

Industrial Controllers Catalog





Tool for Designers, Engineers and Purchasing Agents

Your tool for finding industrial controllers for cranes, electro-hydraulic systems, floor conveyors, industrial applications, ships, rail vehicles, and construction machinery of any kind, joysticks and masterswitches with electronic interface adjustment for all machines matching our product portfolio. Take advantage of our **fold-out order tool** on this page and the **detailed tables of contents** at the beginning of each position.

Product range

Multi-axis controller
Double-handle controller
Single-axis controller
Control switch
Standard contact-arrangement
Technical data

Potentiometer
HG 2
OEC 2
OEC 4
Electronic control unit
MATRIX grip
Hall-push button
Palm grip
Housing

Crane control unit
Driver seat
Ordering information
Portable control unit
Control pedestal for offshore

Naval cruise controller
Pedal-controller
Gear limit switch
DC-contact
Signal-cam controller

As of
2019

Product Portfolio

Gessmann is an international market leader. Our success in the market is based upon our decisive focus on innovative product development and the highest possible standards when it comes to quality. Our product range includes:

- Multi-axis controller, double-handle controller, control switch (master-switch), gear limit switch for hoisting, electro-hydraulic application, material-handling technology and remote control
- Geared limit switch for joisting equipment
- Complete crane control unit, portable control unit, pendant control unit, including wiring for all types of cranes, vehicles and industrial applications
- Operating panels for construction machinery, industrial applications, vehicles and harvesting machines
- Control pedestals, ship-operating transmitters, sensor units and actual-value transmitters for ship drives
- Pedal controllers for welding machines, road and rail vehicles
- Master controllers, panels and control stations for rail vehicles
- Displays for forklifts and construction machinery
- Proportional control electronics for solenoid valves
- Interface electronics with digital and analog outputs matching our controllers
- Interface electronics with Profibus interface or CAN-bus interface matching our controllers (input/output cards)
- DC controllers, selector switches (signal controllers) for high-voltage systems
- Customized solutions for operating devices and electronic units for any type of machinery and vehicles

Management certification:

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For our general conditions for sale and delivery please refer to our website at www.gessmann.com

Please also note:

The prices are ex-works in Leingarten excluding packaging. Packaging is charged at cost and cannot be returned. For orders below EURO 150.00 our gross prices are applicable. The minimum invoice amount is EURO 80.00, regardless of the value of the delivered goodp. Therefore, we recommend combining small orderp.

We are entitled to pass on any additional handling and production costs resulting from modifications to the order caused or requested by the customer (both technical modifications and non-compliance with deadlines).

Our periods of payment are: 30 days without a discount.

These conditions of payment shall be deemed agreed and accepted upon receipt of our written confirmation of order.

All delivered goods shall remain our sole and absolute property until full payment is received.

The delivery period only commences upon clarification of all technical detailp. Unforeseen circumstances justify an appropriate extension of the delivery period. All documents, such as drawings, dimensional drawings, circuit diagrams, etc., are non-binding. We reserve the right to make any changes necessary, in particular changes which serve the technical advancement.

The exclusive place of jurisdiction is 74072 Heilbronn, Germany.



Warning

Certain parts of this electrical device carry hazardous voltages when in operation.

Installation, maintenance, modification or retrofitting may only be carried out by qualified personnel in consideration of the appropriate safety precautionp.

Non-compliance may result in death, severe injuries or substantial property damage.

W. Gessmann GmbH

**P/O Box 11 51
74207 Leingarten
GERMANY**

**Eppinger Straße 221
74211 Leingarten
GERMANY**

Phone +49 (0) 7131 40 67-722

Fax +49 (0) 7131 40 67-10

sales@gessmann.com

www.gessmann.com

Bank details

Deutsche Bank Heilbronn

SWIFT-Code: DEUT DE SS 620 · IBAN-Code: DE 14 620 700 81 0019460500

Kreissparkasse Heilbronn

SWIFT-Code: HE IS DE 66 · IBAN-Code: DE 22 620 500 000 00 0004776

Landesbank Baden-Württemberg

SWIFT-Code: SOLA DE ST · IBAN-Code: DE 09 600 501 01 74 06 50 56 07

Tax No.: 65205/74401 Finanzamt Heilbronn

Sale tax ID No.: DE 145786508

Commercial Register

Stuttgart HRB 100312

Managing Director:

Alwin Ehrensperger

Multi-axis controller V27



The multi-axis controller V27 is available in either single-axis or multi-axis options and is a robust controller used commonly in electro-hydraulic applications. The compact design allows for use in the smallest installation spaces. It can be integrated with detents and a very robust friction brake. With many output options including voltage, amperage and switching contacts and many handle options the V27 series is flexible and customisable. The multi-axis controller is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life V27	10 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	up to IP67
Functional safety	PLd (EN ISO 13849) possible



1

		Example									
		V27	S8	P	T	-R11	+Z	-B10	-E...	-S...	-X
Basic unit											
V27.1	1-axis										
V27	2-axis										
Control-handle extended											
	Standard 160 mm*										
S5	-20 mm										
S8	+20 mm										
*Only available in combination with grip!											
Gate											
P	Cross gate										
P X	Special gate										
Grip / palm grip											
	Knob (included in basic unit!)										
M	Knob with mechanical zero interlock										
T	Dead man										
H	Signal button										
D	Push button										
B...	Palm grip B... (see page palm grip 157)										

Technical details may vary based on configuration or application! Technical data subject to change without notice!

V27 S8 P T -R11 +Z -B10 -E... -S... -X

Axis 1 / Axis 2 (not applied for V27.1)

Z	Spring return
R	Friction brake (possible with one axis)
	Latching:
11	1-0-1
22	2-0-2
33	3-0-3
44	4-0-4
55	5-0-5
08	end-position latching SR2 or SR4
19	1-0-1 + end-position latching SR2 or SR4
80	end-position latching SR1 or SR3
91	1-0-1 + end-position latching SR1 or SR3
88	end-position latching SR1 + SR2 or SR3 + SR4
99	1-0-1 + end-position latching SR1 + SR2 or SR3 + SR4

Degree of protection

B10	Joystick-main board sealed (IP67)
B11	Joystick-main board sealed (IP67) and handle function sealed, handle with drain hole

For a schematic description of the protection class, see page 139

Interface (description see on the following pages)

E0xx	Switching output
E1xx	Voltage output
E2xx	Current output
E3xx	CAN-interface
E4xx	CANOpen safety interface

Plug connectors

S..	Standard plug connectors (see page 138)
-----	---

Special model

X	Special / customer specified
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Combination possibilities with our handles

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 B32 p. 166	 B33 p. 168	 B34 p. 170						

Digital output			
Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Mounting depth A	45 mm		
Wiring	1. cable 14 x 0,25 mm² 500 mm long without plug connector		
	2. cable 14 x 0,25 mm² (optional for grip function) 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
2 Direction signals + 1 zero position signal (galvanically isolated) per axis			
	1 axis		E001 1
	2 axis		2

Voltage output (not stabilized)			
Supply voltage	4,75-5,25 V DC		
Current carrying capacity	Direction signal 8 mA		
Mounting depth A	45 mm		
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector		
	2. cable 14 x 0,25 mm ² (grip function) 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
0,5...2,5...4,5 V redundant + 2 direction signals per axis			
	1 axis	E104 1	S
	2 axis	2	
	Output options		
	Characteristic:		
	Inverse dual		1
	Dual		2
	Inverse Dual with dead zone +/- 3° (standard)		3
	Dual with dead zone +/- 3°		4

Voltage output

Supply voltage	9-32 V DC (*11,5-32)	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Mounting depth A	45 mm (60 mm from 3 axis)	
Wiring	1. cable 14 x 0,25 mm² 500 mm long without plug connector 2. cable 14 x 0,25 mm² (optional for grip function) 500 mm long without plug connector Optional with plug connector (standard plug connectors see page 138)	S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis		
	1 axis	E112 1
	2 axis	2
	3 axis*	3
	4 axis*	4
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC		
	1 axis	E132 1
	2 axis	2
	3 axis*	3
	4 axis*	4
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal		
	1 axis	E136 1
	2 axis	2
	3 axis*	3
	4 axis*	4
Output options		
Characteristic:		
	Inverse dual *1	1
	Dual *1	2
	Inverse dual with dead zone +/- 3° *1 (standard)	3
	Dual with dead zone +/- 3° *1	4
*1 not combinable with output E136X		
	Single *2	5
	Single with dead zone *2 (standard)	6
*2 not combinable with output E112X and E132X		

*Axis for handle functions, interface can vary depending upon actuation element!

Voltage output with other value on request!

Current output

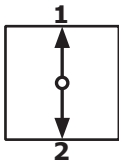
Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Mounting depth A	45 mm (60 mm from 3 axis)		
Wiring	1. cable 14 x 0,25 mm² 500 mm long without plug connector		
	2. cable 14 x 0,25 mm² (optional for grip function) 500 mm long without plug connector		
	Optional with plug connector (standard plug connectors see page 138)		S
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	1 axis	E206	1
	2 axis		2
	3 axis*		3
	4 axis*		4
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	1 axis	E208	1
	2 axis		2
	3 axis*		3
	4 axis*		4
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	1 axis	E214	1
	2 axis		2
	3 axis*		3
	4 axis*		4
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	1 axis	E216	1
	2 axis		2
	3 axis*		3
	4 axis*		4
	Output options		
	Single		5
	Single with dead zone +/- 3° (standard)		6

*Axis for handle functions, interface can vary depending upon actuation element!

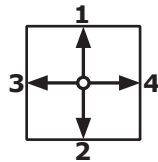
Current output with other value on request!

Identification of the installation variants with switching directions:

V27.1



V27



CAN

Supply voltage	9-32 V DC
Idle current consumption	120 mA (24 V DC)
Current carrying capacity	Direction signal 100 mA Zero position signal 100 mA External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs) Digital switching output (potential-free) 100 mA
Mounting depth A	45 mm (Expansion stage 1) 60 mm (Expansion stage 2) 80 mm (Expansion stage 3)
Protocol	CANOpen CiA DS 301 or SAE J1939
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)
Output value	255...0...255
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male) CAN (OUT) cable 300 mm with plug connector M12 (female) External in-/outputs cable 300 mm long without plug connector External in-/outputs cable 300 mm long without plug connector (additional from 32 in-/outputs)
Optional with plug connector (<i>standard plug connectors see page 138</i>)	

S

CAN V27 expansion stage 1

- 4 analog joystick axis
- 15 digital joystick functions
- Input for capacitive sensor

E304 1

Main-axis with additional digital outputs separately wired (not via CAN)

- 2 direction signals per main axis

1

CAN V27 expansion stage 2

- 7 analog joystick axis
- 15 digital joystick functions
- 2 inputs for capacitive sensors

E305 1

With additional external in-/outputs

- 8 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs

2

3

External LED-outputs can be used in the grip for LEDs

CAN V27 expansion stage 3

- 10 analog joystick axis
- 15 digital joystick functions
- 2 inputs for capacitive sensors

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 16 external digital inputs
- 24 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 24 external digital inputs
- 32 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 32 external digital inputs

External LED-outputs can be used in the grip for LEDs

E306 1

Main-axis with additional digital outputs separately wired (not via CAN)

- 2 direction signals + 1 zero position signal (potential-free) per axis

With additional analog outputs on request!

3

CANopen safety

Supply voltage	9-32 V DC
Idle current consumption	120 mA (24 V DC)
Current carrying capacity	Direction signal 100 mA Zero position signal 100 mA (potential-free) External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs) Digital switching output (potential-free) 100 mA
Baud rate	20 kBit/s to 1 MBit/s (standard 250 kBit/s)
Output value	255...0...255
Mounting depth	45 mm (Expansion stage 1) 60 mm (Expansion stage 2) 80 mm (Expansion stage 3)
Protocol	CANopen Safety CIA 304
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male) CAN (OUT) cable 300 mm with plug connector M12 (female) External in-/outputs cable 300 mm long without plug connector External in-/outputs cable 300 mm long without plug connector (additional from 32 in-/outputs) Optional with plug connector (<i>standard plug connectors see page 138</i>)

S

CANopen Safety expansion stage 1

- 4 analog joystick axis
- 15 digital joystick functions
- Input for capacitive sensor

E404 1

Main-axis with additional digital outputs separately wired (not via CAN)

- 2 direction signals per main axis

1

CANopen safety expansion stage 2

- 7 analog joystick axis
- 15 digital joystick functions
- 2 inputs for capacitive sensors

E405 1

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs

External LED-outputs can be used in the grip for LEDs

2

3

CANopen safety expansion stage 3

E406 1

- 10 analog joystick axis
- 15 digital joystick functions
- 2 inputs for capacitive sensor

With additional external in-/outputs

- 8 external LED-outputs (dimmable), 2 switching outputs (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable), 2 switching outputs (potential-free, 100 mA), 16 external digital inputs
- 24 external LED-outputs (dimmable), 2 switching outputs (potential-free, 100 mA), 24 external digital inputs
- 32 external LED-outputs (dimmable), 2 switching outputs (potential-free, 100 mA), 32 external digital inputs

2
3
4
5

External LED-outputs can be used in the grip for LEDs

Main-axis with additional digital outputs separately wired (not via CAN)

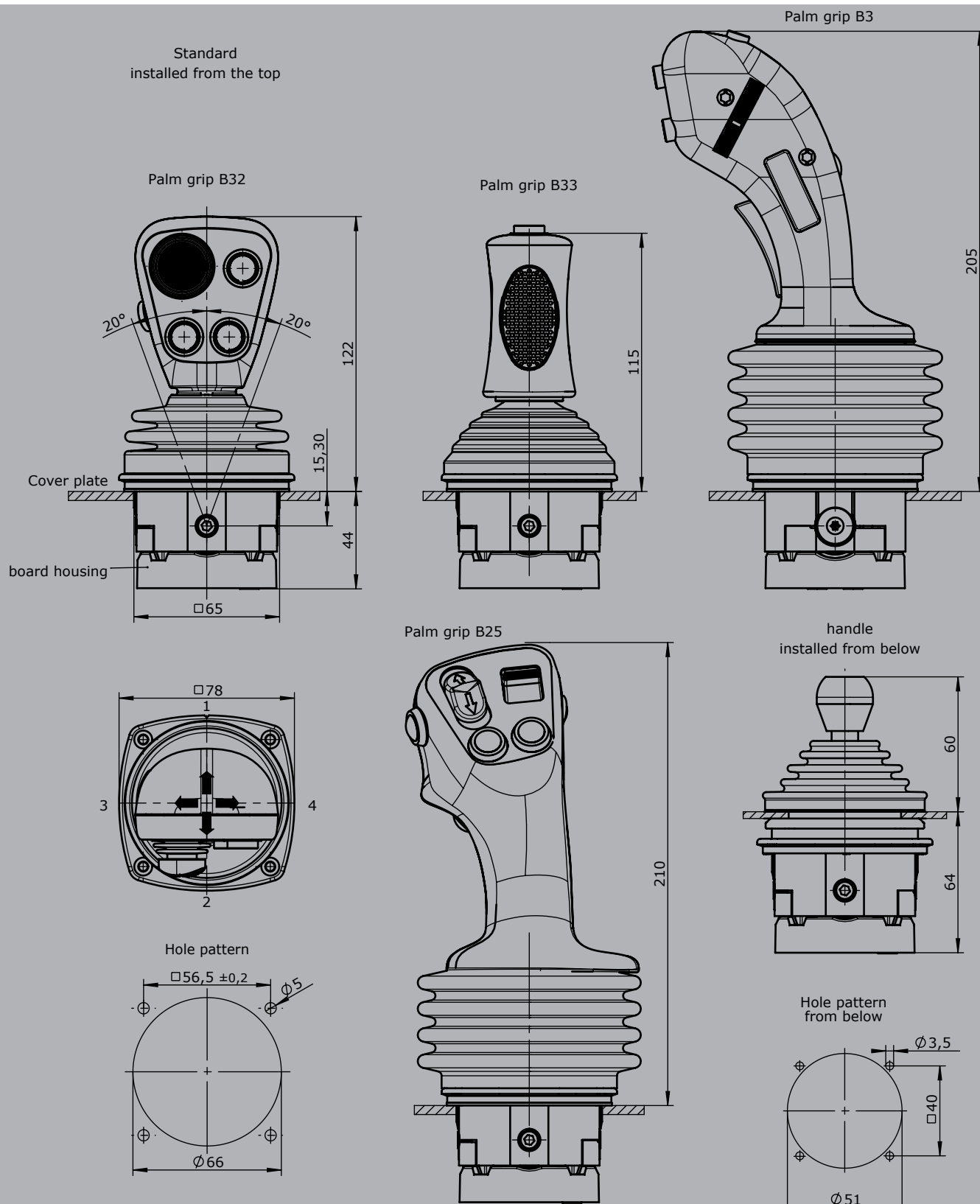
- 2 direction signals + 1 zero position signal (potential-free) per axis

3

With additional analog outputs on request!

Attachments

Z01 Mating connector M12 male insert with 2 m cable	20201140
Z02 Mating connector M12 female insert with 2 m cable	20202298



Multi-axis controller V85 / VV85



The multi-axis controller V85/VV85 is available in either single-axis or multi-axis options and is a robust controller used commonly in electro-hydraulic applications. With many output options including voltage, amperage and switching contacts and many handle options the V85/VV85 series is flexible and customisable. The V85/VV85 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.



1

Technical data

Mechanical life V85	10 million operating cycles
Mechanical life VV85	20 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	up to IP67
Functional safety	PLd (EN ISO 13849) possible

		VV85	S8	P	T	-Z80	+R11	-B	-E...	-S...	-X
Basic unit											
V85.1	1-axis										
V85	2-axis										
Reinforced version											
VV85.1	1-axis										
VV85	2-axis										
Control-handle extended											
	Standard 160 mm*										
S5	-20 mm										
S8	+20 mm										
*Only available in combination with grip!											
Gate											
P	Cross gate										
P X	Special gate										
Grip / palm grip											
	Knob (included in basic unit!)										
M	Knob with mechanical zero interlock										
T	Dead man										
H	Signal button										
D	Push button										
B...	Palm grip B... (see page palm grip 157)										

Technical details may vary based on configuration or application! Technical data subject to change without notice!

		VV85	S8	P	T	-Z80	+R11	-B	-E...	-S...	-X
Axis 1 / Axis 2 <i>(not applied for V/VV85.1)</i>											
Z	Spring return										
R	Friction brake*										
	Latching:*										
11	1-0-1										
22	2-0-2										
33	3-0-3										
44	4-0-4										
55	5-0-5										
08	end-position latching SR2 or SR4										
19	1-0-1 + end-position latching SR2 or SR4										
80	end-position latching SR1 or SR3										
91	1-0-1 + end-position latching SR1 or SR3										
88	end-position latching SR1 + SR2 or SR3 + SR4										
99	1-0-1 + end-position latching SR1 + SR2 or SR3 + SR4										
*Maximum deflection angle +/- 25 degree!											
Degree of protection											
B	Cover housing <i>(included in basic unit!)</i>										
B10	Joystick-main board sealed (IP67)										
B11	Joystick-main board sealed (IP67) and handle function sealed, handle with drain hole										
For a schematic description of the protection class, see page 139											
Interface <i>(description see on the following pages)</i>											
E0xx	Switching output										
E1xx	Voltage output										
E2xx	Current output										
E3xx	CAN-interface										
E4xx	CANOpen safety interface										
E5xx	Profibus DP-interface										
E6xx	Profinet										
E7xx	Profinet safe										
E8xx	PWM - Output										
E9xx	other outputs										
Plug connectors											
S..	Standard plug connectors <i>(see page 138)</i>										
Special model											
X	Special / customer specified										

Combination possibilities with our handles

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 p. 174	 p. 176	 p. 172	 p. 178	 p. 157	 p. 193	 p. 195	 p. 159	 p. 164
 p. 166	 p. 168	 p. 170						

Digital output

Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Mounting depth A	65 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
2 Direction signals + 1 zero position signal (galvanically isolated) per axis		
	1 axis	E001 1
	2 axis	2

Voltage output (not stabilized)

Supply voltage	4,75-5,25 V DC	
Current carrying capacity	Direction signal 8 mA	
Mounting depth A	65 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
0,5...2,5...4,5 V redundant + 2 direction signals per axis		
	1 axis	E104 1
	2 axis	2
Output options		
Characteristic:		
Inverse dual		1
Dual		2
Inverse dual with dead zone +/- 3° (standard)		3
Dual with dead zone +/- 3°		4

Voltage output

Supply voltage	9-32 V DC (*11,5-32)	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Mounting depth A	65 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis		
	1 axis	E112 1
	2 axis	2
	3 axis*	3
	4 axis*	4
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC		
	1 axis	E132 1
	2 axis	2
	3 axis*	3
	4 axis*	4
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal		
	1 axis	E136 1
	2 axis	2
	3 axis*	3
	4 axis*	4
+10...0...-10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, redundant sensor with error monitoring		
	1 axis	E138 1
	2 axis	2
	3 axis*	3
	4 axis*	4
Output options		
Characteristic:		
Inverse dual * ¹		1
Dual * ¹		2
Inverse dual with dead zone +/- 3° * ¹ (standard)		3
Dual with dead zone +/- 3° * ¹		4
* ¹ not combinable with output E136X + E138X		
Single * ²		5
Single with dead zone * ² (standard)		6
* ² not combinable with output E112X and E132X		
Digital output signals:		
Output signals standard:		
Direction signals and zero position signals 1,5A 24V DC		1

*Axis for handle functions, interface can vary depending upon actuation element!

Voltage output with other value on request!

1

Current output				
Supply voltage	9-32 V DC			
Current carrying capacity	Direction signal 150 mA			
	Zero position signal 500 mA			
Mounting depth A	65 mm			
Wiring	1. cable 14 x 0,25 mm² 500 mm long without plug connector			
	2. cable 14 x 0,25 mm² (optional for grip function) 500 mm long without plug connector			
Optional with plug connector (<i>standard plug connectors see page 138</i>)				S
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal				
	1 axis		E206	1
	2 axis			2
	3 axis*			3
	4 axis*			4
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal				
	1 axis		E208	1
	2 axis			2
	3 axis*			3
	4 axis*			4
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal				
	1 axis		E214	1
	2 axis			2
	3 axis*			3
	4 axis*			4
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal				
	1 axis		E216	1
	2 axis			2
	3 axis*			3
	4 axis*			4
+20...0...-20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring				
	1 axis		E226	1
	2 axis			2
	3 axis*			3
	4 axis*			4
Output options				
	Single			5
	Single with dead zone +/- 3° (standard)			6
Digital output signals:				
Output signals standard:				
	Direction signals and zero position signals 1,5A 24 V DC			1

*Axis for handle functions, interface can vary depending upon actuation element!

Current output with other value on request!

CAN

Supply voltage	9-32 V DC
Idle current consumption	120 mA (24 V DC)
Current carrying capacity	Direction signal 100 mA Zero position signal 100 mA (potential-free) External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs) Digital switching output (potential-free) 100 mA
Mounting depth A	E3091: 65 mm E3091X: 85 mm E3101X - E3103X: 85 mm E3104X - E3105X: 105 mm
Protocol	CANopen CiA DS 301 or SAE J1939
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)
Output value	255...0...255
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male) CAN (OUT) cable 300 mm with plug connector M12 (female) External in-/outputs cable 300 mm long without plug connector External in-/outputs cable 300 mm long without plug connector (additionally from 32 in-/outputs) Optional with plug connector (<i>standard plug connectors see page 138</i>)

S

CAN Expansion stage 1

E309 1

- 7 analog joystick axis
- 16 digital joystick functions
- Input for capacitive sensor

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs

2

3

External LED-outputs can be used in the grip for LEDs

**With the use of capacitive sensor, the external digital inputs reduce by one input!*

CAN Expansion stage 2

E310 1

- 10 analog joystick axis
- 16 digital joystick functions
- 2 inputs for capacitive sensors

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs
- 24 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs
- 32 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs

2

3

4

5

External LED-outputs can be used in the grip for LEDs

**With the use of two capacitive sensors, the external digital inputs reduce by one input!*

Main-axis with additional digital-/analog outputs separately wired (not via CAN)

- 2 direction signals + 1 zero position signal (potential-free) per main-axis

3

Additional analog outputs on request!

CANopen safety

Supply voltage	9-32 V DC
Idle current consumption	120 mA (24 V DC)
Current carrying capacity	Direction signal 100 mA
	Zero position signal 100 mA (potential-free)
	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs)
	Digital switching output (potential-free) 100 mA
Mounting depth A	E4091: 65 mm
	E4091X: 85 mm
	E4101X - E4103X: 85 mm
	E4104X - E4105X: 105 mm
Protocol	CANopen Safety CIA 304
Baud rate	20 kBit/s to 1 MBit/s (standard 250 kBit/s)
Output value	255...0...255
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male)
	CAN (OUT) cable 300 mm with plug connector M12 (female)
	External in-/outputs cable 300 mm long without plug connector
	External in-/outputs cable 300 mm long without plug connector (additionally from 32 in-/outputs)
	Optional with plug connector (<i>standard plug connectors see page 138</i>)

S

CANopen safety expansion stage 1

- 7 analog joystick axis
- 16 digital joystick functions
- Input for capacitive sensor

E409 1

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs

2

3

*external LED-outputs can be used in the grip for LEDs

*With the use of capacitive sensor, the external digital inputs reduce by one input!

CANopen safety expansion stage 2

E410 1

- 10 analog joystick axis
- 16 digital joystick functions
- 2 inputs for capacitive sensors

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs
- 24 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs
- 32 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs

2

3

4

5

External LED-outputs can be used in the grip for LEDs

*With the use of two capacitive sensors, the external digital inputs reduce by one input!

Main-axis with additional digital outputs separately wired (not via CAN)

- 2 direction signals + 1 zero position signal (potential-free) per main-axis

3

Additional analog outputs on request!

Profibus DP

Supply voltage	18-30 V DC
Baud rate	to 12 MBit/s
Output value	0...128...255
Mounting depth A	105 mm
Wiring	Profibus, cable 100 mm with plug connector D-Sub 9
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector
	External in-/outputs, cable 300 mm long without plug connector
	Optional with plug connector (<i>standard plug connectors see page 138</i>)

S

Profibus DP

- 4 analog joystick axis
- 16 digital joystick functions
- Input for capacitive sensor

E501 1

With additional external in-/outputs

- 8 external LED-outputs, 8 external digital inputs
- 16 external LED-outputs, 16 external digital inputs

2

3

**External LED-outputs can be used in the grip for LEDs*

Main-axis with additional contact equipment separately wired (not via profibus)

- 2 direction contacts + 1 zero position contact (not potential-free) per main-axis
- 1 zero position contact (potential-free) per main-axis

1

2

Profinet

Supply voltage	18-30 V DC
Baud rate	to 100 MBit/s
Output value	0...512...1023
Mounting depth A	85 mm
Wiring	Profinet (1), cable 300 mm with M12 plug connector (female)
	Profinet (2), cable 300 mm with M12 plug connector (female)
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector
	External in-/outputs, cable 300 mm long without plug connector
	Optional with plug connector (<i>standard plug connectors see page 138</i>)

S

Profinet

- 4 analog joystick axis
- 16 digital joystick functions
- Input for capacitive sensor

E601 1

With with additional external in-/outputs

- 8 external LED-outputs, 8 external digital inputs
- 16 external LED-outputs, 16 external digital inputs

2

3

**External LED-outputs can be used in the grip for LEDs*

Main-axis with additional signals separately wired (not via profinet)

- 2 direction signals + zero position signal (potential-free) per main-axis

3

1

Profinet safe			
Supply voltage	18-30 V DC		
Baud rate	to 100 MBit/s		
Output value	0...512...1023		
Mounting depth A	85 mm		
Wiring	Profinet (IN), cable 300 mm with M12 plug connector (female)		
	Profinet (OUT), cable 300 mm with M12 plug connector (female)		
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector		
	External in-/outputs, cable 300 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
- 4 analog joystick axis	E701 1		S
- 16 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs	2		
- 16 external LED-outputs, 16 external digital inputs	3		
<i>*External LED-outputs can be used in the grip for LEDs</i>			
Main-axis with additional signals separately wired (not via profinet safe)			
- 2 direction signals + zero position signal (potential-free) per main-axis			3

PWM Outputs			
Supply Voltage:	9-32V DC		
Valve control current:	max. 3 A		
PWM-frequency:	1225 Hz		
Dither frequency:	1...250 Hz adjustable		
Mounting depth A	85 mm		
Other features	Creep speed per axis		
	5 configurable switching outputs 2A		
	LED outputs for status indication		
	Input for redundant deadman		
Wiring:	Built-in socket Phoenix 2-pole (power supply)		
	Cable 1 (PWM) 12 x 1mm ² 300 mm long without plug		
	Cable 2 (switching output) 12 x 1mm ² 300 mm long without plug		
	Cable 3 (creep speed / dead man) 14x0,25mm ² 300mm long without plug		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
PWM Output 0-3 A for 2 proportional valve magnets per axis	1 axis	E801 1	S
	2 axis	2	
	3 axis	3	
	4 axis	4	

Other outputs

Voltage output for PVG32 0,25...0,5...0,75Us, power supply 9-32 V DC

- Wiring:
1. cable 14 x 0,25 mm² 300 mm long without plug connector
 2. cable 14 x 0,25 mm² 300 mm long without plug connector (optional for grip function)

Optional with plug connector (*standard plug connectors see page 138*)

S

1 axis	E907 1
2 axis	2
3 axis	3
4 axis	4
5 axis	5
6 axis	6

Main-axis with additional direction signals and zero direction signals (potential-free) per main-axis

3

8 Bit Gray-Code with direction signals per main-axis, supply voltage 9-36 V DC

- Wiring:
1. cable 37 x 0,14 mm² 300 mm long without plug connector (axis 1+2)
 2. cable 37 x 0,14 mm² 300 mm long without plug connector (optional for axis 3+4)

Optional with plug connector (*standard plug connectors see page 138*)

S

1 axis	E903 1
2 axis	2
3 axis	3
4 axis	4

8 Bit Binär-Code with direction signals per main-axis, supply voltage 9-36 V DC

- Wiring:
1. cable 37 x 0,14 mm² 300 mm long without plug connector (axis 1+2)
 2. cable 37 x 0,14 mm² 300 mm long without plug connector (optional for axis 3+4)

Optional with plug connector (*standard plug connectors see page 138*)

S

1 axis	E904 1
2 axis	2
3 axis	3
4 axis	4

Attachments

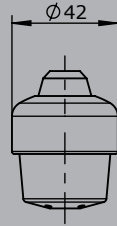
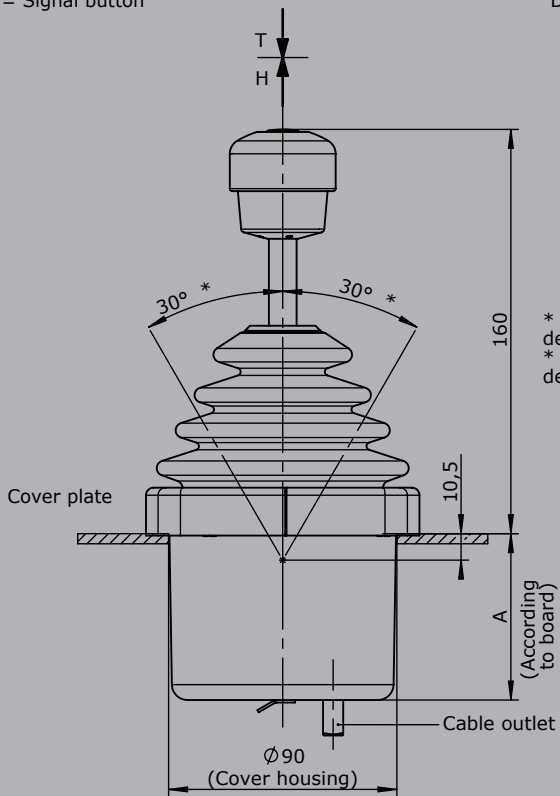
Z01	Mating connector (CAN) M12 (male insert) with 2 m cable	20201140
Z02	Mating connector (CAN) M12 (female contact) with 2 m cable	20202298
Z03	Mating connector (Profibus) straight	22201440
Z04	Mating connector (Profibus) 90° angled	22201741
Z05	Mating connector (Profinet) M12 (male insert) with 2 m cable	5300000222

T = Dead man's button
H = Signal button

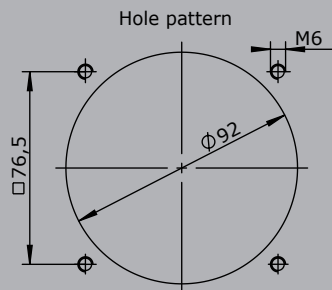
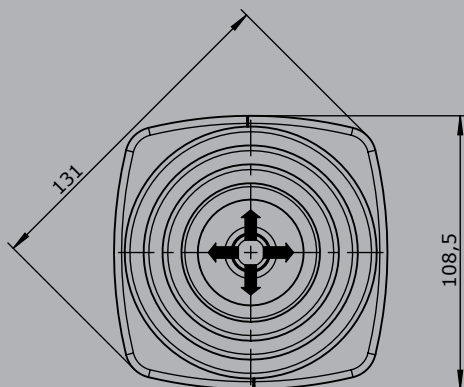
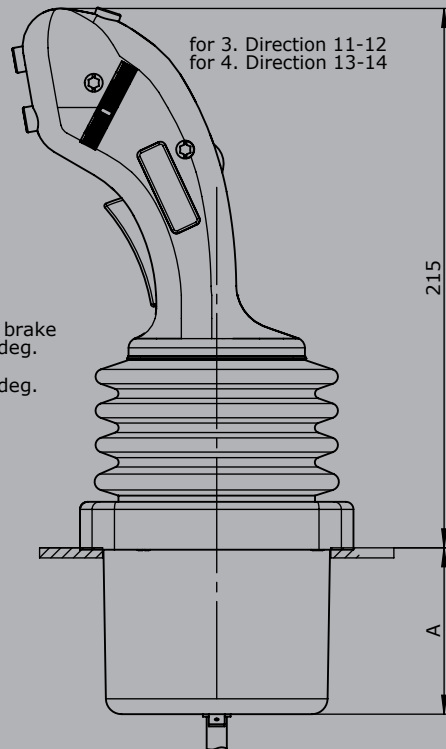
Knob solid
D= Push button

Palm grip B3

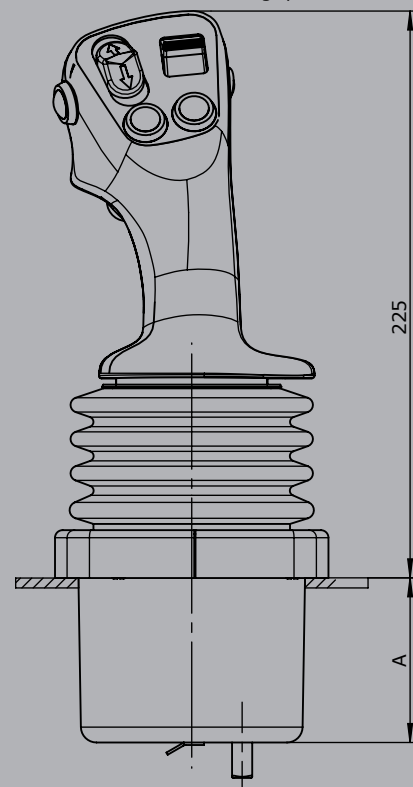
for 3. Direction 11-12
for 4. Direction 13-14



* Type with friction brake
deflection max. 25 deg.
* Type with detent
deflection max. 25 deg.



Palm grip B25



Multi-axis controller V8 / VV8



The multi-axis controller V8/VV8 is available in either single-axis or multi-axis options and is a robust controller used commonly in electro-hydraulic applications. With many output options including voltage, amperage and switch contacts and many handle options the V8 / VV8 series is hugely customisable. The V8 / VV8 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life V8	10 million operating cycles
Mechanical life VV8	20 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	up to IP54



1

		Example										
		VV8	S5	P	T	-2RP	+3ZP	-B	-A05 P184	+A050 P184	E9012	-X
Basic unit												
VV8	2-axis, reinforced version											
Control-handle extended												
	Standard 160 mm*											
S5	-20 mm											
S8	+20 mm											
*Only available in combination with handle!												
Gate												
P	Cross gate											
P X	Special gate											
Grip / palm grip												
T	Dead man											
Axis 1												
2	Contacts											
R	Friction brake											
P	Potentiometer											
Axis 2												
3	Contacts											
Z	Spring return											
P	Potentiometer											
Cover housing												
B	Cover housing											
Description axis 1 (direction 1-2)												
A050	Arrangement MSP21-0											
P184	Potentiometer T301 2 x 5 kOhm											
Description axis 2 (direction 3-4)												
A05	Arrangement MSP21											
P184	Potentiometer T301 2 x 5 kOhm											
Interface (description see on the following pages)												
E9012	Potentiometer output for proportional valve PVG32											
Special model												
X	Special / customer specified											

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Multi-axis controller

V8 / VV8



Combination possibilities with our handles

B1 p. 185	B2 p. 187	B3 p. 161	B5 p. 189	B6 p. 191	B7 B8 p. 182	B9 p. 180	B10 p. 197	B14 B15 p. 199
B20 p. 174	B22 p. 176	B23 p. 172	B24 p. 178	B25 p. 157	B28 p. 193	B29 p. 195	B30 p. 159	B31 p. 164
B32 p. 166	B33 p. 168	B34 p. 170						

		VV8	S5	P	T	-2 R P	+	3 Z P	-B	-	A05 P184	+	A050	P184	E9012	-	X
Basic unit																	
V81	1-axis																
V8	2-axis																
reinforced version																	
VV81	1-axis																
VV8	2-axis																
Control-handle extended																	
S5	-20 mm																
S8	+20 mm																
Gate																	
P	Cross gate																
P X	Special gate																
Grip/ palm grip																	
	Knob (included in basic unit!)																
M	Mechanical zero interlock																
MH	Mechanical zero interlock + signal contact																
T	Dead man																
H	Signal button																
D	Push button																
DV	Flush push button																
B...	Palm grip B... (see page palm grip 157)																
Axis 1: direction 1-2																	
1	1 contact	Standard contact - arrangement see page 140															
2	2 contacts	e.g.															
3	3 contacts	A98				MS0											
		A05				MS21											
		A050				MS21-0											
Z	Spring return																
R	Friction brake only possible with VV8!																

Technical details may vary based on configuration or application! Technical data subject to change without notice!

(P) Mounting options for potentiometer

P	Potentiometer	P181	T301 2 x 0,5 kOhm	I max. 1 mA
		P182	T301 2 x 1 kOhm	I max. 1 mA
		P183	T301 2 x 2 kOhm	I max. 1 mA
		P184	T301 2 x 5 kOhm	I max. 1 mA
		P185	T301 2 x 10 kOhm	I max. 1 mA
		More potentiometers on request!		
H	Hall-Potentiometer	E14811	0,5...2,5...4,5 V / 4,5 V...2,5...0,5	

VV8 S5 P T -2 R P + 3 Z P -B - A05 P184 + A050 P184 E9012 - X

Axis 2: direction 3-4 (not applied for V81/VV81)

1	1 contact	Standard contact - arrangement see page 140		
2	2 contacts	e.g.		
3	3 contacts	A98	MS0	Zero position contact
		A05	MS21	Direction contacts
		A050	MS21-0	Direction contacts + zero position contact

Z Spring return
R Friction brake only possible with VV8!
(P) Mounting options for potentiometer

P	Potentiometer	P181	T301 2 x 0,5 kOhm	I max. 1 mA
		P182	T301 2 x 1 kOhm	I max. 1 mA
		P183	T301 2 x 2 kOhm	I max. 1 mA
		P184	T301 2 x 5 kOhm	I max. 1 mA
		P185	T301 2 x 10 kOhm	I max. 1 mA
		More potentiometers on request!		
H	Hall-Potentiometer	E14811	0,5...2,5...4,5V/4,5V...2,5...0,5	

VV8 S5 P T -2 R P + 3 Z P -B - A05 P184 + A050 P184 E9012 - X

Cover housing

B Cover housing

Interface

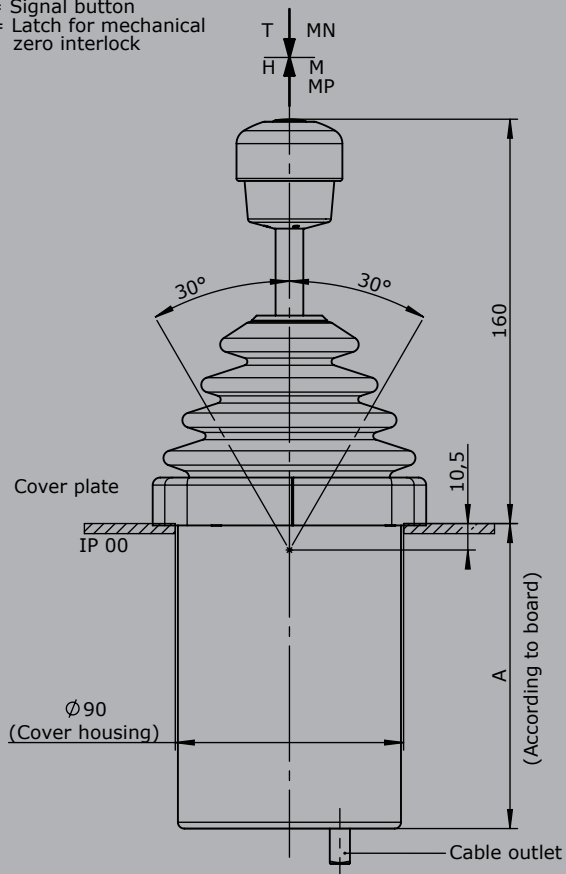
Potentiometer output	
E901	Potentiometer output for proportional valve PVG32
	0,25...0,5...0,75 Us
1	1 axis
2	2 axis
3	3 axis
4	4 axis

Special model

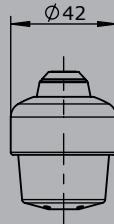
X Special / customer specified

1

T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock

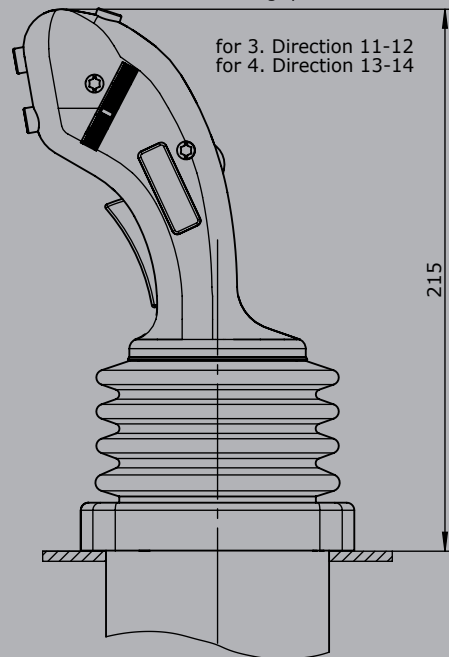


Knob solid
D = Push button

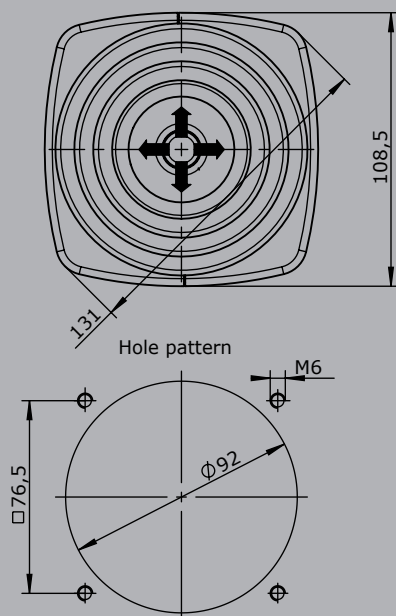
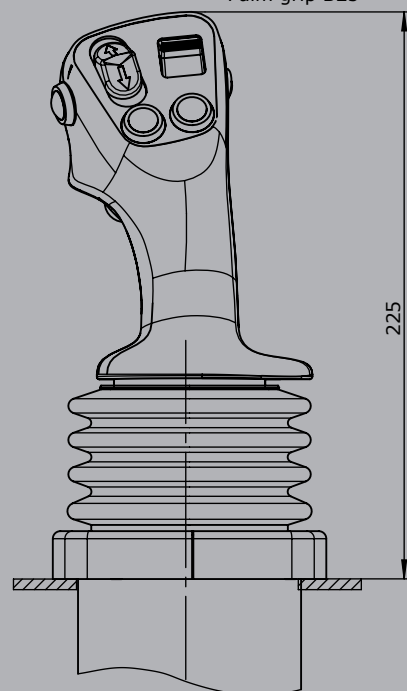


Palm grip B3

for 3. Direction 11-12
for 4. Direction 13-14



Palm grip B25



Multi-axis controller V25



The multi-axis controller V25 is available in either single-axis or multi-axis options and is a robust controller used commonly in electro-hydraulic applications. With many output options including voltage, amperage and switching contacts and many handle options the V25 series is hugely customisable. The V25 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data



1

Mechanical life V25	8 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	up to IP67
Functional safety	PLd (EN ISO 13849) possible

	V25	S8	P	Example T	-Z	-B10	-E...	-S...	-X
Basic unit									
V25.1 1-axis									
V25 2-axis									
Control-handle long									
Standard 100 mm*									
S8 +20 mm									
*Only available in combination with grip!									
Gate									
P Cross gate (deflection angle max. 15°)									
Grip / palm grip									
Knob (included in basic unit!)									
M Mechanical zero interlock									
T Knob with dead man									
H Knob with signal button									
D Knob with push button KDA/70									
B ... Palm grip B... (see page palm grip 157)									
Spring return (included in basic unit!)									
Z Spring return									
Degree of protection									
B Cover housing									
B10 Joystick-main board sealed									
B11 Joystick-main board sealed and handle function sealed, handle with drain hole									
For a schematic description of the protection class, see page 139									
Interface (description see on the following page)									
E0xx Switching output									
E1xx Voltage output									
E2xx Current output									
E3xx CAN-interface									
E4xx CANOpen Safety interface									

V25 S8 P T -Z -B10 -E... -S... -X

Plug connectors

S.. Standard plug connectors (see page 138)

Special model

X Special / customer specified

Combination possibilities with our handles

B1  p. 185	B2  p. 187	B3  p. 161	B5  p. 189	B6  p. 191	B7 B8  p. 182	B9  p. 180	B10  p. 197	B14 B15  p. 199
B20  p. 174	B22  p. 176	B23  p. 172	B24  p. 178	B25  p. 157	B28  p. 193	B29  p. 195	B30  p. 159	B31  p. 164
B32  p. 166	B33  p. 168	B34  p. 170						

Digital output

Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Mounting depth A	60 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector	
	2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector	
	Optional with plug connector (standard plug connectors see page 138)	S
2 Direction signals + 1 zero position signal (galvanically isolated) per axis		
	1 axis	E001 1
	2 axis	2

Voltage output (not stabilized)

Supply voltage	4,75-5,25 V DC	
Current carrying capacity	Direction signal 8 mA	
Mounting depth A	60 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector	
	2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector	
	Optional with plug connector (standard plug connectors see page 138)	S
0,5...2,5...4,5 V redundant + 2 direction signals per axis		
	1 axis	E104 1
	2 axis	2
Output options		
Characteristic:		
Inverse dual		1
Dual		2
Inverse Dual with dead zone +/- 3° (standard)		3
Dual with dead zone +/- 3°		4

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Voltage output

Supply voltage	9-32 V DC (*11,5-32)	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Mounting depth A	60 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis		
	1 axis	E112 1
	2 axis	2
	3 axis*	3
	4 axis*	4
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC		
	1 axis	E132 1
	2 axis	2
	3 axis*	3
	4 axis*	4
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal		
	1 axis	E136 1
	2 axis	2
	3 axis*	3
	4 axis*	4
Output options		
Characteristic:		
Inverse dual * ¹		1
Dual * ¹		2
Inverse dual with dead zone +/- 3° * ¹ (standard)		3
Dual with dead zone +/- 3° * ¹		4
* ¹ not combinable with output E136X		
Single * ²		5
Single with dead zone +/- 3° * ² (standard)		6
* ² not combinable with output E112X and E132X		
Digital output signals:		
Output signals standard:		
Direction signals and zero position signals 1,5A 24 V DC		1

*Axis for handle functions, interface can vary depending upon actuation element!

Voltage output with other value on request!

1

Current output				
Supply voltage	9-32 V DC			
Current carrying capacity	Direction signal 150 mA			
	Zero position signal 500 mA			
Mounting depth A	60 mm			
Wiring	1. cable 14 x 0,25 mm² 500 mm long without plug connector			
	2. cable 14 x 0,25 mm² (optional for grip function) 500 mm long without plug connector			
Optional with plug connector (<i>standard plug connectors see page 138</i>)				S
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal				
		1 axis	E206	1
		2 axis		2
		3 axis*		3
		4 axis*		4
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal				
		1 axis	E208	1
		2 axis		2
		3 axis*		3
		4 axis*		4
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal				
		1 axis	E214	1
		2 axis		2
		3 axis*		3
		4 axis*		4
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal				
		1 axis	E216	1
		2 axis		2
		3 axis*		3
		4 axis*		4
Output options				
		Single		5
		Single with dead zone +/- 3° (standard)		6
Digital output signals:				
Output signals standard:				
		Direction signals and zero position signals 1,5A 24 V DC		1
*Axis for handle functions, interface can vary depending upon actuation element!				
Current output with other value on request!				

Identification of the installation variants with switching directions:



CAN			
Supply voltage	9-32 V DC		
Idle current consumption	120 mA (24 V DC)		
Current carrying capacity	Direction signal 100 mA		
	Zero position signal 100 mA		
	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs)		
	Digital switching output (potential-free) 100 mA		
Mounting depth A	60 mm (Expansion stage 1)		
	75 mm (Expansion stage 2)		
	95 mm (Expansion stage 3)		
Protocol	CANOpen CiA DS 301 or SAE J1939		
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)		
Output value	255...0...255		
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male)		
	CAN (OUT) cable 300 mm with plug connector M12 (female)		
	External in-/outputs cable 300 mm long without plug connector		
	External in-/outputs cable 300 mm long without plug connector (additional from 32 in-/outputs)		
Optional with plug connector (<i>standard plug connectors see page 138</i>)			S
CAN V25 expansion stage 1		E304 1	
- 4 analog joystick axis			
- 15 digital joystick functions			
- Input for capacitive sensor			
Main-axis with additional digital outputs separately wired (not via CAN)			
- 2 direction signals per main axis			1
CAN V25 expansion stage 2		E305 1	
- 7 analog joystick axis			
- 15 digital joystick functions			
- 2 inputs for capacitive sensors			
With additional external in-/outputs			
- 8 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs			2
- 16 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs			3
<i>External LED-outputs can be used in the grip for LEDs</i>			

CAN V25 expansion stage 3

E306 1

- 10 analog joystick axis
- 15 digital joystick functions
- 2 inputs for capacitive sensors

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 16 external digital inputs
- 24 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 24 external digital inputs
- 32 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 32 external digital inputs

2
3
4
5

External LED-outputs can be used in the grip for LEDs

Main-axis with additional digital outputs separately wired (not via CAN)

- 2 direction signals + 1 zero position signal (potential-free) per axis

3

With additional analog outputs on request!

CANopen safety

Supply voltage	9-32 V DC
Idle current consumption	120 mA (24 V DC)
Current carrying capacity	Direction signal 100 mA Zero position signal 100 mA (potential-free) External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs) Digital switching output (potential-free) 100 mA
Baud rate	20 kBit/s to 1 MBit/s (standard 250 kBit/s)
Output value	255...0...255
Mounting depth	60 mm (Expansion stage 1) 75 mm (Expansion stage 2) 95 mm (Expansion stage 3)
Protocol	CANopen Safety CIA 304
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male) CAN (OUT) cable 300 mm with plug connector M12 (female) External in-/outputs cable 300 mm long without plug connector External in-/outputs cable 300 mm long without plug connector (additional from 32 in-/outputs)
	Optional with plug connector (<i>standard plug connectors see page 138</i>)

S

CANopen Safety expansion stage 1

E404 1

- 4 analog joystick axis
- 15 digital joystick functions
- Input for capacitive sensor

Main-axis with additional digital outputs separately wired (not via CAN)

- 2 direction signals per main axis

1

CANopen safety expansion stage 2

E405 1

- 7 analog joystick axis
- 15 digital joystick functions
- 2 inputs for capacitive sensors

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs

2
3

External LED-outputs can be used in the grip for LEDs

CANopen safety expansion stage 3

E406 1

- 10 analog joystick axis
- 15 digital joystick functions
- 2 inputs for capacitive sensor

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 8 external digital inputs
- 16 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 16 external digital inputs
- 24 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 24 external digital inputs
- 32 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 32 external digital inputs

2
3
4
5

External LED-outputs can be used in the grip for LEDs

Main-axis with additional digital outputs separately wired (not via CAN)

- 2 direction signals + 1 zero position signal (potential-free) per axis

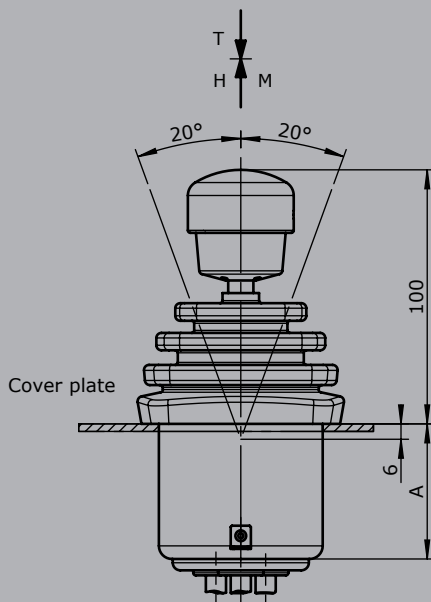
3

With additional analog outputs on request!

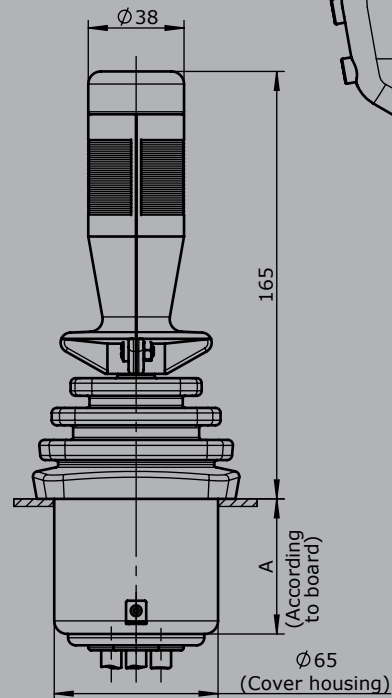
Attachments

Z01 Mating connector M12 male insert with 2 m cable	20201140
Z02 Mating connector M12 female insert with 2 m cable	20202298

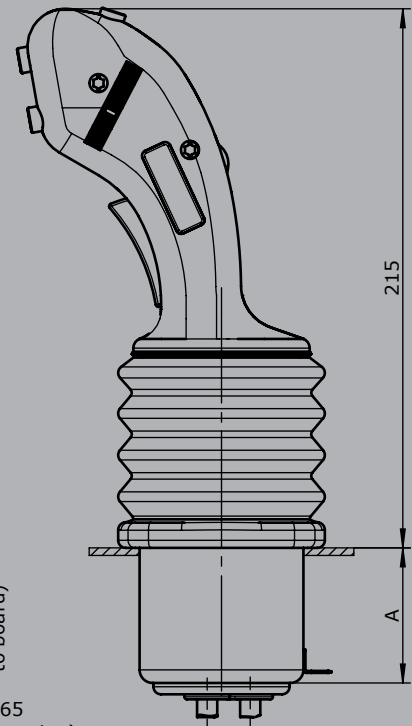
T = Dead man's button
H = Signal button
M = Latch for mechanical
zero interlock



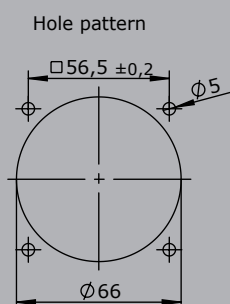
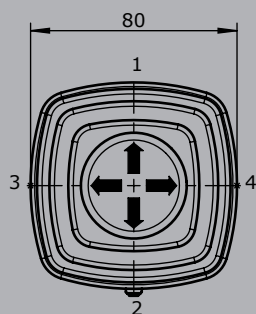
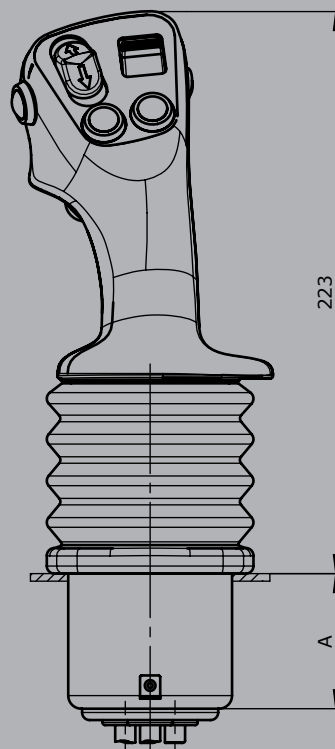
Palm grip B1



Palm grip B3



Palm grip B25



* Optional TP 67

Multi-axis controller V24



The association drive V24 is designed as a driving joystick for construction and agricultural machinery. It has a parking position which can be inserted in the zero position. The V24 is characterized by its extremely rugged design. Through its various interfaces and the many possibilities of combination with our numerous ball handles the V24 is very flexible.



Technical data

Mechanical life V24	20 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	up to IP67
Functional safety	PLd (EN ISO 13849) possible

	V24	P1	Example T	-R	-B10	-E...	-S...	-X
Basic unit								
V24.1	Multi-axis controller, 1-axis							
V24L	Multi-axis controller, 1-axis with parking position left							
V24R	Multi-axis controller, 1-axis parking position right							
Gate								
P1	T-gate main axis axial (included in basic unit!)							
P2	T-gate main axis right outside							
P3	T-gate main axis left outside							
PX	Special gate							
Grip / Palm grip								
	Knob (included in basic unit!)							
T	Dead man							
H	Signal button							
D	Push button							
B...	Palm grip B... (see page palm grip 157)							
Main axis								
R	Friction brake adjustable (included in basic unit!)							
Degree of protection								
B10	Joystick-main board sealed (IP67)							
B11	Joystick-main board sealed (IP67) and handle function sealed, handle with drain hole							
For a schematic description of the protection class, see page 139								
Interface (description see on the following pages)								
E3xx	CAN-interface							
E4xx	CANOpen Safety interface							
Plug connectors								
S..	Standard plug connectors (see page 138)							
Special model								
X	Special / customer specified							

Combination possibilities with our handles

 p. 185	 p. 187	 p. 161	 p. 189	 p. 191	 p. 182	 p. 180	 p. 197	 p. 199
 p. 174	 p. 176	 p. 172	 p. 178	 p. 157	 p. 193	 p. 195	 p. 159	 p. 164
 p. 166	 p. 168	 p. 170						

CAN		
Supply voltage	9-36 V DC	
Idle current consumption	120 mA	
Mounting depth A	60 mm	
Protocol	CANOpen CiA DS 301 or SAE J 1939	
Baud rate	125 kBit/s to 1 Mbit/s	
Output value	255...0...255	
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male) CAN (OUT) cable 300 mm with plug connector M12 (female) External in-/outputs cable 300 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
CAN V24		E312 1
- 7 analog joystick axis		
- 15 digital joystick functions		
*With the use of external inputs, the joystickfunctions reduce by 7 pieces!		
- Input for capacitive sensor		
With additional external in-/outputs		
- 8 external LED-outputs, 1 switching output (potentialfree, 100 mA), 7 external digital inputs		2
- 16 external LED-outputs, 1 switching output (potentialfree, 100 mA), 7 external digital inputs		3
With additional digital outputs for the main-axis		
- 2 direction signals + 1 zero position signal (potential-free) per axis		3
Additional analog outputs on request!		

CANOpen safety

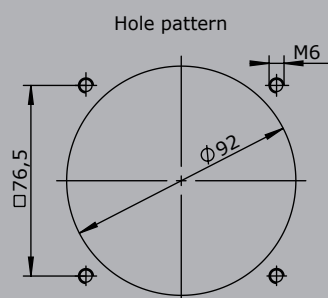
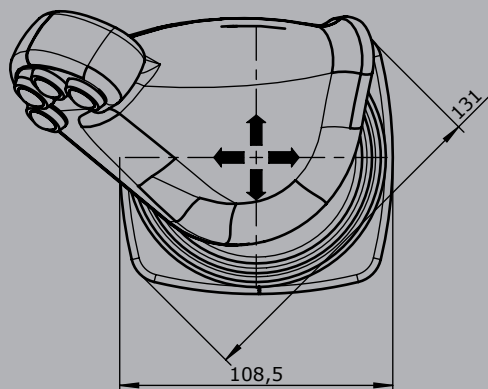
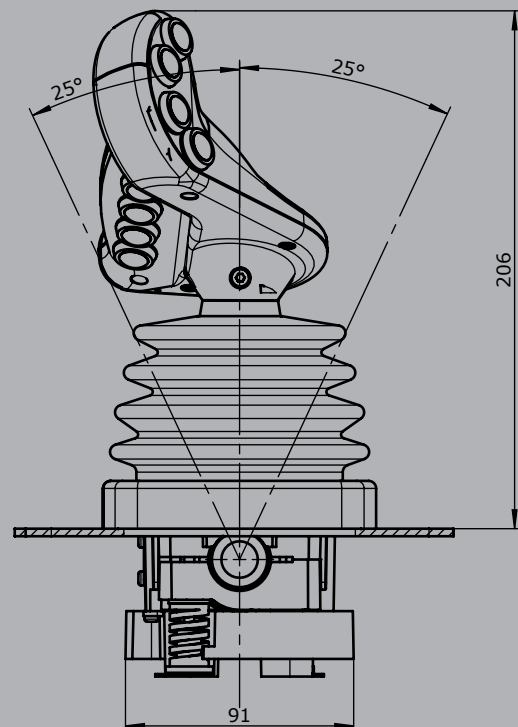
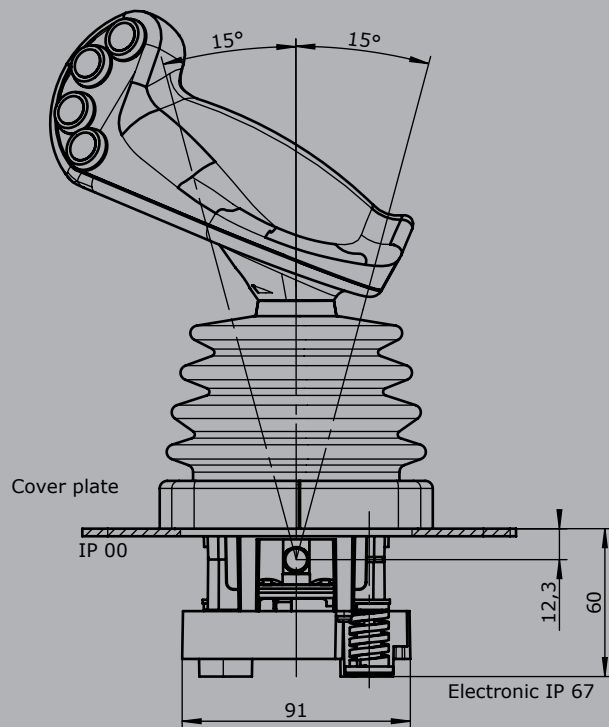
Supply voltage	9-36 V DC	
Idle current consumption	120 mA	
Mounting depth A	60 mm	
Protocol	CANOpen safety CIA 304	
Baud rate	125 kBit/s to 1 Mbit/s	
Output value	255...0...255	
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male)	
	CAN (OUT) cable 300 mm with plug connector M12 (female)	
	External in-/outputs cable 300 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S

CANOpen Safety V24

- 7 analog joystick axis	E411 1	
- 15 digital joystick functions		
<i>*With the use of external inputs, the joystick functions reduce by 7 pieces!</i>		
- Input for capacitive sensor		
With additional external in-/outputs		
- 8 external LED-outputs, 1 switching output (potentialfree, 100 mA), 7 external digital inputs	2	
- 16 external LED-outputs, 1 switching output (potentialfree, 100 mA), 7 external digital inputs	3	
With additional digital outputs for the main-axis		
- 2 direction signals + 1 zero position signal (potential-free) per axis		3
<i>Additional analog outputs on request!</i>		

Attachments

Z01 Mating connector (CAN) M12 (male insert) with 2 m cable	20201140
Z02 Mating connector (CAN) M12 (female contact) with 2 m cable	20202298



Multi-axis controller V26



The multi-axis controller V26 is a robust controller used commonly in electro-hydraulic applications. With many output options including voltage, amperage and switching contacts and many handle options the V26 series is hugely customisable.

Technical data

Mechanical life V26	10 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	IP22



1

	V26	T	-R	+R	-B	-E...	-S...	-X
Basic unit								
V26	2-axis							
Grip / palm grip								
	Knob <i>(included in basic unit!)</i>							
T	Dead man							
H	Signal button							
D	Push button							
B...	Palm grip B... <i>(see page palm grip 157)</i>							
Axis 1								
R	Friction brake							
Axis 2								
R	Friction brake							
Cover housing								
B	Cover housing <i>(included in basic unit!)</i>							
Interface <i>(description see on the following pages)</i>								
E0xx	Switching output							
E1xx	Voltage output							
E2xx	Current output							
E3xx	CAN-interface							
E4xx	CANOpen safety interface							
Plug connectors								
S..	Standard plug connectors <i>(see page 138)</i>							
Special model								
X	Special / customer specified							

Technical details may vary based on configuration or application! Technical data subject to change without notice!

1

Digital output			
Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Mounting depth A	105 mm		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
2 direction signals + 1 zero position signal (galvanically isolated) per axis			S
2 axis			E002 2

Voltage output (not stabilized)			
Supply voltage	4,75-5,25 V DC		
Mounting depth A	105 mm		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
0,5...2,5...4,5 V redundant per axis			S
2 Achsen			E103 2
Output options			
Characteristic:			
Inverse dual			1
Dual			2
Inverse dual with dead zone +/- 3° (standard)			3
Dual with dead zone +/- 3°			4

Voltage output			
Supply voltage	9-32 V DC (*11,5-32)		
Mounting depth A	105 mm		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
0,5...2,5...4,5 V redundant per axis			S
2 axis			E111 2
0...5...10 V redundant per axis, supply voltage 11,5 - 32 V DC			
2 axis			E131 2
Output options			
Characteristic:			
Inverse dual			1
Dual			2
Inverse dual with dead zone +/- 3° (standard)			3
Dual with dead zone +/- 3°			4
<i>Voltage output with other value on request!</i>			

Current output

Supply voltage	9-32 V DC		
Mounting depth A	105 mm		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
0...10...20 mA per axis, sensor redundant with error monitoring and error signal			
	2 axis	E203 2	
4...12...20 mA per axis, sensor redundant with error monitoring and error signal			
	2 axis	E211 2	
	Output options		
	Single		5
	Single with dead zone +/- 3° (standard)		6

Current output with other value on request!

CAN

Supply voltage	9-36 V DC		
Idle current consumption	120 mA		
	External digital output for LEDs 5-30 mA (dependent on the number of LEDs)		
	Digital switching output (potential-free) 100 mA		
Mounting depth A	E3091: 105 mm		
	E3091X: 130 mm		
	E3101X - E3103X: 130 mm		
	E3104X - E3105X: 160 mm		
Protocol	CANOpen CiA DS 301 or SAE J 1939		
Baud rate	125 kBit/s to 1 Mbit/s (standard 250 kBit/s)		
Output value	255...0...255		
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male)		
	CAN (OUT) cable 300 mm with plug connector M12 (female)		
	External in-/outputs cable 300 mm without plug connector		
	External in-/outputs cable 300 mm without plug connector (additionally from 32 in-/outputs)		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S

CAN expansion stage 1

- 7 analogue Joystickachsen	E309 1	
- 16 digitale Joystickfunktionen		
- Input for capacitive sensor		
With additional external in-/outputs		
- 8 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs	2	
- 16 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs	3	

External LED-outputs can be used in the grip for LEDs

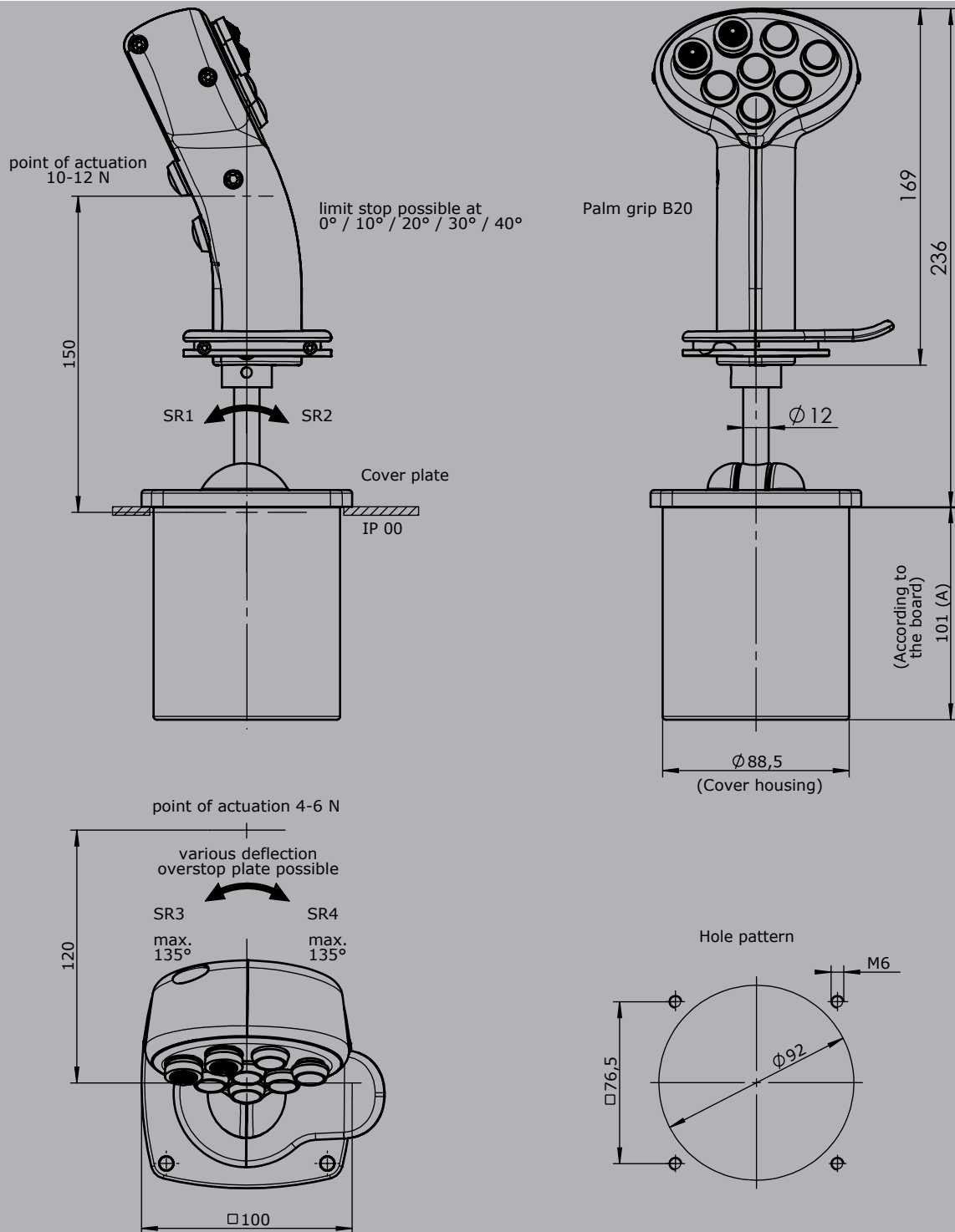
**With the use of capacitive sensor, the external digital inputs reduce by one input!*

1

CANopen Safety			
Supply voltage	9-36 V DC		
Idle current consumption	120 mA		
	External digital output for LEDs 5-30 mA (depending on the number of LED`s)		
	Digital switching output (potential-free) 100 mA		
Mounting depth A	E4091: 105 mm		
	E4091X: 130 mm		
	E4101X - E4103X: 130 mm		
	E4104X - E4105X: 160 mm		
Protocol	CAN Safety CIA 304		
Baud rate	125 kBit/s to 1 MBit/s (Standard 250 kBits)		
Output value	255...0...255		
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male)		
	CAN (OUT) cable 300 mm with plug connector M12 (female)		
	External in-/outputs cable 300 mm without plug connector		
	External in-/outputs cable 300 mm without plug connector (additionally from 32 in-/outputs)		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
CANOpen safety expansion stage 1			S
- 7 analog joystick axis		E409 1	
- 16 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs			2
- 16 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs			3
<i>External LED-outputs can be used in the grip for LEDs</i>			
<i>*With the use of capacitive sensor, the external digital inputs reduce by one input!</i>			

Other outputs			
Voltage output for PVG32 0,25...0,5...0,75Us, power supply 9-32V DC			
Wiring:	1. cable 14 x 0,25 mm² 300 mm long without plug connector		
	2. cable 14 x 0,25 mm² 300 mm long without plug connector (optional for grip function)		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
	2 axis	E907 2	S

Attachments	
Z01 Mating connector (CAN) M12 (male insert) with 2 m cable	20201140
Z02 Mating connector (CAN) M12 (female contact) with 2 m cable	20202298



Multi-axis controller V1



The multi-axis controller V1 is a robust switching device for crane and hoisting applications. The modular design enables the switching device to be used universally. The V1 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.



Technical data

Mechanical life V1	6 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	up to IP65

	V1	P	H11	H13	H15	H17	- Z	+ Z	- B	- E...	- S...	- X
Basic unit												
V1.1 1-axis												
V1 2-axis												
Gate												
P Cross gate												
PX Special gate												
Grip / Grip functions												
Grip (included in basic unit!)												
H11 Additional axis 1 / Grip up - down												
H13 Additional axis 2 / Grip rotate left - right												
H15 Additional axis 3 / Grip tilt forwards - backwards												
H17 Additional axis 4 / Grip tilt left - right												
Axis 1												
Z Spring return												
Axis 2 (not applicable to V1.1)												
Z Spring return												
Cover housing												
B Cover housing (included in basic unit!)												
Interface (description see on the following pages)												
E1xx Voltage output												
Plug connectors												
S.. Standard plug connectors (see page 138)												
Special model												
X Special / customer specified												

Technical details may vary based on configuration or application! Technical data subject to change without notice!

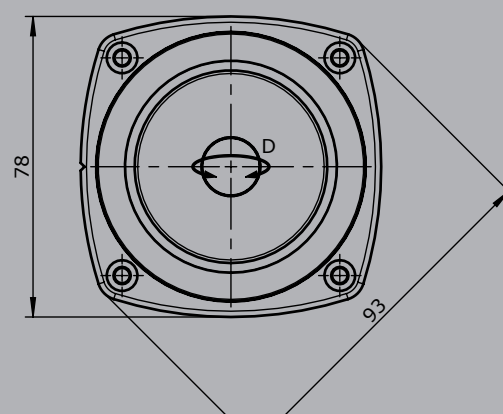
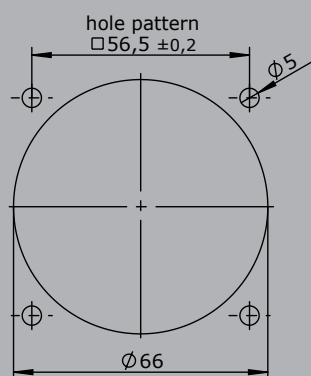
Voltage output (not stabilized)			
Supply voltage	4,75-5,25V DC		
Current carrying capacity	Direction signal 8 mA		
Mounting depth A	85 mm		
Wiring	1. cable 14 x 0,25 mm² 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
0,5...2,5...4,5V redundant signals per axis			
	1 axis	E103 1	S
	2 axis	2	
	3 axis*	3	
	4 axis*	4	
	5 axis*	5	
	6 axis*	6	
	Output options		
Characteristic:			
Inverse dual		1	
Dual		2	
Inverse dual with dead zone +/- 3° (standard)		3	
Dual with dead zone +/- 3°		4	
More outputs on request!			

Technical drawing of the handle assembly for a 100A circuit breaker. The drawing shows a side view of the handle with a diameter of 55 mm and a height of 33 mm. The handle is mounted on a base plate with a diameter of 55 mm and a height of 17.5 mm. The base plate is mounted on a board housing with a diameter of 55 mm and a height of 31.3 mm. The handle is rotated 11 degrees from the vertical. The drawing includes labels for 'handle', 'Cover plate', and 'board housing'. A dimension line 'A' indicates the total height of the assembly.

lift and sink
H/S



+4
-4



Multi-axis controller V21



The multi-axis controller V21 is a robust hallsensor switching device for electro-hydraulic applications. The V21 is especially suitable for installation in our ball handles. The multi-axis controller is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life	5 million operating cycles
Operating force	1,6 to 3,5N
Supply voltage	5V DC stabilized
Operation temperature	-40°C to +85°C
Degree of protection	IP67

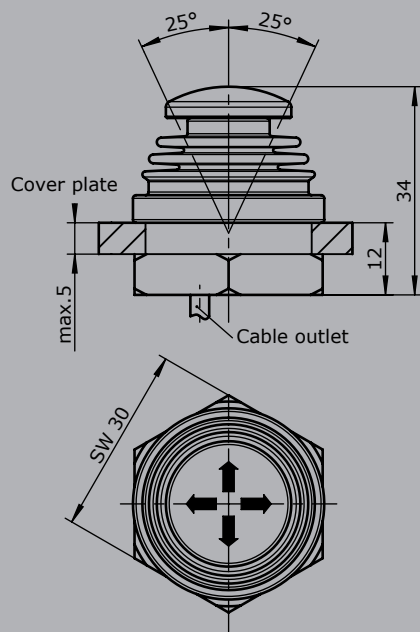


1

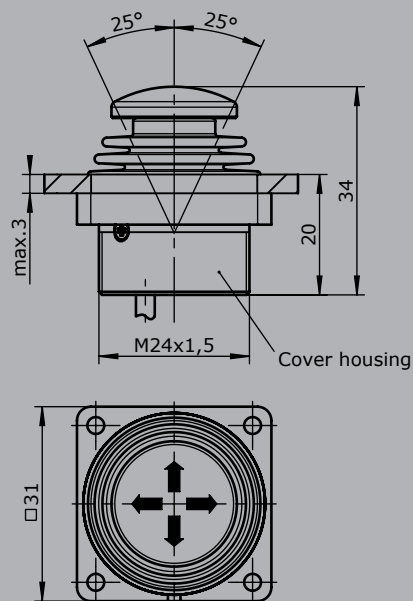
		V21	P	Example	-1	-E1032	-X
Basic unit							
V21.1	1-axis, installation from top with fixing nut						
V21	2-axis, installation from top with fixing nut						
V21.1A	1-axis, with flange, installation from below						
V21A	2-axis, with flange, installation from below						
V21.1B	1-axis, with flange, installation from top						
V21B	2-axis, with flange, installation from top						
Gate							
P	Cross gate						
P X	Special gate						
Knob							
	Standard						
1	KBAD 980						
2	KBAD 1658						
3	KBAD 1690						
Interface							
Voltage output							
0,5...2,5...4,5 V redundant at Ub= 5 V							
	1 axis			E103 1			
	2 axis			2			
	Characteristic:						
	Inverse dual (standard)			1			
	Dual			2			
Special model							
X	Special / customer specified						

1

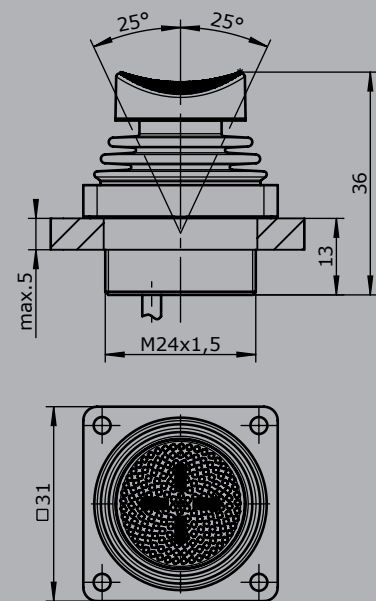
Standard
installed from the top



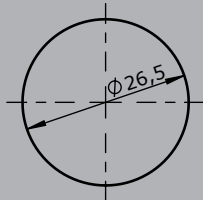
Version A with flange
installed from below



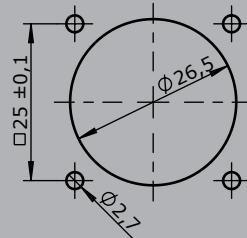
Version B with flange
installed from the top
with actuator KBAD 980



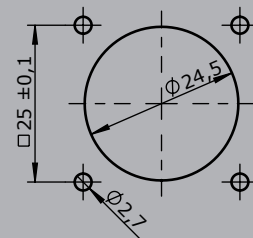
Hole pattern



Hole pattern



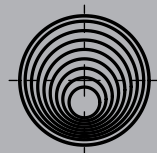
Hole pattern



Actuator KBAD 1658



Actuator KBAD 1690



Multi-axis controller V22



The multi-axis controller V22 is a robust switching device for remote control. The multi-axis controller is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life V22	3 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP67 front



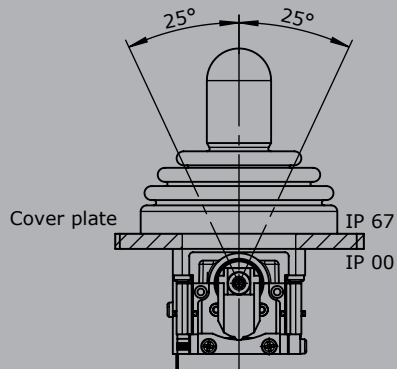
1

		V22A	Example -P	D	-E10321	-X
Basic unit						
V22.1A	1-axis with spring return, installation from below					
V22A	2-axis with spring return, installation from below					
V22.1B	1-axis with spring return, installation from top					
V22B	2-axis with spring return, installation from top					
Gate						
P	Cross gate					
P X	Special gate					
Grip						
	Knob (standard)					
D	Push button					
GS9	Hall-twist grip with spring return					
GS9-D	Hall-twist grip with spring return and push button on top					
Interface						
Voltage output						
0,5...2,5...4,5 V redundant at Ub= 5 V						
	1 axis			E103 1		
	2 axis			2		
	Characteristic:					
	Inverse dual (standard)				1	
	Dual				2	
Special model						
X	Special / customer specified					
Attachments						
Mating connector JST 8-pole					5300000260	
Mating connector JST 8-pole with single wire 500 mm long					5300000261	

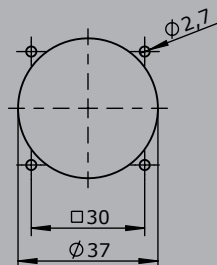
Technical details may vary based on configuration or application! Technical data subject to change without notice!

V22A

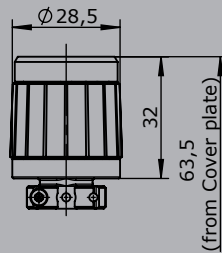
Installed from below



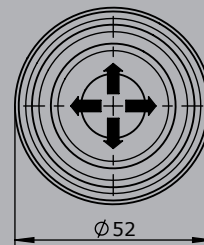
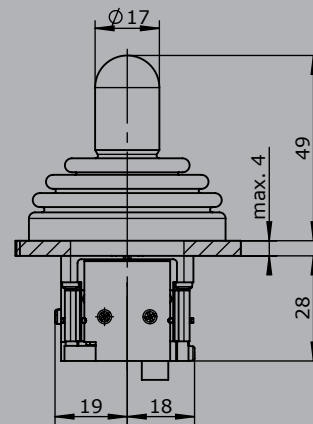
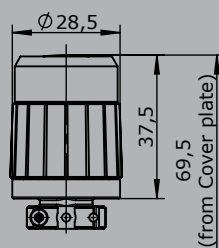
Hole pattern
(installed from below)



Twist grip

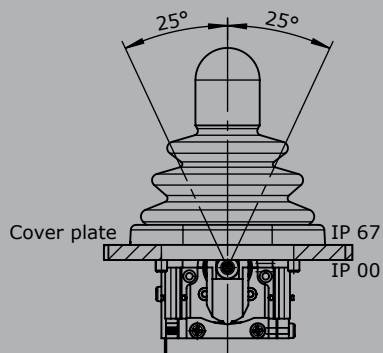


Twist grip
with Push button

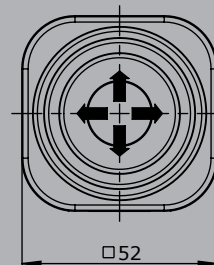
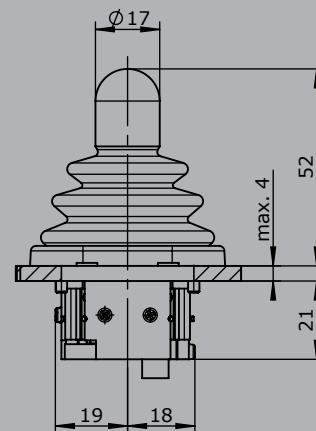
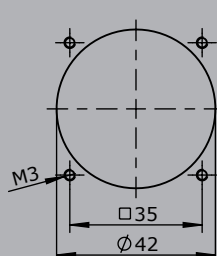


V22B

Installed from the top



Hole pattern
(installed from the top)



Multi-axis controller V23



The multi-axis controller V23 is a robust switching device for remote control applications. The multi-axis controller is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life V23	3 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP67 front

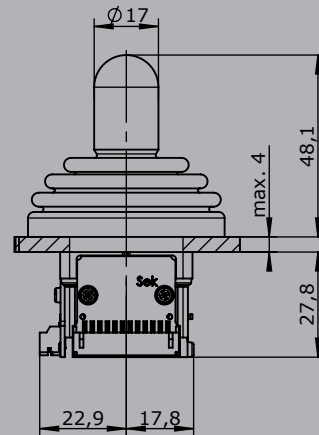
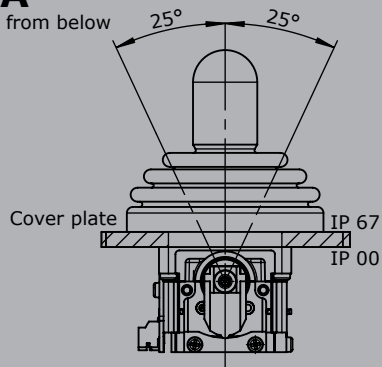


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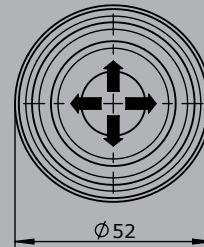
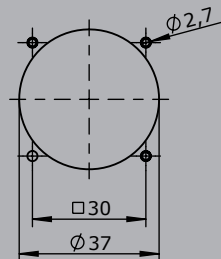
	V23A	-P	-C80	+C80	-X
<i>Example</i>					
Basic unit					
V23.1A	1-axis with spring return, installation from below				
V23A	2-axis with spring return, installation from below				
V23.1B	1-axis with spring return, installation from top				
V23B	2-axis with spring return, installation from top				
Gate					
P	Cross gate				
P X	Special gate				
Axis 1: direction 1-2					
C80	Mechanical encoder				
	MEC 3-1				
	EA/26-10				
	Potentiometer resistance				
	Contact arrangement				
	with 12-pol. JST-connector				
		I max. 1 mA			
		2x5 kOhm			
		Arrangement MS24			
Axis 2: direction 3-4 (not applied for V23.1)					
<i>See description axis 1!</i>					
Special model					
X	Special / customer specified				
Attachments					
Mating connector JST 12-polig (included in delivery!)			5300000263		
Mating connector JST 12-pole with single wire 500 mm long			5300000264		

V23A

Installed from below

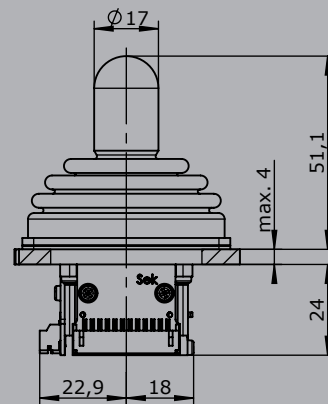
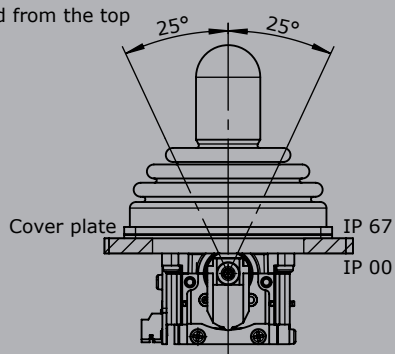


Hole pattern
(installed from below)

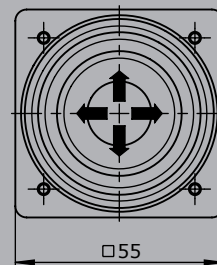
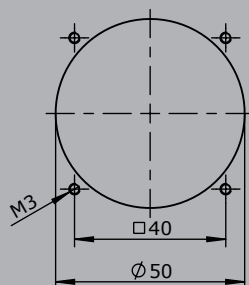


V23B

Installed from the top



Hole pattern
(installed from the top)



Multi-axis controller V20



The multi-axis controller V20 is a rugged switching device for remote control. The multi-axis controller is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life V20	3 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP65 (optional IP67)

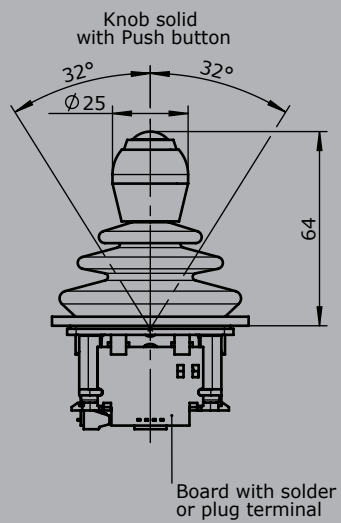
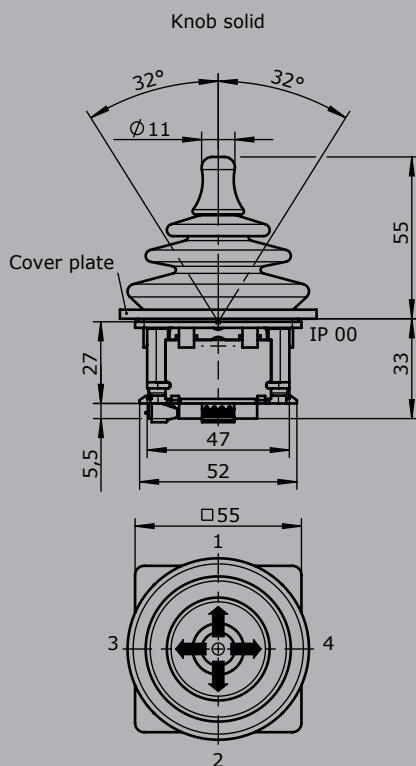


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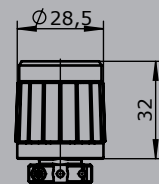
		V20	-P	Example D	-C71	+C71	-B	-X
Basic unit								
V20.1	1-axis with spring return							
V20	2-axis with spring return							
V20.1A	1-axis with spring return, IP67 front							
V20A	2-axis with spring return, IP67 front							
Gate								
p	Cross gate							
P X	Special gate							
Grip								
	Knob (standard)							
D	Push button							
GS9	Hall-twist grip with spring return							
GS9-D	Hall-twist grip with spring return and push button on top							
Axis 1: direction 1-2								
C70	Mechanical encoder							
	MEC 2-1							
	EA/15-10							
	Potentiometer track							
	Direction track							
C71	Mechanical encoder							
	MEC 2-2							
	EA/11-10							
	Potentiometer track							
	Direction track							
C72	Mechanical encoder							
	MEC 2-5							
	EA/21-10							
	Potentiometer track							
	Direction track							
Axis 2: direction 3-4								
See description axis 1!								
Cover housing								
B	Cover housing KBQ 905 (IP65)							
Special model								
X	Special / customer specified							

Technical details may vary based on configuration or application! Technical data subject to change without notice!

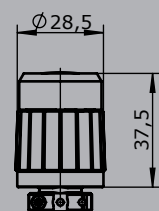
V20 Standard degree of protection front IP 65



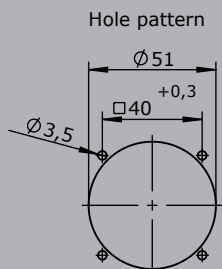
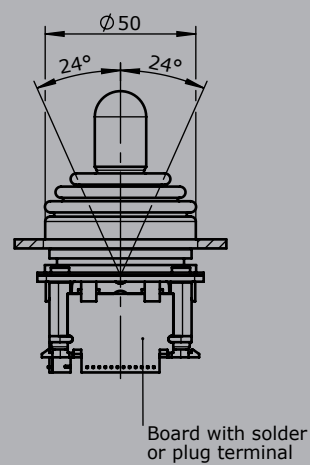
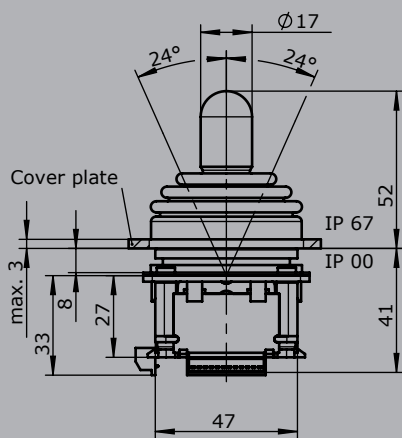
Twist grip



Twist grip with Push button



V20 Degree of protection front IP 67



Multi-axis controller V14



The multi-axis controller V14 is a robust switching device for remote control and electro-hydraulic applications. The modular design enables the switching device to be used universally. The V14 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life V14	6 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	up to IP65



1

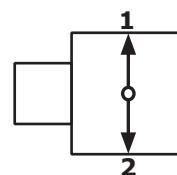
	V14L	S8	P	T	Example -01 Z C	+03 R	-A05 C61	+A110	-X
Basic unit									
V14L 2-axis left									
Control-handle extended									
Standard 60 mm**									
S8 +20 mm									
<i>*Only available in combination with handle!</i>									
Gate									
P Cross gate									
Grip / Palm grip									
T Dead man									
Axis 1 (direction 1-2)									
01 2 contacts (2A 250 V AC15)									
Z Spring return									
C Mechanical encoder									
Axis 2 (direction 3-4)									
03 6 contacts (2A 250 V AC15)									
R Friction brake									
Description axis 1 (direction 1-2)									
A05 Arrangement MSP21									
C61 Mechanical encoder MEC 1-2									
Description axis 2 (direction 3-4)									
A110 Arrangement MS24-0									
Special model									
X Special / customer specified									

Combination possibilities with our handles

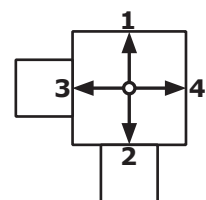


	V14L	S8	P	T	-	01 Z C	+	03 R	-	A05	C61	+	A110	-	X
Basic unit															
V14.1L	1-axis left														
V14.1R	1-axis right														
V14L	2-axis left														
V14R	2-axis right														
Control-handle extended															
	Standard 60mm*														
S8	+20 mm														
*Only available in combination with handle!															
Gate															
P	Cross gate														
P X	Special gate														
Grip / palm grip															
	Knob 25 mm (standard)														
M	Mechanical zero interlock														
MH	Mechanical zero interlock + signal contact														
T	Dead man														
H	Signal button														
GK1	Knob 42 mm														
GK1M	Mechanical zero interlock														
GK1MN	Mechanical zero interlock (push down)														
GK1T	Dead man														
GK1H	Signal button														
GK1MH	Mechanical zero interlock + signal contact														
GK1D	Push button														
GK1DV	Flush push button														
GS9	Hall-twist grip with spring return														
GS9-D	Hall-twist grip with spring return and push button on top														
B...	Palm grip B... (see page palm grip page 157)														

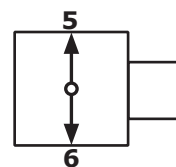
Identification of the installation variants with switching directions:



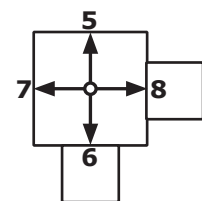
V14.1L



V14L



V14.1R



V14R

*Attention! The multi-axis controller V14 is not suitable for large palm grips (B3, B7/B8, B9...)

	V14L	S8	P	T	-	01 Z C	+	03 R	-	A05	C61	+	A110	-	X
Axis 1: direction 1-2 left / direction 5-6 right															
(Standard contacts gold-plated 2A 250V AC15)															
01	2 contacts														
02	4 contacts														
03	6 contacts														
Standard contact - arrangement see page 140															
e.g.															
A05 MS21															
A0500 MS21-00															
A110 MS24-0															
A99 contact - arrangement according customer request															

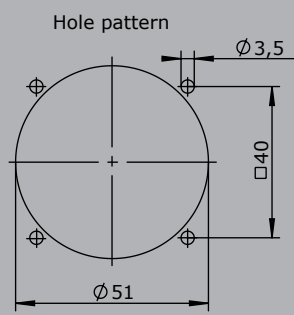
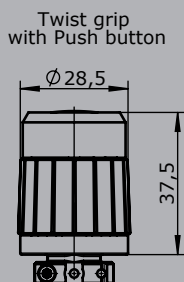
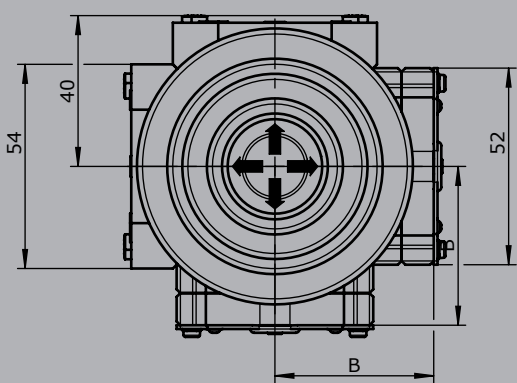
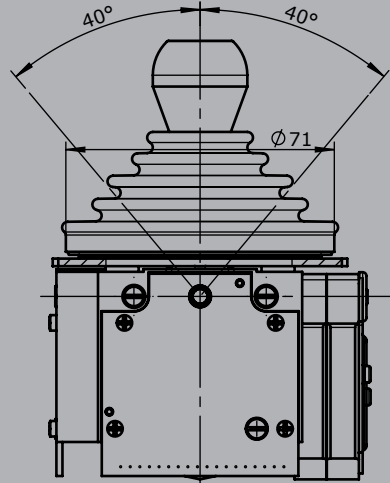
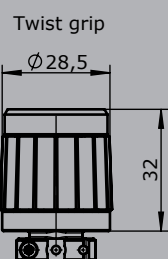
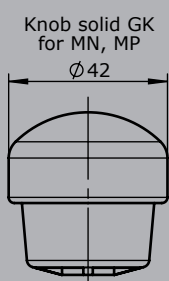
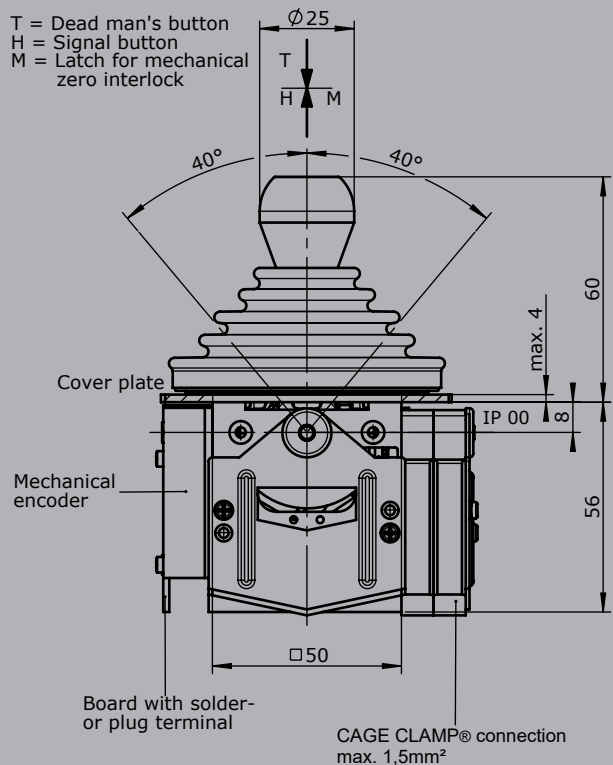
Technical details may vary based on configuration or application! Technical data subject to change without notice!

V14L S8 P T - 01 Z C + 03 R - A05 C61 + A110 - X																	
Z	Spring return <i>(included in basic unit!)</i>																
R	Friction brake																
C	Mechanical encoder																
C61										MEC 1-2							
										EA/02-10				I max. 1 mA			
										Potentiometer track				2 x 10 kOhm			
										Direction tack				Arrangement MS26-0			
C62										MEC 1-7							
										EA/10-10				I max. 1 mA			
										Potentiometer track				2 x 5 kOhm			
										Direction track				Arrangement MS26-0-1			
C66										MEC 1-10							
										EA/17-10				I max. 10 mA			
										Potentiometer track				2 x 1,5 kOhm			
										Direction track				Arrangement MS21-0+MS21			
C63										MEC 1-6							
										EA/09-10							
										6 Bit Gray Code							
C64										MEC 1-6-5							
										ER/36-10				Us=18-30 V			
										Current output 20...4...20 mA							
C65										MEC 1-6-8							
										ER/36-12				Us=18-30 V			
										Current output 20...0...20 mA							
C67										MEC 1-6-9							
										ER/36-11				Us=18-30 V			
										Voltage output 10...0...10 V							
H										Hall-Potentiometer		E14811		0,5...2,5...4,5 V / 4,5...2,5...0,5 V			

V14L S8 P T - 01 Z C + 03 R - A05 C61 + A110 - X									
Axis 2: direction 3-4 left / direction 7-8 right <i>(not applied for V14.1L and V14.1R)</i>									
See description axis 1!									
Special model									
X	Special / customer specified								

1

T = Dead man's button
H = Signal button
M = Latch for mechanical
zero interlock



Type	No. of contacts	Dim.
01	2	36
02	4	45
03	6	54

Multi-axis controller V6 / VV6



The multi-axis controller V6 / VV6 is available in either single-axis or multi-axis options and is a robust controller used commonly in crane and hoisting applications. The modular design and many possibilities of combination with our handles enables the switching device to be used universally. The V6 / VV6 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life V6	10 million operating cycles
Mechanical life VV6	20 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	up to IP54 front



1

	V62L	S5	P	T	Example			-01 Z P	+03A R C	-A05 P134	+A110 C01	-X
Basic unit												
V62L 2-axis left												
Control-handle extended												
S5 -20 mm												
Gate												
P Cross gate												
Grip / palm grip												
T Dead man												
Axis 1 (direction 1-2)												
01 2 contacts (2A 250 V AC15)												
Z Spring return												
P Potentiometer												
Axis 2 (direction 3-4)												
03A 6 contacts (4A 250 V AC15)												
R Friction brake												
C Opto-electronical encoder												
Description axis 1 (direction 1-2)												
A05 Arrangement MS21												
P134 Potentiometer T396 2 x 5 kOhm												
Description axis 2 (direction 3-4)												
A110 Arrangement MS24-0												
C01 OEC 2-1-1												
Special model												
X Special / customer specified												

Combination possibilities with our handles



V62L S5 P T -01 Z P +03A R C -A05 P134 +A110 C01 -X

Basic unit

V61L	1-axis left
V61R	1-axis right
V61.1	1-axis
V64.1	1-axis
V62L	2-axis left
V62R	2-axis right
V64	2-axis

reinforced version

VV61L	1-axis left
VV61R	1-axis right
VV61.1	1-axis
VV64.1	1-axis
VV62L	2-axis left
VV62R	2-axis right
VV64	2 axis

Control-handle extended

Standard 180 mm*

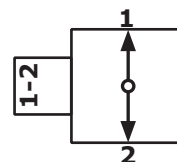
S3	-40 mm
S5	-20 mm
S8	+20 mm

*Only available in combination with handle!

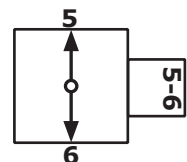
Gate

P	Cross gate
P X	Special gate

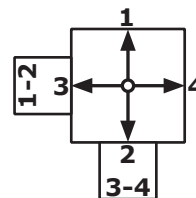
Identification of the installation variants with switching directions:



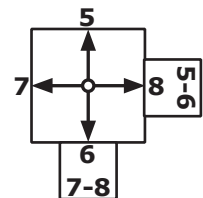
V61L/VV61L



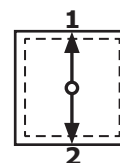
V61R/VV61R



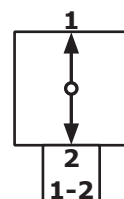
V62L/VV62L



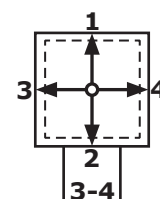
V62R/VV62R



V64.1/VV64.1



V61.1/VV61.1



V64/VV64

V62L S5 P T -01 Z P +03A R C -A05 P134 +A110 C01 -X

Grip / palm grip

	Knob (included in basic unit!)
M	Mechanical zero interlock
MN	Mechanical zero interlock (push down)
T	Dead man
MT*	Mechanical zero interlock + dead man
H	Signal button
MH	Mechanical zero interlock + signal button
D	Push button
MD*	Mechanical zero interlock + push button
DV	Flush push button
MDV*	Mechanical zero interlock + flush push button

*Only possible with VV6!

B... Palm grip B... (see Palm grip page 157)

Attention! When usage some handles reduces the deflection angle to 28 degrees!

V62L S5 P T -01 Z P +03A R C -A05 P134 +A110 C01 -X

Axis 1: direction 1-2 left / direction 5-6 right

(Standard contacts gold-plated 2A 250 V AC15)

01	☐ 2 contacts	Standard contact - arrangement see page 140	
02	☐ 4 contacts	z.B.	
03	☐ 6 contacts	A980	MS00
04	☐ 8 contacts	A05	MS21
05	☐ 10 contacts	A0500	MS21-00
06	☐ 12 contacts	A110	MS24-0
	☒ = silver contacts (4A 250V AC15)	A99 contact - arrangement according customer request	

Z Spring return

R Friction brake

(P) Possibility of mounting potentiometer and encoder (Gessmann-types)

P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA
		P132	T396 2 x 1 kOhm	I max. 1 mA
		P133	T396 2 x 2 kOhm	I max. 1 mA
		P134	T396 2 x 5 kOhm	I max. 1 mA
		P135	T396 2 x 10 kOhm	I max. 1 mA
		More potentiometers on request!		

C Encoder C... Encoder see page 146

V62L S5 P T -01 Z P +03A R C -A05 P134 +A110 C01 -X

Axis 2: direction 3-4 left / Direction 7-8 right

(not applicable for V/VV61, V/VV61.1, V/VV64.1)

(Standard contacts gold-plated 2A 250 V AC15)

01	☐	2 contacts	Standard contact - arrangement see page 140	
02	☐	4 contacts	z.B.	
03	☐	6 contacts	A980	MS00
04	☐	8 contacts	A05	MS21
05	☐	10 contacts	A0500	MS21-00
06	☐	12 contacts	A110	MS24-0
		☒ = Silver contacts (4A 250 V AC15)	A99 contact - arrangement according customer request	

Z Spring return

R Friction brake

(P) Possibility of mounting potentiometer and encoder (Gessmann-types)

P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA
		P132	T396 2 x 1 kOhm	I max. 1 mA
		P133	T396 2 x 2 kOhm	I max. 1 mA
		P134	T396 2 x 5 kOhm	I max. 1 mA
		P135	T396 2 x 10 kOhm	I max. 1 mA
		More potentiometers on request!		

C Encoder C... Encoder see page 146

V62L S5 P T -01 Z P +03A R C -A05 P134 +A110 C01 -X

Special model

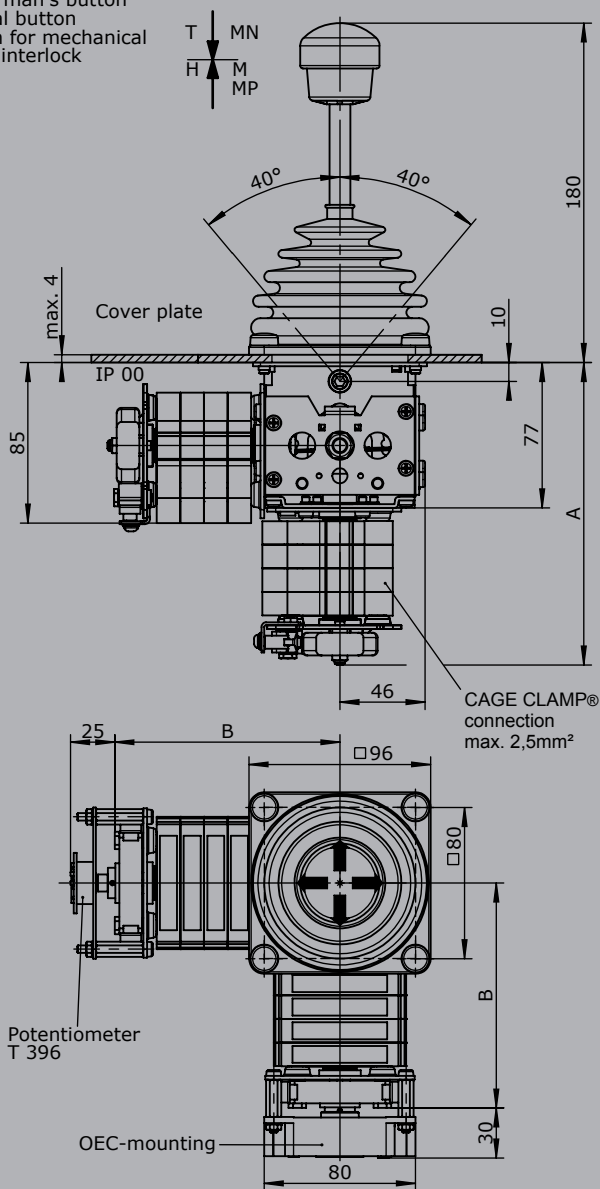
X Special /customer specified

Attachments

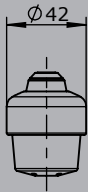
Indicating labels

Indicating labels with engraving

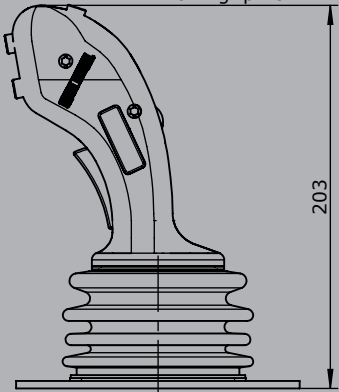
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock



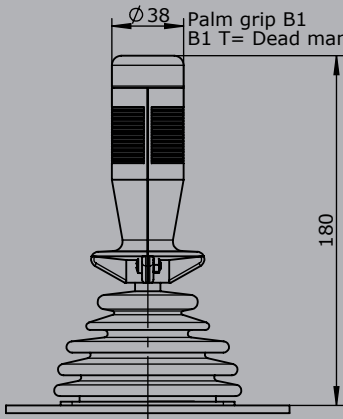
Knob solid
D= Push button



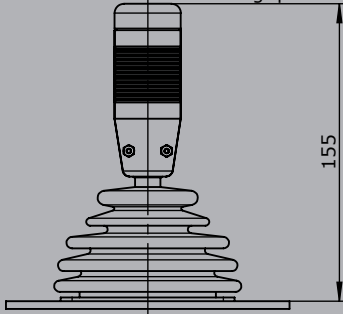
Palm grip B3



Ø 38 Palm grip B1
B1 T= Dead man's button



Palm grip B5



Type	No. of contacts	Dim. A	Dim. B
01	2	119	82
02	4	131	94
03	6	144	107
04	8	156	119
05	10	169	132
06	12	181	144

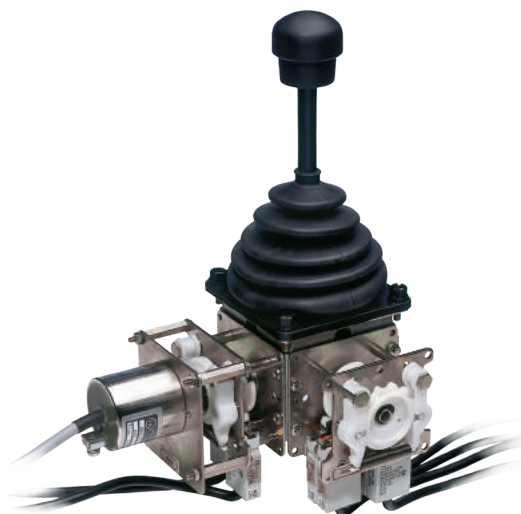
Multi-axis controller VA6



The multi-axis controller VA6 is available in either single-axis or multi-axis options and is a robust explosion proof controller used commonly in crane and hoisting applications. The modular design enables the switching device to be used universally. The VA6 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life VA6	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP54 front IP66 (microswitch and potentiometer)
Identifications	II 2G IIC T5 or T6 II 2D T85° or T95°C
Group of devices	II
Equipment category	2D and 2G
Certificate	OBAC 17 ATEX 0126X

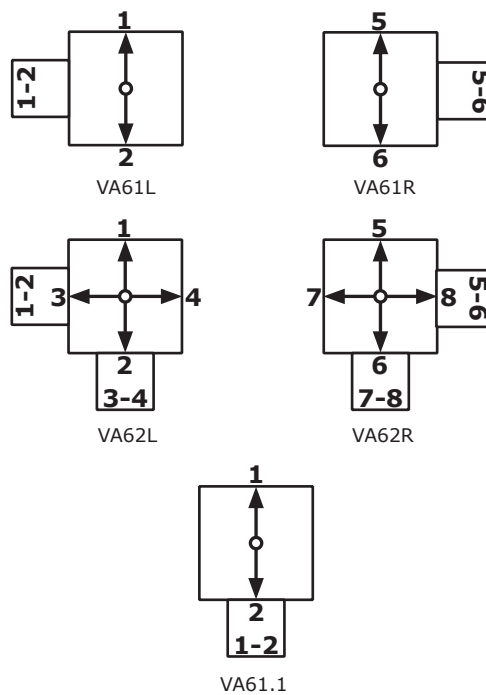


	VA62L	S5	P	T	-01 Z P	+03 R	-A05 P144	+A110
Basic unit								
VA62L 2-axis left								
Control-handle extended								
S5 -20 mm								
Gate								
P Cross gate								
Grip / palm grip								
T Dead man								
Axis 1 (direction 1-2)								
01 2 contacts								
Z Spring return								
P Potentiometer								
Axis 2 (direction 3-4)								
03 6 contacts								
R Friction brake								
Description axis 1 (direction 1-2)								
A05 Arrangement MS21								

Example

	VA62L	S5	P	T
Basic unit				
VA61L	1-axis left			
VA61R	1-axis right			
VA61.1	1-axis			
VA62L	2-axis left			
VA62R	2-axis right			
Control-handle extended				
	Standard 180 mm			
S3	-40 mm			
S5	-20 mm			
S8	+20 mm			
Gate				
P	Cross gate			
P X	Special gate			
Grip / palm grip				
	Knob (included in basic unit!)			
M	Mechanical zero interlock			
MN	Mechanical zero interlock (push down)			
T	Dead man			
H	Signal button			
D	Push button			
DV	Flush push button			

Identification of the installation variants with switching directions:



	VA62L	S5	P	T	-01 Z P	+ 03 R	A05	P144	+ A110
Axis 1: direction 1-2 left / direction 5-6 right									
	(contacts gold-plated 2A 250V AC15,  II 2G Ex d IIC T6, connecting cable 6 m)								
01	2 contacts				Standard contact - arrangement see page 140				
02	4 contacts				z.B.				
03	6 contacts				A980	MS00			
04	8 contacts				A05	MS21			
05	10 contacts				A0500	MS21-00			
06	12 contacts				A110	MS24-0			
					A99 contact - arrangement according customer request				
Z	Spring return								
R	Friction brake								
P	Potentiometer Ex	P144			T1350 2 x 5 kOhm	I max. 1 mA			
		P145			T1350 2 x 10 kOhm	I max. 1 mA			
					 II 2G Ex d IIC T6 Gb				
					Connecting cable 6 m				



VA62L S5 P T -01 Z P +03 R -A05 P144 +A110

Axis 2: direction 3-4 left / Direction 7-8 right

(not applicable for VA61, VA61.1)

(contacts gold-plated 2A 250 V AC15, II 2G Ex d IIC T6, connection cable 6 m)

01	2 contacts	Standard contact - arrangement see page 140	
02	4 contacts	z.B.	
03	6 contacts	A980	MS00
04	8 contacts	A05	MS21
05	10 contacts	A0500	MS21-00
06	12 contacts	A110	MS24-0
		A99 contact - arrangement according customer request	

Z Spring return

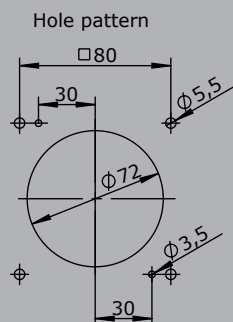
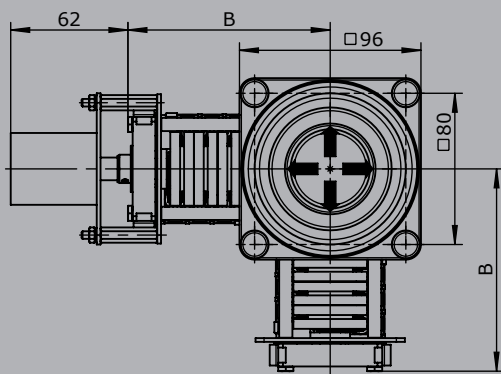
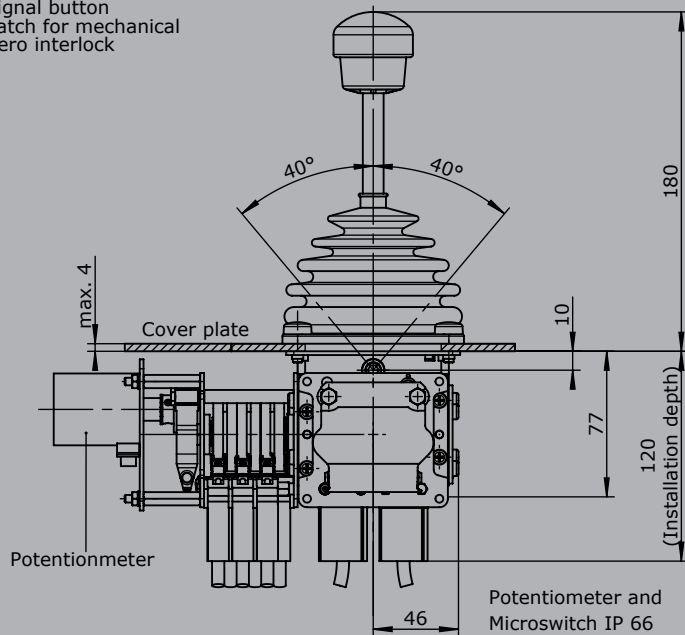
R Friction brake

P Potentiometer Ex

P144	T1350 2 x 5 kOhm	I max. 1 mA
P145	T1350 2 x 10 kOhm	I max. 1 mA

II 2G Ex d IIC T6 Gb
connection cable 6 m

T = Dead man's button
H = Signal button
M = Latch for mechanical
zero interlock



Type	No. of contacts	Dim. B
01	2	82
02	4	94
03	6	107
04	8	119
05	10	132
06	12	144

Multi-axis controller V11



The multi-axis controller V11 is a robust switching device for crane and hoisting applications. The modular design enables the switching device to be used universally. The V11 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	up to IP54 front



	V11L	S5	P	T	-01 Z P	+03A R	-A05 P324	+A110	-X
Basic unit									
V11L 2-axis left									
Control-handle extended									
S5 -20 mm									
Gate									
P Cross gate									
Grip / palm grip									
T Dead man									
Axis 1 (direction 1-2)									
01 2 contacts (2A 250 V AC15)									
Z Spring return									
P Potentiometer									
Axis 2 (direction 3-4)									
03A 6 contacts (4A 250 V AC15)									
R Friction brake									
Description axis 1 (direction 1-2)									
A05 Arrangement MS21									
P324 Potentiometer T365 2 x 5 kOhm									
Description axis 2 (direction 3-4)									
A110 Arrangement MS24-0									
Special model									
X Special / customer specified									

Combination possibilities with our handles



V11L S5 P T - 01 Z P + 03A R P - A05 P324 + A110 P325 - X

Basic unit

V11L 2-axis left
V11R 2-axis right
V11.1L 1-axis left
V11.1R 1-axis right

Control-handle extended

Standard 120 mm*
S5 -20 mm
S8 +20 mm

*Only available in combination with handle!

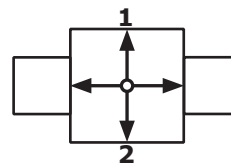
Gate

P Cross gate
P X Special gate

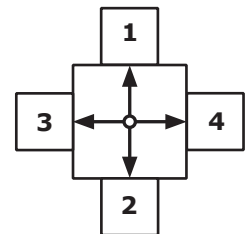
Grip / palm grip

Knob (included in basic unit!)
M Mechanical zero interlock
MN Mechanical zero interlock (push down)
T Dead man
H Signal button
D Push button
DV Flush push button
B... Palm grip B... (see page palm grip 157)

Identification of the installation variants with switching directions:



V11.1



V11

V11L S5 P T - 01 Z P + 03A R P - A05 P324 + A110 P325 - X

Axis 1: direction 1-2 left / direction 5-6 right

(Standard contacts gold-plated 2A 250 V AC15)

01	☐	2 contacts	Standard contact - arrangement see page 140		
02	☐	4 contacts	e.g.		
03	☐	6 contacts	A980	MS00	
			A05	MS21	
			A0500	MS21-00	
			A110	MS24-0	
			(Max. 4 steps per switching direction possible!)		
	☒	Silver contacts (4A 250 V AC15)	A99 contact - arrangement according customer request		
Z		Spring return			
R		Friction brake			
(P)		Possibility of mounting potentiometer and encoder (Gessmann-types)			
P		Potentiometer	P324	T365 2 x 5 kOhm	I max. 1 mA
			P325	T365 2 x 10 kOhm	I max. 1 mA
			More potentiometers on request!		
C		Encoder	C... Encoder see page 146		

V11L S5 P T - 01 Z P + 03A R P - A05 P324 + A110 P325 - X

Axis 2: direction 3-4 left / direction 7-8 right

(not applied for V11.1)

(Standard contacts gold-plated 2A 250 V AC15)

01	☐	2 contacts (2A 250V AC15)	Standard contact - arrangement see page 140		
02	☐	4 contacts (2A 250V AC15)	z.B.		
03	☐	6 contacts (2A 250V AC15)	A980	MS00	
			A05	MS21	
			A0500	MS21-00	
			A110	MS24-0	
			(Max. 4 steps per switching direction possible!)		
	☒	Silver contacts (4A 250 V AC15)	A99 contact - arrangement according customer request		
Z		Spring return			
R		Friction brake			
(P)		Possibility of mounting potentiometer and encoder (Gessmann-types)			
P		Potentiometer	P324	T365 2 x 5 kOhm	I max. 1 mA
			P325	T365 2 x 10 kOhm	I max. 1 mA
			More potentiometers on request!		
C		Encoder	C... Encoder see page 146		

V11L S5 P T - 01 Z P + 03A R P - A05 P324 + A110 P325 - X

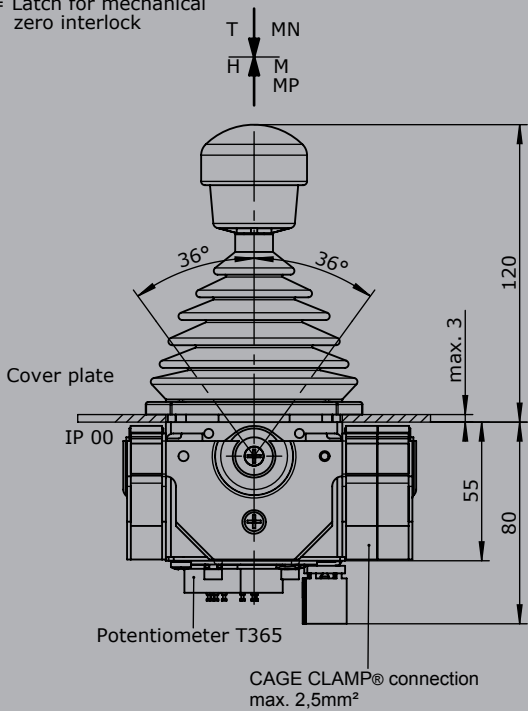
Special model

X Special / customer specified

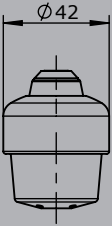
Attachments

Indicating labels
Indicating labels with engraving

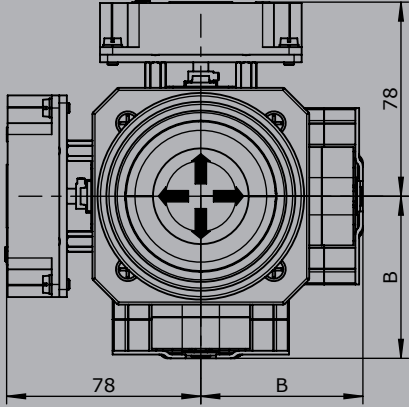
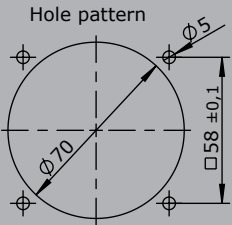
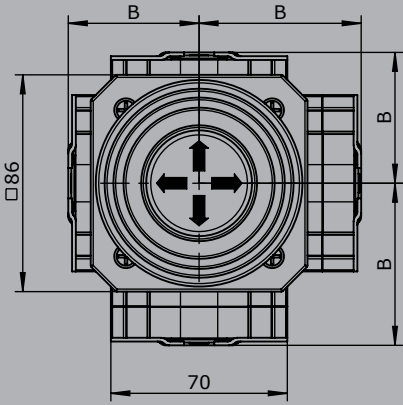
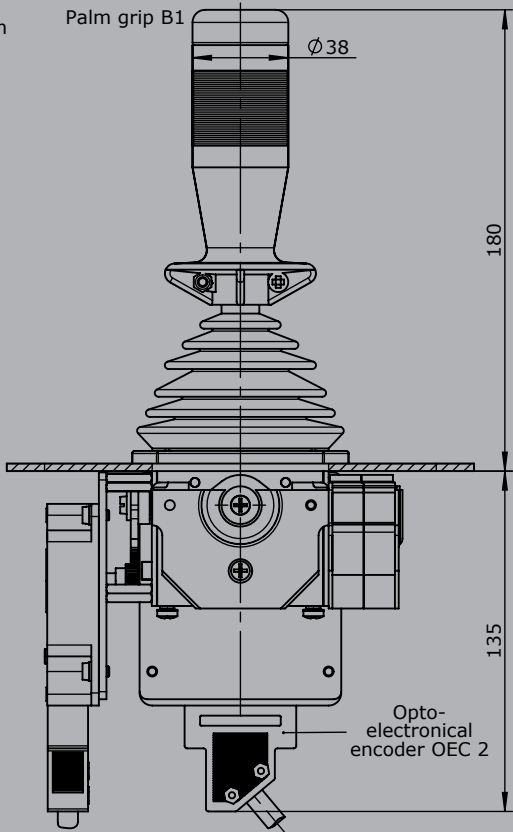
T = Dead man's button
H = Signalbutton
M = Latch for mechanical
zero interlock



Knob solid
D= Push button



Palm grip B1



Type	No. of contacts	Dim. B
01	2	51
02	4	64
03	6	76

Double-handle controller D85



The double-handle controller D85 is a robust switching device for hoisting applications. The modular design enables the switching device to be used universally. The double-handle controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.



Technical data

Mechanical life D85	8 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP54 front

	D85	S5	Q	/	Q	-Z	+R	-B	-E...	-S..	-X
Basic unit											
D85											
Control-handle extended											
Standard 160 mm*											
S5 -20 mm											
S8 +20 mm											
*Only available in combination with handle!											
Grip- control-handle left											
Knob											
M Mechanical zero interlock											
T Dead man											
H Signal button											
D Push button											
Q T-grip											
QD T-grip with push button side											
B10... Palm grip B10... (see page 197)											
Grip- control-handle right											
See grip-control-handle left											
Axis 1: direction 1-2 left											
Z Spring return											
R Friction brake											
Axis 2: direction 3-4 left											
Z Spring return											
R Friction brake											

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Double-handle controller
D85



	D85	S5	Q / Q	-Z	+R	-B	-E...	-S...	-X
Cover housing									
B	Cover housing								
Interface (description see following pages)									
E1xx	Voltage output								
E2xx	Current output								
E3xx	CAN-interface								
E4xx	CANOpen Safety								
E5xx	Profibus DP interface								
E6xx	Profinet								
E7xx	Profinet safe								
E8xx	PWM output								
E9xx	Other outputs								
Plug connectors									
S..	Standard plug connectors (see page 138)								
Special model									
X	Special/ customer specified								

Combination possibilities with our handles



Digital output			
Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Mounting depth A	85 mm		
Wiring	Cable 500mm long without plug connector		
	Optional with plug connector (standard plug connectors see page 138)		
2 direction signals + 1 zero position signal (galvanically isolated) per axis			S
	2 axis		E001 2

Voltage output (not stabilized)			
Supply voltage	4,75-5,25 V DC		
Current carrying capacity	Direction signal 8 mA		
Mounting depth A	85 mm		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (standard plug connectors see page 138)		
0,5...2,5...4,5V redundant + 2 direction signals per axis			S
	2 Achsen		E104 2
Output options			
Characteristic:			
	Inverse dual		1
	Dual		2
	Inverse dual with dead zone +/- 3° (standard)		3
	Dual with dead zone +/- 3°		4

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Voltage output

Supply voltage	9-32 V DC (*11,5-32)			
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA			
Mounting depth A	85 mm			
Wiring	Cable 500 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)			S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis				
	2 axis		E112 2	
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC				
	2 axis		E132 2	
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal				
	2 axis		E136 2	
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring				
	2 axis		E138 2	
Output options				
Characteristic:				
	Inverse dual *1		1	
	Dual *1		2	
	Inverse dual with dead zone +/- 3° *1 (standard)		3	
	Dual with dead zone +/- 3° *1		4	
*1 not combinable with output E136X and E138X				
	Single *2		5	
	Single with dead zone +/- 3° *2 (standard)		6	
*2 not combinable with output E112X and E132X				
Digital output signals:				
Output signals standard:				
Direction signals and zero position signals 1,5A 24 V DC				1
Voltage output with other value on request!				

Current output

Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA		
Mounting depth A	85 mm		
Wiring	Cable 500 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	2 axis	E206 2	
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	2 axis	E208 2	
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	2 axis	E214 2	
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	2 axis	E216 2	
+20...0...-20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal			
	2 axis	E226 2	
Output options			
	Single		5
	Single with dead zone +/- 3° (standard)		6
Digital output signals:			
Output signals standard:			
	Direction signals and zero position signals 1,5A 24 V DC		1

Current output with other value on request!

CAN

Supply voltage	9-36 V DC	
Idle current consumption	120 mA	
Current carrying capacity	Direction signal 100 mA Zero position signal 100 mA External digital output for LEDs 5-30 mA (dependent on the number of LED`s) Digital switching output (potential-free) 100 mA	
Mounting depth A	E3091: 85 mm E3091X: 105 mm E3101X - E3103X: 105 mm E3104X - E3105X: 125 mm	
Protocol	CANOpen CiA DS 301 or SAE J 1939	
Baud rate	125 kBit/s to 1 Mbit/s (standard 250 kBit/s)	
Output value	255...0...255	
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male) CAN (OUT) cable 300 mm with plug connector M12 (female) External in-/outputs cable 300 mm without plug connector External in-/outputs cable 300 mm without plug connector (additionally from 32 in-/outputs)	

Optional with plug connector (standard plug connectors see page 138)

S

CAN expansion stage 1

E309 1

- 7 analogue Joystickachsen
- 16 digitale Joystickfunktionen
- Input for capacitive sensor

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs 2
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs 3

External LED-outputs can be used in the grip for LEDs

*With the use of capacitive sensor, the external digital inputs reduce by one input!

CAN expansion stage 2

E310 1

- 10 analog joystick axis
- 16 digital joystick functions
- 2 inputs for capacitive sensor

With additional external in-/outputs

- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs 2
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs 3
- 24 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs 4
- 32 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs 5

External LED-outputs can be used in the grip for LEDs

*With the use of capacitive sensor, the external digital inputs reduce by one input!

Main-axis with additional digital-/analog outputs separately wired (not via CAN)

- 2 direction signals + 1 zero position signal (potential-free) per main-axis

Additional analog outputs on request!

CANopen Safety

Supply voltage	9-36 V DC
Idle current consumption	120 mA
Current carrying capacity	Direction signal 100 mA
	Zero position signal 100 mA
	External digital output for LEDs 5-30 mA (depending on the number of LED`s)
	Digital switching output (potential-free) 100 mA
Mounting depth A	E4091: 85 mm
	E4091X: 105 mm
	E4101X - E4103X: 105 mm
	E4104X - E4105X: 125 mm
Protocol	CAN Safety CIA 304
Baud rate	125 kBit/s to 1 MBit/s (Standard 250 kBits)
Output value	255...0...255
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male)
	CAN (OUT) cable 300 mm with plug connector M12 (female)
	External in-/outputs cable 300 mm without plug connector
	External in-/outputs cable 300 mm without plug connector (additionally from 32 in-/outputs)

Optional with plug connector (standard plug connectors see page 138)		S
CANOpen safety expansion stage 1		E409 1
- 7 analog joystick axis - 16 digital joystick functions - Input for capacitive sensor		
With additional external in-/outputs		
- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs		2
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs		3
External LED-outputs can be used in the grip for LEDs		
*With the use of capacitive sensor, the external digital inputs reduce by one input!		
CANOpen safety expansion stage 2		E410 1
- 10 analog joystick axis - 16 digital joystick functions		
With additional external in-/outputs		
- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs		2
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs		3
- 24 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs		4
- 32 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs		5
External LED-outputs can be used in the grip for LEDs		
*With the use of capacitive sensor, the external digital inputs reduce by one input!		
Main-axis with additional digital-/analog outputs separately wired (not via CAN)		
- 2 direction signals + 1 zero position signal (potential-free) per main-axis		3
Additional analog outputs on request!		

Profibus DP		
Supply voltage	18-30 V DC	
Baud rate	to 12 MBit/s	
Output value	0...128...255	
Mounting depth A	105 mm	
Wiring	Profibus, cable 100 mm with plug D-Sub 9	
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector	
	External in-/outputs, cable 300 mm long without plug connector	
Optional with plug connector (standard plug connectors see page 138)		S
Profibus DP		E501 1
- 4 analog joystick axis - 16 digital joystick function - Input for capacitive sensor		
With additional external in-/outputs		
- 8 external LED-output, 8 external digital input		2
- 16 external LED-output, 16 external digital input		3
External LED-outputs can be used in the grip for LEDs		
With additional contact equipment separately wired (not via profibus)		
- 2 direction contacts + 1 zero position contact (not potential-free) per main-axis		1
- 1 zero position contact (potential-free) per main-axis		2

1

Profinet			
Supply voltage	18-30 V DC		
Baud rate	to 100 MBit/s		
Output value	0...512...1023		
Mounting depth A	105 mm		
Verdrahtung	Profinet (1), cable 300 mm with M12 plug connector (female)		
	Profinet (2), cable 300 mm with M12 plug connector (female)		
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector		
	External in-/outputs, cable 300 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
Profinet		E601 1	
- 4 analog joystick axis			
- 16 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs		2	
- 16 external LED-outputs, 16 external digital inputs		3	
<i>*External LED-outputs can be used in the grip for LEDs</i>			
Main-axis with additional signals separately wired (not via profinet)			
- 2 direction signals + zero position signal (potential-free) per main-axis			3

Profinet Safe			
Supply voltage	18-30 V DC		
Baud rate	to 12 MBit/s		
Output value	0...512...1023		
Mounting depth A	105 mm		
Wiring	Profinet (1), cable 300 mm with M12 plug connector (female)		
	Profinet (2), cable 300 mm with M12 plug connector (female)		
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector		
	External in-/outputs, cable 300 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
- 4 analog joystick axis		E701 1	
- 16 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs		2	
- 16 external LED-outputs, 16 external digital inputs		3	
<i>*External LED-outputs can be used in the grip for LEDs</i>			
Main-axis with additional signals separately wired (not via profinet safe)			
- 2 direction signals + zero position signal (potential-free) per main-axis			3

PWM Outputs

Supply Voltage:	9-32V DC		
Valve control current:	max. 3 A		
PWM-frequency:	1225 Hz		
Dither frequency:	1...250 Hz adjustable		
Mounting depth A	85 mm		
Other features	Creep speed per axis 5 configurable switching outputs 2A LED outputs for status indication Input for redundant deadman		
Wiring:	Built-in socket Phoenix 2-pole (power supply) Cable 1 (PWM) 12 x 1mm² 300 mm long without plug Cable 2 (switching output) 12 x 1mm² 300 mm long without plug Cable 3 (creep speed / dead man) 14x0,25mm² 300mm long without plug Optional with plug connector (<i>standard plug connectors see page 138</i>)		
PWM Output 0-3 A for 2 proportional valve magnets per axis	1 axis 2 axis 3 axis 4 axis	E801 1 2 3 4	S

Other outputs

Voltage output for PVG32 0,25...0,5...0,75 Us, power supply 9-32 V DC			
Wiring:	Cable 14 x 0,25 mm² 300 mm long without plug connector		
	Optional with plug connector (standard plug connectors see page 138)		S
	2 axis	E907 2	
Main-axis with additional direction contacts per main-axis			4
8 Bit Gray-Code with direction signals per main-axis, supply voltage 9-36 V DC			
Wiring:	Cable 37 x 0,14 mm² 300 mm long without plug connector (axis 1+2)		
	Optional with plug connector (standard plug connectors see page 138)		S
	2 axis	E903 2	
8 Bit Binär-Code with direction signals per main-axis, supply voltage 9-36 V DC			
Wiring:	Cable 37 x 0,14 mm² 300 mm long without plug connector (axis 1+2)		
	Optional with plug connector (standard plug connectors see page 138)		S
	2 axis	E904 2	

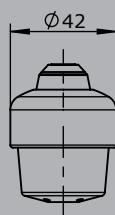
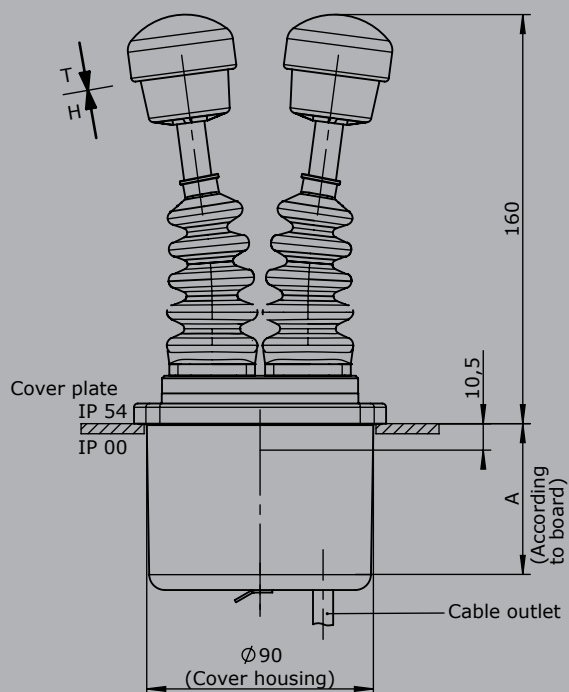
Attachments

Z01 Mating connector (CAN) M12 (male insert) with 2 m cable	20201140
Z02 Mating connector (CAN) M12 (female contact) with 2 m cable	20202298
Z03 Mating connector (Profibus) straight	22201440
Z04 Mating connector (Profibus) 90° angled	22201741
Z05 Mating connector (Profinet) M12 (male insert) with 2 m cable	5300000222

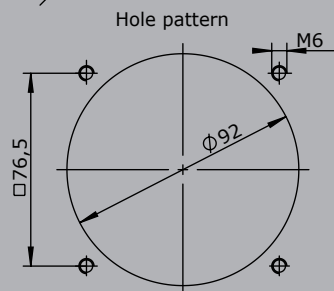
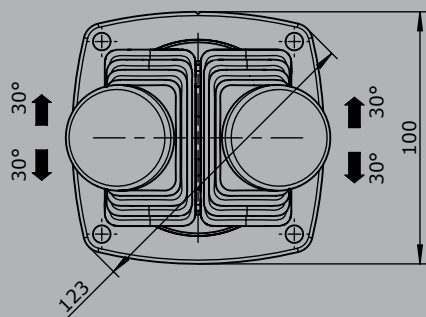
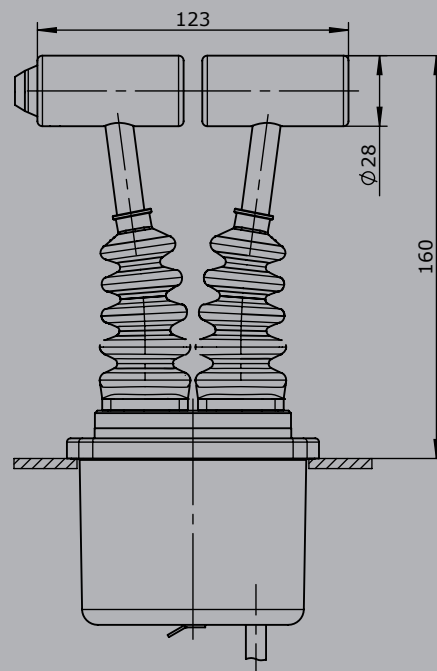
T = Dead man's button
H = Signal button

Knob solid
D = Push button

T - grip
D = Push button



To build in:
Direction 1-2
Direction 3-4



Double-handle controller D8



The double-handle controller D8 is a robust switching device for the hoisting applications. The modular design enables the switching device to be used universally. The double-handle controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

Technical data

Mechanical life D8	8 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	up to IP54 front



1

	D8	S5	Q / Q	-2ZP	+3 RP	-B	-A05 P184	+A050 P184	-E9012	-S...	-X
Basic unit											
D8											
Control-handle extended											
S5 -20 mm											
Grip- control-handle left											
Q T-grip											
Grip- control-handle right											
Q T-grip											
Axis 1 (direction 1-2)											
2 2 contacts (1,5A 24 V DC13)											
Z Spring return											
P Potentiometer											
Axis 2 (direction 3-4)											
3 3 contacts (1,5A 24 V DC13)											
R Friction brake											
P Potentiometer											
Cover housing											
B Cover housing											
Description axis 1 (direction 1-2)											
A05 Arrangement MSP21											
P184 Potentiometer T301 2 x 5 kOhm											
Description axis 2 (direction 3-4)											
A050 Arrangement MSP21-0											
P184 Potentiometer T301 2 x 5 kOhm											
Interface											
E9012 Potentiometer output for proportional valve PVG32											
Plug connector											
S... Standard plug connector (see page 138)											
Special model											
X Special / customer specified											

Technical details may vary based on configuration or application! Technical data subject to change without notice!

		D8	S5	Q / Q	-2 Z P	+3 R P	-B	-A05	P184	+A050	P184	-E9012	-X
Axis 1: direction 1-2 left													
1	1 contact	Standard contact - arrangement see page 140											
2	2 contacts	e.g.											
3	3 contacts	A98 A05 A050 <i>A99 contact - arrangement for customer request</i>											
Z	Spring return												
R	Friction brake												
(P)	Mounting options for potentiometer and encoder (Gessmann-types)												
P	Potentiometer	P181	T301 2 x 0,5 kOhm	I max. 1 mA									
		P182	T301 2 x 1 kOhm	I max. 1 mA									
		P183	T301 2 x 2 kOhm	I max. 1 mA									
		P184	T301 2 x 5 kOhm	I max. 1 mA									
		P185	T301 2 x 10 kOhm	I max. 1 mA									
		<i>More potentiometers on request!</i>											
H	Hall-potentiometer	E14811	0,5...2,5...4,5 V / 4,5...2,5...0,5 V										

Double-handle controller D8

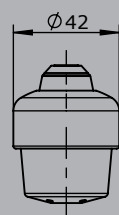
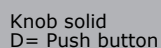


Combination possibilities with our handles



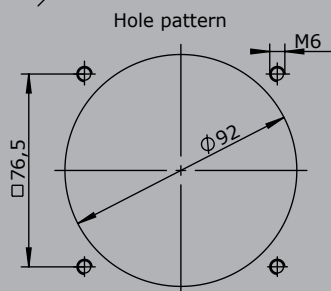
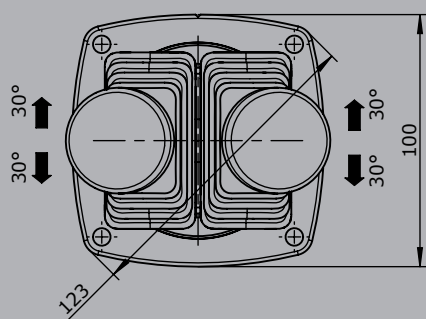
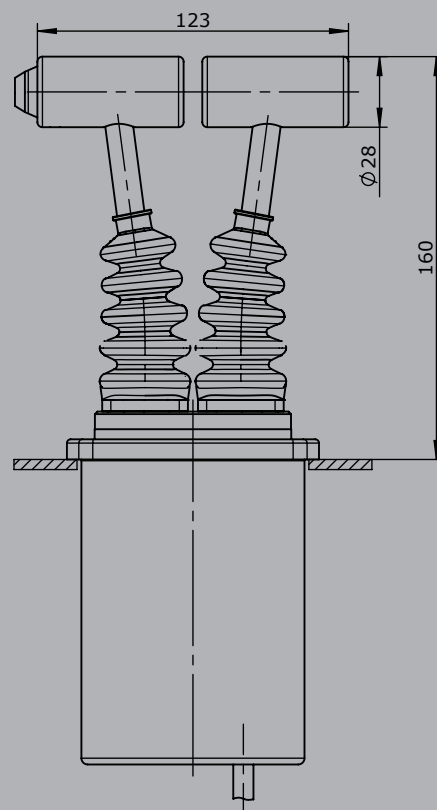
		D8	S5	Q / Q	-2 Z P	+3 R P	-B	A05 P184	+A050	P184	-E9012	-X
Axis 2: direction 3-4												
1	1 contacts	Standard contact - arrangement see page 140 e.g. A98 A05 A050 <i>A99 contact - arrangement for customer request</i>										
2	2 contacts											
3	3 contacts											
Z	Spring return											
R	Friction brake											
(P)	Mounting options for potentiometer and encoder (Gessmann-types)											
P	Potentiometer	P181	T301 2 x 0,5 kOhm	I max. 1 mA								
		P182	T301 2 x 1 kOhm	I max. 1 mA								
		P183	T301 2 x 2 kOhm	I max. 1 mA								
		P184	T301 2 x 5 kOhm	I max. 1 mA								
		P185	T301 2 x 10 kOhm	I max. 1 mA								
		<i>More potentiometers on request!</i>										
H	Hall-Potentiometer	E14811	0,5...2,5...4,5 V / 4,5...2,5...0,5 V									

		D8	S5	Q / Q	-2 Z P	+3 R P	-B	A05 P184	+A050 P184	-E9012	-X
Cover housing											
B	Cover housing										
Interface											
E901	1	Potentiometer output for proportional valve PVG32 0,25...0,5...0,75 Us						1 axis			
	2							2 axis			
Special model											
X	Special / customer specified										



To build in:
Direction 1-2
Direction 3-4

T - grip
D= Push button



Double-handle controller D64 / DD64



The double-handle controller D64/DD64 is available in either single-axis or multi-axis options and is a robust controller used commonly in electro-hydraulic applications. The modular design enables the switching device to be used universally. The double-handle controller is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life D64	10 million operating cycles
Mechanical life DD64	20 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	up to IP54 front



1

	D64	S5	Q	/	Q	-01 Z P	+03A R C	-A05 P134	+A110 C01	-X
Basic unit										
D64										
Control-handle extended										
S5 -20 mm										
Grip- control handle left										
Q T-grip										
Grip- control handle right										
Q T-grip										
Axis 1 (direction 1-2)										
01 2 contacts (2A 250 V AC15)										
Z Spring return										
P Potentiometer										
Axis 2 (direction 3-4)										
03A 6 contacts (4A 250 V AC15)										
R Friction brake										
C Opto-electronical encoder										
Description axis 1 (direction 1-2)										
A05 Arrangement MSP21										
P134 Potentiometer T396 2 x 5 kOhm										
Description axis 2 (direction 3-4)										
A110 Arrangement MSP 24-0										
C01 OEC 2-1-1										
Special model										
X Special / customer specified										

Double-handle controller D64 / DD64



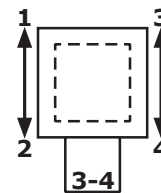
Combination possibilities with our handles



1

	D64	S5	Q	/	Q	-01 Z P	+03 A R C	-A05	P134	+A110	C01	-X
Basic unit												
D64												
Reinforced version												
DD64												
Control-handle long												
Standard 180 mm*												
S5 -20 mm												
S8 +20 mm												
*Only in combination with knob!												
Grip- control handle left												
Knob												
M Mechanical zero interlock												
T Dead man												
H Signal button												
D Push button												
DV Flush push button												
Q T-grip												
QM T-grip with mechanical zero interlock												
QMH T-grip with mechanical zero interlock + signal contact												
QH T-grip + signal button												
QD T-grip + push button side												
B10 Palm grip B10... (see page 197)												
Grip- control handle right												
Knob												
M Mechanical zero interlock												
T Dead man												
H Signal button												
D Push button												
DV Flush push button												
Q T-grip												
QM T-grip with mechanical zero interlock												
QMH T-grip with mechanical zero interlock + signal contact												
QH T-grip with signal button												
QD T-grip push button side												
B10... Palm grip B10... (see page 197)												

Identification of the installation variants with switching directions:



D64 / DD64

D64 S5 Q / Q -01 Z P +03 A R C -A05 P134 +A110 C01 -X

Axis 1: direction 1-2

(Standard contacts gold-plated 2A 250 V AC15)

01	☐	2 contacts	Standard contacts - see arrangement page 140 e.g. A980 MS00 A05 MS21 A0500 MS21-00 A110 MS24-0 A99 contact - arrangement according customer request	
02	☐	4 contacts		
03	☐	6 contacts		
04	☐	8 contacts		
05	☐	10 contacts		
06	☐	12 contacts		
A = Silver contact (4A 250 V AC15)				

Z Spring return

R Friction brake

(P) Mounting options for potentiometer and encoder (Gessmann-types)

P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA
		P132	T396 2 x 1 kOhm	I max. 1 mA
		P133	T396 2 x 2 kOhm	I max. 1 mA
		P134	T396 2 x 5 kOhm	I max. 1 mA
		P135	T396 2 x 10 kOhm	I max. 1 mA
		More potentiometers on request!		

C Encoder C... Encoder see page 146

Axis 2: direction 3-4

(Standard contacts gold plated 2A 250 V AC15)

01	☐	2 contacts	Standard contact - see arrangement on page 140 e.g. A980 MS00 A05 MS21 A0500 MS21-00 A110 MS24-0 A99 contact - arrangement according customer request	
02	☐	4 contacts		
03	☐	6 contacts		
04	☐	8 contacts		
05	☐	10 contacts		
06	☐	12 contacts		
A = Silver contacts (4A 250 V AC15)				

Z Spring return

R Friction brake

(P) Mounting options for potentiometer and encoder (Gessmann-types)

P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA
		P132	T396 2 x 1 kOhm	I max. 1 mA
		P133	T396 2 x 2 kOhm	I max. 1 mA
		P134	T396 2 x 5 kOhm	I max. 1 mA
		P135	T396 2 x 10 kOhm	I max. 1 mA
		More potentiometers on request!		

C Encoder C... Encoder see page 146

Double-handle controller
D64 / DD64



D64 S5 Q / Q -01 Z P +03 A R C -A05 P134 +A110 C01 -X

Special model

X Special / customer specified

Attachments

Indicating labels

Indicating labels engraved

1

Double-handle controller D3



The double-handle controller D3 is a robust switching device for nautical navigation applications. The modular design enables the switching device to be used universally. The double-handle controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.



1

Technical data

Mechanical life D3	12 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP66 front

	D3	S5	Q / Q	-2 R P	+3 R P	-B	-A05 P484	+A05 P484	-E1292	-S...	-X
Basic unit											
D3											
Control-handle extended											
S5 -20 mm											
Grip- control handle left											
Q T-grip											
Grip- control handle right											
Q T-grip											
Axis 1 (direction 1-2)											
2 2 contacts (1,5A 24 V DC13)											
R Friction brake											
P Potentiometer											
Axis 2 (direction 3-4)											
3 3 contacts (1,5A 24 V DC13)											
R Friction brake											
P Potentiometer											
Cover housing											
B Cover housing											
Description axis 1 (direction 1-2)											
A05 Arrangement MSP21											
P484 Potentiometer T318 2 x 5 kOhm											
Description axis 2 (direction 3-4)											
A050 Arrangement MSP21-0											
P484 Potentiometer T318 2 x 5 kOhm											
Interface											
E1292 Voltage output 0...5...10 V											
Plug connectors											
S.. Standard plug connectors (see page 138)											
Special model											
X Special / customer specified											

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Double-handle controller

D3

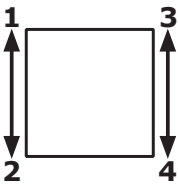


Combination possibilities with our handles



	D3	S5	Q / Q	-	2 R P	+	3 R P	-	B	-	A05	P484	+	A050	P484	-	E1292	-	X
Basic unit																			
D3																			
Control-handle extended*																			
Standard 148 mm*																			
S5 -20 mm																			
S8 +20 mm																			
*Only available in combination with handle!																			
Grip-control-handle left																			
Knob																			
D Push button																			
Q T-grip																			
QD T-grip with push button side																			
Grip-control-handle right																			
Knob																			
D Push button																			
Q T-grip																			
QD T-grip with push button side																			

Identification of the installation variants with switching directions:



D3

	D3	S5	Q / Q	-	2 R P	+	3 R P	-	B	-	A05	P484	+	A050	P484	-	E1292	-	X
Axis 1: direction 1-2 left																			
1 1 contact																			
2 2 contacts																			
3 3 contacts																			
R Friction brake																			
(P) Mounting options for potentiometer and (Gessmann-types)																			
P Potentiometer																			
H Hall-Potentiometer																			

Technical details may vary based on configuration or application! Technical data subject to change without notice!

D3 S5 Q / Q - 2 R P + 3 R P - B - A05 P484 + A050 P484 - E1292 - X

Axis 2: direction 3-4 left

1	1 contact	Standard contact- arrangement see page 140		
2	2 contacts	e.g.		
3	3 contacts	A98	MS0	
		A05	MS21	
		A050	MS21-0	
		A99 contact - arrangement according customer request		
R	Friction brake			
(P)	Mounting options for potentiometer (Gessmann-types)			
P	Potentiometer	P484	T318 2 x 5 kOhm	I max. 1 mA
		More potentiometers on request!		
H	Hall-Potentiometer	E14811	0,5...2,5...4,5 V / 4,5...2,5...0,5 V	

D3 S5 Q / Q - 2 R P + 3 R P - B - A05 P484 + A050 P484 - E1292 - X

Cover housing

B Cover housing

Interface (description the following pages)

Potentiometer output
E1xx Voltage output
E2xx Current output

Special model

X Special / customer specified

Voltage outputs

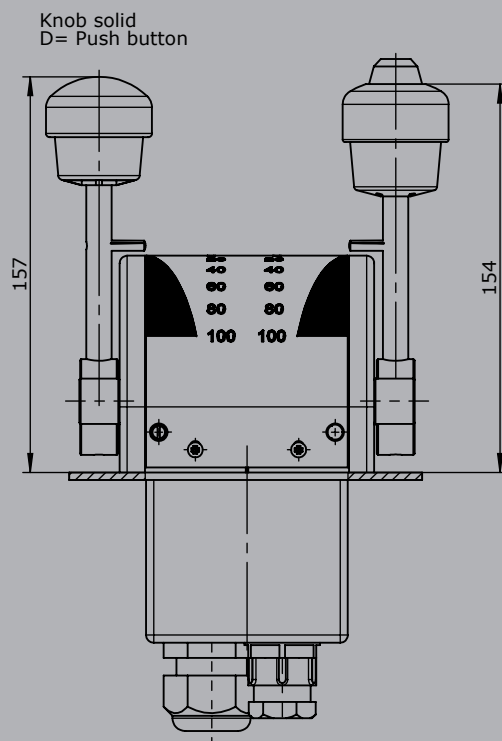
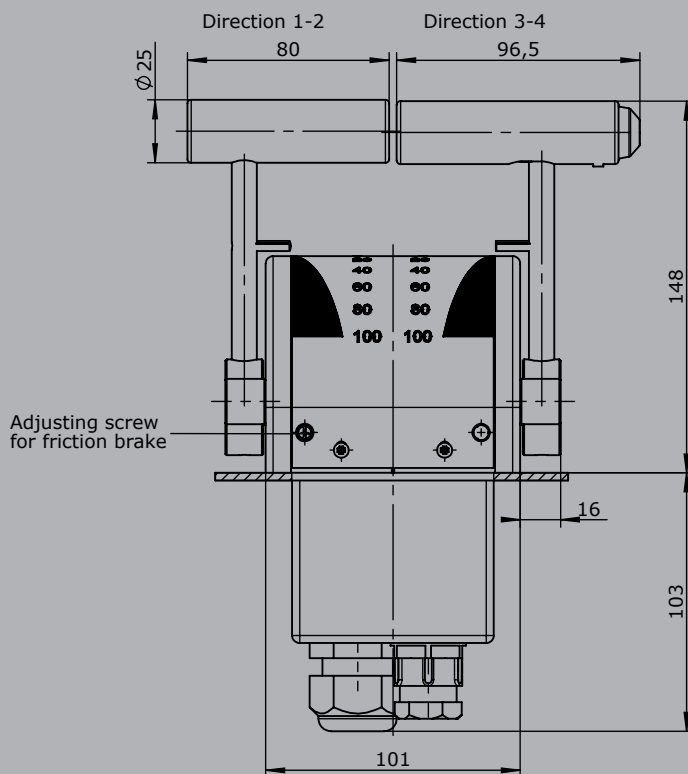
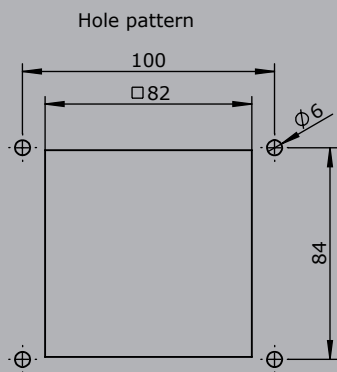
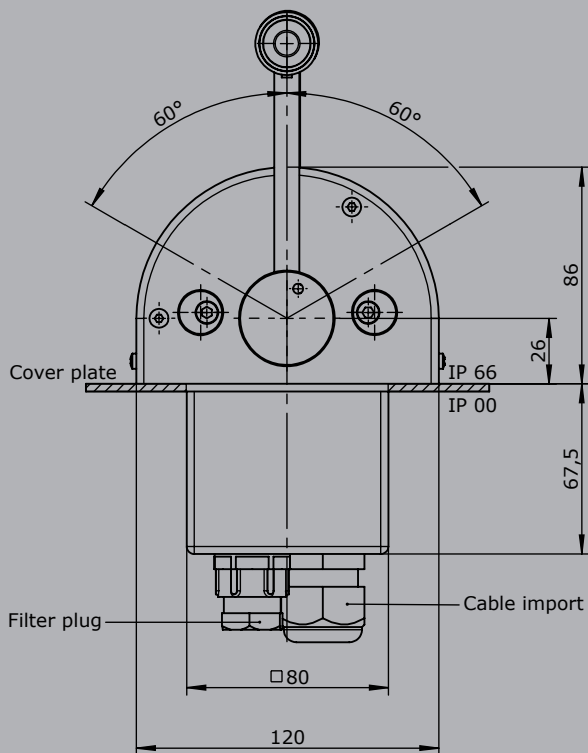
Supply voltage	11,5-32 V DC		
Wiring	Cable 300 mm long without plug connector		
	Optional with plug connector (standard plug connectors see page 138)		
0...5...10 V per axis	1 axis	E129	1
	2 axis		2
10...0...10 V per axis	1 axis	E141	1
	2 axis		2
-10...0...+10 V per axis	1 axis	E140	1
	2 axis		2
Voltage output with other value on request!			

Current outputs			
Supply voltage	18-36 V DC		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
4...12...20 mA per axis	1 axis	E209 1	S
	2 axis	2	
20...4...20 mA per axis	1 axis	E217 1	
	2 axis	2	

Double-handle controller D3



T- grip
D=Push button



Single-axis controller S11



The single-axis controller S11 is a hall sensor switching device designed for electro-hydraulic and remote controlled hydraulic. The modular design of the switching device is universally applicable. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

Technical data

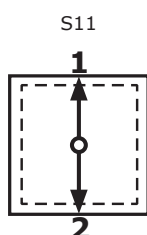
Mechanical life S11	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP65, electronic assembly IP67



1

	S11	T	- Z	- E...	- S...	- X
<i>Example</i>						
Basic unit						
S11 1-axis						
Grip / palm grip						
Knob (standard)						
M Mechanical zero interlock						
T Dead man						
D Push button						
GS8 Knob GS8						
Z Spring return <i>(included in basic unit!)</i>						
R Friction brake						
Interface <i>(description on the following page)</i>						
E0xx Digital output						
E1xx Voltage output						
E2xx Current output						
Plug connectors						
S.. Standard plug connectors <i>(see page 138)</i>						
Special model						
X Special / customer specified						

Identification of the installation variants with switching directions:



Digital Output

Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
Cable 500mm long with plug (male)		
	1 axis	E001 1

Voltage output (not stabilized)

Supply voltage	4,75-5,25 V DC	
Current carrying capacity	Direction signal 8 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
0,5...2,5...4,5V redundant + 2 direction signals		
	1 axis	E104 1
	Output options	
	Characteristic:	
	Inverse dual	1
	Dual	2
	Inverse dual with dead zone +/- 3° (standard)	3
	Dual with dead zone +/- 3°	4

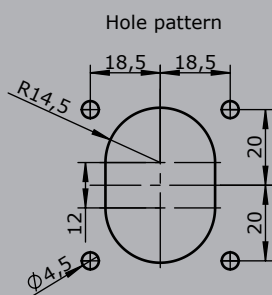
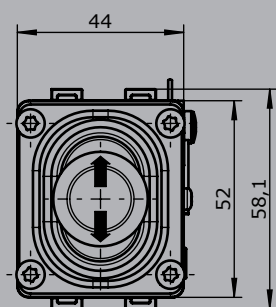
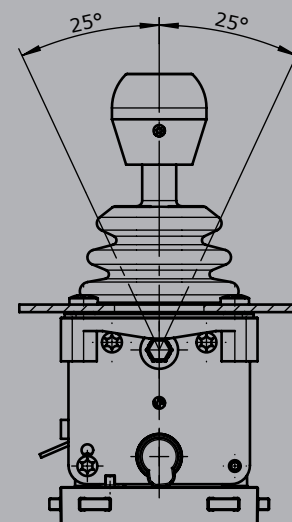
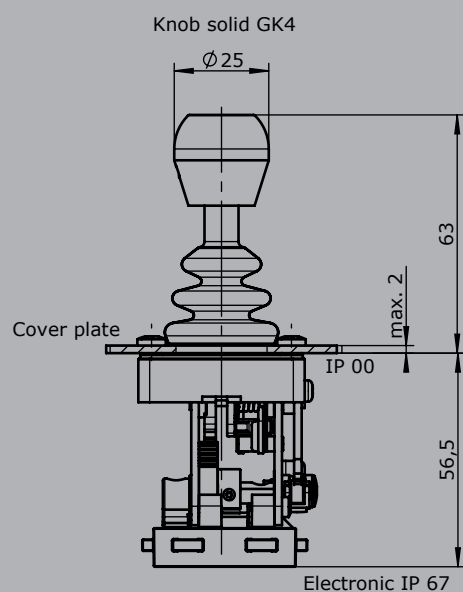
Voltage output

Supply voltage	9-32 V DC (*11,5-32 V)	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated)		
	1 axis	E112 1
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC		
	1 axis	E132 1
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal		
	1 axis	E136 1
	Output options	
	Characteristic:	
	Inverse dual *1	1
	Dual *1	2
	Inverse dual with dead zone +/- 3° *1 (standard)	3
	Dual with dead zone +/- 3° *1	4
	*1 not combinable with output E136X	
	Single *2	5
	Single with dead zone *2 (standard)	6
	*2 not combinable with output E112X and E132X	

Voltage output with other value on request!

1

T = Dead man's button



Single-axis controller

S1



The single-axis controller S1 is a robust switching device for remote control and eletro-hydraulic applications. The modular design of the switching device is universally applicab-
le. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels,
UV radiation typically from the sun.

Technical data

Mechanical life S1	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP65



1

		Example				
		S1	T	- 2 Z P	- A05 P374	- X
Basic unit						
S1	1-axis					
Grip / palm grip						
T	Dead man					
Axis 1 (direction 1-2)						
2	2 contacts (1,5A 24 V DC13)					
Z	Spring return					
P	Potentiometer					
Description axis 1 (direction 1-2)						
A05	Arrangement MSP21					
P374	Potentiometer T 375 2 x 5 kOhm					
Special model						
X	Special / customer specified					

S1 T - 2 Z P - A05 P374 - X

Basic unit

S1 1-axis

Grip / palm grip

Knob (standard)
M Mechanical zero interlock
T Dead man
D Push button
GS8 Knob GS8

S1 T - 2 Z P - A05 P374 - X

Axis 1: direction 1-2 left

1	1 contact	Standard contact - arrangement see page 140		
2	2 contacts	z.B.		
3	3 contacts	A05	MS21	
4	4 contacts	A050	MS21-0	
		A060	MS22-0	
		A99 contact - arrangement according customer request		
Z	Spring return (included in basic unit!)			
R	Friction brake			
P	Potentiometer	P372	T375	2 x 1 kOhm I max. 1 mA
		P374	T375	2 x 5 kOhm I max. 1 mA
		P274	T430	2 x 5 kOhm I max. 1 mA

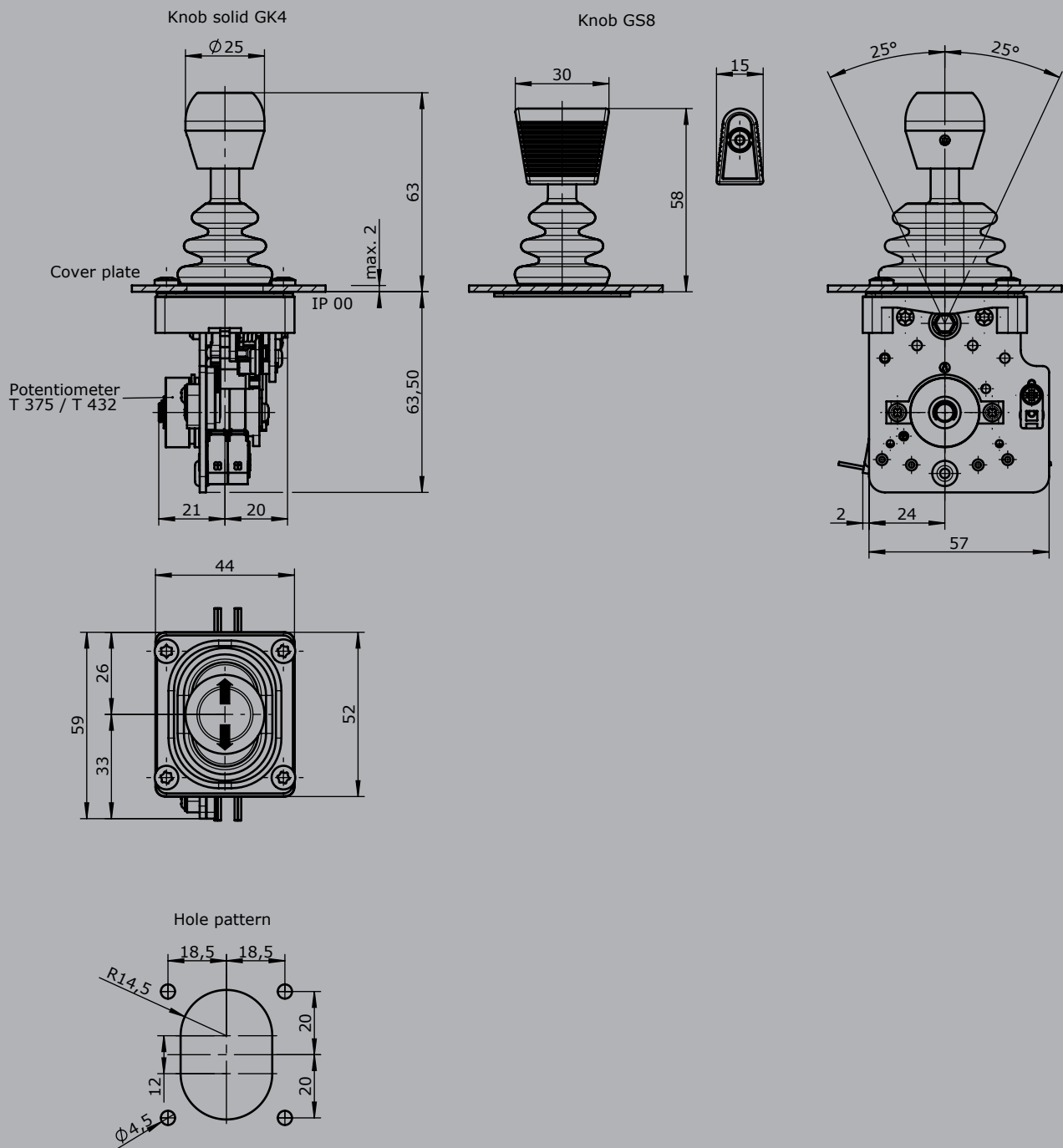
With direction track

S1 T - 2 Z P - A05 P374 - X

Special model

X Special / customer specified

T = Dead man's button



The thumbwheel S12 is designed for electro-hydraulic applications. By the combination of different lighting options and colours you can customise the appearance.

Technical data

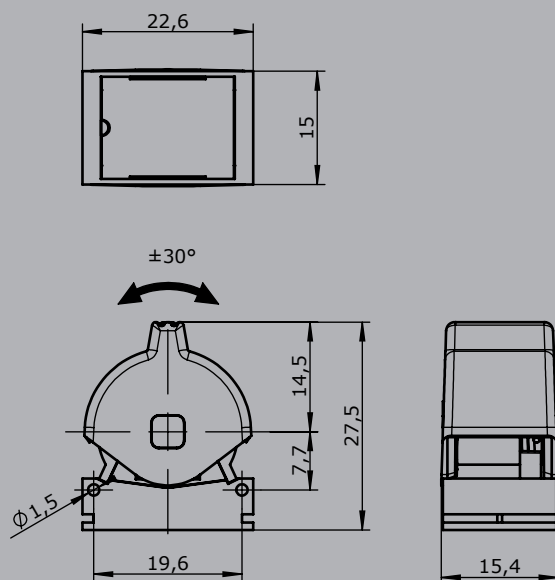
Mechanical life S12	5 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP67
Functional safety	PLd (EN ISO 13849) possible



	S12	- 2	- 1	-1	-E1031	-X
Basic unit						
S12	Thumbwheel S12					
S12A	Thumbwheel S12 with mounting frame					
Illumination						
1	Unlighted					
2	Functional lighting 2-colour red-green (separate switchable) U_LED= 4,5 - 5,5 V					
3	Functional lighting 2-colour white-red (separate switchable) U_LED= 4,5 - 5,5 V					
4	Functional lighting 2-colour white-green (separate switchable) U_LED= 4,5 - 5,5 V					
Actuator colour						
1	Black					
2	Grey					
3	Blue					
4	Red					
5	Yellow					
6	Orange					
Mechanical function						
1	T-0-T					
2	R-0-R					
3	T-0-R					
4	R-0-T					
5	R-R					
6	R-R-0-R-R					
Interface						
E1031	0,5...2,5...4,5 V redundant by U _B = 5 V					
1	Output option inverse dual					
2	Output option dual					
Special model						
X	Special / customer specified					

Technical details may vary based on configuration or application! Technical data subject to change without notice!

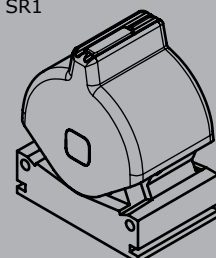
S12 without mounting frame



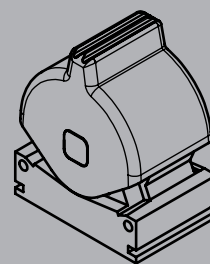
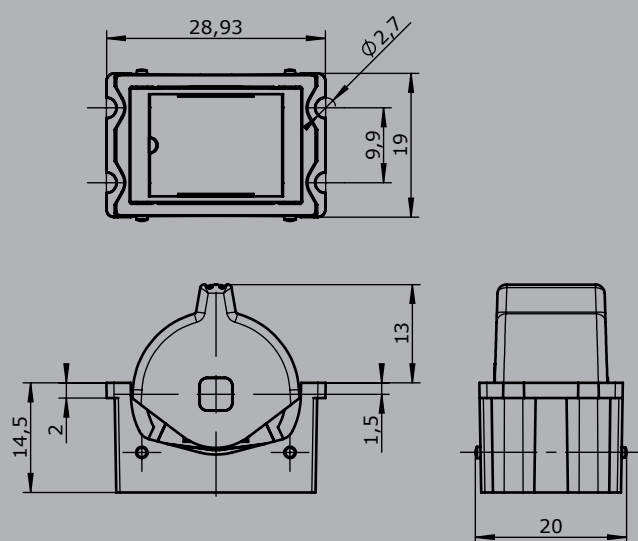
S12 with LED

SR1

SR2



S12 with mounting frame



Single-axis controller S9



The single-axis controller S9 is a hallsensor switching device designed for electro-hydraulic applications. Due to its small size, the S9 is particularly suitable for installation in our ball handles. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.



Technical data

Mechanical life S9	5 million operating cycles
Operating force	1,6 to 3,5N
Supply voltage	5V DC stabilized
Operating temperature	-40°C to +85°C
Degree of protection	IP67

Example
S9

- E10311

- X

Basic unit

S9

Interface

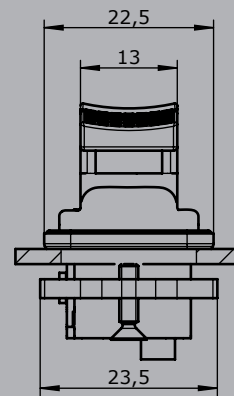
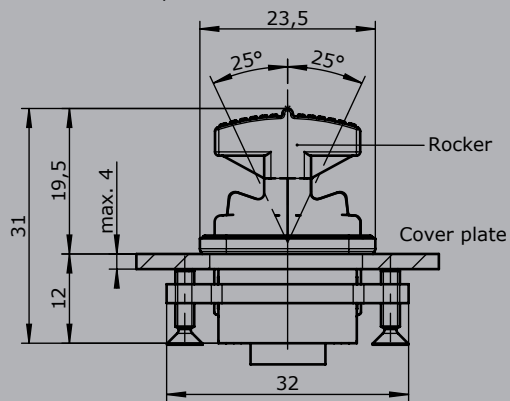
E1031 0,5...2,5...4,5 V redundant by $U_b = 5\text{ V}$

- 1 Output option inverse dual
- 2 Output option dual

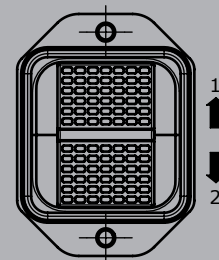
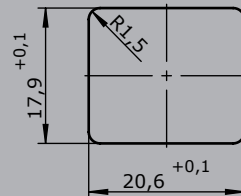
Special model

X Special / customer specified

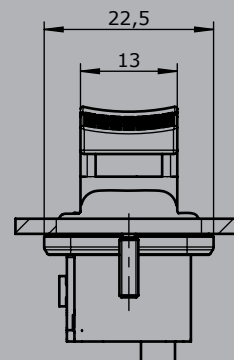
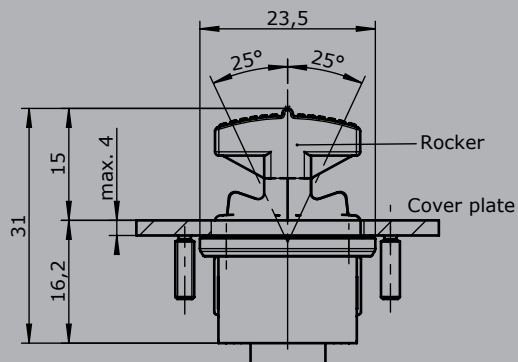
Installed from the top



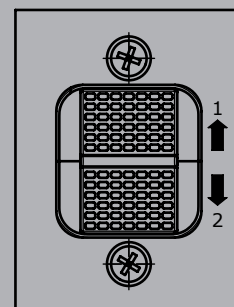
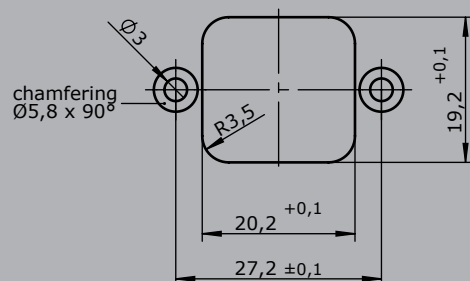
Hole pattern
(installed from the top)



Installed from below



Hole pattern
(installed from below)



Single-axis controller S26



The single-axis controller S26 is a hall sensor switching device designed for electro-hydraulic and remote controlled hydraulic. The modular design of the switching device is universally applicable. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

Technical data

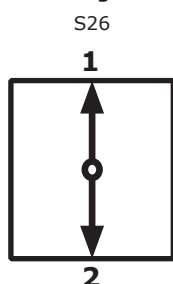
Mechanical life S26	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP54, electronic assembly IP67



	S26	T	- Z	- E...	- S...	- X
Basic unit						
S26	1-axis					
Grip / palm grip						
	Knob					
M	Mechanical zero interlock					
T	Dead man					
H	Signal button					
D	Push button					
B...	Palm grip B... (on request!)					
Z	Spring return					
R	Friction brake					
Interface (description on the following pages)						
E0xx	Digital output					
E1xx	Voltage output					
E2xx	Current output					
Plug connectors						
S..	Standard plug connectors (see page 138)					
Special model						
X	Special / customer specified					

Identification of the installation variants

with switching directions:



Technical details may vary based on configuration or application! Technical data subject to change without notice!

Digital output			
Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
2 direction signals + 1 zero position signal (galvanically isolated)			
	1 axis	E001 1	

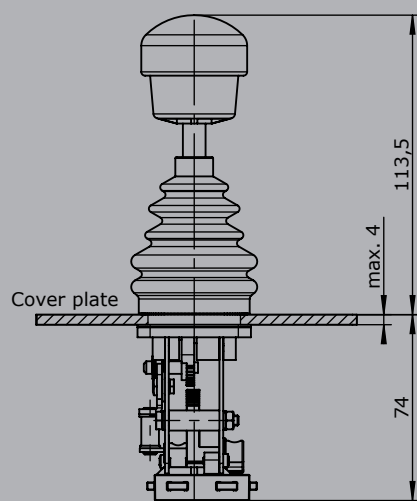
Voltage output (not stabilized)			
Supply voltage	4,75-5,25 V DC		
Current carrying capacity	Direction signal 8 mA		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
0,5...2,5...4,5 V redundant + 2 direction signals			
	1 axis	E104 1	
Output options			
Characteristic:			
	Inverse dual		1
	Dual		2
	Inverse dual with dead zone +/- 3° (standard)		3
	Dual with dead zone +/- 3° *1		4

Voltage output			
Supply voltage	9-32 V DC (*11,5-32 V)		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated)			
	1 axis	E112 1	
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC			
	1 axis	E132 1	
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal			
	1 axis	E136 1	
Output options			
Characteristic:			
	Inverse dual *1		1
	Dual *1		2
	Inverse dual with dead zone +/- 3° *1 (standard)		3
	Dual with dead zone +/- 3° *1		4
*1 not combinable with output E136X			
	Single *2		5
	Single with dead zone *2 (standard)		6
*2 not combinable with output E112X and E132X			
Voltage output with other value on request!			

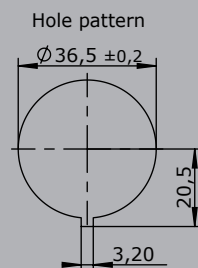
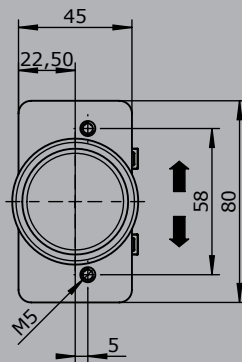
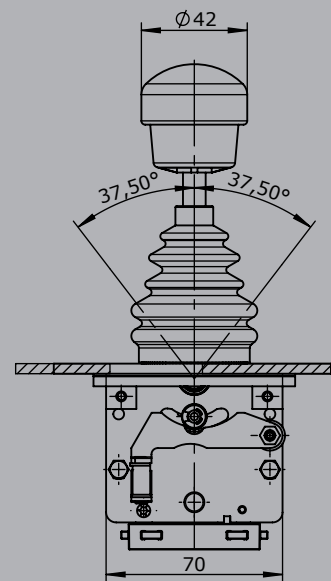
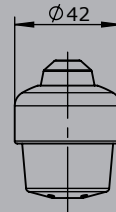
Current output

Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal	1 axis	E206 1	
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal	1 axis	E208 1	
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal	1 axis	E214 1	
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal	1 axis	E216 1	
	Output options		
	Single		5
	Single with dead zone +/-3° (standard)		6
<i>Current output with other value on request!</i>			

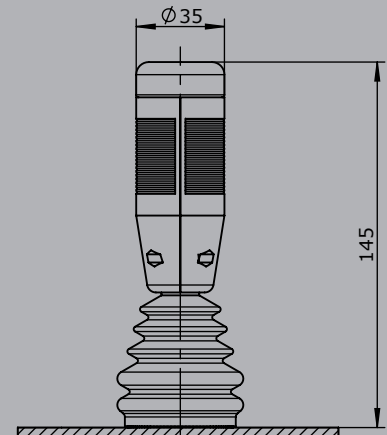
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock



Knob solid
D = Push button



Palm grip B5
B5 T = Dead man's button



Single-axis controller S27



The single-axis controller S27 is a hall sensor switching device designed for electro-hydraulic and remote controlled hydraulic. The modular design of the switching device is universally applicable. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

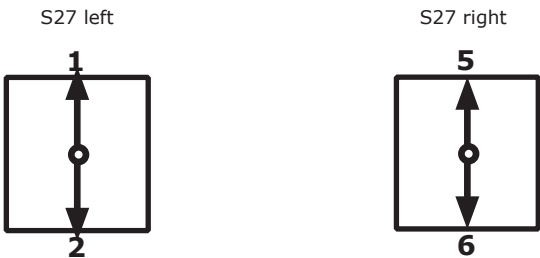
Technical data

Mechanical life S27	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP65, electronic assembly IP67



	S27L	M	- Z	- E...	- S...	- X
Basic unit						
S27L left						
S27R right						
Grip / palm grip						
Knob (standard)						
M Mechanical zero interlock						
Q T-grip						
Z Spring return						
R Friction brake						
Interface (description on the following pages)						
E0xx Digital output						
E1xx Voltage output						
E2xx Current output						
Plug connectors						
S.. Standard plug connectors (see page 138)						
Special model						
X Special / customer specific						

Identification of the installation variants with switching directions:



Technical details may vary based on configuration or application! Technical data subject to change without notice!

Digital Output

Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
2 direction signals + 1 zero position signal (galvanically isolated)		
	1 axis	E001 1

Voltage output (not stabilized)

Supply voltage	4,75-5,25 V DC	
Current carrying capacity	Direction signal 8 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
0,5...2,5...4,5 V redundant + 2 direction signals		
	1 axis	E104 1
Output options		
Characteristic:		
Inverse dual		1
Dual		2
Inverse dual with dead zone +/- 3° (standard)		3
Dual with dead zone +/- 3°		4

Voltage output

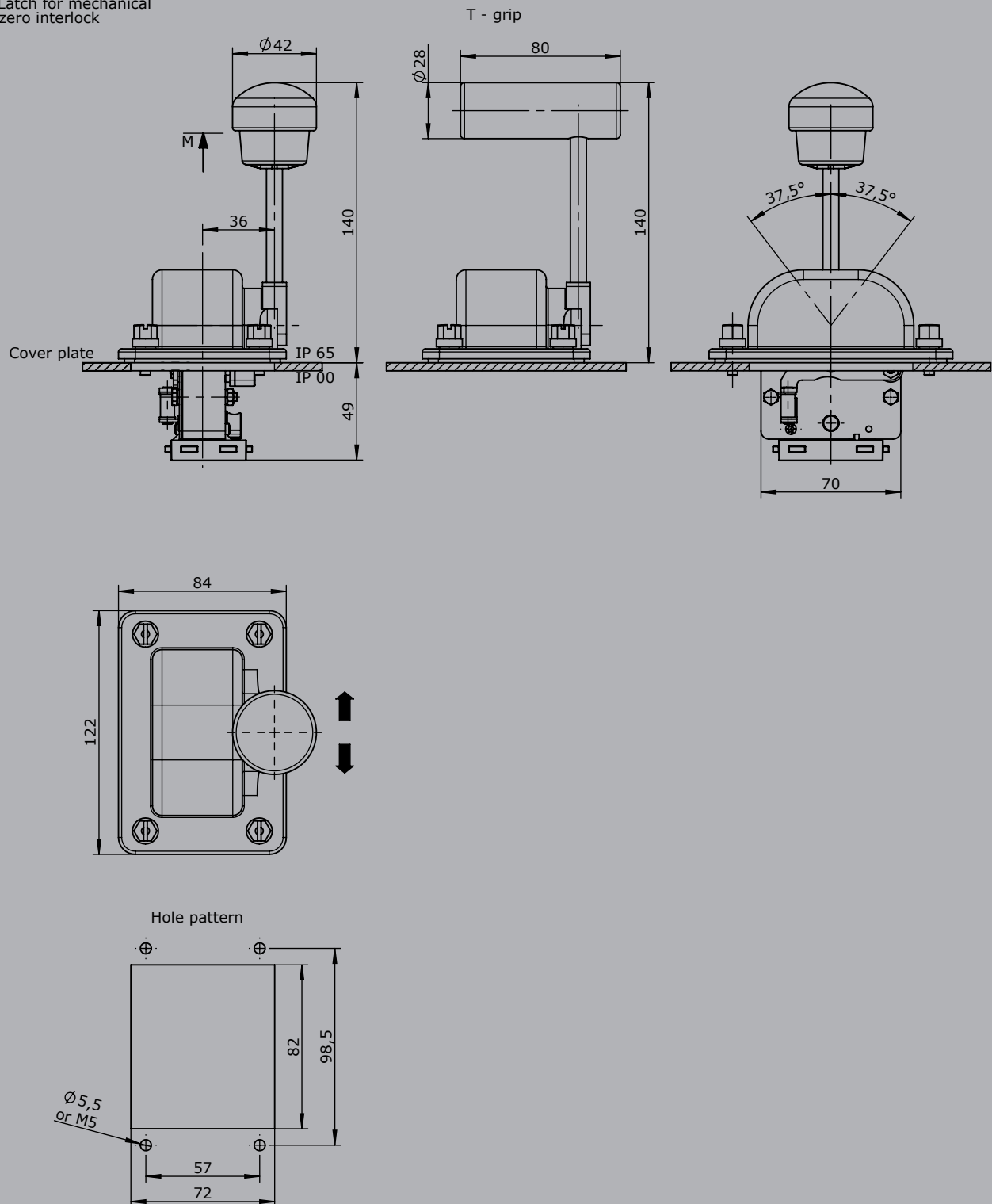
Supply voltage	9-32 V DC (*11,5-32 V)	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated)		
	1 axis	E112 1
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC		
	1 axis	E132 1
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal		
	1 axis	E136 1
Output options		
Characteristic:		
Inverse dual *1		1
Dual *1		2
Inverse dual with dead zone +/- 3° *1 (standard)		3
Dual with dead zone +/- 3° *1		4
*1 not combinable with output E136X		
Single *2		5
Single with dead zone *2 (standard)		6
*2 not combinable with output E112X and E132X		

Voltage output with other value on request!

1

Current output			
Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal			
	1 axis		E206 1
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal			
	1 axis		E208 1
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal			
	1 axis		E214 1
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal			
	1 axis		E216 1
Output options			
	Single		5
	Single with dead zone +/-3° (standard)		6
Current output with other value on request!			

M = Latch for mechanical
zero interlock



Single-axis controller S2 / SS2 / S21



The single-axis controller S2/SS2 is a robust switching device for remote controlled and electrohydraulic applications. The modular design of the switching device is universally applicable. The single-axis controller is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life S2 / S21	6 million operating cycles
Mechanical life SS2	10 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP54

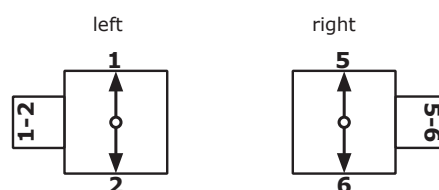


Example

	S2L	S5	T	- 02 Z P	- A050 P134	- X
Basic unit						
S2L left						
Control-handle extended						
S5 -20 mm						
Grip / palm grip						
T Dead man						
Axis 1 (direction 1-2)						
02 3 contacts (2A 250 V AC15)						
Z Spring return						
P Potentiometer						
Description axis 1 (direction 1-2)						
A050 Arrangement MSP21-0						
P134 Potentiometer T396 2 x 5 kOhm						
Special model						
X Special / customer specified						

	S2L	S5	T	- 02 Z P	- A050 P134	- X
Basic unit						
S2L Single-axis controller left						
S2R Single-axis controller right						
S21L Single-axis controller left with flange 96 x 96 mm						
S21R Single-axis controller right with flange 96 x 96 mm						
Reinforced version						
SS2L Single-axis controller left						
SS2R Single-axis controller right						
SS21L Single-axis controller left with flange 96 x 96 mm						
SS21R Single-axis controller right with flange 96 x 96 mm						

Identification of the installation variants with switching directions:



Single-axis controller S2 / SS2 / S21



Combination possibilities with our handles (valid for single-axis controller S21)



S2L

S5

T

- 02 Z P

- A050 P134

- X

Control-handle extended

Standard

S5 -20 mm

S8 +20 mm

Grip / palm grip

Knob (standard)

M Mechanical zero interlock

MN Mechanical zero interlock (push down)

T Dead man

MT Mechanical zero interlock + dead man

H Signal button

MH Mechanical zero interlock + signal button

D Push button

MD Mechanical zero interlock + push button

DV Flush push button

MDV Mechanical zero interlock + flush push button

B... Palm grip B... (see page palm grip 157)

S2L

S5

T

- 02 Z P

- A050 P134

- X

Axis 1: direction 1-2 left / direction 5-6 right

02 3 contacts

Standard contact - arrangement see page 140

03 5 contacts

z.B.

04 7 contacts

A98

MS0

05 9 contacts

A05

MS21

A0500

MS21-00

A110

MS24-0

A99 contact - arrangement according customer request

Z Spring return

R Friction brake

(P) Possibility of mounting potentiometer and encoder (Gessmann-types)

P Potentiometer

P131

T396 2 x 0,5 kOhm

I max. 1 mA

P132

T396 2 x 1 kOhm

I max. 1 mA

P133

T396 2 x 2 kOhm

I max. 1 mA

P134

T396 2 x 5 kOhm

I max. 1 mA

P135

T396 2 x 10 kOhm

I max. 1 mA

More potentiometers on request!

C Encoder

C... Encoder see page 146

S2L S5 T - 02 Z P - A050 P134 - X

Special model

- X Special / customer specified
- X1 Microswitch (MZT 1) positively driven NC contact

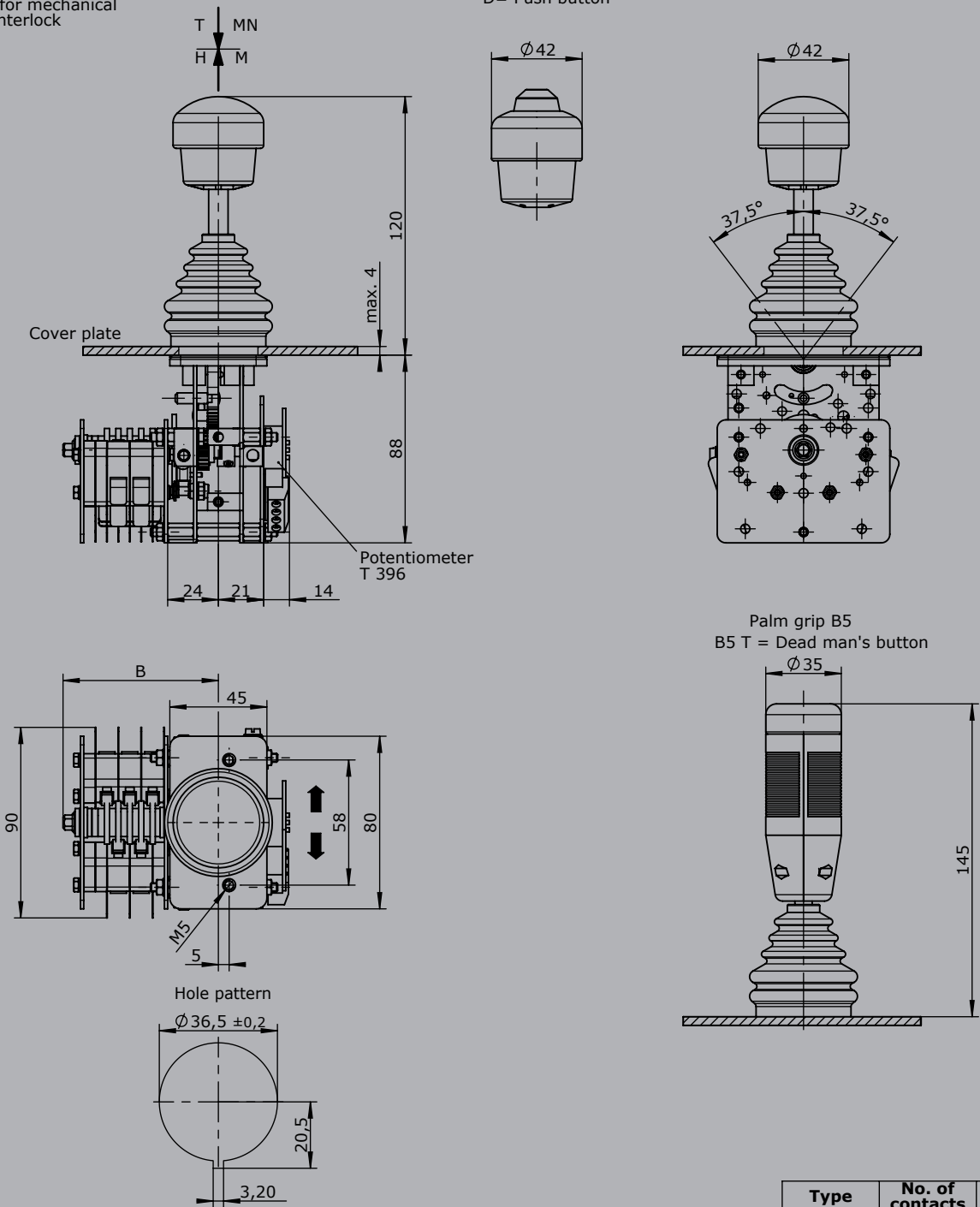
Attachments

- Indicating labels
- Indicating labels with engraving

1

T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock

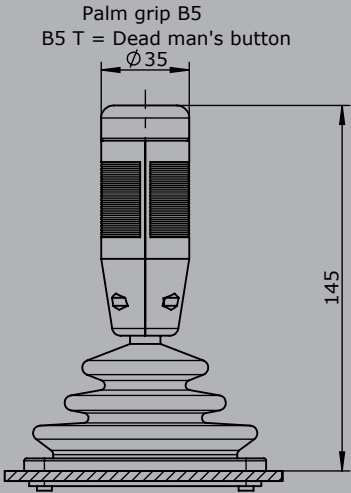
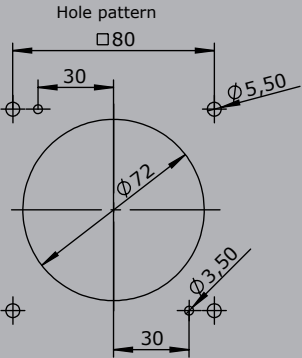
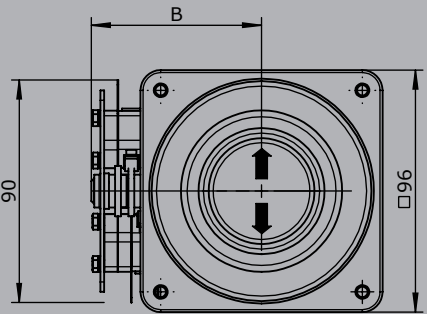
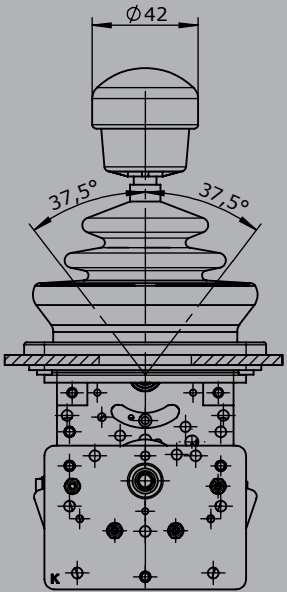
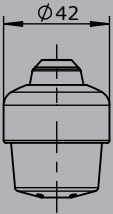
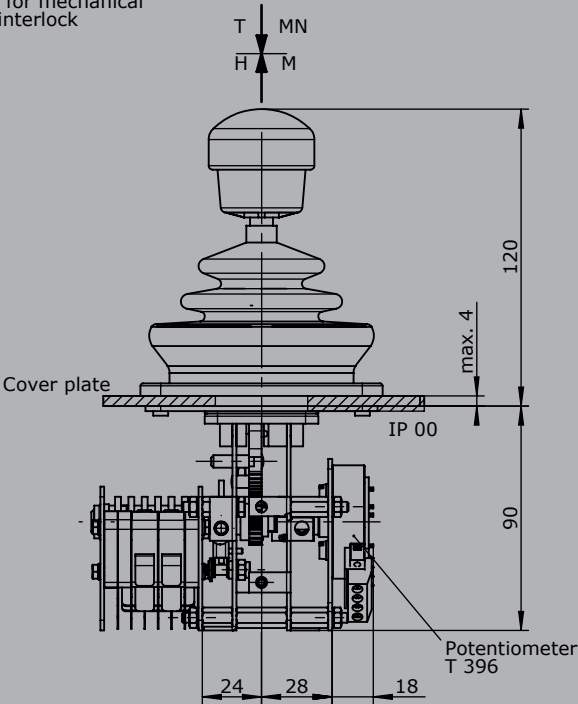
Knob solid
D= Push button



Type	No. of contacts	Maß B
02	3	62
03	5	72
04	7	83
05	9	93

T = Dead man's button
H = Signal button
M = Latch for mechanical
zero interlock

Knob solid
D= Push button



Type	No. of contacts	Maß B
02	3	62
03	5	72
04	7	83
05	9	93

Single-axis controller S22 / SS22



The single-axis controller S2/SS2 is a robust switching device for remote controlled and electrohydraulic applications. The modular design of the switching device is universally applicable. The single-axis controller is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.

Technical data

Mechanical life S22	6 million operating cycles
Mechanical life SS22	10 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP54

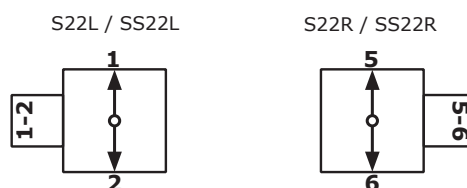


1

	S22L	S5	T	- 3 Z P	- A050 P134	- X
Basic unit						
S22L left						
Control-handle extended						
S5 -20 mm						
Grip / palm grip						
T Dead man						
Axis 1 (direction 1-2)						
3 3 contacts (2A 250 V AC15)						
Z Spring return						
P Potentiometer						
Description axis 1 (direction 1-2)						
A050 Arrangement MSP21-0						
P134 Potentiometer T396 2 x 5 kOhm						
Special model						
X Special / customer specified						

	S22L	S5	T	- 3 Z P	- A050 P134	- X
Basic unit						
S22L Single-axis controller left						
S22R Single-axis controller right						
Reinforced version						
SS22L Single-axis controller left						
SS22R Single-axis controller right						
Control-handle extended						
Standard						
S5 -20 mm						
S8 +20 mm						

Identification of the installation variants with switching directions:



S22L S5 T - 3 Z P - A050 P134 - X

Grip / palm grip

	Knob (standard)
M	Mechanical zero interlock
MN	Mechanical zero interlock (push down)
T	Dead man
MT	Mechanical zero interlock + dead man
H	Signal button
MH	Mechanical zero interlock + signal button
D	Push button
MD	Mechanical zero interlock + push button
DV	Flush push button
MDV	Mechanical zero interlock + flush push button
B...	Palm grip B... <i>(on request!)</i>

S22L S5 T - 3 Z P - A050 P134 - X

Axis 1: direction 1-2 left / direction 5-6 right

1	1 contact	Standard contact - arrangement see page 140		
2	2 contacts	z.B.		
3	3 contacts	A98	MS0	
4	4 contacts	A05	MS21	
		A0500	MS21-00	
		A99 contact - arrangement according customer request		
Z	Spring return			
R	Friction brake			
(P)	Possibility of mounting potentiometer and encoder (Gessmann-types)			
P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA
		P132	T396 2 x 1 kOhm	I max. 1 mA
		P133	T396 2 x 2 kOhm	I max. 1 mA
		P134	T396 2 x 5 kOhm	I max. 1 mA
		P135	T396 2 x 10 kOhm	I max. 1 mA
		More potentiometers on request!		
C	Codierer	C...Encoder see page 146		

S22L S5 T - 3 Z P - A050 P134 - X

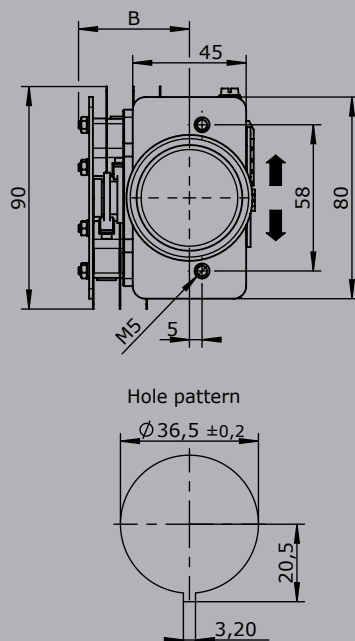
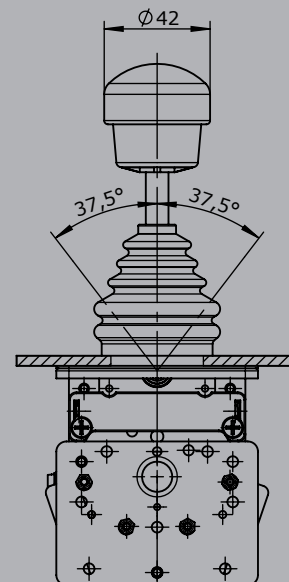
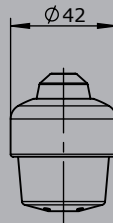
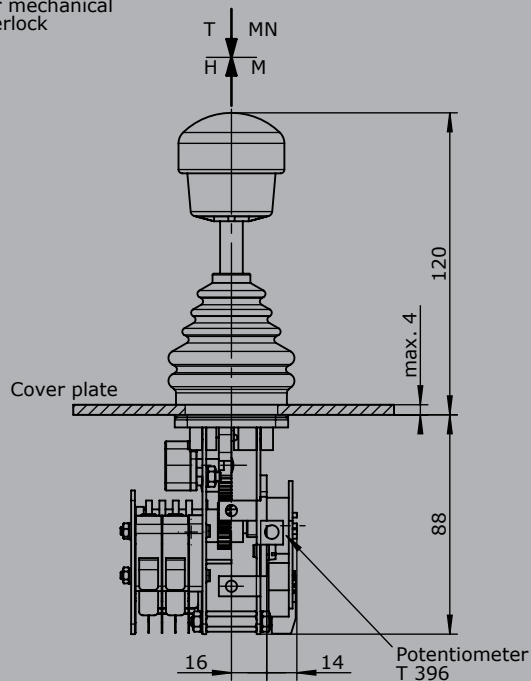
Special model	
X	Special / customer specified
X1	Switching run 2-0-2

Attachments	
Indicating labels	
Indicating labels with engraving	

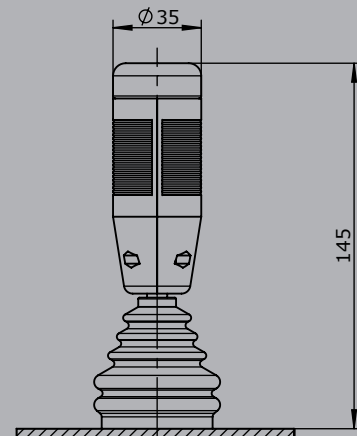
1

T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock

Knob solid
D = Push button



Palm grip B5
B5 T = Dead man's button



Type	No. of contacts	Dim. B
1	1	25
2	2	31
3	3	36
4	4	42

Single-axis controller S23



The single-axis controller S23 is a robust switching device for shipbuilding and electro-hydraulic applications. The modular design of the switching device is universally applicable. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

Technical data

Mechanical life S23	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP65

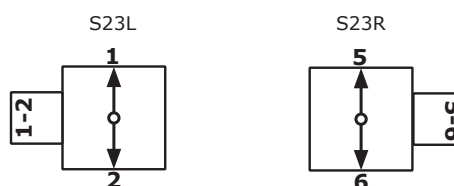


1

	S23L	S5	M	- 3 Z P	- A050 P134	- X
Basic unit						
S23L left						
Control-handle extended						
S5 -20 mm						
Grip / palm grip						
M Mechanical zero interlock						
Axis 1 (direction 1-2)						
3 3 contacts (2A 250 V AC15)						
Z Spring return						
P Potentiometer						
Description axis 1 (direction 1-2)						
A050 Arrangement MSP21-0						
P134 Potentiometer T396 2 x 5 kOhm						
Special model						
X Special / customer specified						

	S23L	S5	M	- 3 Z P	- A050 P134	- X
Basic unit						
S23L left						
S23R right						
Control-handle extended						
Standard 140 mm						
S5 -20 mm						
S8 +20 mm						

Identification of the installation variants with switching directions:



S23L S5 M - 3 Z P - A050 P134 - X

Grip / palm grip

- Knob (standard)
- M Mechanical zero interlock
- Q T-grip
- QM T-grip with mechanical zero interlock

S23L S5 M - 3 Z P - A050 P134 - X

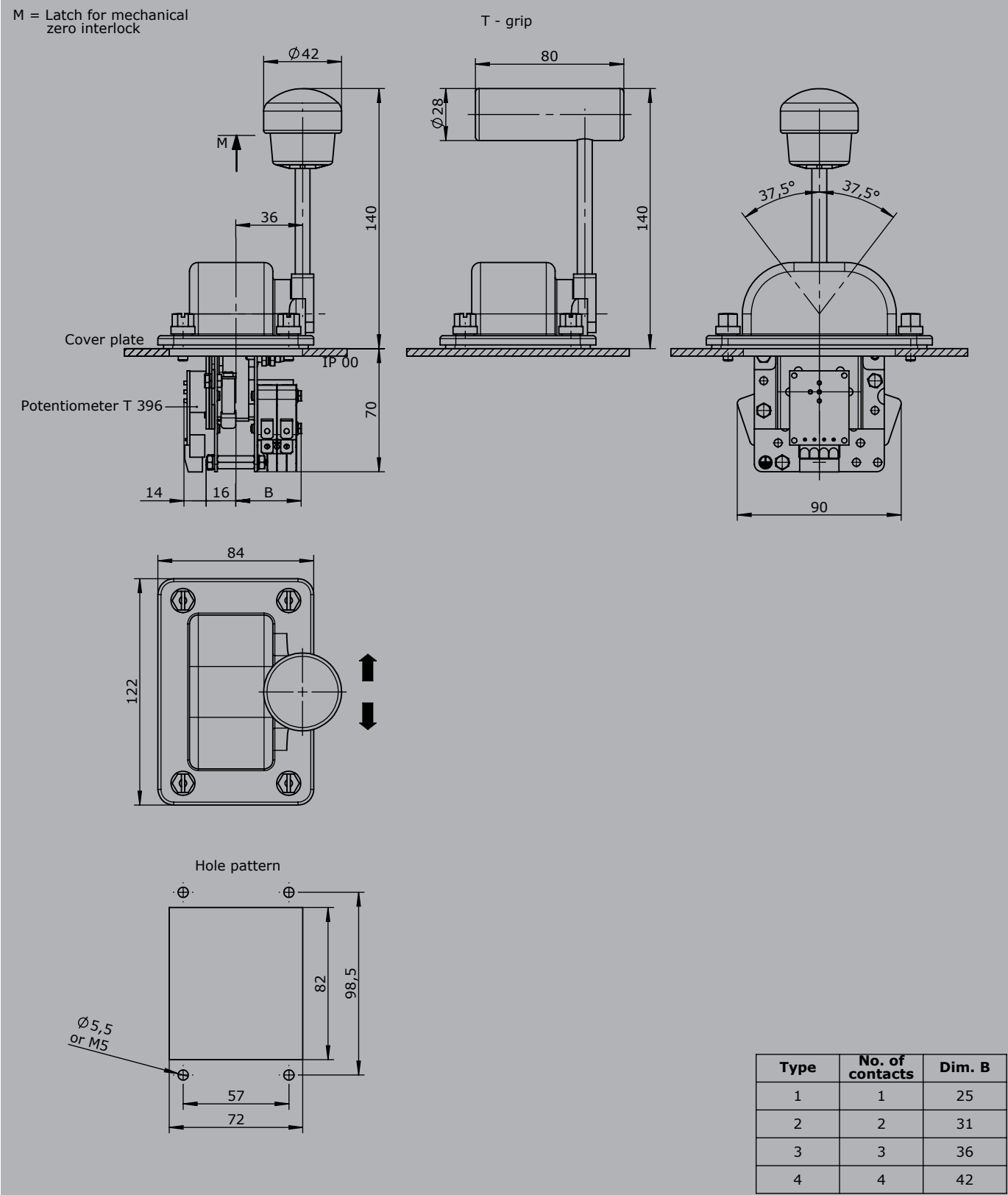
Axis 1: direction 1-2 left / direction 5-6 right

- | | | | |
|-----|--|---|-------------------------------|
| 1 | 1 contact | Standard contact - arrangement see page 140 | |
| 2 | 2 contacts | z.B. | |
| 3 | 3 contacts | A98 | MS0 |
| 4 | 4 contacts | A05 | MS21 |
| | | A0500 | MS21-00 |
| | | <i>A99 contact - arrangement according customer request</i> | |
| Z | Spring return | | |
| R | Friction brake | | |
| (P) | Possibility of mounting potentiometer and encoder (Gessmann-types) | | |
| P | Potentiometer | P131 | T396 2 x 0,5 kOhm I max. 1 mA |
| | | P132 | T396 2 x 1 kOhm I max. 1 mA |
| | | P133 | T396 2 x 2 kOhm I max. 1 mA |
| | | P134 | T396 2 x 5 kOhm I max. 1 mA |
| | | P135 | T396 2 x 10 kOhm I max. 1 mA |
| | | <i>More potentiometers on request!</i> | |
| C | Encoder | C... Encoder see page 146 | |

S23L S5 M - 3 Z P - A050 P134 - X

Special model

- X Special / customer specified



Single-axis controller S14



The single-axis controller S14 is a designed hall sensor switching device for electro-hydraulic and remote controlled hydraulic. The modular design of the switching device is universally applicable. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.



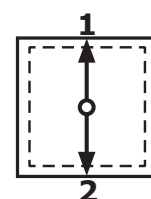
Technical data

Mechanical life S14	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP65

	S14L	S8	Example T	-01ZC	-A05 C61	-X
Basic unit						
S14L						
Control-handle extended						
Standard 60 mm*						
S8 +20 mm						
<i>*Only possible in combination with handle!</i>						
Grip / palm grip						
T Dead man						
Axis 1 (direction 1-2)						
01 2 contacts (2A 250 V AC15)						
Z Spring return						
C Mechanical encoder						
Description axis 1 (direction 1-2)						
A05 Arrangement MSP21						
C61 Mechanical encoder MEC 1-2						
Special model						
X Special / customer specified						

	S14L	S8	T	-01ZC	-A05 C61	-X
Basic unit						
S14L 1-axis left						
S14R 1-axis right						
Control-handle extended						
Standard 60 mm*						
S8 +20 mm						
<i>*Only possible in combination with handle!</i>						
Grip / palm grip						
Knob (standard)						
M Mechanical zero interlock						
MH Mechanical zero interlock + signal contact						
T Dead man						
H Signal button						
GK1 Knob 42 mm						
GK1M Mechanical zero interlock						

Identification of the installation
variants with switching directions:



S14

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Single-axis controller S14



		S14L	S8	T	-01ZC	-A05	C61	-X
GK1MN	Mechanical zero interlock (push down)							
GK1T	Dead man							
GK1H	Signal button							
GK1MH	Mechanical zero interlock + signal contact							
GK1D	Push button							
GK1DV	Flush push button							
GS9	Hall-twist grip with spring return							
GS9-D	Hall-twist grip with spring return and push button on top							
B ...	Palm grip B... <i>(on request!)</i>							

		S14L	S8	T	-01ZC	-A05	C61	-X
Axis 1: direction 1-2 left / direction 5-6 right								
	(Standard contacts gold-plated 2A 250V AC15)							
01	2 contacts							
02	4 contacts							
03	6 contacts							
Z	Spring return <i>(included in basic unit!)</i>							
R	Friction brake							
C	Mechanical encoder							
		C61	MEC 1-2					
			EA/02-10			I max. 1 mA		
			Potentiometer track			2 x 10 kOhm		
			Direction track			Arrangement MS26-0		
		C62	MEC 1-7					
			EA/10-10			I max. 1 mA		
			Potentiometer track			2 x 5 kOhm		
			Direction track			Arrangement MS26-0-1		
		C66	MEC 1-10					
			EA/17-10			I max. 1 mA		
			Potentiometer track			2 x 1,5 kOhm		
			Direction track			Arrangement MS21-0+MS21		
		C63	MEC 1-6					
			EA/09-10					
			6 Bit Gray Code					
		C64	MEC 1-6-5					
			ER/36-10			Us= 18-30 V		
			Current output 20...4...20 mA					
		C65	MEC 1-6-8					
			ER/ 36-10			Us= 18-30 V		
			Current output 20...0...20 mA					
		C67	MEC 1-6-9					
			ER/36-11			Us= 18-30 V		
			Voltage output 10...0...10V					
			<i>More potentiometers on request!</i>					
H	Hall-Potentiometer	E14811					0,5...2,5...5,4 V / 4,5...2,5...0,5 V	

		S14L	S8	T	-01ZC	-A05	C61	-X
Special model								
X	Special / customer specified							

Single-axis controller S3



The single-axis control S3 is a rugged switching device for hoisting applications. The modular design enables the switching device to be used universally. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

Technical data

Mechanical life S3	12 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP66 front



1

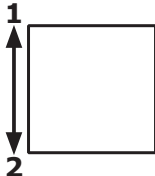
	S3L	S5	Q	-2 R P	-B	-A05 P484	-E1291	-S...	-X
Basic unit									
S3L Single-axis controller left									
Control-handle extended									
S5 -20 mm									
Grip- control-handle left									
Q T-grip									
Axis 1									
2 2 contacts (1,5A 24 V DC13)									
R Friction brake									
P Potentiometer									
Cover housing									
B Cover housing									
Description axis 1 (direction 1-2)									
A05 Arrangement MSP21									
P484 Potentiometer T318 2 x 5 kOhm									
Interface									
E1291 Voltage output 0...5...10 V									
Plug connectors									
S.. Standard plug connectors (see page 138)									
Special model									
X Special / customer specified									

1

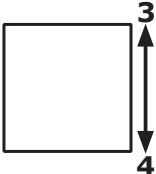
	S3L	S5	Q	-2 R P	-B	-A05	P484	-E1291	-S...	-X
Basic unit										
S3L	Single-axis controller, control-handle left									
S3R	Single-axis controller, control-handle right									
Control-handle extended										
	Standard 148 mm*									
S5	-20 mm									
S8	+20 mm									
*Only possible in combination with handle!										
Grip										
	Knob									
D	Push button									
Q	T-grip									
QD	T-grip with push button side									

**Identification of the installation variants
with switching directions:**

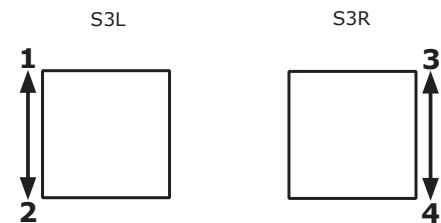
S3L



S3R



Identification of the installation variants with switching directions:



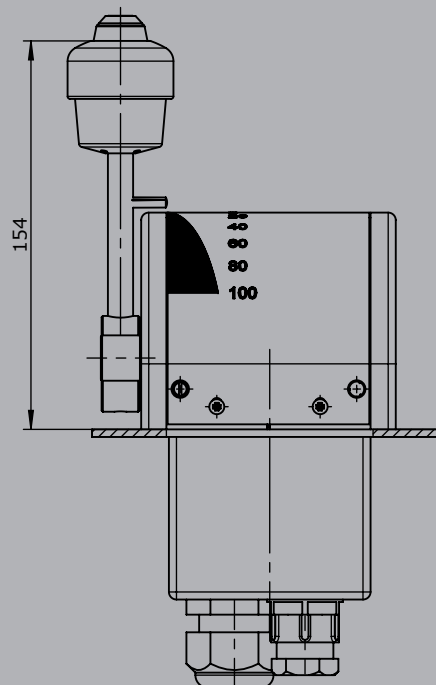
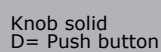
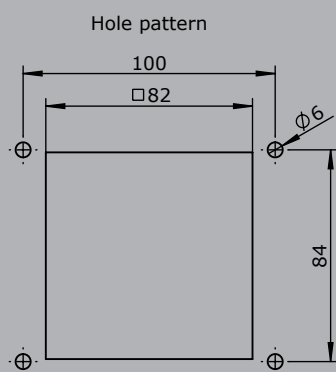
		S3L	S5	Q	-2 R P	-B	-A05	P484	-E1291	-S...	-X
Axis 1: direction 1-2 left											
1	1 contact	Standard contact - arrangement see page 140									
2	2 contacts	z.B.									
3	3 contacts	A98									
		A05									
		A050									
		A99 contact - arrangement according customer request									
R	Friction brake										
(P)	Possibility of mounting potentiometer and encoder (Gessmann-types)										
P	Potentiometer	P484		T318 2x5 kOhm	I max. 1 mA						
		More potentiometers on request!									
H	Hall-Potentiometer			E14811	0,5...2,5...4,5 V / 4,5...2,5...0,5 V						

	S3L	S5	Q	-2 R P	-B	-A05	P484	-E1291	-S...	-X
Cover housing										
B	Cover housing									
Interface (description on the following pages)										
	Potentiometer output									
E1xx	Voltage output									
E2xx	Current output									
Special model										
X	Special / customer specified									

Voltage output			
Supply voltage	11,5-32 V DC		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
...5...10V			S
	1 axis	E112 1	
10...0...10V	1 axis	E141 1	
-10...0...+10V			
	1 axis	E140 1	
Voltage output with other value on request!			

Current output			
Supply voltage	18-36 V DC		
Wiring	Cable 500mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
4...12...20 mA	1 axis	E209 1	S
20...4...20 mA	1 axis	E217 1	

1



Control switch N6



The control-switch N6 is a rugged switching device for hoisting applications. The modular design enables the switching device to be used universally. The single-axis controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

Technical data

Mechanical life N6	10 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP54



1

	N6	-DG	<i>Example</i> -01 Z P	-A05 P134	-X
Basic unit					
N6	incl. ISO-front plate 88 x 88 mm				
Grip					
DG	Twist grip				
Axis 1 (direction 2-4)					
01	2 contacts (2A 250 V AC15)				
Z	Spring return				
P	Potentiometer				
Description axis 1 (direction 3-4)					
A05	Arrangement MSP21				
P134	Potentiometer T396 2 x 5 kOhm				
Special model					
X	Special / customer specified				

N6
-DG
-01 Z P
-A05
P134
-X

Basic unit

- N6 incl. ISO-front plate 88 x 88 mm
N6A incl. ISO-front plate 88 x 88 mm, IP65 (front)

Grip

- KN Knob
HG Ball grip
DG Twist grip

Axis 1: direction 3-4

(Standard contacts gold-plated 2A 250 V AC15)

- | | | | |
|----|---|---|---------|
| 01 | ☐ 2 contacts | Standard contact - arrangement see page 140 | |
| 02 | ☐ 4 contacts | z.B. | |
| 03 | ☐ 6 contacts | A980 | MS00 |
| 04 | ☐ 8 contacts | A05 | MS21 |
| 05 | ☐ 10 contacts | A0500 | MS21-00 |
| 06 | ☐ 12 contacts | A110 | MS24-0 |
| | ☒ = Silver contacts (4A 250 V AC15) | A99 contacts - arrangement according customer request | |

- Z Spring return
R Friction brake
(P) Possibility of mounting potentiometer and encoder (Gessmann-types)

- | | | | | |
|---|---------------|--|-------------------|-------------|
| P | Potentiometer | P131 | T396 2 x 0,5 kOhm | I max. 1 mA |
| | | P132 | T396 2 x 1 kOhm | I max. 1 mA |
| | | P138 | T396 2 x 2 kOhm | I max. 1 mA |
| | | P134 | T396 2 x 5 kOhm | I max. 1 mA |
| | | P135 | T396 2 x 10 kOhm | I max. 1 mA |
| | | <i>More potentiometers on request!</i> | | |

- C C... Encoder see page 146

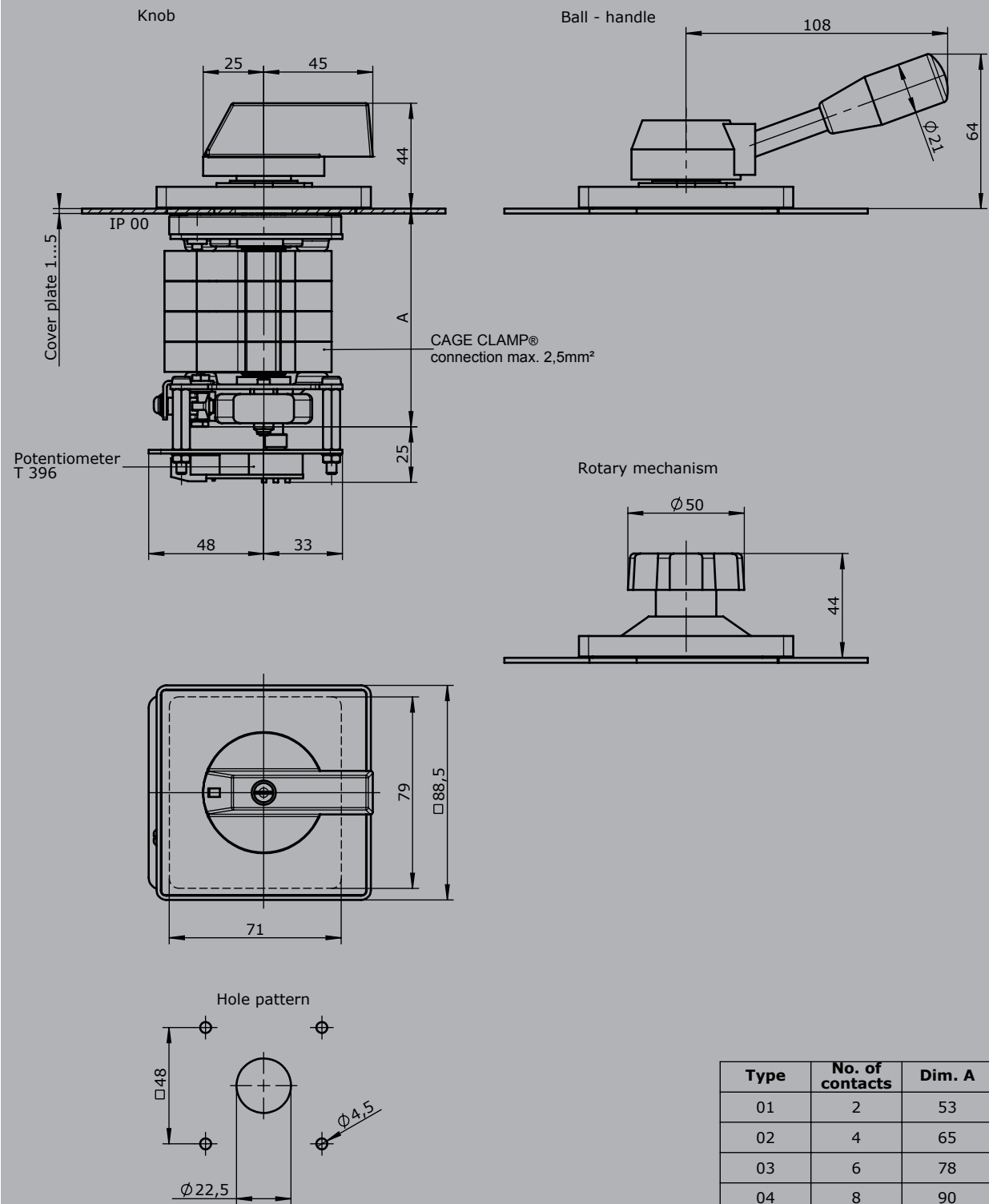
N6
-DG
-01 Z P
-A05
P134
-X

Special model

- X Special / customer specified

Attachments

- Indicating label
Indicating label with engraving



Type	No. of contacts	Dim. A	Spring return
01	2	53	+25
02	4	65	
03	6	78	
04	8	90	
05	10	103	
06	12	115	

Control switch N9



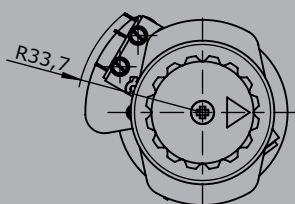
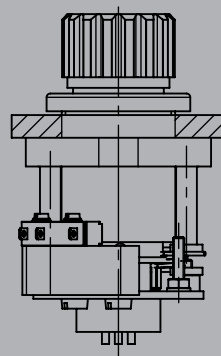
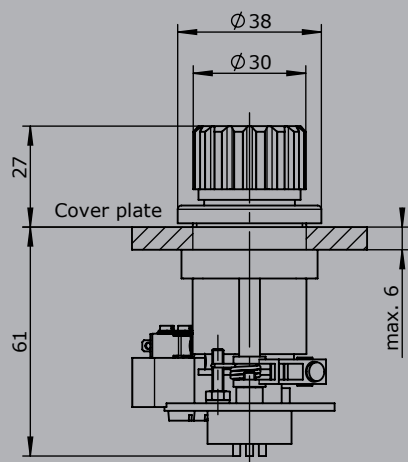
The control-switch N9 is a rugged switching device for electrohydraulic and hoisting applications. The modular design enables the switching device to be used universally.

Technical data

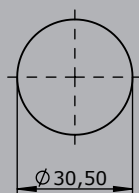
Mechanical life N9	10 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP54



		Example			
		N9	-2 R P	-A05	P134 -X
Basic unit					
N9	Control switch with twist grip				
Axis 1: direction 3-4					
1	1 contact	Standard contact - arrangement see page 140 z.B. A98 MS0 A05 MS21 A99 contacts - arrangement according customer request			
2	2 contacts				
R	Friction brake (included in basic unit)				
(P)	Possibility of mounting potentiometer and encoder (Gessmann-types)				
P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA	
		P132	T396 2 x 1 kOhm	I max. 1 mA	
		P133	T396 2 x 2 kOhm	I max. 1 mA	
		P134	T396 2 x 5 kOhm	I max. 1 mA	
		P135	T396 2 x 10 kOhm	I max. 1 mA	
		More potentiometers on request!			
H	Hall-Potentiometer	E14811	0,5...2,5...4,5 V / 4,5...2,5...0,5 V		
Special model					
X	Special / customer specified				



Hole pattern



Control switch N10



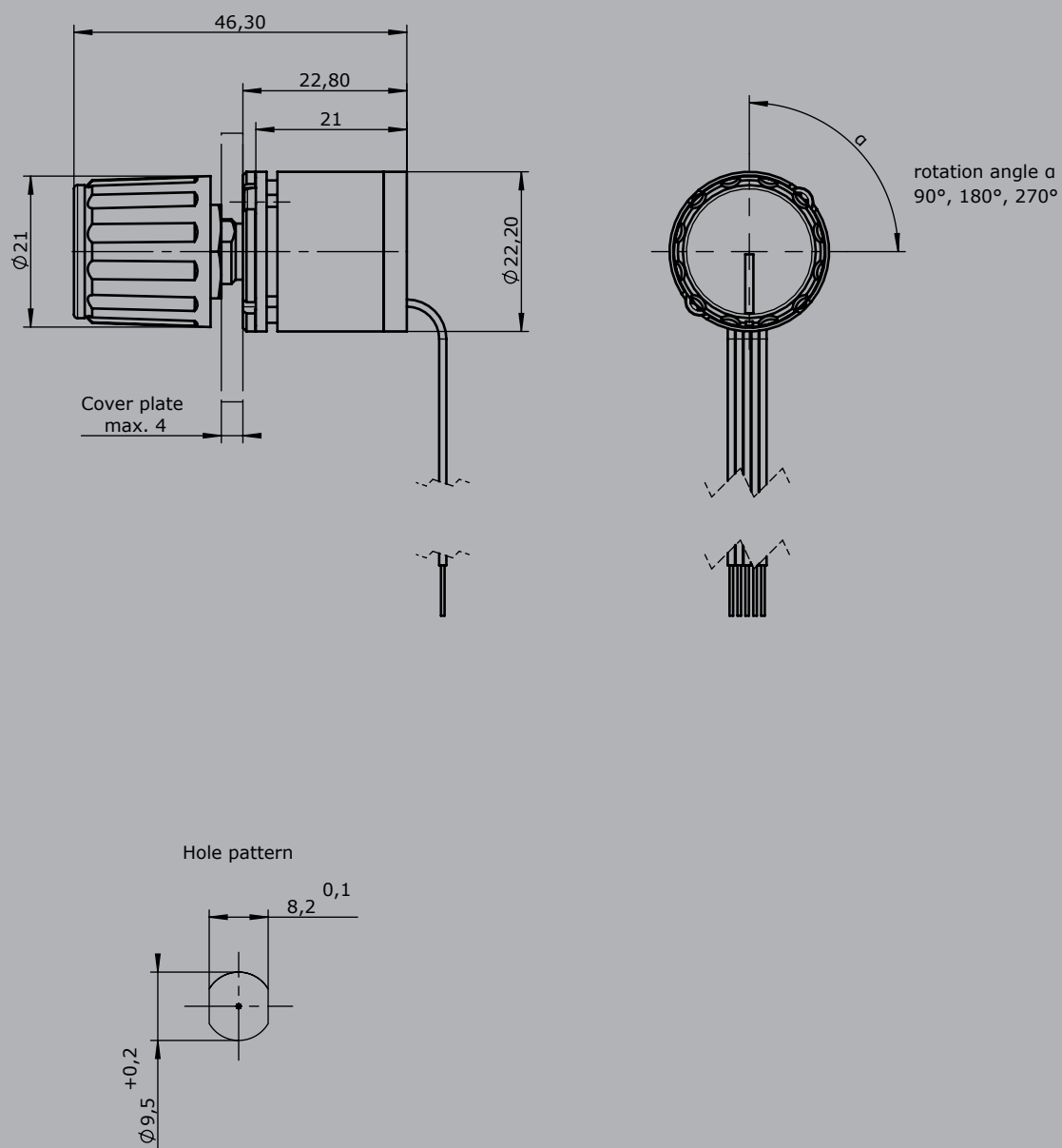
The control switch N10 is a rugged switching device for electrohydraulic and hoisting applications. Up to 18 detent points can be integrated.

Technical data

Mechanical life	10 million operating cycles
Mechanical life with detent	3 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP67 (electronic)



	N10	-90	1	-6	-E14811	-X
Basic unit						
N10	Control switch with rotary knob					
Operating distance						
270°						
180°						
90°						
Detent						
0	Without detent					
1	Detent point in middle position					
2	Detent points at a distance of 15°					
Dead zone around the center position						
0	No dead zone					
Example +/-3° => 6						
Interface						
Voltage output						
E1481	1 0,5...2,5...4,5 V dual inverse Ub= 5 V DC					
	2 0,5...2,5...4,5 V dual positive gradient clockwise (cw) Ub= 5 V DC					
	3 0,5...2,5...4,5 V dual positive gradient counter clockwise (ccw) Ub= 5 V DC					
E1491	1 0,5...2,5...4,5 V positive gradient clockwise (cw) with zero position signal Ub= 5 V DC					
	2 0,5...2,5...4,5 V positive gradient counter clockwise (ccw) with zero position signal Ub= 5 V DC					
	3 0,5...2,5...4,5 V positive gradient clockwise (cw) with direction signals Ub= 5 V DC					
	4 0,5...2,5...4,5 V positive gradient counter clockwise (ccw) with direction signals Ub= 5 V DC					
Special model						
X	Special / customer specified					



Molex Micro-Fit 3.0 - Suited for conductor cross-section 0,1 til 0,75 mm²

S004 Male housing 10-pole

S006 Male housing 14-pole

S007 Male housing 18-pole



S012 Female housing 10-pole

S014 Female housing 14-pole

S015 Female housing 18-pole



Deutsch DTM - Suited for conductor cross-section 0,25 til 1,5 mm²

S017 Male housing 4-pole

S018 Male housing 6-pole

S019 Male housing 8-pole

S021 Male housing 12-pole



S022 Female housing 4-pole

S023 Female housing 6-pole

S024 Female housing 8-pole

S026 Female housing 12-pole



Deutsch DT - Suited for conductor cross-section 0,25 til 2,0 mm²

S027 Male housing 4-pole

S028 Male housing 6-pole

S029 Male housing 8-pole

S031 Male housing 12-pole



S032 Female housing 4-pole

S033 Female housing 6-pole

S034 Female housing 8-pole

S036 Female housing 12-pole



AMP CPC - Suited for conductor cross-section 0,12 til 1,5 mm²

S037 Male housing CPC 13 9-pole

S038 Male housing CPC 17 14-pole

S039 Male housing CPC 23 37-pole



S040 Female housing CPC 13 9-pole

S041 Female housing CPC 17 14-pole

S042 Female housing CPC 23 37-pole



AMP Mini-Universal MATE-N-LOK (seaked) - Suited for conductor cross-section 0,12 til 1,5 mm²

S043 Male housing 4-pole

S044 Male housing 6-pole

S045 Male housing 8-pole

S046 Male housing 10-pole

S047 Male housing 16-pole



S048 Female housing 4-pole

S049 Female housing 6-pole

S050 Female housing 8-pole

S051 Female housing 10-pole

S052 Female housing 16-pole



Phoenix - Suited for conductor cross-section til 1,5 mm²

S053 Male housing IC 2,5 (STGF) 8-pole with screw terminal

S054 Male housing IC 2,5 (STGF) 12-pole with screw terminal

S055 Male housing IC 2,5 (STGF) 14-pole with screw terminal

S056 Male housing IC 2,5 (STGF) 18-pole with screw terminal



S057 Female housing MSTB 2,5 (STF) 8-pole with screw terminal

S058 Female housing MSTB 2,5 (STF) 12-pole with screw terminal

S059 Female housing MSTB 2,5 (STF) 14-pole with screw terminal

S060 Female housing MSTB 2,5 (STF) 18-pole with screw terminal



Technical details may vary based on configuration or application! Technical data subject to change without notice!



IP
SAVE



1

Degree of protection

B10	Joystick-main circuit board grouted (IP67)
B11	Joystick-main circuit board grouted (IP67) and grip function sealed, grip with drain hole

Standard contact-arrangement for master switch



1

Type **MS11** Form



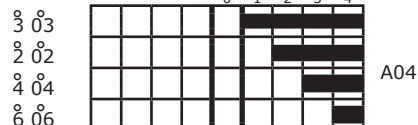
Type **MS12** Form



Type **MS13** Form



Type **MS14** Form



Type **MS21** Form



Type **MS22** Form



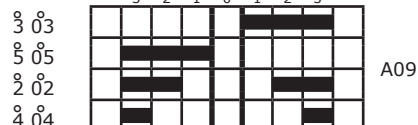
Type **MS212** Form



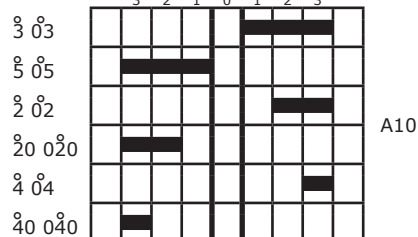
Type **MS222** Form



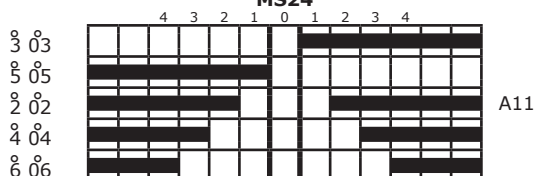
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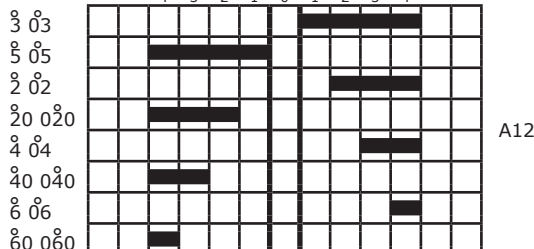
Type **MS213** Form



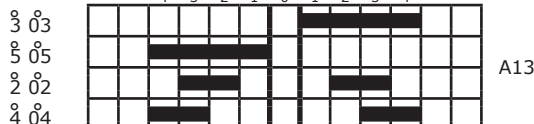
Type **MS24** Form



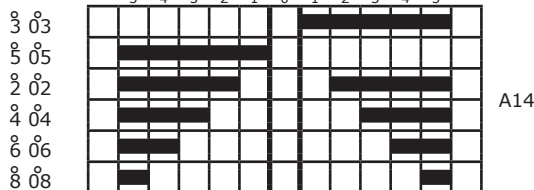
Type **MS214** Form



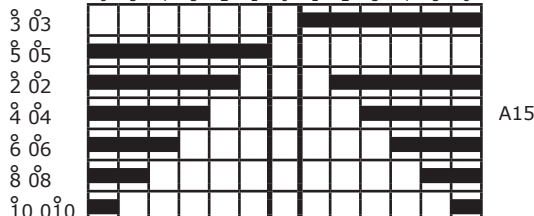
Type **MS224** Form



Type **MS25** Form



Type **MS26** Form



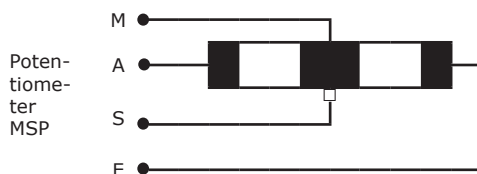
Type **MS0** Form



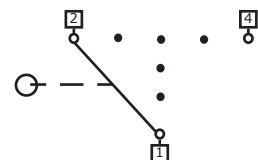
Zero contact NC



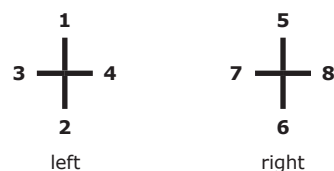
Zero contact NO



Micro change over
contact for control
handle with dead
man's button signal button
push button



contact 5 05 = direction 1/4/5/8
contact 3 03 = direction 2/3/6/7



Deflection directions designated
DIN 15025

Utilization categories for control switches to IEC/EN 60947-5-1

Type of current	Utilization category	Typical examples of application	Normal conditions of use					
			Make			Breake		
		I= current made, Ic= current broken Ie= rated operational current, U= voltage before make Ue= rated operational voltage Ur= recovery voltage T 0,95= time in ms, to reach 95% of the steady-state current. P= UE · Ie= steady-state power consumption in watts	I — le	U — Ue	cos	Ic — le	Ur — Ue	cos
alternating current	AC12	Control of resistive loads and solid state loads with isolation by opto couplers control of a.c. electromagnetic loads (> 72VA)	1	1	0,9	1	1	0,9
	AC15		10	1	0,3	1	1	0,3
			I — le	U — Ue	t 0,95	Ic — le	Ur — Ue	t 0,95
Direct current	DC 12	Control of resistive loads and solid state loads with isolation by opto couplers Control of d.c. electromagnets	1	1	1 ms	1	1	1 ms
	DC 13		1	1	6 · P	1	1	6 · P

The value 6·P results from an empirical relationship with is found to represent most d.c. magnetic loads to an upper limit of P = 50 W viz 6·P = 300 ms. Loads having power consumption greater than 50 W are assumed to consist of smaller loads in parallel. Therefore 300 ms is to be an upper limit, irrespective of the power consumption value.

Attach our switching device	V6 N6 S6 N61 N62			VV6 DD64			V11			V5 S2-S23			VV5 SS2-SS21		
Rated isolation voltage Ui in Volt	250			250			250			250			250		
Rated operational voltage Ue in Volt	250			250			250			250			250		
Rated operational current Ie in Ampere	6 or 16			6 or 16			6 or 16			10			10		
AC 15	2 4			2 4			2 4			2			2		
DC 12 24 V	6 8			6 8			6 8			4			4		
48 V	2 4			2 4			2 4			2			2		
110 V	0,5 1			0,5 1			0,5 1			0,2			0,2		
220 V	0,1 0,5			0,1 0,5			0,1 0,5			0,1			0,1		
Contacts gold-coated 24 V	5 mA			5 mA			5 mA			5 mA			5 mA		
DC 13 24 V	1			1			1			3			3		
48 V	0,5			0,5			0,5			1,5			1,5		
110 V	0,2			0,2			0,2			0,1			0,1		
220 V	0,05			0,05			0,05			0,05			0,05		
Short-circuit-protection in Ampere Fuse Circuit-breaker G-characteristic	6 16 6 16			6 6 6 16			6 16 6 16			10 10 10 10			10 10 10 10		
Terminal screws Plug-in connector CAGE CLAMP® connection is a registered trademark of WAGO Kontakttechnik GmbH Germany	M 3,5 2,5 mm²			M 3,5 2,5 mm²			M 3,5 2,5 mm²			M 3,5 6,3 x 0,8			M3,5 6,3 x 0,8		
Conductor sizes in mm² finely stranded with end steeves	1,5			1,5			1,5			1,5			1,5		
Mechanical life in million (operation cycles) max. switching frequency c/h 1000	10			20			10			6			10		

Mechanical shock resistance IEC 68-2-27 Shock-amplitude > 15 Shock duration 20 ms

Clearances and creepage distances IEC 947-1; 2.5.46.51 Overvoltage category III pollution grade 3

Attach our switching device	V8 V85 D8	VV8 VV85 D3 S3	V10 V25 S1	V14 S14	V3	Dead man`s button signal button push button
Rated isolation voltage Ui in Volt	110	110	110	250	500	250
Rated operational voltage Ue in Volt	110	110	110	250	350	250
Rated operational voltage in Ampere	2	2	2	6	16	6
AC 15	0,5	0,5	0,5	2	4	2
DC 12 24 V	2	2	2	6	8	4
48 V	1	1	1	2	4	2
110 V	0,1	0,1	0,1	0,5	1	0,2
220 V				0,1	0,5	0,1
Contacts gold-coated 24 V	5 mA	5 mA	5 mA	5 mA	5 mA	5 mA
DC 13 24 V	1,5	1,5	1,5	1	1	3
48 V	0,5	0,5	0,5	0,5	0,5	1,5
110 V	0,05	0,05	0,05	0,2	0,2	0,1
220 V				0,05	0,05	0,05
Short-circuit-protection in Ampere Fuse 9L	4	4	4	6	16	6
Circuit-breaker G-characteristic	4	4	4	6	16	6
Terminal screws Plug-in connector CAGE CLAMP® connection is a registered trademark of WAGO Kontakttechnik GmbH Germany	Solder terminal			M4 1,5 mm²	M 3,5 6,3 x 0,8	6,3 x 0,8
Conductor sizes in mm² finely stranded with end steeves	0,5	0,5	0,5	1	1,5	1,5
Mechanical life in million (operation cycles) max. switching frequency c/h 1000	8	12	8	6	6	10
Mechanical shock resistance IEC 68-2-27	Shock-amplitude > 15 Shock duration 20 ms					
Clearances and creepage distances IEC 947-1; 2.5.46.51	Overvoltage category III pollution grade 3					
Degree of protection to IEC/EN 60529	1. numeral protection of contact and foreign bodies			2. numeral protection of water		
	IP00	No protection		No protection		
	IP54	Dust-protected		protected against splashing water		
	IP65	dust-tight		protected against water jets		
	IP66	dust-tight		protected against powerful water jets		
	IP67	dust-tight		protected against the effects of temporary immersion in water		

Potentiometer with attach to our switching device



for mounting on	Typ	Capacity (W)	Imax wiper (mA)	Typ	Expansion	with centre tap life					Hall 0,5...2,5...4,5V / 4,5...2,5...0,5V	Part No.	Addition for Part No.	Comment
						2 x 0,5 kOhm	2 x 1 kOhm	2 x 2 kOhm	2 x 5 kOhm	2 x 10 kOhm				
						1	2	3	4	5				
V6 / VV6 D64 / DD64 V5 / VV5 V3 S2 / SS2 S6 N6 P7 P8	T1420	1,5	10	P44	☐	x	x	x	x	x		524004400	☐	characteristic progressive *1 R= 2 x 6,5 kOhm
	T132	2,5	10	P05	☐	x	x	x	x	x		524000500	☐	
	T132 Öl	2,5	10	P06	☐	x	x		x	x		524000600	☐	
	T178	1,5	10	P07	☐		x	x	x			524000700	☐	
	T238	1	10	P08	☐	x	x	x	x	x*1		524000800	☐	
	T133	60	85	P10	☐	x						524001000	☐	
	T396	0,5	1	P13	☐	x	x	x	x	x		524001300	☐	
	T1350 Ex	0,5	1	P14	☐	x	x	x	x	x		524001400	☐	
	T1360			P43							x	5240043009		
V8 / VV8 D8 P10 P11 P12	T239	1	10	P17	☐			x	x			524001700	☐	with direction lines
	T301	0,5	1	P18	☐		x	x	x	x		524001800	☐	
	T426	0,5	1	P19	☐				x	x		524001900	☐	
	T432	0,5	1	P20	☐				x			524002000	☐	
	T246	0,5	1	P21	☐	x	x		x	x		524002100	☐	
	T362	0,5	1	P22	☐		x	x	x			524002200	☐	
	T1003			P42							x	5240042009		
	T1360			P43							x	5240043009		
V10 S1 Palm handle	T321	1	10	P24	☐		x					524002400	☐	with direction lines
	T320	0,5	1	P25	☐		x		x			524002500	☐	
	T1187	0,5	1	P27	☐				x			524002700	☐	
	T375	0,5	1	P37	☐		x		x			524003700	☐	
	T997			P41							x	5240041009		
V11	T316	1	10	P31	☐				x*2			524003100	☐	*2 R= 2 x 4 kOhm
	T365	0,5	1	P32	☐				x	x		524003200	☐	
D3 S3	T318	0,5	1	P48	☐				x			524004800	☐	

for mounting on	Typ	Capacity (W)	Imax wiper (mA)	Typ	Expansion	without centre tap life					Part No.	Addition for Part No.	Commend
						0,5 kOhm	1 kOhm	2 kOhm	5 kOhm	10 kOhm			
						1	2	3	4	5			
V6 / VV6 D64 / DD64 V5 / VV5 V3 S2 / SS2 S6 N6 P7 / P8	T1491	1,5	10	P46	☐	x	x	x	x	x	524004600	☐	
	T131	2,5	10	P03	☐	x	x	x	x	x	524000300	☐	
	T131 Oil	2,5	10	P04	☐		x		x	x	524000400	☐	
	T134	60	85	P11	☐				x		524001100	☐	
	T374	0,5	1	P12	☐	x	x	x	x	x	524001200	☐	
V8 / VV8 /D8 P10/P11/P12	T244	0,5	1	P23	☐			x	x	x	524002300	☐	
	T397	0,5	1	P47	☐		x	x	x		524004700	☐	
V10 / S1 Palm grip	T337	0,5	1	P26	☐		x	x	x	x	524002600	☐	
GE1/GE2	PW70	5	30	P45	☐	x	x		x		524004500	☐	

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Hall-Potentiometer HG 2



The Hall-Potentiometer HG2 is distinguished by its precision and longevity.

Technical data

Mechanical life	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP67



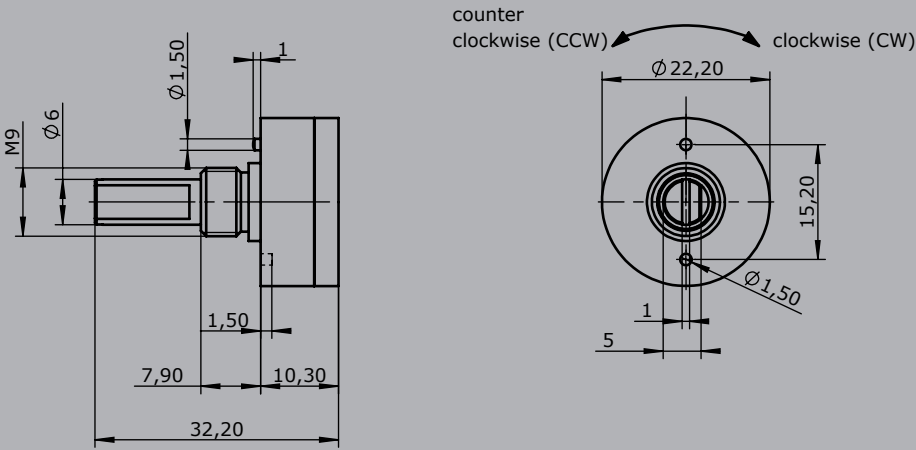
2

Example

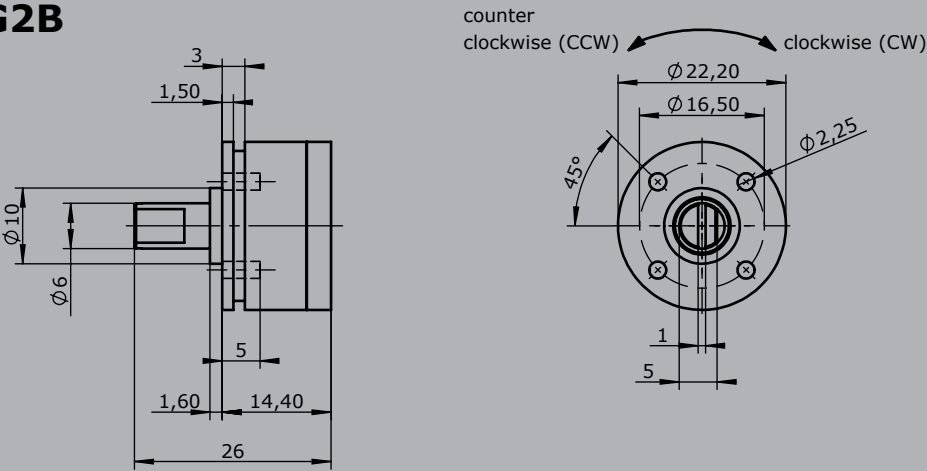
	HG2A	-60	-6	-E14811	-X
Basic unit					
HG2A	Hall-Potentiometer HG2 Model A				
HG2B	Hall-Potentiometer HG2 Model B				
Operating distance					
0-359° possible					
Example 60° => 60					
Dead zone around the center position					
0	No dead zone				
Example +/-3° => 6					
Interface					
Voltage output HG2					
E1481	1	0,5...2,5...4,5 V dual inverse Ub= 5 V DC			
	2	0,5...2,5...4,5 V dual positive gradient clockwise (cw) Ub= 5 V DC			
	3	0,5...2,5...4,5 V dual positive gradient counter clockwise (ccw) Ub= 5 V DC			
E1491	1	0,5...2,5...4,5 V positive gradient clockwise (cw) with zero position signal Ub= 5 V DC			
	2	0,5...2,5...4,5 V positive gradient counter clockwise (ccw) with zero position signal Ub= 5 V DC			
	3	0,5...2,5...4,5 V positive gradient clockwise (cw) with direction signals Ub= 5 V DC			
	4	0,5...2,5...4,5 V positive gradient counter clockwise (ccw) with direction signals Ub= 5 V DC			
Special model					
X	Special / customer specified				

Technical details may vary based on configuration or application! Technical data subject to change without notice!

HG2A



HG2B



Opto-electronic encoder Output digital OEC 2 with attach to our switching device



Opto-electronical encoder OEC 2 with digital output gray-/binär-cdode

Power supply	18-30 V DC				
Rotation angle	Max. +/-150° (by 9 Bit 300°)				
Digital output	8 Bit Gray-Code T359	Output characteristic linear	OEC 2-1-1	C01	410 g
	8 Bit Binary-Code T359	Output characteristic linear	OEC 2-2-1	C02	410 g
	6 Bit Gray-Code T359	Output characteristic linear	OEC 2-3-1	C031	410 g
	6 Bit Gray-Code T359	Output characteristic quadratic	OEC 2-3-2	C032	410 g
	6 Bit Binary-Code T359	Output characteristic linear	OEC 2-4-1	C041	410 g
	6 Bit Binary-Code T359	Output characteristic quadratic	OEC 2-4-2	C042	410 g
	9 Bit Gray-Code T384	Output characteristic linear one side clockwise	OEC 2-5-4	C054	410 g
	9 Bit Gray-Code T384	Output characteristic linear one side anticlockwise	OEC 2-5-5	C055	410 g
	9 Bit Binary-Code T384	Output characteristic linear one side clockwise	OEC 2-6-4	C064	410 g
	9 Bit Binary-Code T384	Output characteristic linear one side anticlockwise	OEC 2-6-5	C065	410 g

6 Bit-type T359

PIN connection	Colour-code
1 Not connected	-
2 D4	brown
3 D3	green
4 D2	yellow
5 D1	grey
6 Not connected	-
7 Not connected	-
8 Housing 0 V	black
9 Input 18-30 V DC	red
10 Not connected	-
11 Not connected	-
12 Direction-signal left	violet
13 Direction-signal grey	grey-pink
14 D6	red-blue
15 D5	white-green
- Cable screen	brown-green

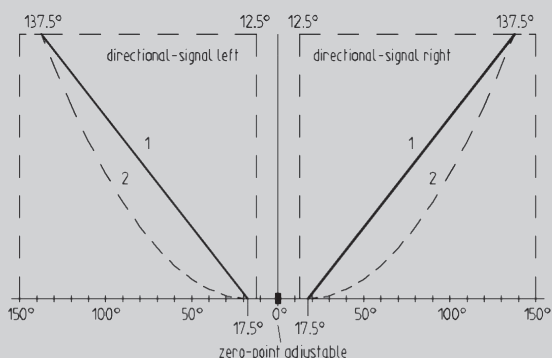
8-Bit-type T359

PIN connection	Colour-code
1 Not connected	-
2 D6	brown
3 D5	green
4 D4	yellow
5 D3	grey
6 D2	pink
7 D1	blue
8 Housing 0 V	black
9 Input 18-30 V DC	red
10 Not connected	-
11 Not connected	-
12 Direction-signal left	violett
13 Direction-signal right	grey-pink
14 D8	red-blue
15 D7	white-green
- Cable screen	brown-green

9 Bit-type T384

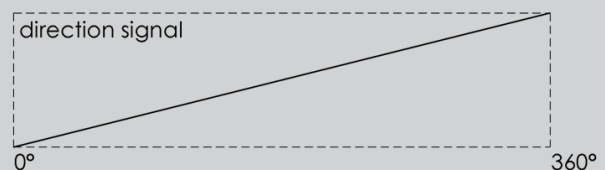
PIN connection	Colour-code
1 Not connected	-
2 D6	brown
3 D5	green
4 D4	yellow
5 D3	grey
6 D2	pink
7 D1	blue
8 Housing 0 V	black
9 Input 18-30 V DC	red
10 Not connected	-
11 Not connected	-
12 Direction-signal left	violett
13 D9	grey-pink
14 D8	red-blue
15 D7	white-green
- Cable screen	brown-green

6 Bit-type T359



8 Bit-type T359

9 Bit-type T384



Opto-electronic encoder digital OEC 2 with attach to our switching device



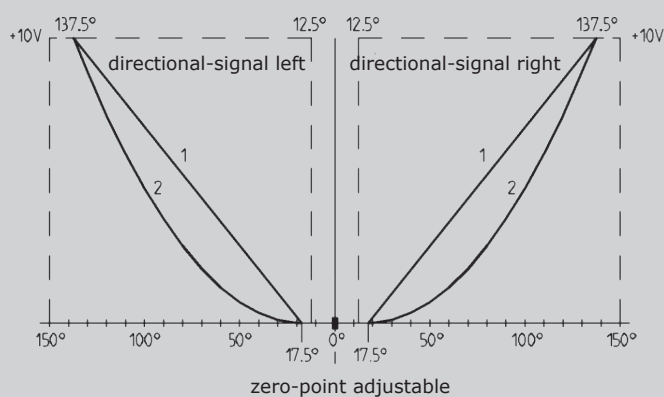
Opto-electronical encoder OEC 2 with voltage output

Power supply	18 - 30 V DC				
Scanning	6 Bit Gray-Code				
Rotation angle	Max. +/-150°				
Voltage output	10...0...10 V T366	Output characteristic linear	OEC 2-3-1-1	C111	410 g
	10...0...10 V T366	Output characteristic quadratic	OEC 2-3-2-1	C112	410 g
	-10...0...+10 V T367	Output characteristic linear	OEC 2-3-1-2	C151	410 g
	-10...0...+10 V T367	Output characteristic quadratic	OEC 2-3-2-2	C152	410 g

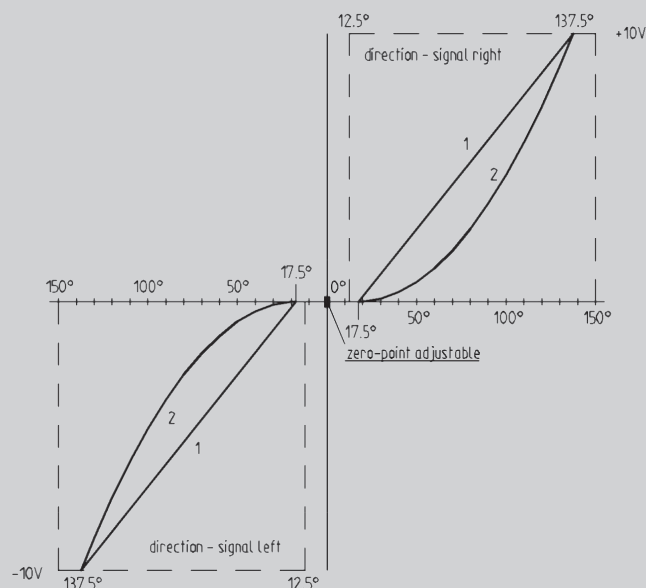
Voltage output

PIN connection	Colour-code
1 Not connected	-
2 Not connected	-
3 Not connected	-
4 Not connected	-
5 Not connected	-
6 Not connected	-
7 Not connected	-
8 Housing 0V	blue
9 Input 18-30V DC	brown
10 Not connected	-
11 Voltage output	green
12 Direction signal left	yellow
13 Direction signal right	grey
14 Not connected	-
15 Not connected	-
- Cable screen	white

6 Bit-type T366



6 Bit-type T367



Opto-electronic encoder Output digital OEC 2 with attach to our switching device



Opto-electronical encoder OEC 2 with current output

Power supply	18 - 30 V DC				
Scanning	6 Bit Gray-Code				
Rotation angle	Max. +/-150°				
Output current	20...4...20 mA T368	Output characteristic linear	OEC 2-3-1-5	C191	410 g
	20...4...20 mA T368	Output characteristic quadratic	OEC 2-3-2-5	C192	410 g
	20...0...20 mA T368	Output characteristic linear	OEC 2-3-1-8	C201	410 g
	20...0...20 mA T368	Output characteristic quadratic	OEC 2-3-2-8	C202	410 g
	-20...0...+20 mA T369	Output characteristic linear	OEC 2-3-1-6	C231	410 g
	-20...0...+20 mA T369	Output characteristic quadratic	OEC 2-3-2-6	C232	410 g

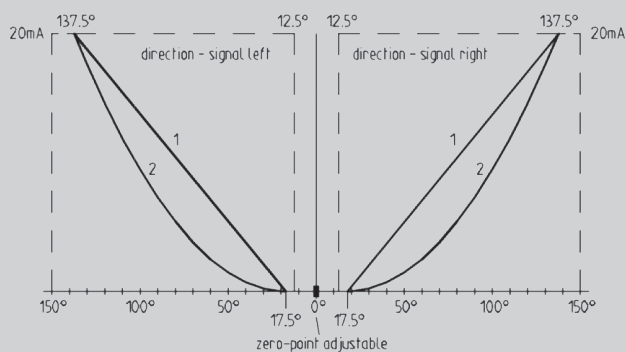
6 Bit-Type T368

PIN connection	Colour-code
1 Not connected	-
2 Not connected	-
3 Not connected	-
4 Not connected	-
5 Not connected	-
6 Not connected	-
7 Not connected	-
8 Housing 0 V	blue
9 Input 18-30 V DC	brown
10 Not connected	-
11 Current output	green
12 Direction signal left	yellow
13 Direction signal right	grey
14 Not connected	-
15 Not connected	-
- Cable screen	white

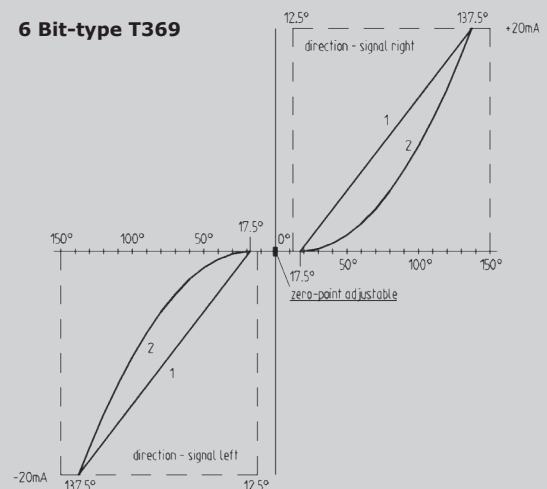
6 Bit-Type T369

PIN connection	Colour-code
1 Not connected	-
2 Not connected	-
3 Not connected	-
4 Not connected	-
5 Not connected	-
6 Not connected	-
7 Not connected	-
8 Housing 0V	blue
9 Input 18-30 V DC	brown
10 Not connected	-
11 Current output	green
12 Direction signal left	yellow
13 Direction signal right	grey
14 Not connected	-
15 Not connected	-
- Cable screen	white

6 Bit-type T368



6 Bit-type T369



Attachment

Plug with cable 14 x 0,25 mm ² , 2000 mm long, cable head open (for OEC 2 with digital outputs)	5300000495
Plug with cable 7 x 0,34 mm ² , 2000 mm long, cable head open (for OEC 2 with analog outputs)	5300000496

The OEC 2 is able for mounting on V6,VV6/D64,DD64/V11/S2,SS2/S6/N6. For mounting a potentiometer mounting option (P) of the respective controller is required!

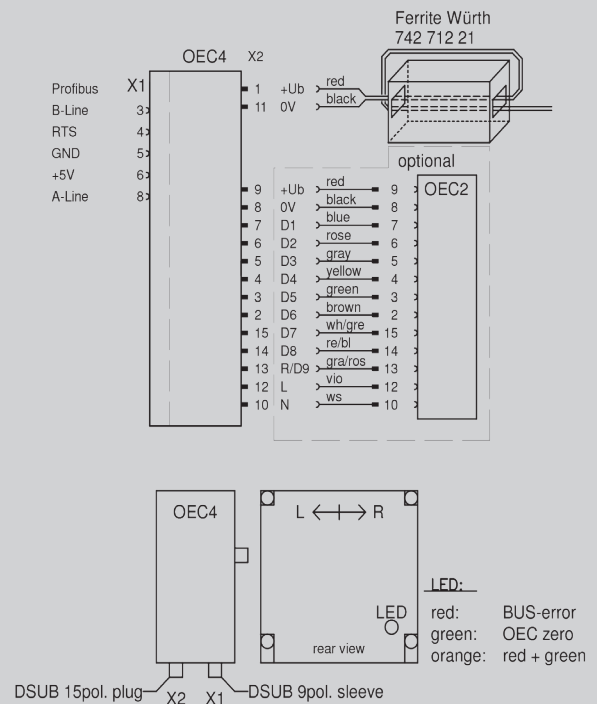
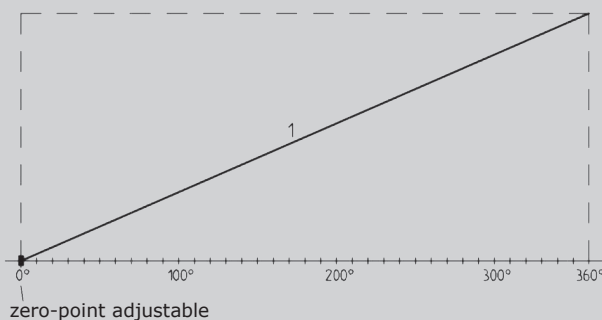
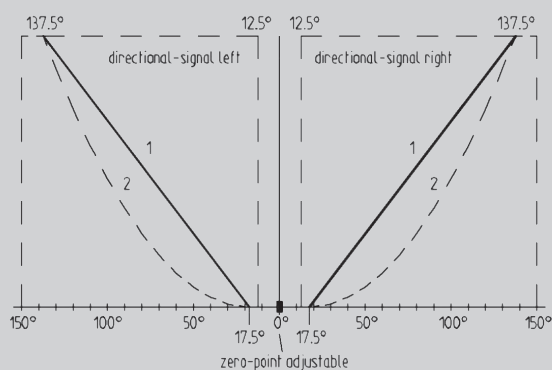
Opto-electronic encoder OEC 4 with interface Profibus DP



Opto-electronic encoder

Power supply	18 - 30 V DC
Scanning	6, 8 or 9 Bit Gray-Code
Rotation angle	Max. +/-150°
Interface	Profibus, DP, address 0-99 adjustable above selector switch

Voltage output	8 Bit Gray-Code T496 linear	OEC 4-1-1-2	C27	820 g
	8 Bit Binary-Code T496 linear	OEC 4-2-1-2	C28	820 g
	6 Bit Gray-Code T496 linear	OEC 4-3-1-2	C291	820 g
	6 Bit Gray-Code T496 quadratic	OEC 4-3-2-2	C292	820 g
	6 Bit Binary-Code T496 linear	OEC 4-4-1-2	C301	820 g
	6 Bit Binary-Code T496 quadratic	OEC 4-4-2-2	C302	820 g
	9 Bit Gray-Code T497 linear one sided right turn	OEC 4-5-4-2	C314	820 g
	9 Bit Gray-Code T497 linear one sided left turn	OEC 4-5-5-2	C315	820 g
	9 Bit Binary-Code T497 linear one sided right turn	OEC 4-6-4-2	C324	820 g
	9 Bit Binary-Code T497 linear one sided left turn	OEC 4-6-5-2	C325	820 g



Attachment

Plug (Profibus) straight

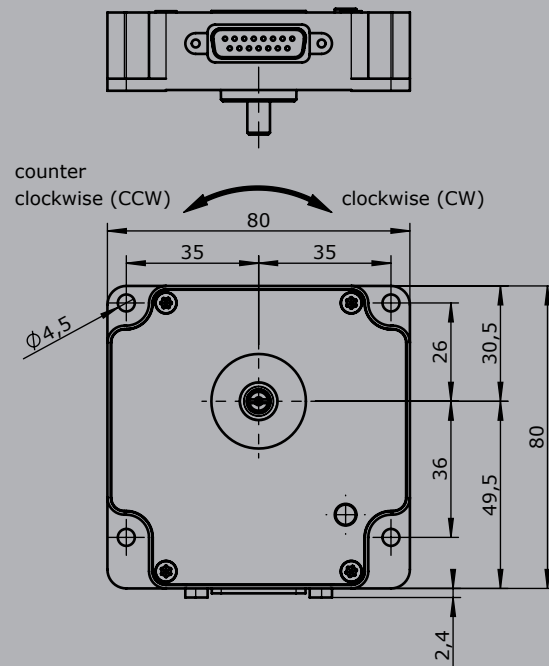
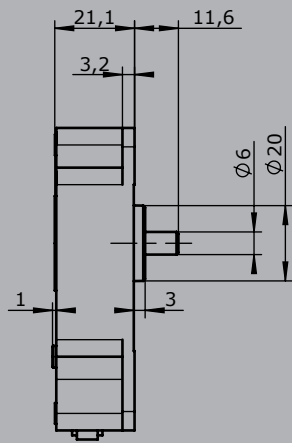
Plug (Profibus) 90° angled

Plug with cable 2 x 0,25 mm², 2000 mm long, cable head open (cable for current supply OEC 4 single application)

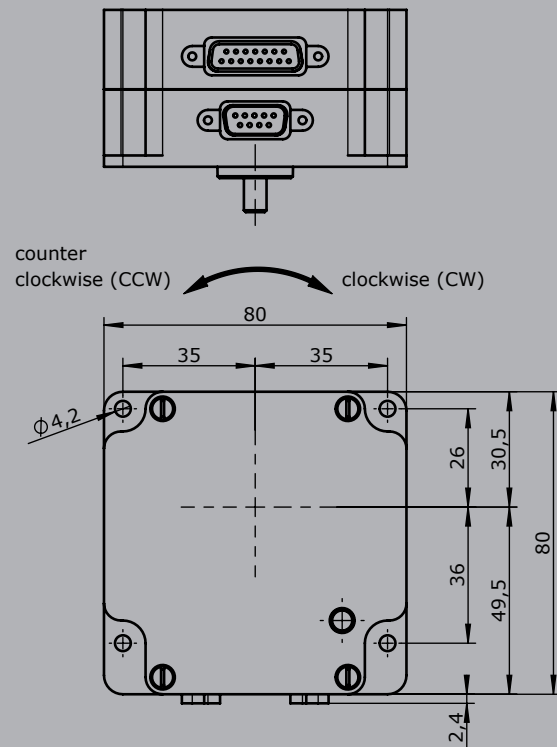
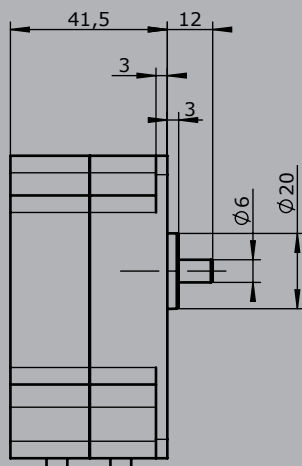
Connecting cable OEC 4/ OEC 2 (14 x 0,25 mm²) with 2 plug connectors incl. cable for current supply (2 x 0,25 mm² 2000 mm long, cable head open)

The OEC 4 is able for mounting on V6,VV6/D64,DD64/V11/S2,SS2/S6/N6. For mounting a potentiometer mounting option (P) of the respective controller is required! For a controller with one axis is required 1 piece of OEC 4, for a controller with 2 axis are required 1 piece of OEC 4 and 1 piece of OEC 2.

OEC 2



OEC 4

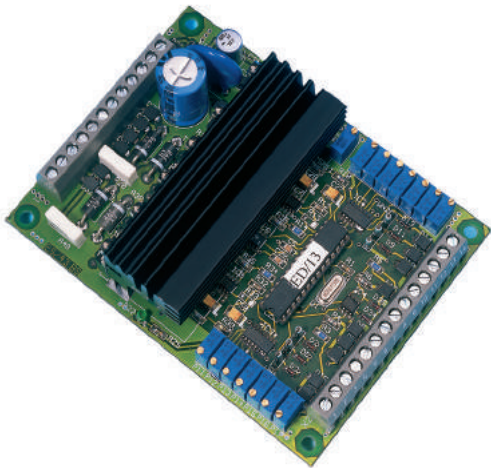




The electronic control unit ES/43 serves for control of proportional valves without position control. There is a version for 4 proportional valve solenoids (ES / 43-10) and a version for 2 Proportional valve solenoids (ES / 43-11) available.

Features:

- Stabailized voltage
- Chopper output stage with adjustable frequency
- Ramp time setting ON/OFF delay
- Creep speed circuit adjustable
- Solenoid current setting separate for minimum current and maximum current
- Output current controlled independently of temperature and solenoid
- Power output short-circuit-proof with overload protection
- Voltage input protected against polarity reversal
- Mechanical selection of direction by means of contacts
- LED operating voltage and working display
- Microprocessor technology therefore especially adaptable



Example

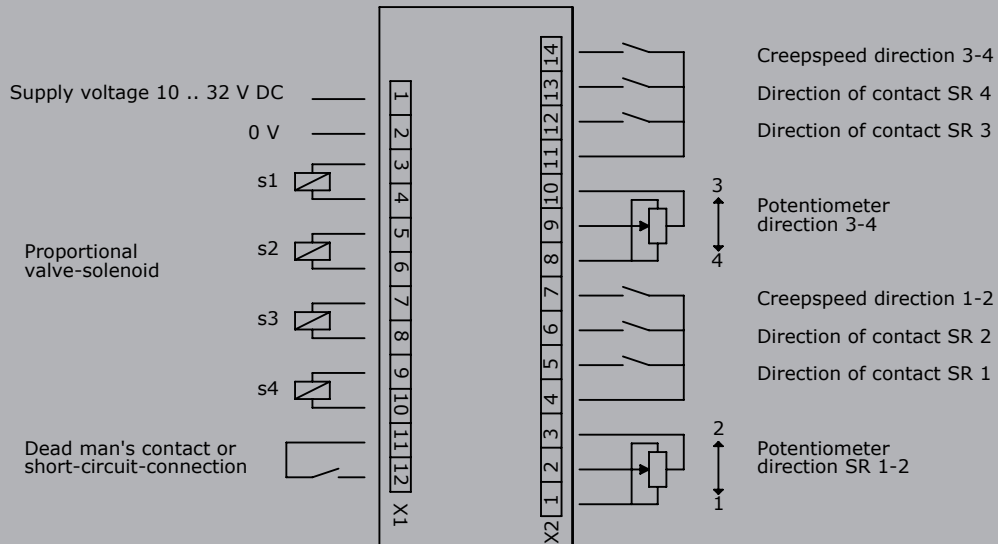
Technical data:

- Supply voltage		10...	32 V DC
- Residual ripple		20%	
- Control voltage range	Ue	0...	5 V
- Control current	Ie	< 1mA	
- Dither frequency	f	25...	250Hz
- Proportional valve S 1-4	I min.	0...	1A
Output	I max. = I min ...		2A at 12 Volt
Output	I max. = I min ...		1A at 24 Volt
- Ramp time setting	t on	0,2...	25 sec
	t off	0,2...	25 sec
- Creep speed	variable reduction		25...75%
- Operating temperature	-40°C to +85°C		
- Storage temperature	-40°C to +80°C		

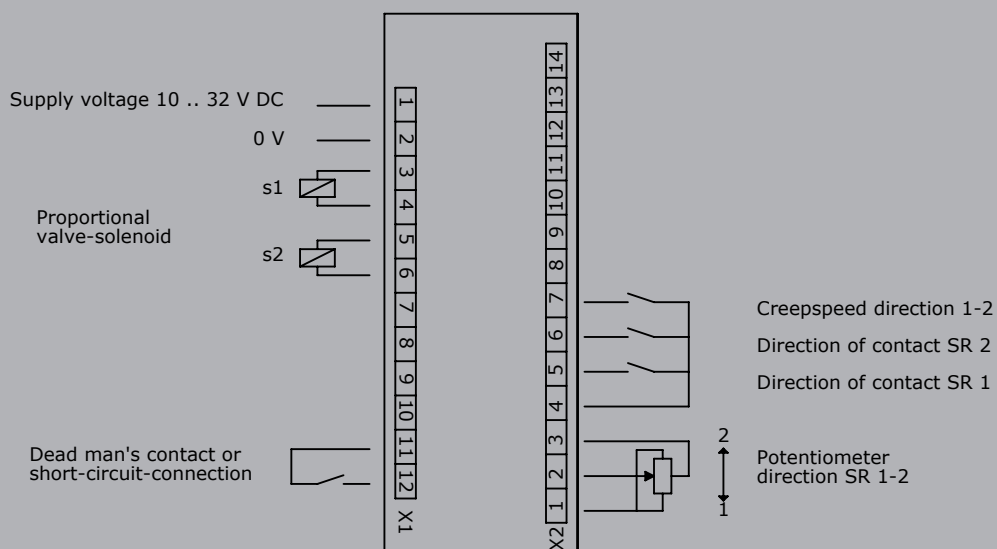
Electronic control unit for 4 proportional valves solenoid ES/43-10

Electronic control unit for 2 proportional valves solenoid ES/43-11

ES / 43-10
4 Proportional valves-solenoid



ES / 43-11
2 Proportional valves-solenoid



Palm grip MATRIX with attach to our switching device



Controllers	Palm grip																				
	B1	B2	B3	B5	B6	B7 / B8	B9	B10	B14 / B15	B20	B22	B23	B24	B25	B28	B29	B30	B31	B32	B33	B34
V6 / VV6	X	X	X*1	X	X			X	X		X		X		X		X		X	X	X
V11	X			X	X			X	X		X		X		X		X		X	X	X
V8 / VV8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
V85 / VV85	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
V25	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
V24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
V14 / S14				X	X						X								X*2	X	
D64 / DD64								X													
D8								X													
D3								X													
S2 / SS2				X																	
S22 / SS22				X																	
S21 / SS21				X	X			X			X		X		X	X	X		X	X	X
S26				X																	
V27	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

*1 deflection limited to 28°

*2 only with adapter installation plate (installation from the top)

Hall-push button HD



The hall-push button impressed by its durability and versatility. It is available in three basic versions. By combining different lighting options, colours and symbols, it is possible to customize.

Technical data

Mechanical life	10 million operating cycles
Operation temperature	-40°C til +85°C
Degree of protection	IP67

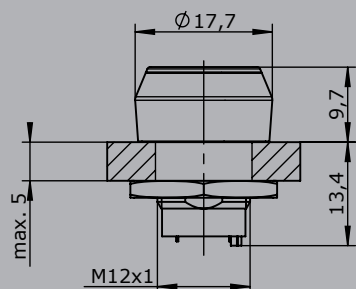


		HD1	-2	-1	-1	-1	-E0111	-X
Basic unit								
HD1	Hall-push button digital with bellow							
HD2	Hall-push button digital without bellow							
HD3	Hall-push button digital, flat mounting without bellow							
HD4	Hall-push button digital without bellow, actuator convex							
HD5	Hall-push button digital, flat mounting without bellow, actuator convex							
Illumination								
1	Unlighted							
2	Night light white, U_LED=4,5 - 5,5 V							
3	Functional lighting 2-coloured red-green (single shiftable) U_LED=4,5 - 5,5 V							
4	Functional lighting 2-coloured red-white (single shiftable) U_LED=4,5 - 5,5 V							
5	Functional lighting 2-coloured green-white (single shiftable) U_LED=4,5 - 5,5 V							
Actuator colour								
1	Transparent							
2	Black*							
3	White*							
4	Yellow*							
5	Green*							
6	Blue*							
7	Red*							
8	Orange*							
9	Grey*							
*Only possible by HD4 and HD5!								
Icon platelets								
0	Without icon platelets (only for HD4 and HD5)							
1	White transparent* (Print on back side possible, thereby the print is resistant to abrasion!)							
2	White*							
3	Yellow*							
4	Green*							
5	Blue*							
6	Black*							
7	Red*							
8	Orange*							
*Not possible with HD4 and HD5!								

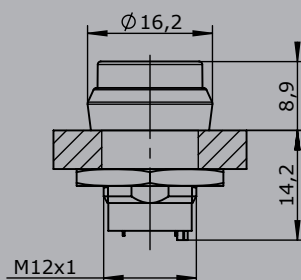
Technical details may vary based on configuration or application! Technical data subject to change without notice!

		HD1	-2	-1	-1	-1	-E0111	-X
Symbol								
1	Without							
2	Buzzer*							
3	Arrow up*							
4	Arrow down*							
5	Turtle*							
6	Rabbit*							
X	Custom-made*							
*Only possible by HD1 til HD3!								
*More Symbols on request!								
Interface								
E0101	Push button signal not redundant Ub=4,5 - 5,5 V DC							
E0111	Push button signal redundant Ub=4,5 - 5,5 V DC							
E0201	Push button signal not redundant Ub=4 - 32 V DC							
E0211	Push button signal redundant Ub=4 - 32 V DC							
0	Energy safe I (Hall) max. = 3,2 mA (limited)							
1	Possible for optocoupler and PLC							
2	Power switch (Open Drain) I_Hallmax= 25 mA							
Special model								
X	Special / customer specified							

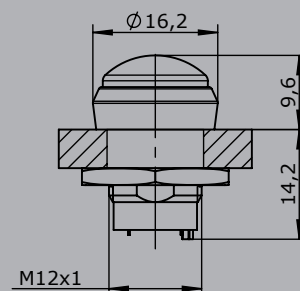
Edition:
HD1



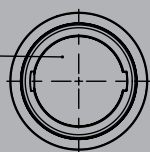
Edition:
HD2



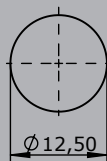
Edition:
HD4



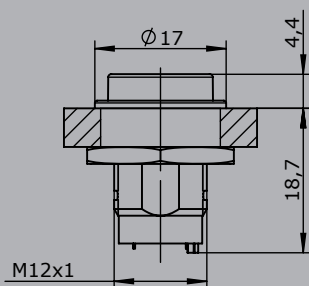
Symbol plate



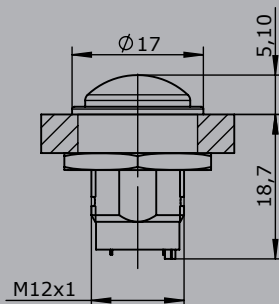
Hole pattern
HD1, HD2, HD4



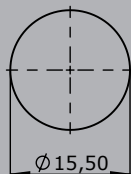
Edition:
HD3



Edition:
HD5



Hole pattern
HD3, HD5



Palm grip B25



The palm grip B25 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data



Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC 13 (*1 0,1A 24 V DC13)

	B25L	-2D	W	K	SE	V21	H13	-X
Basic unit								
B25L Palm grip left								
B25R Palm grip right								
Digital actuating element								
D Push button KDA21 *1								
Colour: red, black, yellow, green, blue, white, orange								
HD Hall-push button (see page 154)								
W Rocker switch momentary (T) or maintained (R), colours: red, black, yellow, blue, white								
Mechanical functions: T-0-T, 0-T, R-0-T, R-0-R, 0-R, R-R								
K Lever switch								
SR Sliding switch R-0-R								
ST Sliding switch T-0-T								
SE Sensor button capacitive with external control electronics								
S Sensor button capacitive without external control electronics								
(Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)								
V Vibration								
Analog actuating element								
S12 Hall-Thumb rocker, Output 0,5...2,5...4,5 V inverse dual (see page 100)								
V21 Hall-minijoystick, Output 0,5...2,5...4,5 V inverse dual (see page 45)								
H13 Hall-rotary grip, Output 0,5...2,5...4,5 V inverse dual								

CAN			
Supply voltage	9-32 V DC		
Idle current consumption	80 mA (24 V DC)		
Current carrying capacity	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LED`s)		
Protocol	CANopen CiA DS 301, SAE J1939 or CANopen Safety CIA 304		
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)		
Output value	255...0...255		
CAN	E313 1	CANopen Safety	E412 1
- 8 analog joystick axis		- 8 analog joystick axis	
- 48 digital joystick functions		- 48 digital joystick functions	
Additional with 16 LED-outputs	2	Additional with 16 LED-outputs	2
Additional with 32 LED-outputs	3	Additional with 32 LED-outputs	3

Special model

X	Special / customer specified
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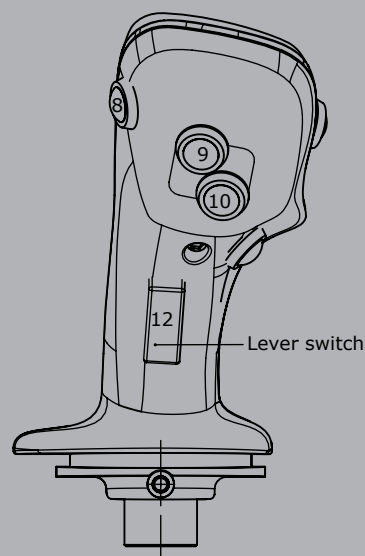
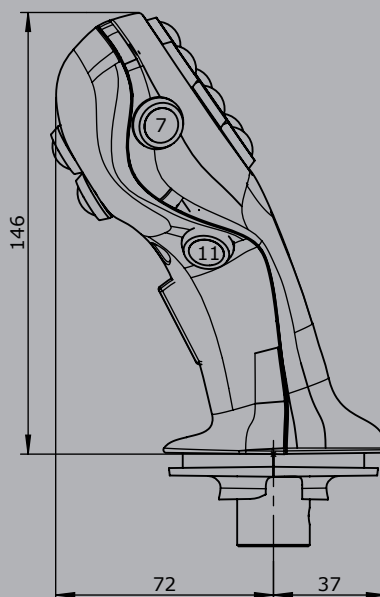
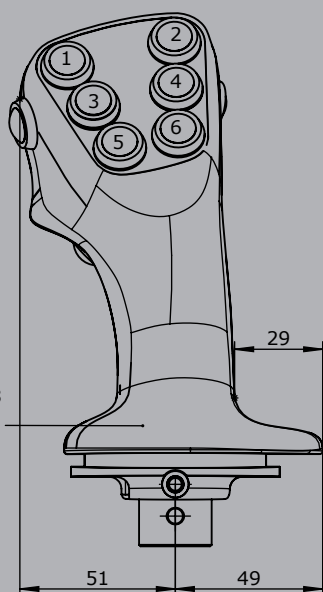
Technical details may vary based on configuration or application! Technical data subject to change without notice!

B25R

Push button installed Pos. 1 - 11
Lever switch installed Pos. 12

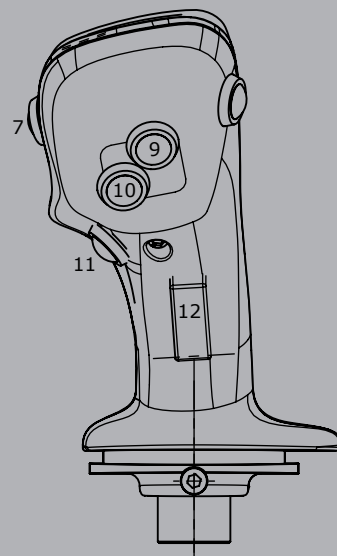
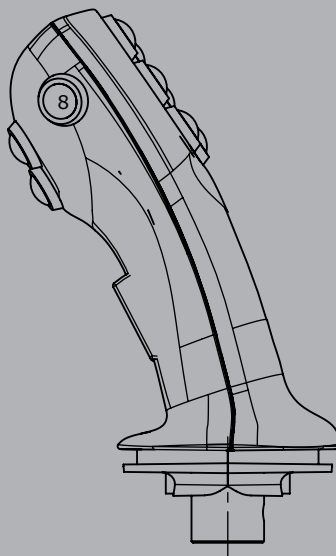
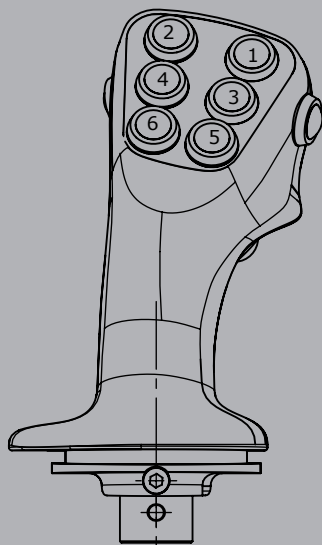
Rocker switch
installed Pos. 9+10 possible

Twist grip PA13,H13
Direction 13-14
Actuating by
rotation $\pm 25^\circ$



B25L

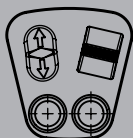
Push button installed Pos. 1 - 11
Lever switch installed Pos. 12



Edition: B25R
Rocker switch installed Pos. 3+1
Rocker switch installed Pos. 2+4



Edition: B25R
Sliding switch installed Pos. 3+1
Rocker switch installed Pos. 2+4



Edition: B25R
Multi-axis controller V21
installed Pos. 2+4
Rocker switch installed Pos. 5+6



Edition: B25R
Hall Push button
installed Pos. 1,2,5,6,15
Rocker switch installed Pos. 3,4



Palm grip B30



The palm grip B30 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

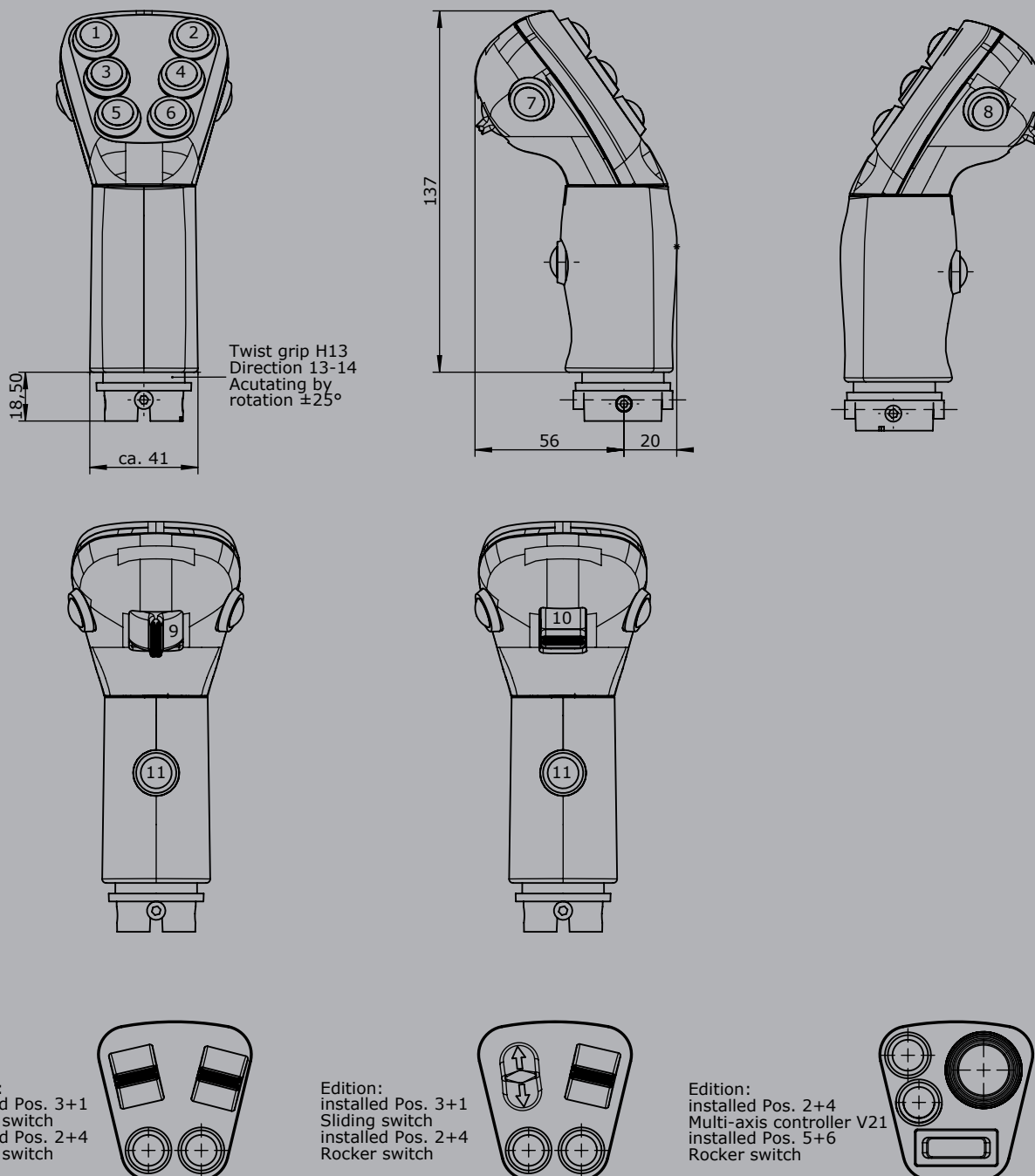
Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC 13 (*1 0,1A 24 V DC13)



		B30	-2D	W	SR	SE	S12	H13	-X
Basic unit									
B30	Palm grip								
Digital actuating element									
D	Push button KDA21 *1								
	Colour: red, black, yellow, green, blue, white, orange								
HD	Hall-push button (see page 154)								
W	Rocker switch T-0-T, Colour: red, black, yellow, blue, white								
W	Rocker switch 0-T, Colour: red, black, yellow, blue, white								
W	Rocker switch R-0-T, Colour: red, black, yellow, blue, white								
W	Rocker switch R-0-R, Colour: red, black, yellow, blue, white								
W	Rocker switch 0-R, Colour: red, black, yellow, blue, white								
W	Rocker switch R-R, Colour: red, black, yellow, blue, white								
SR	Sliding switch R-O-R								
ST	Sliding switch T-0-T								
SE	Sensor button capacitive with external control electronics								
S	Sensor button capacitive without external control electronics								
(Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)									
Analog actuating element									
S12	Hall-Thumb rocker (see page 100)								
	Output 0,5...2,5...4,5 V inverse dual								
V21	Hall-minijoystick (see page 45)								
	Output 0,5...2,5...4,5 V inverse dual								
H13	Hall-rotary grip								
	Output 0,5...2,5...4,5 V inverse dual								
Special model									
X	Special / customer specified								

B30

Push button
installed Pos. 1 - 8 +11
Rocker switch
installed Pos. 9+10



Palm grip B3



The palm grip B3 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)



		Example							
		B3	-2D	W	K	SE	PA11	PA13	-X
Basic unit									
B3	Palm grip								
Digital actuating element									
D	Push button								
	Colour: red, black, yellow, green, blue, grey								
D	Push button KDA21 *1								
	Colour: red, black, yellow, green, blue, white, orange								
W	Rocker switch T-0-T								
W	Rocker switch 0-T								
W	Rocker switch R-0-T								
W	Rocker switch R-0-R								
W	Rocker switch 0-R								
W	Rocker switch R-R								
K	Lever switch								
SR	Sliding switch								
ST	Sliding switch								
ZD	Push button with 2 steps								
A12	Push button Pos. 11-12								
A11	Thumbwheel T-0-T								
A11	Thumbwheel R-0-R								
	L left, R right								
A13	Rotary grip T-0-T								
SE	Sensor button capacitive								
S	Sensor button capacitive without external control electronics								
	(Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)								
V	Vibration								

Technical details may vary based on configuration or application! Technical data subject to change without notice!

B3L -2D W K SE PA11R PA13 -X

Analog actuating element

PA11	Thumbwheel
	Potentiometer T375 2 x 5 kOhm with direction contacts
H11	Thumbwheel
	Hall-Potentiometer
	Output 0,5...2,5...4,5 V inverse dual
	L left, R right
PA12	Push button analog Pos. 11+12
	Potentiometer T375 2 x 5 kOhm with direction contacts
H12	Push button analog Pos. 11+12
	Hall-Potentiometer
	Output 0,5...2,5...4,5 V inverse dual
PA13	Rotary handle
	Potentiometer T375 2 x 5 kOhm with direction contacts
H13	Hall-Rotary handle
	Output 0,5...2,5...4,5 V inverse dual

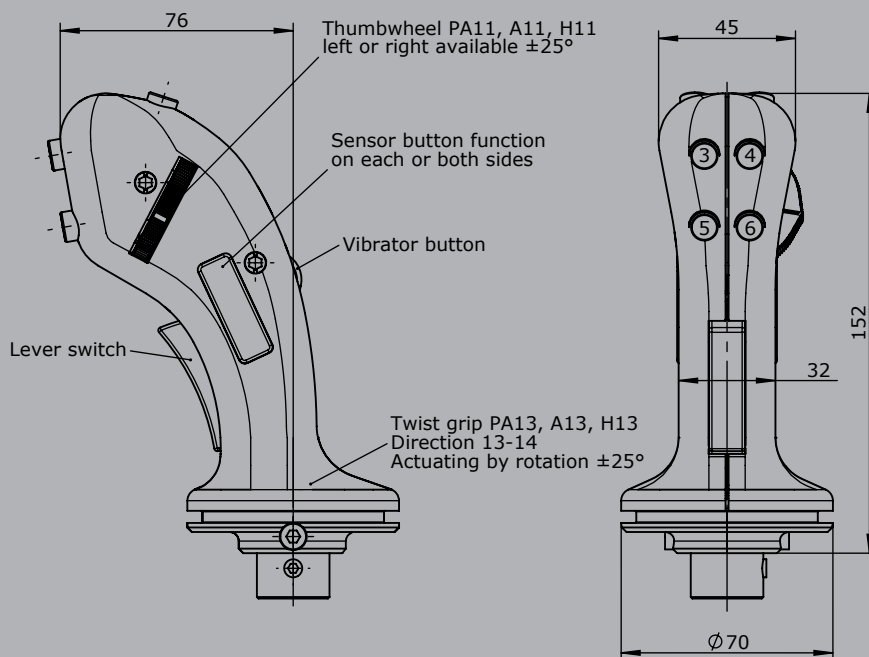
Special model

X	Special / customer specified
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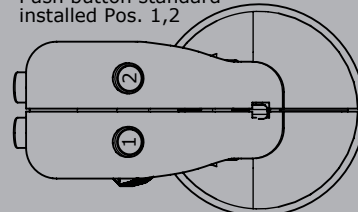
Attachments

Z01	Bellow KMD 109	10300009
Z02	Bellow KMD 190	10300093
Z03	Rosette KBF 905 with 4 screws M5 x 15 necessary for bellow KMD 190	520990004

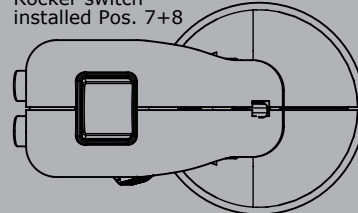
B3



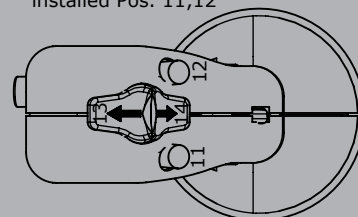
Edition:
Push button standard
installed Pos. 1,2



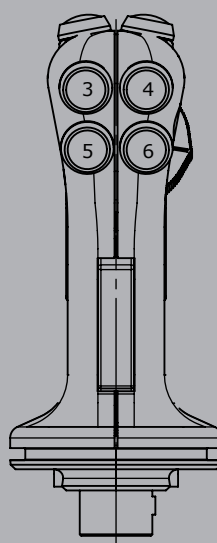
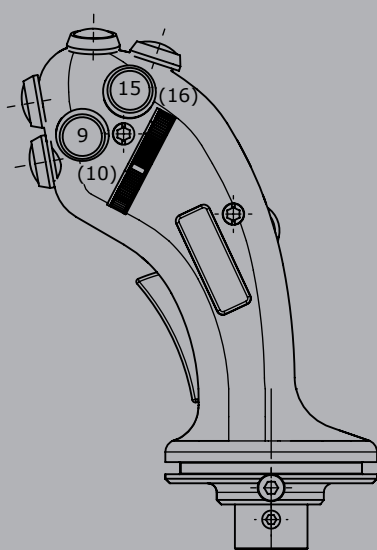
Edition:
Rocker switch
installed Pos. 7+8



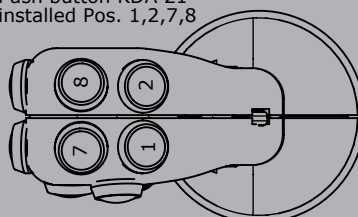
Edition:
Sliding switch
installed Pos. 13 + 14
Drive with potentiometer PA12 bzw.
Push button with 2 steps ZD
installed Pos. 11,12



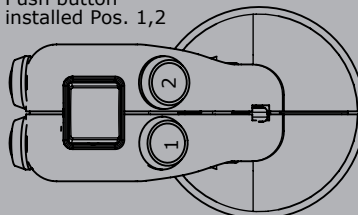
() = Installation right



Edition:
Push button KDA 21
installed Pos. 1,2,7,8



Edition:
Rocker switch
installed Pos. 7 + 8
Push button
installed Pos. 1,2



Palm grip B31



The palm grip B31 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long).

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)



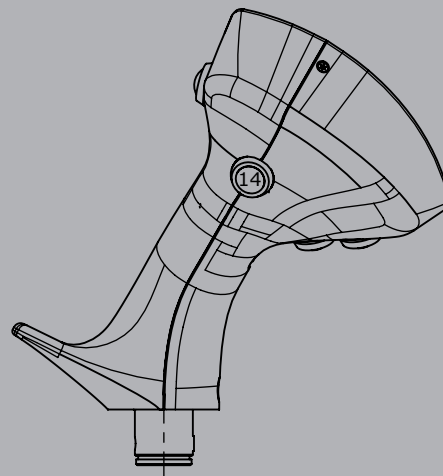
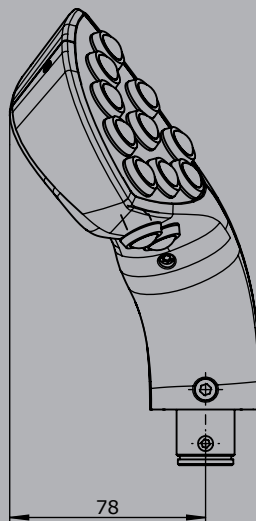
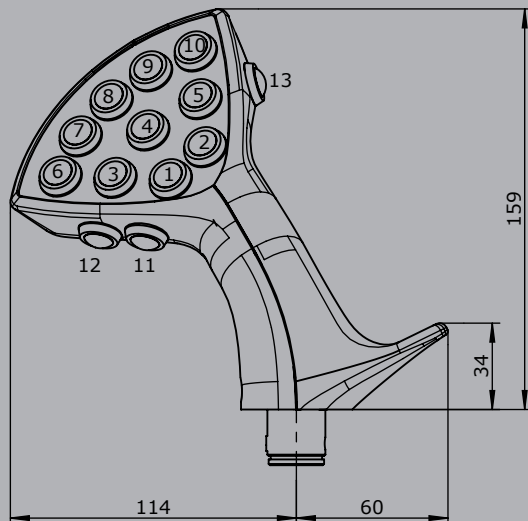
Example

	B31R	-2D	W	KT	S12	V21	-X
Basic unit							
B21R Palm grip right							
Digital actuating element							
D Push button KDA21 *1							
Colour: red, black, yellow, green, blue, white, orange							
HD Hall-push button (see page 154)							
W Rocker switch momentary (T) or maintained (R), colours: red, black, yellow, blue, white							
Mechanical functions: T-0-T, 0-T, R-0-T, R-0-R, 0-R, R-R							
KT Cross switch T-0-T / T-0-T							
Analog actuating element							
S12 Hall-Thumb rocker (see page 100)							
Output 0,5...2,5...4,5 V inverse dual							
V21 Hall-minijoystick (see page 45)							
Output 0,5...2,5...4,5 V inverse dual							
CAN							
Supply voltage	9-32 V DC						
Idle current consumption	80 mA (24 V DC)						
Current carrying capacity	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LED`s)						
Protocol	CANopen CiA DS 301, SAE J1939 or CANopen Safety CIA 304						
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)						
Output value	255...0...255						
CAN						E313 1	
- 8 analoge joystick axis							
- 48 digital joystick functions							
Additional with 16 LED-outputs						2	
Additional with 32 LED-outputs						3	
CANopen Safety						E412 1	
- 8 analog joystick axis							
- 48 digital joystick functions							
Additional with 16 LED-outputs						2	
Additional with 32 LED-outputs						3	
Special model							
X Special / customer specified							

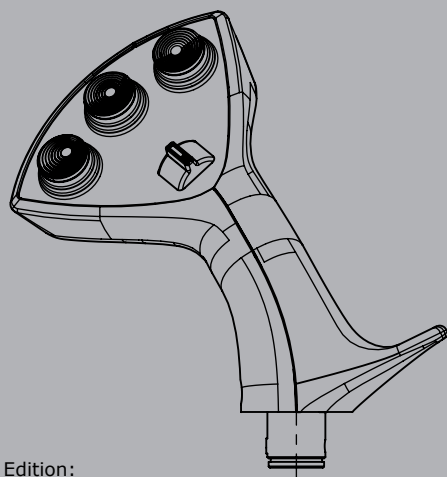
Technical details may vary based on configuration or application! Technical data subject to change without notice!

B31

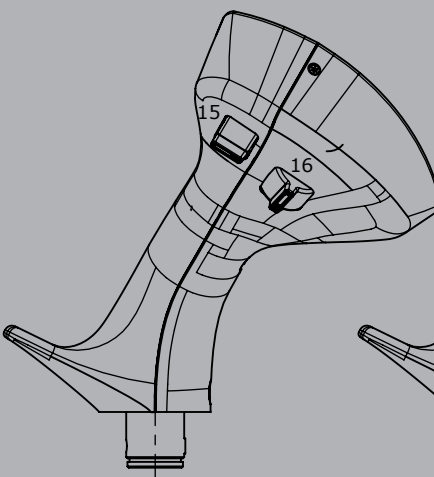
Edition:
Push button installed Pos. 1-14



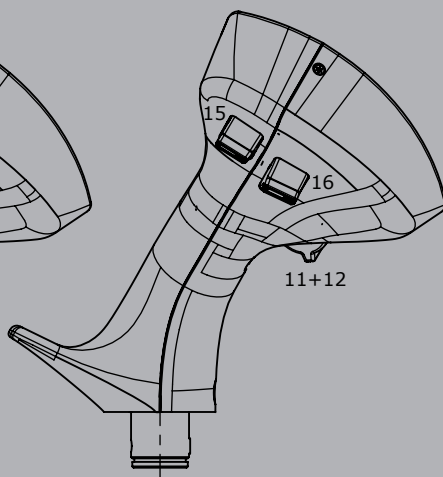
Edition:
Multi-axis controller V21
installed Pos. 6+7, Pos.8, Pos. 9+10
Rocker switch installed Pos. 1+2



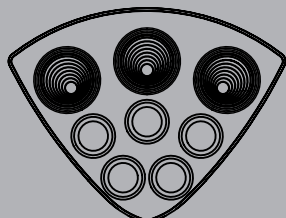
Edition:
Rocker switch
installed Pos. 15, 16 horizontal



Edition:
Rocker switch
installed Pos.11+12, 15, 16 vertical



Edition:
Multi-axis controller V21
Installed Pos. 6+7, Pos.8, Pos. 9+10
Push button installed Pos. 1-5



Palm grip B32



The palm grip B32 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC 13 (*1 0,1A 24 V DC13)



Example

B32L -2D W SE S12 -X

Basic unit

B32L	Palm grip left
B32R	Palm grip right

Digitale actuating element

D	Push button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange
HD	Hall-push button (see page 154)
W	Rocker switch T-0-T, Colour: red, black, yellow, blue, white
W	Rocker switch 0-T, Colour: red, black, yellow, blue, white
W	Rocker switch R-0-T, Colour: red, black, yellow, blue, white
W	Rocker switch R-0-R, Colour: red, black, yellow, blue, white
W	Rocker switch 0-R, Colour: red, black, yellow, blue, white
W	Rocker switch R-R, Colour: red, black, yellow, blue, white
SE	Sensor button capacitive with external control electronics
S	Sensor button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)

Analog actuating element

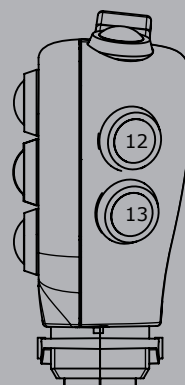
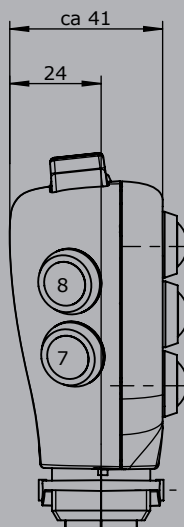
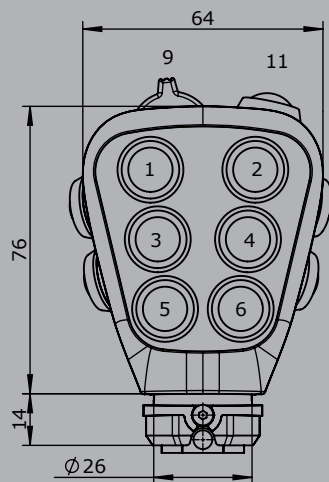
S12	Hall-Thumb rocker (see page 100) Output 0,5...2,5...4,5 V inverse dual
V21	Hall-mini joystick (see page 45) Output 0,5...2,5...4,5 V inverse dual

Special model

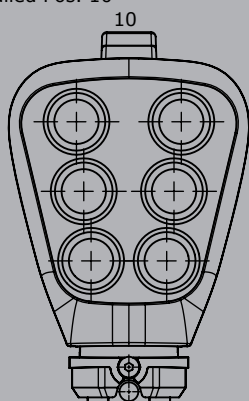
X	Special / customer specified
---	------------------------------

B32

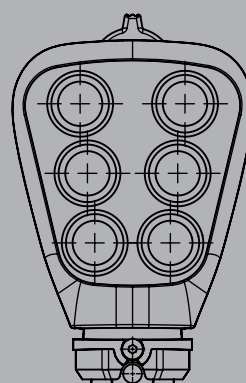
Push button
installed Pos. 1 - 8, 11 - 13
Rocker switch
installed Pos. 9



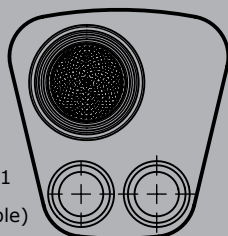
Push button
installed Pos. 1 - 8, 12 + 13
Rocker switch lengthwise
installed Pos. 10



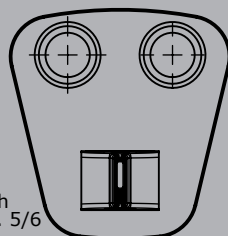
Rocker switch crosswise
installed Pos. 10



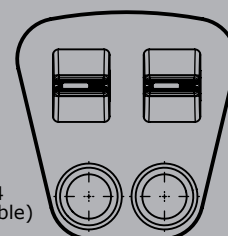
Edition:
Multi-axis controller V21
installed Pos. 1/3
(Pos. 9 - 11 not available)



Edition:
Rocker switch
installed Pos. 5/6



Edition:
Rocker switch
installed Pos. 1/3 + 2/4
(Pos. 9 - 11 not available)



Palm grip B33



The palm grip B32 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 10 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	*1 0,1A 24 V DC13



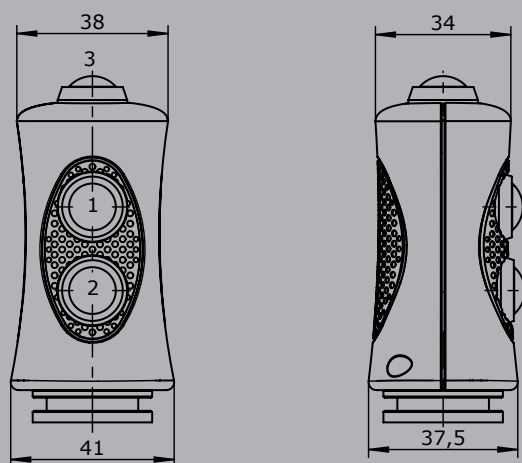
2

	B33L	-2D	S12	-X
Basic unit				
B33L	Palm grip left			
B33R	Palm grip right			
Digitale actuating element				
D	Push button KDA21 *1			
	Colour: red, black, yellow, green, blue, white, orange			
HD	Hall-push button (see page 154)			
Analog actuating element				
S12	Hall-Thumb rocker (see page 100)			
	Output 0,5...2,5...4,5 V inverse dual			
Special model				
X	Special / customer specified			

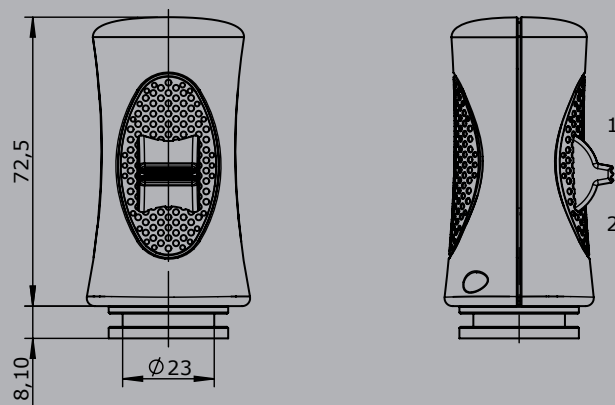
Technical details may vary based on configuration or application! Technical data subject to change without notice!

B33

Edition:
Push button installed Pos. 1,2,3



Edition:
Rocker switch installed Pos. 1+2



Palm grip B34



The palm grip B32 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC 13 (*1 0,1A 24 V DC13)

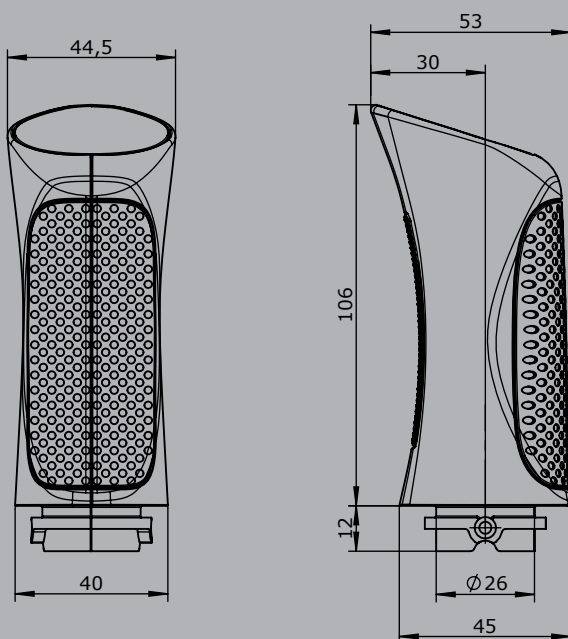


2

	B34L	-2D	W	S12	-X
Basic unit					
B34L	Palm grip left				
B34R	Palm grip right				
Digitale actuating element					
D	Push button KDA21 *1				
	Colour: red, black, yellow, green, blue, white, orange				
HD	Hall-push button (see page 154)				
W	Rocker switch T-0-T, Colour: red, black, yellow, blue, white				
W	Rocker switch 0-T, Colour: red, black, yellow, blue, white				
W	Rocker switch R-0-T, Colour: red, black, yellow, blue, white				
W	Rocker switch R-0-R, Colour: red, black, yellow, blue, white				
W	Rocker switch 0-R, Colour: red, black, yellow, blue, white				
W	Rocker switch R-R, Colour: red, black, yellow, blue, white				
K	Lever switch				
Analog actuating element					
S12	Hall-Thumb rocker (see page 100)				
	Output 0,5...2,5...4,5 V inverse dual				
Special model					
X	Special / customer specified				

Technical details may vary based on configuration or application! Technical data subject to change without notice!

B34



Edition:

Push button installed Pos. 1-3

Rocker switch installed Pos. 4-5

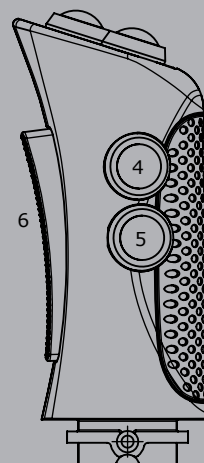
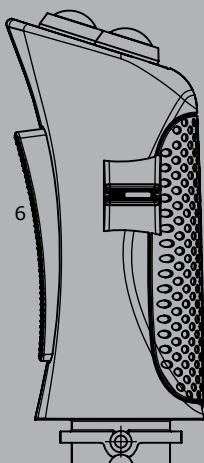
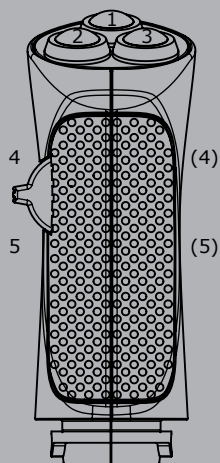
Lever switch installed Pos. 6

Position rocker switch or push button left hand ()

Edition:

Push button installed Pos. 1-3,4,5

Lever switch installed Pos. 6



Palm grip B23



The palm grip B23 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)

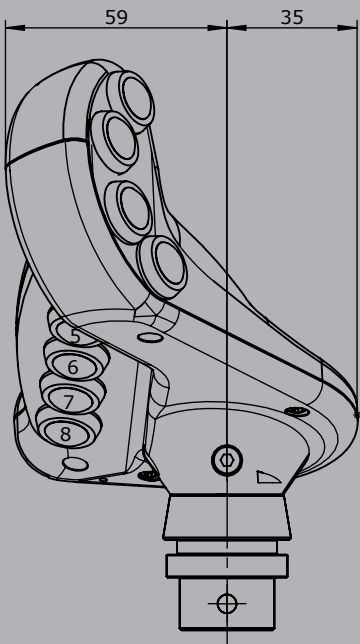
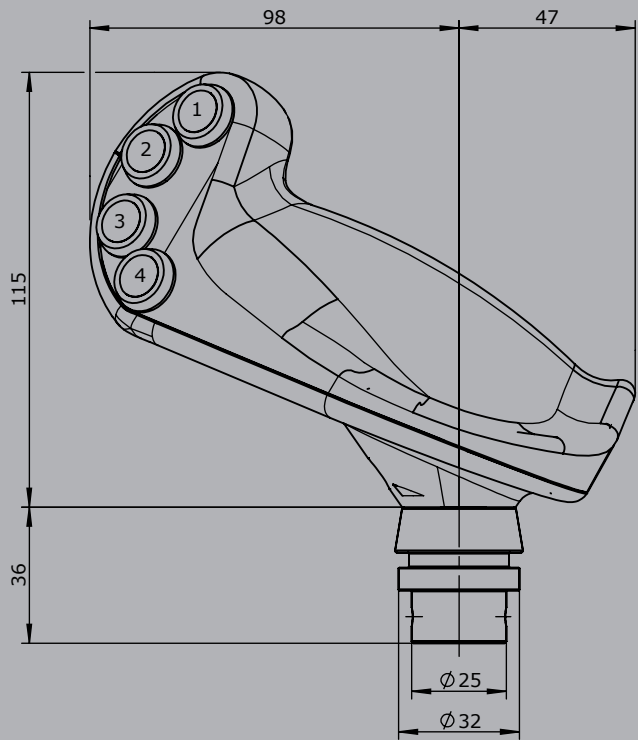


Example

	B23R	-2D	W	V21	-X
Basic unit					
B23L Palm grip left					
B23R Palm grip right					
Digital actuating element					
D Push button KDA21 *1					
Colour: red, black, yellow, green, blue, white, orange					
W Rocker switch T-0-T, Colour: red, black, yellow, blue, white					
W Rocker switch 0-T, Colour: red, black, yellow, blue, white					
W Rocker switch R-0-T, Colour: red, black, yellow, blue, white					
W Rocker switch R-0-R, Colour: red, black, yellow, blue, white					
W Rocker switch 0-R, Colour: red, black, yellow, blue, white					
W Rocker switch R-R, Colour: red, black, yellow, blue, white					
Analog actuating element					
S12 Hall-Thumb rocker (see page 100)					
Output 0,5...2,5...4,5 V inverse dual					
V21 Hall-mini joystick (see page 45)					
Output 0,5...2,5...4,5 V inverse dual					
Special model					
X Special / customer specified					

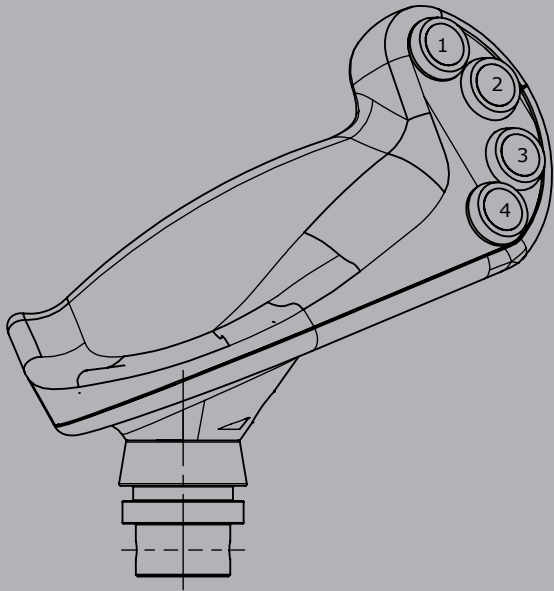
B23R

Push button installed Pos. 1 - 8

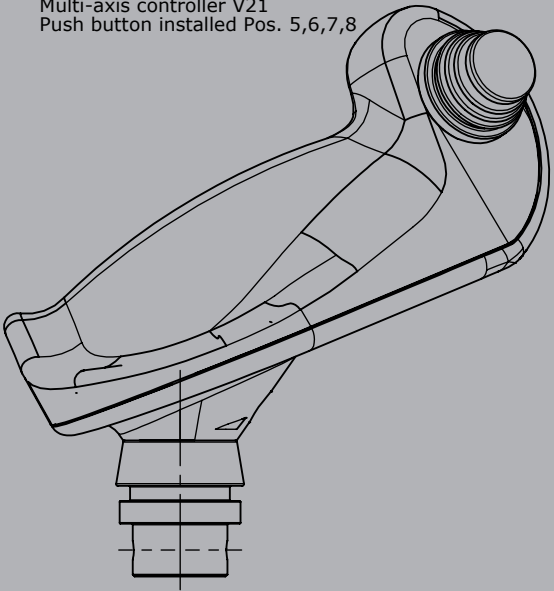


B23L

Push button installed Pos. 1 - 8



Edition :
Multi-axis controller V21
Push button installed Pos. 5,6,7,8



Palm grip B20



The palm grip B20 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)



Example

B20L -2D W K V21 H13 -X

Basic unit

B20L	Palm grip left with hand pad
B20R	Palm grip right with hand pad

Digital actuating element

D	Push button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange
HD	Hall-push button (see page 154)
W	Rocker switch T-0-T, Colour: red, black, yellow, blue, white
W	Rocker switch 0-T, Colour: red, black, yellow, blue, white
W	Rocker switch R-0-T, Colour: red, black, yellow, blue, white
W	Rocker switch R-0-R, Colour: red, black, yellow, blue, white
W	Rocker switch 0-R, Colour: red, black, yellow, blue, white
W	Rocker switch R-R, Colour: red, black, yellow, blue, white
K	Lever switch
KT	Cross switch T-0-T / T-0-T
SE	Sensor button capacitive with external control electronics
S	Sensor button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)

Analog actuating element

S12	Hall-thumb rocker (see page 100) Output 0,5...2,5...4,5 V inverse dual
V21	Hall-minijoystick (see page 45) Output 0,5...2,5...4,5 V inverse dual
P9	Thumbwheel with potentiometer
H13	Hall-Rotary grip Output 0,5...2,5...4,5 V inverse dual

Special model

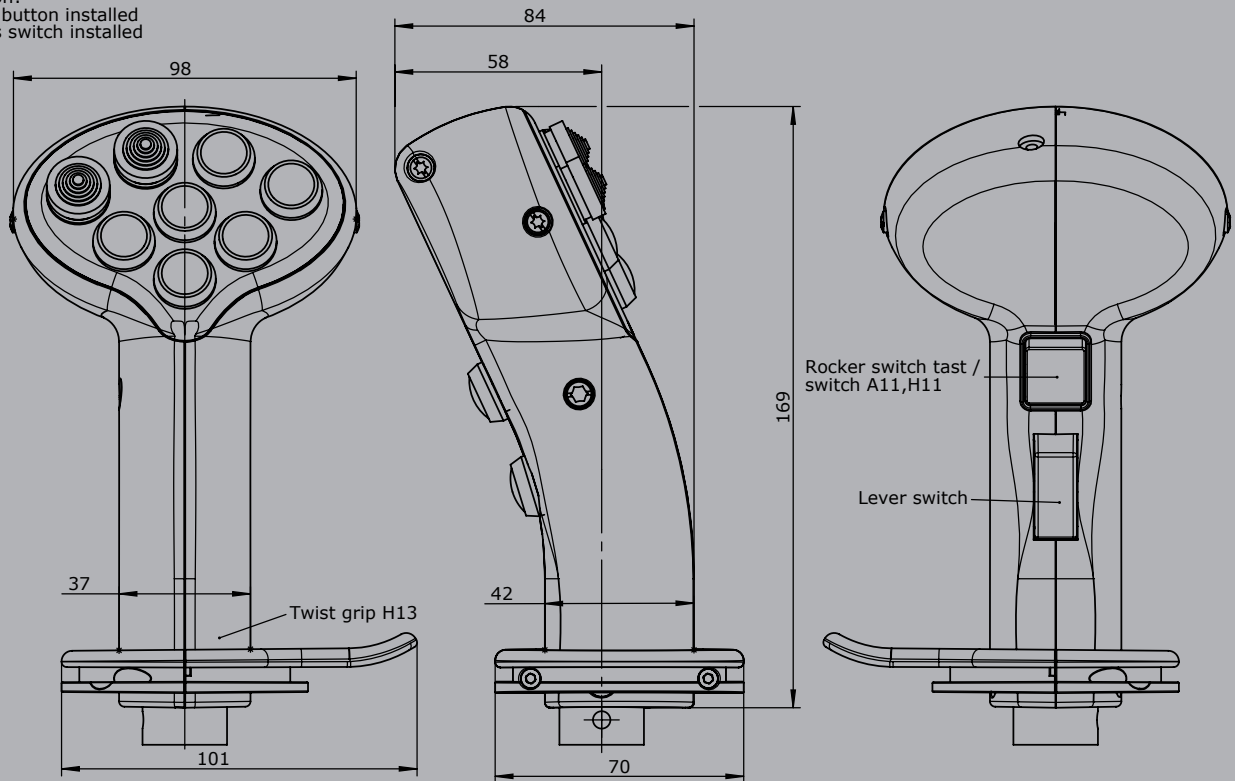
X	Special / customer specified
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Attachments

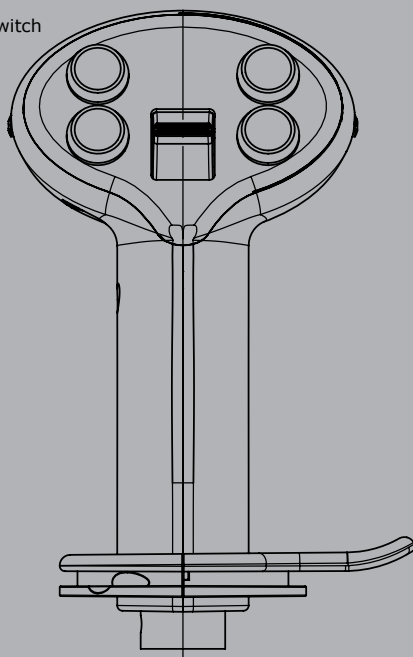
Z01	Bellow KMD 109	10300009
Z02	Bellow KMD 190	10300093
Z03	Rosette KBF 905 with 4 screws M5 x 15 necessary for bellow KMD 190	5209900404

Technical details may vary based on configuration or application! Technical data subject to change without notice!

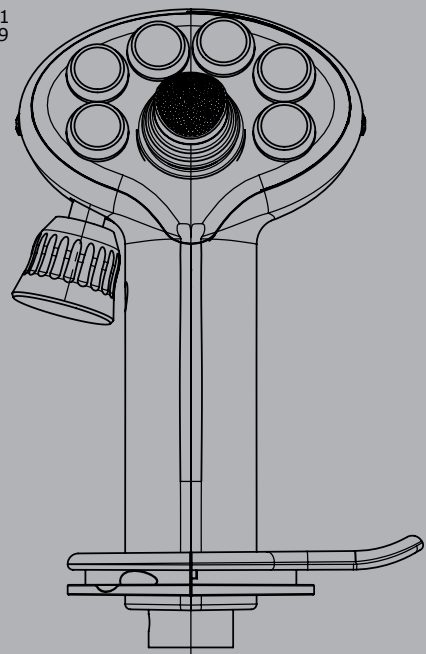
Edition:
Push button installed
Cross switch installed



Edition:
Hall rocker switch
Push button



Edition:
Multi-axis controller V21
Potentiometer drive PA9
Push button



Palm grip B22



The palm grip B22 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 7 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5 24 V DC13 (*1 0,1A 24 V DC13)



Example

B22AL

-4D

W

-X

Basic unit

B22L	Palm grip left
B22R	Palm grip right
B22AL	Palm grip left with support
B22AR	Palm grip right with support

Digital actuating element

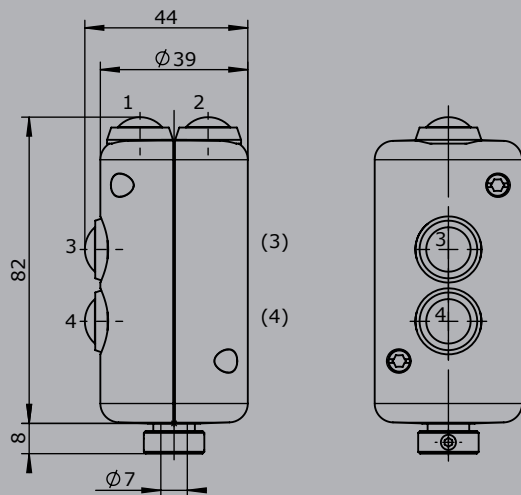
D	Push button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange
W*	Rocker switch T-0-T
W*	Rocker switch 0-T
W*	Rocker switch R-0-T
W*	Rocker switch R-0-R
W*	Rocker switch 0-R
W*	Rocker switch R-R
	<i>*Only possible with version with support!</i>
SE	Sensor button capacitive with external control electronics
S	Sensor button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)

Special model

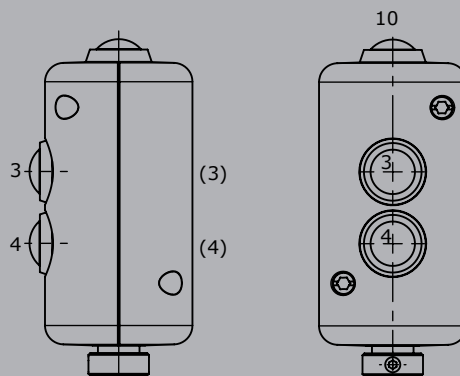
X	Special / customer specified
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B22

Edition:
Push button installed Pos. 1,2,3,4
Position push button left hand ()

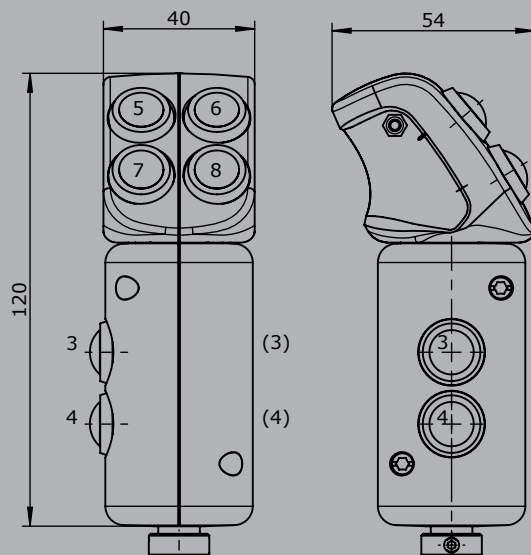


Edition:
Push button installed Pos. 3,4,10
Position push button left hand ()

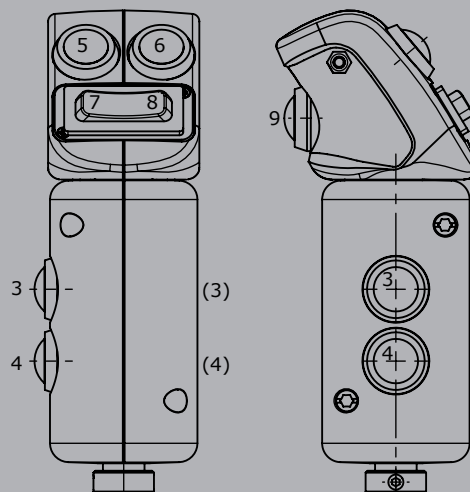


B22A

Edition:
Push button installed Pos. 3,4,5,6,7,8
Position push button left hand ()



Edition:
Push button installed Pos. 3,4,5,6,9
Rocker switch installed Pos. 7-8
Position push button left hand ()



Palm grip B24



The palm grip B24 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The superior grip surface is framed by an illuminated coloured ring element. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)

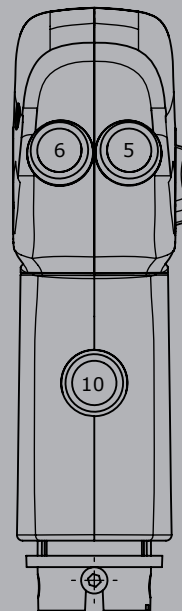
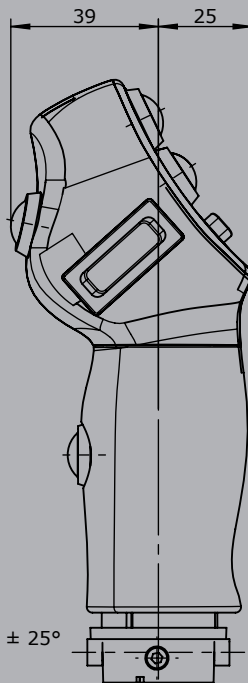
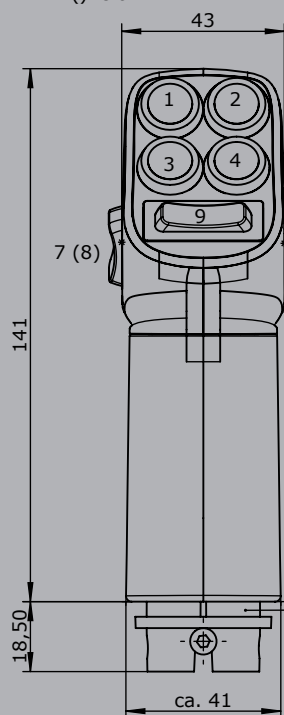


Example
B24

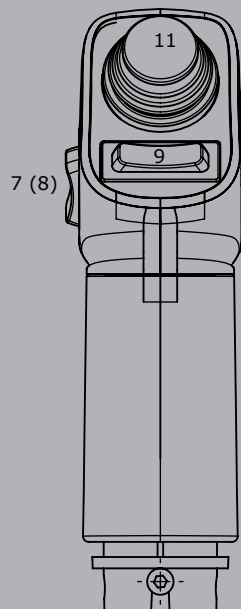
		-D	2W	V21	-IWH	-X
Basic unit						
B24	Palm grip					
Digital actuating element						
D	Push button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange					
W	Rocker switch T-0-T					
W	Rocker switch 0-T					
W	Rocker switch R-0-T					
W	Rocker switch R-0-R					
W	Rocker switch 0-R					
W	Rocker switch R-R					
SE	Sensor button capacitive with external control electronics					
S	Sensor button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)					
Analog actuating element						
V21	Hall-minijoystick (see page 45) Output 0,5...2,5...4,5 V inverse dual					
H13	Hall-rotary grip Output 0,5...2,5...4,5 V inverse dual					
Additional option						
IWH	Colour ring white, illuminated					
IRD	Colour ring red, illuminated					
IBL	Colour ring blue, illuminated					
WH	Colour ring white					
RD	Colour ring red					
BL	Colour ring blue					
GN	Colour ring green					
YE	Colour ring yellow					
Special model						
X	Special / customer specified					

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Edition :
Push button installed Pos. 1 - 6, 10
Rocker switch / taste installed Pos. 7,(8), 9
() left



Edition :
Push button installed Pos. 5,6,10
Rocker switch / taste Pos. 7,(8), 9
multi-axis controller V21 Pos. 11
() left



Palm grip B9



The palm grip B9 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	1,5A 24 V DC13



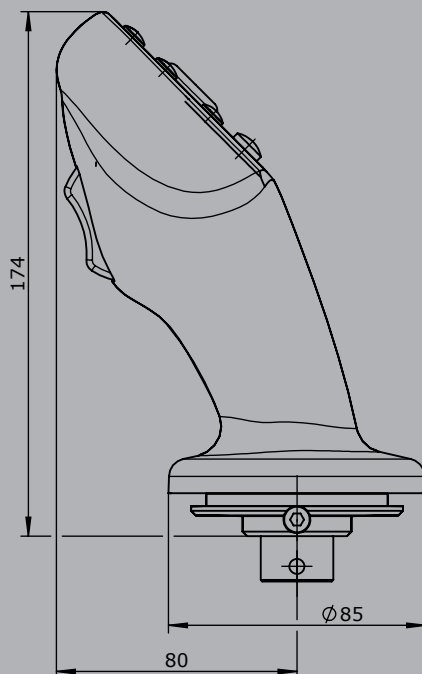
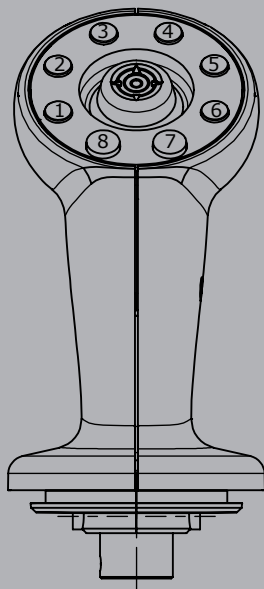
Example

	B9	-2D	KT	A13	PA11	PA13	-X
Basic unit							
B9 Palm grip							
Digital actuating element							
D Push button							
Colour: red, black, yellow, green, blue, white							
KT Cross switch T-0-T / T-0-T							
KR Cross switch R-0-R / R-0-R							
A11 Rocker switch T-0-T Pos. 11 + 12							
A11 Rocker switch R-0-R Pos. 11 + 12							
A13 Rotary grip T-0-T							
Analog actuating element							
V21 Hall-minijoystick (see page 45)							
Output 0,5...2,5...4,5 V inverse dual							
PA11 Rocker analog Pos. 11 + 12							
Potentiometer T394 2 x 5 kOhm with direction contacts							
H11 Rocker analog Pos. 11 + 12							
Hall-Potentiometer							
Output 0,5...2,5...4,5 V inverse dual							
PA13 Rotary grip							
Potentiometer T375 2 x 5 kOhm with direction contacts							
H13 Hall-Rotary grip							
Output 0,5...2,5...4,5 V inverse dual							
Special model							
X Special / customer specified							
Attachments							
Z01 Bellow KMD 109							10300009
Z02 Bellow KMD 190							10300093
Z03 Rosette KBF 905 with 4 screws M5x15 necessary for bellow KMD 190							5209900404

Technical details may vary based on configuration or application! Technical data subject to change without notice!

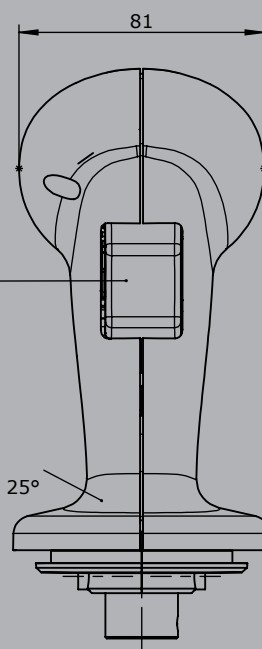
B9

Edition :
Push button installed Pos. 1 - 8
Cross switch fast

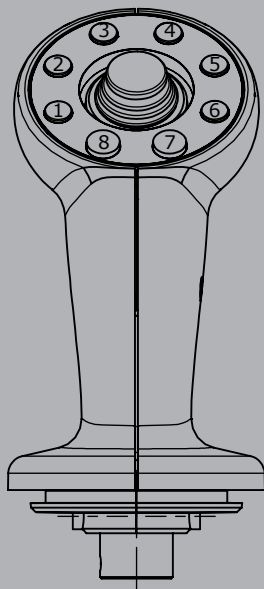


Rocker PA11, A11, H11
Direction 11-12

Twist grip PA13, H13
Direction 13-14
Actuating by rotating $\pm 25^\circ$



Edition :
Push button installed Pos. 1 - 8
Multi-axis controller V21



Palm grip B7 / B8



The palm grip B7 / B8 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)



Example

	B7	-2D	W	K	SE	S9	PA13	-X
Basic unit								
B7	Palm grip left							
B8	Palm grip right							
Digital actuating element								
D	Push button							
	Colour: red, black, yellow, green, white, orange							
D	Push button KDA21 *1							
	Colour: red, black, yellow, green, blue, white, orange							
W	Rocker switch T-0-T, Colour: red, black, yellow, blue, white							
W	Rocker switch 0-T, Colour: red, black, yellow, blue, white							
W	Rocker switch R-0-T, Colour: red, black, yellow, blue, white							
W	Rocker switch R-0-R, Colour: red, black, yellow, blue, white							
W	Rocker switch 0-R, Colour: red, black, yellow, blue, white							
W	Rocker switch R-R, Colour: red, black, yellow, blue, white							
K	Lever switch							
A13	Rotary grip T-0-T							
SE	Sensor button capacitive with external control electronics							
S	Sensor button capacitive without external control electronics							
	(Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)							
V	Vibrator							
	Impulse 24 V DC ED 100%							
Analog actuating element								
S12	Hall-thumb rocker (see page 100)							
	Output 0,5...2,5...4,5 V inverse dual							
V21	Hall-minijoystick (see page 45)							
	Output 0,5...2,5...4,5 V inverse dual							
PA13	Rotary grip							
	Potentiometer T375 2 x 5 kOhm with direction contacts							
H13	Hall-Rotary grip							
	Output 0,5...2,5...4,5 V inverse dual							

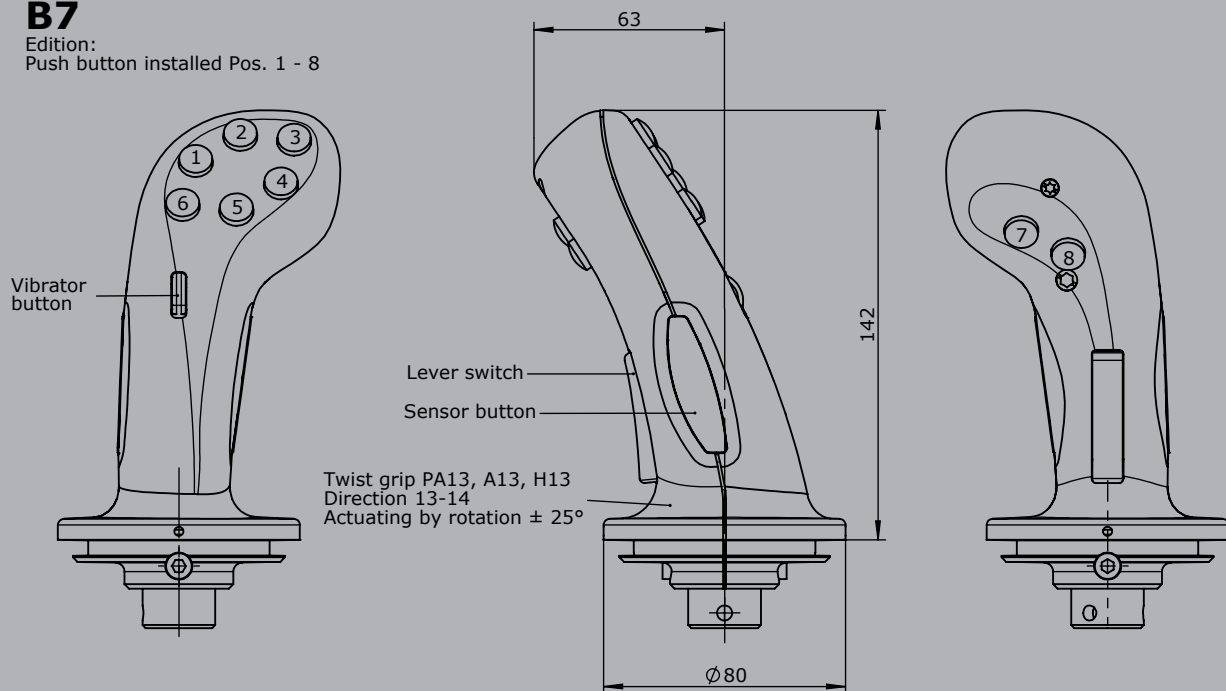
B7 -2D W K SE S9 PA13 -X

Special model	
X	Special / customer specified

Attachments		
Z01	Bellow KMD 109	10300009
Z02	Bellow KMD 190	10300093
Z03	Rosette KBF 905 with 4 screws M5x15 necessary for bellow KMD 190	5209900404

B7

Edition:
Push button installed Pos. 1 - 8

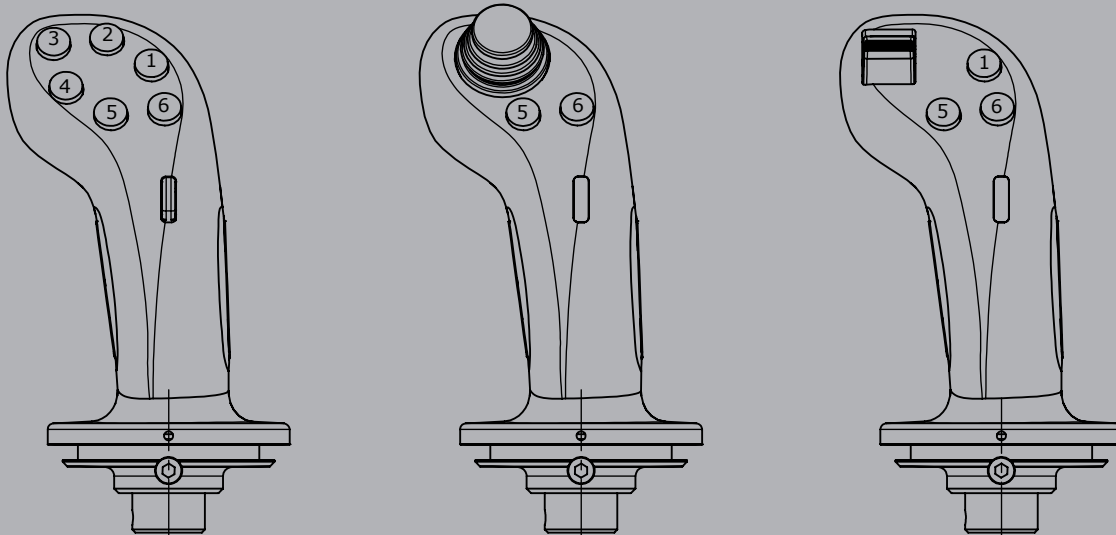


B8

Edition:
Push button installed Pos. 1 - 8

Edition:
Multi-axis controller V21
Push button installed Pos. 5,6,7,8

Edition :
Hall Rocker switch
Push button installed Pos. 1,5,6,8



Palm grip

B1



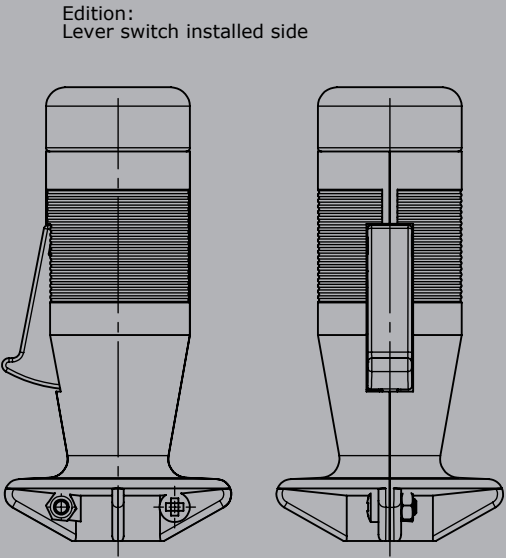
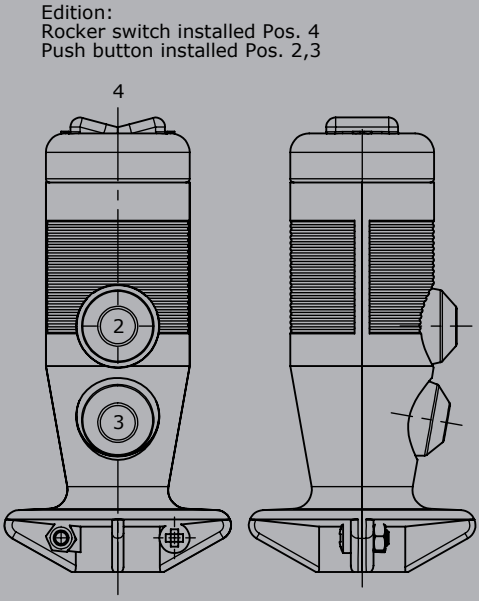
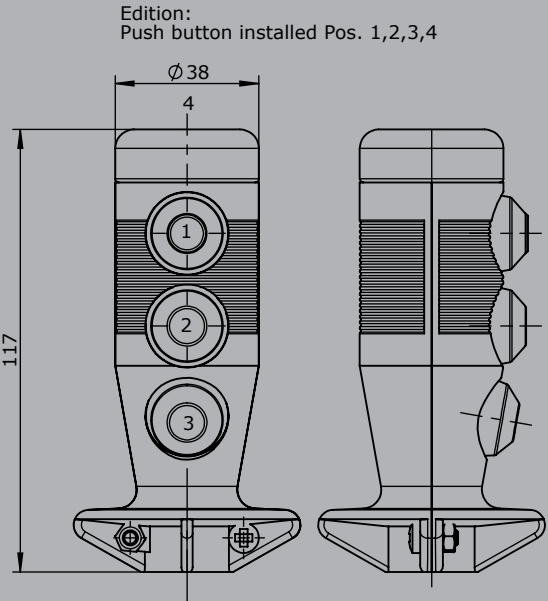
The palm grip B1 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible cable (4 respectively 8 x 0,25 mm², 450 mm long). The mounting piece can be supplied with a tapped hole M10 (standard) or M8.

Technical data

Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	3A 24 V DC13 (*1 1,5A 24 V DC13)



	B1	-2D	W	-X
Basic unit				
B1 Palm grip				
Digital actuating element				
D Push button top				
D Push button side *1				
W Rocker switch top T-0-T				
W Rocker switch top R-0-T				
W Rocker switch top R-0-R				
T Push button top with mechanical operation				
(Only possible with multi-axis controller or single-axis controller!)				
K Lever switch				
KT Lever switch mechanical operation				
(Only possible with multi-axis controller or single-axis controller!)				
Special model				
X Special / customer specified				



Palm grip B2



The palm grip B2 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible cable (8 x 0,25 mm², 450 mm long). He can be tilted in any direction by 20 de-grees and can lock in this position. The mounting piece can be supplied with a tapped hole M10 (standard) or M8.

Technical data

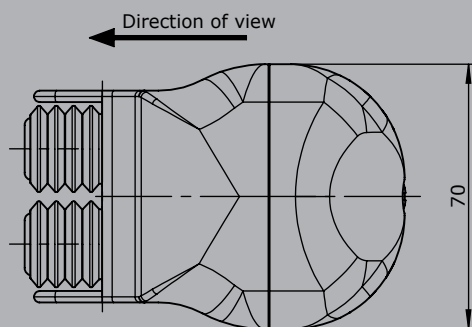
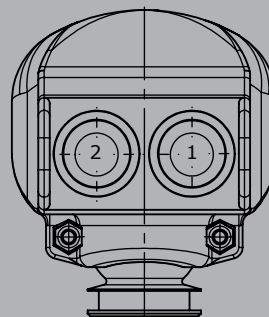
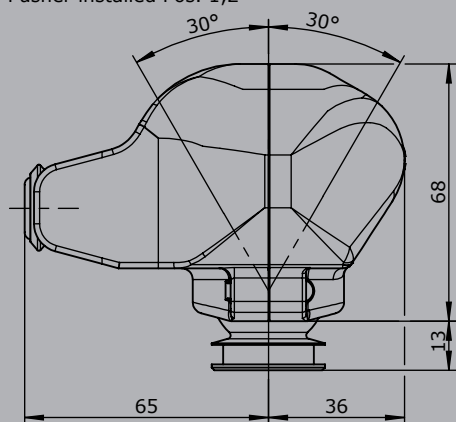
Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)



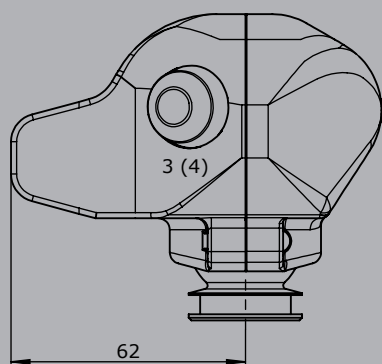
		Example			
		B2	-2D	PA15	-X
Basic unit					
B2	Palm grip				
Digital actuating element					
D	Push button KDA/70				
D	Push button KDA21 *1				
	Colour: red, black, yellow, green, blue, white, orange				
A15	2 push button Pos. 1 + 2 interlocked				
Analog actuating element					
PA15	Push button analog Pos. 1 + 2				
	2 potentiometer T301 2 x 5 kOhm with direction contacts				
Special model					
X	Special / customer specified				

B2

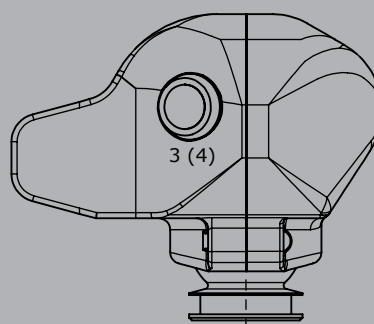
Edition:
Pusher installed Pos. 1,2



Edition:
Push button KDA / 70
installed Pos. 1,2,3,4



Edition:
Push button KDA 21
installed 1,2,3,4



Palm grip B5



The palm grip B5 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (4 respectively 8 x 0,25 mm², 450 mm long). The mounting piece can be supplied with a tapped hole M10 (standard) or M8.

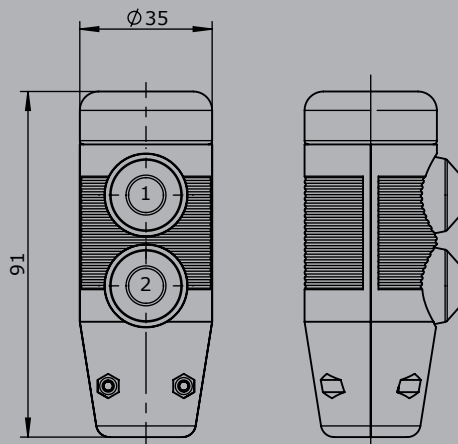
Technical data

Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	3A 24 V DC13 (*1 1,5A 24 V DC13)

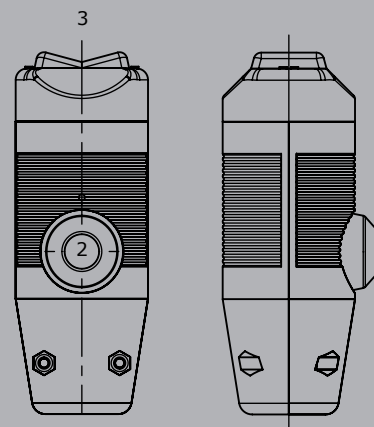


	Example	B5	-2D	W	-X
Basic unit					
B5	Palm grip				
Digital actuating element					
D	Push button top				
D	Push button side *1				
W	Rocker switch top T-0-T				
W	Rocker switch top R-0-T				
W	Rocker switch top R-0-R				
T	Push button top mechanical operation (Only possible in combination with multi-axis controller or single-axis controller!)				
Special model					
X	Special / customer specified				

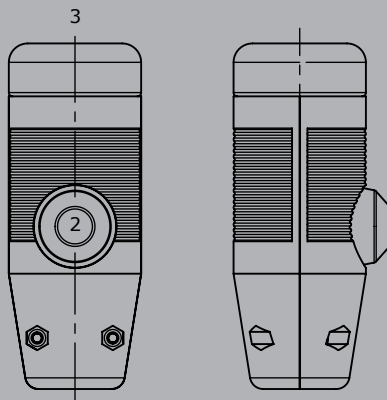
Edition:
Push button installed Pos. 1,2



Edition:
Rocker switch installed Pos. 3
Push button installed Pos. 2



Edition:
Push button installed Pos. 2,3



Palm grip B6



The palm grip B6 has different equipment options for many requirements. It is compatible with our multi-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible cable (4 respectively 8 x 0,25 mm², 450 mm long). The mounting piece can be supplied with a tapped hole M10 (standard) or M8.

Technical data

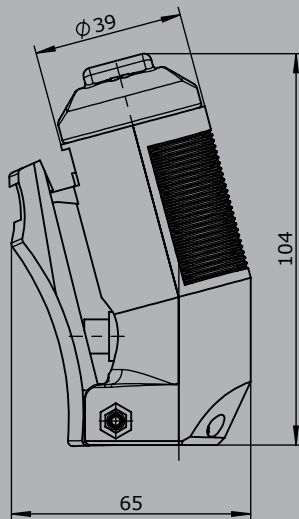
Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	1,5A 24 V DC13



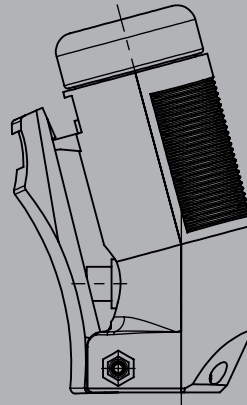
	B6	-2D	K	-X
Basic unit				
B6 Palm grip				
Digital actuating element				
D Push button top				
W Rocker switch top T-0-T				
W Rocker switch top R-0-T				
W Rocker switch top R-0-R				
K* Lever switch				
* Included with the delivery of palm grip B6!				
Special model				
X Special / customer specified				

B6

Edition:
Lever switch side
Rocker switch installed top



Edition:
Lever switch side
Push button top



Palm grip B28



The palm grip B28 has different equipment options for many requirements. It is compatible with our multi-axis and single-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 10 mm (standard).

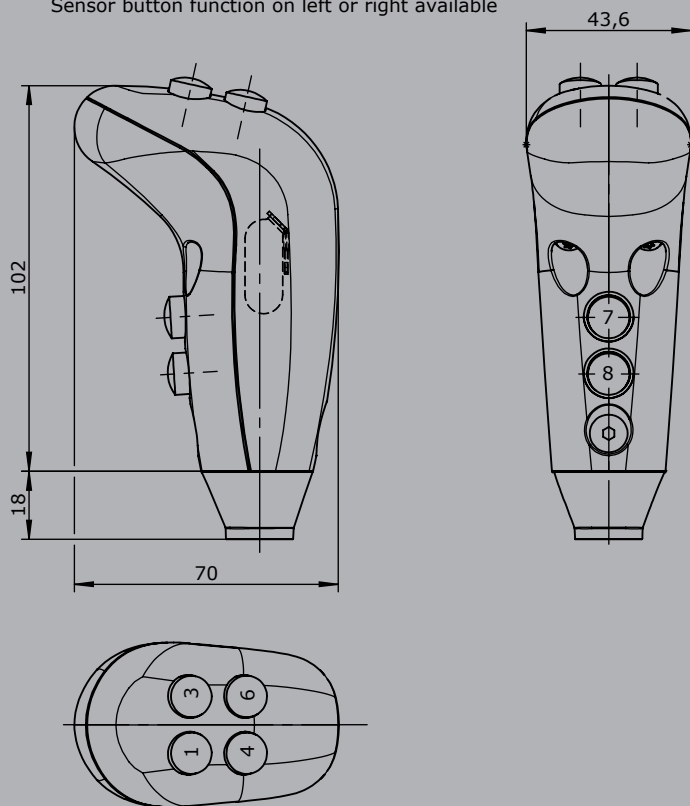
Technical data

Operating temperature	-40°C to +85°C
Degree of protection	up to IP54

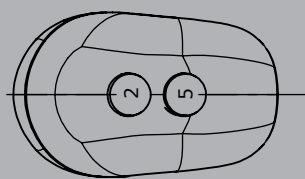


		Example			
		B28	-2D	SE	-X
Basic unit					
B28	Palm grip				
Digital actuating element					
D	Push button (1,5A 24 V DC13) Colour: red, black, yellow, green, blue, grey				
SE	Sensor button capacitive with external control electronics				
S	Sensor button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)				
Special model					
X	Special / customer specified				

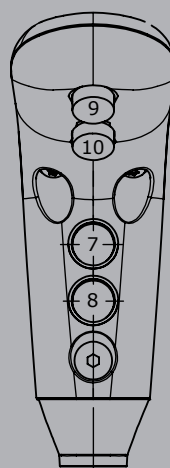
Edition:
Push button installed
Pos. 1,3,4,6,7,8
Sensor button function on left or right available



Edition:
Push button installed
Pos. 2,5,7,8
Sensor button function on left or right available



Edition:
Push button installed
Pos. 7,8,9,10
Sensor button function on left or right available



Palm grip B29



The palm grip B29 has different equipment options for many requirements. It is compatible with our multi-axis and single-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

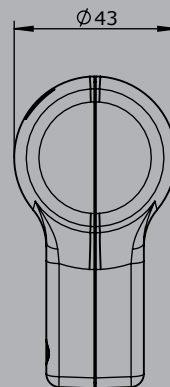
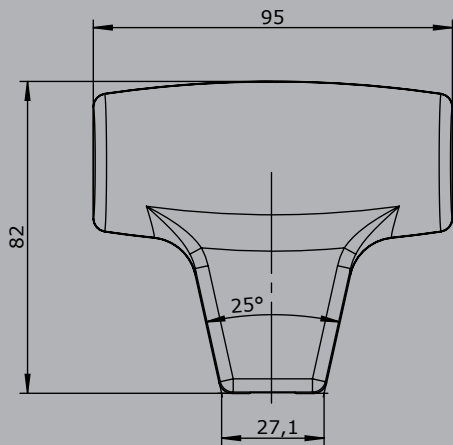
Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	0,1A 24 V DC13

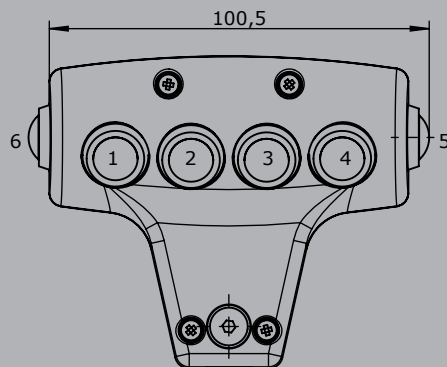


		Example		
		B29	-2D	-X
Basic unit				
B29	Palm grip			
Digital actuating element				
D	Push button KDA21			
	Colour: red, black, yellow, green, blue, white, orange			
SE	Sensor button capacitive with external control electronics			
S	Sensor button capacitive without external control electronics			
(Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx)				
Special model				
X	Special / customer specified			

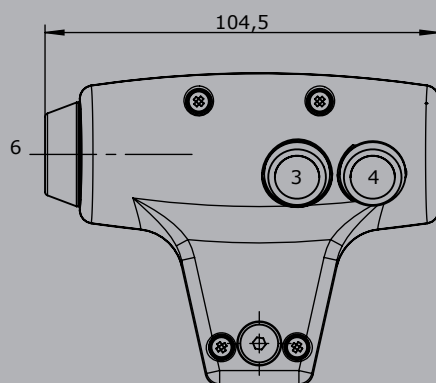
B29



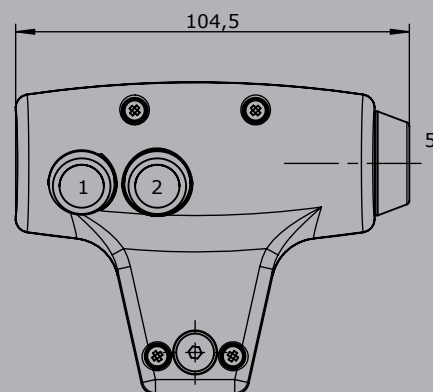
Edition:
Push button installed Pos. 1-6



Edition:
Sensor installed Pos. 6,
Push button installed Pos. 3,4



Edition:
Sensor installed Pos. 5,
Push button installed Pos. 1,2



Palm grip B10



The palm grip B10 has different equipment options for many requirements. It is compatible with our double-handle controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 10 mm.

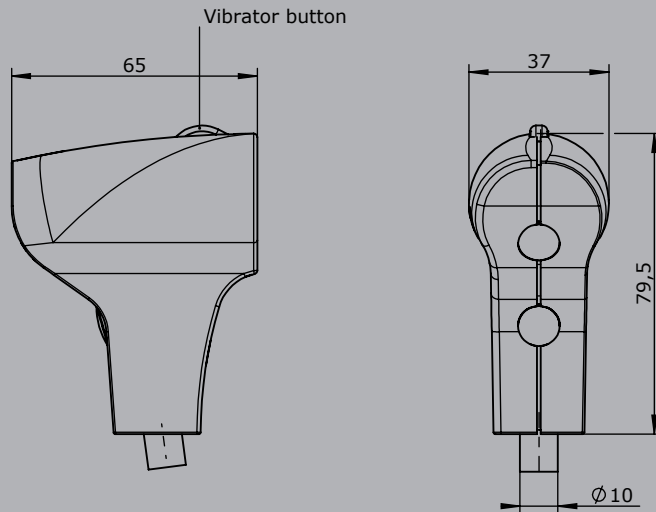
Technical data

Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)



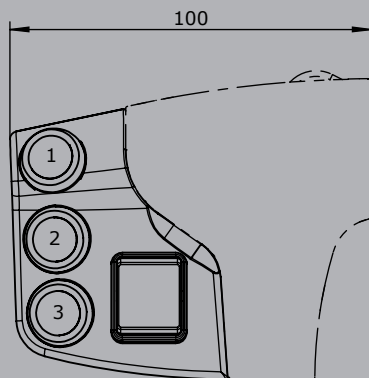
		Example				
		B10AL	-3D	W	V	-X
Basic unit						
B10L	Palm grip left					
B10R	Palm grip right					
B10AL	Palm grip left with growing part					
B10AR	Palm grip right with growing part					
Digital actuating element						
D	Push button KDA21 *1					
Colour: red, black, yellow, green, blue, white, orange						
W*	Rocker switch T-0-T					
W*	Rocker switch 0-T					
W*	Rocker switch R-0-T					
W*	Rocker switch R-0-R					
W*	Rocker switch 0-R					
W*	Rocker switch R-R					
*Only possible with version with attachment!						
V	Vibration pulse 24V DC ED 100%					
Special model						
X	Special / customer specified					

B10

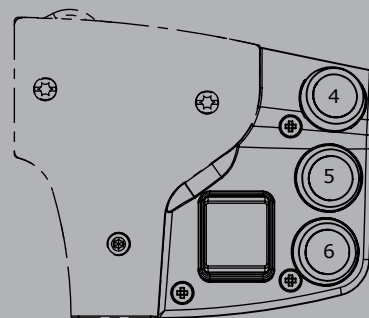


B10A

Edition installed left:
Push button installed Pos. 1,2,3
Rocker switch



Edition installed right:
Push button installed Pos. 4,5,6
Rocker switch



Palm grip

B14 / B15



The palm grip B14/B15 has different equipment options for many requirements. It is compatible with our multi-axis and single-axis controller or mounted on hydraulic drives. The palm grip has a highly flexible single wire (0,1 mm², 450 mm long). The mounting piece for the drive rod can be supplied with a tapped hole 12 mm (standard) or 10 mm.

Technical data

Operation temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	0,1A 24 V DC13

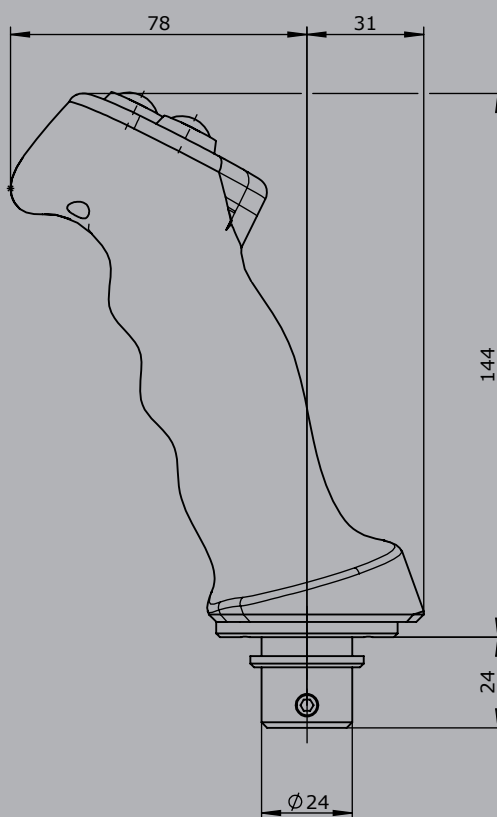


	B14	-2D	-X
Basic unit			
B14 Palm grip left			
B15 Palm grip right			
Digital actuating element			
D Push button KDA21 (0,1A 24 V DC13)			
Colour: red, black, yellow, green, blue, white, orange			
Special model			
X Special / customer specified			

Example

B14

Push button installed Pos. 1,2



B15

Push button installed Pos. 1,2



Dimension outside in mm (BxLxH)	Dimension inside in mm (BxLxH)	Remarks	Weight KG	Form
Steel sheet housing material thickness 1/1,5 mm				
Protection IP54 painting RAL 7032 pebble-grey textured varnish				
200 x 200 x 92	166 x 166 x 90		1,3	B 200
230x 230 x 105	196 x 196 x 102		1,4	B 230
230 x 340 x 105	196 x 306 x 102		1,5	B 230 x 340
230 x 440 x 105	196 x 406 x 102		1,6	B 230 x 440
250 x 250 x 150	216 x 216 x 147		1,6	B 250 x 250
150 x 400 x 105	116 x 366 x 102		3,2	B 150 x 400
150 x 500 x 105	116 x 466 x 102		3,5	B 150 x 500
150 x 600 x 105	116 x 566 x 102		3,8	B 150 x 600
260 x 500 x 105	226 x 466 x 102		3,8	B 260 x 500
260 x 600 x 105	226 x 566 x 102		4,2	B 260 x 600
dimensions special		On enquiry		
Plastic housing polycarbonat				
Protection IP65 colour RAL 7035 fair-grey				
120 x 122 x 105	113 x 115 x 98		0,35	I 120 x 122
120 x 160 x 140	113 x 134 x 133		0,6	I 120 x 160
160 x 240 x 120	153 x 215 x 114		0,8	I 160 x 240
160 x 360 x 100	153 x 352 x 94		1,0	I 160 x 360
230 x 300 x 110	223 x 293 x 103		1,15	I 230 x 300
Plastic housing polyester				
Protection IP65 colour RAL 7000 grey				
220 x 335 x 115	200 x 292 x 108	Colour altern. RAL 9011 black	1,65	I 220 x 335
220 x 465 x 115	200 x 432 x 108	Colour altern. RAL 9011 black	2,24	I 220 x 465
250 x 255 x 120	236 x 243 x 110		2,65	I 250 x 255
250 x 400 x 120	236 x 386 x 110		3,65	I 250 x 400
250 x 600 x 120	236 x 586 x 110		5,24	I 250 x 600
Accessory parts				
Hinges each housing (2 pcs.)			0,2	
Armrest with clamp adjustable straps			0,5	
Cable entry M20 cable 7 - 13 mm		With anti-kink predection and strain relief	0,15	
Cable entry M32 cable 11 - 21 mm		With anti-kink predection and strain relief	0,2	
Cable entry M40 cable 19 - 28mm		With anti-kink predection and strain relief	0,25	
Pillar with flange 100 x 100 x 535 mm high		Flange 150 x 150 mm	14,0	
Indicating labels not engraved for Multi-axis / Single-axis controller				
Indicating labels with engraving for Multi-axis / Single-axis controller		Character		

Command and indicating devices 22 mm (Siemens Typ 3SU) incl. indicating label		Contact-complement	Weight KG	Type
Push button		1 S + 1 Ö	0,040	D
Selector switch 0-1	2 positions	1 S + 1 Ö	0,050	W
Selector switch 1-0-2	3 positions	2 S + 2 Ö	0,060	W
Key switch 0-1	2 positions	1 S + 1 Ö	0,130	S
Key switch 1-0-2	3 positions	2 S + 2 Ö	0,140	S
Mushroom key switch latching		1 S + 1 Ö	0,080	PS
Mushroom head push button latching		1 Ö	0,060	PV
Illuminated push button diode 24 V DC/AC		1 S + 1 Ö	0,040	LD
Illuminated push button diode 230 V AC		1 S + 1 Ö	0,040	LD
Indicator light diode 24 V DC/AC			0,040	L
Indicator light diode 230 V AC			0,040	L
Coordinate switch 2 positions horizontal T-O-T 3SU1030-7AC10		2 S	0,102	K
Coordinate switch 2 positions vertical T-O-T 3SU1030-7AD10		2 S	0,102	K
Coordinate switch 4 positions T-O-T / T-O-T 3SU1030-7AF10		4 S	0,112	K
Switching element in addition		1S + 1Ö	0,010	
Other command and indicating devices				
Summer			0,250	
Knee button FAK-S/KC/I		1 S + 1 Ö	0,350	
Foot button		1 S + 1 Ö	0,450	
Attachments				
Drilling 22 mm				
Blind plug 22 mm				
Cutouts for display devices				
Microphone with gooseneck				
Power supply 230 V/24 V DC for driver seat				

Crane control unit

KST 30 swiveling



The KST 30 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort. The inner consoles, mounted to the driver's seat, swing with the seat. The consoles can be positioned to perfectly match any person by means of length, height and inclination adjustment. For console version 1 the whole control unit can be expanded by additional fixed outer consoles.

The standard version includes:

Inner consoles:

The plastic consoles can be height-adjusted to match joysticks of any size. In addition consoles can be equipped with custom command and indicating devices.

Outer consoles:

The outer metal consoles feature foldable top covers, including mechanical fixation to keep cover in open position. Internal terminal strips can easily be accessed by removeable side covers. Command and indicating devices can be added based on customer's choice. Also special sizes and shapes of outer consoles are available on request.

Driver's seat:

The comfortable driver's seat KFS 11 is equipped with a spring loaded hydraulic vibration absorption system, including weight adjustment, air-permeable textile cover, arm rests and head rest.

Cross-member with swivel base:

The cover of the sheet steel cross-member including the driver's seat is forward foldable. Thereby all wirings, terminals and bushings are easily accessible during commissioning and maintenance. Swivel base has zero-tolerance bearings and rotation can be locked in 3° steps.

Surface treatment:

Base coat and textured varnish

Standard colour RAL 7035 light grey in combination with RAL 7015 slate-grey



		Example															
		KST 3011	-U2	-M1	-F3	-LK	/	KFS 11	/	V85	/	V85	/	KL	/	X	
Basic unit																	
KST 3001	With inner equipment boxes version 1																
KST 3011	With inner equipment boxes version 1 and outside equipment boxes 160 mm wide																
KST 3031	With inner equipment boxes version 1 and outside equipment boxes 270 mm wide																
KST 3041	With inner equipment boxes version 1 and outside equipment boxes 320 mm wide																
		Special equipment boxes form on request!															
Base unit																	
U2	Swiveling 180° left, 90° right with detent																
U3	Electric swiveling 180° left, 90° right																
U4	Non swiveling																
Attachments																	
M1	Monitor mounting with monitor housing																
M2	Monitor mounting with monitor mounting bracket																
M3	Monitor mounting without monitor housing/ -mounting bracket																
F3	Footrest KBF/716																
LK	Plate for horizontal manual adjustment for control units +/- 250 mm																
Driver seat																	
KFS 11*	(Included in the delivery!)																
KFS 9*																	
KFS 10*																	
KFS 12*																	
		*Description see driver seat page 229															

Technical details may vary based on configuration or application! Technical data subject to change without notice!

KST 3011 -U2 -M1 -F3 -LK / KFS 11 / V85 / V85 / KL / X

Mounting for equipment boxes

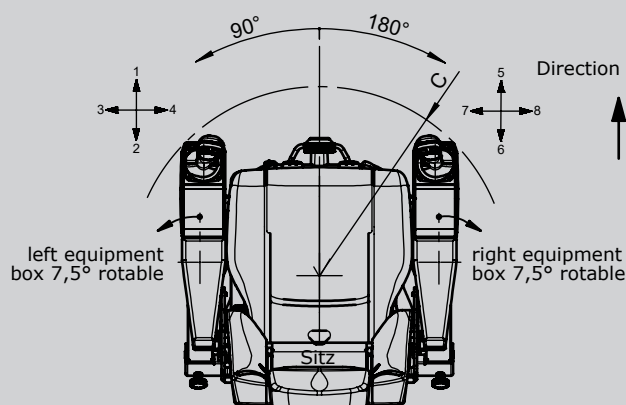
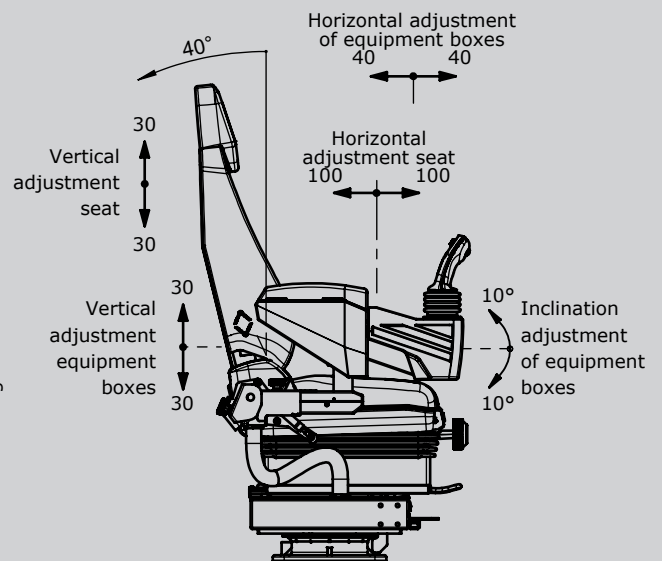
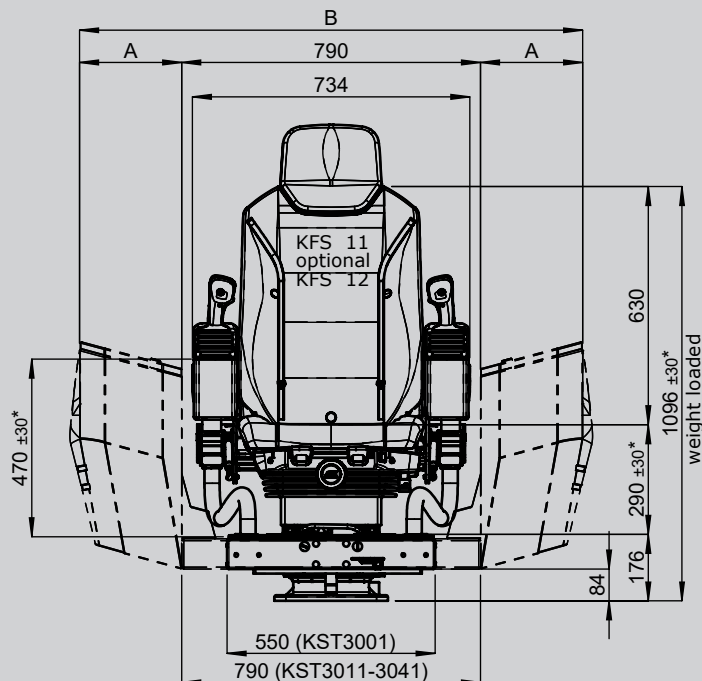
V...	Multi-axis controller (see page 1)
S...	Single-axis controller (see page 93)
D...	Double-handle controller (see page 70)
N...	Control-switch (see page 131)
...	More command and indicating devices (see page 202)

Wiring

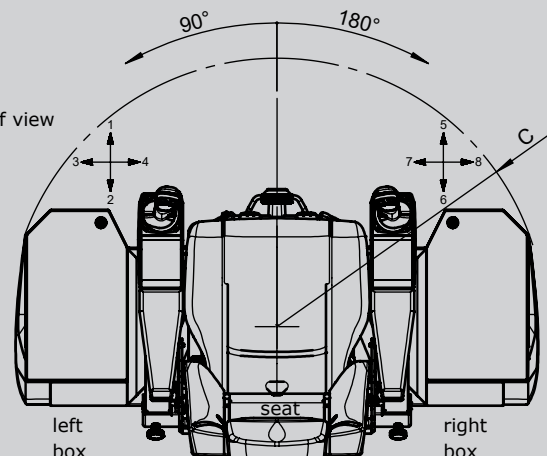
KL	Without wiring, but terminal block built in each terminal
KL V	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KL V	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal
<i>Additional-/ reduction price per meter</i>	

Special model

X	Special / customer specified
X	Special painted

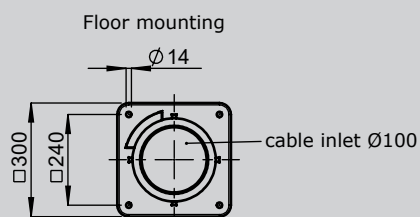


KST 3001



KST 3011-3041

Equipment boxes NOT rotatable



* adjustable

Type	Dim. A	Dim. B	Dim. C
KST 3001	-	-	500
KST 3011	160	1110	610
KST 3031	270	1330	710
KST 3041	320	1430	755

Crane control unit

KST 19 swiveling



The KST 19 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort.

Equipment boxes:
The equipment boxes are vertically and horizontally adjustable. The arrangement of the joysticks, indicators and control devices is customised according to customer specifications. Cabling is carried out through a cross-member in the traverse. (Terminal block)

Driver seat:
As standard the KST 19 is fitted with a KFS 10 seat. The seat itself is fitted with a pneumatic vibration absorption system complete with weight adjustment to ensure that the comfort level is fitted with arm-rests and a headrest. There is the option to have the seat covered with air-permeable artificial leather.

Cross-member with swivel base:
Swivel base has zero-clearance bearing and can be locked by a friction brake.

Surface treatment:
Base coat and textured varnish
Standard colour RAL 7035 light grey, equipment boxes RAL 7016 anthracite

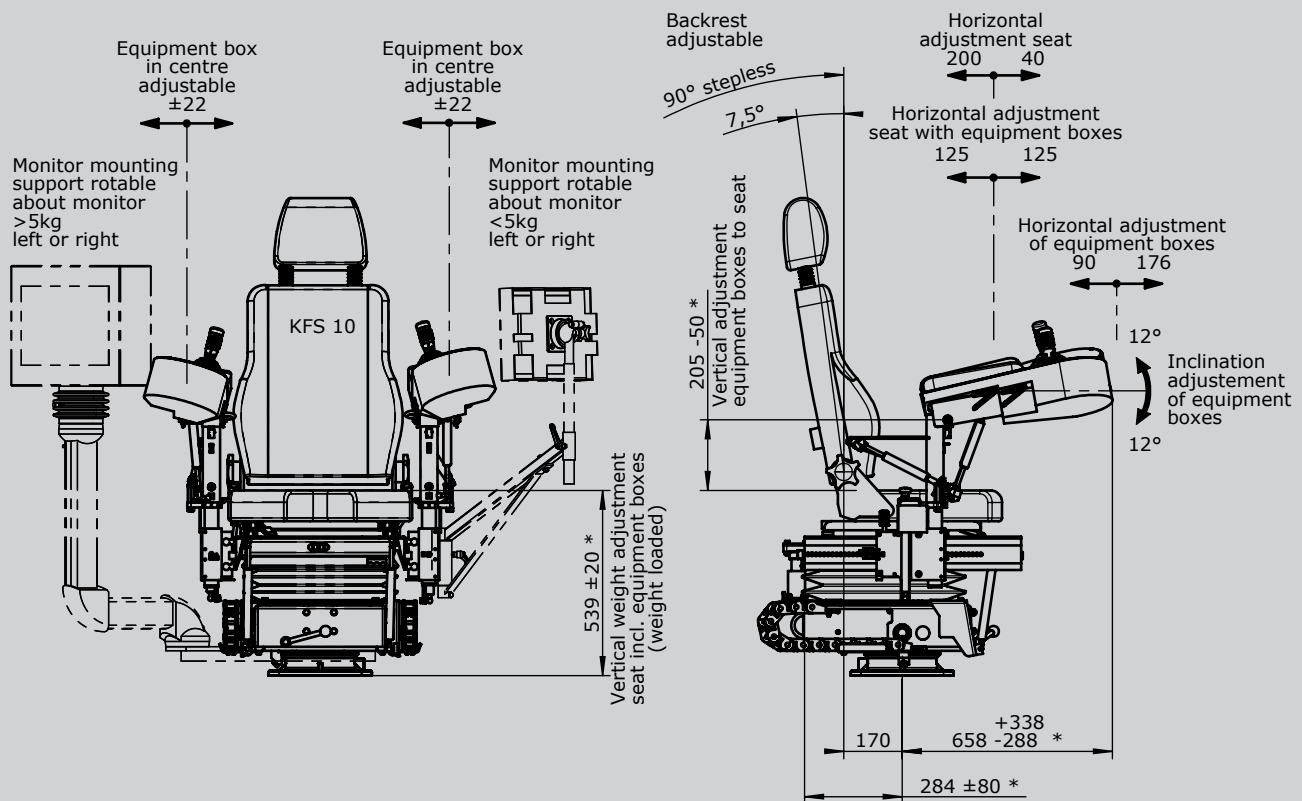


		Example														
		KST 19	-U1	-M1	-F3	-LK	/	KFS 10	/	V85	/	V85	/	KL	/	X
Basic unit																
KST 19	With equipment boxes															
Base unit																
U1	Swiveling 180° left, 90° right with friction brake															
U2	Swiveling 180° left, 90° right with detent															
U4	Non swiveling															
Attachments																
M1	Monitor mounting with monitor housing															
M2	Monitor mounting with monitor mounting bracket															
M3	Monitor mounting without monitor housing/ -mounting bracket															
M4	Monitor mounting (Monitor < 5 kg) with monitor housing															
M5	Monitor mounting (Monitor < 5 kg) with mounting adapter															
F3	Footrest KBF/716															
H	Heater 2 x 2 kW with ventilator															
LK	Plate for horizontal manual adjustment for control units +/- 250 mm															
Driver seat																
KFS 10* (Included in the delivery!)																
*Description see driver seat page 229																

Technical details may vary based on configuration or application! Technical data subject to change without notice!

KST19 -U1 -M1 -F3 -LK / KFS10 / V85 / V85 / KL / X

Mounting for equipment boxes	
V...	Multi-axis controller (see page 1)
S...	Single-axis controller (see page 93)
D...	Double-handle controller (see page 70)
N...	Control-switch (see page 131)
...	More command and indicating devices (see page 202)
Wiring	
KL	Without wiring, but terminal block built in each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal
Special model	
X	Special / customer specified
X ¹	Special painted
Option	
Radio remote control system	



* adjustable

Crane control unit

KST 10 swiveling



The KST 10 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort.

Equipment boxes:

The equipment boxes are vertically and horizontally adjustable. The arrangement of the joysticks, indicators and control devices is customised according to customer specifications. Cabling is carried out through a cross-member in the traverse. (Terminal block)
Special boxes available upon request.

Driver seat:

As standard the KST 10 is fitted with a KFS 11 seat. The seat itself is fitted with a hydraulic vibration absorption system complete with weight adjustment to ensure that the comfort level is fitted with armrests and a headrest. There is the option to have the seat covered with air-permeable artificial leather.

Cross-member with swivel base:

The cover of the sheet steel cross-member including the driver's seat is forward foldable. Thereby all wirings, terminals and bushings are easily accessible during commissioning and maintenance. Swivel base has zero-clearance bearing and can be locked by a friction brake.

Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black



		Example														
		KST 10	-U1	-M1	-F3	-LK	/	KFS 11	/	V85	/	V85.1	/	KL	/	X
Basic unit																
KST 10	With equipment boxes															
Base unit																
U1	Swiveling 180° left, 90° right with friction brake															
U2	Swiveling 180° left, 90° right with detent															
U3	Electric swiveling 180° left, 90° right															
U4	Non swiveling															
U5	Without base frame															
Attachments																
M1	Monitor mounting with monitor housing															
M2	Monitor mounting with monitor mounting bracket															
M3	Monitor mounting without monitor housing/-mounting bracket															
F3	Footrest KBF/716															
H	Heater 2 x 2 kW with ventilator															
LK	Plate for horizontal manual adjustment of control units +/- 250 mm															
Driver seat																
KFS 11*	(Included in the delivery!)															
KFS 9*																
KFS 10*																
KFS 12*																
*Description see driver seat page 229																

KST 10 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Mounting for equipment boxes

V...	Multi-axis controller (see page 1)
S...	Single-axis controller (see page 93)
D...	Double-handle controller (see page 70)
N...	Control-switch (see page 131)
...	More command and indicating devices (see page 202)

Wiring

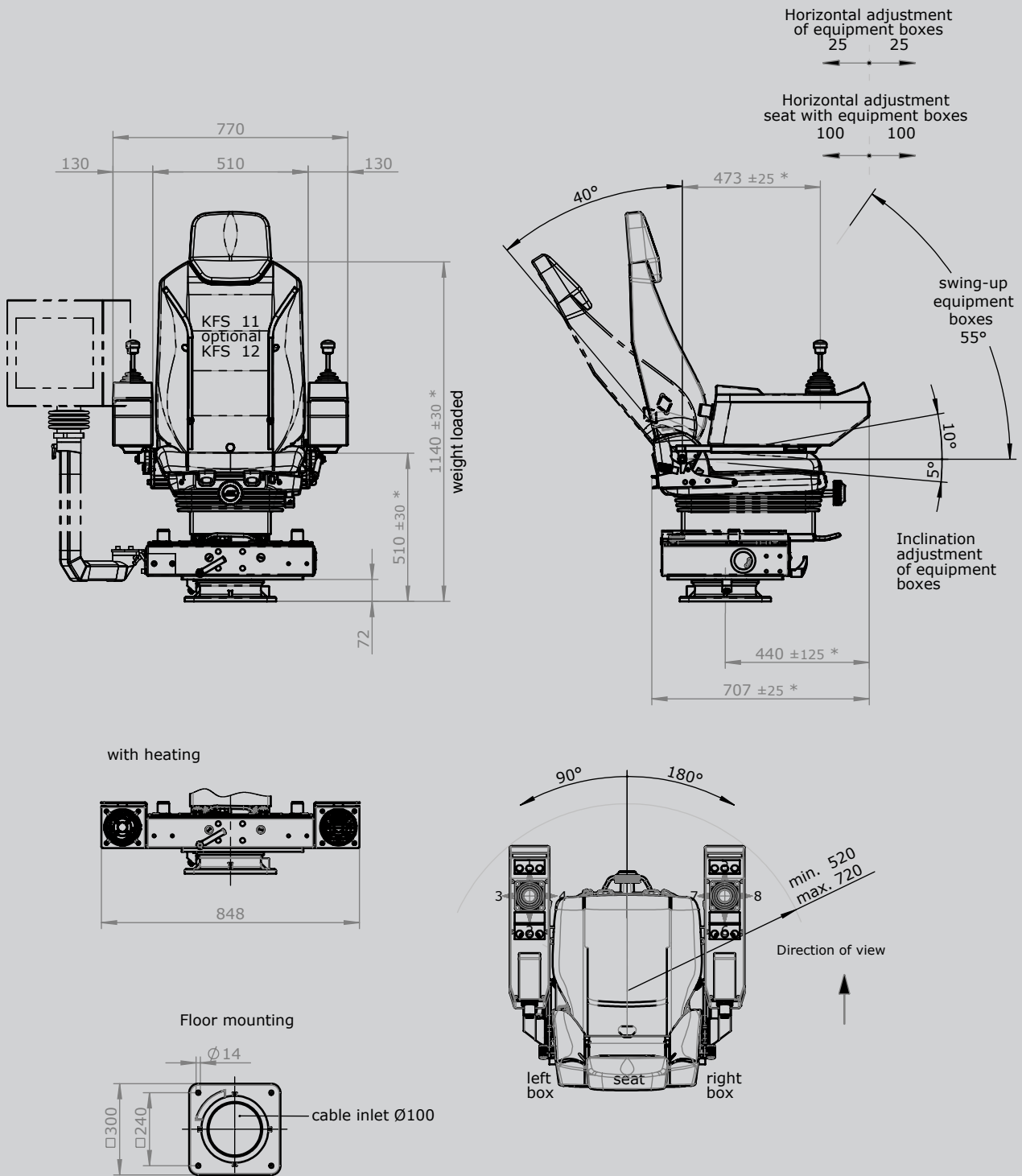
KL	Without wiring, but terminal block built in each terminal
KL V	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KL V	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

X	Special / customer specified
X ¹	Special painted

Option

Radio remote control system



* adjustable

Crane control unit

KST 4 swiveling



The KST 4 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort.

Equipment boxes:

The sheet steel equipment boxes are vertically and horizontally adjustable. The arrangement of the joysticks, indicators and control devices is customised according to customer specifications. Cabling is carried out through a cross-member in the traverse. (Terminal block)
Special boxes available upon request.

Driver seat:

As standard the KST 4 is fitted with a KFS 11 seat. The seat itself is fitted with a hydraulic vibration absorption system complete with weight adjustment to ensure that the comfort level is fitted with armrests and a headrest. There is the option to have the seat covered with air-permeable artificial leather.

Cross-member with swivel base:

The cover of the sheet steel cross-member including the driver's seat is forward foldable. Thereby all wirings, terminals and bushings are easily accessible during commissioning and maintenance. Swivel base has zero-clearance bearing and can be locked by a friction brake.

Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black



Example

KST 41 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Basic unit

KST 41	With equipment boxes 160 x 420 mm
KST 42	With equipment boxes 200 x 420 mm

Base unit

U1	Swiveling 180° left, 90° right with friction brake
U2	Swiveling 180° left, 90° right with detent
U3	Electric swiveling 180° left, 90° right
U4	Non swiveling
U5	Without base frame

Attachments

M1	Monitor mounting with monitor housing
M2	Monitor mounting with monitor mounting bracket
M3	Monitor mounting without monitor housing/-mounting bracket
F3	Footrest KBF/716
H	Heater 2 x 2 kW with ventilator
LK	Plate for horizontal manual adjustment of crane control units +/- 250 mm

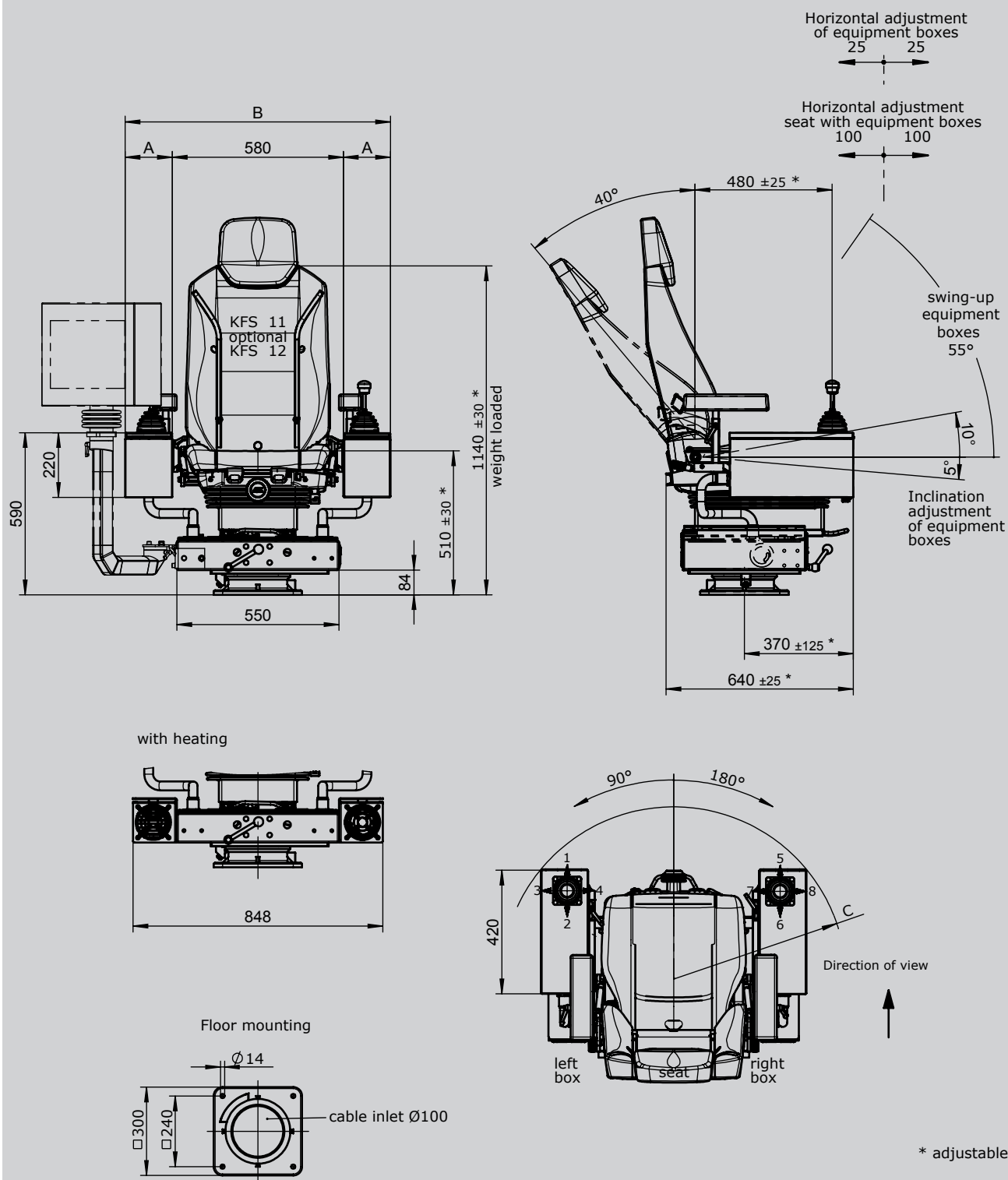
Driver seat

KFS 11*	(Included in the delivery!)
KFS 9*	
KFS 10*	
KFS 12*	

*Description see driver seat page 229

Technical details may vary based on configuration or application! Technical data subject to change without notice!

		KST 41	-U1	-M1	-F3	-LK	/	KFS 11	/	V64	/	V64.1	/	KL	/	X
Mounting for equipment boxes																
V...	Multi-axis controller (see page 1)															
S...	Single-axis controller (see page 93)															
D...	Double-handle controller (see page 70)															
N...	Control-switch (see page 131)															
...	More command and indicating devices (see page 202)															
Wiring																
KL	Without wiring, each terminal block built in each terminal															
KL V	On terminal block 4 mm² with single wire 1 mm² each terminal															
KL V	On SPS (SPS provision) with single wire 1 mm² each terminal															
KLVA	External wiring single wire highly flexible 1,5 mm², 5 m long each terminal															
Special model																
X	Special / customer specified															
X¹	Special painted															
Option																
Radio remote control system																



Type	Dim. A	Dim. B	Dim. C
KST 41	160	900	max. 670 min. 570
KST 42	200	980	max. 700 min. 600

Crane control unit

KST 5 swiveling



The KST 5 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort.

Equipment boxes:
The equipment boxes are made from sheet steel and as standard have a hinged lid with locking feature. This allows for easy inspection and maintenance. The side of the equipment boxes is as standard fitted with an inspection plate which again is lockable. The arrangement of the joystick, indicators and control devices is customised according to customer specifications. This combined with the custom sized and profiled equipment boxes that are available means that the KST 5 is very flexible and customisable solution.

Driver seat:
As standard the KST 5 is fitted with a KFS 11 seat. The seat itself is fitted with a hydraulic vibration absorption system complete with weight adjustment to ensure that the comfort level is fitted with armrests and a headrest. There is the option to have the seat covered with air-permeable artificial leather.

Cross-member with swivel base:
The cover of the sheet steel cross-member including the driver's seat is forward foldable. Thereby all wirings, terminals and bushings are easily accessible during commissioning and maintenance. Swivel base has zero-clearance bearing and can be locked by a friction brake.

Surface treatment:
Base coat and textured varnish
Standard colour RAL 7035 light grey



		Example														
		KST 51	-U1	-M1	-F3	-LK	/	KFS 11	/	V64	/	V64.1	/	KL	/	X
Basic unit																
KST 51	With equipment boxes 200 x 580 mm															
KST 52	With equipment boxes 270 x 580 mm															
KST 54	With equipment boxes 320 x 580 mm															
Special boxes for request!																
Base unit																
U1	Swiveling 180° left, 90° right with friction brake															
U2	Swiveling 180° left, 90° right with detent															
U3	Electric swiveling 180° left, 90° right															
U4	Non swiveling															
Attachments																
M1	Monitor mounting with monitor housing															
M2	Monitor mounting with monitor mounting bracket															
M3	Monitor mounting without monitor housing/-mounting bracket															
F3	Footrest KBF/716															
H	Heater 2 x 2 kW with ventilator 240V AC															
LS	Plate for horizontal manual adjustment for control units +/- 75 mm															
LK	Plate for horizontal manual adjustment for control units +/- 250 mm															
Label without engraving for multi-axis-/ single-axis controller																
Label with engraving for multi-axis-/ single-axis controller																

Technical details may vary based on configuration or application! Technical data subject to change without notice!

KST 51 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Driver seat

KFS 11* *(Included in the delivery!)*

KFS 9*

KFS 10*

KFS 12*

*Description see driver seat page 229

Mounting for equipment boxes

V... Multi-axis controller *(see page 1)*

S... Single-axis controller *(see page 93)*

D... Double-handle controller *(see page 70)*

N... Control-switch *(see page 131)*

... *More command and indicating devices (see page 202)*

Wiring

KL Without, but terminal block built each terminal

KL V On terminal block 4 mm² with single wire 1 mm² each terminal

KL V On SPS (SPS provision) with single wire 1 mm² each terminal

KL V A External wiring single wire highly flexible 1,5 mm², 5 m long each terminal

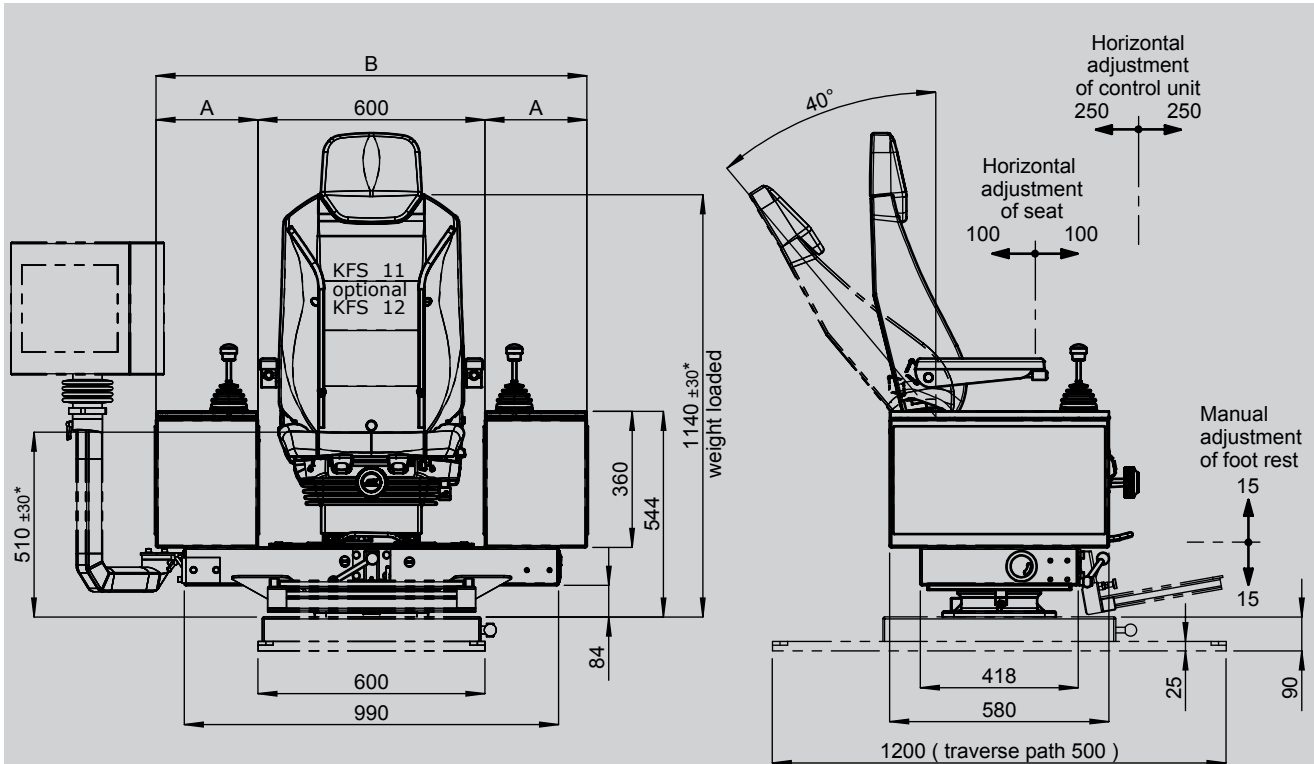
Special model

X Special / customer specified

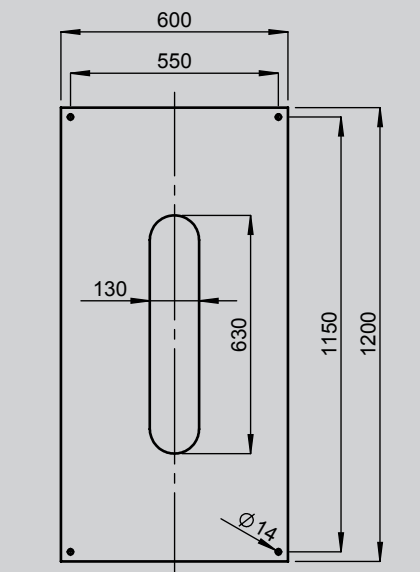
X1 Special painted

Option

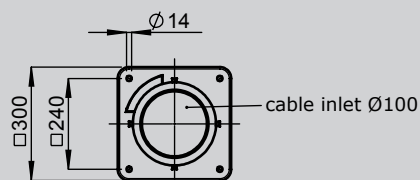
Radio remote control system



Floor mounting



Floor mounting



* adjustable

Type	Dim. A	Dim. B	Dim. C
KST 51	200	1000	580
KST 52	270	1140	640
KST 54	320	1240	690

Crane control unit KST 6 swiveling



The KST 6 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort.

Equipment boxes:

The equipment boxes are vertically and horizontally adjustable. The arrangement of the joysticks, indicators and control devices is customised according to customer specifications. Cabling is carried out through a cross-member in the traverse. (Terminal block)

Driver seat:

As standard the KST 6 is fitted with a KFS 11 seat. The seat itself is fitted with a hydraulic vibration absorption system complete with weight adjustment to ensure that the comfort level is fitted with armrests and a headrest. There is the option to have the seat covered with air-permeable artificial leather.

Cross-member with swivel base:

The cover of the sheet steel cross-member including the driver's seat is forward foldable. Thereby all wirings, terminals and bushings are easily accessible during commissioning and maintenance. Swivel base has zero-clearance bearing and can be locked by a friction brake.

Surface treatment:

Base coat and textured varnish

Standard colour RAL 9011 black



Example

KST 6 -U2 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Basic unit

KST 6 With equipment boxes

Base unit

U1 Swiveling 180° left, 90° right with friction brake
U2 Swiveling 180° left, 90° right with detent
U3 Electric swiveling 180° left, 90° right
U4 Non swiveling
U5 Without base frame

Attachments

M1 Monitor mounting with monitor housing
M2 Monitor mounting with monitor mounting bracket
M3 Monitor mounting without monitor housing/-mounting bracket
F3 Footrest KBF/716
H Heater 2 x 2 kW with ventilator
LK Plate for horizontal manual adjustment for control units +/- 250 mm

Driver seat

KFS 11* (Included in the delivery!)
KFS 9*
KFS 10*
KFS 12*

*Description see driver seat page 229

Technical details may vary based on configuration or application! Technical data subject to change without notice!

KST 6 -U2 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Mounting for equipment boxes

V...	Multi-axis controller (see page 1)
S...	Single-axis controller (see page 93)
D...	Double-handle controller (see page 70)
N...	Control-switch (see page 131)
...	More command and indicating devices (see page 202)

Wiring

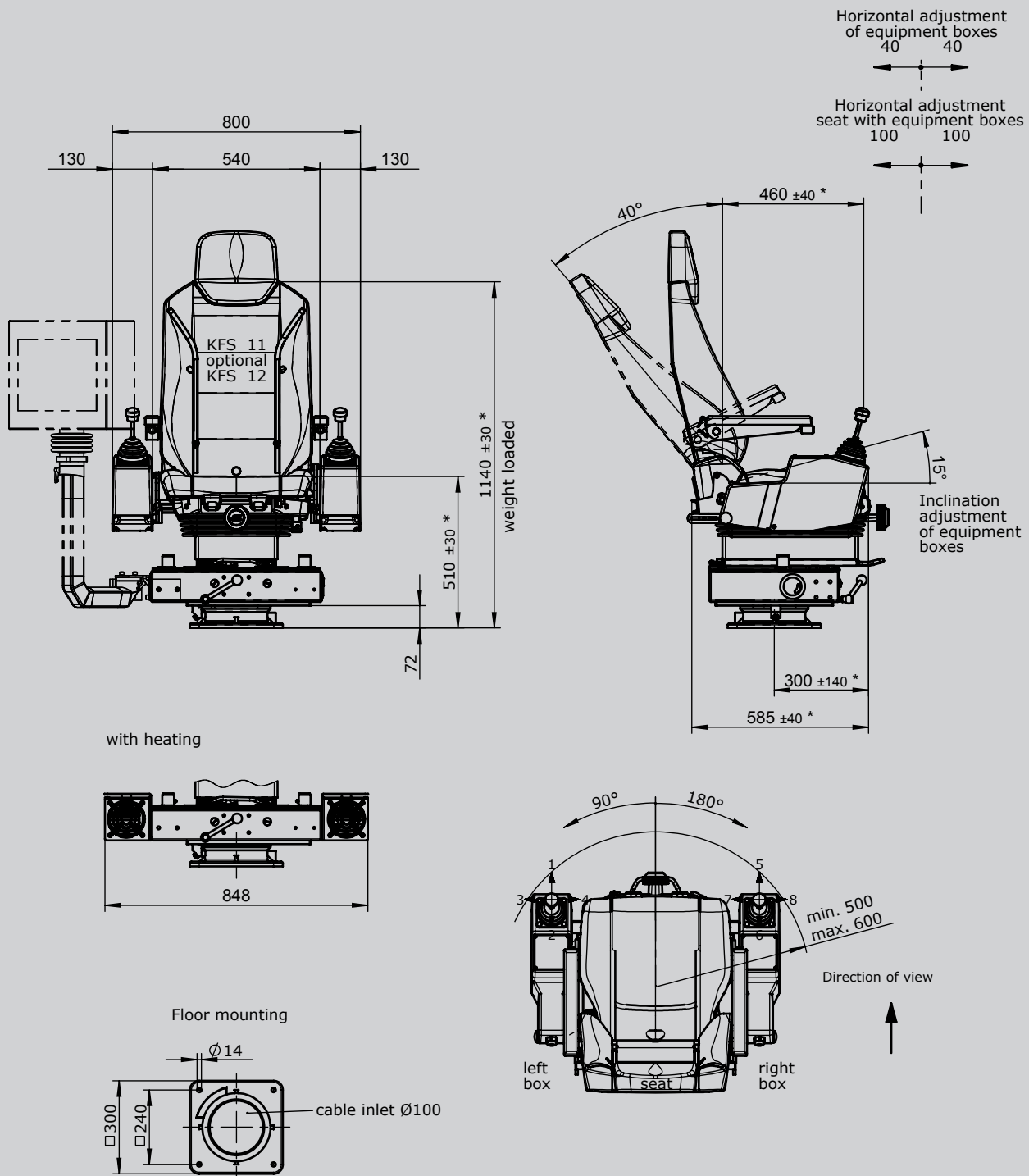
KL	Without, but terminal block built each terminal
KL V	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KL V	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

X	Special / customer specified
X ¹	Special painted

Option

Radio remote control system



* adjustable

Crane control unit

KST 8 swiveling



The KST 8 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort.

Equipment boxes:
The equipment boxes are vertically and horizontally adjustable. The arrangement of the joysticks, indicators and control devices is customised according to customer specifications. Cabling is carried out through a cross-member in the traverse. (Terminal block)
Special boxes available upon request.

Driver seat:
As standard the KST 8 is fitted with a KFS 11 seat. The seat itself is fitted with a hydraulic vibration absorption system complete with weight adjustment to ensure that the comfort level is fitted with armrests and a headrest. There is the option to have the seat covered with air-permeable artificial leather.

Cross member with swivel base:
The cover of the sheet steel cross-member including the driver's seat is forward foldable. Thereby all wirings, terminals and bushings are easily accessible during commissioning and maintenance. Swivel base has zero-clearance bearing and can be locked by a friction brake.

Surface treatment:
Base coat and textured varnish
Standard colour RAL 9011 black



		Example														
		KST 8	-U1	-M1	-F3	-LK	/	KFS 11	/	V64	/	V64.1	/	KL	/	X
Basic unit																
KST 8	With equipment boxes															
Base unit																
U1	Swiveling 180° left, 90° right with friction brake															
U2	Swiveling 180° left, 90° right with detent															
U3	Electric swiveling 180° left, 90° right															
U4	Non swiveling															
U5	Without base frame															
Attachments																
M1	Monitor mounting with monitor housing															
M2	Monitor mounting with monitor mounting bracket															
M3	Monitor mounting without monitor housing/-mounting bracket															
F3	Footrest KBF/716															
H	Heater 2 x 2 kW with ventilator															
LK	Plate for horizontal manual adjustment of control units +/- 250 mm															
Driver seat																
KFS 11*	(Included in the delivery!)															
KFS 9*																
KFS 10*																
KFS 12*																
*Description see driver seat page 229																

KST 8 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Mounting for equipment boxes

V...	Multi-axis controller (see page 1)
S...	Single-axis controller (see page 93)
D...	Double-handle controller (see page 70)
N...	Control-switch (see page 131)
...	More command and indicating devices (see page 202)

Wiring

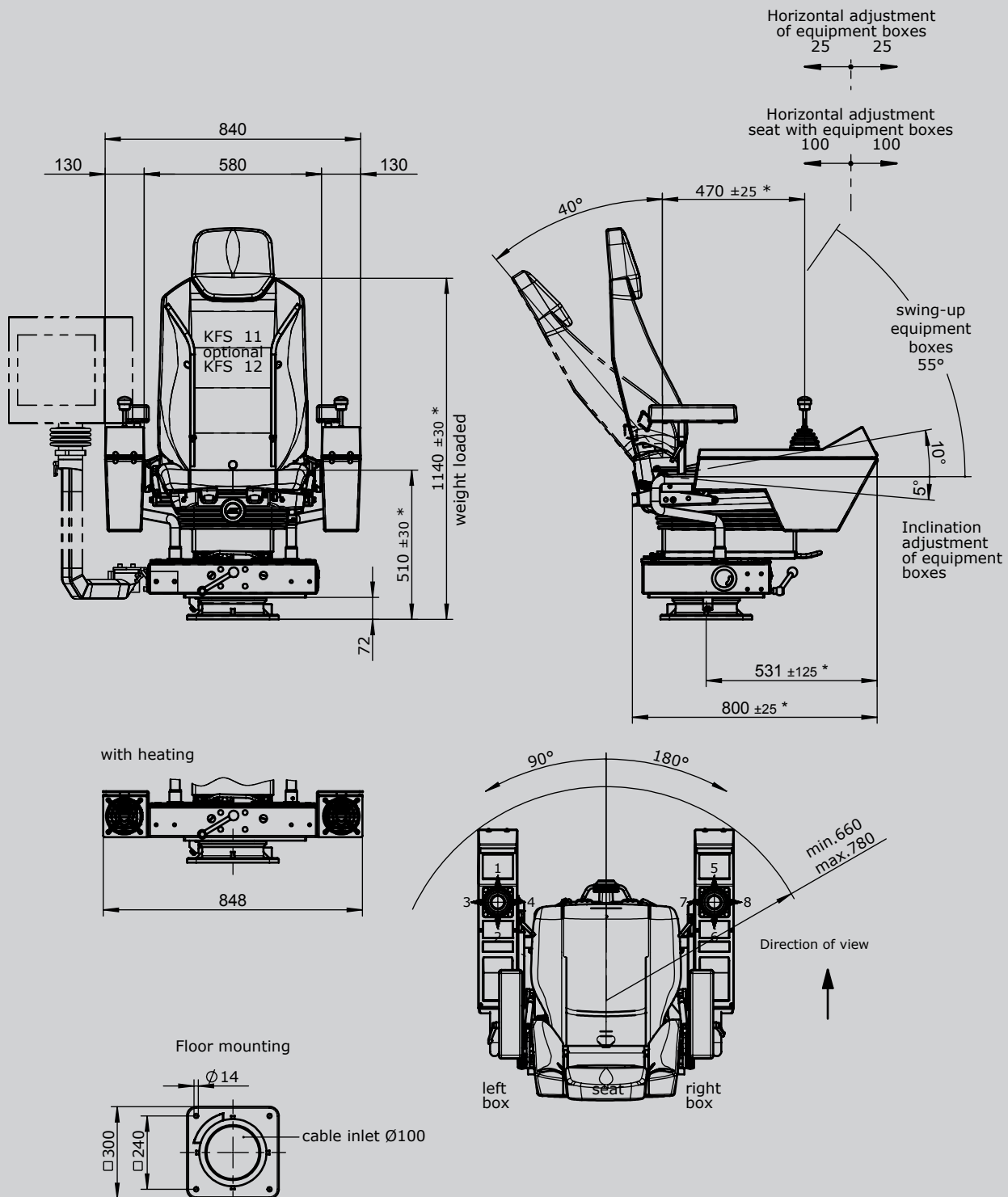
KL	Without wiring, but terminal block built each terminal
KL V	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KL V	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

X	Special / customer specified
X ¹	Special painted

Option

Radio remote control system



* adjustable

Crane control unit KST 85



The KST 85 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort.

Equipment boxes:

The equipment boxes are vertically and horizontally adjustable. The arrangement of the joysticks, indicators and control devices is customised according to customer specifications. Cabling is carried out through a cross-member in the traverse. (Terminal block)
Special boxes available upon request.

Driver seat:

The comfortable spring mounted seat KFS 14 with roller-bearing swivel systems.

Heating console:

Cover with 2 steps heating (2x2kW 400V AC) with integrated ventilator. The cover of the heating cover can be tilted forward to reach the terminal block of the heating and cable execution.

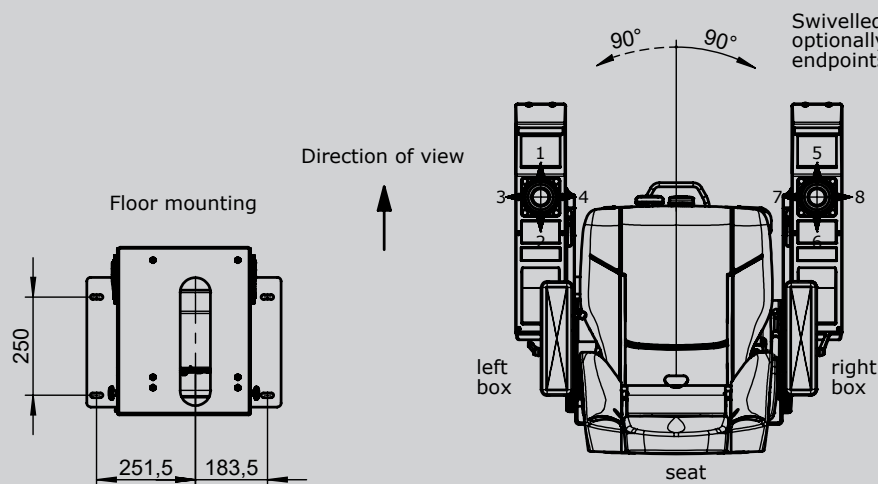
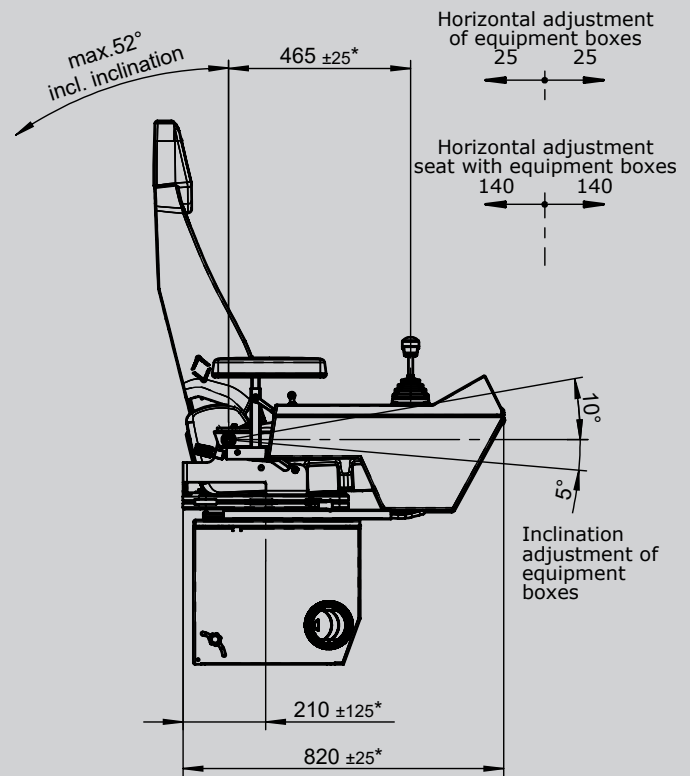
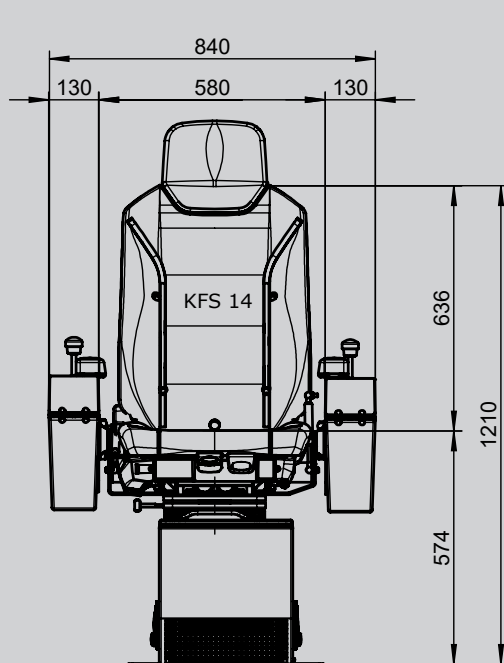
Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black



		Example											
		KST 85	-M1	/	KFS 82	/	V64	/	V64.1	/	KL	/	X
Basic unit													
KST 85	With heating in the apron												
KST 87	With apron without heating												
Attachments													
M1	Monitor mounting with monitor housing												
M2	Monitor mounting with monitor mounting bracket												
M3	Monitor mounting without monitor housing/-mounting bracket												
Driver seat													
KFS 82*	(Included in the delivery!)												
Mounting for equipment boxes													
V...	Multi-axis controller (see page 1)												
S...	Single-axis controller (see page 93)												
D...	Double-handle controller (see page 70)												
N...	Control-switch (see page 131)												
....	More command and indicating devices (see page 202)												
Wiring													
KL	Without wiring, but with terminal block built each terminal												
KL V	On terminal block 4 mm² with single wire 1 mm² each terminal												
KL V	On SPS (SPS provision) with single wire 1 mm² each terminal												
KLVA	External wiring single wire highly flexible 1,5 mm², 5 m long each terminal												
Special model													
X	Special / customer specified												
X¹	Special painted												
Option													
Radio remote control system													

Technical details may vary based on configuration or application! Technical data subject to change without notice!



* adjustable

Crane control unit

KST 7



The KST 7 is an ergonomically designed swiveling crane control chair which provides a high degree of comfort.

Equipment boxes:

The equipment boxes are made from sheet steel and as standard have a hinged lid with locking feature. This allows for easy inspection and maintenance. The side of the equipment boxes is as standard fitted with an inspection plate which again is lockable. The arrangement of the joystick, indicators and control devices is customised according to customer specifications. This combined with the custom sized and profiled equipment boxes that are available means that the KST 7 is very flexible and customisable solution.

Driver seat:

The tipped spring mounted seat KFS 4 is fit with an hydraulic vibration absorption system incl. weight adjustment. With the folding spring mounted seat you can also arrive your workplace in small cabins.

Base plate:

The crane control unit is available with or without base plate.

Surface treatment:

Base coat and textured varnish

Standard colour RAL 7035 light grey



Example

KST 7 -1 / KFS 11 / V64 / V64.1 / KL / X

Basic unit

KST 7 With equipment boxes 290 x 500 mm

KST 75 With equipment boxes 210 x 500 mm

Special boxes for request!

Base plate

1 With base plate prepare for driver seat KFS 4

2 With base plate prepare for driver seat KFS 2

3 With base plate with apron for driver seat KFS 9, KFS 11...

4 Without base plate

Driver seat

KFS 4* *(Included in the delivery!)*

KFS 2*

KFS 11*

KFS 9*

**Description see driver seat page 229*

Mounting for equipment boxes

V... Multi-axis controller *(see page 1)*

S... Single-axis controller *(see page 93)*

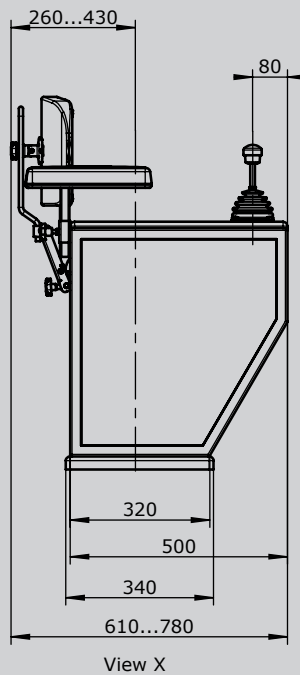
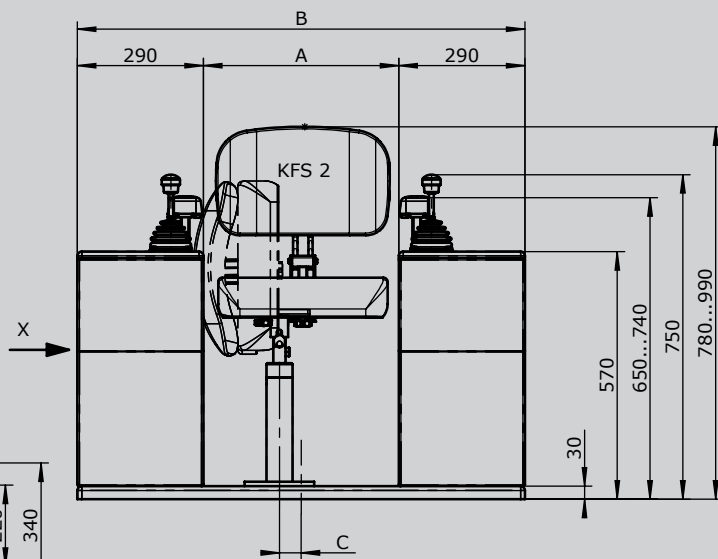
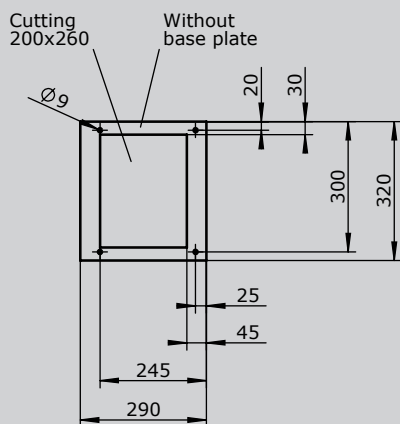
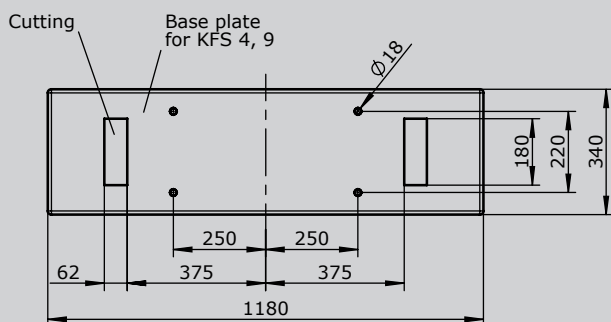
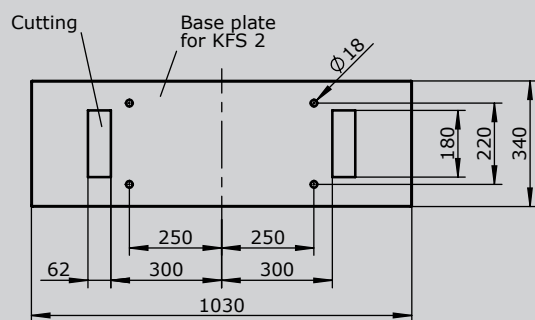
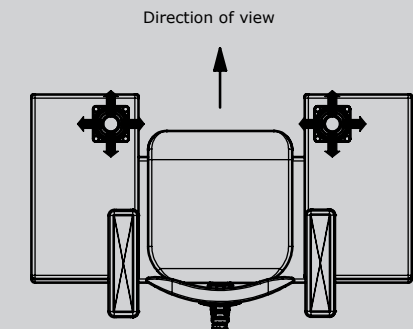
D... Double-handle controller *(see page 70)*

N... Control-switch *(see page 131)*

... *More command and indicating devices (see page 202)*

KST 7 -1 / KFS 11 / V64 / V64.1 / KL / X

Wiring	
KL	Without wiring, but terminal block built each terminal
KL V	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KL V	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal
Special model	
X	Special / customer specified
X ¹	Special painted
Option	
Radio remote control system	



Type	Dim. A	Dim. B	Dim. C
KFS 2	450	1030	50
KFS 4	600	1180	25
KFS 9	600	1180	25

Driver seat KFS 12



The crane driver`s seat KFS 12 is ergonomically designed and provides a high grade of comfort. The driver's seat is equipped with an air-sprung vibration system. The weight adjustment is infinitely. Heated seats 24V, lumbar support, seat cushion adjustment, seat allocation recognition and headrest are included in the standard delivery. All adjustment controls are positioned ergonomically within easy access. The metal parts are protected against corrosion and painted black.

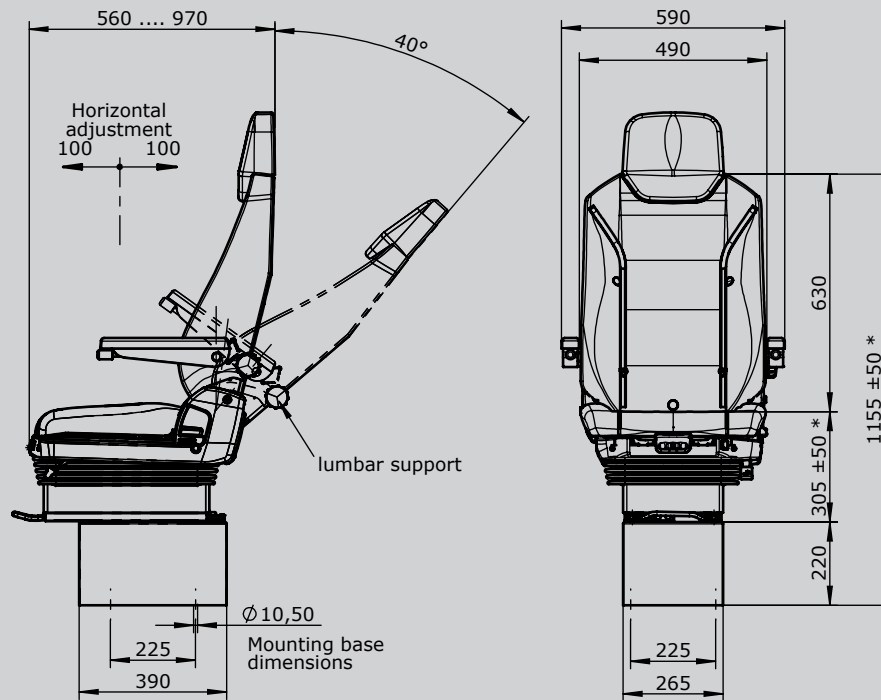
Technical data:

Suspension stoke	80 mm
Weight adjustment	50 - 150 kg
Horizontal adjustment	200 mm
Inclination of the backrest	-12°/+40°
Slope adjustment	-2°/+14°
Height adjustment	100 mm
Seat cushion adjustment	60 mm

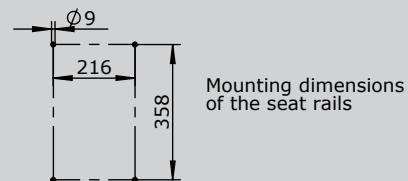
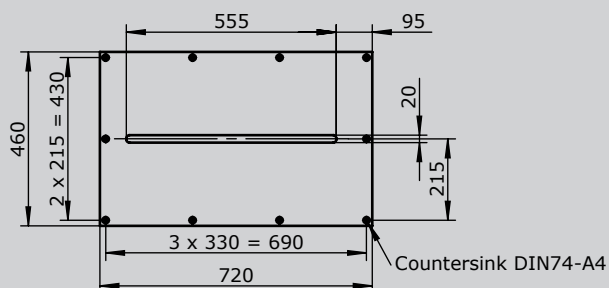
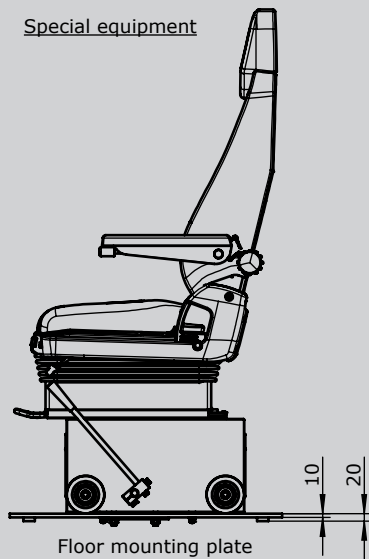


Example

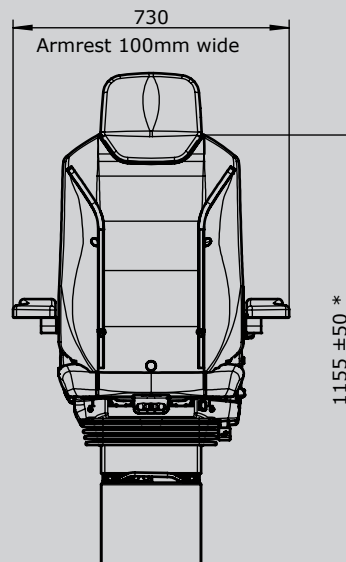
		Example		
		KFS 12	-A1	-S1
Driver seat				
KFS 12	Driver seat with textile cover black			
Attachments				
A1	Armrest adjustable (2 pieces) 50 mm wide			
A2	Armrest continuously adjustable (2 pieces) 100 mm wide			
S1	Safety belt 2 point fixing (automatic)			
S3	Safety belt 2 point fixing (static)			
LK	Plate for horizontal manual adjustment of seat adjustable +/-250 mm			
C4	Loose cover for driver seat KFS 11 / KFS 12			
U	Console (base)			



Special equipment



Mounting dimensions
of the seat rails



* adjustable

Driver seat

KFS 11



The crane driver`s seat KFS 11 is ergonomically designed and provides a high grade of comfort. The driver`s seat is a low level mechanical suspension seat with an oil-hydraulic vibration absorption system with weight adjustment. All adjustment controls are positioned ergonomically within easy access. The metal parts are protected against corrosion and painted black.

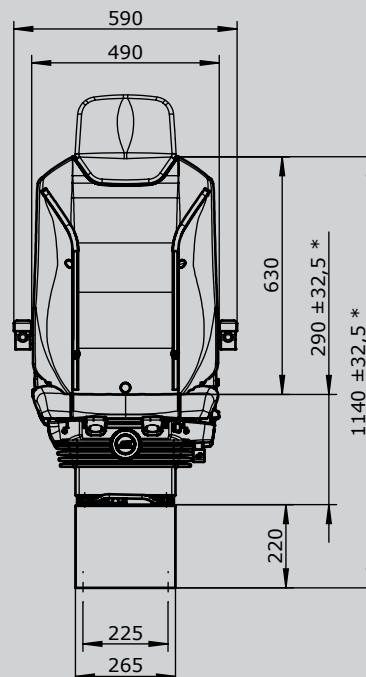
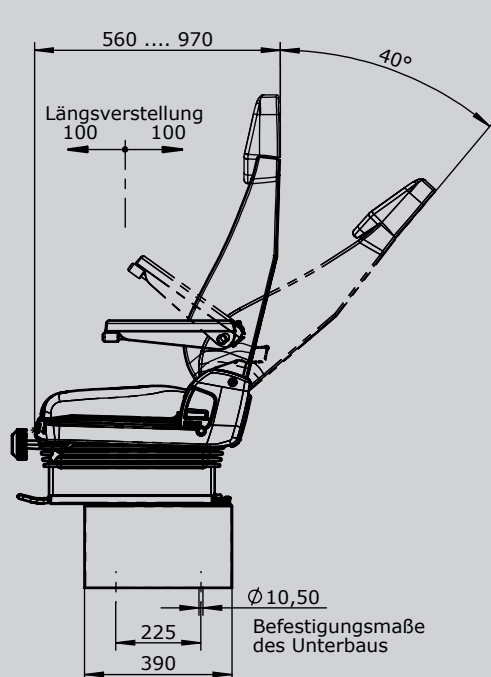
Technical data

Suspension stoke	80 mm
Weight adjustment	50 - 150 kg
Horizontal adjustment	200 mm
Inclination of the backrest	-12°/+40°
Slope adjustment	-10°/+12°
Height adjustment	65 mm

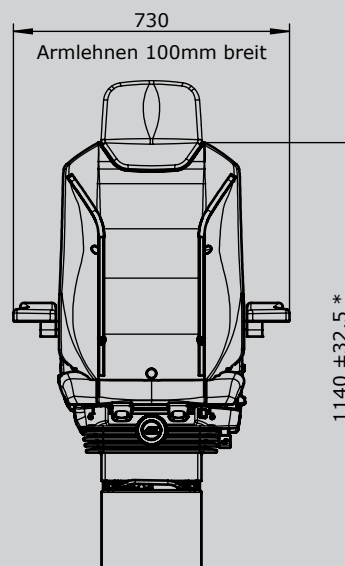
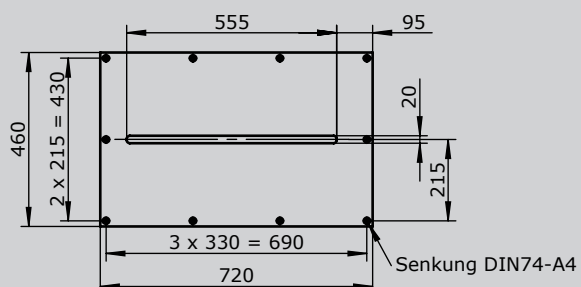
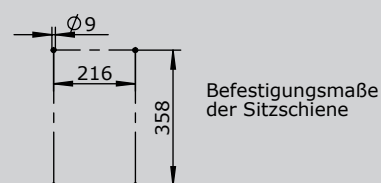
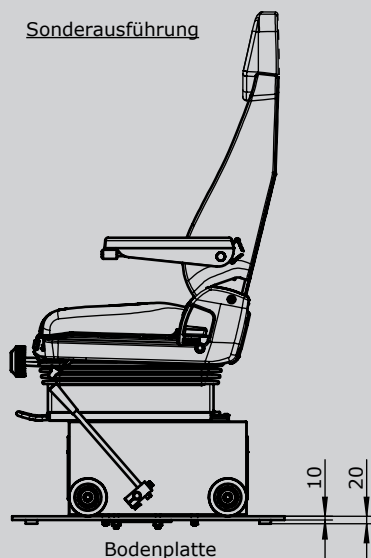


Example

		KFS 11	-A1	-S1
Driver seat				
KFS 11	Driver seat with textile cover black			
Attachments				
K	Headrest			
A1	Armrest adjustable (2 pieces) 50 mm wide			
A2	Armrest continuously adjustable (2 pieces) 100 mm wide			
H	Seat cushion and backrest with heating element 24V DC 75W			
S1	Safety belt 2 point fixing (automatic)			
S3	Safety belt 2 point fixing (static)			
LK	Plate for horizontal manual adjustment of seat adjustable +/-250 mm			
C4	Loose cover for driver seat KFS 11 / KFS 12			
U	Console (base)			



Sonderausführung



* einstellbar

Driver seat KFS 10



The crane driver`s seat KFS 10 is ergonomically designed and provides a high grade of comfort. The driver`s seat has a pneumatic vibration absorption system with weight adjustment by compressor (24V DC 8 Ampere) and a standard seat cushion V-cut. Through its three horizontal adjustment, it can be flexibly adapted to very many applications. All adjustment controls are positioned ergonomically within easy access. The metal parts are protected against corrosion and painted black.

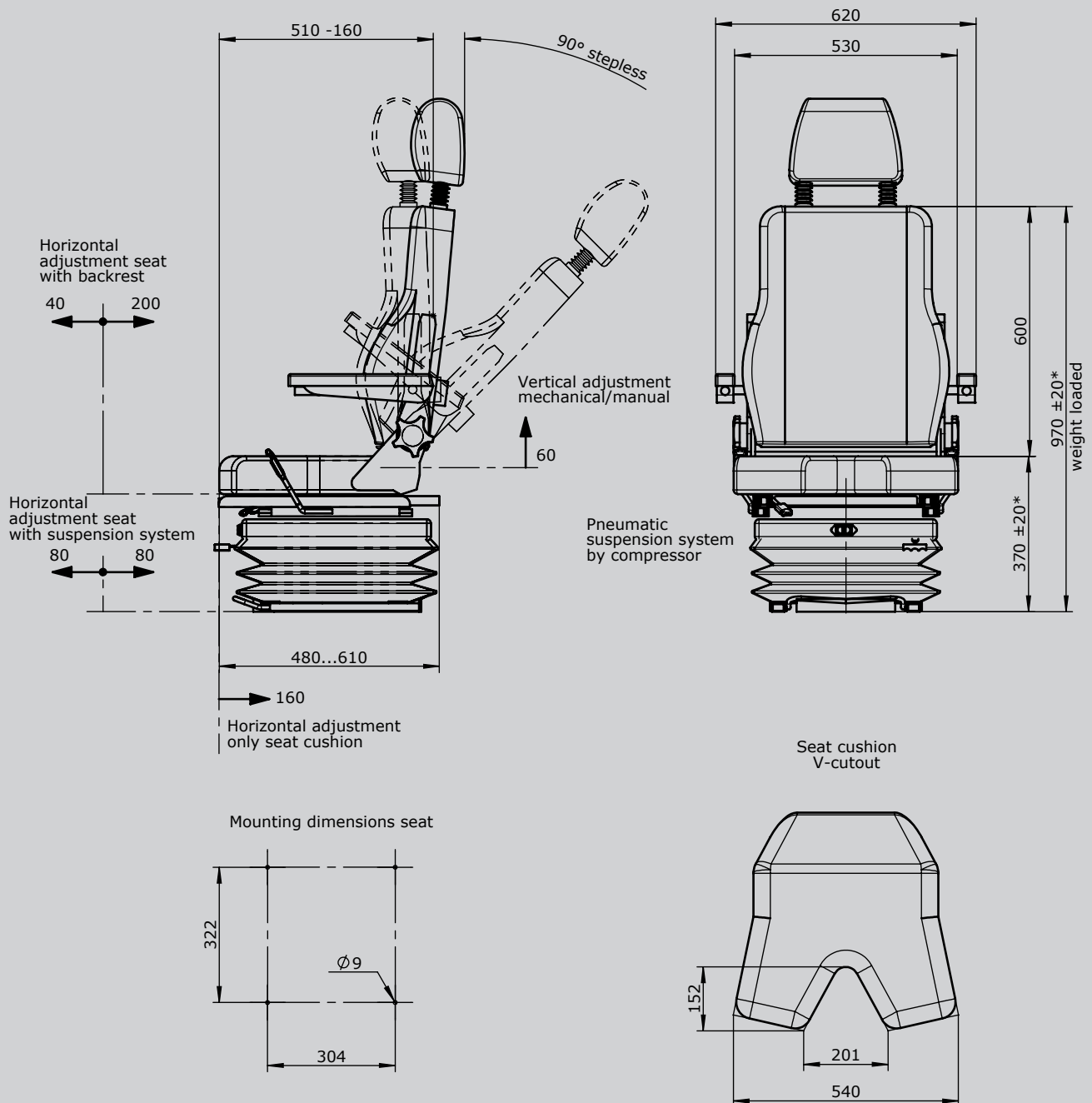
Technical data:

Suspension stoke	80 mm
Weight adjustment	50 - 150 kg (pneumatic)
	50 - 130 kg (mechanical)
Horizontal adjustment	
Seat with suspension system	160 mm
Seat part individual	240 mm
Seat cushion	160 mm
Inclination of the backrest	max. 90°
Height and slope adjustment	40 mm



Example

		KFS 102	-A1	-L2	-S2	-R1
Driver seat						
KFS 101	Driver seat with air-permeable artificial leather cover black with V-cut					
KFS 102	Driver seat with textile cover black with V-cut					
Attachments						
K	Headrest					
A1	Armrest adjustable (2 pieces) 50 mm wide					
A2	Armrest continuously adjustable (2 pieces) 100 mm wide					
L1	Lumbar support manual adjustment - 2 movement					
L2	Lumbar support manual adjustment - 4 movement					
B	Seat allocation recognition					
H	Seat cushion and backrest with heating element 24 V DC 47W					
S1	Safety belt 2 point fixing (automatic)					
S2	Safety belt 4 point fixing (headrest required)					
S3	Safety belt 2 point fixing (static)					
U	Console (base)					
C3	Loose cover for driver seat KFS 10 with V-cut					
R1	Price reduction pneumatic vibration absorption system					
R2	Seat cushion without V-cut					



* adjustable

Driver seat

KFS 9



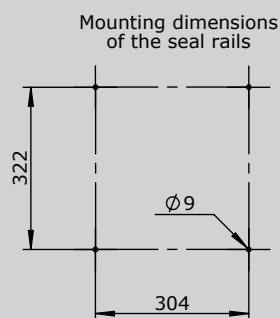
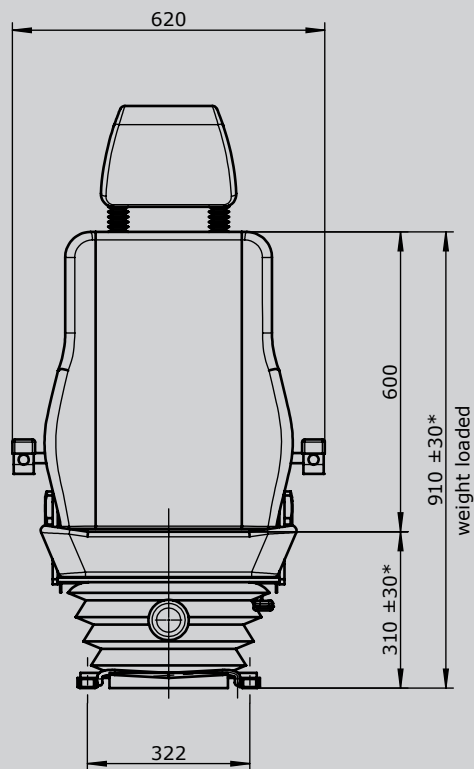
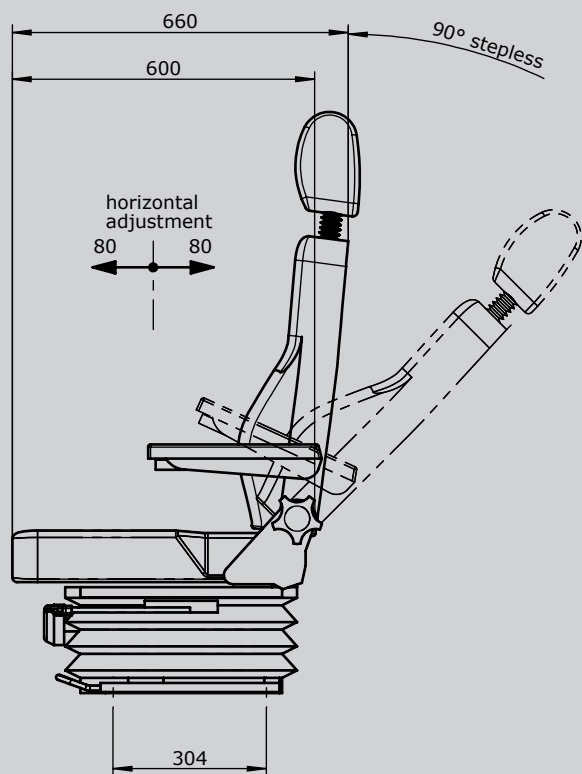
The crane driver`s seat KFS 9 is ergonomically designed and provides a high grade of comfort. The driver`s seat is a low level mechanical suspension seat with an oil-hydraulic vibration absorption system with weight adjustment. Upon request, a pneumatic vibrating system with weight adjustment is available. All adjustment controls are positioned ergonomically within easy access. The metal parts are protected against corrosion and painted black.

Technical data

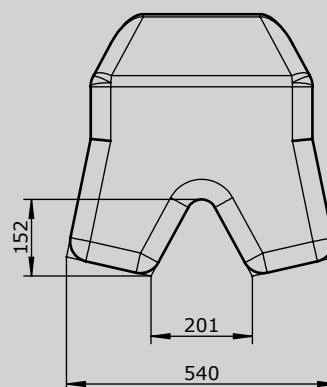
Suspension stoke	80 mm
Weight adjustment	50 - 150 kg (pneumatic) 50 - 130 kg (mechanical)
Horizontal adjustment	160 mm
Inclination of the backrest	max. 90°
Height and slope adjustment	60 mm



		Example				
		KFS 92	-A1	-L2	-S1	-P
Driver seat						
KFS 91	Driver seat with air-permeable artificial leather cover black					
KFS 92	Driver seat with textile cover black					
Attachments						
K	Headrest rain					
A1	Armrest adjustable (2 pieces) 50 mm wide					
A2	Armrest continuously adjustable (2 pieces) 100 mm wide					
L1	Lumbar support manual adjustment - 2 movement					
L2	Lumbar support manual adjustment - 4 movement					
B	Seat allocation recognition					
H	Seat cushion and backrest standard with heating element 24 V DC 47W					
S1	Safety belt 2 point fixing (automatic)					
S2	Safety belt 4 point fixing (headrest required)					
S3	Safety belt 2 point fixing (static)					
V	Seat cushion with V-cut (LD required!)					
LD	Horizontal adjustment dual (seat height +30 mm!)					
P	Pneumatic vibration absorption system with weight adjustment (incl. compressor)					
LK	Plate for horizontal manual adjustment of seat adjustable +/-250 mm					
C1	Loose cover for driver seat KFS 9					
C2	Loose cover for driver seat KFS 9 with V-cut					
U	Console (base)					



Seat cushion
v-cutout



* adjustable

Driver seat

KFS 14



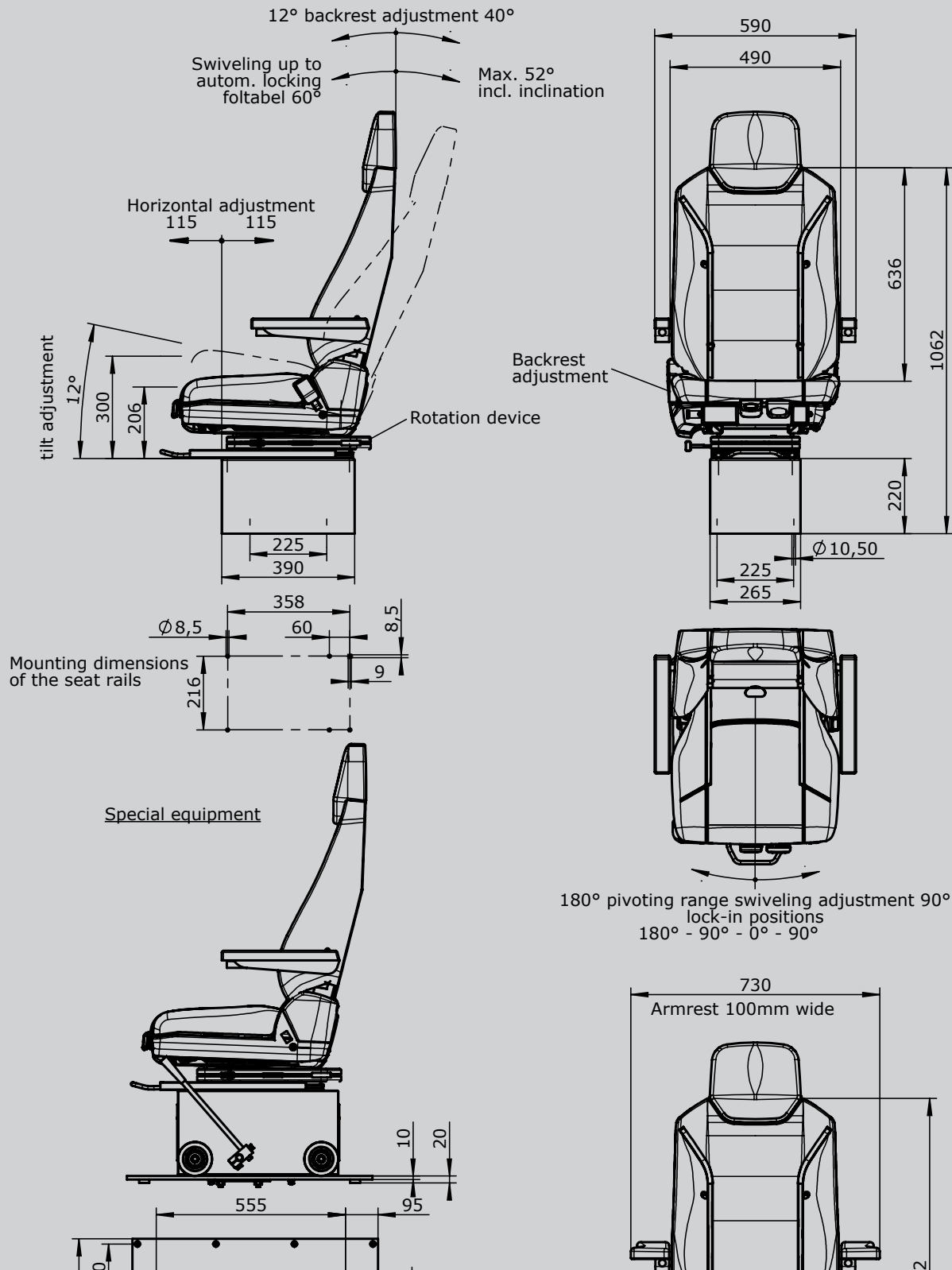
The crane driver`s seat KFS 14 is a static seat with ergonomically designed and provides a high grade of comfort. The driver`s seat is equipped with roller-bearing swivel system. All adjustment controls are positioned ergonomically within easy access. The metal parts are protected against corrosion and painted black.

Technical data:

Horizontal adjustment	150 mm
Inclination of the backrest	max. 28°
Height adjustment	65 mm



		Example			
		KFS 14	-A1	-S1	-U
Driver seat					
KFS 14	Driver seat with textile cover black				
Attachments					
K	Headrest				
A1	Armrest fully adjustable (2 pieces) 50 mm wide				
A2	Armrest fully adjustable (2 pieces) 100 mm wide				
S1	Safety belt 2-point mounting (automatic)				
S3	Safety belt 2-point mounting (static)				
U	Base frame (Apron)				



Driver seat KFS 4



The crane driver`s seat KFS 4 has stepless high adjustment by means of a gas-loaded spring and an oil-hydraulic vibration absorption system with weight adjustment. The backrest can be tilted, forwards into the cushion, which in turn can then be tilted 90° sideways. All functions are performed by a simple lever operation. The metal parts are protected against corrosion and painted black.

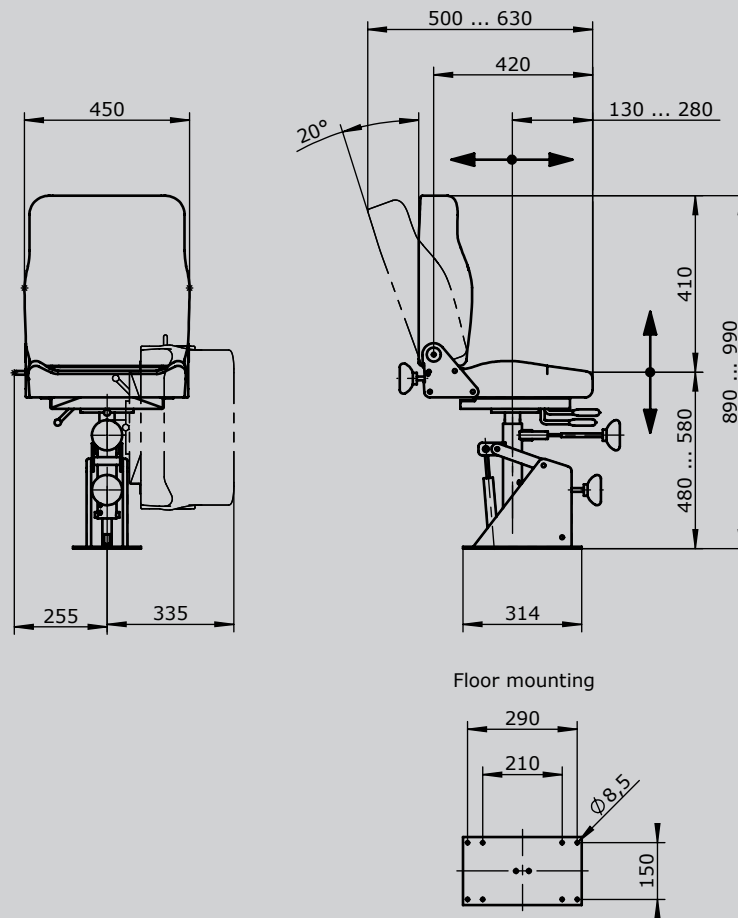
Technical data:

Suspension stoke	80 mm
Weight adjustment	50 - 130 kg
Horizontal adjustment	100 mm
Inclination of the backrest	max. 20°
Height adjustment	100 mm



Example

		KFS 42	-A1
Driver seat			
KFS 41	Driver seat with air-permeable artificial leather cover black		
KFS 42	Driver seat with textile cover grey / black		
Attachments			
A1	Armrest fully adjustable (2 pieces) 50 mm wide		
A2	Armrest fully adjustable (2 pieces) 100 mm wide		



Driver seat KFS 2



The crane driver`s seat KFS 2 has stepless high adjustment by means of a gas-loaded spring. The backrest can be tilted, forwards onto the cushion, which in turn can then be tilted 90° sideways. All these functions are performed easily via levers.

Technical data

Horizontal adjustment	100 mm
Inclination of the backrest	max. 10°
Height adjustment	120 mm

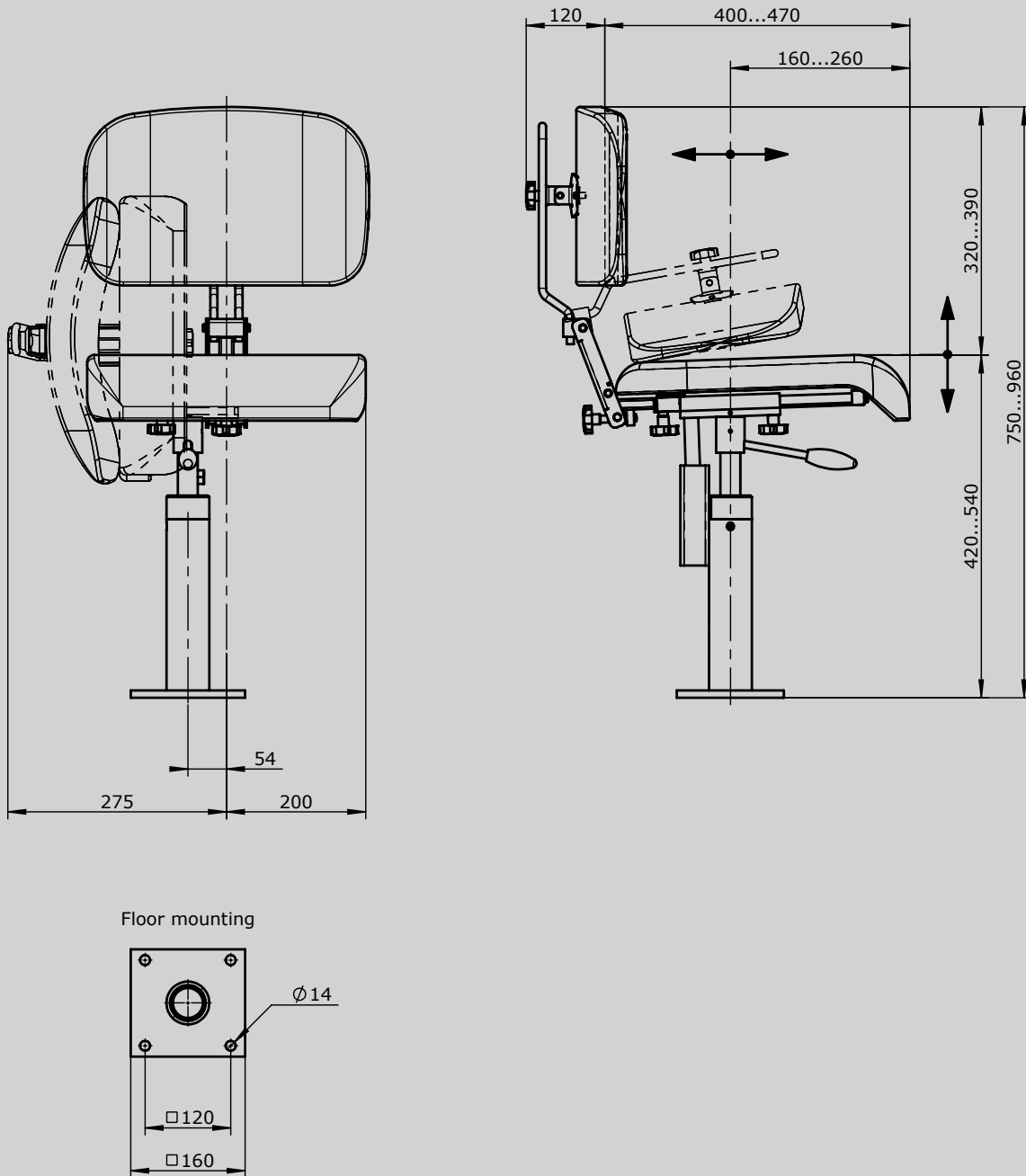


Example

KFS 22

Driver seat

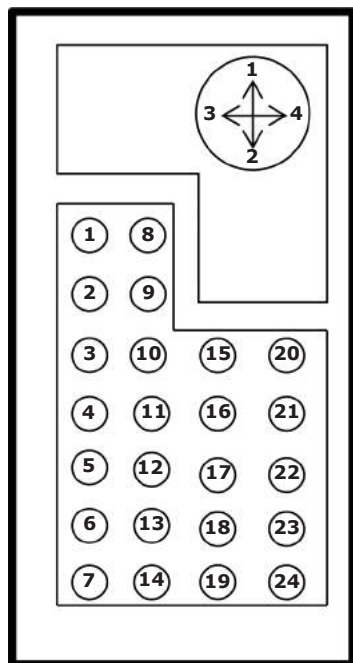
KFS 21	With air-permeable artificial leather cover black
KFS 22	With textile cover grey / black



Customer _____

Order No. _____

Equipment box left	Pos. No.	Type	Colour	Label text (max. 2 x 12 characters	Plant ref.	Desti- nation	Notes
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
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	10						
	11						
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	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						



Maximum installation of command and indicating devices 22 (see p.202) in our control units and housings if our multi-axis controllers V62 (see p.57) are used. Additional command and indicating devices can be installed of multi-axis controllers V64 or V11 (see p.57 or p.66) are used. (please enquire)

Control unit (see p. 203)
Type

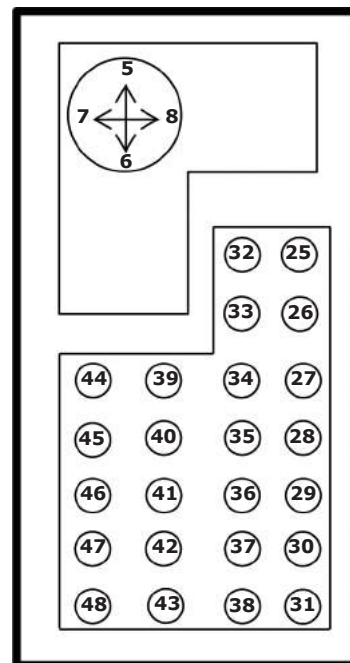
		No. of pieces max.
KST 3	1 - 6, 8 - 13, 15 - 18	16
KST 41/181	1 - 5, 10 - 12	8
KST 42/182	1 - 5, 8 - 12, 15 - 17	13
KST 51/151	3 - 7, 10 - 14, 15 - 19, 20 - 24	20
KST 52/53/54/152/154	1 - 24	24
KST 6	3 - 4, 10 - 11, 15 - 16	6
KST 7	1 - 24	24
KST 75	1 - 19	19

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Customer _____

Order No. _____

Pos. No.	Type	Colour	Label text (max). 2 x 12 characters	Plant ref.	Destination	Notes	Equipment box right
1							
2							
3							
4							
5							
6							
7							
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10							
11							
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21							
22							
23							
24							

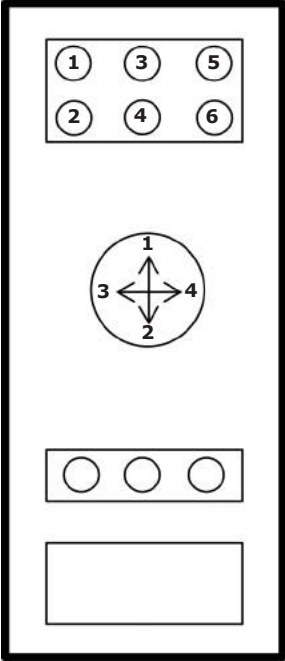


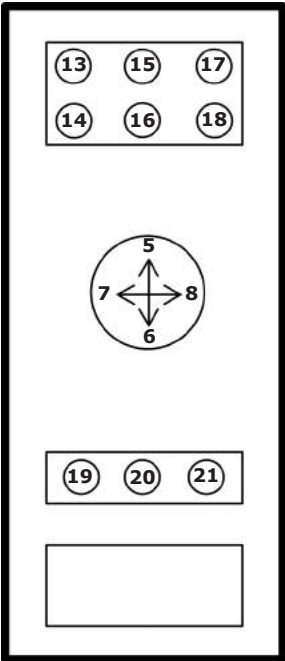
Maximum installation of command and indicating devices 22 (see p.202) in our control units and housings if our multi-axis controllers V62 (see p.57) are used. Additional command and indicating devices can be installed if multi-axis controllers V64 or V11 (see p.57 or p.66) are used. (please enquire)

	No. of pieces max.	Control unit (see p.203) Type
25 - 30, 32 - 37, 39 - 42	16	KST 3
25 - 29, 34 - 36	8	KST 41/181
25 - 29, 32 - 36, 39 - 41	13	KST 42/182
27 - 31, 34 - 38, 39 - 43, 44 - 48	20	KST 51/151
25 - 48	24	KST 52/53/54/152/154
27 - 28, 34 - 35, 39 - 40	6	KST 6
25 - 48	24	KST 7
25 - 43	19	KST 75

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Customer _____ Order No. _____

Equipment box left		Pos. No.	Type	Colour	Lable text (max). 2 x 12 characters	Plant ref.	Desti- nation	Notes
	Max. 6 pcs. installation of command and indicating devices 22 (see p.202) or 1 pcs. monitoring device 72 x 72mm	1						
		2						
		3						
		4						
		5						
	Multi-axis controller V64 (see p.57) or V11 (see p.63)	6						
		7						
		8						
	Max. 3 pcs. installation of command and indicating devices 22 (see p.202)	9						
		10						
		11						
	Place to put on devices	12						

Equipment box right								
	Max. 6 pcs. installation of command and indicating devices 22 (see p.202) or 1 pcs. monitoring device 72 x 72mm	13						
		14						
		15						
		16						
		17						
	Multi-axis controller V64 (see p.57) or V11 (see p.63)	18						
		19						
		20						
	Max. 3 pcs. installation of command and indicatin devices 22 (see p.202)	21						
		22						
		23						
	Place to put on devices	24						

Order No. _____

1
2
3



4
5
6

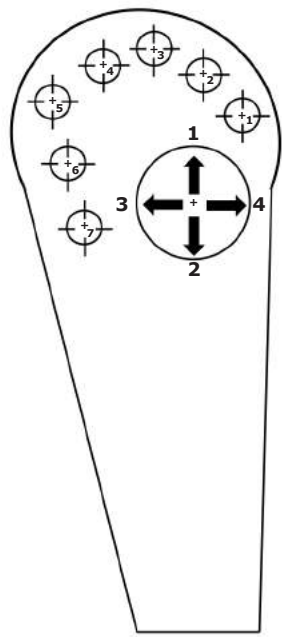
10
11
12



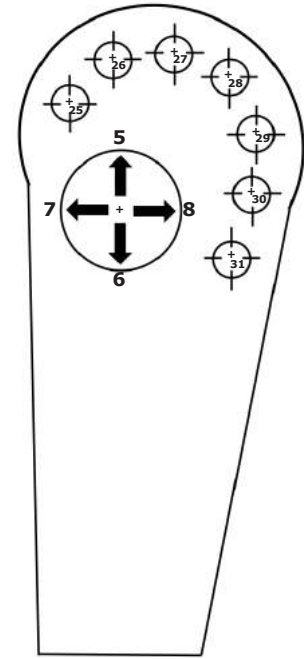
13
14
15

Customer _____ Order No. _____

Equipment box left	Pos. No.	Type	Colour	Label text (max. 2 x 12 characters)	Plant-ref.	Desti-nation	Notes
Multi-axis controller V11, V14, V25, V85 see p. 63, 50, 25, 10	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
max. 7 installations of command and indicating devices 22 (see p.202)							



Equipment box right	Pos. No.	Type	Colour	Label text (max. 2 x 12 characters)	Plant-ref.	Desti-nation	Notes
Multi-axis controller V11, V14, V25, V85 see p. 63, 50, 25, 10	25						
	26						
	27						
	28						
	29						
	30						
	31						
max. 7 installations of command and indicating devices 22 (see p.202)							

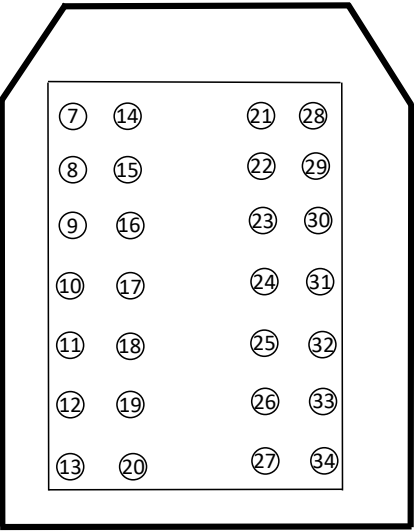
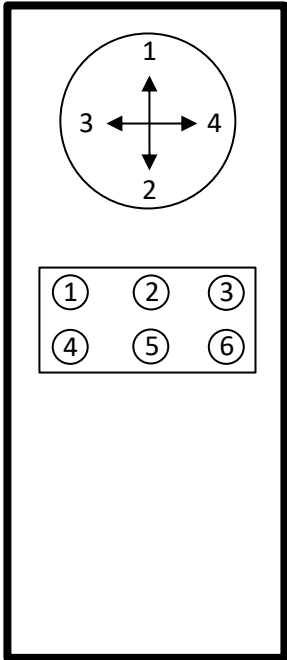


Customer _____

Order No. _____

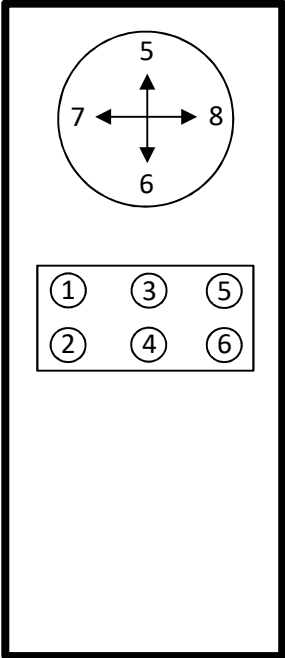
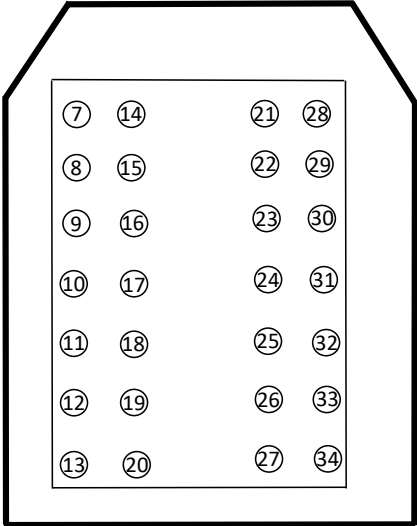
Equipment box left

Pos. No.	Type	Colour	Lable text (max). 2 x 12 characters	Plant ref.	Desti- nation	Notes
1						
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21						
22						
23						
24						



Customer

Order No.

Equipment box right	Pos. No.	Type	Colour	Lable text (max). 2 x 12 characters	Plant ref.	Desti- nation	Notes
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						

Portable control unit TS 1



The portable control unit TS 1 is used for controlling and monitoring the necessary equipment. The chest panel and straps enable the operator to carry it without becoming tired. An adjustable carrying strap can also be fitted for use without the chest plate.

Surface treatment:
Priming and structure-finishing paint
Standard colour RAL 7032 pebble-grey

Technical data:

Operation temperature	-40°C to +85°C
Degree of protection	IP54



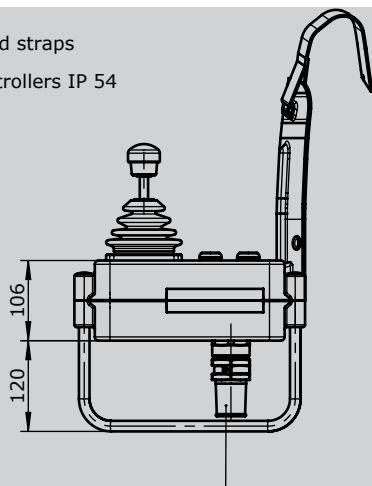
		TS 1	-SB 1	-RH 1	Example		-K 3	-HS 1	/	V...	/	KLS	/	X
Basic unit														
TS 1	With chest plate and straps													
TS 11	With straps													
Attachment														
SB 1	Legs for control unit alu-tube 2 pieces													
SB 2	Legs for control unit stainless steel-tube V2 A 2 pieces													
RH 1	Reeling hooks for control unit stainless steel V2 A													
K 1	Cable entry M32 cable 11 - 21 mm													
K 2	Cable entry M40 cable 19-28 mm													
K 3	Cable entry 180° swiveling M32 cable 11-21 mm													
HS 1	Plug in socket 16-pole male insert													
HB 1	Connector 16-pole female insert													
HS 2	Plug in socket 24-pole female insert													
HB 2	Connector 24-pole female insert													
HS 3	Plug in socket 32-pole male insert													
HB 3	Connector 32-pole female insert													
Indicating labels not engraved for multi-axis-/ single-axis controller														
Mounting for equipment boxes														
V	Multi-axis controller (see page 1)													
S	Single-axis controller (see page 93)													
N	Control-switch (see page 131)													
...	More command and indicating devices (see page 202)													
Cable and wiring														
Cable Ölflex Classic FD 810 P	18 x 1 mm ²	13,9 mm Ø	-5°C to +70°C	each meter										
Cable Ölflex Classic FD 810 P	25 x 1 mm ²	16,4 mm Ø	-5°C to +70°C	each meter										
Cable Ölflex Classic FD 810 P	34 x 1 mm ²	18,9 mm Ø	-5°C to +70°C	each meter										
Cable Neonflex	18 x 1 mm ²	19,2 mm Ø	-25°C to +80°C	each meter										
Cable Neonflex	24 x 1 mm ²	22,1 mm Ø	-25°C to +80°C	each meter										
Cable Neonflex	36 x 1 mm ²	26,1 mm Ø	-25°C to +80°C	each meter										
KLS	Wired on connector / plug in socket per core													
KLK	Wiring for cable per core													

Technical details may vary based on configuration or application! Technical data subject to change without notice!

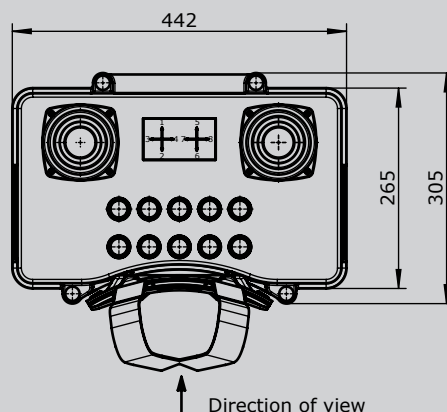
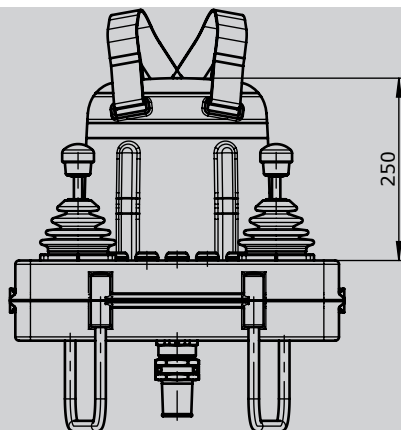
TS 1 -SB 1 -RH 1 -K 3 -HS 1 / V... / KLS / X

Special model	
X	Special / customer specified
X1	Housing antistatic design < 10 ⁹ Ohm/cm
X2	Finishing colour yellow RAL 1021

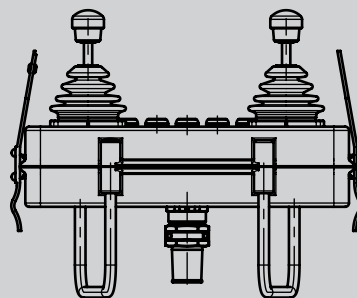
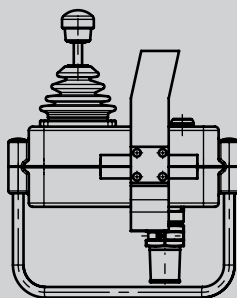
With chest plate and straps
Protection IP 65
with multi-axis controllers IP 54



Cable entry
with anti-kink protection
and strain relief or connectors



With adjustable carrying strap
Protection IP 65
with multi-axis controllers IP 54



Portable control unit TS 2



The portable control unit TS 2 is used for controlling and monitoring the necessary equipment. The chest panel and straps enable the operator to carry it without becoming tired. An adjustable carrying strap can also be fitted for use without the chest plate.

Surface treatment:
 Priming and structure-finishing paint
 Standard colour RAL 7032 pebble-grey

Technical data:

Operation temperature	-40°C to +85°C
Degree of protection	IP65



		Example									
		TS 2	-SB 1	-RH 1	-K 3	-HS 1	/	V...	/	KLS	/ X
Basic unit											
TS 2	With chest plate, straps										
TS 21	With straps										
TS 22	With bracket and straps										
Attachment											
SB 1	Legs for control unit alu-tube 2 pieces										
SB 2	Legs for control unit stainless steel-tube V2 A 2 pieces										
RH 1	Reeling hooks for control unit stainless steel V2 A										
K 1	Cable entry M32 cable 11 - 21 mm										
K 2	Cable entry M40 cable 19 - 28 mm										
K 3	Cable entry 180° swiveling M32 cable 11-21 mm										
HS 1	Plug in socket 16-pole male insert										
HB 1	Connector 16-pole female insert										
HS 2	Plug in socket 24-pole female insert										
HB 2	Connector 24-pole female insert										
HS 3	Plug in socket 32-pole male insert										
HB 3	Connector 32-pole female insert										
Indicating labels not engraved for multi-axis-/ single-axis controller											
Indicating labels engraved for multi-axis-/ single-axis controller											
Mounting for equipment boxes											
V	Multi-axis controller (see page 1)										
S	Single-axis controller (see page 93)										
N	Control-switch (see page 131)										
...	More command and indicating devices (see page 202)										

Technical details may vary based on configuration or application! Technical data subject to change without notice!

TS 2 -SB 1 -RH 1 -K 3 -HS 1 / V... / KLS / X

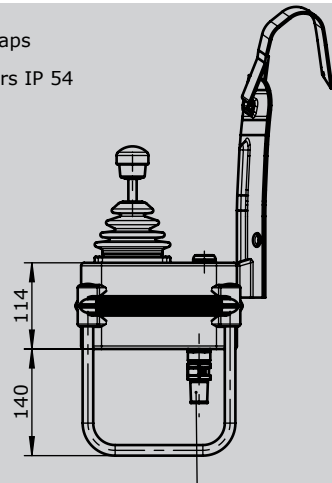
Cable and wiring

Cable Oelflex	18 x 1 mm ²	13,9 mm Ø	-5°C to +70°C	each meter
Cable Oelflex	25 x 1 mm ²	16,4 mm Ø	-5°C to +70°C	each meter
Cable Oelflex	34 x 1 mm ²	18,9 mm Ø	-5°C to +70°C	each meter
Cable Ölflex Crane	18 x 1 mm ²	19,2 mm Ø	-25°C to +80°C	each meter
Cable Ölflex Crane	24 x 1 mm ²	22,1 mm Ø	-25°C to +80°C	each meter
Cable Ölflex Crane	36 x 1 mm ²	26,1 mm Ø	-25°C to +80°C	each meter
KLS	Wired on connector / plug in socket per core			
KLK	Wiring for cable per core			

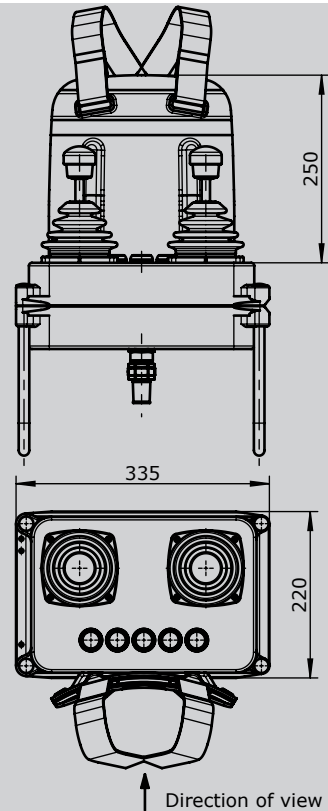
Special model

X	Special / customer specified
X1	Housing antistatic design < 10 ⁹ Ohm/cm
X2	Finishing color yellow RAL 1021

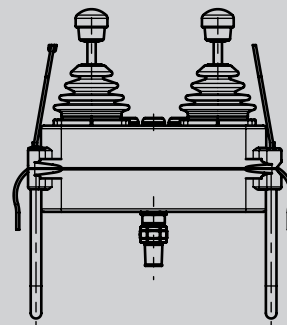
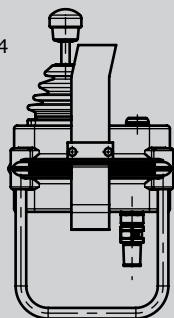
With chest plate and straps
Protection IP 65
with multi-axis controllers IP 54



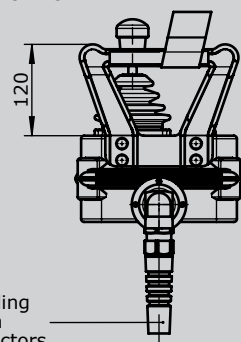
Cable entry
with anti-kink protection
and stain relief or connectors



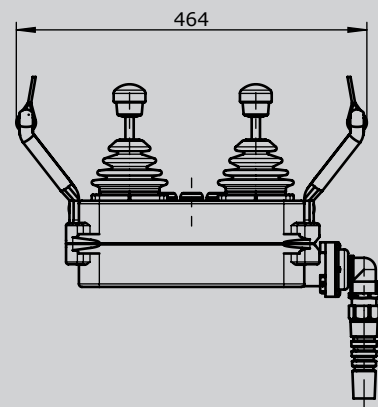
With adjustable carrying strap
Protection IP 65
with multi-axis controllers IP 54



With bracket and cable entry swivelling
Protection IP 65
with multi-axis controllers IP 54



Cable entry 180° swivelling
with anti-kink protection
and stain relief or connectors



Control pedestal for offshore U22 / 32



The control pedestal U22 / 32 accommodate the devices necessary for control and monitoring.

Ready wired, it can be quickly and easily installed on the sea deck.

The housing (pedestal head) is made of seawater-resistant aluminium.

Surface treatment:

Priming and structure-finishing paint

Standard colour RAL 7032 pebble-grey

Technical data:

Operation temperature	-40°C to +85°C
Degree of protection	IP66



Example

U22 / 32 / N61... / N62... / H / PW / 2D / PQ / KLV / X

Housing

U22/32	With 1 narrow side-plate with pillar-gasket
FD	Side-plate narrow gasket
HD	Side-plate wide gasket (required for command and indicating devices)
KD	Hinged side-plate with gasket that can be locked in position
IA	Monitoring devices cover with gasket for max. 2 monitors 72 x 72 mm or 4 monitors 72 x 36 mm and max. 6 indicating devices pos. 28, 29
RS	Pillar 108 mm Ø 670 mm height with flange quadratic or round

Masterswitch / Control-switch

N61	HG Masterswitch with ball handle and indicating labels
N62	KN Control-switch with knob and indicating label

-HG -01 Z P -A05 P134 -X

Axis 1: direction 3-4

(Standard contacts gold-plated 2A 250 V AC15)

01	2 contacts	Standard contact - arrangement see page 140
02	4 contacts	z.B.
03	6 contacts	A05 MS21
04	8 contacts	A0500 MS21-00
A99 contact - arrangement according customer request		

Z Spring return

R Friction brake

P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA
		P132	T396 2 x 1 kOhm	I max. 1 mA
		P133	T396 2 x 2 kOhm	I max. 1 mA
		P134	T396 2 x 5 kOhm	I max. 1 mA
		P135	T396 2 x 10 kOhm	I max. 1 mA

More potentiometers on request!

U22 / 32 / N61.../N62... / H / PW / 2D / PQ / KLV / X

Command and indicating devices

H	Heating	20 Watt 220 or 110V 50/60 Hz	
PV	Mushroom head push button latching	22 latching with indicating label	1 NC
P	Mushroom head push button	22 with indicating label	1 NO
D	Push button	22 with indicating label	1 NO
W	Selector switch 0-1	22 with indicating label	1 NO
L	Indicator light	22 with indicating label	Diode 24 Volt
L	Indicator light	22 with indicating label	Diode 230 Volt AC
	Contact block additional		1 S or 1 Ö
L	Indicator light	22 with indicating label	Diode 24 Volt protection IP65
L	Indicator light	10 with indicating label	Diode 24 Volt protection IP65

Display devices

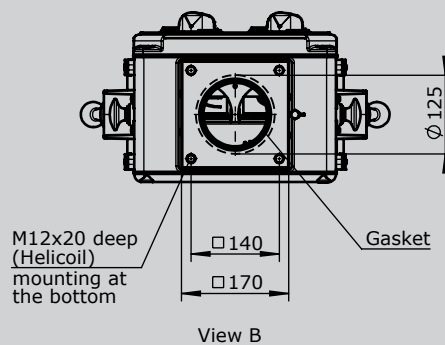
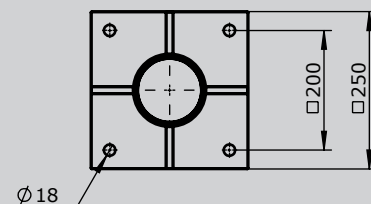
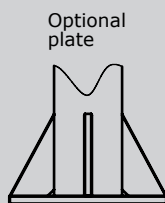
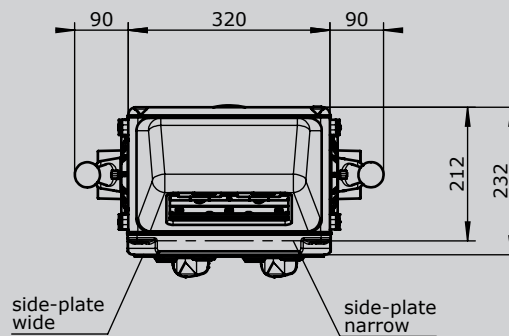
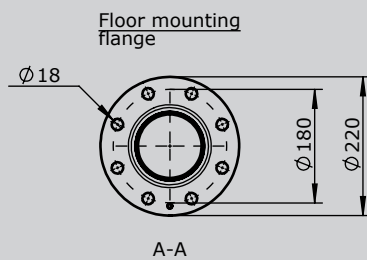
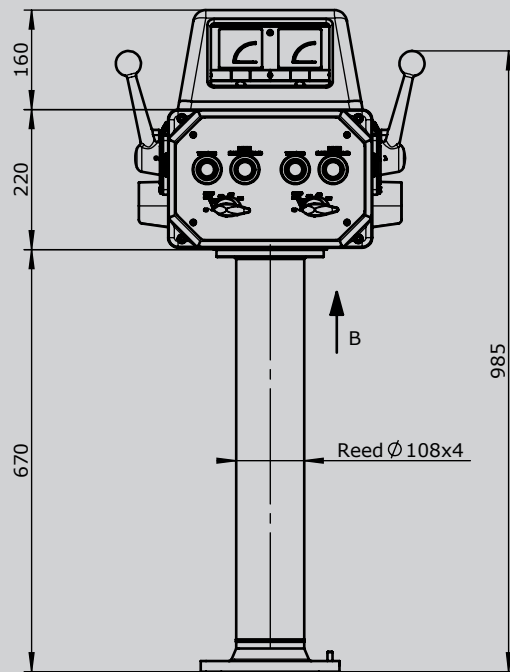
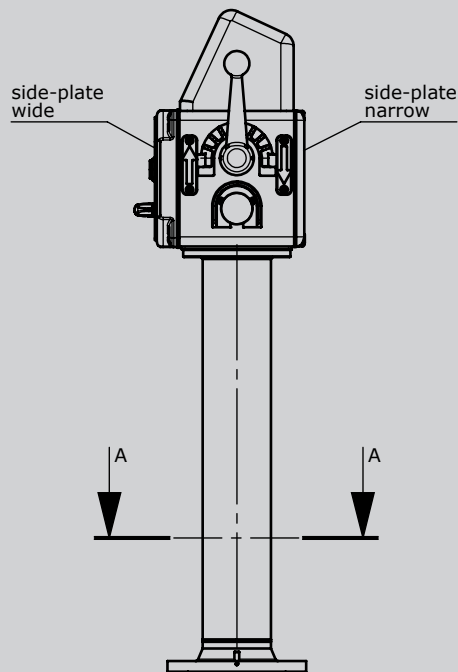
PQ	Powermeter PQ 72 1 mA DC	Engraved your instructions
PQI	Powermeter PQ 72 1 mA DC illuminated 24 Volt	Engraved your instructions
PQ	Powermeter PQ 72 x 36 1 mA DC	Engraved your instructions
PQI	Powermeter PQ 72 x 36 1 mA DC illuminated 24 Volt	Engraved your instructions
EQ	Amperemeter EQ 72 100/200/1A	Engraved your instructions
EQI	Amperemeter EQ 72 100/200/1A illuminated 24 Volt	Engraved your instructions
EQ	Amperemeter EQ 72 x 36 100/200/1A	Engraved your instructions
EQI	Amperemeter EQ 72 x 36 100/200/1A illuminated 24 Volt	Engraved your instructions

Wiring

KLV on terminal block 2,5mm² with wire line 0,75 mm²

Special model

X Special / customer specified



Control pedestal for offshore

U23 / 23



The control pedestal U23 / 23 accomodate the devices necessary for control and monitoring. Ready wired, it can be quickly and easily installed on the sea deck. The housing (pedestal head) is made of seawater-resistant aluminium.

Surface treatment:
Priming and structure-finishing paint
Standard colour RAL 7032 pebble-grey



Technical data:

Operation temperature	-40°C to +85°C
Degree of protection	IP66

Example

		U23 / 23		/ N61.../N62...		/ H / PW / 2D		/ PQ		/ KLV		/ X	
Housing													
U23/23	With 1 narrow cover with pillar-gasket												
U23/23A	With 1 narrow cover without drilling in the housing												
IA	Monitoring devices cover with gasket for max. 2 monitors 72 x 72 mm or 4 monitors 72 x 36 mm and max. 6 indicating devices pos. 28, 29												
RS	Pillar 108mm Ø 670 mm height with flange quadratic or round												
Masterswitch / Control-switch													
N61	HG Masterswitch with ball handle and indicating labels												
N62	KN Control-switch with knob and indicating label												
		-HG	-01 Z P	-A05	P134	-X							
Axis 1: direction 3-4													
		(Standard contacts gold-plated 2A 250 V AC15)											
01	2 contacts	Standard contact - arrangement see page 140											
02	4 contacts	z.B.											
03	6 contacts	A05	MS21										
04	8 contacts	A0500	MS21-00										
		A99 contact - arrangement according customer request											
Z	Spring return												
R	Friction brake												
P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA									
		P132	T396 2 x 1 kOhm	I max. 1 mA									
		P133	T396 2 x 2kOhm	I max. 1 mA									
		P134	T396 2 x 5 kOhm	I max. 1 mA									
		P135	T396 2 x 10 kOhm	I max. 1 mA									
		More potentiometers on request!											

Technical details may vary based on configuration or application! Technical data subject to change without notice!

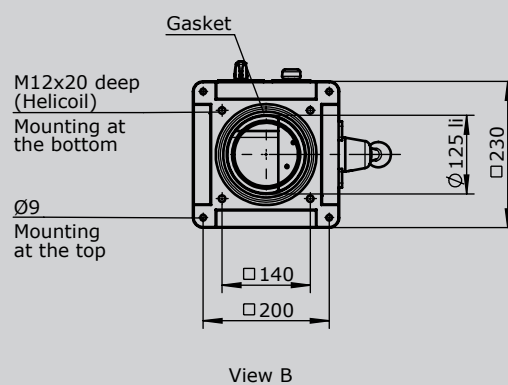
U23 / 23 / N61.../N62... / H / PW / 2D / PQ / KLV / X

Command and indicating devices			
H	Heating	20 Watt 220 or 110V 50/60 Hz	
PV	Mushroom head push button latching	22 latching with indicating label	1 Ö
P	Mushroom head push button	22 with indicating label	1 S
D	Push button	22 with indicating label	1 S
W	Selector switch 0-1	22 with indicating label	1 S
L	Indicator light	22 with indicating label	Diode 24 Volt
L	Indicator light	22 with indicating label	Diode 230 Volt AC
	Contact block additional		1 S or 1 Ö
L	Indicator light	22 with indicating label	Diode 24 Volt protection IP65
L	Indicator light	10 with indicating label	Diode 24 Volt protection IP65

Display devices	
PQ	Powermeter PQ 72 1 mA DC Engraved your instructions
PQI	Powermeter PQ 72 1 mA DC illuminated 24 Volt Engraved your instructions
PQ	Powermeter PQ 72 x 36 1 mA DC Engraved your instructions
PQI	Powermeter PQ 72 x 36 1 mA DC illuminated 24 Volt Engraved your instructions
EQ	Amperemeter EQ 72 100/200/1A Engraved your instructions
EQI	Amperemeter EQ 72 100/200/1A illuminated 24 Volt Engraved your instructions
EQ	Amperemeter EQ 72 x 36 100/200/1A Engraved your instructions
EQI	Amperemeter EQ 72 x 36 100/200/1A illuminated 24 Volt Engraved your instructions

Wiring	
KLV on terminal block 2,5 mm² with wire line 0,75 mm²	

Special model	
X	Special / customer specified



Naval cruise controller AZ1



The naval cruise controller AZ1 is a rugged switching device. The modular design enables the switching device to be used universally.

The design includes:

The mechanical control-system for the engine speed 0-max. rpm. switching angle 60 degrees with pressure print at 7 degrees and friction brake direction 0-2. The mechanical control-system for the steering left/right direction 13-14, 360 degrees with pressure points 4x90 degrees and friction brake.

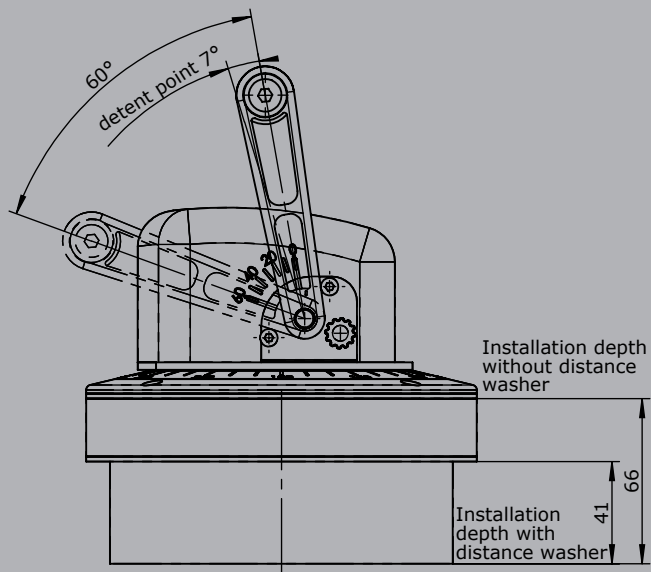
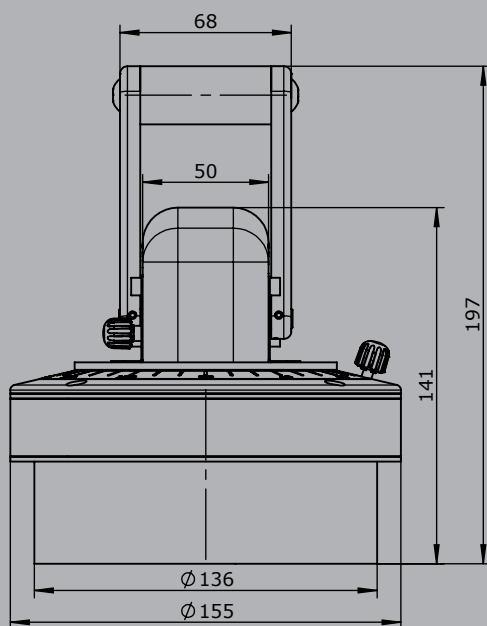
The AZ1 is resistant to oil, maritime climate, ozone and UV radiation.



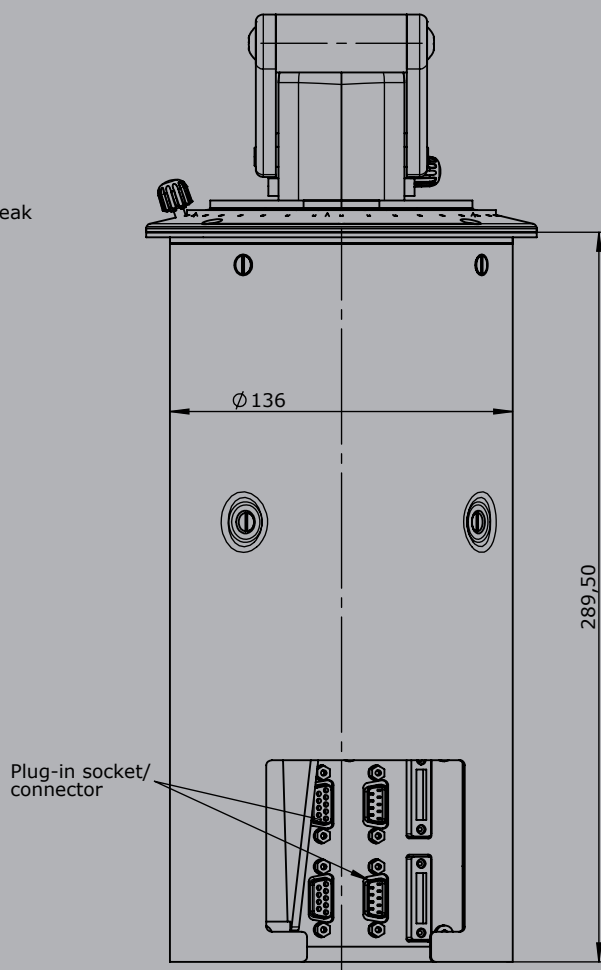
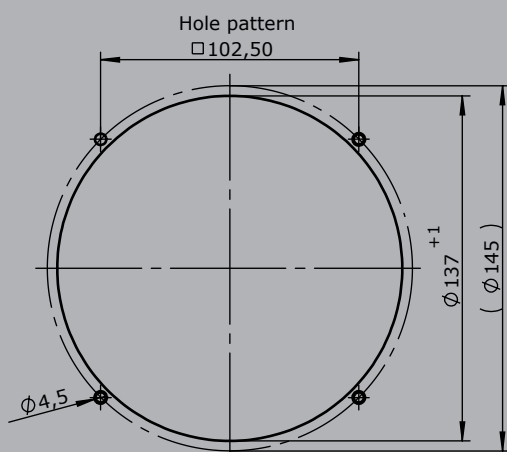
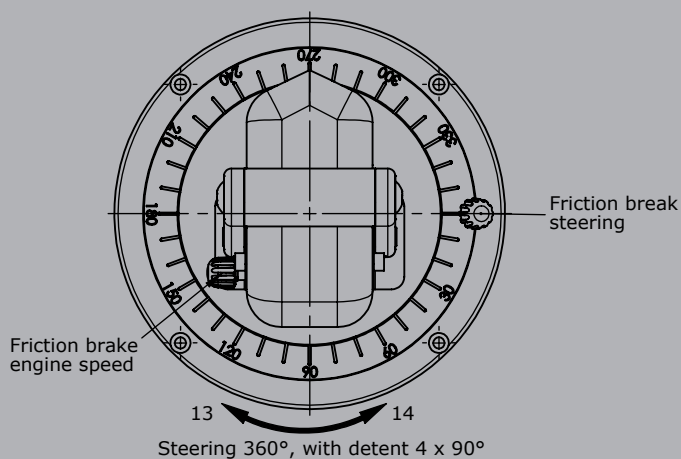
Technical data

Mechanical life AZ 1	12 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP66

	AZ1	-L	E2112	-X
Basic unit				
AZ1 Naval cruise controller				
Options				
L Scale illuminated (LED) 24 V dimmable				
Interface				
Voltage output (not stabilized)				
Supply voltage 4,75 - 5,25 V DC				
	Characteristic: <u>1</u> = Inverse dual, <u>2</u> = Dual			
0,5...2,5...4,5 V redundant per axis		1 axis	E103 1	
		2 axis	2	
Voltage output				
Supply voltage 9 - 32 V DC (*11,5 - 32 V DC)				
	Characteristic: <u>1</u> = Inverse dual, <u>2</u> = Dual			
0,5...2,5...4,5 V redundant per axis		1 axis	E111 1	
		2 axis	2	
Output power				
Supply voltage 9-32 V DC				
	Characteristic: <u>1</u> = Inverse dual, <u>2</u> = Dual			
4...12...20 mA redundant per axis		1 axis	E211 1	
		2 axis	2	
Special model				
X Special / customer specified				



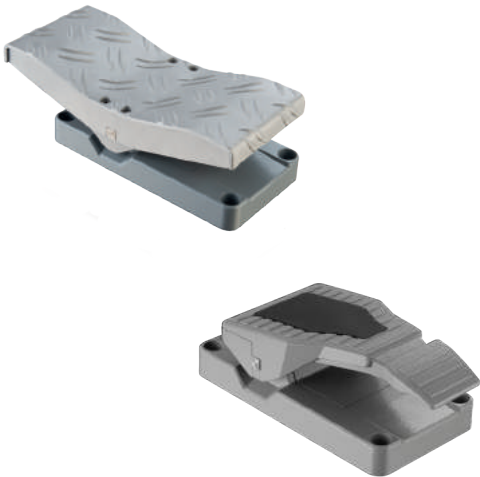
Edition:
with motor rossetting control system



Pedal-controller P20



The pedal-controller P20 is a rugged switching device for electro-hydraulic. The modular design enables the switching device to be used universally. The P20 is resistant to oil, maritime, climate, ozone and UV radiation.



Technical data

Mechanical life P20	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection P20	IP67 (electronic)
Functional safety	PLd (EN ISO 13849) possible

		P20	-1	Example -ZZ	-E1041	-S...	-X
Basic unit							
P20	Pedal-controller						
Pedal							
1	Pedal shape A 0-15°						
2	Pedal shape B 0-25°						
3	Pedal shape C 15°-0-15°						
4	Pedal shape C 0-15°						
Spring return							
Z	Spring return						
ZZ	Spring return redundant						
Interfaces <i>(description see on the following pages)</i>							
E	0xx Switching output						
E	1xx Voltage output						
E	2xx Current output						
E	3xx CAN-interface						
E	4xx CANopen Safety interface						
Plug connectors							
S...	Standard plug connectors <i>(see page 138)</i>						
Special model							
X	Special / customer specified						

Digital output

Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA		
Wiring	Cable 500mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
2 direction signals + 1 zero position signal (galvanically isolated)		E001 1	
1 direction signal + 1 zero position signal (galvanically isolated)		E003 1	

Voltage output (not stabilized)

Supply voltage	4,75-5,25 V DC		
Current carrying capacity	Direction signal 8 mA		
Wiring	Cable 500mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
0,5...2,5...4,5 V redundant + 2 direction signals		E104 1	
0,5...2,5...4,5 V redundant + 1 direction signal		E145 1	
Output options			
Characteristic:			
Inverse dual			1
Dual			2
Inverse dual with dead zone +/- 3° (standard)			3
Dual with dead zone +/- 3°			4

Voltage output

Supply voltage	9-32 V DC (*11,5-32 V)		
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA		
Wiring	Cable 500mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated)		E112 1	
0,5...2,5...4,5 V redundant + 1 direction signal + 1 zero position signal (galvanically isolated)		E146 1	
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC		E132 1	
0...5...10 V redundant + 1 direction signal + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC		E147 1	
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal		E136 1	
Output options			
Characteristic:			
Inverse dual *1			1
Dual *1			2
Inverse dual with dead zone +/- 3° *1 (standard)			3
Dual with dead zone +/- 3° *1			4
*1 not combinable with output E136X			
Single *2			5
Single with dead zone +/- 3° *2 (standard)			6
*2 not combinable with output E1121 and E1321, E1461 und E1471			

Voltage output with other value on request!

Current output			
Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal		E206 1	S
0...20 mA + 1 direction signal + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal		E222 1	
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal		E208 1	
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal		E214 1	
4...20 mA + 1 direction signal + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal		E223 1	
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal		E216 1	
		Output options	
		Single	5
		Single with dead zone +/- 3° (standard)	6
Current output with other value on request!			

CAN		
Supply voltage	9-36 V DC	
Idle current consumption	120 mA	
Current carrying capacity	Direction signal 100 mA	
Protocol	CANopen CiA DS 301 or SAE J 1939	
Baud rate	125 kBit/s to 1 Mbit/s (standard 250 kBit/s)	
Output value	0...255 / 255...0...255	
Wiring	CAN (IN) cable 500 mm with plug connector M12 (male) CAN (OUT) cable 500 mm with plug connector M12 (female)	
CAN P20		E307 1
With additional digital output separately wired (not via CAN)		
- 1 direction signal		

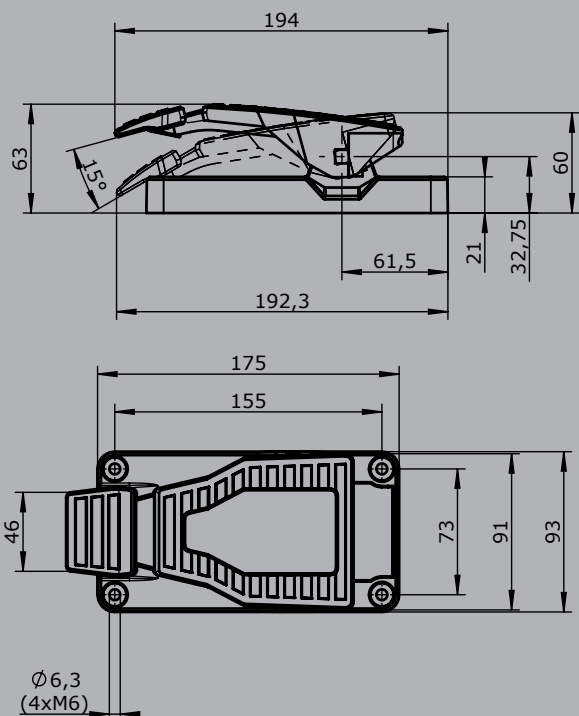
2

CANopen Safety		
Supply voltage	9-36 V DC	
Idle current consumption	120 mA	
Current carrying capacity	Direction signal 100 mA	
Protocol	CANopen Safety CIA 304	
Baud rate	125 kBit/s bis 1 MBit/s (standard	
Output value	0...255 / 255...0...255	
Wiring	CAN (IN) cable 500 mm with plug connector M12 (male)	
	CAN (OUT) cable 500 mm with plug connector M12 (female)	
CANopen Safety P20		E407 1
With additional digital outputs separately wired (not via CAN)		
- 1 direction signal		

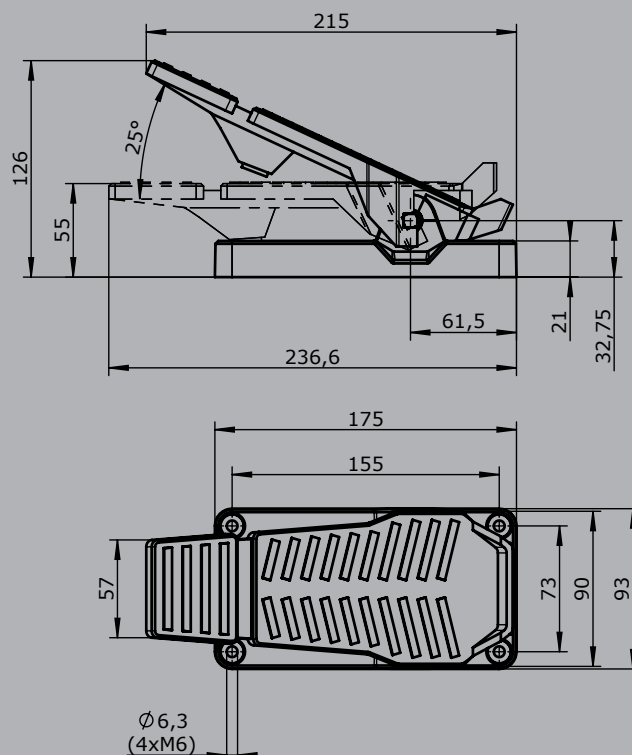
Attachments	
Z01 Mating connector M12 male insert with 2 m cable	20201140
Z02 Mating connector M12 female insert with 2 m cable	20202298

Technical details may vary based on configuration or application! Technical data subject to change without notice!

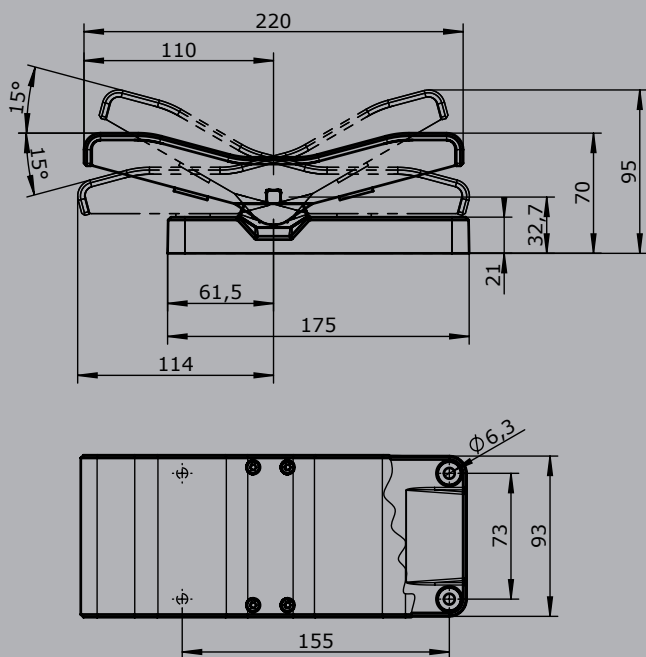
Pedalform A



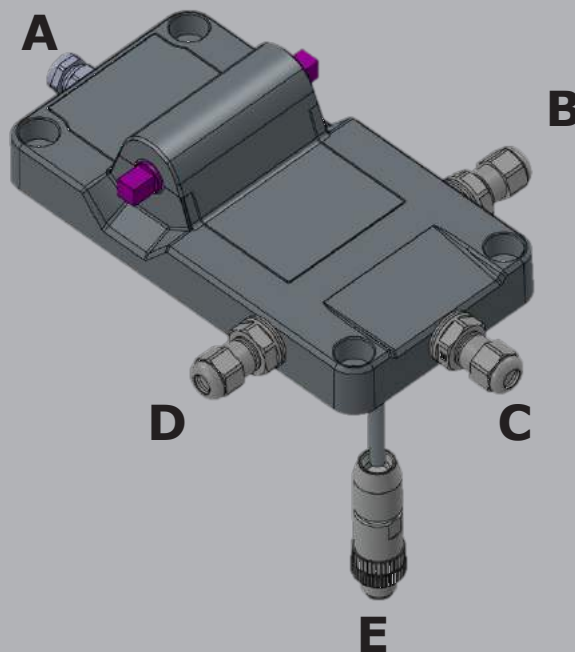
Pedalform B



Pedalform C



Possible cable outputs



Pedal-controller P10/P11/P12



The pedal-controller P10/P11/P12 is a rugged switching device for electro-hydraulic. The modular design enables the switching device to be used universally. The P10/P11/P12 is resistant to oil, maritime, climate, ozone and UV radiation.

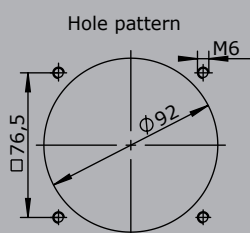
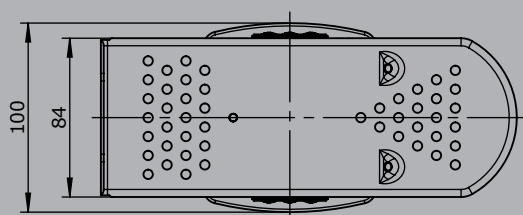
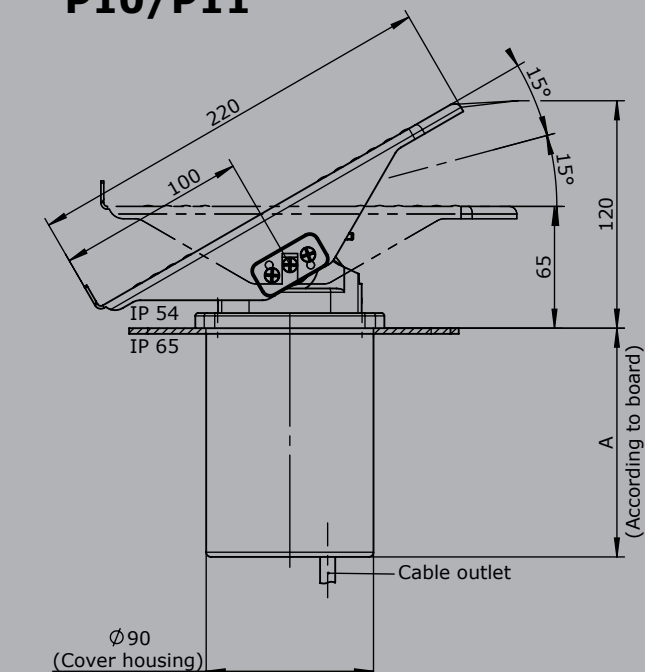
Technical data

Mechanical life P10	8 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection P10	IP66

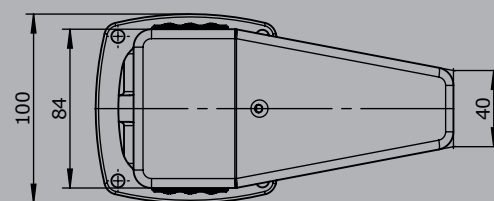
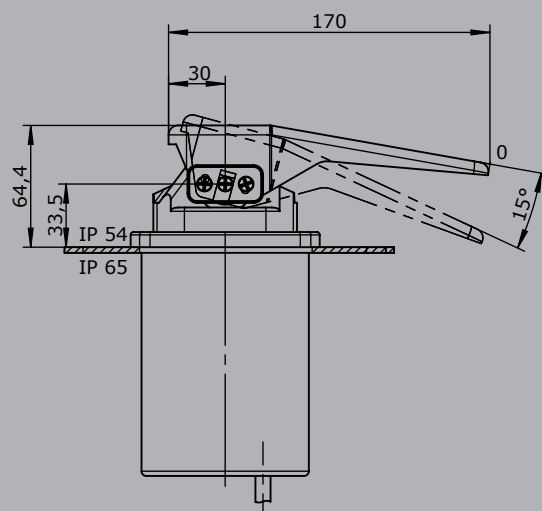


		Example						
		P10	-1 Z	P	-A01	P224	-B	-X
Basic unit								
P10	Pedal-controller, 0-30°							
P11	Pedal-controller, 15°-0-15°							
P12	Pedal-controller, 0-15°							
Detent								
	Without							
R4	1-0-1							
Direction 1-2								
1	1 contact	Standard contact - arrangement see page 140						
2	2 contacts	z.B.						
3	3 contacts	MS11 A01 MS12 A02 MS13 A03 MS21 A05 <i>A99 contact - arrangement according customer request</i>						
Z	Spring return							
R	Friction brake							
(P)	Possibility of mounting potentiometer (Gessmann-types)							
P	Potentiometer	P222	T362	1 kOhm	I max. 1 mA			
		P223	T362	2 kOhm	I max. 1 mA			
		P224	T362	5 kOhm	I max. 1 mA			
		<i>More potentiometers on request!</i>						
Cover housing								
B	Cover housing with cable entry M20							
Special model								
X	Special / customer specified							

P10/P11



P12



Pedal-controller P8 / PP8



The pedal-controller P8 and PP8 is a rugged switching devices for footing applications. The pedal-controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

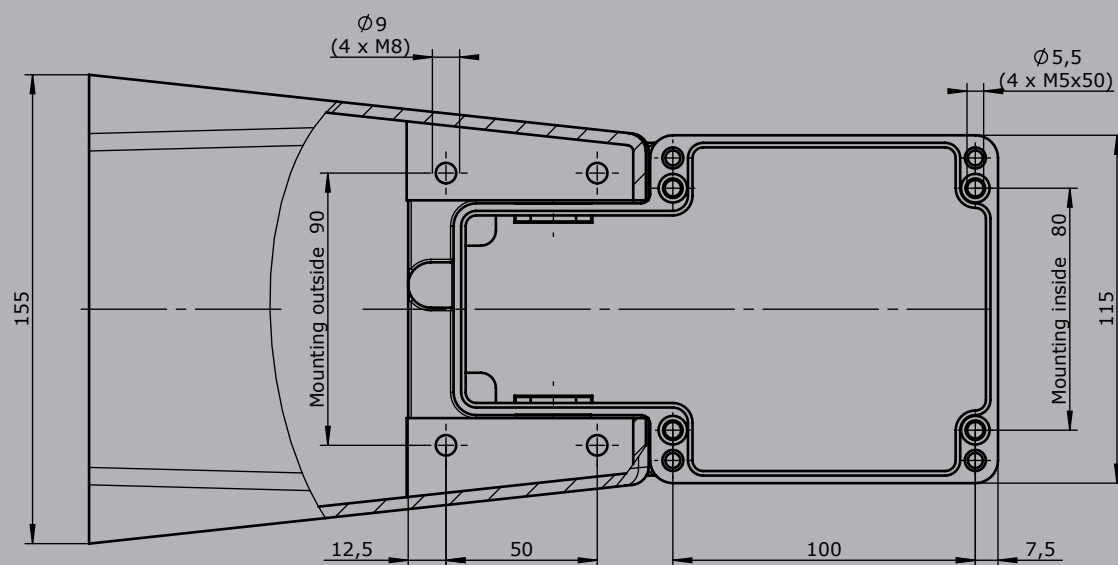
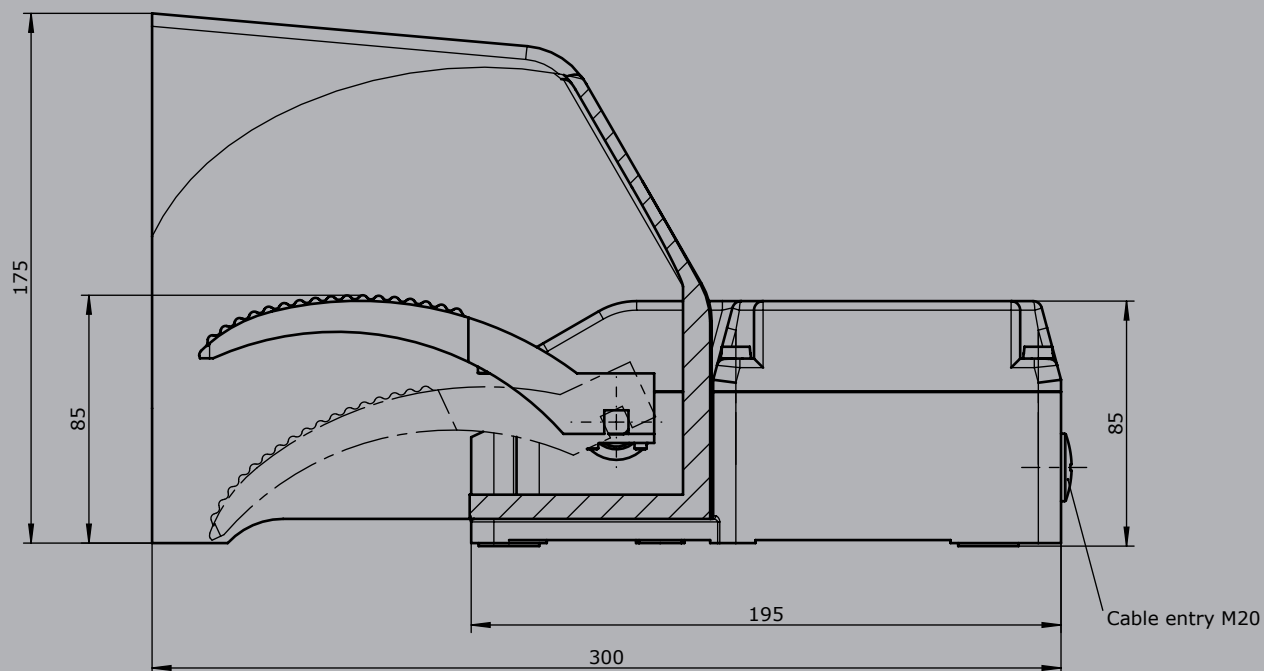
Technical data

Mechanical life P8	6 million operating cycles
Mechanical life PP8	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection P8	IP54
Degree of protection PP8	IP65
Colour	RAL 7032 pebble-grey



Example

	P8	-1 Z	P	-A01	P124	-X
Basic unit						
P8	Pedal-controller					
	Reinforced version					
PP8	Pedal-controller					
Detent						
	without					
R2	0-2					
R3	0-3					
R4	0-4					
Direction 1-2						
1	1 contact	Standard contact - Arrangement see page 140				
2	2 contacts	z.B.				
3	3 contacts	MS11	A01			
4	4 contacts*	MS12	A02			
5	5 contacts*	MS13	A03			
6	6 contacts*	MS14	A04			
*Only possible without potentiometer!		A99 contact - arrangement according customer request				
Z	Spring return					
R	Friction brake					
(P)	Mounting options for potentiometer and encoder (Gessmann-types)					
P	Potentiometer	P121	T374	0,5 kOhm	I max. 1 mA	
		P122	T374	1 kOhm	I max. 1 mA	
		P123	T374	2 kOhm	I max. 1 mA	
		P124	T374	5 kOhm	I max. 1 mA	
		P125	T374	10 kOhm	I max. 1 mA	
		More potentiometers on demand!				
Special model						
X	Special / customer specified					



Pedal-controller P7 / PP7



The pedal-controller P7 and PP7 is a rugged switching devices for footing applications. The pedal-controller is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

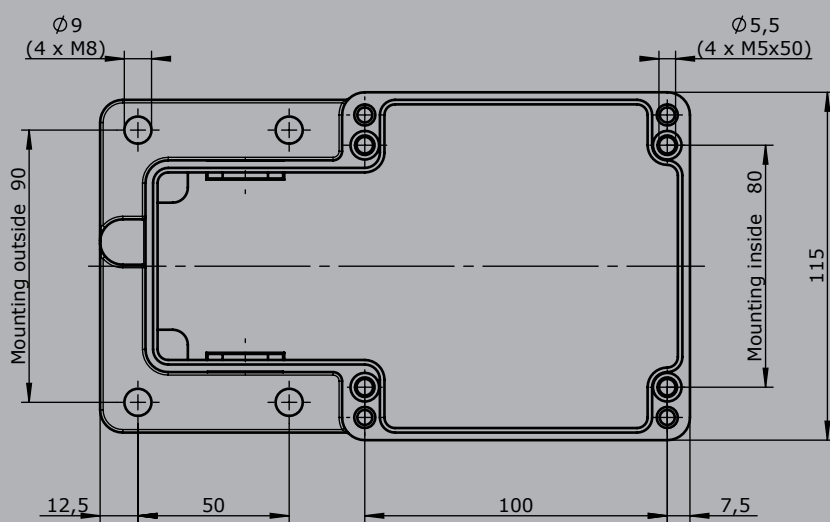
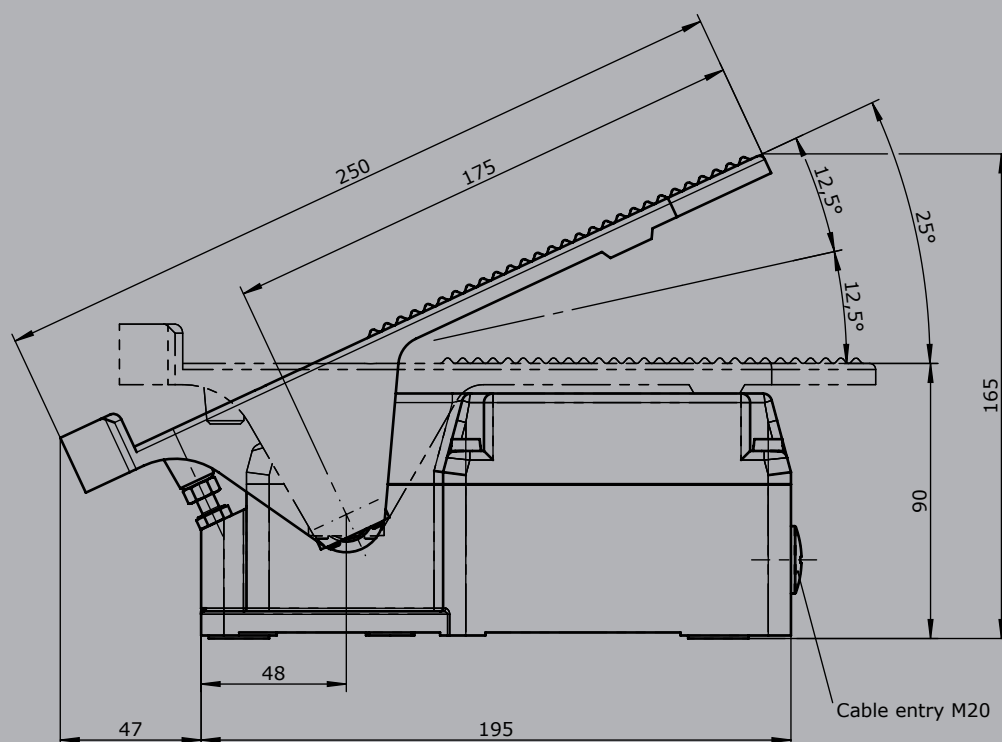
Technical data

Mechanical life P7	6 million operating cycles
Mechanical life PP7	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection P7	IP54
Degree of protection PP7	IP65
Colour	RAL 7032 pebble-grey



		P7	-1 Z	P	-A01	P124	-X
Basic unit							
P7	Pedal-controller						
	Reinforced version						
PP7	Pedal-controller						
Detent							
	Without						
R2	0-2						
R3	0-3						
R4	0-4						
R11	1-0-1						
R22	2-0-2						
Direction 1-2							
1	1 contact	Standard contact - Arrangement see page 140					
2	2 contacts	z.B.					
3	3 contacts	MS11	A01				
4	4 contacts*	MS12	A02				
5	5 contacts*	MS13	A03				
6	6 contacts*	MS14	A04				
*Only possible without potentiometer!		MS21	A05				
		A99 contact - arrangement according customer request					
Z	Spring return						
R	Friction brake						
(P)	Mounting options for potentiometer and encoder (Gessmann-types)						
P	Potentiometer	P121	T374	0,5 kOhm	I max. 1 mA		
		P122	T374	1 kOhm	I max. 1 mA		
		P123	T374	2 kOhm	I max. 1 mA		
		P124	T374	5 kOhm	I max. 1 mA		
		P125	T374	10 kOhm	I max. 1 mA		
		More potentiometers on demand!					
Special model							
X	Special / customer specified						

Technical details may vary based on configuration or application! Technical data subject to change without notice!



Gear limit switch
GE 1 / GE 2



The gear limit switch GE 1 / GE 2 is a rugged switching device designed for hoisting applications. The modular micro changeover contacts with positive opening operation. The device is programmed by means of stepless adjustment of double cam discs, which can be provided from 18° to 192° contact discs according to the switching program required.



Technical data

Table with 2 columns: Specification (Mechanical life, Operation temperature, Degree of protection, Colour) and Value (10 million operating cycles, -40°C to +85°C, IP65, RAL 7032 pebble grey).

Example

Main configuration table with columns for GE 1, -10, -4, -P, and Example options (-U7, -P, -18, -30, -60, -90, -X). Rows include Basic unit, Gearing (Ratios), Limit switch (2-16 contacts), and Potentiometer options (P451-P455).

Technical details may vary based on configuration or application! Technical data subject to change without notice!

Gear limit switch

GE 1 / GE 2



GE 1 -10 -4 -P **-U7** -P -18 -30 -60 -90 -X

Aluminium housing

U5	U17/13 170 x 130 mm (max. 8 contacts GE 1)
U6	U16/16 160 x 160 mm (max. 12 contacts GE 1/ max. 6 contacts GE 2)
U7	U16/20 160 x 200 mm (max. 16 contacts GE 1/max. 10 v GE 2)
U8	U16/26 160 x 260 mm (max. 16 contacts GE2)
U9	U16/35 160 x 350 mm

Program-disc

Following program-discs are available :

18°, 24°, 30°, 36°, 45°, 60°, 75°, 90°, 110°, 120°, 176°, 192°

Example:

Contact 1: program-discs pair 18° (adjustment range 18°-36°)

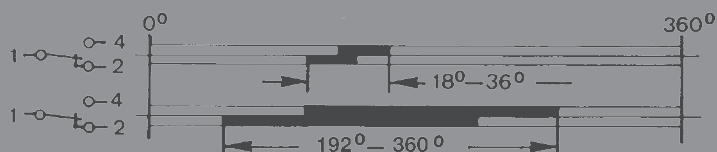
Contact 2: program-discs pair 30° (adjustment range 30°-60°)

Contact 3: program-discs pair 60° (adjustment range 60°-120°)

Contact 4: program-discs pair 90° (adjustment range 90°-180°)

Contact n:

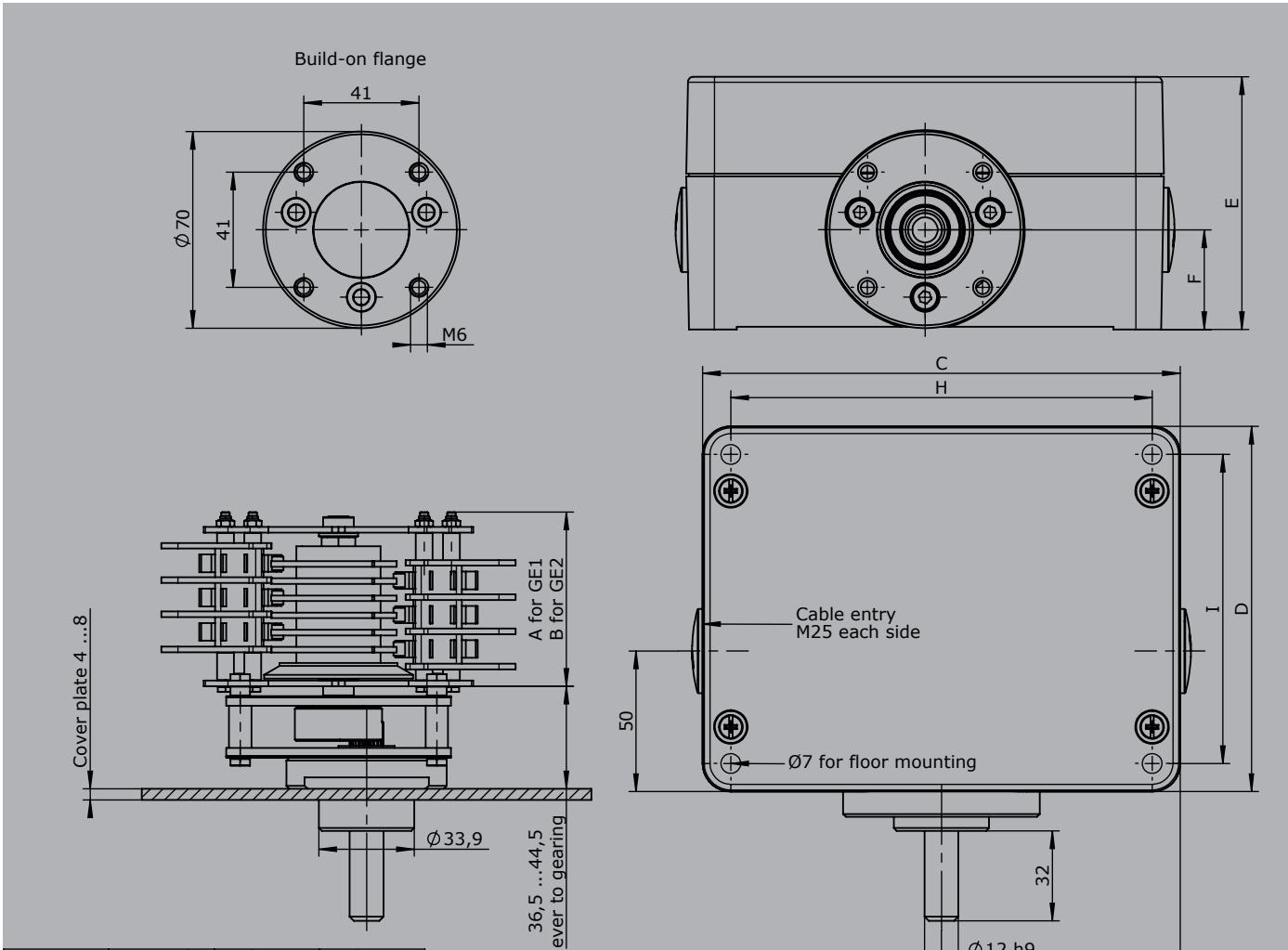
Illustration



The programm-discs are infinitely adjustable within 360°

Special model

X Special / customer specified



Type	No. of contacts	Dim. A (GE1)	Dim. B (GE2)
1	1	32	35,5
2	2	38,5	42
3	3	44,5	48
4	4	50,5	54
5	5	56,5	60
6	6	63	66,5
7	7	69	72,5
8	8	75	78,5
9	9	81	84,5
10	10	87	90,5
11	11	93	96,5
12	12	99	102,5
13	13	105,5	109
14	14	111,5	115
15	15	117,5	121
16	16	123,5	127

Type	Dim. C	Dim. D	Dim. E	Dim. F	Dim. G	Dim. H	Dim. I
U17/13	170	130	90	35,5	75	150	110
U16/16	160	160	91	45	70	110	140
U16/20	160	200	100	45	70	140	180
U16/26	160	260	91	45	70	110	240
U16/35	160	350	100	45	70	140	330

DC-Contact

SO 1.10 Normally closed (NC)

SS 1.10 Normally open (NO)



The DC contact block is used for signalling and annunciation applications. The snap-action mechanism prevents slow contact opening when the plunger is operated slowly. Quenching of the arc that occurs with DC is supported by two-capacity permanent magnets.

These are arranged so that the polarity can be ignored when connecting +/- cabling. However, the polarity of the quenching magnets must be noted when installing the contact blocks to prevent the magnets adversely affecting each other. Contact blocks in four different colours are available for polarity identification of the magnets when fitted.

The contact blocks may only be installed on non-magnetisable materials with screw, etc. made of non-ferrous metal.

The self-cleaning silver contacts are designed for low switching frequency, low currents and voltages. Gold coated contacts can be supplied (approx 0,2µ), less than 42 Volt required. The screw connection M3.5 at the side is suitable for 2 conductors max. 2,5 mm². The plug-in connection at the top 4.8 x 0.8 mm DIN 46247.

Several contact blocks can be plugged on the top of each other and operated jointly. The plug-type terminals are then only accessible on the top unit. The contact blocks can be provided with shock protection to DIN VDE 0106 Part 100.



Example

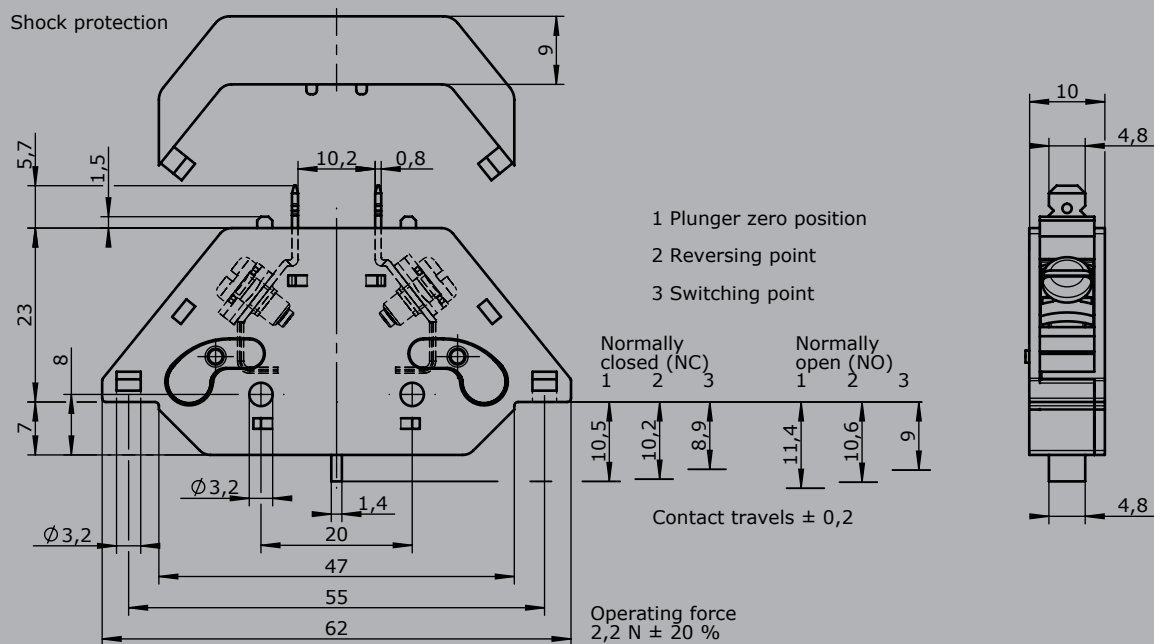
	Switching capacity		Time constant
	NC	NO	
250 V DC	2A	1A	20 ms
125 V DC	4A	3A	20 ms
50 V DC	6A	6A	20 ms
30 V DC	10A	10A	20 ms
250 V AC 15	6A	6A	

Technical data

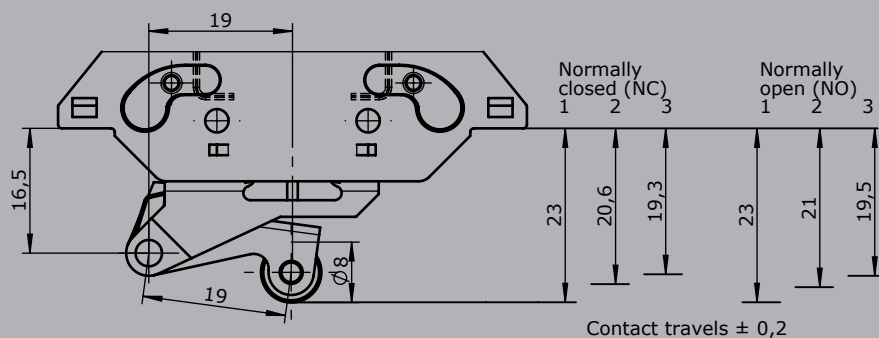
Mechanical life	2 million operating cycles
Electrical service life	50.000 operating cycles (at 2A 250 V DC L/R 20 ms)
Operation temperature	-40°C to +85°C
Degree of protection	IP40

	SO 1.10	-B	-R	-F	-X
Basic unit					
SO1.10	DC-contact normally closed (NC)				
	Colour code grey or blue				
SS1.10	DC-contact normally open (NO)				
	Colour code yellow or green				
Attachment					
B	Shock protection KEG 142 to DIN VDE 0106 part 100				
R	Roller lever				
K	Toggle lever (switching is one direction only)				
F	Plug-in connection at side 4,8 x 0,8 mm (2 pieces)				
AU	Contacts gold-coated approx. 0,5				
Special model					
X	Special / customer specified				
X1	Contact without quenching magnets				

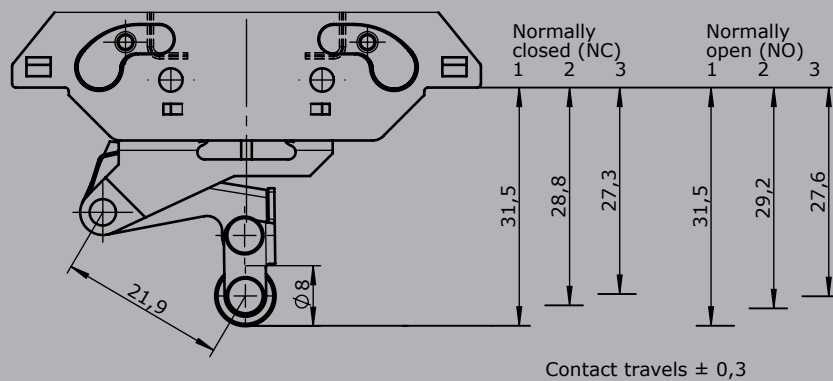
Technical details may vary based on configuration or application! Technical data subject to change without notice!



with roller lever



with toggle lever



The cam controller NU 1 is used as a signal and annunciation switch in HV systems. This rugged switching device has cam discs made of insulation material that can be set at 10° intervals. The DC contact blocks are designed to permit series assembly, which can be operated simultaneously.

Technical data

Mechanical life NU1	2 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP40 / IP65 with aluminium housing

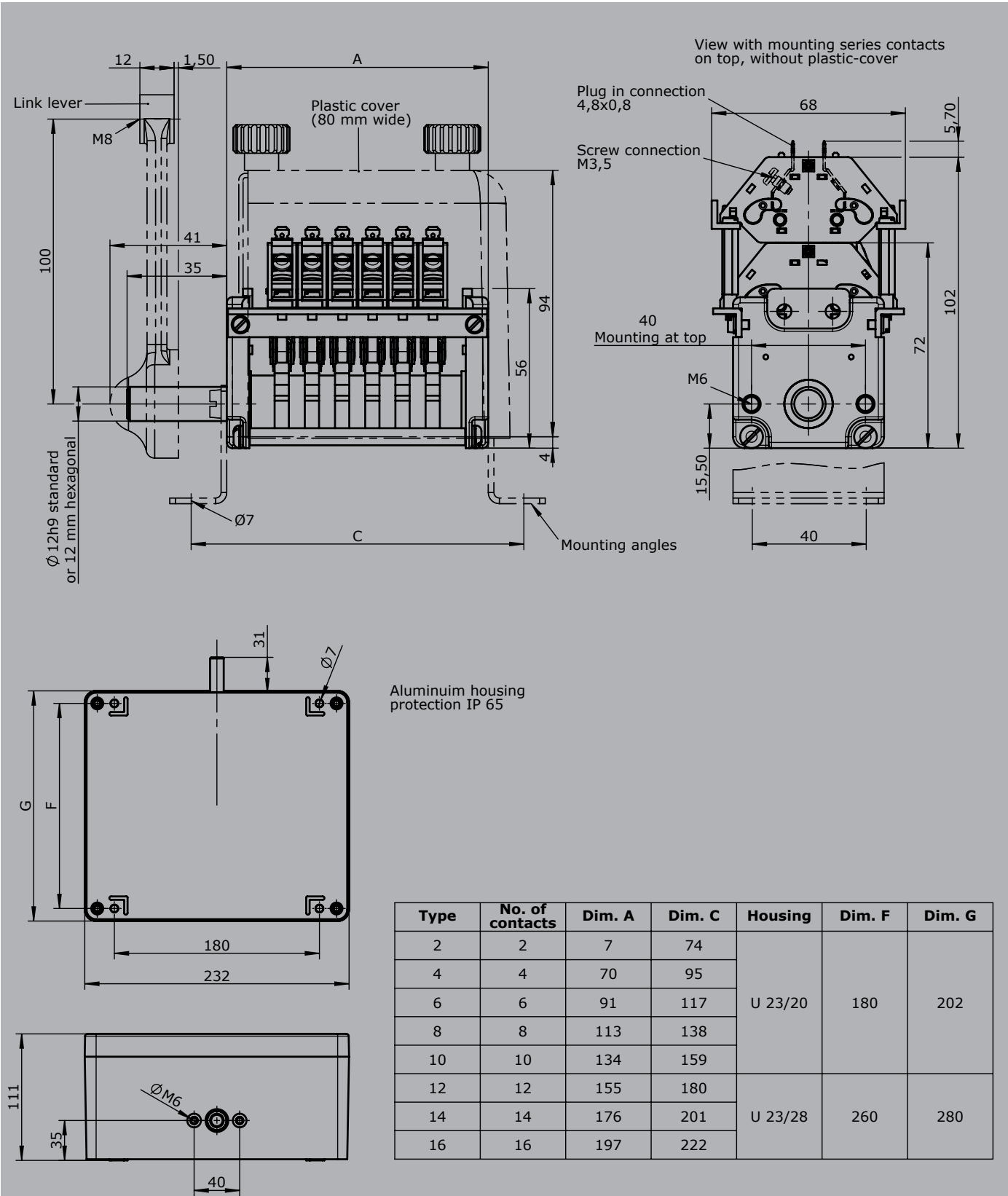
Switching capacity	NC	NO	Time constant
250 V DC	2A	1A	20 ms
125 V DC	4A	3A	20 ms
50 V DC	6A	6A	20 ms
30 V DC	10A	10A	20 ms
250 V DC15	6A	6A	



	NU1	-4	-4	-F2	-Z	-W	-A	-X
Basic unit								
NU 1 Signal-cam controller								
Contacts (1. range)								
2	2 contacts							
4	4 contacts							
6	6 contacts							
8	8 contacts							
10	10 contacts							
12	12 contacts							
14	14 contacts							
16	16 contacts							
Contacts (2. range)								
2	2 contacts							
4	4 contacts							
6	6 contacts							
8	8 contacts							
10	10 contacts							
12	12 contacts							
14	14 contacts							
16	16 contacts							

Example

	NU1	-4	-4	-F2	-Z	-W	-A		-X
Option									
F1	1 free shaft-end with hexagonal 12 mm								
F2	2 free shaft-end diameter 12 mm								
F3	2 free shaft-end with hexagonal 12 mm								
Z	Spring return								
W	Mounting angles (2 pieces)								
GH	Link lever								
A	Cover housing off Astralon								
	Til installation size 4 contacts								
	Til installation size 8 contacts								
	Til installation size 12 contacts								
	Til installation size 16 contacts								
B	Shock protection KEG 142 for single contact								
Aluminium housing									
U11	U23/20 232 x 202 mm (max. 10 contacts)								
U12	U23/28 232 x 280 mm (max. 16 contacts)								
Housing only possible with single-row version contacts									
Special model									
X	Special / customer specified								



Technical details may vary based on configuration or application! Technical data subject to change without notice!

Dealer network worldwide

Algeria
Phoenix Engineering Solutions FZ LLE
Al Saaha Offices B
404 Dubai
Phone: +97 15 01 71 38 32
john.rostagno@phoenix-es.com
www.phoenix-es.com

Dealer

Australia
Hunter Engineering Sales
29 Torrens Avenue
Cardiff NSW 2285
Phone: +61 24 95 28 53 3
info@hesales.com.au
www.hesales.com.au

Dealer

Bahrain
Phoenix Engineering Solutions FZ LLE
Al Saaha Offices B
404 Dubai
Phone: +97 15 01 71 38 32
john.rostagno@phoenix-es.com
www.phoenix-es.com

Dealer

Belgium
Batenburg Mechatronica B.V.
Leuvensesteenweg 613
1930 Zaventem zuid 7
Phone: +32 22 53 31 20
info@batenburgbelgie.be
www.batenburg-mechatronica.com

Dealer

Brazil
Choice Tecnologia Ind.e Com.de
equipamentos industrial Ltda
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81320-020 Curitiba / PR
Phone: +55 41 30 15 79 53
contato@choicetech.com.br
www.choicetecnologia.com.br

Dealer

Canada
Gessmann North America Limited
8620 Escarpment Way, Unit 5-7
Milton ON L9T 0M1
Phone: +1 905 69 36 94 8
Sales.NorthAmerica@gessmann.com
www.gessmannnorthamerica.com

 **GESSMANN**

Chile
Sistemas de Control Ltda.
La Cordillera 21- Lampa
8320000 Santiago
Phone: +56 22 95 27 96 6
alorca@scontrol.cl
www.scontrol.cl

Dealer

China
Gessmann China Ltd.
K2-183, No. 318 Xiupu Road
201315 Pudong, Shanghai
Phone: +86 21 50 11 34 66
sales@gessmann.com.cn
www.gessmann.com

 **GESSMANN**

Czech Republic
RIA control a.s.
Míru 3
739 61 Trinec-Kanada
Phone: +42 05 53 03 88 48
info@riacontrol.cz
www.riacontrol.cz

Dealer

Denmark
Baastrup A/S
Dronning Olgas Vej 30
2000 Frederiksberg
Phone: +45 38 10 21 29
info@baastrup.com
www.baastrup.com

Dealer

Djibouti
Phoenix Engineering Solutions FZ LLE
Al Saaha Offices B
404 Dubai
Phone: +97 15 01 71 38 32
www.phoenix-es.com

Dealer

Egypt
Phoenix Engineering Solutions FZ LLE
Al Saaha Offices B
404 Dubai
Phone: +97 15 01 71 38 32
john.rostagno@phoenix-es.com
www.phoenix-es.com

Dealer

Finland
Gessmann Office Finland
Harri Järvenpää
Vuorikatu 30 A
23500 Uusikaupunki
Phone: +35 84 08 28 00 10
harri.jarvenpaa@gessmann.com
www.gessmann.com

 **GESSMANN**

Kentek Oy
Postbox 18, 01721 Vantaa
Tiilenlyöjänkuja 4, 01720 Vantaa
Phone: +35 89 84 94 20 0
kentek@kentek.fi
www.kentek.fi

Dealer

France
Gessmann Office France
Nicolas PATRICOT
14 rue de la Perruche
78117 Chateaufort
Phone: +33 65 20 74 55 9
nicolas.patricot@gessmann.com
www.gessmann.com

 **GESSMANN**

Greece
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Stefanidou Kalliopei & Co.
Agios Dimitrios
50100 Kozani
Phone: +30 30 2 46 10 9 44 45
kastefa@otenet.gr

Dealer

India
Gessmann Controllers India Pvt. Ltd.
1st Floor, Plot No. 19/1-A
2nd Main, 2nd Phase
Peenya Industrial Area
560058 Bangalore
Phone: +91 99 45 91 91 70
gopalshastry@gessmann.com
www.gessmann.com

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Arihant Elsys Private Limited
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www.arihantelectricals.com

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128809 Singapur
Phone: +65 88 77 57 07
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Dealer

Italy
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Via Generale Carlo Alberto
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www.gessmann.com

 **GESSMANN**

Japan
JEPICO Corporation
Shinjuku Front Tower
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Shinjuku-ku, Tokyo 169-0074
Phone: +81 36 36 20 31 6
a_oeiki@jepico.co.jp
www.jepico.co.jp

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Phone: +97 15 01 71 38 32
john.rostagno@phoenix-es.com
www.phoenix-es.com

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Phone: +78 12 32 59 36 5
info@eim-engineering.ru

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128809 Singapur
Phone: +65 88 77 57 07
epatmos@outlook.com

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Al Saaha Offices B
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www.hesales.com.au

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Tyrihans 21
3055 Krokstadelva
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Harald.skjønberg@gessmann.com
www.gessmann.com



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Sweden

Gessmann Office Norway
Harald Skjønberg
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Harald.skjønberg@gessmann.com
www.gessmann.com



Dealer

United Kingdom

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Phone: +44 79 79 88 82 14
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Poland

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www.elektro-trading.com.pl

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OEM Controls inc.

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Phone: +1 203 92 98 43 1
contactUs@oemcontrol.com
www.oemcontrols.com

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Qatar

Phoenix Engineering Solutions FZ LLE
Al Saaha Offices B
404 Dubai
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john.rostagno@phoenix-es.com
www.phoenix-es.com

Dealer

Slovakia

VENIO, s.r.o.
Karminová 1092/3
01030 Zilina
Phone: +42 19 49 13 02 70
venio@venio.sk
www.venio.sk

Dealer

Thailand, Philippines, Vietnam

MTI Engineering CO., LTD
94/20, moo 3, Soi-Janthongaium
Bangrakpattana, Bangbaothong
Nonthaburi 11110
Phone: +66 20 21 90 20 50 53
info@mti-eng.com
www.mti-eng.com

Dealer

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john.rostagno@phoenix-es.com
www.phoenix-es.com

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Bucuresti
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office@electrodistribution.ro
www.electrodistribution.ro

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Somalia

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Al Saaha Offices B
404 Dubai
Phone: +97 15 01 71 38 32
john.rostagno@phoenix-es.com
www.phoenix-es.com

Dealer

Turkey

ARDA Makina Elektrik
Ticaret ve Sanayi Ltd. Sti.
100. Yil Bulvarı 1230. Street No. 1
06374 Ostim-Ankara
Phone: +90 31 23 85 80 37
arda@ardaelektrik.com
www.ardaelektrik.com

Dealer

Representatives in Germany

Dr.-Ing. Klaus Zimmermann
Ingenieurbüro
Hauptstraße 158
06493 Harzgerode OT Neudorf
Phone: +49 39 48 46 36 4
ib-zimmermann@gmx.de
www.gessmann.com

Systemautomation Zimmermann
Dipl.-Ing. Jan Zimmermann
Hauptstraße 158
06493 Harzgerode OT Neudorf
Phone: +49 39 48 47 42 48 4
saz-zimmermann@gmx.de
www.gessmann.com

Christiani
Elektro-Vertriebs-GmbH
Innungstraße 39
50354 Hürth
Phone: +49 22 33 35 03 5
vertrieb@christiani-gmbh.de
www.christiani-gmbh.de



Headquarters and locations of Gessmann Group

Headquarters Germany

W. Gessmann GmbH
Postfach 11 51
74207 Leingarten
Eppinger Straße 221
74211 Leingarten
Phone +49 7131 40 67-722
Fax +49 7131 40 67-10
sales@gessmann.com
www.gessmann.com

Sales Office Northwest Germany

Phone +49 4221 9285-640
Fax +49 7131 4067-10
tino.krueder@gessmann.com
www.gessmann.com



Gessmann Group

Sales office France

Gessmann Office France
Nicolas Patricot
14 rue de la Perruche
78117 Chateaufort
Phone: +33 65 20 74 55 9
nicolas.patricot@gessmann.com
www.gessmann.com

Responsible for:

France

Sales office Italy

Gessmann Office Italy
Via Generale Carlo Alberto
Dalla Chiesa n.45
20816 Ceriano Laghetto (MB)
gabriele.fiore@gessmann.com
www.gessmann.com

Responsible for:

Italy

Sales office Norway

Gessmann Office Norway
Harald Skjøsberg
Tyrhans 21
3055 Krokstadelva
Phone: +47 47 30 26 86
Harald.skjongsberg@gessmann.com

Responsible for:

Norway
Sweden

Sales office Scandinavia

Gessmann Office Finland
Harri Järvenpää
Vuorikatu 30 A
23500 Uusikaupunki
Phone: +35 84 08 28 00 10
harri.jarvenpaa@gessmann.com

Responsible for:

Finland

Subsidiary North America, Mexico, Chile, Canada

Gessmann North America Limited
8620 Escarpment Way, Unit 5-7
Milton ON L9T 0M1
KANADA
Phone: +19 05 69 36 94 8
Sales.NorthAmerica@gessmann.com
www.gessmannnorthamerica.com

Responsible for:

Mexico
Chile
Canada

Subsidiary USA

Gessmann USA Inc.
Phillips Lytle LLP,
One Canalside
125 Main Street
Buffalo, NY 14203
Phone: +19 05 69 36 94 8
Sales.NorthAmerica@gessmann.com
www.gessmannnorthamerica.com

Responsible for:

USA

Subsidiary Asia

Gessmann China Ltd.
K2-183, No. 3188 Xiupu Road
201315 Pudong, Shanghai
Phone: +86 21 50 11 34 66
sales@gessmann.com.cn
www.gessmann.com

Responsible for:

China

Subsidiary India

Gessmann Controllers India Pvt. Ltd.
1st Floor, Plot No. 19/1-A
2nd Main, 2nd Phase,
Peenye Industrial Area
560058 Bangalore
Tel. +91 99 4591 9170
gopalshastry@gessmann.com
www.gessmann.com

Responsible for:

India

Subsidiary Poland

Gessmann Polska sp. z o.o.
ul. Dojazdowa 23, III pietro
43-100 Tychy
sales@gessmann.com
www.gessmann.com

Production location

www.gessmann.com

W. Gessmann GmbH

P/O Box 11 51

74207 Leingarten

GERMANY

Eppinger Straße 221

74211 Leingarten

GERMANY

Phone +49 (0) 7131 40 67-722

Fax +49 (0) 7131 40 67-10

sales@gessmann.com

www.gessmann.com



GESSMANN®