



HAND-HELD ENCLOSURES



A Phoenix Mecano Company

ROSE Systemtechnik GmbH

The company was founded in 1969 and specializes in the development and production of high quality industrial enclosures, which are used in a variety of environmental conditions.

Phoenix Mecano AG / Switzerland is a global company.

The basis of our business success are systems from a wide range of high quality products, innovative design and first class customer service.

For more informations please visit our homepage

www.rose-pw.de www.rose-ex-enclosures.com















A Phoenix Mecano Company

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- ABS hand held enclosure for data acquisition and measurement
- With integrated battery compartment
- Version with or without display opening
- Optional EMC version with internal coating

Technical data

Material:

ABS

Ingress protection:

IP 40 to EN 60529

Surface resistance:

4 x 10¹⁴ Ohm, IEC 60093

Flammability:

UL 94 HB

Colour:

top and base, battery compartment cover, head/shaft panel: RAL 5020, ocean blue

keyboard cover, battery compartment/battery pack: RAL 7024, graphite grey

Temperature range:

-40°C to +80°C

Included in delivery

5-part enclosure with top and base, battery compartment, battery compartment cover, head and shaft cover, fixing and enclosure screws. Open version incl. display screen and punched seal.

Taguan 130

Product range

Type	Order No.	Version	Dimensions W x L x H (mm)	Weight (g)
Taguan 130 FO	27.01 02 00	flat, open	80/70 x 125 x 36,7 / 28,5	130
Taguan 130 FG	27.01 02 01	flat, closed	80/70 x 125 x 36,7 / 28,5	110
Taguan 130 TO	27.01 02 10	deep, open	80/70 x 125 x 46,7 / 28,5	123
Taguan 130 TG	27.01 02 11	deep, closed	80/70 x 125 x 46,7 / 28,5	140



Accessories

Battery holder for 4 micro-cells (AAA)	27.01 02 80
Battery holder for 9 V monobloc	27.01 02 81
Clip	27.01 02 82
Keypad FT 130b, 12 keys, printed (common connection)	82.10 00 01
Keypad FT 130e, 12 keys, with insert (matrix)	82.10 00 02
Connector 13-pole	82.20 00 13
Shaft cover in enclosure colour	27.01 02 85
Shaft cover transparent	27.01 02 86
Shaft cover for infrared	27.01 02 87
Spare display screen set	27.01 02 88
Spare screw set	27.01 00 90
Scratch resistant display screen	on request
Push-button and switches see page 53 - 58	

Electromechanical and electronic components

Upon request we can supply enclosures ready equipped with electromechanical and electronic components such as display, chipcard-acceptor, interface modules etc.

Component mounting options

Component options	Type T130 FO	Type T130 FG	Type T130 TO	Type T130 TG
Display max. view area 45 x 17,4 mm max. mounting dimensions 65 x 29 mm	•		•	
Chipcard reader in head section	•	•	•	•
Scanner	•	•	•	•
PCMCIA slot	•	•	•	•
D-Sub interface 9-pin	•	•	•	•
D-Sub interface 15-pin	•	•	•	•
9 V monobloc	•	•	•	•
4 R3 micro-cells (AAA)	•	•	•	•
1. PCB (main board)	•	•	•	•
2. PCB (adapter board)			•	•
Membrane keypad	•	•	•	•

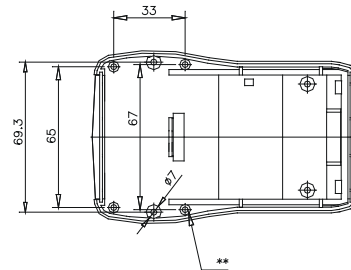
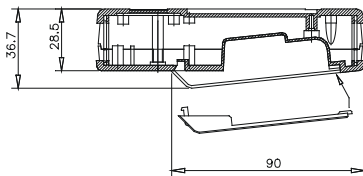
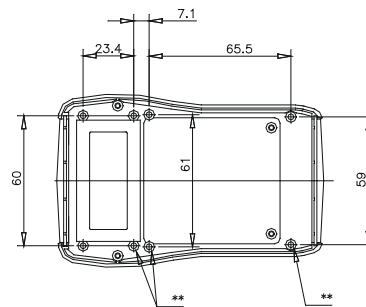
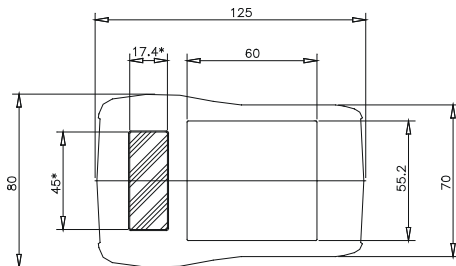
Dimensions



Type	Version	Order No.
Taguan 130 FO	flat, open	27.01 02 00
Taguan 130 FG	flat, closed	27.01 02 01

(max. PCB size of displays ca. 65 x 29 mm)

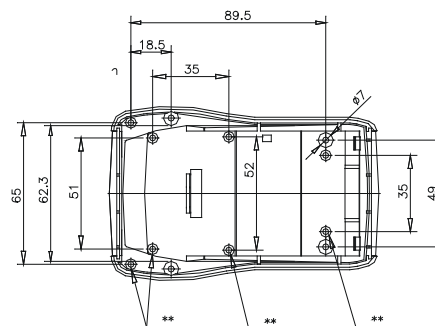
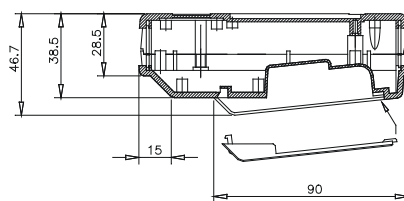
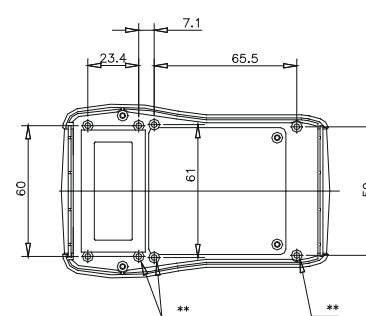
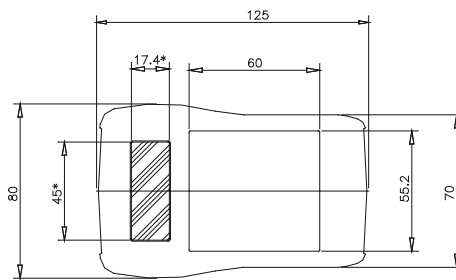
* = Open version
** = PCB mounting boss (screw 2.5 x 5)



Type	Version	Order No.
Taguan 130 TO	deep, open	27.01 02 10
Taguan 130 TG	deep, closed	27.01 02 11

(max. PCB size of displays ca. 65 x 29 mm)

* = Open version
** = PCB mounting boss (screw 2.5 x 5)



Taguan 130

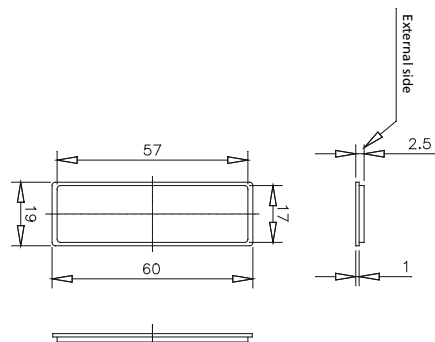
Accessories



Cover
for use as head or shaft cover

Version	Order No.
in enclosure colour	27.01 02 85
transparent	27.01 02 86
for infrared	27.01 02 87

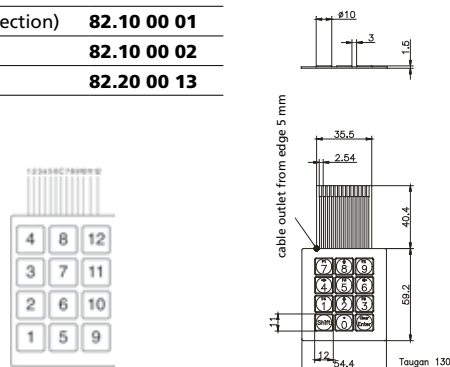
Units per pack: 1 pc



Keypads
12 keys, printed version or plain with insertion facility for custom inscription

Type	Version	Order No.
FT 130b	12 keys, printed (common connection)	82.10 00 01
FT 130e	12 keys, with insert (matrix)	82.10 00 02
	Connector 13-pole	82.20 00 13

Customized keypads on request.



Clip
Metal clip to snap onto battery compartment lid
Order No. **27.01 02 82**



Battery holder
for mounting in the bottom part, for 4 micro-cells (AAA) side by side or connection contact for 9 V monobloc

Version	Order No.
for 4 micro-cells (AAA)	27.01 02 80
for 9 V monobloc	27.01 02 81



- ABS hand held enclosure for data acquisition and measurement
- With integrated battery compartment
- Version with or without display openings
- Optional EMC version with internal coating

Technical data

Material:

ABS

Ingress protection:

IP 40 to EN 60529

Surface resistance:

4×10^{14} Ohm, IEC 60093

Flammability:

UL 94 HB

Colour:

top and base, battery compartment cover, head/shaft cover: RAL 5020, ocean blue

keyboard cover, battery compartment/battery pack: RAL 7024, graphite grey

Temperature range:

-40°C to +80°C

Included in delivery

Enclosure with top and base, keyboard cover, head and shaft cover, fastening and enclosure screws. Open version incl. display screen and punched seal.
Please order battery compartment separately.

Taguan 180/230

Product range

Type	Order No.	Version	Dimensions W x L x H (mm)	Weight (g)
Taguan 180 O	27.01 04 00	open	84/70 x 180 x 52,5/37,5	140
Taguan 180 G	27.01 04 01	closed	84/70 x 180 x 52,5/37,5	170
Taguan 230 O	27.01 06 00	open	97/70 x 229 x 52,5/37,5	230
Taguan 230 G	27.01 06 01	closed	97/70 x 229 x 52,5/37,5	400



Electromechanical and electronic components
Upon request we can supply enclosures ready equipped with electromechanical and electronic components such as display, chipcard-acceptor, interface modules etc.

Accessories

Battery holder 9 V monobloc	27.01 00 94	Hand strap (T 180)	27.01 04 84
Shaft cover in enclosure colour	27.01 02 85	Hand strap (T 230)	27.01 06 84
Shaft cover transparent	27.01 02 86	Spare display screen set (T 180)	27.01 04 88
Shaft cover for infrared	27.01 02 87	Spare display screen set (T 230)	27.01 06 88
Battery compartment empty, 30 g	27.01 00 80	Spare screws set	27.01 00 90
Rechargeable battery pack NiMH 4.8 V / 2100 mAh	27.20 00 03	Head cover, stepped, in enclosure colour	27.01 00 85
Connector charger	27.20 00 02	Head cover, stepped, for infrared	27.01 00 87
Battery charging station	27.20 00 01	Head cover, stepped, transparent	27.01 00 89
Spring contact, 2-pole	27.01 00 82	Head cover, straight, in enclosure colour	27.01 00 91
Wrist strap	27.01 00 83	Head cover, straight, transparent	27.01 00 92
Display fixing set (T 180)	27.01 04 80	Head cover, straight, for infrared	27.01 00 93
Display fixing set (T 230)	27.01 06 80	Scratch resistant display screen	auf Anfrage
Switch mat set 12 keys	27.01 00 95	Push-button and switches see page 53 - 58	
Switch mat set 24 keys (T 180)	27.01 04 81		
Switch mat set 36 keys (T 230)	27.01 06 81		

Components mounting options

Component options	Type T180 O	Type T180 G	Type T230 O	Type T230 G
Display (max. view area 56 x 33 mm; max. mounting dimensions 66 x 46 mm) •				
Display (max. view area 66 x 43 mm; max. mounting dimensions 78 x 56 mm)			•	
Chipcard reader in head section	•	•	•	•
Chipcard reader in shaft section	•	•	•	•
Magnetic card reader	•	•	•	•
Scanner	•	•	•	•
PCMCIA slot	•	•	•	•
D-Sub interface 9-pin	•	•	•	•
D-Sub interface 15-pin	•	•	•	•
D-Sub interface 25-pin	•	•	•	•
Battery pack	•	•	•	•
4 micro-cells R6 (AA)	•	•	•	•
9 V monobloc	•	•	•	•
1st board (main board)	•	•	•	•
2nd board (adapter board)	•	•	•	•
Membrane keypad	•	•	•	•
Switching mat, 12 keys, in combination with keypad plate	•	•	•	•
Switching mat, 24 keys	•	•		
Switching mat, 36 keys			•	•

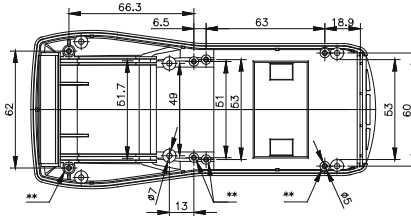
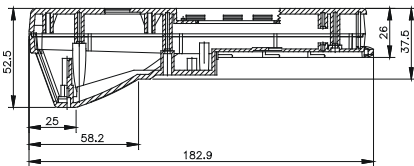
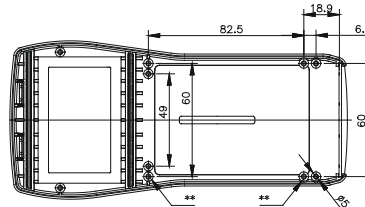
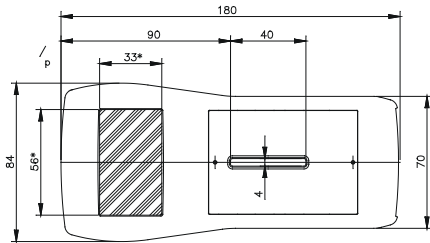
Abmessungen



Type	Version	Order No.
Taguan 180 O	open	27.01 04 00
Taguan 180 G	closed	27.01 04 01

(max. PCB size of displays ca. 66 x 46 mm)

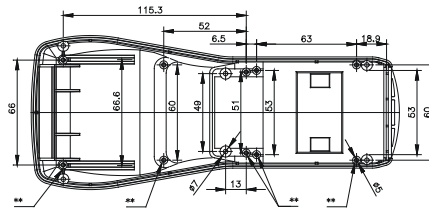
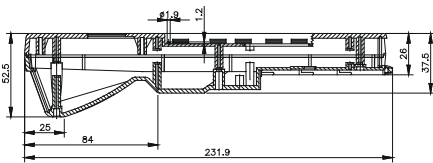
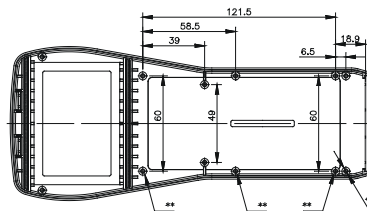
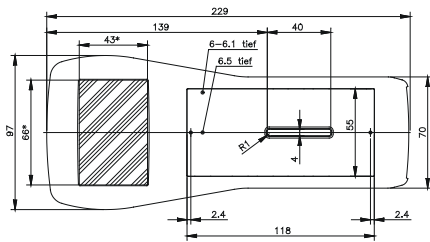
* = Open version
** = PCB mounting boss (screw 2.5 x 5)



Type	Version	Order No.
Taguan 230 O	open	27.01 06 00
Taguan 230 G	closed	27.01 06 01

(max. PCB size of displays ca. 78 x 56 mm)

* = Open version
** = PCB mounting boss (screw 2.5 x 5)



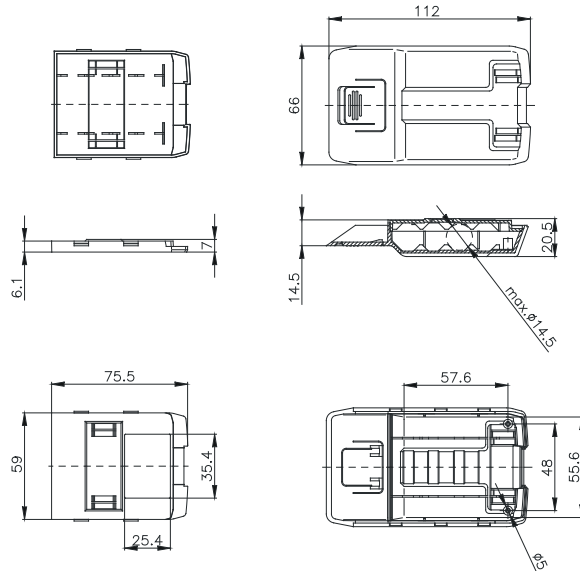
Taguan 180/230

Accessories



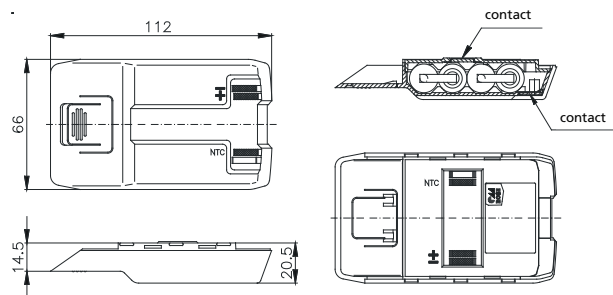
Battery compartment empty
consisting of battery compartment and lid space for 4 micro-cells R6 (AA) side by side

Order No. **27.01 00 80**



Rechargeable battery pack
NiMH 4.8 V / 2100 mAh

Order No. **27.20 00 03**



Battery holder
for mounting in the bottom part for 9 V monobloc

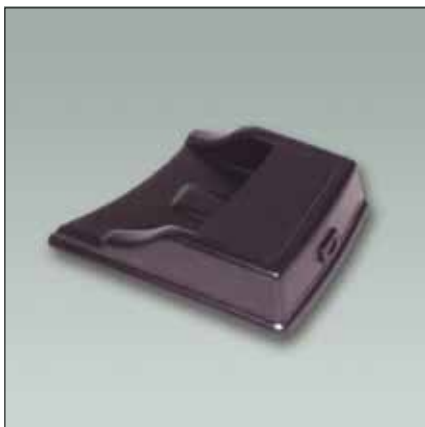
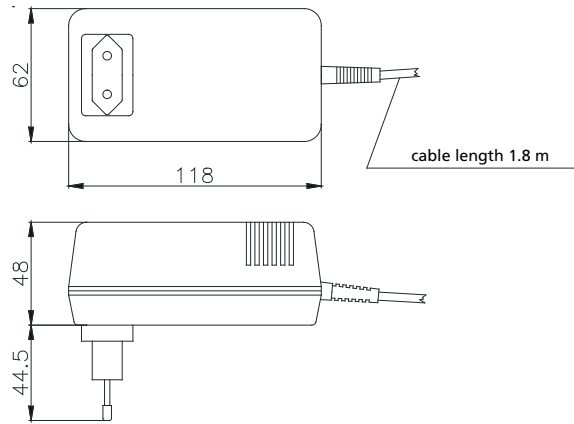
Order No. **27.01 00 94**

Accessories



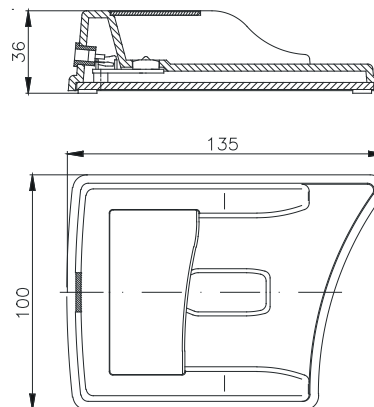
Connector charger
with primary adapter

Order No. **27.20 00 02**



Battery charging station

Order No. **27.20 00 01**



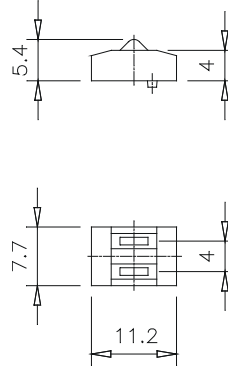
Accessories



Spring contact 2-pole

Counter-contacts for the battery pack (Company Bourns, type 70ADJ002ML1), for mounting in enclosure bottom part

Order No. **27.01 00 82**

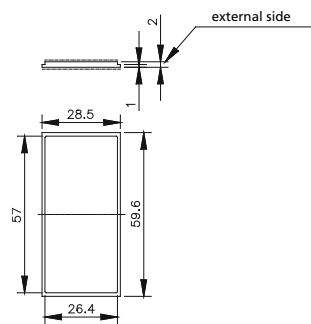


Head cover

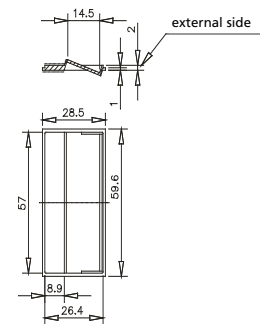
Version	Order No.
stepped in enclosure colour	27.01 00 85
stepped transparent	27.01 00 89
stepped for infrared	27.01 00 87
straight in enclosure colour	27.01 00 91
straight transparent	27.01 00 92
straight for infrared	27.01 00 93

units per pack: 1 pc

even



stepped



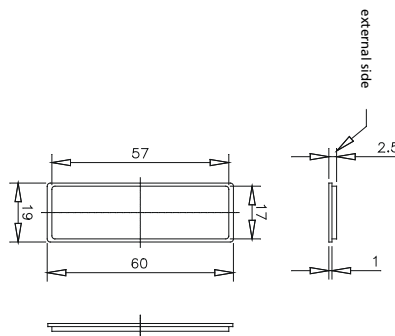
Accessories



Shaft cover

Version	Order No.
in enclosure colour	27.01 02 85
transparent	27.01 02 86
for infrared	27.01 02 87

units per pack: 1 pc

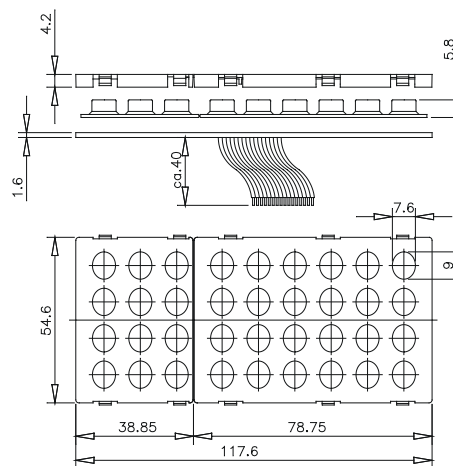


Switch mat set

consisting of keypad plate, silicone switching mat and keypad circuit board with connecting cable

for type	No. of keys	Order No.
Taguan 180/230	12*/**	27.01 00 95
Taguan 180	24**	27.01 04 81
Taguan 230	36	27.01 06 81

* Please remember the modification of the toppart for the flat cable
 ** Please not different heights by combination with closed cover



Taguan 180/230

Accessories



Display fixing set
for variable display mounting

Version for	Order No.
Taguan 180	27.01 04 80
Taguan 230	27.01 06 80



Hand strap
with Velcro fastener for adjustment, consisting of holding strap, adapter and screws

Version for	Order No.
Taguan 180	27.01 04 84
Taguan 230	27.01 06 84



Wrist strap
to prevent falling down, or as carrying aid

Order No. **27.01 00 83**



- Polyamide hand held enclosure for MCR- and automation engineering
- Version with or without display opening
- Prepared for acceptance of keypads/silicone switch mats
- Optional EMC version with internal coating and EMC seal

Included in delivery

Double-skinned enclosure with top and base unit, each with fixing domes, fastening and enclosure screws.
Open version incl. display screen and punched seal.

Technical data

Material:

Polyamide

Ingress protection:

IP 65 to EN 60529

Surface resistance:

10^{12} Ohm, IEC 60093

Flammability:

UL 94 V-2

Colour:

RAL 7021, black grey

Temperature range:

-40°C to +60°C

Beluga 180/220

Product range

Type	Order No.	Version	Dimensions W x L x H (mm)	Weight (g)
Beluga 180 O	27.02 02 00	open	106/75 x 187 x 50	290
Beluga 180 G	27.02 02 01	closed	106/75 x 187 x 50	228
Beluga 220 O	27.02 04 00	open	116/85 x 220 x 51	262
Beluga 220 G	27.02 04 01	closed	116/85 x 220 x 51	254

Accessories

Hook set without magnet	27.02 00 80
Hook set with magnet	27.02 00 81
Keypad FT 180b, 15 keys, printed (Matrix) (B 180)	82.10 00 03
Keypad FT 180e, 15 keys, with insert (Matrix) (B 180)	82.10 00 04
Keypad FT 220b, 18 keys, printed (Matrix) (B 220)	82.10 00 05
Keypad FT 220e, 18 keys, with insert (Matrix) (B 220)	82.10 00 06
Keypad FT 180ge, 12 keys, with insert (common connection) (B 180)	82.10 00 07
Connector (B 180)	82.20 00 08
Connector (B 220)	82.20 00 09
Display fixing set (B 180)	27.01 06 80
Display fixing set (B 220)	27.02 04 82
Cable gland with bending protection M 16 x 1,5	08.10 01 16
Cable gland with bending protection M 20 x 1,5	08.10 01 20
Hand strap	27.02 00 83
Spare screw set	27.02 00 82
Spare display screen set (B 180)	27.01 06 88
Spare display screen set (B 220)	27.02 04 83
Battery compartment without contacts	27.02 00 85
Battery holder for 4 round cells for battery compartment	27.02 00 86
Battery holder for 9 V monobloc for battery compartment	27.02 00 87
Wall holder set (B 180/220)	27.02 00 84
Enabling switch 2-step, blue	83.50 00 10
Scratch resistant display screen	on request
Push-button and switches see page 53 - 58	



Electromechanical components

On request, we offer the enclosures ready equipped with electromechanical components such as emergency stop button, confirm keys, hand wheel, step switch, display.

Components mounting options

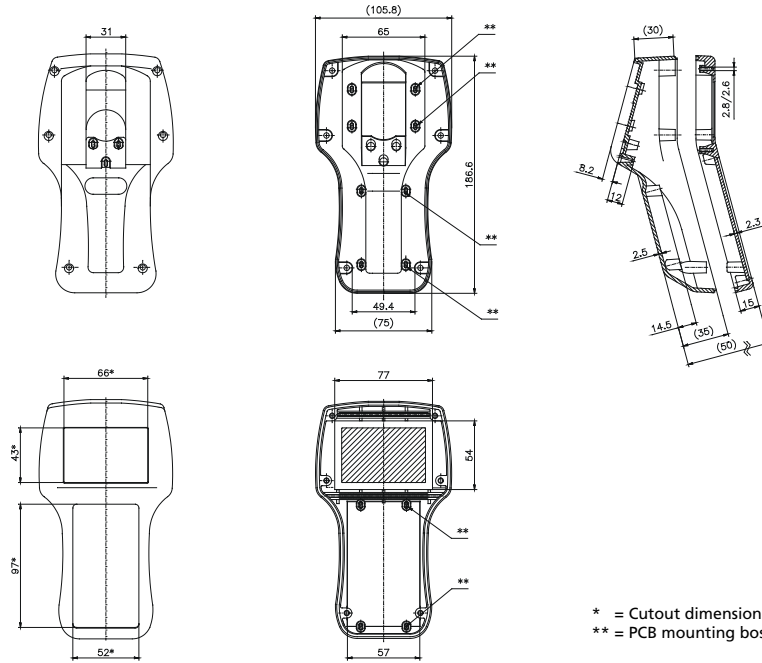
Component options	Type B180 O	Type B180 G	Type B220 O	Type B220 G
Display max. view area 42 x 65 mm max. mounting dimensions 56,4 x 74 mm or 54 x 80 mm	•			
Display max. view area 49 x 78 mm max. mounting dimensions 71,5 x 84 mm or 70,5 x 86 mm			•	
Emergency stop button	•	•	•	•
Confirm key	•	•	•	•
Hand wheel		•		•
Step switch		•		•
Joy stick	•		•	
Cable outlet up to M 16	•	•	•	•
Cable outlet up to M 20			•	•
1st board (main board)	•	•	•	•
Other boards	•	•	•	•

Dimensions



Type	Version	Order No.
Beluga 180 O	open	27.02 02 00
Beluga 180 G	closed	27.02 02 01

(max. PCB size of displays ca. 74 x 56,4 mm or 80 x 54 mm)

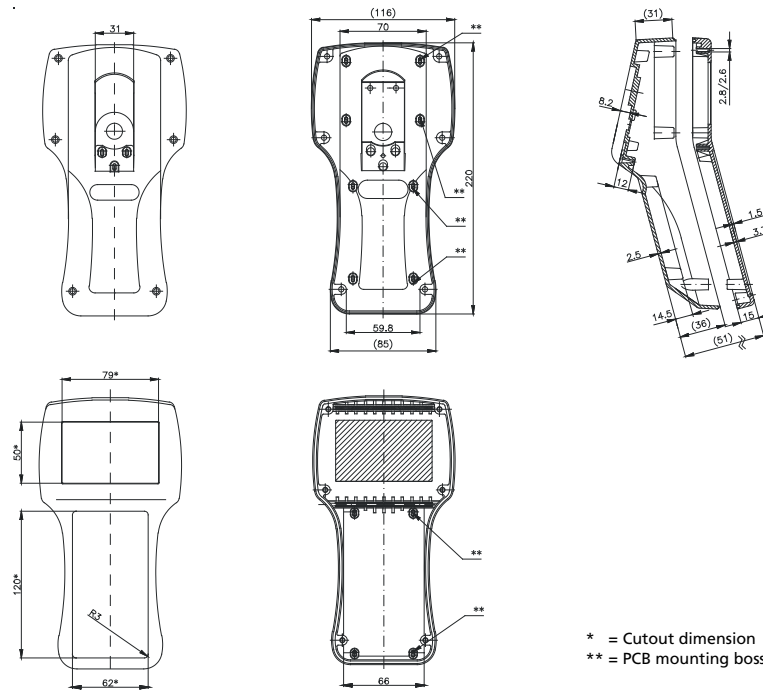


* = Cutout dimension
 ** = PCB mounting boss (screw 3 x 8)



Type	Version	Order No.
Beluga 220 O	open	27.02 04 00
Beluga 220 G	closed	27.02 04 01

(max. PCB size of displays ca. 84 x 71,5 mm or 86 x 70,5 mm)



* = Cutout dimension
 ** = PCB mounting boss (screw 3 x 8)

Beluga 180/220

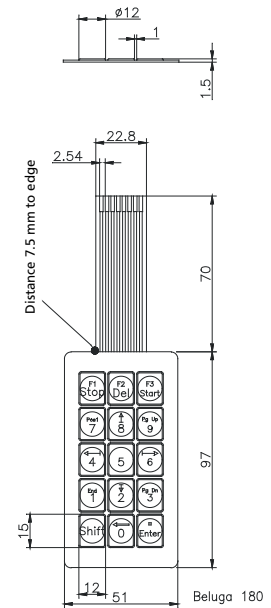
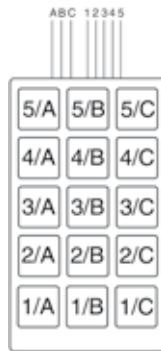
Accessories



Keypads for Beluga 180

Standard membrane keypad with 15 keys as printed version or plain. Insertion facility for custom inscription

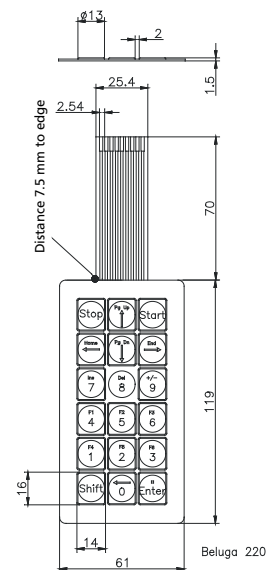
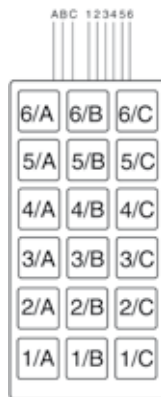
Type	Version	Order No.
FT 180b	15 keys, Matrix printed	82.10 00 03
FT 180e	15 keys, Matrix with insert	82.10 00 04
Connector		82.20 00 08



Keypads for Beluga 220

Standard membrane keypad with 18 keys as printed version or plain. Insertion facility for custom inscription

Type	Version	Order No.
FT 220b	18 keys, Matrix printed	82.10 00 05
FT 220e	18 keys, Matrix with insert	82.10 00 06
Connector		82.20 00 09



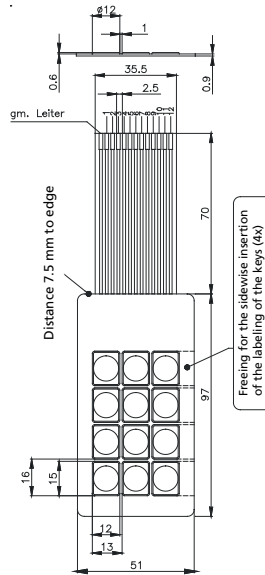
Accessories



Keypads for Beluga 180

Standard membrane keypad with 12 keys as plain version. Insertion facility for custom inscription

Type	Version	Order No.
FT 180ge	12 keys, with insert (common connection)	82.10 00 07



Hook set
consisting of mounted hook and fixing screws

Version	Order No.
without magnet	27.02 00 80
with magnet	27.02 00 81

Adhesion by version with magnet	
plate thickness	force
2 mm	20 N
5 mm	30 N



Display fixing set
for variable display mounting

Version for	Order No.
Beluga 180	27.01 06 80
Beluga 220	27.02 04 82



Battery compartment
without contacts

Order No. **27.02 00 85**

Applications





- Polyamide hand held enclosure for MCR- and automation engineering
- Version with or without display opening
- Prepared for acceptance of keypads/silicone switch mats
- Optional EMC version with internal coating and EMC seal

Technical data

Material:

Polyamide

Ingress protection:

IP 65 to EN 60529

Surface resistance:

10^{12} Ohm, IEC 60093

Flammability:

UL 94 V-2

Colour:

RAL 7021, black grey

Temperature range:

-40°C to +60°C

Included in delivery

Double-skinned enclosure with top and base unit, each with fixing domes, mounting / hook set, fastening and enclosure screws.

Beluga 380

Product range

Type	Order No.	Version	Dimensions W x L x H (mm)	Weight (g)
Beluga 380	27.02 05 01	closed	380 x 117 x 68	670

Accessories

Cable gland with bending protection M 16 x 1,5	08.10 01 16
Cable gland with bending protection M 20 x 1,5	08.10 01 20
Carrying strap	27.02 05 80
Hand strap	27.02 05 81
Wall holder set, stainless steel	27.02 05 82
Spare screw set	27.02 05 83
Push-button and switches see page 53 - 58	



Wall holder set

stainless steel angle bracket set, +/- 45° inclination slope adjustable by means of knurled screws.

Order No. **27.02 05 82**



Electromechanical components

On request, we can supply equipment fitted with electro-mechanical components such as emergency stop button, acknowledge keys, hand wheel, switches, display

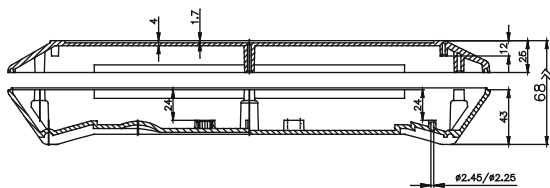
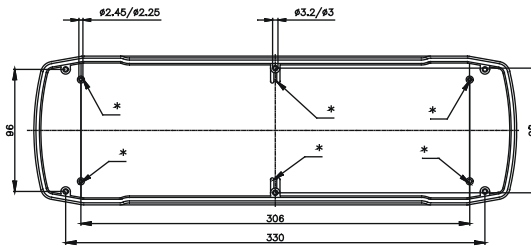
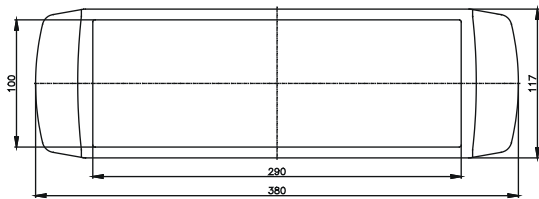
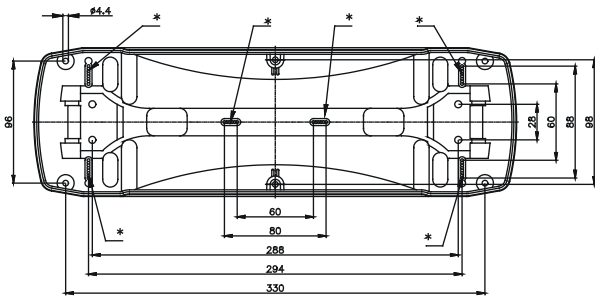
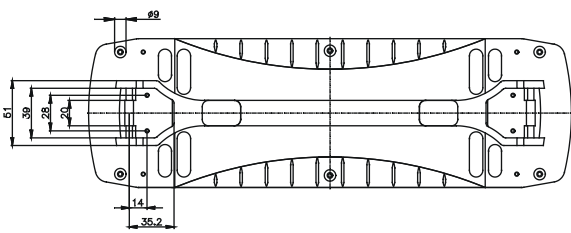
Component mounting options

Component options	Type B380
Display (max. view area / max. mounting dimensions see drawing on page 53 - 58)	•
Emergency stop button	•
Confirm key	•
Enabling switch	•
Hand wheel	•
Step switch	•
Joy stick	•
Cable outlet up to M 20	•
1st board (main board)	•
Other boards	•

Dimensions



Type	Version	Order No.
Beluga 380	closed	27.02 05 01



* = PCB mounting boss (screw 3 x 8)

Beluga 380



Large displays mounted (1/4 VGA)



Integrated hook set



Large mounting space for electronic devices



Hook set, can be used as a stand



- Design plastic enclosure for communication and automation engineering
- Optional with recess for membrane keypads
- Space for automation components

Technical data

Material:

PC / ABS

Ingress protection:

IP 65 to EN 60529

Colour:

black (side part silver)

Temperature range:

-20°C to +60°C

Included in delivery

Enclosure with top, base and side elements

Norvent

Product range

Type	Order No.	Dimensions W x L x H (mm)	Weight (g)
Norvent S	27.04 01 00	274 x 121 x 35	292
Norvent L	27.04 02 00	274 x 166 x 35	370
Norvent XL	27.04 13 00	274 x 166 x 50	459
Norvent S-F	27.04 01 01	274 x 121 x 35	292
Norvent L-F	27.04 02 01	274 x 166 x 35	370
Norvent XL-F	27.04 13 01	274 x 166 x 50	459

F = with recess for foil

Accessories

Norvent quiver S / L / XL	27.04 99 01
Wall holder	on request



Electromechanical components

On request, we can supply equipment fitted with electro-mechanical components such as emergency stop button, acknowledge keys, hand wheel, switches, display



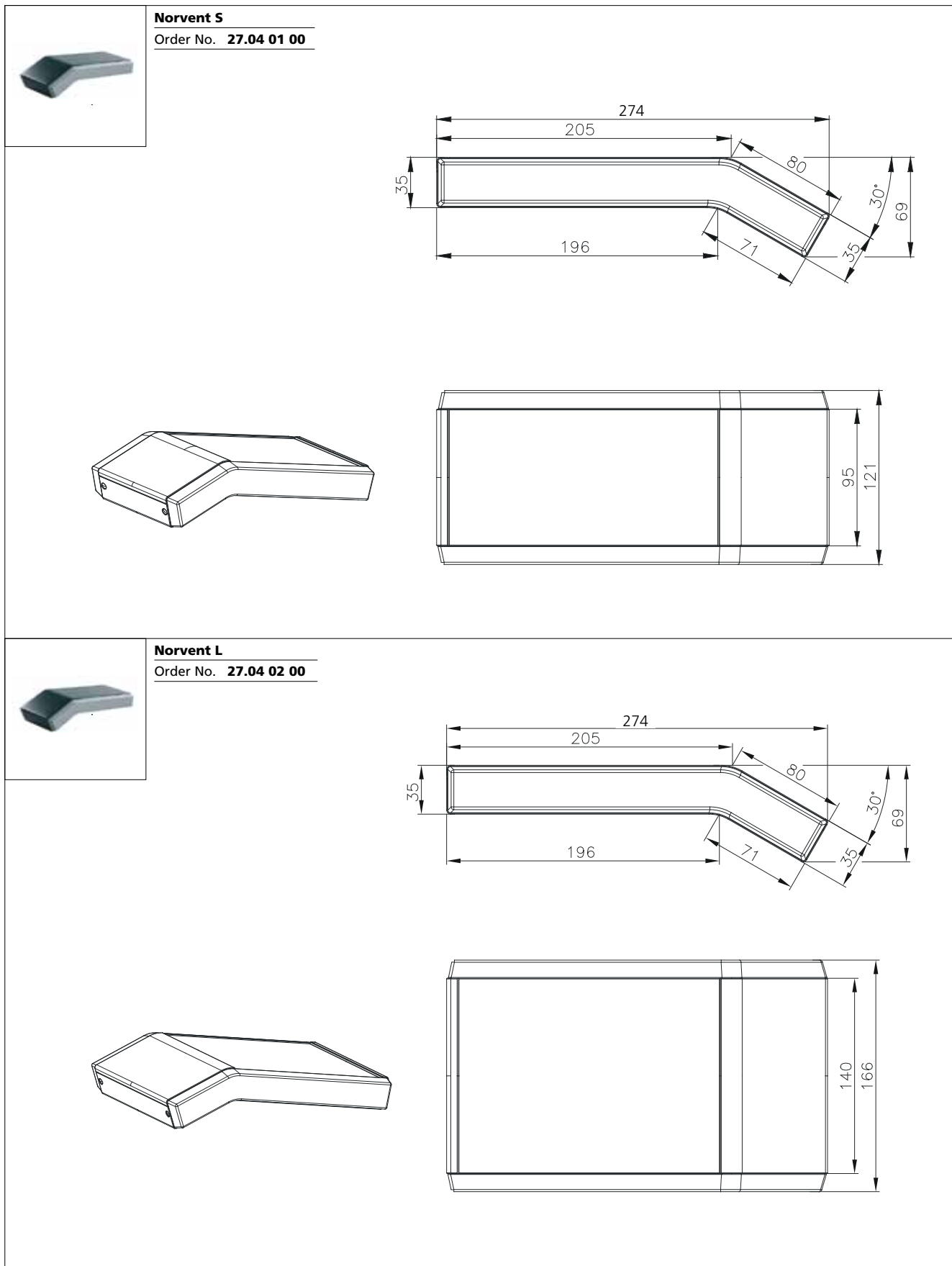
Quiver

Order No. **27.04 99 01**

Applications

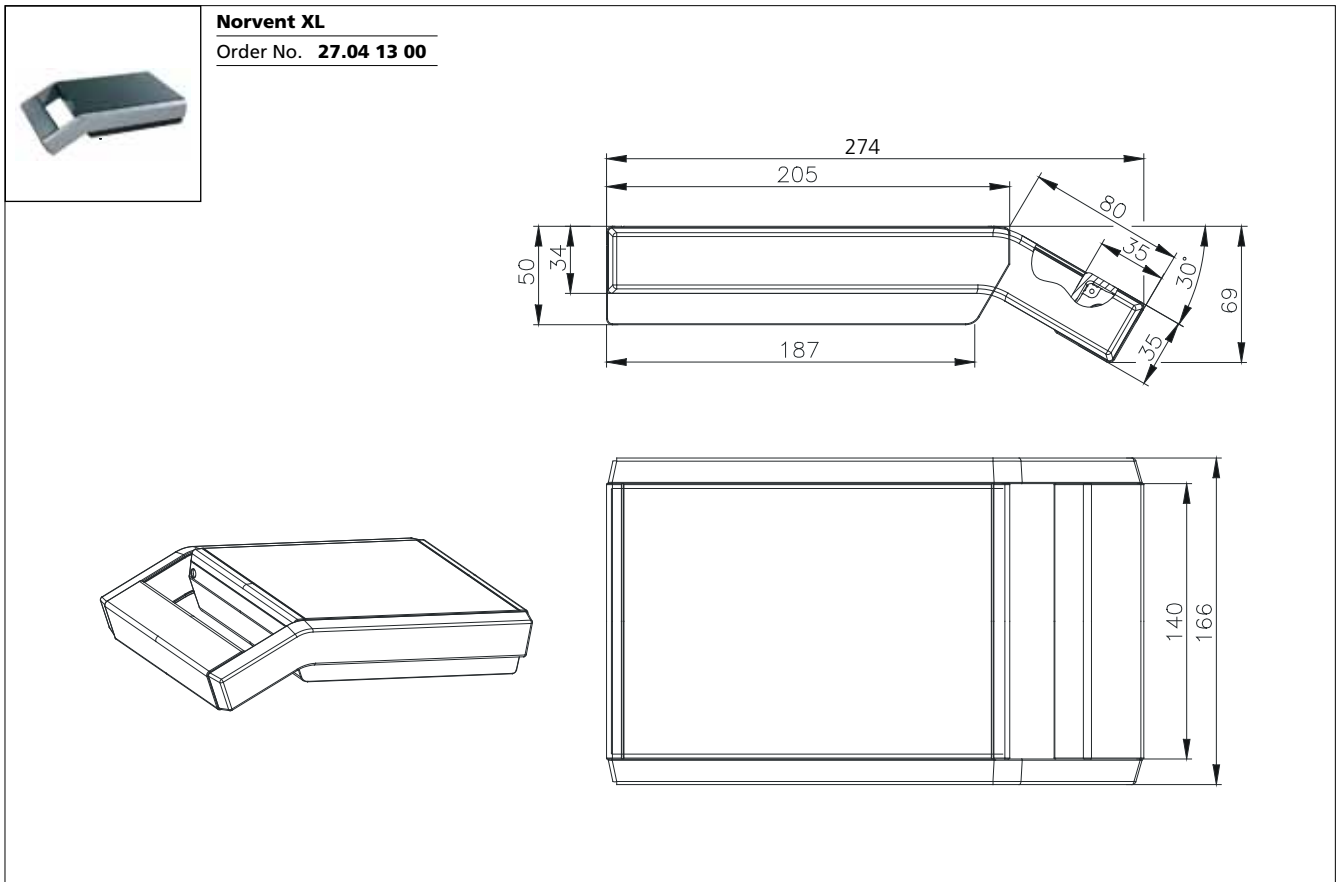


Dimensions



Norvent

Dimensions





- Polyamide hand held enclosure for MCR- and automation engineering
- Version with closed or front frame lid
- Rear battery compartment
- Optional EMC version with internal coating and EMC seal

Included in delivery

Double-skinned enclosure with top and base unit, each with fixing domes, battery compartment lid, fastening and enclosure screws

Technical data

Material:

Polyamide

Ingress protection:

IP 65 to EN 60529

Impact resistance:

7 Joule to EN 60079-0

Flammability:

UL 94 HB

Colour:

Base and lid: RAL 7021, black grey

Rear cover: RAL 5003, sapphire blue

Temperature range:

-40°C to +60°C

Pilot 250

Product range

Type	Order No.	Version top part	Dimensions W x L x H (mm)	Weight (g)
Pilot 250/1	29.25 00 01	closed	140/120 x 280 x 86	700
Pilot 250/2	29.25 00 02	lid frame	140/120 x 280 x 86	460

Accessories

Front panel, aluminium for Pilot 250/2	29.25 01 01
Magnet holder round	29.25 01 02
Battery holder for fixing in the enclosure base for 4 micro-cells	29.25 01 03
Battery holder for fixing in the enclosure base for 9V monobloc	29.25 01 04
Wall holder (2 hooks, 2 bolts with screws)	29.25 01 05
Cable gland with bending protection M 16 x 1,5	08.10 01 16
Cable gland with bending protection M 20 x 1,5	08.10 01 20
Enabling switch (3-steps)	on request



Electromechanical components

On request, we can supply equipment fitted with electro-mechanical components such as emergency stop button, acknowledge keys, hand wheel, switches, display



Battery holder

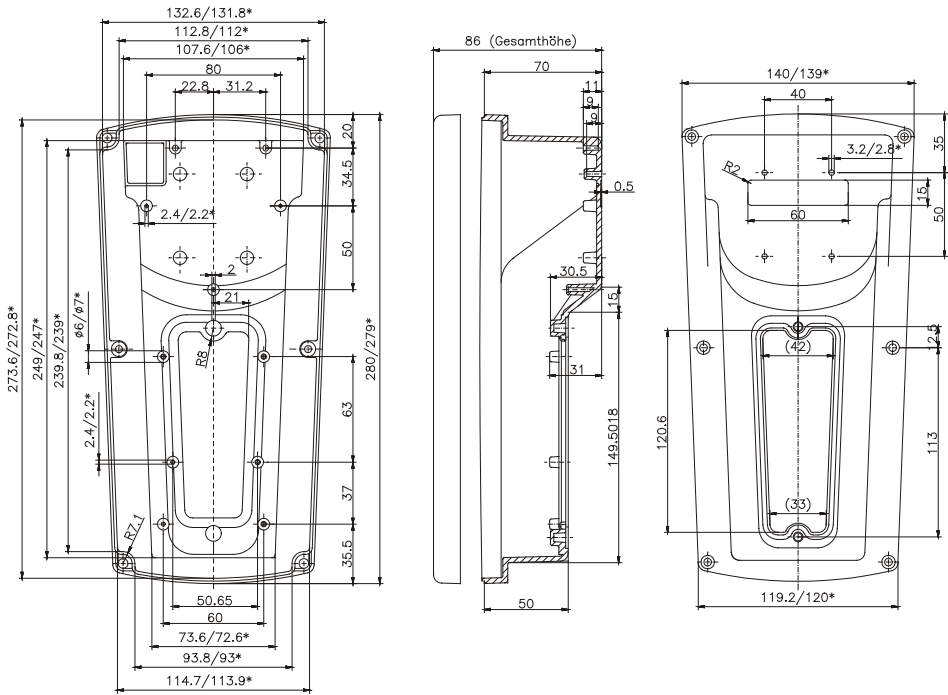
for fixing in enclosure base for 4 micro-cells or 9 V monobloc

Version	Order No.
for 4 micro-cells	29.25 01 03
for 9 V monobloc	29.25 01 04

Dimensions



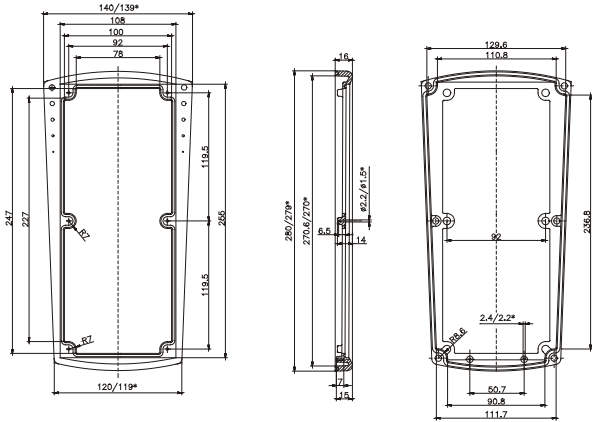
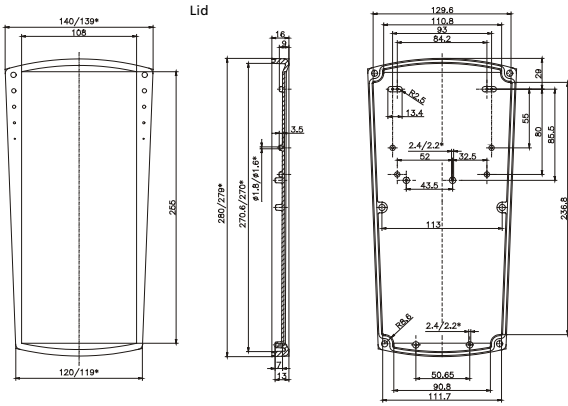
Type	Version	Order No.
Pilot 250/1	closed	29.25 00 01
Pilot 250/2	lid frame	29.25 00 02



* = Conical form tapering downwards

Closed lid

Lid frame



Pilot 250



Pilot with membrane keypad



Rear cover



Large mounting space for electronic assemblies



Wall holder

Order No. **29.25 01 05**



Magnetic holder round

Order No. **29.25 01 02**



Cable gland

Size	Order No.
M 16 x 1,5	08.10 01 16
M 20 x 1,5	08.10 01 20



- Polyamide / PVC hand held enclosure for MCR and automation engineering
- Large fitting space
- Variable length using profile technology

Included in delivery

Enclosure system consisting of polyamide internal enclosure with end covers, two side PVC cover profiles, Alucobond composite front plate, rear wall, 2 external end covers, with M 25 x 1,5 threaded hole for cable gland

Technical data

Material:

Polyamide / PVC

Ingress protection:

IP 65 to EN 60529

Impact resistance:

5 Joule to EN 60079-0

Flammability:

End covers: UL 94 HB

Colour:

End covers: RAL 1021, rape yellow

PVC-profile: RAL 9005, jet black

Temperature range:

-20°C to +70°C

Pilot 50

Product range

External enclosure dimensions W x L x H (mm)	Order No. Standard complete	Standard enclosure body without front plate/ without rear wall	Standard rear wall seperate	Standard front plate seperate
280 x 191 x 76	29.11 10 00	29.11 00 00	29.11 00 01	29.11 00 02
330 x 191 x 76	29.12 10 00	29.12 00 00	29.12 00 01	29.12 00 02
440 x 191 x 76	29.13 10 00	29.13 00 00	29.13 00 01	29.13 00 02
Sonderlänge	29.19 10 00	29.19 00 00	29.19 00 01	29.19 00 02

Accessories

Cable gland with bending protection M 25 x 1,5	08.10 01 25
Cable gland reduction M 25 / M 12	08.01 25 12
Cable gland reduction M 25 / M 16	08.01 25 16
Cable gland reduction M 25 / M 20	08.01 25 20
Spring nut set of M4 for internal mounting, set of 4 pcs	29.00 00 50
PCB fixings, set of 4 pcs incl. spring nuts	29.00 00 60
Wall holder (set single)	29.00 00 70
Magnetic wall holder, 1 pc	29.00 00 80
Wall holder incl. enclosure modification	29.00 10 00
Push button and switches see page 53 - 58	



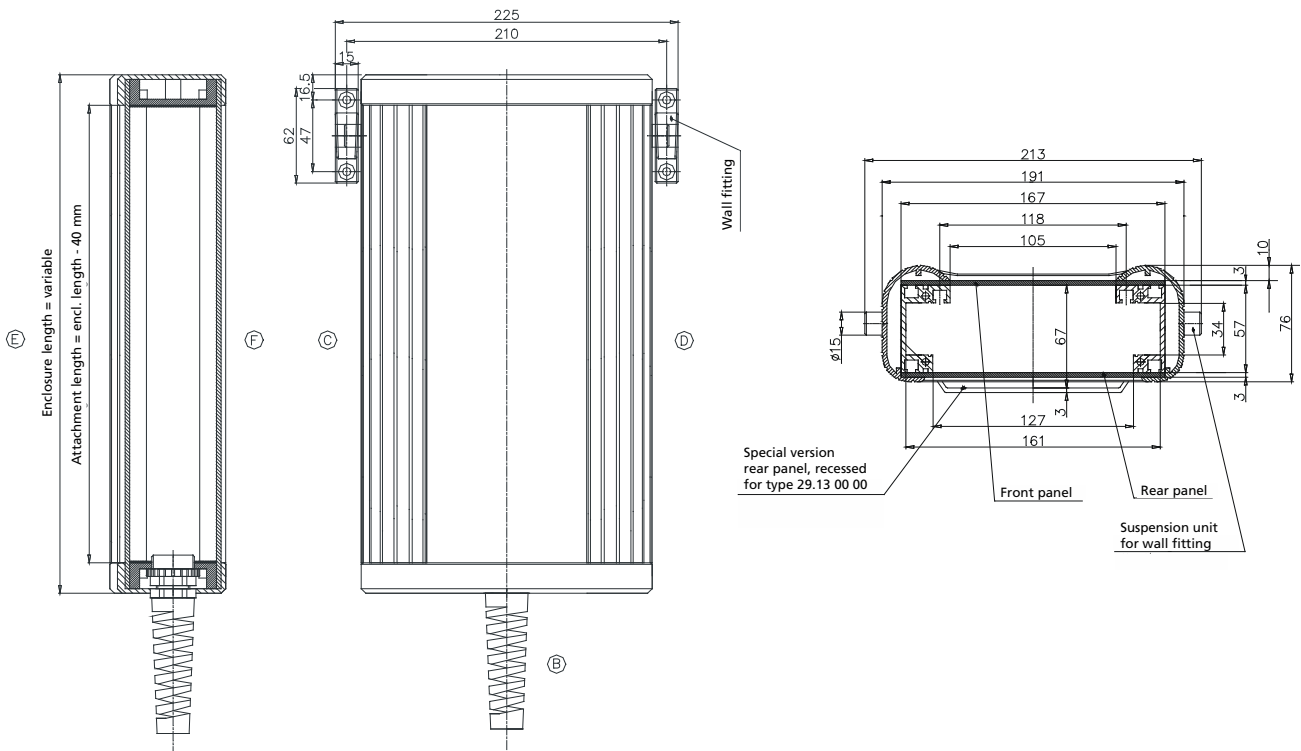
Electromechanical components

On request, we can supply equipment fitted with electro-mechanical components such as emergency stop button, acknowledge keys, hand wheel, switches, display

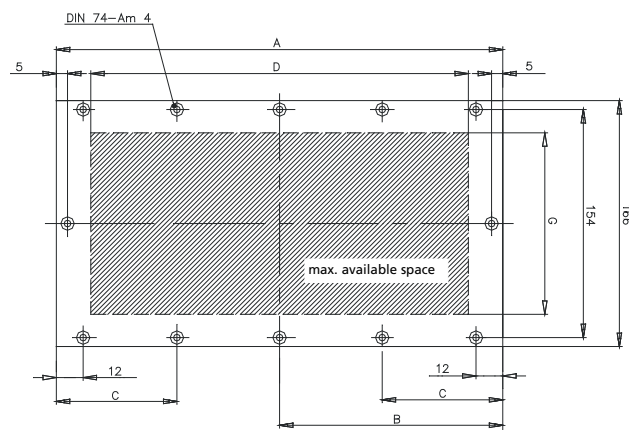
Dimensions



Standard	Dimensions	Weight (g)
29.11 10 00	280 x 191 x 76	1660
29.12 10 00	330 x 191 x 76	1900
29.13 10 00	440 x 191 x 76	2200
29.19 10 00	Special length	



Type	A	B	C	D	G
29.11 10 00	274	-	92	240	105/127
29.12 10 00	324	162	81	290	105/127
29.13 10 00	434	217	109	400	105/127
Special size, $A \leq 300$ mm	Enclosure length - 6	-	A/3	A - 34	105/127
Special size, $A \geq 300$ mm	Enclosure length - 6	A/2	A/4	A - 34	105/127



Pilot 50

Zubehör



PCB fixing set
Set = 4 pcs with spring nuts
Order No. **29.00 00 60**



Set of spring nuts
Spring nuts (M4) for internal mounting;
set = 4 pcs
Order No. **29.00 00 50**



Wall holder set
Order No. **29.00 00 70**



Pilot with small control device



Inner T-slots offer mounting facilities on all sides



EMC version



Variable fittings



- Hand held enclosure for MCR and automation engineering
- Robust design (Polyamide or Polyester)
- Version with handle and integrated cable entry (Pilot 10, 20 standard)

Included in delivery

Pilot 10/20: enclosure with handle, including cable gland M 20 x 1,5, front plate with fastening screw and wall holder

Pilot 30: two-part Polyester enclosure with self-adhesive aluminium front plate, enclosure screws and wall holder

Technical data

Material:

Pilot 10 and Pilot 20: Polyamide

Pilot 30: Polyester

Ingress protection:

Pilot 10 and Pilot 20: IP 65 to EN 60529

Pilot 30: IP 66 to EN 60529

Impact resistance:

7 Joule to EN 60079-0

Flammability:

Pilot 10 and 20: UL 94 HB

Pilot 30: UL 94 V-0

Colour:

RAL 1021, rape yellow

Temperature range:

Pilot 10 and Pilot 20: -40°C to +60°C

Pilot 30: -25°C to +90°C

Pilot 10/20/30

Product range

Type	Order No.	Enclosure dimensions incl. handle W x L x H (mm)	Front plate dimensions W x H (mm)	Mounting depth (mm)
Pilot 10	29.40 02 00	70 x 93 x 190	61 x 59	67
Pilot 20	29.30 01 00	115 x 93 x 200	106 x 69	67
Pilot 30	29.50 01 00	164 x 116 x 295	70 x 280	71

Accessories

Mounting plate (Pilot 20)	29.31 00 00
Wall holder (2 pcs. with screws)	29.60 01 00
Cable gland M 20 x 1,5 (Pilot 30)	08.10 01 20
Push button and switches see page 53 - 58	



Electromechanical components

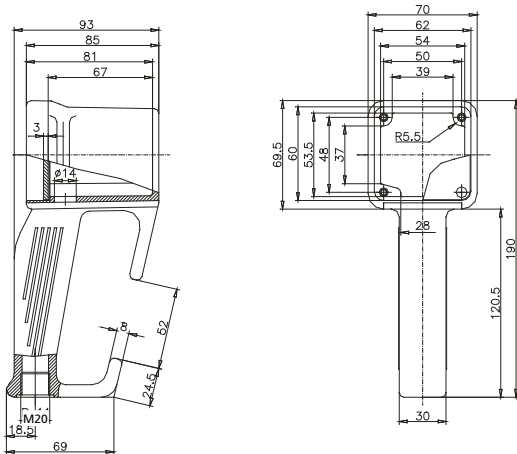
On request, we can supply equipment fitted with electro-mechanical components such as emergency stop button, acknowledge keys, hand wheel, switches, display

Dimensions

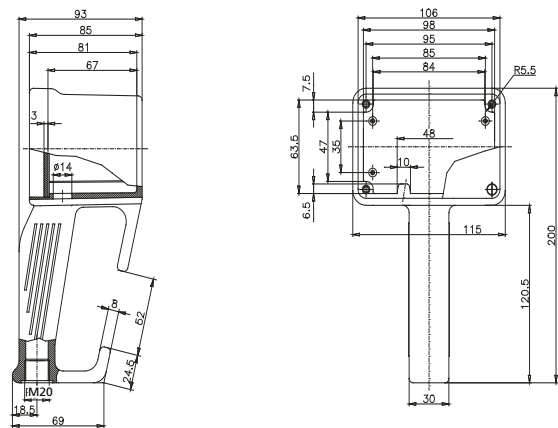


Type	Order No.	Weight (g)
Pilot 10	29.40 02 00	380
Pilot 20	29.30 01 00	440

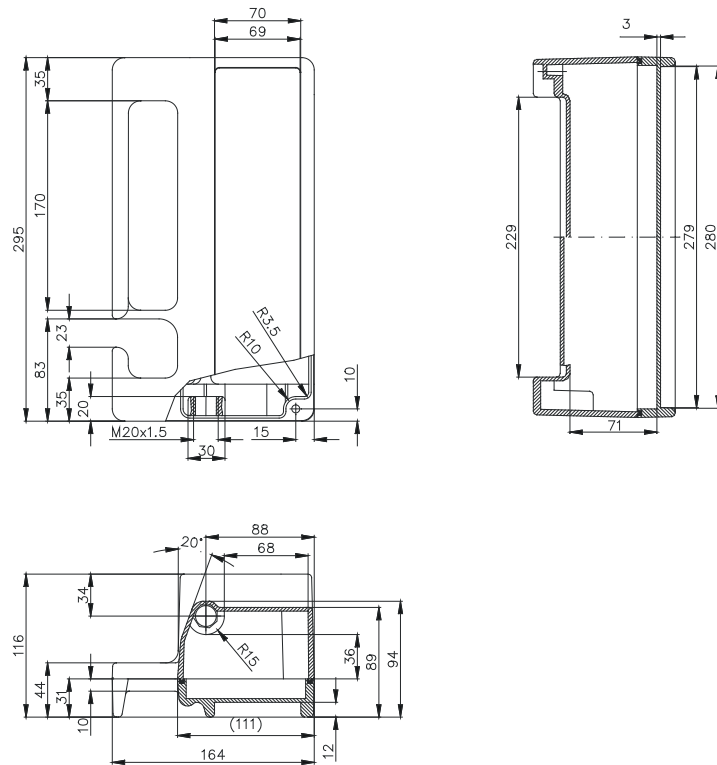
Pilot 10



Pilot 20



Type	Order No.	Weight (g)
Pilot 30	29.50 01 00	1700



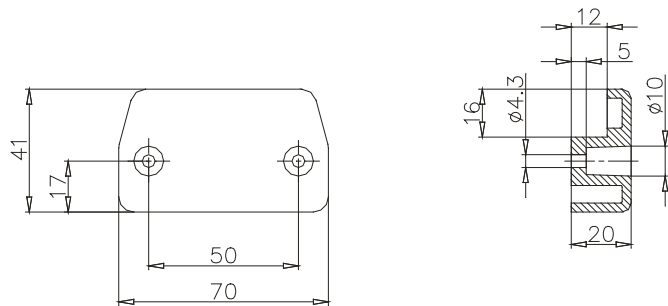
Pilot 10/20/30

Accessories



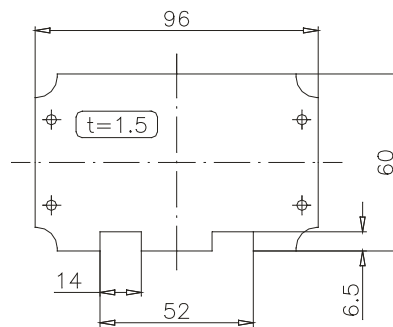
Wall holder
Set complete with 2 fittings and screws

Order No. **29.60 01 00**



Mounting plate Pilot 20

Order No. **29.31 00 00**



One and two button enclosures Pilot 10 / Pilot 20



Integrated handles on Pilot 10 and Pilot 20



Multi button enclosure Pilot 30



- Polyamide hand enclosure for automation and control engineering
- Version with handle and integrated cable entry
- Large fitting space

Technical data

Material:

Polyamide

Front plate: Polystyrol

Ingress protection:

IP 65 to EN 60529

Impact resistance:

7 Joule to EN 60079-0

Flammability:

UL 94 HB

Colour:

RAL 1021, rape yellow

Temperature range:

-40°C to +60°C

Included in delivery

Enclosure with handle, including cable gland M 20 x 1.5, front plate, enclosure and front panel screws, and wall holder

Pilot 110 - 150

Product range

Type	Order No.	Enclosure dimensions incl. handle W x L x H (mm)	Front plate dimensions W x H (mm)	Mounting depth (mm)
Pilot 110	29.21 10 00	85 x 85 x 191	77 x 77	63,5
Pilot 120	29.21 20 00	115 x 85 x 191	107 x 77	63,5
Pilot 130	29.21 30 00	85 x 85 x 221	77 x 107	63,5
Pilot 140	29.21 40 00	160 x 85 x 211	152 x 97	63,5
Pilot 150	29.21 50 00	105 x 85 x 266	97 x 152	63,5

Accessories

Magnetic holder (for Pilot 120 - 150)

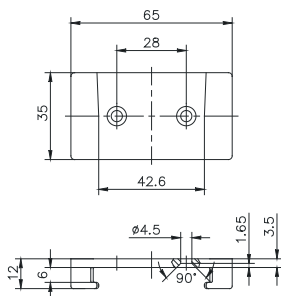
29.00 00 80

Push button and switches see page 53 - 58



Electromechanical components

On request, we can supply equipment fitted with electro-mechanical components such as emergency stop button, acknowledge keys, hand wheel, switches, display



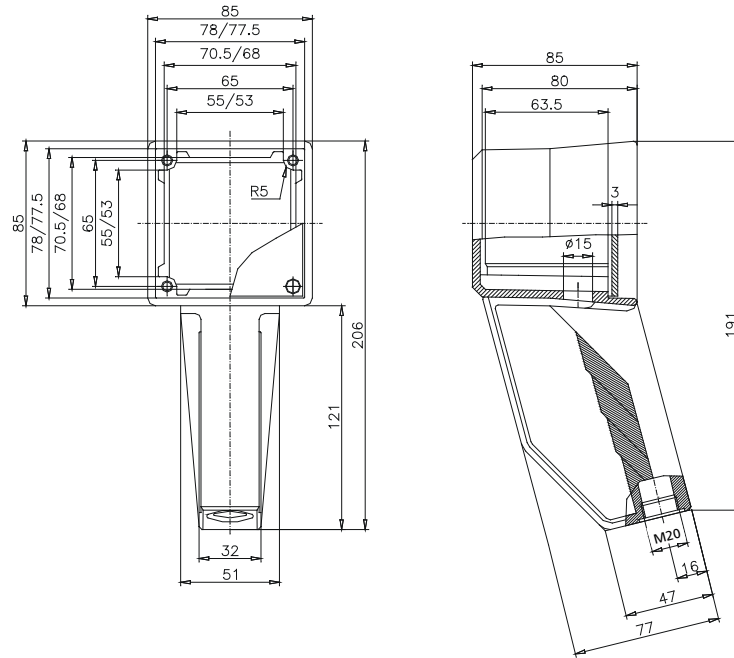
Wall holder

included in delivery

Dimensions

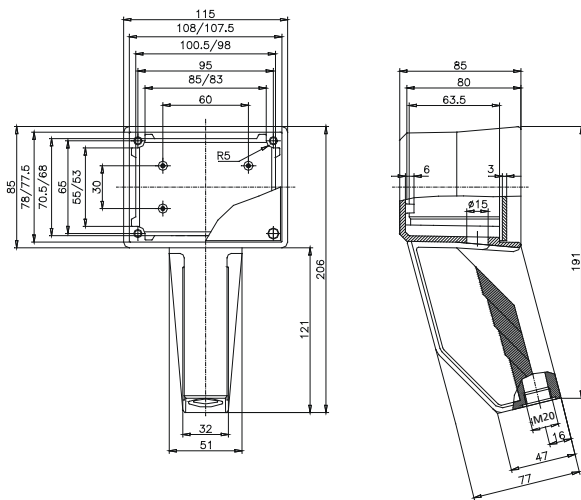


Type	Order No.	Weight (g)
Pilot 110	29.21 10 00	500

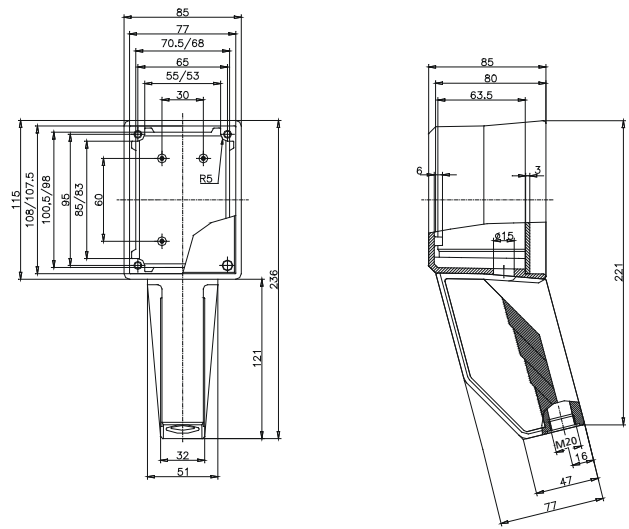


Type	Order No.	Weight (g)
Pilot 120	29.21 20 00	341
Pilot 130	29.21 30 00	341

Pilot 120



Pilot 130



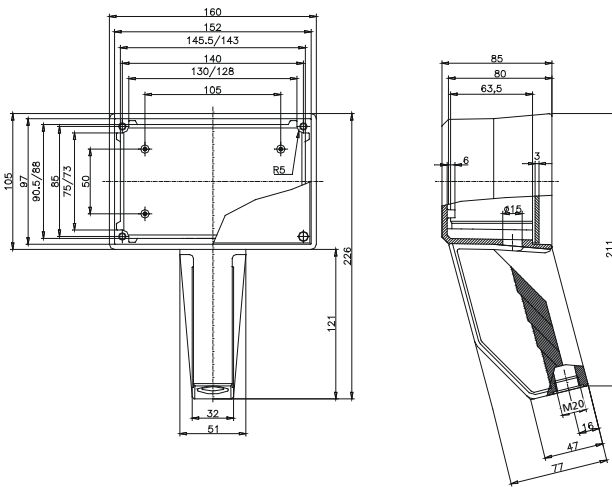
Pilot 110 - 150

Accessories

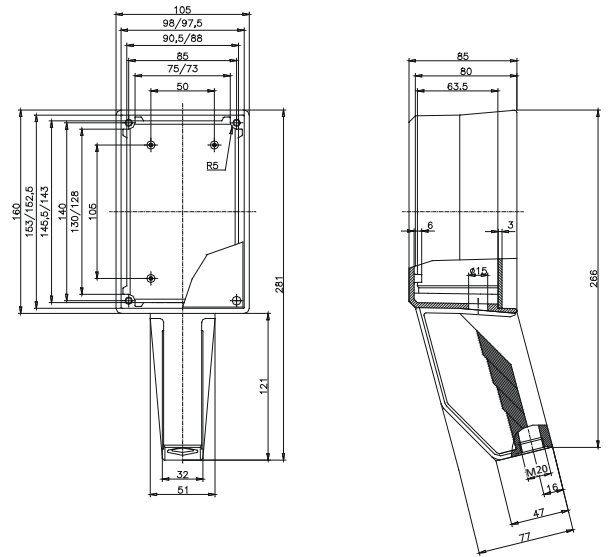


Type	Order No.	Weight (g)
Pilot 140	29.21 40 00	780
Pilot 150	29.21 50 00	780

Pilot 140



Pilot 150



Accessories



Magnetic holder
for Pilot 120 - 150, self-adhesive
dimensions: 90 x 30 x 7.5 mm

Order No. **29. 00 00 80**



- Polyamide hand held enclosures for data acquisition, MCR and automation engineering
- For installations and command devices mobile and stationary applicable
- Variable mounting depths

Technical data

Material:

Enclosure: Polyamide

Border profile : NBR, black

Ingress protection:

IP 65 to EN 60529

EMC:

Optional

Surface resistance:

10¹² Ohm, IEC 60093

Flammability:

UL 94 V-2

Colour:

RAL 7021, black grey

Temperature range:

-20°C to +60°C

Included in delivery:

Clam shell enclosure with top and base, each with fixing domes incl. seals and border profile, 3 cover flaps for interface garages, screws and fixing materials for front panel mounting.

Limanda

Product range

Order No.	Type	Dimensions (mm) W x L x H	Weight (g)
27.03 03 00	Limanda I	311 x 281 x 72	1200
27.03 03 01	Limanda I EMV	311 x 281 x 72	1200
27.03 03 17	Limanda I für OP17	311 x 281 x 97	1500
27.03 02 00	Limanda II	270 x 248 x 64	800
27.03 02 01	Limanda II EMV	270 x 248 x 64	800

Accessories

	Order No.
Limanda I Aluminium front plate, natural anodized finish	27.03 03 80
Limanda I EMC front plate	27.03 03 90
Limanda II Aluminium front plate, natural anodized finish	27.03 02 80
Limanda II EMC front plate	27.03 02 90
Limanda I intermediate frame	27.03 03 81
Limanda II intermediate frame	27.03 02 81
Limanda II mounting set for Siemens TP 170 / TP 070	27.03 02 82
Limanda I EMC intermediate frame	27.03 00 88
Limanda II EMC intermediate frame	27.03 02 88
Limanda I handle set without push button	27.03 00 83
Limanda holder	27.03 00 84
Limanda carrying strap	27.03 00 85
Limanda carrying strap comfort	27.03 00 92
Limanda I quiver	27.03 00 86
Limanda II table stand (set = 2 pcs.)	27.03 00 87
Limanda II quiver	27.03 00 89
Limanda I quiver with intermediate frame	27.03 00 90
Limanda II quiver with intermediate frame	27.03 00 91
Limanda I handle set with 3 step enabling switch (right-hand version)	27.03 00 71
Limanda I handle set with 3 step enabling switch (left-hand version)	27.03 00 72
Cable connection with bending protection M 16	08.10 01 16
Cable connection with bending protection M 20	08.10 01 20
Cable connection with bending protection M 25	08.10 01 25
Inclining adapter for mounting directly on wall or machine	50.02 00 01
Inclining adapter for mounting directly onto GT 48/2 tube	50.02 00 02
Inclining adapter for mounting directly onto GTK electronic tube	50.02 00 03
Inclining adapter for mounting directly onto GT 48/2 or GTK electronic	50.02 00 04
Inclining adapter for holder onto GT 48/2 tube	50.02 00 05
Inclining adapter for holder onto GTK electronic tube	50.02 00 06
Inclining adapter for holder on wall or machine	50.02 00 07
Push button and switches see page 53 - 58	



Limanda enclosure systems enable installation of many manual operation panels.



Limanda I for OP17 - Supplied ready for installation of the Siemens OP17 Operator Panel without additional fitting materials.



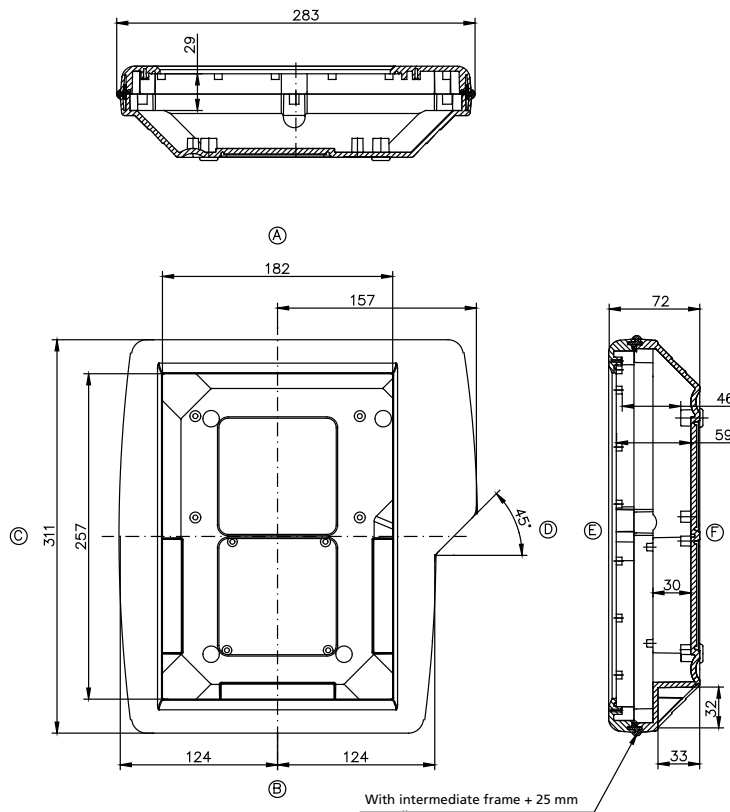
Limanda II with fitted command unit

Dimensions



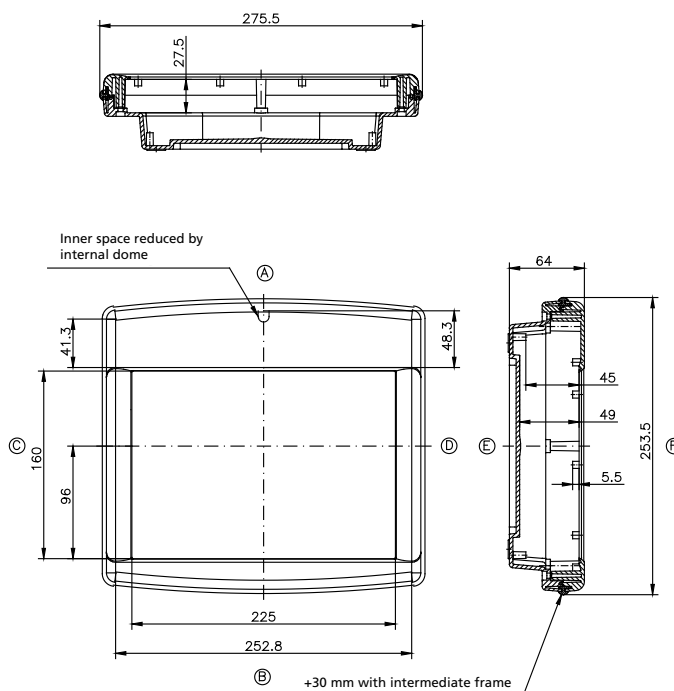
Limanda I

Order No. **27.03 03 00**



Limanda II

Order No. **27.03 02 00**



Limanda

Accessories

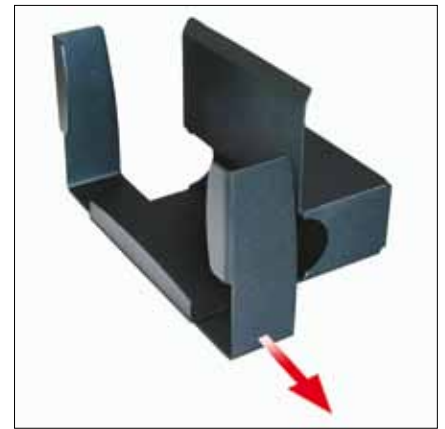
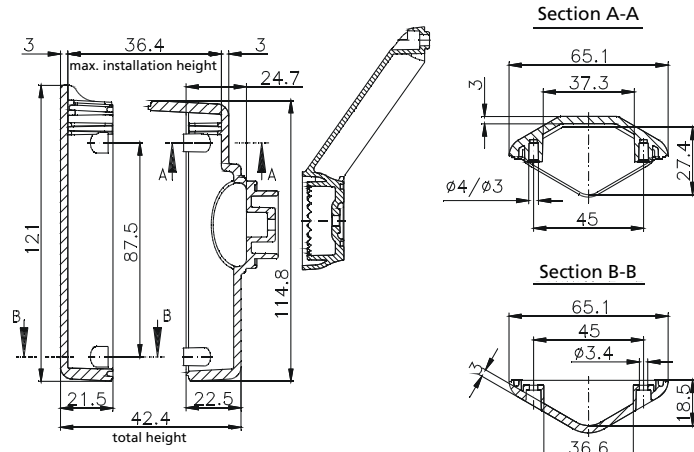


Limanda I handle set without push button

For installation on all four rear corners of the enclosure. The handle incorporates a stepped engaging mechanism which allows it to be optimally adjusted for the operator during installation.

IP 65 once assembled.

Order No. **27.03 00 83**



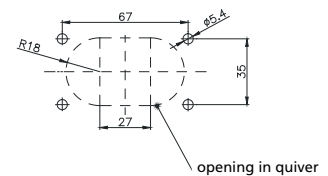
Limanda I handle set with 3-step enabling switch
(2-channel) for use in service, set up and programming operations.
Included in delivery: handle set with fixed enabling switch

Order No.	Type
27.03 00 71	Right-hand version
27.03 00 72	Left-hand version

Technical data see page 53 - 58

Limanda quiver
Wall holder - adjustable in width, can be adapted to inclining adapter.
Material sheet steel.

Order No.	for version
27.03 00 86	Limanda I
27.03 00 89	Limanda II
27.03 00 90	Limanda I with intermediate frame
27.03 00 91	Limanda II with intermediate frame



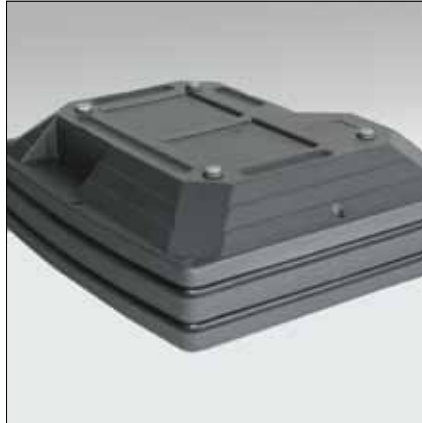
Accessories



Limanda holder

Enables rapid removal of the Limanda from the inclining adapter (for Limanda I and II). There is a gap of 19.5 mm between the Limanda and the holder for assembly purposes.

Order No. **27.03 00 84**



Limanda I intermediate frame

To increase the mounting depth

Order No.	Depth	for version
27.03 03 81	25 mm	Limanda I
27.03 02 81	30 mm	Limanda II
27.03 00 88	25 mm	Limanda I EMC
27.03 02 88	30 mm	Limanda II EMC



Limanda carrying strap

Carrying strap in 2 versions: Standard and comfort: strengthened execution with shoulder pad

Order No.	
27.03 00 85	Carrying strap
27.03 00 92	Carrying strap comfort



Inclining adapter

Order No.	Type	Weight (g)
50.02 00 01	For mounting directly on wall or machine	1286
50.02 00 02	For mounting directly onto GT 48/2 tube	986
50.02 00 03	For mounting directly onto GTK electronic tube	1004
50.02 00 04	For mounting directly onto GT 48/2 or GTK electronic	900

Technical data

Material	2.5 mm sheet steel
Bellow	PVC (T-50M), RAL 9005 (black)
Surface	black powder-coated
Temperature range	-40°C to +60°C
Stepped engaging mechanism	22,5°-steps



Cable connection with bending protection (no lock nut)

Order No.	Type
08.10 01 16	M 16 cable connection with bending protection
08.10 01 20	M 20 cable connection with bending protection
08.10 01 25	M 25 cable connection with bending protection

Technical data

Material	Polyamide
Moulded seal	NBR
Enclosure rating	IP 68 - 5 bar
Temperature range	-20°C to +100°C
Colour	RAL 9005 jet black

Accessories



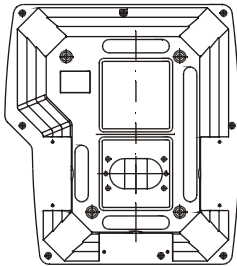
Inclining adapter for holder

Order No.	Type	Weight (g)
50.02 00 05	For mounting directly onto GT 48/2 tube	776
50.02 00 06	For mounting directly onto GTK electronic tube	804
50.02 00 07	For mounting directly on wall or machine	490

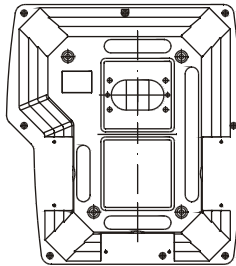
Technical data

Material	2.5 mm sheet steel (black powdered)
Knurled handles	reinforced thermoplastic
Temperature range	-40°C to +60°C

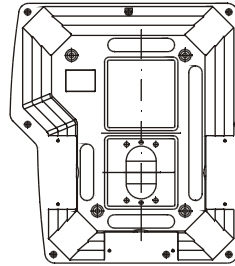
Variant 1



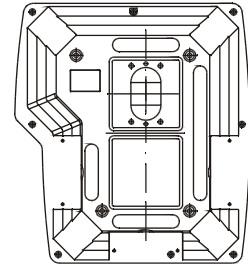
Variant 2



Variant 3

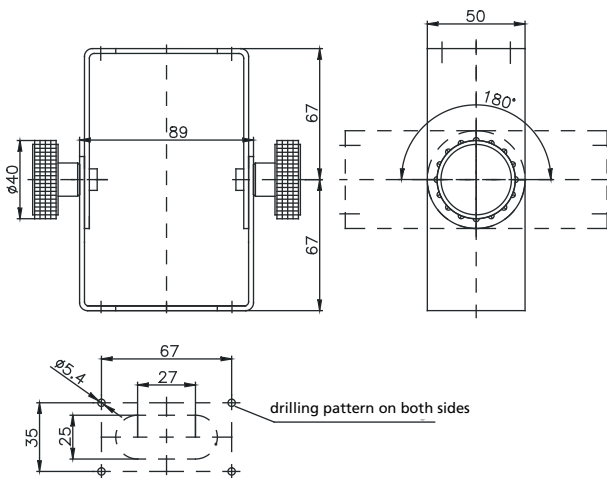


Variant 4



Specific Limanda drilling pattern required!

Dimensions (wall mounted version)





For assembling of enclosures there is available a huge programme range of switches / push buttons:

- enabling switches
- emergency stop button
- accessories

Electro-mechanical components



2-step enabling switch (1NO), blue

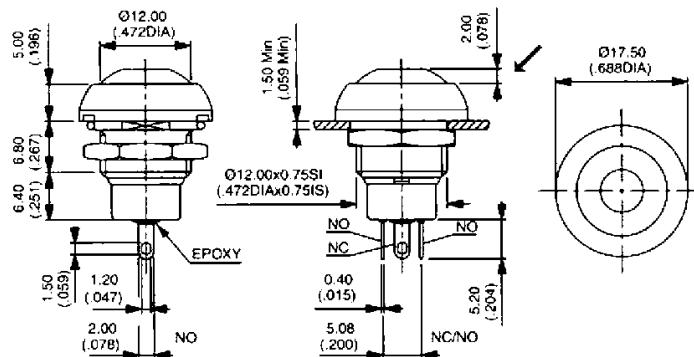
Order No. **83.50 00 10**

2-step enabling switch (1NC/1NO), blue

Order No. **83.50 00 09**

Technical data

Contact loading	48 V (AC), 500 mA 250 V (AC), 200 mA 50 V (DC), 200 mA
Ingress protection	IP 67 front side
Temperature range	-40°C to +125°C (no condensation)
Volume resistance	max. 50 mW (initial value)
Service life	≥ 5 x 10 ⁵ switchings

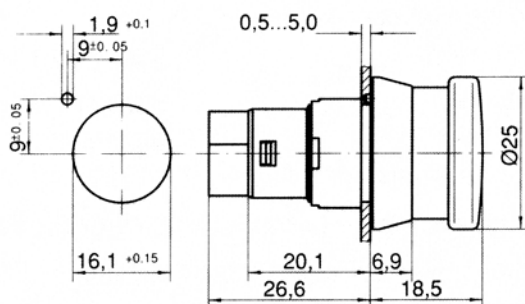


Emergency stop button (2NC), Ø 25mm, red

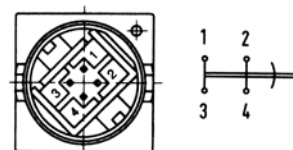
Order No. **83.50 00 02**

Technical data

Contact system and fitting	2 NC
Ingress protection	IP 65 front side
Temperature range	-25°C to +70°C (no condensation)
Connections	galvanized, suitable to 4-pole multipoint socket connector
Switching voltage	0,02 to 25 V AC/DC
Switching current	0,1 to 1 A
Volumne resistance	< 100 mW
Duration of bounce	< 10 ms
Service life	> 1,5 x 10 ⁴ switchings



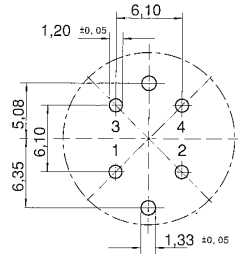
Connection diagram (view from down)





PCB plug-socket for emergency stop button, Ø 25 mm

Order No. **83.90 00 01**



Contact fitting area

NC 1: Pin 1 - blue
Pin 2 - black
NC 2: Pin 3 - blue
Pin 4 - black



Ribbon cable

10 cm with multipoint socket connector and strip, AMP 4-pole for emergency stop button Ø 25 mm

Order No. **83.90 00 02**

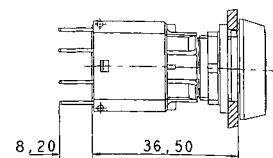
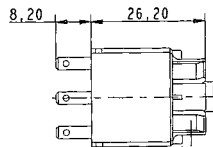
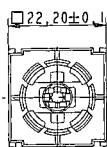
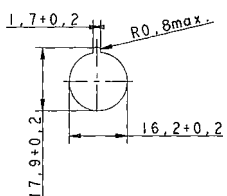


Emergency stop button with switch unit (2NC), Ø 28 mm, red

Order No. **83.50 00 03**

Technical data

Contact system and fitting	self cleaning bridge forming contact (Ag), 2 NC
Ingress protection	IP 65 front side
Temperature range	-25°C to +70°C (no condensation)
Connections	Flat plug 2.8 x 0.8
Switching voltage	AC: 250 V / DC: 24 V (further voltage on request)
Switching current	AC: 1,5 A / DC: 2,0 A
Volume resistance	max. 20 mW (initial value)
Service life	≥ 3 x 10 ⁴ switchings



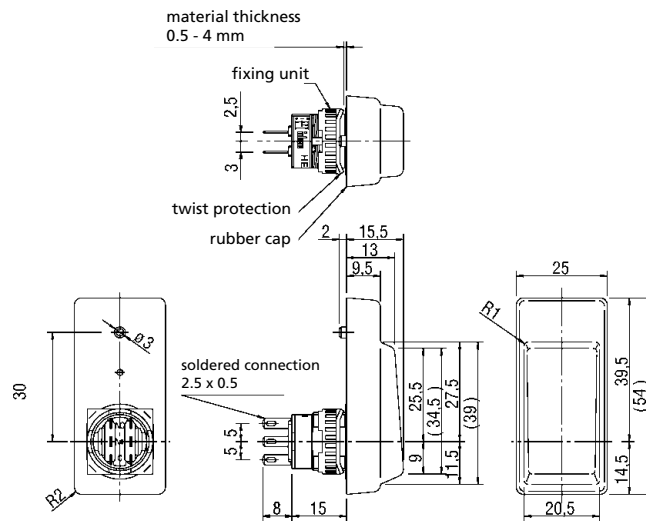
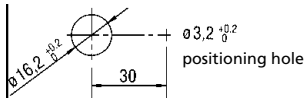


3-steps enabling switches (2 changers), 55 x 25, yellow

Order No. **83.50 00 07**

Technical data

Contact system and fitting	2 main switches (changer)
Ingress protection	IP 65 (with rubber cap)
Temperature range	-25°C to +60°C (no condensation)
Connections	soldered condensation
Switching voltage	AC(12): 125 V / DC(12): 30 V
Switching current	AC(12): 1,0 A / DC(12): 1,0 A
Volume resistance	max. 50 mW (initial value)
Service life	≥ 1 x 10 ⁵ switchings

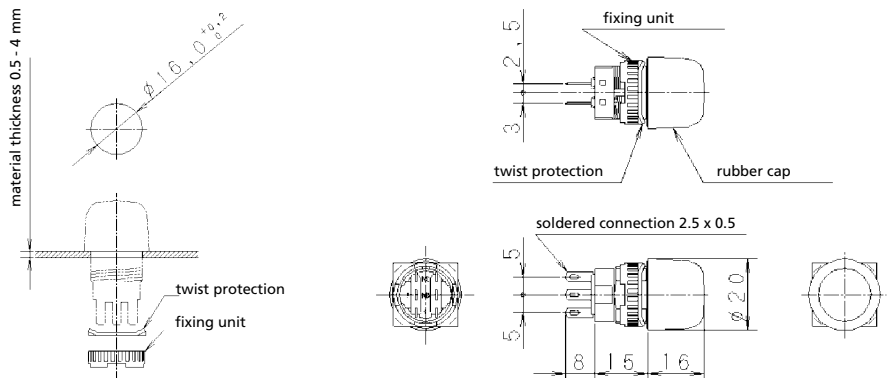


3-steps enabling switches (2 changer), $\varnothing 20$ mm, yellow

Order No. **83.50 00 08**

Technical data

Contact system and fitting	2 main switches (changer)
Ingress protection	IP 65 (with rubber cap)
Temperature range	-10°C bis +60°C (no condensation)
Connections	soldered connection
Switch voltage	AC(12): 125 V / DC(12): 30 V
Switch current	AC(12): 0,5 A / DC(12): 1,0 A
Volume resistance	max. 50 mW (initial value)
Service life	≥ 1 x 10 ⁵ switchings



Elektro-mechanical components

Product allocation

Products	2-steps enabling switches (1NO), blue	2-steps enabling switches (1NC/1NO), blue	Emergency stop button (2NC), Ø 25 mm, red	PCB-plug-socket for emergency stop button Ø 25 mm	Ribbon cable 10 cm with multipoint socket connector and strip, AMP 4-pole for emergency stop button Ø 25 mm	Emergency stop button with contact block (2NC), Ø 28 mm, red
Order No.	83.50 00 10	83.50 00 09	83.50 00 02	83.90 00 01	83.90 00 02	83.50 00 03
Taguan 130			x	x	x	
Taguan 180			x	x	x	
Taguan 230			x	x	x	
Beluga 180	x	x	x	x	x	x
Beluga 220	x	x	x	x	x	x
Beluga 380	x	x	x	x	x	x
Pilot 250	x	x	x	x	x	x
Pilot 50			x	x	x	x
Pilot 10			x	x	x	x
Pilot 20			x	x	x	x
Pilot 30			x	x	x	x
Pilot 110			x	x	x	x
Pilot 120			x	x	x	x
Pilot 130			x	x	x	x
Pilot 140			x	x	x	x
Limanda I Griffset	x	x				
Limanda I	x	x	x	x	x	x
Limanda II	x	x	x	x	x	x
Norvent	x	x	x	x	x	x

Products	Emergency stop button (3NC/1NO), Ø 29 mm, red	Stop button (3NC/1NO), Ø 29 mm, grey	3-steps enabling switches (2 changer), 80 x 22, black	3-steps enabling switches (2 changer), 55 x 25, yellow	3-steps enabling switches (2 changer), Ø 20 mm, yellow
Order No.	83.50 00 04	83.50 00 05	83.50 00 06	83.50 00 07	83.50 00 08
Taguan 130					
Taguan 180					
Taguan 230					
Beluga 180	x	x			
Beluga 220	x	x			x
Beluga 380	x	x			
Pilot 250	x	x	x	x	x
Pilot 50	x	x			
Pilot 10	x	x			x
Pilot 20	x	x			
Pilot 30	x	x			
Pilot 110	x	x			x
Pilot 120	x	x			
Pilot 130	x	x			
Pilot 140	x	x			
Limanda I Griffset			x		x
Limanda I	x	x	x		x
Limanda II	x	x	x	x	x
Norvent	x	x	x	x	x

The way to the right enclosure

Various criteria must be taken into account when selecting an enclosure:

- the fitting location (internal or external use, explosion zone, sea-water use etc.)
- the size (depends on the contents)
- the protective functions (ingress protection, EMC toughness, Ex)

The listings below should help you to select the right enclosure to match your special requirements.

I. Enclosure material specifications

Aluminium enclosures (Pilot 50, EMC)

- light-weight, robust metal enclosures
- good resistance to chemicals (see chart)
- can be used in a wide temperature range
- basic EMC screening (full screening optional)
- machining operations easy to carry out
- application areas: suitable for indoor and outdoor use

Polyester enclosures (Pilot 30)

- plastic enclosures for hostile atmospheres
- good resistance to chemicals (see chart)
- can be used in a wide temperature range
- good insulating properties
- VO design (to UL)
- application areas: suitable for indoor and outdoor use

PVC enclosures

- light-weight plastic enclosures
- good resistance to chemicals (see chart)
- machining operations easy to carry out
- application areas: suitable for indoor and outdoor use

ABS enclosures (Taguan)

- light-weight plastic enclosure
- good resistance to chemicals (see chart)
- used within a normal temperature range
- application areas: hand-held operating enclosures for data acquisition and measurement

Polyamide enclosures (Beluga, Pilot 10 / 20, Pilot 110 / 150)

- light-weight plastic enclosure
- good insulating properties
- high impact resistance
- application areas: hand-held operating enclosures for machine control

II. Temperature range

The definition of temperature resistance for enclosures is based on the maximum continuous temperature at which the enclosure remains dimensionally stable and the ingress protection remains guaranteed. Admissible short term peak temperatures are often considerably higher.

The definition of temperature resistance in the case of the components of the process automation is based to the maximum continuous temperature, provided that the factory-installed (electronic) components are functioning correctly and the enclosure rating is maintained.

Further classifications apply to storage and transport, and are listed in the respective product descriptions.

III. Corrosion resistance

We offer the following for critical external areas:

SWB version (seawater-resistant):

Purified - chromated - powder-coated

Standard colour RAL 5009, other colours on request.

For application areas with extreme UV radiation we recommend coating with a special Polyester powder.

SBG/SBGL version only for wet painting processes

SBG = washed - chromated - priming

SBGL = washed - chromated - priming - painting

Stainless steel socket inserts available on request.

General technical informations

IV. Ingress protection

ROSE enclosures are classified in ingress protection to the generally applicable guidelines contained in EN 60529 and IEC 144.

The ingress protection is indicated by an abbreviation, which is always composed of the two letters IP and two digits relating to the protection level.

Protection class for contact and foreign body protection

First digit	Designation
0	No protection
1	Protection against large foreign bodies
2	Protection against medium-sized foreign bodies
3	Protection against small foreign bodies
4	Protection against grain-shaped foreign bodies
5	Protection against dust deposits
6	Protection against dust entry

Protection class for water protection

Second digit	Designation
0	No protection
1	Protection against vertical falling drip water
2	Protection against obliquely falling drip water
3	Protection against water spray
4	Protection against splashing water
5	Protection against water jets
6	Protection when flooded
7	Protection when immersed
8	Protection when submerged

Note: The ingress protection indicated for the enclosures is based on non-processed enclosures as supplied. Aging and temperature fluctuations can lead to a diminution of the ingress protection.

V. Chemical resistance

Enclosure material chemical resistance

Chemicals	Aluminium	Stainless steel	Polycarbonate	Polyester	Polystyrene	Polyamide
Acetone	+	+	-	-	-	•
Formic acid	•	+	30 %	10 %	•	-
Ammonia	+	+	-	-	+	20 %
Petrol	+	+	•	+	•	+
Benzene	+	+	-	+	-	-
Brake fluid	/	/	-	+	/	60°
Butane	+	/	+	/	-	+
Butanol	/	/	/	+	/	+
Calcium chloride	+	+	+	+	+	+
Chloral benzene	+	/	-	+	-	•
Diesel oil	/	/	•	+	•	/
Acetic acid	+	+	10 %	40 %	+ max. 50 %	-
Formaldehyde	+	+	/	30 %	+ max. 40 %	+
Freon 113	/	/	+	+	/	/
Fruit juice	/	+	+	+	/	+
Glycerine	+	+	•	+	+	+
Fuel oil	+	+	•	+	•	+
Hydraulic oil	/	/	+	+	•	+
Caustic potash solution	/	+	-	-	+ max. 50 %	-
Potassium chloride	•	+	+	+	+	+
Potassium hydroxide	-	+	/	-	+	/
Linseed oil	+	+	+	+	+	+
Methane	+	+	-	-	+	•
Methylene chloride	+	+	-	-	-	-
Lactic acid	+	+	10 %	+	+ max. 80 %	10 %
Mineral oils	/	/	+	+	+	+
Motor oils	/	/	+	+	+	+
Sodium carbonate	•	+	+	+	+	+
Sodium chloride	•	•	+	+	+	10 %
Sodium hydroxide	+	+	/	-	/	/
Soda lye	/	+	-	40 %	+ max. 50 %	10 %
Nitric acid	+	+	10 %	10 %	+ max. 25 %	-
Hydrochloric acid	/	+	20 %	+	+ max. 10 %	-
Lubricating oil	+	+	+	+	/	+
Carbon bisulphide	+	+	-	-	-	•
Sulphuric acid	•	+	50 %	70 %	+ max. 50 %	-
Suds	/	+	•	+	/	+
Cleansing agent	/	+	+	/	/	/
Terpentine oil	/	/	/	+	-	+
Carbon tetrachloride	+	/	/	+	-	•
Toluene	+	/	-	+	-	+
Trichlorethylene	+	/	/	-	-	-
Water (dest. water, river, tap or seawater)	/	+	+	+	+	+
Tartaric acid	/	/	10 %	+	+	+
Xylene	+	/	-	+	-	+
Zinc sulfate	•	/	+	+	+	/
Citric acid	+	/	10 %	+	+	10 %

Explanation of symbols

- + resistant against all concentrations
- + resistant against maximum % concentration
- C° resistant to maximum C°
- limited resistance
- not resistant
- / no information

General technical informations

Enclosure seal and accessory chemical resistance

Chemicals	Chloroprene	EPDM	NBR	Pocane	Polyurethane	PVC	Silicone
Acetone	+	+	-	+	-	-	•
Formic acid	+	+	-	10 %	/	< 50 %	•
Ammonia	+	+	+	10 %	/	•	+
Petrol	+	•	+	+	+	+	+
Benzene	-	-	-	+	+	-	-
Brake fluid	•	-	/	+	/	/	+
Butane	+	/	+	+	/	50 %	-
Butanol	+	/	-	+	/	•	-
Calcium chloride	/	/	/	10 %	/	+	/
Chloral benzene	-	-	-	-	-	-	-
Diesel oil	•	•	/	+	+	•	•
Acetic acid	-	/	-	10 %	/	25 %	-
Formaldehyde	-	/	+	/	/	40 %	+
Freon 113	+	/	+	+	/	/	/
Fruit juice	+	+	/	+	+	+	+
Glycerine	+	+	+	+	+	+	+
Fuel oil	•	•	+	+	+	•	•
Hydraulic oil	+	/	/	+	/	/	•
Caustic potash solution	+	/	/	10 %	/	+	/
Potassium chloride	+	+	+	10 %	+	+	+
Potassium hydroxide	+	+	+	-	-	/	•
Linseed oil	+	+	+	+	+	+	•
Methane	+	/	•	+	/	/	+
Methylene chloride	-	/	-	-	-	-	-
Lactic acid	+	+	+	/	/	10 %	/
Mineral oils	•	•	+	+	+	+	+
Motor oils	•	•	+	+	+	/	+
Sodium carbonate	/	/	/	10 %	/	/	/
Sodium chloride	+	+	+	10 %	+	+	+
Sodium hydroxide	+	+	•	-	-	•	•
Soda lye	50 %	/	-	/	/	60 %	-
Nitric acid	•	+	•	10 %	-	30 %	-
Hydrochloric acid	+	+	< 65 % •	10 %	-	30 %	/
Lubricating oil	•	•	+	+	+	+	+
Carbon bisulphide	-	/	-	+	/	•	-
Sulphuric acid	50 %	/	25 %	10 %	/	80 %	25 %
Suds	+	/	+	10 %	•	•	+
Cleansing agent	+	•	/	+	•	/	+
Terpentine oil	-	/	+	+	/	+	-
Carbon tetrachloride	-	-	-	+	-	•	-
Toluene	-	-	-	•	-	-	-
Trichlorethylene	-	-	-	•	-	-	-
Water (dest. water, river, tap or seawater)	+	+	80 C°	+	+	40 C°	+
Tartaric acid	+	+	+	/	+	10 %	+
Xylene	-	-	-	•	-	-	-
Zinc sulfate	+	+	+	/	/	40 %	+
Citric acid	+	+	+	10 %	/	10 %	+

Die Untersuchungen sind, wenn nichts Gegenteiliges angegeben ist, bei Raumtemperatur durchgeführt worden. Bei einem Zusammentreffen verschiedener Medien können sich die Beständigkeiten ändern. Daher können wir für die Angaben keine Gewähr übernehmen.

Explanation of symbols

- + resistant against all concentrations
- + resistant against maximum % concentration
- C° resistant to maximum C°
- limited resistance
- not resistant
- / no information

EMC in enclosure technology

General information

In electrical/electronic engineering, enclosures assume two tasks:

- protection of the installed components from mechanical hazards and adverse radiation from outside
- protection of the surroundings from occurring mechanical and electrical hazards and adverse interference radiation from the components installed

Especially the electromagnetic compatibility (EMC) has an increasing effect on the selection of enclosures because of the ongoing development of the electronic components and the increased equipment density on the PCB's - which increasingly generates „pollution“ by electromagnetic interference radiation in the environment.

Legal regulations

Within the framework of harmonising the European standards, an EC guideline directive (05.89/336/EEC) was passed in May 1989, which took effect in the Federal Republic of Germany on the 9th Nov. 1992 in the EMC law (EMVG).

This law is applicable to all units which might cause electromagnetic interference or the operation of which could be impaired by such interference.

The EMC directive came into effect on 1.1.1996 EC-wide - from which date all new electrical and electronic units brought into circulation within the EC had to fulfil these regulations.

As an external sign that the EC relevant laws (EMC law and further design basics), these units have to show the CE symbol.

Requirements from the enclosure

Enclosures as such are not subjected to the EMC law, as by definition they are not electrical or electronic units.

However, enclosures are to a large extent responsible for the intensity of interference emission (receipt and transmission of interference waves) of a unit.

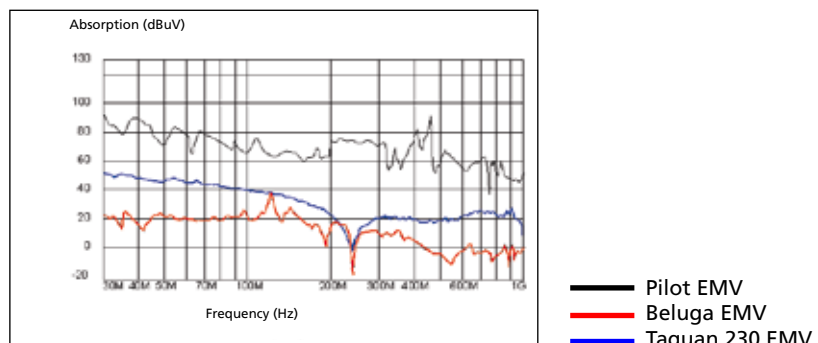
At this point, the choice of the enclosure material is also decisive for the screening effect which is composed of a reflection and an absorption damping of an enclosure.

Synthetic materials (plastics) alone have no filtering effect on interference radiation. A screening effect can be achieved by additional costly treatment (metal flashing or application of a conductive lacquer).

Metal enclosures, on the other hand, offer a highly effective basic protection against interference radiation. (Here an important factor is a large contact surface of the individual components of the enclosure (cover, enclosure shells).

To meet special protection requirements, the EMC compatibility can be increased by

- conductive seals,
- contact bare front surfaces as well as
- EMC compatible cable screw connections.



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