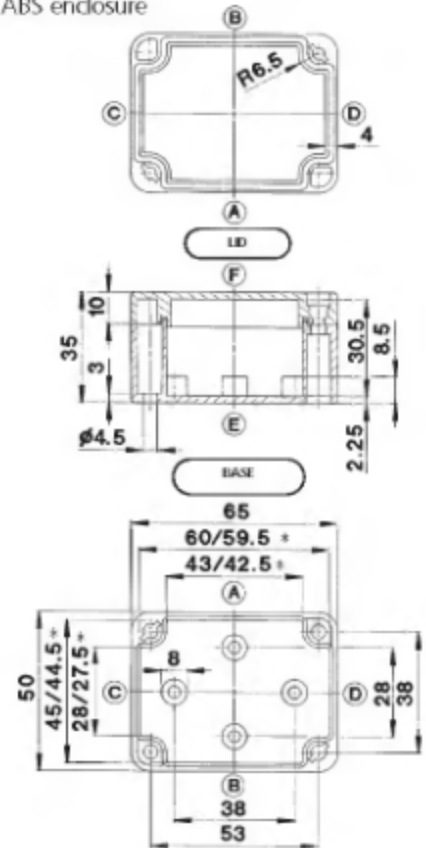
52 x 50 x 35 mm

CT-501
Polycarbonate enclosure
CT-502
ABS enclosure



65 x 50 x 35 mm

CT-521
Polycarbonate enclosure
CT-522
ABS enclosure



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D carrs)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

Max. Pg threads

	CT-501	CT-502
Weight (g)	40	38
External dimensions (mm)	52 x 50 x 35	
Part number		
PC, with gasket and quick release	250.0.0000.00 ●	
PC, with gasket and screw release	250.0.0010.00	
PC, with gasket, transparent lid (PC) and quick release	250.1.0000.00 ●	
PC, with gasket, transparent lid (PC) and screw release	250.1.0010.00	
ABS, with gasket and quick release		350.0.0000.00 ●
ABS, with gasket and screw release		350.0.0010.00
ABS, with gasket, transparent lid (PC) and quick release		350.1.0000.00 ●
ABS, with gasket, transparent lid (PC) and screw release		350.1.0010.00
Accessories (separate or as a mounting set)		
Mounting plate	951.2.0090.00 ●	
TS 15 mounting rail	-	
TS 32 mounting rail	-	
TS 35 mounting rail	-	
Grounding rail (attachment on central C/D carrs)	-	
External attachment brackets	-	
External hinges**	-	
Internal hinges, flexible, for quick-release enclosures	-	
Silicone gasket for wider temperature range (piece goods)	-	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	-	

ISO M	12	16	20	25	32	40	50	63
Side A/B	1	0	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

	CT-521	CT-522
Weight (g)	50	47
External dimensions (mm)	65 x 50 x 35	
Part number		
PC, with gasket and quick release	252.0.0000.00 ●	
PC, with gasket and screw release	252.0.0010.00	
PC, with gasket, transparent lid (PC) and quick release	252.1.0000.00 ●	
PC, with gasket, transparent lid (PC) and screw release	252.1.0010.00	
ABS, with gasket and quick release		352.0.0000.00 ●
ABS, with gasket and screw release		352.0.0010.00
ABS, with gasket, transparent lid (PC) and quick release		352.1.0000.00 ●
ABS, with gasket, transparent lid (PC) and screw release		352.1.0010.00
Accessories (separate or as a mounting set)		
Mounting plate	951.2.0100.00 ●	
TS 15 mounting rail	982.0.0010.00 ●	
TS 32 mounting rail	-	
TS 35 mounting rail	-	
Grounding rail (attachment on central C/D carrs)	-	
External attachment brackets	-	
External hinges**	-	
Internal hinges, flexible, for quick-release enclosures	-	
Silicone gasket for wider temperature range (piece goods)	-	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	-	
	980.0.0250.00 ●	

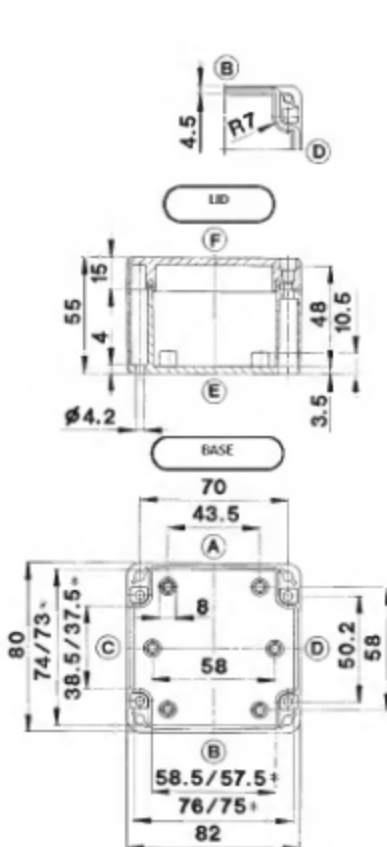
ISO M	12	16	20	25	32	40	50	63
Side A/B	2	0	0	0	0	0	0	0
Side C/D	0	0	0	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

82 x 80 x 55 mm

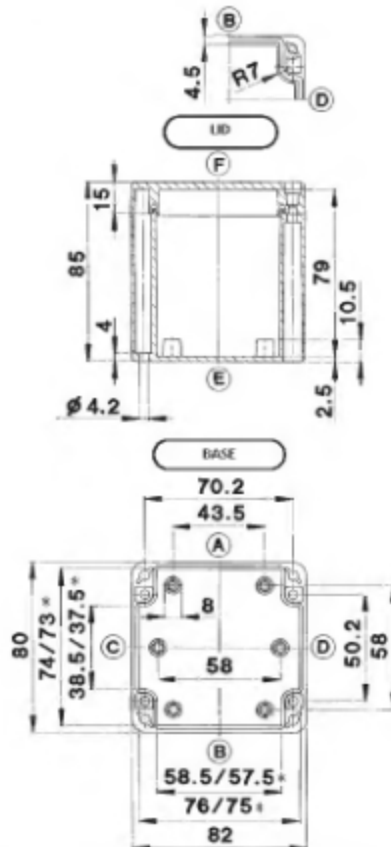
CT-541
Polycarbonate enclosure
CT-542
ABS enclosure



* minimum dimensions at level of mounting plate support

82 x 80 x 85 mm

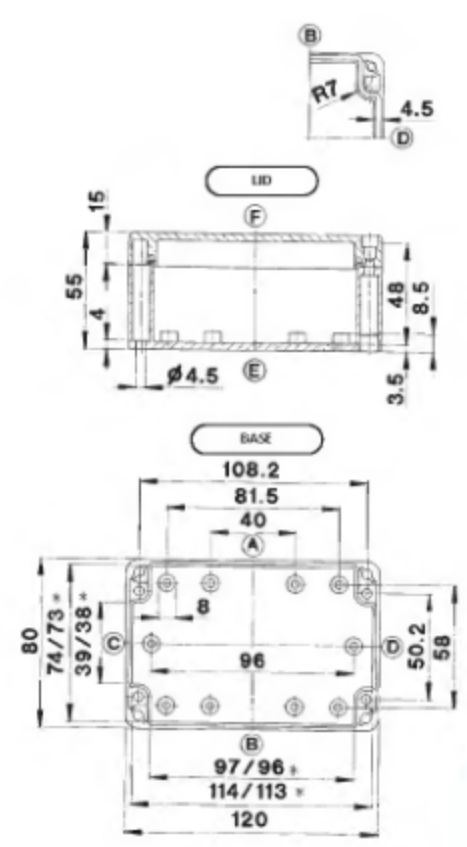
CT-561
Polycarbonate enclosure
CT-562
ABS enclosure



* minimum dimensions at level of mounting plate support

120 x 80 x 55 mm

CT-581
Polycarbonate enclosure
CT-582
ABS enclosure



* minimum dimensions at level of mounting plate support

CT-541	CT-542
140	116
82 x 80 x 55	
Part number	
254.0.0000.00 ●	
254.0.0010.00	
254.1.0000.00 ●	
254.1.0010.00	
	354.0.0000.00 ●
	354.0.0010.00
	354.1.0000.00 ●
	354.1.0010.00

951.2.0110.00 ●
982.0.0040.00 ●
-
982.2.0000.00 ●
-
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	2	0	0	0	0	0
Side C/D	2	1	0	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

CT-561	CT-562
175	150
82 x 80 x 85	
Part number	
256.0.0000.00 ●	
256.0.0010.00	
256.1.0000.00 ●	
256.1.0010.00	
	356.0.0000.00 ●
	356.0.0010.00
	356.1.0000.00 ●
	356.1.0010.00

951.2.0110.00 ●
982.0.0040.00 ●
-
982.2.0000.00 ●
-
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	10	5	3	2	1	1	1	0
Side C/D	5	2	1	1	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

CT-581	CT-582
180	135
120 x 80 x 55	
Part number	
258.0.0000.00 ●	
258.0.0010.00	
258.1.0000.00 ●	
258.1.0010.00	
	358.0.0000.00 ●
	358.0.0010.00
	358.1.0000.00 ●
	358.1.0010.00

951.2.0120.00 ●
982.0.0090.00 ●
-
982.2.0020.00 ●
981.0.0010.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0400.00 ●

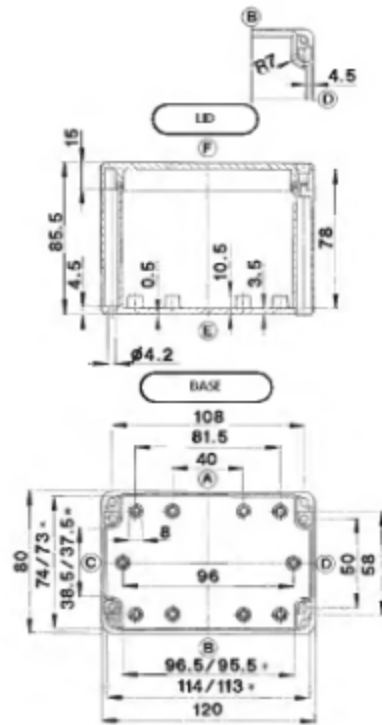
ISO M	12	16	20	25	32	40	50	63
Side A/B	9	4	3	2	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

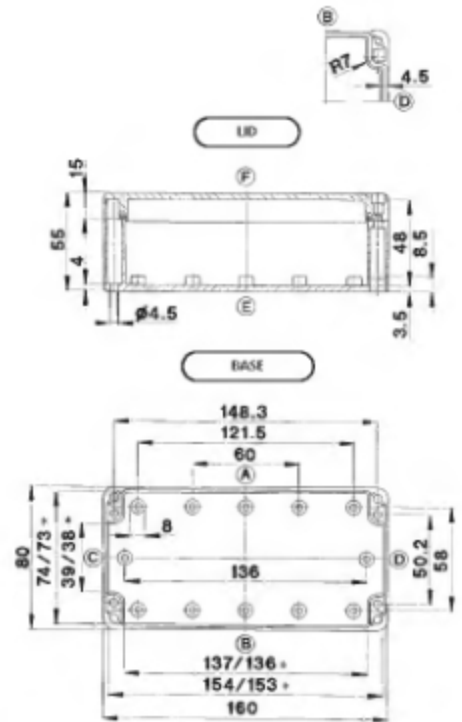
120 x 80 x 85 mm

CT-601
Polycarbonate enclosure
CT-602
ABS enclosure



160 x 80 x 55 mm

CT-621
Polycarbonate enclosure
CT-622
ABS enclosure



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D carrs)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

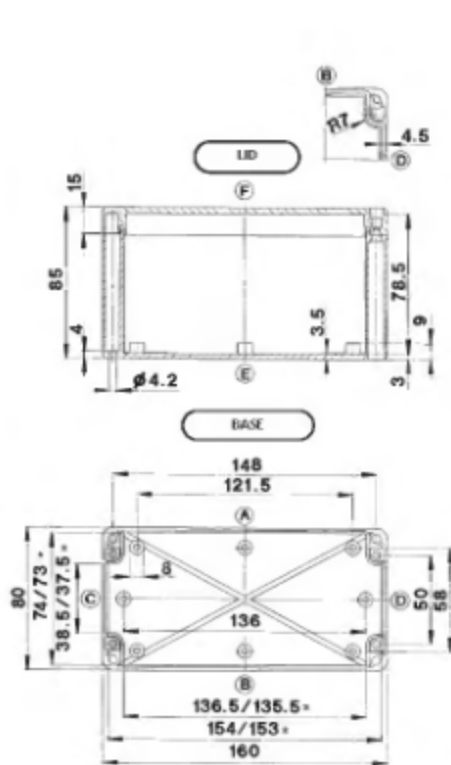
Max. Pg threads

	CT-601	CT-602
Weight (g)	225	192
External dimensions (mm)	120 x 80 x 85	
Part number		
PC, with gasket and quick release	260.0.0000.00 ●	
PC, with gasket and screw release	260.0.0010.00	
PC, with gasket, transparent lid (PC) and quick release	260.1.0000.00 ●	
PC, with gasket, transparent lid (PC) and screw release	260.1.0010.00	
ABS, with gasket and quick release		360.0.0000.00 ●
ABS, with gasket and screw release		360.0.0010.00
ABS, with gasket, transparent lid (PC) and quick release		360.1.0000.00 ●
ABS, with gasket, transparent lid (PC) and screw release		360.1.0010.00
Mounting plate	951.2.0120.00 ●	
TS 15 mounting rail	982.0.0090.00 ●	
TS 32 mounting rail	-	
TS 35 mounting rail	982.2.0020.00 ●	
Grounding rail (attachment on central C/D carrs)	981.0.0010.00	
External attachment brackets	980.2.0020.00 ●	
External hinges**	980.2.0250.00 ●	
Internal hinges, flexible, for quick-release enclosures	980.1.0760.00 ●	
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	980.0.0250.00 ●	
Max. Pg threads		
ISO M	12 16 20 25 32 40 50 63	
Side A/B	15 6 6 3 2 1 1 0	
Side C/D	5 2 1 1 1 0 0 0	
** mechanical enclosure machining required		
● = kept in stock		

	CT-621	CT-622
Weight (g)	225	199
External dimensions (mm)	160 x 80 x 55	
Part number		
PC, with gasket and quick release	262.0.0000.00 ●	
PC, with gasket and screw release	262.0.0010.00	
PC, with gasket, transparent lid (PC) and quick release	262.1.0000.00 ●	
PC, with gasket, transparent lid (PC) and screw release	262.1.0010.00	
ABS, with gasket and quick release		362.0.0000.00 ●
ABS, with gasket and screw release		362.0.0010.00
ABS, with gasket, transparent lid (PC) and quick release		362.1.0000.00 ●
ABS, with gasket, transparent lid (PC) and screw release		362.1.0010.00
Mounting plate	951.2.0130.00 ●	
TS 15 mounting rail	982.0.0130.00 ●	
TS 32 mounting rail	-	
TS 35 mounting rail	982.2.0280.00 ●	
Grounding rail (attachment on central C/D carrs)	981.0.0050.00	
External attachment brackets	980.2.0020.00 ●	
External hinges**	980.2.0250.00 ●	
Internal hinges, flexible, for quick-release enclosures	980.1.0760.00 ●	
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	980.0.0400.00 ●	
Max. Pg threads		
ISO M	12 16 20 25 32 40 50 63	
Side A/B	11 5 4 3 0 0 0 0	
Side C/D	2 1 1 0 0 0 0 0	
** mechanical enclosure machining required		
● = kept in stock		

160 x 80 x 85 mm

CT-641
Polycarbonate enclosure
CT-642
ABS enclosure



* minimum dimensions at level of mounting plate support

CT-641	CT-642
240	225
160 x 80 x 85	
Part number	
264.0.0000.00 ●	
264.0.0010.00	
264.1.0000.00 ●	
264.1.0010.00	
	364.0.0000.00 ●
	364.0.0010.00
	364.1.0000.00 ●
	364.1.0010.00

951.2.0130.00 ●
982.0.0130.00 ●
-
982.2.0280.00 ●
981.0.0050.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

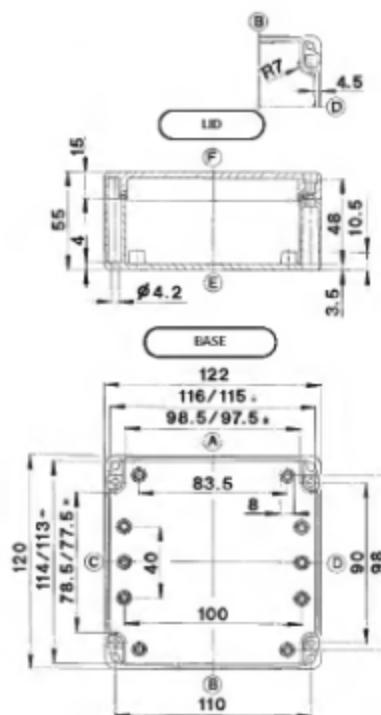
ISO M	12	16	20	25	32	40	50	63
Side A/B	22	10	8	5	3	2	2	0
Side C/D	5	2	1	1	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

122 x 120 x 55 mm

CT-661
Polycarbonate enclosure
CT-662
ABS enclosure



* minimum dimensions at level of mounting plate support

CT-661	CT-662
240	218
122 x 120 x 55	
Part number	
266.0.0000.00 ●	
266.0.0010.00	
266.1.0000.00 ●	
266.1.0010.00	
	366.0.0000.00 ●
	366.0.0010.00
	366.1.0000.00 ●
	366.1.0010.00

951.2.0140.00 ●
982.0.0080.00 ●
-
982.2.0020.00 ●
981.0.0030.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

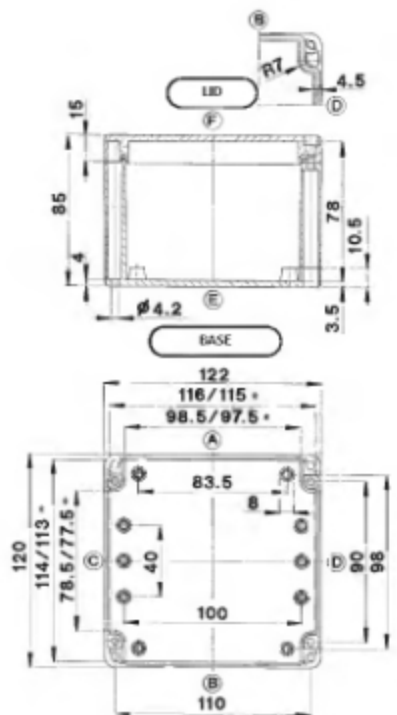
ISO M	12	16	20	25	32	40	50	63
Side A/B	9	4	3	2	0	0	0	0
Side C/D	4	3	2	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

122 x 120 x 85 mm

CT-681
Polycarbonate enclosure
CT-682
ABS enclosure



* minimum dimensions at level of mounting plate support

CT-681	CT-682
295	269
122 x 120 x 85	
Part number	
268.0.0000.00 ●	
268.0.0010.00	
268.1.0000.00 ●	
268.1.0010.00	
	368.0.0000.00 ●
	368.0.0010.00
	368.1.0000.00 ●
	368.1.0010.00

951.2.0140.00 ●
-
982.1.0010.00 ●
982.2.0020.00 ●
981.0.0030.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

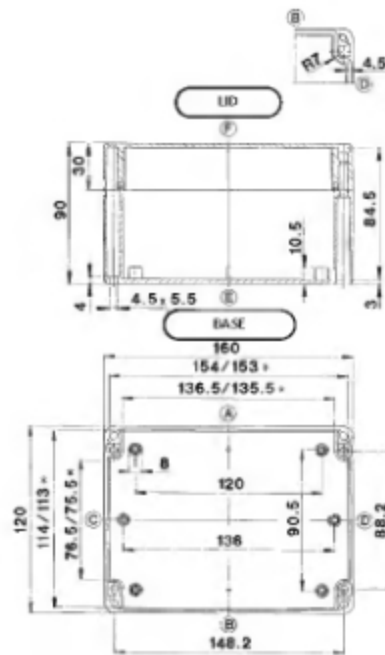
ISO M	12	16	20	25	32	40	50	63
Side A/B	15	6	6	3	20	1	1	0
Side C/D	10	3	3	2	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

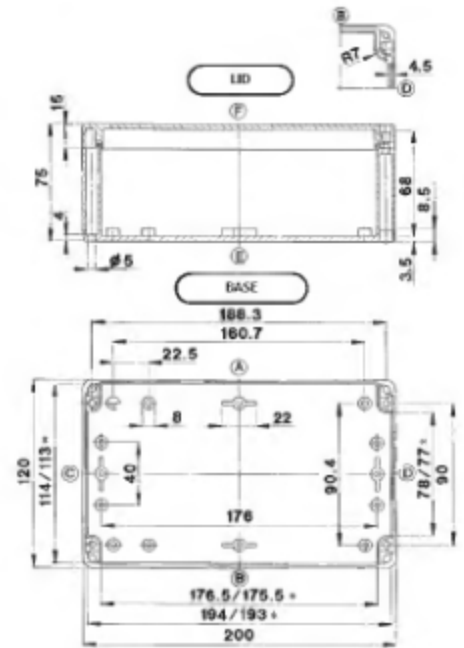
160 x 120 x 90 mm

CT-721
Polycarbonate enclosure
CT-722
ABS enclosure



200 x 120 x 75 mm

CT-761
Polycarbonate enclosure
CT-762
ABS enclosure



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D carrs)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

Max. Pg threads

	CT-721	CT-722
Weight (g)	360	310
External dimensions (mm)	160 x 120 x 90	
Part number		
PC, with gasket and quick release	272.0.0000.00 ●	
PC, with gasket and screw release	272.0.0010.00	
PC, with gasket, transparent lid (PC) and quick release	272.1.0000.00 ●	
PC, with gasket, transparent lid (PC) and screw release	272.1.0010.00	
ABS, with gasket and quick release		372.0.0000.00 ●
ABS, with gasket and screw release		372.0.0010.00
ABS, with gasket, transparent lid (PC) and quick release		372.1.0000.00 ●
ABS, with gasket, transparent lid (PC) and screw release		372.1.0010.00
Mounting plate	951.2.0360.00 ●	
TS 15 mounting rail	-	
TS 32 mounting rail	982.1.0250.00 ●	
TS 35 mounting rail	982.2.0280.00 ●	
Grounding rail (attachment on central C/D carrs)	981.0.0400.00	
External attachment brackets	980.2.0020.00 ●	
External hinges**	980.2.0250.00 ●	
Internal hinges, flexible, for quick-release enclosures	980.1.0790.00 ●	
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	980.0.0250.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	18	10	7	3	3	0	0	0
Side C/D	9	5	2	2	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

	CT-761	CT-762
Weight (g)	400	373
External dimensions (mm)	200 x 120 x 75	
Part number		
PC, with gasket and quick release	276.0.0000.00 ●	
PC, with gasket and screw release	276.0.0010.00	
PC, with gasket, transparent lid (PC) and quick release	276.1.0000.00 ●	
PC, with gasket, transparent lid (PC) and screw release	276.1.0010.00	
ABS, with gasket and quick release		376.0.0000.00 ●
ABS, with gasket and screw release		376.0.0010.00
ABS, with gasket, transparent lid (PC) and quick release		376.1.0000.00 ●
ABS, with gasket, transparent lid (PC) and screw release		376.1.0010.00
Mounting plate	951.2.0150.00 ●	
TS 15 mounting rail	-	
TS 32 mounting rail	982.1.0040.00 ●	
TS 35 mounting rail	982.2.0060.00 ●	
Grounding rail (attachment on central C/D carrs)	981.0.0060.00	
External attachment brackets	980.2.0020.00 ●	
External hinges**	980.2.0250.00 ●	
Internal hinges, flexible, for quick-release enclosures	980.1.0760.00 ●	
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	980.0.0400.00 ●	

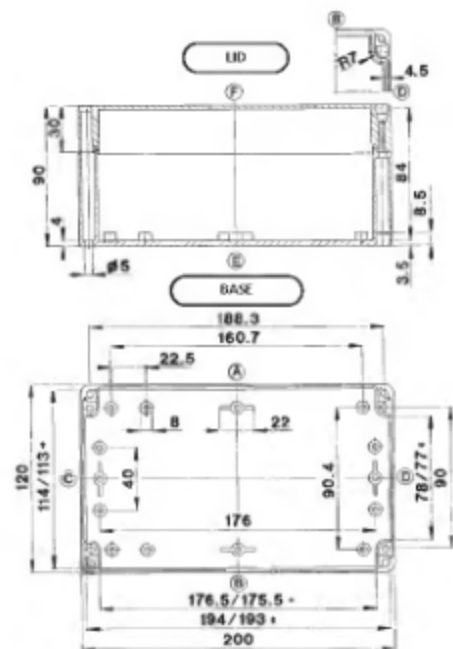
ISO M	12	16	20	25	32	40	50	63
Side A/B	26	12	8	5	3	0	0	0
Side C/D	10	5	2	2	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

200 x 120 x 90 mm

CT-781
Polycarbonate enclosure
CT-782
ABS enclosure



* minimum dimensions at level of mounting plate support

CT-781	CT-782
420	365
200 x 120 x 90	
Part number	
278.0.0000.00 ●	
278.0.0010.00	
278.1.0000.00 ●	
278.1.0010.00	
	378.0.0000.00 ●
	378.0.0010.00
	378.1.0000.00 ●
	378.1.0010.00

951.2.0150.00 ●
-
982.1.0040.00 ●
982.2.0060.00 ●
981.0.0060.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0790.00 ●
923.1.0050.00 ●
980.0.0400.00 ●

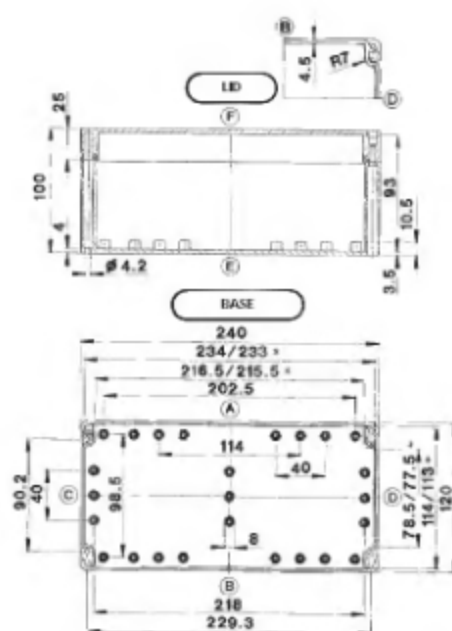
ISO M	12	16	20	25	32	40	50	63
Side A/B	26	12	8	5	3	0	0	0
Side C/D	10	5	2	2	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

240 x 120 x 100 mm

CT-801
Polycarbonate enclosure
CT-802
ABS enclosure



* minimum dimensions at level of mounting plate support

CT-801	CT-802
540	478
240 x 120 x 100	
Part number	
280.0.0000.00 ●	
280.0.0010.00	
280.1.0000.00 ●	
280.1.0010.00	
	380.0.0000.00 ●
	380.0.0010.00
	380.1.0000.00 ●
	380.1.0010.00

951.2.0160.00 ●
-
982.1.0060.00 ●
982.2.0080.00 ●
981.0.0090.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0780.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

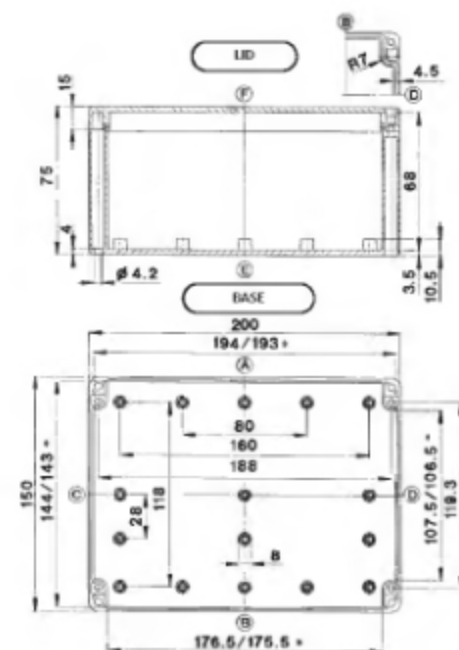
ISO M	12	16	20	25	32	40	50	63
Side A/B	34	17	12	6	5	3	3	2
Side C/D	10	6	3	2	1	1	0	0

** mechanical enclosure machining required

● = kept in stock

200 x 150 x 75 mm

CT-821
Polycarbonate enclosure
CT-822
ABS enclosure



* minimum dimensions at level of mounting plate support

CT-821	CT-822
475	425
200 x 150 x 75	
Part number	
282.0.0000.00 ●	
282.0.0010.00	
282.1.0000.00 ●	
282.1.0010.00	
	382.0.0000.00 ●
	382.0.0010.00
	382.1.0000.00 ●
	382.1.0010.00

951.2.0170.00 ●
-
982.1.0170.00 ●
982.2.0200.00 ●
981.0.0060.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0250.00 ●

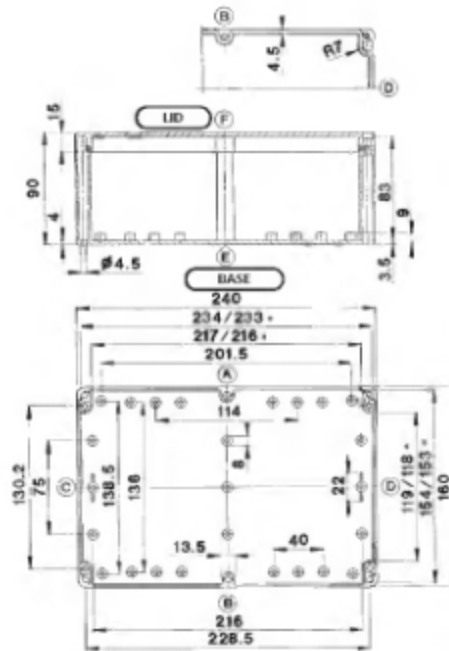
ISO M	12	16	20	25	32	40	50	63
Side A/B	22	12	9	5	3	0	0	0
Side C/D	12	6	3	2	2	0	0	0

** mechanical enclosure machining required

● = kept in stock

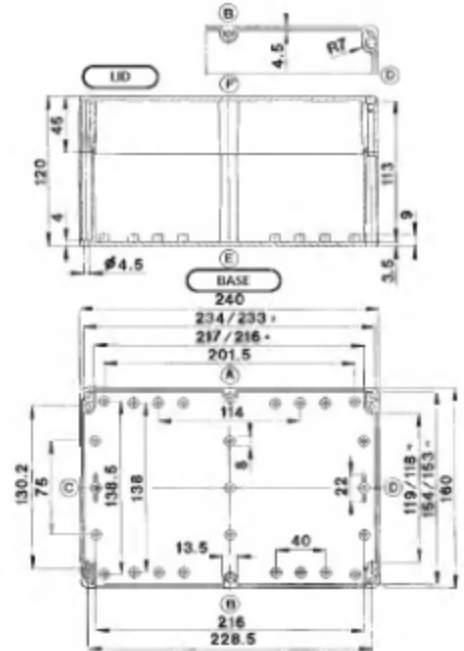
240 x 160 x 90 mm

CT-841
Polycarbonate enclosure
CT-842
ABS enclosure



240 x 160 x 120 mm

CT-861
Polycarbonate enclosure
CT-862
ABS enclosure



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D carrs)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

	CT-841	CT-842
Weight (g)	650	528
External dimensions (mm)	240 x 160 x 90	
Part number		
PC, with gasket and quick release	284.0.0000.00 ●	
PC, with gasket and screw release	284.0.0010.00	
PC, with gasket, transparent lid (PC) and quick release	284.1.0000.00 ●	
PC, with gasket, transparent lid (PC) and screw release	284.1.0010.00	
ABS, with gasket and quick release		384.0.0000.00 ●
ABS, with gasket and screw release		384.0.0010.00
ABS, with gasket, transparent lid (PC) and quick release		384.1.0000.00 ●
ABS, with gasket, transparent lid (PC) and screw release		384.1.0010.00
Mounting plate	951.2.0180.00 ●	
TS 15 mounting rail	-	
TS 32 mounting rail	982.1.0060.00 ●	
TS 35 mounting rail	982.2.0080.00 ●	
Grounding rail (attachment on central C/D carrs)	981.0.0090.00	
External attachment brackets	980.2.0020.00 ●	
External hinges**	980.2.0250.00 ●	
Internal hinges, flexible, for quick-release enclosures	980.1.0760.00 ●	
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	980.0.0400.00 ●	

	CT-861	CT-862
Weight (g)	785	636
External dimensions (mm)	240 x 160 x 120	
Part number		
PC, with gasket and quick release	286.0.0000.00 ●	
PC, with gasket and screw release	286.0.0010.00	
PC, with gasket, transparent lid (PC) and quick release	286.1.0000.00 ●	
PC, with gasket, transparent lid (PC) and screw release	286.1.0010.00	
ABS, with gasket and quick release		386.0.0000.00 ●
ABS, with gasket and screw release		386.0.0010.00
ABS, with gasket, transparent lid (PC) and quick release		386.1.0000.00 ●
ABS, with gasket, transparent lid (PC) and screw release		386.1.0010.00
Mounting plate	951.2.0180.00 ●	
TS 15 mounting rail	-	
TS 32 mounting rail	982.1.0060.00 ●	
TS 35 mounting rail	982.2.0080.00 ●	
Grounding rail (attachment on central C/D carrs)	981.0.0090.00	
External attachment brackets	980.2.0020.00 ●	
External hinges**	980.2.0250.00 ●	
Internal hinges, flexible, for quick-release enclosures	980.1.0800.00 ●	
Silicone gasket for wider temperature range (piece goods)	923.1.0050.00 ●	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	980.0.0400.00 ●	

Max. Pg threads	ISO M	12	16	20	25	32	40	50	63
Side A/B	36	16	12	8	4	2	2	2	2
Side C/D	17	8	5	3	2	2	1	0	0

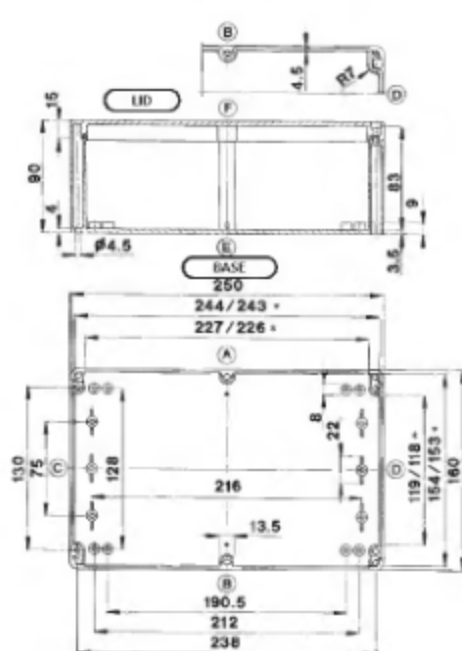
** mechanical enclosure machining required
● = kept in stock

Max. Pg threads	ISO M	12	16	20	25	32	40	50	63
Side A/B	36	16	12	8	4	2	2	2	2
Side C/D	17	8	5	3	2	2	1	0	0

** mechanical enclosure machining required
● = kept in stock

250 x 160 x 90 mm

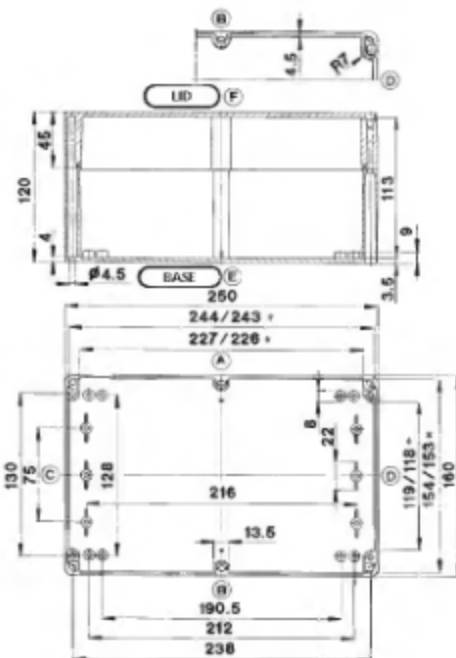
CT-901
Polycarbonate enclosure
CT-902
ABS enclosure



* minimum dimensions at level of mounting plate support

250 x 160 x 120 mm

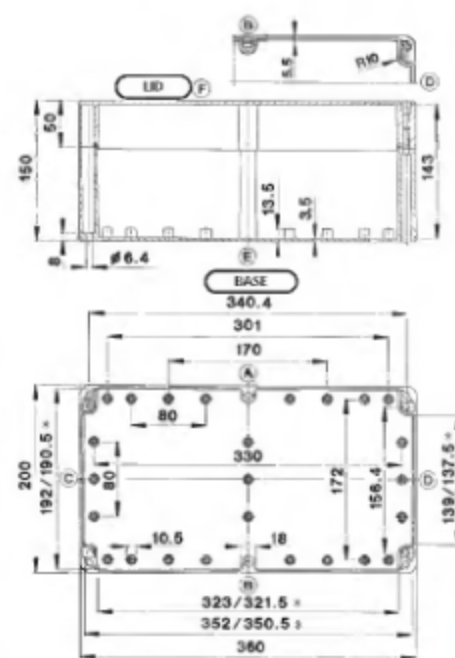
CT-911
Polycarbonate enclosure
CT-912
ABS enclosure



* minimum dimensions at level of mounting plate support

360 x 200 x 150 mm

CT-881
Polycarbonate enclosure
CT-882
ABS enclosure



* minimum dimensions at level of mounting plate support

CT-901	CT-902
680	550
250 x 160 x 90	
Part number	
290.0.0000.00 ●	
290.0.0010.00	
290.1.0000.00 ●	
290.1.0010.00	
	390.0.0000.00 ●
	390.0.0010.00
	390.1.0000.00 ●
	390.1.0010.00

951.2.1870.00 ●
-
982.1.0060.00 ●
982.2.0080.00 ●
981.0.0090.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0760.00 ●
923.1.0050.00 ●
980.0.0400.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	38	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0
** mechanical enclosure machining required								
● = kept in stock								

CT-911	CT-912
830	660
250 x 160 x 120	
Part number	
291.0.0000.00 ●	
291.0.0010.00	
291.1.0000.00 ●	
291.1.0010.00	
	391.0.0000.00 ●
	391.0.0010.00
	391.1.0000.00 ●
	391.1.0010.00

951.2.1870.00 ●
-
982.1.0060.00 ●
982.2.0080.00 ●
981.0.0090.00
980.2.0020.00 ●
980.2.0250.00 ●
980.1.0800.00 ●
923.1.0050.00 ●
980.0.0400.00 ●

ISO M	12	16	20	25	32	40	50	63
Side A/B	38	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0
** mechanical enclosure machining required								
● = kept in stock								

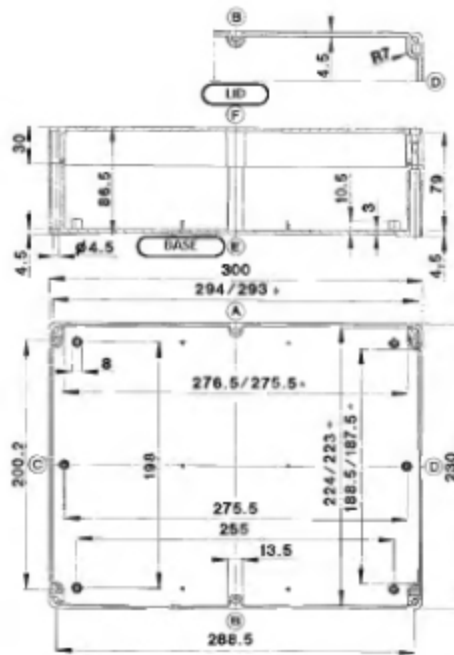
CT-881	CT-882
1550	1375
360 x 200 x 150	
Part number	
288.0.0000.00 ●	
288.0.0010.00	
288.1.0000.00 ●	
288.1.0010.00	
	388.0.0000.00 ●
	388.0.0010.00
	388.1.0000.00 ●
	388.1.0010.00

951.2.0200.00 ●
-
982.1.0130.00
982.2.0160.00
981.0.0340.00
-
980.2.0260.00 ●
-
923.1.0060.00 ●
980.0.0260.00 ● (M 4 x 8)

ISO M	12	16	20	25	32	40	50	63
Side A/B	70	32	24	16	10	6	4	4
Side C/D	26	11	8	5	3	2	2	1
** mechanical enclosure machining required								
● = kept in stock								

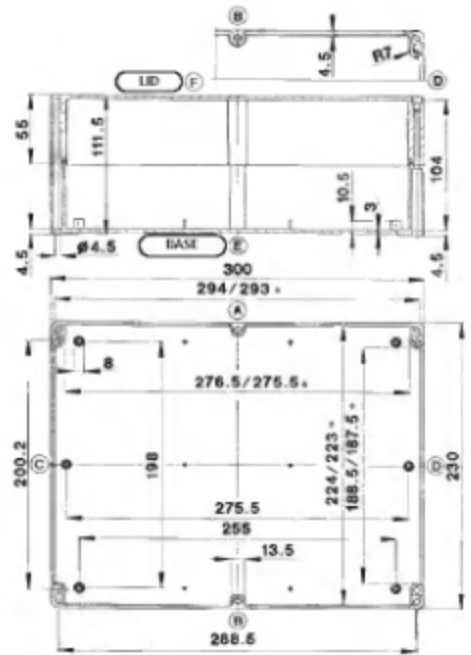
300 x 230 x 86 mm

CT-871
Polycarbonate enclosure
CT-872
ABS enclosure



300 x 230 x 111 mm

CT-891
Polycarbonate enclosure
CT-892
ABS enclosure



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
PC, with gasket and quick release	
PC, with gasket and screw release	
PC, with gasket, transparent lid (PC) and quick release	
PC, with gasket, transparent lid (PC) and screw release	
ABS, with gasket and quick release	
ABS, with gasket and screw release	
ABS, with gasket, transparent lid (PC) and quick release	
ABS, with gasket, transparent lid (PC) and screw release	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail (attachment on central C/D carrs)	
External attachment brackets	
External hinges**	
Internal hinges, flexible, for quick-release enclosures	
Silicone gasket for wider temperature range (piece goods)	
Mounting bushes with metr. M 3 x 8 screws (4 pcs.)	

	CT-871	CT-872
915		850
300 x 230 x 86		
Part number		
287.0.0000.00 ●		
287.0.0010.00		
287.1.0000.00 ●		
287.1.0010.00		
		387.0.0000.00 ●
		387.0.0010.00
		387.1.0000.00 ●
		387.1.0010.00
951.2.0190.00 ●		
-		
982.1.0100.00 ●		
982.2.0130.00 ●		
981.0.0120.00		
980.2.0020.00 ●		
980.2.0250.00 ●		
980.1.0790.00 ●		
-		
980.0.0250.00 ●		

	CT-891	CT-892
1155		1000
300 x 230 x 111		
Part number		
289.0.0000.00 ●		
289.0.0010.00		
289.1.0000.00 ●		
289.1.0010.00		
		389.0.0000.00 ●
		389.0.0010.00
		389.1.0000.00 ●
		389.1.0010.00
951.2.0190.00 ●		
-		
982.1.0100.00 ●		
982.2.0130.00 ●		
981.0.0120.00		
980.2.0020.00 ●		
980.2.0250.00 ●		
980.1.0820.00 ●		
-		
980.0.0250.00 ●		

Max. Pg threads	
ISO M	12 16 20 25 32 40 50 63
Side A/B	34 14 10 6 4 0 0 0
Side C/D	21 13 5 4 2 0 0 0
** mechanical enclosure machining required	
● = kept in stock	

Max. Pg threads	
ISO M	12 16 20 25 32 40 50 63
Side A/B	34 14 10 6 4 0 0 0
Side C/D	21 13 5 4 2 0 0 0
** mechanical enclosure machining required	
● = kept in stock	

CT-Module Plastic Enclosures



Universal applications

- Adaptable before, during and after installation
- Variety of options
- No machining required
- Reduced stock holding



Knock-outs CT-S



Flange CT-C



Quick release latch CT-W

CT-Module

Application areas and features

Technical features of PC and ABS					
	Standard	Unit	PC	PC + fibre glass	ABS
Mechanical properties					
Impact strength +23°C	ISO 179-1eU	kJ/m ²	good	good	good
-30°C	ISO 179-1eU	kJ/m ²	good	good	-
Elastic Modulus	ISO 527	Mpa	2400	4000	2100
Temperature properties					
Vicat softening point B50	ISO 306	°C	145	144	94
Longterm use, heat	UL 7468	°C	125	120	60
Longterm use, cold		°C	-50	-50	-40
Flammability	UL 94	class	V-2	V-0	HB
Electrical properties					
Disruptive strength	EC 243-1	kV/mm	30	30	32
Creeping current limit	IEC 112	V	275	175	525
Physical properties					
Moisture absorption	ISO 62	%	0.15	0.13	
Density	ISO 1183	g/cm ³	1.20	1.25	1.04



Extension frame

CT-Module Plastic enclosures are manufactured from high-quality polycarbonate or ABS. They are particularly suitable for housing electrical and electronic components as well as small control devices. All enclosures are offered with a transparent polycarbonate. The enclosures protection class IP 66/67. Standard colour is RAL 7035.

Gasket material: Polyurethane (PUR)

Technical properties of PUR		
	Unit	PUR
Temperature	°C	-50 – +130
Tensile strength	Mpa	0.4
Elongation at break	%	110
Hardness	Shore A	6
Specific weight	g/cm ³	0.4
Permanent compression	%	5

CT-Module Plastic Enclosures

Type: CT-S



Features

- 17 sizes in ABS or polycarbonate
- Grey or transparent polycarbonate lid
- Captive lid screws (with wire seal option)
- Foam (PUR) gasket, IP 66/67
- Metric or PG 'knock-outs' option on polycarbonate bases
- Base depth 50 mm
- Lid depth 25, 50, 75 or 100 mm



CT-Module Plastic Enclosures

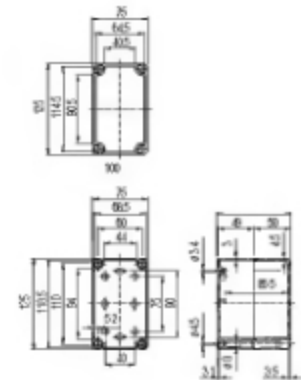
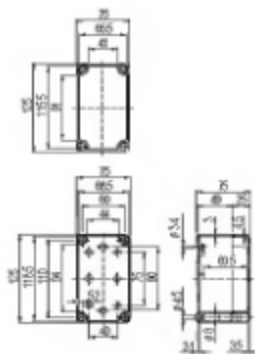
Type: CT-S

75 x 125 x 75 mm

CT-S 201 PC-Enclosure
CT-S 301 ABS-Enclosure

75 x 125 x 100 mm

CT-S 202 PC-Enclosure
CT-S 302 ABS-Enclosure



Type	CT-S 201	CT-S 301
Material	PC	ABS
Weight (g)	209	184
External dimensions (mm)	75 x 125 x 75	75 x 125 x 75
	Part number	Part number
Metric knock-outs (grey lid)	212.0010.000	
Metric knock-outs (transparent lid)	212.1010.000	
PG knock-outs (grey lid)	213.0010.000	
PG knock-outs (transparent lid)	213.1010.000	
Without knock-outs (grey lid)	211.0010.000	311.0010.000
Without knock-outs (transparent lid)	211.1010.000	311.1010.000

Accessories (also see P 359)

	Dim's (mm)	Material	CT-S 201	CT-S 301
Mounting plate	48 x 98 x 1.5	St, Zn	929.5001.000	929.5001.000
DIN rail	35 x 50	St, Zn	929.2001.000	929.2001.000
DIN rail	35 x 100	St, Zn	929.2002.000	929.2002.000
Hinges (pair)		PA	929.3001.000	929.3001.000
External mounting brackets		PC	929.3002.000	929.3002.000
Lid screws (Set of 4)	35	PA	929.3011.000	929.3011.000
Internal mounting screws	4 x 8	St, Zn	929.3005.000	929.3005.000
Threaded inserts (Set of 4)	M2	Ms	929.3004.000	929.3004.000

Knock-outs (only PC-Enclosures)

Metric	1 x M16/25 + 3 x M12/20
PG	8 x PG 9/13.5

Type	CT-S 202	CT-S 302
Material	PC	ABS
Weight (g)	274	243
External dimensions (mm)	75 x 125 x 100	75 x 125 x 100
	Part number	Part number
Metric knock-outs (grey lid)	212.0020.000	
Metric knock-outs (transparent lid)	212.1020.000	
PG knock-outs (grey lid)	213.0020.000	
PG knock-outs (transparent lid)	213.1020.000	
Without knock-outs (grey lid)	211.0020.000	311.0020.000
Without knock-outs (transparent lid)	211.1020.000	311.1020.000

	Dim's (mm)	Material	CT-S 202	CT-S 302
Mounting plate	48 x 98 x 1.5	St, Zn	929.5001.000	929.5001.000
DIN rail	35 x 50	St, Zn	929.2001.000	929.2001.000
DIN rail	35 x 100	St, Zn	929.2002.000	929.2002.000
Hinges (pair)		PA	929.3001.000	929.3001.000
External mounting brackets		PC	929.3002.000	929.3002.000
Lid screws (Set of 4)	60	PA	929.3012.000	929.3012.000
Internal mounting screws	4 x 8	St, Zn	929.3005.000	929.3005.000
Threaded inserts (Set of 4)	M2	Ms	929.3004.000	929.3004.000

Metric	1 x M16/25 + 3 x M12/20
PG	8 x PG 9/13.5

CT-Module Plastic Enclosures

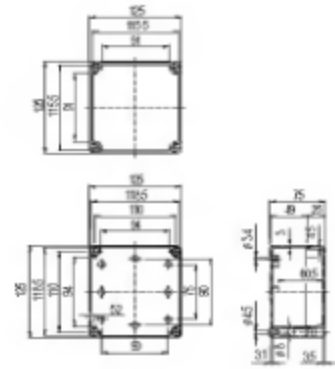
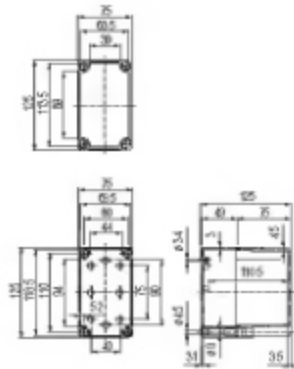
Type: CT-S

75 x 125 x 125 mm

CT-S 203 PC-Enclosure
CT-S 303 ABS-Enclosure

125 x 125 x 75 mm

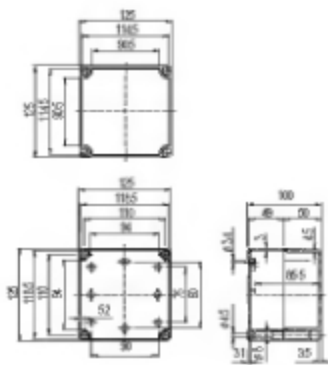
CT-S 204 PC-Enclosure
CT-S 304 ABS-Enclosure



Type	CT-S 203	CT-S 303	CT-S 204	CT-S 304		
Material	PC	ABS	PC	ABS		
Weight (g)	300	266	283	250		
External dimensions (mm)	75 x 125 x 125	75 x 125 x 125	125 x 125 x 75	125 x 125 x 75		
	Part number	Part number	Part number	Part number		
Metric knock-outs (grey lid)	212.0030.000	-	212.0040.000	-		
Metric knock-outs (transparent lid)	212.1030.000	-	212.1040.000	-		
PG knock-outs (grey lid)	213.0030.000	-	213.0040.000	-		
PG knock-outs (transparent lid)	213.1030.000	-	213.1040.000	-		
Without knock-outs (grey lid)	211.0030.000	311.0030.000	211.0040.000	311.0040.000		
Without knock-outs (transparent lid)	211.1030.000	311.1030.000	211.1040.000	311.1040.000		
Accessories (also see P 359)	Dim's (mm)	Material	Dim's (mm)	Material		
Mounting plate	48 x 98 x 1.5	St, Zn 929.5001.000	929.5001.000	98 x 98 x 1.5	St, Zn 929.5002.000	929.5002.000
DIN rail	35 x 50	St, Zn 929.2001.000	929.2001.000	35 x 50	St, Zn 929.2002.000	929.2002.000
DIN rail	35 x 100	St, Zn 929.2002.000	929.2002.000	35 x 100	St, Zn 929.2002.000	929.2002.000
Hinges (pair)		PA 929.3001.000	929.3001.000		PA 929.3001.000	929.3001.000
External mounting brackets		PC 929.3002.000	929.3002.000		PC 929.3002.000	929.3002.000
Lid screws (Set of 4)	35	PA 929.3011.000	929.3011.000	60	PA 929.3012.000	929.3012.000
Internal mounting screws	4 x 8	St, Zn 929.3005.000	929.3005.000	4 x 8	St, Zn 929.3005.000	929.3005.000
Threaded inserts (Set of 4)	M2	Ms 929.3004.000	929.3004.000	M2	Ms 929.3004.000	929.3004.000
Knock-outs (only PC-Enclosures)						
Metric	1 x M16/25 + 3 x M12/20		2 x M16/25 + 3 x M12/20			
PG	8 x PG 9/13.5		4 x PG 16/21 + 4 x PG 9/13.5			

125 x 125 x 100 mm

CT-S 205 PC-Enclosure
CT-S 305 ABS-Enclosure



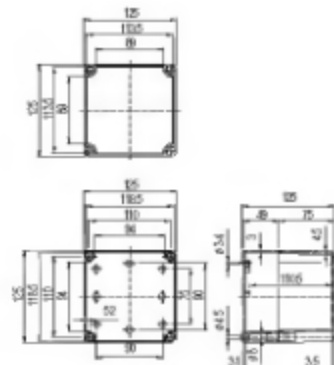
	CT-S 205	CT-S 305
	PC	ABS
	357	317
	125x125x100	125x125x100
	Part number	Part number
	212.0050.000	-
	212.1050.000	-
	213.0050.000	-
	213.1050.000	-
	211.0050.000	311.0050.000
	211.1050.000	311.1050.000

Dim's (mm)	Material		
98 x 98 x 1.5	St, Zn	929.5002.000	929.5002.000
35 x 100	St, Zn	929.2002.000	929.2002.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
60	PA	929.3012.000	929.3012.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

2 x M16/25 + 3 x M12/20
4 x PG 16/21 + 4 x PG 9/13.5

125 x 125 x 125 mm

CT-S 206 PC-Enclosure
CT-S 306 ABS-Enclosure



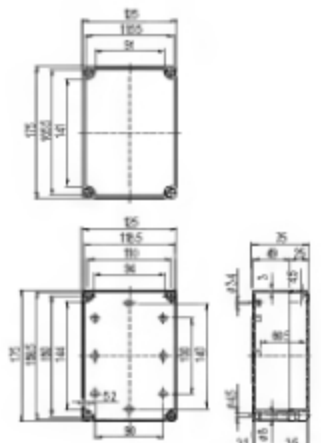
	CT-S 206	CT-S 306
	PC	ABS
	398	353
	125x125x125	125x125x125
	Part number	Part number
	212.0060.000	-
	212.1060.000	-
	213.0060.000	-
	213.1060.000	-
	211.0060.000	311.0060.000
	211.1060.000	311.1060.000

Dim's (mm)	Material		
98 x 98 x 1.5	St, Zn	929.5002.000	929.5002.000
35 x 100	St, Zn	929.2002.000	929.2002.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

2 x M16/25 + 3 x M12/20
4 x PG 16/21 + 4 x PG 9/13.5

125 x 175 x 75 mm

CT-S 207 PC-Enclosure
CT-S 307 ABS-Enclosure



	CT-S 207	CT-S 307
	PC	ABS
	381	328
	125 x 175 x 75	125 x 175 x 75
	Part number	Part number
	212.0070.000	-
	212.1070.000	-
	213.0070.000	-
	213.1070.000	-
	211.0070.000	311.0070.000
	211.1070.000	311.1070.000

Dim's (mm)	Material		
98 x 148 x 1.5	St, Zn	929.5003.000	929.5003.000
35 x 150	St, Zn	929.2004.000	929.2004.000
35 x 100	St, Zn	929.2002.000	929.2002.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

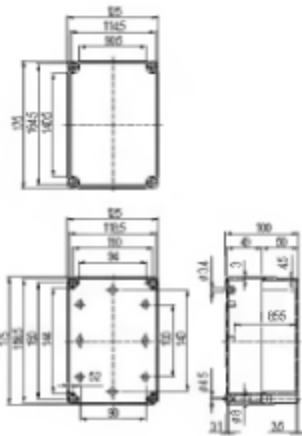
2 x M16/25 + 4 x M12/20
4 x PG 16/21 + 8 x PG 9/13.5

CT-Module Plastic Enclosures

Type: CT-S

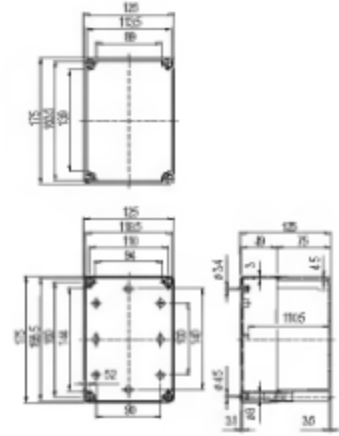
125 x 175 x 100 mm

CT-S 208 PC-Enclosure
CT-S 308 ABS-Enclosure



125 x 175 x 125 mm

CT-S 209 PC-Enclosure
CT-S 309 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	
Metric knock-outs (grey lid)	
Metric knock-outs (transparent lid)	
PG knock-outs (grey lid)	
PG knock-outs (transparent lid)	
Without knock-outs (grey lid)	
Without knock-outs (transparent lid)	

	CT-S 208	CT-S 308
Material	PC	ABS
Weight (g)	465	401
External dimensions (mm)	125x175x100	125x175x100
Part number	Part number	
Metric knock-outs (grey lid)	212.0080.000	-
Metric knock-outs (transparent lid)	212.1080.000	-
PG knock-outs (grey lid)	213.0080.000	-
PG knock-outs (transparent lid)	213.1080.000	-
Without knock-outs (grey lid)	211.0080.000	311.0080.000
Without knock-outs (transparent lid)	211.1080.000	311.1080.000

	CT-S 209	CT-S 309
Material	PC	ABS
Weight (g)	530	459
External dimensions (mm)	125x175x125	125x175x125
Part number	Part number	
Metric knock-outs (grey lid)	212.0090.000	-
Metric knock-outs (transparent lid)	212.1090.000	-
PG knock-outs (grey lid)	213.0090.000	-
PG knock-outs (transparent lid)	213.1090.000	-
Without knock-outs (grey lid)	211.0090.000	311.0090.000
Without knock-outs (transparent lid)	211.1090.000	311.1090.000

Accessories (also see P 359)	
Mounting plate	
DIN rail	
DIN rail	
Hinges (pair)	
External mounting brackets	
Lid screws (Set of 4)	
Internal mounting screws	
Threaded inserts (Set of 4)	

Dim's (mm)	Material		
98x148x1.5	St, Zn	929.5003.000	929.5003.000
35 x 150	St, Zn	929.2004.000	929.2004.000
35 x 100	St, Zn	929.2002.000	929.2002.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
60	PA	929.3012.000	929.3012.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

Dim's (mm)	Material		
98x148x1.5	St, Zn	929.5003.000	929.5003.000
35 x 150	St, Zn	929.2004.000	929.2004.000
35 x 100	St, Zn	929.2002.000	929.2002.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

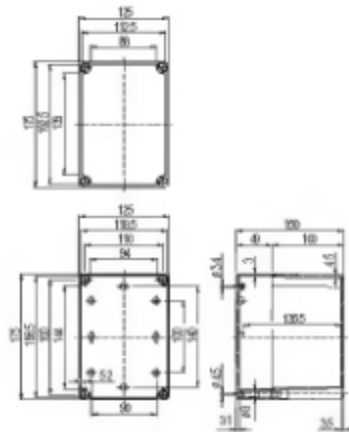
Knock-outs (only PC-Enclosures)	
Metric	
PG	

2 x M16/25 + 4 x M12/20
4 x PG 16/21 + 8 x PG 9/13.5

2 x M16/25 + 4 x M12/20
4 x PG 16/21 + 8 x PG 9/13.5

125 x 175 x 150 mm

CT-S 210 PC-Enclosure
CT-S 310 ABS-Enclosure



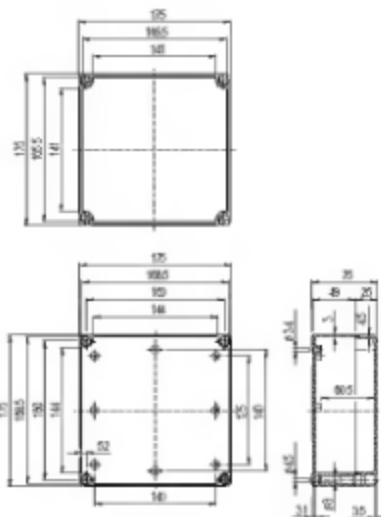
	CT-S 210	CT-S 310
	PC	ABS
	603	521
	125x175x150	125x 175x 150
	Part number	Part number
	212.0100.000	-
	212.1100.000	-
	213.0100.000	-
	213.1100.000	-
	211.0100.000	311.0100.000
	211.1100.000	311.1100.000

Dim's (mm)	Material		
98x148x15	St, Zn	929.5004.000	929.5004.000
35 x 150	St, Zn	929.2004.000	929.2004.000
35 x 100	St, Zn	929.2002.000	929.2002.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

2 x M16/25 + 4 x M12/20
4 x PG 16/21 + 8 x PG 9/13.5

175 x 175 x 75 mm

CT-S 211 PC-Enclosure
CT-S 311 ABS-Enclosure



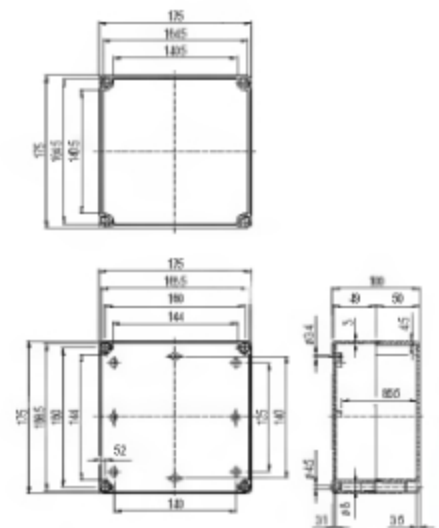
	CT-S 211	CT-S 311
	PC	ABS
	461	392
	175x175x75	175x175x75
	Part number	Part number
	212.0110.000	-
	212.1110.000	-
	213.0110.000	-
	213.1110.000	-
	211.0110.000	311.0110.000
	211.1110.000	311.1110.000

Dim's (mm)	Material		
148x148x15	St, Zn	929.5004.000	929.5004.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

2 x M12/20 + 2 x M16/25 + 5 x M12/20
4 x PG 16/21 + 4 x PG 9/16 + 10 x PG 9/13.5

175 x 175 x 100 mm

CT-S 212 PC-Enclosure
CT-S 312 ABS-Enclosure



	CT-S 212	CT-S 312
	PC	ABS
	573	490
	175x175x100	175x175x100
	Part number	Part number
	212.0120.000	-
	212.1120.000	-
	213.0120.000	-
	213.1120.000	-
	211.0120.000	311.0120.000
	211.1120.000	311.1120.000

Dim's (mm)	Material		
148x148x15	St, Zn	929.5004.000	929.5004.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
60	PA	929.3012.000	929.3012.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

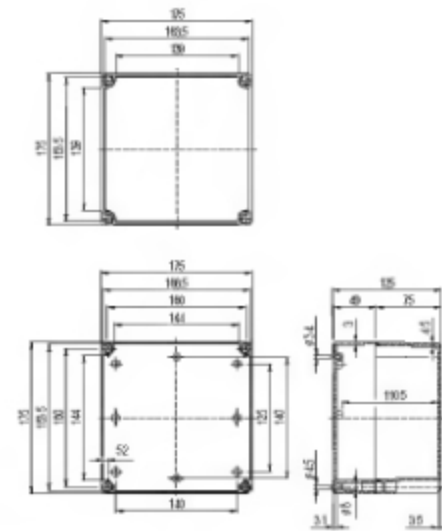
2 x M12/20 + 2 x M16/25 + 5 x M12/20
4 x PG 16/21 + 4 x PG 9/16 + 10 x PG 9/13.5

CT-Module Plastic Enclosures

Type: CT-S

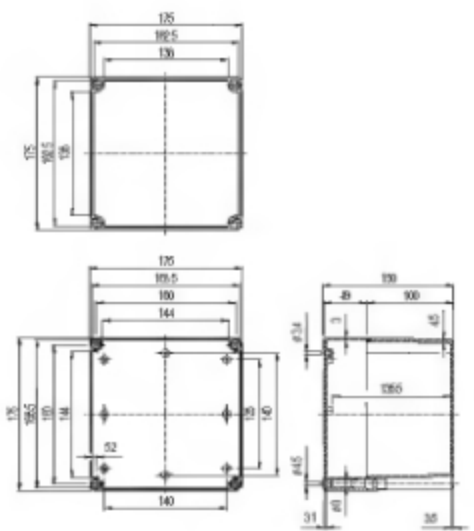
175 x 175 x 125 mm

CT-S 213 PC-Enclosure
CT-S 313 ABS-Enclosure



175 x 175 x 150 mm

CT-S 214 PC-Enclosure
CT-S 314 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	
Metric knock-outs (grey lid)	
Metric knock-outs (transparent lid)	
PG knock-outs (grey lid)	
PG knock-outs (transparent lid)	
Without knock-outs (grey lid)	
Without knock-outs (transparent lid)	

	CT-S 213	CT-S 313
Material	PC	ABS
Weight (g)	640	557
External dimensions (mm)	175 x 175 x 125	175 x 175 x 125
Part number	Part number	
Metric knock-outs (grey lid)	212.0130.000	-
Metric knock-outs (transparent lid)	212.1130.000	-
PG knock-outs (grey lid)	213.0130.000	-
PG knock-outs (transparent lid)	213.1130.000	-
Without knock-outs (grey lid)	211.0130.000	311.0130.000
Without knock-outs (transparent lid)	211.1130.000	311.1130.000

	CT-S 214	CT-S 314
Material	PC	ABS
Weight (g)	717	616
External dimensions (mm)	175 x 175 x 150	175 x 175 x 150
Part number	Part number	
Metric knock-outs (grey lid)	212.0140.000	-
Metric knock-outs (transparent lid)	212.1140.000	-
PG knock-outs (grey lid)	213.0140.000	-
PG knock-outs (transparent lid)	213.1140.000	-
Without knock-outs (grey lid)	211.0140.000	311.0140.000
Without knock-outs (transparent lid)	211.1140.000	311.1140.000

Accessories (also see P 359)	
Mounting plate	
DIN rail	
DIN rail	
Hinges (pair)	
External mounting brackets	
Lid screws (Set of 4)	
Internal mounting screws	
Threaded inserts (Set of 4)	

Dim's (mm)	Material		
148x148x15	St, Zn	929.5004.000	929.5004.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

Dim's (mm)	Material		
148x148x15	St, Zn	929.5004.000	929.5004.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

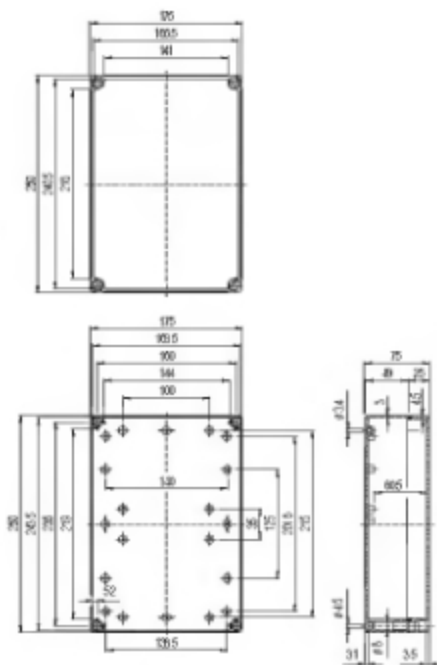
Knock-outs (only PC-Enclosures)	
Metric	
PG	

2 x M12/20 + 2 x M16/25 + 5 x M12/20
4 x PG 16/21 + 4 x PG 9/16 + 10 x PG 9/13 5

2 x M12/20 + 2 x M16/25 + 5 x M12/20
4 x PG 16/21 + 4 x PG 9/16 + 10 x PG 9/13 5

175 x 250 x 75 mm

CT-S 215 PC-Enclosure
CT-S 315 ABS-Enclosure



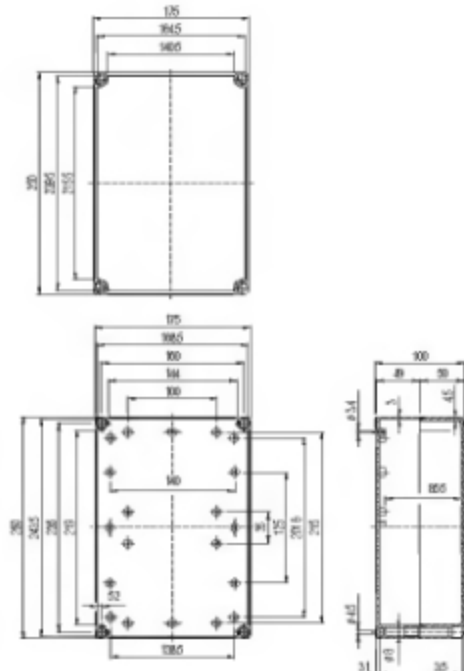
	CT-S 215	CT-S 315
	PC	ABS
	631	553
	175x250x75	175x250x75
	Part number	Part number
	212.0150.000	-
	212.1150.000	-
	213.0150.000	-
	213.1150.000	-
	211.0150.000	311.0150.000
	211.1150.000	311.1150.000

Dim's (mm)	Material		
148x223x15	St, Zn	929.5005.000	929.5005.000
35 x 225	St, Zn	929.2005.000	929.2005.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

2 x M12/20 + 2 x M16/25 + 6 x M12/20
4 x PG 16/21 + 4 x PG 9/16 + 12 x PG 9/13 5

175 x 250 x 100 mm

CT-S 216 PC-Enclosure
CT-S 316 ABS-Enclosure



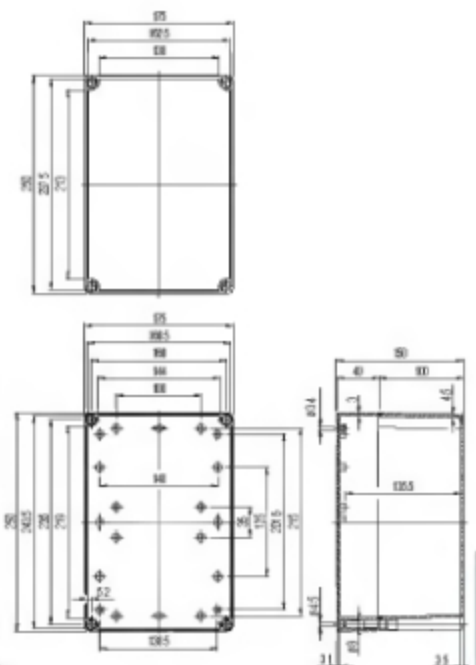
	CT-S 216	CT-S 316
	PC	ABS
	743	666
	175x250x100	175x250x100
	Part number	Part number
	212.0160.000	-
	212.1160.000	-
	213.0160.000	-
	213.1160.000	-
	211.0160.000	311.0160.000
	211.1160.000	311.1160.000

Dim's (mm)	Material		
148x223x15	St, Zn	929.5005.000	929.5005.000
35 x 225	St, Zn	929.2005.000	929.2005.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

2 x M12/20 + 2 x M16/25 + 6 x M12/20
4 x PG 16/21 + 4 x PG 9/16 + 12 x PG 9/13 5

175 x 250 x 150 mm

CT-S 217 PC-Enclosure
CT-S 317 ABS-Enclosure



	CT-S 217	CT-S 317
	PC	ABS
	947	842
	175x250x150	175x250x150
	Part number	Part number
	212.0170.000	-
	212.1170.000	-
	213.0170.000	-
	213.1170.000	-
	211.0170.000	311.0170.000
	211.1170.000	311.1170.000

Dim's (mm)	Material		
148x223x15	St, Zn	929.5005.000	929.5005.000
35 x 225	St, Zn	929.2005.000	929.2005.000
35 x 150	St, Zn	929.2004.000	929.2004.000
	PA	929.3001.000	929.3001.000
	PC	929.3002.000	929.3002.000
35	PA	929.3011.000	929.3011.000
4 x 8	St, Zn	929.3005.000	929.3005.000
M2	Ms	929.3004.000	929.3004.000

2 x M12/20 + 2 x M16/25 + 6 x M12/20
4 x PG 16/21 + 4 x PG 9/16 + 12 x PG 9/13 5

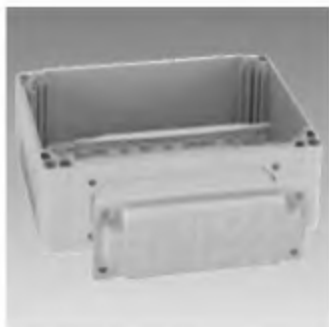
CT-Module Plastic Enclosures

Type: CT-C



Features

- Polycarbonate enclosure range can be linked 'side-by-side' to form larger units
- Pre-formed flange knock-outs on all base sides
- Variety of flange plate options (full details P 359)
- Grey or transparent lid
- Foam (PUR) gasket, IP 66/67
- 132 or 187 mm depth (using 55 mm extension frame)
- Corner elevator brackets allow height adjustment of optional internal front plate



CT-Module Plastic Enclosures

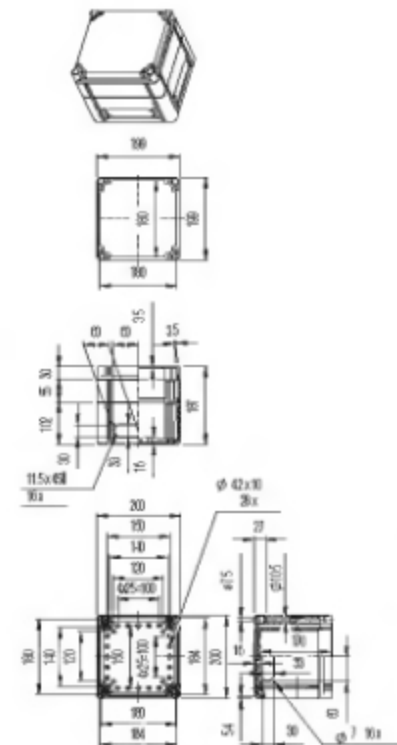
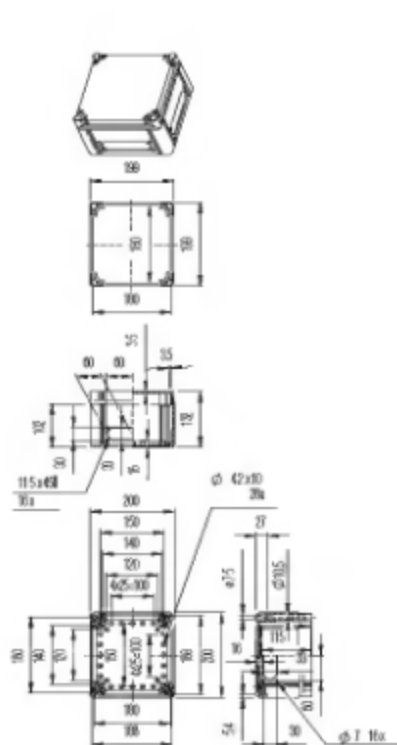
Type: CT-C

200 x 200 x 130 mm

CT-C 201 PC-Enclosure

200 x 200 x 185 mm

CT-C 202 PC-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

Grey lid	
Transparent lid	

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
Hinges (pair)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Flange Plates	

	CT-C 201
	PC
	1039
	200 x 200 x 130
	Part number
	224.0010.000
	224.1010.000

Dim's (mm)	Material	
186x166x1.5	Al	929.4001.000
160x160x1.5	St	929.5010.000
35 x 160	St	929.2010.000
35 x 160	St	929.2010.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
	4 x F1	

	CT-C 202
	PC
	1367
	200 x 200 x 185
	Part number
	224.0020.000
	224.1020.000

Dim's (mm)	Material	
186x166x1.5	Al	929.4001.000
160x160x1.5	St	929.5010.000
35 x 160	St	929.2010.000
35 x 160	St	929.2010.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
	4 x F1	

CT-Module Plastic Enclosures

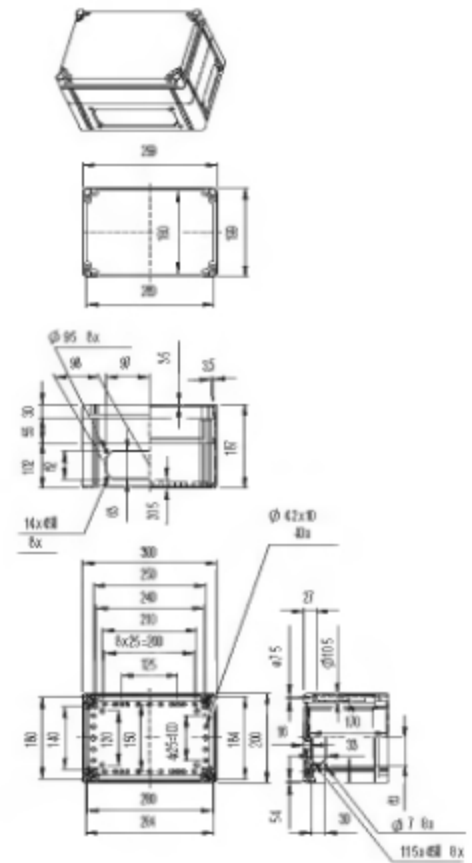
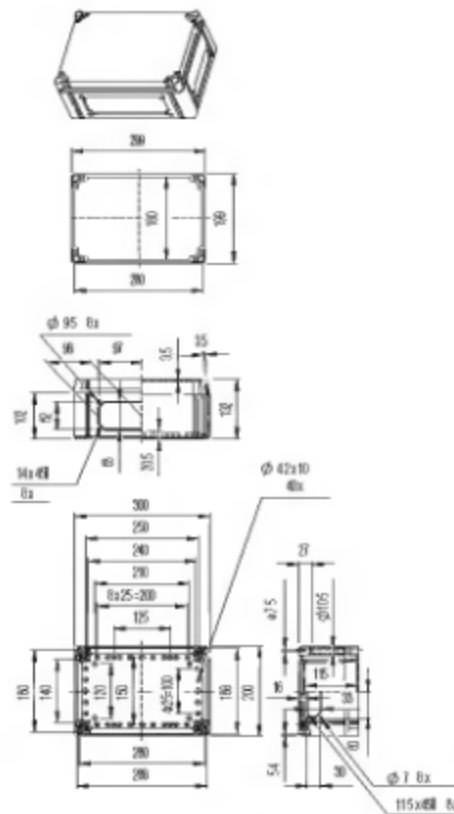
Type: CT-C

200 x 300 x 130 mm

CT-C 203 PC-Enclosure

200 x 300 x 185 mm

CT-C 204 PC-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

Grey lid	
Transparent lid	

Accessories (also see P 359)

Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
Hinges (pair)	
External mounting brackets	
Lid screws (std) (Set of 4)	

Flange Plates

	CT-C 203
	PC
	1349
	200 x 300 x 130
	Part number
	224.0030.000
	224.1030.000

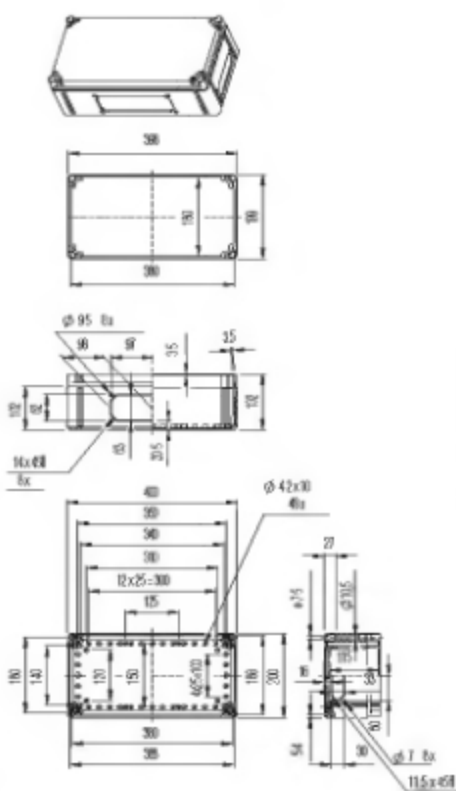
Dim's (mm)	Material	
186x286x1.5	Al	929.4003.000
160x260x1.5	St	929.5011.000
35 x 260	St	929.2012.000
35 x 160	St	929.2010.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		2 x F1 + 2 x F2

	CT-C 204
	PC
	1733
	200 x 300 x 185
	Part number
	224.0040.000
	224.1040.000

Dim's (mm)	Material	
186x286x1.5	Al	929.4003.000
160x260x1.5	St	929.5011.000
35 x 260	St	929.2012.000
35 x 160	St	929.2010.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		2 x F1 + 2 x F2

200 x 400 x 130 mm

CT-C 205 PC-Enclosure

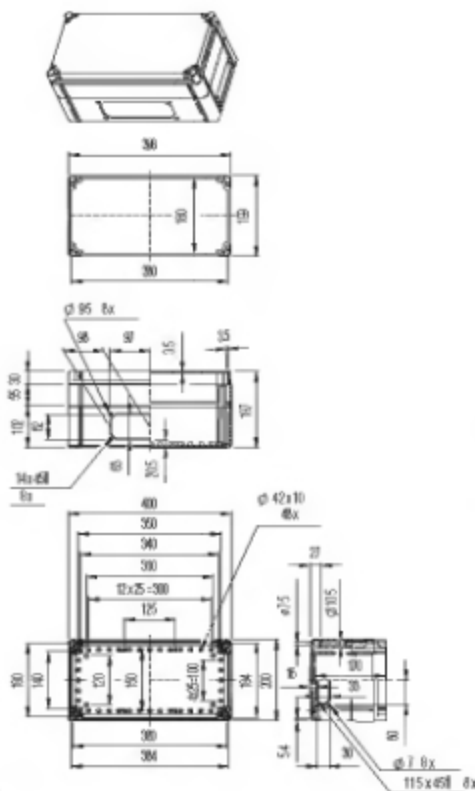


CT-C 205
PC
1674
200 x 400 x 130
Part number
224.0050.000
224.1050.000

Dim's (mm)	Material	
186x386x1.5	Al	929.4005.000
160x360x1.5	St	929.5012.000
35 x 160	St	929.2010.000
35 x 360	St	929.2014.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		2 x F1 + 2 x F2

200 x 400 x 185 mm

CT-C 206 PC-Enclosure

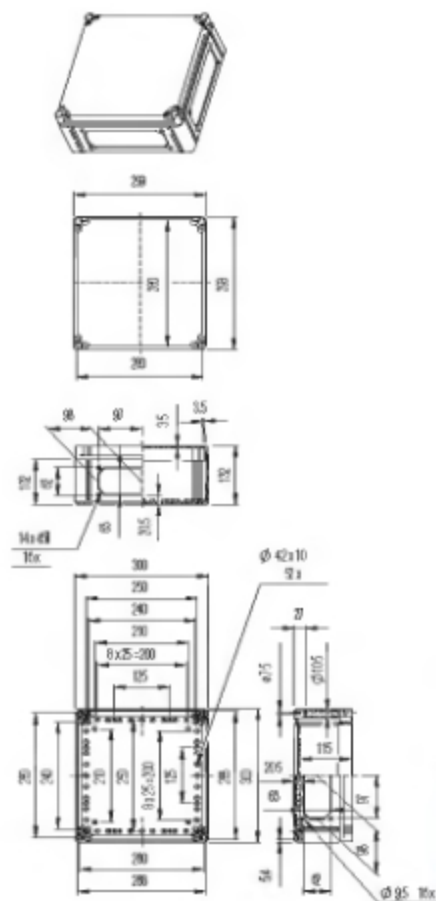


CT-C 206
PC
2131
200 x 400 x 185
Part number
224.0060.000
224.1060.000

Dim's (mm)	Material	
186x386x1.5	Al	929.4005.000
160x360x1.5	St	929.5012.000
35 x 160	St	929.2010.000
35 x 360	St	929.2014.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		2 x F1 + 2 x F2

300 x 300 x 130 mm

CT-C 207 PC-Enclosure



CT-C 207
PC
1738
300 x 300 x 130
Part number
224.0070.000
224.1070.000

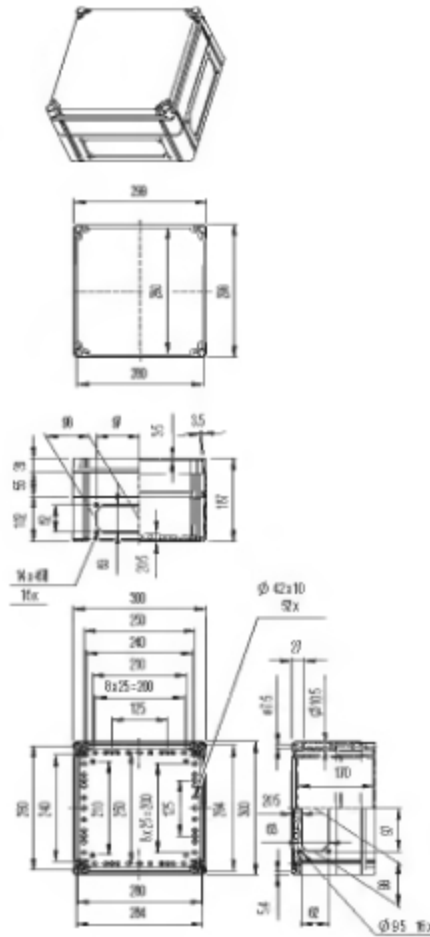
Dim's (mm)	Material	
286x286x1.5	Al	929.4006.000
260x260x1.5	St	929.5013.000
35 x 260	St	929.2012.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		4 x F2

CT-Module Plastic Enclosures

Type: CT-C

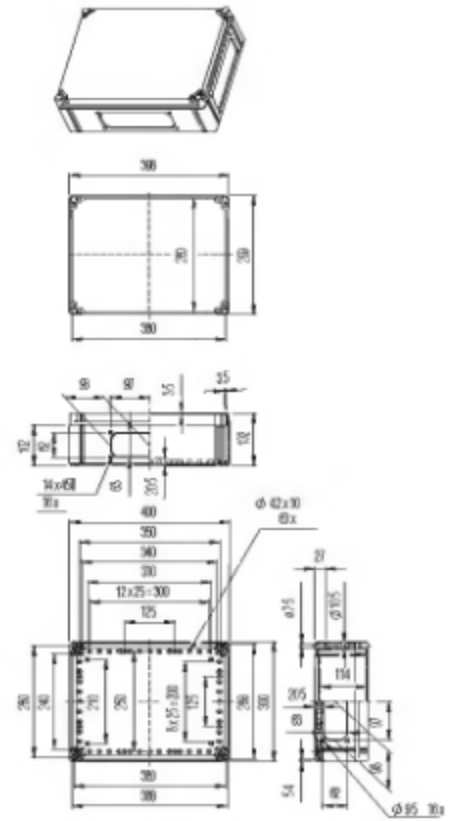
300 x 300 x 185 mm

CT-C 208 PC-Enclosure



300 x 400 x 130 mm

CT-C 209 PC-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

Grey lid	
Transparent lid	

Accessories (also see P 359)

Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
Hinges (pair)	
External mounting brackets	
Lid screws (std) (Set of 4)	

Flange Plates

	CT-C 208
	PC
	2188
	300 x 300 x 185

	Part number
	224.0080.000
	224.1080.000

Dim's (mm)	Material	
286x286x1.5	Al	929.4006.000
260x260x1.5	St	929.5013.000
35 x 260	St	929.2012.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000

4 x F2

	CT-C 209
	PC
	2199
	300 x 400 x 130

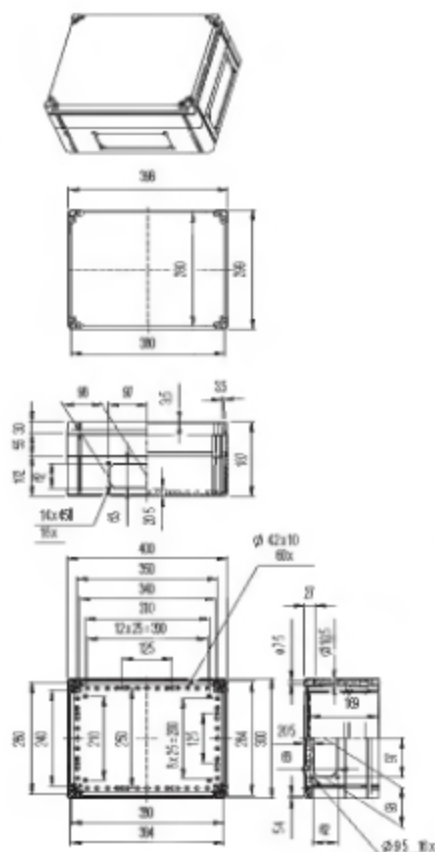
	Part number
	224.0090.000
	224.1090.000

Dim's (mm)	Material	
286x386x1.5	Al	929.4008.000
260x360x1.5	St	929.5014.000
35 x 360	St	929.2014.000
35 x 260	St	929.2012.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000

4 x F2

300 x 400 x 185 mm

CTC 210 PC-Enclosure



CTC 210

PC

2703

300 x 400 x 185

Part number

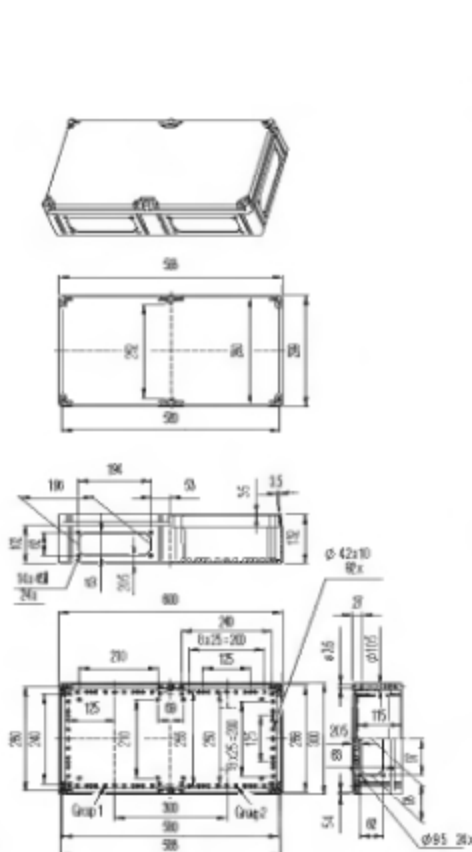
224.0100.000

224.1100.000

Dim's (mm)	Material	
286x386x1.5	Al	929.4008.000
260x360x1.5	St	929.5014.000
35 x 360	St	929.2014.000
35 x 260	St	929.2012.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		4 x F2

300 x 600 x 130 mm

CTC 211 PC-Enclosure



CTC 211

PC

3000

300 x 600 x 130

Part number

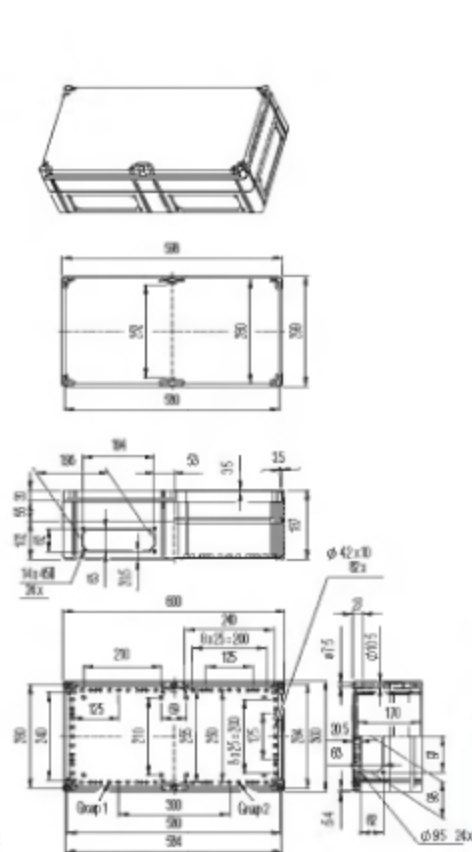
224.0110.000

224.1110.000

Dim's (mm)	Material	
286x586x1.5	Al	929.4010.000
260x560x1.5	St	929.5016.000
35 x 260	St	929.2012.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		6 x F2

300 x 600 x 185 mm

CTC 212 PC-Enclosure



CTC 212

PC

3703

300 x 600 x 185

Part number

224.0120.000

224.1120.000

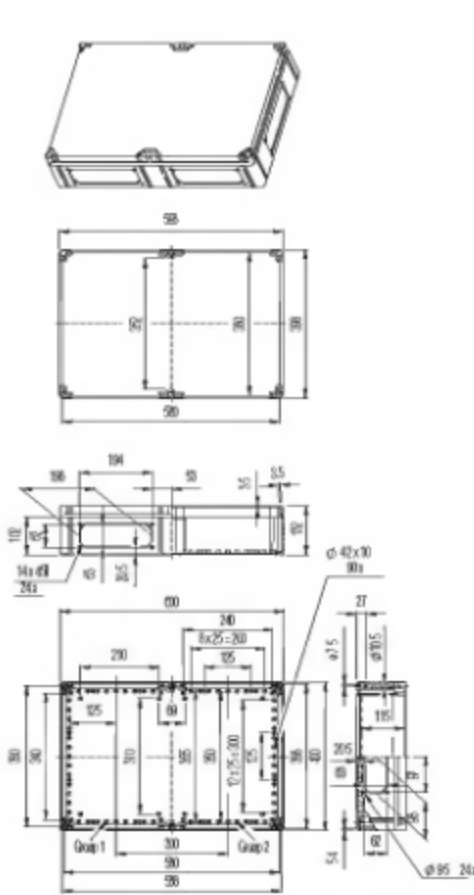
Dim's (mm)	Material	
286x586x1.5	Al	929.4010.000
260x560x1.5	St	929.5016.000
35 x 260	St	929.2012.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		6 x F2

CT-Module Plastic Enclosures

Type: CT-C

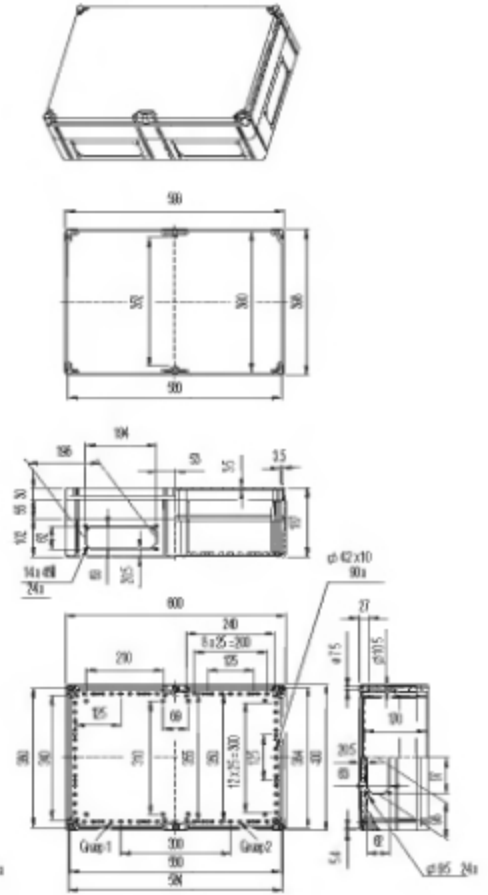
400 x 600 x 130 mm

CT-C 213 PC-Enclosure



400 x 600 x 185 mm

CT-C 214 PC-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

Grey lid	
Transparent lid	

Accessories (also see P 359)

Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
Hinges (pair)	
External mounting brackets	
Lid screws (std) (Set of 4)	

Flange Plates

	CT-C 213
	PC
	3964
	400 x 600 x 130
	Part number
	224.0130.000
	224.1130.000

Dim's (mm)	Material	
386x586x1.5	Al	929.4012.000
360x560x1.5	St	929.5018.000
35 x 360	St	929.2014.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		6 x F2

	CT-C 214
	PC
	4730
	400 x 600 x 185
	Part number
	224.0140.000
	224.1140.000

Dim's (mm)	Material	
386x586x1.5	Al	929.4012.000
360x560x1.5	St	929.5018.000
35 x 360	St	929.2014.000
	PA	929.3061.000
	PC	929.3063.000
42	PA	929.3091.000
		6 x F2

CT-Module Plastic Enclosures

Type: CT-W



Features

- Hinged lid with robust hinges
- Quick release lid latches (can be padlocked)
- Grey or transparent lid
- Foam (PUR) gasket, IP 66/67
- 132 or 187 mm depth (using 55 mm extension frame)
- Corner elevator brackets allow height adjustment of optional internal front plate

CT-Module Plastic Enclosures

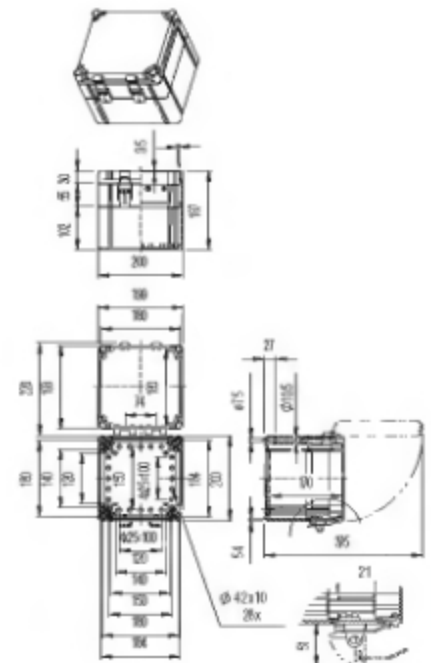
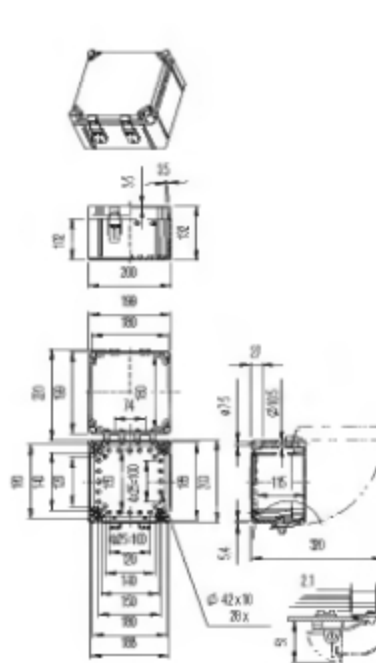
Type: CT-W

200 x 200 x 130 mm

CT-W 201 PC-Enclosure

200 x 200 x 185 mm

CT-W 202 PC-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	
Grey lid	
Transparent lid	

	CT-W 201
	PC
	1149
	200 x 200 x 130
	Part number
	234.0010.000
	234.1010.000

	CT-W 202
	PC
	1453
	200 x 200 x 185
	Part number
	234.0020.000
	234.1020.000

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	

Dim's (mm)	Material	
186x166x1.5	Al	929.4001.000
160x160x1.5	St	929.5010.000
35 x 160	St	929.2010.000
35 x 160	St	929.2010.000
	PC	929.3063.000
42	PA	929.3091.000

Dim's (mm)	Material	
186x166x1.5	Al	929.4001.000
160x160x1.5	St	929.5010.000
35 x 160	St	929.2010.000
35 x 160	St	929.2010.000
	PC	929.3063.000
42	PA	929.3091.000

CT-Module Plastic Enclosures

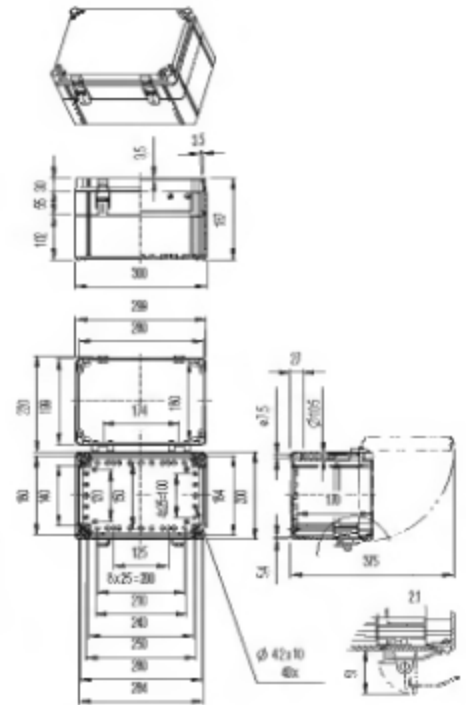
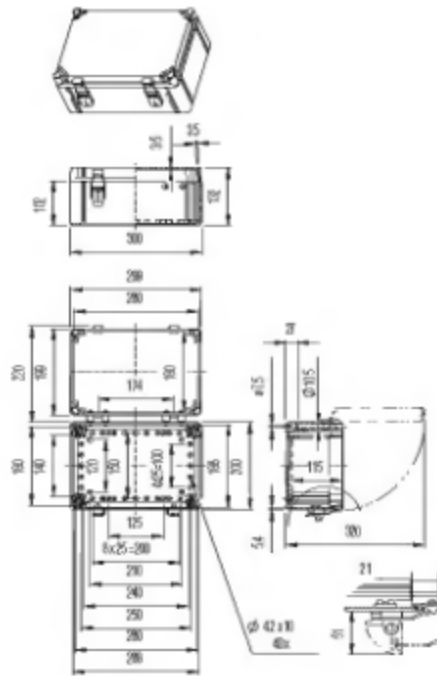
Type: CT-W

200 x 300 x 130 mm

CT-W 203 PC-Enclosure

200 x 300 x 185 mm

CT-W 204 PC-Enclosure



Type	
Material	
Weight	(g)
External dimensions	(mm)

Grey lid	
Transparent lid	

Accessories (also see P 359)

Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	

	CT-W 203
	PC
	1459
	200 x 300 x 130
	Part number
	234.0030.000
	234.1030.000

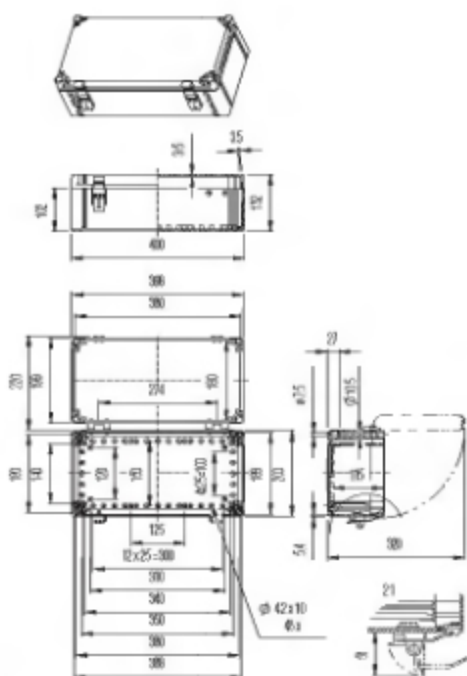
Dim's (mm)	Material	
186x286x15	Al	929.4003.000
160x260x15	St	929.5011.000
35 x 260	St	929.2012.000
35 x 160	St	929.2010.000
	PC	929.3063.000
42	PA	929.3091.000

	CT-W 204
	PC
	1819
	200 x 300 x 185
	Part number
	234.0040.000
	234.1040.000

Dim's (mm)	Material	
186x286x15	Al	929.4003.000
160x260x15	St	929.5011.000
35 x 260	St	929.2012.000
35 x 160	St	929.2010.000
	PC	929.3063.000
42	PA	929.3091.000

200 x 400 x 130 mm

CT-W 205 PC-Enclosure



CT-W 205

PC

1784

200 x 400 x 130

Part number

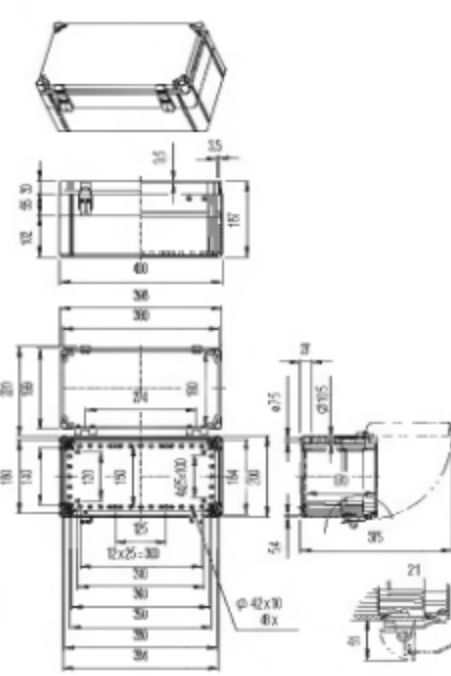
234.0050.000

234.1050.000

Dim's (mm)	Material	
186x386x1.5	Al	929.4005.000
160x360x1.5	St	929.5012.000
35 x 160	St	929.2010.000
35 x 360	St	929.2014.000
	PC	929.3063.000
42	PA	929.3091.000

200 x 400 x 185 mm

CT-W 206 PC-Enclosure



CT-W 206

PC

2217

200 x 400 x 185

Part number

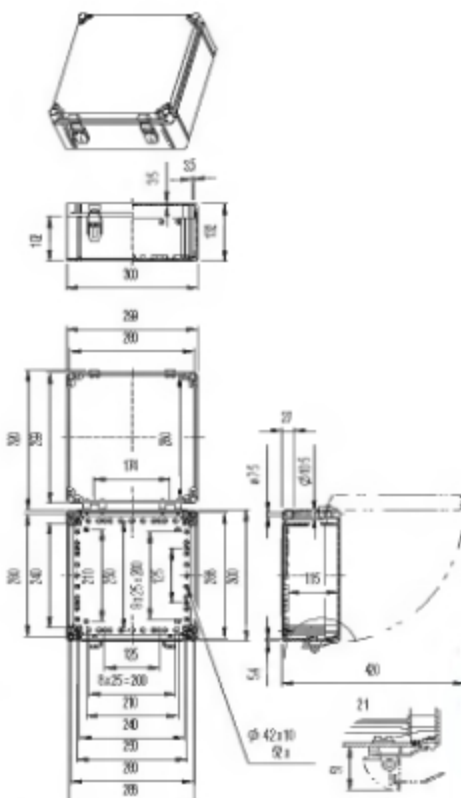
234.0060.000

234.1060.000

Dim's (mm)	Material	
186x386x1.5	Al	929.4005.000
160x360x1.5	St	929.5012.000
35 x 160	St	929.2010.000
35 x 360	St	929.2014.000
	PC	929.3063.000
42	PA	929.3091.000

300 x 300 x 130 mm

CT-W 207 PC-Enclosure



CT-W 207

PC

1848

300 x 300 x 130

Part number

234.0070.000

234.1070.000

Dim's (mm)	Material	
286x286x1.5	Al	929.4006.000
260x260x1.5	St	929.5013.000
35 x 260	St	929.2012.000
	PC	929.3063.000
42	PA	929.3091.000

CT-Module Plastic Enclosures

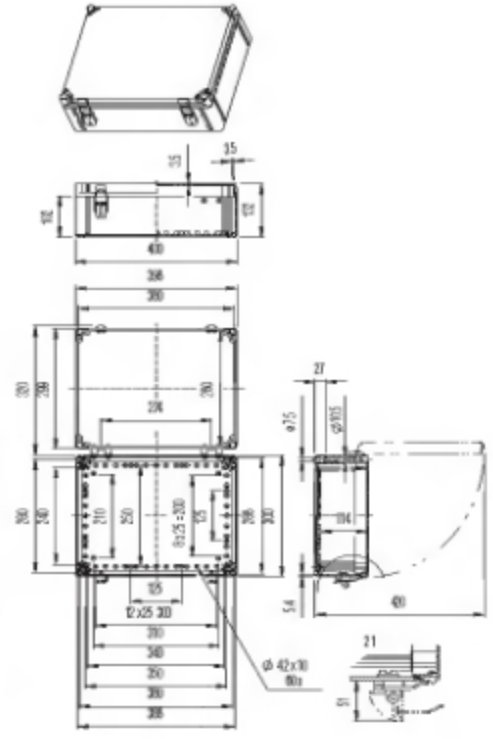
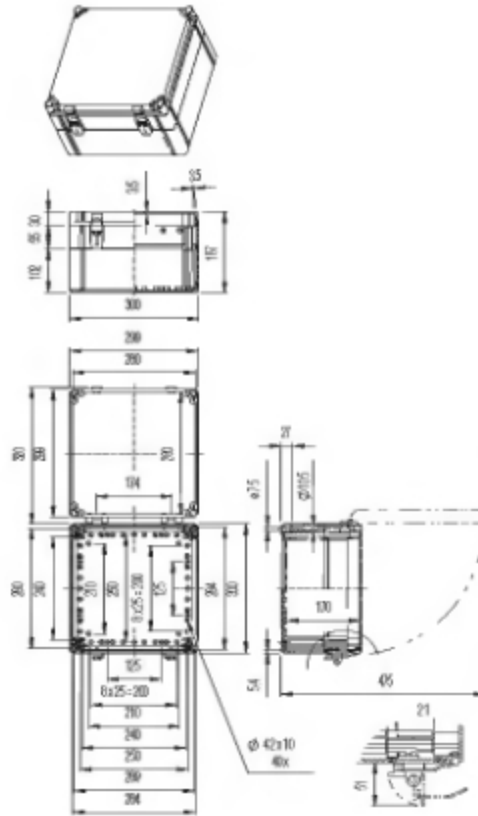
Type: CT-W

300 x 300 x 185 mm

CT-W 208 PC-Enclosure

300 x 400 x 130 mm

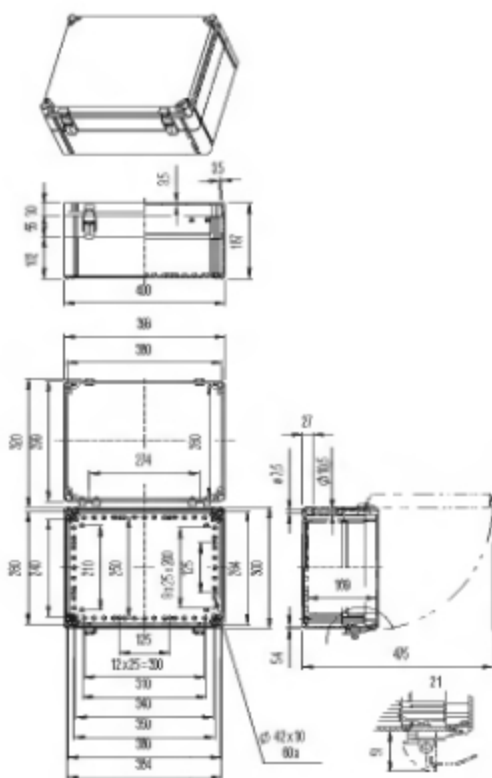
CT-W 209 PC-Enclosure



Type	CT-W 208	CT-W 209
Material	PC	PC
Weight (g)	2298	2257
External dimensions (mm)	300 x 300 x 185	300 x 400 x 130
	Part number	Part number
Grey lid	234.0080.000	234.0090.000
Transparent lid	234.1080.000	234.1090.000
Accessories (also see P 359)	Dim's (mm) Material	Dim's (mm) Material
Front plate (inc elevator brackets)	286x286x1.5 Al 929.4006.000	286x386x1.5 Al 929.4008.000
Mounting plate	260x260x1.5 St 929.5013.000	260x360x1.5 St 929.5014.000
DIN rail (H)		35 x 360 St 929.2014.000
DIN rail (V)	35 x 260 St 929.2012.000	35 x 260 St 929.2012.000
External mounting brackets	PC 929.3063.000	PC 929.3063.000
Lid screws (std) (Set of 4)	42 PA 929.3091.000	42 PA 929.3091.000

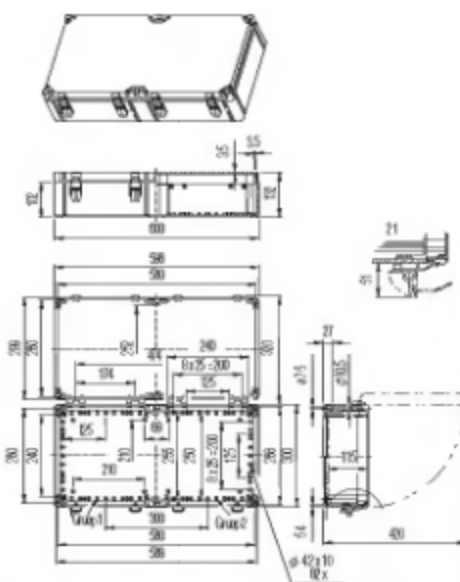
300 x 400 x 185 mm

CT-W 210 PC-Enclosure



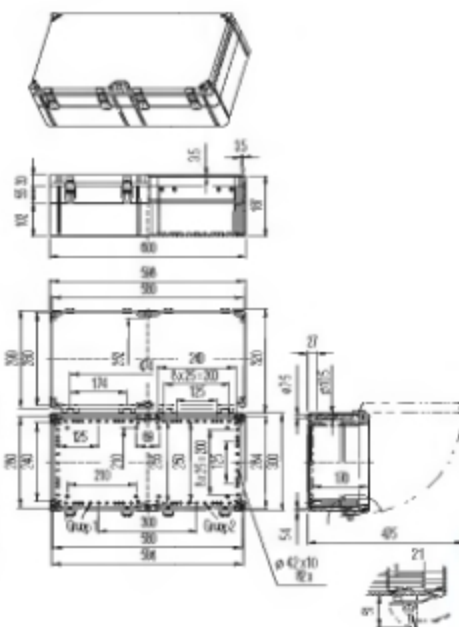
300 x 600 x 130 mm

CT-W 211 PC-Enclosure



300 x 600 x 185 mm

CT-W 212 PC-Enclosure



CT-W 210
PC
2737
300 x 400 x 185
Part number
234.0100.000
234.1100.000

CT-W 211
PC
3212
300 x 600 x 130
Part number
234.0110.000
234.1110.000

CT-W 212
PC
3703
300 x 600 x 185
Part number
234.0120.000
234.1120.000

Dim's (mm)	Material	
286x386x1.5	Al	929.4008.000
260x360x1.5	St	929.5014.000
35 x 360	St	929.2014.000
35 x 260	St	929.2012.000
	PC	929.3063.000
42	PA	929.3091.000

Dim's (mm)	Material	
286x586x1.5	Al	929.4010.000
260x560x1.5	St	929.5016.000
35 x 260	St	929.2012.000
	PC	929.3063.000
42	PA	929.3091.000

Dim's (mm)	Material	
286x586x1.5	Al	929.4010.000
260x560x1.5	St	929.5016.000
35 x 260	St	929.2012.000
	PC	929.3063.000
42	PA	929.3091.000

CT-Module Plastic Enclosures

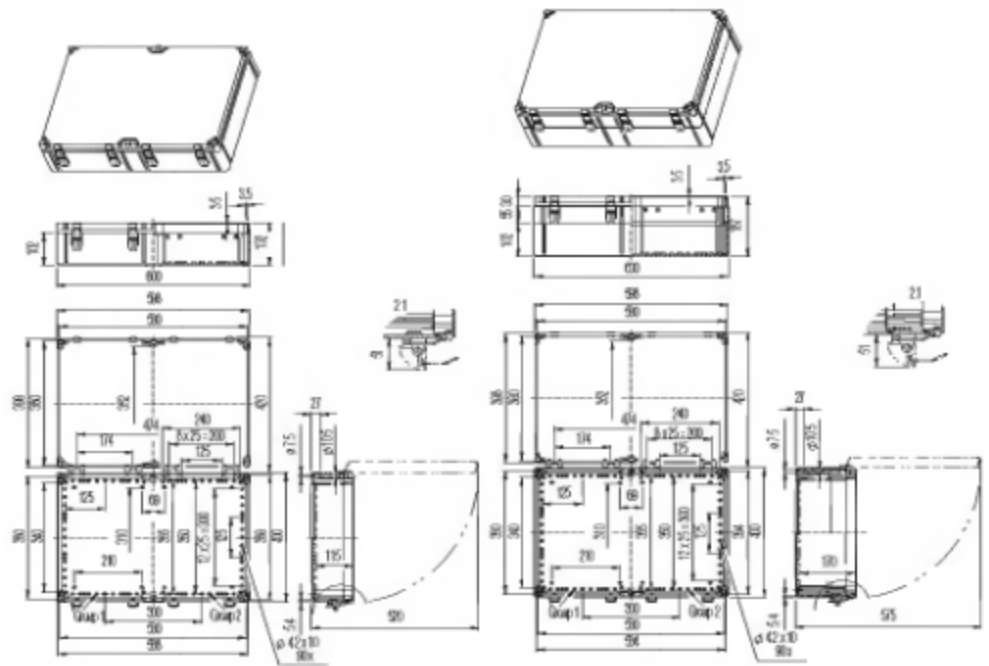
Type: CT-W

400 x 600 x 130 mm

CT-W 213 PC-Enclosure

400 x 600 x 185 mm

CT-W 214 PC-Enclosure



Type	CT-W 213	CT-W 214
Material	PC	PC
Weight (g)	4176	4942
External dimensions (mm)	400 x 600 x 130	400 x 600 x 185
PC-Enclosures	Part number	Part number
Grey lid	234.0130.000	234.0140.000
Transparent lid	234.1130.000	234.1140.000
Accessories (also see P 359)	Dim's (mm) Material	Dim's (mm) Material
Front plate (inc elevator brackets)	386x586x1.5 Al 929.4012.000	386x586x1.5 Al 929.4012.000
Mounting plate	360x560x1.5 St 929.5018.000	360x560x1.5 St 929.5018.000
DIN rail (H)	35 x 360 St 929.2014.000	35 x 360 St 929.2014.000
DIN rail (V)		
External mounting brackets	PC 929.3063.000	PC 929.3063.000
Lid screws (std) (Set of 4)	42 PA 929.3091.000	42 PA 929.3091.000

CT-Module Plastic Enclosures

Type: CT-O



Features

- Grey or transparent lid
- Foam (PUR) gasket, IP 66/67
- 132 or 187 mm depth (using 55 mm extension frame)
- Optional corner elevator brackets allow height adjustment of internal mounting plate.



CT-Module Plastic Enclosures

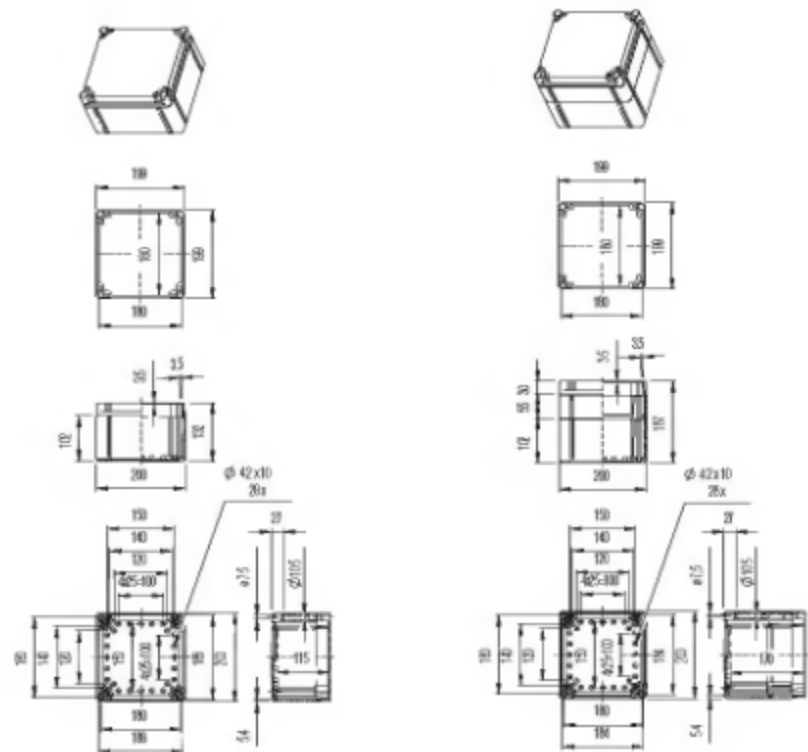
Type: CT-O

200 x 200 x 130 mm

CT-O 201 PC-Enclosure
CT-O 301 ABS-Enclosure

200 x 200 x 185 mm

CT-O 202 PC-Enclosure
CT-O 302 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	
Grey lid	
Transparent lid	

	CT-O 201	CT-O 301
	PC	ABS
	1039	894
	200x200x130	200x200x130
	Part number	Part number
	244.0010.000	344.0010.000
	244.1010.000	344.1010.000

	CT-O 202	CT-O 302
	PC	ABS
	1367	1222
	200x200x185	200x200x185
	Part number	Part number
	244.0020.000	344.0020.000
	244.1020.000	344.1020.000

Accessories (also see P 359)	
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Threaded inserts	

Dim's (mm)	Material		
186x166x1.5	Al	929.4001.000	929.4001.000
160x160x1.5	St	929.5010.000	929.5010.000
35 x 160	St	929.2010.000	929.2010.000
35 x 160	St	929.2010.000	929.2010.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

Dim's (mm)	Material		
186x166x1.5	Al	929.4001.000	929.4001.000
160x160x1.5	St	929.5010.000	929.5010.000
35 x 160	St	929.2010.000	929.2010.000
35 x 160	St	929.2010.000	929.2010.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

CT-Module Plastic Enclosures

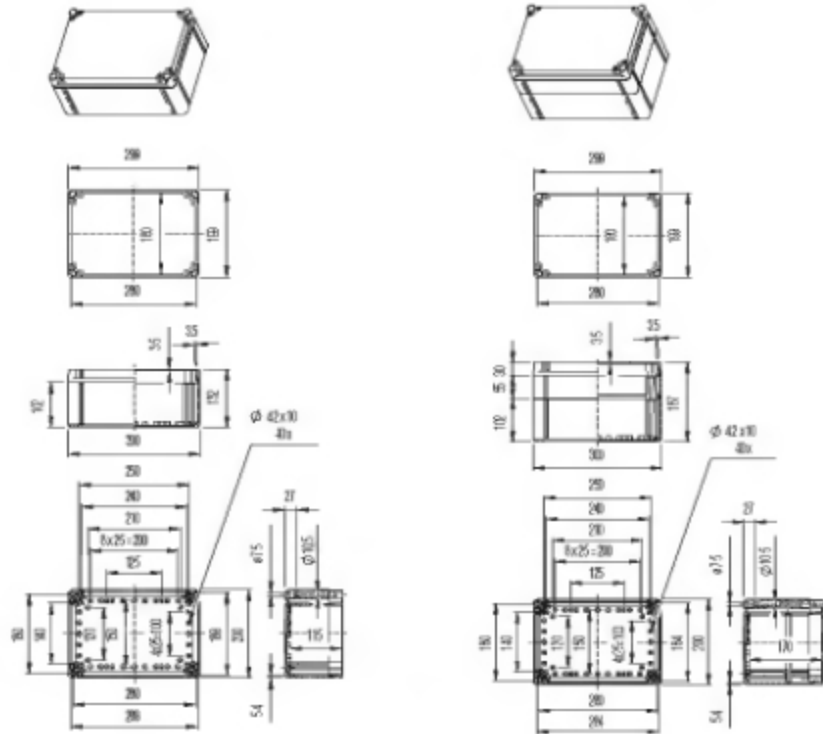
Type: CT-O

200 x 300 x 130 mm

CT-O 203 PC-Enclosure
CT-O 303 ABS-Enclosure

200 x 300 x 185 mm

CT-O 204 PC-Enclosure
CT-O 304 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

Grey lid	
Transparent lid	

Accessories (also see P 359)

Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Threaded inserts	

	CT-O 203	CT-O 303
Material	PC	ABS
Weight (g)	1349	1176
External dimensions (mm)	200x300x130	200x300x130
Part number	Part number	Part number
	244.0030.000	344.0030.000
	244.1030.000	344.1030.000

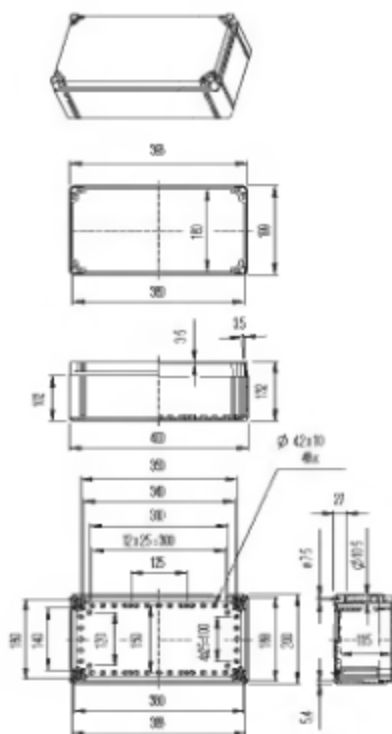
Dim's (mm)	Material		
186x286x1.5	Al	929.4003.000	929.4003.000
160x260x1.5	St	929.5011.000	929.5011.000
35 x 260	St	929.2012.000	929.2012.000
35 x 160	St	929.2010.000	929.2010.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

	CT-O 204	CT-O 304
Material	PC	ABS
Weight (g)	1733	1560
External dimensions (mm)	200x300x185	200x300x185
Part number	Part number	Part number
	244.0040.000	344.0040.000
	244.1040.000	344.1040.000

Dim's (mm)	Material		
186x286x1.5	Al	929.4003.000	929.4003.000
160x260x1.5	St	929.5011.000	929.5011.000
35 x 260	St	929.2012.000	929.2012.000
35 x 160	St	929.2010.000	929.2010.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

200 x 400 x 130 mm

CT-O 205 PC-Enclosure
CT-O 305 ABS-Enclosure

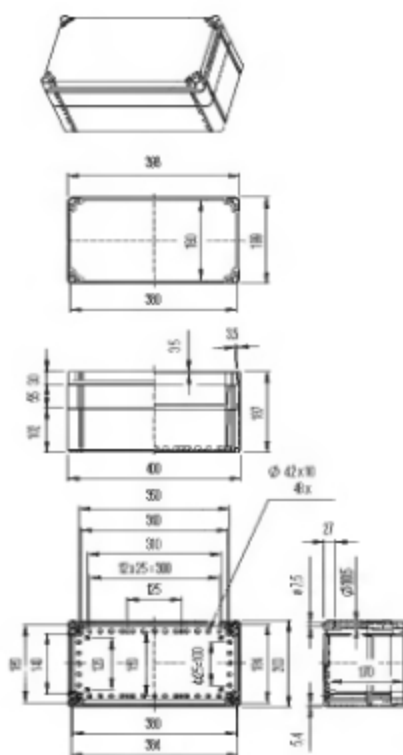


	CT-O 205	CT-O 305
	FC	ABS
	1674	1467
	200x 400x 130	200x 400x 130
	Part number	Part number
	244.0050.000	344.0050.000
	244.1050.000	344.1050.000

Dim's (mm)	Material		
186x386x1.5	Al	929.4005.000	929.4005.000
160x360x1.5	St	929.5012.000	929.5012.000
35 x 160	St	929.2010.000	929.2010.000
35 x 360	St	929.2014.000	929.2014.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

200 x 400 x 185 mm

CT-O 206 PC-Enclosure
CT-O 306 ABS-Enclosure

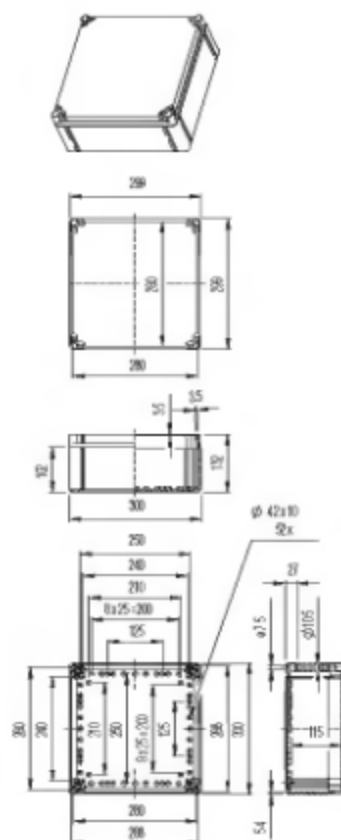


	CT-O 206	CT-O 306
	FC	ABS
	2131	1924
	200x 400x 185	200x 400x 185
	Part number	Part number
	244.0060.000	344.0060.000
	244.1060.000	344.1060.000

Dim's (mm)	Material		
186x386x1.5	Al	929.4005.000	929.4005.000
160x360x1.5	St	929.5012.000	929.5012.000
35 x 160	St	929.2010.000	929.2010.000
35 x 360	St	929.2014.000	929.2014.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

300 x 300 x 130 mm

CT-O 207 PC-Enclosure
CT-O 307 ABS-Enclosure



	CT-O 207	CT-O 307
	FC	ABS
	1738	1510
	300x 300x 130	300x 300x 130
	Part number	Part number
	244.0070.000	344.0070.000
	244.1070.000	344.1070.000

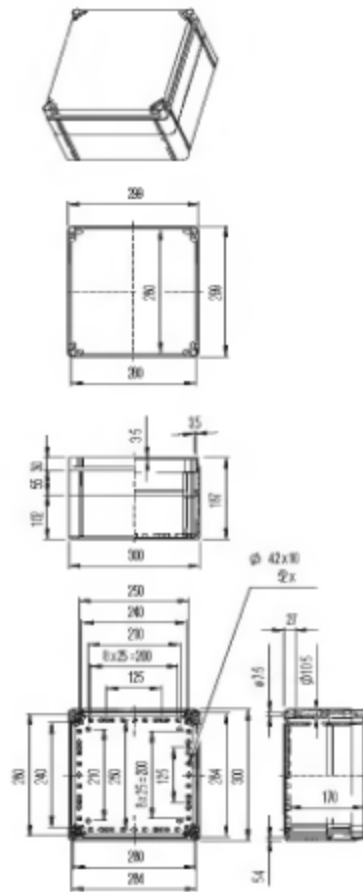
Dim's (mm)	Material		
286x286x1.5	Al	929.4006.000	929.4006.000
260x260x1.5	St	929.5013.000	929.5013.000
35 x 260	St	929.2012.000	929.2012.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

CT-Module Plastic Enclosures

Type: CT-O

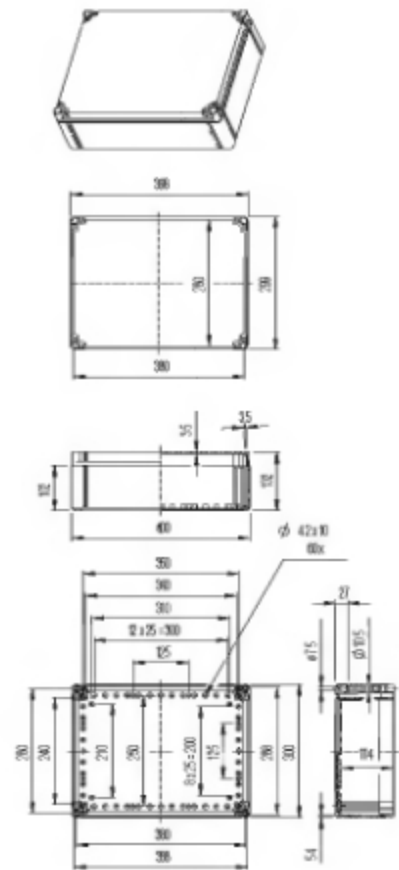
300 x 300 x 185 mm

CT-O 208 PC-Enclosure
CT-O 308 ABS-Enclosure



300 x 400 x 130 mm

CT-O 209 PC-Enclosure
CT-O 309 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

Grey lid	
Transparent lid	

Accessories (also see P 359)

Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Threaded inserts	

	CT-O 208	CT-O 308
Material	PC	ABS
Weight (g)	2188	1960
External dimensions (mm)	300x300x185	300x300x185
Part number	244.0080.000	344.0080.000
Part number	244.1080.000	344.1080.000

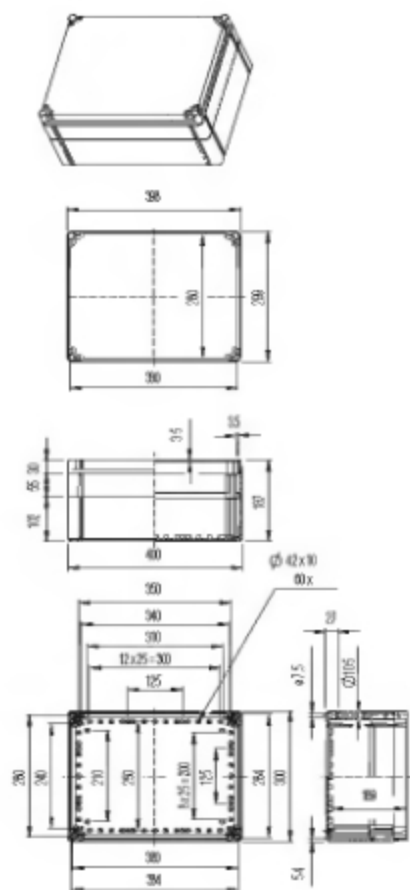
Dim's (mm)	Material		
286x286x1.5	Al	929.4006.000	929.4006.000
260x260x1.5	St	929.5013.000	929.5013.000
35 x 260	St	929.2012.000	929.2012.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

	CT-O 209	CT-O 309
Material	PC	ABS
Weight (g)	2199	1950
External dimensions (mm)	300 x 400 x 130	300 x 400 x 130
Part number	244.0090.000	344.0090.000
Part number	244.1090.000	344.1090.000

Dim's (mm)	Material		
286x386x1.5	Al	929.4008.000	929.4008.000
260x360x1.5	St	929.5014.000	929.5014.000
35 x 360	St	929.2014.000	929.2014.000
35 x 260	St	929.2012.000	929.2012.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

300 x 400 x 185 mm

CT-O 210 PC-Enclosure
CT-O 310 ABS-Enclosure

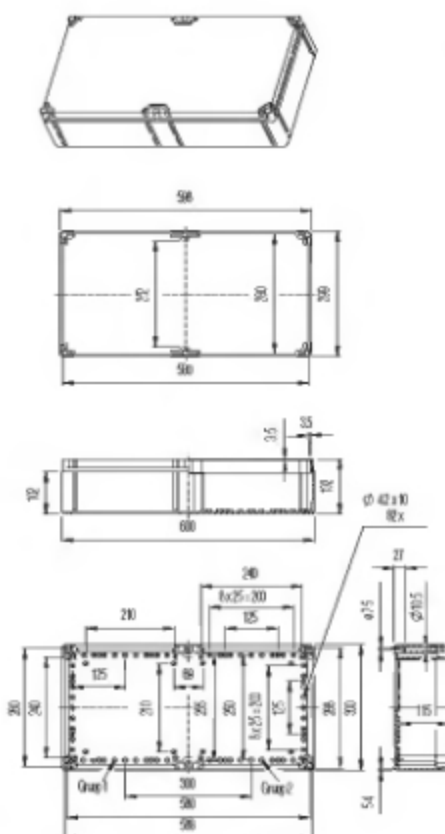


	CT-O 210	CT-O 310
	FC	ABS
	2703	2454
	300 x 400 x 185	300 x 400 x 185
	Part number	Part number
	244.0100.000	344.0100.000
	244.1100.000	344.1100.000

Dim's (mm)	Material		
286x386x1.5	Al	929.4008.000	929.4008.000
260x360x1.5	St	929.5014.000	929.5014.000
35 x 360	St	929.2014.000	929.2014.000
35 x 260	St	929.2012.000	929.2012.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

300 x 600 x 130 mm

CT-O 211 PC-Enclosure
CT-O 311 ABS-Enclosure

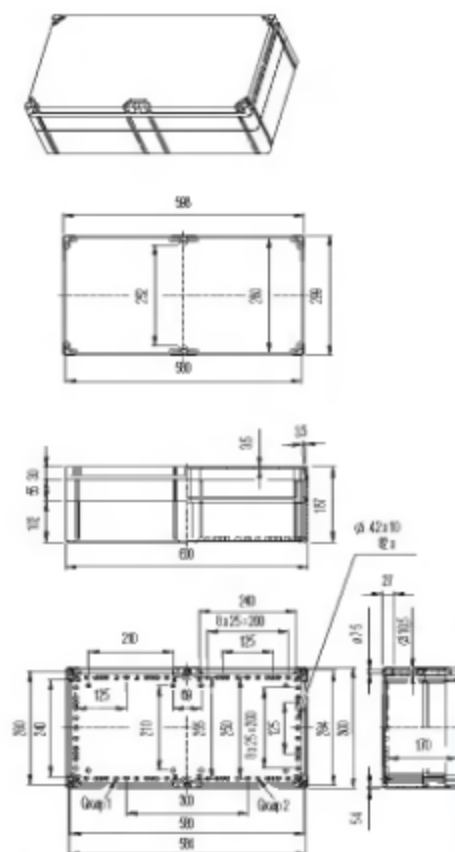


	CT-O 211	CT-O 311
	FC	ABS
	3000	2696
	300 x 600 x 130	300 x 600 x 130
	Part number	Part number
	244.0110.000	344.0110.000
	244.1110.000	344.1110.000

Dim's (mm)	Material		
286x586x1.5	Al	929.4010.000	929.4010.000
260x560x1.5	St	929.5016.000	929.5016.000
35 x 260	St	929.2012.000	929.2012.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

300 x 600 x 185 mm

CT-O 212 PC-Enclosure
CT-O 312 ABS-Enclosure



	CT-O 212	CT-O 312
	FC	ABS
	3703	3399
	300 x 600 x 185	300 x 600 x 185
	Part number	Part number
	244.0120.000	344.0120.000
	244.1120.000	344.1120.000

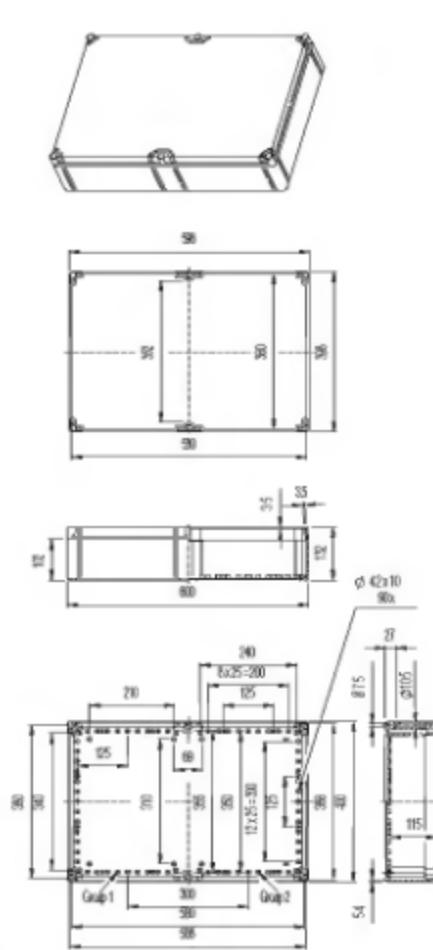
Dim's (mm)	Material		
286x586x1.5	Al	929.4010.000	929.4010.000
260x560x1.5	St	929.5016.000	929.5016.000
35 x 260	St	929.2012.000	929.2012.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

CT-Module Plastic Enclosures

Type: CT-O

400 x 600 x 130

CT-O 213 PC-Enclosure
CT-O 313 ABS-Enclosure



Type	
Material	
Weight (g)	
External dimensions (mm)	

Grey lid	
Transparent lid	

Accessories (also see P 359)

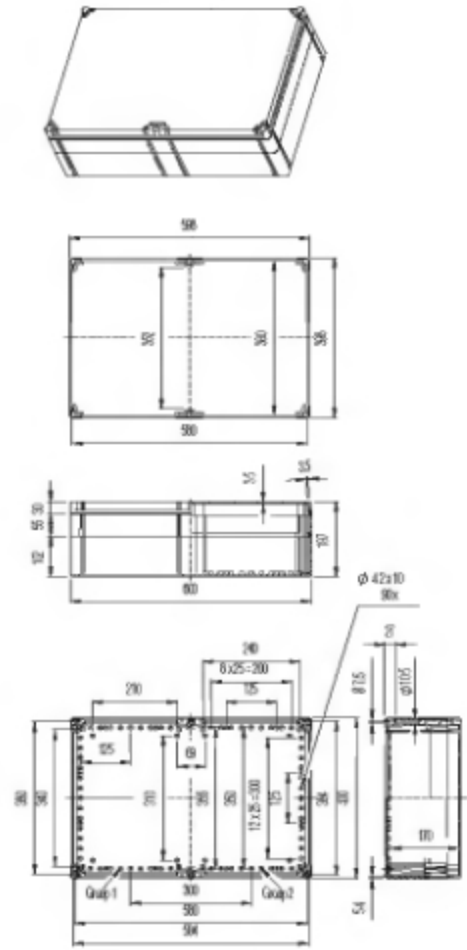
Front plate (inc elevator brackets)	
Mounting plate	
DIN rail (H)	
DIN rail (V)	
External mounting brackets	
Lid screws (std) (Set of 4)	
Threaded inserts	

	CT-O 213	CT-O 313
Material	PC	ABS
Weight (g)	3964	3484
External dimensions (mm)	400x600x130	400x600x130
Part number	244.0130.000	344.0130.000
Part number	244.1130.000	344.1130.000

Dim's (mm)	Material		
386x586x1.5	Al	929.4012.000	929.4012.000
360x560x1.5	St	929.5018.000	929.5018.000
35 x 360	St	929.2014.000	929.2014.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

400 x 600 x 185

CT-O 214 PC-Enclosure
CT-O 314 ABS-Enclosure



	CT-O 214	CT-O 314
Material	PC	ABS
Weight (g)	4730	4250
External dimensions (mm)	400x600x185	400x600x185
Part number	244.0140.000	344.0140.000
Part number	244.1140.000	344.1140.000

Dim's (mm)	Material		
386x586x1.5	Al	929.4012.000	929.4012.000
360x560x1.5	St	929.5018.000	929.5018.000
35 x 360	St	929.2014.000	929.2014.000
	PC	929.3063.000	929.3063.000
42	PA	929.3091.000	929.3091.000
M3	Ms	929.3069.000	929.3069.000

Accessories CT-Module



Cover flange



Knock-out flange



Membrane flange



Assembly handle

Flanges & Accessories for CFC

Part number	Cover flanges
929.6022.000	Size F1 without gasket, 1°C/25
929.6024.000	Size F2 with gasket (PUR), PC
Threaded flanges	
Size F1	
929.6006.000	3x PG 16 without gasket
929.6007.000	3x PG 21 without gasket
929.6008.000	1x PG 29 without gasket, PG/ABS
Size F2 with gasket	
929.6001.000	3x PG 21 + 4x PG 16 with gasket
929.6002.000	2x PG 29 + 6x PG 16 with gasket
929.6003.000	2x PG 36 + 4x PG 16 with gasket
929.6004.000	8x PG 16 with gasket
929.6005.000	10x PG 11 with gasket
Knock-out flanges, size F2	
929.6010.000	7x PG 11 + 7x PG 9/16 with gasket
929.6011.000	2x PG 21/29/36 + 2x PG 9/16 + 1x PG 11 with gasket
929.6012.000	5x PG 16/21 + 2x PG 11 with gasket
929.6025.000	7x M 16 + 7x M 12/20
929.6026.000	2x M 20/32/50 + 2x M 12/20 + 2x M 16
929.6027.000	5x M 20/32 + 2x M 16 + 1x M 12/20
Membrane flange, size F1	
929.6013.000	for 5x Ø 7–30 mm, EPDM
929.6017.000	3x Ø 21 + 4x Ø 15 mm without gasket, TPE
929.6018.000	4x Ø 16 + 6x Ø 13 mm without gasket, TPE
Membrane flange, size F2	
929.6014.000	for 25x Ø 5–26 mm, EPDM
929.6015.000	for 35x Ø 5–26 mm, EPDM
929.6016.000	for 3x Ø 24–60 mm, EPDM
929.6019.000	3x Ø 30 + 6x Ø 18 + 16x Ø 14 mm without gasket, TPE
929.6020.000	5x Ø 18 + 24x Ø 14 mm without gasket, TPE
Flange Accessories, size F1 & F2	
929.3020.000	50 mm extension frame for F2
929.3021.000	Flange gasket F1
929.3022.000	Flange gasket F2
929.3023.000	Foam screw set F1 (PA)
929.3024.000	Foam screw set F1 (S with PA head)
929.3025.000	Foam screw set F2 (PA)
929.3026.000	Foam screw set F2 (S with PA head)
929.3027.000	Assembly handle F2

Accessories for CT-O, C & W

Part number	
929.3040.000	Latch (pat)
929.3041.000	Latch (separate) GFR/ABS/304
929.3042.000	Latch handle
929.3043.000	Latch hook, PA
929.3044.000	O-ring seal
929.3045.000	Padlock plate, AISI304
929.3046.000	Foam screw for hook
929.3047.000	Foam screw for latch
929.3006.000	Filter plug for 25 mm lid
929.3007.000	Filter plug for 50 mm lid
929.3008.000	Filter plug for 100 mm lid
929.3060.000	Screw for frame
929.3061.000	Hinge (pair)
929.3062.000	Hinge (pair) including two lid plugs
929.3065.000	Mounting plate elevator brackets (Set of 4)
929.3067.000	Threaded bushes & lid screw, PA
929.3068.000	Mounting screw for rail & plate
929.3069.000	Threaded inserts
929.3070.000	M 3 threaded bush (Set of 4)
929.3071.000	Lid plugs, PE
929.3072.000	Lid padlock (inc. two keys)
929.3073.000	Spare key for padlock
929.3075.000	4x 15-mm-distance-inc screw M5, ST
929.3098.000	Winged lid screw
Accessories for CT-S	
929.3001.000	Hinges (pat)
929.3002.000	External mounting brackets
929.3004.000	Threaded inserts
929.3005.000	Internal mounting screws
929.3006.000	Filter plug for 25-mm-lid
929.3007.000	Filter plug for 50-mm-lid
929.3008.000	Filter plug for 100-mm-lid
929.3011.000	Lid screw (Set of 4), 35 mm
929.3012.000	Lid screw (Set of 4), 60 mm
Front plates with hinges for CFC, CFW and CF-O	
929.6001.000	186 x 166 x 1.5 Hinge side: 200 mm
929.6002.000	186 x 286 x 1.5 Hinge side: 200 mm
929.6003.000	106 x 286 x 1.5 Hinge side: 300 mm
929.6004.000	186 x 386 x 1.5 Hinge side: 200 mm
929.6005.000	186 x 386 x 1.5 Hinge side: 400 mm
929.6006.000	286 x 286 x 1.5 Hinge side: 300 mm
929.6007.000	286 x 386 x 1.5 Hinge side: 300 mm
929.6008.000	286 x 386 x 1.5 Hinge side: 400 mm
929.6009.000	286 x 506 x 1.5 Hinge side: 300 mm
929.6010.000	286 x 586 x 1.5 Hinge side: 600 mm
929.6011.000	386 x 506 x 1.5 Hinge side: 400 mm
929.6012.000	386 x 586 x 1.5 Hinge side: 600 mm

Polyester enclosures CP series



BERNSTEIN polyester enclosures from the CP and CPS series are made of high-quality glass-fibre reinforced polyester. The reduced surface resistance ($R_{iO} < 10^9$ ohms) of the black polyester enclosures (CPS) makes them ideally suited to use in 'EX' areas and in generally harsh conditions. They can encapsulate electrical, electronic and control components. All enclosures comply with protection class IP 65 (according to DIN).

BERNSTEIN polyester enclosures provide either M4 or M6 internal mounting options, depending on the size of the base. These galvanised brass bushes are embedded in the interior of the base, permitting the assembly of mounting plates, mounting rails, PCBs etc.

The captive stainless steel lid screws are held in place by a lock integrated in the lid. The threaded bushes for lid attachment are also made of stainless steel. A gasket is factory-fitted (for standard enclosures), guaranteeing the protection class. The polyester enclosures are available in grey (RAL 7000, light grey) or black material (RAL 9005, jet black), as standard.

Technical data

Material

Glass-fibre reinforced polyester in grey or glass-fibre reinforced polyester in black

Gasket

Neoprene round seal (siliconised)
alternative:
Neoprene round seal (silicone-free)
Silicone round seal

Lid screws

Stainless steel, captive, multi-purpose cross-head
alternative:
Allen screws, stainless steel, captive

Colour

RAL 7000 (grey)
or RAL 9005 (deep black)
alternative:
other colours on request

Temperature

-40 °C to +80 °C (neoprene gasket)
alternative:
-50 °C to +130 °C (silicone gasket)
or -30 °C to +100 °C
(explosion-hazardous areas)

Protection class

IP 65
alternative:
higher protection classes on request

Approval

FTB No. Ex-83/3120
FTB No. Ex-90 C.3118
FTB No. Ex-90 C.3116 U

German Lloyd No. 91 186-84HH

SEV 97 1 10396

UL File E 182264



Accessories Polyester enclosures



Mounting plates

galvanized sheet steel or laminated paper (thickness CP-140 to CP-195, laminated paper 1.5 mm, CP-220 to CP-320 and CP-370 to CP-460 sheet steel 1.5 mm, CP-330 sheet steel 2.5 mm), permitting the extended mounting of equipment



Mounting rails

Standard rails TS-15, TS-32 or TS-35 (steel), yellow-passivated for holding terminal blocks



Earthing rails

Galvanized steel for connecting and routing of protective earth connections



External attachment brackets

Stainless steel for mounting enclosures without lid opening. The built-in straps always run in parallel to the narrow face of the enclosures



External hinges

For hinged attachment of the enclosure lid. Opening angle of lid approx. 155°. Aluminum casting, RAL 7001 or RAL 9005. Mechanical machining is required for mounting. Drill template is supplied



Internal hinges

For hinged attachment of the enclosure lid. Opening angle of lid approx. 99°. Stainless steel. Mechanical machining is required for mounting



Silicone lid gasket

with improved temperature range (-50 °C to +130 °C). Standard type made of silicone foam



Overview – polyester enclosures

Dimensions/mm L x W x H	Polyester enclosures (gray)		Polyester enclosures (black)	
	Part number	Type	Part number	Type
80 x 75 x 55	414.0.0000.00	CP-140	514.0.0000.00	CPS-140
80 x 75 x 75	414.0.0000.50	CP-145	514.0.0000.50	CPS-145
110 x 75 x 55	415.0.0000.00	CP-150	515.0.0000.00	CPS-150
110 x 75 x 75	415.0.0000.50	CP-155	515.0.0000.50	CPS-155
160 x 75 x 55	417.0.0000.00	CP-170	517.0.0000.00	CPS-170
160 x 75 x 75	417.0.0000.50	CP-175	517.0.0000.50	CPS-175
190 x 75 x 55	419.0.0000.00	CP-190	519.0.0000.00	CPS-190
190 x 75 x 75	419.0.0000.50	CP-195	519.0.0000.50	CPS-195
122 x 120 x 90	422.0.0000.00	CP-220	522.0.0000.00	CPS-220
220 x 120 x 90	424.0.0000.00	CP-240	524.0.0000.00	CPS-240
160 x 160 x 90	428.0.0000.00	CP-280	528.0.0000.00	CPS-280
260 x 160 x 90	430.0.0000.00	CP-300	530.0.0000.00	CPS-300
360 x 160 x 90	432.0.0000.00	CP-320	532.0.0000.00	CPS-320
560 x 160 x 90	433.0.0000.00	CP-330	533.0.0000.00	CPS-330
255 x 250 x 120	437.0.0000.00	CP-370	537.0.0000.00	CPS-370
400 x 250 x 120	440.0.0000.00	CP-400	540.0.0000.00	CPS-400
400 x 405 x 120	445.0.0000.00	CP-450	545.0.0000.00	CPS-450
400 x 405 x 165	446.0.0000.00	CP-460	546.0.0000.00	CPS-460

Component overview polyester enclosures

Model	Weidmüller			Phoenix			Wieland			Entelec						Phoenix									
	Block terminal			Block terminal			Block terminal			Terminal block						Terminal block									
Terminal width (mm):										5.2	6.2	5.2	6.2	6.2	8.2	10.2	12.2	5.2	6.2	7.5	5.2	6.2	8.2	10.2	
Single-core	mm²	4	4	4	4	4	4	2.5	2.5	2.5	2.5	4	4	6	4	10	16	25	2.5	4	10	4	4	10	16
Stranded	mm²	4	4	4	4	4	4	2.5	2.5	2.5	1.5	4	2.5	4	4	6	10	16	1.5	4	6	2.5	4	6	10
Nominal voltage	V	380	380	380	500	500	500	500	500	500	250	380	750	750	750	750	750	750	–	500	500	750	750	750	750
Loading capacity	A	36	36	36	36	36	36	25	25	25	20	35	26	35	35	46	63	85	27	36	65	36	36	65	87
Terminal bridging		–	–	–	–	–	–	–	–	–	–	o	o	o	–	o	o	o	–	o	–	o	o	o	o
Mounting rail	TS 15	–	–	–	–	–	–	–	–	–	o	o	–	–	–	–	–	–	o	o	o	–	–	–	–
	TS 32	–	–	–	–	–	–	–	–	–	–	–	o	o	o	o	o	o	–	–	–	o	o	o	o
	TS 35	–	–	–	–	–	–	–	–	–	–	–	o	o	o	o	o	o	–	–	–	o	o	o	o
Part number		9.40.1.0100.00	9.40.1.0090.00	9.40.1.0130.00	9.40.1.0020.00	9.40.1.0030.00	9.40.1.0040.00	9.40.1.0050.00	9.40.1.0060.00	9.40.1.0080.00	9.40.2.1270.00	9.40.2.0940.00	9.40.2.1090.00	9.40.2.1030.00	9.40.2.1280.00	9.40.2.1040.00	9.40.2.1050.00	9.40.2.1060.00	9.40.2.0010.00	9.40.2.0020.00	9.40.2.0030.00	9.40.2.0050.00	9.40.2.0070.00	9.40.2.0090.00	9.40.2.0110.00
Type		BK 4	BK 6	BK 12	G 5/4	G 5/6	G 5/12	KL-16/8	KL-16/12	KL-16/20	DR 1.5/5	DR 4/6	MA 2.5/5	M 4/6	MS 4/6	M 6/8	M 10/10	M 16/12	MEK	MEK 5/E	MEK 10	UK 3 N	UK 5 N	UK 10	UK 16
CP-140/145		1	1	–	1	1	–	–	–	–	7	6	–	–	–	–	–	–	7	6	5	–	–	–	–
CP-150/155		–	1	–	–	1	–	1	1	–	13	11	–	–	–	–	–	–	13	11	9	–	–	–	–
CP-170/175		–	–	1	–	–	1	–	–	1	22	19	–	–	–	–	–	–	22	19	15	–	–	–	–
CP-190/195		–	–	–	–	–	–	–	2	1	28	24	–	–	–	–	–	–	28	24	19	–	–	–	–
CP-220		–	–	–	–	–	–	–	–	–	–	–	12	10	10	8	6	5	–	–	–	12	10	8	6
CP-240		–	–	–	–	–	–	–	–	–	–	–	31	26	26	19	16	13	–	–	–	31	26	19	16
CP-280		–	–	–	–	–	–	–	–	–	–	–	19	16	16	12	10	8	–	–	–	19	16	12	10
CP-300		–	–	–	–	–	–	–	–	–	–	–	39	32	32	24	20	16	–	–	–	39	32	24	20
CP-320		–	–	–	–	–	–	–	–	–	–	–	58	48	48	37	29	24	–	–	–	58	48	37	29
CP-330		–	–	–	–	–	–	–	–	–	–	–	96	80	80	61	48	40	–	–	–	96	80	61	48
CP-370		–	–	–	–	–	–	–	–	–	–	–	38	32	32	24	19	16	–	–	–	38	32	24	19
CP-370*)		–	–	–	–	–	–	–	–	–	–	–	76	64	64	48	38	–	–	–	–	76	64	48	38
CP-400		–	–	–	–	–	–	–	–	–	–	–	66	55	55	41	33	28	–	–	–	66	55	41	33
CP-400*)		–	–	–	–	–	–	–	–	–	–	–	132	110	110	82	106	–	–	–	–	132	110	82	66
CP-450		–	–	–	–	–	–	–	–	–	–	–	66	55	55	41	33	28	–	–	–	66	55	41	33
CP-450*)		–	–	–	–	–	–	–	–	–	–	–	132	110	110	82	66	56	–	–	–	132	110	82	66
CP-450***)		–	–	–	–	–	–	–	–	–	–	–	198	165	165	123	99	84	–	–	–	198	165	123	99
CP-460		–	–	–	–	–	–	–	–	–	–	–	66	55	55	41	33	28	–	–	–	66	55	41	33
CP-460*)		–	–	–	–	–	–	–	–	–	–	–	132	110	110	82	66	56	–	–	–	132	110	82	66
CP-460***)		–	–	–	–	–	–	–	–	–	–	–	198	165	165	123	99	84	–	–	–	198	165	123	99

*) Assembled on 2 mounting rails

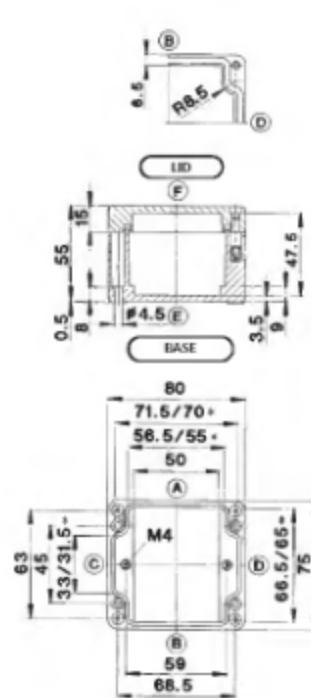
**) Assembled on 3 mounting rails

The number of terminals is reduced when partitions are used.

	Siemens				WAGO												Weidmüller											
	Terminal block		Terminal block		Terminal block												Terminal block											
	Screw terminals				Caged tension spring		6.2	10.2	6.2	10.2	4.2	5.2	5.2	6.2	6.2	8.2	10.2	12.2	5.2	6.2	6.2	6.5	8.2	10.2	12.2	5.2	6.2	
	4	6	10	25	4	4	10	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	2.5	4	4	6	10	16	25	4	6
	2.5	4	6	16	2.5	4	6	2.5	2.5	2.5	2.5	1.5	2.5	2.5	4	4	6	10	16	1.5	4	2.5	4	6	10	15	2.5	4
	750	750	750	750	750	750	750	800	800	800	800	800	800	800	800	800	800	800	800	250	380	750	750	750	750	750	750	750
	26	35	46	85	36	36	65	26	26	26	26	18	26	26	34	34	44	61	82	27	36	27	36	47	65	87	26	34
	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
	-	o	-	-	-	-	-	o	o	-	-	-	-	-	-	-	-	-	o	o	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o	o	o	o	-	-	
	o	o	o	o	o	o	o	-	-	o	o	o	o	o	o	o	o	o	-	-	-	-	-	-	-	-	o	
	9.40.2.4000.00	9.40.2.4010.00	9.40.2.4020.00	9.40.2.4030.00	9.40.2.4040.00	9.40.2.4050.00	9.40.2.4060.00	9.40.2.3020.00	9.40.2.3030.00	9.40.2.3210.00	9.40.2.3220.00	9.40.2.3230.00	9.40.2.0930.00	9.40.2.3240.00	9.40.2.3250.00	9.40.2.3260.00	9.40.2.3270.00	9.40.2.3280.00	9.40.2.3290.00	9.40.2.0500.00	9.40.2.0130.00	9.40.2.0140.00	9.40.2.0150.00	9.40.2.0160.00	9.40.2.0470.00	9.40.2.0170.00	9.40.2.1460.00	9.40.2.1470.00
	8WA1011- 1DF11	8WA1011- 1DG11	8WA1011- 1DH11	8WA1204	8WA2011- 1DF20	8WA2011- 1DG20	8WA2011- 1DH20	264-701	264-721	264-711	264-731	279-621	280-601	280-901	281-601	281-901	282-601	284-601	283-601	AKZ 2.5 PA	AKZ 4 PA	SAK 2.5 PA	SAK 4 PA	SAK 6 NPA	SAK 10 PA	SAK 16 PA	WDU 2.5	WDU 4
	-	-	-	-	-	-	-	7	4	-	-	-	-	-	-	-	-	-	7	6	-	-	-	-	-	-		
	-	-	-	-	-	-	-	12	7	-	-	-	-	-	-	-	-	-	13	11	-	-	-	-	-	-		
	-	-	-	-	-	-	-	20	12	-	-	-	-	-	-	-	-	-	22	19	-	-	-	-	-	-		
	-	-	-	-	-	-	-	25	15	-	-	-	-	-	-	-	-	-	28	24	-	-	-	-	-	-		
	12	11	9	17	14	12	9	-	-	13	7	20	16	16	13	13	9	8	6	-	-	10	10	8	6	5	12	10
	28	26	21	17	33	28	21	-	-	29	17	44	35	35	29	29	22	17	14	-	-	26	25	19	16	13	31	26
	16	15	12	9	19	16	12	-	-	17	10	26	20	20	17	17	12	10	8	-	-	16	15	12	10	8	19	16
	35	32	26	21	41	34	26	-	-	33	20	51	40	40	33	13	25	20	16	-	-	32	31	24	20	16	39	32
	52	48	39	31	60	50	38	-	-	50	30	76	60	60	50	50	37	30	25	-	-	48	46	37	29	24	58	48
	85	78	64	51	98	82	62	-	-	83	50	125	100	100	83	83	62	50	41	-	-	86	74	61	48	40	96	80
	34	32	26	20	40	33	25	-	-	33	21	53	42	42	35	35	26	21	17	-	-	32	30	24	19	16	38	32
	68	64	52	40	80	66	50	-	-	66	42	106	84	84	70	70	52	42	37	-	-	64	60	48	38	-	76	64
	58	54	44	35	68	57	43	-	-	59	35	89	71	71	59	59	44	35	29	-	-	55	52	41	33	28	66	55
	116	108	88	70	136	114	86	-	-	118	70	178	142	142	118	118	88	70	58	-	-	110	104	82	106	-	132	110
	59	54	44	35	68	57	43	-	-	59	35	90	71	71	59	59	44	35	29	-	-	55	52	41	33	28	66	55
	118	108	88	70	136	114	86	-	-	118	70	180	142	142	118	118	88	70	58	-	-	110	104	82	66	56	132	110
	177	162	132	205	204	171	129	-	-	117	105	270	213	213	177	177	132	105	87	-	-	165	156	123	99	84	198	165
	59	54	44	35	68	57	43	-	-	-	-	-	-	-	-	-	-	-	-	-	55	52	41	33	28	66	55	
	118	108	88	70	136	114	86	-	-	-	-	-	-	-	-	-	-	-	-	-	110	104	82	66	56	132	110	
	177	162	132	205	204	171	129	-	-	-	-	-	-	-	-	-	-	-	-	-	165	156	123	99	84	198	165	

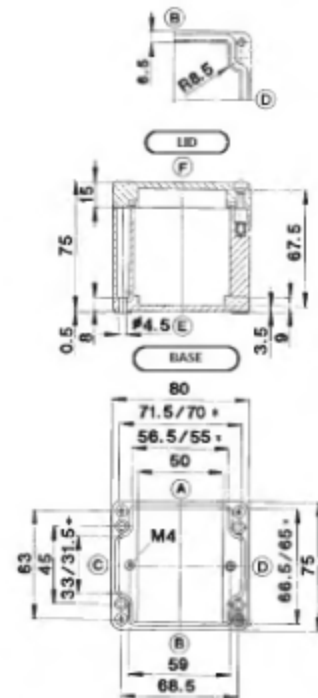
80 x 75 x 55 mm

CP-140
Polyester enclosure, grey
CPS-140
Polyester enclosure, black



80 x 75 x 75 mm

CP-145
Polyester enclosure, grey
CPS-145
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex socket head screws	
Black (CPS), with silicone gasket and lid screws	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

CP-140	CPS-140
230	230
80 x 75 x 55	
Part number	
414.0.0000.00 ●	
414.0.0010.00	
414.0.0140.00	
	514.0.0000.00 ●
	514.0.0010.00
	514.0.0170.00
982.3.0000.00 ●	
982.0.0030.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	

CP-145	CPS-145
300	300
80 x 75 x 75	
Part number	
414.0.0000.50 ●	
414.0.0010.50	
414.0.0100.50	
	514.0.0000.50 ●
	514.0.0010.50
	514.0.0100.50
982.3.0000.00 ●	
982.0.0030.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	

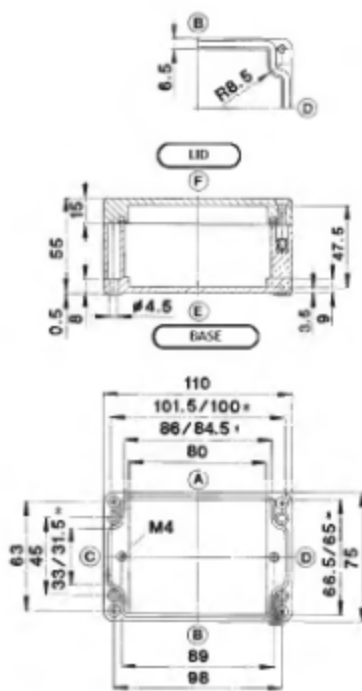
Max. Pg threads	
ISO M	12 16 20 25 32 40 50 63
Side A/B	5 2 2 1 0 0 0 0
Side C/D	2 1 1 0 0 0 0 0
** mechanical enclosure machining required	
● = kept in stock	

ISO M	12 16 20 25 32 40 50 63
Side A/B	8 4 2 1 1 0 0 0
Side C/D	4 1 1 1 1 0 0 0
** mechanical enclosure machining required	
● = kept in stock	

ISO M	12 16 20 25 32 40 50 63
Side A/B	8 4 2 1 1 0 0 0
Side C/D	4 1 1 1 1 0 0 0
** mechanical enclosure machining required	
● = kept in stock	

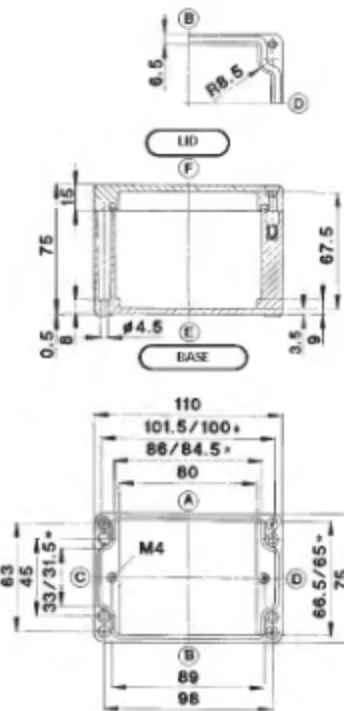
110 x 75 x 55 mm

CP-150
Polyester enclosure, grey
CPS-150
Polyester enclosure, grey



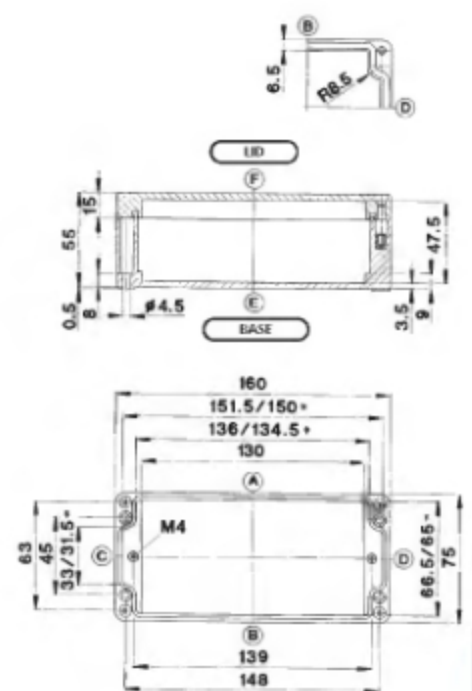
110 x 75 x 75 mm

CP-155
Polyester enclosure, grey
CPS-155
Polyester enclosure, grey



160 x 75 x 55 mm

CP-170
Polyester enclosure, grey
CPS-170
Polyester enclosure, grey



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

CP-150	CPS-150
295	295
110 x 75 x 55	
Part number	
415.0.0000.00 ●	
415.0.0010.00	
415.0.0250.00	
	515.0.0000.00 ●
	515.0.0010.00
	515.0.0310.00
982.3.0010.00 ●	
982.0.0060.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	

CP-155	CPS-155
360	360
110 x 75 x 75	
Part number	
415.0.0000.50 ●	
415.0.0010.50	
415.0.0100.50	
	515.0.0000.50 ●
	515.0.0010.50
	515.0.0100.50
982.3.0010.00 ●	
982.0.0060.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	

CP-170	CPS-170
405	405
160 x 75 x 55	
Part number	
417.0.0000.00 ●	
417.0.0010.00	
417.0.0160.00	
	517.0.0000.00 ●
	517.0.0010.00
	517.0.0100.00
982.3.0020.00 ●	
982.0.0120.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	8	3	2	2	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** mechanical enclosure machining required
● = kept in stock.

ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	3	2	2	0	0	0
Side C/D	4	1	1	1	1	0	0	0

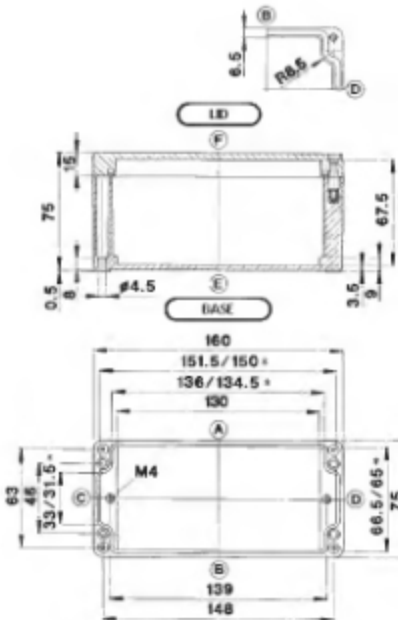
** mechanical enclosure machining required
● = kept in stock.

ISO M	12	16	20	25	32	40	50	63
Side A/B	12	5	4	3	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** mechanical enclosure machining required
● = kept in stock.

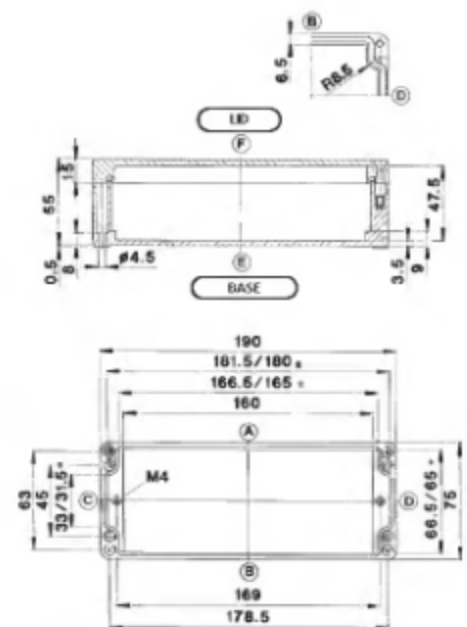
160 x 75 x 75 mm

CP-175
Polyester enclosure, grey
CPS-175
Polyester enclosure, black



190 x 75 x 55 mm

CP-190
Polyester enclosure, grey
CPS-190
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex socket head screws	
Black (CPS), with silicone gasket and lid screws	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

	CP-175	CPS-175
Weight (g)	460	460
External dimensions (mm)	160 x 75 x 75	
Part number		
Grey (CP), with gasket and lid screws	417.0.0000.50 ●	
Grey (CP), with gasket, hex socket head screws	417.0.0010.50	
Grey (CP), with silicone gasket and lid screws	417.0.0100.50	
Black (CPS), with gasket and lid screws		517.0.0000.50 ●
Black (CPS), with gasket, hex socket head screws		517.0.0010.50
Black (CPS), with silicone gasket and lid screws		517.0.0100.50
Accessories (separate or as a mounting set)		
Mounting plate	982.3.0020.00 ●	
TS 15 mounting rail	982.0.0120.00 ●	
TS 32 mounting rail	-	
TS 35 mounting rail	-	
Grounding rail	-	
External attachment brackets	982.4.0000.00 ●	
External hinges for CP enclosure (grey)**	-	
External hinges for CPS enclosure (black)**	-	
Internal hinges with lid guiding**	-	
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●	

	CP-190	CPS-190
Weight (g)	450	450
External dimensions (mm)	190 x 75 x 55	
Part number		
Grey (CP), with gasket and lid screws	419.0.0000.00 ●	
Grey (CP), with gasket, hex socket head screws	419.0.0010.00	
Grey (CP), with silicone gasket and lid screws	419.0.0150.00	
Black (CPS), with gasket and lid screws		519.0.0000.00 ●
Black (CPS), with gasket, hex socket head screws		519.0.0010.00
Black (CPS), with silicone gasket and lid screws		519.0.0100.00
Accessories (separate or as a mounting set)		
Mounting plate	982.3.0030.00 ●	
TS 15 mounting rail	982.0.0150.00 ●	
TS 32 mounting rail	-	
TS 35 mounting rail	-	
Grounding rail	-	
External attachment brackets	982.4.0000.00 ●	
External hinges for CP enclosure (grey)**	-	
External hinges for CPS enclosure (black)**	-	
Internal hinges with lid guiding**	-	
Silicone gasket for wider temperature range (piece goods)	923.1.0060.00 ●	

Max. Pg threads

ISO M	12	16	20	25	32	40	50	63
Side A/B	18	10	6	4	3	0	0	0
Side C/D	4	1	1	1	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

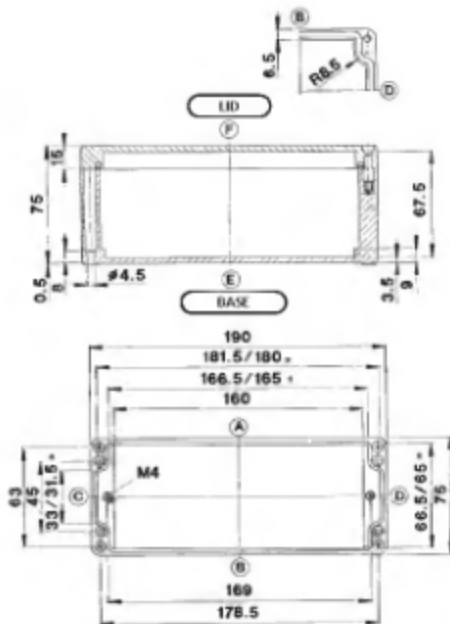
ISO M	12	16	20	25	32	40	50	63
Side A/B	16	7	5	4	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** mechanical enclosure machining required

● = kept in stock

190 x 75 x 75 mm

CP-195
Polyester enclosure, grey
CPS-195
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

CP-195	CPS-195
530	530
190 x 75 x 75	
Part number	
419.0.0000.50 ●	
419.0.0010.50	
419.0.0100.50	
	519.0.0000.50 ●
	519.0.0010.50
	519.0.0100.50
982.3.0030.00 ●	
982.0.0150.00 ●	
-	
-	
-	
982.4.0000.00 ●	
-	
-	
-	
923.1.0060.00 ●	

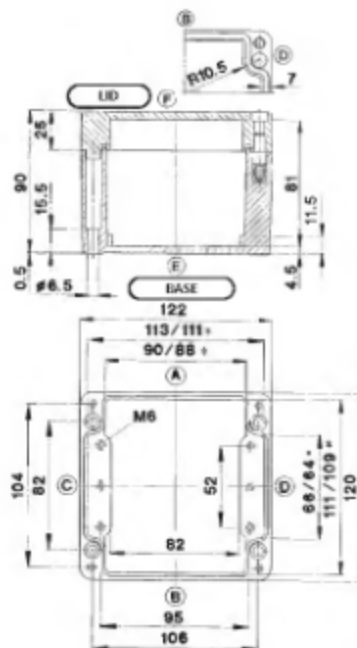
ISO M	12	16	20	25	32	40	50	63
Side A/B	24	12	8	4	3	0	0	0
Side C/D	14	1	1	1	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

122 x 120 x 90 mm

CP-220
Polyester enclosure, grey
CPS-220
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

CP-220	CPS-220
750	750
122 x 120 x 90	
Part number	
422.0.0000.00 ●	
422.0.0010.00	
422.0.0180.00	
	522.0.0000.00 ●
	522.0.0010.00
	522.0.0400.00
982.3.0040.00 ●	
-	
982.1.0000.00 ●	
982.2.0010.00 ●	
981.0.0020.00 ●	
982.4.0010.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
-	
923.1.0060.00 ●	

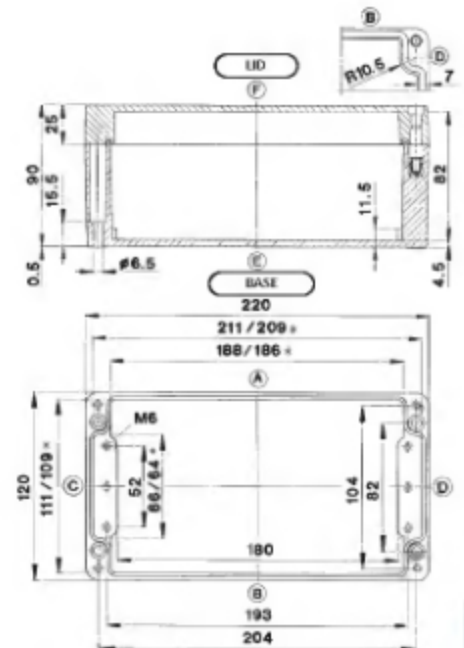
ISO M	12	16	20	25	32	40	50	63
Side A/B	13	6	4	3	2	1	0	0
Side C/D	6	3	2	2	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

220 x 120 x 90 mm

CP-240
Polyester enclosure, grey
CPS-240
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

CP-240	CPS-240
1060	1060
220 x 120 x 90	
Part number	
424.0.0000.00 ●	
424.0.0010.00	
424.0.0470.00	
	524.0.0000.00 ●
	524.0.0010.00
	524.0.0400.00
982.3.0050.00 ●	
-	
982.1.0050.00 ●	
982.2.0070.00 ●	
981.0.0080.00 ●	
982.4.0010.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
-	
923.1.0060.00 ●	

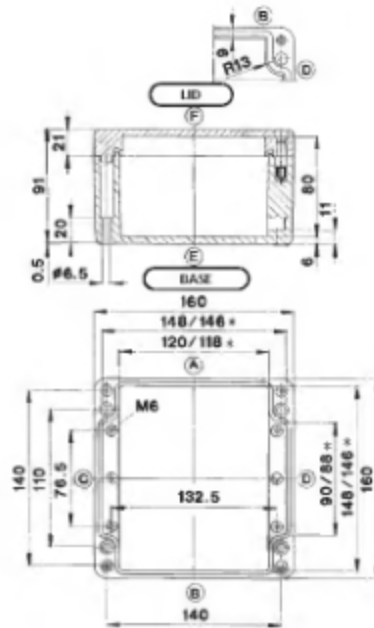
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	9	6	4	3	0	0
Side C/D	6	3	2	2	1	0	0	0

** mechanical enclosure machining required

● = kept in stock

160 x 160 x 91 mm

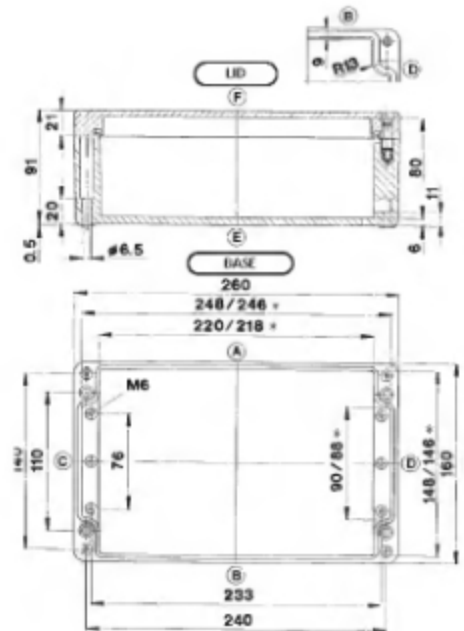
CP-280
Polyester enclosure, grey
CPS-280
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

260 x 160 x 91 mm

CP-300
Polyester enclosure, grey
CPS-300
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex socket head screws	
Black (CPS), with silicone gasket and lid screws	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

Max. Pg threads

	CP-280	CPS-280
Weight (g)	1130	1130
External dimensions (mm)	160 x 160 x 91	
Part number		
Grey (CP), with gasket and lid screws	428.0.0000.00 ●	
Grey (CP), with gasket, hex socket head screws	428.0.0010.00	
Grey (CP), with silicone gasket and lid screws	428.0.0200.00	
Black (CPS), with gasket and lid screws	528.0.0000.00 ●	
Black (CPS), with gasket, hex socket head screws	528.0.0010.00	
Black (CPS), with silicone gasket and lid screws	528.0.0100.00	
Mounting plate	982.3.0060.00 ●	
TS 15 mounting rail	-	
TS 32 mounting rail	982.1.0020.00 ●	
TS 35 mounting rail	982.2.0030.00 ●	
Grounding rail	981.0.0040.00 ●	
External attachment brackets	982.4.0040.00 ●	
External hinges for CP enclosure (grey)**	980.1.0450.00 ●	
External hinges for CPS enclosure (black)**	980.1.0460.00 ●	
Internal hinges with lid guiding**	980.1.0320.00 ●	
Silicone gasket for wider temperature range (piece goods)	923.1.0090.00 ●	

ISO M	12	16	20	25	32	40	50	63
Side A/B	18	8	6	4	2	2	1	0
Side C/D	9	4	3	2	2	1	0	0

** mechanical enclosure machining required

● = kept in stock

	CP-300	CPS-300
Weight (g)	1710	1710
External dimensions (mm)	260 x 160 x 91	
Part number		
Grey (CP), with gasket and lid screws	430.0.0000.00 ●	
Grey (CP), with gasket, hex socket head screws	430.0.0010.00	
Grey (CP), with silicone gasket and lid screws	430.0.0140.00	
Black (CPS), with gasket and lid screws	530.0.0000.00 ●	
Black (CPS), with gasket, hex socket head screws	530.0.0010.00	
Black (CPS), with silicone gasket and lid screws	530.0.0340.00	
Mounting plate	982.3.0070.00 ●	
TS 15 mounting rail	-	
TS 32 mounting rail	982.1.0080.00 ●	
TS 35 mounting rail	982.2.0110.00 ●	
Grounding rail	981.0.0100.00 ●	
External attachment brackets	982.4.0040.00 ●	
External hinges for CP enclosure (grey)**	980.1.0450.00 ●	
External hinges for CPS enclosure (black)**	980.1.0460.00 ●	
Internal hinges with lid guiding**	980.1.0320.00 ●	
Silicone gasket for wider temperature range (piece goods)	923.1.0090.00 ●	

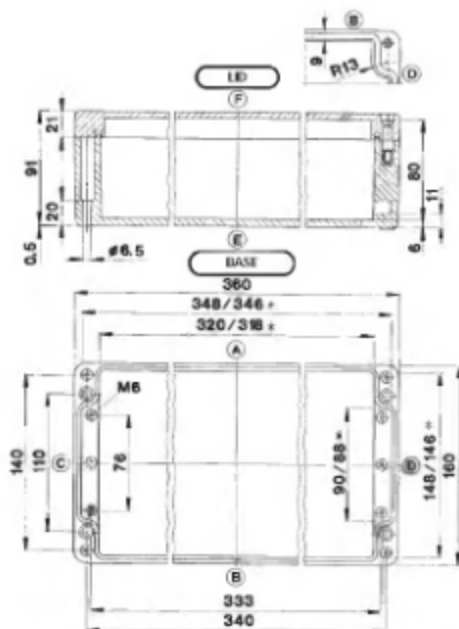
ISO M	12	16	20	25	32	40	50	63
Side A/B	33	15	12	8	4	3	3	0
Side C/D	9	4	3	2	2	1	0	0

** mechanical enclosure machining required

● = kept in stock

360 x 160 x 91 mm

CP-320
Polyester enclosure, grey
CPS-320
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

CP-320	CPS-320
2150	2150
360 x 160 x 91	
Part number	
432.0.0000.00 ●	
432.0.0010.00	
432.0.0310.00	
	532.0.0000.00 ●
	532.0.0010.00
	532.0.0210.00
982.3.0080.00 ●	
-	
982.1.0120.00 ●	
982.2.0150.00 ●	
981.0.0140.00 ●	
982.4.0040.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	
-	
-	

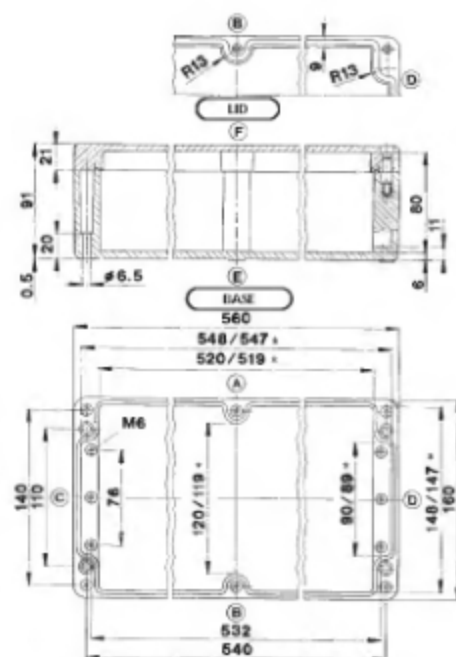
ISO M	12	16	20	25	32	40	50	63
Side A/B	48	23	18	11	7	5	4	0
Side C/D	9	4	3	2	2	1	0	0

** mechanical enclosure machining required

● = kept in stock

560 x 160 x 91 mm

CP-330
Polyester enclosure, grey
CPS-330
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

CP-330	CPS-330
3185	3185
560 x 160 x 91	
Part number	
433.0.0000.00 ●	
433.0.0010.00	
433.0.0100.00	
	533.0.0000.00 ●
	533.0.0010.00
	533.0.0100.00
982.3.0850.00 ●	
-	
982.1.0150.00 ●	
982.2.0180.00 ●	
981.0.0160.00 ●	
982.4.0040.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	
-	
-	

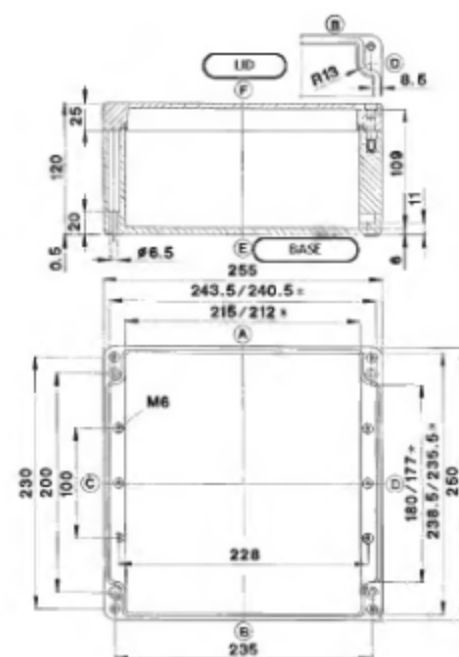
ISO M	12	16	20	25	32	40	50	63
Side A/B	76	40	28	18	10	8	6	0
Side C/D	9	4	3	2	2	1	0	0

** mechanical enclosure machining required

● = kept in stock

255 x 250 x 120 mm

CP-370
Polyester enclosure, grey
CPS-370
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

CP-370	CPS-370
2650	2650
255 x 250 x 120	
Part number	
437.0.0000.00 ●	
437.0.0010.00	
437.0.0100.00	
	537.0.0000.00 ●
	537.0.0010.00
	537.0.0230.00
982.3.0090.00 ●	
-	
982.1.0070.00 ●	
982.2.0100.00 ●	
981.0.0350.00 ●	
982.4.0110.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	
-	
-	

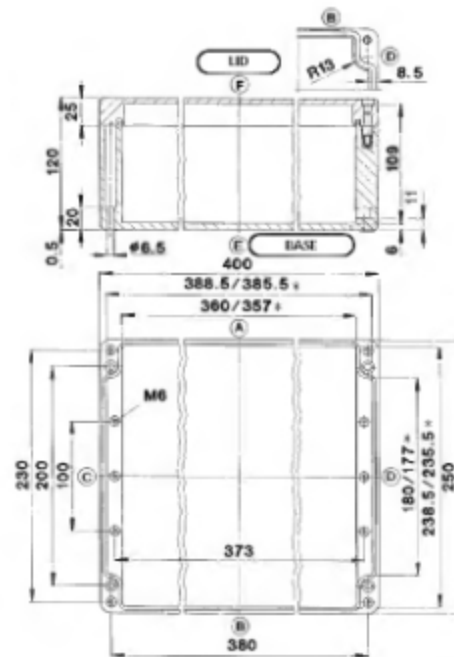
ISO M	12	16	20	25	32	40	50	63
Side A/B	42	23	17	11	7	4	3	3
Side C/D	32	14	10	16	4	3	2	2

** mechanical enclosure machining required

● = kept in stock

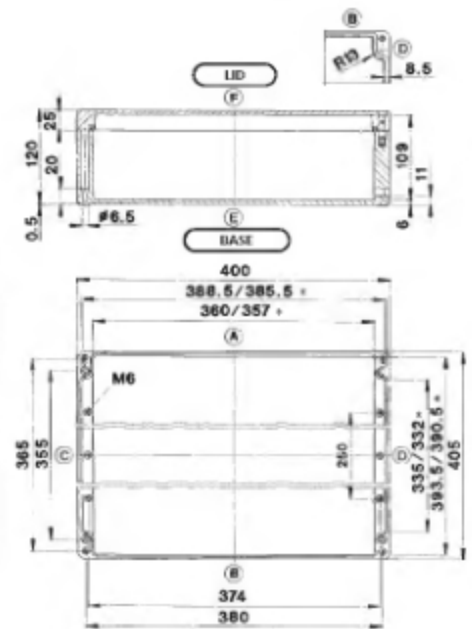
400 x 250 x 120 mm

CP-400
Polyester enclosure, grey
CPS-400
Polyester enclosure, black



400 x 405 x 120 mm

CP-450
Polyester enclosure, grey
CPS-450
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex socket head screws	
Black (CPS), with silicone gasket and lid screws	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

CP-400	CPS-400
3650	3650
400 x 250 x 120	
Part number	
440.0.0000.00 ●	
440.0.0010.00	
440.0.0770.00	
	540.0.0000.00 ●
	540.0.0010.00
	540.0.0100.00
982.3.0100.00 ●	
-	
982.1.0140.00 ●	
982.2.0170.00 ●	
981.0.0150.00 ●	
982.4.0110.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

CP-450	CPS-450
5580	5580
400 x 405 x 120	
Part number	
445.0.0000.00 ●	
445.0.0010.00	
445.0.0130.00	
	545.0.0000.00 ●
	545.0.0010.00
	545.0.0100.00
982.3.0110.00 ●	
-	
982.1.0140.00 ●	
982.2.0170.00 ●	
981.0.0150.00 ●	
982.4.0120.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	

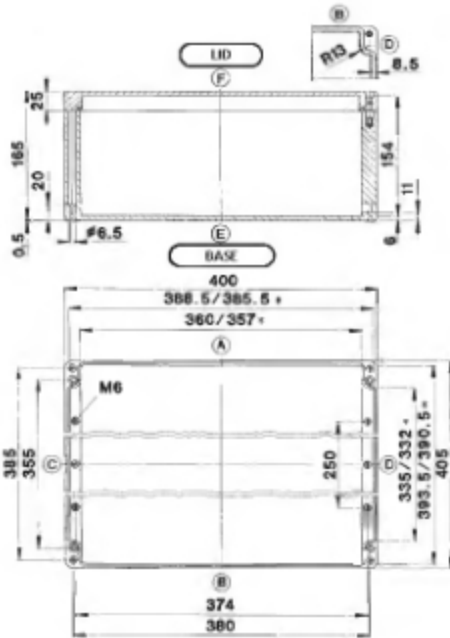
Max. Pg threads	
ISO M	12 16 20 25 32 40 50 63
Side A/B	74 38 27 17 13 6 5 4
Side C/D	32 14 10 8 4 3 2 2
** mechanical enclosure machining required	
● = kept in stock	

ISO M	12 16 20 25 32 40 50 63
Side A/B	74 38 27 17 13 6 5 4
Side C/D	57 29 20 15 7 5 4 4
** mechanical enclosure machining required	
● = kept in stock	

ISO M	12 16 20 25 32 40 50 63
Side A/B	74 38 27 17 13 6 5 4
Side C/D	57 29 20 15 7 5 4 4
** mechanical enclosure machining required	
● = kept in stock	

400 x 405 x 165 mm

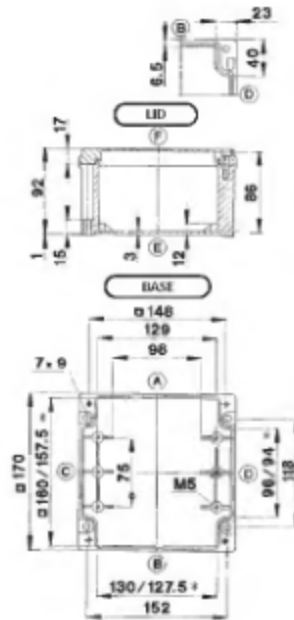
CP-460
Polyester enclosure, grey
CPS-460
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

170 x 170 x 92 mm

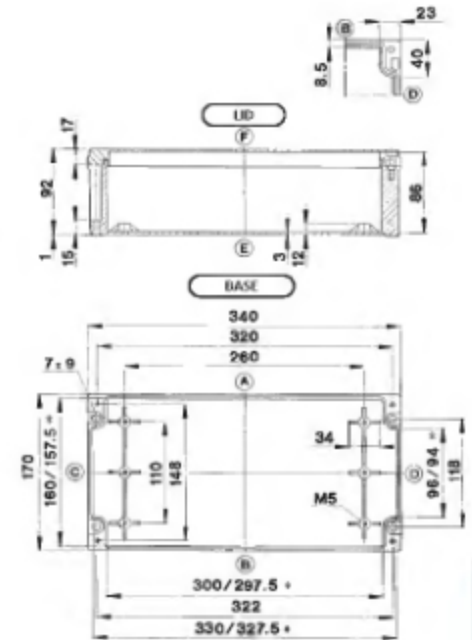
CPS-530
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

340 x 170 x 92 mm

CPS-550
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

CP-460	CPS-460
7740	7740
400 x 405 x 165	
Part number	
446.0.0000.00 ●	
446.0.0010.00	
446.0.0100.00	
	546.0.0000.00 ●
	546.0.0010.00
	546.0.0100.00
982.3.0110.00 ●	
-	
982.1.0140.00 ●	
982.2.0170.00 ●	
981.0.0150.00 ●	
982.4.0120.00 ●	
980.1.0450.00 ●	
980.1.0460.00 ●	
980.1.0320.00 ●	
923.1.0090.00 ●	
-	
-	

ISO M	12	16	20	25	32	40	50	63
Side A/B	105	56	40	27	20	10	9	8
Side C/D	92	45	30	23	12	9	6	5

** mechanical enclosure machining required

● = kept in stock

CPS-530	
850	
170 x 170 x 92	
Part number	
-	
-	
553.0.0000.00 ●	
-	
-	
-	
982.1.0440.00	
-	
981.0.0440.00	
-	
-	
-	
923.1.0060.00 ●	
-	
-	

ISO M	12	16	20	25	32	40	50	63
Side A/B	22	11	8	4	3	2	2	0
Side C/D	10	4	3	2	2	2	1	0

** mechanical enclosure machining required

● = kept in stock

CPS-550	
1800	
340 x 170 x 92	
Part number	
-	
-	
555.0.0000.00 ●	
-	
-	
-	
982.1.0450.00	
-	
981.0.0450.00	
-	
-	
-	
923.1.0060.00 ●	
-	
-	

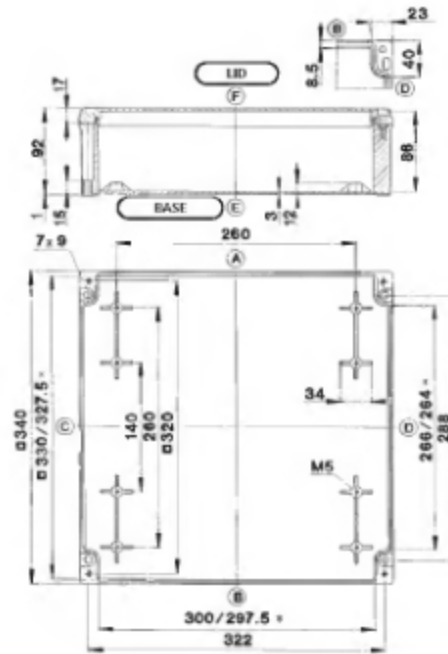
ISO M	12	16	20	25	32	40	50	63
Side A/B	48	22	15	9	6	5	3	0
Side C/D	10	4	3	2	2	1	0	0

** mechanical enclosure machining required

● = kept in stock

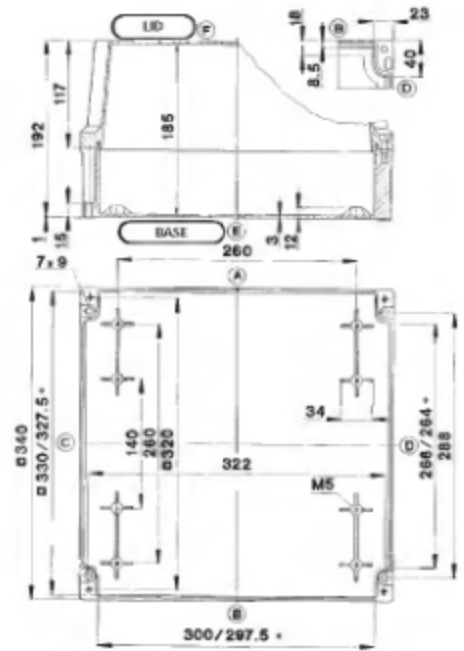
340 x 340 x 92 mm

CPS-570
Polyester enclosure, black



340 x 340 x 192 mm

CPS-590
Polyester enclosure, black



* minimum dimensions at level of mounting plate support

* minimum dimensions at level of mounting plate support

Type	
Weight (g)	
External dimensions (mm)	
Complete enclosures	
Grey (CP), with gasket and lid screws	
Grey (CP), with gasket, hex. socket head screws	
Grey (CP), with silicone gasket and lid screws	
Black (CPS), with gasket and lid screws	
Black (CPS), with gasket, hex. socket head screws	
Black (CPS), with silicone gasket and lid screws	
Accessories (separate or as a mounting set)	
Mounting plate	
TS 15 mounting rail	
TS 32 mounting rail	
TS 35 mounting rail	
Grounding rail	
External attachment brackets	
External hinges for CP enclosure (grey)**	
External hinges for CPS enclosure (black)**	
Internal hinges with lid guiding**	
Silicone gasket for wider temperature range (piece goods)	

CPS-570	
2000	
340 x 340 x 92	
Part number	
-	
-	
-	
557.0.0000.00 ●	
-	
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-	
-	
-	
-	
-	
-	
-	
923.1.0060.00 ●	

CPS-590	
2600	
340 x 340 x 192	
Part number	
-	
-	
-	
559.0.0000.00 ●	
-	
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-	
-	
923.1.0060.00 ●	

Max. Pg threads	
ISO M	12 16 20 25 32 40 50 63
Side A/B	48 22 15 9 6 5 3 0
Side C/D	31 16 8 6 5 4 1 0
** mechanical enclosure machining required	
● = kept in stock	

ISO M	12 16 20 25 32 40 50 63
Side A/B	48 22 15 9 6 5 3 0
Side C/D	31 16 8 6 5 4 1 0
** mechanical enclosure machining required	
● = kept in stock	

ISO M	12 16 20 25 32 40 50 63
Side A/B	48 22 15 9 6 5 3 0
Side C/D	31 16 8 6 5 4 1 0
** mechanical enclosure machining required	
● = kept in stock	

EExe and EExi terminal boxes in polyester and aluminium for 'Ex' areas



All BERNSTEIN polyester and aluminium enclosures are available in EExe and EExi versions. For further details please refer to the BERNSTEIN Ex products catalogue.



Special conditions for EExe and EExi terminal boxes in explosion-hazardous areas

Electric distribution boards or terminal boxes are required for connecting and branching cables. For terminal boxes in explosion-hazardous areas, special measures must be taken to prevent unacceptably high temperatures and the possibility of sparks or electrical arcing within the enclosure.

- Only enclosure materials and component materials adhering to the temperature range required for Ex devices are used.
- Enclosures and cable glands correspond to the protection class **IP 65** - (minimum specified ingress protection is IP 54), and are therefore well protected from dust and liquids.
- All enclosures and cable inserts are tested to ensure resistance to an impact force of 7 Nm - without affecting the protection class. All protective earth and ground connections are high reliability parts.
- All lid screws are captive and are located outside the working space. Lid screws and spring rings are stainless steel and type tags are made of polyester (self-adhesive, no corrosion problems).
- All fittings (terminals, cable glands, etc.) supplied by the manufacturer must be Ex compliant.
- The surface resistance of black polyester Enclosures is decreased to $< 10^9$ ohm in order to prevent damaging electrostatic discharge. As an enclosure material, polyester is especially resistant to chemically aggressive ambient conditions.
- Polyester enclosures in selfextinguishing material, regulation Vb0 according to UL - Subj. 94.

CC-10 compact control enclosures



BERNSTEIN compact control enclosures from the CC-10 product line are ideal for use as remote operator control stations. Made from die-cast aluminium these enclosures are available from stock in 11 standard sizes. All sizes have an earthing point in the lid and the base for protective earth connection. The captive lid screws are stainless steel and are concealed by push fit corner pieces. The anodised aluminium frontplate (ordered separately) is fixed internally and sealed to the frame with a neoprene gasket maintaining an IP 65 rating for the complete enclosure.

Attachment points provided inside the enclosure facilitate easy mounting of components (mounting rail, mounting plate, PCBs etc.).

Technical data

Material

Aluminium, die-casting AlSi12 (copper)

Gasket

Neoprene round seal for lid and front plate
alternative:
Silicone round seal

Lid screws

Stainless steel, captive screw, multi-purpose
cross-head with plastic covering

Coating

Base RAL 7035 (light grey)
Frame RAL 7035 (light grey)
Frame screw coverings
RAL 7035 (light grey)
alternative:
Special colours according to RAL,
special coatings

Temperature range

-40 °C to +80 °C (neoprene gasket)
alternative:
-50 °C to +130 °C (silicone gasket)

Protection class

IP 65

Application fields and characteristics

Material

BERNSTEIN compact control enclosures feature a high mechanical resistance. Their excellent chemical and petro-chemical resistance makes them suitable for a wide range of applications. The enclosures are supplied with a standard coating, affording a good resistance to corrosion. This resistance can be further improved by the application of an additional protective coating. Alternatively, they can be passivated, or a special protective coating resistant to saltwater and ideal for external use, can be applied. Aluminium has excellent heat dissipation and HF radio shielding properties.

A special gasket (silicon or conductive material) can be used to further increase heat and EMC resistance.

Applications

As compact control enclosures in automation, machine and installation engineering, in utility vehicles, construction or agricultural machinery, in mechanical and plant engineering. Suitable for all uses where operating and indicator controls with a high corrosion resistance and in a high protection class are to be encapsulated with a high mechanical resistance. The front plate is supplied separately, facilitating mounting of fittings. The high industrial standards achieved by BERNSTEIN, allow their enclosures to be effective in a wide range of automation control and instrumentation applications.

Angled adaptor

BERNSTEIN offers a wide range of accessories for the CC-10. These include angled adaptors which allow the enclosure to be inclined. This makes it possible to install the enclosure in an ergonomic inclined position on a wall or machine. The angled adaptors for the CC-10 compact control enclosure are available in 15° and 30° angles.



Complete enclosures and accessories

CC-10 series



Handles

made from naturally-anodized aluminium profile with plastic corner shoulders in RAL 7035 for subsequent attachment to the frame and base



Mounting rails

TS-32 and TS-35, steel, yellow-passivated for terminal block attachment



Frame gasket, front plate gasket

silicone, improved temperature range (-50 °C to +130 °C). Standard type made of silicone foam



Standard type

enclosure in RAL 7035, light grey, caps in RAL 7035 (light grey), gasket mounted, packaged



Angled adaptor

with 15° or 30° angle, RAL 7035, light grey, including gaskets and mounting screws. Mechanical machining required



External hinges

for hinged mounting of enclosure frames. Opening angle of frame approx. 155°. Aluminium casting, RAL 7035. Mechanical machining required for mounting. Drill template is supplied



Front plate

clear-anodized aluminium, 3 mm thick, for holding operating controls or indicator panels



Mounting plates

from galvanneal sheet metal (thickness: CC-270 to CC-400: 1.5 mm; CC-450 and CC-460: 2.5 mm) allows for further addition of mounted fittings



Internal hinges

for hinge attachment of the enclosure lid. Opening angle of lid approx. 95°. Stainless steel. Mechanical machining is required for enclosure mounting

Overview – CC-10 compact control enclosures

Dimensions mm L x W x H	CC-10 aluminium enclosures with clipped protective frames		Frame dc = die cast cc = drilled casting	base
	Part number	Type		
160 x 160 x 105	127.3.0010.00	CC-270	dc	dc
260 x 160 x 105	129.3.0010.00	CC-290	dc	dc
360 x 160 x 105	131.3.0010.00	CC-310	dc	dc
200 x 230 x 125	135.3.0010.00	CC-350	dc	dc
200 x 230 x 195	136.3.0010.00	CC-360	dc	cc
280 x 230 x 125	137.3.0010.00	CC-370	dc	dc
330 x 230 x 125	138.3.0010.00	CC-390	dc	dc
330 x 230 x 195	139.3.0010.00	CC-390	dc	cc
400 x 230 x 125	140.3.0010.00	CC-400	dc	dc
402 x 310 x 125	145.3.0010.00	CC-450	dc	dc
402 x 310 x 195	146.3.0010.00	CC-460	dc	cc

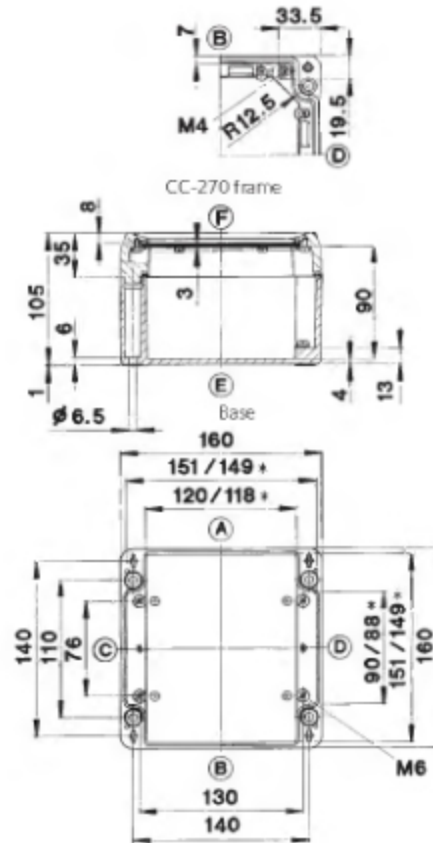
Customising service

The range of accessories for individual enclosures can be supplied separately or pre-assembled. The BERNSTEIN customising service provides complete mechanical machining. The fittings (terminals, cable glands or customised mounting

components) are included in the service, as is the individual finishing of enclosures. The custom-made front plates (supplied separately) can also be mechanically machined and supplied with individual screen-printing or engraving.

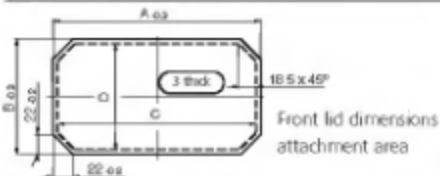
160 x 160 x 105 mm

CC-270 aluminium control enclosure



* minimum dimensions at level of mounting plate support

Type	CC-270
Weight (g)	1800
External dimensions (mm)	160 x 160 x 105
Complete enclosures	Part number
coated, with gasket and lid screws	127.3.0010.00 ●
Accessories (separate or as a mounting set)	
Front plate	951.1.7580.00 ●
Mounting plate	951.1.1490.00 ●
TS 32 mounting rail	982.1.0020.00 ●
TS 35 mounting rail	982.2.0030.00 ●
External hinges**	980.1.0990.00 ●
Internal hinges with lid guiding**	980.1.0390.00 ●
Frame gasket for extended temp. range (piece goods)**	923.1.0060.00 ●
Front plate gasket for extended temp. range (piece goods)***	923.1.0060.00 ●
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	-
Side handles (C/D)**	-
Angled adaptor 15° (RAL 7035)	101.6.6300.00 only side C/D
Angle adaptor 30° (RAL 7035)	-

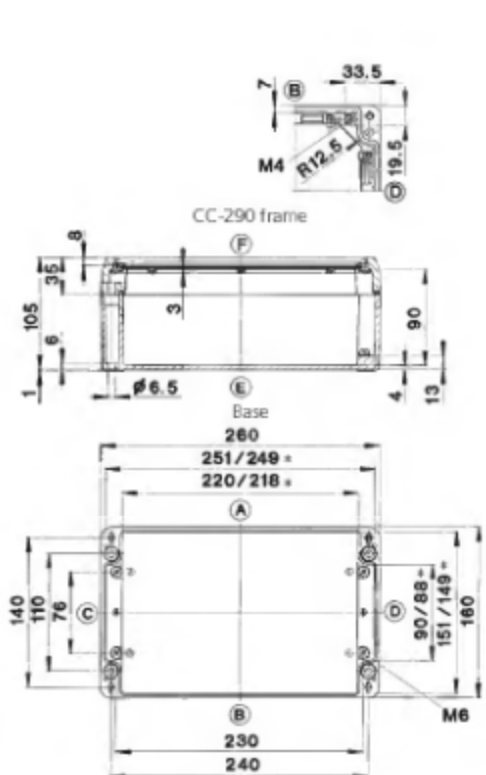


** mechanical enclosure machining required
*** piece goods

● = kept in stock

260 x 160 x 105 mm

CC-290 aluminium control enclosure



* minimum dimensions at level of mounting plate support

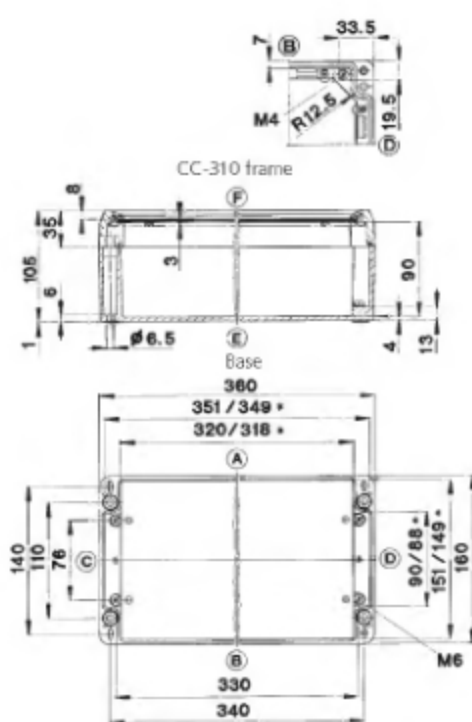
Type	CC-290
Weight (g)	2300
External dimensions (mm)	260 x 160 x 105
Complete enclosures	Part number
coated, with gasket and lid screws	129.3.0010.00 ●
Accessories (separate or as a mounting set)	
Front plate	951.1.7590.00 ●
Mounting plate	951.1.0490.00 ●
TS 32 mounting rail	982.1.0080.00 ●
TS 35 mounting rail	982.2.0110.00 ●
External hinges**	980.1.0990.00 ●
Internal hinges with lid guiding**	980.1.0390.00 ●
Frame gasket for extended temp. range (piece goods)**	923.1.0060.00 ●
Front plate gasket for extended temp. range (piece goods)***	923.1.0060.00 ●
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	-
Side handles (C/D)**	-
Angled adaptor 15° (RAL 7035)	101.6.6300.00
Angle adaptor 30° (RAL 7035)	101.6.6310.00 only side A/B

A x B: 225.5 x 125.5 mm
C x D: 215 x 115 mm

● = kept in stock

360 x 160 x 105 mm

CC-310 aluminium control enclosure



* minimum dimensions at level of mounting plate support

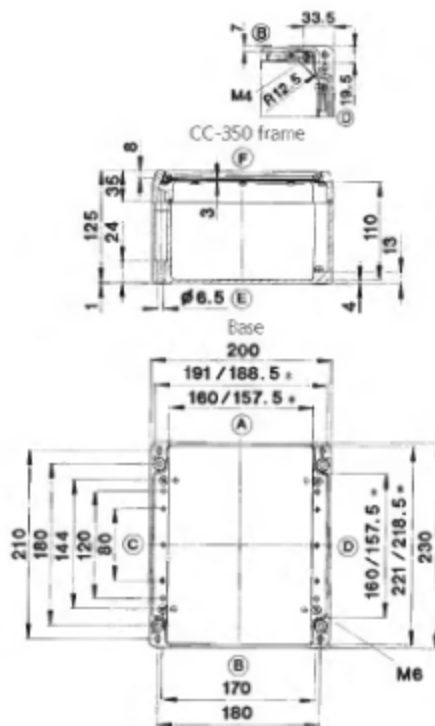
CC-310
2500
360 x 160 x 105
Part number
131.3.0010.00 ●
951.1.7600.00 ●
951.1.1750.00 ●
982.1.0120.00 ●
982.2.0150.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
-
101.6.6300.00
101.6.6310.00

A x B: 325.5 x 125.5 mm
C x D: 315 x 115 mm

● = kept in stock

200 x 230 x 125 mm

CC-350 aluminium control enclosure



* minimum dimensions at level of mounting plate support

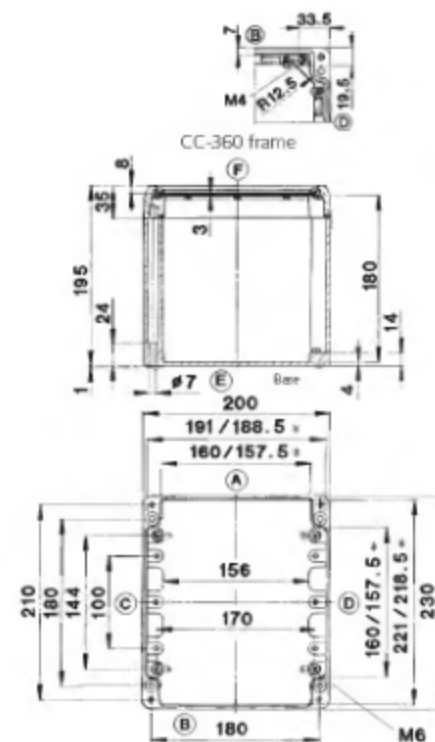
CC-350
2800
200 x 230 x 125
Part number
135.3.0010.00 ●
951.1.7610.00 ●
951.1.0150.00 ●
982.1.0030.00 ●
982.2.0050.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0920.00 ●
981.4.0920.00 ●
101.6.6300.00
101.6.6310.00

A x B: 165.5 x 195.5 mm
C x D: 155 x 185 mm

● = kept in stock

200 x 230 x 195 mm

CC-360 aluminium control enclosure



* minimum dimensions at level of mounting plate support

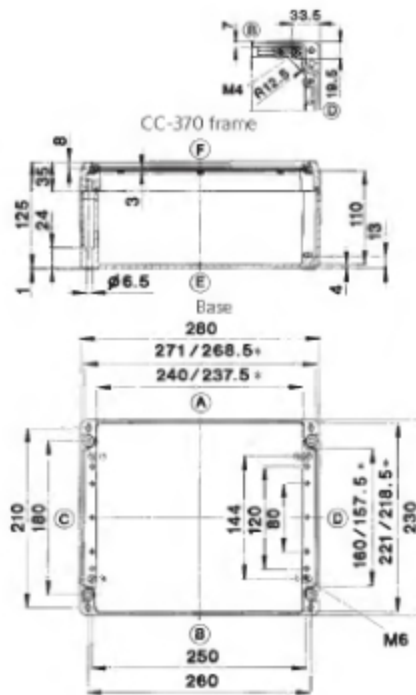
CC-360
4100
200 x 230 x 195
Part number
136.3.0010.00 ●
951.1.7610.00 ●
951.1.0150.00 ●
982.1.0030.00 ●
982.2.0050.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0920.00 ●
981.4.0920.00 ●
101.6.6300.00
101.6.6310.00

A x B: 165.5 x 195.5 mm
C x D: 155 x 185 mm

● = kept in stock

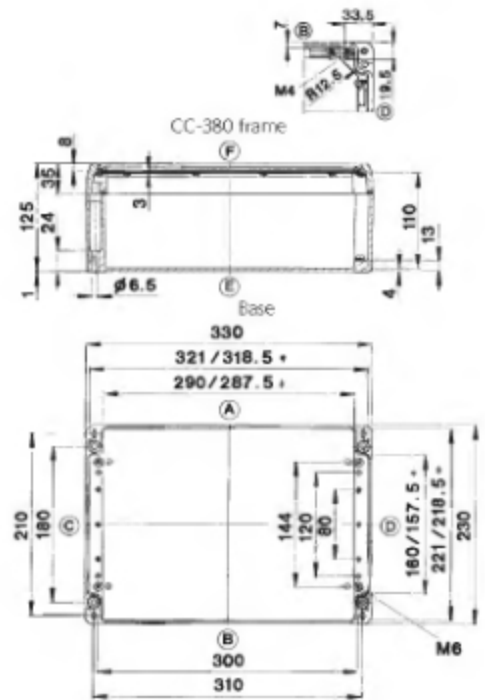
280 x 230 x 125 mm

CC-370 aluminium control enclosure

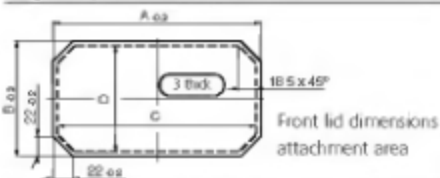


330 x 230 x 125 mm

CC-380 aluminium control enclosure



Type	CC-370
Weight (g)	3400
External dimensions (mm)	280 x 230 x 125
Complete enclosures	Part number
coated, with gasket and lid screws	137.3.0010.00 ●
Accessories (separate or as a mounting set)	
Front plate	951.1.7620.00 ●
Mounting plate	951.1.0160.00 ●
TS 32 mounting rail	982.1.0090.00 ●
TS 35 mounting rail	982.2.0120.00 ●
External hinges**	980.1.0990.00 ●
Internal hinges with lid guiding**	980.1.0390.00 ●
Frame gasket for extended temp. range (piece goods)**	923.1.0060.00 ●
Front plate gasket for extended temp. range (piece goods)***	923.1.0060.00 ●
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	981.4.0930.00 ●
Side handles (C/D)**	981.4.0920.00 ●
Angled adaptor 15° (RAL 7035)	101.6.6300.00 ●
Angle adaptor 30° (RAL 7035)	101.6.6310.00 ●



** mechanical enclosure machining required
*** piece goods

* minimum dimensions at level of mounting plate support

A x B: 245.5 x 195.5 mm
C x D: 235 x 185 mm

● = kept in stock

* minimum dimensions at level of mounting plate support

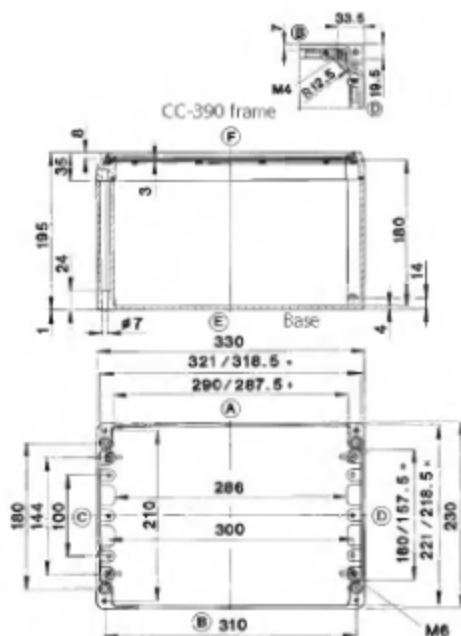
Type	CC-380
Weight (g)	3400
External dimensions (mm)	330 x 230 x 125
Complete enclosures	Part number
coated, with gasket and lid screws	138.3.0010.00 ●
Accessories (separate or as a mounting set)	
Front plate	951.1.7630.00 ●
Mounting plate	951.1.0170.00 ●
TS 32 mounting rail	982.1.0110.00 ●
TS 35 mounting rail	982.2.0140.00 ●
External hinges**	980.1.0990.00 ●
Internal hinges with lid guiding**	980.1.0390.00 ●
Frame gasket for extended temp. range (piece goods)**	923.1.0060.00 ●
Front plate gasket for extended temp. range (piece goods)***	923.1.0060.00 ●
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	981.4.0930.00 ●
Side handles (C/D)**	981.4.0920.00 ●
Angled adaptor 15° (RAL 7035)	101.6.6300.00 ●
Angle adaptor 30° (RAL 7035)	101.6.6310.00 ●

A x B: 295.5 x 195.5 mm
C x D: 285 x 185 mm

● = kept in stock

330 x 230 x 195 mm

CC-390 aluminium control enclosure



* minimum dimensions at level of mounting plate support

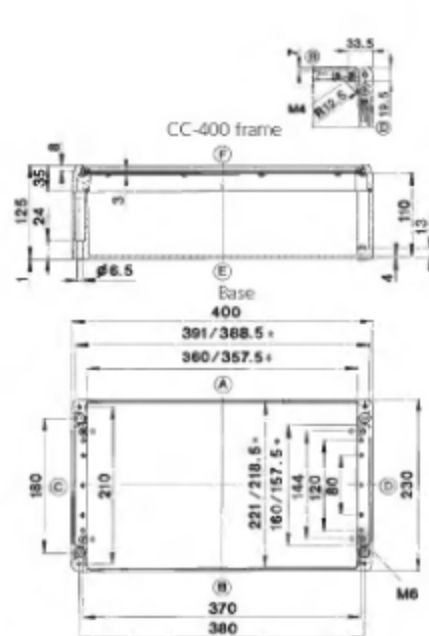
CC-390
5300
330 x 230 x 195
Part number
139.3.0010.00 ●
951.1.7630.00 ●
951.1.0170.00 ●
982.1.0110.00 ●
982.2.0140.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0930.00 ●
981.4.0920.00 ●
101.6.6300.00 ●
101.6.6310.00 ●

A x B: 295.5 x 195.5 mm
C x D: 285 x 185 mm

● = kept in stock

400 x 230 x 125 mm

CC-400 aluminium control enclosure



* minimum dimensions at level of mounting plate support

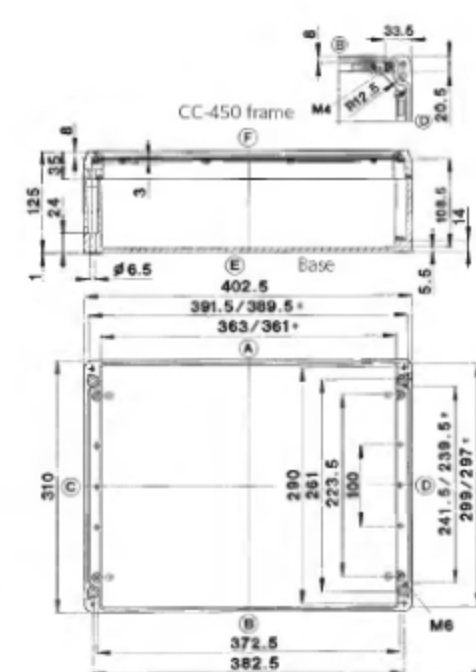
CC-400
4900
400 x 230 x 125
Part number
140.3.0010.00 ●
951.1.7640.00 ●
951.1.2940.00 ●
982.1.0140.00 ●
982.2.0170.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0930.00 ●
981.4.0920.00 ●
101.6.6300.00 ●
101.6.6310.00 ●

A x B: 365.5 x 195.5 mm
C x D: 355 x 185 mm

● = kept in stock

402 x 310 x 125 mm

CC-450 aluminium control enclosure



* minimum dimensions at level of mounting plate support

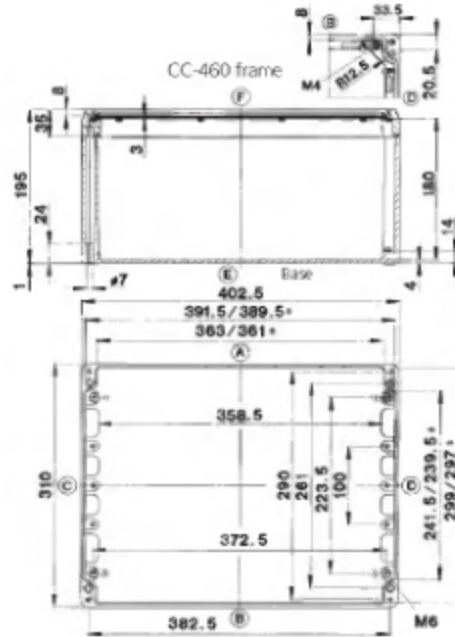
CC-450
5600
402 x 310 x 125
Part number
145.3.0010.00 ●
951.1.7650.00 ●
951.1.0200.00 ●
982.1.0140.00 ●
982.2.0170.00 ●
980.1.0990.00 ●
980.1.0390.00 ●
923.1.0060.00 ●
923.1.0060.00 ●
-
-
981.4.0930.00 ●
981.4.0930.00 ●
101.6.6300.00 ●
101.6.6310.00 ●

A x B: 365.7 x 273.2 mm
C x D: 354.5 x 262 mm

● = kept in stock

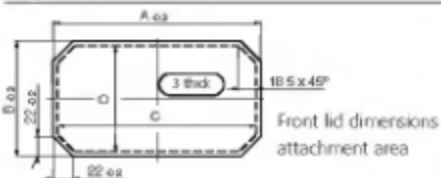
402 x 310 x 195 mm

CC-460 aluminium control enclosure



* minimum dimensions at level of mounting plate support

Type	CC-460
Weight (g)	7300
External dimensions (mm)	402 x 310 x 195
Complete enclosures	Part number
coated, with gasket and lid screws	146.3.0010.00 ●
Accessories (separate or as a mounting set)	
Front plate	951.1.7650.00 ●
Mounting plate	951.1.0200.00 ●
TS 32 mounting rail	982.1.0140.00 ●
TS 35 mounting rail	982.2.0170.00 ●
External hinges**	980.1.0990.00 ●
Internal hinges with lid guiding**	980.1.0390.00 ●
Frame gasket for extended temp. range (piece goods)**	923.1.0060.00 ●
Front plate gasket for extended temp. range (piece goods)***	923.1.0060.00 ●
Corner handles (C-B/D-B)**	-
Corner handles (B-D/A-D)**	-
Side handles (A/B)**	981.4.0930.00 ●
Side handles (C/D)**	981.4.0930.00 ●
Angled adaptor 15° (RAL 7035)	101.6.6300.00 ●
Angle adaptor 30° (RAL 7035)	101.6.6310.00 ●

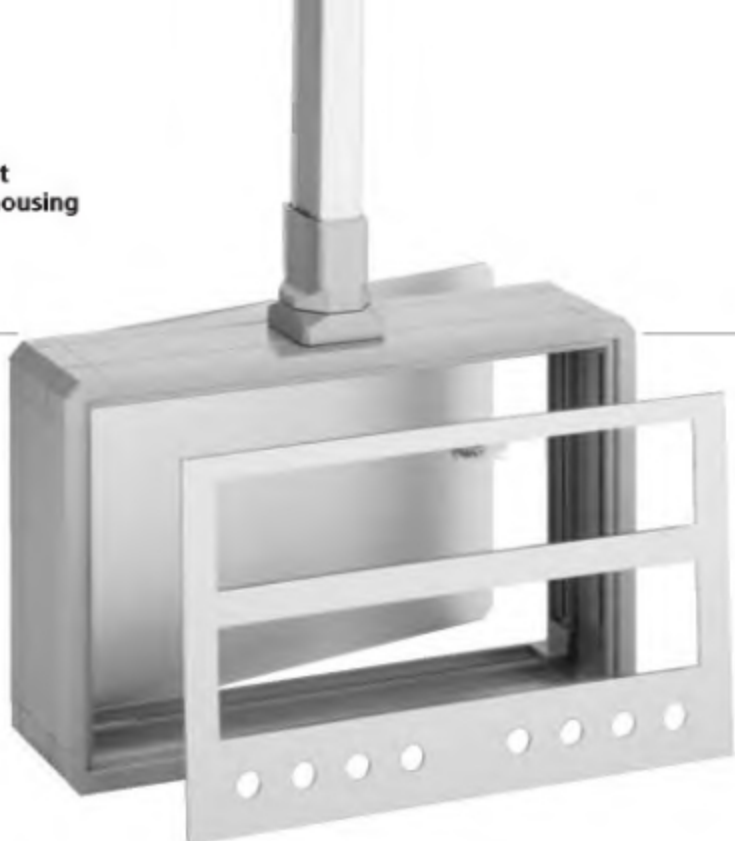


A x B: 365.7 x 273.2 mm
C x D: 354.5 x 262 mm

** mechanical enclosure machining required
*** piece goods

● = kept in stock

Modular lightweight operator interface housing CC-2000 SL



The BERNSTEIN lightweight Operator Interface CC-2000 SL is a modular aluminium enclosure particularly suited for operator control station applications where the mounting of industrial computers, MMI, display and similar components is necessary. Its height and width are variable up to a recommended maximum size of approximately 600 x 600 mm. The depth is selected from the combination or individual use of the 200, 120 and 55 mm aluminium profiles available.

The front plate may be mounted through a specially developed quick and simple mounting system. Secured from the inside fastening clips replace both the requirement to machine the front plate and the time-consuming screw fitting during installation or servicing. The rear panel is secured using foaming screws or hinged using internal hinges that do not affect the usable depth. With the 55 mm deep extension profile, hinged as a door, there is a maximum usable depth of 244 mm when the 200 mm profile width is used.

The aluminium-extruded profile has grooves running the width and height of the enclosure, allowing components to be fitted and secured by means of simple spring nuts, again without additional enclosure machining. The profile is designed to create a cable duct around the inside of the housing to provide protection for cable looms and wiring entering from the suspension system.

Product advantages

- Modular system – width and height of the housing are completely variable
- Standard rectangular front plates can be fitted directly (e. g. Displays, MMIs)
- Front plates can be internally or externally mounted and secured
- Front plate mounting from the inside is particularly quick and easy
- No external rubber gasket required
- IP 65 protection
- Rear panel secured by screws or mounted on integrated hinges
- No loss of usable depth due to hinges
- Internal grooves allow simple fastening with spring nuts
- Single-wall aluminium extruded profile incorporates a built-in cable channel
- Excellent heat dissipation
- Modern industrial design

Materials

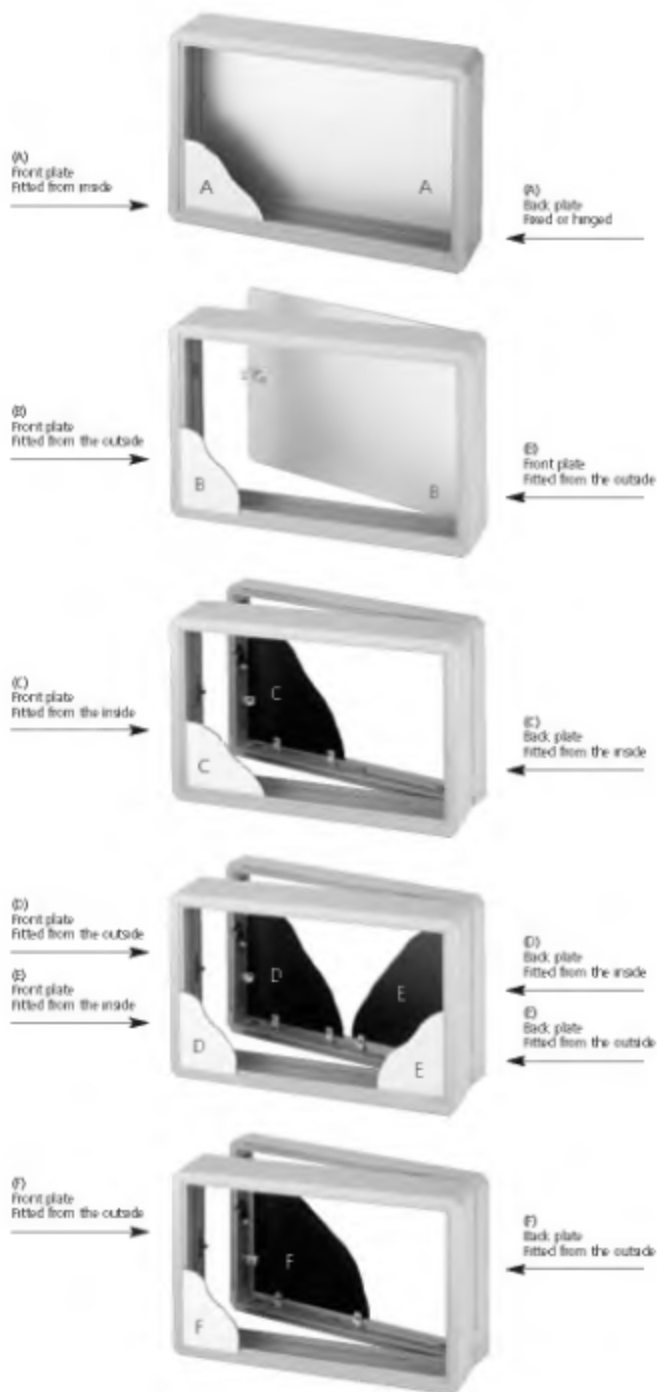
- Aluminium extruded profile: Al Mg Si 05
- Aluminium die-cast corners: Al Si 12
- Seals between profile and corner module: CR
- Seal for front plate and rear panel: CR
- Hinge profile: Al Mg Si 05
- Front plate, rear panel: Al Mg 3

Colour

- Housing: RAL 7035
- Front plate and rear panel: Aluminium nature anodised

Availability

CC-2000 SL lightweight control housings in standard sizes are available with short delivery times or as custom versions built to order.



System variations

As a result of the various fitting and profile combinations, usable depths between the front plate and the back plate (each 3 mm thick) vary between 101 and 244 mm.

Profile 120/Profile 200

Usable depth		Housing construction
Profile 120 [mm]	Profile 200 [mm]	
101	181	Front plate from the inside. Back plate fixed or hinged
		(A)
108	189	Front plate from the outside. Back plate fixed or hinged
		(B)

Profile 120 + 55 as a door extension

Profile 200 + 55 as a door extension

Usable depth		Housing construction
Profile 120+55 [mm]	Profile 200+55 [mm]	
147	227	Front plate from the inside. Back plate from the inside
		(C)
155	235	Front plate from the outside. Back plate from the inside
		(D)
155	235	Front plate from the inside. Back plate from the outside
		(E)
164	244	Front plate from the outside. Back plate from the outside
		(F)



Dimensions

The BERNSTEIN CC-2000 SL is available with a selection of front and back plates and various combinations of profile width, including:

Profile widths

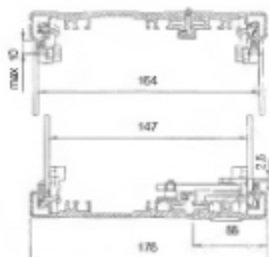
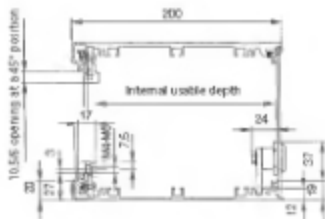
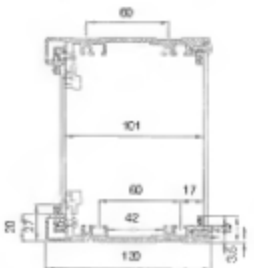
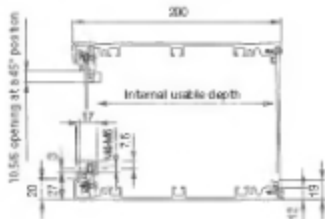
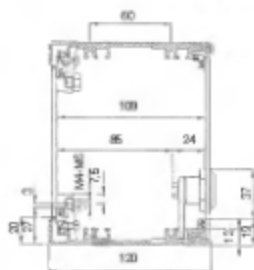
- 120 mm
- 175 mm (120 + 55 mm)
- 200 mm
- 255 mm (200 + 55 mm)

allowing the following different internal depths:

Internal usable depths

- 101 mm
- 109 mm
- 147 mm
- 155 mm
- 164 mm
- 181 mm
- 189 mm
- 227 mm
- 235 mm
- 244 mm

Width and height of the CC-2000 SL control interface housing are completely optional up to a recommended size of circa 600 x 600 mm.



Enclosure components

Light weight operator interface housing

CC-2000 SL



Front plate

Clear (silver) anodized aluminum front plate, 3 mm thick, both sides anodized, protection film one side



Handles

Handle set, made from aluminum profile. Filing without machining



Separator piece

Aluminum separator piece for direct mounting of control and other operating panels (for example emergency stop buttons and other operating components). It cut to size and machined to fit individual housing. Complete with filing and sealing material. Order separately or via checklist.



Spring nut set M4

(Part number 980.6.0060.00)

Spring nut set M5

(Part number 980.6.0070.00)

10 off spring nuts with metric thread M4 or M5 for fixing units in the housing. The spring nuts are fitted in the filing rails into the aluminum housing profile and can be pushed into position in the housing.



19" fixing set

(Part number 980.6.1120.00)

4 cage nuts M6 with screws and washers to fix 19" inserts of the fixing clips enclosed in the housing.



CD-ROM-Cover

(Part number 980.6.2170.00)

Dimensions (W x H x D)

177 x 119 x 8 mm

Surface: possible to paint.



Keyboard holder (Stimp)

(Part number 980.6.1270.00)

Metal frame for PC keyboards, which can be installed additionally. For assembly the machining of the housing is necessary. Filing, enclosed.



Keyboard support

(Part number 980.6.1250.00)

Steel plate keyboard support in RAL 7035 for additional mounting. Machining is necessary for assembly, including filing.



Floppy-Cover

(Part number 980.6.2190.00)

Dimensions (W x H x D) 120 x 92 x 8 mm

Surface: possible to paint.

Standard dimensions CC-2000 SL light weight operator interface housing

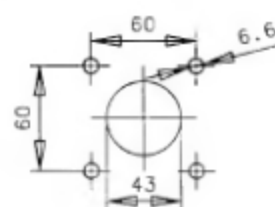
Part number	External housing dimensions	19" fitting dimensions	Front plate dimensions overall	Front plate usable area	Front plate Part number	Usable depth with 3 mm plate thickness min./max. (mm)	Back plate dimensions overall e x f (mm)
	W x H x D (mm)		(mm)	(mm)			
114.5.2000.00	275 x 254 x 120	–	235 x 214	221 x 200	954.5.5410.00	101/109	268 x 247
114.5.2000.00	275 x 254 x 120	–	235 x 214	221 x 200	954.5.5410.00	101/109	266 x 245
114.5.2010.00	284 x 312 x 120	–	244 x 272	230 x 258	954.5.5420.00	101/109	277 x 305
114.5.2010.00	284 x 312 x 120	–	244 x 272	230 x 258	954.5.5420.00	101/109	275 x 303
114.5.2020.00	284 x 428 x 120	–	244 x 388	230 x 374	954.5.0120.00	101/109	277 x 421
114.5.2020.00	284 x 428 x 120	–	244 x 388	230 x 374	954.5.0120.00	101/109	275 x 419
116.5.2020.00	284 x 428 x 175	–	244 x 388	230 x 374	954.5.0120.00	147/164*	244 x 388
124.5.2020.00	284 x 428 x 200	–	244 x 388	230 x 374	954.5.0120.00	181/189	277 x 421
124.5.2020.00	284 x 428 x 200	–	244 x 388	230 x 374	954.5.0120.00	181/189	275 x 419
114.5.2030.00	395 x 345 x 120	–	355 x 305	341 x 291	954.5.0090.00	101/109	388 x 338
114.5.2030.00	395 x 345 x 120	–	355 x 305	341 x 291	954.5.0090.00	101/109	386 x 336
116.5.2030.00	395 x 345 x 175	–	355 x 305	341 x 291	954.5.0090.00	147/164*	355 x 305
124.5.2030.00	395 x 345 x 200	–	355 x 305	341 x 291	954.5.0090.00	181/189	388 x 338
124.5.2030.00	395 x 345 x 200	–	355 x 305	341 x 291	954.5.0090.00	181/189	386 x 336
114.5.2040.00	470 x 415 x 120	–	430 x 375	416 x 361	954.5.0150.00	101/109	463 x 408
114.5.2040.00	470 x 415 x 120	–	430 x 375	416 x 361	954.5.0150.00	101/109	461 x 406
116.5.2040.00	470 x 415 x 175	–	430 x 375	416 x 361	954.5.0150.00	147/164*	430 x 375
124.5.2040.00	470 x 415 x 200	–	430 x 375	416 x 361	954.5.0150.00	181/189	463 x 408
124.5.2040.00	470 x 415 x 200	–	430 x 375	416 x 361	954.5.0150.00	181/189	461 x 406
114.5.2050.00	525 x 309 x 120	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	101/109	518 x 302
114.5.2050.00	525 x 309 x 120	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	101/109	516 x 300
116.5.2050.00	525 x 309 x 175	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	147/164*	485 x 269
124.5.2050.00	525 x 309 x 200	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	181/189	518 x 302
124.5.2050.00	525 x 309 x 200	84 TE x 6 HE	485 x 269	471 x 255	954.5.0060.00	181/189	516 x 300
114.5.2060.00	525 x 354 x 120	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	101/109	518 x 347
114.5.2060.00	525 x 354 x 120	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	101/109	516 x 345
116.5.2060.00	525 x 354 x 175	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	147/164*	485 x 314
124.5.2060.00	525 x 354 x 200	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	181/189	518 x 347
124.5.2060.00	525 x 354 x 200	84 TE x 7 HE	485 x 314	471 x 300	954.5.0000.00	181/189	516 x 345
114.5.2070.00	525 x 398 x 120	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	101/109	518 x 391
114.5.2070.00	525 x 398 x 120	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	101/109	516 x 389
116.5.2070.00	525 x 398 x 175	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	147/164*	485 x 358
124.5.2070.00	525 x 398 x 200	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	181/189	518 x 391
124.5.2070.00	525 x 398 x 200	84 TE x 8 HE	485 x 358	471 x 344	954.5.0030.00	181/189	516 x 389
114.5.2080.00	356 x 377 x 120	–	316 x 337	302 x 323	954.5.3420.00	101/109	349 x 370
114.5.2080.00	356 x 377 x 120	–	316 x 337	302 x 323	954.5.3420.00	101/109	347 x 368
114.5.2090.00	542 x 495 x 120	–	502 x 455	488 x 441	954.5.5430.00	101/109	535 x 488
114.5.2090.00	542 x 495 x 120	–	502 x 455	488 x 441	954.5.5430.00	101/109	533 x 486
116.5.2090.00	542 x 495 x 175	–	502 x 455	488 x 441	954.5.5430.00	147/164*	502 x 455
124.5.2090.00	542 x 495 x 200	–	502 x 455	488 x 441	954.5.5430.00	181/189	535 x 488
124.5.2090.00	542 x 495 x 200	–	502 x 455	488 x 441	954.5.5430.00	181/189	533 x 486
124.5.2100.00	475 x 306 x 200	–	435 x 266	421 x 252	direct mounting	181/189	468 x 299
124.5.2100.00	475 x 306 x 200	–	435 x 266	421 x 252	direct mounting	181/189	466 x 297

Delivery includes:

- Assembled enclosure, painted (RAL 7035 light grey) incl. quick fastening kit for front plate
- Standard 8 mm square lock on doors or hinged back plates, lock mounted in back plate
- Front plate, rear panel, handles (optional)

Suspension system machining

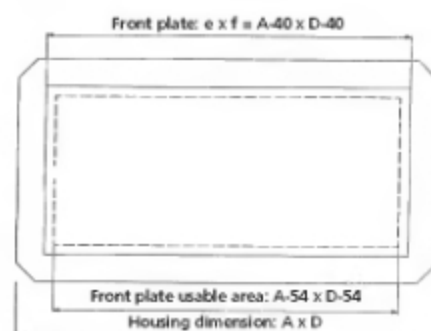
- CS-1000 mini support system
- CS-2000 SL light weight support system
- CS-2000 suspension system 50
- CS-2000 suspension system 60
- Inclination couplings of all systems



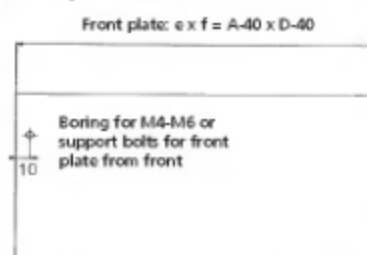
Back plate Features	Back plate Part number	Handles on side Part number	Handles at bottom Part number
screw mounted	954.5.0500.00	980.6.1420.00	-
hinged	980.6.1400.00	980.6.1420.00	-
screw mounted	954.5.1250.00	980.6.1430.00	-
hinged	980.6.1410.00	980.6.1430.00	-
screw mounted	954.5.0130.00	980.6.1310.00	-
hinged	980.6.1250.00	980.6.1310.00	-
from inside	954.5.0120.00	980.6.1310.00	-
screw mounted	954.5.0130.00	980.6.1310.00	-
hinged	980.6.1250.00	980.6.1310.00	-
screw mounted	954.5.0100.00	980.6.1320.00	-
hinged	980.6.1260.00	980.6.1320.00	-
from inside	954.5.0090.00	980.6.1320.00	-
screw mounted	954.5.0100.00	980.6.1320.00	-
hinged	980.6.1260.00	980.6.1320.00	-
screw mounted	954.5.0160.00	980.6.1330.00	-
hinged	980.6.1270.00	980.6.1330.00	-
from inside	954.5.0150.00	980.6.1330.00	-
screw mounted	954.5.0160.00	980.6.1330.00	-
hinged	980.6.1270.00	980.6.1330.00	-
screw mounted	954.5.0070.00	980.6.1340.00	-
hinged	980.6.1280.00	980.6.1340.00	-
from inside	954.5.0060.00	980.6.1340.00	-
screw mounted	954.5.0070.00	980.6.1340.00	-
hinged	980.6.1280.00	980.6.1340.00	-
screw mounted	954.5.0010.00	980.6.1350.00	-
hinged	980.6.1290.00	980.6.1350.00	-
from inside	954.5.0000.00	980.6.1350.00	-
screw mounted	954.5.0010.00	980.6.1350.00	-
hinged	980.6.1290.00	980.6.1350.00	-
screw mounted	954.5.0040.00	980.6.1360.00	-
hinged	980.6.1300.00	980.6.1360.00	-
from inside	954.5.0030.00	980.6.1360.00	-
screw mounted	954.5.0040.00	980.6.1360.00	-
hinged	980.6.1300.00	980.6.1360.00	-
screw mounted	954.5.4840.00	980.6.1600.00	-
hinged	980.6.1640.00	980.6.1600.00	-
screw mounted	954.5.4850.00	980.6.1660.00	-
hinged	980.6.1650.00	980.6.1660.00	-
from outside ^{*)}	954.5.1210.00	980.6.1660.00	-
screw mounted	954.5.4850.00	980.6.1660.00	-
hinged	980.6.1650.00	980.6.1660.00	-
screw mounted	954.5.4810.00	-	980.6.1630.00
hinged	980.6.1620.00	-	980.6.1630.00

*) 164 mm when drilling or screwing through the rear panel; otherwise 155 mm usable depth (clearance required for internal fixing)

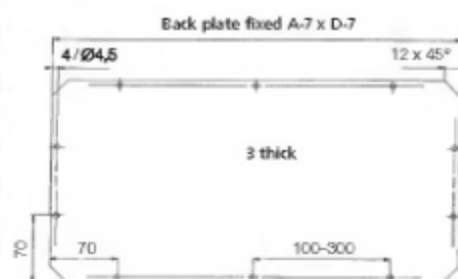
Housing dimensions outline



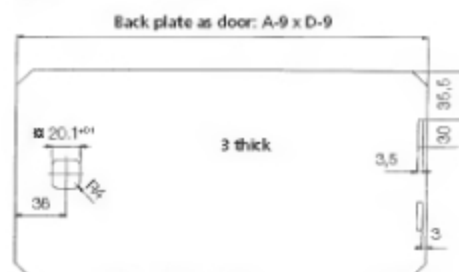
Front plate dimensions



Back plate dimensions (back plate screw fitted)



Back plate dimensions (hinged back plate)



Check list

Price enquiry, Order form Lightweight control housing CC-2000 SL

Please use copies of this form.
Grey marked boxes are standard.

Client		Code	Part No.
Address		Cust. No.	
Telephone	Telefax	Branch	
Contact		Department	
<input type="checkbox"/> Price enquiry	Enquiry No.	Date	Qty
<input type="checkbox"/> Enquiry		Annual need	Qty
<input type="checkbox"/> Order		Delivery date	Qty

1 Enclosure orientation

Horizontal

Vertical

Square housing treat as horizontal



Weight of components

	kg
--	----

2 Dimensions (mm)

Housing dimensions overall: A x D x

Front plate dimension: e x f x



3a Front plate - back plate

Fixing accessories for customer's own plates

none with

Front plate

none with

Back plate

- For plates mounted internally: gasket, clips etc.
- For plates mounted externally: gasket/washers/nuts M5
- 19° fixing set (9806112000): screws and nuts M6

3b Separating piece

- vertical
- horizontal
- not mounted/standard
- mounted right
- mounted left
- mounted at bottom
- mounted at top

Operating plate anodised (not mounted) s = 3 mm

Dimension: g x h x

(g = width, h = height)

4a Housing without door profile:

Back plate

Housing depth (overall):	Position of front plate:		fixed	or	hinged with joint & lock
	inside	usable depth (mm)			
<input type="checkbox"/> 120 mm	<input type="checkbox"/> inside	101 mm	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/> outside	109 mm			
<input type="checkbox"/> 200 mm	<input type="checkbox"/> inside	181 mm	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/> outside	189 mm			

4b Housing with door profile:

(Door with internal hinges can only be used for its own weight)

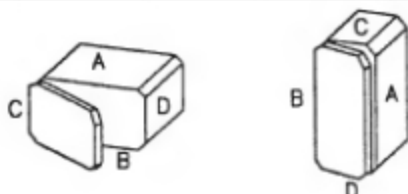
*FP = Frontplatte
RW = Rückwand

Door front	or Housing depth External (mm)	Door back	*FP internal and BP internal		*FP internal and BP external		*FP external and BP internal		*FP external and BP external	
			Usable depth (mm)		Usable depth (mm)		Usable depth (mm)		Usable depth (mm)	
External joint <input type="checkbox"/>	120 + 55	Internal joint <input type="checkbox"/>	<input type="checkbox"/>	147	<input type="checkbox"/>	155	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	164
			<input type="checkbox"/>	227	<input type="checkbox"/>	235	<input type="checkbox"/>	<input type="checkbox"/>	244	
Internal joint <input type="checkbox"/>	200 + 55	Internal joint <input type="checkbox"/>	<input type="checkbox"/>	147	<input type="checkbox"/>	155	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	164
			<input type="checkbox"/>	227	<input type="checkbox"/>	235	<input type="checkbox"/>	<input type="checkbox"/>	244	



5 Door fixing front

Standard (as shown)

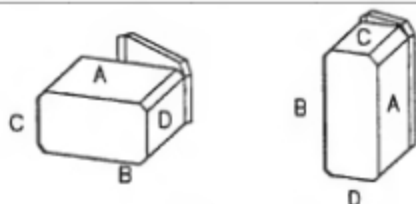


Variation to standard

A B
C D

Door fixing rear

Standard (as shown)



Variation to standard

A B
C D

6 Lock

Square (mm) 6 7 8 Standard
Triangular (mm) 7 8
Double beard (mm) 3 5

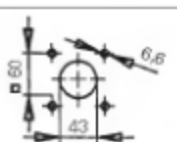
Handle with lock
 Daimler Benz
 Special lock (customers specifier)

7 Machining for support systems

Side

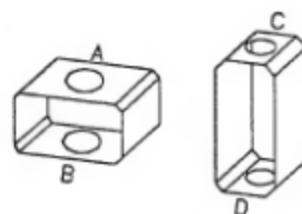
A
 B
 C
 D

Standard machining
For swivel tilt coupling and
flange coupling 50, 60, 45/60 (SL)



Flange coupling 80 (only profile 200)
 Angle adapter (only profile 200)
 Special machining to customers specifications

None



8 Paint

Main body:
Doors:
Front plates:
Back plates:

Standard
 RAL 7035, light grey
 RAL 7035, light grey
 anodised, clear
 anodised, clear

Customer specification

9 EMV (electro magnetic compatibility) version

Conducting connections between housing main body, housing door and front plate and back plate.

10 Handles



Not for depths 120
and 175 with
coupling from
below.



None
 Pre assembled - ready to fit Standard

11 Accessories, note

Included in delivery: key and earth-set

<input type="checkbox"/> End.	Sales	Techn. dept	Planning dept.	Enquiry
<input type="checkbox"/> No encl.				Order

Control housing CC-4000



The operator control panel is often the visual focus point of a machine. The new CC-4000 control housing from BERNSTEIN has a dynamic modern industrial design. Not only does this enhance the appearance of your system, machine, controller or operator panel, but provides functional advantages that both you and your customers will value.

What's in it for you?

- An ultra-modern design, combined with impressive functionality
- High quality aluminium casting with smooth surface finish
- Design enhancing coloured profiles, optionally available in your company livery
- Integrated handgrips – for easy handling, also enhance enclosure styling

IP 65 protection – for peace of mind

- IP 65 ingress protection is provided as standard.

You want it deeper, higher & wider? No problem!

Thanks to a flexible modular design, the housing depth can be matched to suit your controller. Aluminium frame profiles: 52, 80, 140, 200 & 290 mm deep, can be linked with extension profiles of 68, 128 & 228 to attain depths from 52 mm to 646 mm. The required width and height is precisely obtained by trimming sections to size.

You specify the access

- Flush fitting hinged rear door
- Extension section as rear door
- Frame section as front door
- Removable front or rear door when optional two part external hinge used – allows replacement of complete control module when servicing required

You manage heat dissipation, with three profile versions

- Housing with smooth external surface
- Housing with external aluminium fins, for increased heat dissipation
- Housing with external aluminium fins and internal fans for maximum heat dissipation



Front opening of the CC-4000 housing using hinged frame section



Rear access to the CC-4000 with flush-fitting hinged door



Hinged and demountable front frame (also available for rear profile)



Ergonomically designed handles are integral to the front frame



Different RAL colour can be applied to match your company livery



Externally finned aluminium extrusion provides excellent heat dissipation



Smooth finish aluminium profile



Combination of different frame and extension profile widths allow many enclosure depths to be realised

Dimensions

Using a combination of extension widths the CC-4000 depth may be selected in the range 52–646 mm (see drawings below).

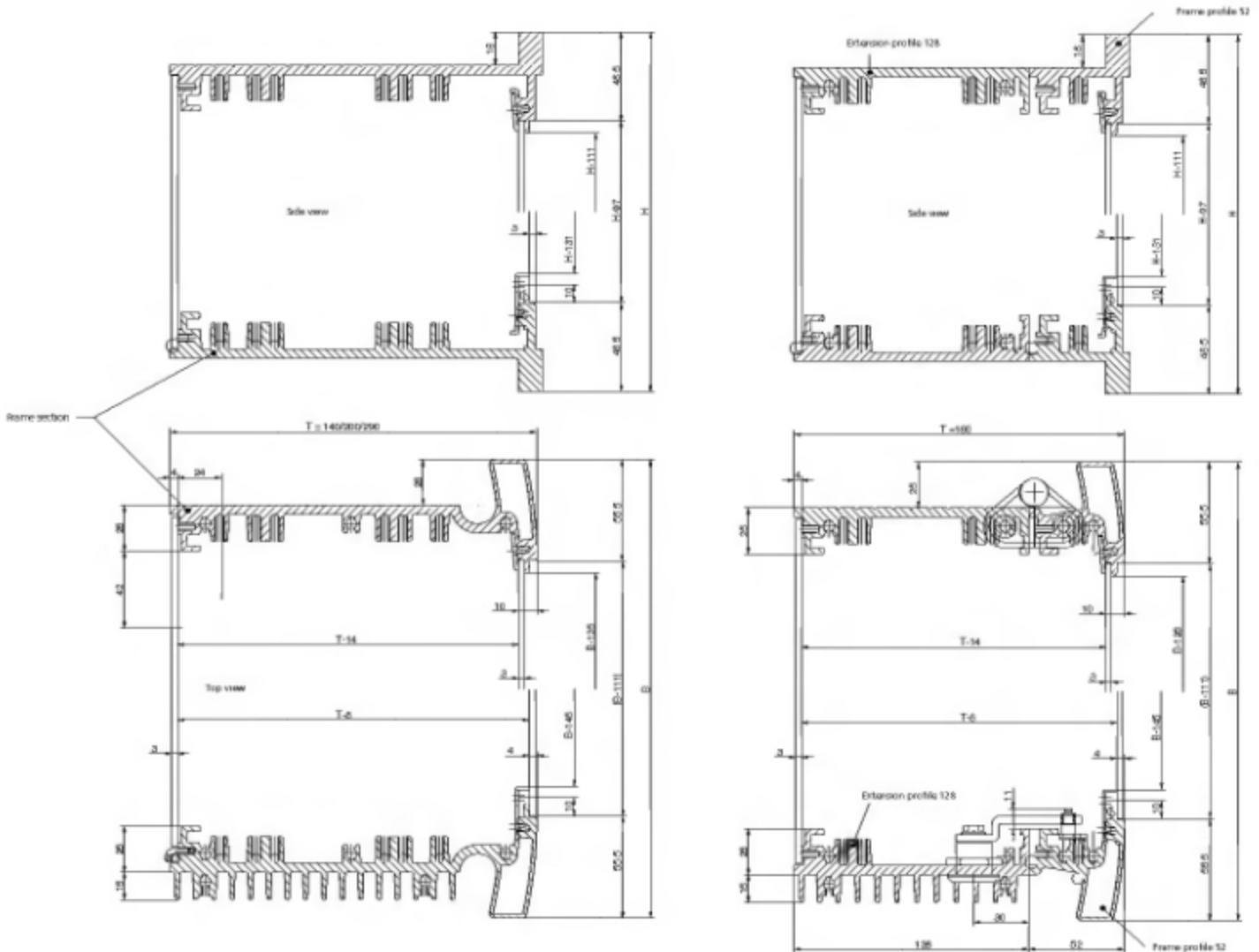
Height and width up to 800 x 800 mm may be freely chosen. Sizes outside of this range can be confirmed upon request.

If the front plate is installed in front then – for the profiles 52, 140, 200 and 290 the lay-on surface is 3.0 mm low

– for the profiles 52 and 80 the lay-on surface is 6.5 mm low

Frame profile
52 mm
80 mm
140 mm
200 mm
290 mm

Extension profile
68 mm
128 mm
228 mm



Standard sizes

Part number	External dimensions enclosure W x H x D (mm)	19" component dimensions	Profile size frame/ extension (mm)	Front plate dimensions (mm)	External mounted front plate mounting area dimensions (mm)	Front plate part number: cut to size, unmachined	Available mounting depth with 3 mm front plate min/max (mm)	Rear door configuration: s = hinged f = fixed, suspension system machining
114.4.0000.11	596 x 364 x 140	84 TE x 6 HE	140/-	485 x 267	451 x 233	954.5.9820.00	132	s, 50/60 above
124.4.0000.11	596 x 364 x 200	84 TE x 6 HE	200/-	485 x 267	451 x 233	954.5.9820.00	192	s, 50/60 above
134.4.0000.11	596 x 364 x 290	84 TE x 6 HE	290/-	485 x 267	451 x 233	954.5.9820.00	282	s, 80 above
156.4.0000.11	596 x 364 x 180	84 TE x 6 HE	52/128	485 x 267	451 x 233	954.5.9820.00	172	f, 50/60 above
114.4.0000.14	596 x 453 x 140	84 TE x 8 HE	140/-	485 x 356	451 x 322	954.5.9830.00	132	s, 50/60 above
114.4.0000.17	596 x 542 x 140	84 TE x 10 HE	140/-	485 x 445	451 x 411	954.5.9840.00	132	s, 50/60 above

Includes as standard

- Enclosures assembled and painted
 - horizontal profiles in RAL 7043 traffic grey B.
 - vertical profiles clear anodised
 - all profiles smooth without cooling fins
 - hinged rear door (hinge left)
 - with hinged front frame (hinge left)
 - fixed rear wall
- 19" mounting set
(Part number 980.6.2320.00)
 - screws and captive nuts M6
- 8 mm square lock on all hinged doors
- Suspension system machining for BERNSTEIN CS-2000 (50, 60 or 80)

Accessories

- Front plate, internal mounting
- Front plate mounting set
(Part number 980.6.2330.00)
- Other accessories upon request

Note: Shorter lead times for standard sizes!

Application samples:



Combination of front profile 200 and back door 68.

Directly mounted Industrial-PC with operator panel and keyboard drawer.

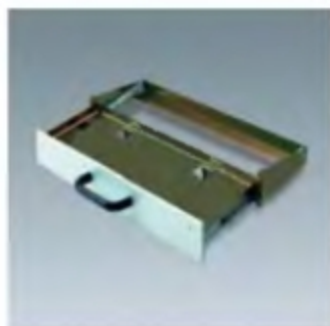


Front profile 80 with hinged back plate.

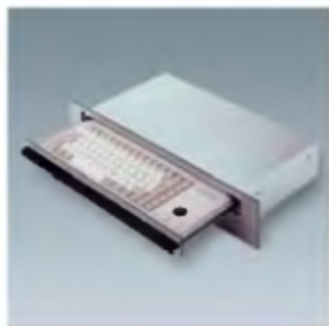
Directly mounted Industrial-PC with operator panel.

Accessories enclosure

CC-4000



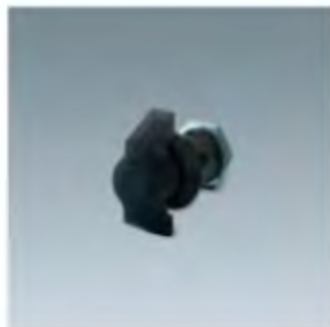
Keyboard drawer
Part number 928.6.0500.00
Dimensions (W x H x D):
500 x 77 x 170 mm
Front plate: clear anodised
Handle bar: black



Keyboard drawer with keyboard
Part number 928.6.0610.00
Dimensions (WxHxD): 483x88x218 mm
Layout: IBM-AT (MF2) german with trackball
Ingress protection: IP 65 if closed
Front plate: 5 mm



Fan 24 V DC
Part number 942.1.2240.00
Flow rate 30 m³/h



Locking belt without lock
Part number 942.1.6420.00



Locking belt with E1-lock
Part number 942.1.6430.00



Integrated-push socket
Part number 942.1.2180.00

Accessories enclosure CC-4000



CD-ROM-Cover
Part number 980.6.2170.00
Dimensions (W x H x D):
177 x 119 x 8 mm
Surface: possible to paint



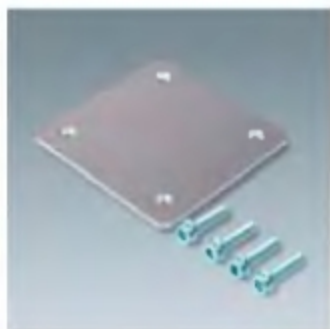
Floppy-Cover
Part number 980.6.2190.00
Dimensions (WxHxD): 120 x 92 x 8 mm
Surface: possible to paint



Door angle limitation
Part number 980.6.2540.00



Cover for adapter flange
Part number 951.1.7710.00
Suspension system: CS-2000-80
Surface: possible to paint



Cover for coupling
Part number 951.7.7810.00
Suspension system: CS-2000-80
Surface: possible to paint



Ground strap 200 mm
Part number 941.1.0480.00
Ribbon cable, copper

Check list

Price enquiry, Order form

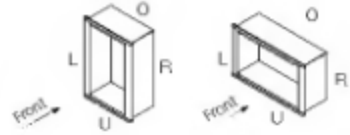
Control enclosure CC-4000

Grey boxes with thick frame refer to standard design.

Customer	Code	Part -No.
Address	Cust.-No.	
Telephone	Telefax	Branch
Contact	Department	
<input type="checkbox"/> Price enquiry	Date	Qty.
<input type="checkbox"/> Enquiry	Enquiry No.	Annual need
<input type="checkbox"/> Order	Delivery date	Qty.

1 Enclosure orientation

Standard
 Desk version, control enclosure
 Desk version, keyboard housing



O = Profile top
 U = Profile bottom
 L = Profile left
 R = Profile right

Weight of mounted components
 _____ kg

2 Dimensions (mm)

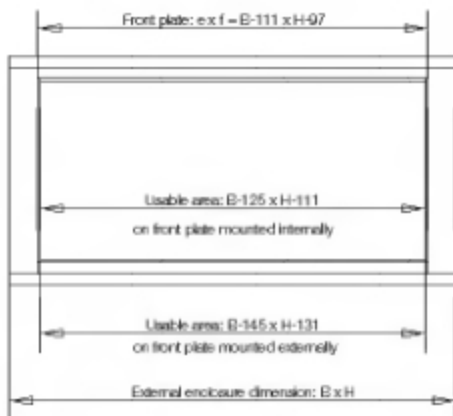
Enclosure dimensions overall:
 Width x Height (B x H) x

19"-Enclosure B x H x

$H = (n \times HE) + 97 - 1$ HE = 44.45 HE =

Front plate dimensions: e x f = B-111 x H-97 x

Back plate dimensions: b x h x
 b x h = B-61 x H-47
 b x h = B-63 x H-47 (hinged back plate)



3 Profile Profile without fins Profile with fins

4 Enclosure depth external

or

front profile with mounted FP 3.0 mm deep

52 140 200 290

Front profile with FP 6.5 mm deep

52 80

Extension

68 128 228 128 68

68 128 228 128 68

* Internal depth by mounted FP 3.0 mm
 For mounted FP 6.5 mm internal depth is reduced by 3.5 mm

	52	80	120	140	148	180	188	200	208	216	248	268	276	280	290	308	328	336	348	358	368	376	396	408	418	426	428	436	456	486	496	518	A		
Profile	38	66	106	126	134	166	174	186	194	202	234	254	262	266	276	294	314	322	334	344	354	362	382	394	404	412	414	422	442	472	482	504	I*		
52	●																																		
80		●																																	
140			●																																
200				●																															
290					●																														
68			●																																
68				●																															
128					●																														
128						●																													
228							●																												

A = External depth, I = Internal depth. With front plate mounted from the inside. Assembly from the outside - internal depth increases about 6 mm. ■◆ = alternatively combination

5 Door hinging (suspension system position)


Back plate

Extension 2

Extension 1

Profile with back plate fixed

Door hinging



Extension 2

Extension 1

Frame profile

Position of suspension system machining in profile (from 140)



6 Separating piece not mounted Standard vertical Qty. mounted right
 mounted left horizontal Qty. mounted at bottom
 mounted at top Operating plate anodised (not mounted), s = 3 mm
Dimension: g x h
(g = width, h = height)Operating plate 1 x Operating plate 2 x **Attention!** Separating piece height for frame profile with mounted front plate 3.0 mm = 20 mm/front plate 6.5 mm = 25 mm**7 Front plate** none with 3 mm, from inside
 3 mm, from outside**Back plate** none with 3 mm, fixed from outside
 3 mm, hinged**Accessories (Front plate)**

-
- For plates mounted internal: gasket and fixing material
-
-
- For plates mounted external: gasket/washers/nuts M5
-
-
- 19"-fixing set (980.6.1120.00): Screws and nuts M6

8 LockSquare (mm): 6 7 8 Standard
Triangular (mm): 7 8
Double beard (mm): 3 5
Daimler Chrysler:

-
- Toggle without lock
-
-
- Toggle with lock
-
-
- Toggle with lock E1
-
-
- Special lock/customer specific

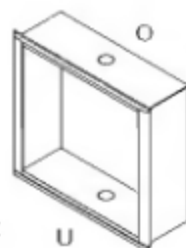
9 Machining for suspension system No O U**Coupling**

-
- Swivel tilt coupling (from profile 128)
-
-
- Flange (indicate profile size)
-
-
- Angle adapter (from profile 200)
-
-
- Special machining customer specific

System

-
- SL (only profile 80)
-
-
- 50 (from profile 128)
-
-
- 60 (from profile 128)
-
-
- 80 (from profile 128)
-
-
- 80/140 (from profile 290/228)

in the profile:

**10 Paints****Standard****Customised design**Profile horizontal: RAL 7043, painted
Profile vertical: anodised, natural colour
Separator piece: RAL 7043, painted
Front plates: anodised, natural colour
Back plates: anodised, natural colour

-
-
-
-
-
-
-
-
-

11 EMV (electro magnetic compatibility) version (Protection degree IP 54)

-
- Conducting connections between enclosure main body, enclosure door, front plate and back plate

12 Accessories, notes

Included in delivery: key an earth-set

<input type="checkbox"/> End.	Sales	Techn. dept	Planning dept.	Enquiry
<input type="checkbox"/> No encl.				Order

Pedestal/Desk version CC-4000

In addition to mounting the CC-4000 on the CS-2000 and CS-2000 SL suspension systems BERNSTEIN also offers the options of a simple free-standing pedestal and standing or hanging desk models.

With newly developed components this option offers a stylish and space saving workplace for industrial PC users. All models feature enclosure and keyboard tilt capabilities to facilitate an optimum user interface regardless of the individual's height or lighting conditions.



Cables may be run up the pedestal via a rear integrated cable channel which is hidden through a rubber seal. In the pedestals with integrated mounting drum cables with plugs can be through fed for direct connection to controllers or the keyboard.

All pedestal or desk models are available immediately ex-stock. Using the check list a fully configured CC-4000 complete with suspension system can be quickly configured. Accessories include roller sets which may be mounted without machining directly to the pedestal base. Height adjustable feet are also available.



Delivery includes

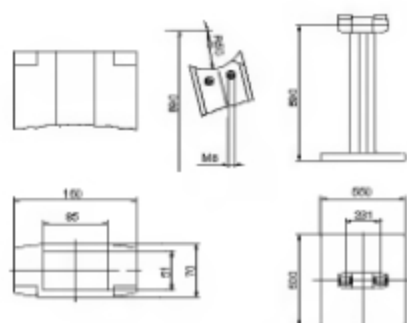
- Basic pedestal, desk pedestal, hanging desk, mounting feet and rollers are supplied with fixings and instructions
- Ex-stock availability
- Painted RAL 7035 finish
- Special colours upon request





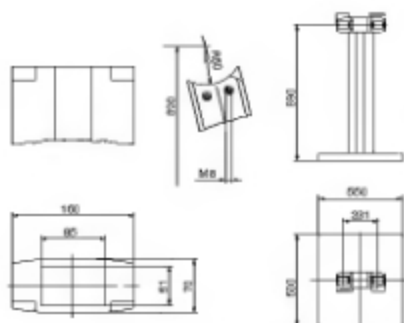
Basic pedestal
Part number 101.6.7450.00

Free standing pedestal with integrated attachment for adjustable 0° to 30° mounting of CC-4000 and CC-2000 SL control enclosures. Colour RAL 7035. Complete with fixings and instructions. Mechanical preparation of enclosure necessary.



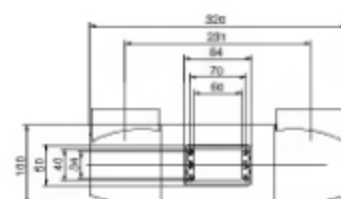
Desk pedestal
Part number 101.6.7440.00

Free standing pedestal with integrated desk attachment for adjustable 0° to 30° mounting of CC-4000 and CC-2000 SL control enclosures and keyboard housings (0° to 20°). Colour RAL 7035. Complete with fixings and instructions. Mechanical preparation of enclosure and keyboard housing necessary.



Hanging desk attachment
Part number 980.8.0131.00

Hanging desk attachment for all CC-4000 desk control enclosures attached to the CC-2000 suspension system. Keyboard housing may be tilted 0° to 30°. Colour RAL 7035. Complete with fixings and instructions.



Rollers
Part number 980.8.0128.00

Rollers include 4 directional wheels for desk or pedestal models. Complete with fixings and instructions



Adjustable feet
Part number 980.8.0129.00

Height adjustable feet (1 Set = 4 pieces) for desk or pedestal use. Complete with fixings and instructions

Selection criteria for suspension systems

Mechanical stress/load capacity

Differently assembled suspension systems can cope with different levels of stress (loads).

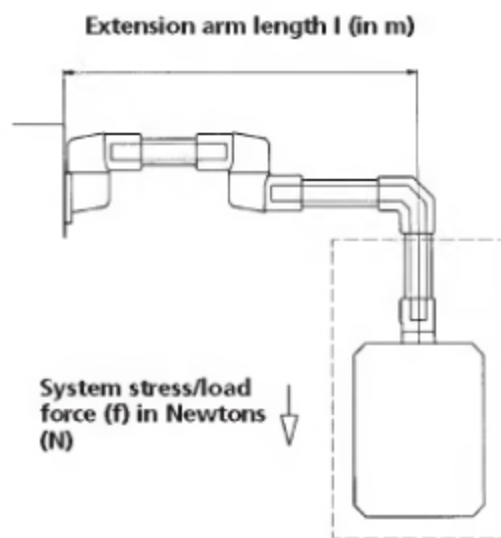
The mechanical stress (load) induced by the weight of the enclosure to be supported (with all internal components installed) combined with the desired length of the extension arm is an important consideration when selecting the correct suspension system.

System selection is made easier by using the opposite diagram. If a swivel tilt coupling is used to support the enclosure, a maximum load of 300N will apply.

To determine the force f (system stress/load) from the housing weight m :
 $f \text{ (N)} = m \text{ (kg)} \times g \text{ (ms}^{-2}\text{)}$
 system stress/load f = enclosure weight m multiplied by the acceleration due to gravity g
 $f \text{ (N)} = m \text{ (kg)} \times 9.81 \text{ (ms}^{-2}\text{)}$

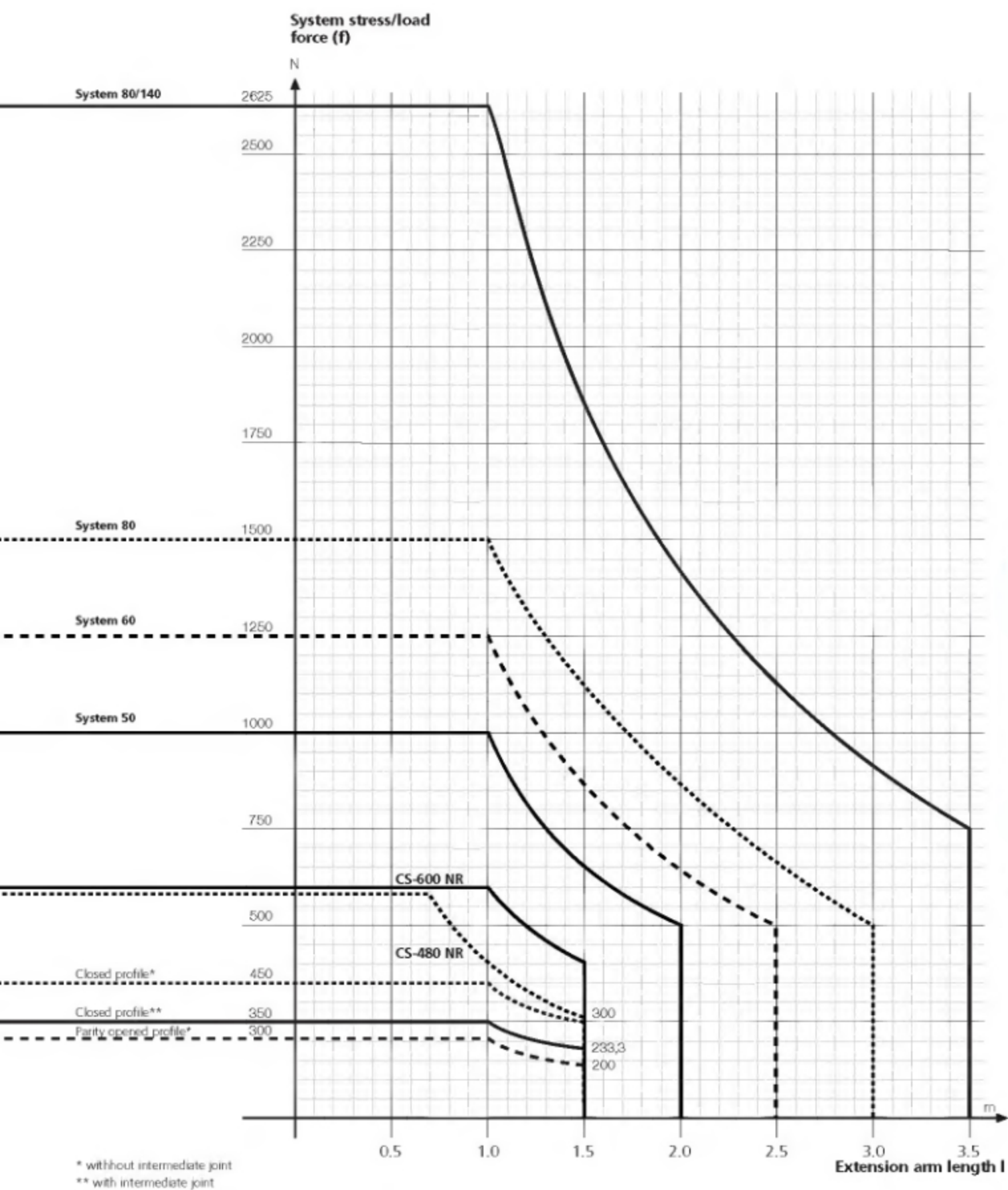
Heavy-duty suspension system CS-2000

Suspension system for medium to heavy loads CS-2000



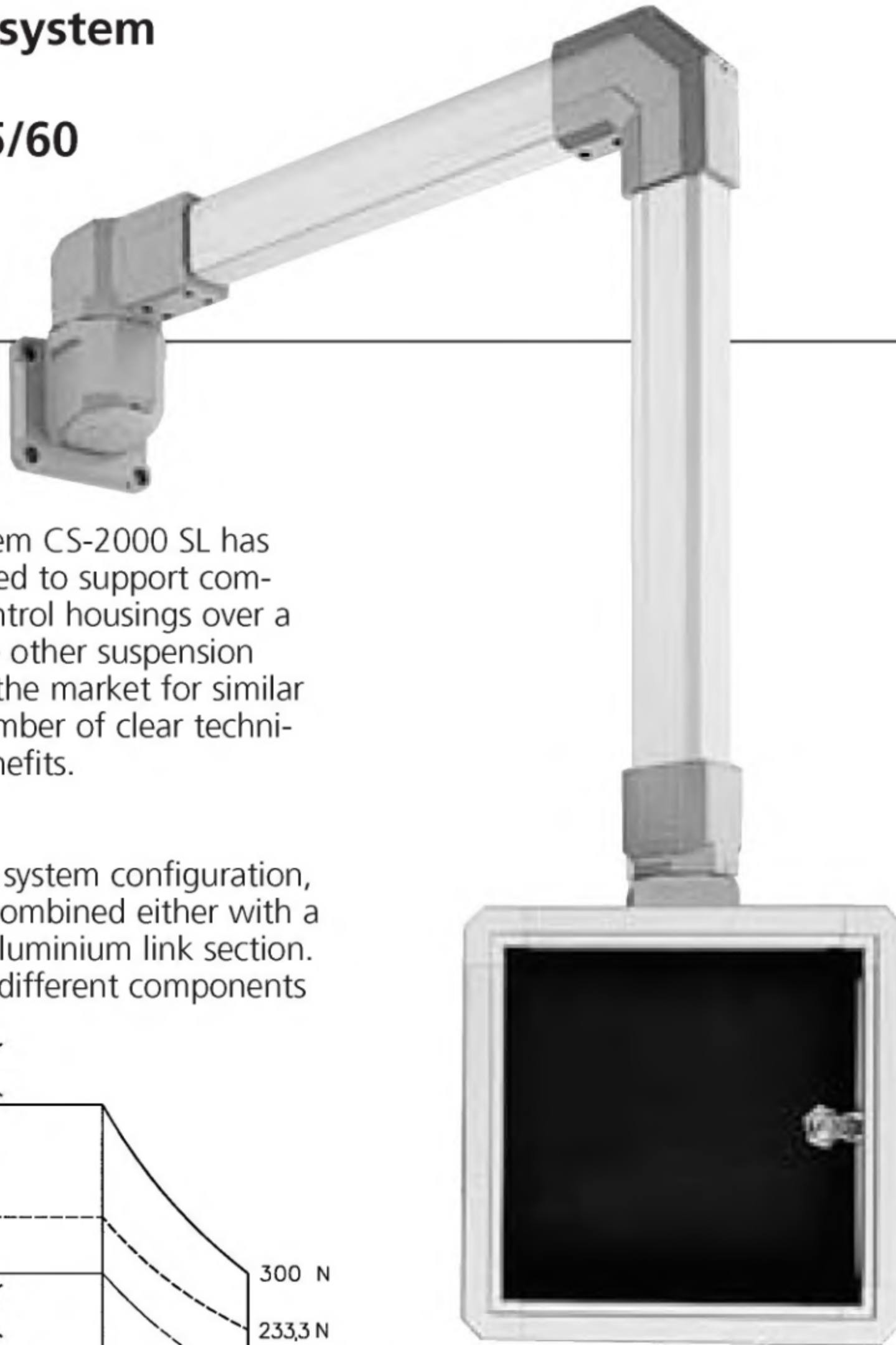
Stainless steel suspension system CS-600 NR CS-480 NR

Light-weight suspension system CS-2000 SL



Light weight system

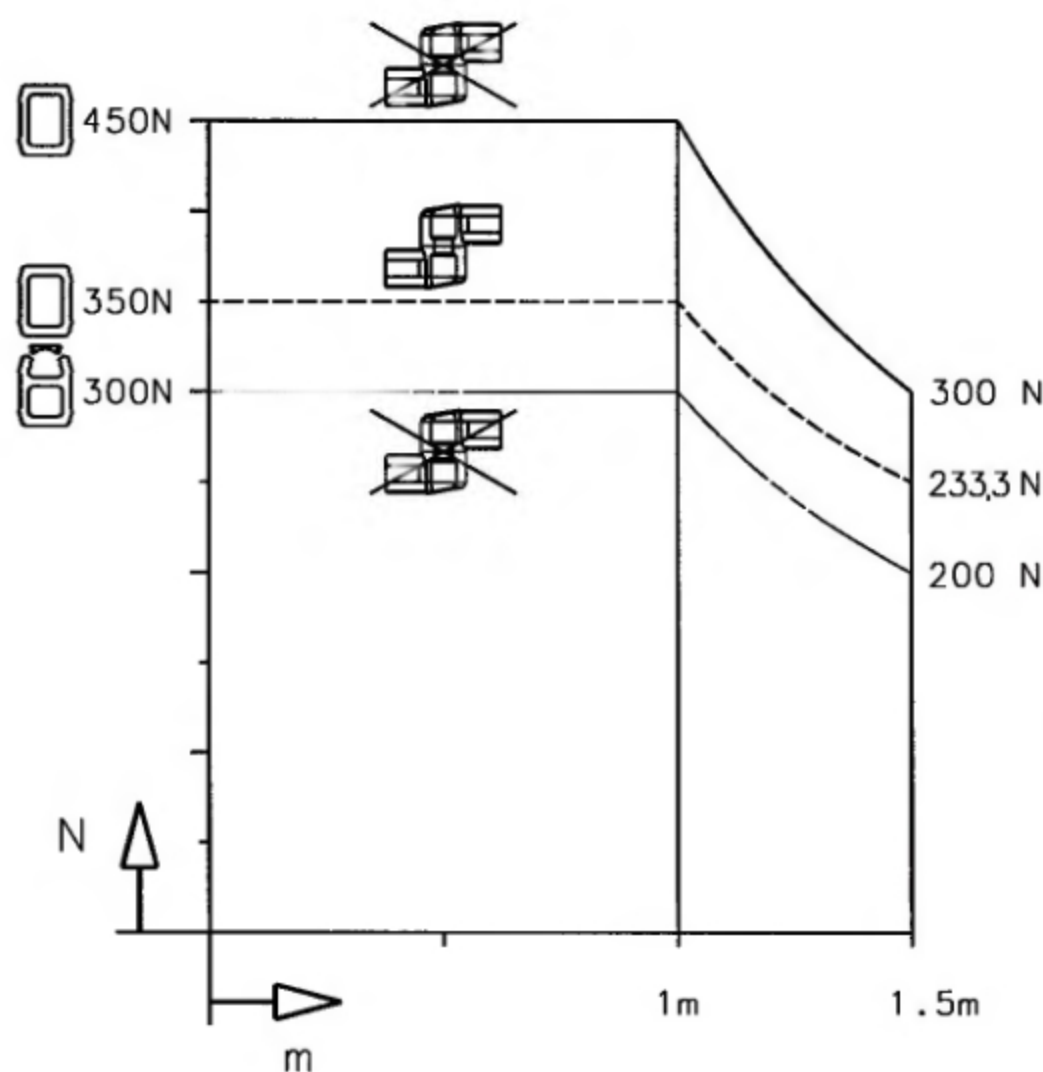
CS-2000 SL 45/60



The light weight system CS-2000 SL has been specially designed to support compact, light weight control housings over a short distance. Unlike other suspension systems currently on the market for similar purposes, it has a number of clear technical and economic benefits.

System structure

To obtain the desired system configuration, components can be combined either with a closed or open top, aluminium link section. The large number of different components



available, allows a great variety of system configurations. Construction should follow the specifications in the load diagram.

Materials

- Gravity-die-cast aluminium components: AlSi12 (Cu)
- Installation opening: POM
- Bearing: PA
- Seals: CR
- Aluminium link section: Al Mg Si 0.5
- Link section cover with open profile: EPDM

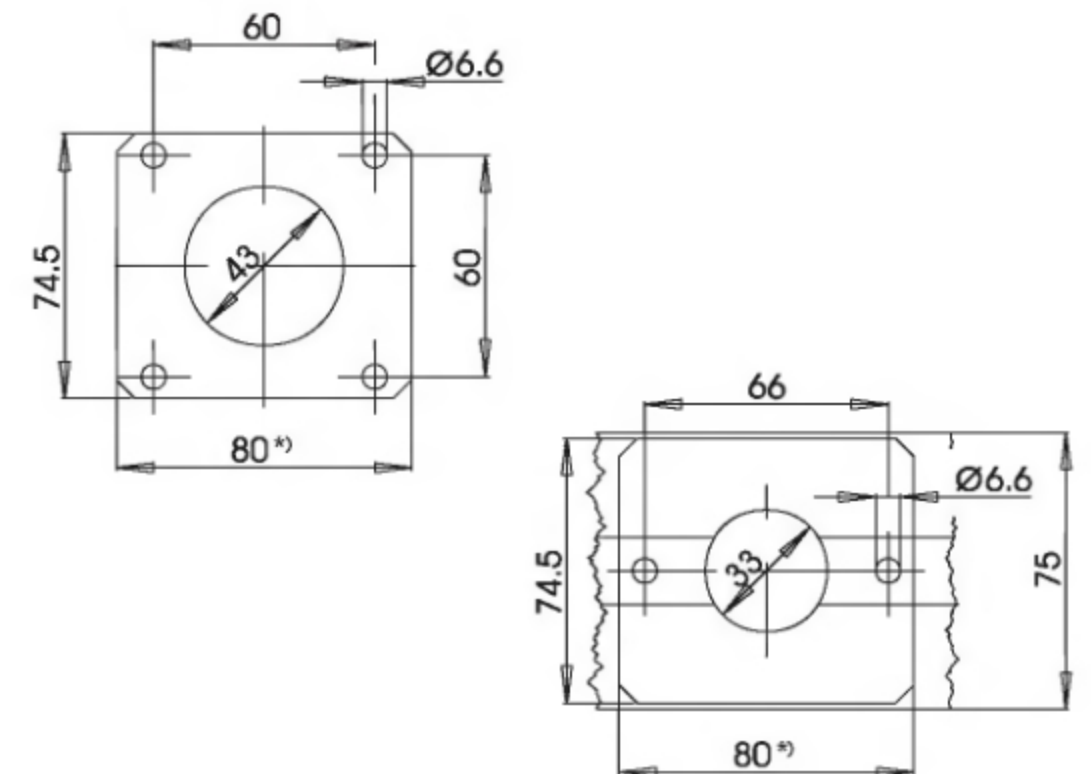
Colours

- Suspension system components: light grey, RAL 7035
- Link section: silver, clear anodised

System benefits

- Installation openings at elbow points
- Choice between the use of open and closed link sections
- Free cable passage area with closed system:
dia. 40 mm = 12.5 cm² at the narrowest point (bearing passage)
- Free cable passage area with partially closed system:
– 2.76 cm² at the narrowest point (where the section enters the component)
– 7.40 cm² within an enclosed tube
- Simply added rotation limiter for couplings and joints
- Couplings have a small flange which can be fixed to very narrow housings
- "Overhead" installation of all components possible
- Modern industrial design
- Protection system IP 65

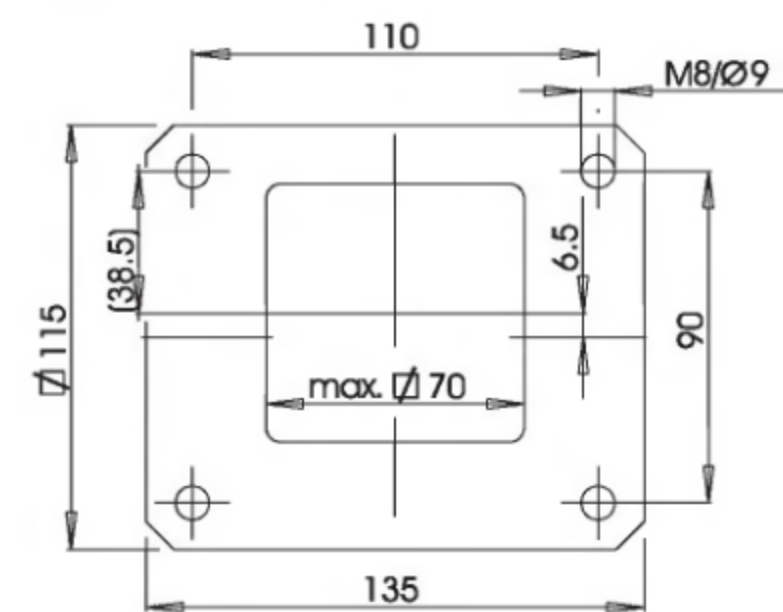
Components for mounting housings



For	Part number
Coupling	101.5.1630.00
Elbow coupling	101.5.1650.00
Base bracket coupling	101.5.1670.00
Angled coupling	101.5.1640.00
Angled elbow coupling	101.5.1660.00
Angled base bracket coupling	101.5.1680.00
Adjustable angle coupling	101.5.1690.00
Adjustable angle elbow coupling	101.5.1700.00

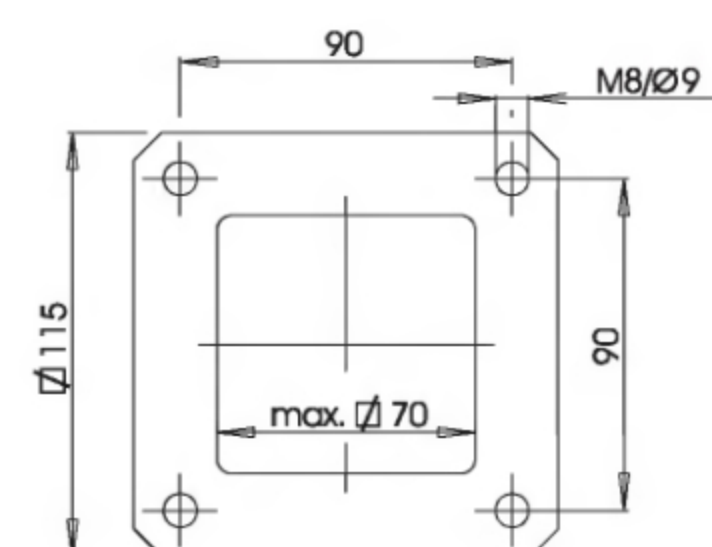
*) The CC-2000 section 75 has a bore diameter of 33 mm

Machining drawing for wall joints



For	Part number
Wall joint with horizontal outlet	101.5.1750.00
Wall joint with vertical outlet	101.5.1770.00

Machining drawing for other elements

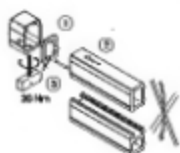


For	Part number
Base bracket coupling	101.5.1670.00
Angled base bracket coupling	101.5.1680.00
Base bracket, rotating	101.5.1780.00
Set-up joint	101.5.1750.00
Base bracket/wall flange	101.5.1790.00

Link profile

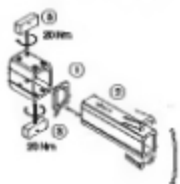
CS-2000 SL 45/60

Installation of the link profiles



- [A] Open or closed section in couplings and elbows:

Attach seal to link section (1), mount link section onto suspension system components (2, 3).



- [B] Closed section in suspension system components with 8 fastening screws:

Attach seal to link section (1), mount link section into suspension system components (2, 3), making use of the adjustment facility.



- [C] Open section in suspension system components with 8 fastening screws:

Attach seal to link section, mount link section into suspension system components, making sure, however, you only mount using the 4 fastening screws onto the closed part of the tube. Fit cover seal.

Link sections

The link section is an extruded aluminium profile (Al Mg Si 0.5). The surface is clear anodised, so that it has a colour similar to RAL 9006. The link section can be used either with an open cable duct or with a completely closed one. The partially open section has a cover made from EPDM, similar to RAL 7042. This flexible plastic cover can easily be pulled out and pushed back in place.

Weight

Open profile: 3.76 kg/m
Closed profile: 3.50 kg/m



Open profile	
Dimensions (mm)	Part number
45 x 60 x 250	952.4.0010.00
45 x 60 x 500	952.4.0020.00
45 x 60 x 750	952.4.0030.00
45 x 60 x 1000	952.4.0040.00
45 x 60 x 1250	952.4.0050.00
45 x 60 x 1500	952.4.0060.00
45 x 60 x 2000	952.4.0080.00

Closed profile	
Dimensions (mm)	Part number
45 x 60 x 250	952.4.3010.00
45 x 60 x 500	952.4.3020.00
45 x 60 x 750	952.4.3030.00
45 x 60 x 1000	952.4.3040.00
45 x 60 x 1250	952.4.3050.00
45 x 60 x 1500	952.4.3060.00
45 x 60 x 2000	952.4.3080.00



Turn to page 344 ff + to select
– Loading capacity
– Cable routing cross-section

System components

Light-weight suspension system for small loads

Type CS-2000 SL System size 45/60

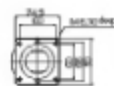
Part	
Weight	(g)
Part number	



For enclosure mounting
Coupling CS-2000 SL

740
101.5.1630.00
Angle of rotation 300° with limiter
Complete with installation fixings, seals and instructions for installation

Dimensions in mm



980 5 1290 00

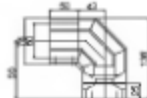
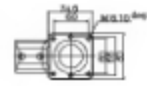
Detail
Accessories, can be retro-fitted
Rotation limiter (see page 426)



For enclosure mounting
Elbow coupling CS-2000 SL

960
101.5.1650.00
Cable installation access with plastic clip-on cover
Angle of rotation 300° with limiter
Complete with installation fixings, seals and instructions for installation

Dimensions in mm



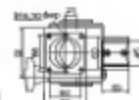
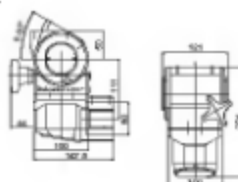
980 5 1290 00



For enclosure mounting
Adjustable angle elbow coupling CS-2000 SL

3300
101.5.1700.00
Angle of rotation 300° with limiter
Inclination angle infinitely adjustable 0–30°
Complete with installation fixings and seals
Housing max 300N

Dimensions in mm



980 5 1300 00

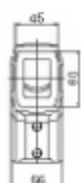
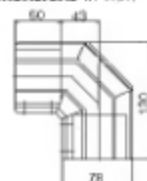
Detail
Accessories, can be retro-fitted
Rotation limiter (see page 426)



Elbow CS-2000 SL

590
101.5.1710.00
Cable installation access with plastic clip-on cover
Complete with seals and instructions for installation

Dimensions in mm





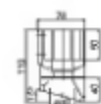
For enclosure mounting
Angled coupling CS-2000 SL

1100

101.5.1640.00

Inclined angle 15°
Angle of rotation 300°
with limiter
Complete with installation
fixings, seals and
instructions for installa-
tion

Dimensions in mm



980.5.1290.00



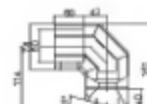
For enclosure mounting
Angled elbow coupling CS-2000 SL

1400

101.5.1660.00

Inclined angle 15°
Cable installation access
with plastic clip-on cover
Angle of rotation 300°
with limiter
Complete with installa-
tion fixings, seals and
instructions for installa-
tion

Dimensions in mm



980.5.1290.00



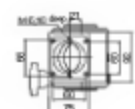
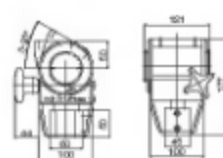
For enclosure mounting
Swivel tilt coupling CS-2000 SL

3000

101.5.1690.00

Angle of rotation 300°
with limiter
Inclination angle infinite-
ly adjustable 0–30°
Complete with installa-
tion fixings and seals
Housing max. 300 N

Dimensions in mm



980.5.1300.00



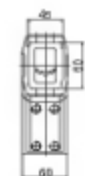
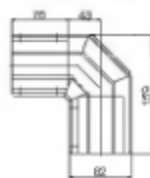
Elbow for moment load CS-2000 SL

1000

101.5.1720.00

Elbow with reinforced
wall strength
Link section adjustment
Cable installation access
with plastic clip-on cover
Complete with seals and
instructions for installa-
tion

Dimensions in mm



-



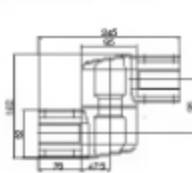
Intermediate join CS-2000 SL

2130

101.5.1740.00

Pivoting angle 360° with
limiter
Cable installation access
on both sides
Link section adjustment
Complete with seals and
instructions for installa-
tion

Dimensions in mm



980.5.1320.00



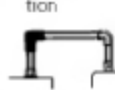
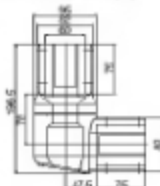
Rotation elbow CS-2000 SL

1850

101.5.1730.00

Rotation angle 300° with
limiter
Link section adjustment
Cable installation access
with clip-on plastic cover
Complete with seals and
instructions for installa-
tion

Dimensions in mm



980.5.1320.00

System components

Light-weight suspension system for small loads

Type CS-2000 SL System size 45/60

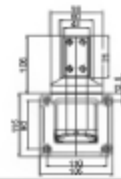


Part	
Weight	(g)
Part number	

Wall joint with vertical outlet CS-2000 SL

1840
101.5.1770.00
Pivoting angle 300° with limiter
Link section adjustment
Cable installation access with clip-on plastic cover
Complete with seals and instructions for installation

Dimensions in mm

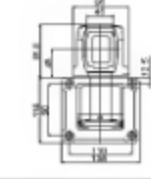
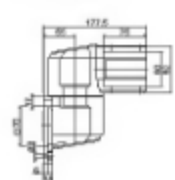


980 5 1320 00

Wall joint with horizontal outlet CS-2000 SL

2090
101.5.1760.00
Pivoting angle 300° with limiter
Link section adjustment
Cable installation access with clip-on plastic cover
Complete with seals and instructions for installation

Dimensions in mm



980 5 1320 00

Detail	
Accessories, can be retro-fitted	
Rotation limiter (see page 426)	

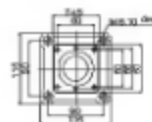
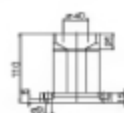


Part	
Weight	(g)
Part number	

Base bracket coupling CS-2000 SL

1180
101.5.1670.00
Integrated component
Pivoting angle 300° with limiter
Complete with installation fixings, seals and instructions for installation

Dimensions in mm

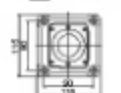
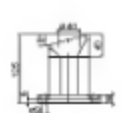


980 5 1290 00

Angled base bracket coupling CS-2000 SL

1200
101.5.1680.00
Pivoting angle of 300° with limiter
Fixed incline of 15°
Complete with installation fixings, seals and instructions for installation

Dimensions in mm



980 5 1290 00

Detail	
Accessories, can be retro-fitted	
Rotation limiter (see page 426)	



Set-up joint CS-2000 SL

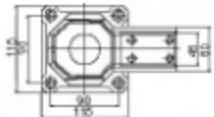
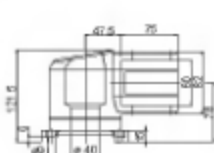
1720

101.5.1750.00

Pivoting angle 300° with limiter

Link section adjustment
Cable installation access with clip-on plastic cover
Complete with seals and instructions for installation

Dimensions in mm



980.5.1320.00



Base bracket, turnable, CS-2000 SL

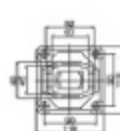
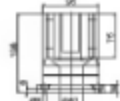
1460

101.5.1780.00

Pivoting angle 300° with limiter

Link section adjustment
Complete with seals and instructions for installation

Dimensions in mm



980.5.1320.00



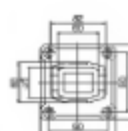
Base/wall flange CS-2000 SL

690

101.5.1790.00

Link section adjustment
Complete with seals and instructions for installation

Dimensions in mm



-



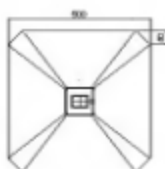
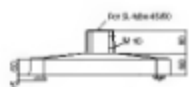
Free standing base CS-2000 SL

11820

101.5.1800.00

Large surface foot for stable, free standing applications

Dimensions in mm



-

Light-weight suspension system CS-2000 SL

Panel components



Application areas

In many industrial applications a trend to decentralised operate and visualisation units can be observed. The used terminals usually show a flat shape, because control intelligence is no longer integrated. Flat terminals often cannot be used close to a machine by a suspension system, because the building depth does not permit an attachment of the suspension system from top or bottom. In this case a connection over the rear wall is necessary.

Variety of configurations

The panel components allow a rear connection and have the advantage of being integrated into the conventional light-weight suspension system CS-2000 SL. For the user the complete configuration variety of an approved suspension system is so available also for this application.

Variations:

- Panel coupling with vertical connection
- Panel elbow coupling with horizontal connection
- Panel-swivel tilt coupling horizontal
- Panel-swivel tilt coupling vertical

Quality and availability

BERNSTEIN provides a high quality standard. All panel components are available from stock.

Panel components



Panel coupling

Part number 101.5.2320.00 (Standard)
Part number 101.5.2510.00 (Beckhoff)



Panel elbow coupling

Part number 101.5.2330.00 (Standard)
Part number 101.5.2520.00 (Beckhoff)



Panel swivel tilt coupling V/H

Part number 101.5.2360.00 (Standard)
Part number 101.5.2540.00 (Beckhoff)

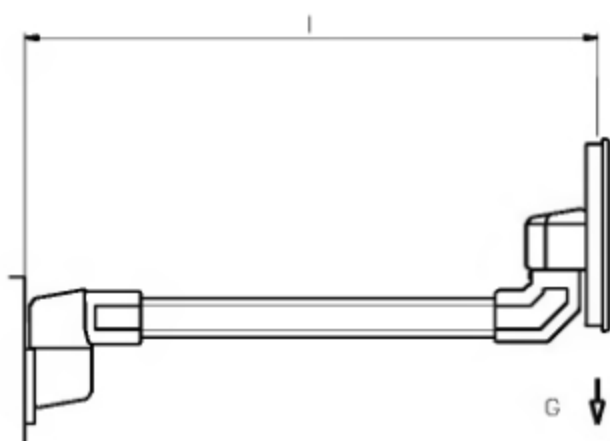


Panel swivel tilt coupling V

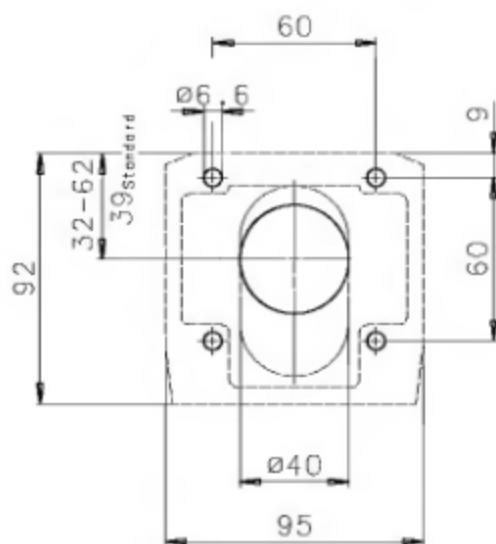
Part number 101.5.2350.00 (Standard)
Part number 101.5.2530.00 (Beckhoff)

Technical data

Load capacity



Machining drawing for enclosure rear wall



Mechanical characteristics

Max. load capacity G	250 N
Max. system length	1500 mm

Materials

Components	AlSi12 (Cu) - Chilled casting
Installation opening	POM
Bearing	PA
Gaskets	CR

Operating and ambient conditions

Protection class	IP 54 according EN 60529
Temperature range	-25 °C ... + 80 °C

Scope of services

Scope of supply	Panel components incl. gasket and mounting instruction
Colouring	RAL 7035 (Standard) / RAL 7012 (Beckhoff)
Availability	from stock

Suspension systems

CS-2000 50/60/80

With its large variety of components and different system sizes (50P, 60P and 80P), the BERNSTEIN range of suspension systems CS-2000 provides a technically mature solution for numerous applications.

System structure

The following conditions are important for your choice of system:

- Load-bearing capacity of the overall system
- Free passage for cables
- Design
- System configuration

Having decided on the right size of the system, you need to select the necessary components and tubes, so that you can put together the desired configuration.

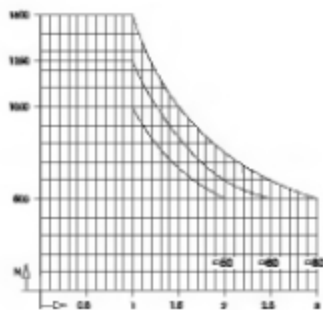
System sizes

This concerns the suspension systems of the sizes 50P, 60P and 80P. The figures refer to the dimensions of steel tubes that link up the components.

System 50P – steel tube 50 x 50 mm

System 60P – steel tube 60 x 60 mm

System 80P – steel tube 80 x 80 mm



Selection support for different load capacities are presented on pages 400/401.



Materials

- Gravity-die-cast aluminium components: AlSi12 (Cu)
- Steel-cast components: GGG 40
- Steel welded constructions: St 37
- Suspension tubes: St 37
- Bearings: St/PTFE
- Seals: CR
- Installation opening: AlSi12 (Cu)
- Expansion bellows: PVC

Colours

- Suspension system components: light grey, RAL 7035
- Expansion bellows: light grey, RAL 7035
- Tubes: light grey, RAL 7035

System benefits

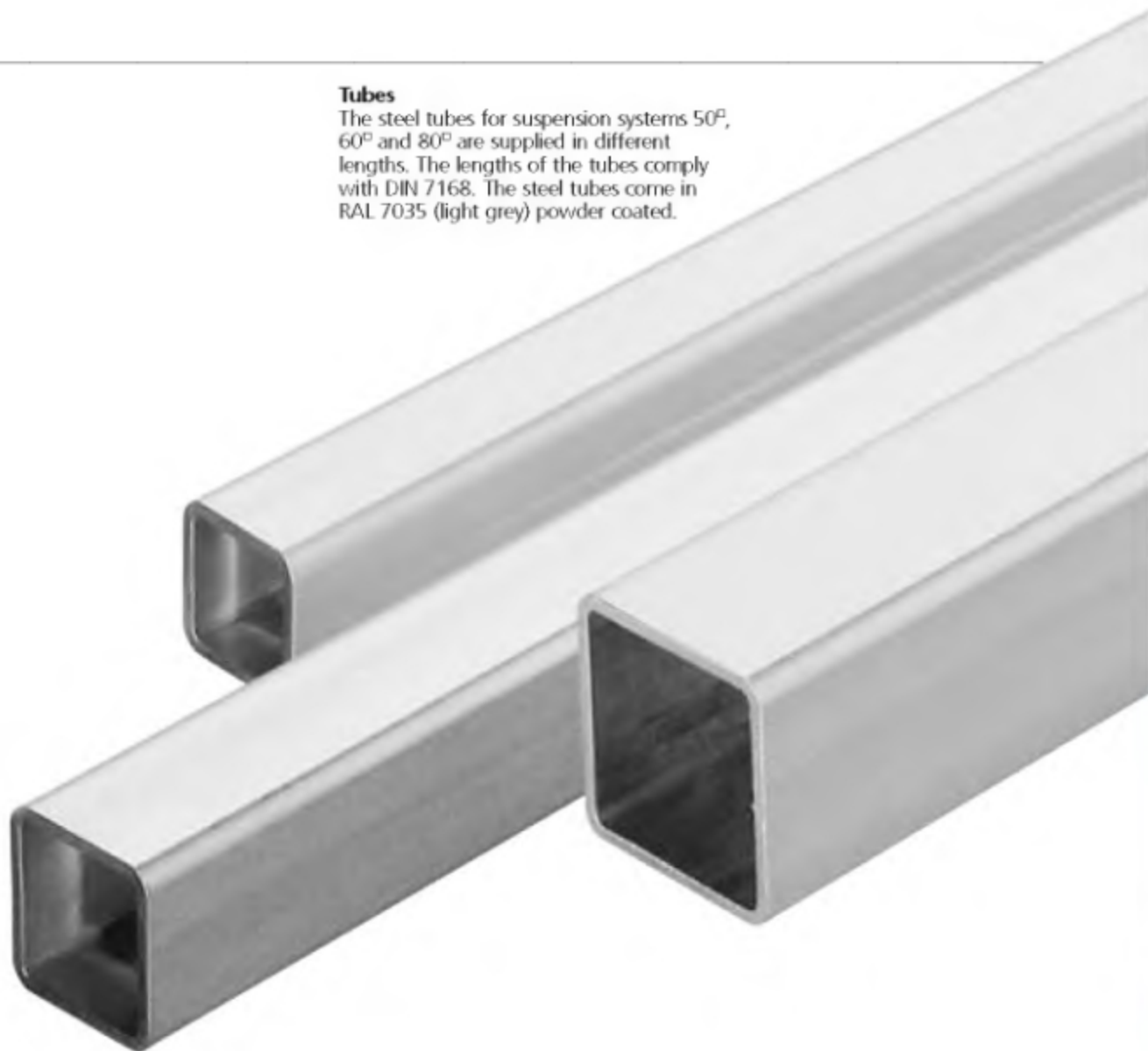
- Cable installation openings at all joints to simplify the installation of cables
- Integrated strain relief to ease the strain on cables
- High variability through the large number of available components
- Broad spectrum of applications through systems with different load-bearing capacities
- Flange coupling with damping lever at operator face and selectable rotation limiter
- Maintenance-free friction bearings in all joints and couplings
- Adjustment options for the exact adjustment of suspension tubes
- Wall and intermediate joints with damping lever at operator face and optional rotation limiter (available as accessories).

Connecting tubes

CS-2000 50/60/80

Tubes

The steel tubes for suspension systems 50^P, 60^P and 80^P are supplied in different lengths. The lengths of the tubes comply with DIN 7168. The steel tubes come in RAL 7035 (light grey) powder coated.



Weights

System 50 ^P	6.3 kg/m
System 60 ^P	8.1 kg/m
System 80 ^P	11.0 kg/m

Available lengths of tubes

Length (mm)	System 50 ^P	System 60 ^P	System 80 ^P
	Part number	Part number	Part number
250	952 5 0520 00	952 6 0390 00	952 7 1140 00
500	952 5 0530 00	952 6 0400 00	952 7 1150 00
750	952 5 0540 00	952 6 0410 00	952 7 1160 00
1000	952 5 0550 00	952 6 0420 00	952 7 1170 00
1250	952 5 0560 00	952 6 0430 00	952 7 1180 00
1500	952 5 0570 00	952 6 0440 00	952 7 1190 00
2000	952 5 0590 00	952 6 0460 00	952 7 1210 00
3000	952 5 0610 00	952 6 0480 00	952 7 1230 00

System components

Suspension system for medium loads

Type CS-2000 System size 50[□]



Part	
Weight	60
Material	
Part number	RAL 7035 light grey

For enduse mounting
Standard coupling, flange, CS-2000

9550	Dimensions in mm
Aluminium	
901.6.7000.00	

Angle of rotation 320°
with limiter
Clamping lever at
operator face
Complete with seals and
fixing screws



Detail



Accessories, can be retro-fitted
Rotation limiter (see page 426)
Light adapter (see page 426)

900.5.1760.00	
-	



Part	
Weight	60
Material	
Part number	RAL 7035 light grey

Elbow for moment load CS-2000

4500	Dimensions in mm
GGG	
901.6.7090.00	

Increased strength
Access cover
Complete with seals



Detail



Accessories, can be retro-fitted
Rotation limiter (see page 427)
Light adapter (see page 426)

-	
980.5.1870.00	



Intermediate joint CS-2000

4360	Dimensions in mm
Steel	
901.6.4540.00	

Expansion bellows can
be applied on at a later
stage

Rotation angle 180° with
limiter on either side
Integrated rotation tor-
que setting



980.5.0630.00	
-	



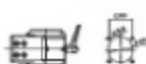
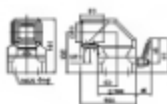
For enclosure mounting
Elbow coupling, flange CS-2000

2000

Dimensions in mm

101.6.7030.00

Angle of rotation 320°
with limiter
Clamping lever at
operator face
Complete with seals and
fixing screws



580 S. 1760.00

580 S. 1870.00



Elbow CS-2000

3100

Dimensions in mm

101.6.7060.00

Access cover
Complete with seals



580 S. 1870.00



Wall flange CS-2000

4260

GGG

101.6.4550.00

Complete with seals

Dimensions in mm



580 S. 0630.00



Wall joint CS-2000

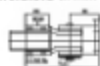
3500

Steel

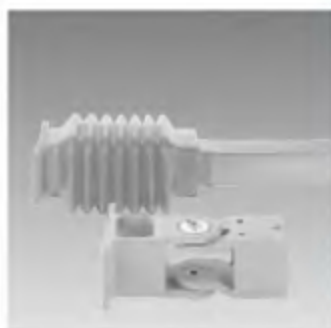
101.6.4560.00

Expansion bellows can
be applied on at a later
stage
Rotation angle 180° with
limiter on either side
Integrated rotation tor-
que setting

Dimensions in mm



580 S. 0630.00



Wall joint with cable inlet CS-2000

4720

Steel

101.6.4570.00

Expansion bellows can
be applied on at a later
stage
Rotation angle 180° with
limiter on either side
Integrated rotation tor-
que setting

Dimensions in mm



580 S. 0630.00

System components

Suspension system for medium loads

Type CS-2000 System size 50[□]

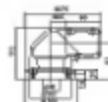


Part	
Weight	60
Material	GGG
Part number	RAL 7035 light grey

Set-up joint CS-2000

9390
GGG
901.6.7120.00
Angle of rotation 30° with limiter
Complete with seals

Dimensions in mm



Base bracket CS-2000

4320
GGG
901.6.4580.00
Complete with seals

Dimensions in mm



Detail



Accessories, can be retro-fitted

Rotation limiter (see page 426)	580.5.1770.00
Light adaptor (see page 426)	580.5.1870.00

580.5.1770.00
580.5.1870.00



Angle adapter CS-2000

15° = 460 30° = 600 60° = 800

Aluminium

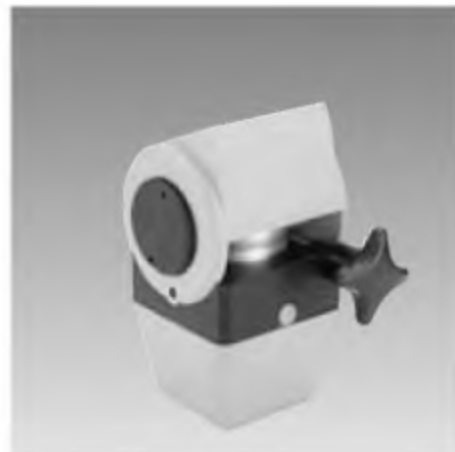
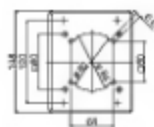
15° = 101.6.4590.00 30° = 101.6.4600.00 60° = 101.6.4610.00

The angle adapter is fixed firmly onto the flange or angle flange coupling. Complete with seals and fixing screws.

101.6.4590.00: A = 15°, B = 39
101.6.4600.00: A = 30°, B = 66
101.6.4610.00: A = 60°, B = 111



Dimensions in mm



Swivel tilt coupling CS-2000

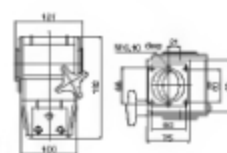
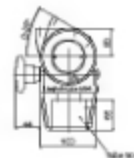
3000

Aluminium and PA

101.6.3190.00

Angle of rotation 300° with limiter
 Inclination angle infinitely adjustable 0–30°
 Complete with gaskets, fixing screws

Dimensions in mm



980.5.1300.00

System components

Suspension system for medium loads

Type CS-2000 System size 60[□]



Part	
Weight	60
Material	
Part number	RAL 7035 light grey

For enclosure mounting
Standard coupling, flange CS-2000

2380	Dimensions in mm
Aluminum	
901.6.7010.00	

Angle of rotation 320°
with limiter
Clamping lever at
operator face
Complete with gaskets
and fixing screws



Detail



900.5.1760.00	
---------------	--

Accessories, can be retro-fitted
Rotation limiter (see page 426)
Light adapter (see page 429)

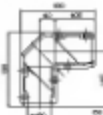


Part	
Weight	60
Material	
Part number	RAL 7035 light grey

Elbow for momentary load stress CS-2000

6000	Dimensions in mm
GGG	
901.6.7100.00	

Higher density
Unscrewable mounting
opening
Complete with gaskets



Detail



980.5.1880.00	
---------------	--

Accessories, can be retro-fitted
Rotation limiter (see page 427)
Light adapter (see page 429)



Intermediate joint CS-2000

5520	Dimensions in mm
Steel	
901.6.4640.00	

Expansion bellows can
be added on at a later
stage
Pivotal angle 180° with
limiter on either side
Rotation moment setting



980.5.0630.00	
---------------	--





For enclosure mounting
Elbow coupling, flange CS-2000

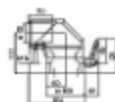
2950

Aluminum

101.6.7040.00

Angle of rotation 320°
with limiter
Unscrewable installation
opening
Clamping lever at
operator face
Complete with seals and
fixing screws

Dimensions in mm



580 S. 1760.00

580 S. 1880.00



Elbow CS-2000

1850

Aluminum

101.6.7070.00

Unscrewable installation
opening
Complete with seals

Dimensions in mm



580 S. 1880.00



Wall flange CS-2000

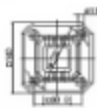
4900

GGG

101.6.4650.00

Complete with gaskets

Dimensions in mm



Wall joint CS-2000

5360

Steel

101.6.4660.00

Expansion bellows can
be applied on at a later
stage
Pivotal angle 180° with
limiter on either side
Rotation moment setting

Dimensions in mm



580 S. 0630.00



Wall joint for cable inlet CS-2000

5620

Steel

101.6.4670.00

Expansion bellows can
be applied on at a later
stage
Pivotal angle 180° with
limiter on either side
Rotation moment setting

Dimensions in mm



580 S. 0630.00

System components

Suspension system for medium loads

Type CS-2000 System size 60[□]



Part	
Weight	60
Material	
Part number	RAL 7035 light grey

Slip-on joint CS-2000

32740

GGG

901.6.7100.00

Angle of rotation 30°
with limiter

Complete with seals

Dimensions in mm



Base bracket CS-2000

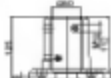
4800

GGG

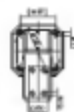
901.6.4680.00

Complete with seals

Dimensions in mm



Detail



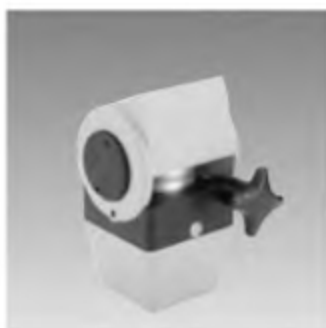
Accessories, can be retro-fitted

Rotation limiter (see page 426)

Light adaptor (see page 426)

980.5.1770.00

980.5.1880.00



Part	
Weight	60
Material	
Part number	RAL 7035 light grey

Swivel tilt coupling CS-2000

2900

Aluminum und PA

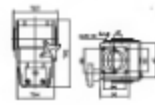
901.6.3200.00

Angle of rotation 30°
with limiter

Inclination angle infinitely
adjustable 0-30°

Complete with gaskets,
tension screws

Dimensions in mm



Detail

Accessories, can be retro-fitted

Rotation limiter (see page 426)

980.5.1300.00

Drawing code 0004



Self-supporting base bracket CS-2000

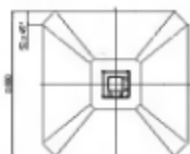
14000

Aluminium

101.6.3220.00

Large-surface foot for self-supporting applications

Dimensions in mm



Fixed rollers, guide rolls,
feet see page 427



Indication adapter CS-2000

15° = 460

30° = 600

60° = 800

Aluminium

15° = 101.6.4590.00

30° = 101.6.4600.00

60° = 101.6.4610.00

The indication adapter is fixed firmly onto the flange or flange angle coupling

Complete with seals and fixing screws

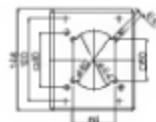
101.6.4590.00: A = 15°, B = 39

101.6.4600.00: A = 30°, B = 66

101.6.4610.00: A = 60°, B = 111



Dimensions in mm



System components

Suspension system for medium loads

Type CS-2000 System size 80[□]



Part	
Weight	60
Material	
Part number	RAL 7035 light grey

For enduse mounting
Standard coupling, flange CS-2000

3270	Dimensions in mm
Aluminium	
901.6.7020.00	

Angle of rotation 320°
with limiter
Clamping lever at
operator face
Complete with seals and
fixing screws



Detail



Accessories, can be retro-fitted
Rotation limiter (see page 426)
Light adapter (see page 429)

980.5.1760.00	
-	

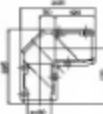


Part	
Weight	60
Material	
Part number	RAL 7035 light grey

Elbow momentum stress CS-2000

8500	Dimensions in mm
GGG	
901.6.7190.00	

High density
Unscrewable mounting
opening
Complete with gaskets



Detail



Accessories, can be retro-fitted
Rotation limiter (see page 426/427)
Light adapter (see page 429)

980.5.1890.00	
-	



Intermediate joint CS-2000

5700	Dimensions in mm
Steel	
901.6.4710.00	

Expansion bellows can
be added on at a later
stage
Pivotal angle 180° with
limiter on either side
Rotation moment setting



980.5.0620.00	
-	



For enclosure mounting
Elbow coupling, flange CS-2000

4100 **Dimensions in mm**

Aluminum

101.6.7050.00

Angle of rotation 320°
with limiter
Clamping lever at
operator face
Complete with seals and
fixing screws



580 S.1760.00

580 S.1890.00



Elbow CS-2000

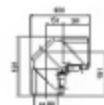
2900

Aluminum

101.6.7080.00

Installation opening
Complete with gaskets

Dimensions in mm (incl)



580 S.1890.00



Wall flange CS-2000

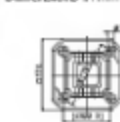
9100

GGG

101.6.4720.00

Complete with gaskets

Dimensions in mm



580 S.0620.00



Wall joint CS-2000

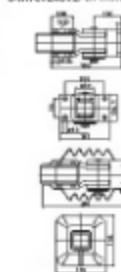
9250

Steel

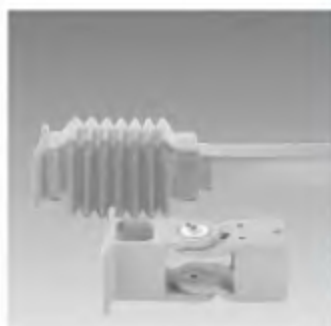
101.6.4730.00

Expansion bellows can
be zipped on at a later
stage
Pivotal angle 180° with
limiter on either side
Rotation moment setting

Dimensions in mm



580 S.0620.00



Wall joint for cable inlet CS-2000

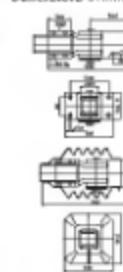
9500

Steel

101.6.4740.00

Expansion bellows can
be zipped on at a later
stage
Pivotal angle 180° with
limiter on either side
Rotation moment setting

Dimensions in mm



580 S.0620.00

System components

Suspension system for medium loads

Type CS-2000 System size 80[□]



Part	
Weight	60
Material	
Part number	RAL 7035 light gray

Step-on joint CS-2000

20620
GGG
901.6.7940.00
Practical angle 306° with limb on either side

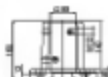
Dimensions in mm



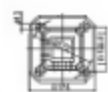
Base bracket CS-2000

9240
GGG
901.6.4750.00
Complete with seals

Dimensions in mm



Detail



Accessories, can be retro-fitted

Rotation limiter (see page 426)

Light adaptor (see page 429)

580.5.1770.00
580.5.1880.00

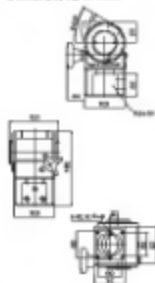


Part	
Weight	60
Material	
Part number	RAL 7035 light gray

Swivel tilt coupling CS-2000

2500
Aluminum and PA
901.6.3210.00
Practical angle 300° with buffer
Inclination continuously adjustable 0–30°
Complete with gaskets, mounting screws

Dimensions in mm

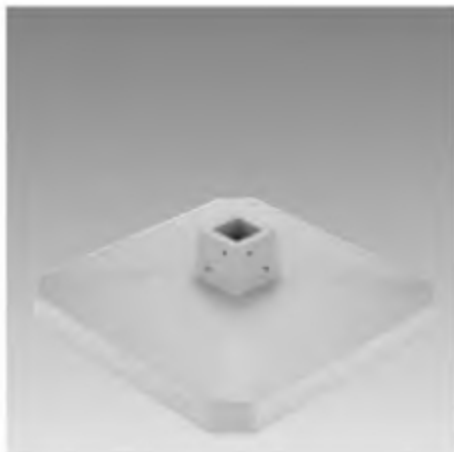


Detail

Accessories, can be retro-fitted

Rotation limiter (see page 426)

580.5.1300.00



Self-supporting base bracket CS-2000

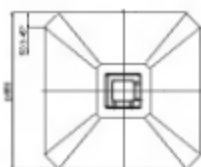
14300

Aluminium

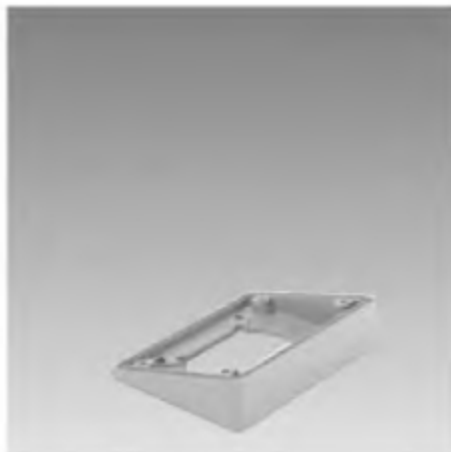
101.6.3230.00

Large-surface foot for self-supporting applications

Dimensions in mm



Fixed rollers, guide rolls, feet see page 427



Inclination adapter CS-2000

15° = 460

30° = 600

60° = 800

Aluminium

15° = 101.6.4590.00

30° = 101.6.4600.00

60° = 101.6.4610.00

The inclination adapter is fixed firmly onto the flange or flange angle-coupling
Complete with seals and fixing screws

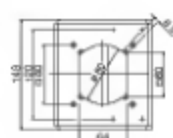
101.6.4590.00: A = 15°, B = 39

101.6.4600.00: A = 30°, B = 66

101.6.4610.00: A = 60°, B = 111



Dimensions in mm



Heavy-duty suspension system

CS-2000 80/140

The BERNSTEIN heavy-duty suspension system, 80/140 from the CS-2000 range of suspension systems provides the right solution for even the highest loads and large cable looms with ready-made connectors.

System structure

The following conditions are important for your choice of system:

- Load-bearing capacity of the overall system
- Free passage area for cables
- Design
- System configuration

Having decided on the right size of system, you need to select the necessary components and tubes, so that you can put together the desired configuration.

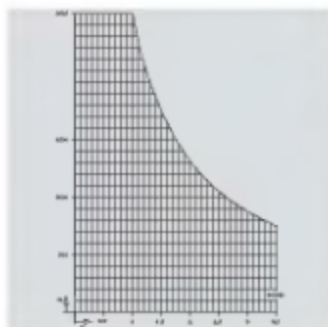
System benefits

- Installation openings
Generously dimensioned cable installation access points at all corners allow the easy installation of cables/wiring looms.
- Full use of cable ducts
within the entire suspension system without reduction of the rated diameter.
- Cable fixtures
Fixing points in each angle to clamp cables.
- Rotation angle limiters
can simply be added to joints at a later stage.
- High load-bearing capacity
Extremely high overall load-bearing capacity for applications with the highest loads.
- Divided expansion bellows
Expansion bellows for wall and intermediate joints can be installed at a later stage.
- Ready-made connections
Option of inserting ready-made connections with heavy-duty industrial plugs.



Connecting tubes

CS-2000 80/140



Load diagram

The load diagram illustrates the maximum load-bearing capacity for the chosen length of suspension system. If for a brief period of time (i.e. 5 seconds), a load of 75 kg is added, then this does not lead to dimensional deformation or destruction of the system.

Free cable passage area in the system

Suspension tube	80/140
Outside (mm)	80/140
Cross section (cm ²)	91
Wall thickness (mm)	5

Materials

- Gravity-die-cast aluminum components: AlSi12 (Cu)
- Cast-iron components: GGG 40
- Steel welding constructions: St 37
- Suspension tubes: St 37
- Bearings: St/PTFE
- Seals: CR
- Cable access covers: AlSi12 (Cu)
- Expansion bellows: PVC



Tubes

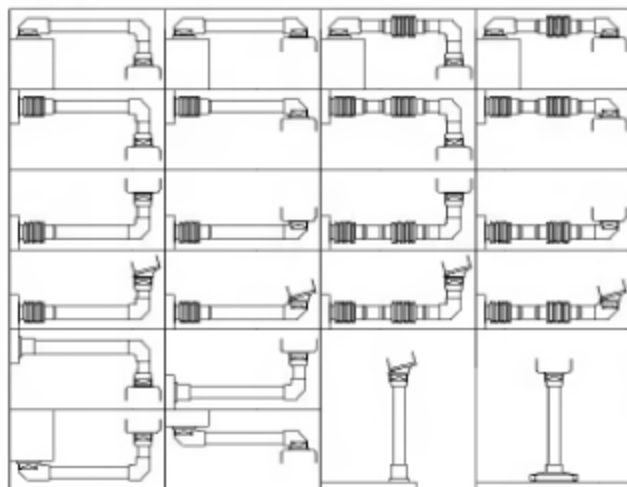
The steel tube for the suspension system 80/140 is available in a variety of different lengths. Tube lengths comply with DIN 7168. The steel tubes are supplied in RAL 7035 (light grey) powder coated.

Weight

per metre of tube 15 kg

Colours

- Suspension system components: light grey, RAL 7035
- Cable access covers: light grey, RAL 7035
- Expansion bellows: black, RAL 9005
- Tubes: light grey, RAL 7035



Available lengths of tube

Length (mm)	System 80/140 Part number
250	952.8.0460.00
500	952.8.0470.00
750	952.8.0480.00
1000	952.8.0490.00
1250	952.8.0500.00
1500	952.8.0510.00
2000	952.8.0530.00
3000	952.8.0550.00

Heavy-duty suspension system

CS-2000 System size 80/140

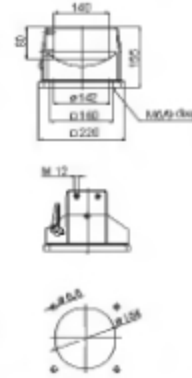


For enclosure mounting
Standard coupling CS-2000

Part	
Weight	(g)
Material	
Part number	RAL 7035 light grey

4600
Aluminium
101.6.4760.00
Angle of rotation 300° with limiter
Complete with seals and fixing screws

Dimensions in mm



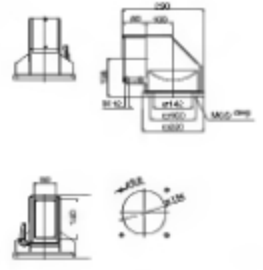
Detail
Accessories, can be retro-fitted
Pivoting angle limit stop (see page 427)



For enclosure mounting
Elbow coupling, flange, CS-2000

E900
Aluminium
101.6.4770.00
Angle of rotation 300° with limiter
Access cover
Complete with seals and fixing screws

Dimensions in mm

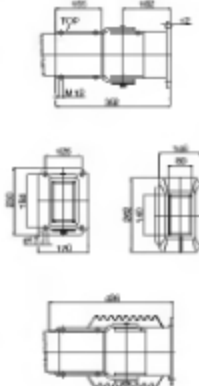


Wall joint CS-2000

Part	
Weight	(g)
Material	
Part number	RAL 7035 light grey

17180
Steel
101.6.4810.00
Expansion bellows can be zipped on at a later stage
Rotation angle 180° with limiter on either side
Suspension tube adjustment

Dimensions in mm



Detail
Accessories, can be retro-fitted
Pivoting angle limit stop (see page 427)

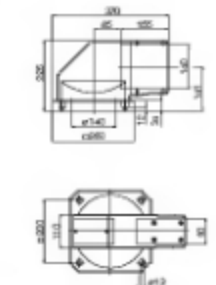
980 5 0620 00



Set-up CS-2000

28560
GGG
101.6.4820.00
Rotation angle 300°
Access cover

Dimensions in mm



Available request

Accessories Suspension systems



Part
Part number
Material
Details

Rotation limiter for coupling components	
Systems 45/60	Systems 50°, 60°, 80°
980.5.1290.00	980.5.1760.00
PA	
Rotation limiter for coupling components in the CS-2000 SL system or CS-2000 system. Can easily be added at a later stage.	
After simple installation the balls limit the rotation angle.	
Adjustable in increments of	8.5° (CS-2000 SL) 11° (CS-2000 50, 60) 9° (CS-2000)

Rotation limiter for joint components	
Systems 45/60	Systems 50°, 60°, 80°
980.5.1320.00	980.5.1770.00
PA	
Rotation limiter for joint components in the CS-2000 SL system or CS-2000 system. Can easily be added at a later stage.	
After simple installation the balls limit the rotation angle.	
Adjustable in increments of	14° (CS-2000 SL) 12° (CS 2000 50) 11.5°(CS-2000 60) 8.5° (CS-2000 80)



Part
Part number
Material
Details

Rotation limiter for rotating angle couplings	
Systems 45/60, 50°, 60°, 80°	
980.5.1300.00	
PA	
Rotation limiter for rotating angle couplings in the CS-2000 SL system and CS-2000. Can easily be added at a later stage.	
After simple installation the balls limit the rotation angle.	
Adjustable in increments of 8.5°.	

Light adapter		
System 50	System 60	System 80
980.5.1870.00	980.5.1880.00	980.5.1890.00
Aluminium	Aluminium	
Easy to apply light adapter.		
Entry opening for light tubes with outside diameter of 25 mm, fixing by headless screw. Colour RAL 7035.		

Accessories Suspension systems



Part	Rotation limiters System 50P	System 60P	Rotation limiters System 80P	System 80/140
Part number	980.5.0630.00	980.5.0630.00	980.5.0620.00	980.5.0620.00
Material	Steel	Steel	Steel	Steel
Details	Rotation limiters as a set of accessories for wall and intermediate joints can be retro-fitted. For systems 50 and 60. Can be set in 7.5° increments. Rotation angle range can be fixed in a given position.		Rotation limiters as a set of accessories for wall and intermediate joints can be retro-fitted. For systems 80 and 80/140. Can be set in a 15° increments. Rotation angle range can be fixed in a given position.	



Part	Fixed rollers (1 set = 2 rollers) for the large support foot in systems 60, 80, 80 x 140 and 45/60	Guide rolls (1 set = 2 rolls) for the large support foot in systems 60, 80, 80 x 140 and 45/60
Part number	980.6.0430.00	980.6.0440.00
Notes	Complete with installation fittings and instructions for the large support foot.	Complete with installation fittings and instructions for the large support foot.



Part	Adjustment feet (1 set = 2 feet) for the large support foot in systems 60, 80, 80 x 140 and 45/60
Part number	980.6.0450.00
Notes	Complete with installation fittings and instructions for the large support foot.

Front-door control enclosures CC-480 NR



The standard line of stainless steel CC-480 NR front-door control enclosures is ideal for use in hygiene environments in the food and pharmaceutical industry.

Customised apertures in the front door can be provided by the BERNSTEIN customising service. The aperture in the front door can thus be dimensioned exactly to suit the installation of operating and control units.

Integral foam gaskets guarantee protection to IP 66. The CC-480 NR comes conveniently pre-configured as standard for the user to attach to the suspension system.

Product features

- Various standard sizes
- Modern design
- Front door hinged on right as standard - at top where pre-configured for suspension system attachment
- Foamed gaskets
- Facilities for installing mounting plates
- IP 66 protection rating
- Stainless steel lock mounted at side, away from protected space

Materials

- Enclosure 1.5 mm sheet steel stainless steel B.S.I. 304 S15 / AISI 304
- Front door 1.5 mm sheet steel stainless steel B.S.I. 304 S15 / AISI 304
- Gaskets PU foam
- Lock 1.5 mm sheet steel stainless steel B.S.I. 304 S15 / AISI 304

Surfaces

Enclosure	240 grain brushed finish
Front door	240 grain brushed finish

CC-480 NR front-door control enclosures are supplied in the form of standard enclosures or with customised front door. Enclosure is pre-configured as standard for attachment to BERNSTEIN suspension systems. Delivery time as agreed.

Special sizes on request

Components supplied

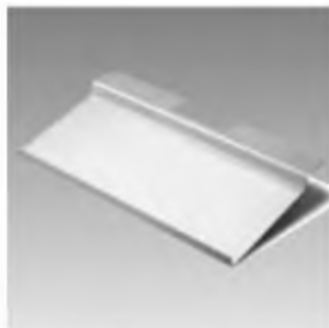
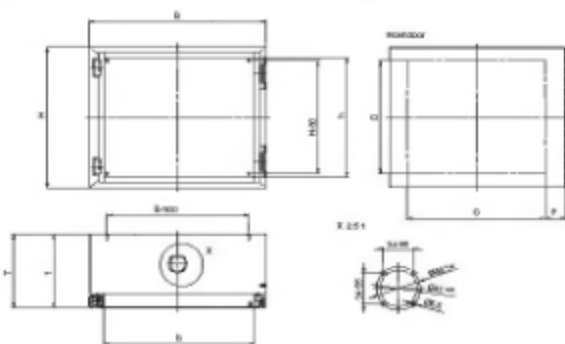
- Cabinet body with hinged front door
- 5 mm two-way key safety lock as standard

Dimensions

Part number	External enclosure dimensions W x H x D (mm)	Internal enclosure dimensions w x h x d (mm)	Mounting area on front door C x D x F (mm)	Side handles Part number	Mounting plates Part number
180.3.0000.01	250x300x130	176.75x240x124.5	140x220x56	980.E.0119.00	982.3.1040.00
180.3.0000.02	350x300x130	276.75x240x124.5	240x220x56	980.E.0119.00	982.3.1050.00
180.3.0000.03	400x350x160	326.75x290x154.5	290x270x56	980.E.0119.00	982.3.1060.00
180.3.0000.04	400x400x160	326.75x340x154.5	290x320x56	980.E.0119.00	982.3.1070.00
180.3.0000.05	500x400x210	426.75x340x204.5	390x320x56	980.E.0120.00	982.3.1080.00
180.3.0000.06	550x500x210	476.75x390x204.5	440x370x56	980.E.0120.00	982.3.1090.00
180.3.0000.07	550x500x210	476.75x440x204.5	440x420x56	980.E.0120.00	982.3.1100.00
180.3.0000.08	550x500x210	476.75x540x204.5	440x520x56	980.E.0120.00	982.3.1110.00

Pre-configuration for suspension system

The CC-480 NR front-door control enclosure comes pre-configured as standard for attachment to the suspension system. The holes provided for the suspension system are shown in the diagram on the right. This level of pre-configuration is designed to ensure maximum user-friendliness, making the enclosure simple to attach to the suspension system by one person only.



Keyboard shelf

(Part number 980.6.1760.00)
from 500 mm enclosure width; in stainless steel. For retrofitting, sloping at an angle of 10°. Finishing material included. Enclosure machining required.



Handles

in stainless steel for retrofitting to enclosure sides. Finishing material included. Enclosure machining required.

Control enclosures CC-600/CC-600 NR



Product benefits

- Various standard sizes available from stock
- Door as standard
- Foamed gaskets
- Equipment mounted inside enclosure body can be infinitely adjusted in height and depth on mounting rails
- IP 65/ IP 66 (CC-600 NR) ingress protection
- Enclosure can be mounted to suspension system by one person
- Clamping bar for mounting control equipment can be moved to any position in all-round mounting groove
- Clamping bar groove outside protected space
- Additional profiled sealing strip to close off space between studded front plates and enclosure (only CC-600 NR)

Materials + Coating CC-600

- Enclosures: 1.5 mm sheet steel
- Back plates: 1.5 mm sheet steel
- Front plates: 3 mm aluminium
- Gaskets: PU foam
- Enclosure and door – RAL 7035, light grey
- Back plate – RAL 7035, light grey
- Front plate – natural (silver), anodised

Materials + Surfaces CC-600 NR

- Enclosures: 1.5 mm sheet steel stainless steel B.S.I. 304 S15
- Front plates: 2 mm sheet steel stainless steel B.S.I. 304 S15
- Gaskets: PU foam
- Enclosures and doors: 240 grain brushed finish
- Front plates: 240 grain brushed finish

Front plate attachment (CC-600)

The attachment of front plates with visible screw holes is performed using the enclosed freely positioned locking mechanisms. These locking mechanisms are fitted in a enclosure groove which is not externally visible. The attachment screws are screwed into the locking mechanisms.

Front plates with welded studs are clamped into place using clamping brackets in the interior of the enclosure. These front plates have studs welded on the rear, and provide a smooth front surface without visible screw heads.

Application samples



**Keyboard shelf****(Part number 980.6.1750.00 painted sheet steel)****(Part number 980.6.1760.00 VA 1.4301)**
sheet steel keyboard support for subsequent mounting. RAL 7035, light grey, 10° inclination, mechanical machining is required for mounting. Attachment material is included.**Keyboard rail****(Part number 980.6.1770.00)**

metal frame with attachment elements for accommodation of PC keyboards. Adjustable inclination. Mechanical machining is required for mounting. Attachment material is included.

**M4 cage nuts (8 off)****(Part number 980.8.0041.00)****M5 cage nuts (8 off)****(Part number 980.8.0042.00)**

for attaching equipment to the attachment rails. The cage nuts are simply slid into the required position.

**Profiled sealing strip****(Part number 980.8.0099.00)**

Profiled strip made of silicone for sealing gap between front plate and enclosure. Simple to cut to the required length and fit before mounting front plate.



Application sample CC-600 NRF

Directly mounted industrial-PC with hygiene front

Dimensions CC-600

Empty enclosure	Enclosure-ext. dimensions	Enclosure-int. dimensions	Attachment area on front plate with welded studs	External dimensions of front plate with welded studs	Front plate with welded studs	Attachment area on front plate with screw holes
Part number	W x H x D (mm)	W x H x D (mm)	W x H (mm)	W x H (mm)	Part number	W x H (mm)
180.0.0001.00	370x500x150	290x420x145	250x380	318x448	980.8.0002.00	290x420
180.0.0002.00	430x380x150	350x300x145	310x260	378x328	980.8.0004.00	350x300
180.0.0003.00	430x630x150	350x550x145	310x510	378x578	980.8.0006.00	350x550
180.0.0004.00	480x430x150	400x350x145	360x310	428x378	980.8.0008.00	400x350
180.0.0005.00	480x580x220	400x500x215	360x460	428x528	980.8.0010.00	400x500
180.0.0006.00	580x380x220	500x300x215	460x260	528x328	980.8.0012.00	500x300
180.0.0007.00	580x430x300	500x350x295	460x310	528x378	980.8.0014.00	500x350
180.0.0008.00	580x500x300	500x420x295	460x380	528x448	980.8.0016.00	500x420

Dimensions CC-600 NR

Empty enclosure	Enclosure-ext. dimensions	Enclosure-int. dimensions	Attachment area on front plate with welded studs	External dimensions of front plate with welded studs	Front plate with welded studs	Attachment area of mounting plate
Part number	W x H x D (mm)	W x H x D (mm)	W x H (mm)	W x H (mm)	Part number	W x H (mm)
180.1.0001.00	380 x 380 x 150	300 x 300 x 145	260 x 260	328 x 328	980.8.0053.00	220 x 220
180.1.0002.00	430 x 380 x 150	350 x 300 x 145	310 x 260	378 x 328	980.8.0055.00	270 x 220
180.1.0003.00	430 x 480 x 180	350 x 400 x 175	310 x 360	378 x 428	980.8.0057.00	270 x 320
180.1.0004.00	480 x 430 x 180	400 x 350 x 175	360 x 310	428 x 378	980.8.0057.00	320 x 270
180.1.0005.00	480 x 480 x 220	400 x 400 x 215	360 x 360	428 x 428	980.8.0059.00	320 x 320
180.1.0020.00	530 x 480 x 220	450 x 400 x 215	410 x 360	478 x 428	980.8.0061.00	370 x 220
180.1.0021.00	580 x 530 x 300	500 x 450 x 295	460 x 410	528 x 478	980.8.0063.00	420 x 370
180.1.0022.00	630 x 580 x 300	550 x 500 x 295	510 x 460	578 x 528	980.8.0065.00	470 x 420

Components supplied CC-600

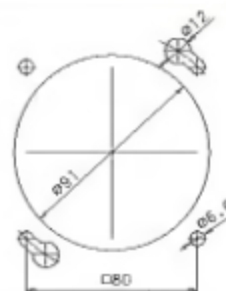
- Main body with mounted door, coated (RAL 7035, light grey)
- 8 mm square lock as standard
- Attachment material for front plate with screws (locking mechanism)

Components supplied CC-600 NR

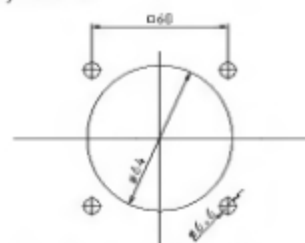
- Enclosure body with door mounted
- 5 mm two-way key safety lock as standard
- Front plate

Suspension system machining

The CC-600 and CC-600 NR control enclosures have suspension system machining as standard. The hole pattern of the suspension system machining for CC-600 enclosures with a depth of 300 mm is compatible with the BERNSTEIN CS-2000 system 80. The suspension system machining for CC-600 enclosures with a depth of 150 mm and 220 mm matches the CS-2000 systems 50 and 60 as well as the CS-2000 SL system. The hole pattern for CC-600 NR enclosures is compatible with the stainless suspension system CS-600 NR.



Machining pattern for CS-2000 couplings from system 80



Machining pattern for CS-2000 couplings from system 50 and 60, and CS-2000 SL

External dimensions on front plate with screw holes W x H (mm)	Front plate screw holes Part number	Mounting plate set Part number	Attachment area of mounting plate W x H (mm)	Mounting rails TS 35 Part number	Attachment rails for main body Part number	Handles side Part number
320x450	980.8.0001.00	980.8.0112.00	210x340	980.8.0031.00	980.8.0038.00	980.8.0025.00
380x320	980.8.0003.00	980.8.0105.00	270x220	980.8.0033.00	980.8.0038.00	980.8.0026.00
380x580	980.8.0005.00	980.8.0113.00	270x470	980.8.0033.00	980.8.0038.00	980.8.0027.00
430x380	980.8.0007.00	980.8.0107.00	320x270	980.8.0035.00	980.8.0038.00	980.8.0028.00
430x530	980.8.0009.00	980.8.0114.00	320x420	980.8.0035.00	980.8.0039.00	980.8.0029.00
530x330	980.8.0011.00	980.8.0115.00	420x220	980.8.0037.00	980.8.0039.00	980.8.0026.00
530x380	980.8.0013.00	980.8.0116.00	420x270	980.8.0037.00	980.8.0040.00	980.8.0028.00
530x450	980.8.0015.00	980.8.0117.00	420x340	980.8.0037.00	980.8.0040.00	980.8.0025.00

Mounting plate kit with long material and hinges Part number	Mounting rails TS 35 Part number	Attachment rails for main body Part number	Stainless steel handle kit Part number
980.8.0104.00	980.8.0079.00	980.8.0088.00	980.8.0095.00
980.8.0105.00	980.8.0081.00	980.8.0088.00	980.8.0095.00
980.8.0106.00	980.8.0081.00	980.8.0089.00	980.8.0096.00
980.8.0107.00	980.8.0083.00	980.8.0089.00	980.8.0095.00
980.8.0108.00	980.8.0083.00	980.8.0090.00	980.8.0096.00
980.8.0109.00	980.8.0083.00	980.8.0090.00	980.8.0096.00
980.8.0110.00	980.8.0085.00	980.8.0091.00	980.8.0096.00
980.8.0111.00	980.8.0087.00	980.8.0091.00	980.8.0096.00



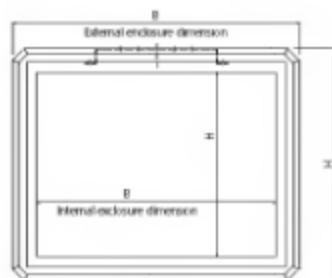
Handles CC-600



Handles in stainless steel CC-600 NR



Mounting plate CC-600 and CC-600 NR



CC-600/CC-600 NR



CS-600 NR

Suspension system CS-480 NR



Product description

The CS-480 NR system has been developed specifically for suspending control enclosures in hygiene environments in the food and pharmaceutical industry.

The CS-480 NR is extremely flexible thanks to the wide range of variants in which it is available. You have the choice between a combination of customised pre-formed tubing and suspension system components or, if time is scarce, you can combine the pre-formed tubings and coupling sleeves ex-stock with components from the suspension system.

System features

- Assembly apertures on bearing components
- Tubing simply clamped in position
- Loading capacity 400 Nm
- IP 65 protection rating
- Material X10 CrNiS18 9
- Factory-set torque
- Wide selection of components for a particularly large number of combination options

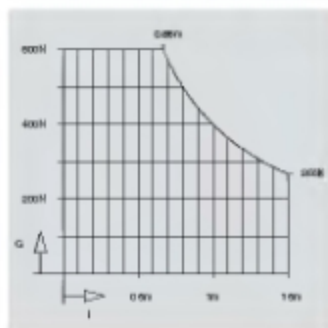
Machining of enclosures for mounting couplings

The coupling hole dimensions for enclosure machining are shown in the diagram below.



Materials and surfaces

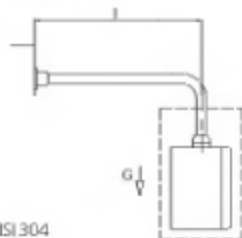
- | | |
|----------------------------|-------------------------|
| Stainless steel tubings | B.S.1.304 S15/ AISI 304 |
| Stainless steel components | X10 CrNiS18 9 |
| Bearings | FOM |
| O-rings | NR |



Load diagram

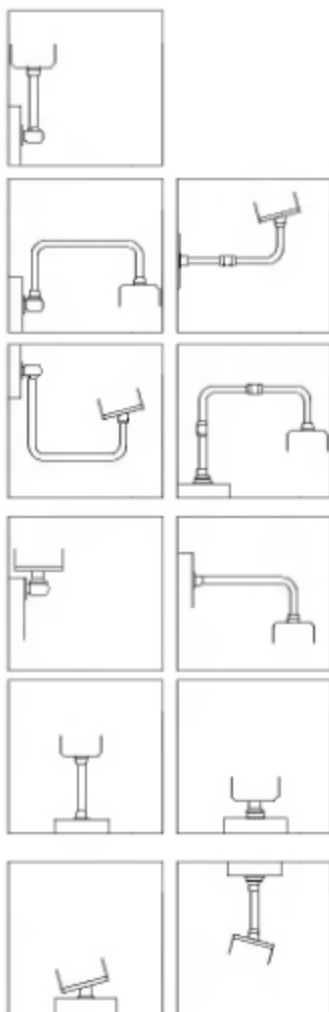
The loading capacity of the CS-480 NR suspension system product line is shown in the diagram. Separate approval must be requested for higher loads.

In the following description, system length l refers to the length shown in the diagram.



System combinations

The wide range of components permits a high level of flexibility in configuring the suspension system. A selection of possible combinations is shown here.



Selection support for different load capacities are presented on pages 400/401.



Tubings

The 48.3 mm outer diameter tubings are made from 3.6 mm gauge stainless steel and are available in the following standard sizes.

Tubing, straight

250 mm	Art.-Nr. 952.3.5010.00
500 mm	Art.-Nr. 952.3.5020.00
750 mm	Art.-Nr. 952.3.5030.00
1000 mm	Art.-Nr. 952.3.5040.00
1250 mm	Art.-Nr. 952.3.5050.00
1500 mm	Art.-Nr. 952.3.5060.00

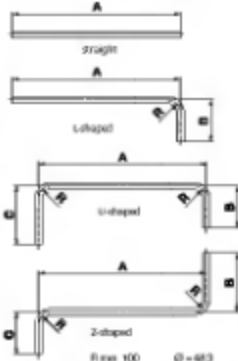


Flexibility enhanced by L-shaped tubes and coupling sleeves

Using L-shaped tubes and coupling sleeves in conjunction with straight tubes, it is possible to dispense with the time-consuming process of making customised tubings. Straight tubing, L-shaped tubing and coupling sleeves are available from stock and are perfect for configuring a flexible suspension system in next to no time. Tubing, L-shaped
 250x250 mm Part number 952.3.5000.01
 500x500 mm Part number 952.3.5000.11
 Coupling sleeve Part number: 101.3.0512.00

Customised tubings

On request, pre-formed tubing is available in different variants for BERNSTEIN's CS-480 NR suspension system. The three different variants are L-shaped, U-shaped and Z-shaped. Straight tubing can also be supplied in customer-specific lengths. To order customised tubing, simply indicate the shape you require when ordering (e.g. straight, L-, U- or Z-shaped) together with dimensions. The letters used to denote the various dimensions are shown in the drawings below.



Note: Dimensions B and C at least 220 mm; dimension A in U- and Z-shaped variant at least 320 mm

System components Type CS-480 NR



Article
Part number
Weight

Coupling (for enclosure mounting)
101.3.0501.00
1.4 kg

Angle coupling (for enclosure mounting)
101.3.0503.00
1.0 kg

Example application

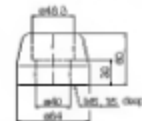


Version

Flange coupling for attaching enclosures. Turns through 340° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets and fixing material.

Rigid flange coupling with 15° angle of inclination for attaching enclosures. Complete with gaskets and fixing material.

Dimensional drawings
(dimensions in mm)



System components Type CS-480 NR



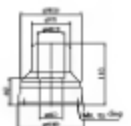
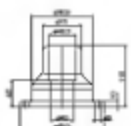
Article	Rotational base, for external attachment	Rotational base, for internal attachment
Part number	101.3.0505.00	101.3.0506.00
Weight	4.2 kg	3.8 kg

Example application



Version	Rotational base for attachment to machine or floor. Turns through 340° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.	Rotational base for attachment to machine or floor. Turns through 340° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.
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Dimensional drawings
(dimensions in mm)



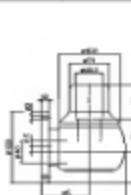
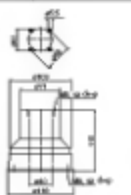
Article	Rotational base bracket coupling, internal	Wall joint S
Part number	101.3.0508.00	101.3.0509.00
Weight	4.1 kg	7.3 kg

Example application



Version	Rotational base bracket coupling (internal attachment) for directly attaching enclosures to machine or floor. Turns through 340° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets and ferris material.	Wall joint with vertical socket for attachment to vertical surfaces. Cover to facilitate wiring. Turns through 340° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.
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Dimensional drawings
(dimensions in mm)





Base bracket/wall flange
101.3.0502.00
1.4 kg



Base bracket or wall flange for attachment to horizontal and vertical surfaces. Complete with gaskets.



Base bracket angle-coupling
101.3.0504.00
1.9 kg



Rigid, 15° angle coupling for direct attachment of enclosures to horizontal and vertical surfaces. Complete with gaskets and fixing material.

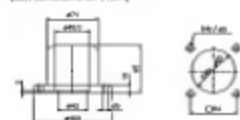


Rotational base bracket coupling, external
101.3.0507.00
4.5 kg



Rotational base bracket coupling (external attachment) for directly attaching enclosures to machine or floor. Turns through 340° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets and fixing material.

Dimensional drawings
(dimensions in mm)



Wall coupling S
101.3.0510.00
7.3 kg



Rotational wall coupling for direct attachment to vertical machine surfaces. Turns through 340° with rotation limiter. Cover to facilitate wiring. Pre-set torque. Maintenance-free bearings. Complete with gaskets and fixing material.



Wall bracket S
101.3.0511.00
7.7 kg



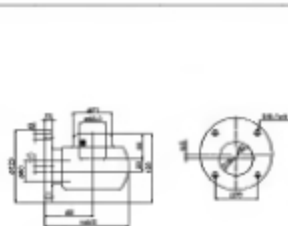
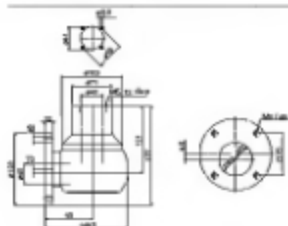
Wall bracket with vertical socket for attachment to vertical surfaces. Cover to facilitate wiring. Complete with gaskets.



Coupling sleeve
101.3.0512.00
1.5 kg



Coupling sleeve to facilitate assembly and disassembly of tubing configurations. Complete with gaskets.



Suspension system CS-600 NR



Product description

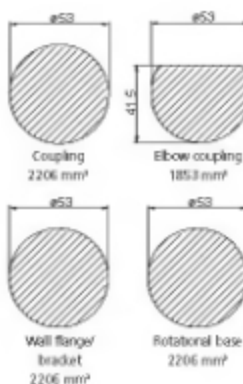
The CS-600 NR suspension system has been developed specifically for suspending control enclosures in hygiene environments in the food and pharmaceutical industry. Compared with suspension products, hitherto familiar, this system is distinguished by its particular suitability for hygiene environments and its fully modular design. The CS-600 NR enables the user to configure angled systems without the need for pre-formed tubing. This dispenses with the time-consuming process of procuring specially pre-formed tubing. The modular suspension system is flexible and versatile, and can be assembled with ease by the user from components that are available ex stock.

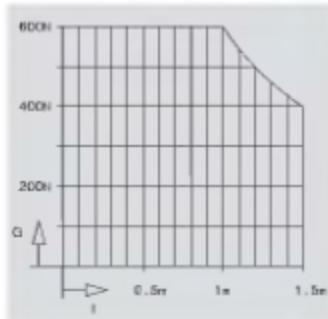
System benefits

- Assembly apertures on bearing components with horizontal socket
- No external screws or dirt traps - ideal to clean
- Tubing simply clamped in position
- Anti-vibration capability for all components
- Loading capacity 600 N/m
- IP 66 protection rating
- Factory-set torque
- Modern design
- Wide choice of components for a particularly large number of combination options
- Choice of materials for components: Stainless steel X10 CrNiS18 9 or anodised aluminium

Cable entry

The various suspension system components offer differing amounts of space through which to insert cables. The diagrams below show the dimensions at the narrowest point of apertures inside the components.

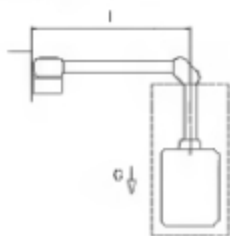




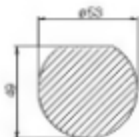
Load diagram

The loading capacity of the CS-600 NR suspension system product line is shown in the diagram.

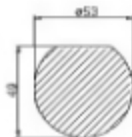
In the following description, system length l refers to the length shown in the diagram.



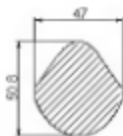
Selection support for different load capacities are presented on pages 400/401.



Wall joint
2130 mm²



Top-mounted joint
2130 mm²



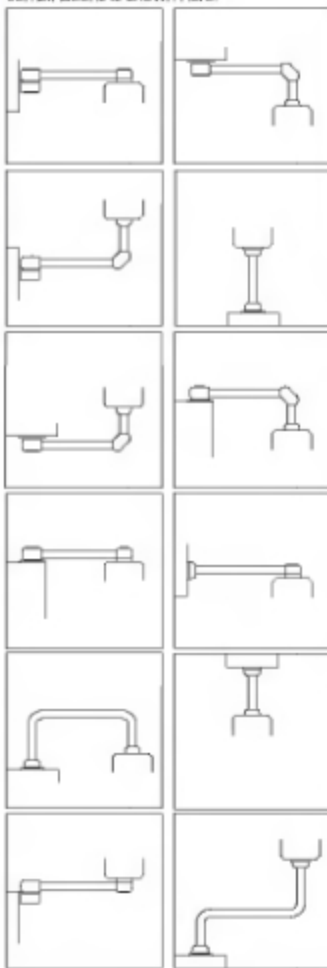
Elbow
1649 mm²

Materials and surfaces

Stainless steel tubings	1.4301
Aluminium components	AlMgSi 1
Stainless steel components	1.4305
Bearings	FOM
O-rings	NBR

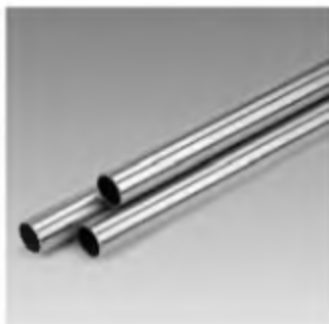
System combinations

The wide range of components permits a high level of flexibility in configuring suspension systems. A selection of possible combinations is shown here.



Machining enclosures for mounting couplings

The coupling hole geometries for enclosure machining are shown in the diagram below.



Tubings

The 60.3 mm outer diameter tubes are made from 3.6 mm gauge stainless steel and are available in the following standard sizes.

250 mm	Part. number 952.3.0010.00
500 mm	Part. number 952.3.0020.00
750 mm	Part. number 952.3.0030.00
1000 mm	Part. number 952.3.0040.00
1250 mm	Part. number 952.3.0050.00
1500 mm	Part. number 952.3.0060.00

Customised tubings

On request, pre-formed tubings are available in different variants for BERNSTEIN'S CS-600 NR suspension system. The three different variants are L-shaped, U-shaped and Z-shaped. Straight tubings can also be supplied in customer-specific lengths. To order customised tubings, simply indicate the shape you require when entering (e.g. straight, L, U or Z-shaped) together with dimensions. The letters used to denote the various dimensions are shown in the drawings below.



L-shaped



U-shaped



Z-shaped
R min. 190 $\alpha = 90.3$



straight

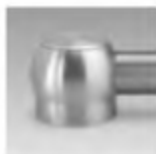
Note: Dimensions B and C, at least 300 mm; dimension A in U- and Z-shaped version at least 450 mm.

System components Type CS-600 NR



For enclosure mounting
Coupling

Part number 101.4.0501.00



For enclosure mounting
Elbow coupling

Part number 101.4.0502.00



Article
Part number Stainless steel

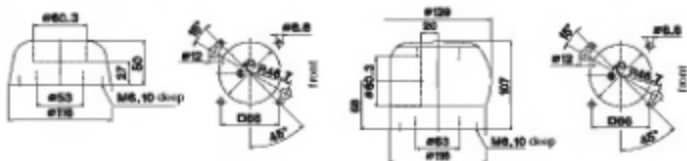
Example application

Version

Flange coupling for attaching enclosures. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets and fixing material.

Flange elbow coupling for attaching enclosures. Assembly aperture cover conceals screws for perfect hygiene. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets and fixing material.

Drawings
(dimensions in mm)



Elbow
Part number 101.4.0507.00



Rotational base, attachment from outside
Part number 101.4.0504.00



Article
Part number Stainless steel

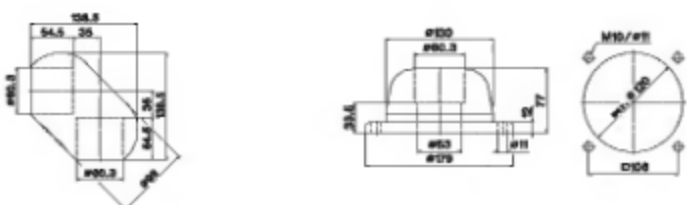
Example application

Version

Elbow for connecting two tubes at 90°. Includes screw cover and gaskets.

Rotational base for attachment to machine or floor. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.

Drawings
(dimensions in mm)





Rotational base, attachment from inside
101.4.0515.00



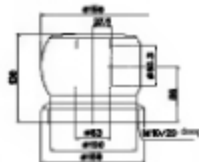
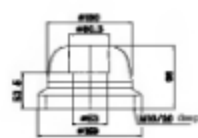
Rotational base for attachment to machine or floor. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.



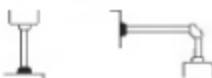
Top-mounted joint, attachment from inside
101.4.0516.00



Top-mounted joint for attachment to horizontal surfaces. Assembly aperture cover conceals screws for perfect hygiene. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.



Wall flange/base bracket
101.4.0503.00



Wall flange or base bracket for attachment to horizontal and vertical surfaces. Complete with gaskets.



Top-mounted, attachment from outside
101.4.0506.00



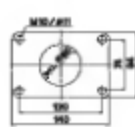
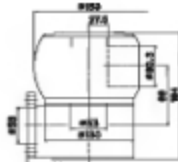
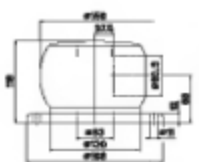
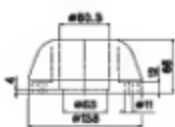
Top-mounted joint for attachment to horizontal surfaces. Assembly aperture cover conceals screws for perfect hygiene. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.



Wall joint
101.4.0505.00



Wall joint for attachment to vertical surfaces. Assembly aperture cover conceals screws for perfect hygiene. Turns through 300° with rotation limiter. Pre-set torque. Maintenance-free bearings. Complete with gaskets.



Cable glands metal

Accessories for cable glands



Standard cable gland

Material: brass, nickel-plated
 Temperature: -20 °C to +60 °C or +80 °C
 Gasket: soft rubber + neoprene and 2 iron thrust collars
 Protection: IP 55, with O ring IP 65
 Standard: DIN 46 320/C4
 Information: with base for screws on intermediate connection pairs



Hexagonal lock-nut

Material: brass, nickel-plated
 Standard: 46 320



Cable gland with strain-relief

Material: brass, nickel-plated
 Temperature: -30 °C to +90 °C
 Dichtung: Neoprene gasket and 2 galvanized iron thrust collars
 Protection: IP 54, with O ring IP 65
 Information: with critically operating strain-relief



"Perfect" cable gland

Material: brass, nickel-plated
 Temperature: -40 °C to +120 °C, for short periods +150 °C
 Gasket: neoprene
 Protection: IP 68/5 bar
 Information: excellent strain-relief, fully insulated, large terminal space, O ring on connection thread



O ring

Material: PTFE/uran, oil-resistant



"Perfect" cable gland with metric thread

Material: brass, nickel-plated
 Temperature: -40 °C to +120 °C, for short periods +150 °C
 Gasket: neoprene
 Protection: IP 68/5 bar
 Information: excellent strain-relief, fully insulated, large terminal space, O ring on connection thread



Lock-nut with metric thread

Material: brass, nickel-plated
 Standard: 46 319



Filler plug

Brass, galvanized, nickel-plated, with metric thread
 excellent seal with assembled O ring
 Standard: 46 320

Thread size	Cable Ø mm		Part number		Part number
			Screw fitting	mm	Lock nut
Pg 7	5...7	14	943.1.0070.00	15	943.1.0300.00
Pg 9	6...8	17	943.1.0080.00	18	943.1.0340.00
Pg 11	8...10	20	943.1.0090.00	21	943.1.0350.00
Pg 13/5	10...12	22	943.1.0100.00	23	943.1.0360.00
Pg 16	12...14	24	943.1.0110.00	26	943.1.0370.00
Pg 21	15...17	30	943.1.0120.00	32	943.1.0380.00
Pg 25	24...26	40	943.1.0130.00	41	943.1.0390.00
Pg 36	31...33	50	943.1.0170.00		
Pg 42	39...41	57	943.1.0160.00		
Pg 48	45...47	64	943.1.0150.00		

Thread size	Cable Ø mm		Part number
Pg 9	4...9/5	17	943.1.0210.00
Pg 11	6...11/5	22	943.1.0220.00
Pg 13/5	6...13/5	24	943.1.0230.00
Pg 16	6...15/5	24	943.1.0240.00
Pg 21	9...21/5	34	943.1.0250.00
Pg 25	17...25/5	40	943.1.0260.00
Pg 36	23...36/5	50	943.1.0510.00
Pg 42	29...42/5	57	943.1.0550.00

Thread size	Cable Ø mm		Part number	Outer Ø inner Ø mm	Part number O ring
Pg 7	3...6/5	14	943.1.1650.00	13/10	943.0.0380.00
Pg 9	4...8	17	943.1.1660.00	17/13	943.0.0380.00
Pg 11	5...10	20	943.1.1670.00	20/16	943.0.0380.00
Pg 13/5	6...12	22	943.1.1680.00	22/18	943.0.0370.00
Pg 16	10...14	24	943.1.1690.00	24/20	943.0.0220.00
Pg 21	13...18	30	943.1.1700.00	28/24	943.0.0250.00
Pg 25	18...25	40	943.1.1710.00	37/33	943.0.0390.00
Pg 36	22...32	50	943.1.1720.00	47/42	943.0.0290.00
Pg 42	30...38	57	943.1.1730.00	53/48	943.0.0400.00
Pg 46	34...44	64	943.1.1740.00	60/54	943.0.0410.00

Thread size	Cable Ø mm		Part number	Thread length	Head Ø mm	Part number	Lock nut
M 12 x 1.5	3...6	14	943.1.2800.00	3.0	13.0	943.1.2800.00	
M 16 x 1.5	5...10	17	943.1.2810.00	6.0	20.0	943.1.2850.00	
M 20 x 1.5	8...13	22	943.1.2820.00	6.5	22.0	943.1.2900.00	
M 25 x 1.5	1...17	27	943.1.2830.00	7.0	28.0	943.1.2910.00	
M 32 x 1.5	15...21	34	943.1.2840.00	8.0	35.0	943.1.2920.00	
M 40 x 1.5	19...28	43	943.1.2850.00	8.0	45.0	943.1.2930.00	
M 50 x 1.5	26...35	55	943.1.2860.00	9.0	55.0	943.1.2940.00	
M 63 x 1.5	32...42	65	943.1.2870.00	10.0	68.0	943.1.2950.00	

Thread size		Part number
M 12 x 1.5	15	943.1.2960.00
M 16 x 1.5	19	943.1.2970.00
M 20 x 1.5	24	943.1.2980.00
M 25 x 1.5	30	943.1.2990.00
M 32 x 1.5	36	943.1.3000.00
M 40 x 1.5	46	943.1.3010.00
M 50 x 1.5	60	943.1.3020.00
M 63 x 1.5	70	943.0.3030.00

Width across corners (mm)

Head width (mm)

**Cable glands for HF/EMC shielding**

Material brass, radial-plated
 Gasket neoprene
 Temperature -20 °C to +130 °C
 Protection IP 68
 Information with connection thread gasket ring, IP 68/20 bar



Hexagon nut
 for earthing, radial-plated brass, with cutting edges for optimum contact through protective or powder coatings.

**Cable gland for HF/EMC with metric thread**

Material brass, radial-plated
 Gasket neoprene
 Temperature -20 °C to +130 °C
 Protection IP 68
 with connection thread gasket ring, IP 68/20 bar

**Filler plug**

Material galvanised brass, radial-plated with assembled Furubran O ring, excellent sealing
 Standard DIN 46 326

Thread size	Cable Ø mm		Part number
Fig 7	4 ... 8	18	943.1.3040.00
Fig 9	6 ... 11	22	943.1.3050.00
Fig 11	6 ... 11	22	943.1.3060.00
Fig 13.5	7.5 ... 13	24	943.1.3080.00
Fig 16	12.5 ... 18	30	943.1.3090.00
Fig 21	12.5 ... 18	30	943.1.3100.00
Fig 21	17.5 ... 23.5	41	943.1.3110.00
Fig 29	17.5 ... 25	41	943.1.3120.00
Fig 29	24.5 ... 31.5	52	943.1.3130.00
Fig 36	24.5 ... 33.5	52	943.1.3140.00
Fig 36	33 ... 40.5	63	943.1.3150.00
Fig 42	33 ... 43	63	943.1.3160.00


Thread size		Thickness L1 L2	Part number
Fig 7	15.0	4.7 3.7	943.1.3500.00
Fig 9	18.0	4.7 3.7	943.1.3510.00
Fig 11	21.0	4.7 3.7	943.1.3520.00
Fig 13.5	23.0	4.7 3.7	943.1.3530.00
Fig 16	26.0	4.7 3.7	943.1.3540.00
Fig 21	32.0	5.2 4.2	943.1.3550.00
Fig 29	41.0	5.7 4.7	943.1.3560.00
Fig 36	51.0	6.0 5.0	943.1.3570.00
Fig 42	60.0	6.0 5.0	943.1.3580.00
Fig 48	64.0	6.5 5.5	943.1.3590.00

Thread size	Head Ø mm		Part number
M 12 x 1.5	4 ... 8	18	943.1.3170.00
M 16 x 1.5	6 ... 11	22	943.1.3180.00
M 20 x 1.5	7.5 ... 13	24	943.1.3190.00
M 25 x 1.5	12.5 ... 18	30	943.1.3200.00
M 32 x 1.5	17.5 ... 25	42	943.1.3210.00
M 40 x 1.5	24.5 ... 33.5	52	943.1.3220.00
M 50 x 1.5	33 ... 43	63	943.1.3230.00
M 63 x 1.5	42.5 ... 55	77	943.1.3240.00

Thread size	Head Ø mm	Thread length	Part number
Fig 7	14	4.5	943.1.0400.00
Fig 9	17	4.5	943.1.0410.00
Fig 11	20	4.5	943.1.0420.00
Fig 13.5	22	6.0	943.1.0430.00
Fig 16	24	6.0	943.1.0440.00
Fig 21	30	6.0	943.1.0450.00
Fig 29	39	8.0	943.1.0460.00
Fig 36	50	9.0	943.1.0930.00
Fig 42	57	10.0	943.1.0770.00
Fig 48	64	10.0	943.1.0870.00

Note!

On 1. 1. 2000 EN 50 262 came into force prescribing metric threaded cable glands as standard.

 Width across corners (mm)
 Head width (mm)

Cable glands plastic

Accessories for cable glands



Compression gland with nut collar

Material Polyamide, glass-fibre reinforced
Gasket acrylonitrile rubber
Temperature: -20 °C to +80 °C
Protection: IP 65 with connection thread, gasket ring (see below)
Standard DIN 46320
Colour: RAL 7035
RAL 9005 on request



Compression gland with nut collar, bonding protection and strain-relief

Material Polyamide, glass-fibre reinforced
Gasket soft rubber
Temperature: -20 °C to +80 °C
Protection: IP 65 with connection thread, gasket ring (see below)
Accessory: terminal compartment of hostalcom C
Colour: RAL 7035
RAL 9005 on request



Euro 2000 cable gland

Material Polyamide
Gasket Neoprene
Temperature: -40 °C to +120 °C
Protection: IP 65, IP 68 with connection thread, gasket ring
Information: VDE-tested, halogen-free
certification test according to VDE 0619
Colour: RAL 7035, RAL 9005 on request



"Perfect" cable gland

Material Polyamide
Gasket Neoprene
Temperature: -40 °C to +100 °C (up to +120 °C for short periods)
Protection: IP 68/5 bar in specified terminal space
Information: halogen-free, use of multiple gaskets possible (UL listing on request)
Colour: RAL 7001



"Perfect" cable gland with metric thread

Material Polyamide
Gasket Neoprene
Temperature: -40 °C to +100 °C (up to +120 °C for short periods)
Protection: IP 68/5 bar in specified terminal space
Information: halogen-free, use of multiple gaskets possible
Colour: RAL 7001



Euro 2000 cable gland with metric thread on request



Connection thread, gasket ring

Material Polyethylene
Temperature: -50 °C to +170 °C
Colour: transparent

Thread size	Cable Ø mm		Part number for RAL 7035
Pg 7	5 ... 7	15	943.2.0300.00
Pg 9	6 ... 8	19	943.2.0340.00
Pg 11	8 ... 10	22	943.2.0350.00
Pg 13.5	10 ... 12	24	943.2.0360.00
Pg 16	12 ... 14	27	943.2.0370.00
Pg 21	15 ... 17	32	943.2.0380.00
Pg 25	24 ... 26	40	943.2.0390.00
Pg 36	31 ... 33	53	943.2.0400.00
Pg 42	39 ... 41	60	943.2.0500.00
Pg 48	45 ... 47	65	943.2.1010.00

Thread size	Cable Ø mm		Part number for RAL 7035
Pg 7	4 ... 6	15	943.2.0080.00
Pg 9	6 ... 8	19	943.2.0090.00
Pg 11	8 ... 10	22	943.2.0100.00
Pg 13.5	10 ... 12	24	943.2.0110.00
Pg 16	12 ... 14	27	943.2.0120.00
Pg 21	14 ... 18	32	943.2.0130.00
Pg 25	18 ... 24	42	943.2.0160.00

Thread size	Cable Ø mm		Part number Euro 2000 for RAL 7035	Cable Ø mm	Part number Perfect for RAL 7001
Pg 7	3 ... 6.5	15	943.2.4450.00	3 ... 6.5	943.2.2910.00
Pg 9	5.5 ... 8	19	943.2.4460.00	4 ... 8	943.2.2920.00
Pg 11	6 ... 10	22	943.2.4470.00	5 ... 10	943.2.2930.00
Pg 13.5	7 ... 12	24	943.2.4480.00	6 ... 12	943.2.2940.00
Pg 16	9 ... 14	27	943.2.4490.00	10 ... 14	943.2.2950.00
Pg 21	13 ... 18	33	943.2.4500.00	13 ... 18	943.2.2960.00
Pg 25	18 ... 25	42	943.2.4510.00	18 ... 25	943.2.2970.00
Pg 36		53		22 ... 32	943.2.2980.00
Pg 42		60		30 ... 38	943.2.2990.00
Pg 48		65		34 ... 44	943.2.3000.00

Thread size	Cable Ø mm		Part number for RAL 7001
M 12 x 1.5	4 ... 7	15	943.2.4620.00
M 16 x 1.5	5 ... 10	20	943.2.4630.00
M 20 x 1.5	8 ... 13	24	943.2.4640.00
M 25 x 1.5	11 ... 17	29	943.2.4650.00
M 32 x 1.5	15 ... 21	36	943.2.4660.00
M 40 x 1.5	19 ... 28	46	943.2.4670.00
M 50 x 1.5	27 ... 35	55	943.2.4680.00
M 63 x 1.5	35 ... 48	68	943.2.4690.00

Thread size	Part number Gasket ring
Pg 7	9.43.0.002
Pg 9	9.43.0.003
Pg 11	9.43.0.004
Pg 13.5	9.43.0.005
Pg 16	9.43.0.006
Pg 21	9.43.0.007
Pg 25	9.43.0.008
Pg 36	9.43.0.009
Pg 42	9.43.0.010
Pg 48	9.43.0.011

Width across corners (mm)

Head width (mm)

**Filler plug**

Material Polyamide, glass-fibre reinforced
 Temperature -40°C to $+100^{\circ}\text{C}$
 Standard DIN 46 320
 DIN 40 430
 Colour RAL 7035
 Protection IP 65 with connection thread, gasket ring

**Blanking plug**

brass and plastic for seal up to IP 68.
 Used for Euro 2000 and Perfect cable glands
 Colour RAL 7035
 Material Polyamide

**Filler plug with metric thread (on request)**

Material Polyamide, glass-fibre reinforced
 Temperature -40°C to $+100^{\circ}\text{C}$
 Standard DIN 46 320
 DIN 40 430

**Lock-nut**

Material Polyamide, glass-fibre reinforced
 Temperature -40°C to $+100^{\circ}\text{C}$
 Standard DIN 46 320

**Lock-nut with metric thread**

Material brass
 Temperature -40°C to $+100^{\circ}\text{C}$
 Standard DIN 46 320


**Sealing plug with piercing diaphragm**

Material Polyethylene
 Temperature -20°C to $+70^{\circ}\text{C}$
 Colour RAL 7035

Thread size	Head Ø mm	Part number ^{a)}	Part number ^{a)}
		filler plug	blanking plug
Fg 7	15	943.2.1140.00	943.2.4720.00
Fg 9	19	943.2.1150.00	943.2.4730.00
Fg 11	22	943.2.1160.00	943.2.4740.00
Fg 13.5	25	943.2.1170.00	943.2.4750.00
Fg 16	27	943.2.1180.00	943.2.4760.00
Fg 21	33	943.2.1190.00	943.2.4770.00
Fg 29	44	943.2.1200.00	943.2.4780.00
Fg 36	55	943.2.1040.00	943.2.4790.00
Fg 42	62	943.2.1360.00	943.2.4800.00
Fg 48	69	943.2.1370.00	943.2.4810.00

Thread size	Head Ø mm	Part number
M 12 x 1.5		
M 16 x 1.5		
M 20 x 1.5		
M 25 x 1.5		
M 32 x 1.5		
M 40 x 1.5		

Thread size	Head Ø mm	Part number ^{a)}
Fg 7	19	943.2.3100.00
Fg 9	22	943.2.3110.00
Fg 11	24	943.2.3120.00
Fg 13.5	27	943.2.1960.00
Fg 16	30	943.2.1970.00
Fg 21	36	943.2.1980.00
Fg 29	46	943.2.1990.00
Fg 36	60	943.2.2000.00
Fg 42	65	943.2.2010.00
Fg 48	70	943.2.2020.00

Thread size	 mm	Part number
M 12 x 1.5	15	943.1.2880.00
M 16 x 1.5	19	943.1.2890.00
M 20 x 1.5	24	943.1.2900.00
M 25 x 1.5	30	943.1.2910.00
M 32 x 1.5	36	943.1.2920.00
M 40 x 1.5	46	943.1.2930.00
M 50 x 1.5	60	943.1.2940.00
M 63 x 1.5	70	943.1.2950.00

Thread size	Part number ^{a)}
Fg 9	943.2.0290.00
Fg 11	943.2.0300.00
Fg 13.5	943.2.0310.00
Fg 16	943.2.0320.00
Fg 21	943.2.0410.00
Fg 29**)	943.2.0420.00

closed type ^{a)} = for RAL 7035 ^{**} = open type

Note!

On 1. 1. 2000 EN 50 262 came into force prescribing metric threaded cable glands as standard.

 Width across corners (mm)
 Head width (mm)

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