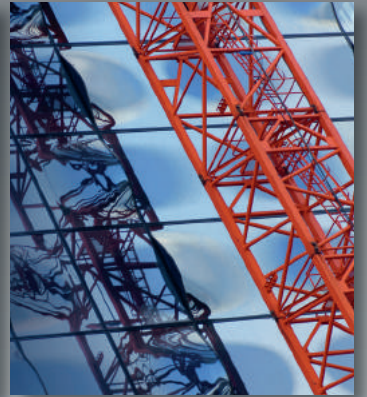


Industrial Controllers Catalog





Product range

Joysticks with
hallsensor-technology

Joysticks with
contacts and potentiometer

Control-Switches

Steering Column Switch

Opto-Electronic Encoders

Control Elements

Palm Grips

Control Console

Foot Pedals

Crane Control Units

Driver's Seats

Portable Control Units

Industrial Controllers

Gear Limit Switches

Naval Cruise Controller

Control Pedestals for offshore

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.

As of
2021



GESSMANN®

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:

- Joysticks (Multi-Axis Controller, Double-Handle Controller, Control Switch), Gear Limit Switch for hoisting, Electro-hydraulic Application, Material-handling technology and Remote Control
- Gear limit switch for josting 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:

Industrial Joysticks

Joysticks with hallsensor-technology

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Joysticks with contacts and potentiometer

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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 goods. Therefore, we recommend combining small orders.

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 details. 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 precautions.

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

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Stuttgart HRB 100312**

**Managing Director:
Alwin Ehrensperger**

Multi-Axis Controller

V85 / VV85



The V85/VV85 is a robust joystick commonly used in electro-hydraulic applications. Long life and high reliability is ensured by the latest contactless hall-technology. With many outputs and grip options the V85/VV85 series is flexible and customisable.

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 compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



		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 a handle!											
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 154)										

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 (not applied for V/VV85.1)

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 of protection

B	Cover housing (included in basic unit!)
B10	Joystick-main board sealed (IP67)
B11	Joystick-main board sealed (IP67) and grip function sealed, grip with drain hole

For a schematic description of the protection class, see page 121

Interface (description see on the following pages)

E0xx	Switching output
E1xx	Voltage output
E2xx	Current output
E3xx	CAN-interface
E4xx	CANopen Safety interface
E5xx	Profibus DP-interface
E6xx	Profinet
E7xx	PROFIsafe
E8xx	PWM - Output
E9xx	Other outputs

Plug connectors

S...	Standard plug connectors (see page 120)
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Special model

X	Special / customer specified
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Combination possibilities with our grips



Digital output	
Supply voltage	9-32 V DC
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA
Mounting depth A	72 mm (reduced mounting depth on request!)
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 120</i>)
2 Direction signals + 1 zero position signal (galvanically isolated) per axis	
	1 axis
	2 axis
	E001 1
	2

Voltage output (not stabilized)	
Supply voltage	4,75-5,25 V DC
Current carrying capacity	Direction signal 8 mA
Mounting depth A	72 mm (reduced mounting depth on request!)
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 120</i>)
0,5...2,5...4,5 V redundant + 2 direction signals per axis	
	1 axis
	2 axis
	E104 1
	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	72 mm (reduced mounting depth on request!)
Option	Input for capacitive sensor
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 120</i>)	

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 grip 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	72 mm (reduced mounting depth on request!)
Option	Input for capacitive sensor
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 120</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 grip 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: 72 mm		
	E3091X: 85 mm		
	E3101X - E3103X: 85 mm		
	E3104X - E3105X: 105 mm		
	(reduced mounting depth on request!)		
Protocol	CANopen CiA DS 301 or SAE J1939 (based on)		
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)		
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 120</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 (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 for LEDs in the grip			
*With the use of capacitive sensor, the external digital inputs are reduced 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 (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	
- 24 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs		4	
- 32 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs		5	
*External LED-outputs can be used for LEDs in the grip			
*With the use of two capacitive sensors, the external digital inputs are reduced 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: 72 mm	
	E4091X: 85 mm	
	E4101X - E4103X: 85 mm	
	E4104X - E4105X: 105 mm	
	(reduced mounting depth on request!)	
Protocol	CANopen Safety EN50325-5	
Baud rate	20 kBit/s to 1 MBit/s (standard 250 kBit/s)	
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 120</i>)	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 (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 for LEDs in the grip		
*With the use of capacitive sensor, the external digital inputs are reduced 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 (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
- 24 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs		4
- 32 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs		5
*External LED-outputs can be used for LEDs in the grip		
*With the use of two capacitive sensors, the external digital inputs are reduced 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 (reduced mounting depth on request!)		
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 120</i>)		S
Profibus DP		E501 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	
*External LED-outputs can be used for LEDs in the grip			
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
- 1 zero position contact (potential-free) per main-axis			2

Profinet			
Supply voltage	18-30 V DC		
Baud rate	to 100 MBit/s		
Output value	0...512...1023		
Mounting depth A	85 mm (reduced mounting depth on request!)		
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 120</i>)		S
Profinet		E601 1	
- 4 analog joystick axis			
- 16 digital joystick functions			
- Input for capacitive sensor			
With with additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs		2	
- 16 external LED-outputs, 16 external digital inputs		3	
*External LED-outputs can be used for LEDs in the grip			
Main-axis with additional signals separately wired (not via profinet)			
- 2 direction signals + zero position signal (potential-free) per main-axis			3

PROFIsafe	
Supply voltage	18-30 V DC
Baud rate	to 100 MBit/s
Output value	0...512...1023
Mounting depth A	85 mm (reduced mounting depth on request!)
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 120</i>)
- 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
*External LED-outputs can be used for LEDs in the grip	
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 (reduced mounting depth on request!)
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 120</i>)
PWM Output 0-3 A for 2 proportional valve magnets per axis	1 axis E801 1
	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

Mounting depth A 72 mm (reduced mounting depth on request!)

Option Input for capacitive sensor

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 120*)

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

S

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 120*)

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

S

8 Bit binary-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 120*)

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

S

Attachments

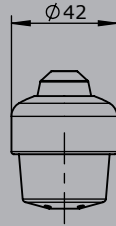
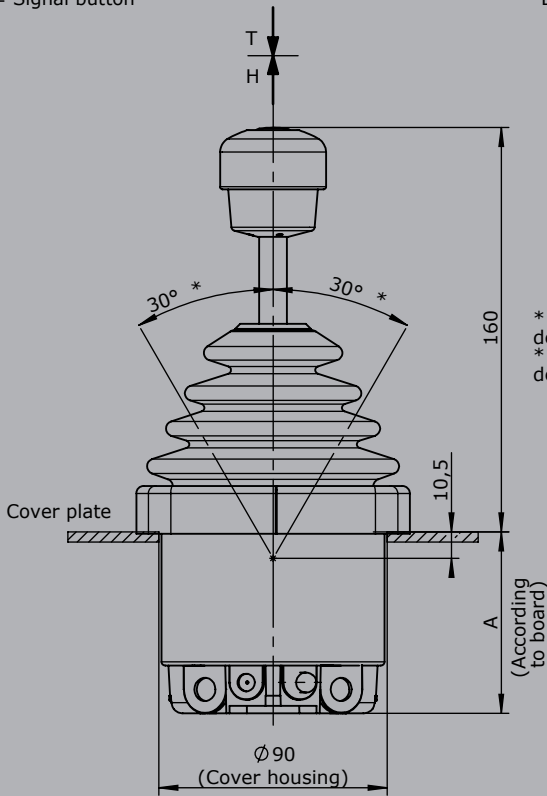
Z01	Mating connector (CAN) M12 (male insert) with 2 m cable	20201140
Z02	Mating connector (CAN) M12 (female contact) with 2 m cable	20202298
Z03	Mating connector (Profibus) straight	22201440
Z04	Mating connector (Profibus) 90° angled	22201741
Z05	Mating connector (Profinet) M12 (male insert) with 2 m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

T = Dead man's button
H = Signal button

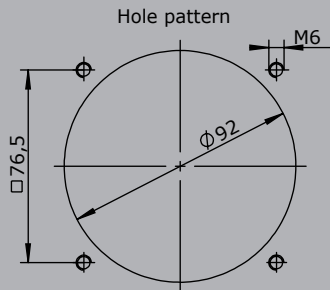
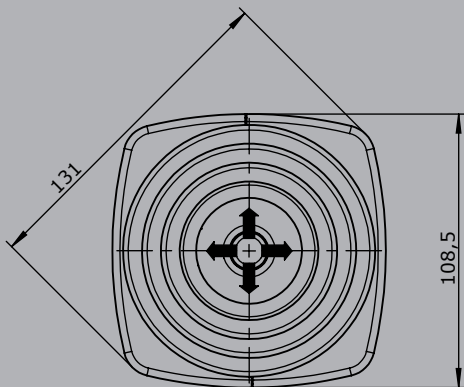
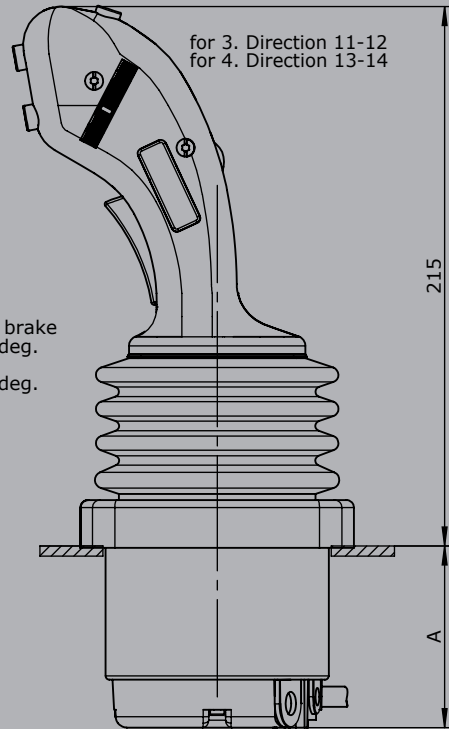
Knob solid
D= Push button

Palm grip B3

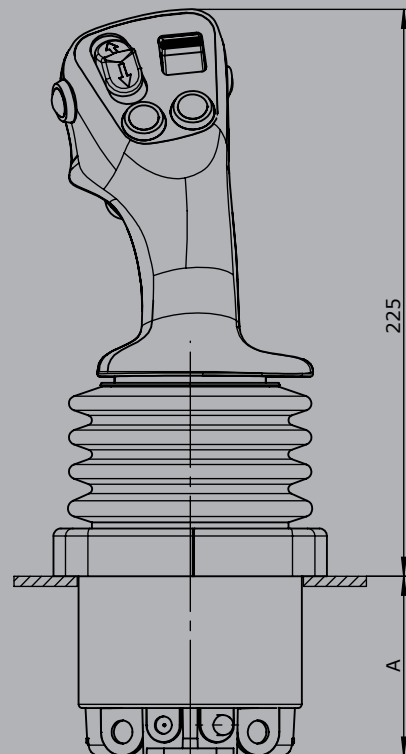
for 3. Direction 11-12
for 4. Direction 13-14



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



Palm grip B25



Multi-Axis Controller V27



The V27 is a robust joystick commonly used in electro-hydraulic applications. The compact design allows for use in smallest installation spaces. It can be integrated with detents and a very robust friction brake. Long life and high reliability is ensured by the latest contactless hall-technology. With many outputs and grip options the V27 series is flexible and customisable.

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 compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



		V27	S8	P	T	-R11	+Z	-B10	-E...	-S..	-X
Basic unit											
V27.1	1-axis										
V27	2-axis										
Control-handle extended											
	Standard 95 mm*										
S8	+20 mm										
*Only available in combination with a handle!											
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 154)										
Axis 1 / Axis 2 (not applied for V27.1)											
Z	Spring return										
R	Friction brake (possible with one axis!)										
	Latching: (possible with one axis!)										
11	1-0-1										
22	2-0-2										
33	3-0-3										
44	4-0-4										
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										

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

Degree of protection

- B10 Joystick-main board sealed (IP67)
 - B11 Joystick-main board sealed (IP67) and grip function sealed, grip with drain hole
- For a schematic description of the protection class, see page 121

Interface (description see on the following pages)

- E0xx Switching output
- E1xx Voltage output
- E2xx Current output
- E3xx CAN-interface
- E4xx CANopen Safety interface
- E9xx Other outputs

Plug connectors

- S... Standard plug connectors (see page 120)

Special model

- X Special / customer specified

Combination possibilities with our grips



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 (standard plug connectors see page 120)

2 Direction signals + 1 zero position signal (galvanically isolated) per axis

- 1 axis
- 2 axis

- E001 1
- 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 120</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

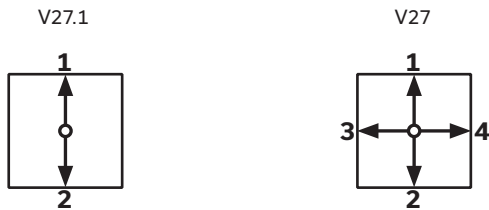
Supply voltage	9-32 V DC (*11,5-32)		
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA		
Mounting depth A	45 mm (60 mm from 3 axis)		
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 120</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 *2 (standard)		6
	*2 not combinable with output E112X and E132X		

*Axis for grip 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 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 120)			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 grip 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	45 mm (expansion stage 1) 60 mm (expansion stage 2) 80 mm (expansion stage 3)		
Protocol	CANopen CiA DS 301 or SAE J1939 (based on)		
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)		
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 120</i>)		S
CAN 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 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 for LEDs in the grip			

CAN expansion stage 3		E306 1
<ul style="list-style-type: none"> - 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		2
- 16 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 16 external digital inputs		3
- 24 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 24 external digital inputs		4
- 32 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 32 external digital inputs		5
<i>*External LED-outputs can be used for LEDs in the grip</i>		
Main-axis with additional digital outputs separately wired (not via CAN)		
- 2 direction signals + 1 zero position signal (potential-free) per axis		3
<i>With additional analog outputs on request!</i>		

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)	
Mounting depth	45 mm (expansion stage 1)	
	60 mm (expansion stage 2)	
	80 mm (expansion stage 3)	
Protocol	CANopen Safety EN50325-5	
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 120</i>)	S
CANopen Safety expansion stage 1		E404 1
<ul style="list-style-type: none"> - 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
<ul style="list-style-type: none"> - 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		2
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs		3
<i>*External LED-outputs can be used for LEDs in the grip</i>		

CANopen Safety expansion stage 3

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

E406 1

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 for LEDs in the grip*

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!

Other outputs

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

Option Input for capacitive sensor

Mounting depth A 45 mm (60 mm from 3 axis)

- 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 120*)

S

1 axis	E907 1
2 axis	2
3 axis	3
4 axis	4

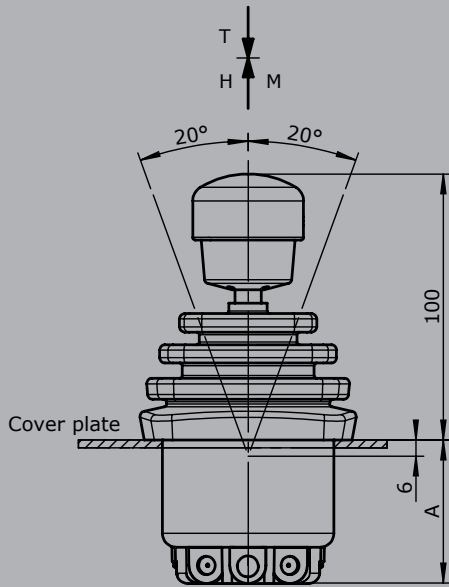
Main-axis with additional direction signals and zero direction signals (potential-free) per main-axis

3

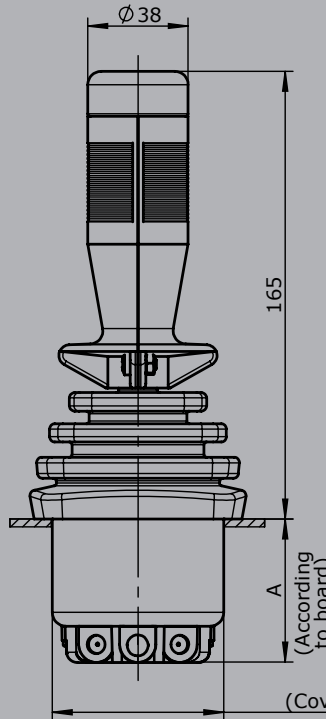
Attachments

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

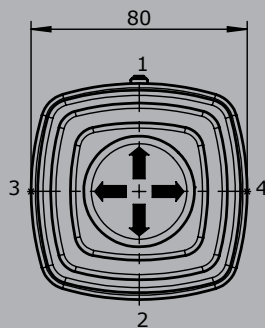
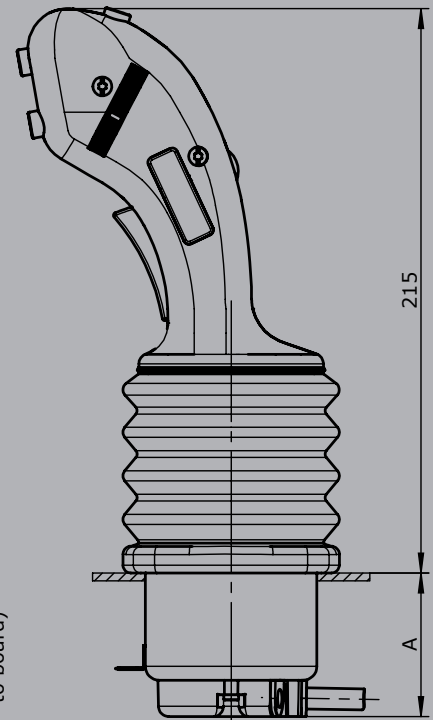
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock



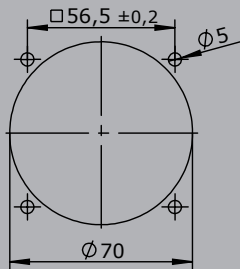
Palm grip B1



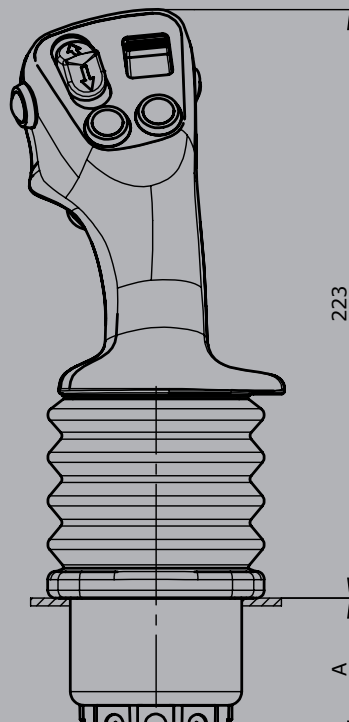
Palm grip B3



Hole pattern



Palm grip B25



Multi-Axis Controller V26



The V26 is a robust joystick commonly used in electro-hydraulic applications. Long life and high reliability is ensured by the latest contactless hall-technology. With many outputs and grip 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
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



	V26	T	-R	+R	-B	-E...	-S...	-X
Basic unit								
V26 2-axis	■	■	■	■	■	■	■	■
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 154)	■	■	■	■	■	■	■	■
Axis 1								
R Friction brake	■	■	■	■	■	■	■	■
Axis 2								
R Friction brake	■	■	■	■	■	■	■	■
Cover housing								
B Cover housing (included in basic unit!)	■	■	■	■	■	■	■	■
Interface (description see on the following pages)								
E0xx Switching output	■	■	■	■	■	■	■	■
E1xx Voltage output	■	■	■	■	■	■	■	■
E2xx Current output	■	■	■	■	■	■	■	■
E3xx CAN-interface	■	■	■	■	■	■	■	■
E4xx CANopen Safety interface	■	■	■	■	■	■	■	■
E9xx Other outputs	■	■	■	■	■	■	■	■
Plug connectors								
S... Standard plug connectors (see page 120)	■	■	■	■	■	■	■	■
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		
Mounting depth A	105 mm		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 120</i>)		
2 direction signals + 1 zero position signal (galvanically isolated) per axis			
	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 120</i>)		
0,5...2,5...4,5 V redundant per axis			
	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		
Option	Input for capacitive sensor		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 120</i>)		
0,5...2,5...4,5 V redundant per axis			
	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	
Option	Input for capacitive sensor	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 120</i>)	
0...10...20 mA per axis, sensor redundant with error monitoring and error signal		S
	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
<i>Current output with other value on request!</i>		

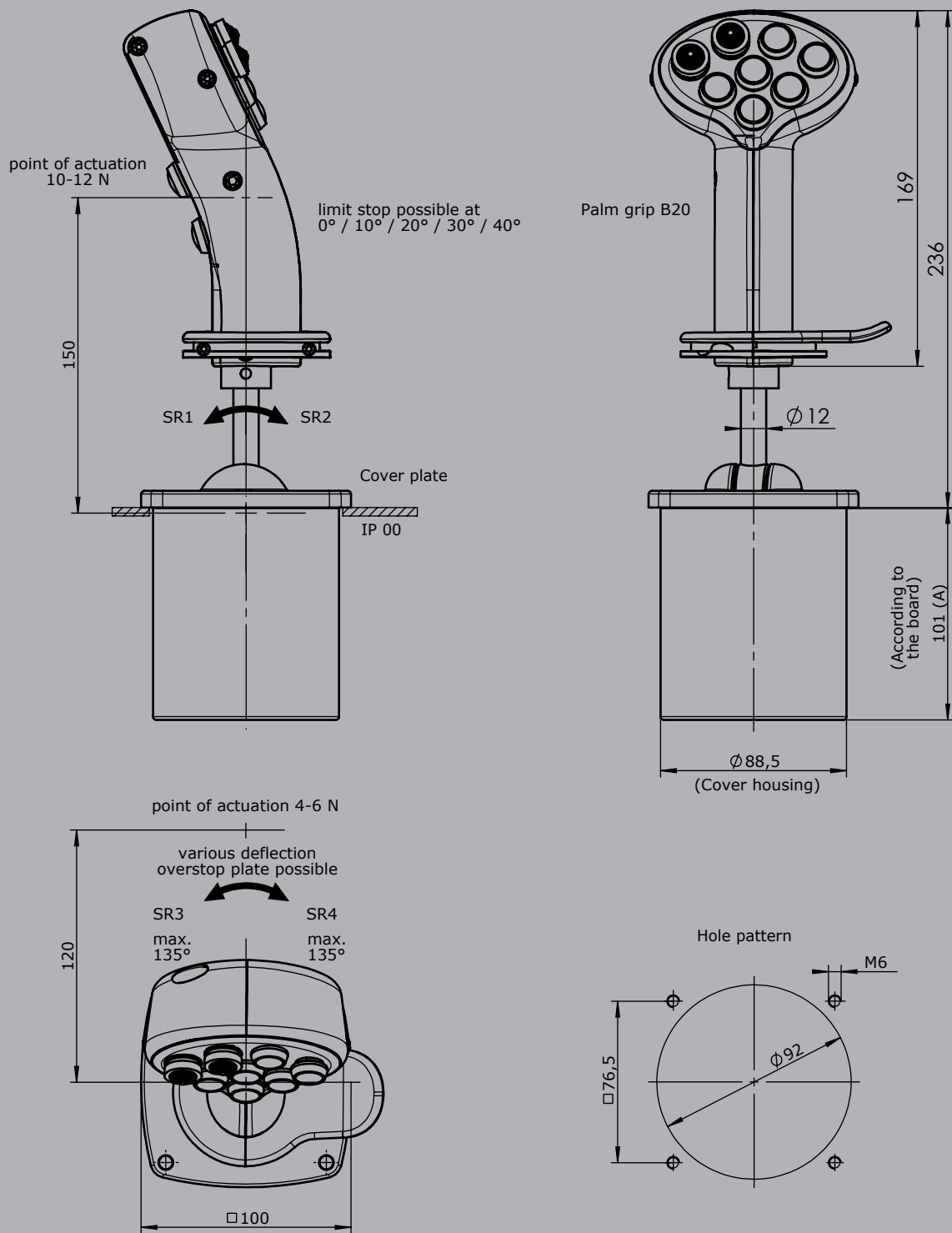
CAN

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 (based on)	
Baud rate	125 kBit/s to 1 Mbit/s (standard 250 kBit/s)	
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 120</i>)	
CAN expansion stage 1	E309	1
- 7 analoge 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 for LEDs in the grip		
*With the use of capacitive sensor, the external digital inputs are reduced by one input!		

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 LEDs)	
	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	CANopen Safety EN50325-5	
Baud rate	125 kBit/s to 1 MBit/s (Standard 250 kBits)	
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 120</i>)	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 (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 for LEDs in the grip		
*With the use of capacitive sensor, the external digital inputs are reduced by one input!		

Other outputs		
Voltage output for PVG32	0,25...0,5...0,75Us, power supply 9-32V DC	
Mounting depth A	105 mm	
Option	Input for capacitive sensor	
Wiring:	1. cable 14 x 0,25 mm ² 300 mm long without plug connector	
	2. cable 14 x 0,25 mm ² 300 mm long without plug connector (optional for grip function)	
	Optional with plug connector (<i>standard plug connectors see page 120</i>)	S
	2 axis	E907 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



Multi-Axis Controller V25



The V25 is a compact and robust joystick commonly used in electro-hydraulic applications. Long life and high reliability is ensured by the latest contactless hall-technology. With many outputs and grip options the V25 series is hugely customisable.

Technical data

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 compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



	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 a handle!									
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 154)								
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 grip function sealed, grip with drain hole								
For a schematic description of the protection class, see page 121									
Interface (description see on the following page)									
E0xx	Switching output								
E1xx	Voltage output								
E2xx	Current output								
E3xx	CAN-interface								
E4xx	CANopen Safety interface								
E9xx	Other outputs								

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

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

Plug connectors

S... Standard plug connectors (see page 120)

Special model

X Special / customer specified

Combination possibilities with our grips



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 120)	S
2 Direction signals + 1 zero position signal (galvanically isolated) per axis		
	1 axis	E001 1
	2 axis	2

Voltage output (not stabilized)

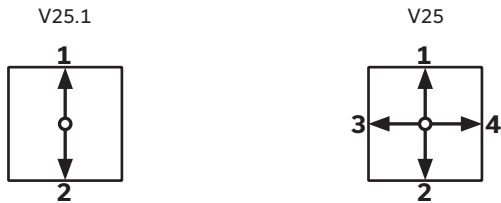
Supply voltage	4,75-5,25 V DC	
Current carrying capacity	Direction signal 8 mA	
Mounting depth A	60 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector Optional with plug connector (standard plug connectors see page 120)	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 120</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 grip 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	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 120</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 grip 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) 70 mm (expansion stage 2) 90 mm (expansion stage 3)
Protocol	CANopen CiA DS 301 or SAE J1939 (based on)
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)
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 120</i>)
CAN 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 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
*External LED-outputs can be used for LEDs in the grip	

CAN expansion stage 3		E306 1
<ul style="list-style-type: none"> - 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		2
- 16 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 16 external digital inputs		3
- 24 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 24 external digital inputs		4
- 32 external LED-outputs (dimmable optional), 2 switching outputs (potential-free, 100 mA), 32 external digital inputs		5
*External LED-outputs can be used for LEDs in the grip		
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)	
Mounting depth	60 mm (expansion stage 1)	
	70 mm (expansion stage 2)	
	90 mm (expansion stage 3)	
Protocol	CANopen Safety EN50325-5	
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 (standard plug connectors see page 120)	S

CANopen Safety expansion stage 1		E404 1
<ul style="list-style-type: none"> - 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

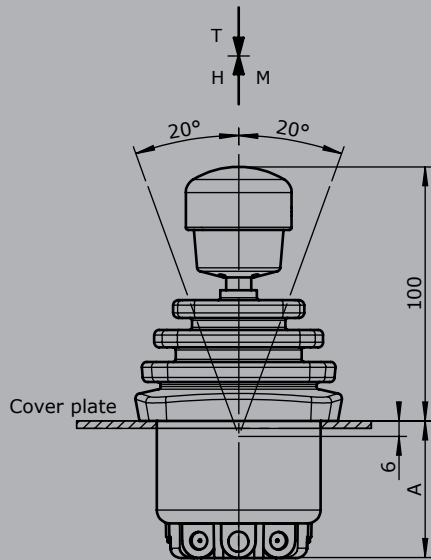
CANopen Safety expansion stage 2		E405 1
<ul style="list-style-type: none"> - 7 analog joystick axis - 15 digital joystick functions - 2 inputs for capacitive sensors 		
With additional external in-/outputs		
- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs		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 for LEDs in the grip		

CANopen Safety expansion stage 3		E406 1
<ul style="list-style-type: none"> - 10 analog joystick axis - 15 digital joystick functions - 2 inputs for capacitive sensor 		
With additional external in-/outputs		
- 8 external LED-outputs (dimnable optional), 2 switching outputs (potential-free, 100 mA), 8 external digital inputs		2
- 16 external LED-outputs (dimnable optional), 2 switching outputs (potential-free, 100 mA), 16 external digital inputs		3
- 24 external LED-outputs (dimnable optional), 2 switching outputs (potential-free, 100 mA), 24 external digital inputs		4
- 32 external LED-outputs (dimnable optional), 2 switching outputs (potential-free, 100 mA), 32 external digital inputs		5
<i>*External LED-outputs can be used for LEDs in the grip</i>		
Main-axis with additional digital outputs separately wired (not via CAN)		
- 2 direction signals + 1 zero position signal (potential-free) per axis		3
<i>With additional analog outputs on request!</i>		

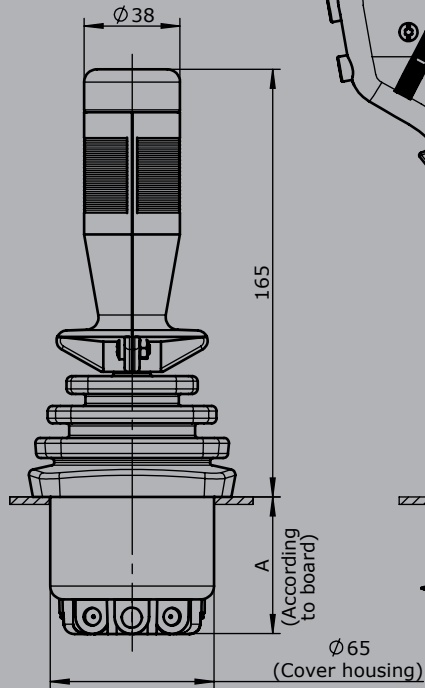
Other outputs		
Voltage output for PVG32 0,25...0,5...0,75Us, power supply 9-32 V DC		
Option	Input for capacitive sensor	
Mounting depth A	60 mm	
Wiring:	<ol style="list-style-type: none"> 1. cable 14 x 0,25 mm² 300 mm long without plug connector 2. cable 14 x 0,25 mm² 300 mm long without plug connector (optional for grip function) 	
	Optional with plug connector (<i>standard plug connectors see page 120</i>)	
		S
	1 axis	E907 1
	2 axis	2
	3 axis	3
	4 axis	4
Main-axis with additional direction signals and zero direction signals (potential-free) per main-axis		3

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

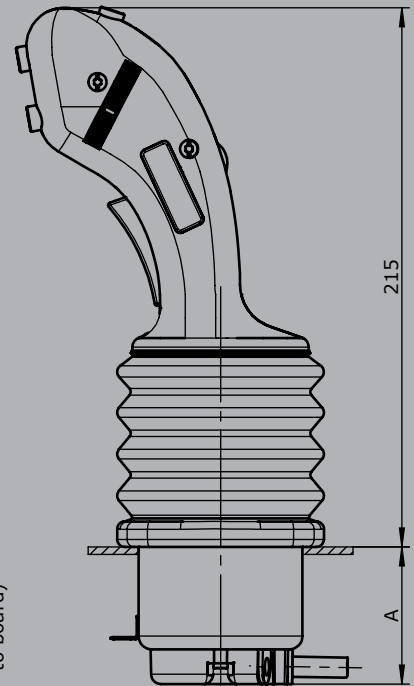
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock



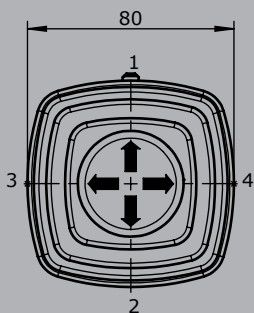
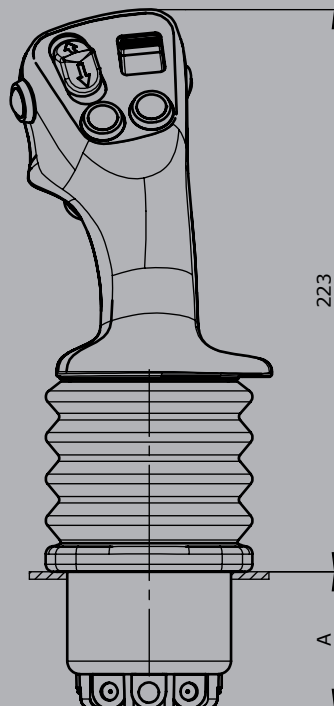
Palm grip B1



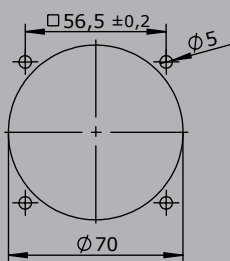
Palm grip B3



Palm grip B25



Hole pattern



Multi-Axis Controller V24



The Multi-Axis Controller 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. Long life and high reliability is ensured by the latest contactless hall-technology. Through its various interfaces and many possibilities of combination with our numerous ball grips 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 compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)

	V24	P1	Example T	-R	-B10	-E...	-S...	-X
Basic unit								
V24.1 1-axis								
V24L 1-axis with parking position left								
V24R 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 154)								
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 grip function sealed, grip with drain hole								
<i>For a schematic description of the protection class, see page 150</i>								
Interface (description see on the following pages)								
E1xx Voltage output								
E2xx Current output								
E3xx CAN-interface								
E4xx CANopen Safety interface								
E9xx Other outputs								
Plug connectors								
S... Standard plug connectors (see page 120)								
Special model								
X Special / customer specified								

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

Combination possibilities with our grips

B1  p. 199	B2  p. 197	B3  p. 194	B5  p. 192	B6  p. 188	B7 B8  p. 188	B9  p. 186	B10  p. 184	B14 B15  p. 182
B20  p. 180	B22  p. 178	B23  p. 176	B24  p. 174	B25  p. 172	B26  p. 170	B28  p. 168	B29  p. 166	B30  p. 164
B31  p. 162	B32  p. 160	B33  p. 158	B34  p. 156	B35  p. 154				

Voltage output (not stabilized)

Supply voltage	4,75-5,25 V DC
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 120</i>)

0,5...2,5...4,5 V redundant

1 axis	E103 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
Option	Input for capacitive sensor
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 120</i>)

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
5 axis*	5
6 axis*	6

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

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

	3 axis*	3
	4 axis*	4
	5 axis*	5
	6 axis*	6
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
	5 axis*	5
	6 axis*	6
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		
*Axis for grip 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	65 mm	
Option	Input for capacitive sensor	
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 120</i>)	
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
	5 axis*	5
	6 axis*	6
20...10...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
	5 axis*	5
	6 axis*	6

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
	5 axis*		5
	6 axis*		6
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
	5 axis*		5
	6 axis*		6
		Output options	
		Single	5
		Single with dead zone +/- 3° (standard)	6

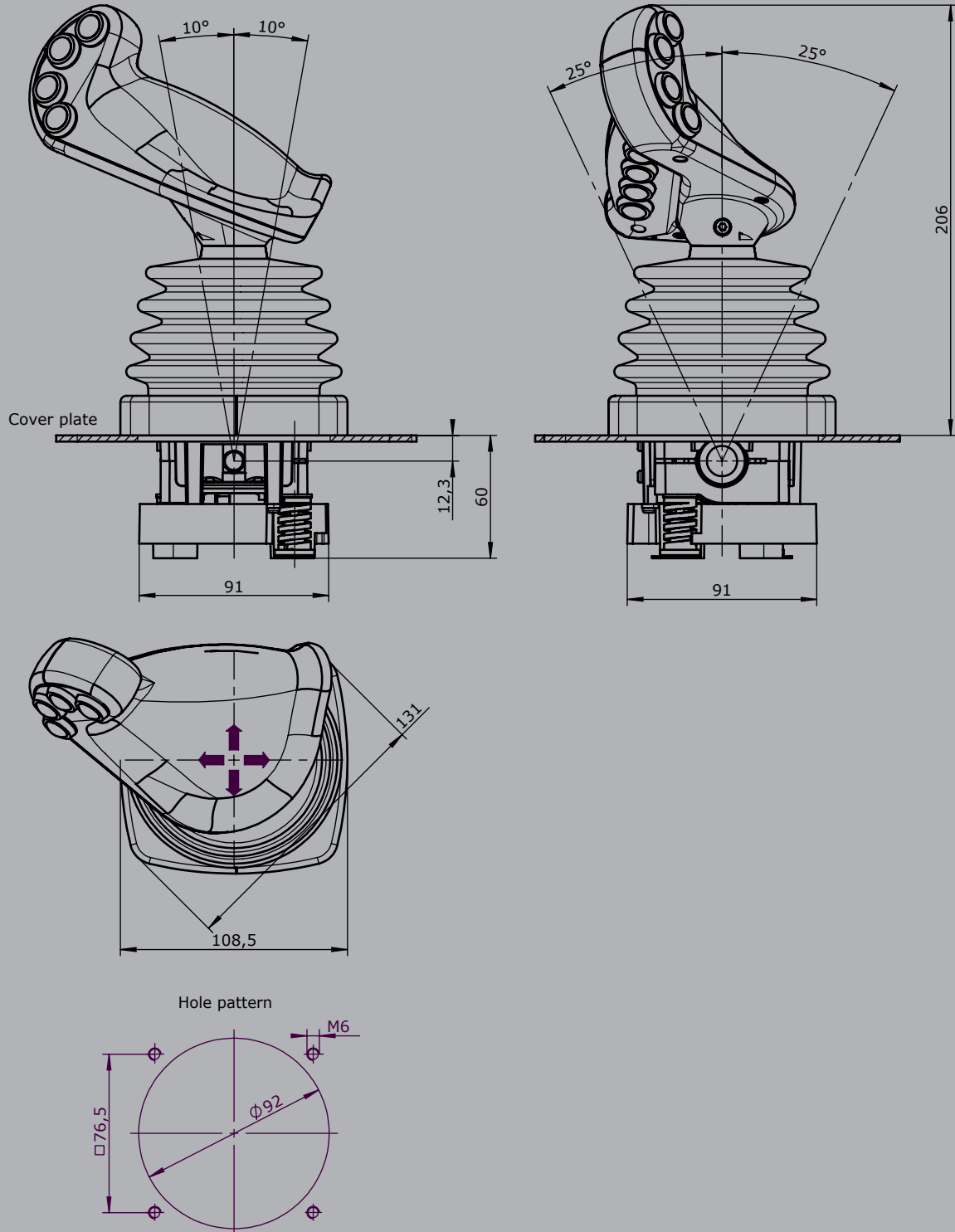
*Axis for grip functions, interface can vary depending upon actuation element!
Current output with other value on request!

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 (based on)		
Baud rate	125 kBit/s to 1 Mbit/s		
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 (standard plug connectors see page 120)	S
CAN			E312 1
- 7 analog joystick axis			
- 15 digital joystick functions			
*With the use of external inputs, the joystickfunctions are reduced 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 EN50325-5
Baud rate	125 kBit/s to 1 Mbit/s
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 120</i>)
CANopen Safety	
- 7 analog joystick axis	E411 1
- 15 digital joystick functions	
<i>*With the use of external inputs, the joystick functions are reduced 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>	

Other outputs	
Voltage output for PVG32 0,25...0,5...0,75Us, power supply 9-32 V DC	
Mounting depth A	60 mm
Option	Input for capacitive sensor
Wiring:	1. cable 14 x 0,25 mm ² 300 mm long without plug connector 2. cable 14 x 0,25 mm ² 300 mm long without plug connector (optional for grip function) Optional with plug connector (<i>standard plug connectors see page 120</i>)
Other outputs	
	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

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 V1 is a robust Joystick commonly used in electro-hydraulic applications. The modular design enables the switching device to be used universally. Long life and high reliability is ensured by the latest contactless hall-technology.

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
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



	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												
R Friction brake												
Axis 2 (not applicable to V1.1)												
Z Spring return												
R Friction brake												
Cover housing												
B Cover housing (included in basic unit!)												
Interface (description see on the following pages)												
E1xx Voltage output												
More interfaces on request!												
Plug connectors												
S... Standard plug connectors (see page 120)												
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 mm ² 500 mm long without plug connector
	Optional with plug connector (<i>standard plug connectors see page 120</i>)

S

0,5...2,5...4,5V redundant signals per axis

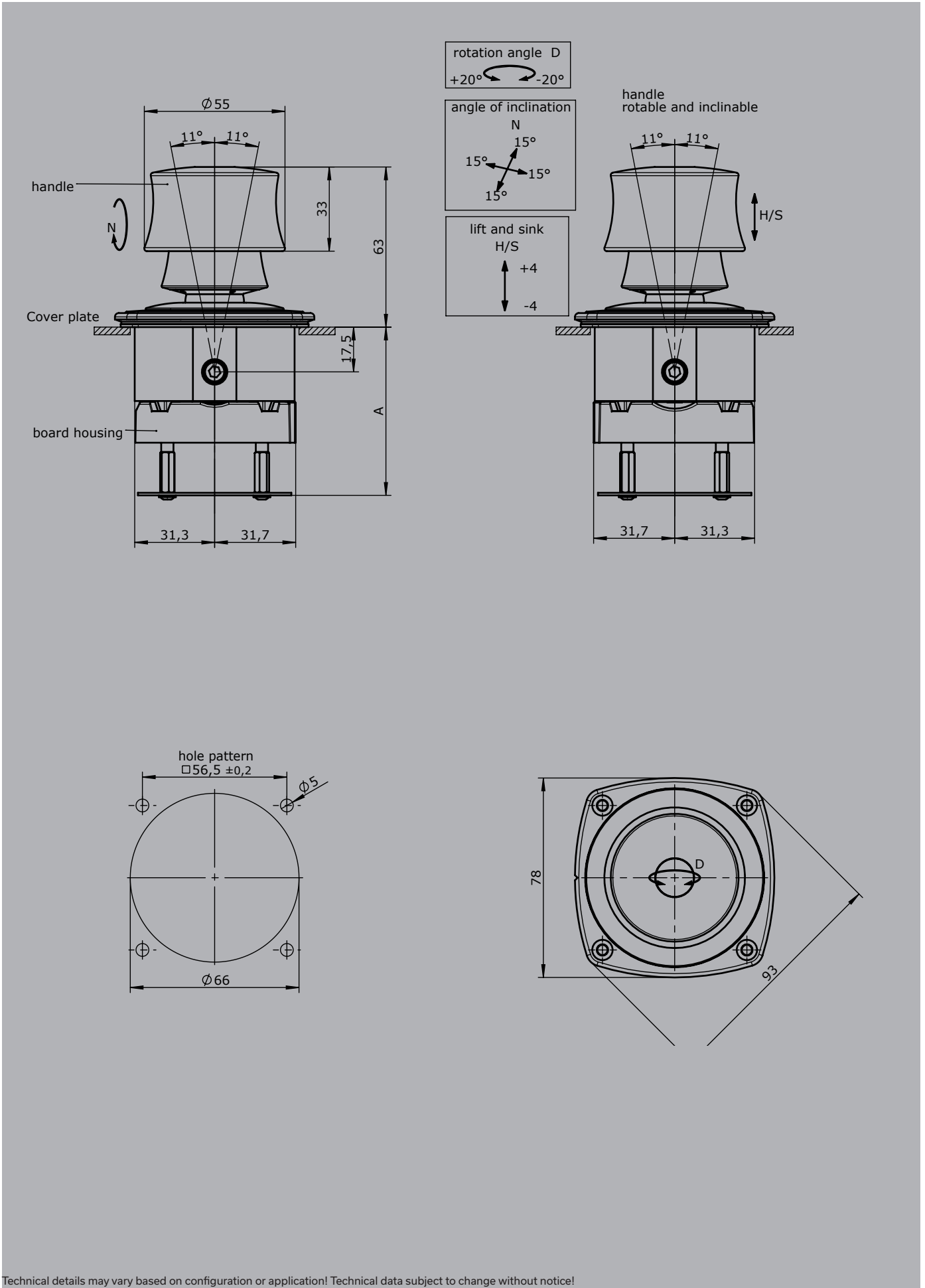
1 axis	E103 1
2 axis	2
3 axis*	3
4 axis*	4
5 axis*	5
6 axis*	6

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

Double-Handle Controller D85



The Double-Handle Controller D85 is a robust switching device for electro hydraulic and hoisting applications. Long life and high reliability is ensured by the latest contactless hall-technology. The modular design enables the switching device to be used universally.



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											
<i>*Only available in combination with handle!</i>											
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 213)											
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!

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	PROFIsafe
E8xx	PWM output
E9xx	Other outputs
Plug connectors	
S...	Standard plug connectors (see page 120)
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 120)
2 direction signals + 1 zero position signal (galvanically isolated) per axis	
	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 120)
0,5...2,5...4,5V redundant + 2 direction signals per axis	
	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

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				
Option	Input for capacitive sensor				
Wiring	Cable 500 mm long without plug connector				
	Optional with plug connector (<i>standard plug connectors see page 120</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
<i>Voltage output with other value on request!</i>					

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
Option	Input for capacitive sensor
Wiring	Cable 500 mm long without plug connector
	Optional with plug connector (<i>standard plug connectors see page 120</i>)
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring signal 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
<i>Current output with other value on request!</i>	

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 LEDs)
Mounting depth A	Digital switching output (potential-free) 100 mA
	E3091: 85 mm
	E3091X: 105 mm
	E3101X - E3103X: 105 mm
Protocol	E3104X - E3105X: 125 mm
	CANOpen CiA DS 301 or SAE J 1939 (based on)
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)

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

Optional with plug connector (standard plug connectors see page 120)		S
CAN expansion stage 1 - 7 analoge Joystickachsen - 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 - 16 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs <i>External LED-outputs can be used in the grip for LEDs</i> *With the use of capacitive sensor, the external digital inputs reduce by one input!	E309 1 2 3	
CAN expansion stage 2 - 10 analog joystick axis - 16 digital joystick functions - 2 inputs 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 - 16 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs - 24 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs - 32 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs <i>External LED-outputs can be used in the grip for LEDs</i> *With the use of capacitive sensor, the external digital inputs reduce by one input!	E310 1 2 3 4 5	
Main-axis with additional digital-/analog outputs separately wired (not via CAN) - 2 direction signals + 1 zero position signal (potential-free) per main-axis <i>Additional analog outputs on request!</i>		

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 LEDs) 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 EN50325-5
Baud rate	125 kBit/s to 1 MBit/s (Standard 250 kBits)
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 120)		S
CANopen Safety expansion stage 1		E409 1
<ul style="list-style-type: none"> - 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
<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>		
CANopen Safety expansion stage 2		E410 1
<ul style="list-style-type: none"> - 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
<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>		
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
<i>Additional analog outputs on request!</i>		

Profibus DP			S
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 120)			S
Profibus DP		E501 1	
<ul style="list-style-type: none"> - 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	
<i>External LED-outputs can be used in the grip for LEDs</i>			
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

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 120</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	
*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

PROFIsafe			
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 120</i>)		S
		E701 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	
*External LED-outputs can be used in the grip for LEDs			
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:	9-32 V 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 1 mm ² 300 mm long without plug Cable 2 (switching output) 12 x 1 mm ² 300 mm long without plug Cable 3 (creep speed / dead man) 14 x 0,25 mm ² 300mm long without plug Optional with plug connector (<i>standard plug connectors see page 120</i>)
PWM Output 0-3 A for 2 proportional valve magnets per axis	2 axis
	E801 2
	S

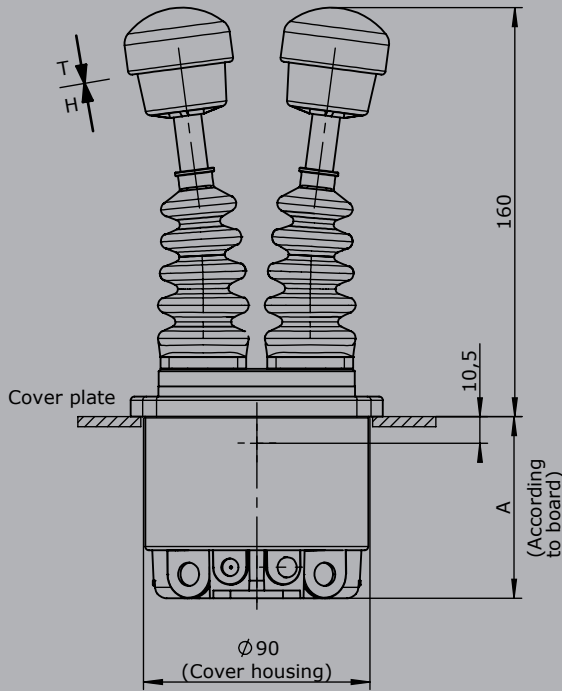
Other outputs	
Voltage output for PVG32 0,25...0,5...0,75 Us, power supply 9-32 V DC	
Option	Input for capacitive sensor
Wiring:	Cable 14 x 0,25 mm ² 300 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 120</i>)
	2 axis
	E907 2
	S
Main-axis with additional 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 mm ² 300 mm long without plug connector (axis 1+2) Optional with plug connector (<i>standard plug connectors see page 120</i>)
	2 axis
	E903 2
	S
8 Bit Binär-Code with direction signals per main-axis, supply voltage 9-36 V DC	
Wiring:	Cable 37 x 0,14 mm ² 300 mm long without plug connector (axis 1+2) Optional with plug connector (<i>standard plug connectors see page 120</i>)
	2 axis
	E904 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
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

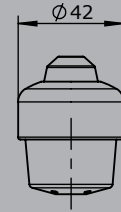
Double-Handle Controller D85



T = Dead man's button
H = Signal button

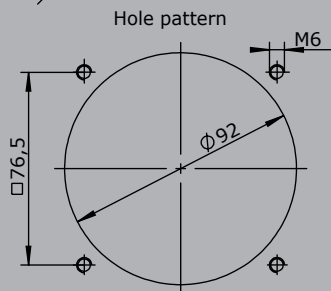
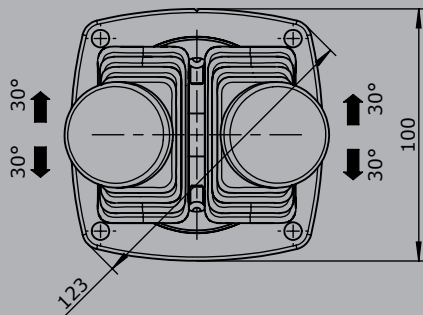
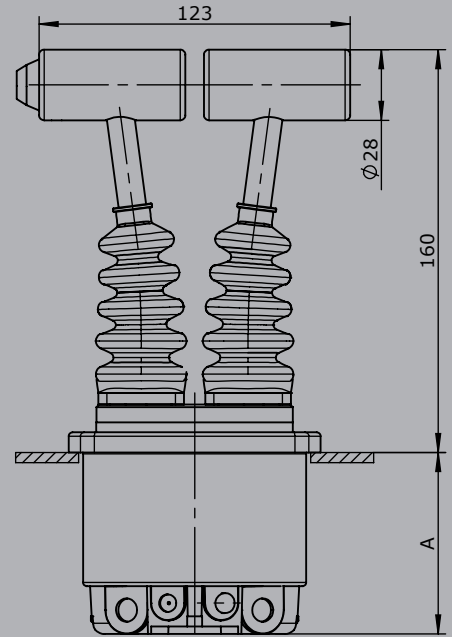


Knob solid
D= Push button

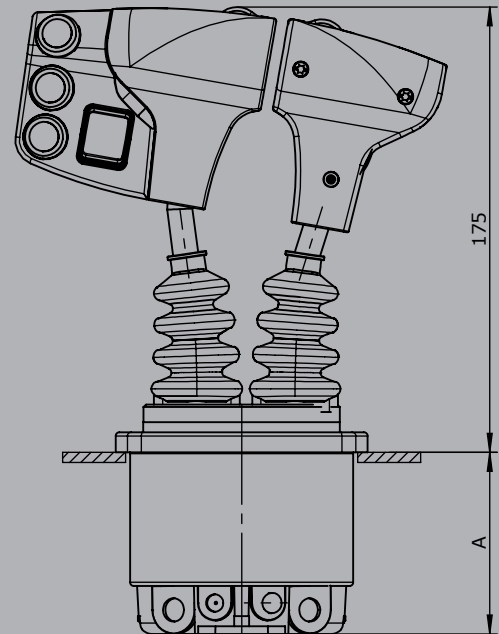


To build in:
Direction 1-2
Direction 3-4

T - grip
D= Push button



Palm grip B10



Multi-Axis Controller V28



The V28 is a compact joystick commonly used in electro-hydraulic applications. Long life and high reliability is ensured by the latest contactless hall-technology. With many outputs and grip options the V28 series is hugely customisable.

Technical data

Mechanical life V28	5 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	up to IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



		V28	P	T	-GS9	-B10	-E...	-S...	-X
Basic unit									
V28.1	1-axis								
V28	2-axis								
Gate									
P	Cross gate								
Grip / Palm Grip									
	Knob (included in basic unit!)								
D	Knob with 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 154)								
Spring return (included in basic unit!)									
Z	Spring return								
Degree of protection									
B10	Joystick-main board sealed								
B11	Joystick-main board sealed and grip function sealed, grip with drain hole								
<i>For a schematic description of the protection class, see page 121</i>									
Interface (description see on the following page)									
E1xx	Voltage output								
E2xx	Current output								
E3xx	CAN-interface								
E4xx	CANopen Safety interface								
Plug connectors									
S...	Standard plug connectors (see page 120)								
Special model									
X	Special / customer specified								

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

Combination possibilities with our grips



Voltage output (not stabilized)

Supply voltage	4,75-5,25 V DC		
Current carrying capacity	Direction signal 8 mA		
Mounting depth A	35 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 120</i>)		S
0,5...2,5...4,5 V redundant	1 axis	E103 1	
	2 axis	2	
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	35 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 120</i>)	
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
0...5...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	
	1 axis E132 1
	2 axis 2
	3 axis* 3
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	
	1 axis E136 1
	2 axis 2
	3 axis* 3
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	
*Axis for grip functions, interface can vary depending upon actuation element!	
Voltage output with other value on request!	

Current output

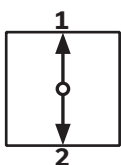
Supply voltage	9-32 V DC		
Current carrying capacity	Direction signal 150 mA		
	Zero position signal 500 mA		
Mounting depth A	35 mm		
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector		
	2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 120</i>)		S
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring			
	1 axis	E206	1
	2 axis		2
	3 axis*		3
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring			
	1 axis	E208	1
	2 axis		2
	3 axis*		3
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring			
	1 axis	E214	1
	2 axis		2
	3 axis*		3
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring			
	1 axis	E216	1
	2 axis		2
	3 axis*		3
Output options			
	Single		5
	Single with dead zone +/- 3° (standard)		6

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

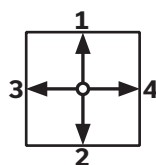
Current output with other value on request!

Identification of the installation variants with switching directions:

V28.1



V28



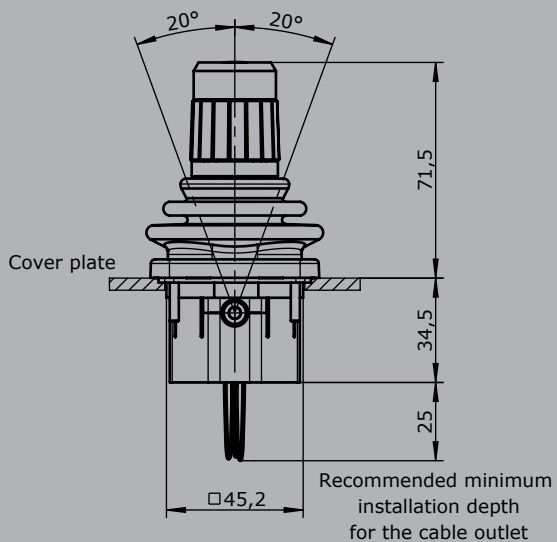
CAN	
Supply voltage	9-32 V DC
Idle current consumption	120 mA (24 V DC)
Current carrying capacity	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs)
Mounting depth A	35 mm
Protocol	CANopen CiA DS 301 or SAE J1939 (based on)
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)
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 120</i>)
S	
CAN	
- 4 analog joystick axis	
- 8 digital joystick functions (incl. input for capacitive sensor)	
- 8 LED-Outputs (dimnable optional) for grip function	
E314 1	

CANopen Safety	
Supply voltage	9-32 V DC
Idle current consumption	120 mA (24 V DC)
Current carrying capacity	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs)
Baud rate	20 kBit/s to 1 MBit/s (standard 250 kBit/s)
Mounting depth	35 mm
Protocol	CANopen Safety EN50325-5
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 120</i>)
S	
CANopen Safety	
- 4 analog joystick axis	
- 8 digital joystick functions (incl. input for capacitive sensor)	
- 8 LED-Outputs (dimnable optional) for grip function	
E413 1	

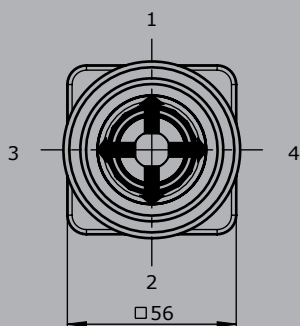
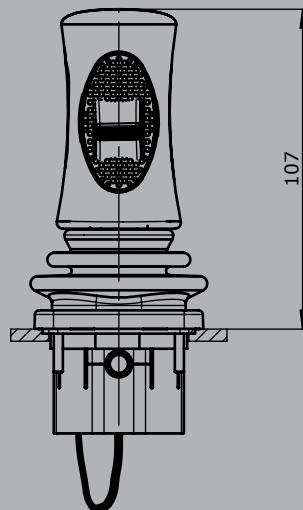
Attachments	
Z01 Mating connector M12 male insert with 2 m cable	20201140
Z02 Mating connector M12 female insert with 2 m cable	20202298

Standard
installed from the top

Hall-twist grip GS9

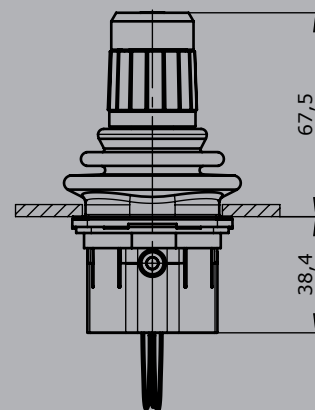
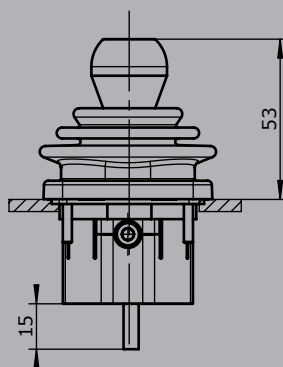


Palm grip B33

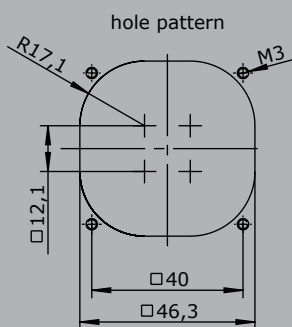


knob

installed from below



Recommended minimum installation depth for the cable outlet



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.

Technical data

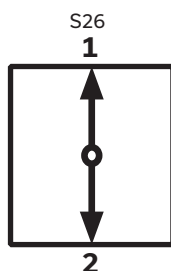
Mechanical life S26	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP54, electronic assembly IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



	S26	T	Example - 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 120)						
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 120</i>)	S
2 direction signals + 1 zero position signal (galvanically isolated)		
	1 axis	E001 1

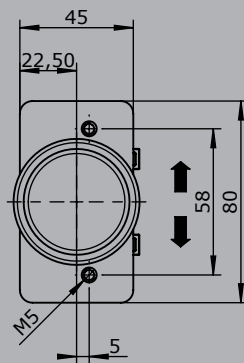
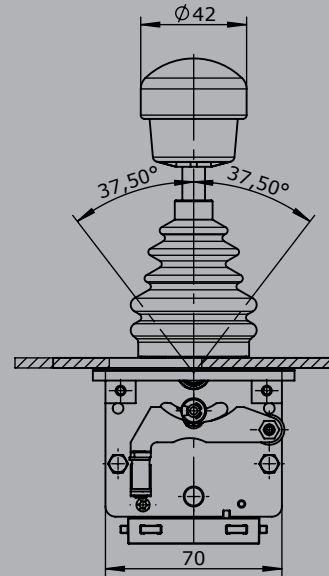
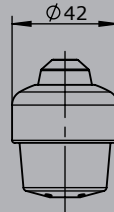
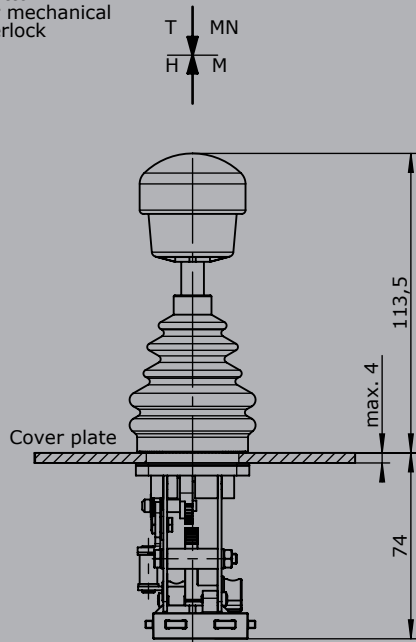
Voltage output (not stabilized)		
Supply voltage	4,75-5,25 V DC	
Current carrying capacity	Direction signal 8 mA	
	Zero position signal 500 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 120</i>)	S
0,5...2,5...4,5 V redundant + 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 120</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		
<i>Voltage output with other value on request!</i>		

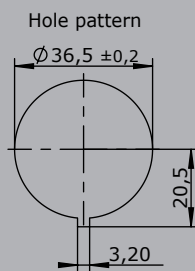
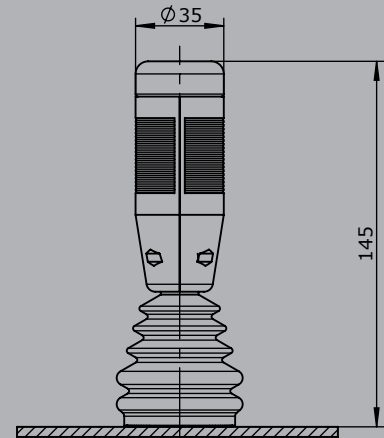
Current output		
Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 120</i>)	
S		
0...10...20 mA + 2 direction signals + 1 zero 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



Multi-Axis Controller V22



The V22 is a joystick commonly used in electro-hydraulic applications. Long life and high reliability is ensured by the latest contactless hall-technology.

Technical data

Mechanical life V22	3 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP67 front
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)

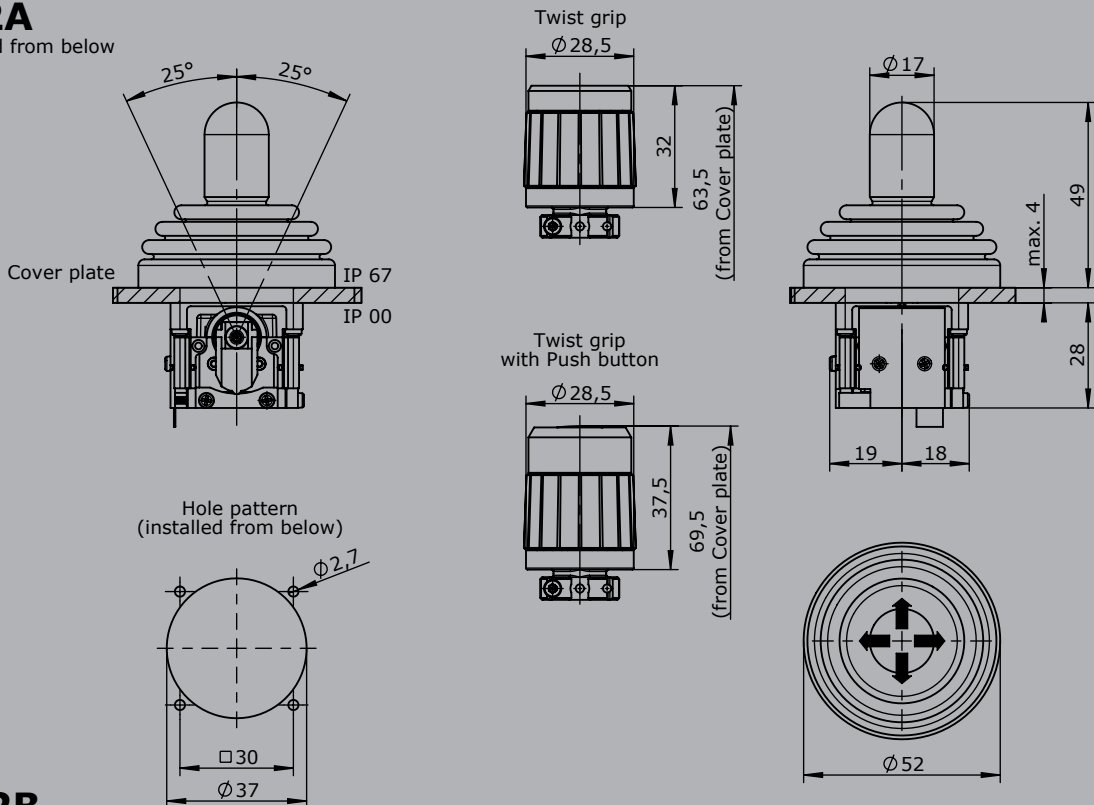


	V22A	-P	Example	D	-E10321	-X
Basic unit						
V22.1A	1-axis with spring return, installation from below					
V22A	2-axis with spring return, installation from below					
V22.1B	1-axis with spring return, installation from top					
V22B	2-axis with spring return, installation from top					
Gate						
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, 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!

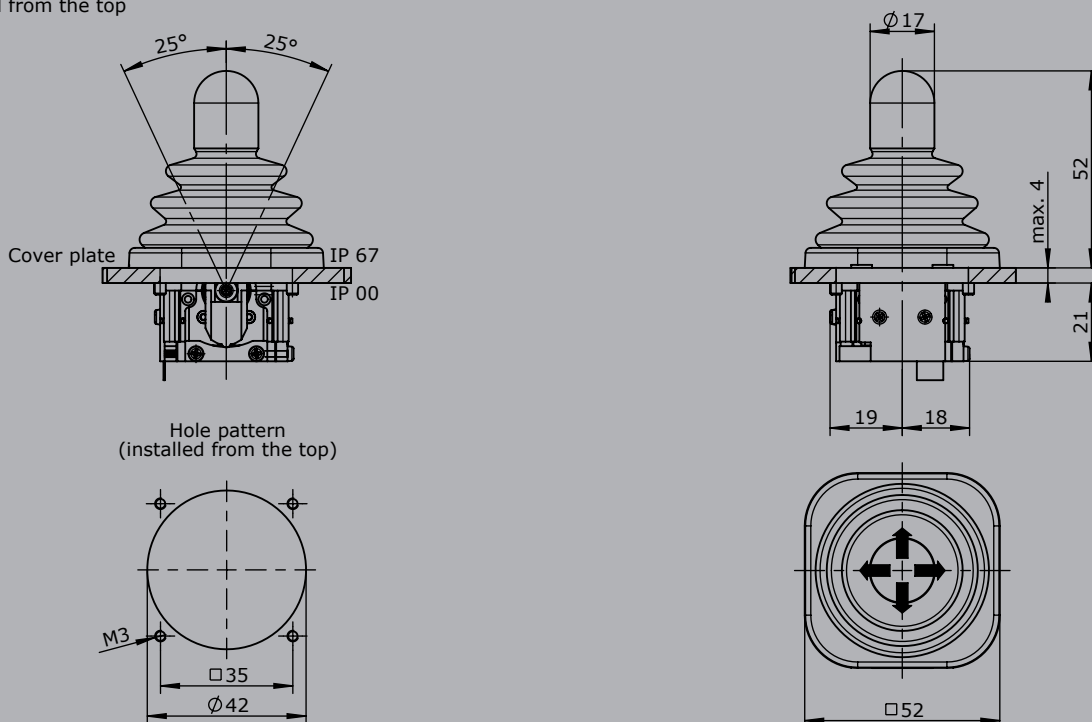
V22A

Installed from below



V22B

Installed from the top



Single-Axis Controller S11



The S11 is a one-axis joystick designed for electro-hydraulic and remote controlled hydraulic. Long life and high reliability is ensured by the latest contactless hall-technology. The modular design of the switching device is universally applicable.

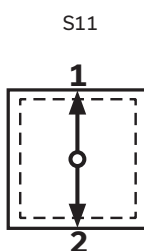
Technical data

Mechanical life S11	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP65, electronic assembly IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to EN IEC 61508)



	S11	T	Example - Z	- E...	- S...	- X
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 120</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 120</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 120</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

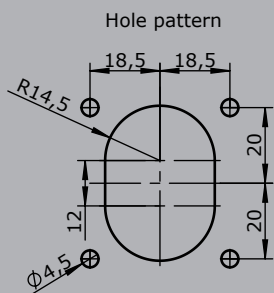
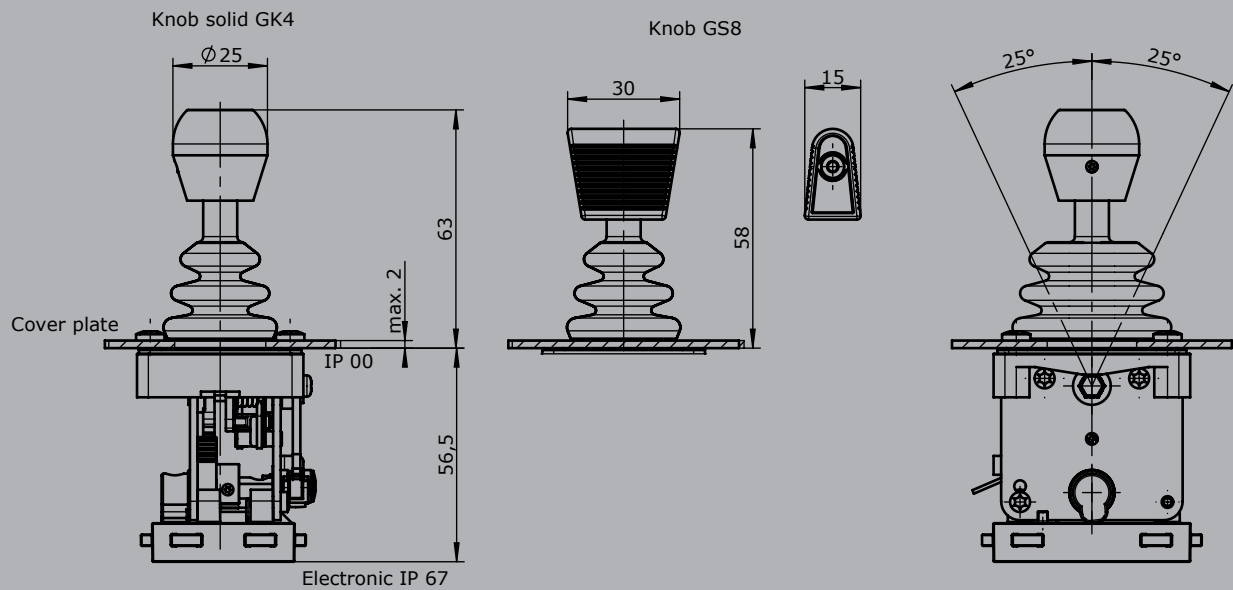
Voltage output

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 120</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 120</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
Voltage output with other value on request!			

T = Dead man's button



Multi-Axis Controller

V8 / VV8



The V8/VV8 is a robust joystick commonly used in electro-hydraulic applications. With many output options including voltage, amperage and switch contacts and many grip options the V8 / VV8 series is hugely customisable.

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



	VV8	S5	P	T	-2RP	Example +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										
<i>*Only available in combination with a handle!</i>											
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!

Combination possibilities with our grips



	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 154)															
Axis 1: direction 1-2																
1	1 contact	Standard contact - arrangement see page 122														
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 available with a 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 max. 1 mA
		P182	T301 2 x 1 kOhm max. 1 mA
		P183	T301 2 x 2 kOhm max. 1 mA
		P184	T301 2 x 5 kOhm max. 1 mA
		P185	T301 2 x 10 kOhm max. 1 mA
		<i>More potentiometers on request!</i>	
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 122	
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 available with a VV8!		
(P)	Mounting options for potentiometer		
P	Potentiometer	P181	T301 2 x 0,5 kOhm max. 1 mA
		P182	T301 2 x 1 kOhm max. 1 mA
		P183	T301 2 x 2 kOhm max. 1 mA
		P184	T301 2 x 5 kOhm max. 1 mA
		P185	T301 2 x 10 kOhm max. 1 mA
		<i>More potentiometers on request!</i>	
H	Hall-Potentiometer	E14811	0,5...2,5...4,5V/4,5V...2,5...0,5

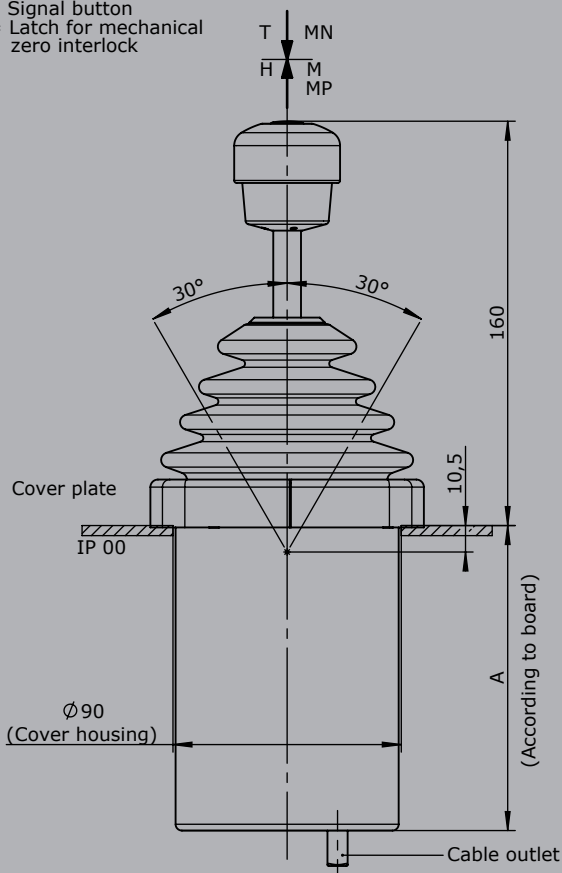
VV8 S5 P T -2 R P + 3 Z P -B - A05 P184 + A050 P184 E9012 - X

Cover housing	
B	Cover housing

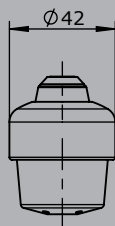
Interface	
	Potentiometer output
E901	Potentiometer output for proportional valve PVG32
	0,25...0,5...0,75 Us
1	1 axis
2	2 axis
3	3 axis
4	4 axis

Special model	
X	Special / customer specified

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

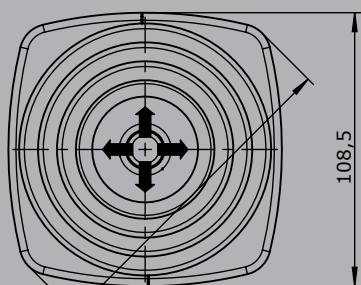
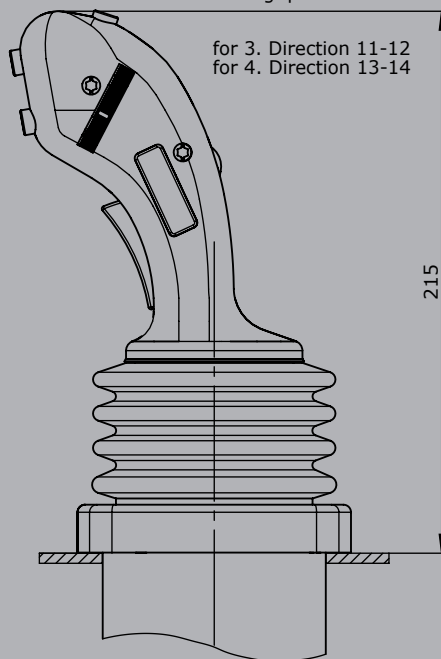


Knob solid
 D= Push button

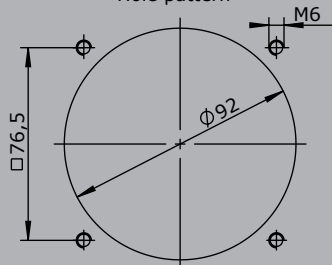


Palm grip B3

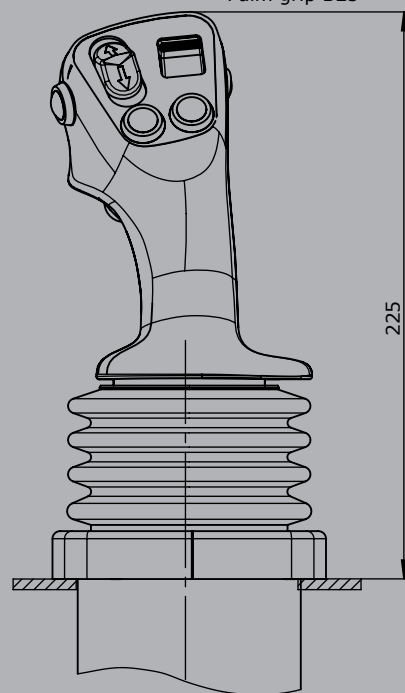
for 3. Direction 11-12
 for 4. Direction 13-14



Hole pattern



Palm grip B25



Multi-Axis Controller V6 / VV6



The Multi-Axis Controller V6 / VV6 is a robust switching device designed for crane systems and hoisting equipment. The modular design and the many possible combinations with our Palm Grips make this joystick universally applicable.

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



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

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

Combination possibilities with our grips



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*

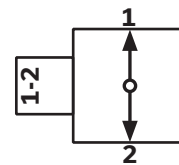
S3	-40 mm
S5	-20 mm
S8	+20 mm

*Only available in combination with a handle!

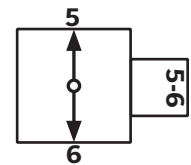
Gate

P	Cross gate
P X	Special gate

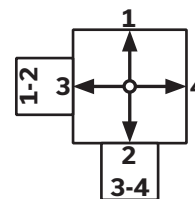
Identification of the installation variants with switching directions:



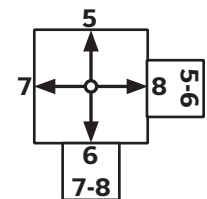
V61L/VV61L



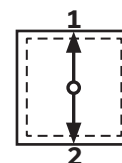
V61R/VV61R



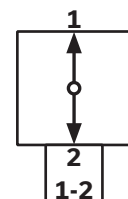
V62L/VV62L



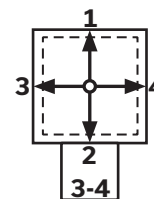
V62R/VV62R



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 154)
<i>Attention! When using some handles the deflection angle can be reduced to 28°!</i>	

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 <input type="checkbox"/>	2 contacts	Standard contact - arrangement see page 122	
02 <input type="checkbox"/>	4 contacts	z.B.	
03 <input type="checkbox"/>	6 contacts	A980	MS00
04 <input type="checkbox"/>	8 contacts	A05	MS21
05 <input type="checkbox"/>	10 contacts	A0500	MS21-00
06 <input type="checkbox"/>	12 contacts	A110	MS24-0
<input type="checkbox"/>	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 max. 1 mA
		P132	T396 2 x 1 kOhm max. 1 mA
		P133	T396 2 x 2 kOhm max. 1 mA
		P134	T396 2 x 5 kOhm max. 1 mA
		P135	T396 2 x 10 kOhm max. 1 mA
		More potentiometers on request!	
C	Encoder	C... Encoder see page 130	

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	<input type="checkbox"/>	2 contacts	Standard contact - arrangement see page 122	
02	<input type="checkbox"/>	4 contacts	z.B.	
03	<input type="checkbox"/>	6 contacts	A980	MS00
04	<input type="checkbox"/>	8 contacts	A05	MS21
05	<input type="checkbox"/>	10 contacts	A0500	MS21-00
06	<input type="checkbox"/>	12 contacts	A110	MS24-0
	<input checked="" type="checkbox"/>	A= 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 157

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

Special model

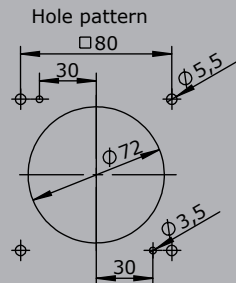
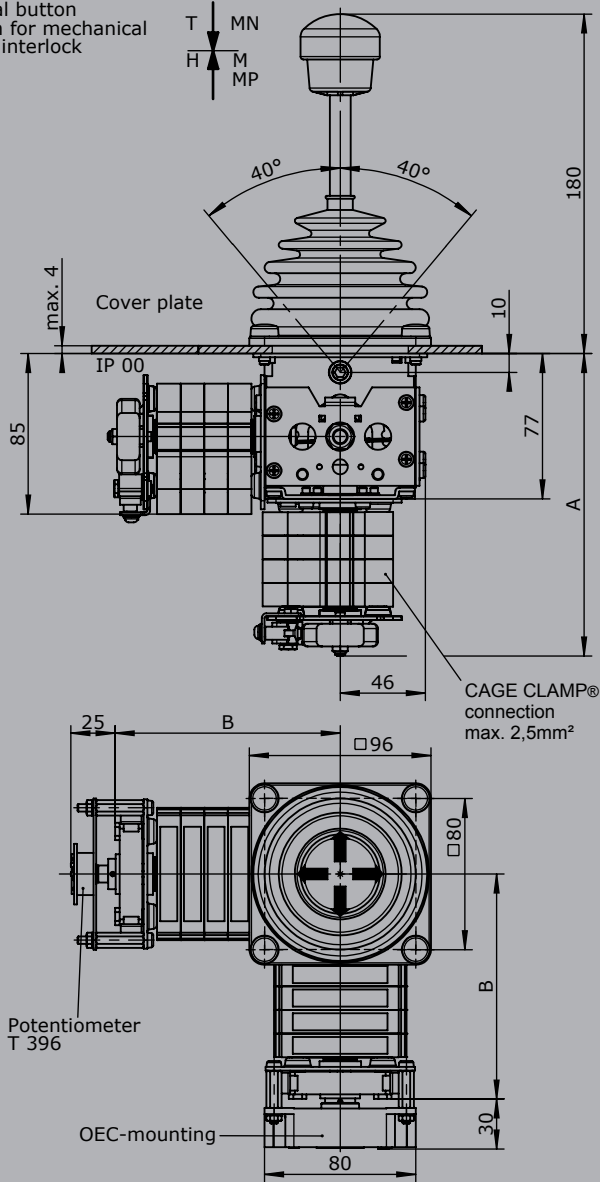
X Special /customer specified

Attachments

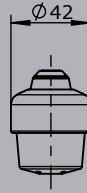
Indicating labels

Indicating labels with engraving

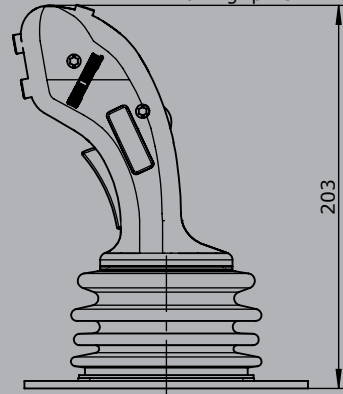
T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock



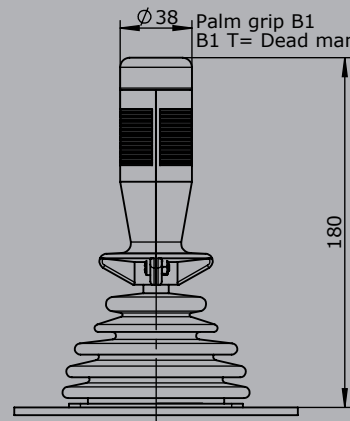
Knob solid
 D = Push button



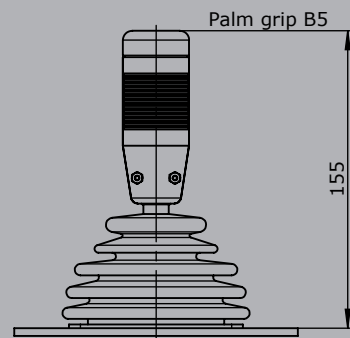
Palm grip B3



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 commonly used in crane and hoisting applications. The modular design enables the switching device to be used universally.

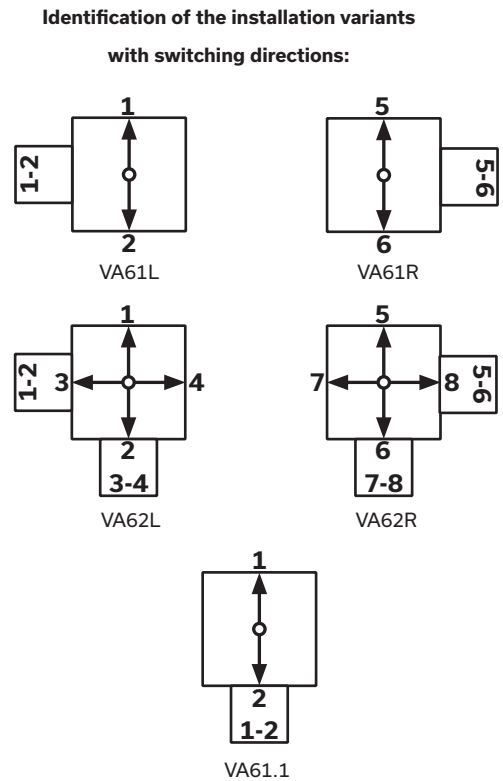
Technical data

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								

	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			



	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 122							
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
- 02 4 contacts
- 03 6 contacts
- 04 8 contacts
- 05 10 contacts
- 06 12 contacts

Standard contact - arrangement see page 122

z.B.

A980 MS00

A05 MS21

A0500 MS21-00

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

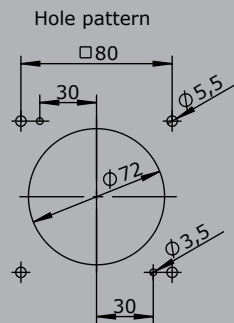
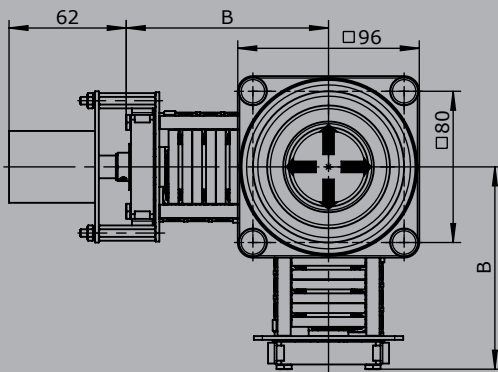
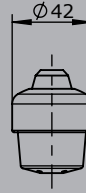
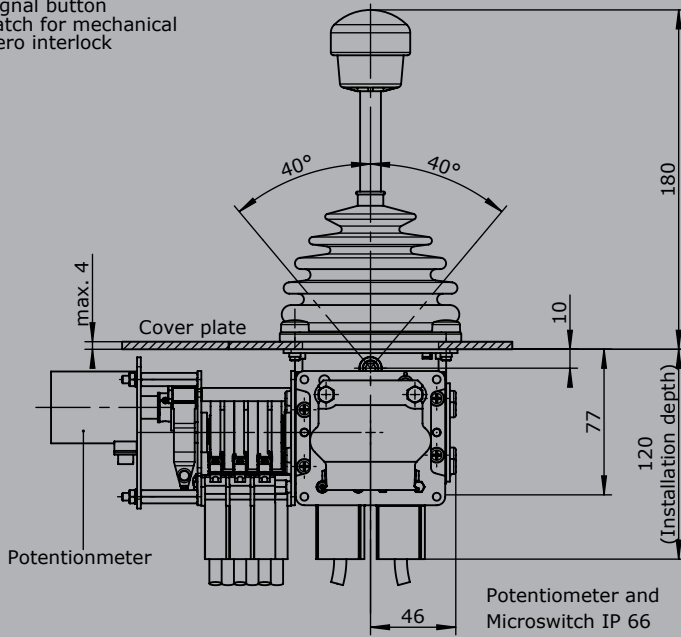
 II 2G Ex d IIC T6 Gb

connection cable 6 m



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

Knob solid
 D= Push button



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

Double-Handle Controller D8



The Double-Handle Controller D8 is a robust switching device for electro hydraulic and the hoisting applications. The modular design enables the switching device to be used universally.

Technical data

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

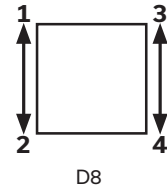


	D8	S5	Q / Q	-2ZP	+3 RP	-B	-A05 P184	+A050 P184	-E9012	-S...	-X
Basic unit	D8										
Control-handle extended	S5 -20 mm										
Grip- control-handle left	Q T-grip										
Grip- control-handle right	Q T-grip										
Axis 1 (direction 1-2)	2 2 contacts (1,5A 24 V DC13)										
Z	Spring return										
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 120)										
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
Basic unit												
D8												
Control-handle extended												
Standard 160 mm*												
S5 -20 mm												
S8 +20 mm												
<i>*Only in combination with knob!</i>												
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 184)												
Grip- control-handle right												
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... Ball handle B10... (see page 184)												

Identification of the installation variants with switching directions:



	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												
2 2 contacts												
3 3 contacts												
Standard contact - arrangement see page 122												
e.g.												
A98												
A05												
A050												
A99 contact - arrangement for customer request												
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										

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
- 2 2 contacts
- 3 3 contacts

Standard contact - arrangement see page 122

e.g.

A98

A05

A050

A99 contact - arrangement for customer request

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

More potentiometers on request!

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

Schnittstelle

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

2 2 axis

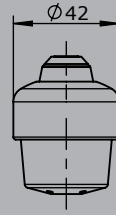
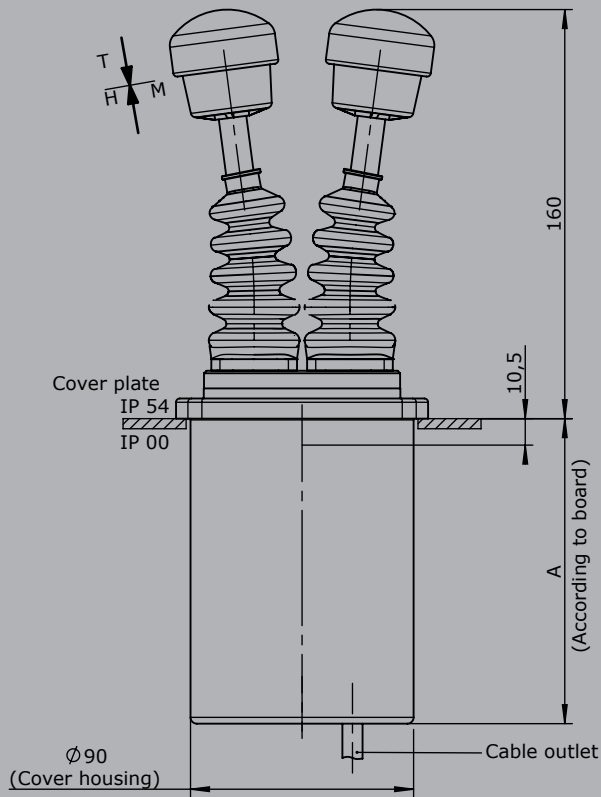
Special model

X Special / customer specified

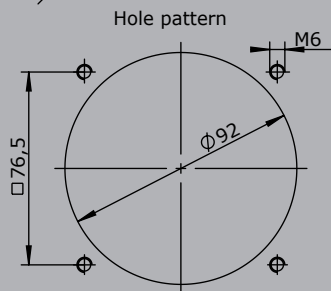
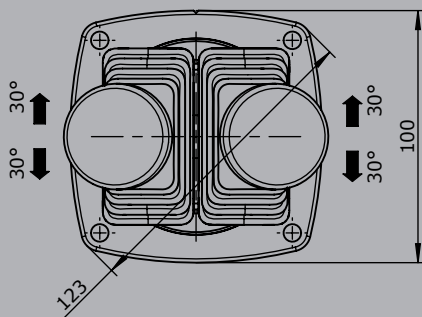
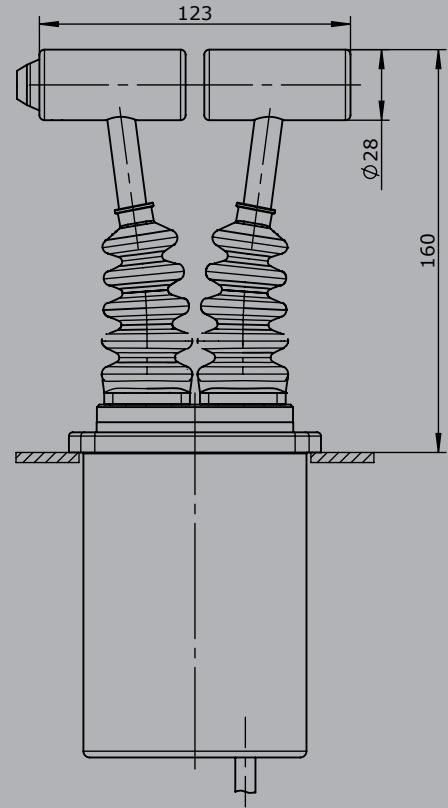
T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock

Knob solid
 D= Push button

T - grip
 D= Push button



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



Double-Handle Controller

D64 / DD64



The Double-Handle Controller D64/DD64 is a robust controller used commonly in crane and hoisting applications. The modular design enables the switching device to be used universally.

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



	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									

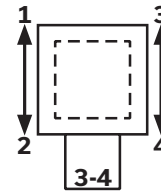
Technical details may vary based on configuration or application! Technical data subject to change without notice!

Combination possibilities with our handles



	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 184)									
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 184)									

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	<input type="checkbox"/>	2 contacts	Standard contacts - see arrangement page 122	
02	<input type="checkbox"/>	4 contacts	e.g.	
03	<input type="checkbox"/>	6 contacts	A980	MS00
04	<input type="checkbox"/>	8 contacts	A05	MS21
05	<input type="checkbox"/>	10 contacts	A0500	MS21-00
06	<input type="checkbox"/>	12 contacts	A110	MS24-0

= Silver contact (4A 250 V AC15) A99 contact - arrangement according customer request

- 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
		<i>More potentiometers on request!</i>		

C Encoder C... Encoder see page 130

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

Axis 2: direction 3-4

(Standard contacts gold plated 2A 250 V AC15)

01	<input type="checkbox"/>	2 contacts	Standard contact - see arrangement on page 122	
02	<input type="checkbox"/>	4 contacts	e.g.	
03	<input type="checkbox"/>	6 contacts	A980	MS00
04	<input type="checkbox"/>	8 contacts	A05	MS21
05	<input type="checkbox"/>	10 contacts	A0500	MS21-00
06	<input type="checkbox"/>	12 contacts	A110	MS24-0

= Silver contacts (4A 250 V AC15) A99 contact - arrangement according customer request

- 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
		<i>More potentiometers on request!</i>		

C Encoder C... Encoder see page 130

Special model

X Special / customer specified

Attachments

- Indicating labels
- Indicating labels engraved

Double-Handle Controller

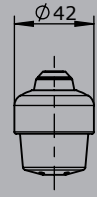
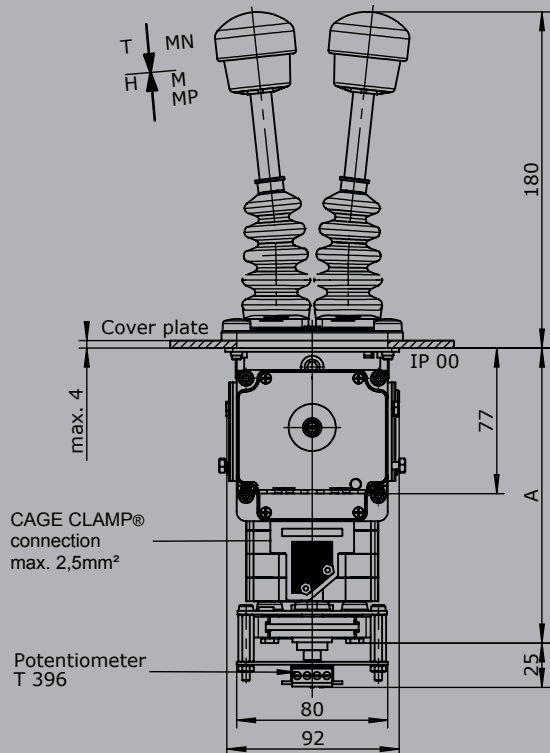
D64 / DD64



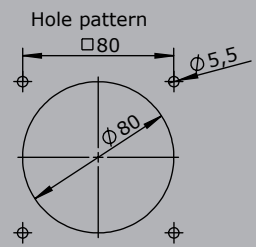
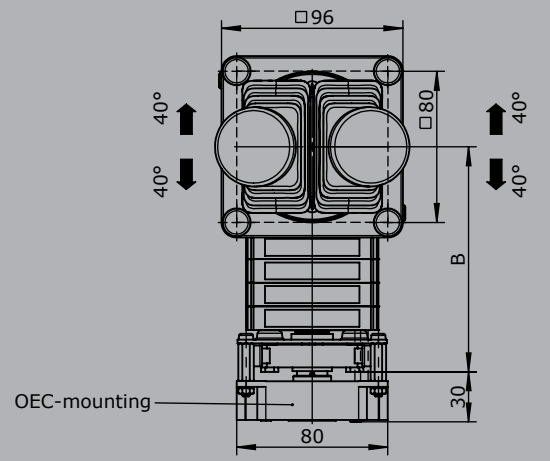
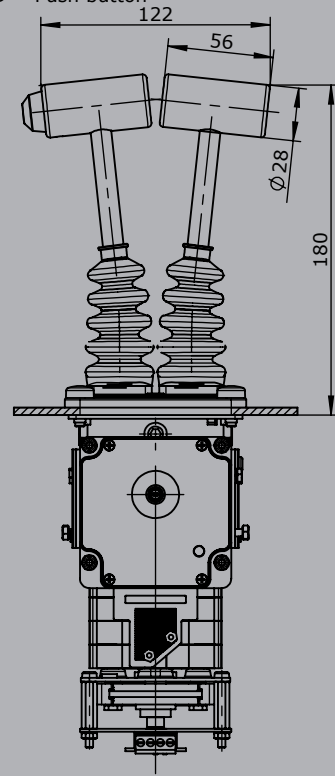
T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock

Knob solid
 D = Push button

T - grip
 D = Push button



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



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

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

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.

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	Example				-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 grips

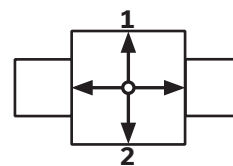


V11L S5 P T - 01 Z P + 03A R P - A05 P324 + A110 P325 - X

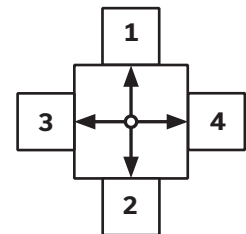
Basic unit		V11L	S5	P	T
V11L	2-axis left				
V11R	2-axis right				
V11.1L	1-axis left				
V11.1R	1-axis right				
Control-handle extended					
	Standard 120 mm*				
S5	-20 mm				
S8	+20 mm				
*Only available in combination with a handle!					
Gate					
P	Cross gate				
P X	Special gate				
Grip / Palm 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 154)				

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	<input type="checkbox"/>	2 contacts	Standard contact - arrangement see page 122		
02	<input type="checkbox"/>	4 contacts	e.g.		
03	<input type="checkbox"/>	6 contacts	A980	MS00	
			A05	MS21	
			A0500	MS21-00	
			A110	MS24-0	
			(Max. 4 steps per switching direction possible!)		
	<input checked="" type="checkbox"/>	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
			<i>More potentiometers on request!</i>		
C	Encoder		C... Encoder see page 130		

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	<input type="checkbox"/>	2 contacts (2A 250V AC15)	Standard contact - arrangement see page 122		
02	<input type="checkbox"/>	4 contacts (2A 250V AC15)	z.B.		
03	<input type="checkbox"/>	6 contacts (2A 250V AC15)	A980	MS00	
			A05	MS21	
			A0500	MS21-00	
			A110	MS24-0	
			(Max. 4 steps per switching direction possible!)		
	<input checked="" type="checkbox"/>	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
			<i>More potentiometers on request!</i>		
C	Encoder		C... Encoder see page 130		

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

Special model

X Special / customer specified

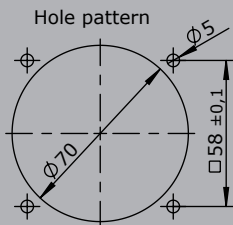
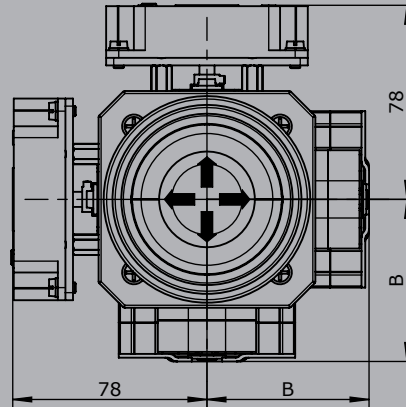
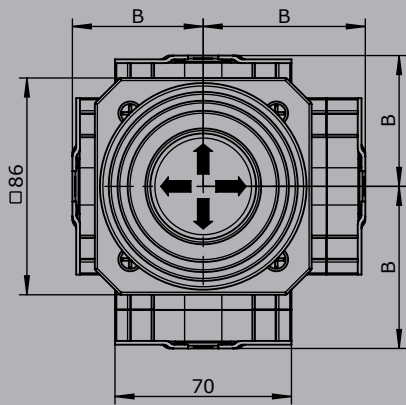
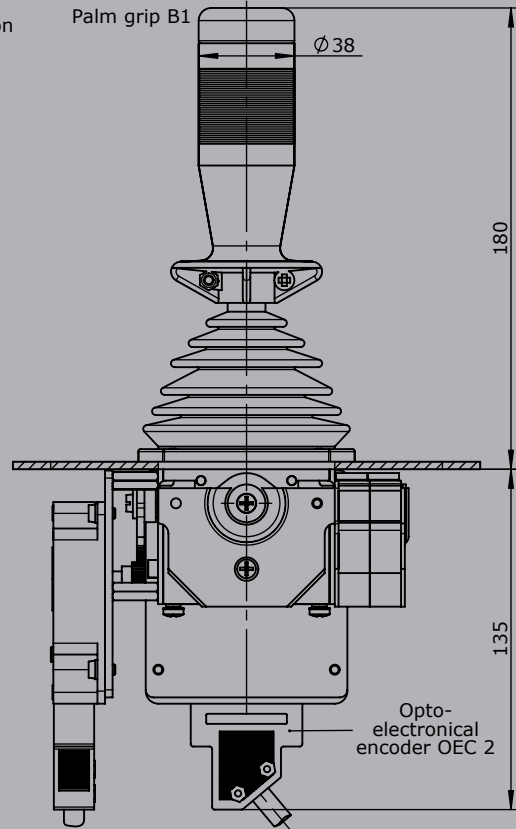
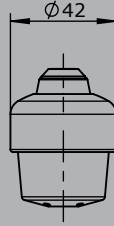
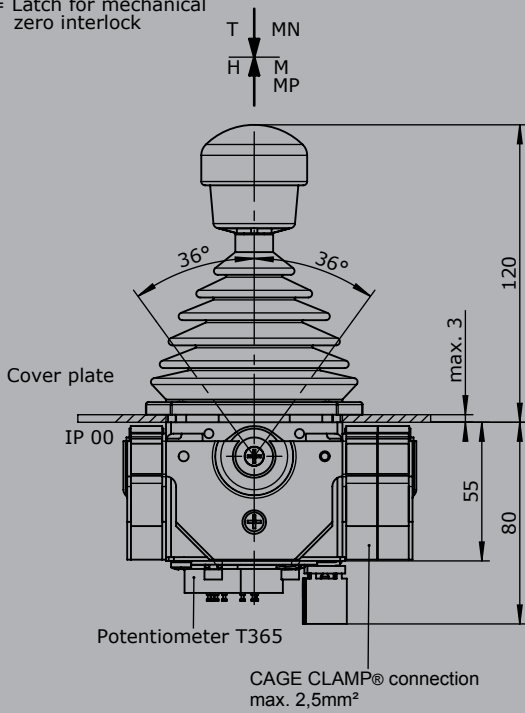
Attachments

- 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

Multi-Axis Controller V14



The V14 is a robust switching device for remote control and electro-hydraulic applications. Due to its modular design, this control unit can be used universally. The integrated sensor system has signal and potentiometer tracks in conductive plastic technology. Switching contacts are also available as an option.

Technical data

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



	V14L	S8	P	T	Example					-X
					-01 Z C	+03 R	-A05 C61	+A110		
Basic unit										
V14L	2-axis left									
Control-handle extended										
	Standard 60 mm**									
S8	+20 mm									
<i>*Only available in combination with grip!</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									

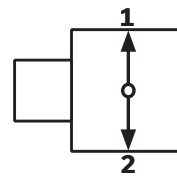
Technical details may vary based on configuration or application! Technical data subject to change without notice!

Combination possibilities with our grips

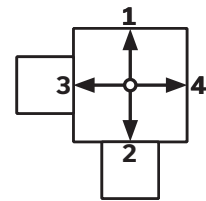


	V14L	S8	P	T	-	01 Z C	+	03 R	-	A05	C61	+	A110	-	X
Basic unit															
V14.1L	1-axis left														
V14.1R	1-axis right														
V14L	2-axis left														
V14R	2-axis right														
Control-handle extended															
	Standard 60 mm*														
S8	+20 mm														
*Only available in combination with a 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 154)														

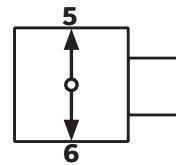
Identification of the installation variants with switching directions:



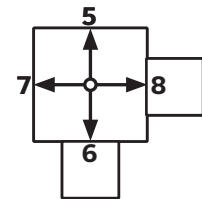
V14.1L



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 122															
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 - 01Z C + 03 R - A05 C61 + A110 - X

Z Spring return *(included in basic unit!)*

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
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 - 01Z C + 03 R - A05 C61 + A110 - X

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

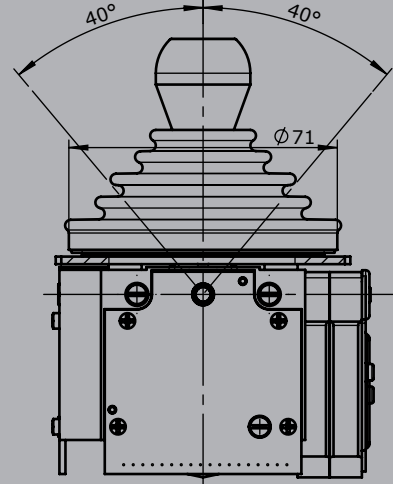
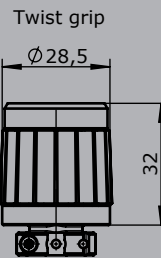
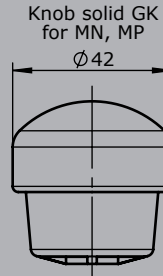
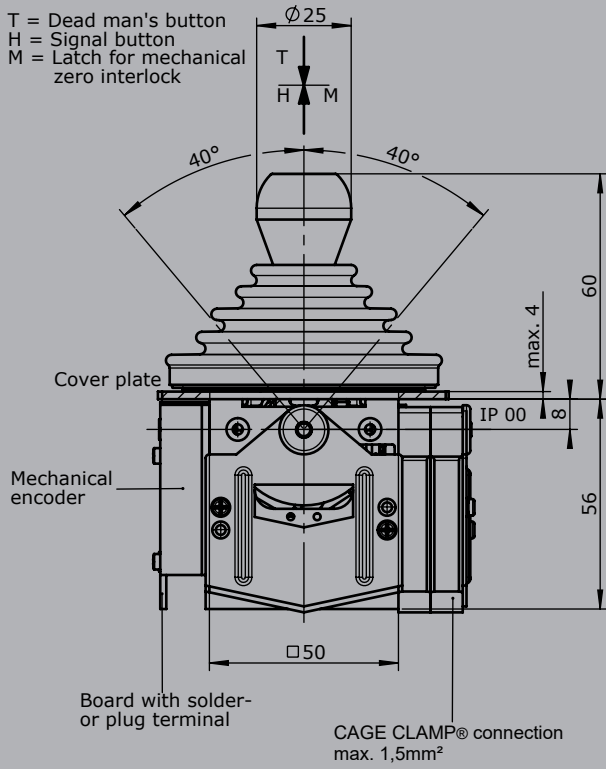
(not applied for V14.1L and V14.1R)

See description axis 1!

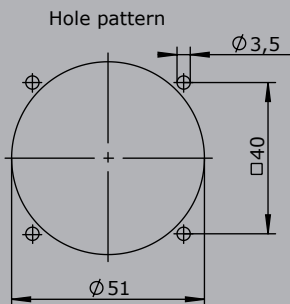
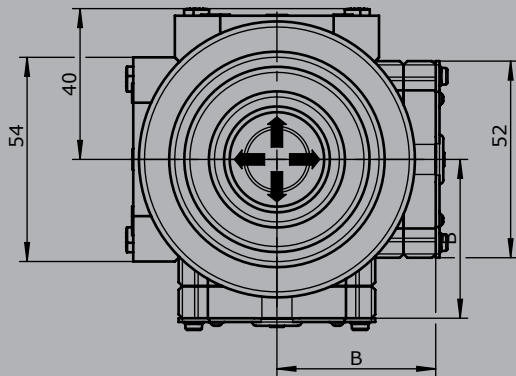
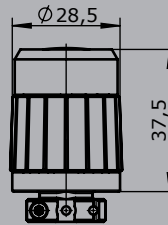
Special model

X Special / customer specified

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



Twist grip with Push button



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

Single-Axis Controller S14



The S14 is a compact single-axis joystick designed for remote control and electrohydraulic applications. Due to its modular design, this control unit can be used universally. The integrated sensor system has signal and potentiometer tracks in conductive plastic technology. Optionally switch contacts are also available.

Technical data

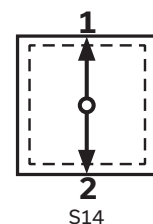
Mechanical life S14	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP65



	S14L	S8	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)						
O1 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:



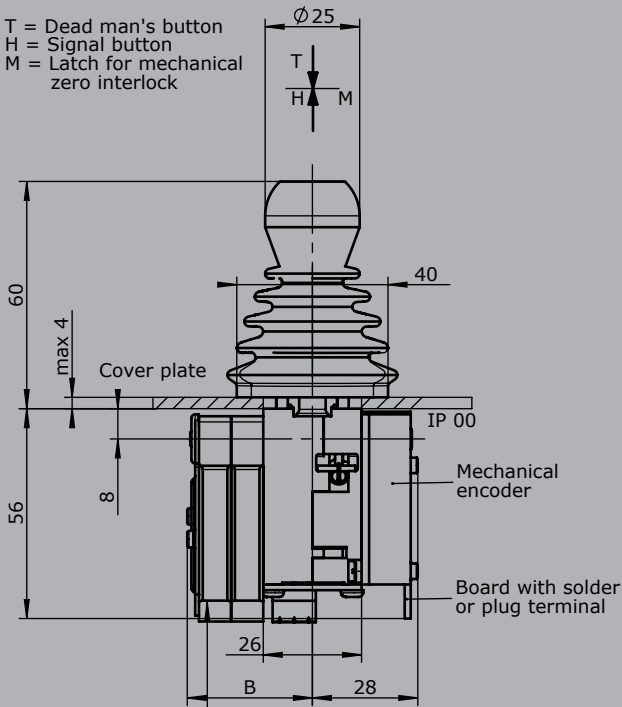
Technical details may vary based on configuration or application! Technical data subject to change without notice!

	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... (on request!)						

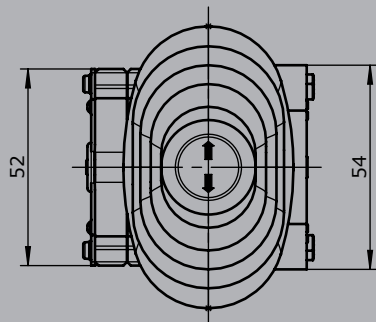
	S14L	S8	T	-01ZC	-A05	C61	-X
Axis 1: direction 1-2 left / direction 5-6 right							
	(Standard contacts gold-plated 2A 250V AC15)						
01	2 contacts	Standard contact - arrangement see page 122					
02	4 contacts	z.B.					
03	6 contacts	A05 MS21					
		A0500 MS21-00					
		A110 MS24-0					
		A99 contact - arrangement according customer request					
Z	Spring return (included in basic unit!)						
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		
		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				
			More potentiometers on request!				
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						

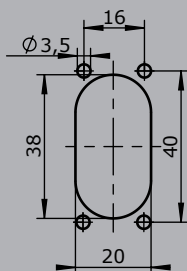
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock



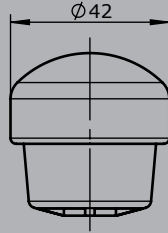
CAGE CLAMP® connection
max. 1,5mm²



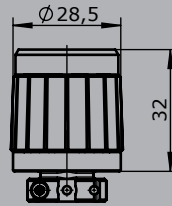
Hole pattern



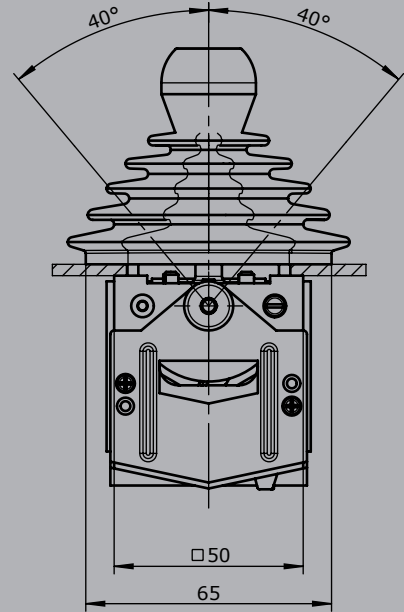
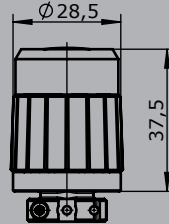
Knob solid GK
for MN, MP



Twist grip



Twist grip
with Push button



Type	No. of contacts	Dim. B
01	2	24
02	4	33
03	6	42

Single-Axis Controller

S2 / SS2 / S21



The Single-Axis Controller S2 / SS2 / S21 is a robust switching device for remote controlled and electrohydraulic applications. The modular design of the switching device is universally applicable.

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

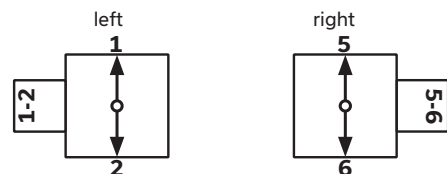


Example

	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						
Control-handle extended						
Standard						
S5 -20 mm						
S8 +20 mm						

Identification of the installation variants with switching directions:



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

Combination possibilities with our handles (valid for Single-Axis Controller S21)



S2L S5 T - 02 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... (see page Palm Grip 154)

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 122		
03	5 contacts	z.B.		
04	7 contacts	A98	MS0	
05	9 contacts	A05	MS21	
		A0500	MS21-00	
		A110	MS24-0	
		<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 157		

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

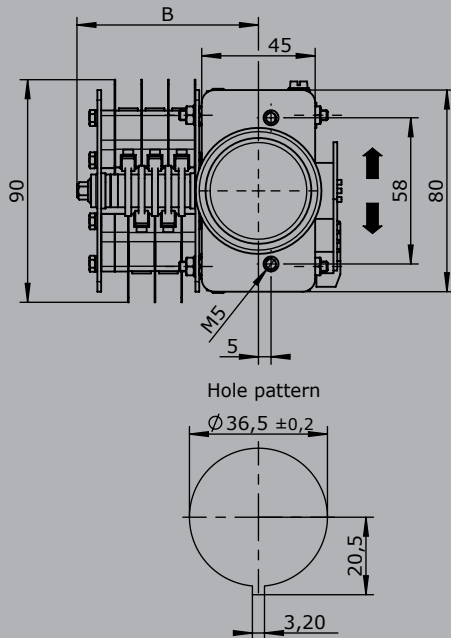
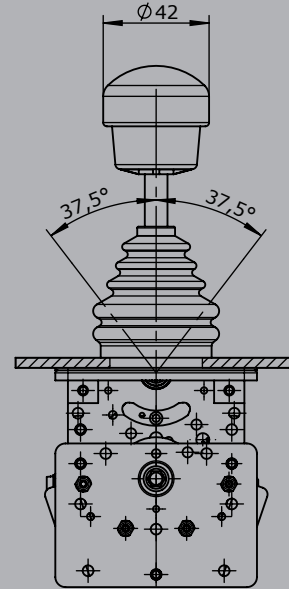
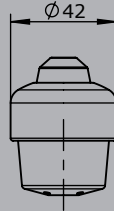
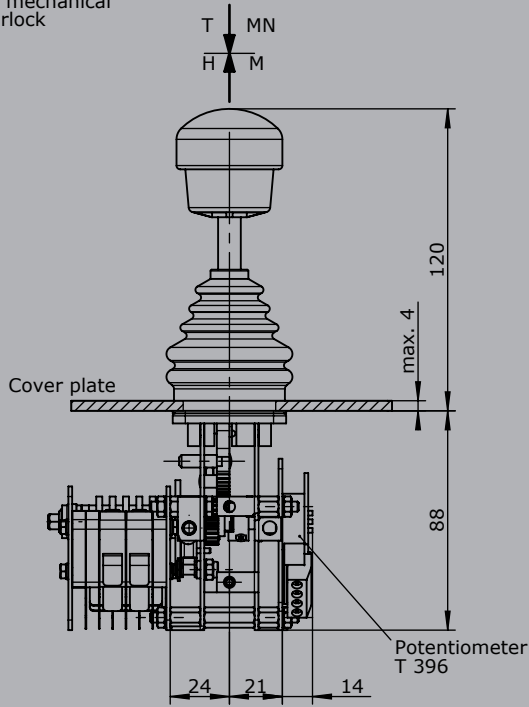
Single-Axis Controller

S2 / SS2 / S21

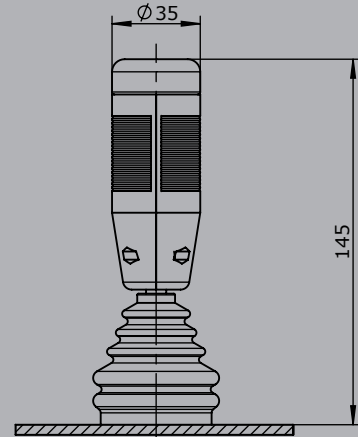


T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock

Knob solid
 D = Push button



Palm grip B5
 B5 T = Dead man's button



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

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

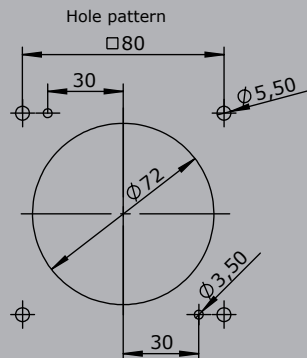
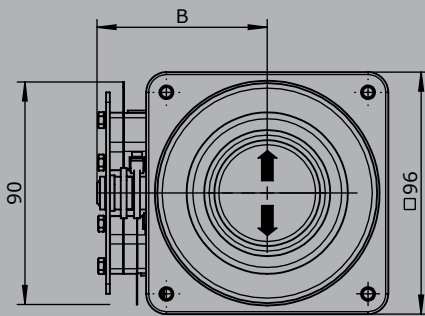
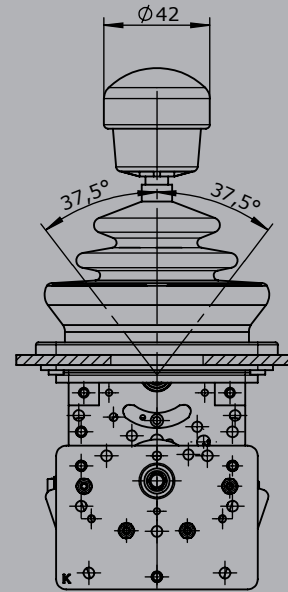
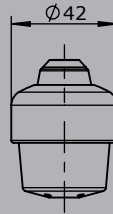
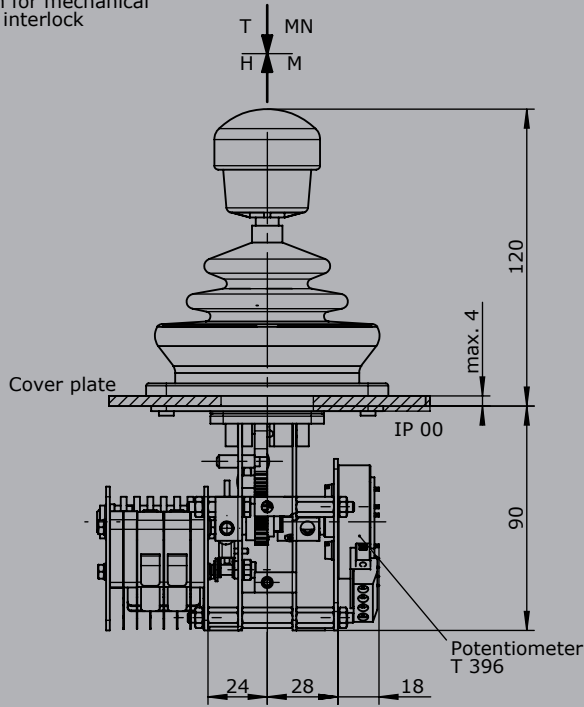
Single-Axis Controller

S2 / SS2 / S21

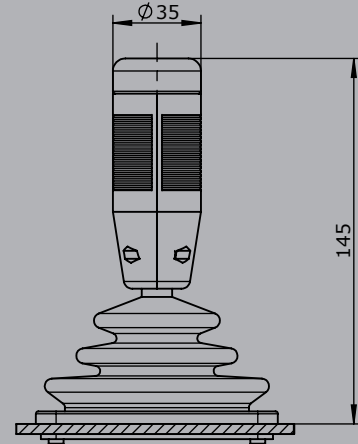


T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock

Knob solid
 D = Push button



Palm grip B5
 B5 T = Dead man's button



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

Single-Axis Controller

S22 / SS22



The Single-Axis Controller S22 / SS22 is a robust switching device for remote controlled and electrohydraulic applications. The modular design of the switching device is universally applicable.

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

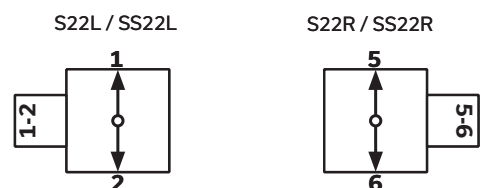


	S22L	S5	T	- 3 Z P	- A050 P134	- X
Basic unit						
S22L left						
Control-handle extended						
S5 -20 mm						
Grip / Palm Grip						
T Dead man						
Axis 1 (direction 1-2)						
3 3 contacts (2A 250 V AC15)						
Z Spring return						
P Potentiometer						
Description axis 1 (direction 1-2)					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

	S22L	S5
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		

T - 3 Z P - A050 P134 - X

Identification of the installation variants with switching directions:



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

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... (on request!)

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 122		
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 130		

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

Special model

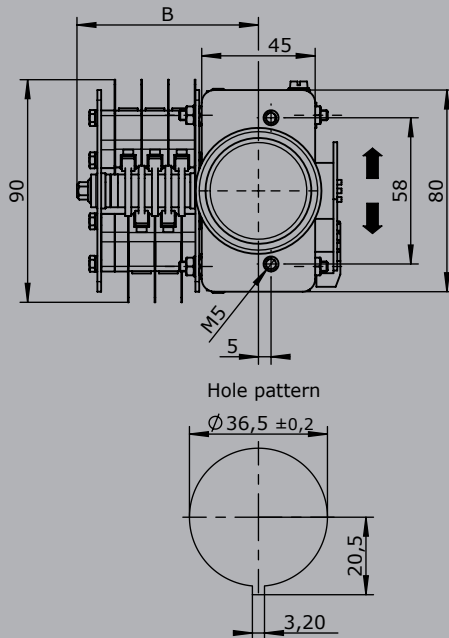
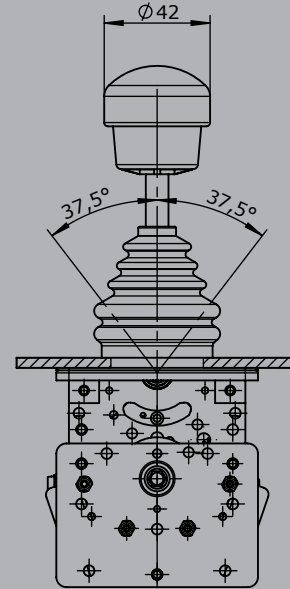
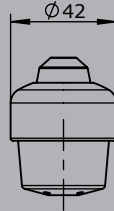
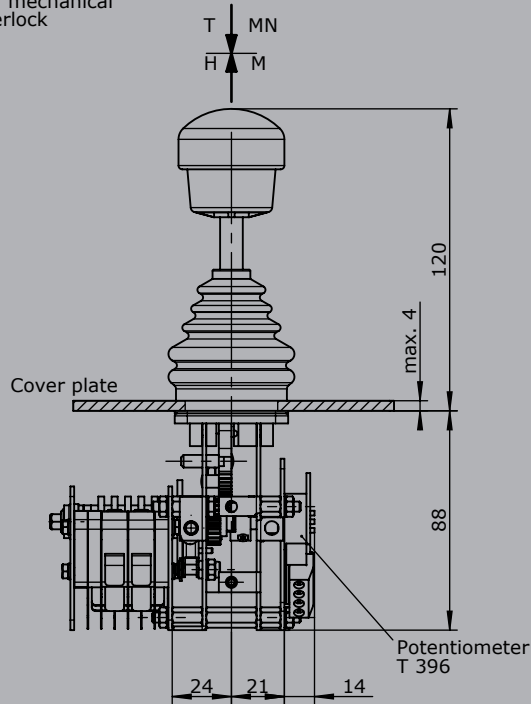
X	Special / customer specified
X1	Switching run 2-0-2

Attachments

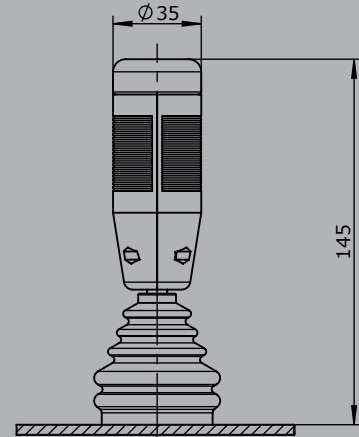
Indicating labels
Indicating labels with engraving

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	Maß B
02	3	62
03	5	72
04	7	83
05	9	93

Multi-Axis Controller V23



The V23 is a switching device for remote control applications. The integrated sensor system has signal and potentiometer tracks in conductive plastic technology. Detent points are optionally selectable. Due to its small dimensions it can be optimally integrated into small remote control housings.

Technical data

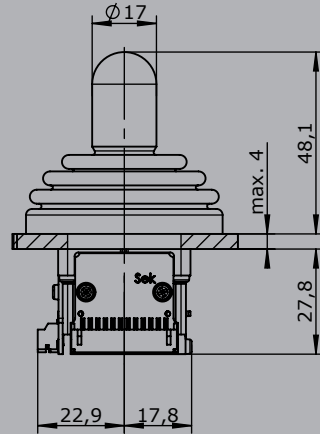
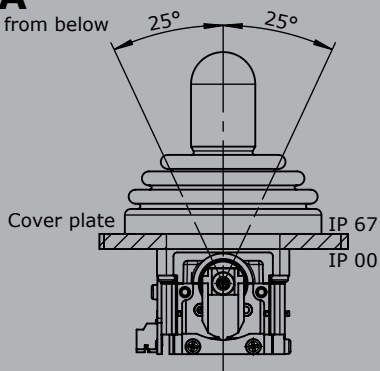
Mechanical life V23	3 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP67 front



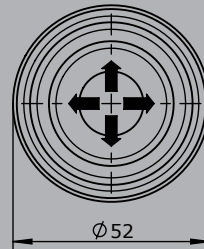
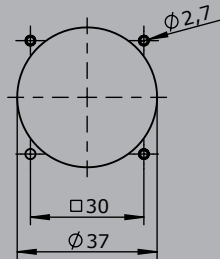
	V23A	-P	-C80	+C80	-X
Basic unit					
V23.1A	1-axis with spring return, installation from below				
V23A	2-axis with spring return, installation from below				
V23.1B	1-axis with spring return, installation from top				
V23B	2-axis with spring return, installation from top				
Gate					
P	Cross gate				
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

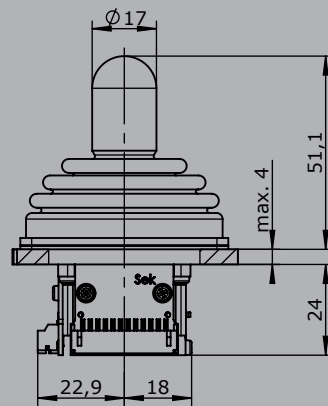
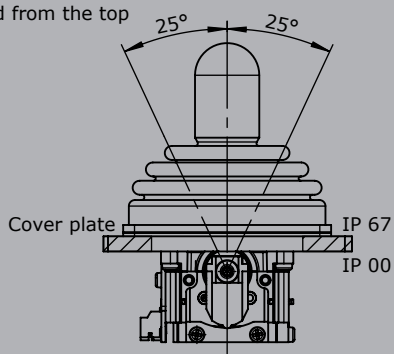


Hole pattern
(installed from below)

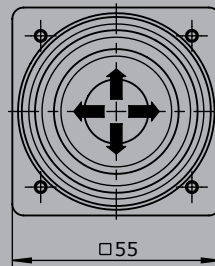
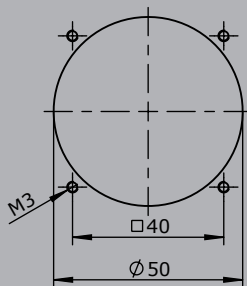


V23B

Installed from the top



Hole pattern
(installed from the top)



Multi-Axis Controller V20



The V20 is a rugged switching device for remote control. The integrated sensor technology has signal and potentiometer tracks in conductive plastic technology. Detent points can be integrated as an option.

Technical data

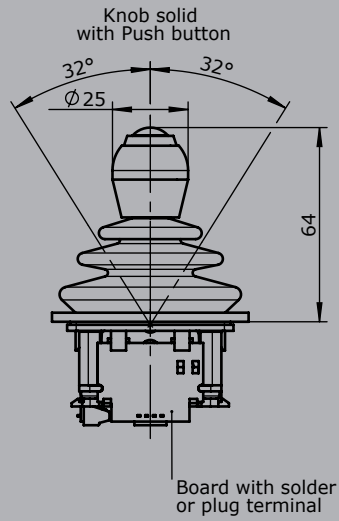
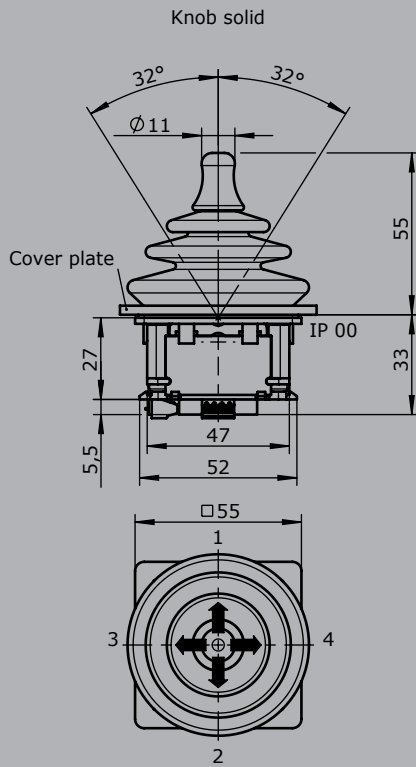
Mechanical life V20	3 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP65 (optional IP67)



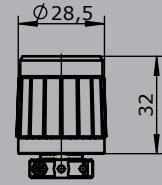
		V20	-P	Example D	-C71	+C71	-B	-X
Basic unit								
V20.1	1-axis with spring return							
V20	2-axis with spring return							
V20.1A	1-axis with spring return, IP67 front							
V20A	2-axis with spring return, IP67 front							
Gate								
p	Cross gate							
P X	Special gate							
Grip								
	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				I max. 1 mA			
	Potentiometer track				2 x 5 kOhm			
	Direction track				Arrangement MS224-0			
C71	Mechanical encoder							
	MEC 2-2							
	EA/11-10				I max. 1 mA			
	Potentiometer track				2 x 5 kOhm			
	Direction track				Arrangement MS24-0			
C72	Mechanical encoder							
	MEC 2-5							
	EA/21-10				I max. 1 mA			
	Potentiometer track				2 x 5 kOhm			
	Direction track				Arrangement MS25-0			
Axis 2: direction 3-4								
<i>See description axis 1!</i>								
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!

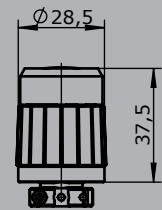
V20 Standard degree of protection front IP 65



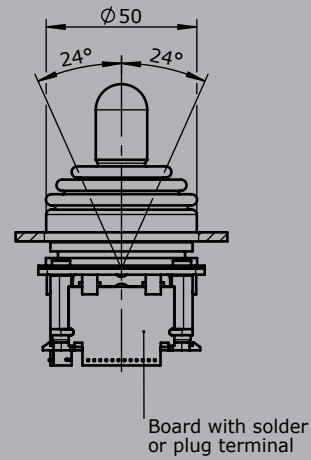
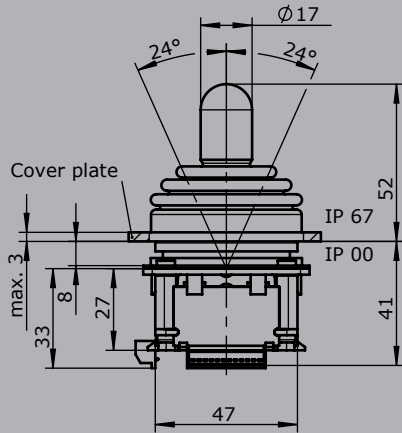
Twist grip



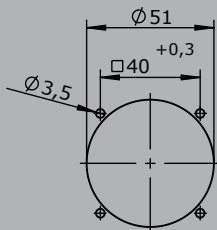
Twist grip with Push button



V20 Degree of protection front IP 67



Hole pattern



Single-Axis Controller S1



The S1 is a one-axis joystick for remote control and eletro-hydraulic applications. The modular design of the switching device is universally applicable.

Technical data

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



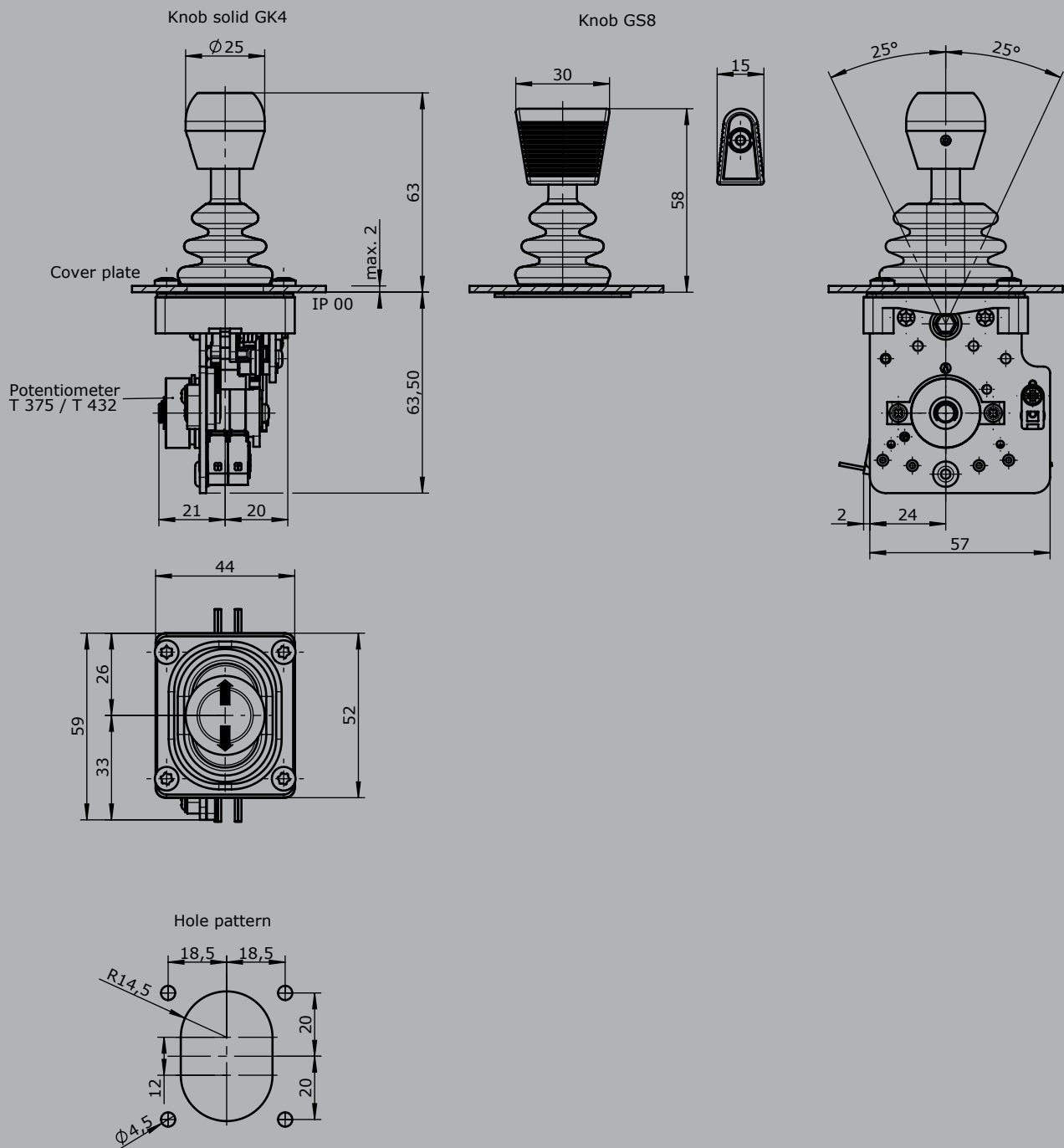
		Example				
		S1	T	- 2 Z P	- A05 P374	- X
Basic unit						
S1	1-axis					
Grip / Palm Grip						
T	Dead man					
Axis 1 (direction 1-2)						
2	2 contacts (1,5A 24 V DC13)					
Z	Spring return					
P	Potentiometer					
Description axis 1 (direction 1-2)						
A05	Arrangement MSP21					
P374	Potentiometer 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 122				
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



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 N6 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



	N6	-DG	Example -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	<input type="checkbox"/> 2 contacts	Standard contact - arrangement see page 122	
02	<input type="checkbox"/> 4 contacts	z.B.	
03	<input type="checkbox"/> 6 contacts	A980	MS00
04	<input type="checkbox"/> 8 contacts	A05	MS21
05	<input type="checkbox"/> 10 contacts	A0500	MS21-00
06	<input type="checkbox"/> 12 contacts	A110	MS24-0
	<input checked="" type="checkbox"/> 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... Encoder see page 130

N6

-DG

-01 Z P

-A05

P134

-X

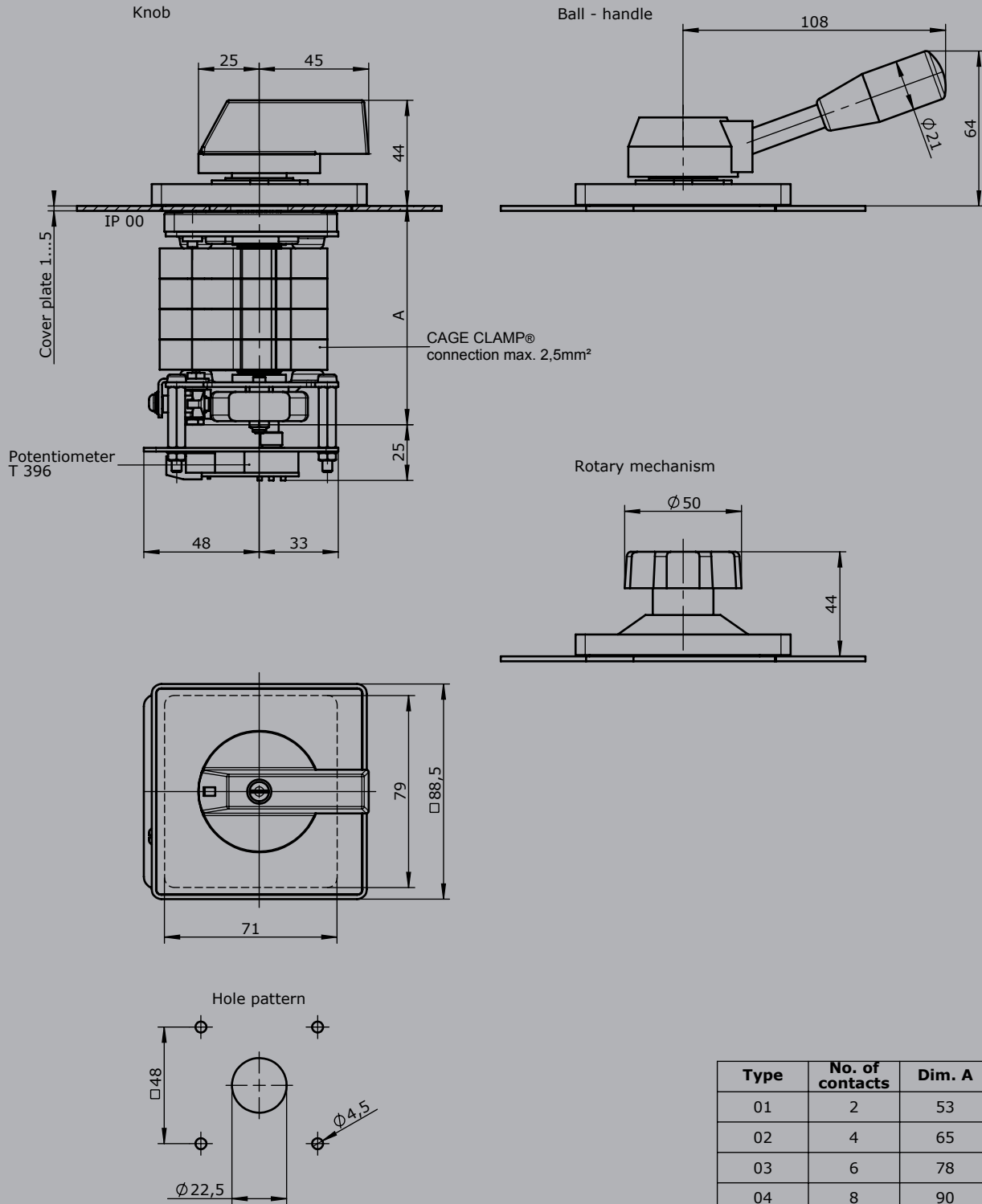
Special model

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



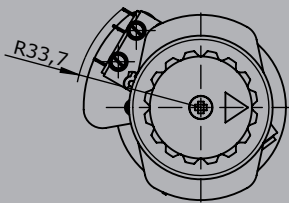
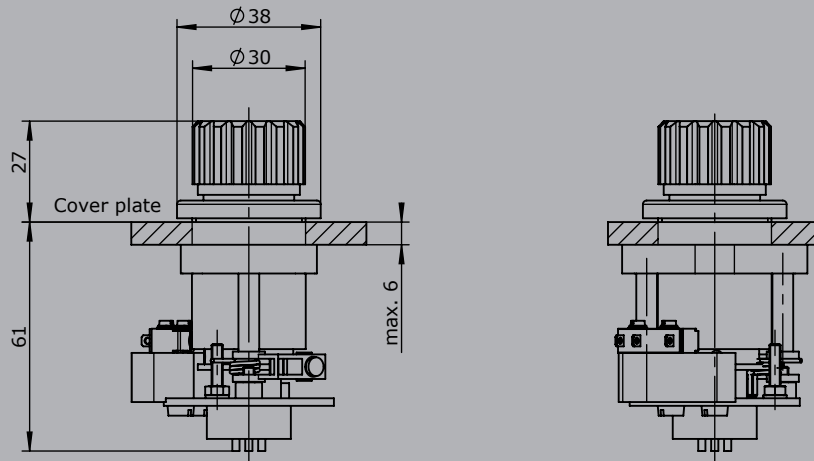
The Control-Switch N9 is a rugged switching device for electrohydraulic and hoisting applications. The modular design enables the switching device to be used universally.

Technical data

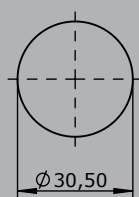
Mechanical life N9	10 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP54



		N9	Example -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 122				
2	2 contacts		z.B. A98 MS0 A05 MS21 A99 contacts - arrangement according customer request				
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			
		<i>More potentiometers on request!</i>					
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



Steering Column Switch V23



The Steering Column Switch V23 is designed for mounting on a steering column.

Technical data

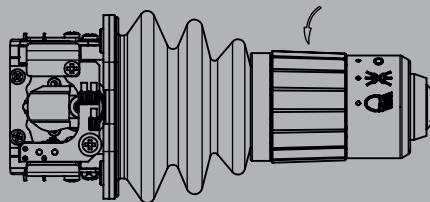
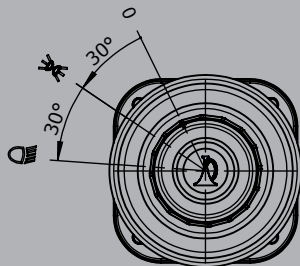
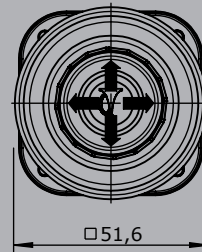
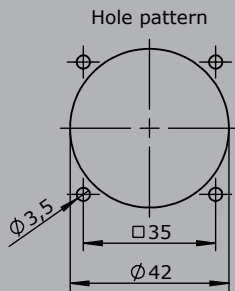
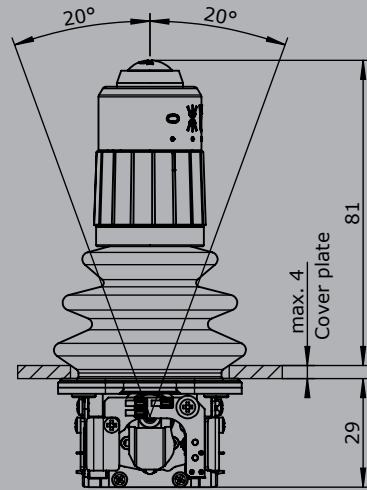
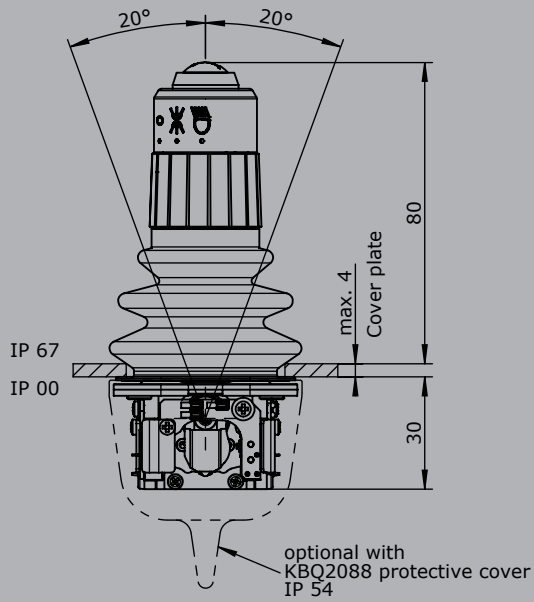
Mechanical life V23S 1 million operating cycles
 Operation temperature -40°C to +85°C



	V23S	-D	-F2	-2	+2	-X
Basic unit						
V23.1S 1-axis with detent						
V23S 2-axis with detent						
Grip						
D Push button (I _{max} = 10 mA)						
F1 Switching function 1-stage						
F2 Switching function 2-stage						
Axis 1: direction 1-2						
2 2 contacts 1,5A 24 V DC						
Axis 2: direction 3-4 (not applied for V23.1)						
See description axis 1!						
Special model						
X Special / customer specified						

Steering column switch

mounting from below



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

S004 Male housing 10-pole

S012 Female housing 10-pole

S006 Male housing 14-pole

S014 Female housing 14-pole

S007 Male housing 18-pole

S015 Female housing 18-pole



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

S017 Male housing 4-pole

S022 Female housing 4-pole

S018 Male housing 6-pole

S023 Female housing 6-pole

S019 Male housing 8-pole

S024 Female housing 8-pole

S021 Male housing 12-pole

S026 Female housing 12-pole



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

S027 Male housing 4-pole

S032 Female housing 4-pole

S028 Male housing 6-pole

S033 Female housing 6-pole

S029 Male housing 8-pole

S034 Female housing 8-pole

S031 Male housing 12-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

S040 Female housing CPC 13 9-pole

S038 Male housing CPC 17 14-pole

S041 Female housing CPC 17 14-pole

S039 Male housing CPC 23 37-pole

S042 Female housing CPC 23 37-pole



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

S043 Cap housing 4-pole

S048 plug housing 4-pole

S044 Cap housing 6-pole

S049 plug housing 6-pole

S045 Cap housing 8-pole

S050 plug housing 8-pole

S046 Cap housing 10-pole

S051 plug housing 10-pole



P pin

S socket

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

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

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

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

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

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

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

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

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



Schematic description of the protection class



IP

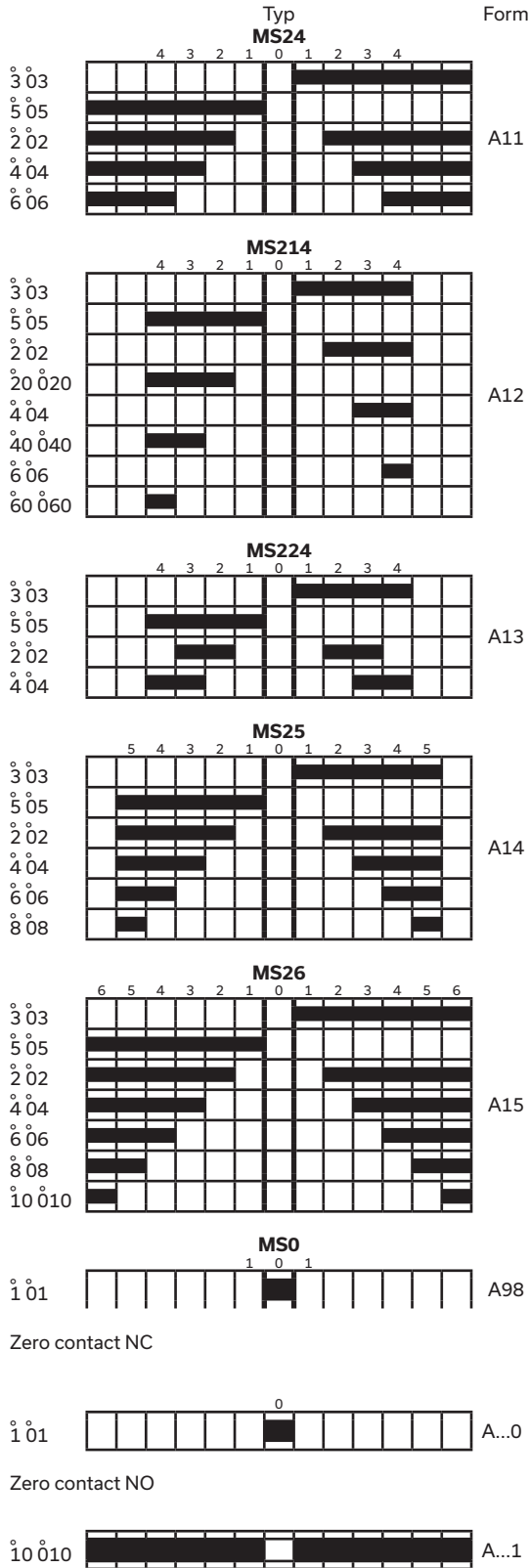
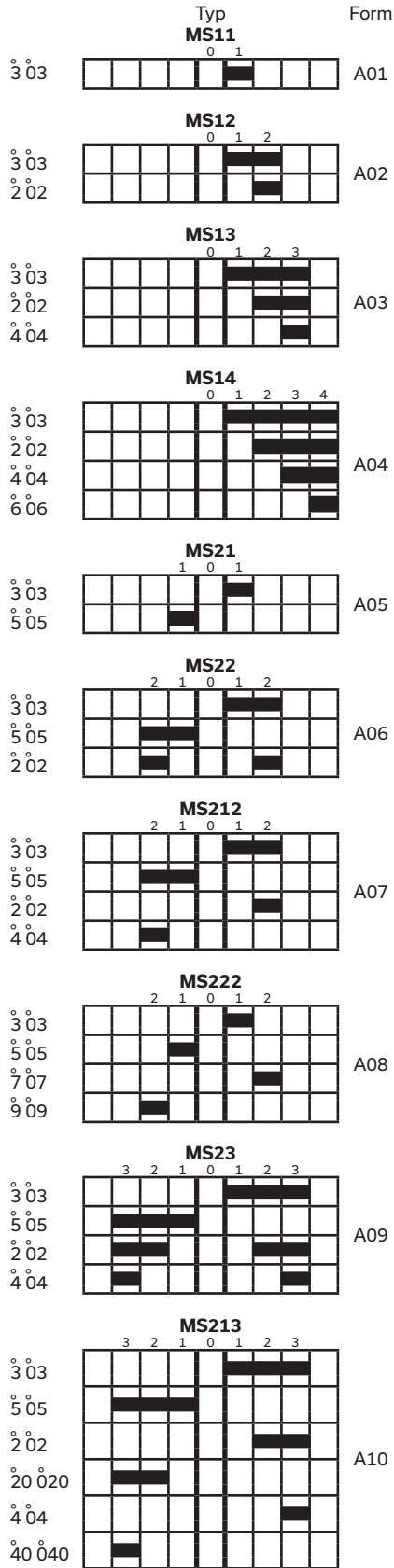
Protection



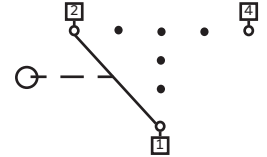
Degree of protection

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



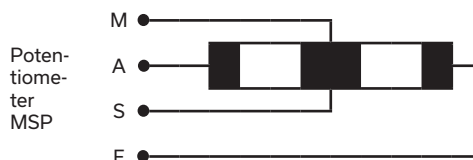
Micro change over contact for control handle with dead man's button signal button push button



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, I _c = current broken I _e = rated operational current, U= voltage before make U _e = rated operational voltage U _r = recovery voltage T _{0,95} = time in ms, to reach 95% of the steady-state current. P= U _e · I _e = steady-state power consumption in watts			I	U	cos	I _c	U _r	cos
			I _e	U _e		I _e	U _e	
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
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 U _i in Volt	250		250		250		250		250	
Rated operational voltage U _e in Volt	250		250		250		250		250	
Rated operational current in Ampere	I _e AC 12 6 or 16		6 or 16		6 or 16		10		10	
AC 15	2	4	2	4	2	4	2	4	2	4
DC 12 24 V	6	8	6	8	6	8	4	8	4	8
48 V	2	4	2	4	2	4	2	4	2	4
110 V	0,5	1	0,5	1	0,5	1	0,2	1	0,2	1
220 V	0,1	0,5	0,1	0,5	0,1	0,5	0,1	0,5	0,1	0,5
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 6	16 16	6 6	6 16	6 6	16 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 mm ²		M 3,5 2,5 mm ²		M 3,5 2,5 mm ²		M 3,5 6,3 x 0,8		M3,5 6,3 x 0,8	
Conductor sizes in mm ² 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						
AC 12	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 Circuit-breaker G-characteristic	4 4	4 4	4 4	6 6	16 16	6 6
Terminal screws Plug-in connector CAGE CLAMP® connection is a registered trademark of WAGO Kontakttechnik GmbH Germany	Solder terminal			M4 1,5 mm ²	M 3,5 6,3 x 0,8	6,3 x 0,8
Conductor sizes in mm ² 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	

Hall-Potentiometer HG2



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

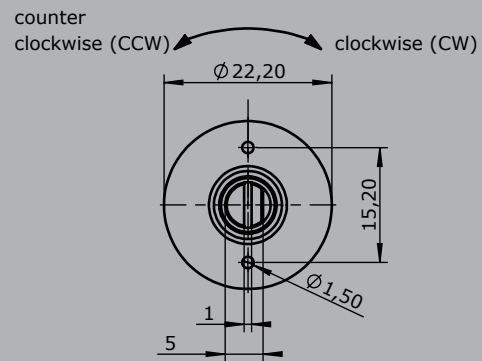
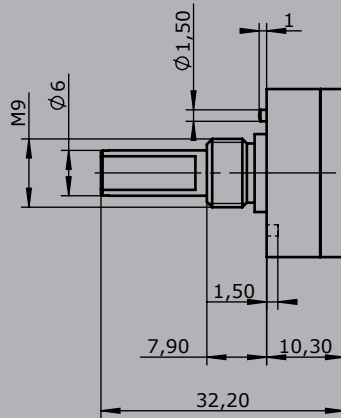
Technical data

Mechanical life	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)

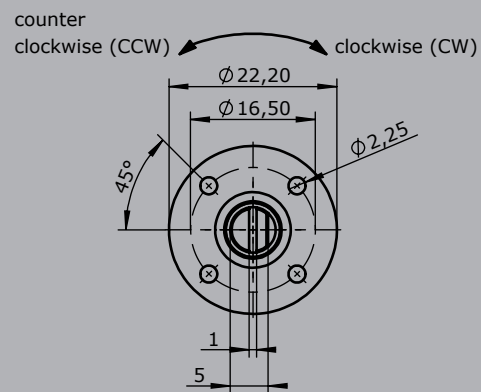
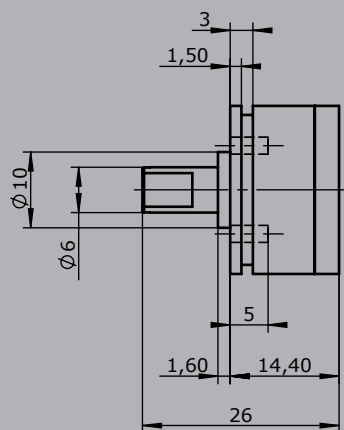


	HG2A	-60	Example -6	-E14811	-X
Basic unit					
HG2A	Hall-Potentiometer HG2 Model A				
HG2B	Hall-Potentiometer HG2 Model B				
Operating distance					
0-360° possible					
Example 60° => 60					
Dead zone around the center position					
0 No dead zone					
Example +/-3° => 6					
Interface					
Voltage 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				
<i>More interfaces (for example SPI BUS) on request!</i>					
Special model					
X	Special / customer specified				

HG2A



HG2B



Hall-Potentiometer

N10



The N10 is a Hall-Potentiometer for electrohydraulic and hoisting applications. Long life and high reliability is ensured by the latest contactless hall-technology. Up to 18 detent points can be integrated.

Technical data

Mechanical life	10 million operating cycles
Mechanical life with detent/friction brake	3 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP67 (electronic)
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)

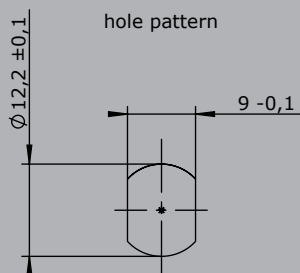
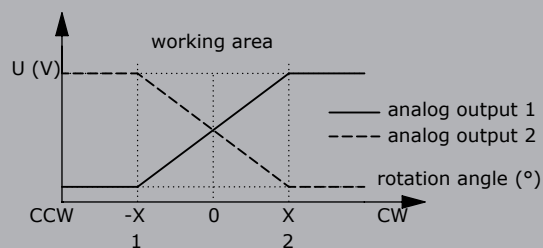
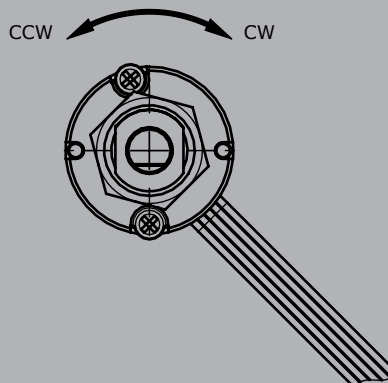
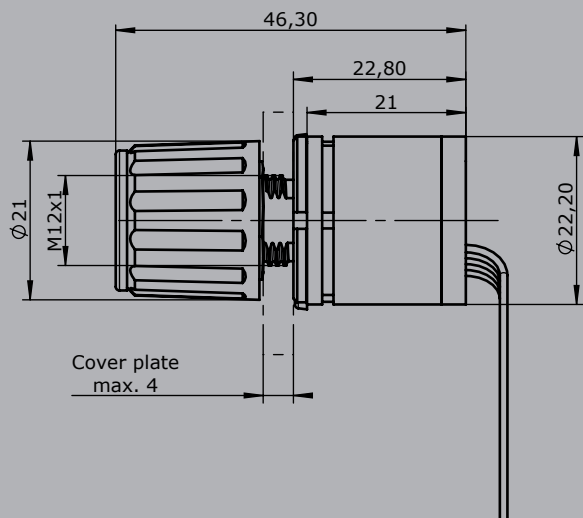


	N10	-90	Example 1	-6	-E14811	-X
Basic unit						
N10A Hall-Potentiometer with rotary knob						
Operating distance						
360° (rotating without stop)						
270°						
180°						
90°						
Detent						
0 Without detent, with friction brake						
1 Detent point in middle position						
3 Detent point in Position 1						
4 Detent point in Position 2						
R15 Detent point at intervals of 15°						
Dead zone around the center position						
0 No dead zone						
Example +/-3° => 6						
Interfaces						
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						
<i>More interfaces (for example SPI Bus) on request!</i>						
Special model						
X Special / customer specified						

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

Hall-Potentiometer

N10

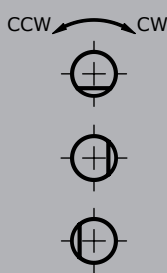


Position of the shaft:

detent in the middle position

detent in 1 figure -90°

detent in 2 figure +90°



Potentiometer with attach to our switching device



for mounting on	Typ	Capacity (W)	I _{max} 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	<input type="checkbox"/>	x	x	x	x	x		524004400	<input type="checkbox"/>	characteristic progressive *1 R= 2 x 6,5 kOhm
	T132	2,5	10	P05	<input type="checkbox"/>	x	x	x	x	x		524000500	<input type="checkbox"/>	
	T132 Öl	2,5	10	P06	<input type="checkbox"/>	x	x		x	x		524000600	<input type="checkbox"/>	
	T178	1,5	10	P07	<input type="checkbox"/>		x	x	x			524000700	<input type="checkbox"/>	
	T238	1	10	P08	<input type="checkbox"/>	x	x	x	x	x*1		524000800	<input type="checkbox"/>	
	T133	60	85	P10	<input type="checkbox"/>	x						524001000	<input type="checkbox"/>	
	T396	0,5	1	P13	<input type="checkbox"/>	x	x	x	x	x		524001300	<input type="checkbox"/>	
T1350 Ex	0,5	1	P14	<input type="checkbox"/>	x	x	x	x	x		524001400	<input type="checkbox"/>		
T1360				P43	<input type="checkbox"/>					x	5240043009	<input type="checkbox"/>		
V8 / VV8 D8 P10 P11 P12	T239	1	10	P17	<input type="checkbox"/>			x	x			524001700	<input type="checkbox"/>	with direction lines
	T301	0,5	1	P18	<input type="checkbox"/>		x	x	x	x		524001800	<input type="checkbox"/>	
	T426	0,5	1	P19	<input type="checkbox"/>				x	x		524001900	<input type="checkbox"/>	
	T432	0,5	1	P20	<input type="checkbox"/>				x			524002000	<input type="checkbox"/>	
	T246	0,5	1	P21	<input type="checkbox"/>	x	x		x	x		524002100	<input type="checkbox"/>	
	T362	0,5	1	P22	<input type="checkbox"/>		x	x	x			524002200	<input type="checkbox"/>	
	T1003				P42	<input type="checkbox"/>					x	5240042009	<input type="checkbox"/>	
T1360				P43	<input type="checkbox"/>					x	5240043009	<input type="checkbox"/>		
V10 S1 Palm handle	T321	1	10	P24	<input type="checkbox"/>		x					524002400	<input type="checkbox"/>	with direction lines
	T320	0,5	1	P25	<input type="checkbox"/>		x		x			524002500	<input type="checkbox"/>	
	T1187	0,5	1	P27	<input type="checkbox"/>				x			524002700	<input type="checkbox"/>	
	T375	0,5	1	P37	<input type="checkbox"/>		x		x			524003700	<input type="checkbox"/>	
T997				P41	<input type="checkbox"/>					x	5240041009	<input type="checkbox"/>		
V11	T316	1	10	P31	<input type="checkbox"/>				x*2			524003100	<input type="checkbox"/>	*2 R= 2 x 4 kOhm
	T365	0,5	1	P32	<input type="checkbox"/>				x	x		524003200	<input type="checkbox"/>	
D3 S3	T318	0,5	1	P48	<input type="checkbox"/>				x			524004800	<input type="checkbox"/>	

for mounting on	Typ	Capacity (W)	I _{max} wiper (mA)	Typ	Expansion	without centre tap life					Part No.	Addition for Part No.	Comment	
						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	<input type="checkbox"/>	x	x	x	x	x		524004600	<input type="checkbox"/>	
	T131	2,5	10	P03	<input type="checkbox"/>	x	x	x	x	x		524000300	<input type="checkbox"/>	
	T131 Oil	2,5	10	P04	<input type="checkbox"/>		x		x	x		524000400	<input type="checkbox"/>	
	T134	60	85	P11	<input type="checkbox"/>				x			524001100	<input type="checkbox"/>	
	T374	0,5	1	P12	<input type="checkbox"/>	x	x	x	x	x		524001200	<input type="checkbox"/>	
V8 / VV8 / D8 P10/P11/P12	T244	0,5	1	P23	<input type="checkbox"/>			x	x	x		524002300	<input type="checkbox"/>	
	T397	0,5	1	P47	<input type="checkbox"/>		x	x	x			524004700	<input type="checkbox"/>	
V10 / S1 Palm grip	T337	0,5	1	P26	<input type="checkbox"/>		x	x	x	x		524002600	<input type="checkbox"/>	
GE1/GE2	PW70	5	30	P45	<input type="checkbox"/>	x	x		x			524004500	<input type="checkbox"/>	

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

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	Code	Output characteristic	Model	Weight
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

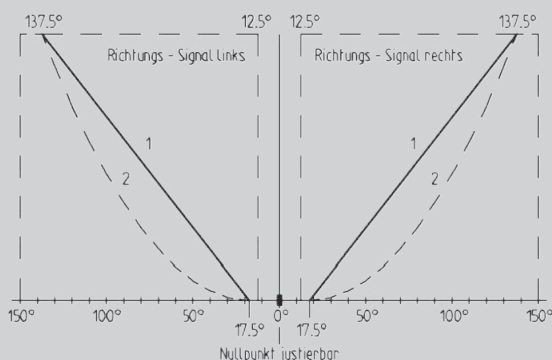
8-Bit-type T359

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

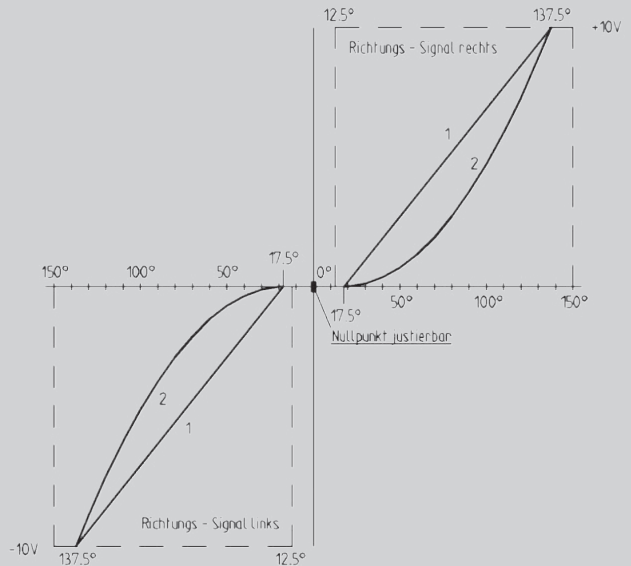
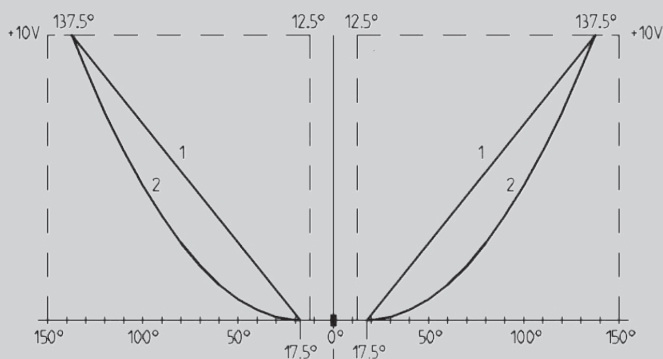


Opto-electronic encoder OEC 2 with voltage output

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



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

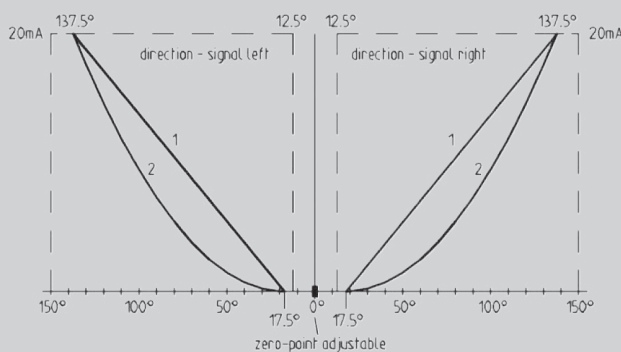
6 Bit-Type T368

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

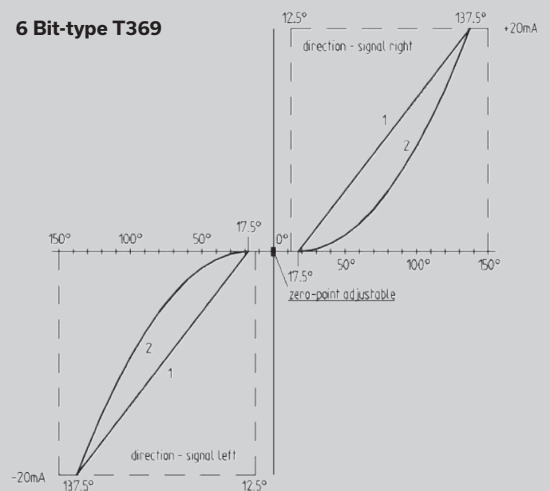
6 Bit-Type T369

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

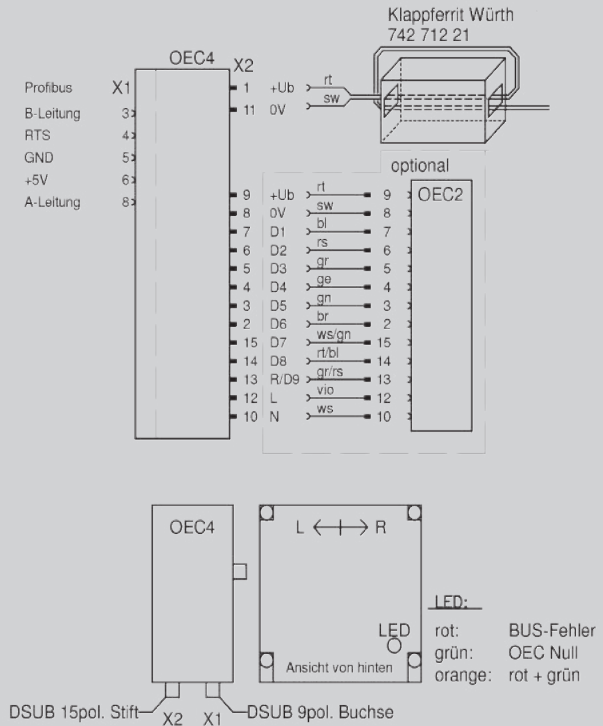
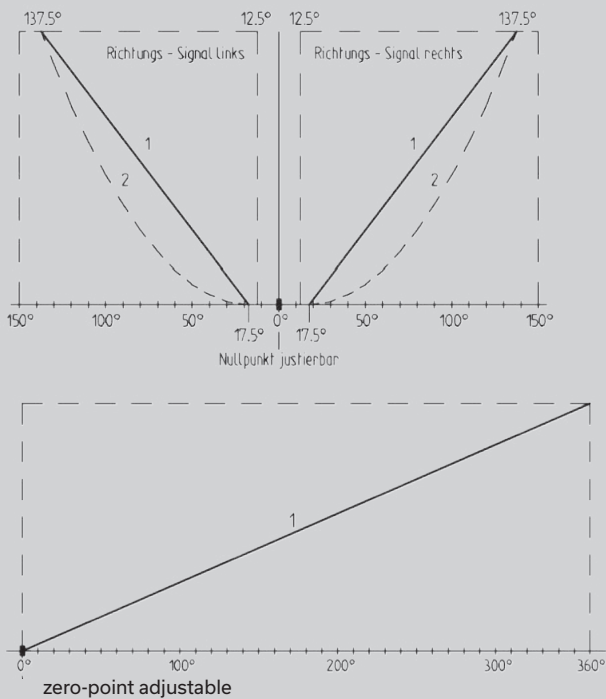
with interface Profibus DP



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

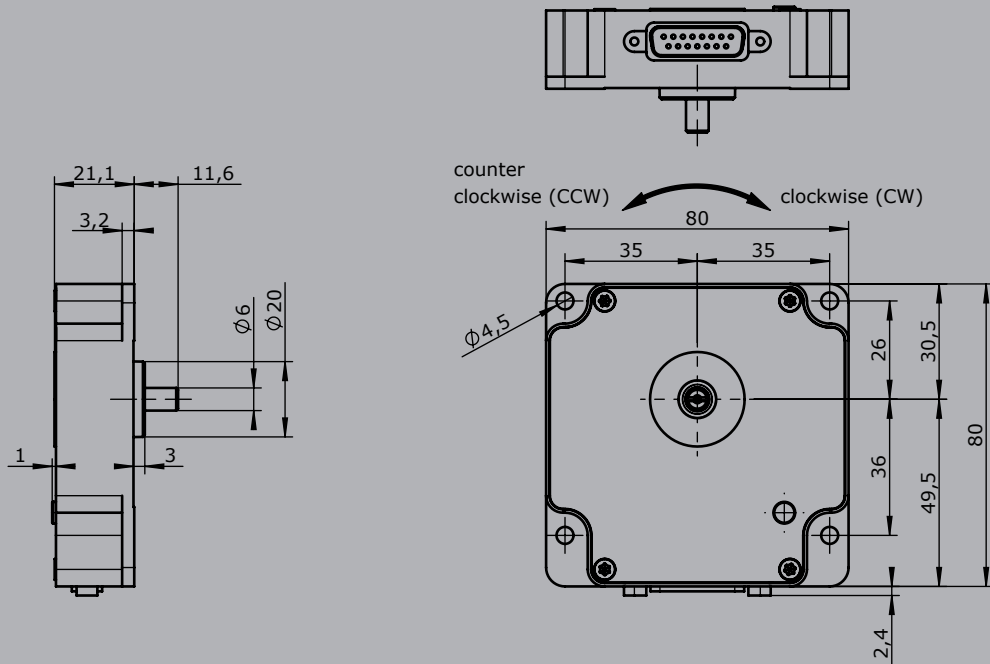
Plug with cable 2 x 0,25 mm², 2000 mm long, cable head open (cable for current supply OEC 4 single application)

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)

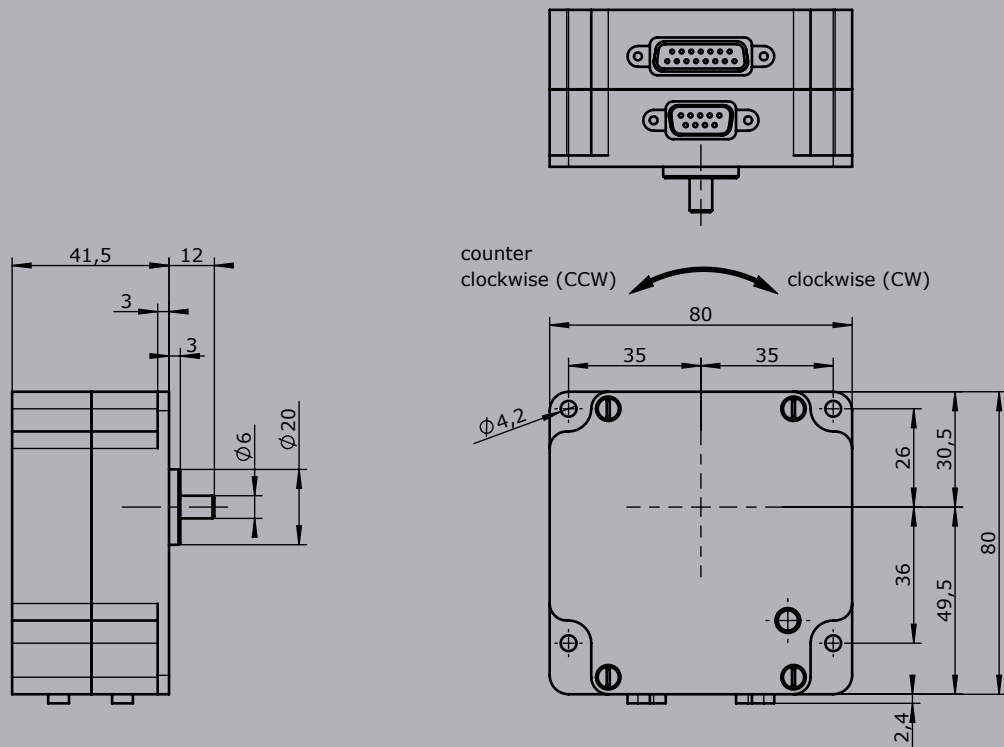
The OEC 4 is able for mounting on V6,VV6/D64,DD64/V11/S2,SS2/S6/N6. For mounting a potentiometer mounting option (P)

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

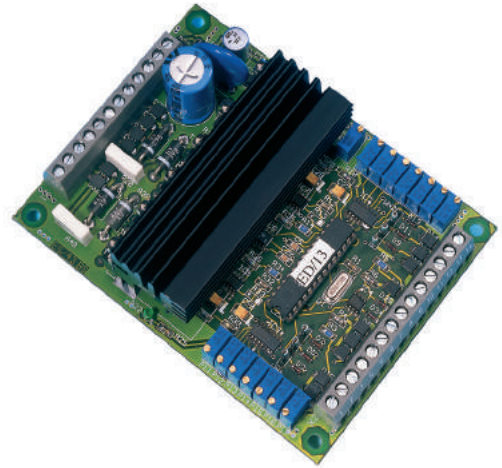




The Electronic Control Unit ES/43 serves for control of proportional valves without position control. There is a version for 4 proportional valve solenoids (ES / 43-10) and a version for 2 Proportional valve solenoids (ES / 43-11) available.

Features:

- Stabilized 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



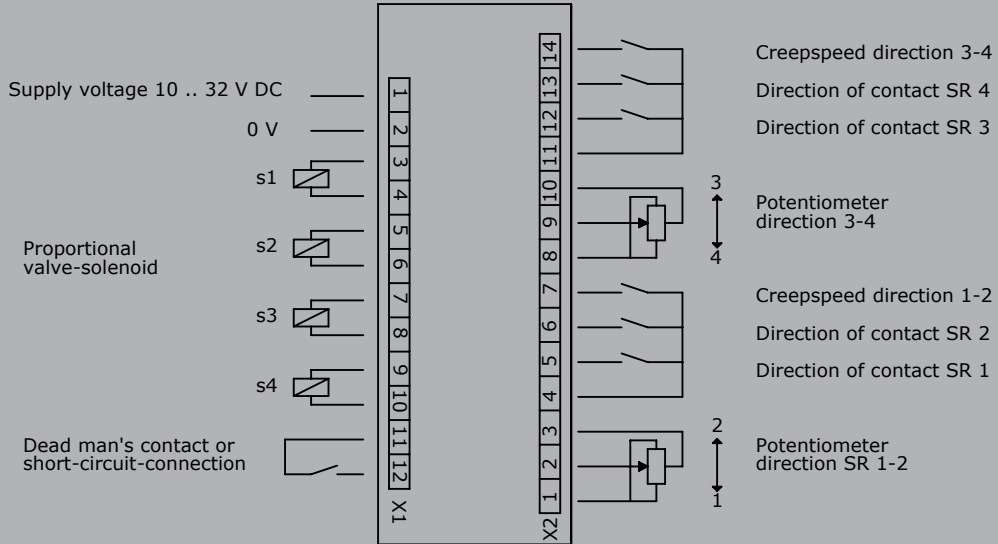
Technical data:

- Supply voltage		10...	32 V DC	<i>Example</i>
- Residual ripple		20%		
- Control voltage range	U _e	0...	5 V	
- Control current	I _e	< 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		

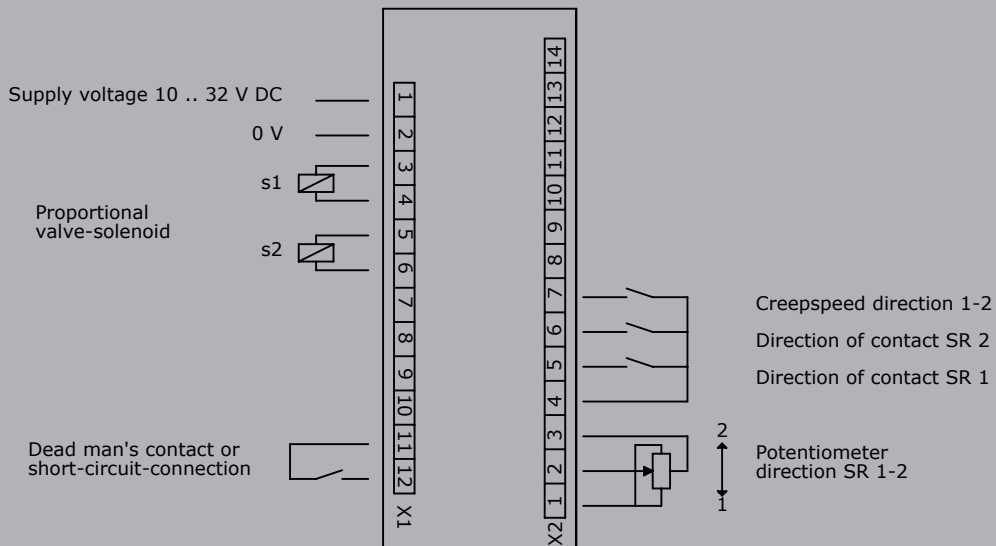
Electronic Control Unit for 4 proportional valves solenoid ES/43-10

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





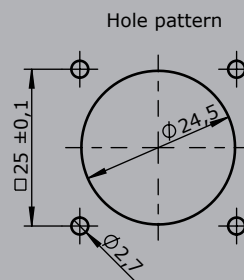
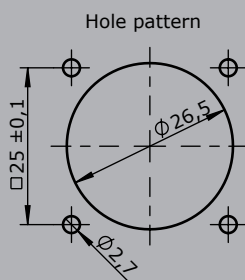
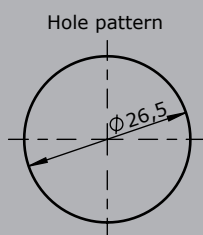
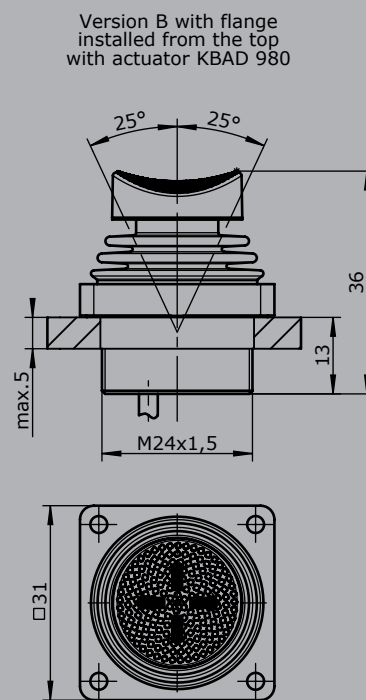
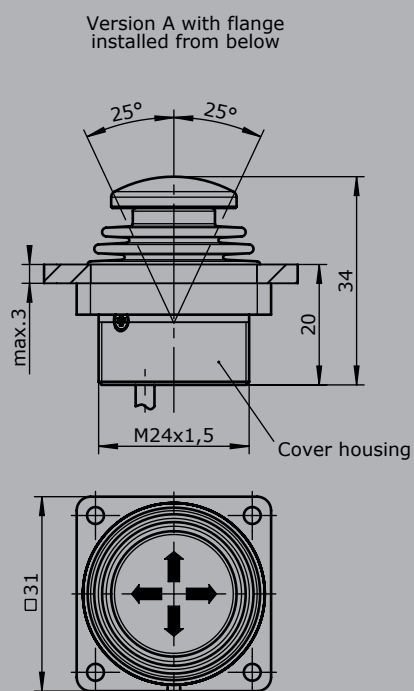
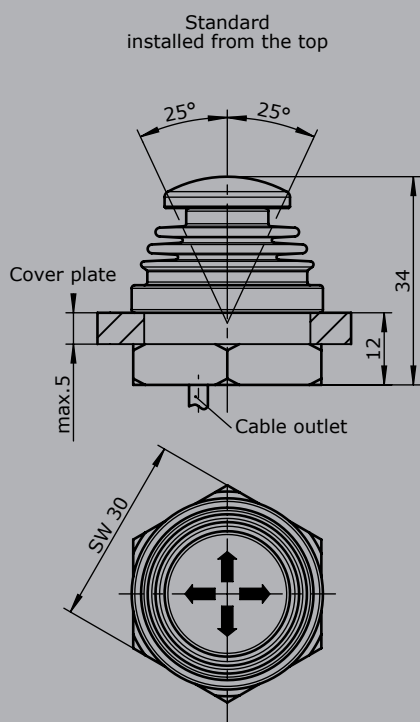
The V21 is a Mini-Joystick commonly used in electro-hydraulic applications. The V21 is especially suitable for installation in our ball grips. Long life and high reliability is ensured by the latest contactless hall-technology.

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
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



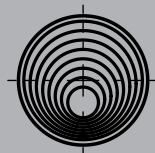
	V21	P	Example	-1	-E1032	-X
Basic unit						
V21.1	1-axis, installation from top with fixing nut					
V21	2-axis, installation from top with fixing nut					
V21.1A	1-axis, with flange, installation from below					
V21A	2-axis, with flange, installation from below					
V21.1B	1-axis, with flange, installation 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 by $U_b = 5 V$	1 axis				E103 1	
	2 axis				2	
	Characteristic:					
	Inverse dual (standard)				1	
	Dual				2	
SPI-Interface on request						
Special model						
X	Special / customer specified					



Actuator KBAD 1658



Actuator KBAD 1690





The Mini-Joystick S9 is a hallsensor switching device designed for electro-hydraulic applications. Long life and high reliability is ensured by the latest contactless hall-technology. Due to its small size, the S9 is particularly suitable for installation in our ball handles.

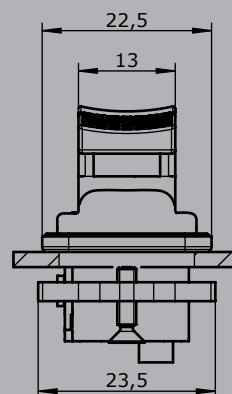
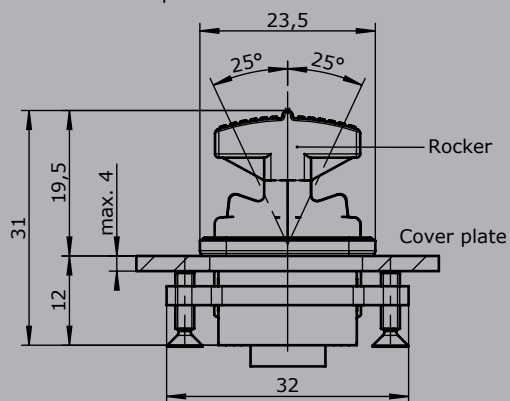
Technical data

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
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)

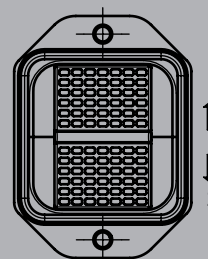
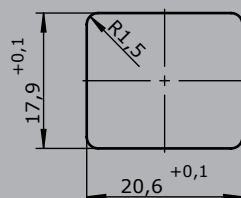


	Example S9	- E10311	- X
Basic unit			
S9			
Interface			
0,5...2,5...4,5 V redundant by Ub= 5 V		E1031	
	Output option inverse dual		1
	Output option dual		2
Special model			
X Special / customer specified			

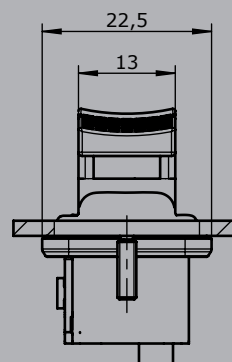
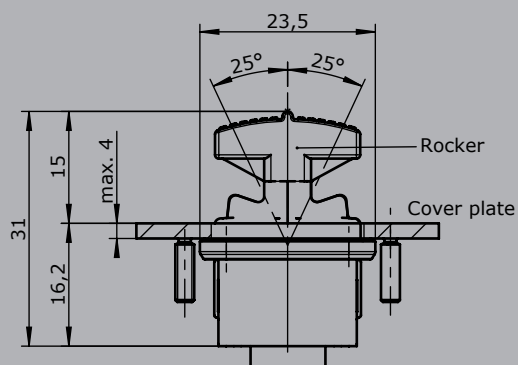
Installed from the top



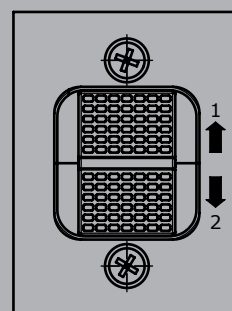
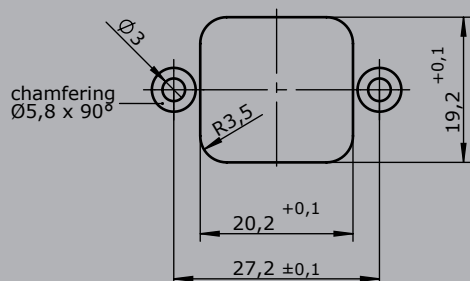
Hole pattern
(installed from the top)



Installed from below



Hole pattern
(installed from below)



The S15 is a Fingertip Joystick designed for electro-hydraulic applications. A long service life and high reliability is achieved by the latest contactless hall-technology. With the different actuator colours the appearance can be individually designed.

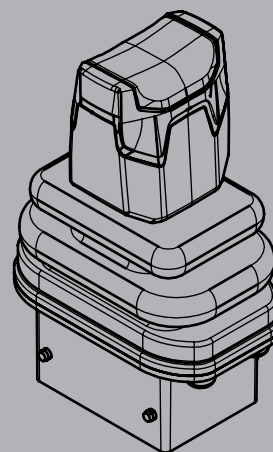
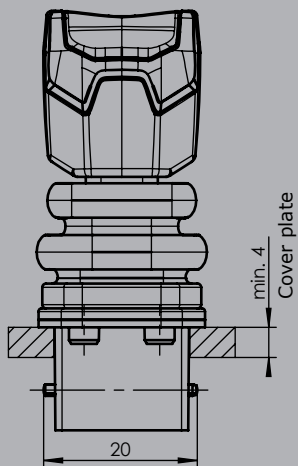
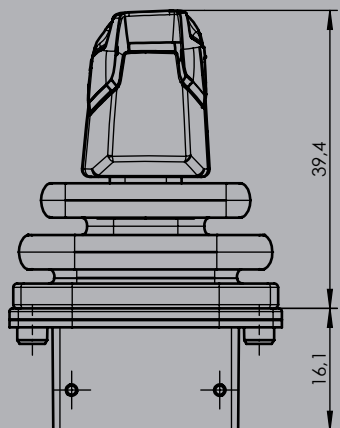
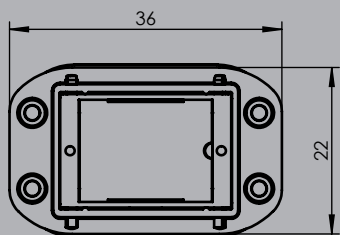
Technical data

Mechanical life S15	5 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)

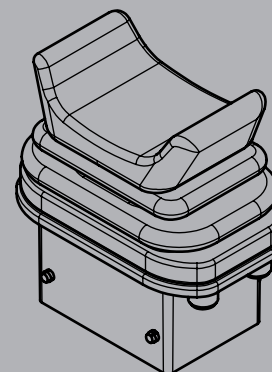
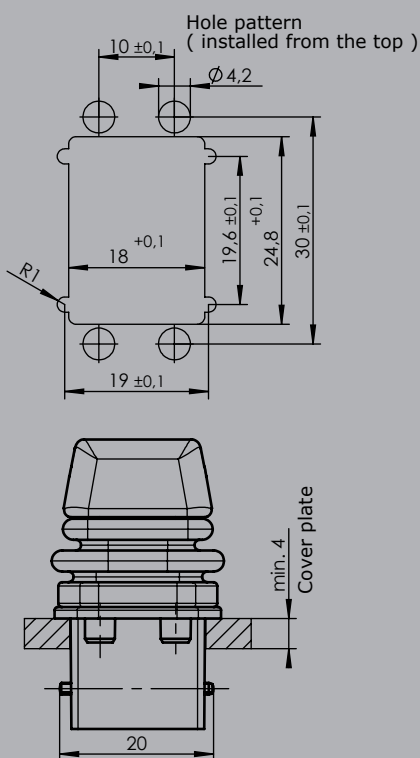
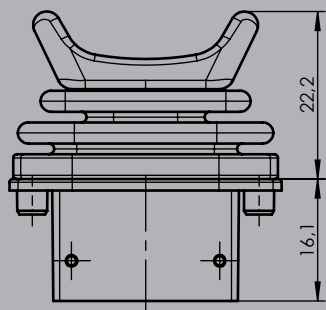
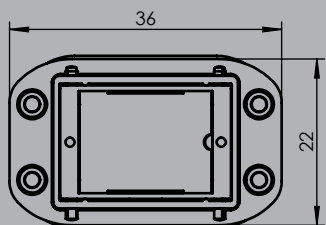


	Example					
	S15	- 2	- 1	- 1	-E1031	-X
Basic unit						
S15 Fingertip Joystick						
Actuator						
1 Actuator form A						
2 Actuator form B						
Actuator colour						
1 Black						
2 Grey*						
3 Blue*						
4 Red*						
5 Yellow*						
6 Orange*						
<i>*not possible with actuator form B!</i>						
Mechanical function						
1 T-0-T						
Interface						
0,5...2,5...4,5 V redundant by Ub= 5 V	1 axis				E1031	
0,5...2,5...4,5 V redundant + direction signal at Ub= 5 V	1 axis				E104 1	
	Characteristic inverse dual					1
	Characteristic dual					2
<i>SPI - Interface on request</i>						
Special model						
X Special / customer specified						

S15 fingertip with actuator edition A



S15 fingertip with actuator edition B



The Hall-Cross Switch HK1 is a contactless Mini-Joystick designed for electro-hydraulic applications. Different actuators are available. Optionally a version with Push button is possible.

Technical data

Mechanical life HK1	1 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP67 (electronic)



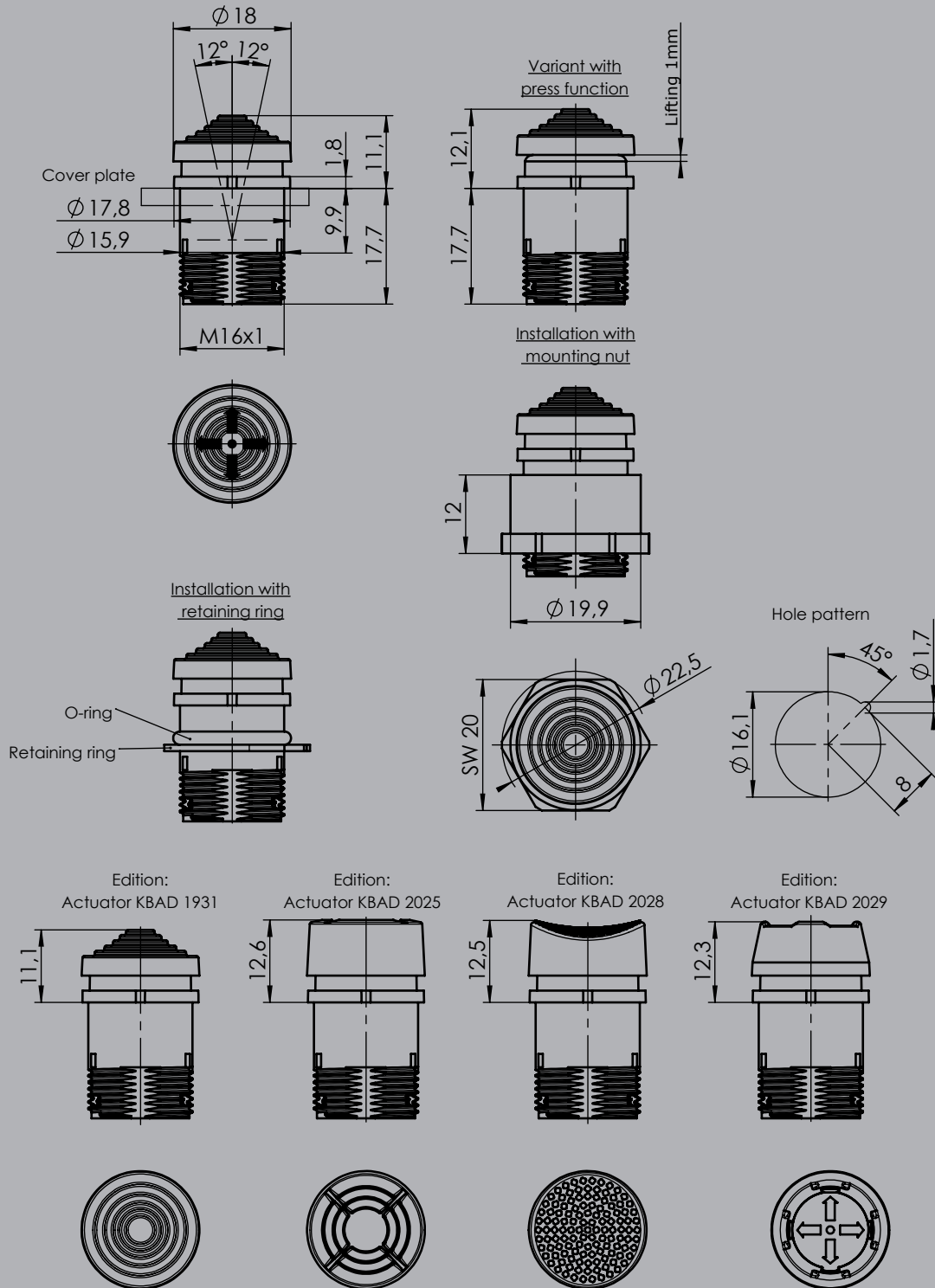
		Example	-D	-1	-1	-0	-E1031	-X
		HK1						
Basic unit								
HK1	Hall-Cross Switch							
Additional function								
D	Push button							
Knob								
1	KBAD 1931 (Mountain Style)							
2	KBAD 2025 (Stadium Style)							
3	KBAD 2028 (Concave Style)							
4	KBAD 2029 (Tower Style)							
Knob colour								
1	black (only with actuator 1, 3, 4 possible!)							
2	grey (only with actuator 2 possible!)							
Incon coloured cap insert								
0	without icon coloured cap insert							
1	white transparent* (printing on the reserve side possible, this makes the imprint abrasion resistant!)							
2	white*							
3	yellow*							
4	green*							
5	blue*							
6	black*							
7	red*							
8	orange*							
<i>Only with actuator 4 possible!</i>								

Hall-Cross Switch

HK1



	HK1	-D	-1	-1	-0	-E1031	-X
Interface							
Digital output							
2 direction signal per axis							
						E004	1
							2
Voltage output							
0,5...2,5...4,5 V redundant at Ub = 5 V							
						E103 1	1
							2
Characteristics:							
							Inverse dual (standard) 1
							Dual 2
Special model							
X	Special / customer specified						



The Thumbwheel S12 is designed for electro-hydraulic applications. Long life and high reliability is ensured by the latest contactless hall-technology. By the combination of different actuators, 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 compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



	S12	Example - A	- 2	- 1	- 1	-E1031	-X
Basic unit							
S12 Thumbwheel S12							
S12B Thumbwheel S12 with actuator version B							
S12C Thumbwheel S12 with actuator version C							
Mounting frame							
A with mounting frame							
without 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*							
<i>*not possible with S12B and S12C!</i>							
Actuator colour							
	S12	S12B	S12C				
1 Black	√	√	√				
2 Grey	√						
3 Blue	√						
4 Red	√		√				
5 Yellow	√						
6 Orange	√						
7 Green	√						

S12 - A - 2 - 1 - 1 -E1031 -X

Mechanical function

- 1 T-0-T
- 2 R-0-R*¹
- 3 T-0-R*¹
- 4 R-0-T*¹
- 5 R-R*¹
- 6 R-R-0-R-R*

*not possible with S12B and S12C!

*¹ not possible with S12B!

Interface

0,5...2,5...4,5 V redundant by Ub= 5 V

1 axis

E103 1

0,5...2,5...4,5 V redundant + 2 direction signals by Ub= 5 V

1 axis

E104 1

Output option inverse dual

1

Output option dual

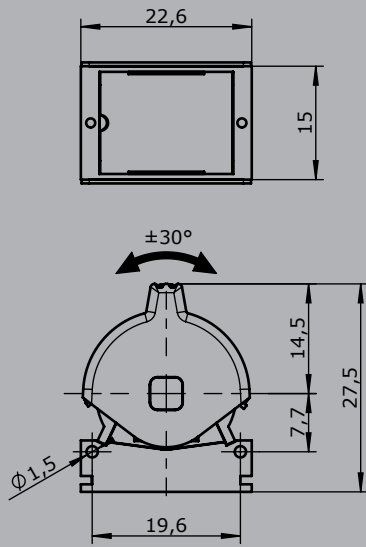
2

SPI - Interface on request

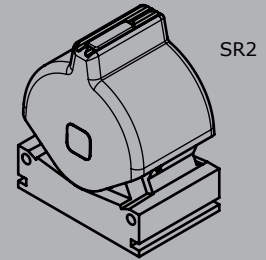
Special model

- X Special / customer specified

S12 without mounting frame
Version A

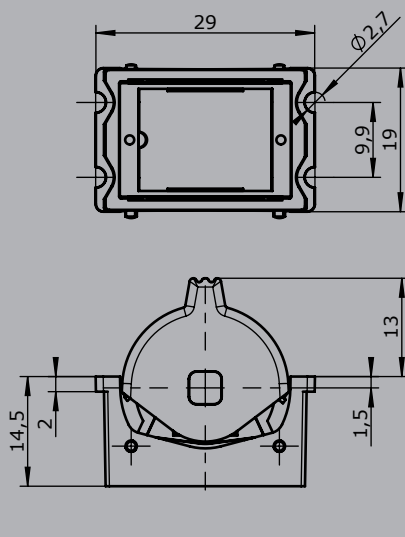


S12 with LED
SR1

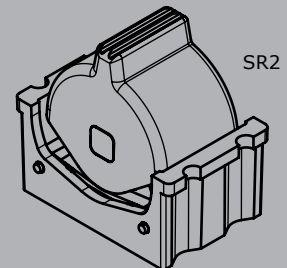


SR2

S12 with mounting frame
Version A

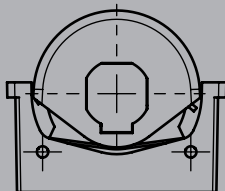


S12 without LED
SR1

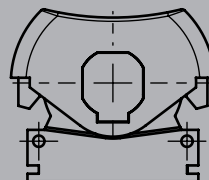


SR2

Version B
with actuator KBAD 1731



Version C
with actuator KBAD 1858



The Thumbwheel S16 is designed for electro-hydraulic applications. The S16 can be optimally used with the scroll and push function as a selection device for displays.

Technical data

Mechanical life S16	5 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)

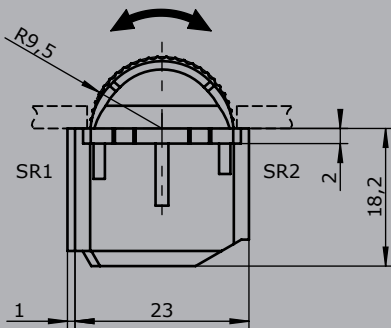


Example

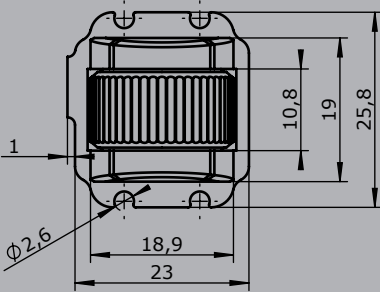
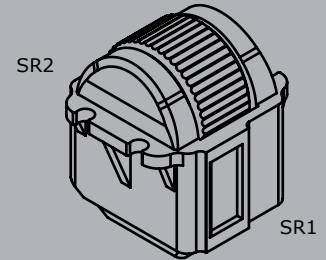
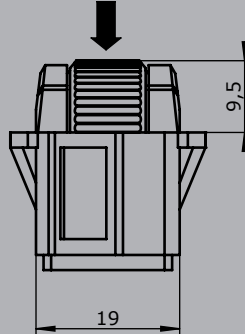
	S16	- D	- 2	- 2	-E10311	-X
Basic unit						
S16	Thumbwheel S16					
Additional function						
D	Push function					
Mounting direction						
1	vertical					
2	horizontal					
Actuator colour						
1	black					
2	grey					
Interface						
0,5...2,5...4,5 V redundant by Ub= 5 V		1 axis		E103 1		
		Output option inverse dual				1
		Output option dual				2
SPI - Interface on request						
Special model						
X	Special / customer specified					

S16 Mounting Position Crosswise

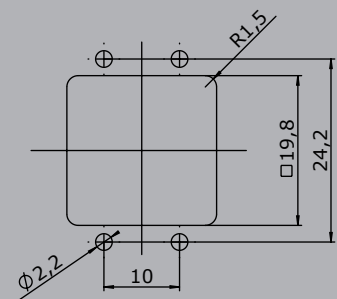
Thumbwheel 360° (18 Steps)



Pushbutton Function

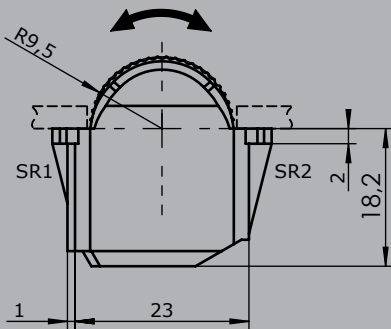


hole pattern and cut out

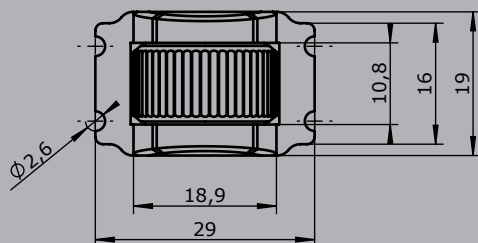
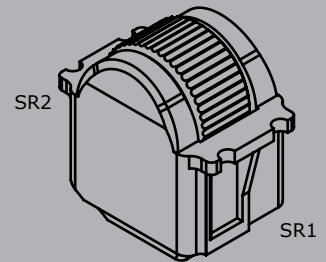
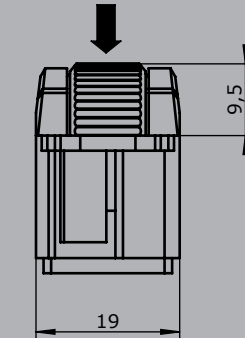


S16 Mounting Position Lengthwise

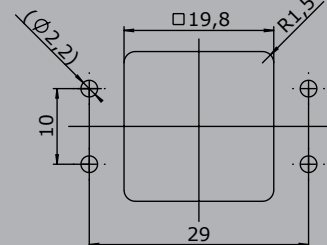
Thumbwheel 360° (18 Steps)



Pushbutton Function



hole pattern and cut out



The Hall-Push Button impressed by its durability and versatility. It is available in five 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
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



		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*							
*Not possible with HD4 and HD5!								
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 coloured cap insert								
0	Without icon coloured cap insert (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!

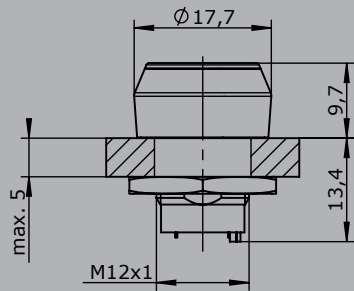
Interface

- E0101 Push button signal not redundant $U_b=4,5 - 5,5$ V DC
- E0111 Push button signal redundant $U_b=4,5 - 5,5$ V DC
- E0201 Push button signal not redundant $U_b=4 - 32$ V DC
- E0211 Push button signal redundant $U_b=4 - 32$ 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

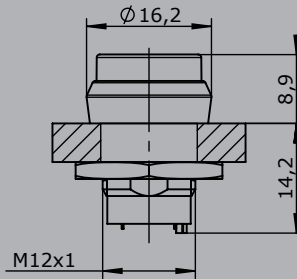
Special model

- X Special / customer specified

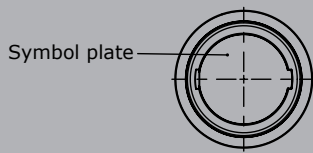
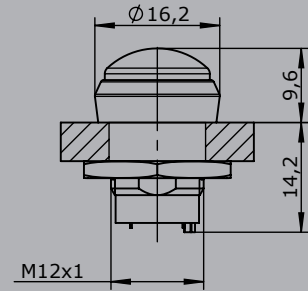
Edition:
HD1



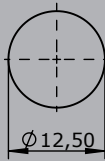
Edition:
HD2



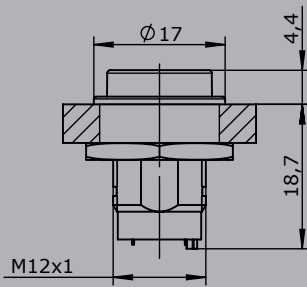
Edition:
HD4



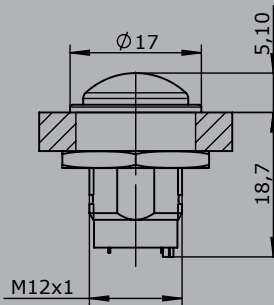
Hole pattern
HD1, HD2, HD4



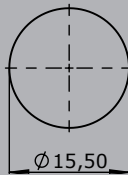
Edition:
HD3



Edition:
HD5



Hole pattern
HD3, HD5





The Palm Grip B35 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)

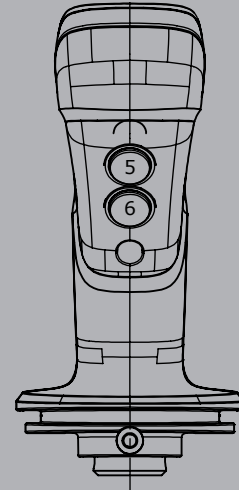
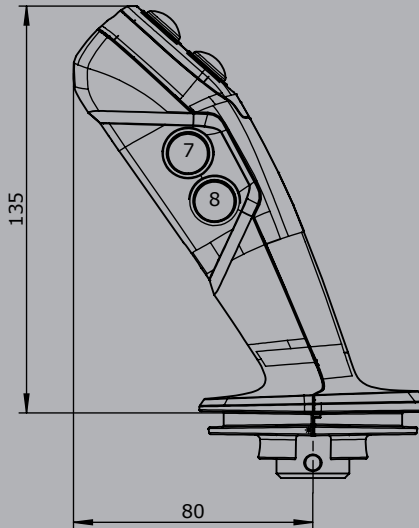
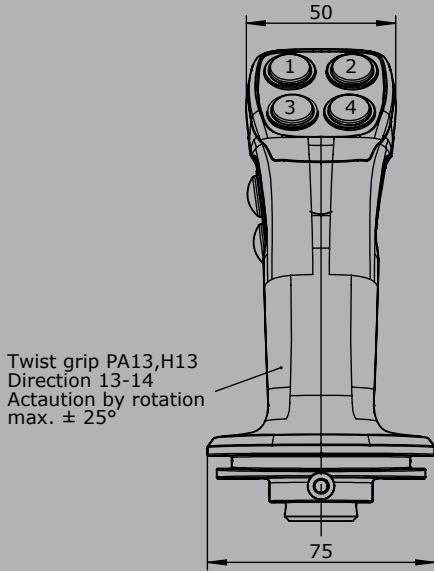


	B35	-2D	W	K	SE	S12	H13	-X
Basic unit								
B35 Palm Grip								
Digital actuating element								
D Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange								
HD Hall-Push Button (see page 151)								
W Rocker switch momentary (T) or maintained (R), colours: red, black, yellow, blue, white Mechanical functions: T-0-T, 0-T, R-0-T, R-0-R, 0-R, R-R								
K Lever switch								
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+E907)								
V Vibration								
Analog actuating element								
S12 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)								
S16 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)								
V21 Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)								
HK Hall-Cross Switch (see page 143)								
H13 Hall-Rotary Grip, output 0,5...2,5...4,5 V inverse dual								
Special model								
X Special / customer specified								

B35R

Hall push button installed Pos. 1 - 4
Hall push button installed Pos. 7 - 8

Hall push button installed Pos. 5 - 6

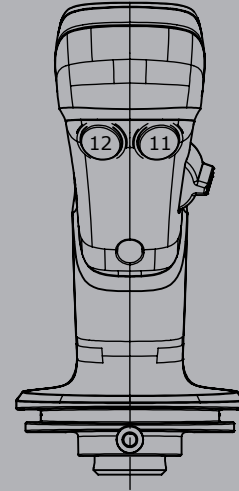
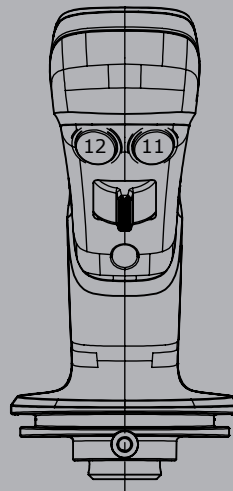
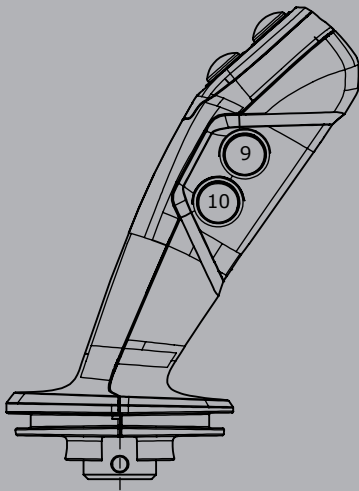


B35L

Hall push button installed Pos. 1 - 4
Hall push button installed Pos. 9 - 10

Hall push button installed Pos. 11 - 12
Rocker switch installed Pos. 6

Hall push button installed Pos. 11 - 12
Rocker switch can be installed on the side

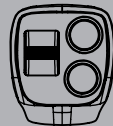
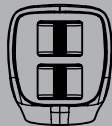


Edition: B35
Rocker switch installed Pos. 1+3
Rocker switch installed Pos. 2+4

Edition: B35
Rocker switch installed Pos. 1+2
Rocker switch installed Pos. 3+4

Edition: B35
Rocker switch installed Pos. 1+3
Hall push button installed Pos. 2+4

Edition: B35
Rocker switch installed Pos. 1+2
Hall push button installed Pos. 3+4



Palm Grip B34



The Palm Grip B34 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.

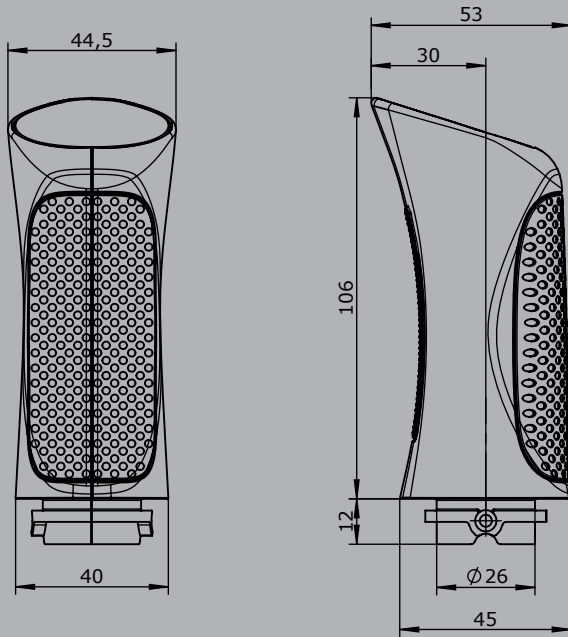


Technische Daten

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)

	B34L	Example -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 151)				
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				
Analog actuating element					
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)				
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)				
Special model					
X	Special / customer specified				

B34

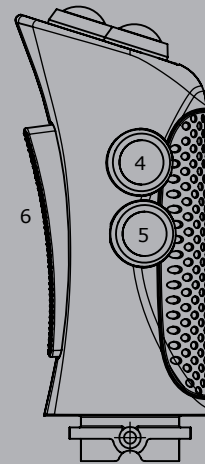
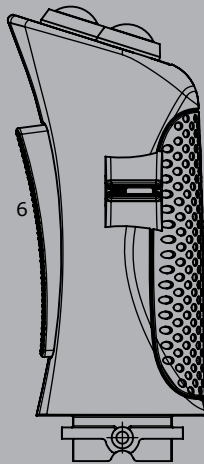
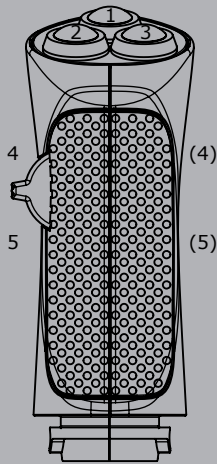


Edition:

- 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 B33



The Palm Grip B33 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

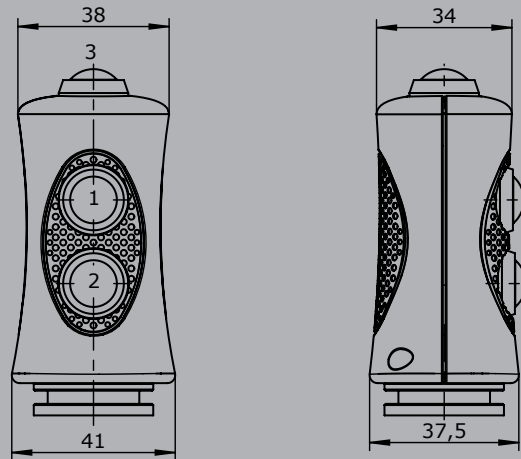
Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	*1 0,1A 24 V DC13



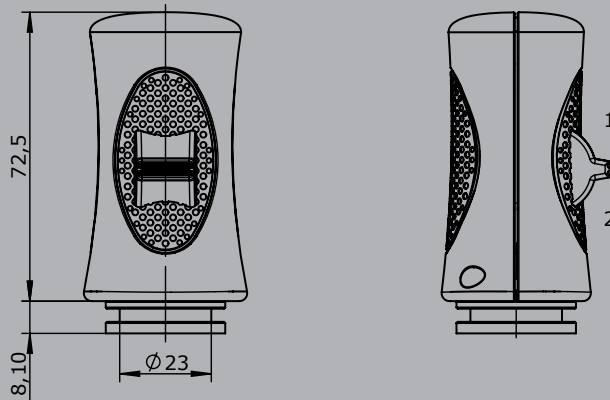
	B33L	Example -2D	S12	-X
Basic unit				
B33L Palm Grip left				
B33R Palm Grip right				
Digitale actuating element				
D Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange				
HD Hall-Push Button (see page 151)				
Analog actuating element				
S12 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)				
S16 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)				
Special model				
X Special / customer specified				

B33

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



Edition:
Rocker switch installed Pos. 1+2



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

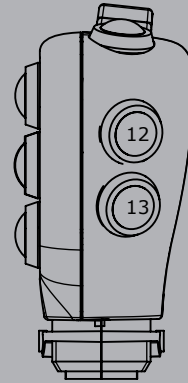
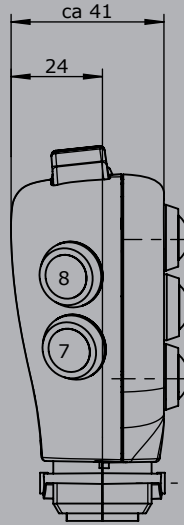
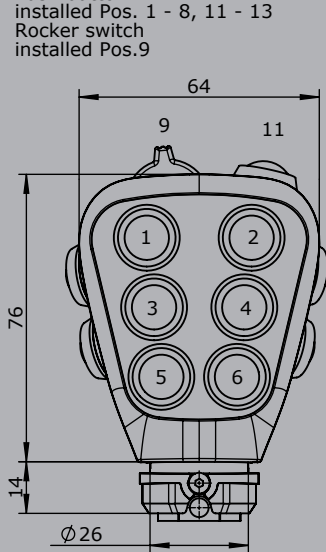
Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC 13 (*1 0,1A 24 V DC13)



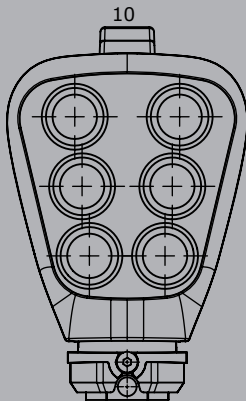
		Example					
		B32L	-2D	W	SE	S12	-X
Basic unit							
B32L	Palm Grip left						
B32R	Palm Grip right						
Digitale actuating element							
D	Push Button KDA21 * ¹ Colour: red, black, yellow, green, blue, white, orange						
HD	Hall-Push Button (see page 151)						
W	Rocker switch momentary (T) or maintained (R), colours: red, black, yellow, blue, white Mechanical functions: T-0-T, 0-T, R-0-T, R-0-R, 0-R, R-R						
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+E907)						
Analog actuating element							
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)						
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)						
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)						
HK	Hall-Cross Switch (see page 143)						
Special model							
X	Special / customer specified						

B32

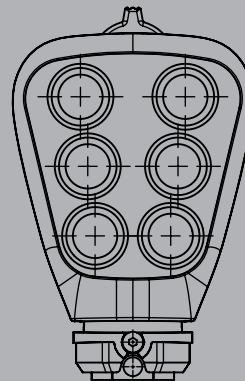
Push button
installed Pos. 1 - 8, 11 - 13
Rocker switch
installed Pos.9



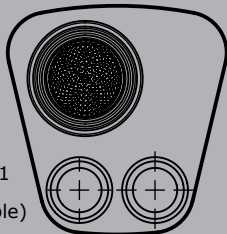
Push button
installed Pos. 1 - 8, 12 + 13
Rocker switch lengthwise
installed Pos. 10



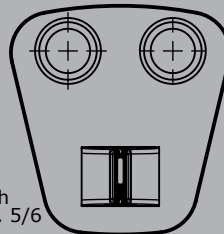
Rocker switch crosswise
installed Pos. 10



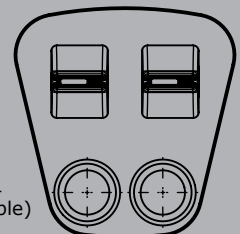
Edition:
Multi-axis controller V21
installed Pos. 1/3
(Pos. 9 - 11 not available)



Edition:
Rocker switch
installed Pos. 5/6



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



Palm Grip 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)



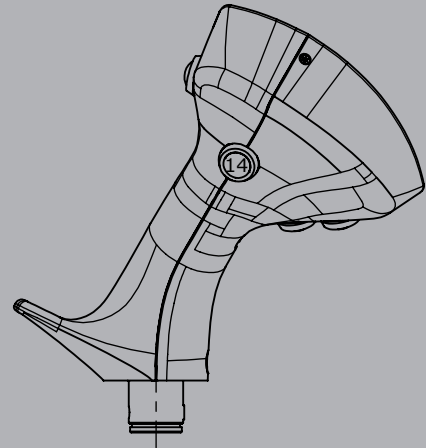
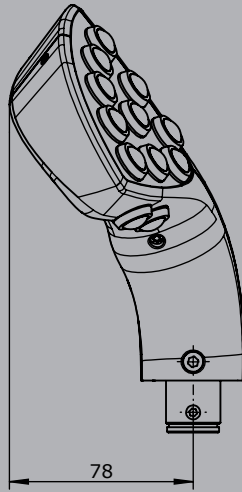
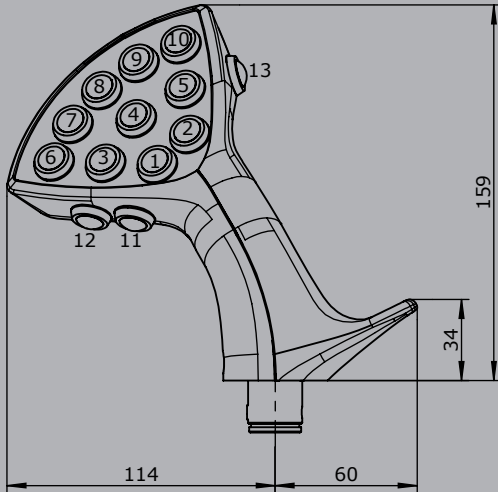
		Example						
		B31R	-2D	W	HK	S12	V21	-X
Basic unit								
B31L	Palm Grip left							
B31R	Palm Grip right							
Digital actuating element								
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange							
HD	Hall-Push Button (see page 151)							
W	Rocker switch momentary (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							
Analog actuating element								
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)							
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)							
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)							
HK	Hall-Cross Switch (see page 143)							

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 (based on) or CANopen Safety EN50325-5	
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)	
CAN		
- 5 analog joystick axis		E313 1
- 24 digital joystick functions		
Additional with 16 LED-outputs		2
CANopen Safety		
- 5 analog joystick axis		E412 1
- 24 digital joystick functions		
Additional with 16 LED-outputs		2
Special model		
X	Special / customer specified	

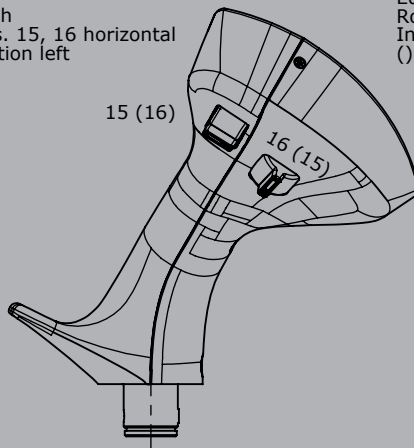
Technical details may vary based on configuration or application! Technical data subject to change without notice!

B31R

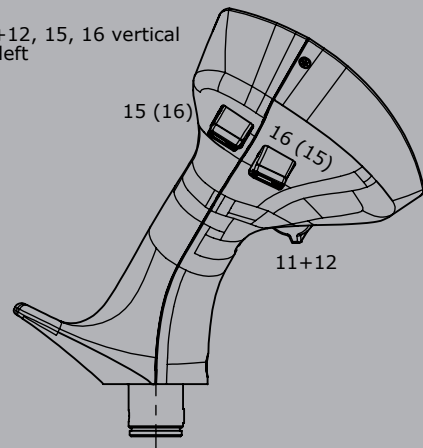
Edition:
Push button installed Pos. 1-14



Edition:
Rocker switch
Installed Pos. 15, 16 horizontal
() = Installation left

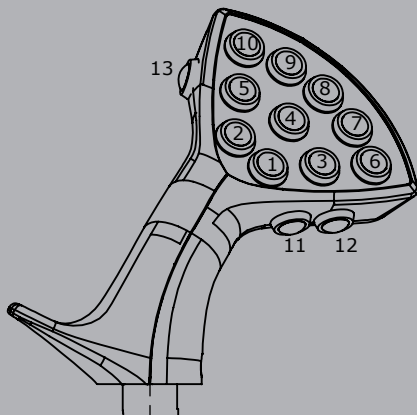


Edition:
Rocker switch
Installed Pos. 11+12, 15, 16 vertical
() = Installation left

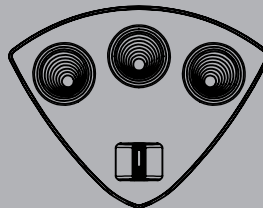


B31L

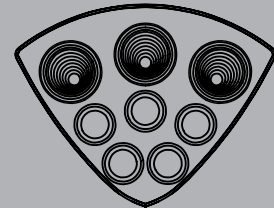
Edition:
Push button installed Pos. 1-14



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



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





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.



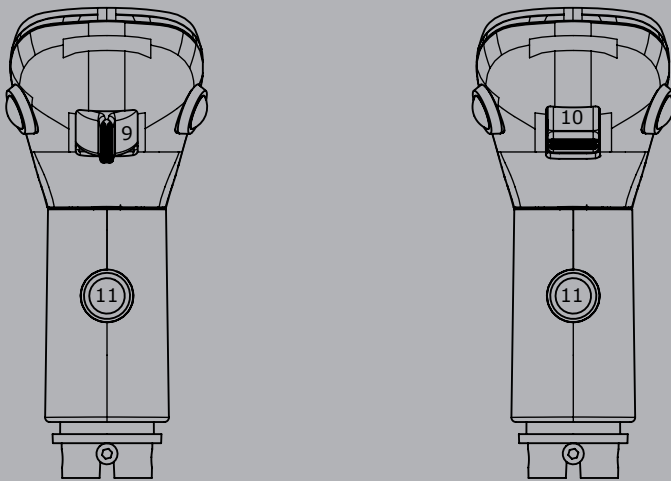
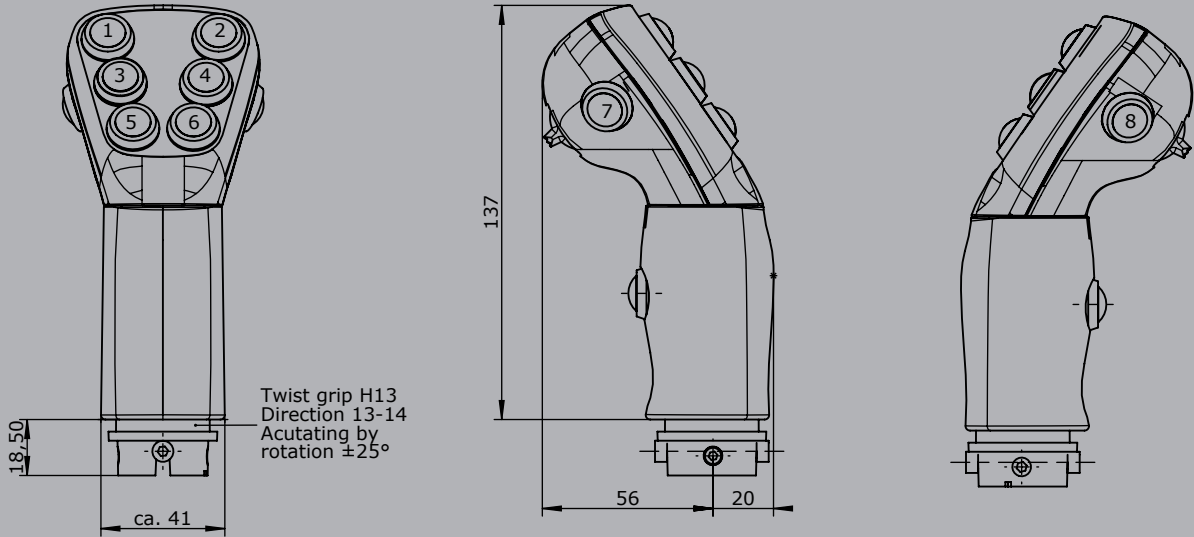
Technical data

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)

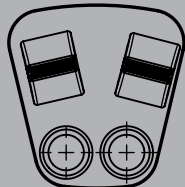
		B30	-2D	W	SR	SE	S12	H13	-X
Basic unit									
B30	Palm Grip								
Digital actuating element									
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange								
HD	Hall-Push Button (see page 151)								
W	Rocker switch momentary (T) or maintained (R), colours: red, black, yellow, blue, white Mechanical functions: T-0-T, 0-T, R-0-T, R-0-R, 0-R, R-R								
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+E907)								
Analog actuating element									
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)								
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)								
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)								
HK	Hall-Cross Switch (see page 143)								
H13	Hall-Rotary Grip Output 0,5...2,5...4,5 V inverse dual								
Special model									
X	Special / customer specified								

B30

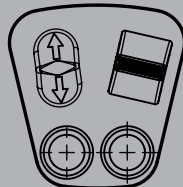
Push button
installed Pos. 1 - 8 +11
Rocker switch
installed Pos. 9+10



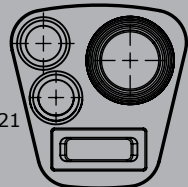
Edition:
installed Pos. 3+1
Rocker switch
installed Pos. 2+4
Rocker switch



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



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



Palm Grip B29



The Palm Grip B29 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.

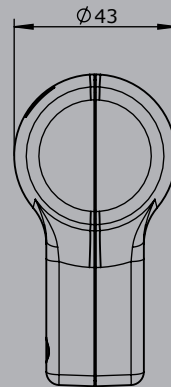
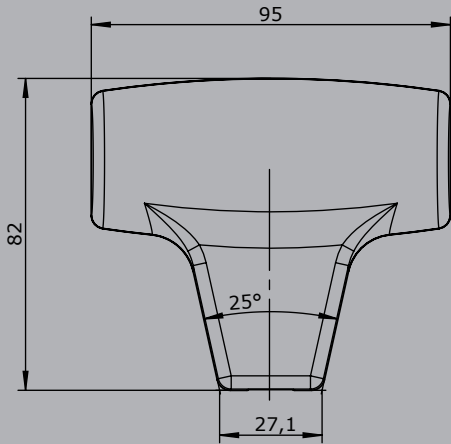
Technical data

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

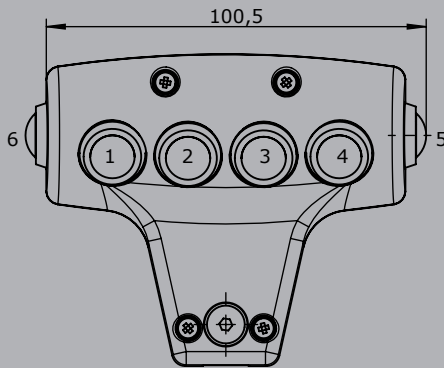


	Example		
	B29	-2D	-X
Basic unit			
B29 Palm Grip			
Digital actuating element			
D Push Button KDA21 Colour: red, black, yellow, green, blue, white, orange			
HD Hall-Push Button (see page 151)			
SE Sensor Button capacitive with external control electronics			
S Sensor Button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E6xx, E907 and V25/V27 with interfaces E3xx + E4xx+E907)			
Special model			
X Special / customer specified			

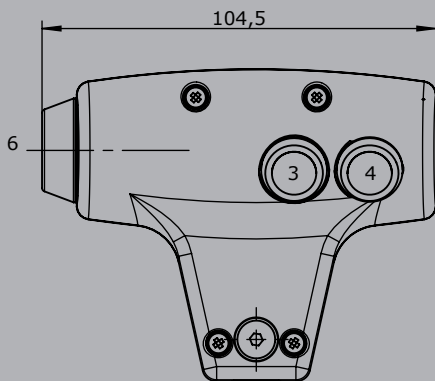
B29



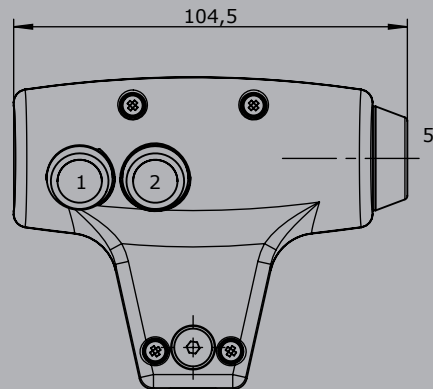
Edition:
Push button installed Pos. 1-6



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



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



Palm Grip B28



The Palm Grip B28 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 (standard).

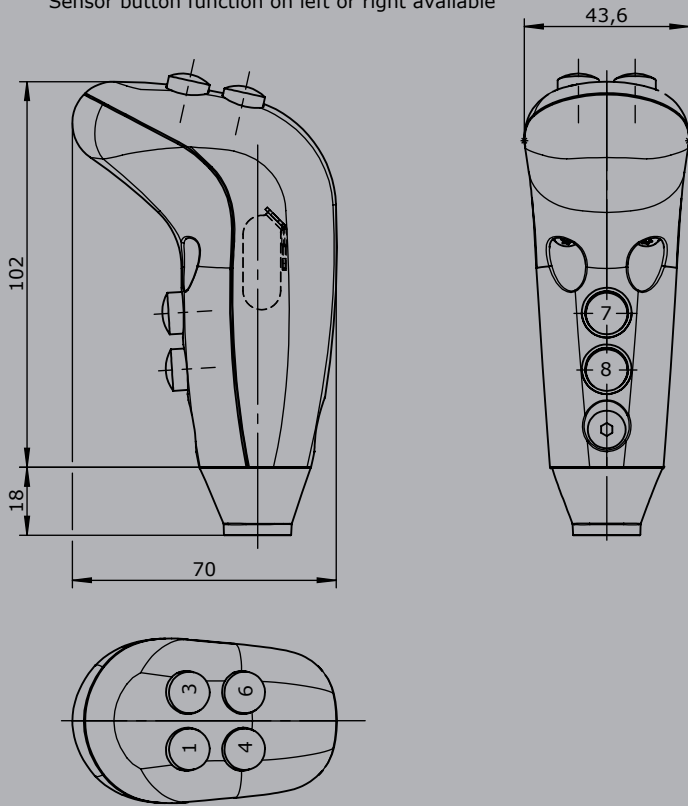
Technical data

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

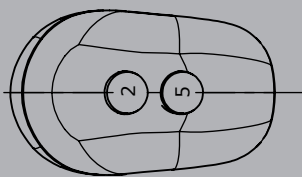


		<i>Example</i>			
		B28	-2D	SE	-X
Basic unit					
B28	Palm Grip				
Digital actuating element					
D	Push Button (1,5A 24 V DC13) Colour: red, black, yellow, green, blue, grey				
SE	Sensor Button capacitive with external control electronics				
S	Sensor Button capacitive without external control electronics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

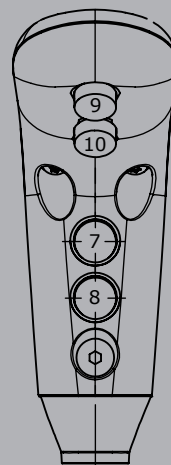
Edition:
Push button installed
Pos. 1,3,4,6,7,8
Sensor button function on left or right available



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 B26



The Palm Grip B26 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.



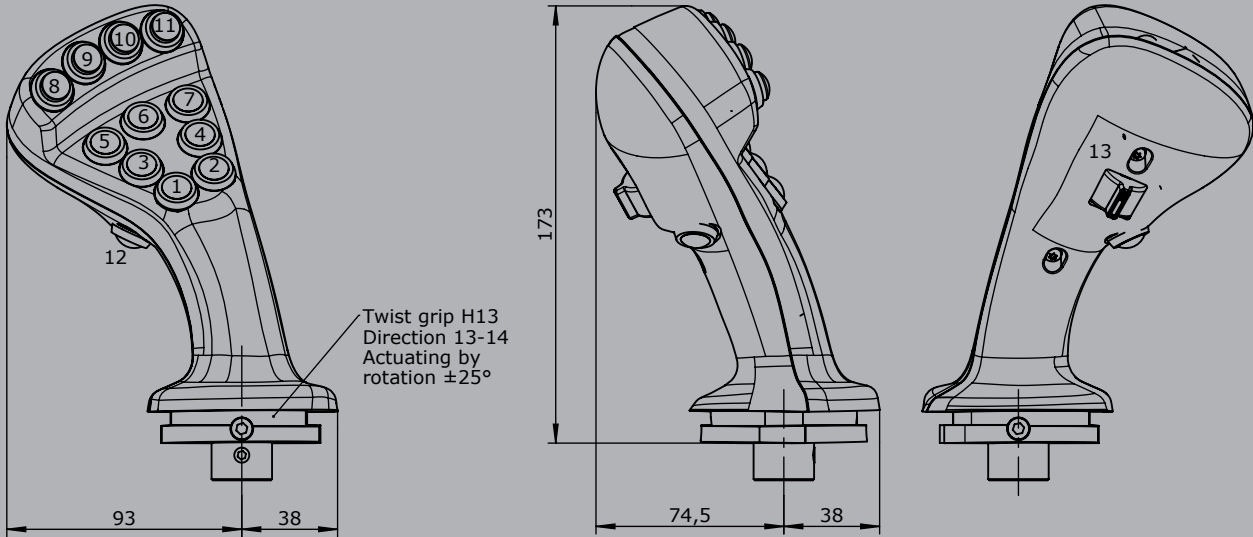
Technical data

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)

	B26L	-2D	HD	W	S12	V21	H13	-X
Basic unit								
B26L	Palm Grip left							
B26R	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 151)							
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							
SR	Sliding switch R-O-R							
ST	Sliding Button T-O-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+E907)							
V	Vibration							
Analog actuating element								
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)							
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)							
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)							
HK	Hall-Cross Switch (see page 143)							
H13	Hall-Rotary Grip							
	Output 0,5...2,5...4,5 V inverse dual							
Special model								
X	Special / customer specified							

B26R

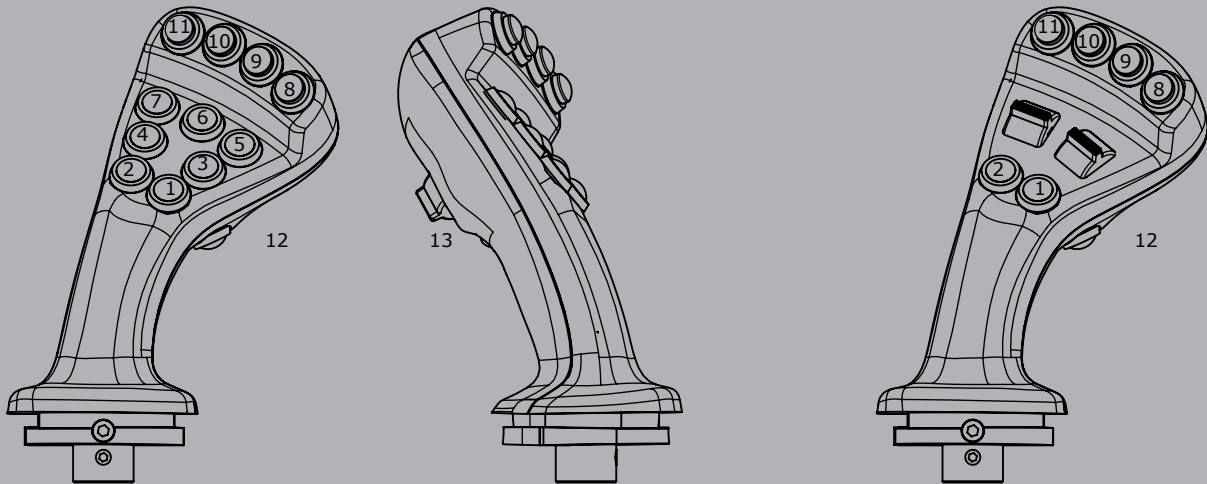
Edition:
Push button installed Pos. 1-12
Rocker switch installed Pos. 13



B26L

Edition:
Push button installed Pos. 1-12
Rocker switch installed Pos. 13

Edition:
Push button installed Pos. 1+2, 8-12
Rocker switch installed Pos. 3+5, 4+7





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)

		Example							
		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 151)								
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-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+E907)								
V	Vibration								
Analog actuating element									
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)								
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)								
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)								
HK	Hall-Cross Switch (see page 143)								
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 LEDs)								
Protocol	CANopen CiA DS 301, SAE J1939 (based on) or CANopen Safety EN50325-5								
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)								
CAN		E313 1	CANopen Safety				E412 1		
- 5 analoge joystick axis			- 5 analog joystick axis						
- 24 digital joystick functions			- 24 digital joystick functions						
Additional with 16 LED-outputs		2	Additional with 16 LED-outputs				2		
Special model									
X	Special / customer specified								

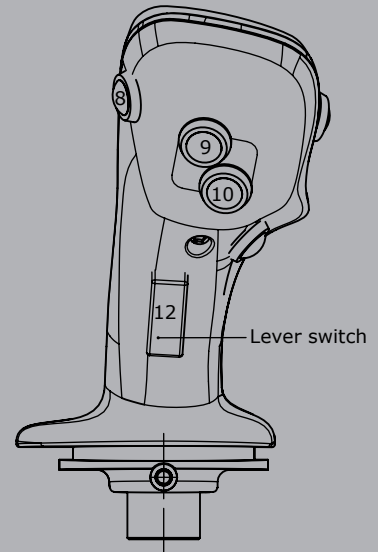
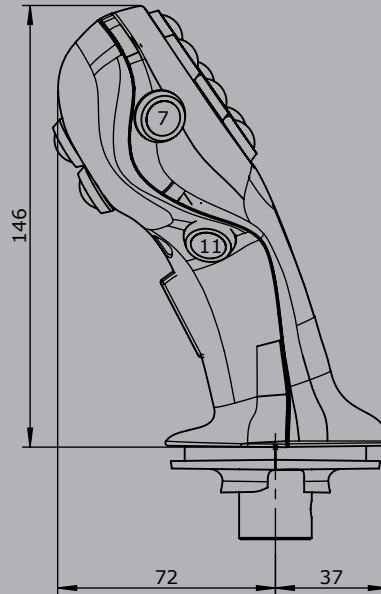
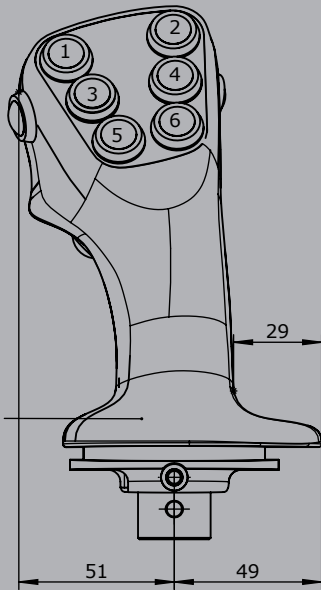
Technical details may vary based on configuration or application! Technical data subject to change without notice!

B25R

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

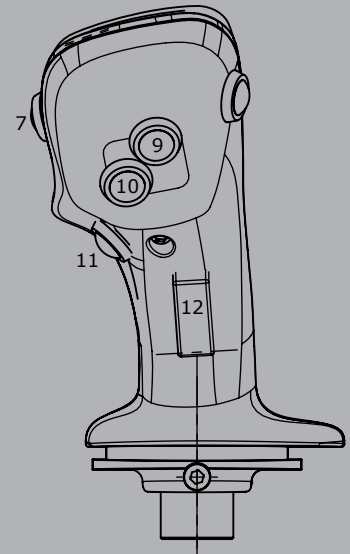
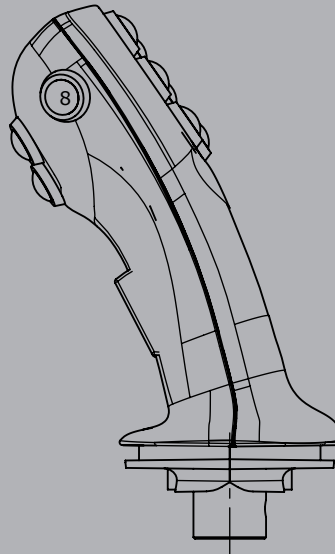
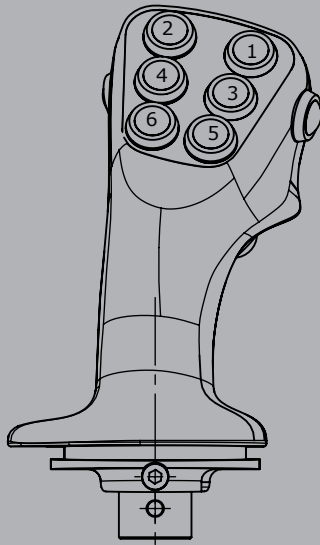
Rocker switch installed Pos. 9+10 possible

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

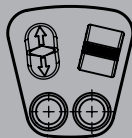


Edition: B25R
Rocker switch installed Pos. 3+1
Rocker switch installed Pos. 2+4

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 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.

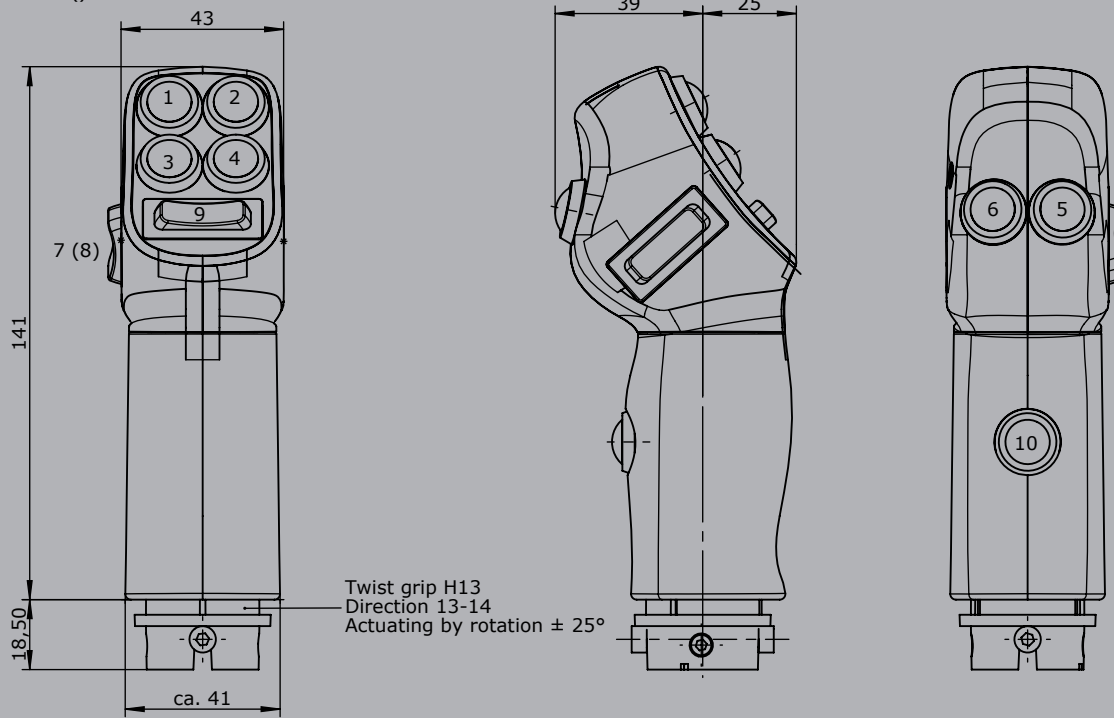
Technical data

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)

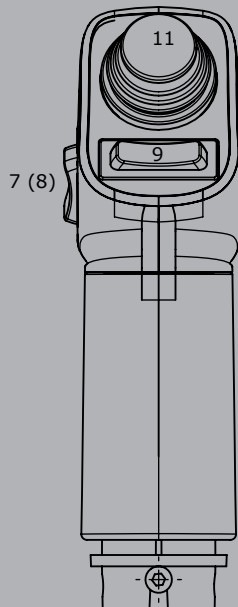


		Example B24	-D	2W	V21	-IWH	-X
Basic unit							
B24	Palm Grip						
Digital actuating element							
D	Push Button KDA21 *B Colour: red, black, yellow, green, blue, white, orange						
W	Rocker switch T-0-T						
W	Rocker switch 0-T						
W	Rocker switch R-0-T						
W	Rocker switch R-0-R						
W	Rocker 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+E907)						
Analog actuating element							
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)						
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						

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 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.



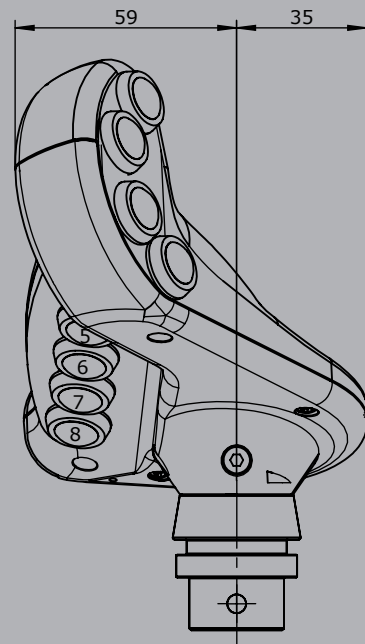
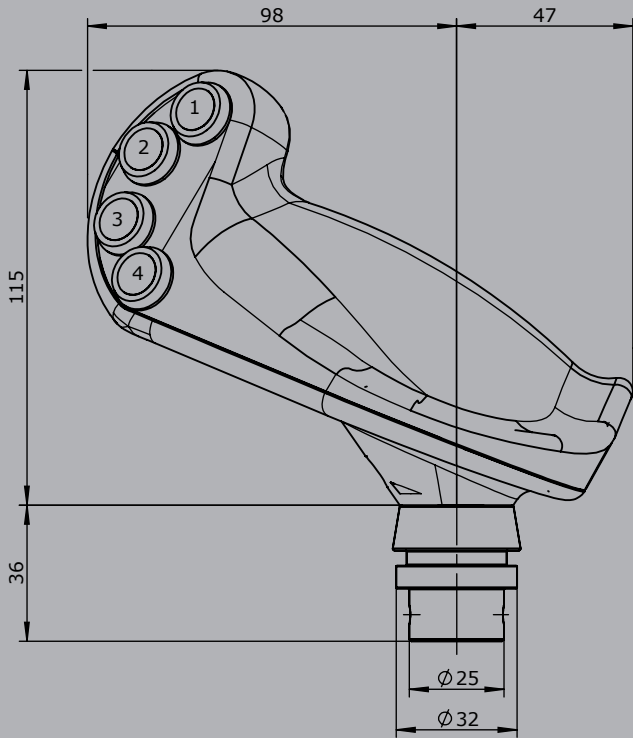
Technical data

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)

	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				
HD	Hall-Push Button (see page 151)				
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				
Analog actuating element					
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)				
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)				
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)				
HK	Hall-Cross Switch (see page 143)				
Special model					
X	Special / customer specified				

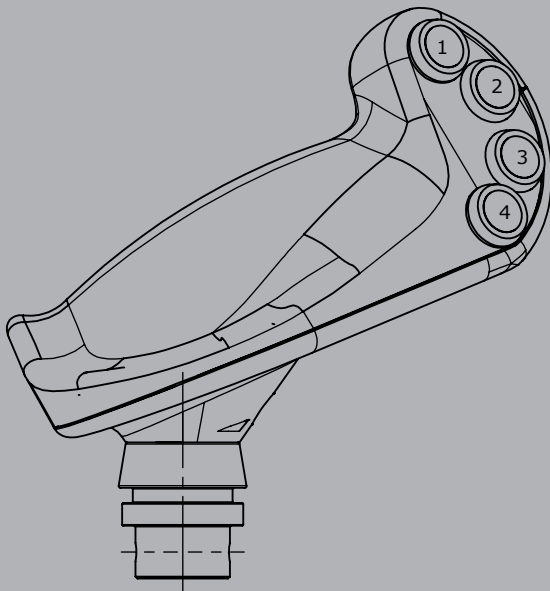
B23R

Push button installed Pos. 1 - 8

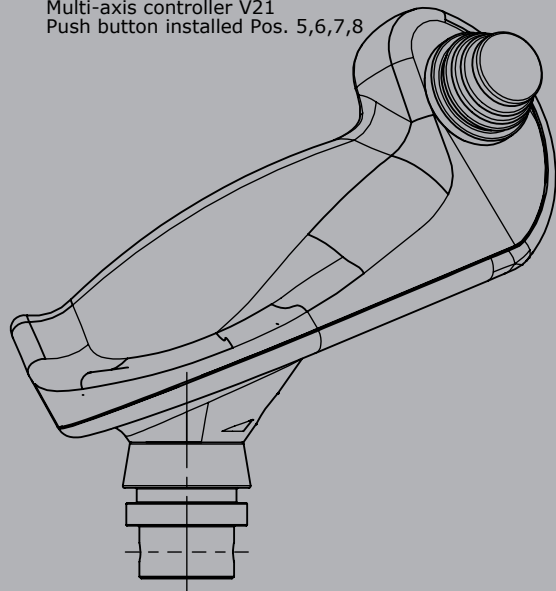


B23L

Push button installed Pos. 1 - 8



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



Palm Grip 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	1,5A 24 V DC13 (*1 0,1A 24 V DC13)

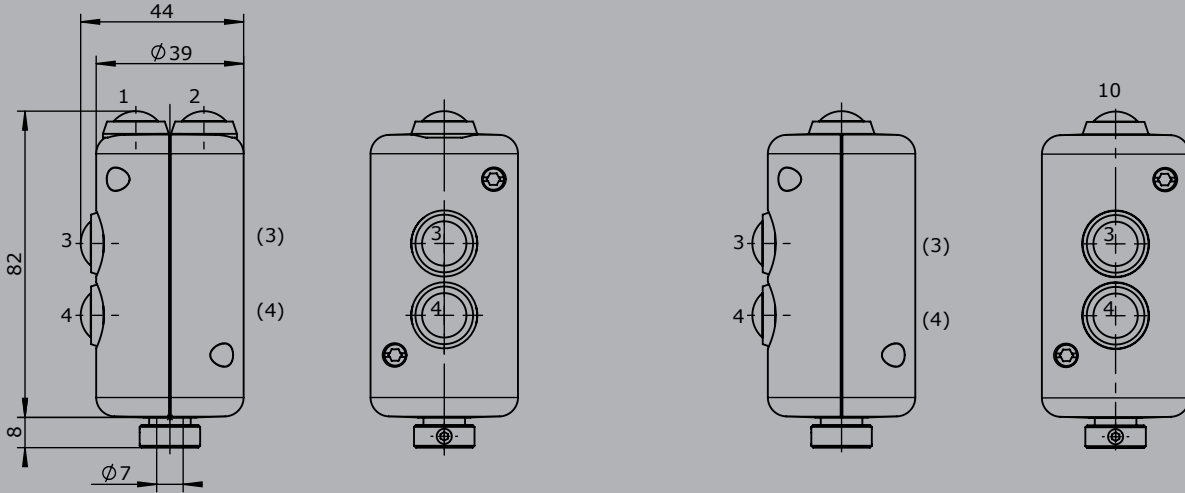


		B22AL	Example -4D	W	-X
Basic unit					
B22L	Palm Grip left				
B22R	Palm Grip right				
B22AL	Palm Grip left with support				
B22AR	Palm Grip right with support				
Digital actuating element					
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange				
HD	Hall-Push Button (see page 151)				
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+E907)				
Special model					
X	Special / customer specified				

B22

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

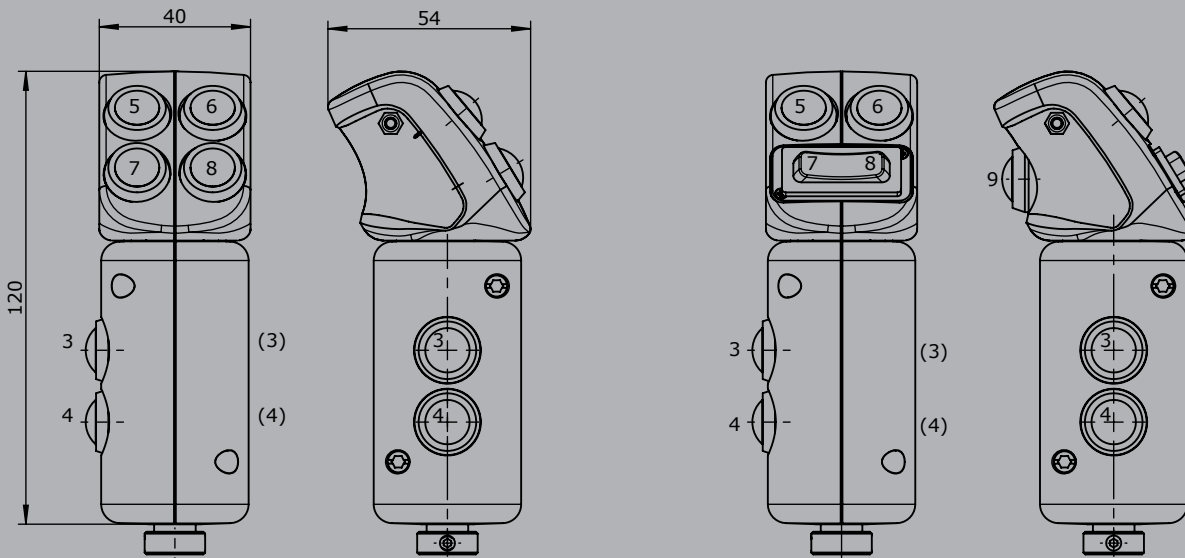
Edition:
Push button installed Pos. 3,4,10
Position push button left hand ()



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 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.

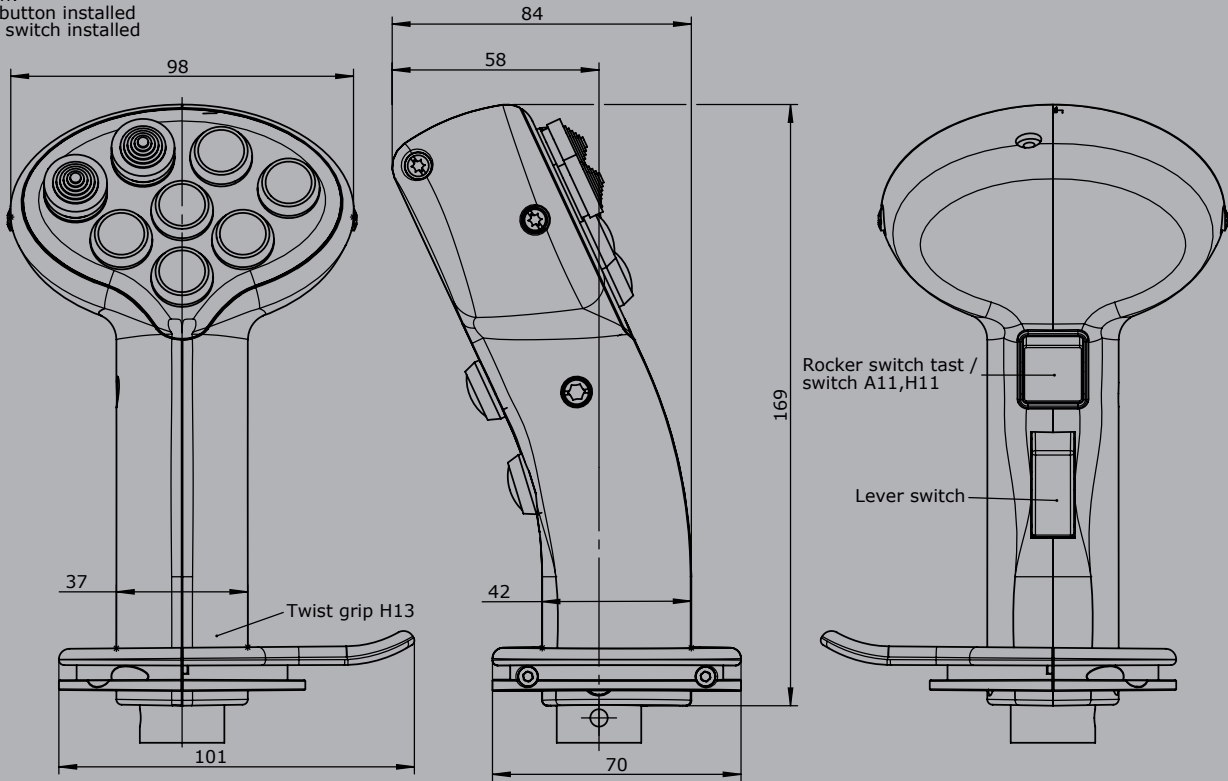
Technical data

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)

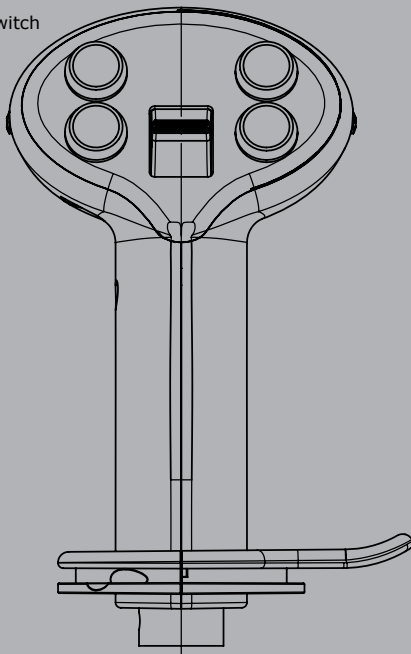


		Example						
		B20L	-2D	W	K	V21	H13	-X
Basic unit								
B20L	Palm Grip left with hand pad							
B20R	Palm Grip right with hand pad							
Digital actuating element								
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange							
HD	Hall-Push Button (see page 151)							
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							
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+E907)							
Analog actuating element								
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)							
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)							
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)							
HK	Hall-Cross Switch (see page 143)							
P9	Thumbwheel with potentiometer							
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 M5 x 15 necessary for bellow KMD 190					5209900404		

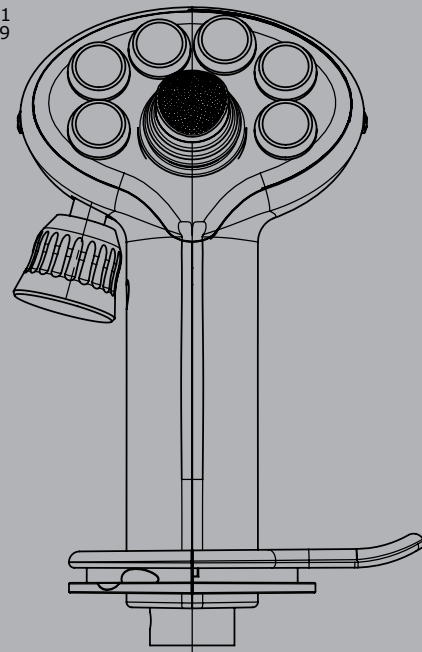
Edition:
Push button installed
Cross switch installed



Edition:
Hall rocker switch
Push button



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



Palm Grip

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

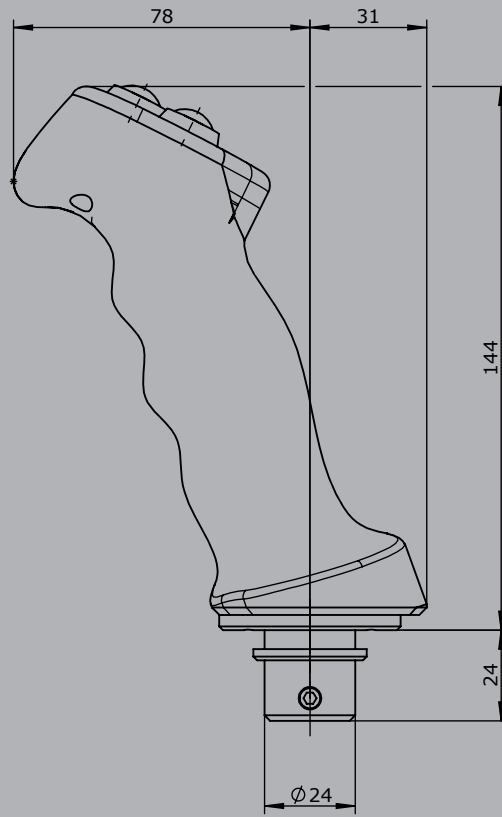
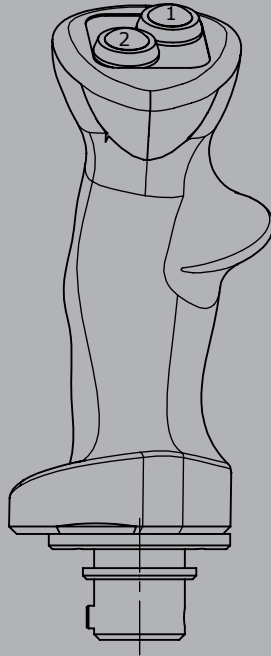
Operation temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	0,1A 24 V DC13



	B14	Example -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			

B14

Push button installed Pos. 1,2



B15

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.

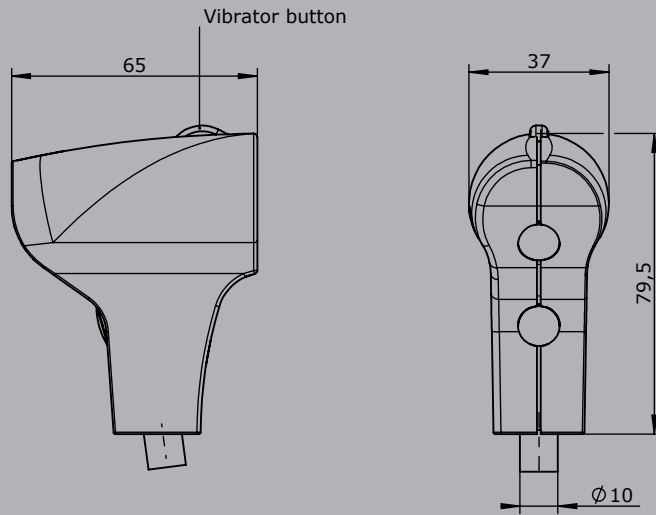
Technical data

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)



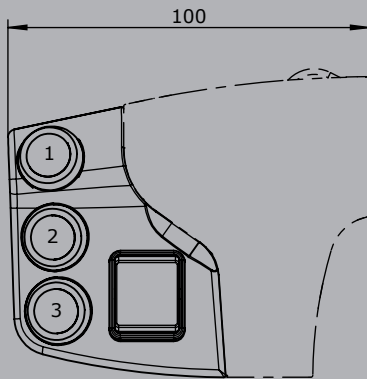
		Example				
		B10AL	-3D	W	V	-X
Basic unit						
B10L	Palm Grip left					
B10R	Palm Grip right					
B10AL	Palm Grip left with growing part					
B10AR	Palm Grip right with growing part					
Digital actuating element						
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange					
HD	Hall-Push Button (see page 151)					
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

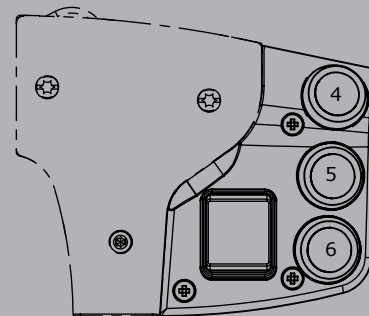


B10A

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



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





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.



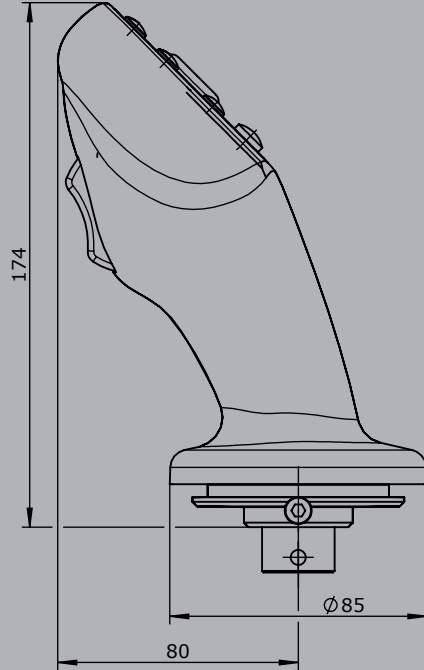
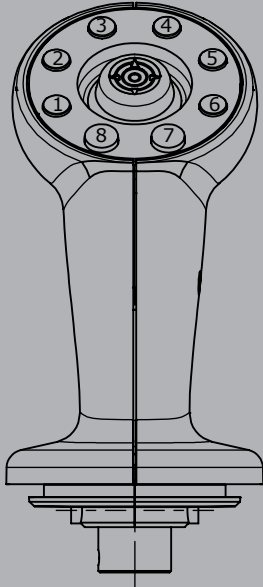
Technical data

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	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)							
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								
Zubehör								
Z01	Bellow KMD 109						10300009	
Z02	Bellow KMD 190						10300093	
Z03	Rosette KBF 905 with 4 screws M5x15 necessary for bellow KMD 190						5209900404	

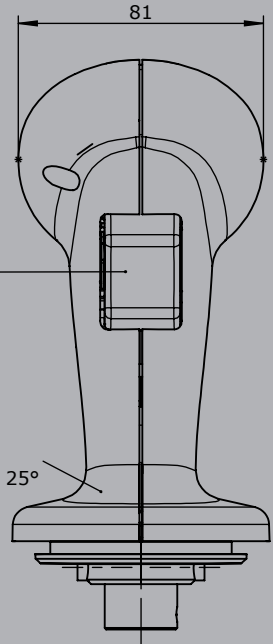
B9

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

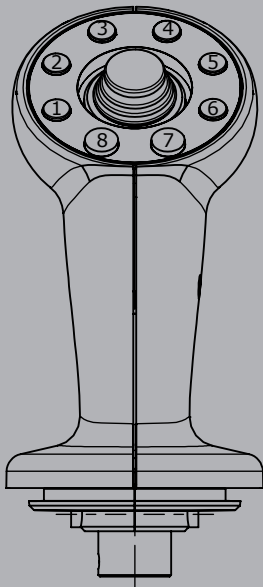


Rocker PA11, A11,H11
Direction 11-12

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



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





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)

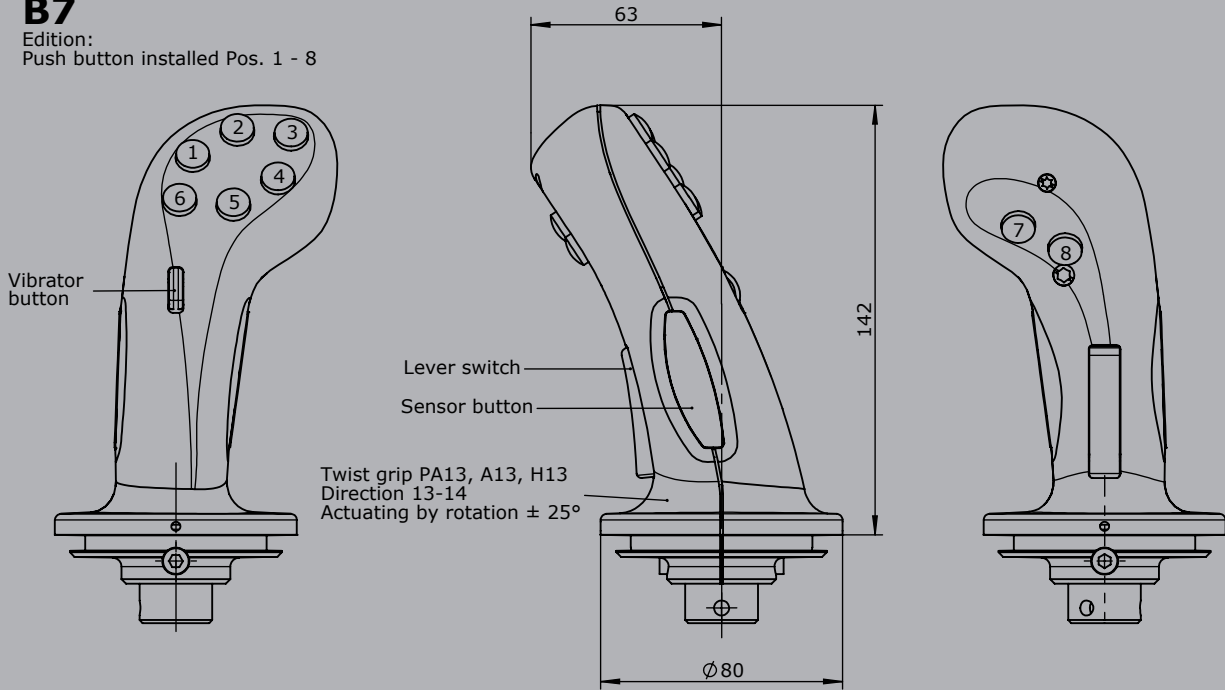


		Example							
		B7	-2D	W	K	SE	S9	PA13	-X
Basic unit									
B7	Palm Grip left								
B8	Palm Grip right								
Digital actuating element									
D	Push Button Colour: red, black, yellow, green, white, orange								
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange								
HD	Hall-Push Button (see page 151)								
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								
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+E907)								
V	Vibrator Impulse 24 V DC ED 100%								
Analog actuating element									
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 146)								
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 149)								
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 137)								
HK	Hall-Cross Switch (see page 143)								
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!

B7

Edition:
Push button installed Pos. 1 - 8

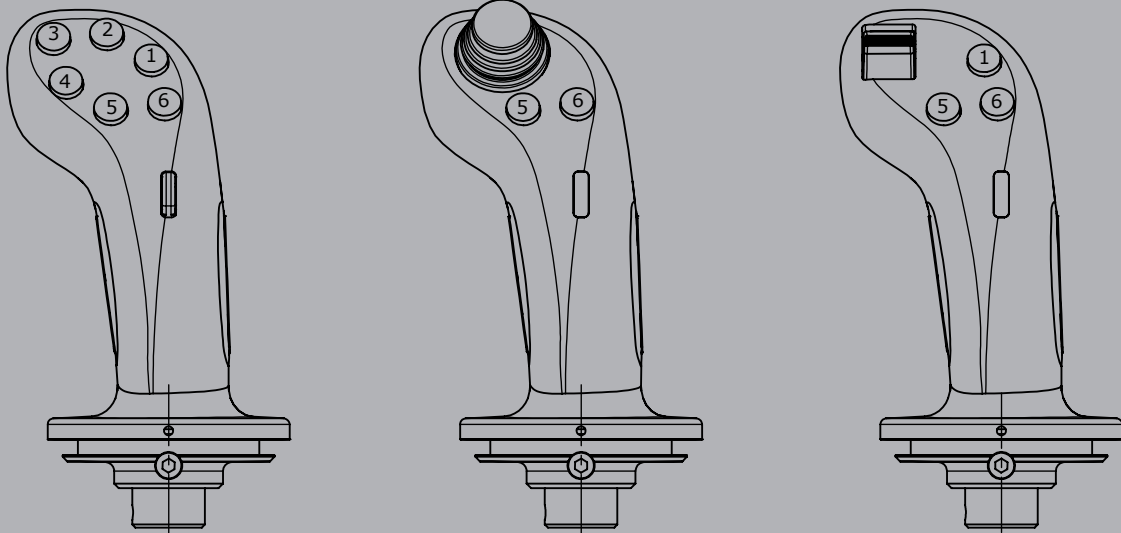


B8

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





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

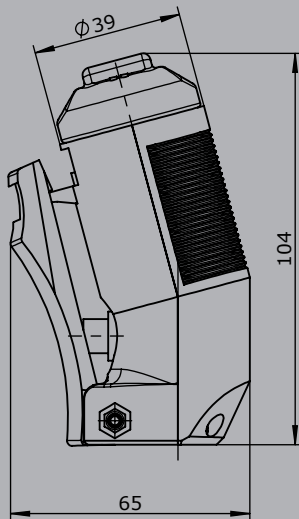
Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	1,5A 24 V DC13



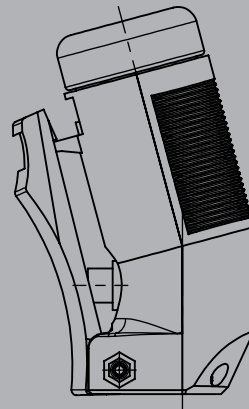
	B6	Example -2D	K	-X
Basic unit				
B6 Palm Grip				
Digital actuating element				
D Push Button top				
W Rocker switch top T-0-T				
W Rocker switch top R-0-T				
W Rocker switch top R-0-R				
K* Lever switch				
* Included with the delivery of Palm Grip B6!				
Special model				
X Special / customer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

B6

Edition:
Lever switch side
Rocker switch installed top



Edition:
Lever switch side
Push button top



Palm Grip 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.

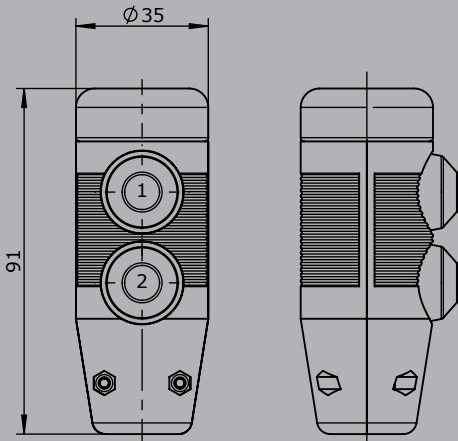
Technical data

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

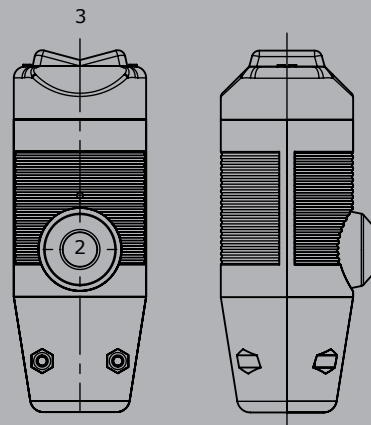


	Example			
	B5	-2D	W	-X
Basic unit				
B5 Palm Grip				
Digital actuating element				
D Push Button top				
D Push Button side *5				
W Rocker switch top T-0-T				
W Rocker switch top R-0-T				
W Rocker switch top R-0-R				
T Push Button top mechanical operation <i>(Only possible in combination with Multi-Axis Controller or single-axis controller!)</i>				
Special model				
X Special / customer specified				

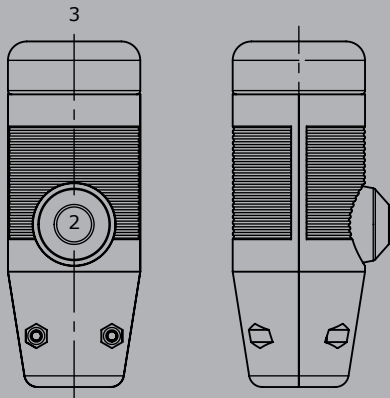
Edition:
Push button installed Pos. 1,2



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



Edition:
Push button installed Pos. 2,3



Palm Grip 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 DC 13 (*1 0,1A 24 V DC13)



		<i>Example</i>							
		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+E907)								
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

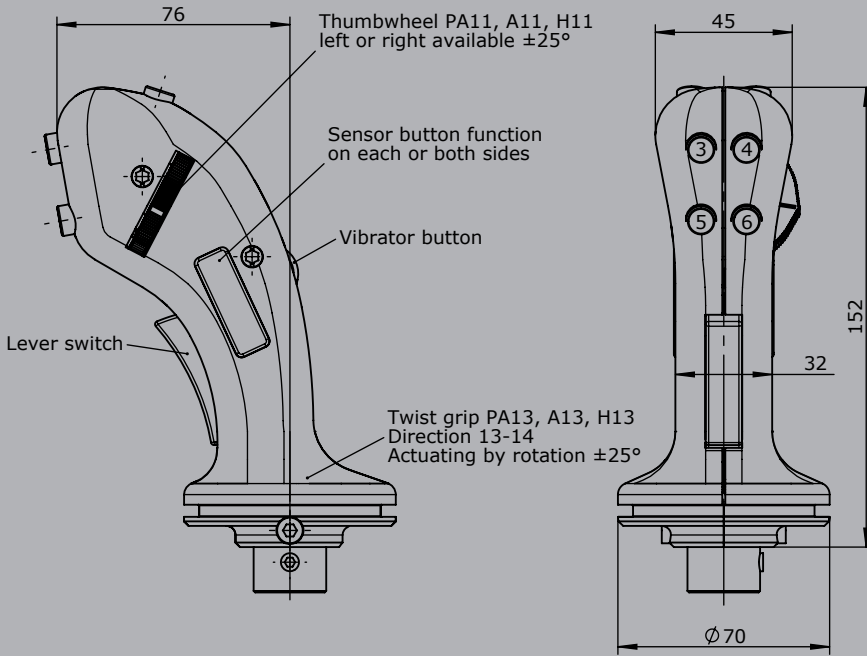
Special model

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

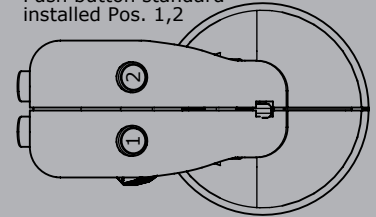
Attachments

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

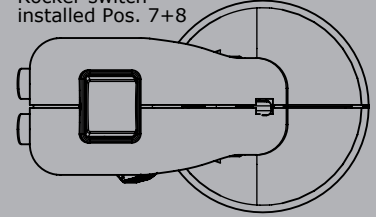
B3



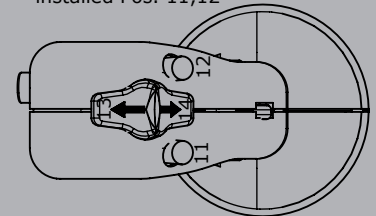
Edition:
Push button standard
installed Pos. 1,2



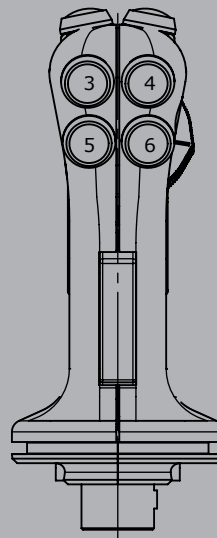
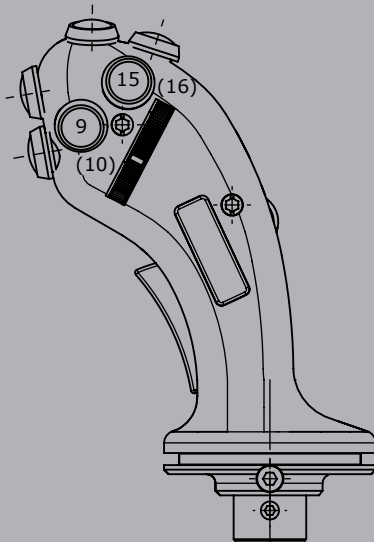
Edition:
Rocker switch
installed Pos. 7+8



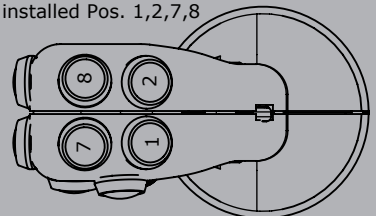
Edition:
Sliding switch
installed Pos. 13 + 14
Drive with potentiometer PA12 bzw.
Push button with 2 steps ZD
installed Pos. 11,12



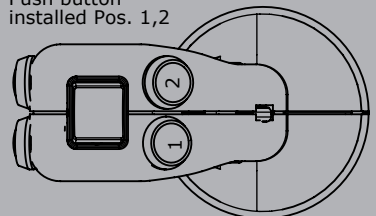
() = Installation right



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 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 degrees and can lock in this position. The mounting piece can be supplied with a tapped hole M10 (standard) or M8.

Technical data

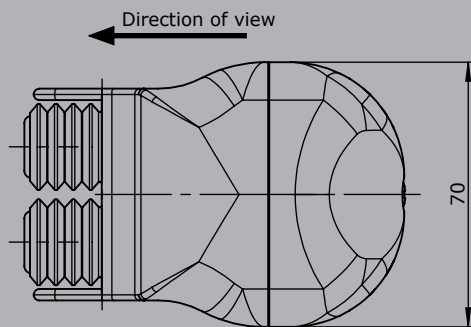
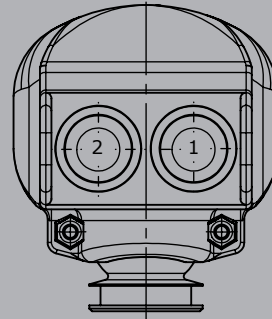
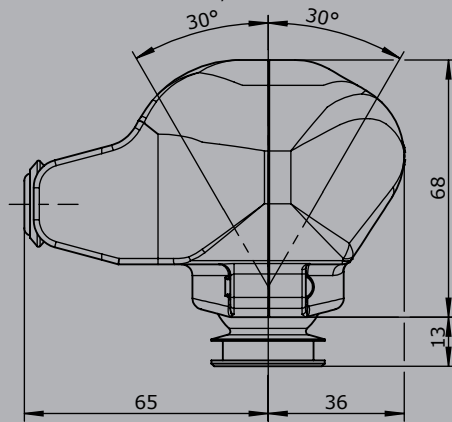
Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)



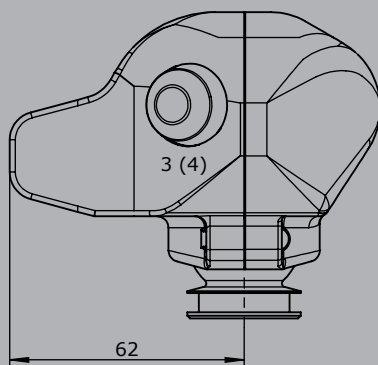
		Example			
		B2	-2D	PA15	-X
Basic unit					
B2	Palm Grip				
Digital actuating element					
D	Push Button KDA/70				
D	Push Button KDA21 *1				
	Colour: red, black, yellow, green, blue, white, orange				
HD	Hall-Push Button (see page 151)				
A15	2 push Button Pos. 1 + 2 interlocked				
Analog actuating 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

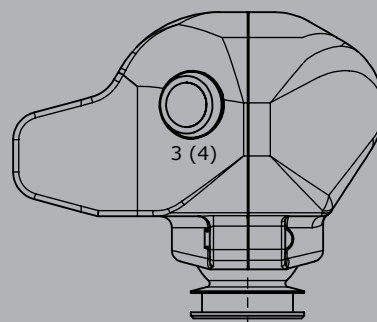
Edition:
Pusher installed Pos. 1,2



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



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



Palm Grip 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.

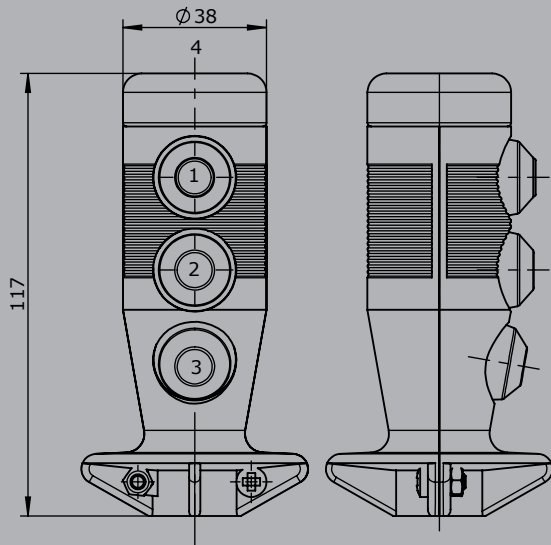
Technical data

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

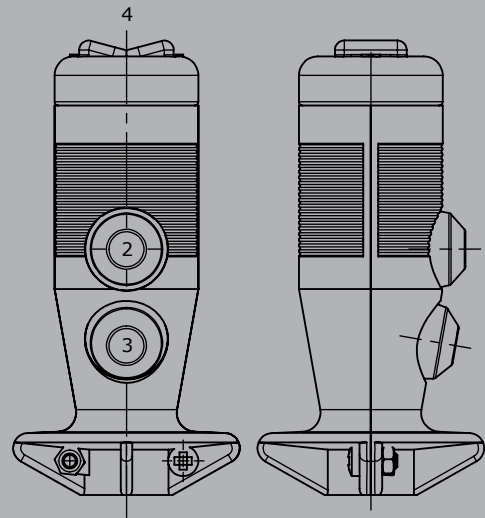


	B1	-2D	W	-X
Basic unit				
B1 Palm Grip				
Digital actuating element				
D Push Button top				
D Push Button side *1				
W Rocker switch top T-0-T				
W Rocker switch top R-0-T				
W Rocker switch top R-0-R				
T Push Button top with mechanical operation				
(Only possible with Multi-Axis Controller 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				

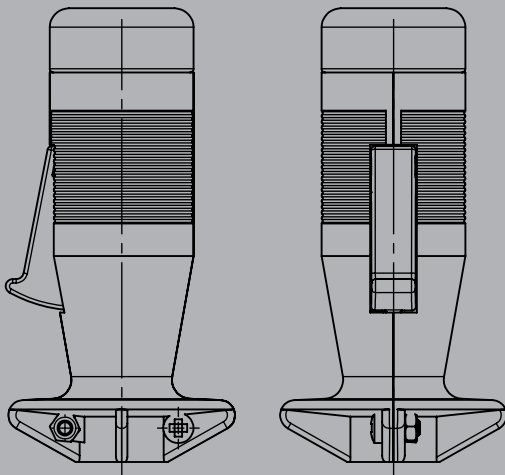
Edition:
Push button installed Pos. 1,2,3,4



Edition:
Rocker switch installed Pos. 4
Push button installed Pos. 2,3



Edition:
Lever switch installed side



Control Console C1



We designed the Control Console C1 to give our customers the maximum freedom of design and configuration options. The design has paid attention to a compact format, which can be extended with additional modules. The modular design allows individual assembly with joysticks, displays and command devices. The Control Console C1 is thus able to adapt perfectly to your product and your branding.



reddot winner 2020
industrial design



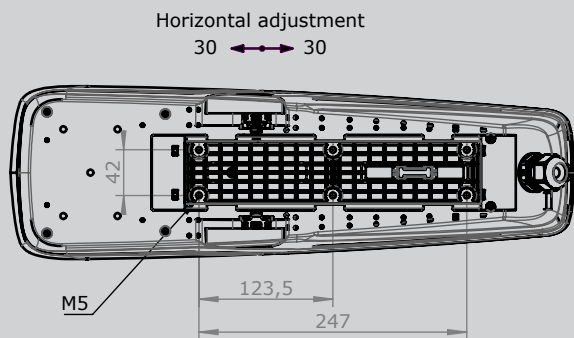
Standard colour:
Housing bottom part: anthracite RAL 7016
Housing upper part: light grey RAL 7035
Insert plate: anthracite RAL 7016

Technical data:

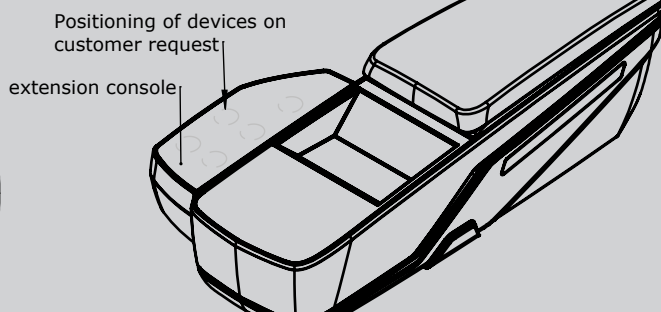
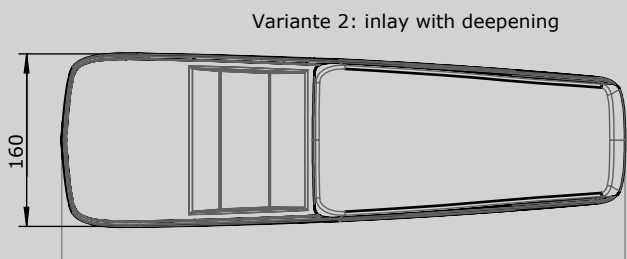
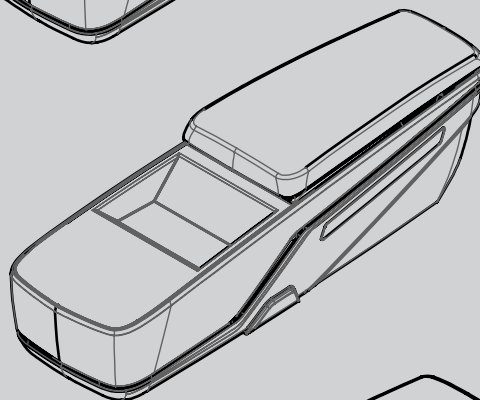
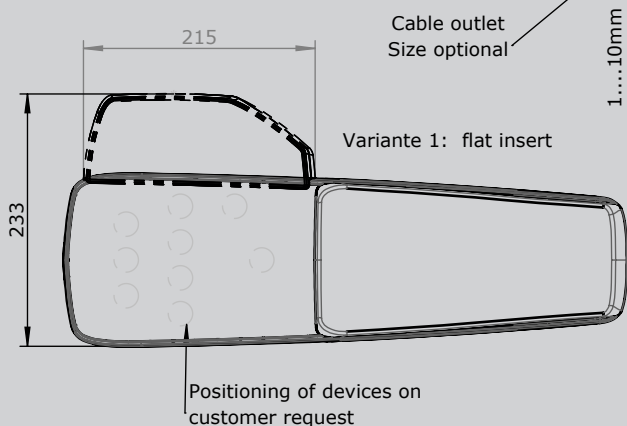
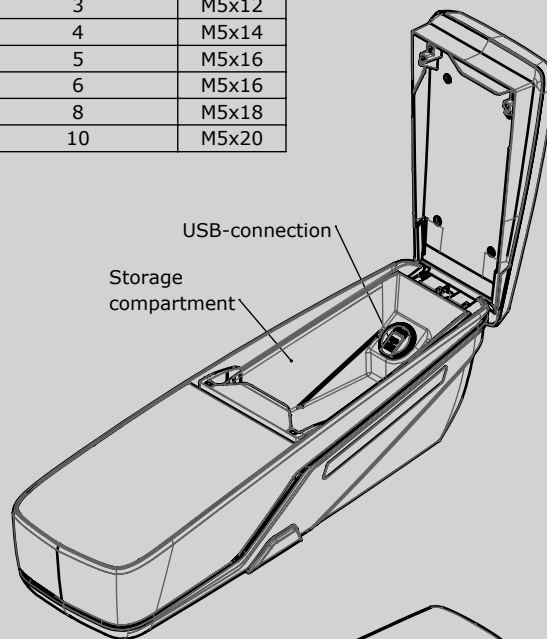
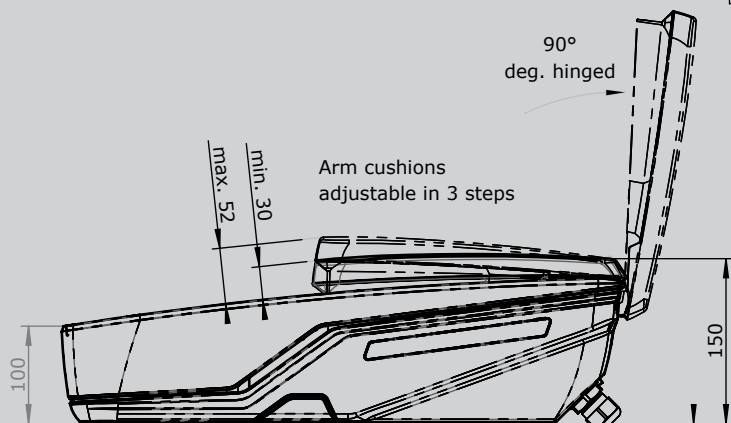
Operation temperature -40°C to +85°C
Horizontal adjustment +/- 30 mm

	C1	-1	-1	-1	-0	USB	-L1	/	V27	/	KLS	/	X
Control Console													
C1	160 x 520 mm												
Insert plate													
1	Insert plate (flat) variant 1												
2	Insert plate (with recess) variant 2												
Colour housing upper part													
1	Light grey RAL 7035												
X	Desired colour (on request!)												
Colour decor stripes													
1	Red												
X	Desired colour (on request!)												
Illumination decor stripes													
0	No illumination												
1	RGB-illumination left												
2	RGB-illumination right												
3	RGB-illumination left + right												
Attachments													
USB	USB-plugin socket 2-fold, 2 x 2,5 A												
L1	Logo left												
L2	Logo right												
L3	Logo left incl. lighting												
L4	Logo right incl. lighting												
E1	Extension housing right												
D1	Display holder (Display on request)												
Mounting for equipment boxes													
V	Multi-Axis Controller (see page 1)												
N	Control-Switch (see page 113)												
More Control Elements (see page 137 and 243)													
Wiring													
KLS	On connector or joystick per core												
KLK	One side on cable per core												
Special model													
X	Special / customer specified												

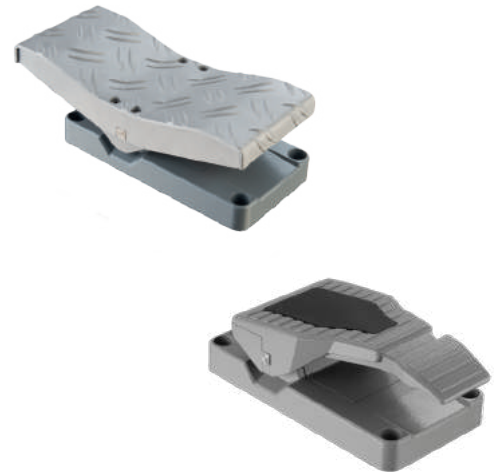
Technical details may vary based on configuration or application! Technical data subject to change without notice!



Thickness of mounting plate, provided by customer (mm)	screw for mounting plate
1	M5x10
1,5	M5x12
2	M5x12
2,5	M5x12
3	M5x12
4	M5x14
5	M5x16
6	M5x16
8	M5x18
10	M5x20



The Foot Pedal P20 is a rugged switching device for electro-hydraulic. A long service life and high reliability is ensured by the latest contactless hall-technology. Due to the modular construction and the different electrical interfaces it is universally applicable..



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 compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)

		P20	-1	Example -ZZ	-E1041	-S...	-X
Basic unit							
P20	Foot Pedal						
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°						
	HL Gearshift mounted on the left side						
	HR Gearshift mounted on the right side						
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 120)</i>						
Special model							
X	Special / customer specified						

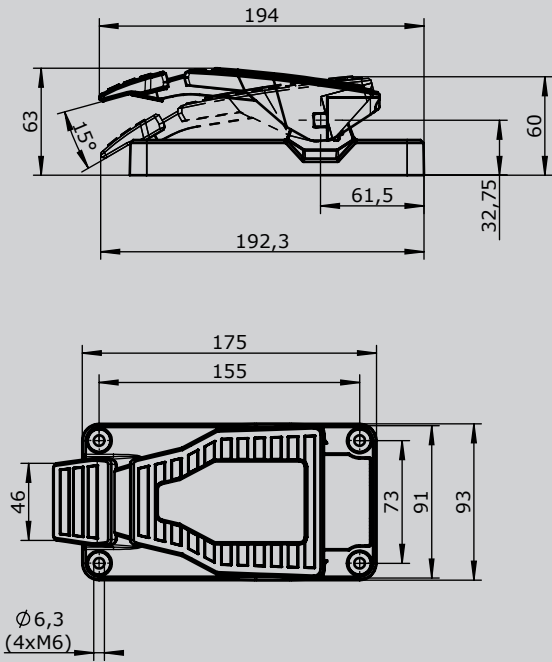
Digital output		
Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Wiring	Cable 500mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 120</i>)	
2 direction signals + 1 zero position signal (galvanically isolated)	E001 1	S
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 120</i>)	
0,5...2,5...4,5 V redundant + 2 direction signals	E104 1	S
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

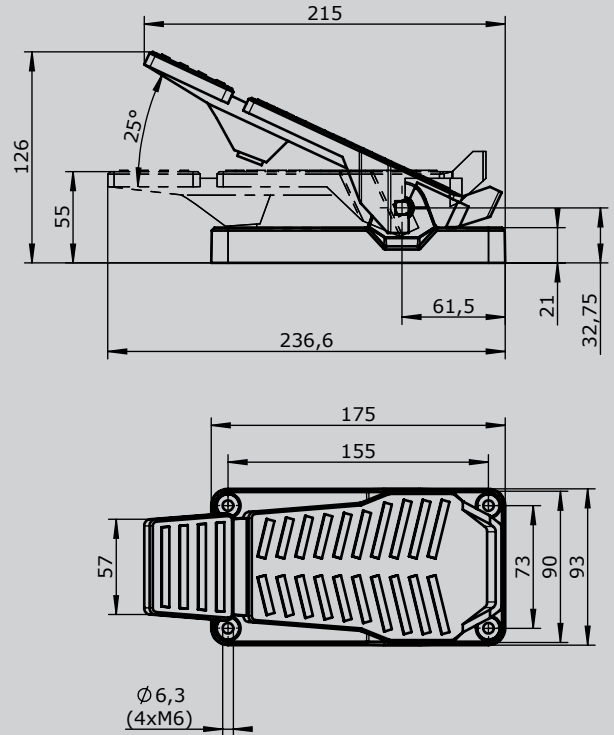
Voltage output		
Supply voltage	9-32 V DC (*11,5-32 V)	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Wiring	Cable 500mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 120</i>)	
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated)	E112 1	S
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	S
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	S
	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	
<i>Voltage output with other value on request!</i>		

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 120</i>)		S
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring and error signal		E206 1	
0...20 mA + 1 direction signal + 1 zero position signal (galvanically isolated), sensor redundant with error monitoring signal 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
<i>Current output with other value on request!</i>			
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 (based on)		
Baud rate	125 kBit/s to 1 Mbit/s (standard 250 kBit/s)		
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 EN50325-5		
Baud rate	125 kBit/s bis 1 MBit/s (standard 250 kBit/s)		
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			2
Attachments			
Z01 Mating connector M12 male insert with 2 m cable		20201140	
Z02 Mating connector M12 female insert with 2 m cable		20202298	

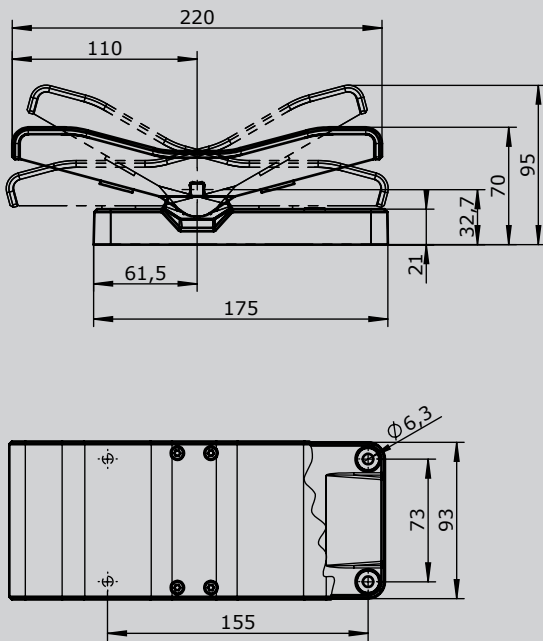
Pedal form A



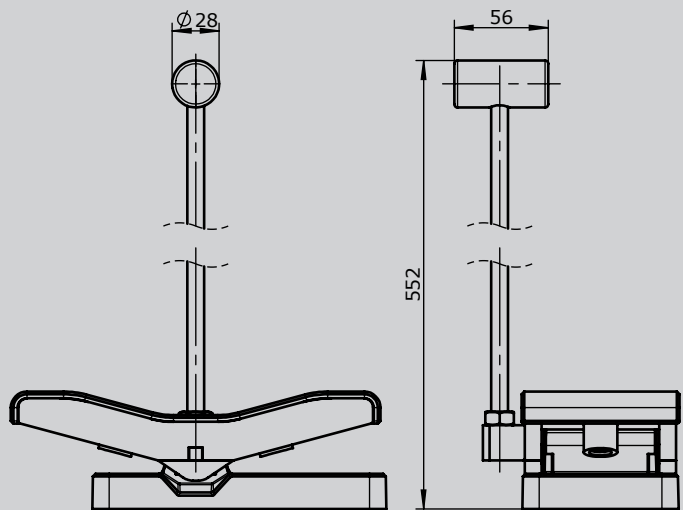
Pedal form B



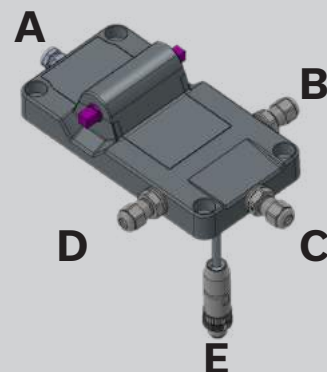
Pedal form C



optional with gear lever



Possible cable outputs



Foot Pedal

P10 / P11 / P12



The Foot Pedal 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.

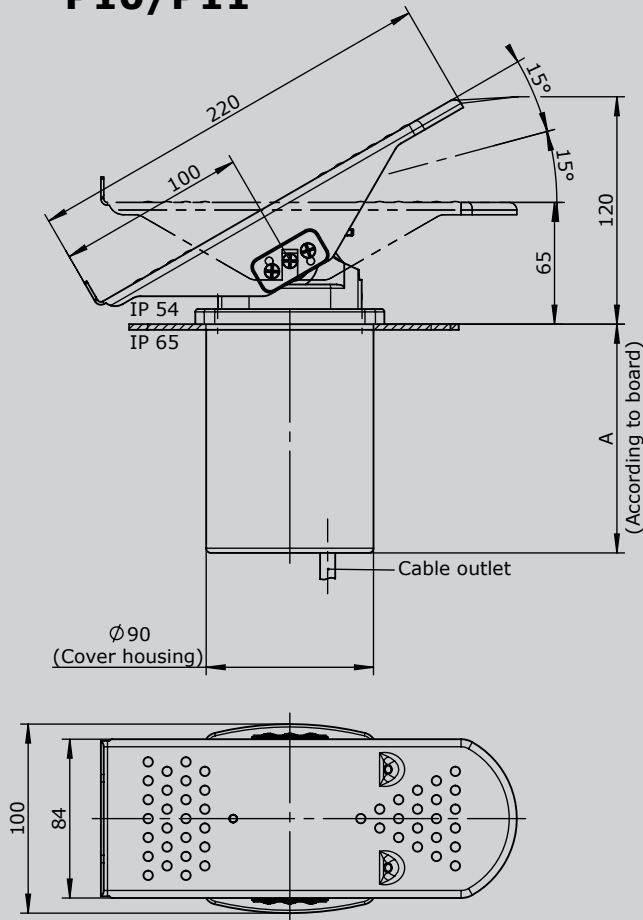
Technical data

Mechanical life P10	8 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection P10	IP66

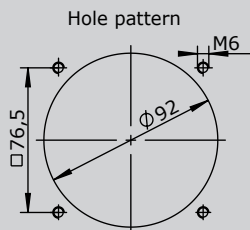
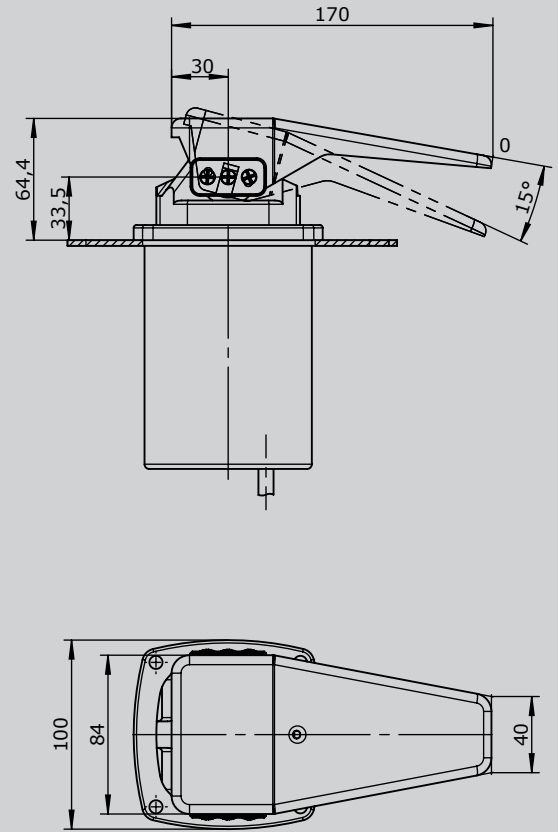


		P10	-1 Z	P	-A01	P224	-B	-X
Basic unit								
P10	Foot Pedal, 0-30°							
P11	Foot Pedal, 15°-0-15°							
P12	Foot Pedal, 0-15°							
Detent								
	Without							
R4	1-0-1							
Direction 1-2								
1	1 contact	Standard contact - arrangement see page 122						
2	2 contacts	z.B.						
3	3 contacts	MS11	A01					
		MS12	A02					
		MS13	A03					
		MS21	A05					
		A99 contact - arrangement according customer request						
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			
		More potentiometers on request!						
Cover housing								
B	Cover housing with cable entry M20							
Special model								
X	Special / customer specified							

P10/P11



P12



Foot Pedal

P8 / PP8



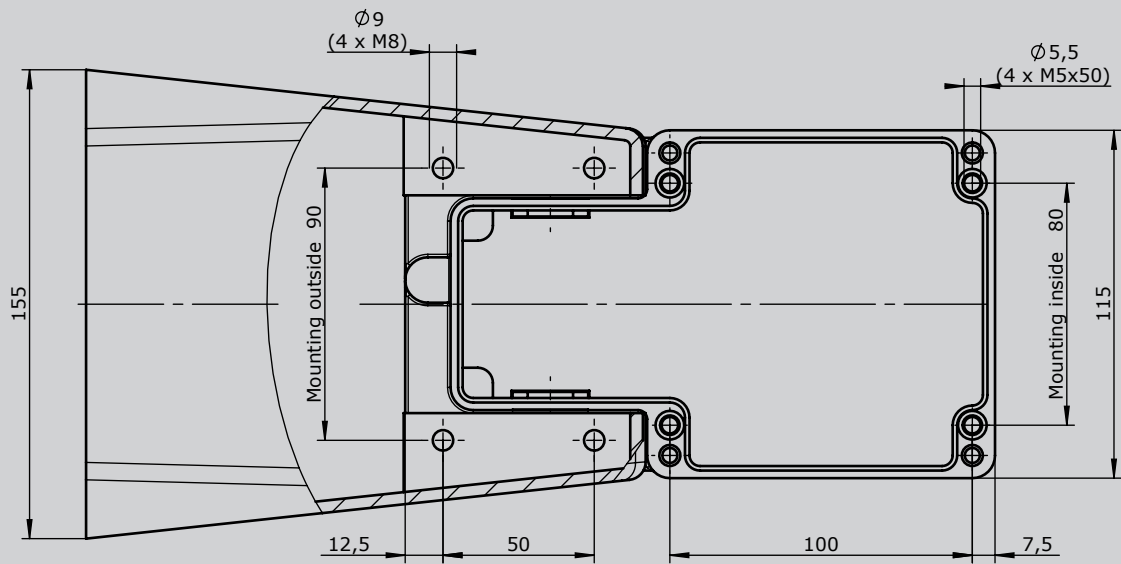
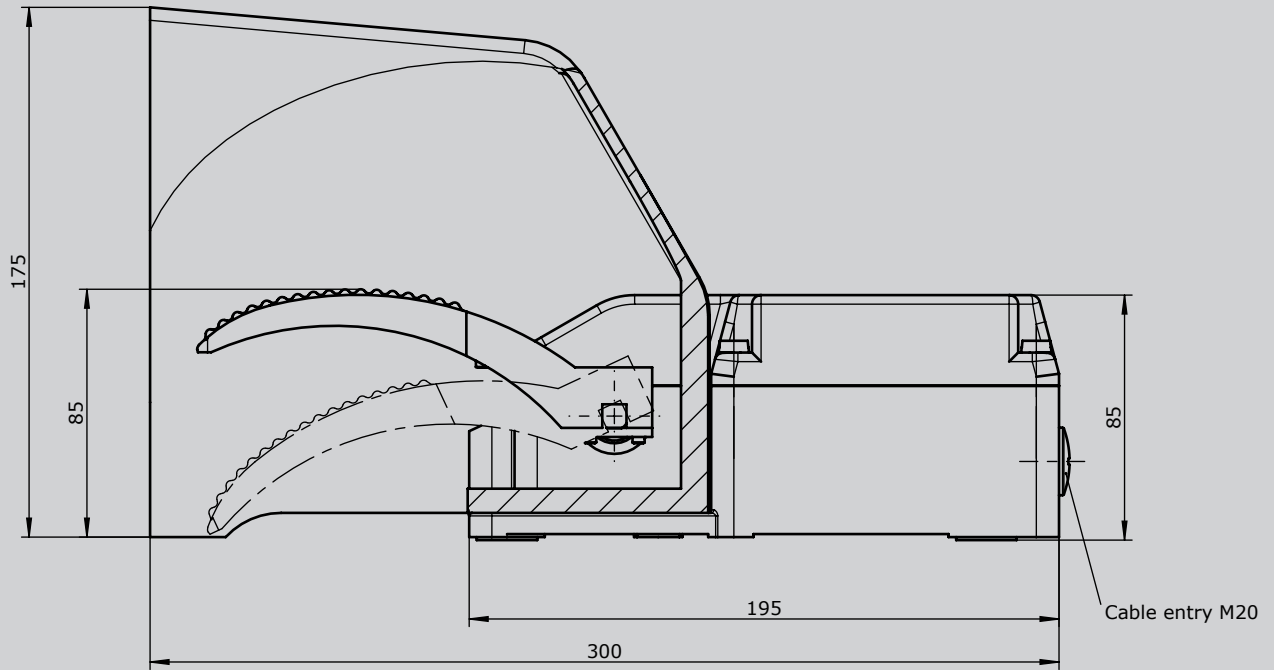
The Foot Pedal P8 / PP8 is a rugged switching devices for footing applications. The Foot Pedal is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

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



		P8	-1 Z	Example P	-A01	P124	-X
Basic unit							
P8	Foot Pedal						
Reinforced version							
PP8	Foot Pedal						
Detent							
	without						
R2	0-2						
R3	0-3						
R4	0-4						
Direction 1-2							
1	1 contact	Standard contact - Arrangement see page 122					
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						



The Foot Pedal P7 / PP7 is a rugged switching devices for footing applications. The Foot Pedal is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

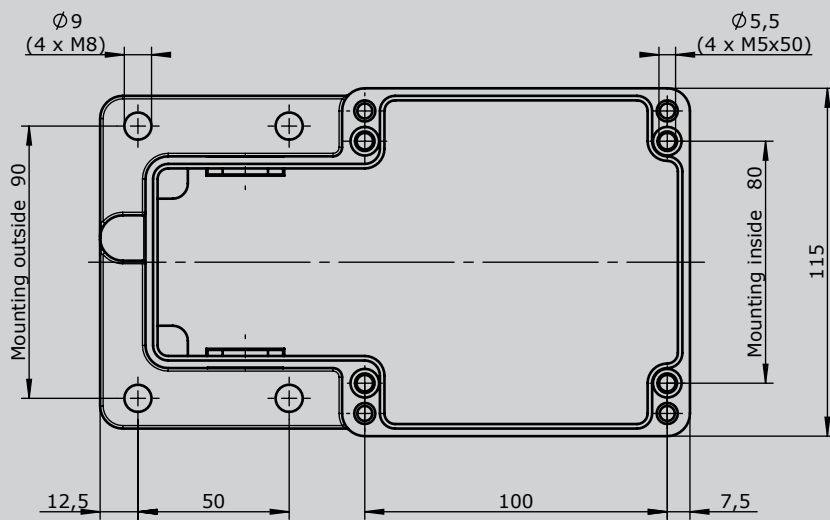
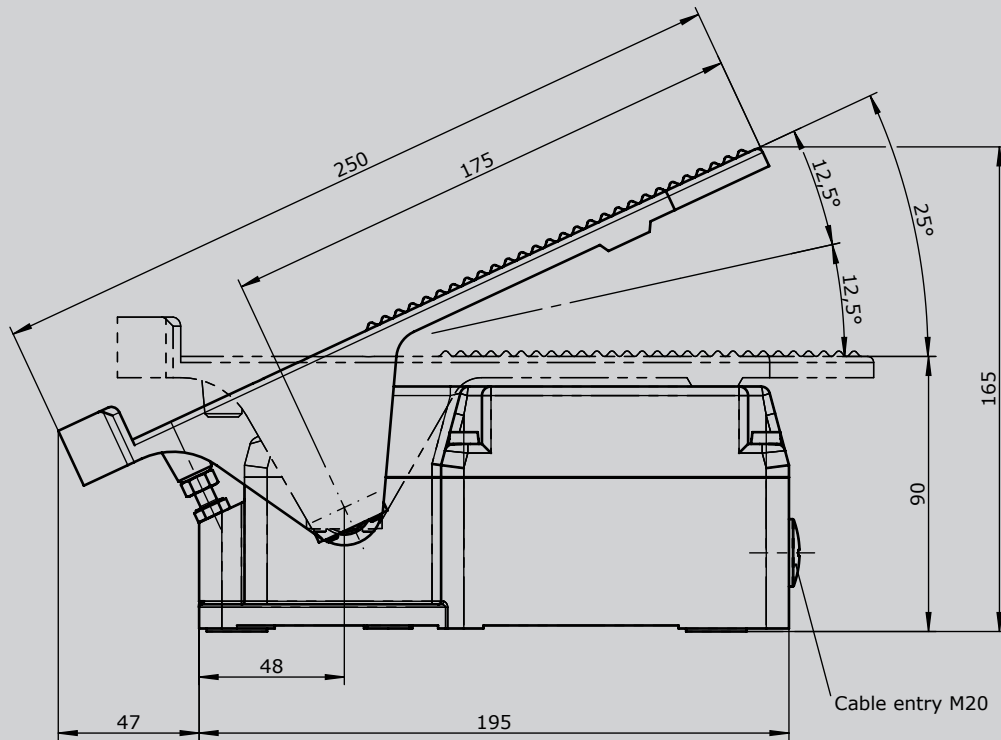
Technical data

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	Example P	-A01	P124	-X
Basic unit							
P7	Foot Pedal						
	Reinforced version						
PP7	Foot Pedal						
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 122					
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!



Control Unit KST 31 swiveling



The KST31 is an ergonomically designed swiveling control chair which provides a high degree of comfort. The 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.

The standard version includes:

Consoles:

The plastic consoles can be equipped with custom command and indicating devices.

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 7016 anthracite



		Example														
		KST311	-U2	-M1	-F3	-LK	/	KFS 11	/	V85	/	V85	/	KL	/	X
Basic unit																
KST311	Consoles 160x520 mm with insert plate (flat) variant 1															
KST312	Consoles 160x520 mm with insert plate (with absorption) variant 2															
Base unit																
U2	Swiveling 180° left, 90° right with detent incl. 2-step release															
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															
USB	USB-plug socket 2-fold, 1 x 1,5 A (mounted in the left storage compartment)															
F3	Footrest KBF/716															
H	Heater 2 x 2 kW with ventilator															
LK	Plate for horizontal manual adjustment for control units +/- 250 mm															
Driver's Seat																
KFS11*	(Included in the delivery!)															
KFS9*																
KFS10*																
KFS12*																
*Description see Driver's Seat page 251																

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

KST311 -U2 -M1 -F3 -LK / KFS 11 / V85 / V85 / KL / X

Mounting for equipment boxes

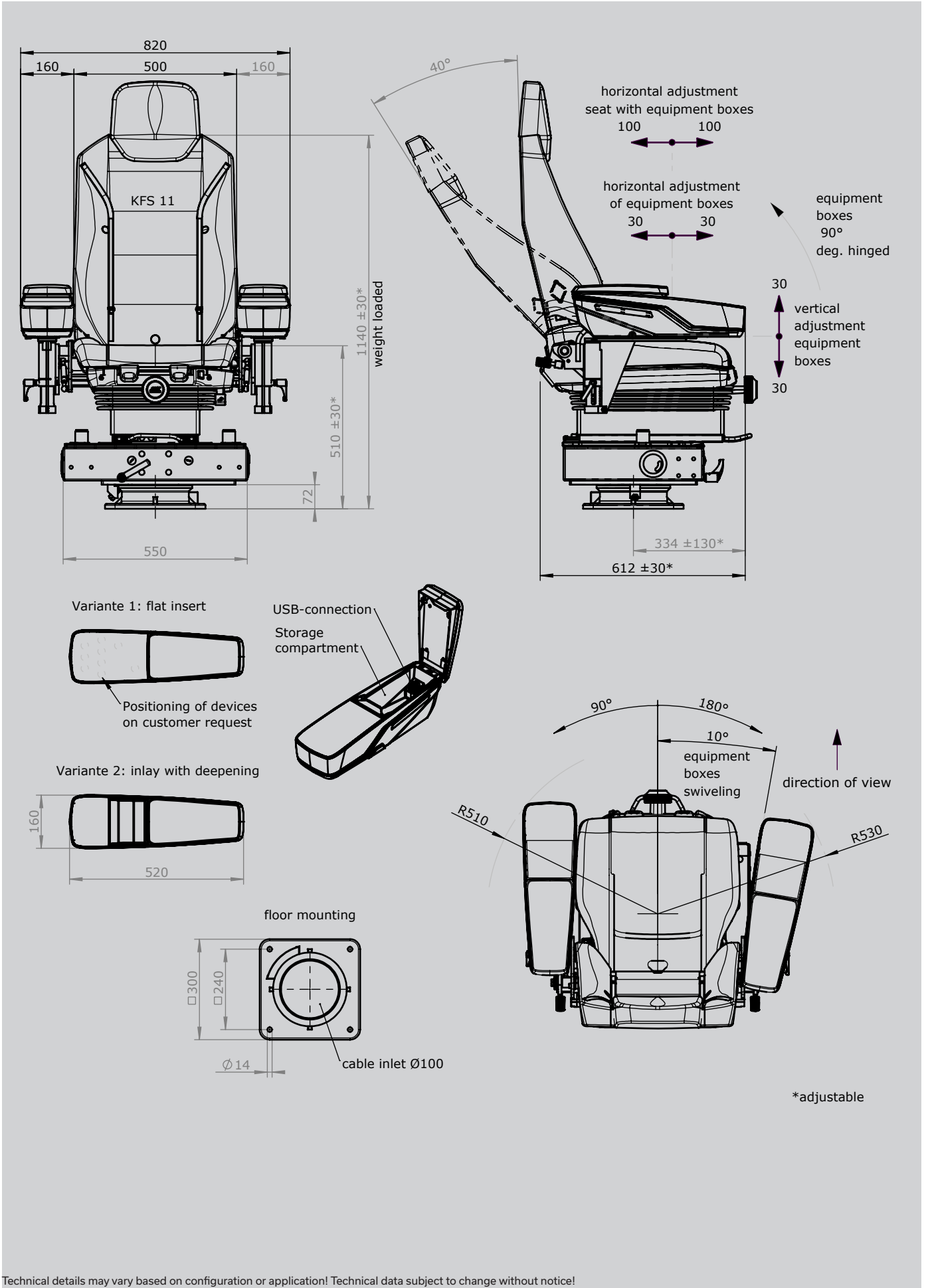
- V... Multi-Axis Controller (see section joysticks)
- S... Single-Axis Controller (see section joysticks)
- D... Double-Handle Controller (see section joysticks)
- N... Control-Switch (see page 113)
- ... More command and indicating devices (see page 137 and 243)

Wiring

- KL Without wiring, but terminal block built in each terminal
- KLV On terminal block 4 mm with single wire 1 mm² each terminal
- KLV 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
Additional-/ reduction price per meter

Special model

- X Special / customer specified
- X Special painted



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

Control Unit

KST 30 swiveling



The KST30 is an ergonomically designed swiveling 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														
		KST3011	-U2	-M1	-F3	-LK	/	KFS 11	/	V85	/	V85	/	KL	/	X
Basic unit																
KST3001	With inner equipment boxes version 1															
KST3011	With inner equipment boxes version 1 and outside equipment boxes 160 mm wide															
KST3031	With inner equipment boxes version 1 and outside equipment boxes 270 mm wide															
KST3041	With inner equipment boxes version 1 and outside equipment boxes 320 mm wide <i>Special equipment boxes form on request!</i>															
Base unit																
U2	Swiveling 180° left, 90° right with detent incl. 2-step release															
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's Seat																
KFS11*	<i>(Included in the delivery!)</i>															
KFS9*																
KFS10*																
KFS12*																
*Description see Driver's Seat page 251																

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

KST3011 -U2 -M1 -F3 -LK / KFS 11 / V85 / V85 / KL / X

Mounting for equipment boxes

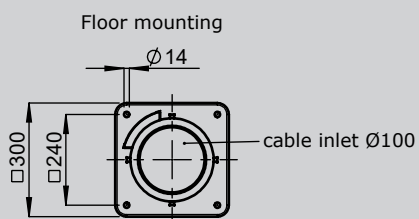
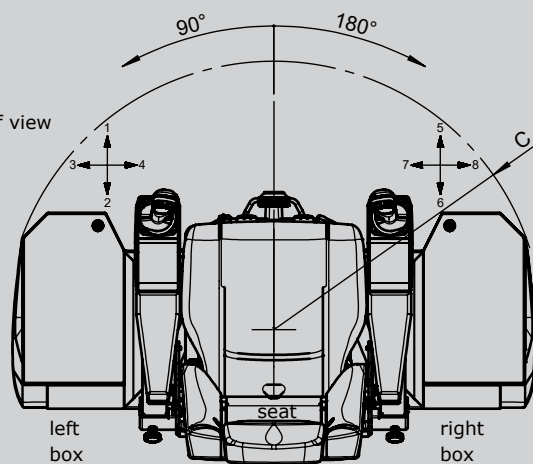
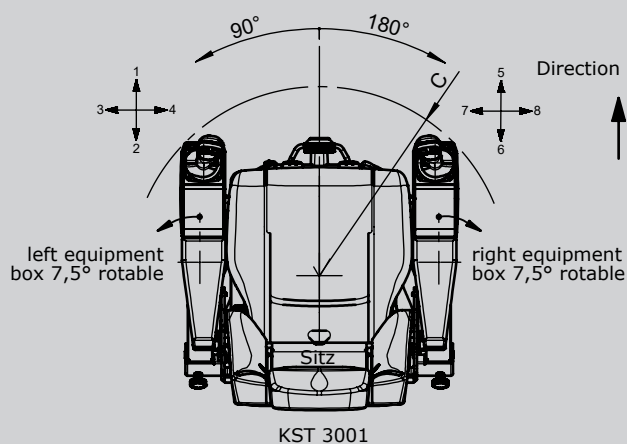
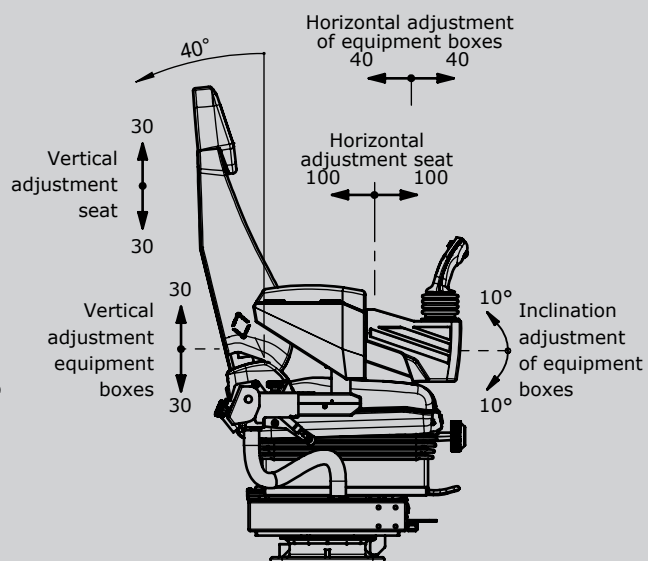
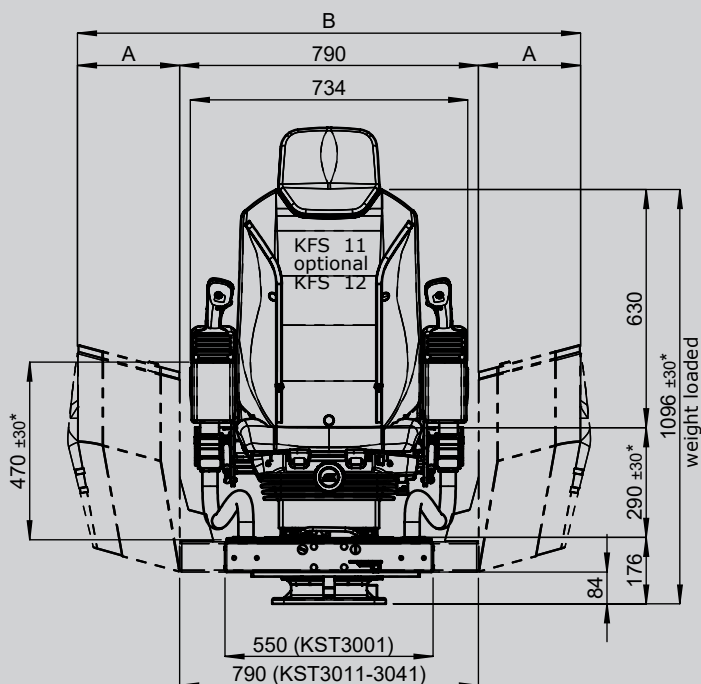
V...	Multi-Axis Controller (see section joysticks)
S...	Single-Axis Controller (see section joysticks)
D...	Double-Handle Controller (see section joysticks)
N...	Control-Switch (see page 113)
...	More command and indicating devices (see page 137 and 243)

Wiring

KL	Without wiring, but terminal block built in each terminal
KLV	On terminal block 4 mm 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
	<i>Additional-/ reduction price per meter</i>

Special model

X	Special / customer specified
X	Special painted



* 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

Control Unit

KST 19 swiveling



The KST19 is an ergonomically designed swiveling 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's Seat:

As standard the KST19 is fitted with a KFS10 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 armrests and a headrest. There is the option to have the seat covered with air-permeable artificial leather.

Cross-member with swivel base:

The swivel base is zero-clearance bearing and can be locked either by a detent (standard) in 3° steps or stepless by a friction brake.

Surface treatment:

Base coat and textured varnish

Standard colour RAL 7035 light grey, equipment boxes RAL 7016 anthracite



Example

KST19 -U1 -M1 -F3 -LK / KFS 10 / V85 / V85 / KL / X

Basic unit

KST19 With equipment boxes

Base unit

U1 Swiveling 180° left, 90° right with friction brake
 U2 Swiveling 180° left, 90° right with detent incl. 2-step release (standard)
 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's Seat

KFS10* (Included in the delivery!)

*Description see Driver's Seat page 251

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

Mounting for equipment boxes

V...	Multi-Axis Controller (see section joysticks)
S...	Single-Axis Controller (see section joysticks)
D...	Double-Handle Controller (see section joysticks)
N...	Control-Switch (see page 113)
...	More command and indicating devices (see page 137 and 243)

Wiring

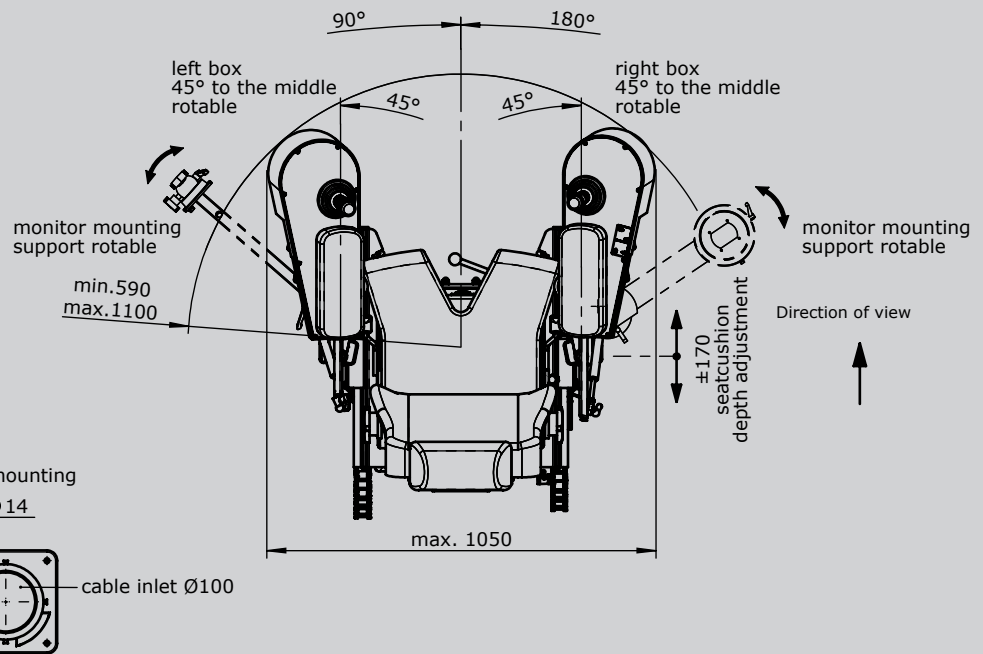
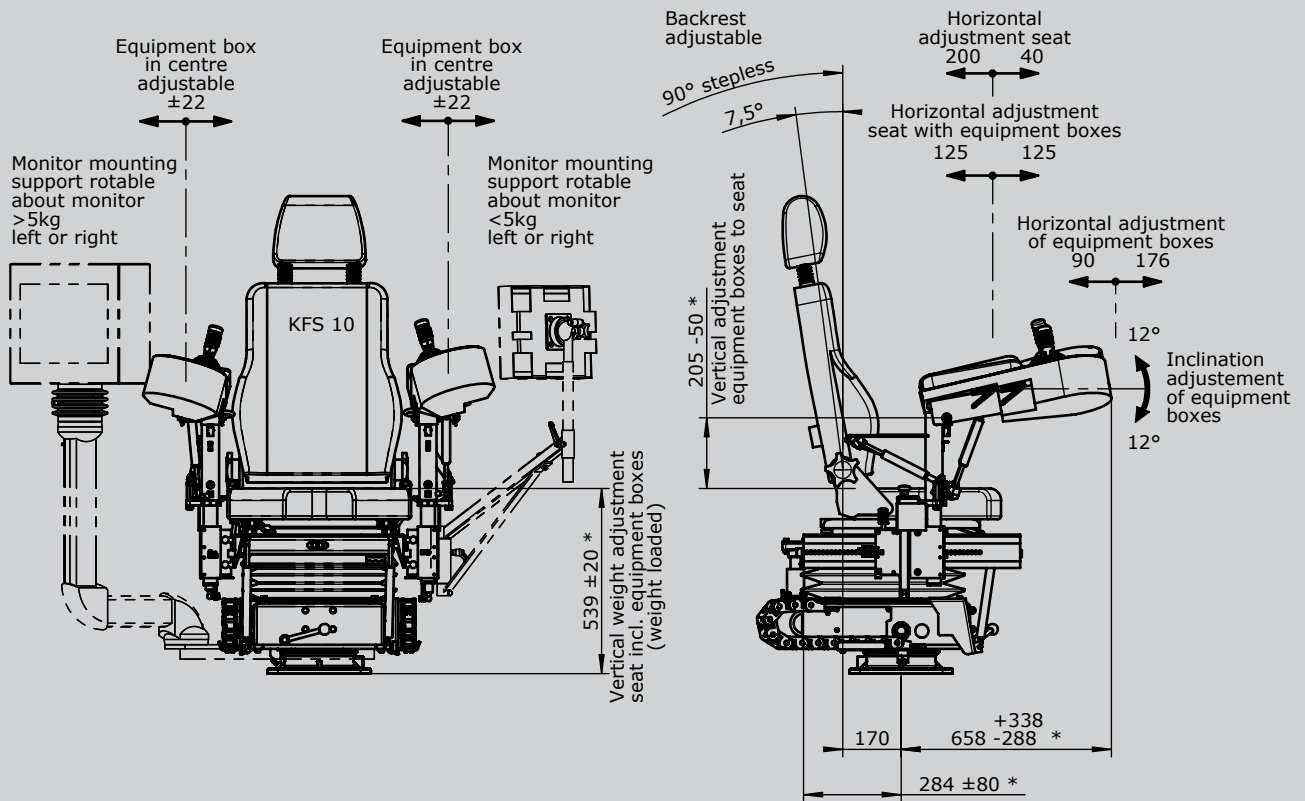
KL	Without wiring, but terminal block built in each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

X	Special / customer specified
X ²	Special painted

Option

Radio remote control system



* adjustable

Control Unit KST 10 swiveling



The KST10 is an ergonomically designed swiveling 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's Seat:

As standard the KST10 is fitted with a KFS11 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. The swivel base is zero-clearance bearing and can be locked either by a detent (standard) in 3° steps or stepless by a friction brake.

Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black



		Example														
		KST10	-U1	-M1	-F3	-LK	/	KFS 11	/	V85	/	V85.1	/	KL	/	X
Basic unit		KST10	With equipment boxes													
Base unit		U1	Swiveling 180° left, 90° right with friction brake													
	U2	Swiveling 180° left, 90° right with detent incl. 2-step release (standard)														
	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's Seat		KFS11*	(Included in the delivery!)													
	KFS9*															
	KFS10*															
	KFS12*															
	*Description see Driver's Seat page 251															

KST10 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Mounting for equipment boxes

V...	Multi-Axis Controller (see section joysticks)
S...	Single-Axis Controller (see section joysticks)
D...	Double-Handle Controller (see section joysticks)
N...	Control-Switch (see page 113)
...	More command and indicating devices (see page 137 and 243)

Wiring

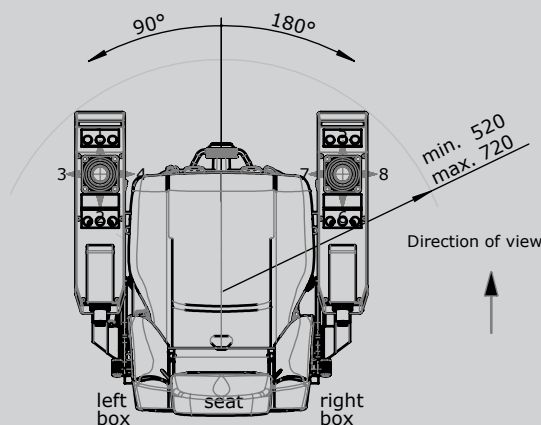
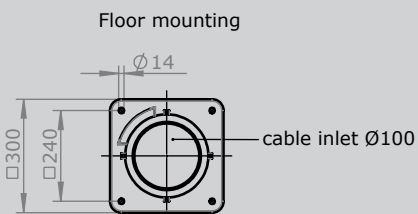
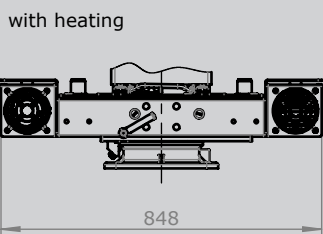
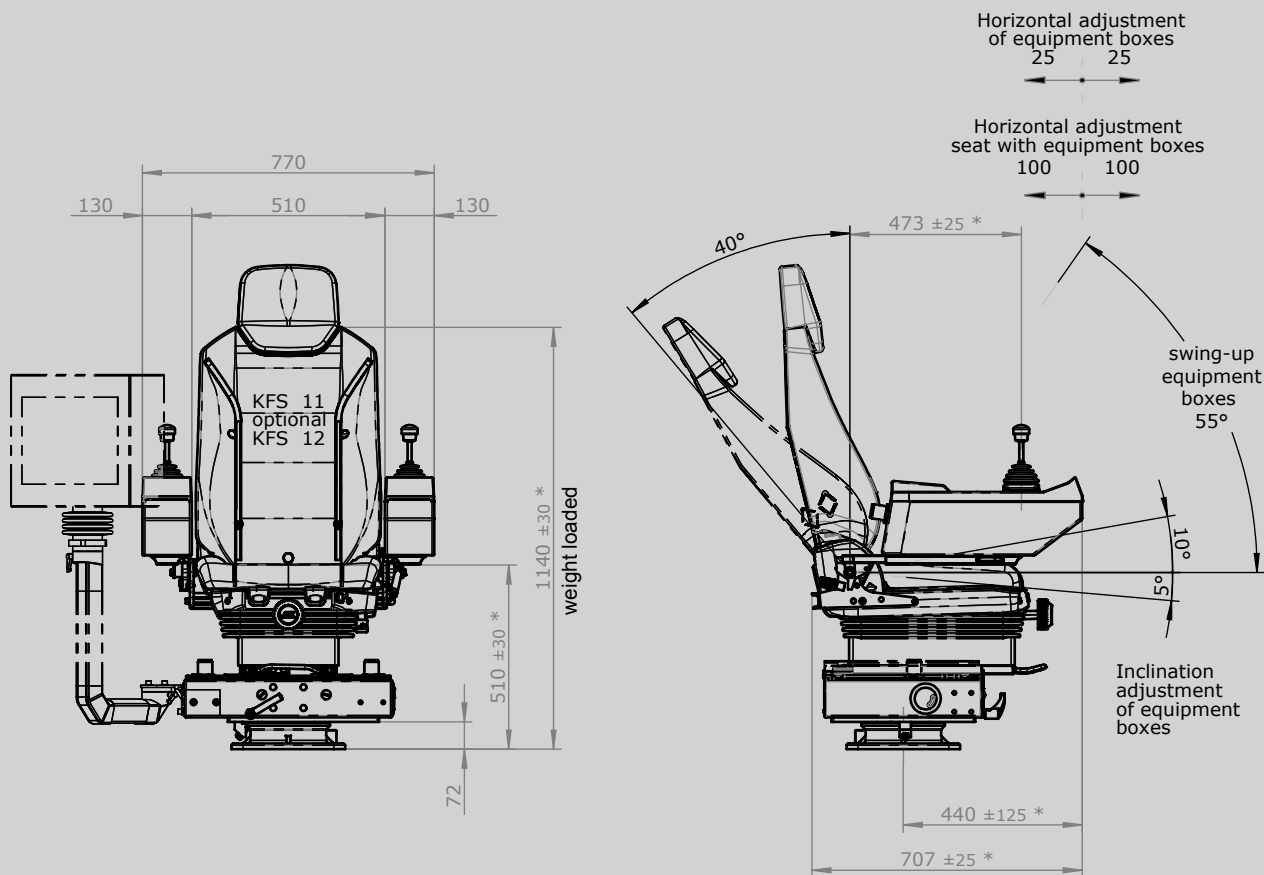
KL	Without wiring, but terminal block built in each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

X	Special / customer specified
X ²	Special painted

Option

Radio remote control system



* adjustable

Control Unit

KST 4 swiveling



The KST4 is an ergonomically designed swiveling 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's Seat:

As standard the KST4 is fitted with a KFS11 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. The swivel base is zero-clearance bearing and can be locked either by a detent (standard) in 3° steps or stepless by a friction brake.

Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black



Example

KST41 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Basic unit

- KST41 With equipment boxes 160 x 420 mm
- KST42 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 incl. 2-step release (standard)
- 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's Seat

- KFS11* (Included in the delivery!)
- KFS9*
- KFS10*
- KFS12*

*Description see Driver's Seat page 251

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

KST41 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Mounting for equipment boxes

V...	Multi-Axis Controller (see section joysticks)
S...	Single-Axis Controller (see section joysticks)
D...	Double-Handle Controller (see section joysticks)
N...	Control-Switch (see page 113)
...	More command and indicating devices (see page 137 and 243)

Wiring

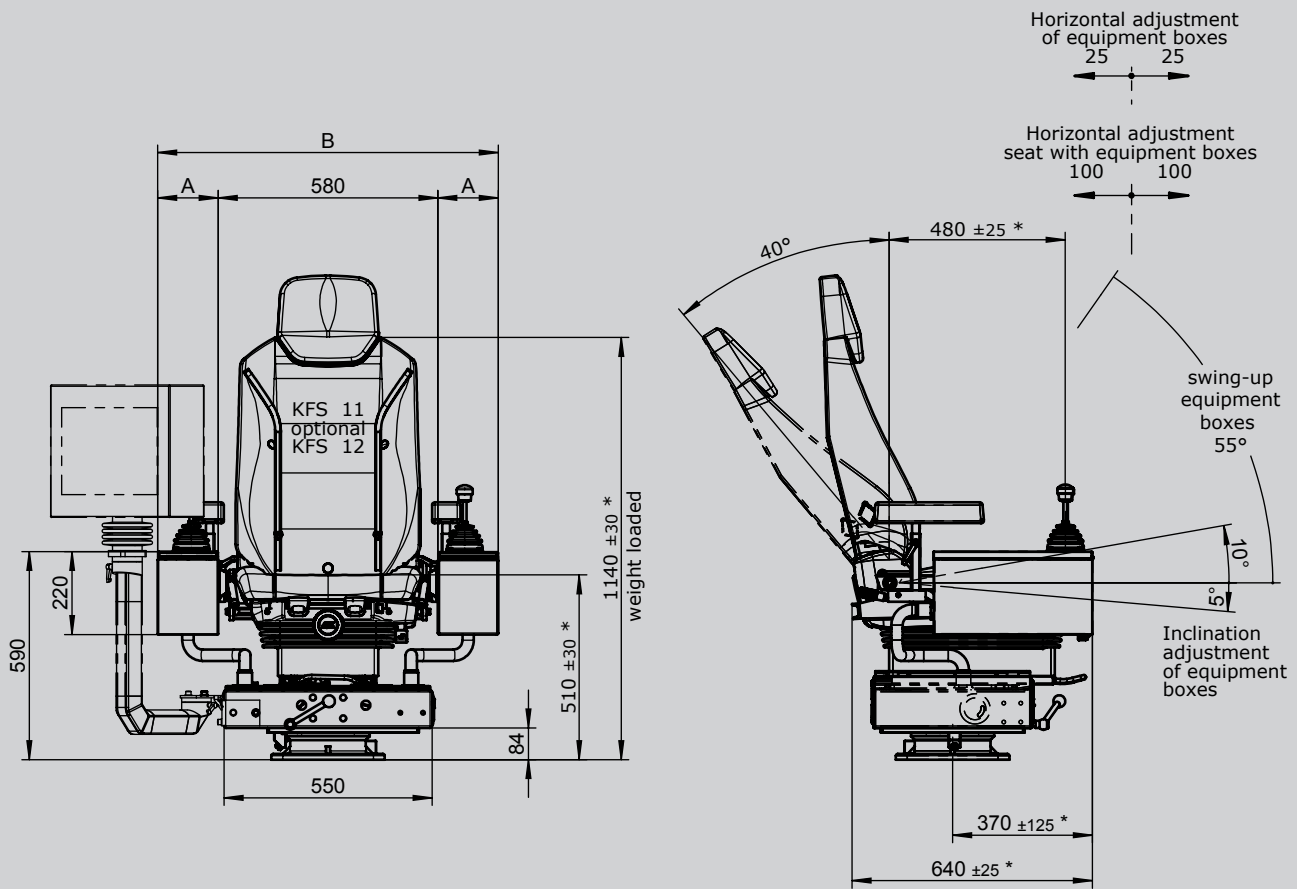
KL	Without wiring, each terminal block built in each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

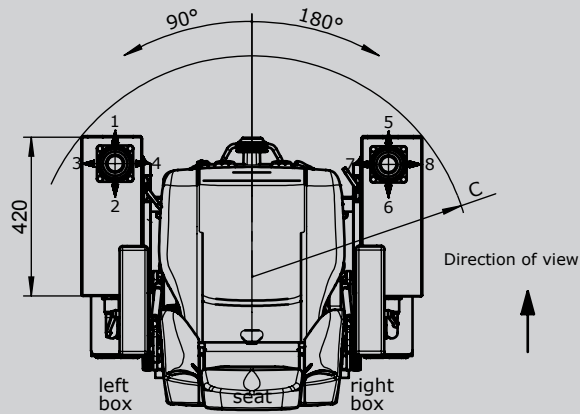
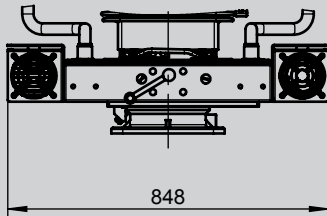
X	Special / customer specified
X ²	Special painted

Option

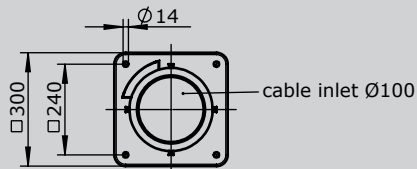
Radio remote control system



with heating



Floor mounting



* adjustable

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

Control Unit KST 5 swiveling



The KST5 is an ergonomically designed swiveling 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 KST5 is very flexible and customisable solution.

Driver's Seat:

As standard the KST5 is fitted with a KFS11 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. The swivel base is zero-clearance bearing and can be locked either by a detent (standard) in 3° steps or stepless by a friction brake.

Surface treatment:

Base coat and textured varnish
Standard colour RAL 7035 light grey



Example

KST51 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Basic unit

- KST51 With equipment boxes 200 x 580 mm
 - KST52 With equipment boxes 270 x 580 mm
 - KST54 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 incl. 2-step release (standard)
- 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

KST51 -U1 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Driver's Seat

KFS11* *(Included in the delivery!)*

KFS9*

KFS10*

KFS12*

*Description see *Driver's Seat* page 251

Mounting for equipment boxes

V... Multi-Axis Controller *(see section joysticks)*

S... Single-Axis Controller *(see section joysticks)*

D... Double-Handle Controller *(see section joysticks)*

N... Control-Switch *(see page 113)*

... *More command and indicating devices (see page 137 and 243)*

Wiring

KL Without, but terminal block built each terminal

KLV On terminal block 4 mm² with single wire 1 mm² each terminal

KLV 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

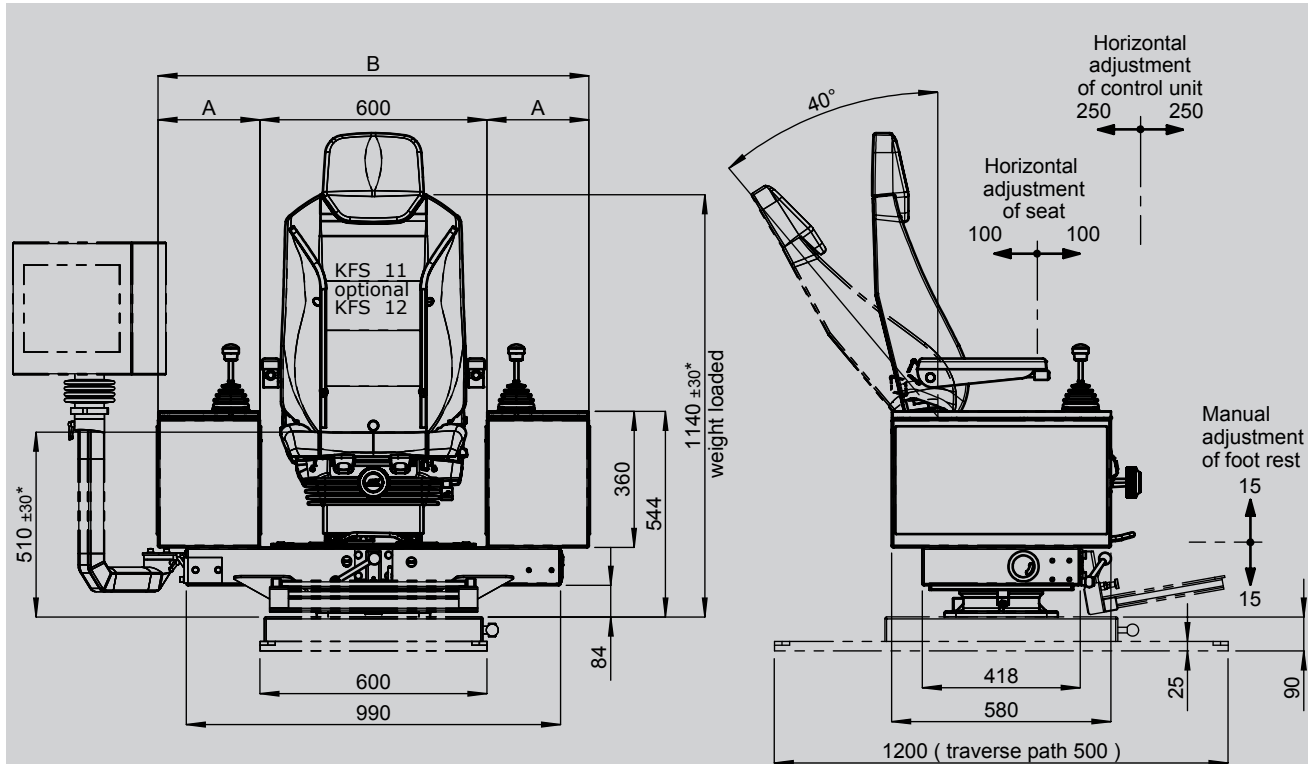
Special model

X Special / customer specified

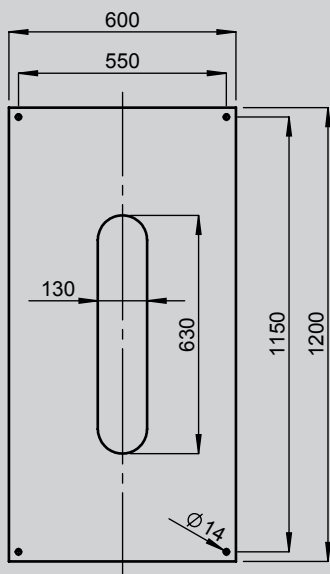
X1 Special painted

Option

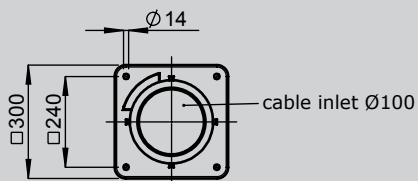
Radio remote control system



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

Control Unit

KST 6 swiveling



The KST6 is an ergonomically designed swiveling 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's Seat:

As standard the KST6 is fitted with a KFS11 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. The swivel base is zero-clearance bearing and can be locked either by a detent (standard) in 3° steps or stepless by a friction brake.

Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black



Example

	KST6	-U2	-M1	-F3	-LK	/	KFS 11	/	V64	/	V64.1	/	KL	/	X
Basic unit															
KST6	With equipment boxes														
Base unit															
U1	Swiveling 180° left, 90° right with friction brake														
U2	Swiveling 180° left, 90° right with detent incl. 2-step release (standard)														
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's Seat															
KFS11*	(Included in the delivery!)														
KFS9*															
KFS10*															
KFS12*															
*Description see Driver's Seat page 251															

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

KST6 -U2 -M1 -F3 -LK / KFS 11 / V64 / V64.1 / KL / X

Mounting for equipment boxes

V...	Multi-Axis Controller (see section joysticks)
S...	Single-Axis Controller (see section joysticks)
D...	Double-Handle Controller (see section joysticks)
N...	Control-Switch (see page 113)
...	More command and indicating devices (see page 137 and 243)

Wiring

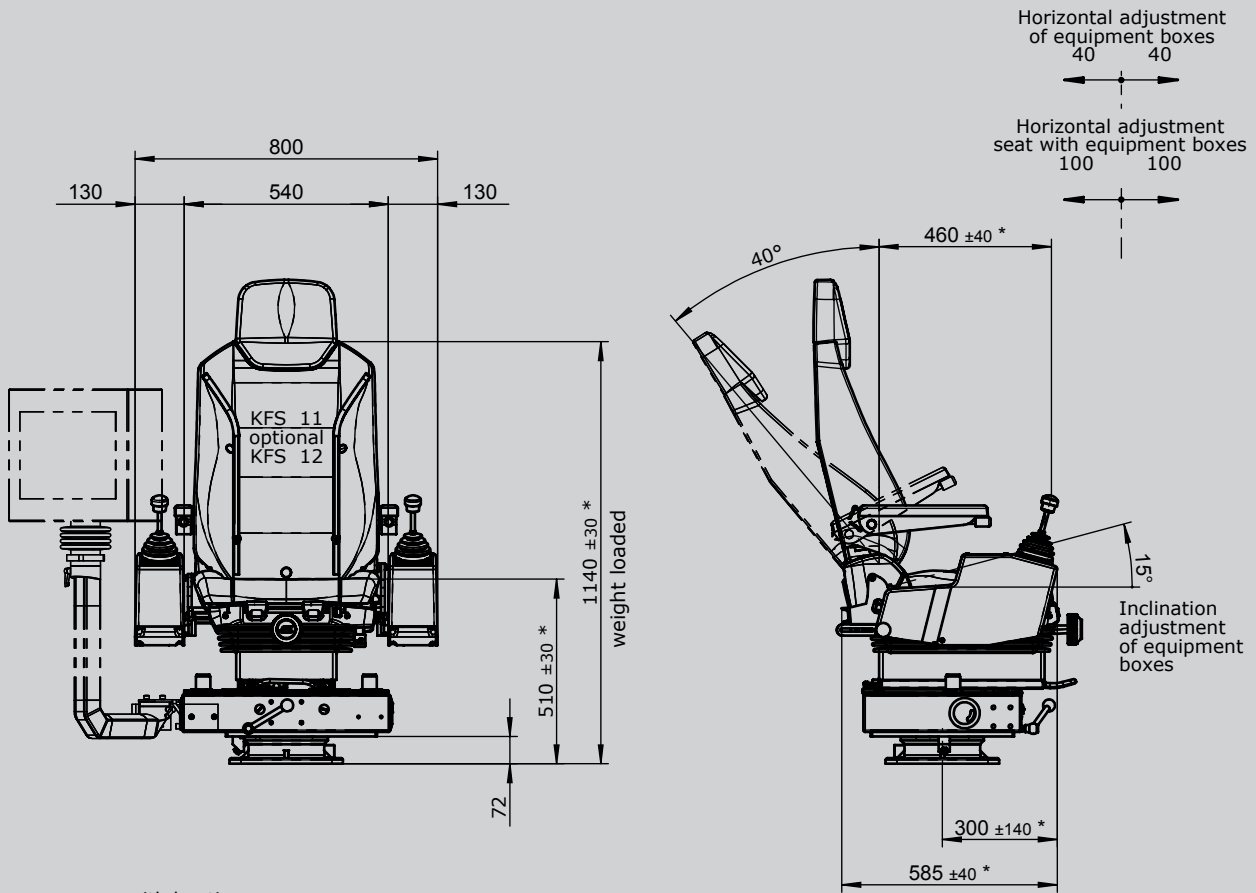
KL	Without, but terminal block built each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

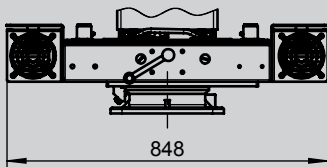
X	Special / customer specified
X ²	Special painted

Option

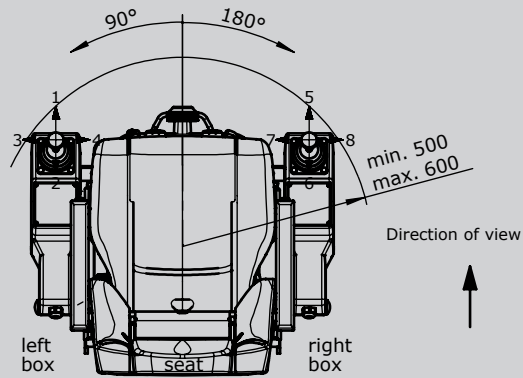
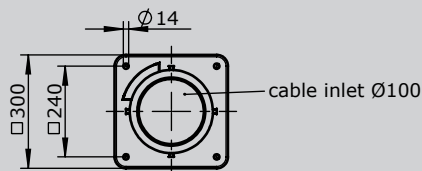
Radio remote control system



with heating



Floor mounting



* adjustable

Control Unit KST 8 swiveling



The KST8 is an ergonomically designed swiveling 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's Seat:

As standard the KST8 is fitted with a KFS11 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. The swivel base is zero-clearance bearing and can be locked either by a detent (standard) in 3° steps or stepless by a friction brake.

Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black



		Example														
		KST8	-U1	-M1	-F3	-LK	/	KFS 11	/	V64	/	V64.1	/	KL	/	X
Basic unit																
KST8	With equipment boxes															
Base unit																
U1	Swiveling 180° left, 90° right with friction brake															
U2	Swiveling 180° left, 90° right with detent incl. 2-step release (standard)															
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's Seat																
KFS11*	(Included in the delivery!)															
KFS9*																
KFS10*																
KFS12*																
*Description see Driver's Seat page 251																

KST8 -U1 -M1 -F3 -LK / KFS11 / V64 / V64.1 / KL / X

Mounting for equipment boxes

V...	Multi-Axis Controller (see section joysticks)
S...	Single-Axis Controller (see section joysticks)
D...	Double-Handle Controller (see section joysticks)
N...	Control-Switch (see page 113)
...	More command and indicating devices (see page 137 and 243)

Wiring

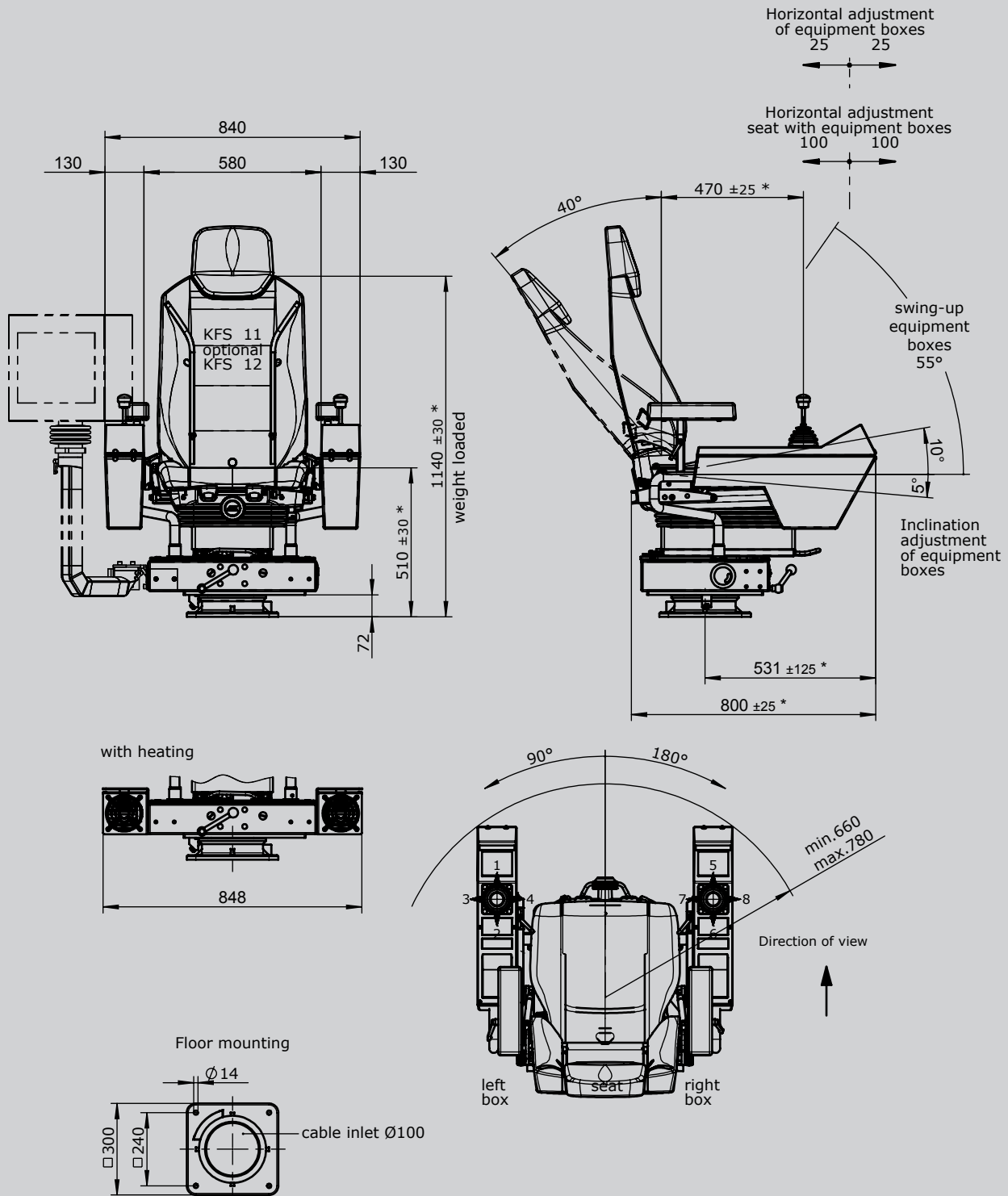
KL	Without wiring, but terminal block built each terminal
KL V	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KL V	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

X	Special / customer specified
X ²	Special painted

Option

Radio remote control system



* adjustable

Control Unit

KST 85



The KST85 is an ergonomically designed swiveling 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's Seat:

The comfortable spring mounted seat KFS14 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.

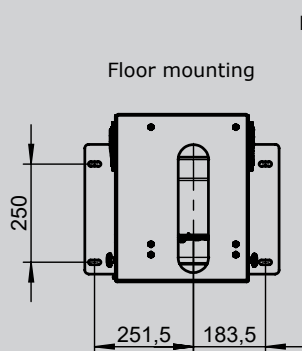
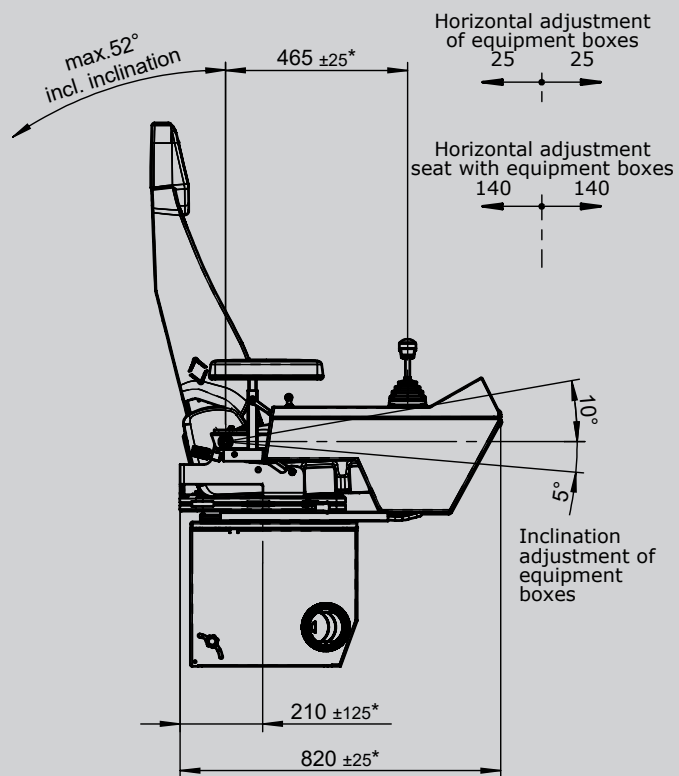
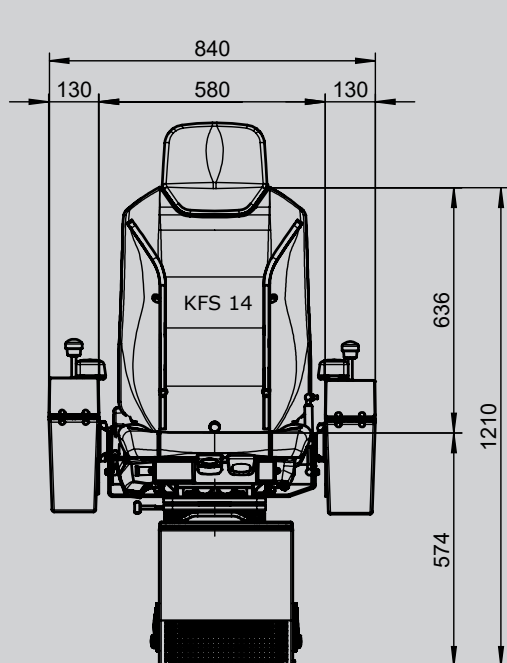
Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black

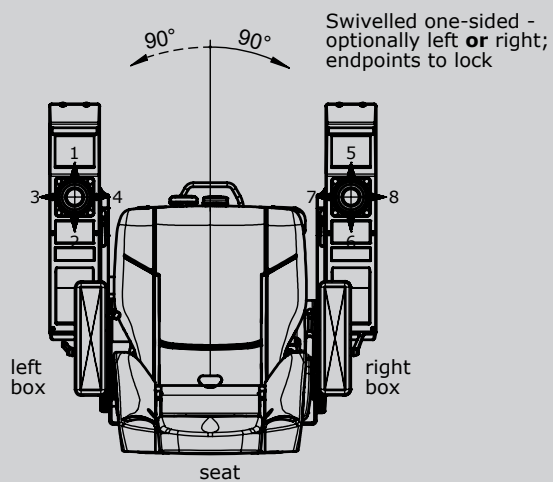


	KST85	Example -M1	/	KFS14	/	V64	/	V64.1	/	KL	/	X
Basic unit												
KST85	With heating in the console base											
KST87	With console base without heating											
Attachments												
M1	Monitor mounting with monitor housing											
M2	Monitor mounting with monitor mounting bracket											
M3	Monitor mounting without monitor housing/-mounting bracket											
Driver's Seat												
KFS14*	(Included in the delivery!)											
Mounting for equipment boxes												
V...	Multi-Axis Controller (see section joysticks)											
S...	Single-Axis Controller (see section joysticks)											
D...	Double-Handle Controller (see section joysticks)											
N...	Control-Switch (see page 113)											
....	More command and indicating devices (see page 137 and 243)											
Wiring												
KL	Without wiring, but with terminal block built 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 ²	Special painted											
Option												
	Radio remote control system											

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



Direction of view



* adjustable



The KST7 is an ergonomically designed swiveling 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 KST7 is very flexible and customisable solution.

Driver's Seat:

The tipped spring mounted seat KFS4 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

KST7 -1 / KFS11 / V64 / V64.1 / KL / X

Basic unit

KST7	With equipment boxes 290 x 500 mm
KST175	With equipment boxes 210 x 500 mm
	<i>Special boxes for request!</i>

Base plate

1	With base plate prepare for Driver's Seat KFS4
2	With base plate prepare for Driver's Seat KFS2
3	With base plate with apron for Driver's Seat KFS9, KFS11...
4	Without base plate

Driver's Seat

KFS 4*	<i>(Included in the delivery!)</i>
KFS 2*	
KFS 11*	
KFS 9*	
*Description see Driver's Seat page 251	

Mounting for equipment boxes

V...	Multi-Axis Controller (see section joysticks)
S...	Single-Axis Controller (see section joysticks)
D...	Double-Handle Controller (see section joysticks)
N...	Control-Switch (see page 113)
...	More command and indicating devices (see page 137 and 243)

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

Wiring

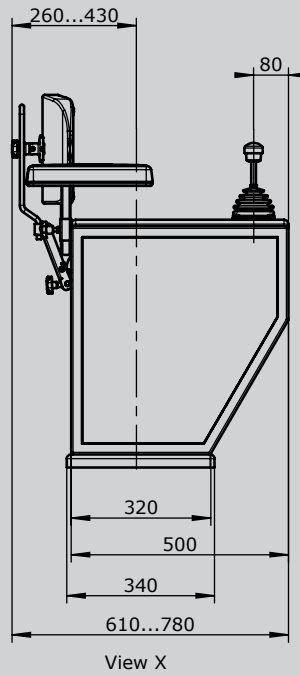
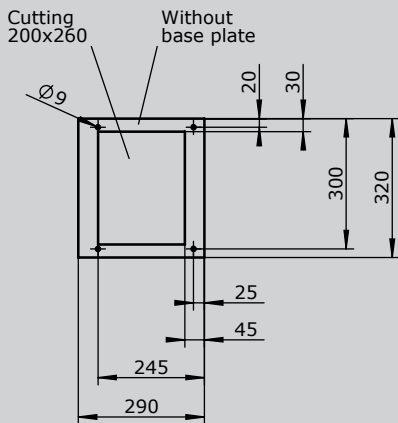
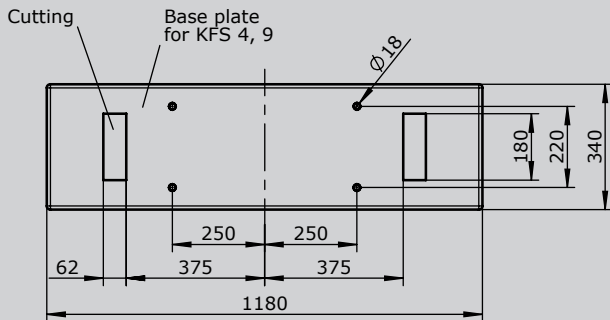
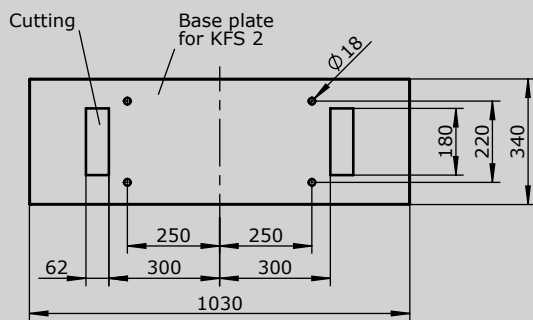
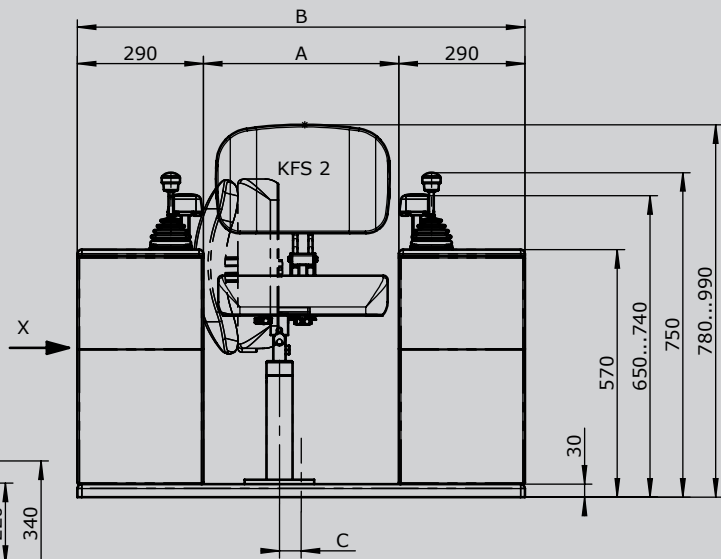
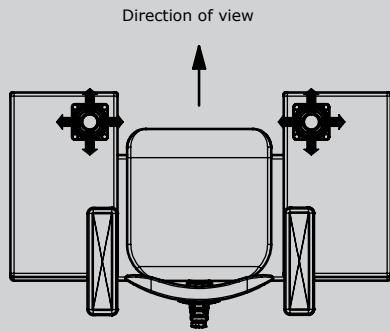
KL	Without wiring, but terminal block built each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

X	Special / customer specified
X ²	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

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 - 28 mm		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		

Attachment for Control Unit, portable control units and housings



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	1 S + 1 Ö	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's Seat			

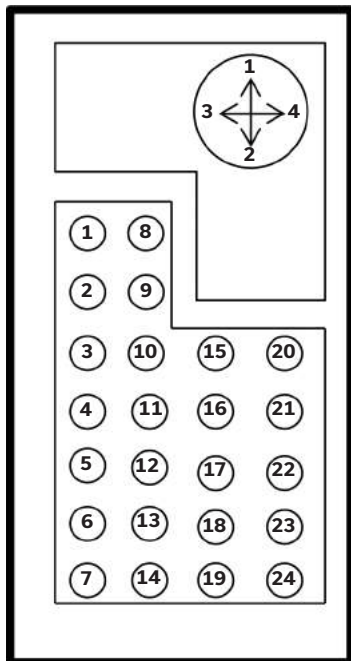
Ordering information



Customer _____

Order No. _____

Equipment box left	Pos. No.	Type	Colour	Label text (max. 2 x 12 characters)	Plant ref.	Destination	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						



Maximum installation of command and indicating devices 22 (see p.137 & 243) in our control units and housings if our Multi-Axis Controllers V62 (see p.71) are used. Additional command and indicating devices can be installed of Multi-Axis Controllers V64 or V11 (see p.71 or p.88) are used. (please enquire)

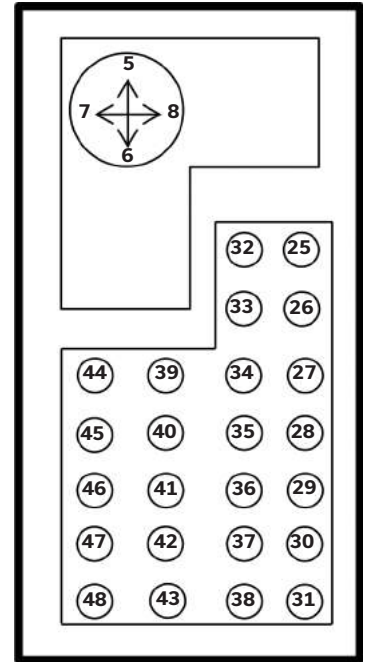
Control unit (see p. 213) Type		No. of pieces max.
KST3	1 - 6, 8 - 13, 15 - 18	16
KST41/181	1 - 5, 10 - 12	8
KST42/182	1 - 5, 8 - 12, 15 - 17	13
KST51/122	3 - 7, 10 - 14, 15 - 19, 20 - 24	20
KST52/53/54/152/154	1 - 24	24
KST6	3 - 4, 10 - 11, 15 - 16	6
KST7	1 - 24	24
KST75	1 - 19	19

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.	Desti- nation	Notes	Equipment box right
1	_____	_____	_____	_____	_____	_____	
2	_____	_____	_____	_____	_____	_____	
3	_____	_____	_____	_____	_____	_____	
4	_____	_____	_____	_____	_____	_____	
5	_____	_____	_____	_____	_____	_____	
6	_____	_____	_____	_____	_____	_____	
7	_____	_____	_____	_____	_____	_____	
8	_____	_____	_____	_____	_____	_____	
9	_____	_____	_____	_____	_____	_____	
10	_____	_____	_____	_____	_____	_____	
11	_____	_____	_____	_____	_____	_____	
12	_____	_____	_____	_____	_____	_____	
13	_____	_____	_____	_____	_____	_____	
14	_____	_____	_____	_____	_____	_____	
15	_____	_____	_____	_____	_____	_____	
16	_____	_____	_____	_____	_____	_____	
17	_____	_____	_____	_____	_____	_____	
18	_____	_____	_____	_____	_____	_____	
19	_____	_____	_____	_____	_____	_____	
20	_____	_____	_____	_____	_____	_____	
21	_____	_____	_____	_____	_____	_____	
22	_____	_____	_____	_____	_____	_____	
23	_____	_____	_____	_____	_____	_____	
24	_____	_____	_____	_____	_____	_____	



Maximum installation of command and indicating devices 22 (see p.137 & 243) in our control units and housings if our Multi-Axis Controllers V62 (see p.71) are used. Additional command and indicating devices can be installed of Multi-Axis Controllers V64 or V11 (see p.71 or p.88) are used. (please enquire)

	No. of pieces max.	Control unit (see p.213) Type
25 - 30, 32 - 37, 39 - 42	16	KST3
25 - 29, 34 - 36	8	KST41/181
25 - 29, 32 - 36, 39 - 41	13	KST42/182
27 - 31, 34 - 38, 39 - 43, 44 - 48	20	KST51/122
25 - 48	24	KST52/53/54/152/154
27 - 28, 34 - 35, 39 - 40	6	KST6
25 - 48	24	KST7
25 - 43	19	KST75

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

Ordering information

KST8, 85



Customer _____

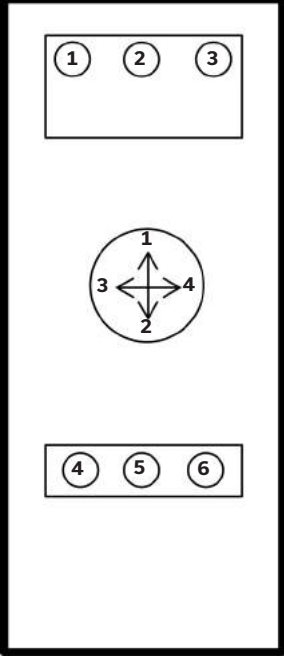
Order No. _____

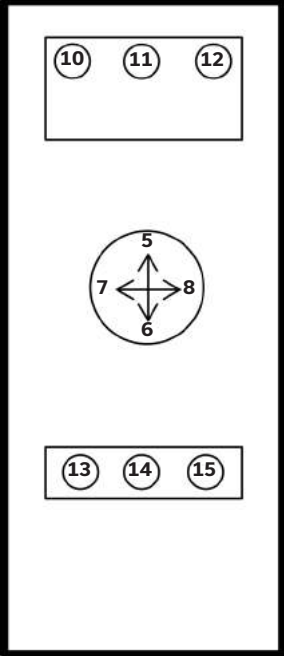
Equipment box left	Pos. No.	Type	Colour	Lable text (max). 2 x 12 characters	Plant ref.	Desti- nation	Notes
<p>Max. 6 pcs. installation of command and indicating devices 22 (see p.137 & 243) or 1 pcs. monitoring device 72 x 72mm</p> <p>Multi-Axis Controller V64 (see p.71) or V11 (see p.88)</p> <p>Max. 3 pcs. installation of command and indicating devices 22 (see p.137 & 243)</p> <p>Place to put on devices</p>	1	_____	_____	_____	_____	_____	_____
	2	_____	_____	_____	_____	_____	_____
	3	_____	_____	_____	_____	_____	_____
	4	_____	_____	_____	_____	_____	_____
	5	_____	_____	_____	_____	_____	_____
	6	_____	_____	_____	_____	_____	_____
	7	_____	_____	_____	_____	_____	_____
	8	_____	_____	_____	_____	_____	_____
	9	_____	_____	_____	_____	_____	_____
	10	_____	_____	_____	_____	_____	_____
	11	_____	_____	_____	_____	_____	_____
	12	_____	_____	_____	_____	_____	_____

Equipment box right	Pos. No.	Type	Colour	Lable text (max). 2 x 12 characters	Plant ref.	Desti- nation	Notes
<p>Max. 6 pcs. installation of command and indicating devices 22 (see p.137 & 243) or 1 pcs. monitoring device 72 x 72mm</p> <p>Multi-Axis Controller V64 (see p.71) or V11 (see p.88)</p> <p>Max. 3 pcs. installation of command and indicatin devices 22 (see p.137 & 243)</p> <p>Place to put on devices</p>	13	_____	_____	_____	_____	_____	_____
	14	_____	_____	_____	_____	_____	_____
	15	_____	_____	_____	_____	_____	_____
	16	_____	_____	_____	_____	_____	_____
	17	_____	_____	_____	_____	_____	_____
	18	_____	_____	_____	_____	_____	_____
	19	_____	_____	_____	_____	_____	_____
	20	_____	_____	_____	_____	_____	_____
	21	_____	_____	_____	_____	_____	_____
	22	_____	_____	_____	_____	_____	_____
	23	_____	_____	_____	_____	_____	_____
	24	_____	_____	_____	_____	_____	_____

Customer _____

Order No. _____

Equipment box left	Pos. No.	Type	Colour	Label text (max. 2 x 12 characters)	Plant ref.	Desti-nation	Notes
 <p>Max. 3 pcs. installation of command and indicating devices 22 (see p.137 & 243)</p> <p>Multi-axis Controller V11, V14, V25, V85</p> <p>Max. 3 pcs. installation of command and indicating devices 22 (see p.137 & 243)</p>	1	_____	_____	_____	_____	_____	_____
	2	_____	_____	_____	_____	_____	_____
	3	_____	_____	_____	_____	_____	_____
	4	_____	_____	_____	_____	_____	_____
	5	_____	_____	_____	_____	_____	_____
	6	_____	_____	_____	_____	_____	_____
	7	_____	_____	_____	_____	_____	_____
	8	_____	_____	_____	_____	_____	_____
	9	_____	_____	_____	_____	_____	_____

Equipment box right	Pos. No.	Type	Colour	Label text (max. 2 x 12 characters)	Plant ref.	Desti-nation	Notes
 <p>Max. 3 pcs. installation of command and indicating devices 22 (see p.137 & 243)</p> <p>Multi-axis Controller V11, V14, V25, V85</p> <p>Max. 3 pcs. installation of command and indicating devices 22 (see p.137 & 243)</p>	13	_____	_____	_____	_____	_____	_____
	14	_____	_____	_____	_____	_____	_____
	15	_____	_____	_____	_____	_____	_____
	16	_____	_____	_____	_____	_____	_____
	17	_____	_____	_____	_____	_____	_____
	18	_____	_____	_____	_____	_____	_____
		_____	_____	_____	_____	_____	_____
		_____	_____	_____	_____	_____	_____
		_____	_____	_____	_____	_____	_____

Ordering information

KST30

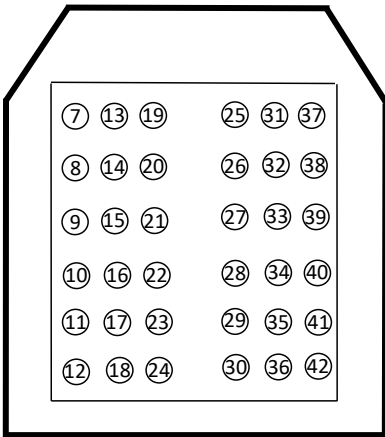
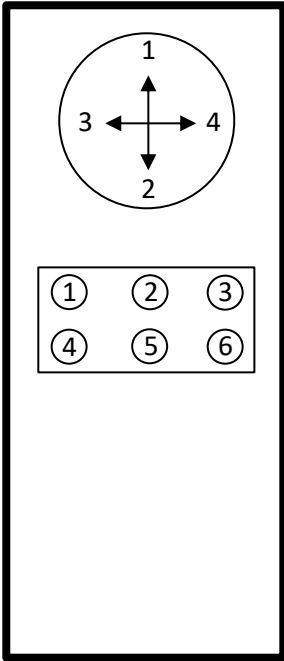


Customer _____

Order No. _____

Equipment box left

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	_____	_____	_____	_____	_____	_____
25	_____	_____	_____	_____	_____	_____
26	_____	_____	_____	_____	_____	_____
27	_____	_____	_____	_____	_____	_____
28	_____	_____	_____	_____	_____	_____
29	_____	_____	_____	_____	_____	_____
30	_____	_____	_____	_____	_____	_____
31	_____	_____	_____	_____	_____	_____
32	_____	_____	_____	_____	_____	_____
33	_____	_____	_____	_____	_____	_____
34	_____	_____	_____	_____	_____	_____
35	_____	_____	_____	_____	_____	_____
36	_____	_____	_____	_____	_____	_____
37	_____	_____	_____	_____	_____	_____
38	_____	_____	_____	_____	_____	_____
39	_____	_____	_____	_____	_____	_____
40	_____	_____	_____	_____	_____	_____
41	_____	_____	_____	_____	_____	_____
42	_____	_____	_____	_____	_____	_____



Maximum occupancy of the various control stations

Control Unit (see p. 216)

Form	Pos.	No. of pieces max.
KST3011	1 - 24	24
KST3031	1 - 36	36
KST3041	1 - 42	42

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

Ordering information

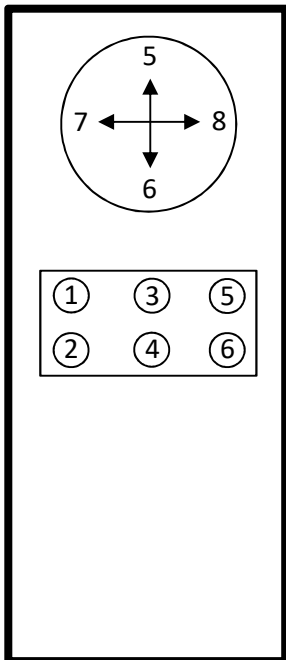
KST30



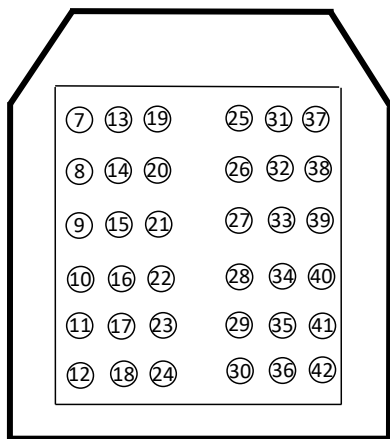
Customer _____

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						
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11						
12						
13						
14						
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34						
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37						
38						
39						
40						
41						
42						



Driver's Seat KFS12



The Driver's Seat KFS12 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.

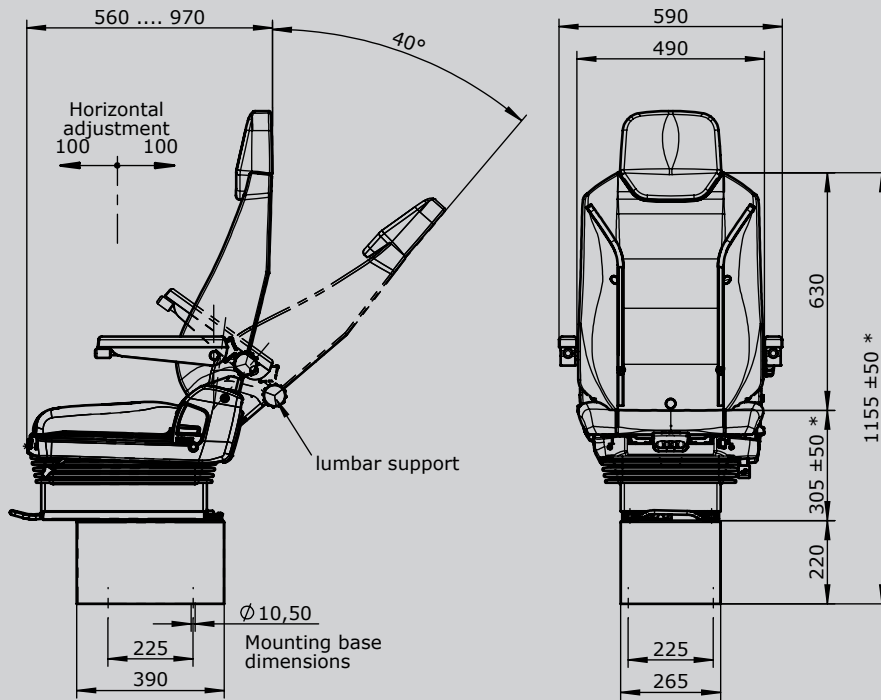
Technical data:

Suspension stroke	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

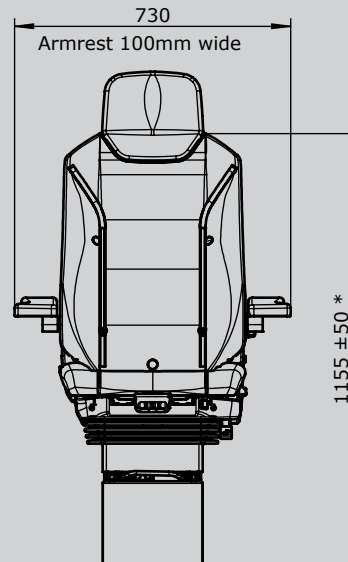
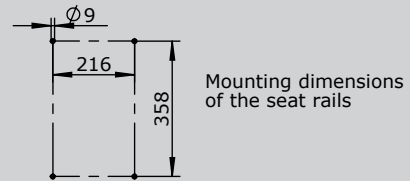
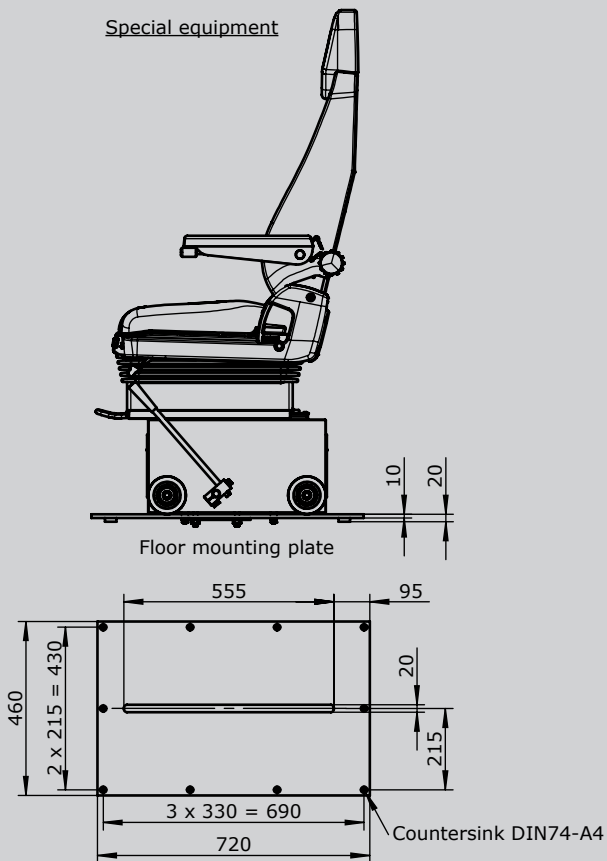


Example

	KFS12	-A1	-S1
Driver's Seat			
KFS12 Driver's 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's Seat KFS 11 / KFS 12			
U Console (base)			
Z1 Mating connectors with 3 m connection cable			



Special equipment



* adjustable

Driver's Seat KFS11



The Driver's Seat KFS11 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.

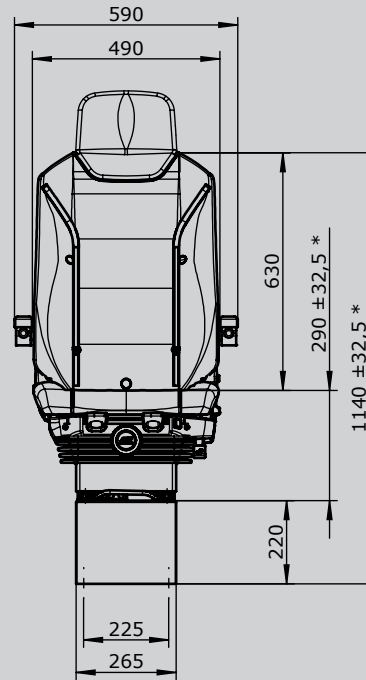
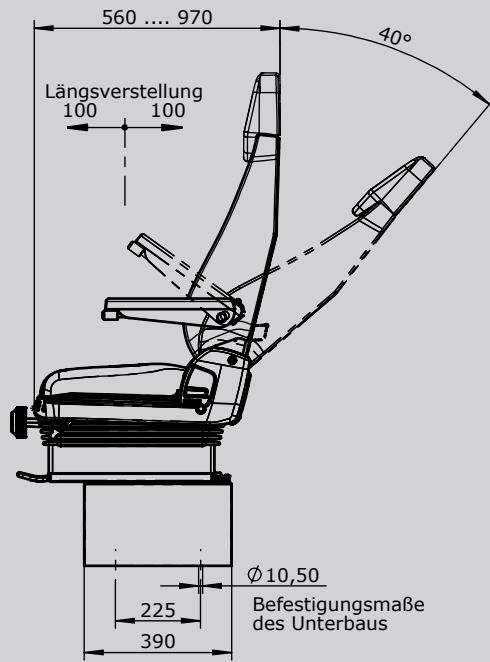
Technical data

Suspension stroke	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

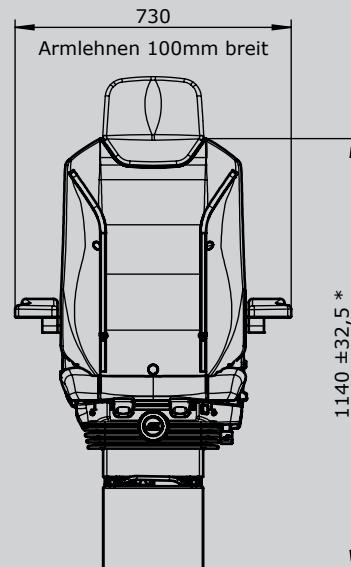
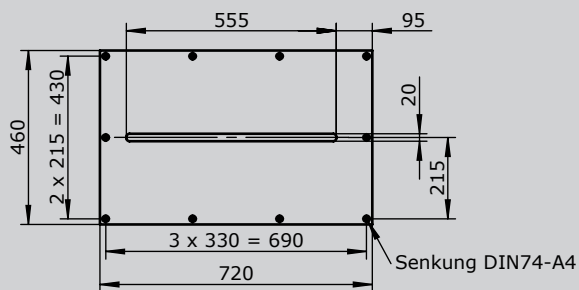
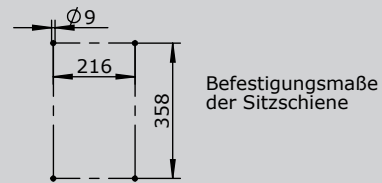
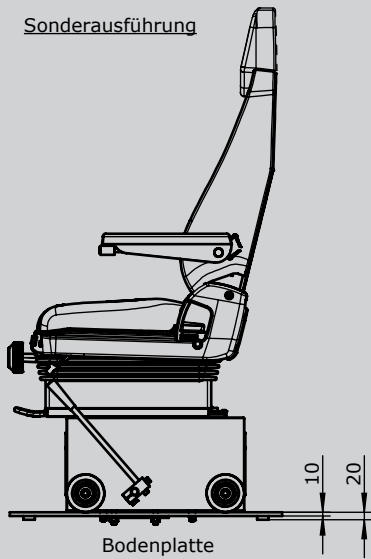


Example

		KFS11	-A1	-S1
Driver's Seat				
KFS11	Driver's 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's Seat KFS 11 / KFS 12			
U	Console (base)			



Sonderausführung



* einstellbar

Driver's Seat KFS10



The Driver's Seat KFS10 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.

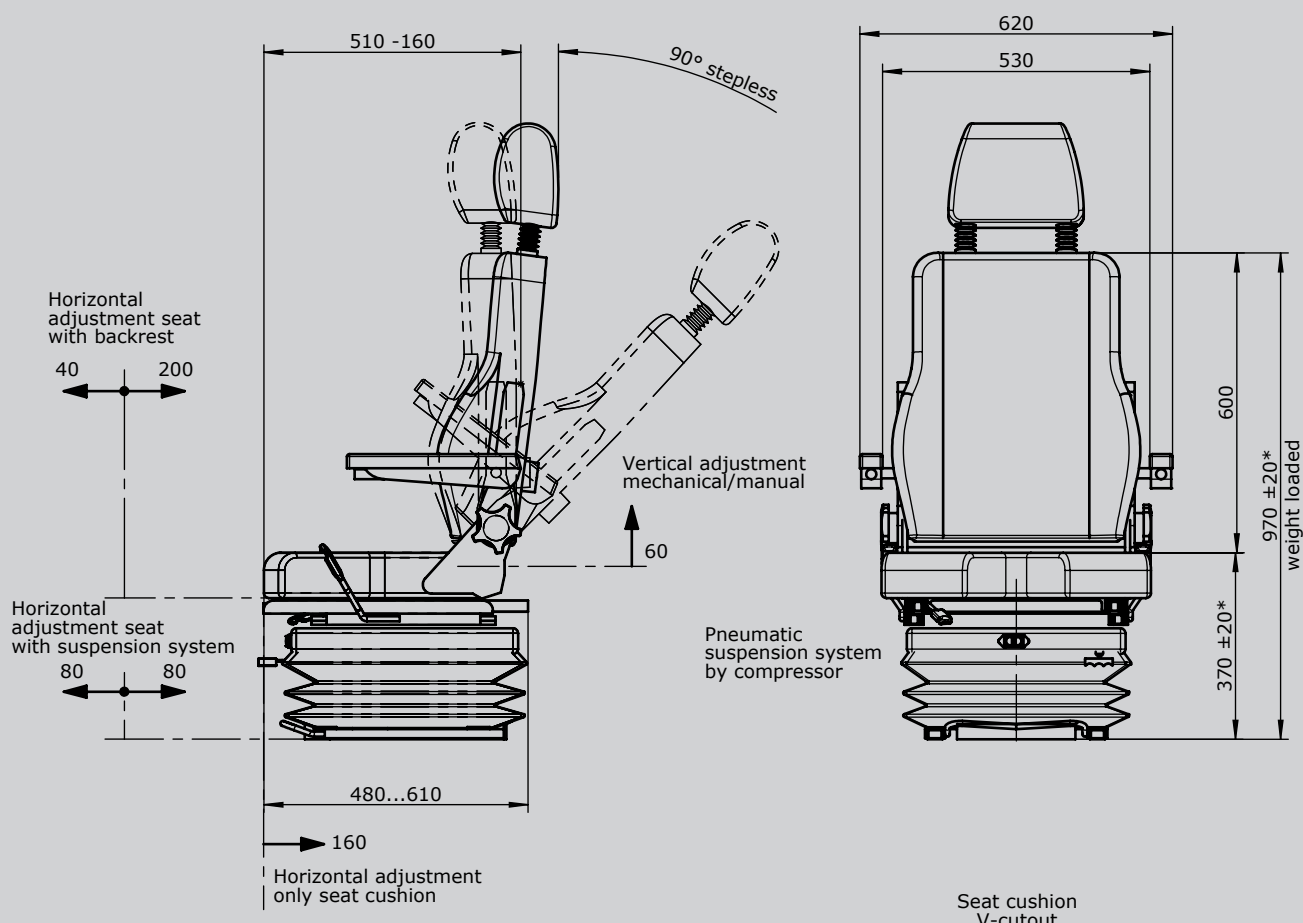
Technical data:

Suspension stroke	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



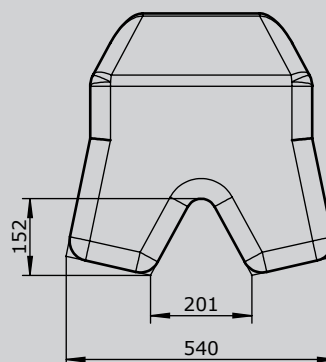
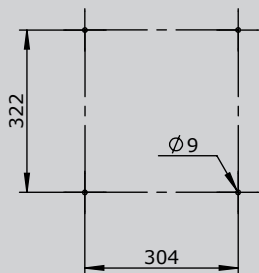
Example

		KFS102	-A1	-L2	-S2	-R1
Driver's Seat						
KFS101	Driver's Seat with air-permeable artificial leather cover black with V-cut					
KFS102	Driver's 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's Seat KFS10 with V-cut					
R1	Price reduction pneumatic vibration absorption system					
R2	Seat cushion without V-cut					



Seat cushion V-cutout

Mounting dimensions seat



* adjustable



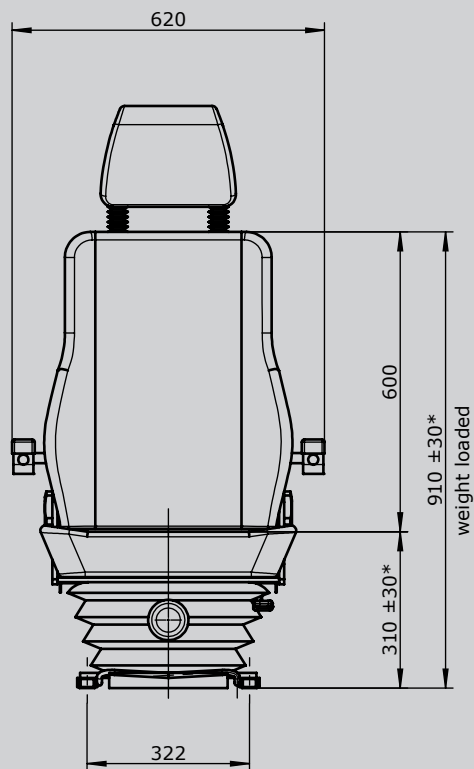
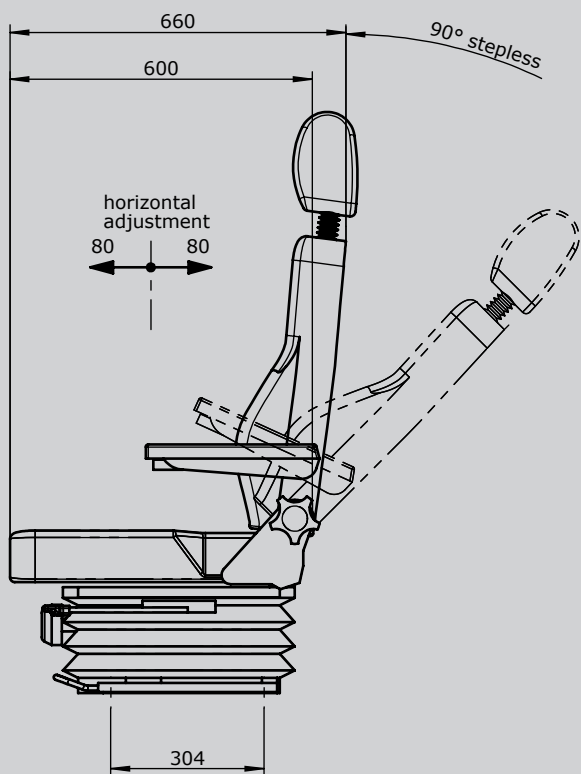
The Driver's Seat KFS9 is ergonomically designed and provides a high grade of comfort. The Driver's Seat is a low level mechanical suspension seat with an oil-hydraulic vibration absorption system with weight adjustment. Upon request, a pneumatic vibrating system with weight adjustment is available. All adjustment controls are positioned ergonomically within easy access. The metal parts are protected against corrosion and painted black.

Technical data

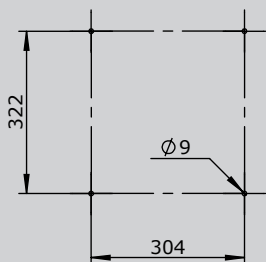
Suspension stroke	80 mm
Weight adjustment	50 - 150 kg (pneumatic)
	50 - 130 kg (mechanical)
Horizontal adjustment	160 mm
Inclination of the backrest	max. 90°
Height and slope adjustment	60 mm



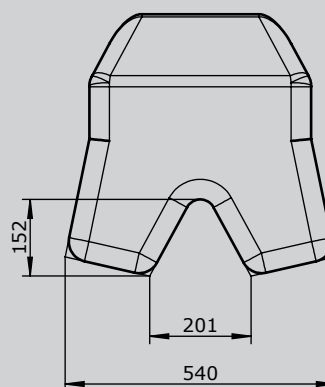
		Example				
		KFS 92	-A1	-L2	-S1	-P
Driver's Seat						
KFS91	Driver's Seat with air-permeable artificial leather cover black					
KFS92	Driver's Seat with textile cover black					
Attachments						
K	Headrest rain					
A1	Armrest adjustable (2 pieces) 50 mm wide					
A2	Armrest continuously adjustable (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's Seat KFS 9					
C2	Loose cover for Driver's Seat KFS 9 with V-cut					
U	Console (base)					



Mounting dimensions
of the seal rails



Seat cushion
v-cutout



* adjustable

Driver's Seat KFS14



The Driver's Seat KFS14 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.

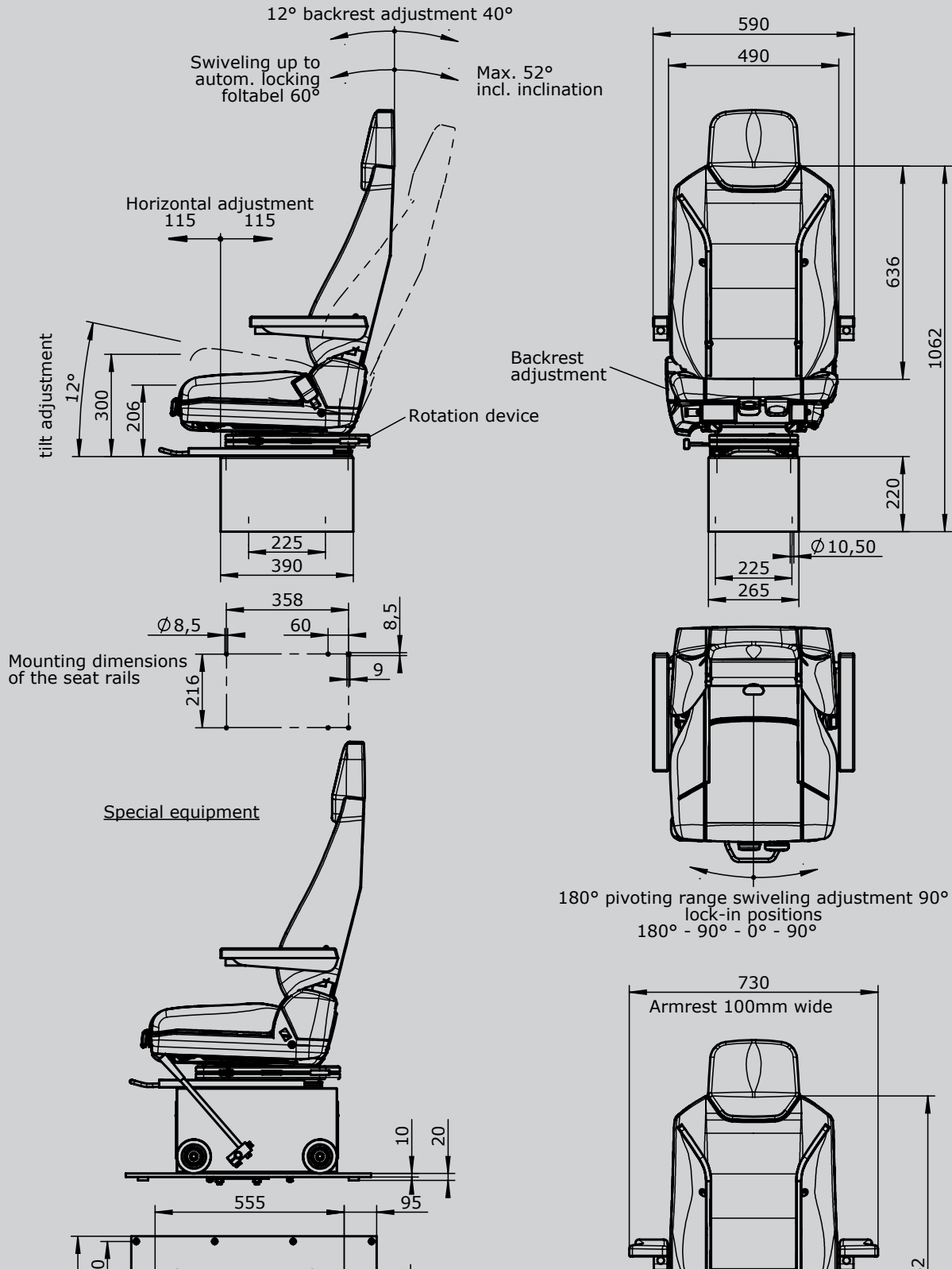
Technical data:

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



Example

		KFS 14	-A1	-S1	-U
Driver's Seat					
KFS14	Driver's 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's Seat KFS4



The Driver's Seat KFS4 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.

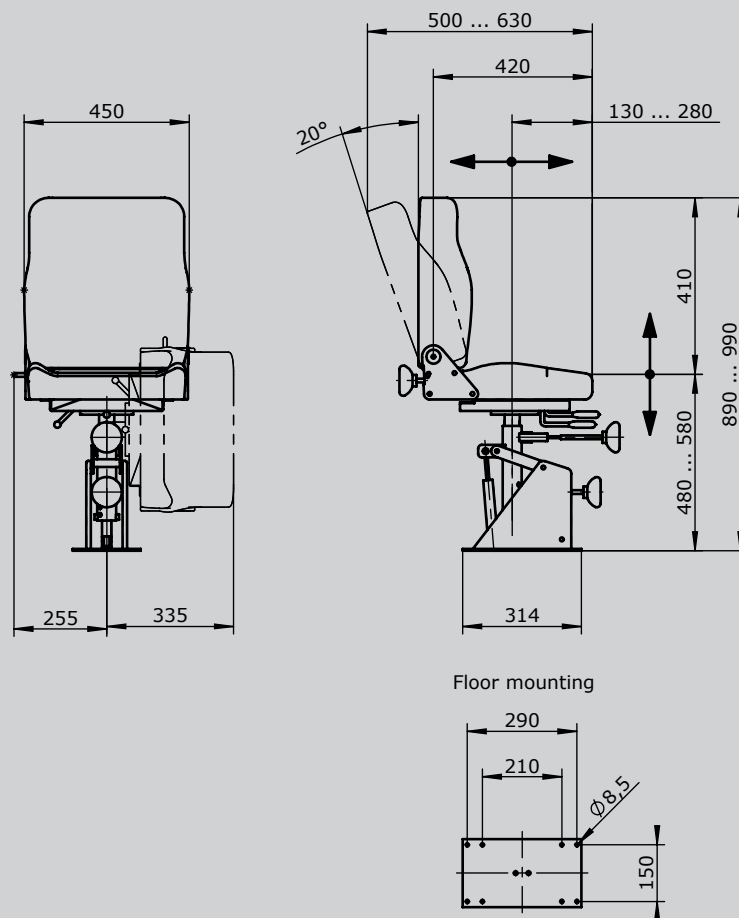
Technical data:

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



Example

Driver's Seat		KFS 42	-A1
KFS41	Driver's Seat with air-permeable artificial leather cover black		
KFS42	Driver's 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's Seat KFS2



The Driver's Seat KFS2 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

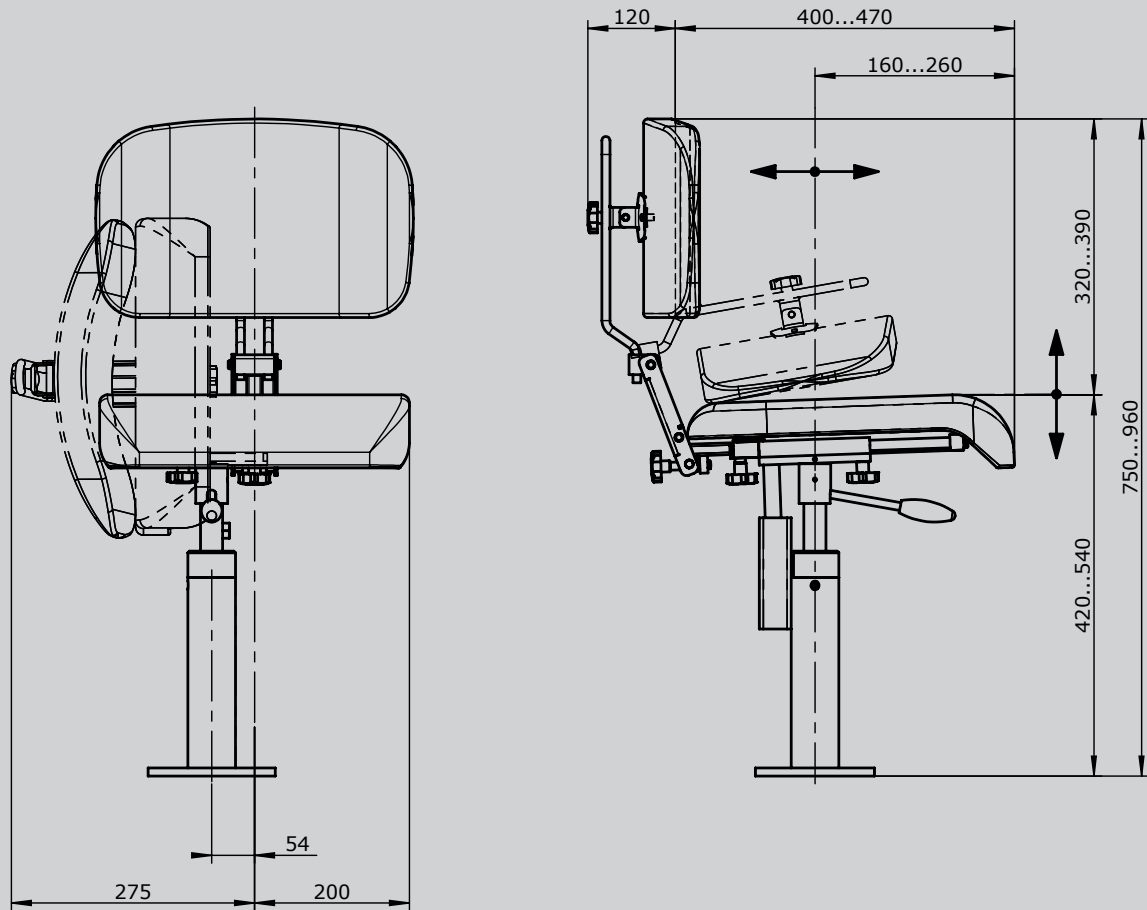


Example

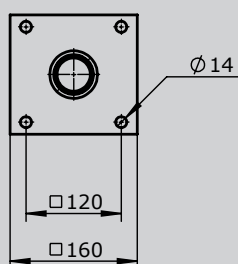
KFS 22

Driver's Seat

KFS21	With air-permeable artificial leather cover black
KFS22	With textile cover grey / black



Floor mounting



Portable Control Unit TS1



The Portable Control Unit TS1 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

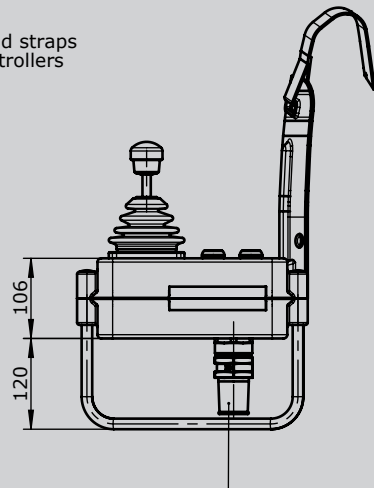


Example

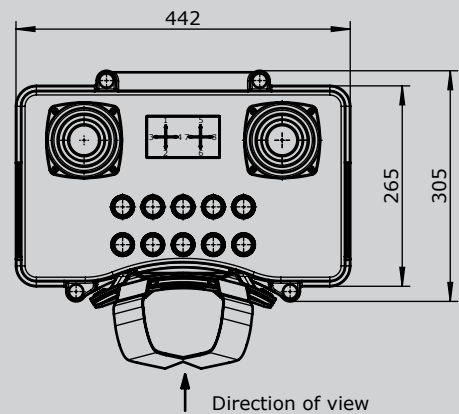
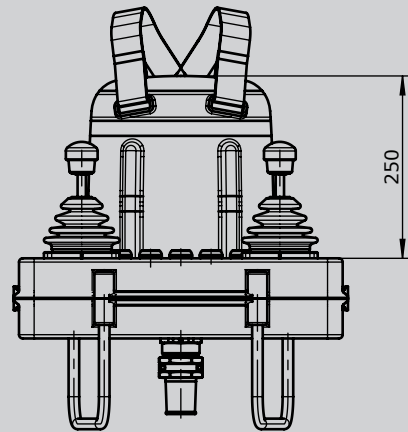
		TS1	-SB 1	-RH 1	-K 3	-HS 1	/	V...	/	KLS	/	X
Basic unit												
TS1	With chest plate and straps											
TS11	With straps											
Attachment												
SB 1	Legs for control unit alu-tube 2 pieces											
SB 2	Legs for control unit stainless steel-tube V2 A 2 pieces											
RH 1	Reeling 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					HAN 16E without wiring						
HB 1	Connector 16-pole female insert					HAN 16E without wiring						
HS 2	Plug in socket 24-pole female insert					HAN 24E without wiring						
HB 2	Connector 24-pole female insert					HAN 24E without wiring						
HS 3	Plug in socket 32-pole male insert					HAN 32E without wiring						
HB 3	Connector 32-pole female insert					HAN 32E without wiring						
<i>Indicating labels not engraved for multi-axis-/ Single-Axis Controller</i>												
Mounting for equipment boxes												
V	Multi-Axis Controller (see page 1)											
N	Control-Switch (see page 113)											
<i>More command and indicating devices (see page 137 and 243)</i>												
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 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 colour yellow RAL 1021											

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

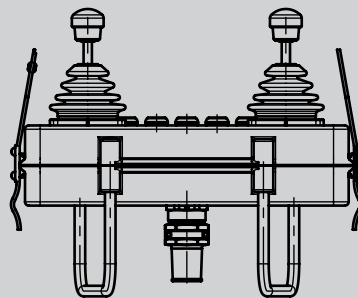
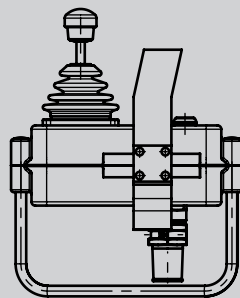
With chest plate and straps
with multi-axis controllers



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



With adjustable carrying strap
with multi-axis controllers



Portable Control Unit TS2



The Portable Control Unit TS2 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



		TS2	-SB 1	-RH 1	-K 3	-HS 1	/	V...	/	KLS	/	X
Basic unit												
TS2	With chest plate, straps											
TS21	With straps											
TS22	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					HAN 16E without wiring						
HB 1	Connector 16-pole female insert					HAN 16E without wiring						
HS 2	Plug in socket 24-pole female insert					HAN 24E without wiring						
HB 2	Connector 24-pole female insert					HAN 24E without wiring						
HS 3	Plug in socket 32-pole male insert					HAN 32E without wiring						
HB 3	Connector 32-pole female insert					HAN 32E without wiring						
<i>Indicating labels not engraved for multi-axis-/ Single-Axis Controller</i>												
<i>Indicating labels engraved for multi-axis-/ Single-Axis Controller</i>												
Mounting for equipment boxes												
V	Multi-Axis Controller (see page 1)											
N	Control-Switch (see page 113)											
<i>More command and indicating devices (see page 137 and 243)</i>												

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

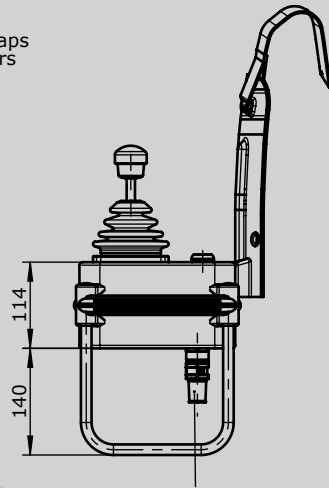
Cable and wiring

Cable Oelflex Classic FD 810 P	18 x 1 mm ²	13,9 mm Ø	-5°C to +70°C	each meter
Cable Oelflex Classic FD 810 P	25 x 1 mm ²	16,4 mm Ø	-5°C to +70°C	each meter
Cable Oelflex Classic FD 810 P	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			

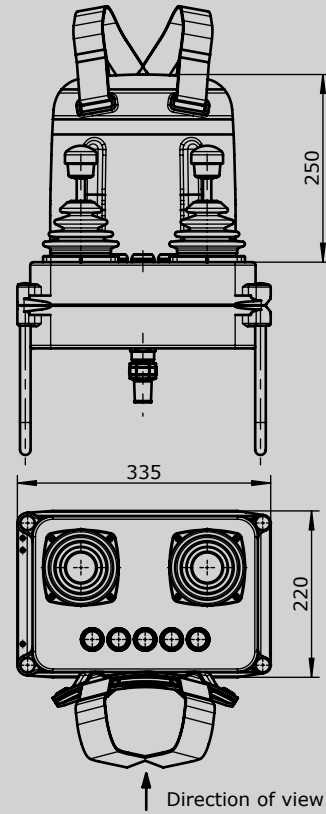
Special model

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

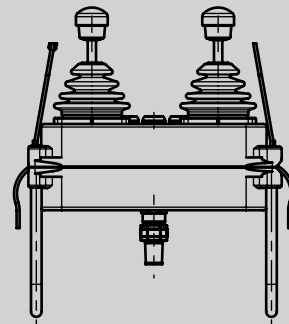
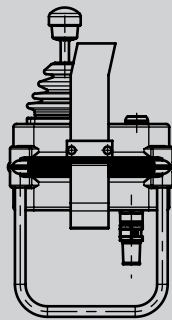
With chest plate and straps
with multi-axis controllers



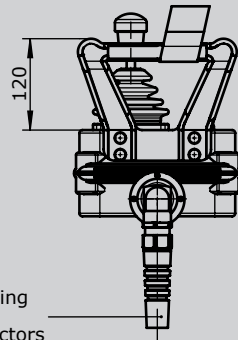
Cable entry
with anti-kink protection
and stain relief or connectors



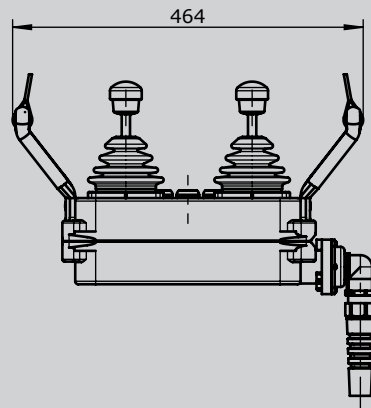
With adjustable carrying strap
with multi-axis controllers



With bracket and cable entry swivelling
with multi-axis controllers



Cable entry 180° swivelling
with anti-kink protection
and stain relief or connectors



Portable Control Unit TS3



The Portable Control Unit TS3 is used for controlling and monitoring the equipment. The abdominal belt enable the operator to carry it without becoming tired. The equipment can be individually designed.

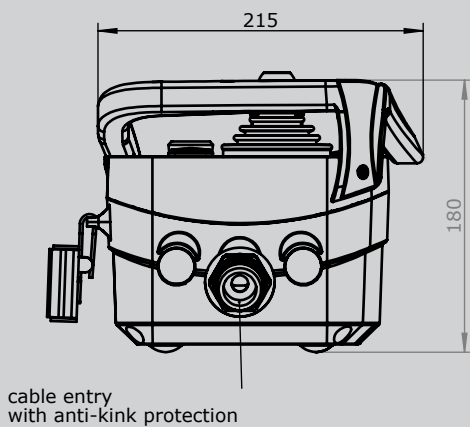
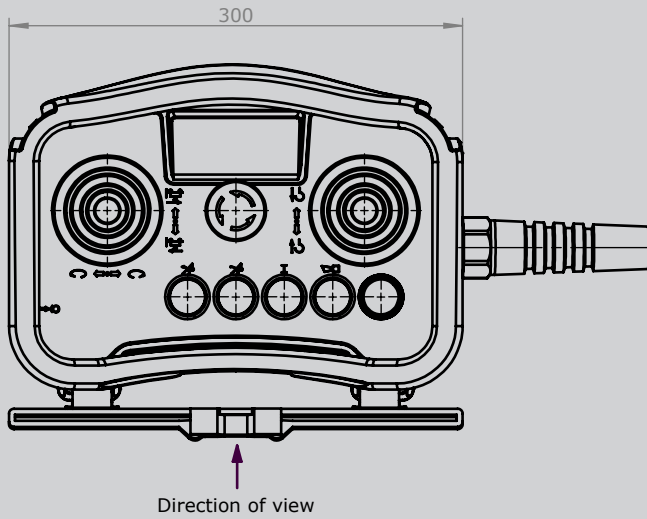
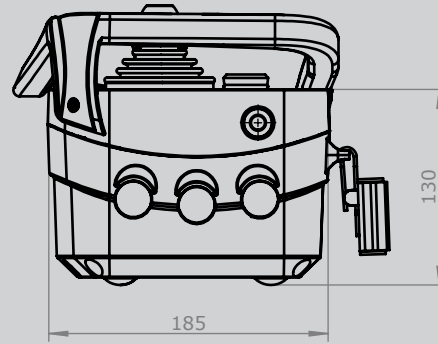
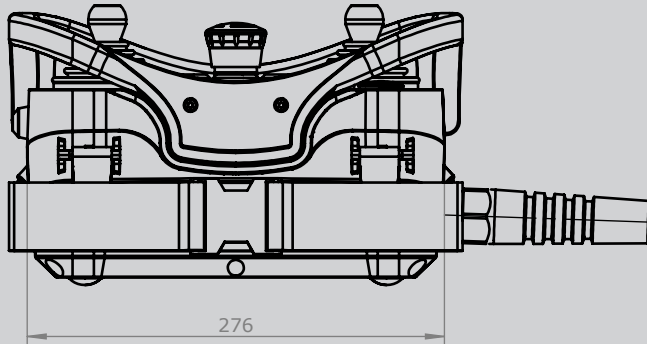
Technical data:

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



		Example									
		TS3	-1	-K1	-G1	/	V...	/	KLS	/	X
Basic unit											
TS3	Portable Control Unit with abdominal belt										
Colour											
1	red / black										
2	gray / black										
Attachment											
K 1	Cable entry M25 cable 11 - 21 mm with bend protection										
K 2	Cable entry M32 cable 19 - 28 mm with bend protection										
G1	Engraving plate <i>Indicating labels engraved for Multi-axis-/ Single-Axis Controller</i>										
Mounting for equipment boxes											
V	Multi-Axis Controller (see page 1)										
N	Control-Switch (see page 113)										
<i>More command and indicating devices (see page 137 and 243)</i>											
Cable and wiring											
Cable Ölflex Classic FD 810 P	18 x 1 mm ²	13,9 mm Ø	-5°C bis +70°C				each meter				
Cable Ölflex Classic FD 810 P	25 x 1 mm ²	16,4 mm Ø	-5°C bis +70°C				each meter				
Cable Ölflex Classic FD 810 P	34 x 1 mm ²	18,9 mm Ø	-5°C bis +70°C				each meter				
Cable Ölflex Crane	18 x 1 mm ²	19,2 mm Ø	-25°C bis +80°C				each meter				
Cable Ölflex Crane	24 x 1 mm ²	22,1 mm Ø	-25°C bis +80°C				each meter				
Cable Ölflex Crane	36 x 1 mm ²	26,1 mm Ø	-25°C bis +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										

with straps and reling
Protection IP 65
with multi-axis-controllers IP 54



Signal-Cam Controller NU1



The Signal-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 Signal-Cam Controllers 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

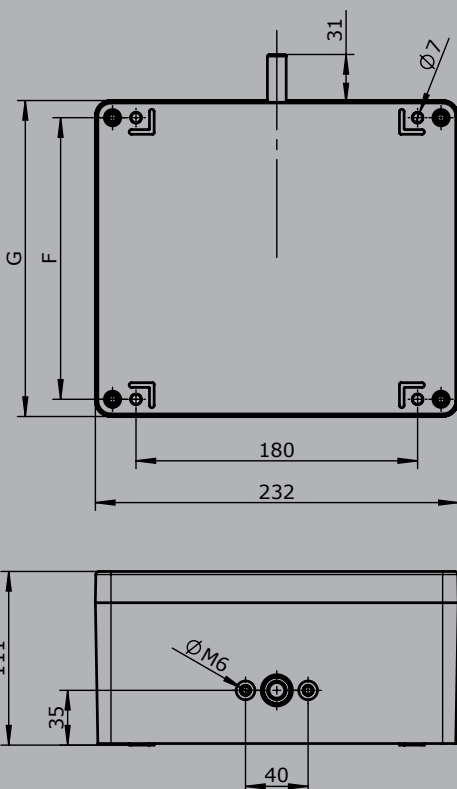
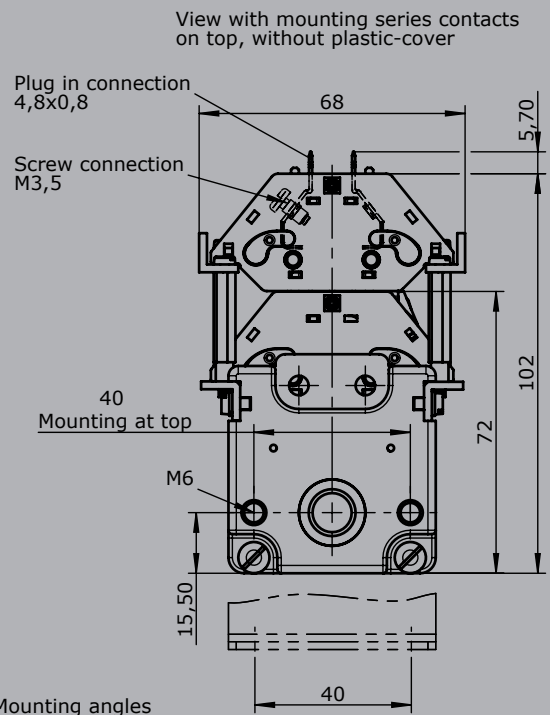
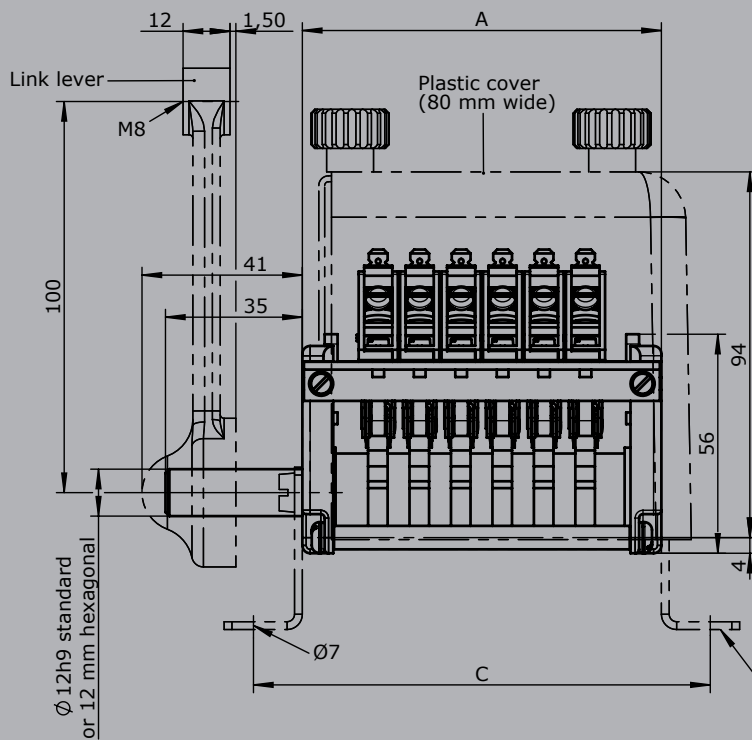


Switching capacity	NC	NO	Time constant
250 V DC	2A	1A	20 ms
125 V DC	4A	3A	20 ms
50 V DC	6A	6A	20 ms
30 V DC	10A	10A	20 ms
250 V DC15	6A	6A	

	NU1	-4	-4	-F2	Example -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								

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

	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)								
	<i>Housing only possible with single-row version contacts</i>								
Special model									
X	Special / customer specified								



Aluminum housing protection IP 65

Type	No. of contacts	Dim. A	Dim. C	Housing	Dim. F	Dim. G
2	2	7	74	U 23/20	180	202
4	4	70	95			
6	6	91	117			
8	8	113	138			
10	10	134	159	U 23/28	260	280
12	12	155	180			
14	14	176	201			
16	16	197	222			

DC Contact

SO 1.10 Normally open (NO)
SS 1.10 Normally closed (NC)



The DC Contact 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 contacts to prevent the magnets adversely affecting each other. Contacts in four different colours are available for polarity identification of the magnets when fitted.

The contact 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 contacts 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 contacts can be provided with shock protection to DIN VDE 0106 Part 100.

	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

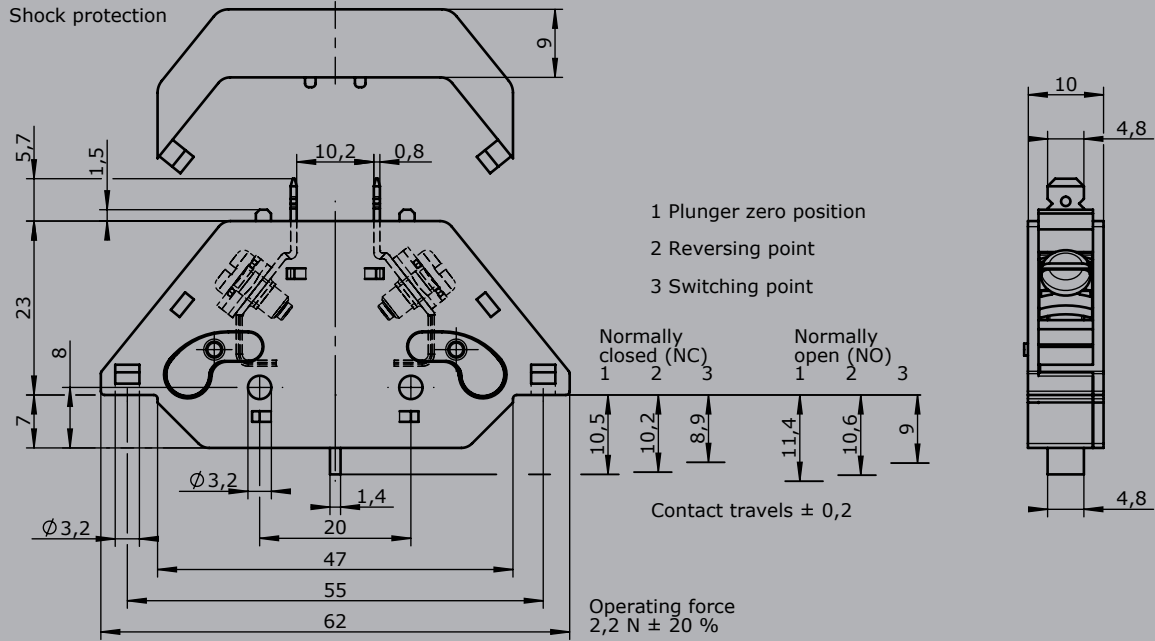
Mechanical life	2 million operating cycles
Electrical service life	50.000 operating cycles (at 2A 250 V DC L/R 20 ms)
Operation temperature	-40°C to +85°C
Degree of protection	IP40

	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				

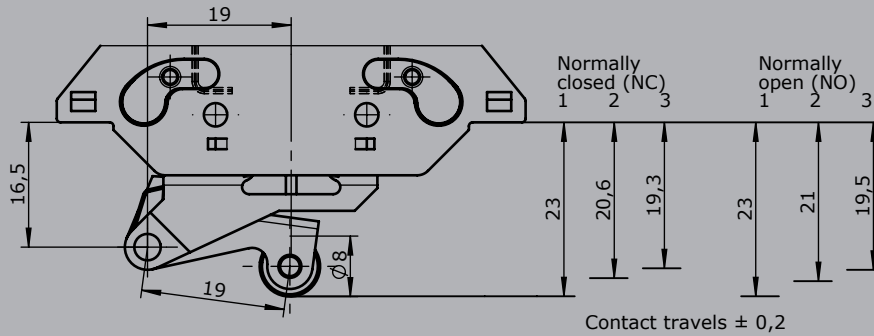
Technical details may vary based on configuration or application! Technical data subject to change without notice!

DC Contact

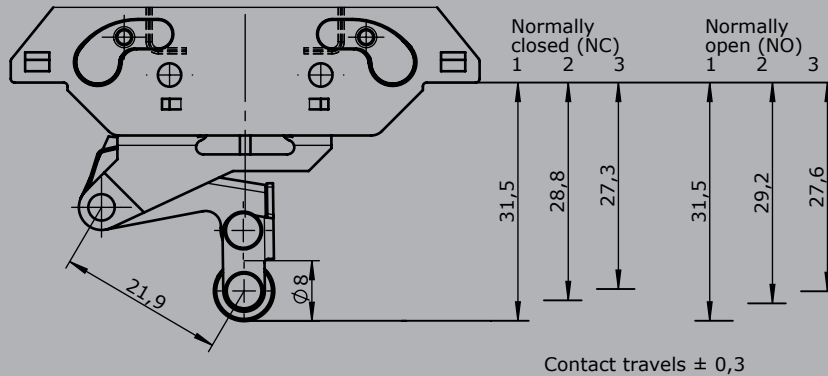
SO 1.10 Normally open (NO)
 SS 1.10 Normally closed (NC)



with roller lever



with toggle lever



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

Gear Limit Switch

GE1 / GE2



The Gear Limit Switch GE1 / GE2 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. The type GE 1 includes a double cam disc conjointly lockable. The type GE 2 includes a double cam disc conjointly lockable.



Technical data

Mechanical life GE1/GE2	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP65
Colour	RAL 7032 pebble grey

	GE 1	-10	-4	-P	-U7	-P	-18	-30	-60	-90	-X										
Basic unit																					
GE 1	Gear Limit Switch GE 1 with mounting flange																				
GE 2	Gear Limit Switch GE 2 with mounting flange																				
Gearing																					
Ratios:	2:1	to	10:1	example: 10:1 => 10																	
	11:1	to	20:1																		
	21:1	to	40:1																		
	41:1	to	80:1																		
	81:1	to	160:1																		
	161:1	to	320:1																		
Limit switch																					
2	2 contacts																				
3	3 contacts																				
4	4 contacts																				
5	5 contacts																				
6	6 contacts																				
7	7 contacts																				
8	8 contacts																				
9	9 contacts																				
10	10 contacts																				
11	11 contacts																				
12	12 contacts																				
13	13 contacts																				
14	14 contacts																				
15	15 contacts																				
16	16 contacts																				
(P)	Possibility of mounting potentiometer (Gessmann-types)																				
P	Potentiometer	P451	PW70	0,5 kOhm	I max. 30 mA	P452	PW70	1 kOhm	I max. 30 mA	P453	PW70	2 kOhm	I max. 30 mA	P454	PW70	5 kOhm	I max. 30 mA	P455	PW70	10 kOhm	I max. 30 mA
<i>More potentiometers on request!</i>																					

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

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°)

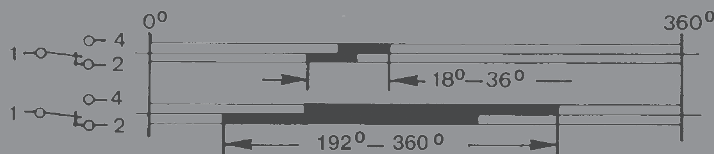
Contact 2: program-discs pair 30° (adjustment range 30°-60°)

Contact 3: program-discs pair 60° (adjustment range 60°-120°)

Contact 4: program-discs pair 90° (adjustment range 90°-180°)

Contact n:

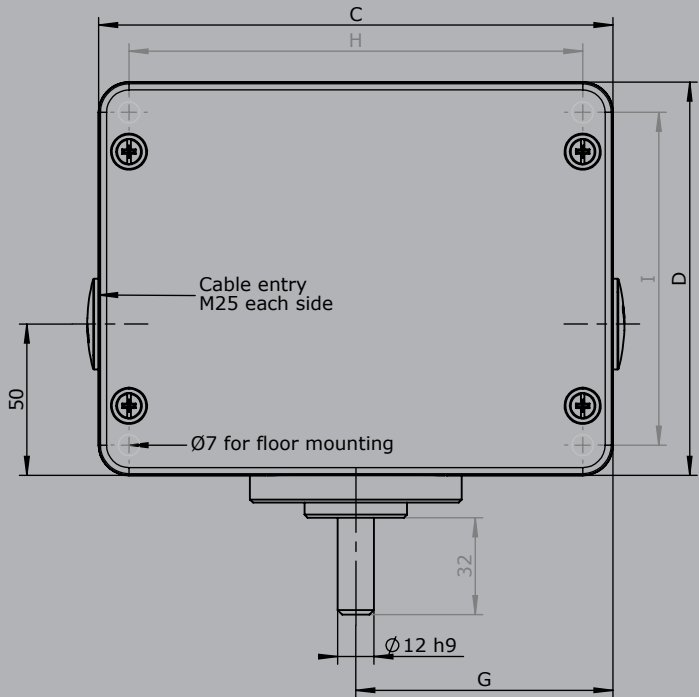
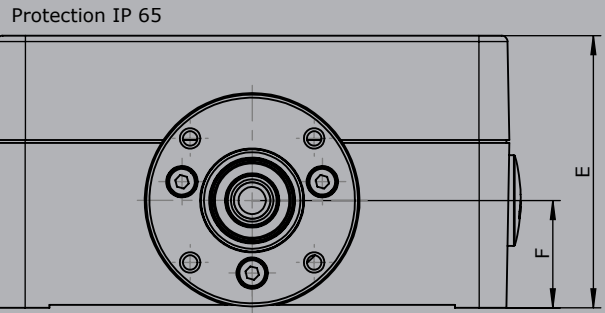
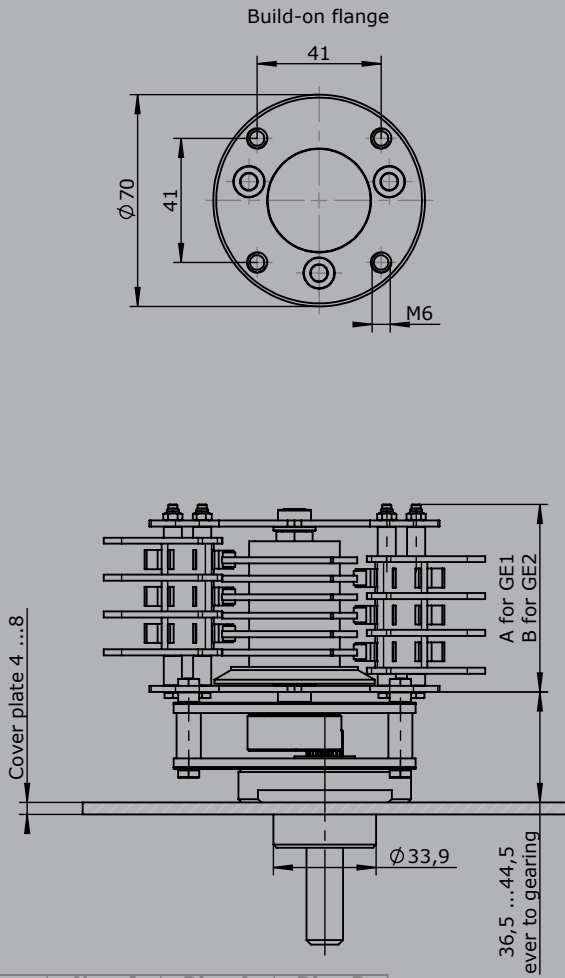
Illustration



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	140	140
U16/20	160	200	100	45	70	140	180
U16/26	160	260	91	45	70	140	240
U16/35	160	350	100	45	70	140	330

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.

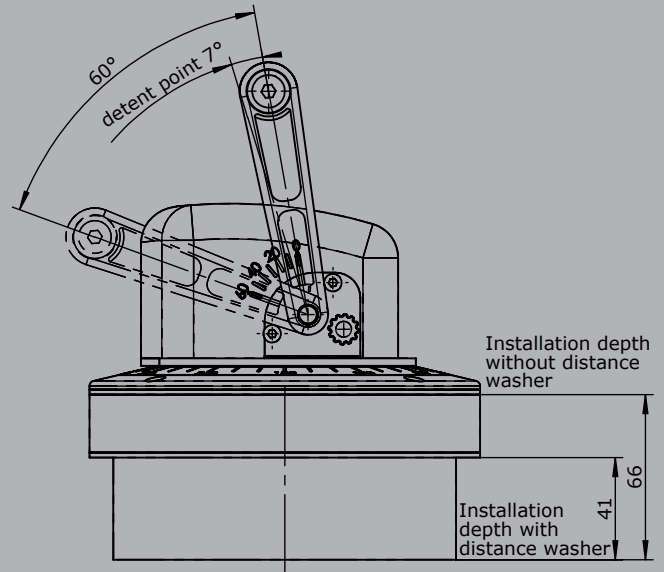
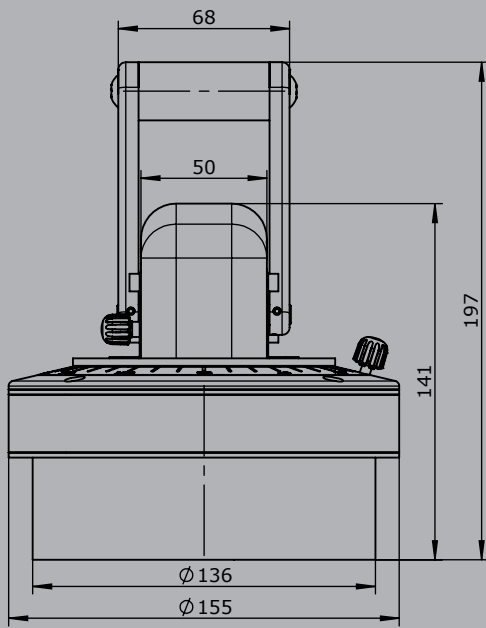
The AZ1 is resistant to oil, maritime climate, ozone and UV radiation.



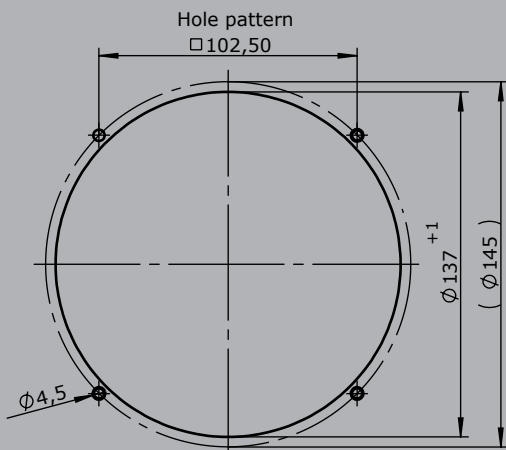
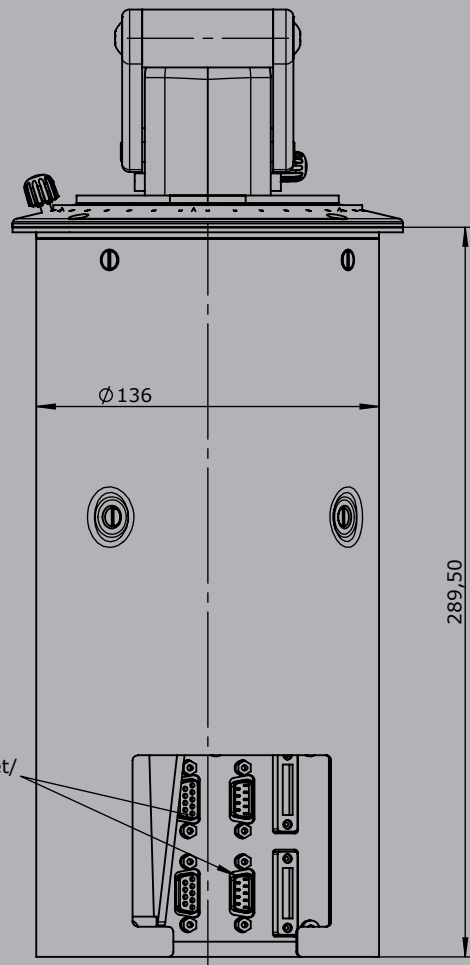
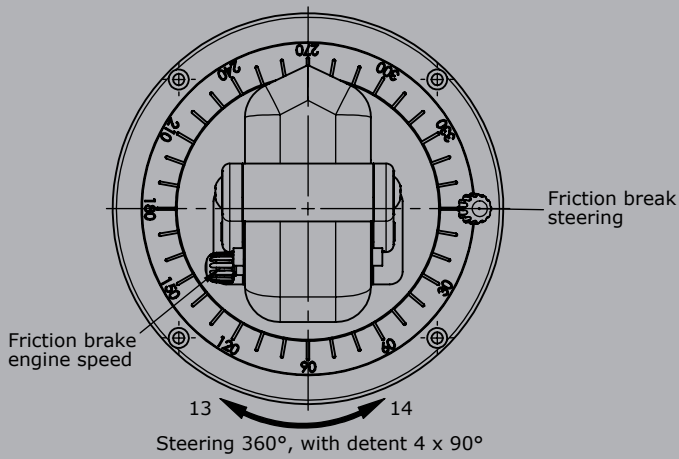
Technical data

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: <input type="checkbox"/> = Inverse dual, <input type="checkbox"/> = 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: <input type="checkbox"/> = Inverse dual, <input type="checkbox"/> = 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: <input type="checkbox"/> = Inverse dual, <input type="checkbox"/> = 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



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.

Technical data

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



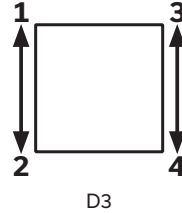
	D3	S5	Q / Q	-2 RP	+3 RP	Example		-B	-A05 P484	+A05 P484	-E1292	-S...	-X
Basic unit	D3												
Control-handle extended	S5	-20 mm											
Grip- control handle left	Q	T-grip											
Grip- control handle right	Q	T-grip											
Axis 1 (direction 1-2)	2	2 contacts (1,5A 24 V DC13)											
R		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 120)											
Special model	X	Special / customer specified											

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

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

Basic unit	
D3	
Control-handle extended*	
	Standard 148 mm*
S5	-20 mm
S8	+20 mm
<i>*Only available in combination with handle!</i>	
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 S5 Q / Q - 2 RP + 3 RP - B - A05 P484 + A050 P484 - E1292 - X

Axis 1: direction 1-2 left	
1	1 contact
2	2 contacts
3	3 contacts
	Standard contact- arrangement see page 122
	e.g.
	A98 MS0
	A05 MS21
	A050 MS21-0
	<i>A99 contact - arrangement according customer request</i>
R	Friction brake
(P)	Mounting options for potentiometer and (Gessmann-types)
P	Potentiometer
	P484 T318 2 x 5 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

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

Axis 2: direction 3-4 left

1	1 contact	Standard contact- arrangement see page 122		
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 RP + 3 RP - 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

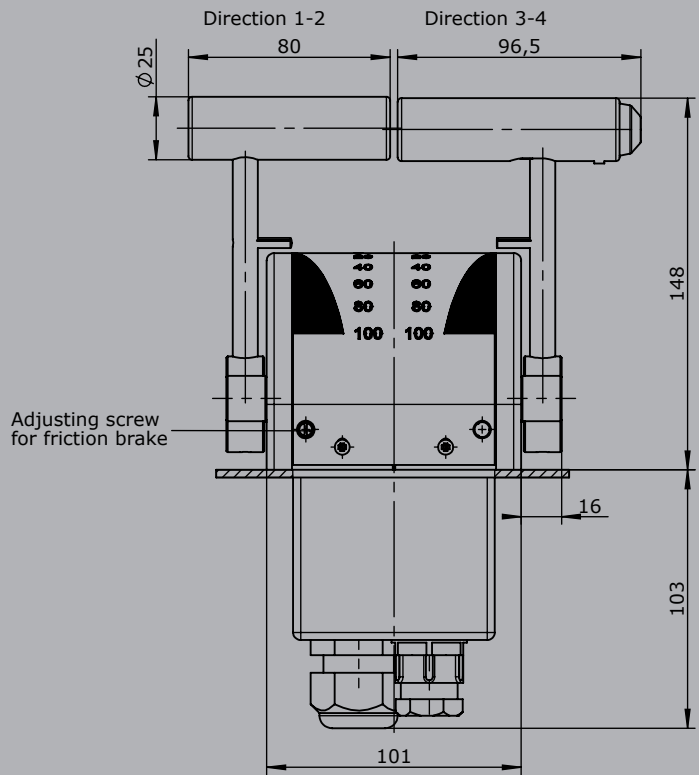
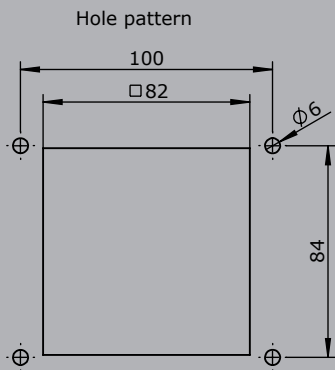
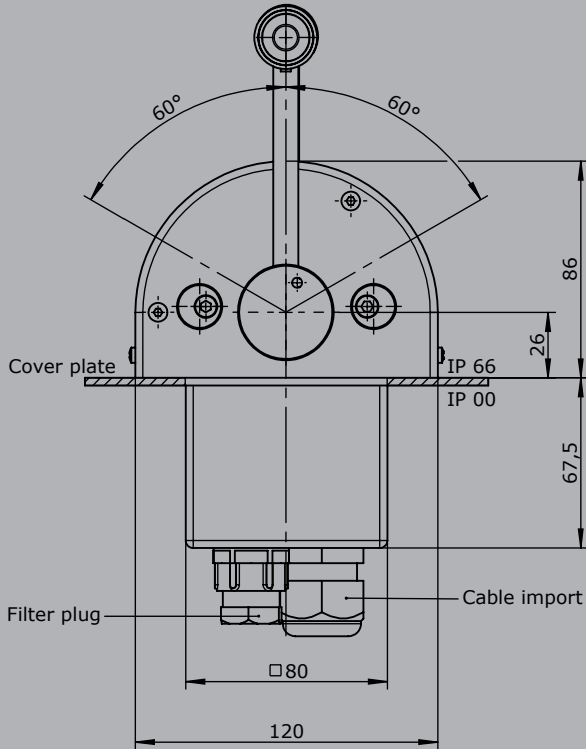
Supply voltage	11,5-32 V DC		
Wiring	Cable 300 mm long without plug connector		
	Optional with plug connector (standard plug connectors see page 120)		S
0...5...10 V per axis		1 axis	E129 1
		2 axis	2
10...0...10 V per axis		1 axis	E141 1
		2 axis	2
-10...0...+10 V per axis		1 axis	E140 1
		2 axis	2

Voltage output with other value on request!

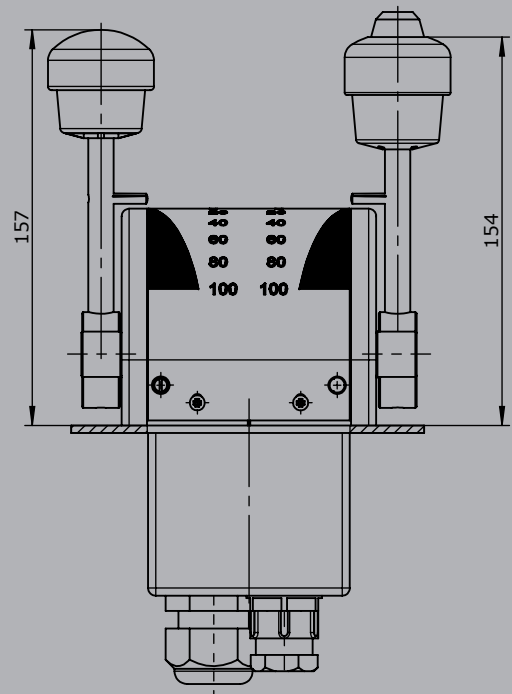
Current outputs

Supply voltage	18-36 V DC		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (standard plug connectors see page 120)		S
4...12...20 mA per axis		1 axis	E209 1
		2 axis	2
20...4...20 mA per axis		1 axis	E217 1
		2 axis	2

T- grip
D=Push button



Knob solid
D= Push button



Single-Axis Controller S3




The Single-Axis Controller 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

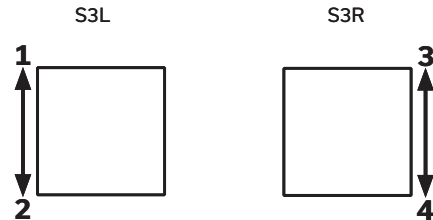


	S3L	S5	Q	-2 R P	-B	-A05 P484	-E1291	-S...	-X
Basic unit									
S3L Single-Axis Controller left									
Control-handle extended									
S5 -20 mm									
Grip- control-handle left									
Q T-grip									
Axis 1									
2 2 contacts (1,5A 24 V DC13)									
R Friction brake									
P Potentiometer									
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 120)									
Special model									
X Special / customer specified									

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

	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:**



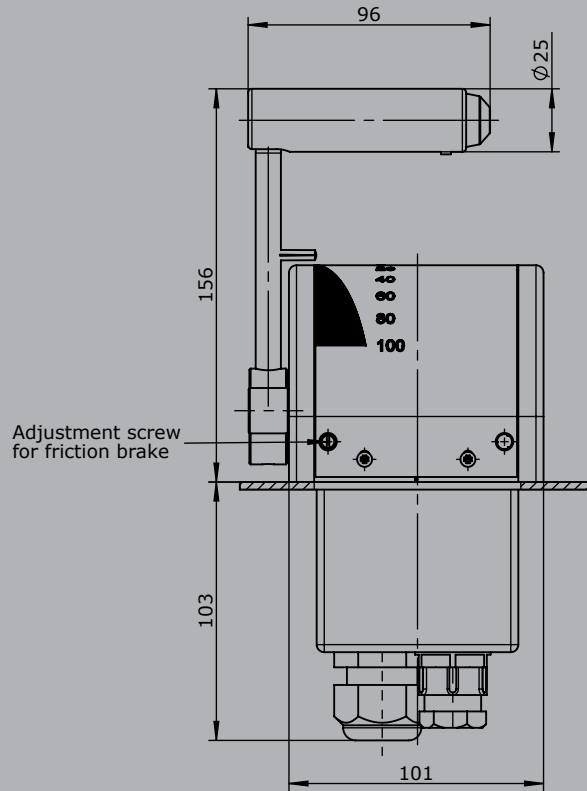
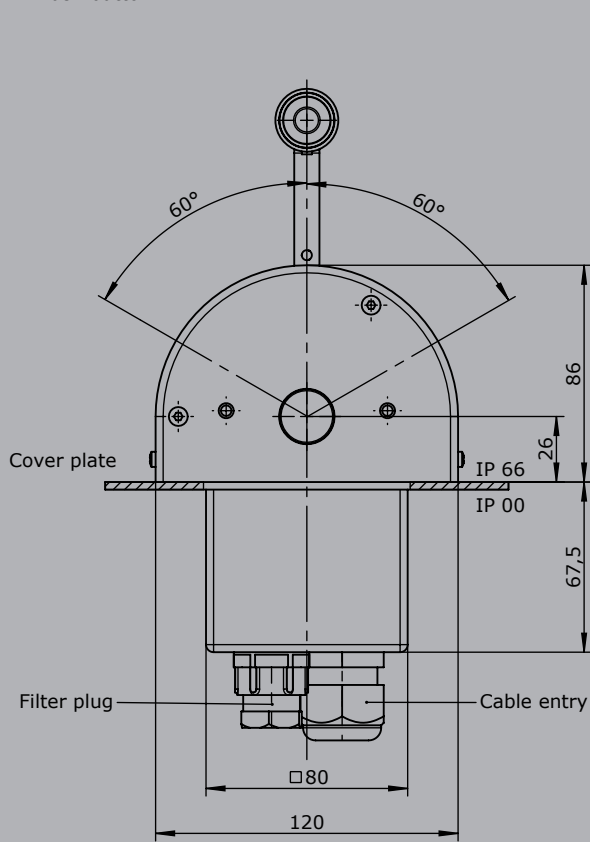
	S3L	S5	Q	-2 R P	-B	-A05	P484	-E1291	-S...	-X
Axis 1: direction 1-2 left										
1	1 contact									
2	2 contacts									
3	3 contacts									
	Standard contact - arrangement see page 122									
	z.B.									
	A98									
	A05									
	A050									
	A99 contact - arrangement according customer 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									

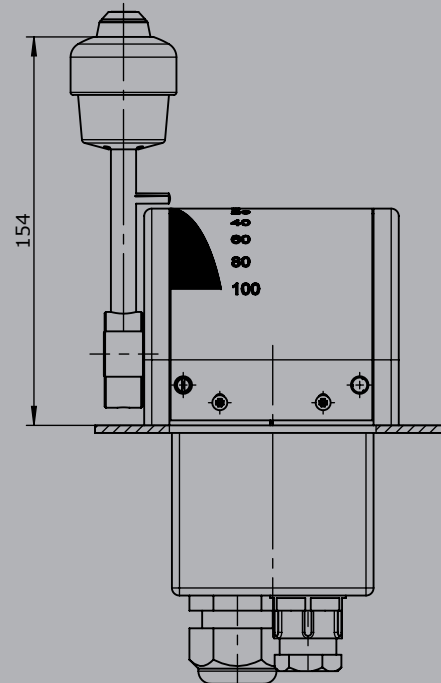
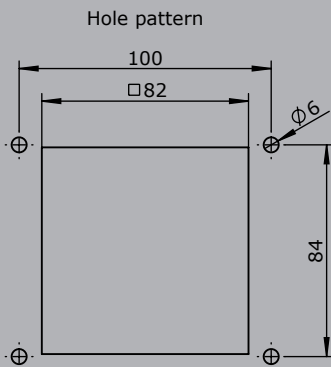
Voltage output			
Supply voltage	11,5-32 V DC		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 120</i>)		
0...5...10V	1 axis	E112 1	S
10...0...10V	1 axis	E141 1	
-10...0...+10V	1 axis	E140 1	
Voltage output with other value on request!			

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 120</i>)		
4...12...20 mA	1 axis	E209 1	S
20...4...20 mA	1 axis	E217 1	

T - grip
D= Push button



Knob solid
D= Push button



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.

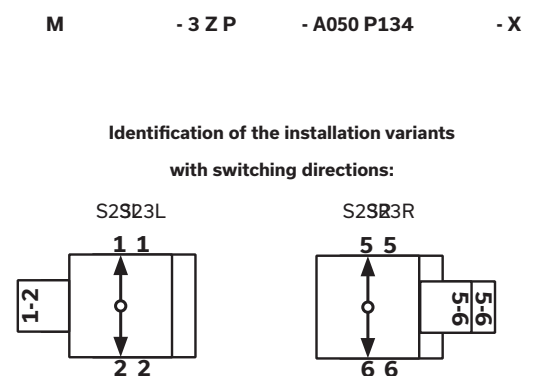
Technical data

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



	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
Basic unit		
S23L left		
S23R right		
Control-handle extended		
Standard 140 mm		
S5 -20 mm		
S8 +20 mm		



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 122		
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 130		

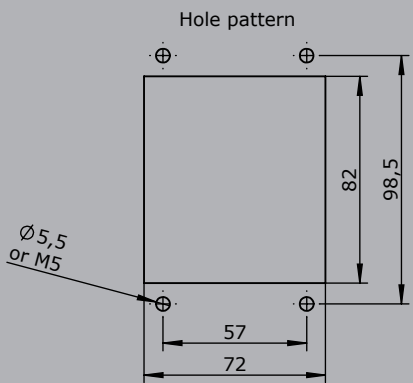
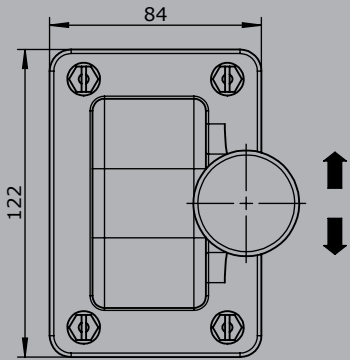
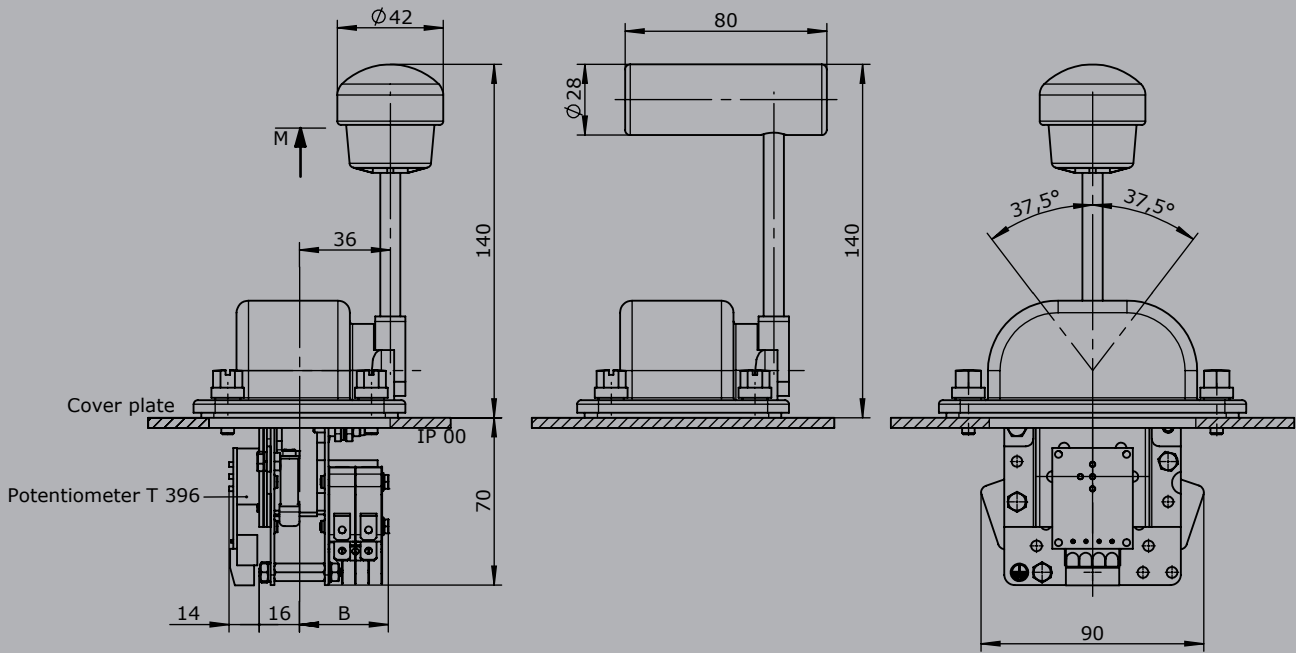
S23L S5 M - 3 Z P - A050 P134 - X

Special model

- X Special / customer specified

M = Latch for mechanical zero interlock

T - grip



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

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

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

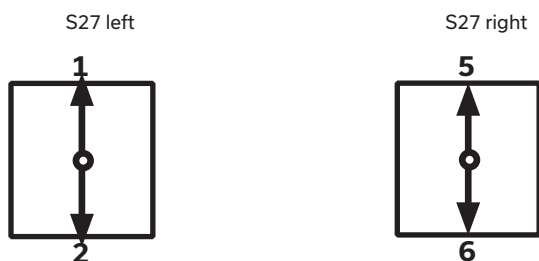
Mechanical life S27	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP65, electronic assembly IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



	S27L	M	Example - 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 120)						
Special model						
X Special / customer specific						

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 120</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 120</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

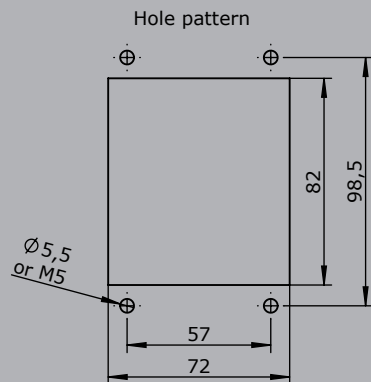
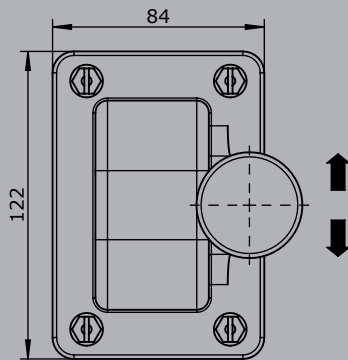
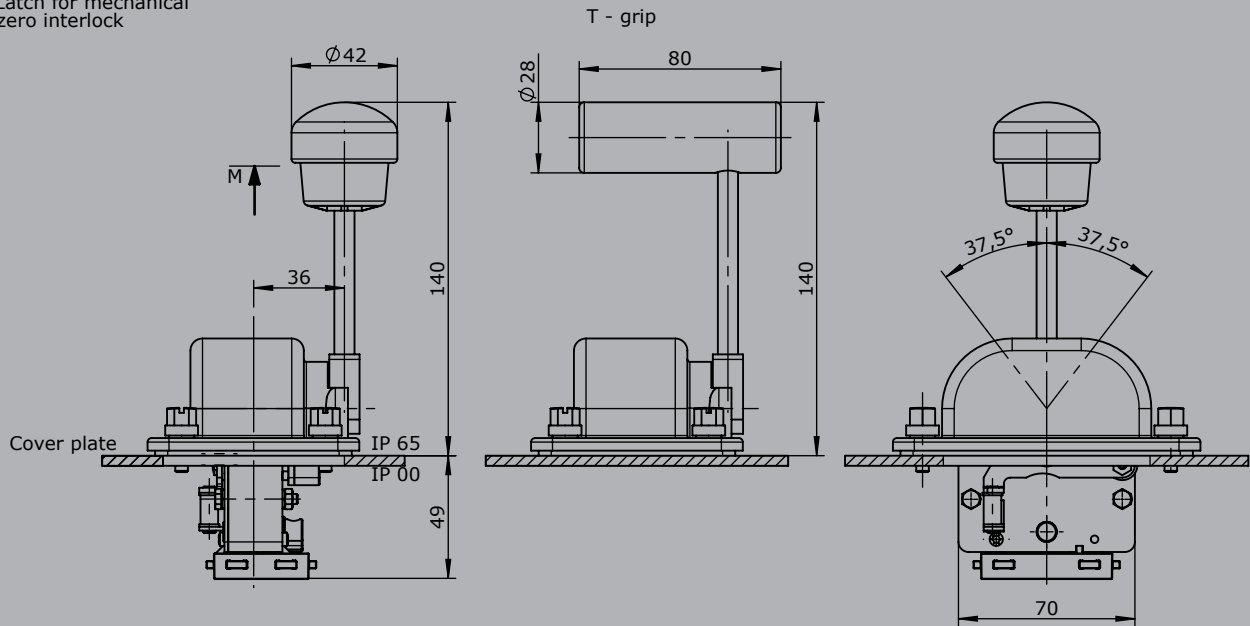
Voltage output

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 120</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 120</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





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 122										
02	4 contacts	z.B.										
03	6 contacts	A05 MS21										
04	8 contacts	A0500 MS21-00										
		<i>A99 contact - arrangement according customer request</i>										
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								
		<i>More potentiometers on request!</i>										

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

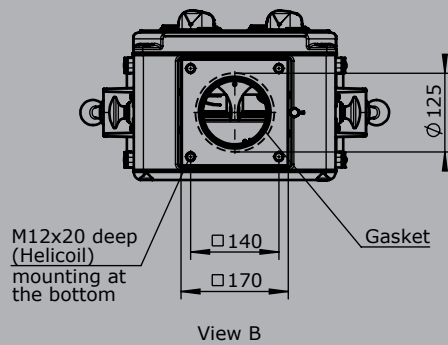
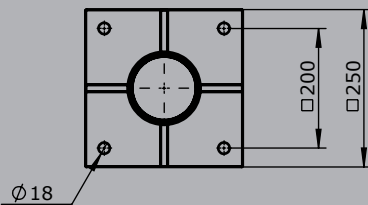
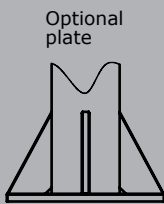
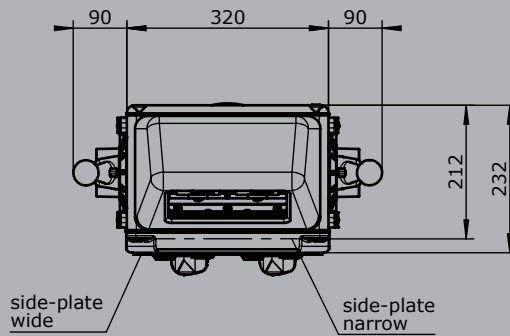
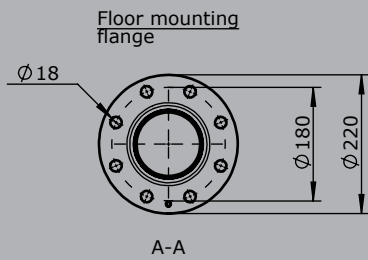
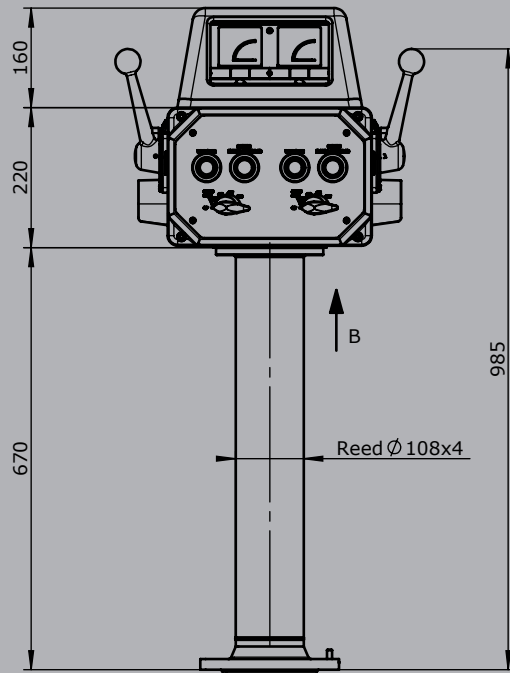
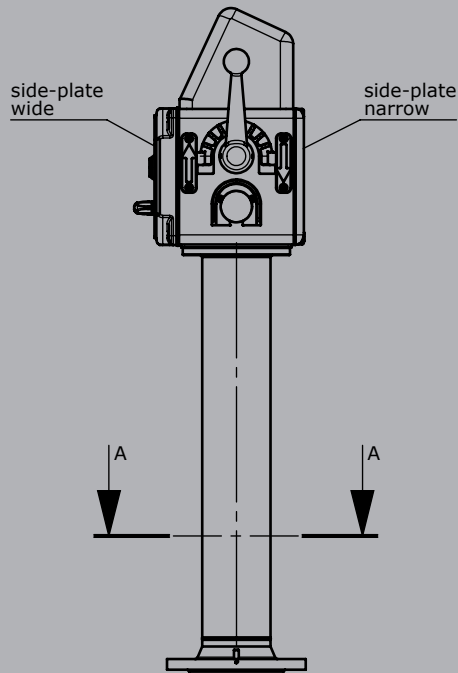
PQ	Powermeter PQ 72 1 mA DC	Engraved your instructions
PQI	Powermeter PQ 72 1 mA DC illuminated 24 Volt	Engraved your instructions
PQ	Powermeter PQ 72 x 36 1 mA DC	Engraved your instructions
PQI	Powermeter PQ 72 x 36 1 mA DC illuminated 24 Volt	Engraved your instructions
EQ	Amperemeter EQ 72 100/200/1A	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



The Control Pedestal U23/23 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

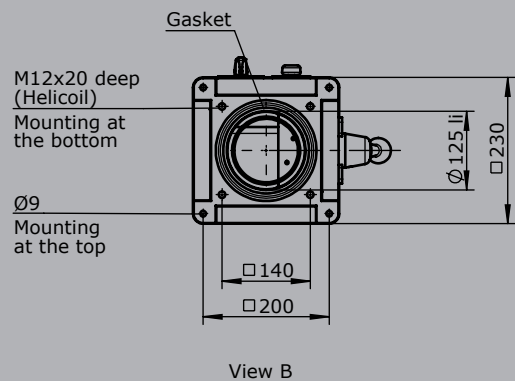
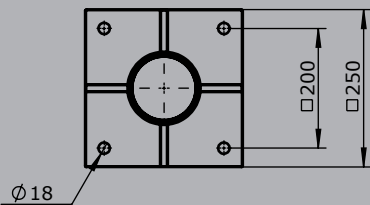
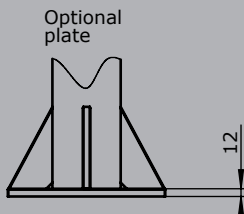
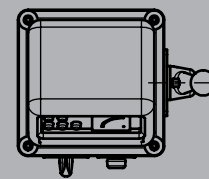
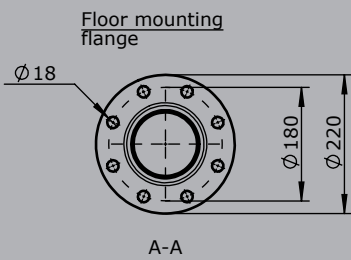
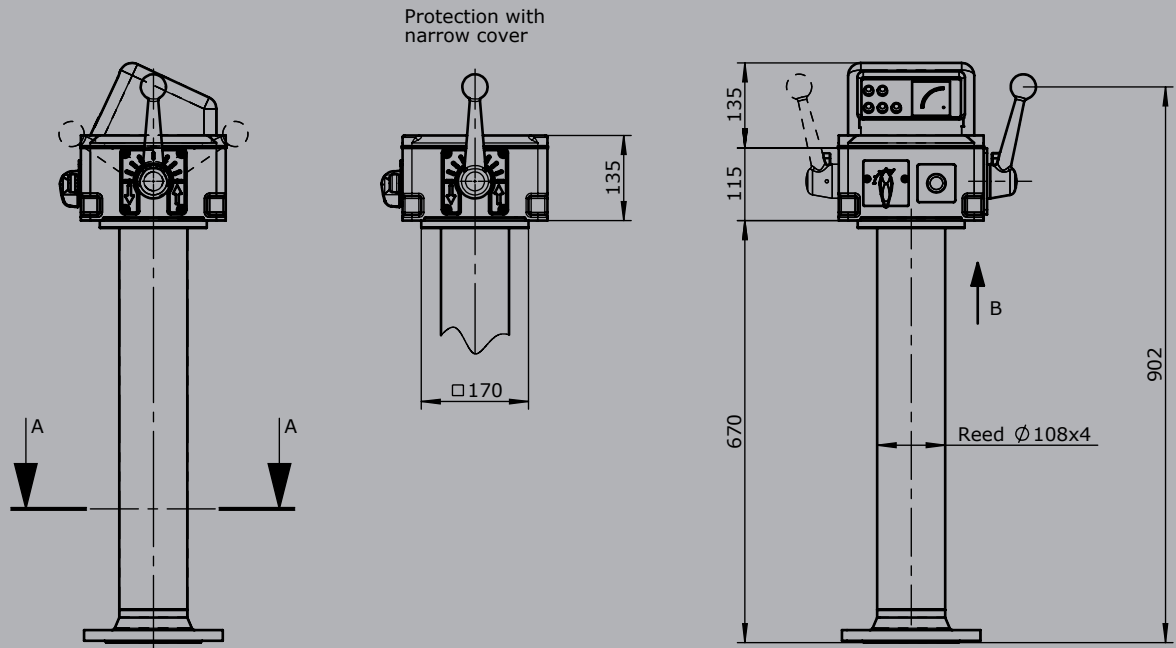


		U23/23	N61.../N62...	H / PW / 2D	PQ	KLV	X
Housing							
U23/23	With 1 narrow cover with pillar-gasket						
U23/23A	With 1 narrow cover without drilling in the housing						
IA	Monitoring devices cover with gasket for max. 2 monitors 72 x 72 mm or 4 monitors 72 x 36 mm and max. 6 indicating devices 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						
Axis 1: direction 3-4							
(Standard contacts gold-plated 2A 250 V AC15)							
01	2 contacts	Standard contact - arrangement see page 122					
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	l max. 1 mA			
		P132	T396 2 x 1 kOhm	l max. 1 mA			
		P133	T396 2 x 2kOhm	l max. 1 mA			
		P134	T396 2 x 5 kOhm	l max. 1 mA			
		P135	T396 2 x 10 kOhm	l 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 mm ² with wire line 0,75 mm ²					
Special model							
X	Special / customer specified						



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