

Industrial Controllers Catalog

2023

Gessmann Industrial Controllers Catalog 2023



GESSMANN



Tool for Designers, Engineers and Purchasing Agents

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

Product range

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

As of
2023



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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Industrial Controllers

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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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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	Multi-Axis Controller, 1-axis										
V85	Multi-Axis Controller, 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 161)										

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 (zero detent)
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

*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 126)

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 125)
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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 125</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 125</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 125</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 125</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 125</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 125</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
<i>*External LED-outputs can be used for LEDs in the grip!</i>		
<i>*With the use of capacitive sensor, the external digital inputs are reduced by one input!</i>		
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
<i>*External LED-outputs can be used for LEDs in the grip!</i>		
<i>*With the use of two capacitive sensors, the external digital inputs are reduced by one input!</i>		
Main-axis with additional digital 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			
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 (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 125</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 125</i>)		S
Profinet		E603 1	
- 6 analog joystick axis			
- 24 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 125</i>)			S
PROFIsafe			E703 1	
- 6 analog joystick axis				
- 24 digital joystick functions				
- Input for capacitive sensor				
With additional external in-/outputs				
- 8 external LED-outputs, 8 external digital inputs			2	
- 16 external LED-outputs, 16 external digital inputs			3	
<i>*External LED-outputs can be used for LEDs in the grip!</i>				
Main-axis with additional signals separately wired (not via profinet safe)				
- 2 direction signals + zero position signal (potential-free) per main-axis				3
PWM Outputs				
Supply Voltage	9-32V DC			
Valve control current	max. 3 A			
PWM-frequency	1225 Hz			
Dither frequency	1...250 Hz adjustable			
Mounting depth A	100 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) 14 x 0,25 mm ² 300 mm long without plug			
	Optional with plug connector (<i>standard plug connectors see page 125</i>)			S
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 125*)

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

Mounting depth A 85 mm

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 125*)

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

Mounting depth A 85 mm

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 125*)

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

S

Attachments

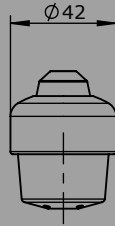
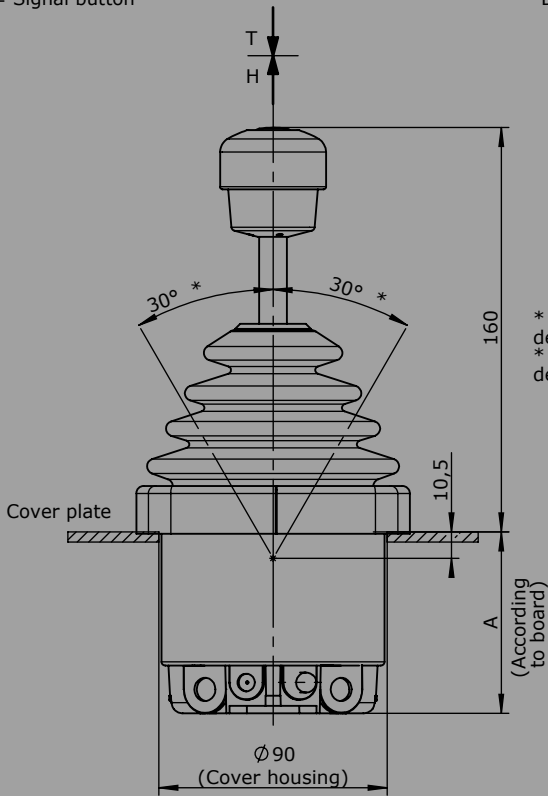
Z01	Mating connector (CAN) M12 (male insert) with 2 m cable	20201140
Z02	Mating connector (CAN) M12 (female contact) with 2 m cable	20202298
Z03	Mating connector (Profibus) straight	22201440
Z04	Mating connector (Profibus) 90° angled	22201741
Z05	Mating connector (Profinet) M12 (male insert) with 2 m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

T = Dead man's button
H = Signal button

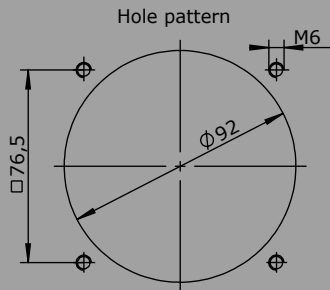
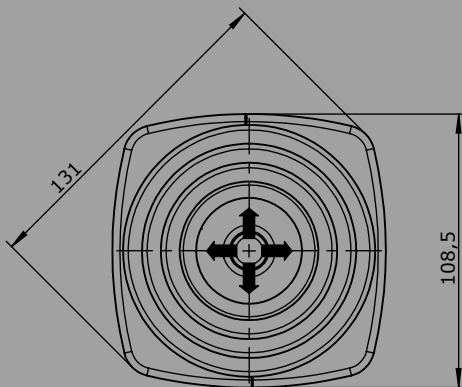
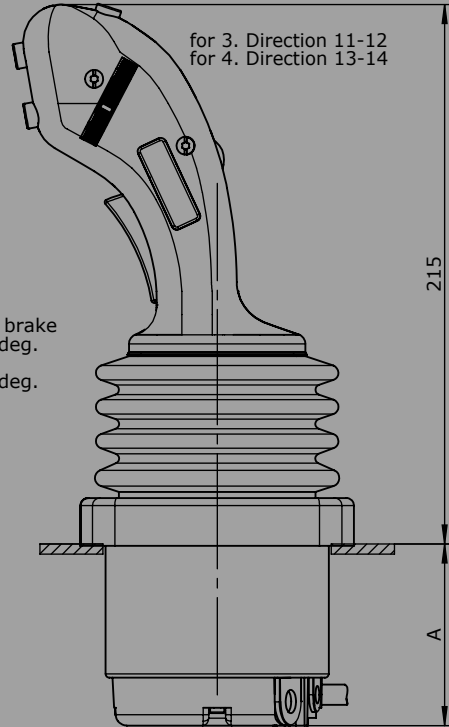
Knob solid
D= Push button

Palm grip B3

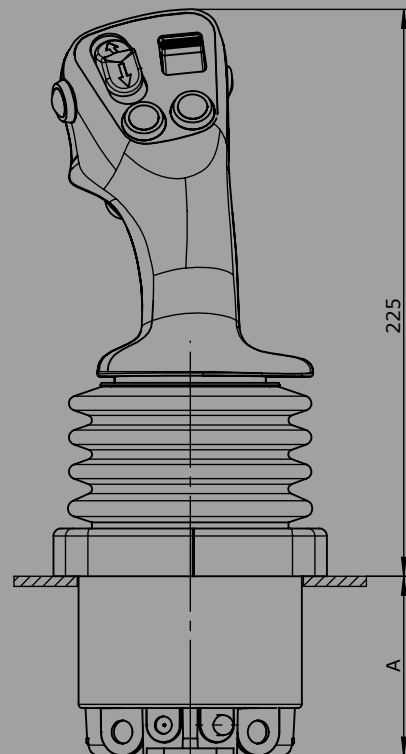
for 3. Direction 11-12
for 4. Direction 13-14



* 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	Multi-Axis Controller, 1-axis										
V27	Multi-Axis Controller, 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 161)										
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 (zero detent)										
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 126)

Interface (description see on the following pages)

E0xx Switching output
 E1xx Voltage output
 E2xx Current output
 E3xx CAN-interface
 E4xx CANopen Safety interface
 E6xx Profinet
 E7xx PROFIsafe
 E9xx Other outputs

Plug connectors

S... Standard plug connectors (see page 125)

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 125)

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 125</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 125</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	

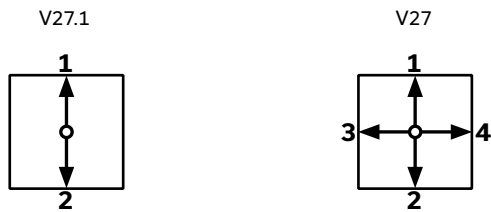
*Axis for grip functions, interface can vary depending upon actuation element!

Voltage output with other value on request!

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

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 125)	
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 125</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)	1
- 2 direction signals per main axis	
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
<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 125</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

3

With additional analog outputs on request!

Profinet

Supply voltage	18-30 V DC
Baud rate	To 100 MBit/s
Ausgangswert	0...512...1023
Mounting depth A	90 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 125</i>)

S

Profinet

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

E602 1

With additional external in-/outputs

- 8 external LED-outputs, 8 external digital inputs

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

2

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

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

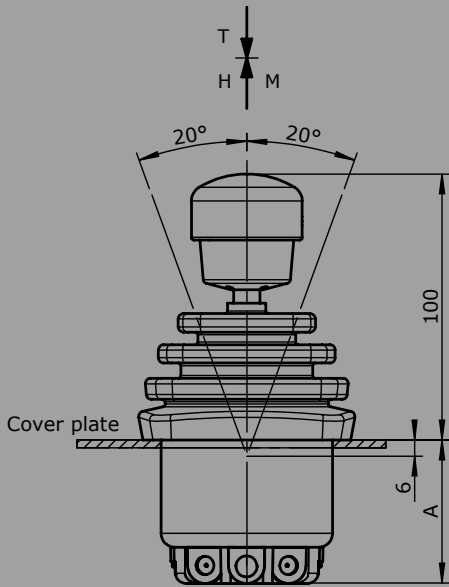
3

PROFIsafe			
Supply voltage	18-30 V DC		
Baud rate	To 100 MBit/s		
Output value	0...512...1023		
Mounting depth A	90 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 125</i>)		S
PROFIsafe		E702 1	
- 4 analog joystick axis			
- 20 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs		2	
*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

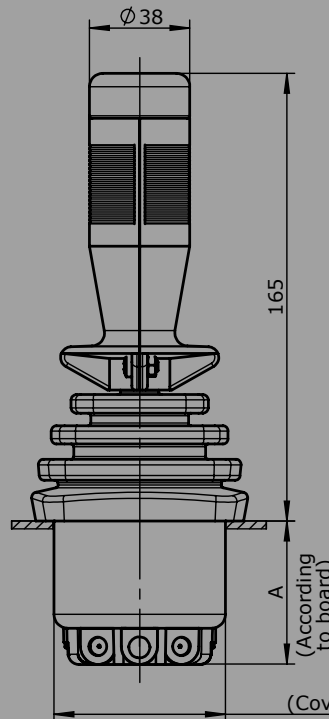
Other outputs			
Voltage output for PVG32	0,25...0,5...0,75Us, power supply 9-32 V DC		
Option	Input for capacitive sensor		
Mounting depth A	45 mm (60 mm from 3 axis)		
Wiring:	1. cable 14 x 0,25 mm ² 300 mm long without plug connector 2. cable 14 x 0,25 mm ² 300 mm long without plug connector (optional for grip function)		
	Optional with plug connector (<i>standard plug connectors see page 125</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		

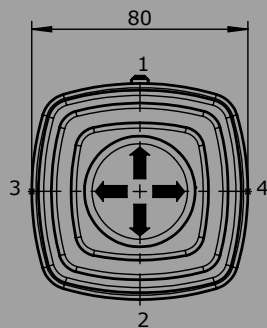
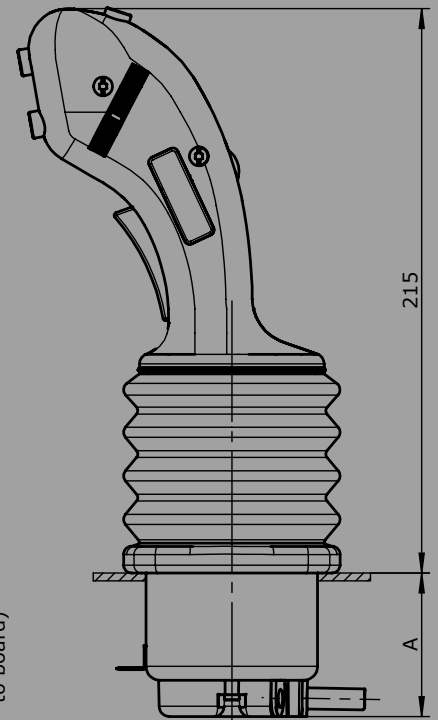
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock



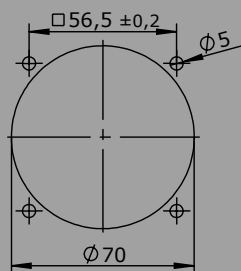
Palm grip B1



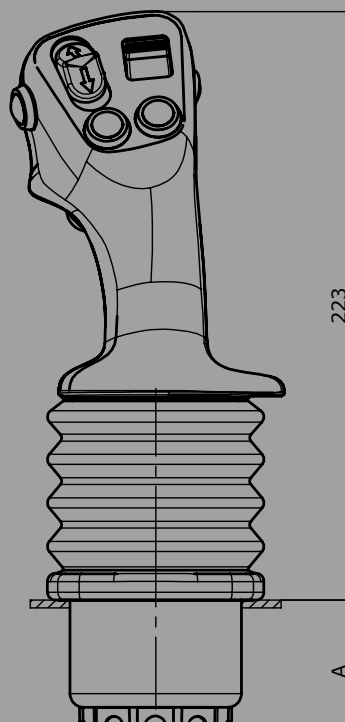
Palm grip B3



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	Multi-axis Controller, 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 161)							
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)								
E3xx	CAN-interface							
E4xx	CANopen Safety interface							
Plug connectors								
S...	Standard plug connectors (see page 125)							
Special model								
X	Special / customer specified							

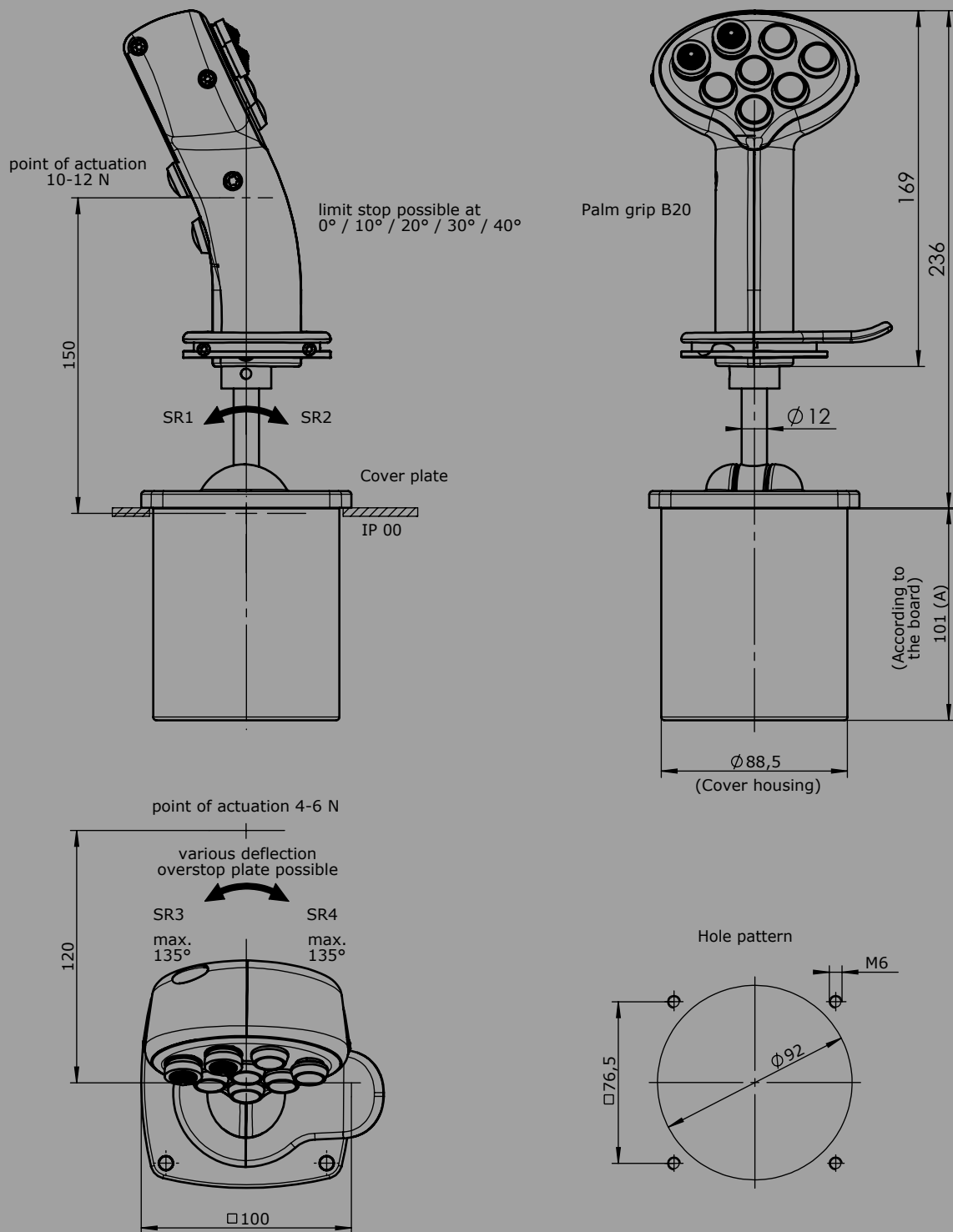
CAN			
Supply voltage	9-36 V DC		
Idle current consumption	120 mA		
	External digital output for LEDs 5-30 mA (dependent on the number of LEDs)		
	Digital switching output (potential-free) 100 mA		
Mounting depth A	E3091: 105 mm		
	E3091X: 130 mm		
	E3101X - E3103X: 130 mm		
	E3104X - E3105X: 160 mm		
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 125</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!			

CANopen Safety			
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	E4091: 105 mm		
	E4091X: 130 mm		
	E4101X - E3103X: 130 mm		
	E4104X - E3105X: 160 mm		
Protocol	CANopen Safety EN50325-5		
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 125</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!			

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

Attachments

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



Multi-Axis Controller 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 Multi-Axis Controller, 1-axis									
V25 Multi-Axis Controller, 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 161)									
Spring return (Included in basic unit!)									
Z Spring return									
Degree of protection									
B Cover housing									
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 126)									
Interface (description see on the following page)									
E0xx Switching output									
E1xx Voltage output									
E2xx Current output									
E3xx CAN-interface									
E4xx CANopen Safety interface									
E6xx Profinet									
E7xx PROFIsafe									
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 125)

Special model

X Special / customer specified

Combination possibilities with our grips

B1  p. 209	B2  p. 207	B3  p. 204	B5  p. 202	B6  p. 200	B7 B8  p. 198	B9  p. 196	B10  p. 194	B14 B15  p. 192
B20  p. 190	B22  p. 188	B23  p. 186	B24  p. 184	B25  p. 181	B26  p. 179	B28  p. 177	B29  p. 175	B30  p. 173
B31  p. 171	B32  p. 169	B33  p. 167	B34  p. 165	B35  p. 163	B36  p. 161			

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 125)
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 125)
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 125</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
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 125</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 125</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
<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	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 (<i>standard plug connectors see page 125</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		E406 1	
- 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>			
Profinet			
Supply voltage	18-30 V DC		
Baud rate	To 100 MBit/s		
Output value	0...512...1023		
Mounting depth A	90 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 125</i>)		S
Profinet		E602 1	
- 4 analog joystick axis			
- 20 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs			2
<i>*External LED-outputs can be used in the grip for LEDs</i>			
Main-axis with additional signals separately wired (not via profinet)			
- 2 direction signals + zero position signal (potential-free) per main-axis			3

PROFIsafe

Supply voltage	18-30 V DC
Baud rate	To 12 MBit/s
Output value	0...512...1023
Mounting depth A	90 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 125</i>)

PROFIsafe

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

With additional external in-/outputs

- 8 external LED-outputs, 8 external digital inputs

*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

E702 1

2

3

S

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: 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 125*)

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

S

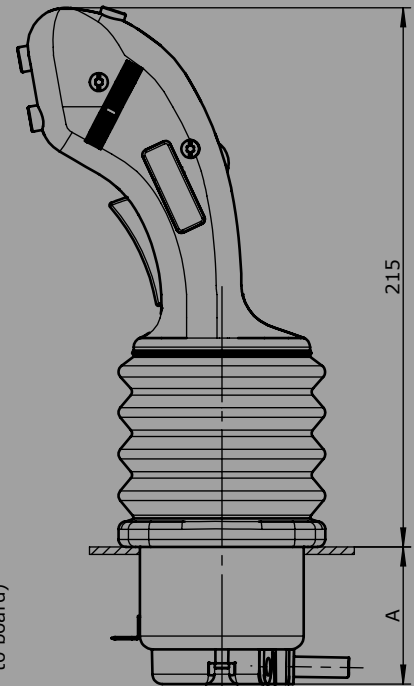
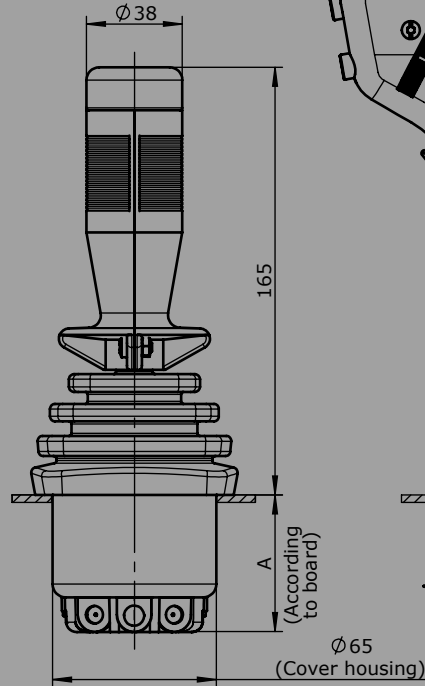
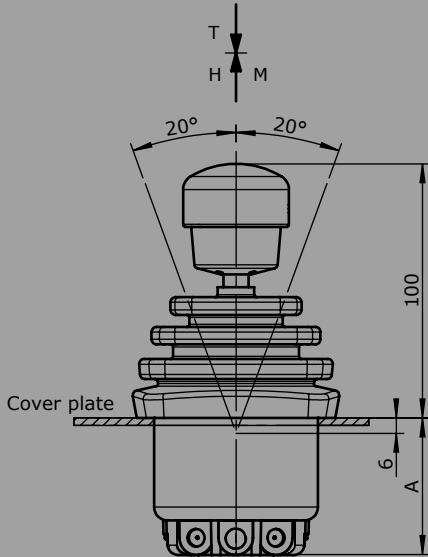
Attachments

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

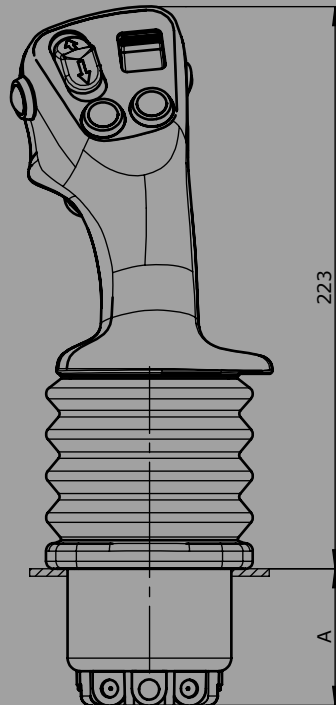
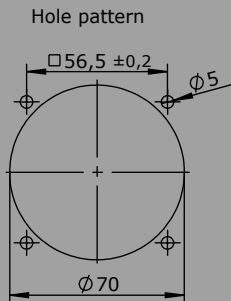
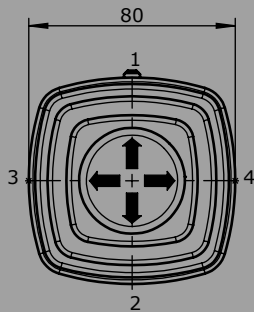
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock

Palm grip B1

Palm grip B3



Palm grip B25



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	T	-R	-B10	-E...	-S...	-X
Basic unit								
V24.1	Multi-Axis Controller, 1-axis							
V24L	Multi-Axis Controller, 1-axis with parking position left							
V24R	Multi-Axis Controller, 1-axis parking position right							
Gate								
P1	T-gate main axis axial (included in basic unit!)							
P2	T-gate main axis right outside							
P3	T-gate main axis left outside							
PX	Special gate							
Grip / Palm Grip								
	Knob (included in basic unit!)							
T	Dead man							
H	Signal button							
D	Push button							
B...	Palm Grip B... (see page Palm Grip 161)							
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 125)							
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		
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 125</i>)		S
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 125</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
	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 (standard plug connectors see page 125)		
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...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
	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 (<i>standard plug connectors see page 125</i>)		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 125</i>)

S

CANopen Safety

- 7 analog joystick axis
- 15 digital joystick functions
- *With the use of external inputs, the joystick functions are reduced by 7 pieces!*
- Input for capacitive sensor

E411 1

With additional external in-/outputs

- 8 external LED-outputs, 1 switching output (potentialfree, 100 mA), 7 external digital inputs
- 16 external LED-outputs, 1 switching output (potentialfree, 100 mA), 7 external digital inputs

2

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!

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 125</i>)

S

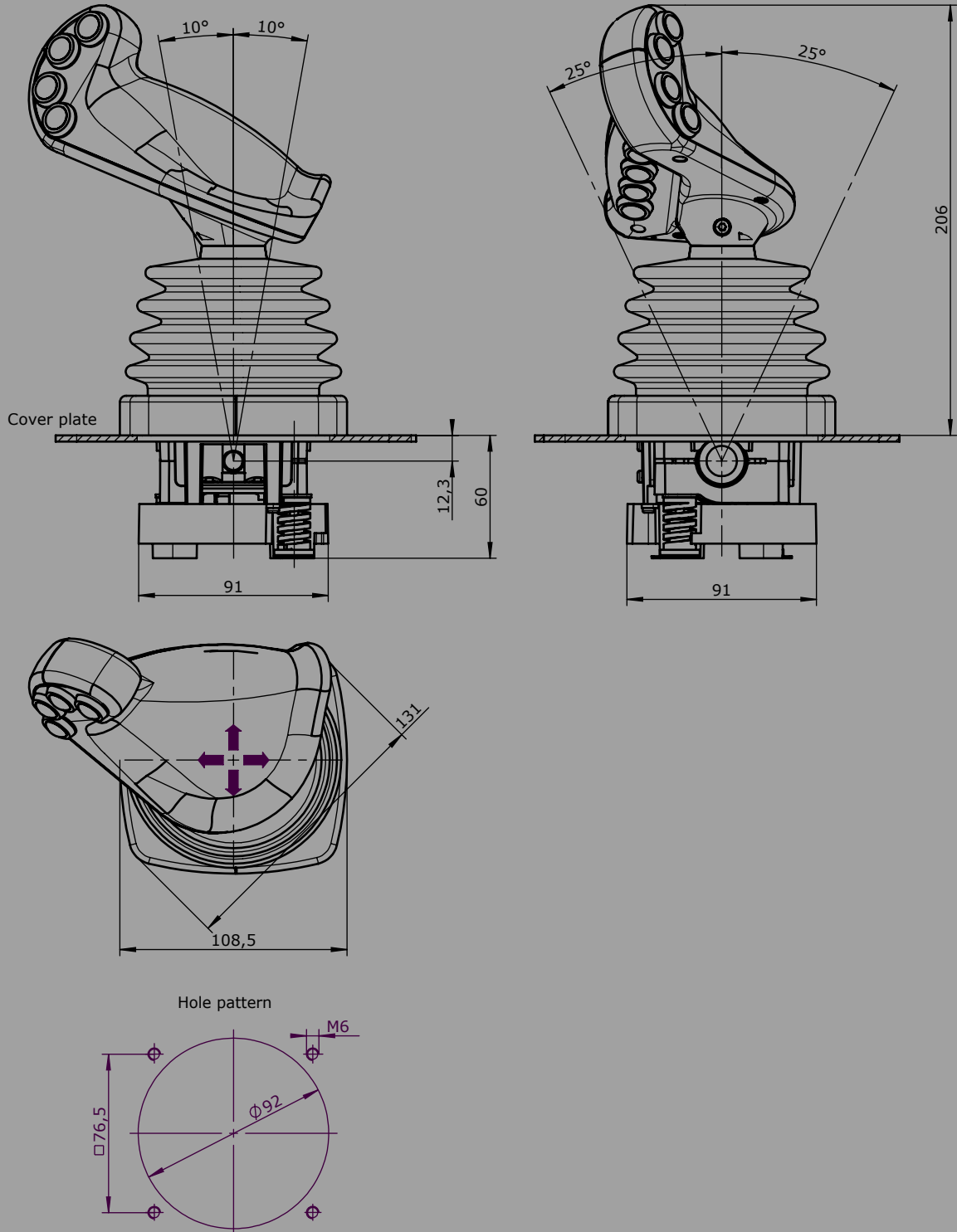
1 axis	E907 1
2 axis	2
3 axis	3
4 axis	4
5 axis	5
6 axis	6

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

3

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

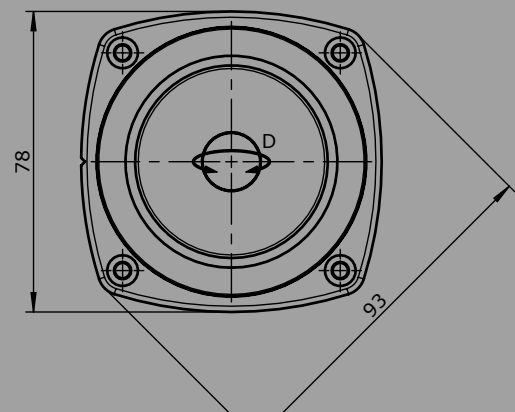
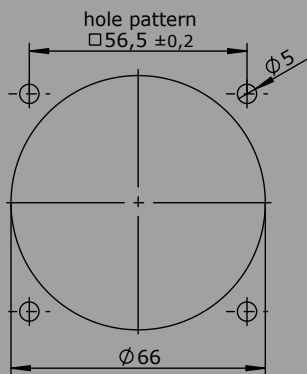
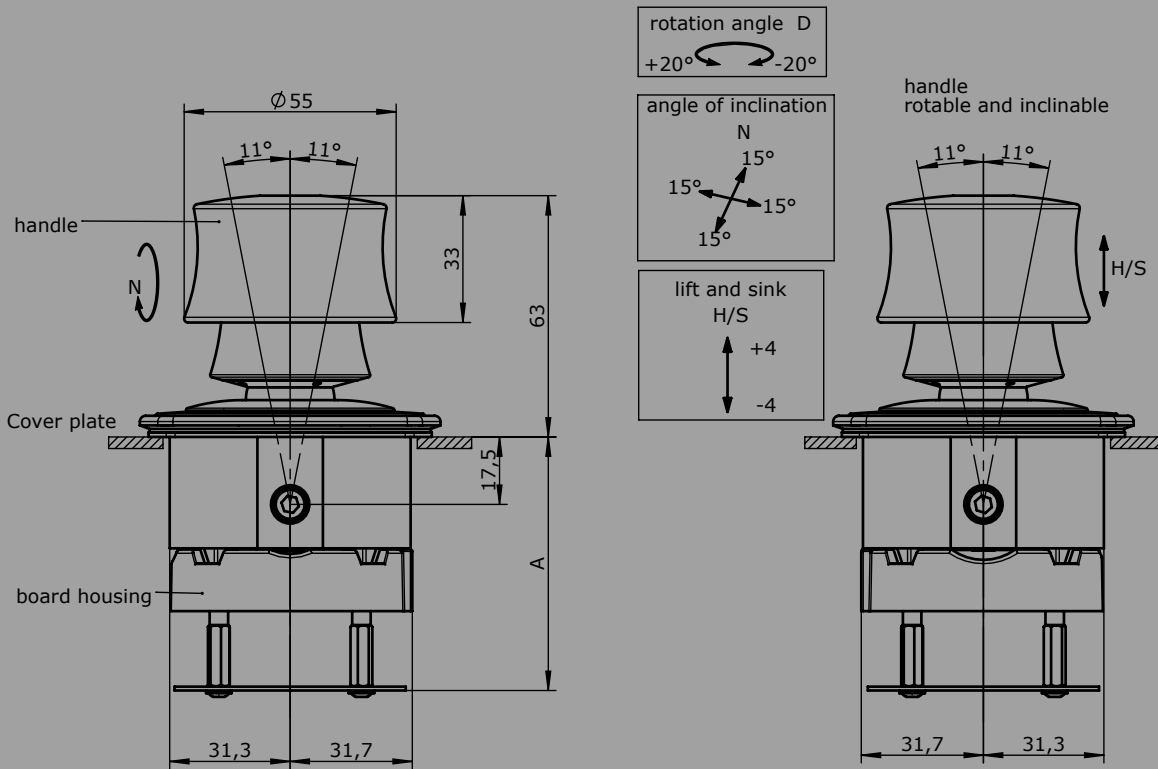
Mechanical life V1	6 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	Up to IP65
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



	V1	P	H11	H13	H15	H17	-Z	+Z	-B	-E...	-S...	-X
Basic unit												
V1.1 Multi-Axis Controller, 1-axis												
V1 Multi-Axis Controller, 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 125)												
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 125</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
<i>More outputs on request!</i>			



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	Example		-Z	+R	-B	-E...	-S...	-X
Basic unit										
D85 Double-Handle Controller										
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 194)										
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 PROFI-safe
 E8xx PWM output
 E9xx Other outputs

Plug connectors

S... Standard plug connectors (see page 125)

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 125)
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 125)
0,5...2,5...4,5V redundant + 2 direction signals per axis	
	2 axis
	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 125</i>)		S
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis			
	2 axis	E112 2	
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC			
	2 axis	E132 2	
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal			
	2 axis	E136 2	
+10...0...-10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring			
	2 axis	E138 2	
Output options			
Characteristic:			
	Inverse dual *1		1
	Dual *1		2
	Inverse dual with dead zone +/- 3° *1 (standard)		3
	Dual with dead zone +/- 3° *1		4
*1 Not combinable with output E136X and E138X			
	Single *2		5
	Single with dead zone +/- 3° *2 (standard)		6
*2 Not combinable with output E112X and E132X			
Digital output signals:			
Output signals standard:			
	Direction signals and zero position signals 1,5A 24 V DC		1

Voltage output with other value on request!

Current output

Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Mounting depth A	85 mm	
Option	Input for capacitive sensor	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 125</i>)	
S		
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

Current output with other value on request!

CAN

Supply voltage	9-36 V DC	
Idle current consumption	120 mA	
Current carrying capacity	Direction signal 100 mA	
	Zero position signal 100 mA	
	External digital output for LEDs 5-30 mA (dependent on the number of LEDs)	
	Digital switching output (potential-free) 100 mA	
Mounting depth A	E3091: 85 mm	
	E3091X: 105 mm	
	E3101X - E3103X: 105 mm	
	E3104X - E3105X: 125 mm	
Protocol	CANOpen CiA DS 301 or SAE J 1939 (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 125)		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>		
*With the use of capacitive sensor, the external digital inputs reduce by one input!		
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>		
*With the use of capacitive sensor, the external digital inputs reduce by one input!		
Main-axis with additional digital-/analog outputs separately wired (not via CAN)		
- 2 direction signals + 1 zero position signal (potential-free) per main-axis		3
<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 125)		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 125</i>)		S
Profinet		E603 1	
- 6 analog joystick axis			
- 24 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	
<i>*External LED-outputs can be used for LEDs in the grip!</i>			
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 125</i>)		S
PROFIsafe		E703 1	
- 6 analog joystick axis			
- 24 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs		2	
- 16 external LED-outputs, 16 external digital inputs		3	
<i>*External LED-outputs can be used for LEDs in the grip!</i>			
Main-axis with additional signals separately wired (not via profinet safe)			
- 2 direction signals + zero position signal (potential-free) per main-axis			3

PWM Outputs

Supply Voltage:	9-32 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 125</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 125</i>)
Main-axis with additional direction contacts per main-axis	2 axis E907 2 S 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 125</i>)
8 Bit Binär-Code with direction signals per main-axis, supply voltage 9-36 V DC	2 axis E903 2 S
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 125</i>)
	2 axis E904 2 S

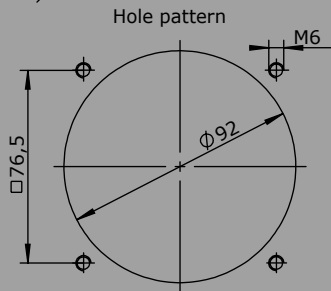
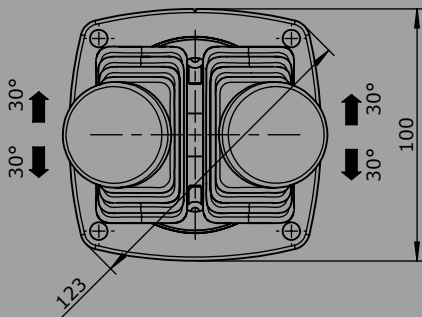
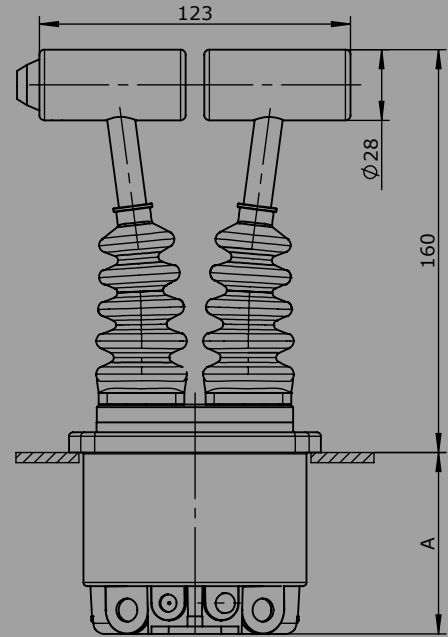
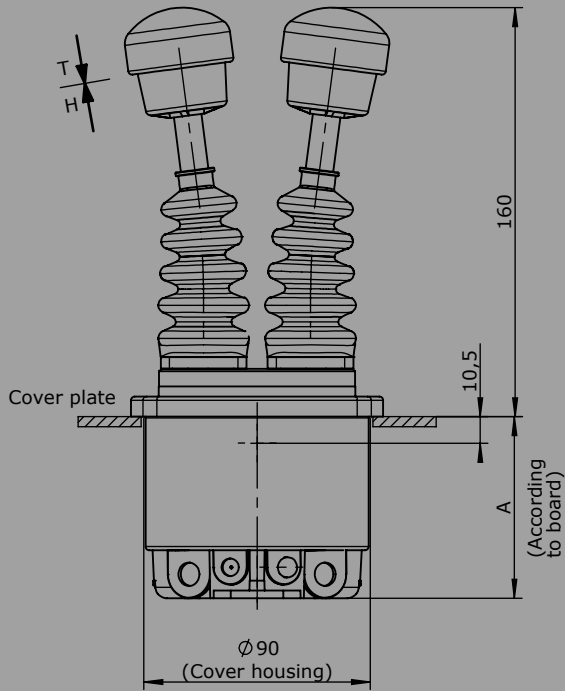
Attachments

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

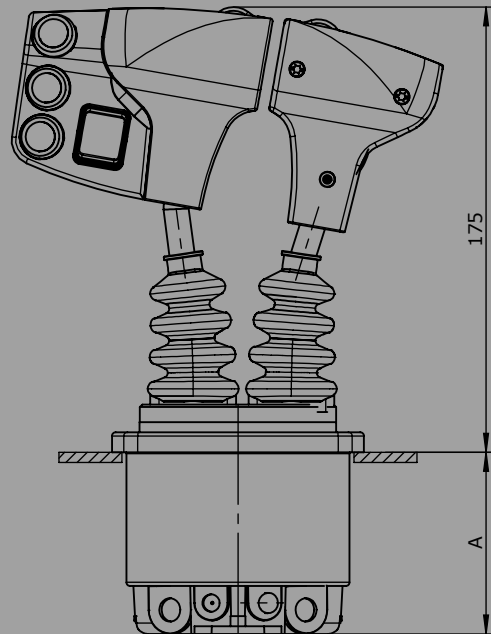
T = Dead man's button
H = Signal button

Knob solid
D = Push button

T - grip
D = Push button



Palm grip B10



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	Example GS9	-Z	-B10	-E...	-S...	-X
Basic unit									
V28.1	Multi-Axis Controller, 1-axis								
V28	Multi-Axis Controller, 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 161)								
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								
For a schematic description of the protection class (see page 126)									
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 125)								
Special model									
X	Special / customer specified								

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 125</i>)	
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 125</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

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!

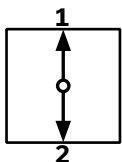
Current output	
Supply voltage	9-32 V DC
Current carrying capacity	Direction signal 150 mA
	Zero position signal 500 mA
Mounting depth A	35 mm
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector
	2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector
Optional with plug connector (<i>standard plug connectors see page 125</i>)	
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 per axis, sensor redundant with error monitoring	
	1 axis E209 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!*

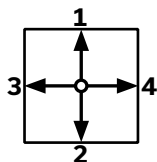
Current output with other value on request!

Identification of the installation variants with switching directions:

V28.1



V28



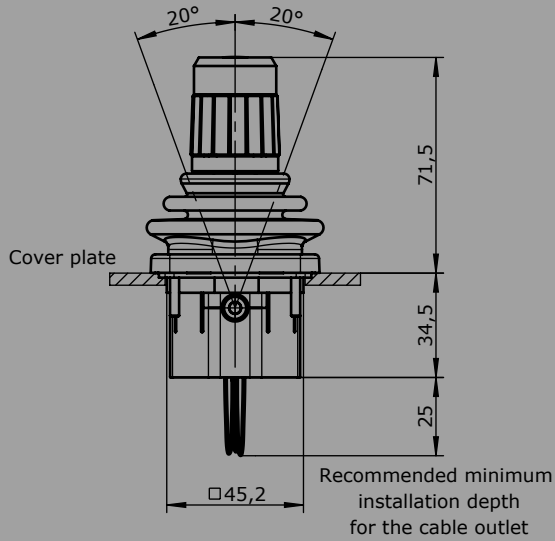
CAN			
Supply voltage	9-32 V DC		
Idle current consumption	120 mA (24 V DC)		
Current carrying capacity	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs)		
Mounting depth A	35 mm		
Protocol	CANopen CiA DS 301 or SAE J1939 (based on)		
Baud rate	20 kBit/s to 1 Mbit/s (standard 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 125</i>)		S
CAN		E314 1	
- 4 analog joystick axis			
- 8 digital joystick functions (incl. input for capacitive sensor)			
- 8 LED-Outputs (dimnable optional) for grip function			

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 125</i>)		S
CANopen Safety		E413 1	
- 4 analog joystick axis			
- 8 digital joystick functions (incl. input for capacitive sensor)			
- 8 LED-Outputs (dimnable optional) for grip function			

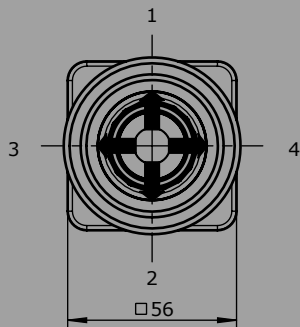
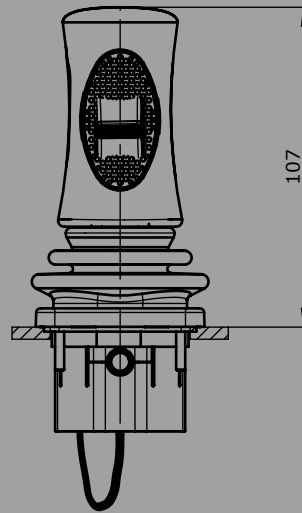
Attachments			
Z01 Mating connector M12 male insert with 2 m cable		20201140	
Z02 Mating connector M12 female insert with 2 m cable		20202298	

Standard
installed from the top

Hall-twist grip GS9

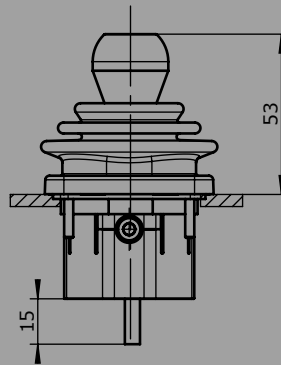


Palm grip B33

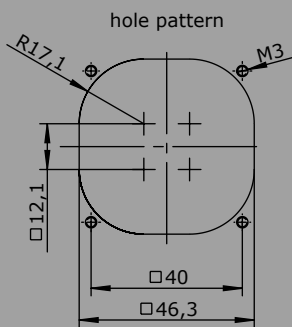
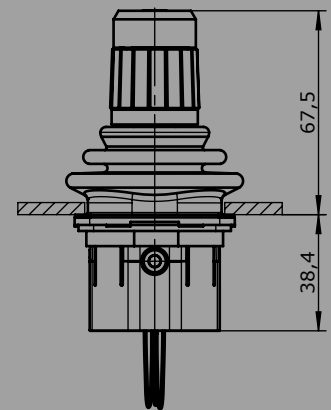


knob

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

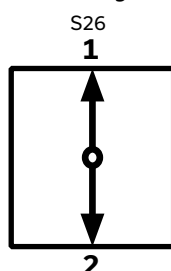
Mechanical life S26	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	up to IP54, electronic assembly IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



		S26	T	Example -Z	-E...	-S...	-X
Basic unit							
S26	Single-Axis Controller, 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 125)						
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 125</i>)
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 125</i>)
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 125</i>)
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	

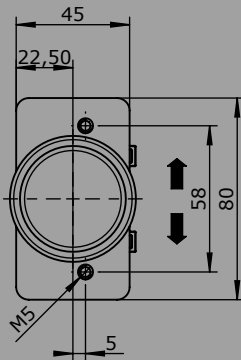
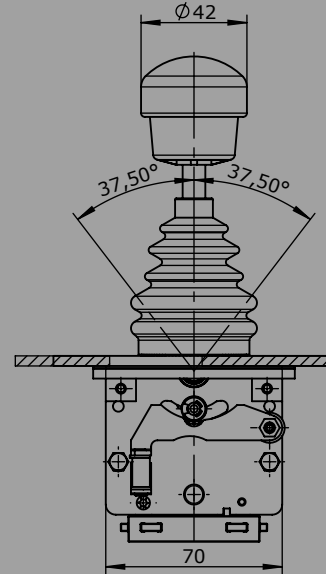
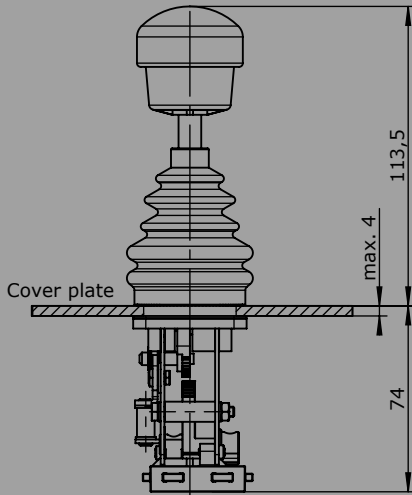
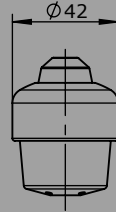
Voltage output with other value on request!

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 125</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>		

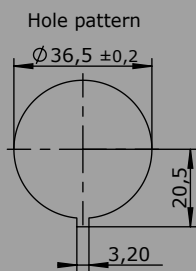
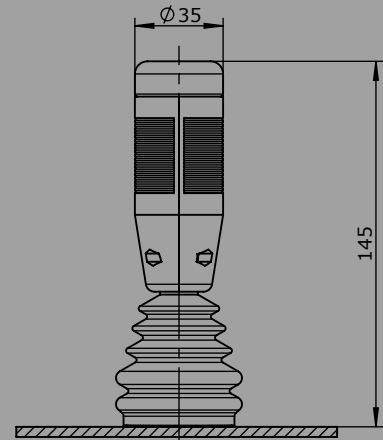
T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock



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)

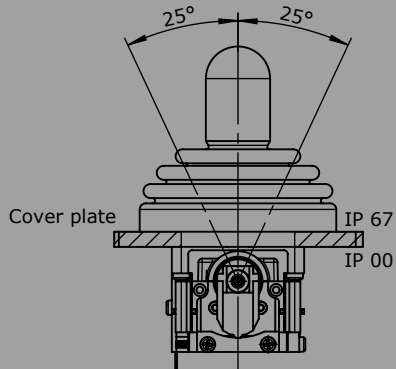


		V22A	-P	D	-E10321	-X
Basic unit						
V22.1A	Multi-Axis Controller, 1-axis with spring return, installation from below					
V22A	Multi-Axis Controller, 2-axis with spring return, installation from below					
V22.1B	Multi-Axis Controller, 1-axis with spring return, installation from top					
V22B	Multi-Axis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

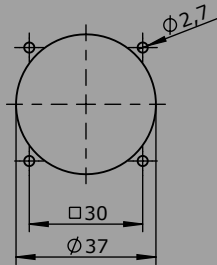
Technical details may vary based on configuration or application! Technical data subject to change without notice!

V22A

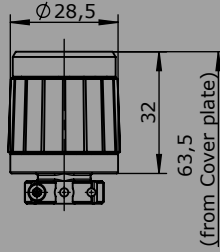
Installed from below



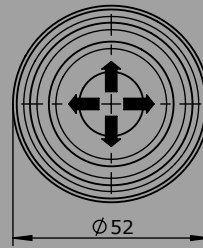
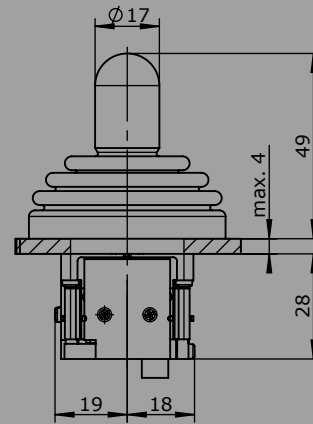
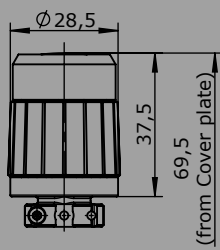
Hole pattern
(installed from below)



Twist grip

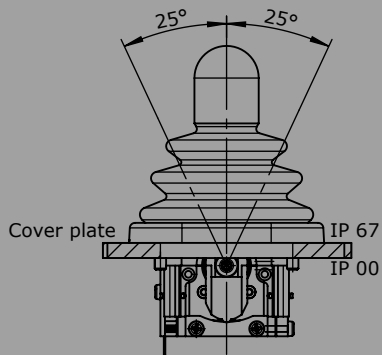


Twist grip
with Push button

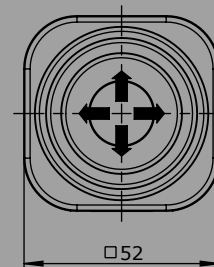
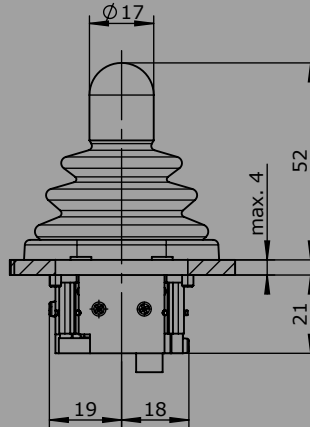
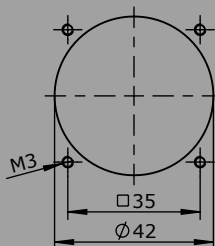


V22B

Installed from the top



Hole pattern
(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

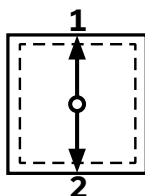
Mechanical life S11	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	Up to IP65, electronic assembly IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to EN IEC 61508)



	S11	T	Example - Z	- E...	- S...	- X
Basic unit						
S11 Single-Axis Controller, 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 125</i>)						
Special model						
X Special / customer specified						

Identification of the installation variants with switching directions:

S11



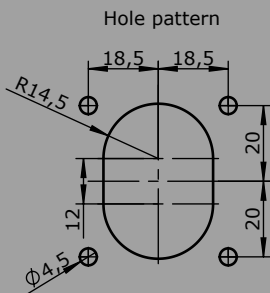
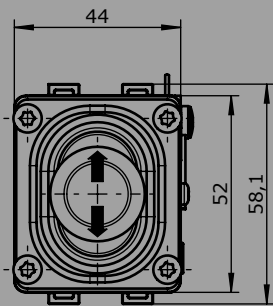
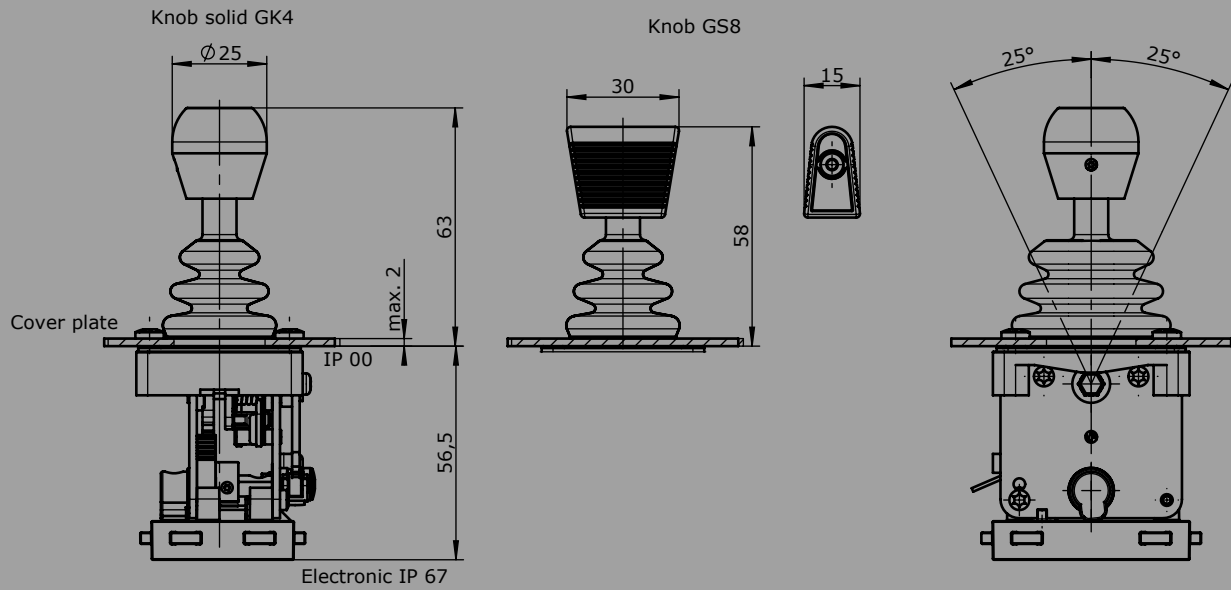
Digital Output		
Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 125</i>)	S
Cable 500mm long with plug (male)		
	1 axis	E001 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 125</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 125</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 125</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>Voltage output with other value on request!</i>		

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	+3ZP	-B	-A05 P184	+A050 P184	E9012	-X
Basic unit											
VV8	Multi-Axis Controller 2-axis, reinforced version										
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											
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														
PX	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 161)														
Axis 1: direction 1-2															
1	1 contact	Standard contact - arrangement see page 127													
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	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 V...2,5...0,5	

VV8 S5 P T -2 RP + 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 127		
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	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...4,5V/4,5V...2,5...0,5	

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

Cover housing

B Cover housing

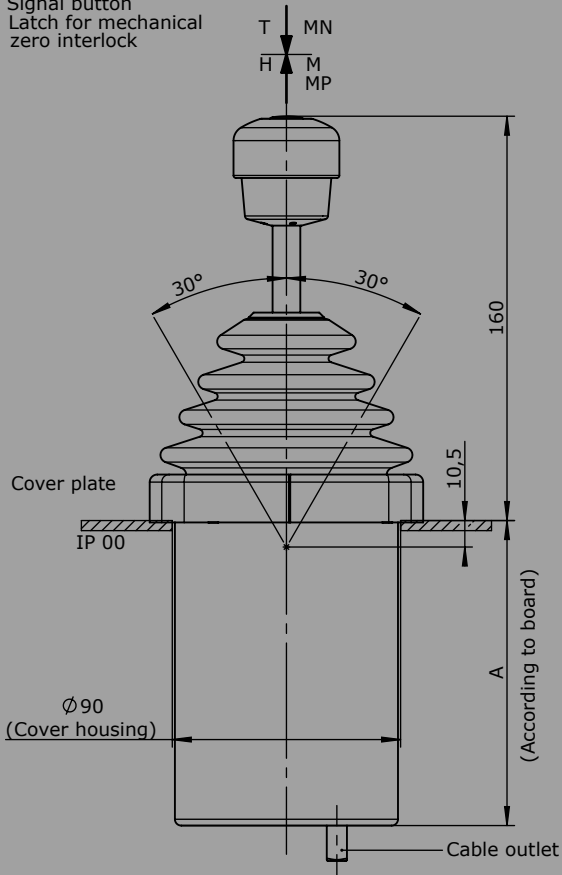
Interface

	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

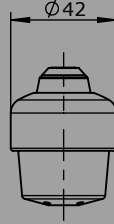
Special model

X Special / customer specified

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

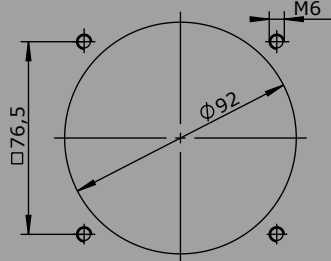
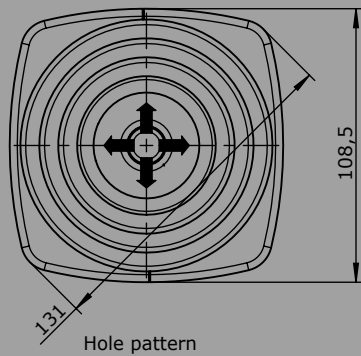
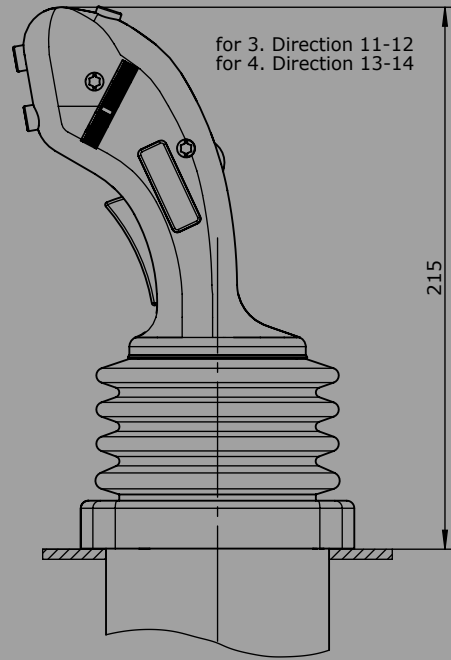


Knob solid
 D = Push button

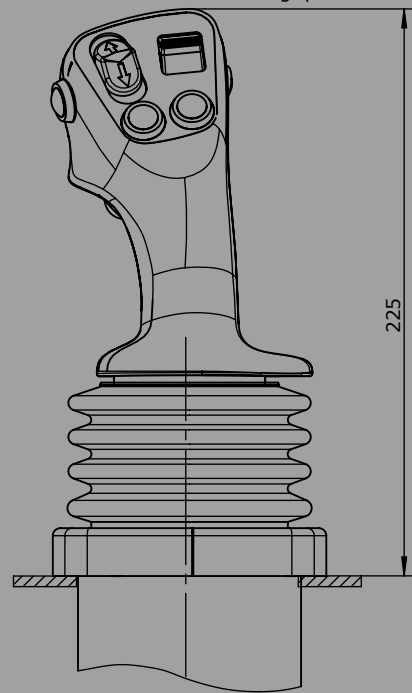


Palm grip B3

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



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

Combination possibilities with our 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*

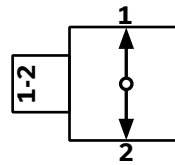
- S3 -40 mm
- S5 -20 mm
- S8 +20 mm

**Only available in combination with a handle!*

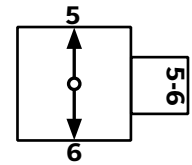
Gate

- P Cross gate
- PX Special gate

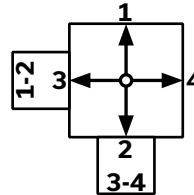
Identification of the installation variants with switching directions:



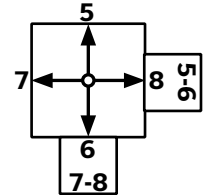
V61L/VV61L



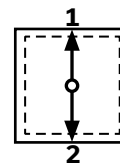
V61R/VV61R



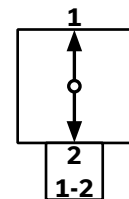
V62L/VV62L



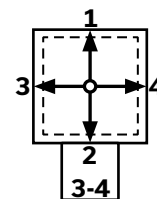
V62R/VV62R



V64.1/VV64.1



V61.1/VV61.1



V64/VV64

V62L S5 P T -01 Z P +03A RC -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 161)

Attention! When using some handles the deflection angle can be reduced to 28°!

V62L S5 P T -01 Z P +03A RC -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 127	
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 250V AC15)	A99 contact - arrangement according customer request	

Z Spring return

R Friction brake

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

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

C Encoder C... Encoder see page 135

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

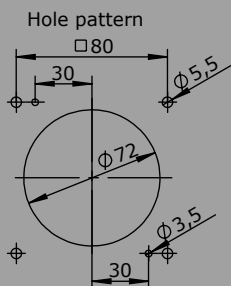
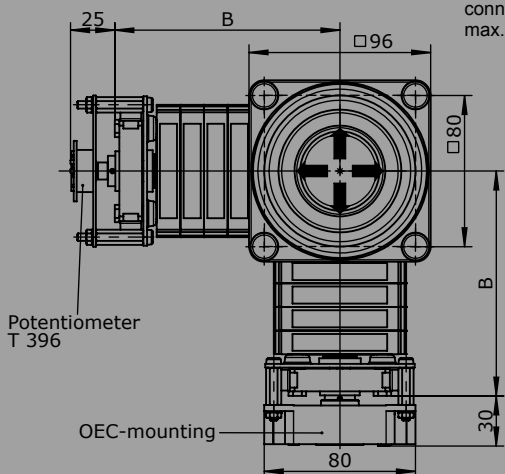
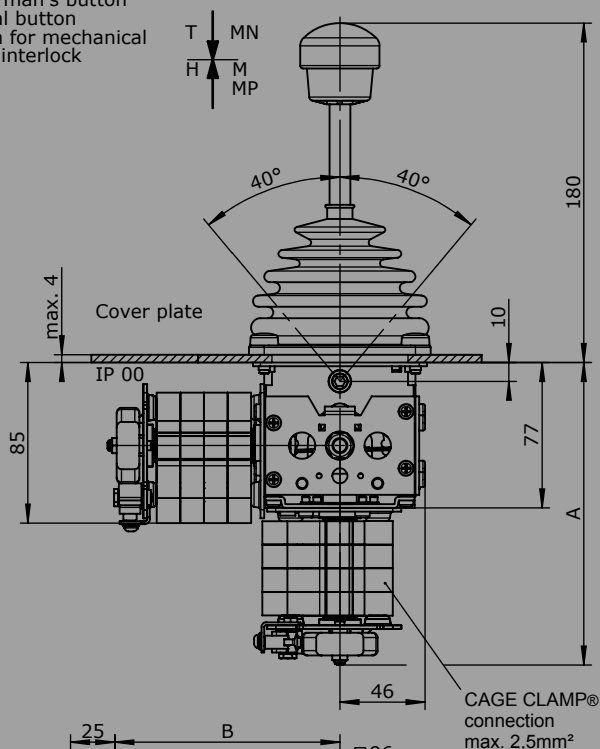
Axis 2: direction 3-4 left / Direction 7-8 right		(not applicable for V/VV61, V/VV61.1, V/VV64.1)	
(Standard contacts gold-plated 2A 250 V AC15)			
01	<input type="checkbox"/> 2 contacts	Standard contact - arrangement see page 127	
02	<input type="checkbox"/> 4 contacts	z.B.	
03	<input type="checkbox"/> 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 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
<i>More potentiometers on request!</i>			
C	Encoder	C... Encoder see page 135	

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

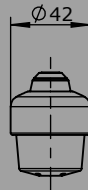
Special model	
X	Special /customer specified

Attachments	
	Indicating labels
	Indicating labels with engraving

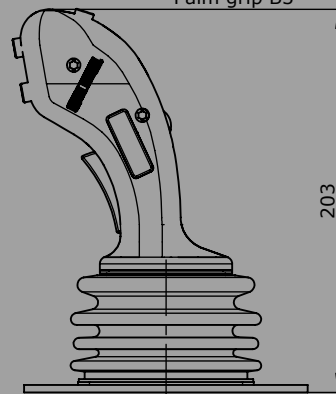
T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock



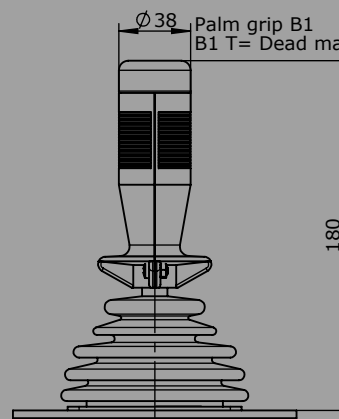
Knob solid
 D = Push button



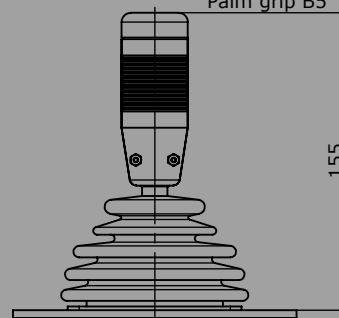
Palm grip B3



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



Palm grip B5



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



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

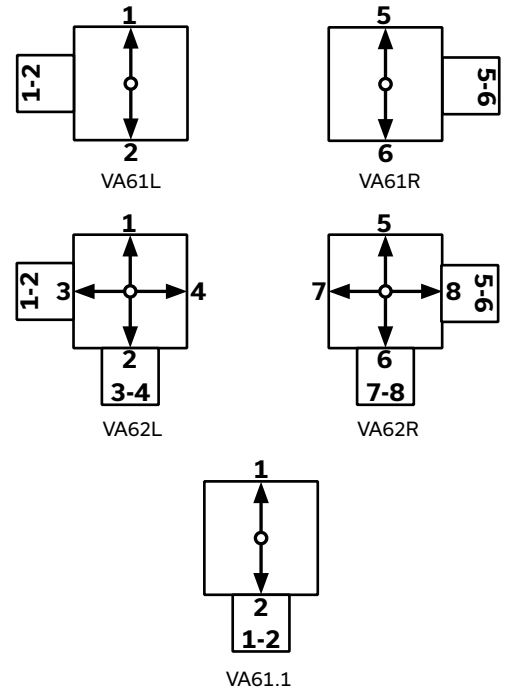


	VA62L	S5	P	T	Example -01 Z P	+03 R	-A05 P144	+A110
Basic unit	VA62L Multi-Axis Controller 2-axis left							
Control-handle extended	S5 -20 mm							
Gate	P Cross gate							
Grip / Palm Grip	T Dead man							
Axis 1 (direction 1-2)	01 2 contacts Z Spring return P Potentiometer							
Axis 2 (direction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



	VA62L	S5	P	T	-01 Z P	+03 R	-A05 P144	+A110
Basic unit								
VA61L	1-axis left							
VA61R	1-axis right							
VA61.1	1-axis							
VA62L	2-axis left							
VA62R	2-axis right							
Control-handle extended								
	Standard 180 mm							
S3	-40 mm							
S5	-20 mm							
S8	+20 mm							
Gate								
P	Cross gate							
P X	Special gate							
Grip / Palm Grip								
	Knob (included in basic unit!)							
M	Mechanical zero interlock							
MN	Mechanical zero interlock (push down)							
T	Dead man							
H	Signal button							
D	Push button							
DV	Flush push button							

Identification of the installation variants with switching directions:



	VA62L	S5	P	T	-01 Z P	+ 03 R	A05	P144	+ A110
Axis 1: direction 1-2 left / direction 5-6 right									
	(Contacts gold-plated 2A 250V AC15, II 2G Ex d IIC T6, connecting cable 6 m)								
01	2 contacts				Standard contact - arrangement see page 127				
02	4 contacts				z.B.				
03	6 contacts				A980	MS00			
04	8 contacts				A05	MS21			
05	10 contacts				A0500	MS21-00			
06	12 contacts				A110	MS24-0			
	A99 contact - arrangement according customer request								
Z	Spring return								
R	Friction brake								
P	Potentiometer Ex								
		P144		T1350 2 x 5 kOhm		I max. 1 mA			
		P145		T1350 2 x 10 kOhm		I max. 1 mA			
				II 2G Ex d IIC T6 Gb					
				Connecting cable 6 m					



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

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

(Not applicable for VA61, VA61.1)

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

01	2 contacts	Standard contact - arrangement see page 127	
02	4 contacts	z.B.	
03	6 contacts	A980	MS00
04	8 contacts	A05	MS21
05	10 contacts	A0500	MS21-00
06	12 contacts	A110	MS24-0
		A99 contact - arrangement according customer request	

Z Spring return

R Friction brake

P Potentiometer Ex

P144 T1350 2 x 5 kOhm I max. 1 mA

P145 T1350 2 x 10 kOhm I max. 1 mA

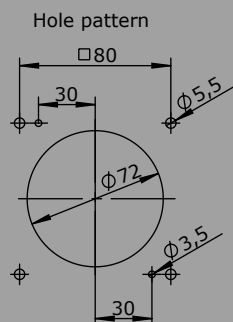
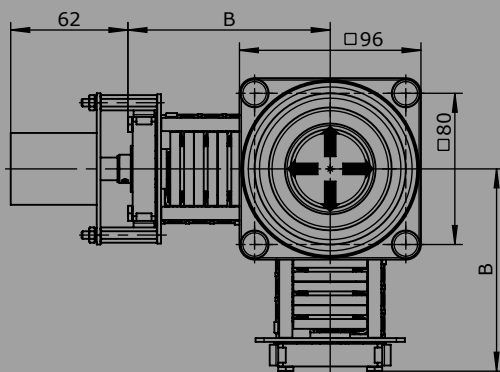
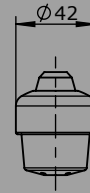
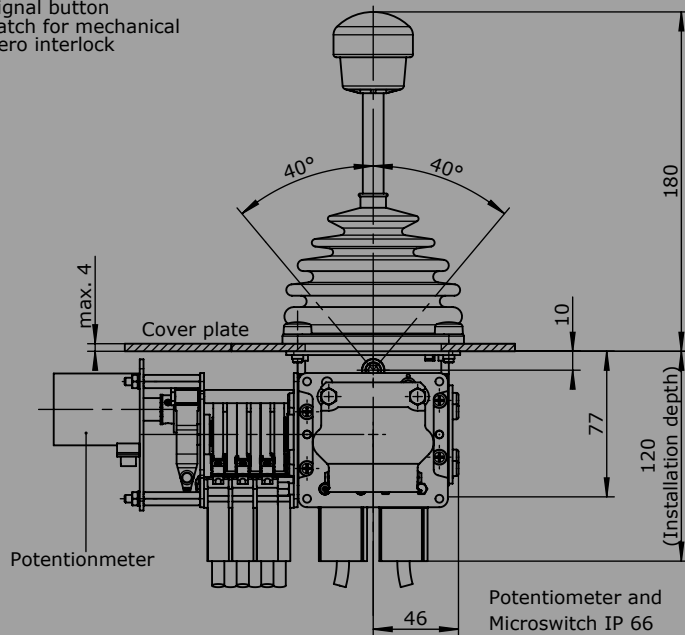
II 2G Ex d IIC T6 Gb

Connection cable 6 m



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

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

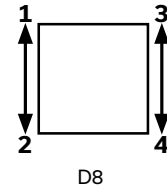


	D8	S5	Q / Q	-2ZP	+3 RP	-B	-A05 P184	+A050 P184	-E9012	-S...	-X
Basic unit											
D8 Double-Handle Controller											
Control-handle extended											
S5 -20 mm											
Grip- control-handle left											
Q T-grip											
Grip- control-handle right											
Q T-grip											
Axis 1 (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 125)											
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 194)												
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... Palm grip B10... (see page 194)												

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 127												
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	Standard contact - arrangement see page 127 e.g. A98 A05 A050 A99 contact - arrangement for customer request
2	2 contacts	
3	3 contacts	
Z	Spring return	
R	Friction brake	
(P)	Mounting options for potentiometer and encoder (Gessmann-types)	
P	Potentiometer	P181 T301 2 x 0,5 kOhm I max. 1 mA
		P182 T301 2 x 1 kOhm I max. 1 mA
		P183 T301 2 x 2 kOhm I max. 1 mA
		P184 T301 2 x 5 kOhm I max. 1 mA
		P185 T301 2 x 10 kOhm I max. 1 mA
		<i>More potentiometers on request!</i>
	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	

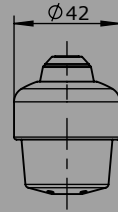
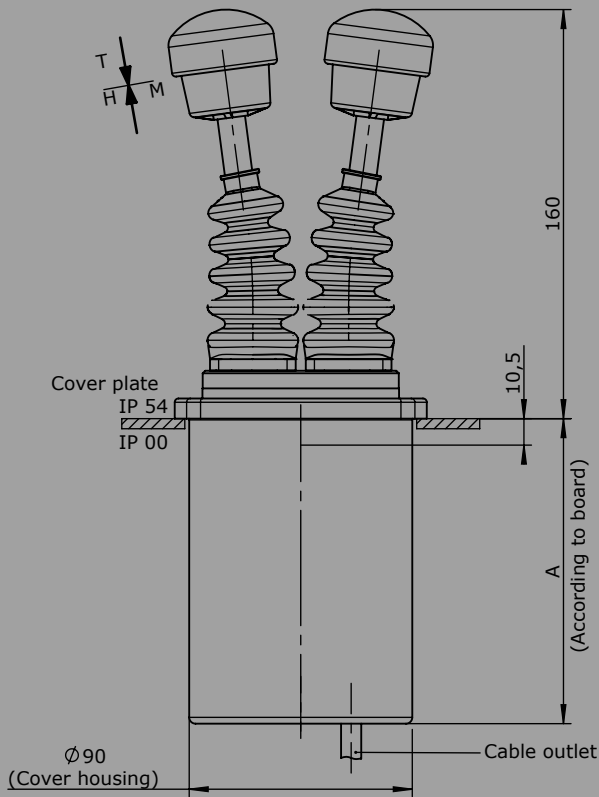
Double-Handle Controller D8



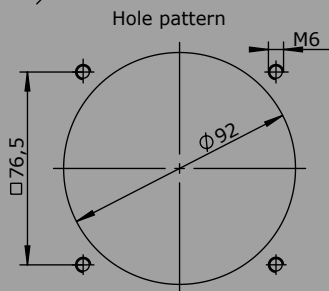
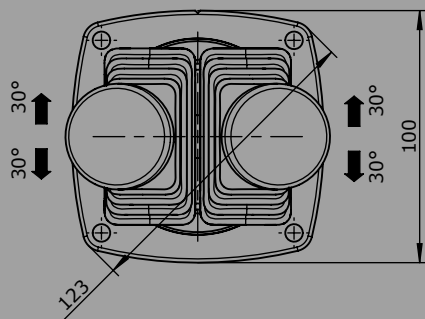
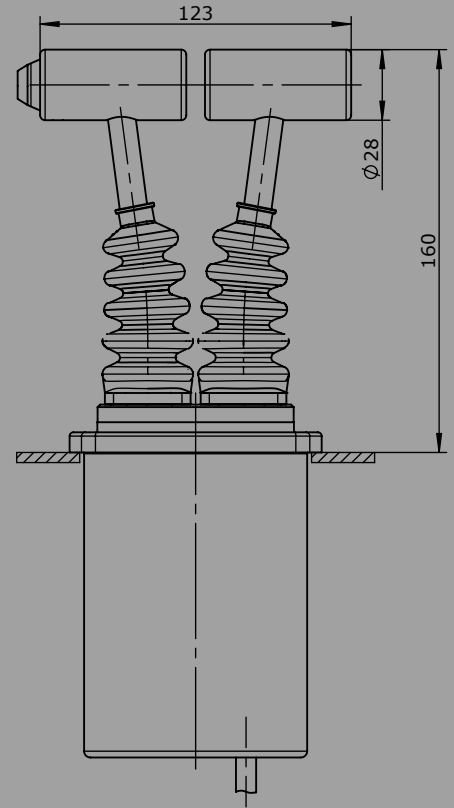
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock

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 Double-Handle Controller										
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										

Example

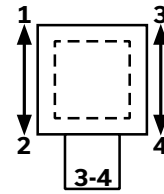
Combination possibilities with our handles



	D64	S5	Q	/	Q
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 194)					
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 194)					

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

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 127
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
	<input checked="" type="checkbox"/>	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 135

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 127
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
	<input checked="" type="checkbox"/>	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 135

Special model	
X	Special / customer specified

Attachments	
	Indicating labels
	Indicating labels engraved

Double-Handle Controller

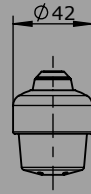
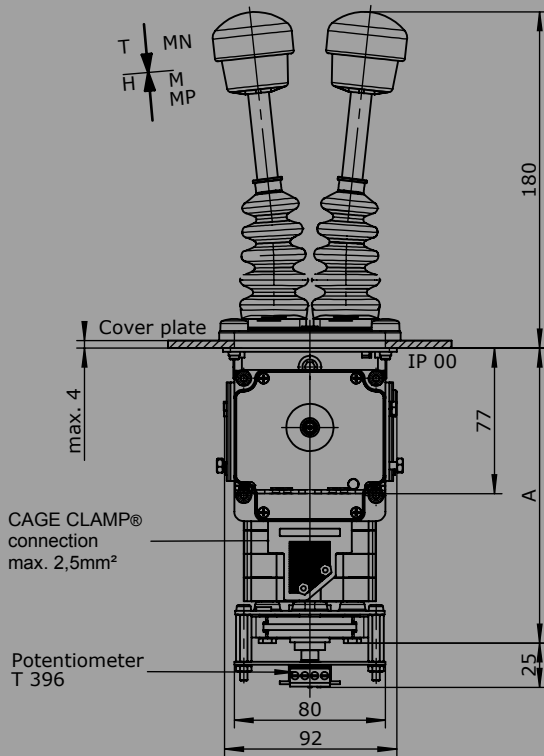
D64 / DD64



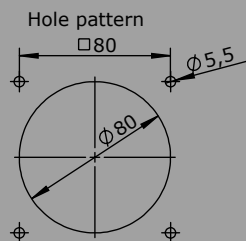
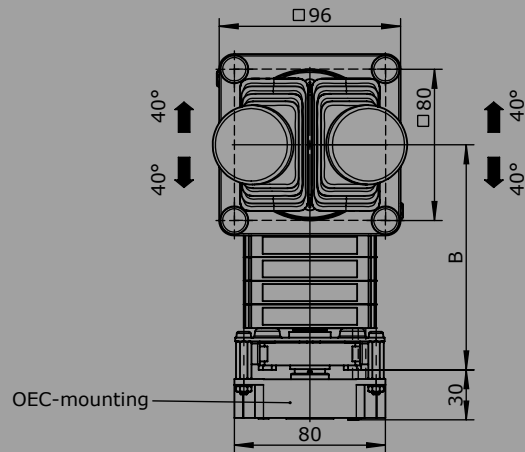
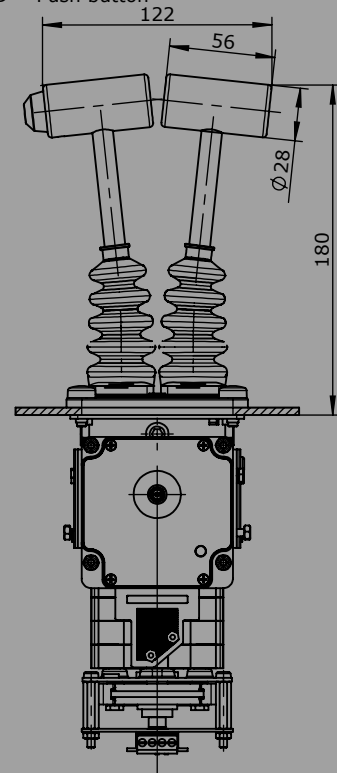
T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock

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

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 V11	10 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	Up to IP54 front



	V11L	S5	P	T	Example					-X
					-01 Z P	+03A R	-A05 P324	+A110		
Basic unit										
V11L Multi-Axis Controller 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										

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

Combination possibilities with our grips



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

Basic unit

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

Control-handle extended

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

*Only available in combination with a handle!

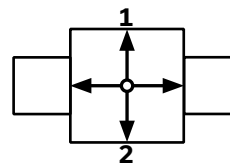
Gate

- P Cross gate
- P X Special gate

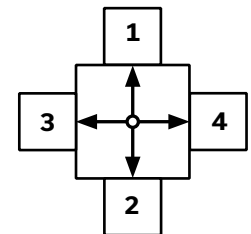
Grip / Palm Grip

- 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 161)

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 127
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 P325 T365 2 x 10 kOhm	I max. 1 mA I max. 1 mA <i>More potentiometers on request!</i>
C	Encoder	C... Encoder see page 135	

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			
(Standard contacts gold-plated 2A 250 V AC15)			
01	<input type="checkbox"/>	2 contacts (2A 250V AC15)	Standard contact - arrangement see page 127
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 P325 T365 2 x 10 kOhm	I max. 1 mA I max. 1 mA <i>More potentiometers on request!</i>
C	Encoder	C... Encoder see page 135	

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

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 -01 Z C	+03 R	-A05 C61	+A110	-X
Basic unit									
V14L	Multi-Axis Controller 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!

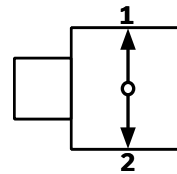
Gate

P	Cross gate
P X	Special gate

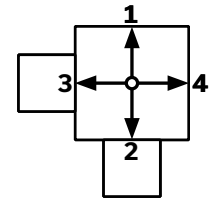
Grip / Palm Grip

	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 161)

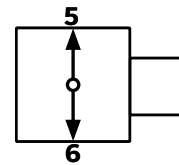
Identification of the installation variants with switching directions:



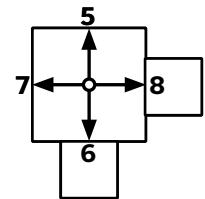
V14.1L



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)

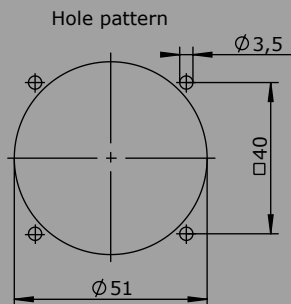
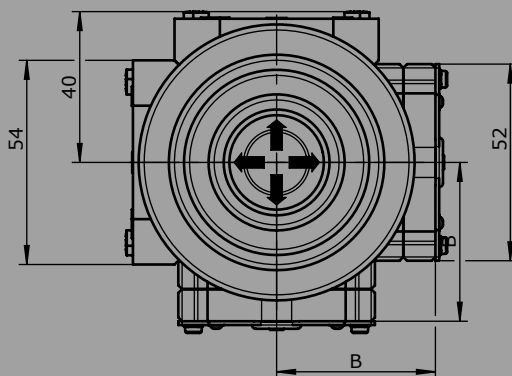
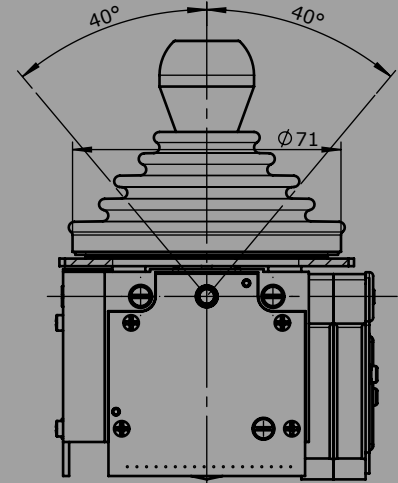
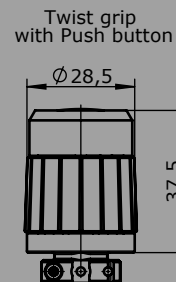
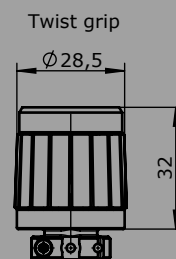
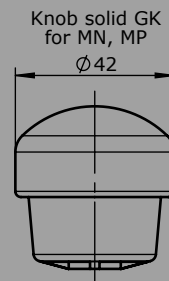
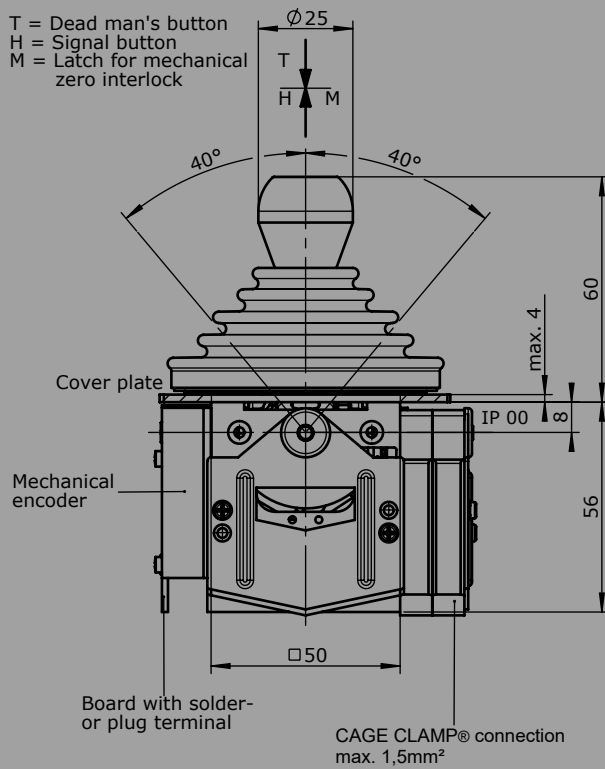
01	2 contacts	Standard contact - arrangement see page 127
02	4 contacts	e.g.
03	6 contacts	A05 MS21
		A0500 MS21-00
		A110 MS24-0
		A99 contact - arrangement according customer request

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

	V14L	S8	P	T	-	01 Z C	+	03 R	-	A05	C61	+	A110	-	X	
Z	Spring return <i>(included in basic unit!)</i>															
R	Friction brake															
C	Mechanical encoder															
		C61	MEC 1-2													
			EA/02-10										I max. 1 mA			
			Potentiometer track										2 x 10 kOhm			
			Direction tack										Arrangement MS26-0			
		C62	MEC 1-7													
			EA/10-10										I max. 1 mA			
			Potentiometer track										2 x 5 kOhm			
			Direction track										Arrangement MS26-0-1			
H	Hall-Potentiometer															
		E14811										0,5...2,5...4,5 V / 4,5...2,5...0,5 V				

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

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



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

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

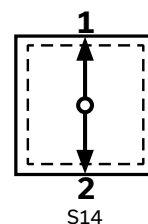
Mechanical life S14	6 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	Up to IP65



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

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

Identification of the installation variants with switching directions:



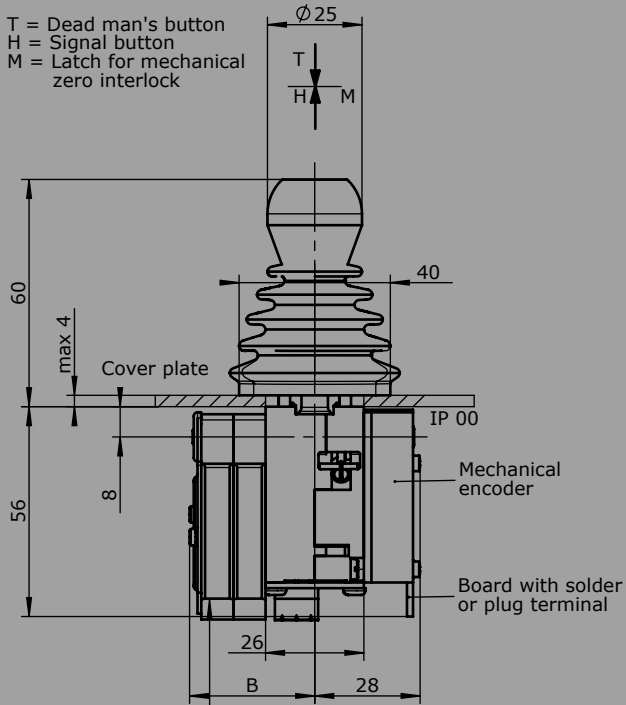
Technical details may vary based on configuration or application! Technical data subject to change without notice!

		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... <i>(on request!)</i>							

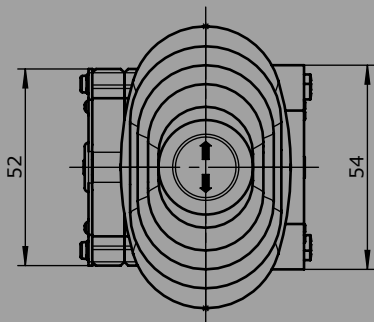
		S14L	S8	T	-01ZC	-A05	C61	-X
Axis 1: direction 1-2 left / direction 5-6 right								
	(Standard contacts gold-plated 2A 250V AC15)							
01	2 contacts							
02	4 contacts							
03	6 contacts							
Z	Spring return <i>(included in basic unit!)</i>							
R	Friction brake							
C	Mechanical encoder	C61	MEC 1-2					
			EA/02-10			I max. 1 mA		
			Potentiometer track			2 x 10 kOhm		
			Direction track			Arrangement MS26-0		
		C62	MEC 1-7					
			EA/10-10			I max. 1 mA		
			Potentiometer track			2 x 5 kOhm		
			Direction track			Arrangement MS26-0-1		
			<i>More potentiometers on request!</i>					
H	Hall-Potentiometer	E14811					0,5...2,5...5,4 V / 4,5...2,5...0,5 V	

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

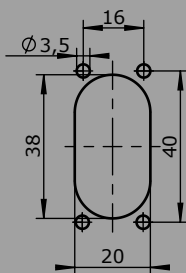
T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock



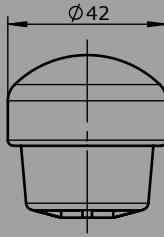
CAGE CLAMP® connection
max. 1,5mm²



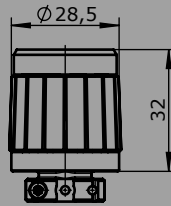
Hole pattern



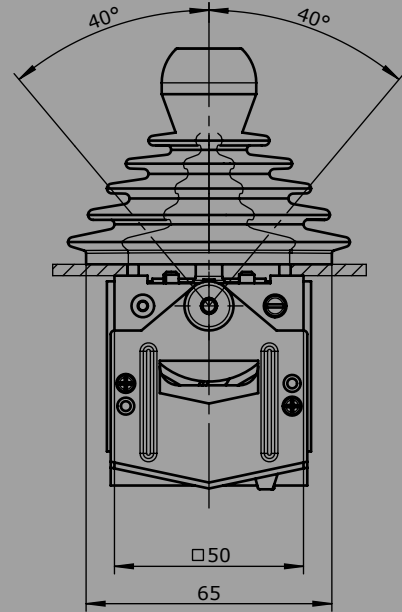
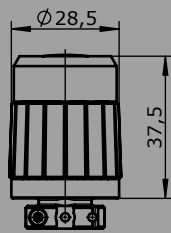
Knob solid GK
for MN, MP



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

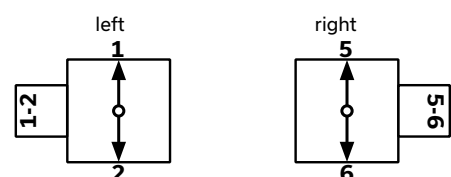
Mechanical life S2 / S21	6 million operating cycles
Mechanical life SS2	10 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	Up to IP54



	S2L	S5	T	- 02 Z P	- A050 P134	- X
Basic unit						
S2L	Single-Axis Controller 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 161)

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 127
03	5 contacts	z.B.
04	7 contacts	A98 MS0
05	9 contacts	A05 MS21
		A0500 MS21-00
		A110 MS24-0
		A99 contact - arrangement according customer request
Z	Spring return	
R	Friction brake	
(P)	Possibility of mounting potentiometer and encoder (Gessmann-types)	
P	Potentiometer	P131 T396 2 x 0,5 kOhm I max. 1 mA
		P132 T396 2 x 1 kOhm I max. 1 mA
		P133 T396 2 x 2 kOhm I max. 1 mA
		P134 T396 2 x 5 kOhm I max. 1 mA
		P135 T396 2 x 10 kOhm I max. 1 mA
		More potentiometers on request!
C	Encoder	C... Encoder see page 157

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

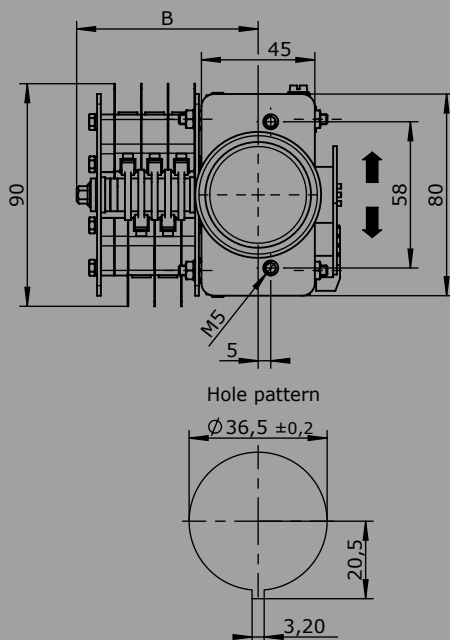
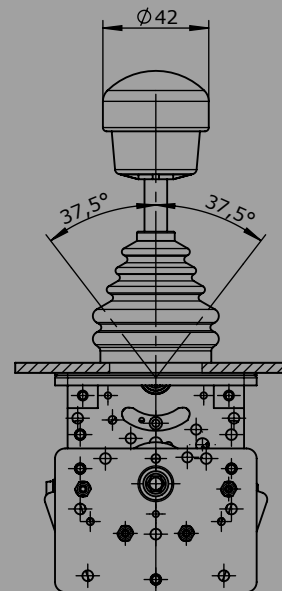
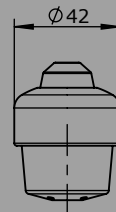
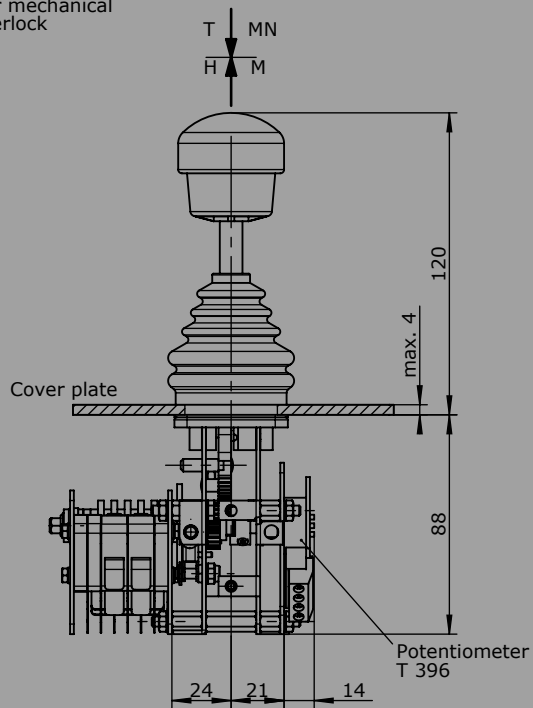
Special model	
X	Special / customer specified
X1	Microswitch (MZT 1) positively driven NC contact

Attachments	
	Indicating labels
	Indicating labels with engraving

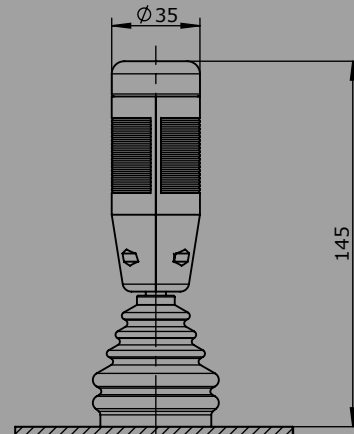
Technical details may vary based on configuration or application! Technical data subject to change without notice!

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



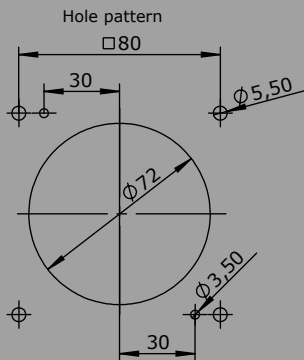
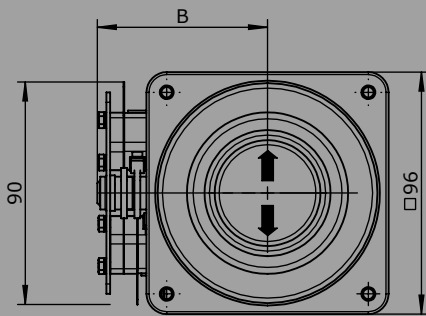
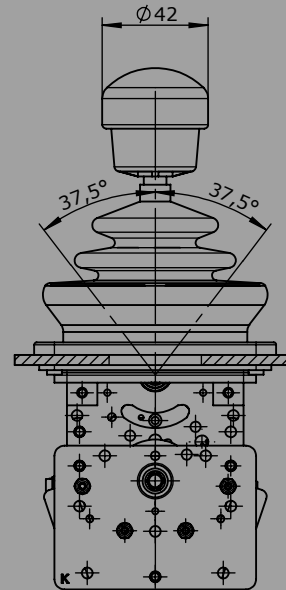
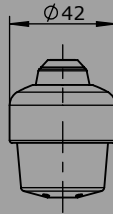
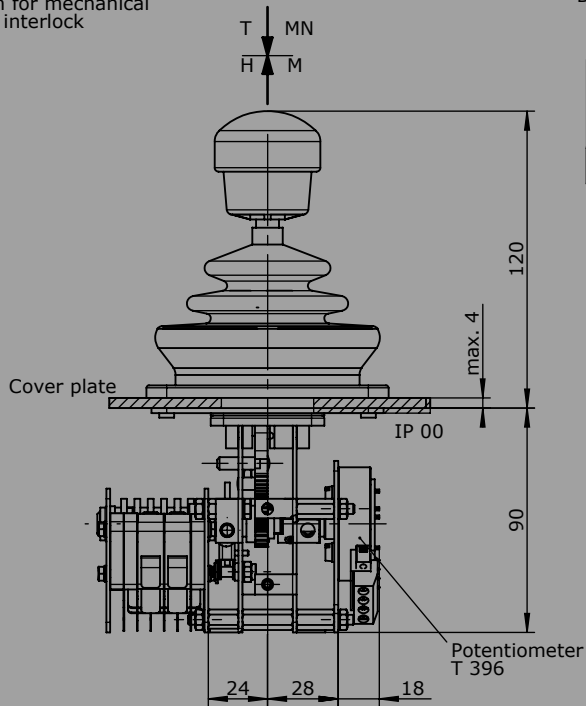
Type	No. of contacts	Maß B
02	3	25
03	5	31
04	7	36
05	9	42

Single-Axis Controller S21

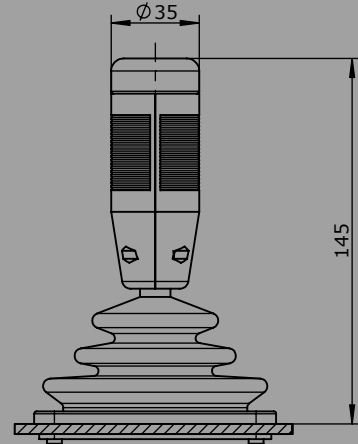


T = Dead man's button
H = Signal button
M = Latch for mechanical zero interlock

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

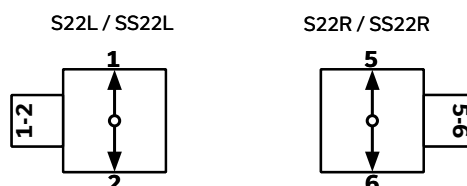


	S22L	S5	T	- 3 Z P	- A050 P134	- X
Basic unit						
S22L	Single-Axis Controller left					
Control-handle extended						
S5	-20 mm					
Grip / Palm Grip						
T	Dead man					
Axis 1 (direction 1-2)						
3	3 contacts (2A 250 V AC15)					
Z	Spring return					
P	Potentiometer					
Description axis 1 (direction 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 127		
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	Codierer	C...Encoder see page 135		

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

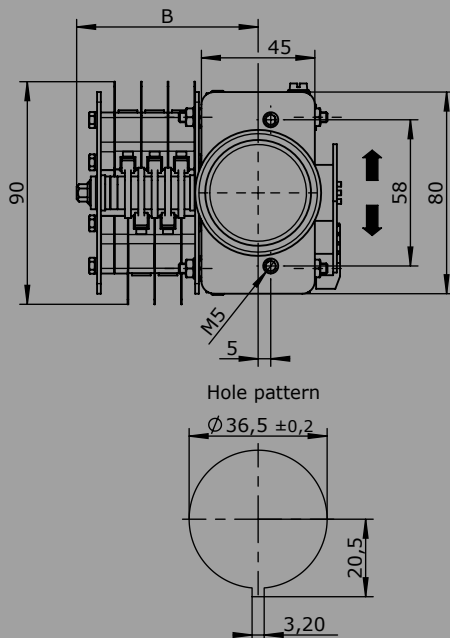
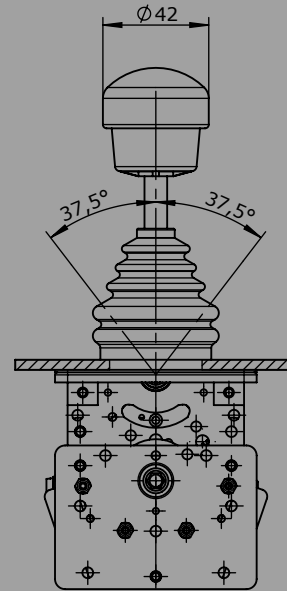
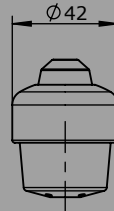
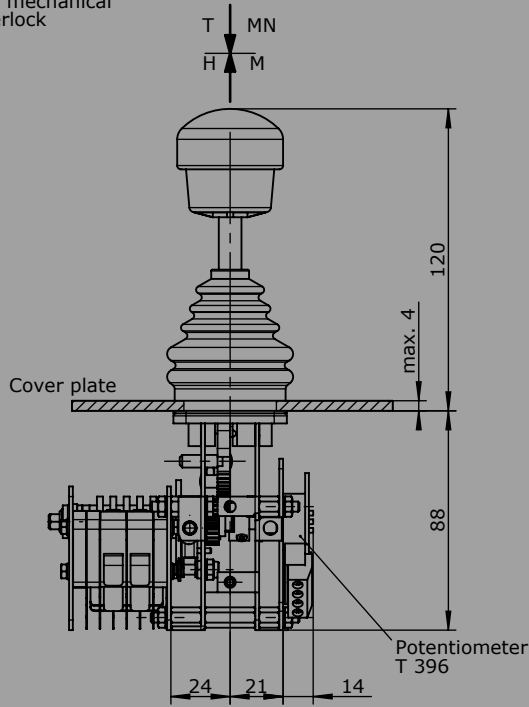
Single-Axis Controller

S22 / SS22

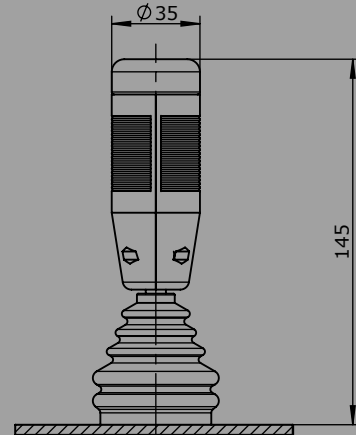


T = Dead man's button
 H = Signal button
 M = Latch for mechanical zero interlock

Knob solid
 D = Push button



Palm grip B5
 B5 T = Dead man's button



Type	No. of contacts	Maß B
02	3	25
03	5	31
04	7	36
05	9	42

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

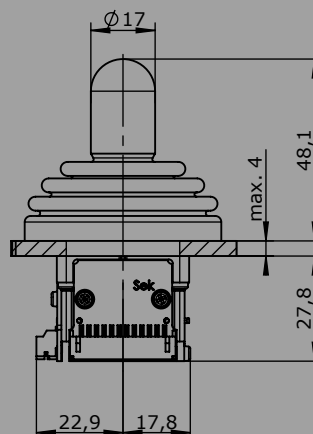
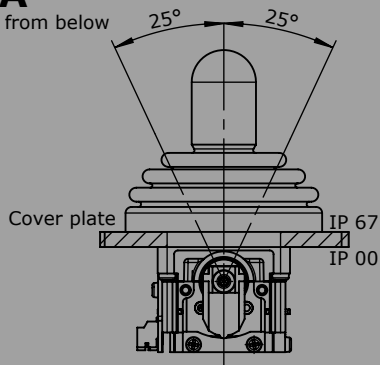


	V23A	-P	-C80	+C80	-X
Basic unit					
V23.1A	Multi-Axis Controller 1-axis with spring return, installation from below				
V23A	Multi-Axis Controller 2-axis with spring return, installation from below				
V23.1B	Multi-Axis Controller 1-axis with spring return, installation from top				
V23B	Multi-Axis Controller 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)					
	See description axis 1!				
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	

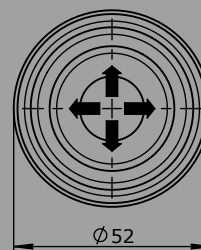
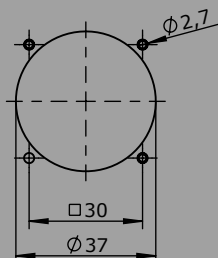
Technical details may vary based on configuration or application! Technical data subject to change without notice!

V23A

Installed from below

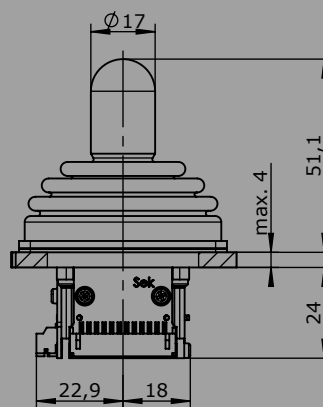
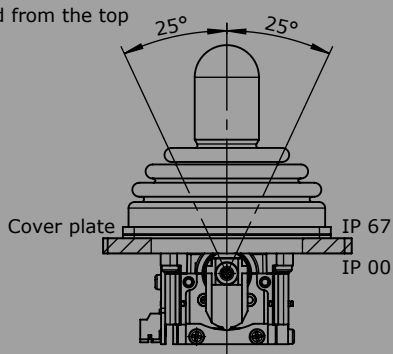


Hole pattern
(installed from below)

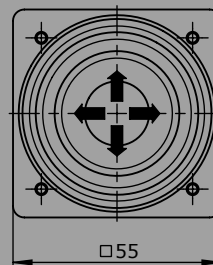
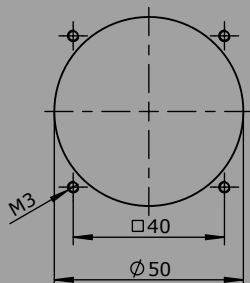


V23B

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

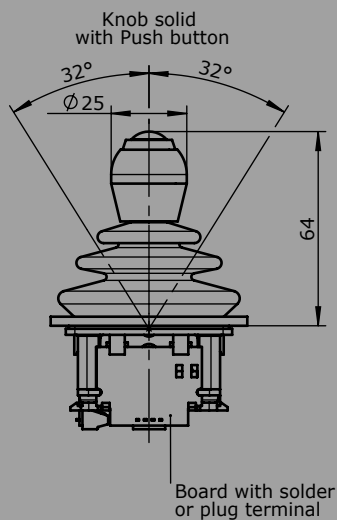
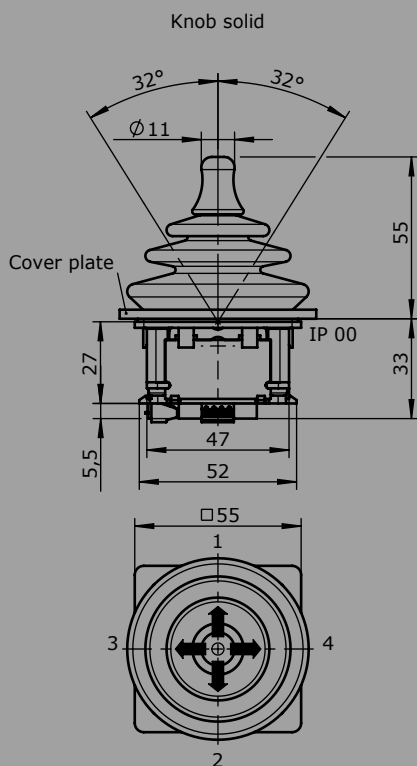
Mechanical life V20	3 million operating cycles
Operation temperature	-40°C to +85°C
Degree of protection	IP65 (optional IP67)



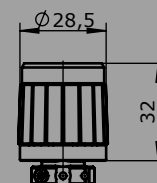
		V20	-P	Example D	-C71	+C71	-B	-X
Basic unit								
V20.1	Multi-Axis Controller 1-axis with spring return							
V20	Multi-Axis Controller 2-axis with spring return							
V20.1A	Multi-Axis Controller 1-axis with spring return, IP67 front							
V20A	Multi-Axis Controller 2-axis with spring return, IP67 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			
C71	Mechanical encoder							
	MEC 2-2							
	EA/11-10				I max. 1 mA			
	Potentiometer track				2 x 5 kOhm			
C72	Mechanical encoder							
	MEC 2-5							
	EA/21-10				I max. 1 mA			
	Potentiometer track				2 x 5 kOhm			
Axis 2: direction 3-4								
See description axis 1!								
Cover housing								
B	Cover housing KBQ 905 (IP65)							
Special model								
X	Special / customer specified							

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

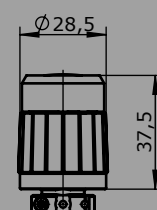
V20 Standard degree of protection front IP 65



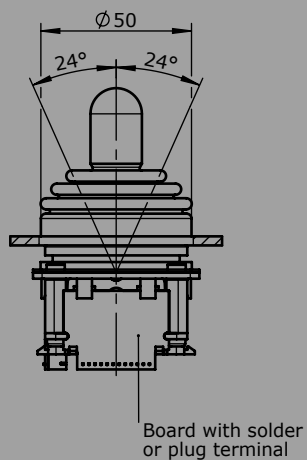
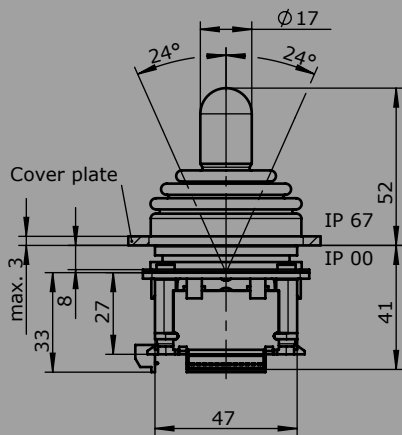
Twist grip



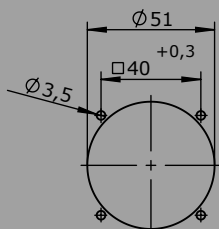
Twist grip with Push button



V20 Degree of protection front IP 67



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



	S1	T	- 2 Z P	- A05 P374	- X
Basic unit					
S1	Single-Axis Controller 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
 2 2 contacts
 3 3 contacts
 4 4 contacts

Standard contact - arrangement see page 127

z.B.

A05	MS21
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

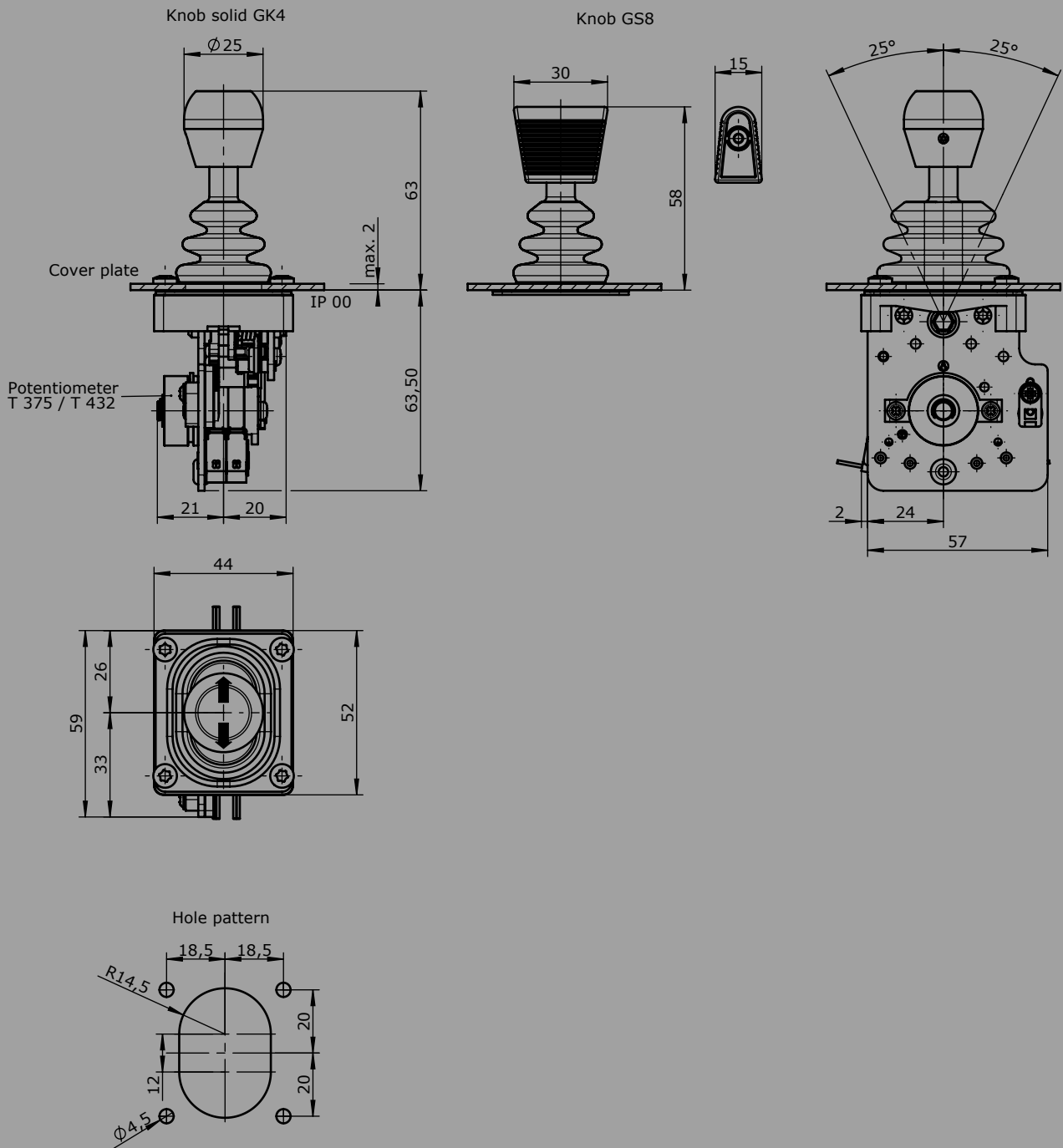
With direction track

S1 T - 2 Z P - A05 P374 - X

Special model

X Special / customer specified

T = Dead man's button



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

Lever Switch S51



The S51 lever switch series, specially developed for the rail sector, offers a high degree of robustness as well as a long service life. Typically, this high-quality product is found in driver's cab consoles of rail traction units.

All current standards (EN 50155, UIC 612, EN 45545 ...) were observed in the course of development.

Technical data

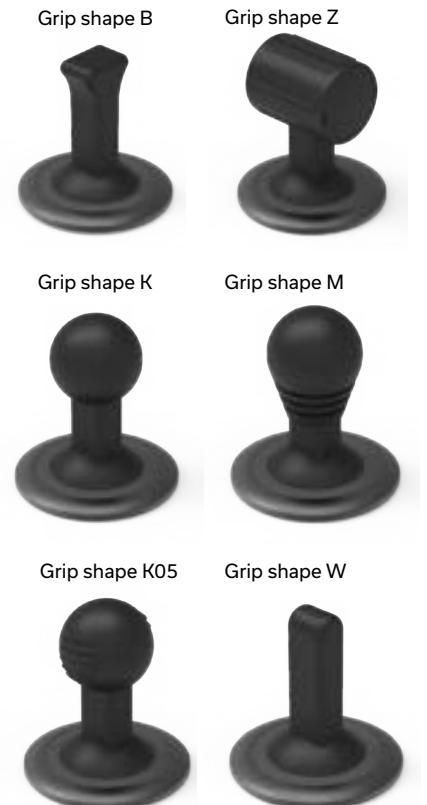
Deflection angle	Total: $\pm 34^\circ$ ($-34^\circ / -17^\circ / 0^\circ / +17^\circ / +34^\circ$)
Mechanical life	3 million operating cycles
Ambient temperature range	-25°C til $+70^\circ\text{C}$ (OT3 acc. to EN50155)
Degree of protection	IP54 (above the mounting plate) IP20 (below the mounting plate)
Supply voltages	24 VDC, 72 VDC, 110 VDC with fluctuations acc. to EN 50155



Reference to relevant standards

Fire protection	EN 45545 part 2
Driver-machine interfaces for EMU/DMU, locomotives and control cars	UIC 612
Protection by housing	EN 60529
Railroad applications - Electronic equipment on railroad vehicles	EN 50155
Vibration and shock tests	EN 61373
Climatic tests	EN 60068

		S51	- 1	- 2	- 4G	Example					
						- MS20	- A 23	- A 24	- A 25	- A 26	- X
Basic unit											
S 51	Lever switch S51										
S 51A	Lever switch S51 with rotation prevention										
Mountaging											
1	Nature eloxed										
2	Black eloxed										
3	Stainless steel (Siemens Sirius Act Design)										
Grip shape											
1	Grip shape B										
2	Grip shape W										
3	Grip shape K										
4	Grip shape K05										
5	Grip shape M										
6	Grip shape Z										
Contacts											
1	1 contact										
2	2 contacts										
3	3 contacts										
4	4 contacts										
5	5 contacts										
6	6 contacts										
S	Silver contacts										
G	Gold contacts										
ZS	Positively driven NC silver contacts										
ZG	Positively driven NC gold contacts										



S51 - 1 - 2 - 4G - MS20 - A 23 - A 24 - A 25 - A 26 - X

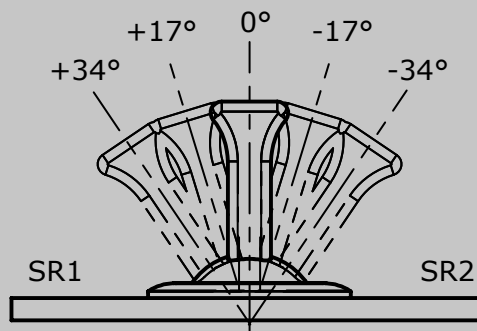
Detent

MS..

Detent	Switching direction 1 (SR1)		Centre 0 0°	Switching direction 2 (SR2)		Detent	Switching direction 1 (SR1)		Centre 0 0°	Switching direction 2 (SR2)	
	2 34°	1 17°		1 -17°	2 -34°		2 34°	1 17°		1 -17°	2 -34°
MS01	switch		Rest or basic position		switch	MS23	switch		without		switch
MS02	locked	locked			switch	MS24	locked	keys	Basic position	keys	locked
MS03	switch			locked	locked	MS25	switch	switch		keys	switch
MS04	switch	switch		switch	switch	MS26	keys	keys		keys	switch
MS05	locked	locked		switch	switch	MS27	switch	keys			keys
MS06	switch	switch		locked	locked	MS28	keys	switch		switch	switch
MS07	keys				keys	MS29	keys			keys	switch
MS08	locked	locked			keys	MS30	switch	keys		keys	keys
MS09	keys			locked	locked	MS31	locked	keys		switch	switch
MS10	locked	locked		keys	keys	MS32	switch			switch	switch
MS11	keys	keys		locked	locked	MS33	locked	switch		switch	locked
MS12	switch				keys	MS34	switch	keys*			keys
MS13	keys				switch	MS35	switch	switch		switch	keys
MS14	switch	keys		keys	switch	MS36	switch	switch		switch	locked
MS15	locked	locked		keys	switch	MS37	locked	switch		keys	keys
MS16	switch	keys		locked	locked	MS38	locked	switch		switch	keys
MS17	locked	switch		switch	switch	MS39	switch	keys		switch	switch
MS18	switch	keys		keys	locked	MS40	switch	switch			keys
MS19	locked	keys		keys	switch	MS41	locked	keys		keys	keys
MS20	keys	keys		keys	keys	MS42	keys	keys			keys
MS21	locked	switch		without	switch	locked	keys	switch		switch	keys
MS22	switch			keys	switch	keys		switch		switch	

*harder transition

Switching function:



S51 -1 -2 -4G -MS20 -A 23 -A 24 -A 25 -A 26 -X

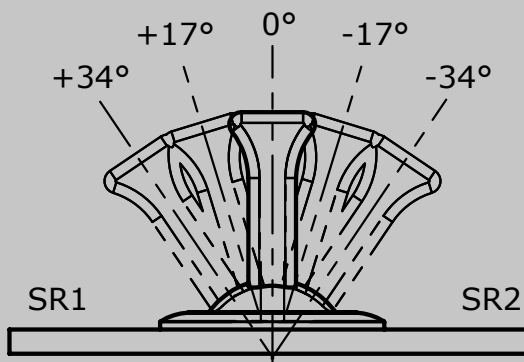
Contacts programming

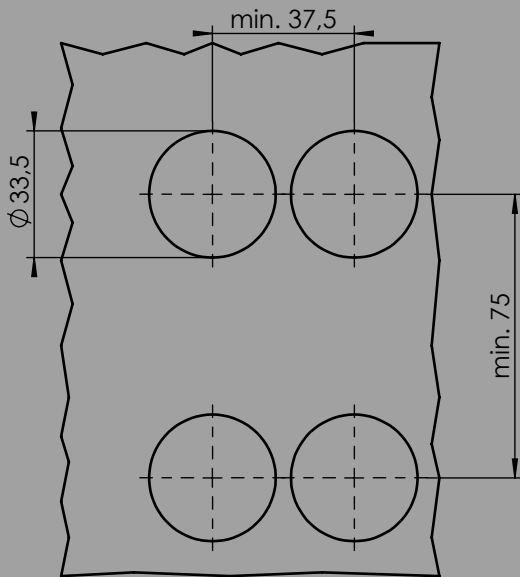
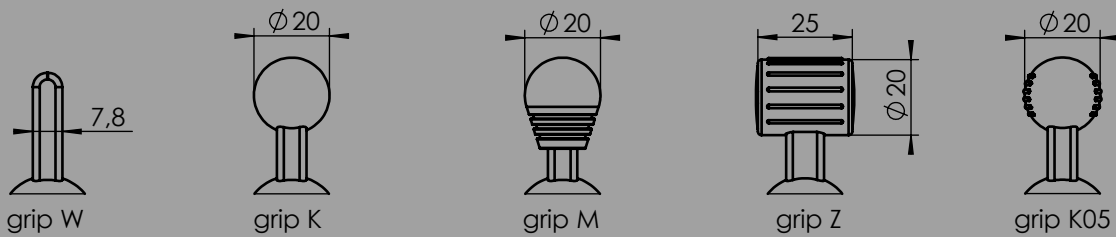
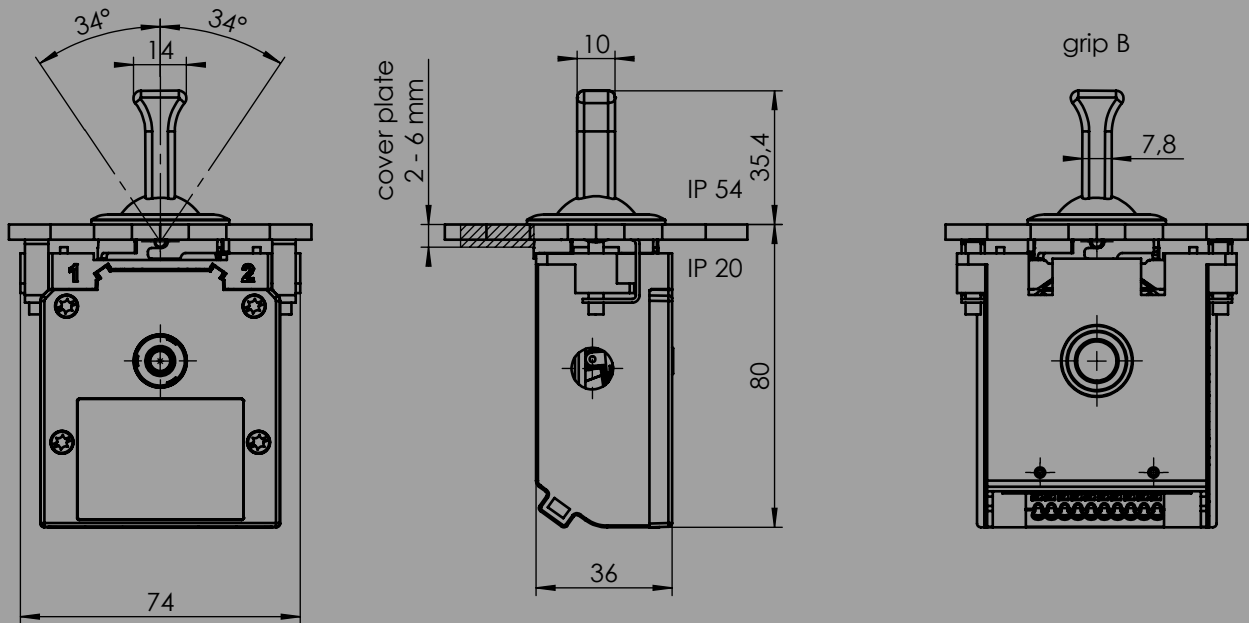
A..

Programmnummer	Control-handle position				
	Switching direction 1 (SR1)		Centre 0 0°	Switching direction 2 (SR2)	
	2 -34°	1 -17°		1 17°	2 34°
A01				X	X
A02			X		
A03					X
A04				X	
A05			X		X
A06			X	X	
A07	X	X			
A08			X		
A09	X				
A10		X			
A11	X		X		
A12		X	X		
A13	X	X		X	X
A14			X		
A15			X	X	X
A16	X	X	X		
A17				X	X
A18	X	X			
A19	X				X
A20		X		X	
A21	X		X		X
A22		X	X	X	

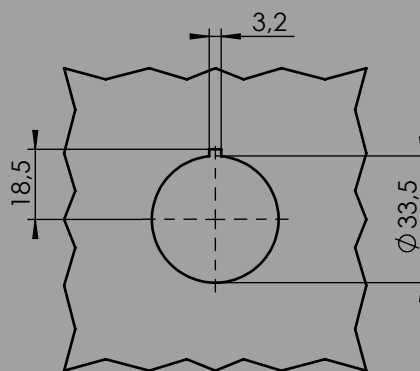
Programmnummer	Control-handle position				
	Switching direction 1 (SR1)		Centre 0 0°	Switching direction 2 (SR2)	
	2 -34°	1 -17°		1 17°	2 34°
A23					X
A24	X				
A25				X	
A26		X			
A27			X		X
A28	X		X		
A29			X	X	
A30		X	X		
A31		X			X
A32	X			X	
A33		X		X	X
A34	X	X		X	
A35		X	X		X
A36	X		X	X	
A37		X	X	X	X
A38	X	X	X	X	
A39	X			X	X
A40	X	X			X
A41	X		X	X	X
A42	X	X	X		X
A43	X	X		X	X

Programming of contacts:





hole pattern
without anti twist



hole pattern
with anti-twist

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

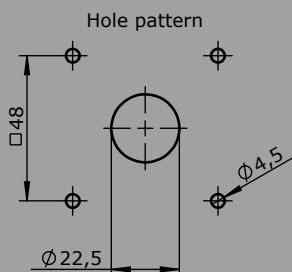
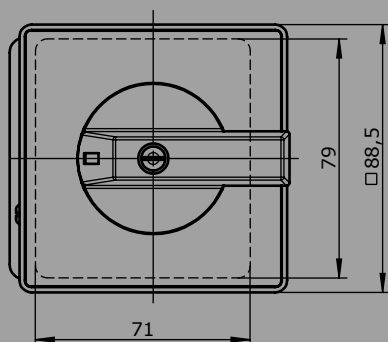
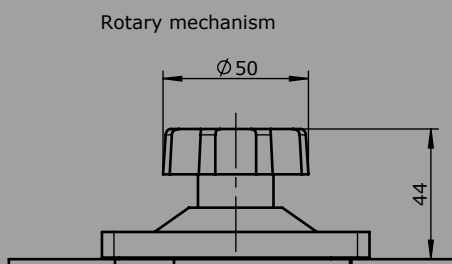
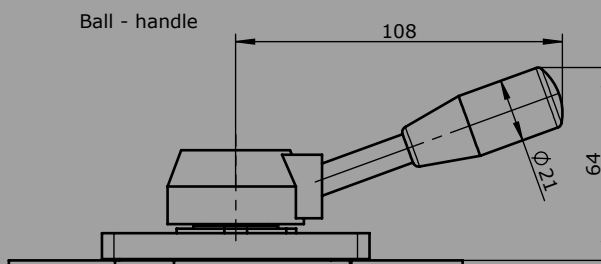
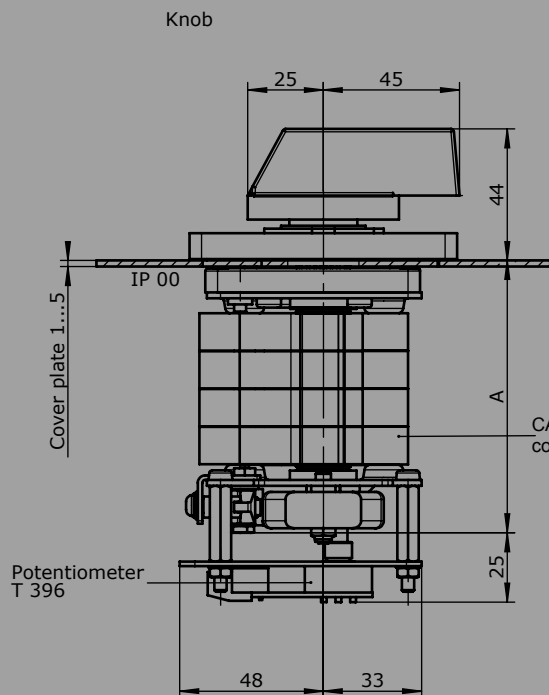


	N6	-DG	Example -01 Z P	-A05 P134	-X
Basic unit					
N6	Control-Switch incl. ISO-front plate 88 x 88 mm				
Grip					
DG	Twist grip				
Axis 1 (direction 2-4)					
01	2 contacts (2A 250 V AC15)				
Z	Spring return				
P	Potentiometer				
Description axis 1 (direction 3-4)					
A05	Arrangement MSP21				
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 127				
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	C... Encoder see page 135					

	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



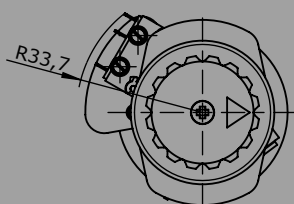
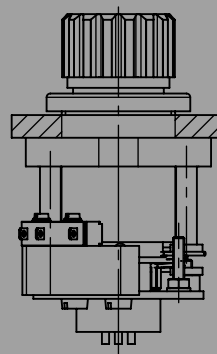
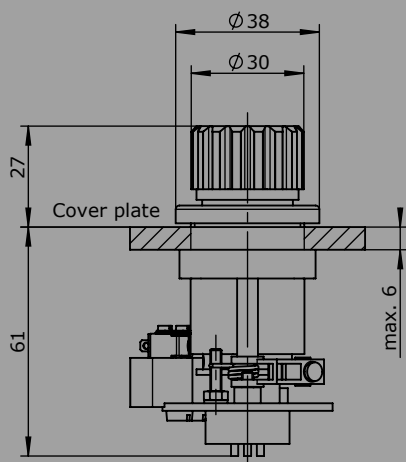
The Control-Switch N9 is a rugged switching device for electrohydraulic and hoisting applications. The modular design enables the switching device to be used universally.

Technical data

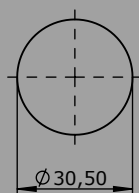
Mechanical life N9	10 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP54



		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 127						
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

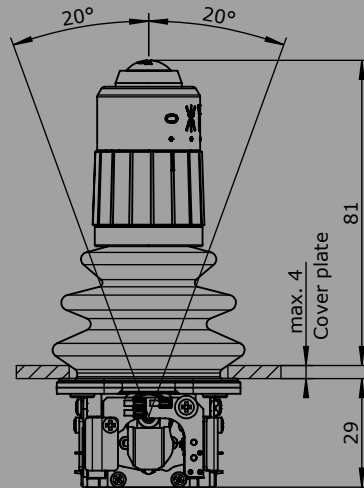
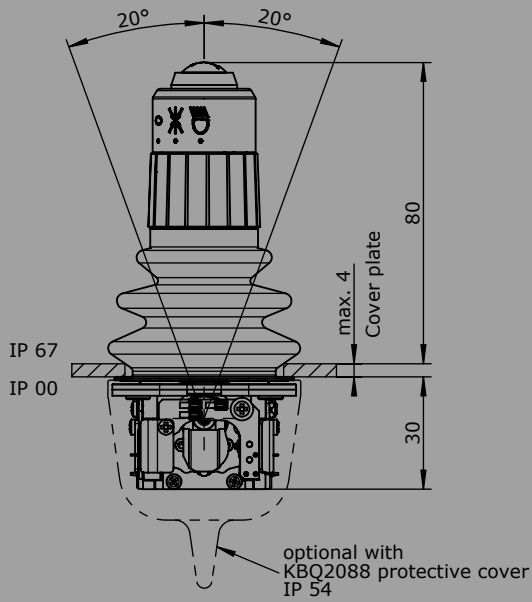


	V23S	-D	-F2	-2	+2	-X
Basic unit						
V23.1S Steering Column Switch, 1-axis with detent						
V23S Steering Column Switch, 2-axis with detent						
Grip						
D Push button (I _{max} = 100 mA)						
F1 Switching function 1-stage						
F2 Switching function 2-stage						
Axis 1: direction 1-2						
2 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						

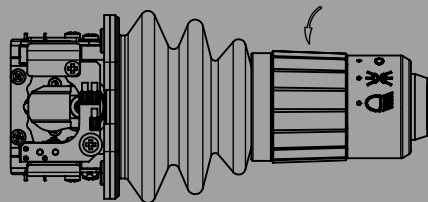
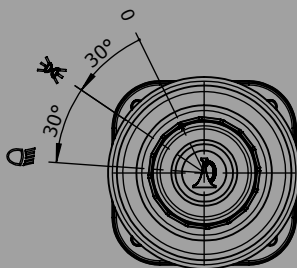
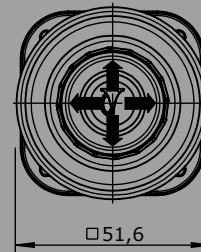
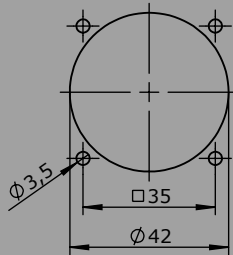
Technical details may vary based on configuration or application! Technical data subject to change without notice!

Steering column switch

mounting from below



Hole pattern



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

S004 Male housing 10-pole

S006 Male housing 14-pole

S007 Male housing 18-pole



S012 Female housing 10-pole

S014 Female housing 14-pole

S015 Female housing 18-pole



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

S017 Male housing 4-pole

S018 Male housing 6-pole

S019 Male housing 8-pole

S021 Male housing 12-pole



S022 Female housing 4-pole

S023 Female housing 6-pole

S024 Female housing 8-pole

S026 Female housing 12-pole



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

S027 Male housing 4-pole

S028 Male housing 6-pole

S029 Male housing 8-pole

S031 Male housing 12-pole



S032 Female housing 4-pole

S033 Female housing 6-pole

S034 Female housing 8-pole

S036 Female housing 12-pole



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

S037 Male housing CPC 13 9-pole

S038 Male housing CPC 17 14-pole

S039 Male housing CPC 23 37-pole



S040 Female housing CPC 13 9-pole

S041 Female housing CPC 17 14-pole

S042 Female housing CPC 23 37-pole



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

S043 Cap housing 4-pole

S044 Cap housing 6-pole

S045 Cap housing 8-pole

S046 Cap housing 10-pole



S048 plug housing 4-pole

S049 plug housing 6-pole

S050 plug housing 8-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

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

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

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



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

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

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

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



Schematic description of the protection class



IP Protection



Degree of protection

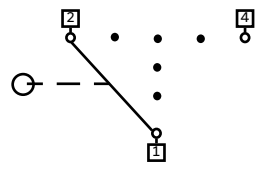
B10	Joystick-main circuit board grouted (IP67)
B11	Joystick-main circuit board grouted (IP67) and grip function sealed, grip with drain hole

Standard Contact-Arrangement for master switch



Typ	Form	Typ	Form
MS11 0 1	A01	MS24 4 3 2 1 0 1 2 3 4	A11
MS12 0 1 2	A02	MS214 4 3 2 1 0 1 2 3 4	A12
MS13 0 1 2 3	A03	MS224 4 3 2 1 0 1 2 3 4	A13
MS14 0 1 2 3 4	A04	MS25 5 4 3 2 1 0 1 2 3 4 5	A14
MS21 1 0 1	A05	MS26 6 5 4 3 2 1 0 1 2 3 4 5 6	A15
MS22 2 1 0 1 2	A06	MS0 1 0 1	A98
MS212 2 1 0 1 2	A07		
MS222 2 1 0 1 2	A08		
MS23 3 2 1 0 1 2 3	A09		
MS213 3 2 1 0 1 2 3	A10		

Micro change over
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

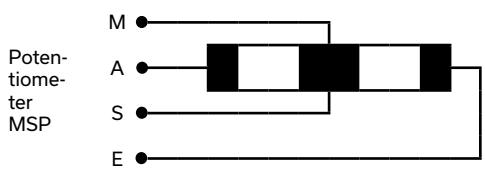


Deflection directions designated
DIN 15025

Zero contact NC

Zero contact NO

Potentiometer MSP



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			Break		
		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	$\frac{I}{I_e}$	$\frac{U}{U_e}$	cos	$\frac{I_c}{I_e}$	$\frac{U_r}{U_e}$	cos
alternating current	AC12	Control of resistive loads and solid state loads with isolation by opto couplers control of a.c. electromagnetic loads (> 72VA)	1	1	0,9	1	1	0,9
	AC15		10	1	0,3	1	1	0,3
Direct current	DC 12	Control of resistive loads and solid state loads with isolation by opto couplers Control of d.c. electromagnets	$\frac{I}{I_e}$	$\frac{U}{U_e}$	t 0,95	$\frac{I_c}{I_e}$	$\frac{U_r}{U_e}$	t 0,95
	DC 13		1	1	1 ms	1	1	1 ms
			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 I _e in Ampere	6 or 16	6 or 16	6 or 16	10	10
AC 12	2 4	2 4	2 4	2	2
DC 12 24 V	6 8	6 8	6 8	4	4
48 V	2 4	2 4	2 4	2	2
110 V	0,5 1	0,5 1	0,5 1	0,2	0,2
220 V	0,1 0,5	0,1 0,5	0,1 0,5	0,1	0,1
Contacts gold-coated 24 V	5 mA	5 mA	5 mA	5 mA	5 mA
DC 13 24 V	1	1	1	3	3
48 V	0,5	0,5	0,5	1,5	1,5
110 V	0,2	0,2	0,2	0,1	0,1
220 V	0,05	0,05	0,05	0,05	0,05
Short-circuit-protection in Ampere Fuse 9L Circuit-breaker G-characteristic	6 16 6 16	6 16 6 16	6 16 6 16	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 ^{le}	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	10 (V8/V85) 8 (D8)	20 (VV8/VV85) 12 (D3/S3)	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.

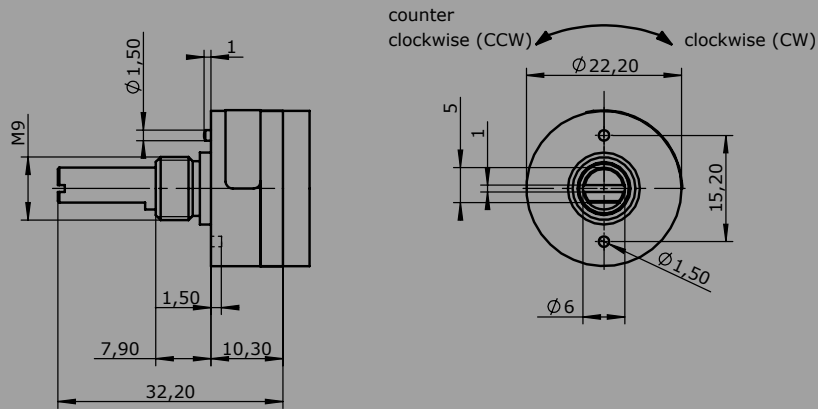
Technical data

Mechanical life HG2	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)

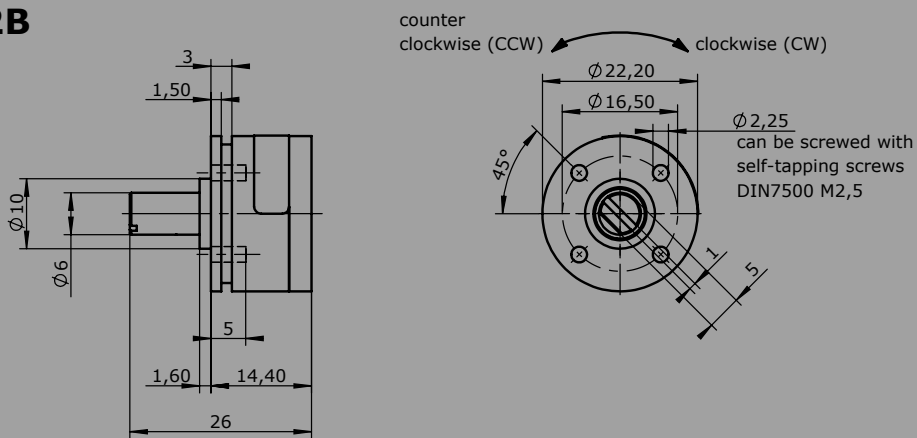


	HG2A	-60	-6	-E14811	-X
<i>Example</i>					
Basic unit					
HG2A	Hall-Potentiometer, Model A				
HG2B	Hall-Potentiometer, Model B				
Operating distance					
0-360° possible					
Example 60° => 60					
Dead zone around the center position					
0 No dead zone					
Example +/-3° => 6					
Interface					
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.

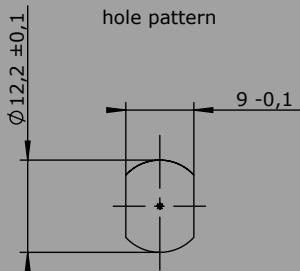
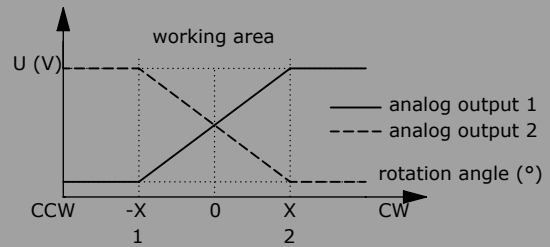
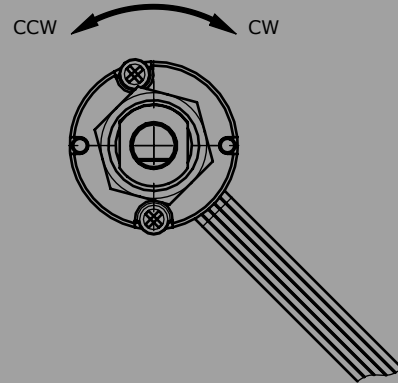
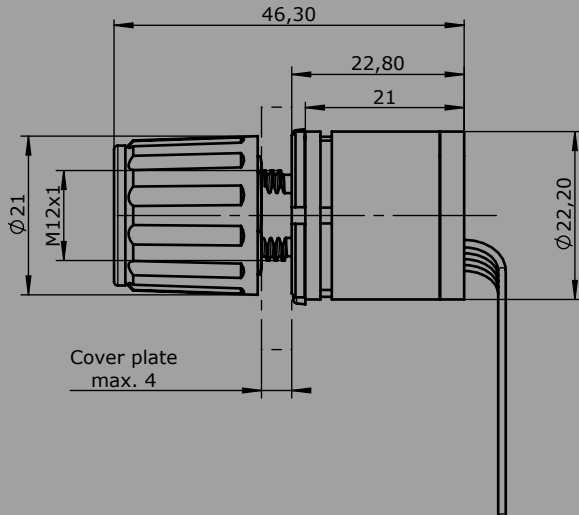
Technical data

Mechanical life N10	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!



Position of the shaft:

CCW → CW

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...4,5 V / 4,5...2,5...0,5 V	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	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

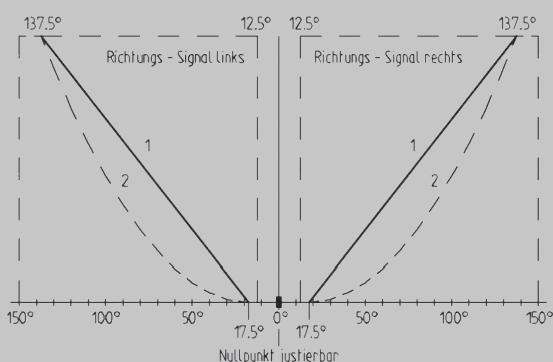
8-Bit-type T359

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

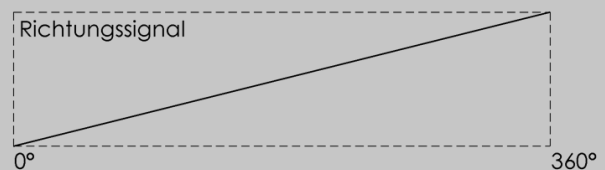
PIN connection	Colour-code
1 Not connected	-
2 D6	brown
3 D5	green
4 D4	yellow
5 D3	grey
6 D2	pink
7 D1	blue
8 Housing 0 V	black
9 Input 18-30 V DC	red
10 Not connected	-
11 Not connected	-
12 Direction-signal left	violett
13 D9	grey-pink
14 D8	red-blue
15 D7	white-green
- Cable screen	brown-green

6 Bit-type T359



8 Bit-type T359

9 Bit-type T384

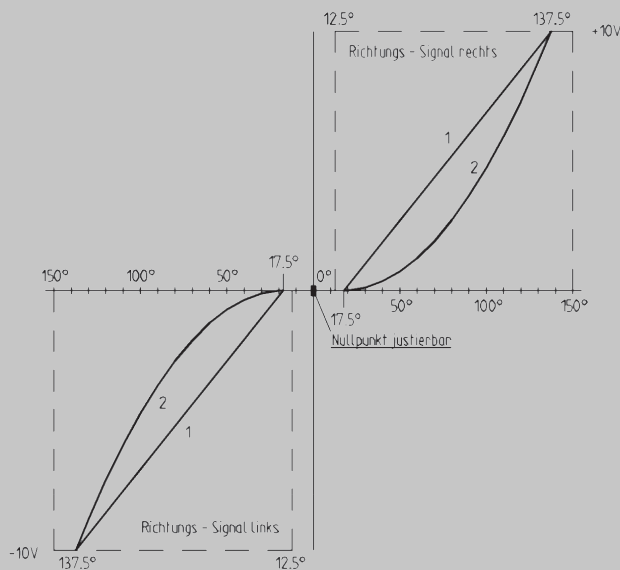
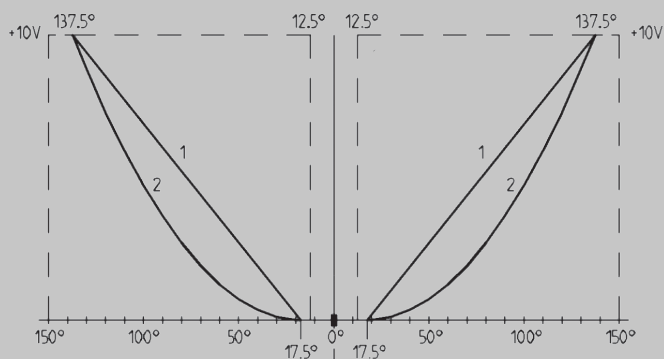


Opto-electronical encoder OEC 2 with voltage output

Power supply	18 - 30 V DC				
Scanning	6 Bit Gray-Code				
Rotation angle	Max. +/-150°				
Voltage output	10...0...10 VT366	Output characteristic linear	OEC 2-3-1-1	C111	410 g
	10...0...10 VT366	Output characteristic quadratic	OEC 2-3-2-1	C112	410 g
	-10...0...+10 VT367	Output characteristic linear	OEC 2-3-1-2	C151	410 g
	-10...0...+10 VT367	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

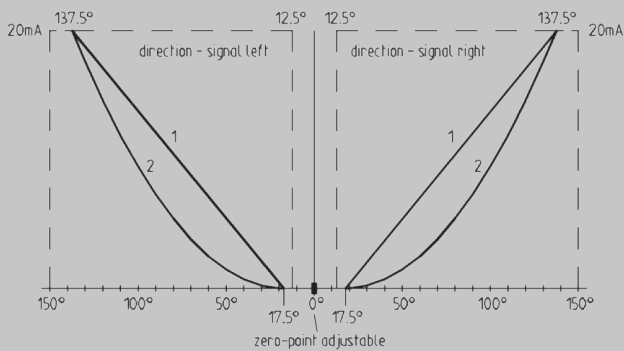
6 Bit-Type T368

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
9	Input 18-30 V DC
10	Not connected
11	Current output
12	Direction signal left
13	Direction signal right
14	Not connected
15	Not connected
-	Cable screen

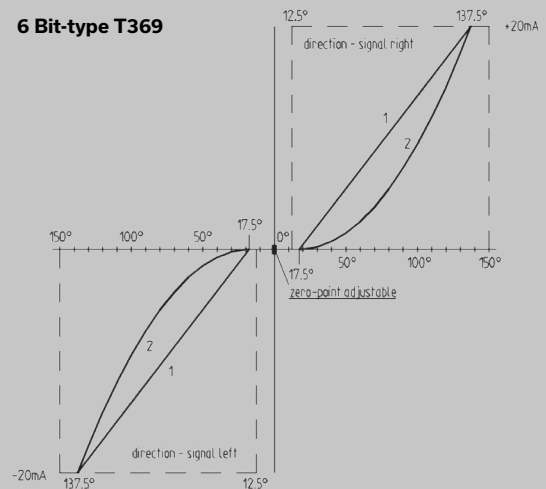
6 Bit-Type T369

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
9	Input 18-30 V DC
10	Not connected
11	Current output
12	Direction signal left
13	Direction signal right
14	Not connected
15	Not connected
-	Cable screen

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

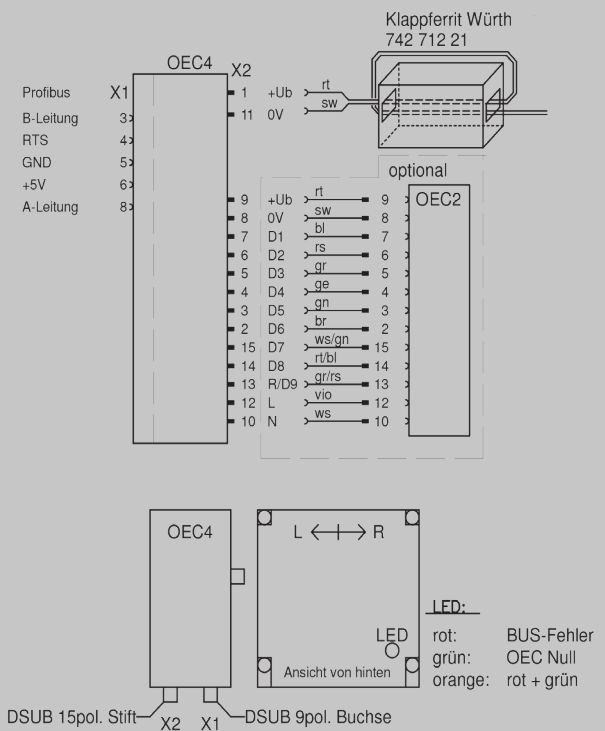
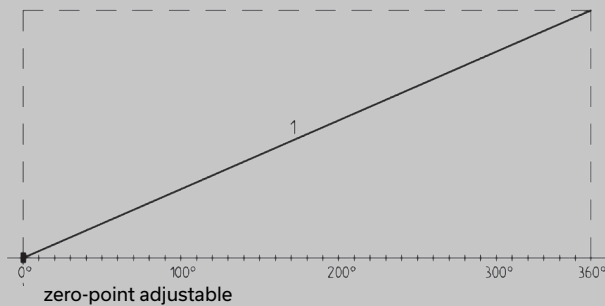
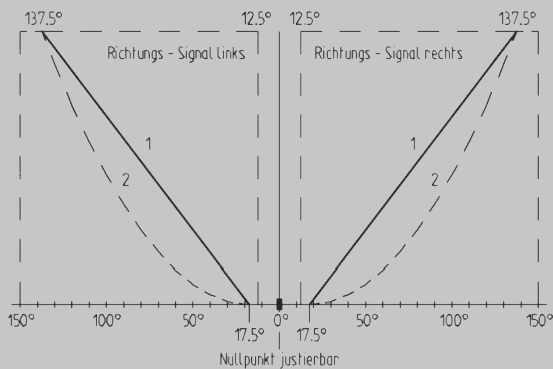
OEC 4
with interface Profibus DP



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

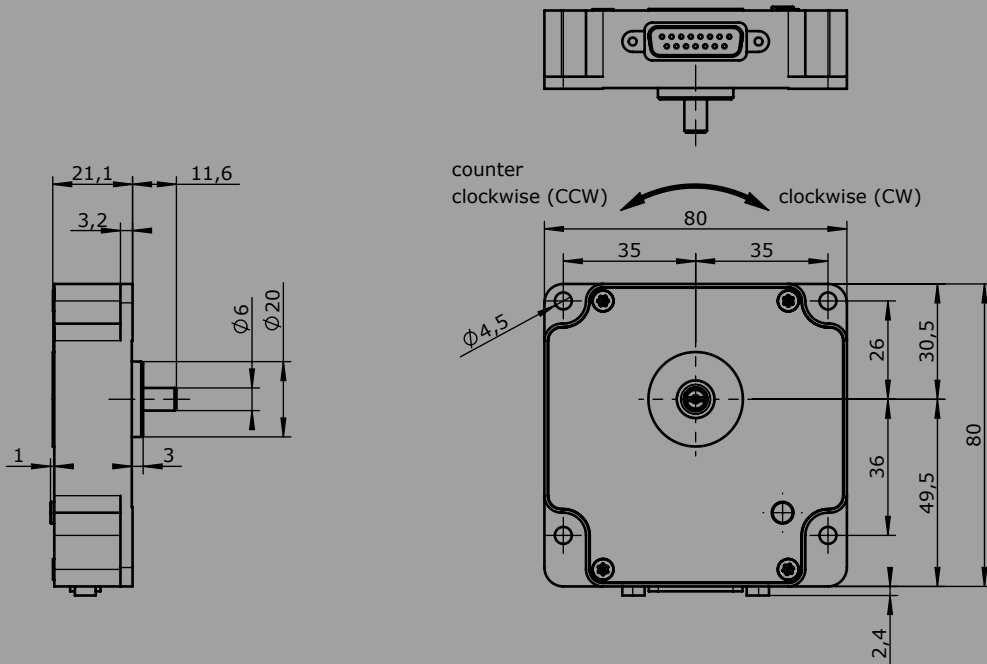


Attachment

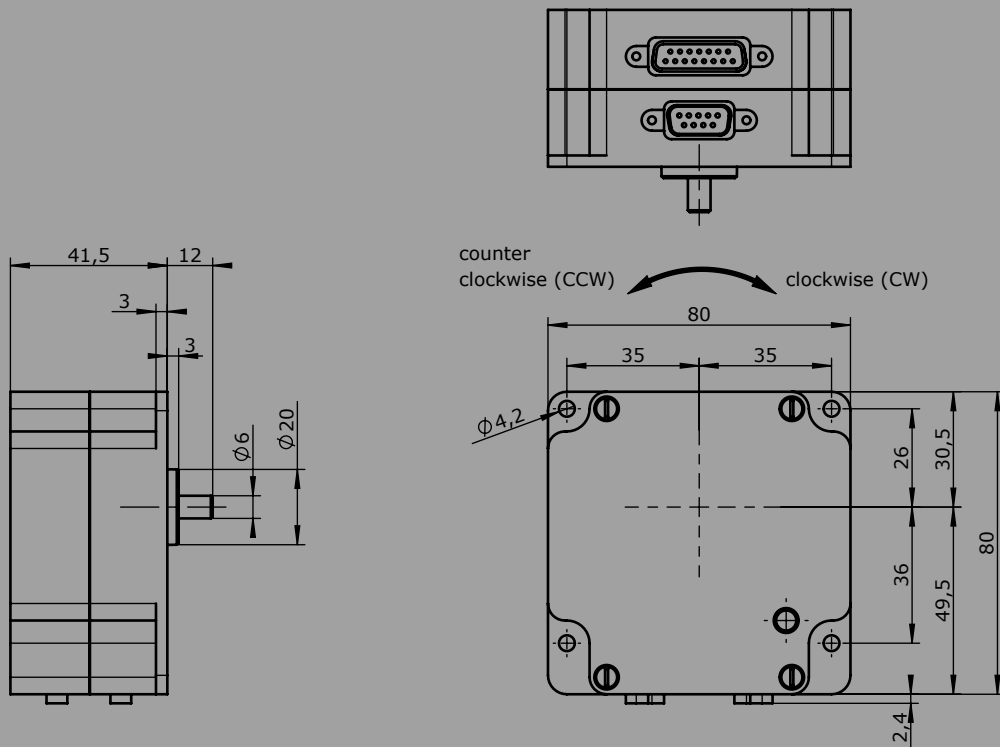
- X1 Plug (Profibus) straight
- X1 Plug (Profibus) 90° angled
- X2 Plug with cable 2 x 0,25 mm², 2000 mm long, cable head open (cable for current supply OEC 4 single application)
- X2 Connecting cable OEC 4/ OEC 2 (14 x 0,25 mm²) with 2 plug connectors incl. cable for current supply (2 x 0,25 mm² 2000 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



Electronic Control Unit

ES/43



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



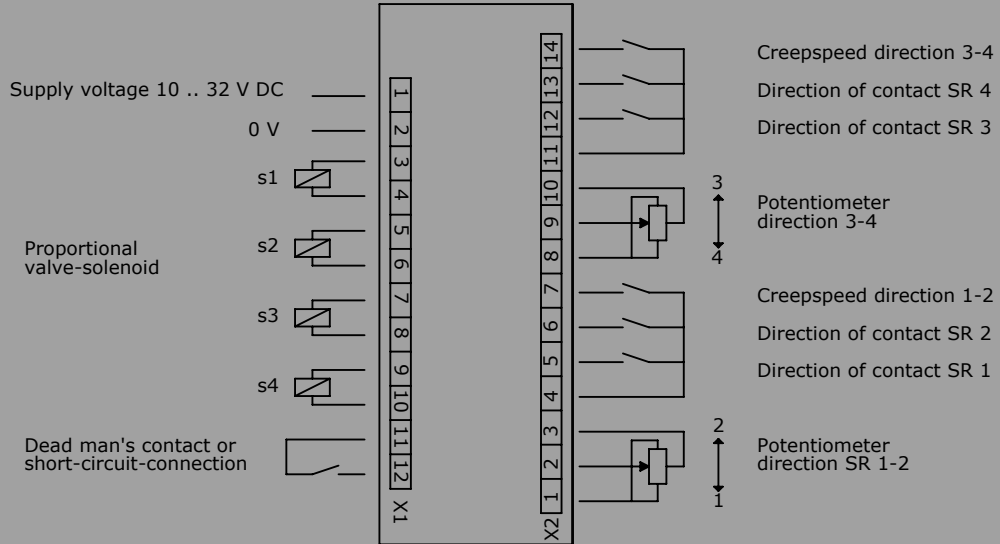
Technical data:

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

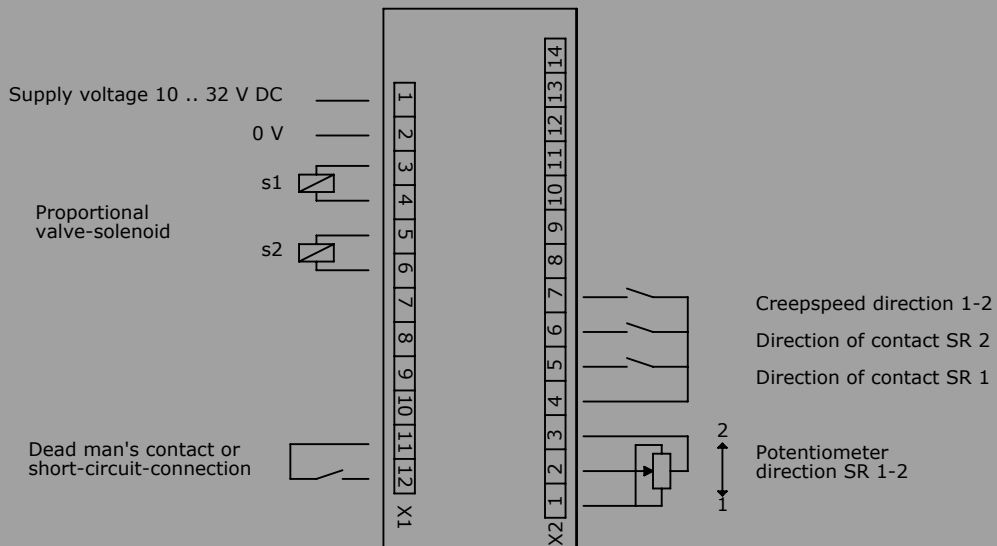
Electronic Control Unit for 4 proportional valves solenoid ES/43-10

Electronic Control Unit for 2 proportional valves solenoid ES/43-11

ES / 43-10
4 Proportional valves-solenoid



ES / 43-11
2 Proportional valves-solenoid





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.

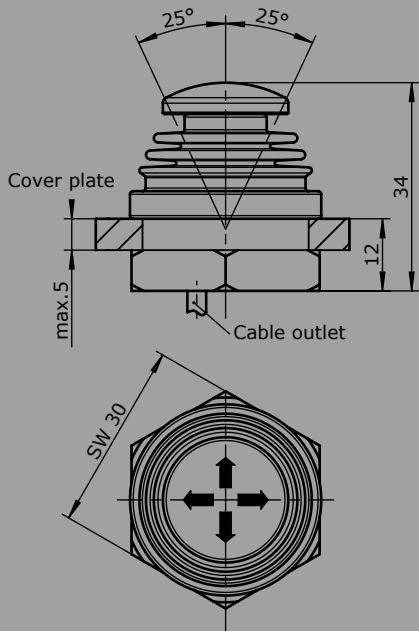
Technical data

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)

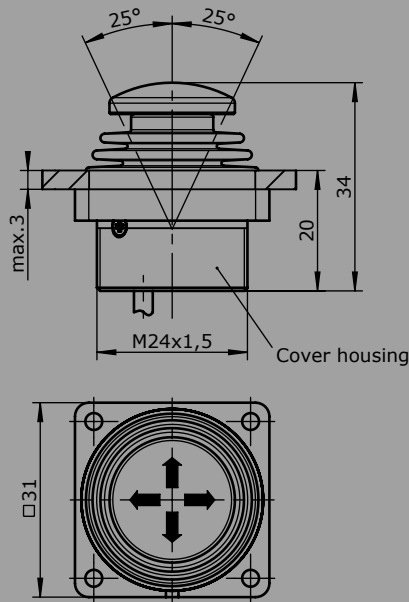


		V21	P	Example	-1	-E1032	-X
Basic unit							
V21.1	Mini-Joystick 1-axis, installation from top with fixing nut						
V21	Mini-Joystick 2-axis, installation from top with fixing nut						
V21.1A	Mini-Joystick 1-axis, with flange, installation from below						
V21A	Mini-Joystick 2-axis, with flange, installation from below						
V21.1B	Mini-Joystick 1-axis, with flange, installation from top						
V21B	Mini-Joystick 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 Ub= 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						

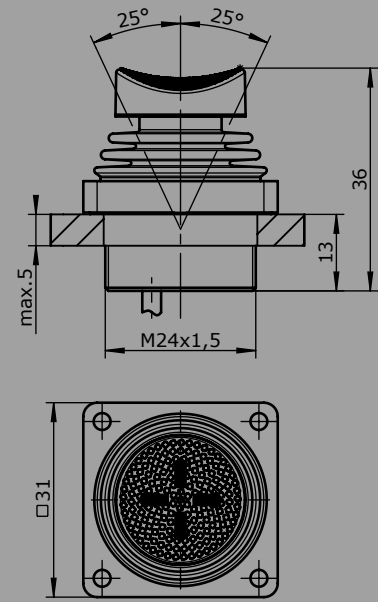
Standard
installed from the top



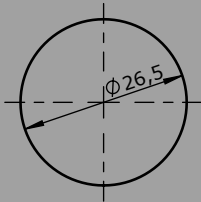
Version A with flange
installed from below



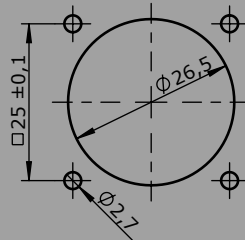
Version B with flange
installed from the top
with actuator KBAD 980



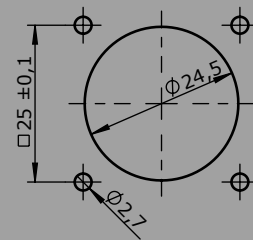
Hole pattern



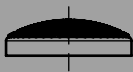
Hole pattern



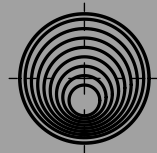
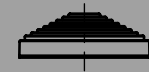
Hole pattern



Actuator KBAD 1658



Actuator KBAD 1690



Mini-Joystick S9



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.

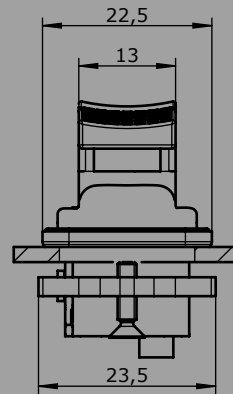
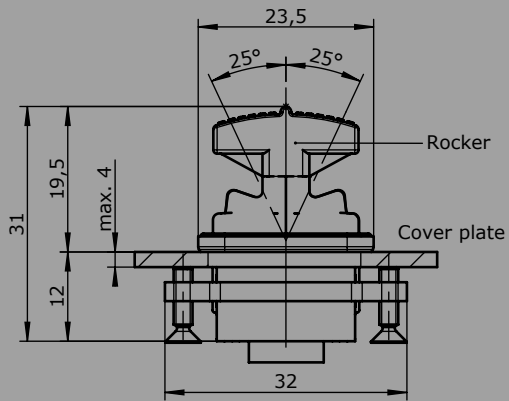
Technical data

Mechanical life	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)

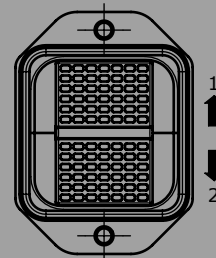
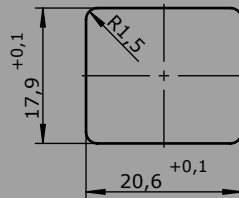


	Example S9	- E10311	- X
Basic unit			
S9 Mini-Joystick			
Interface			
0,5...2,5...4,5 V redundant by Ub= 5 V		E1031	
	Output option inverse dual		1
	Output option dual		2
Special model			
X Special / customer specified			

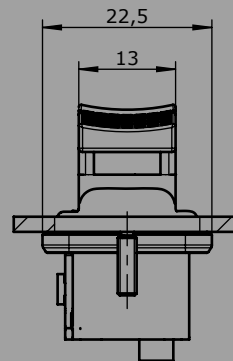
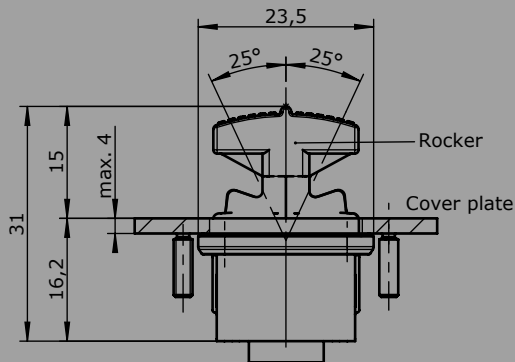
Installed from the top



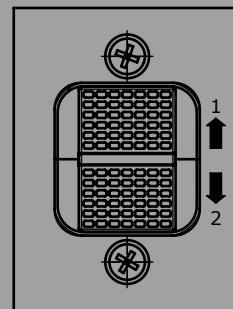
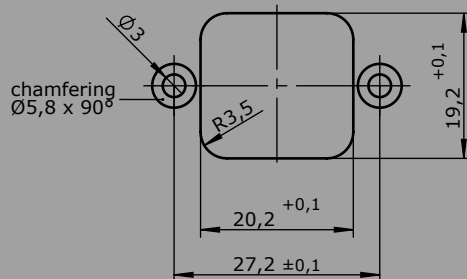
Hole pattern
(installed from the top)



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

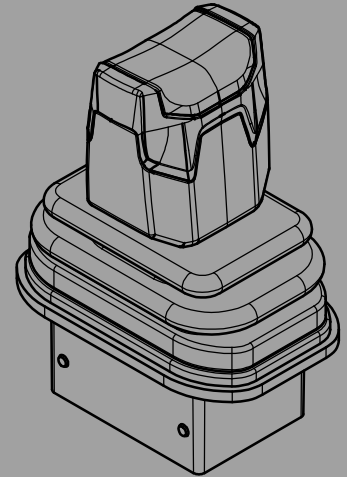
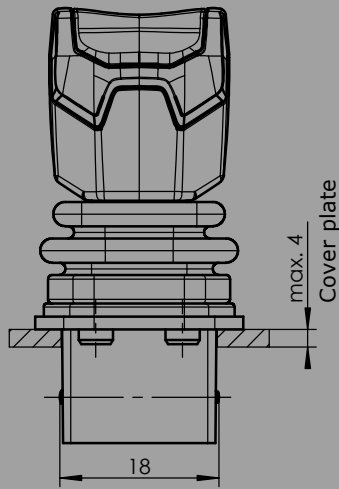
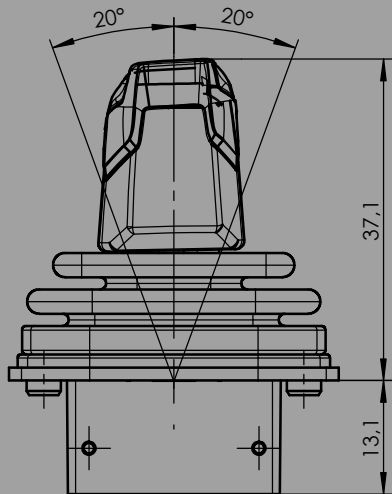
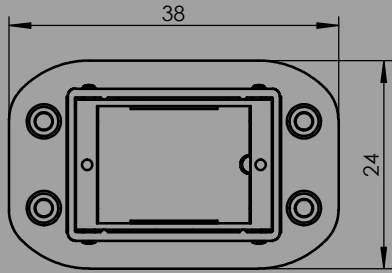
Mechanical life	5 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP67
Functional safety	PLd compatible (EN ISO 13849, complies SIL2 to DIN EN IEC 61508)



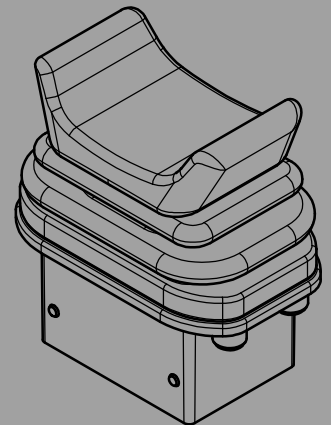
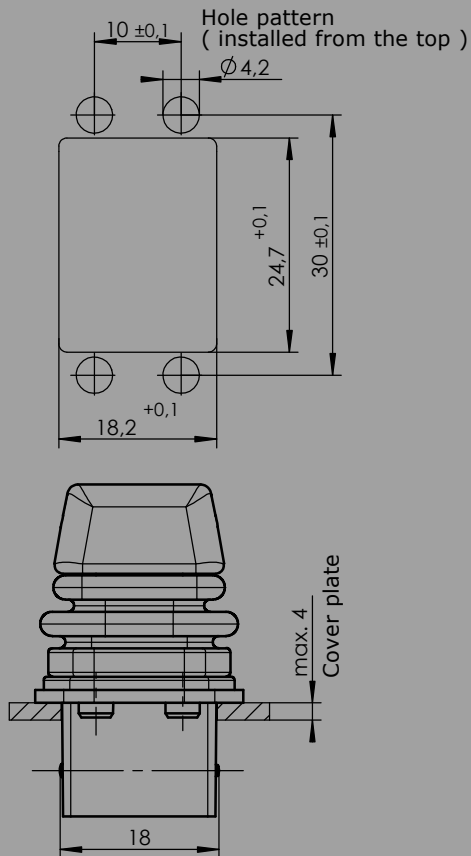
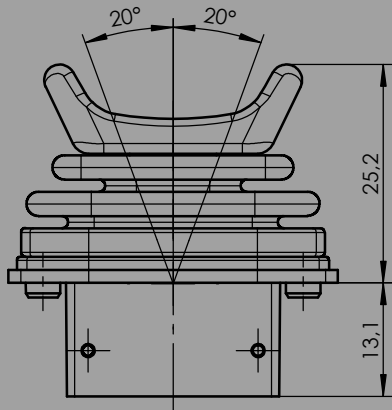
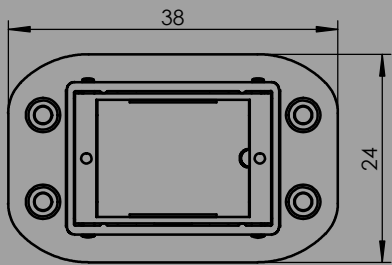
	Example					
	S15	- 2	- 1	-1	-E1031	-X
Basic unit						
S15 Fingertip Joystick						
Actuator						
1 Actuator form A						
2 Actuator form B						
3 Actuator form C						
Actuator colour						
1 Black						
2 Grey*						
3 Blue*						
4 Red*						
5 Yellow*						
6 Orange*						
7 Green*						
*Not possible with actuator form B and C!						
Mechanical function						
1 T-0-T						
2 R-0-R*						
3 T-0-R*						
4 R-0-T*						
5 R-R*						
6 R-R-0-R-R*						
7 R-T-0-T-R*						
8 T-0-T-R*						
9 R-T-0-T*						
*Not possible with actuator form B and C!						
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 + direction signal at Ub= 5 V					1 axis	E104 1
					Characteristic inverse dual	1
					Characteristic dual	2
SPI - Interface on request						
Special model						
X Special / customer specified						

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

S15 fingertip with actuator edition A



S15 fingertip with actuator edition B



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

The S17 is a Fingertip Joystick designed for electro-hydraulic applications. A long service life and high reliability is achieved by the latest contactless hall-technology.

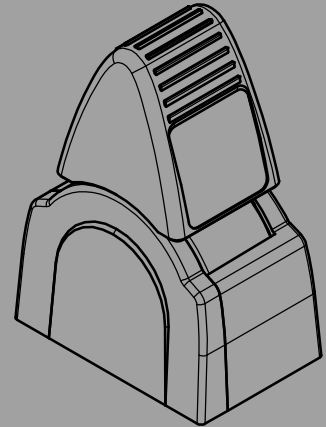
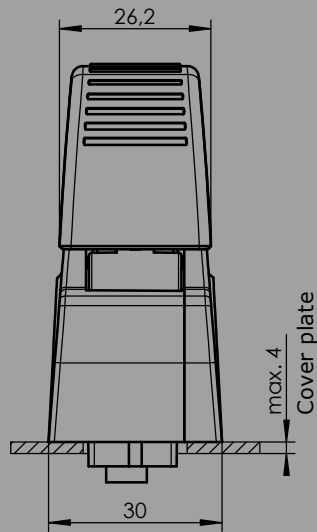
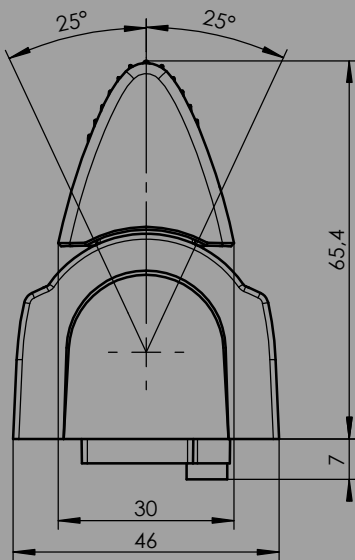
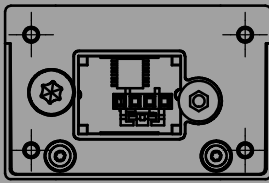
Technical data

Mechanical life	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)

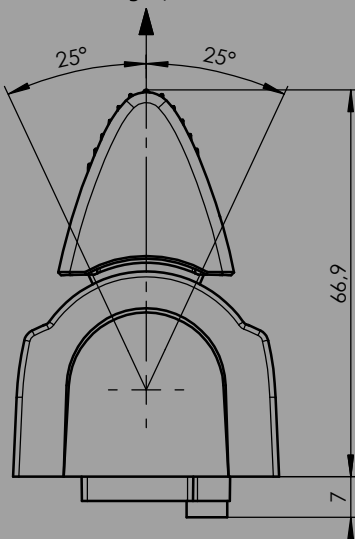


	Example					
	S17	-1	-1	-1	-E1031	-X
Basic unit						
S17 Minilever						
Actuator						
1 Actuator form A						
Actuator colour						
1 Black						
Mechanical function						
1 T-0-T						
2 T-0-T with mechanical zero interlock						
Mechanical function						
0,5...2,5...4,5 V redundant by Ub= 5 V	1 axis				E103 1	
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						

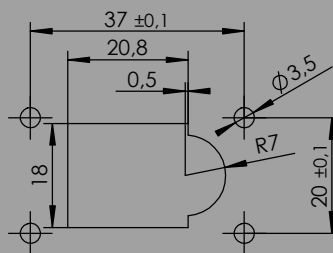
S17 Minilever



S17 Minilever with zero interlock
Lifting 1,5 mm



Hole pattern



Hall-Cross Switch HK1



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

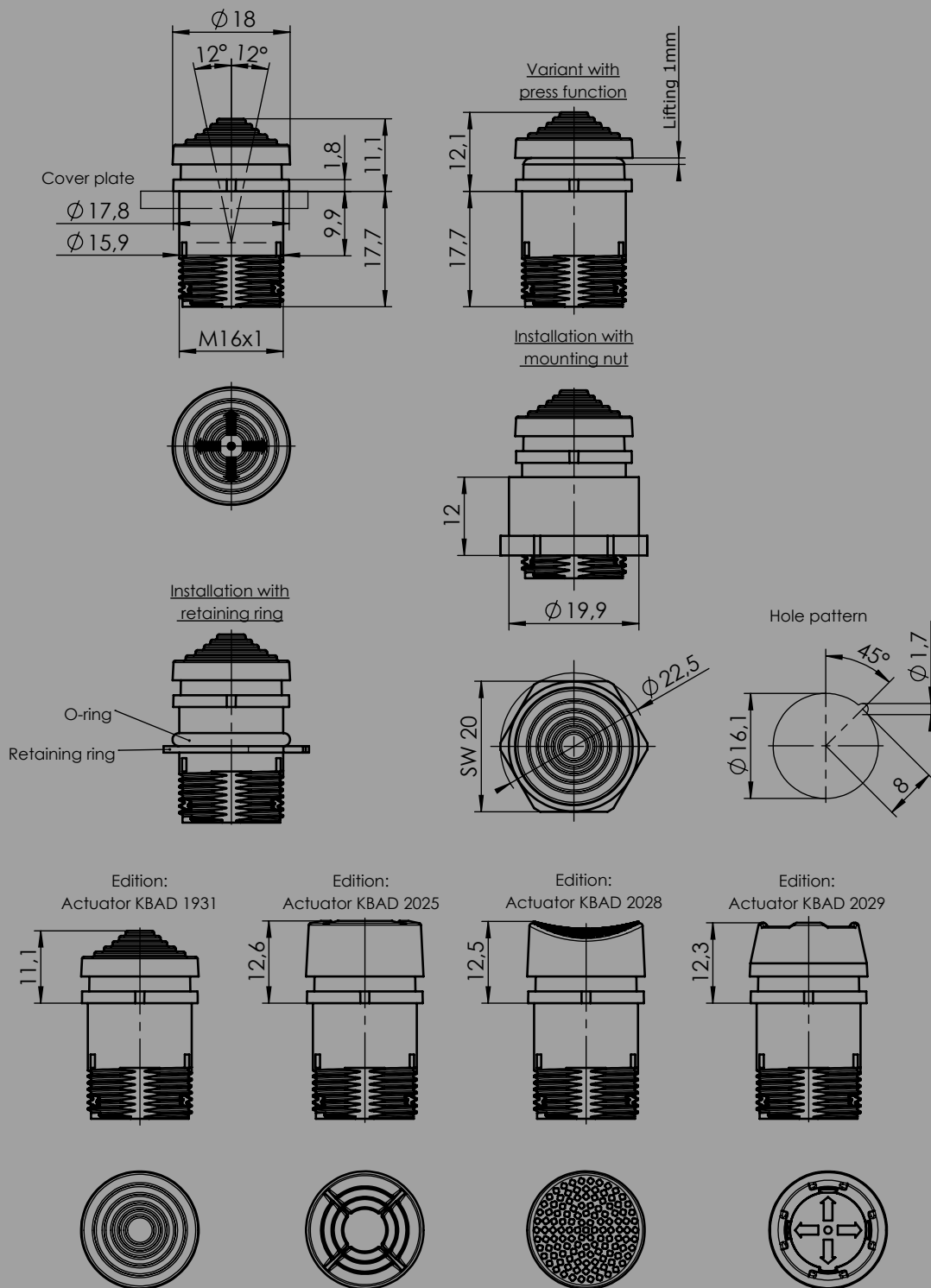
Mechanical life	1 million operating cycles
Operating temperature	-40°C to +85°C
Degree of protection	IP67 (electronic)



		Example						
		HK1	- D	- 1	-1	-0	-E1031	-X
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*							
*Only with actuator 4 possible!								

HK1 -D -1 -1 -0 -E1031 -X

Interface							
Digital output							
2 direction signal per axis							
		1 axis		E004	1		
		2 axis			2		
Voltage output							
0,5...2,5...4,5 V redundant at Ub = 5 V							
		1 axis		E103 1			
		2 axis			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	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)

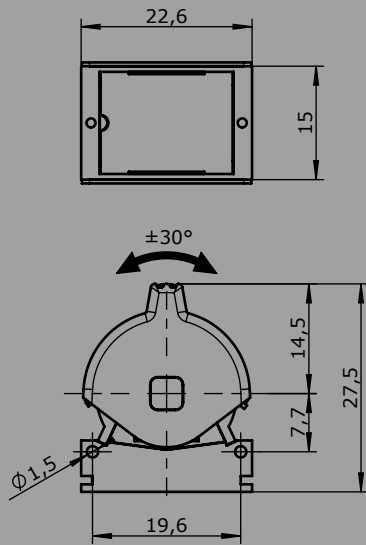


	S12	Example - A	- 2	- 1	- 1	-E1031	-X
Basic unit							
S12 Thumbwheel							
S12B Thumbwheel with actuator version B							
S12C Thumbwheel with actuator version C							
Mounting frame							
A With mounting frame							
Without mounting frame							
Illumination							
1 Unlighted							
2 Functional 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*							
*Not possible with S12B and S12C!							
Actuator colour							
	S12	S12B	S12C				
1 Black	√	√	√				
2 Grey	√						
3 Blue	√						
4 Red	√		√				
5 Yellow	√						
6 Orange	√						
7 Green	√						

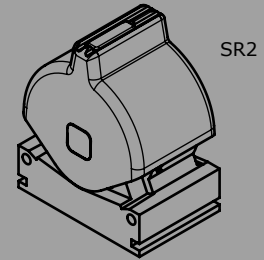
Technical details may vary based on configuration or application! Technical data subject to change without notice!

	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						E103 1	
0,5...2,5...4,5 V redundant + 2 direction signals by Ub= 5 V						E104 1	
					Output option inverse dual		1
					Output option dual		2
SPI - Interface on request							
Special model							
X	Special / customer specified						

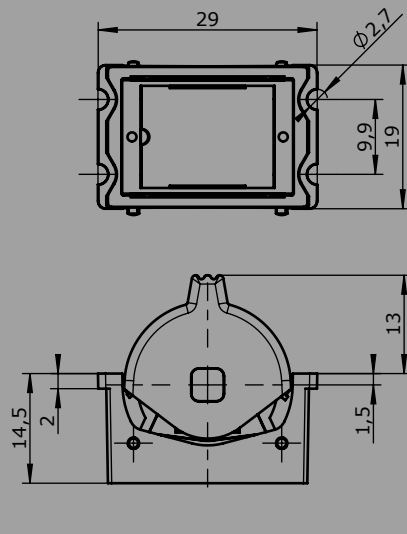
S12 without mountig frame
Version A



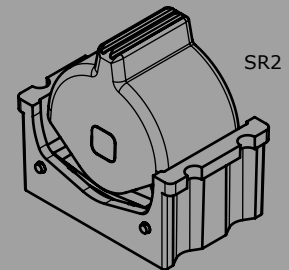
S12 with LED
SR1



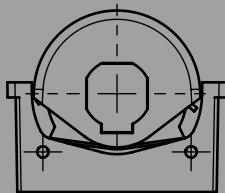
S12 with mounting frame
Version A



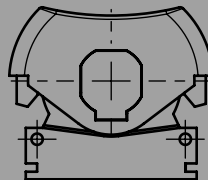
S12 without LED
SR1



Version B
with actuator KBAD 1731

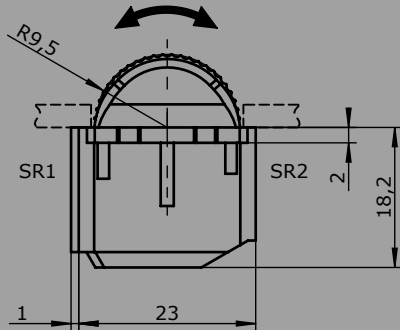


Version C
with actuator KBAD 1858

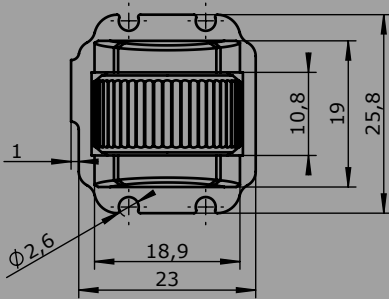
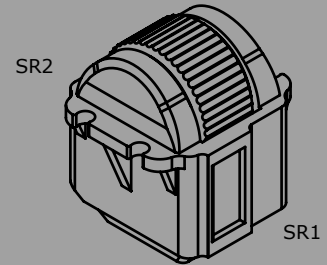
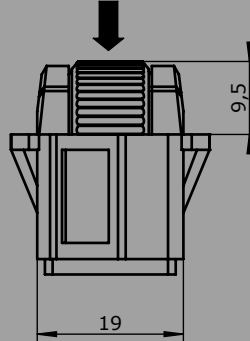


S16 Mounting Position horizontal

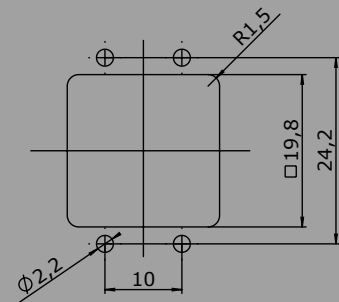
Thumbwheel 360° (18 Steps)



Pushbutton Function

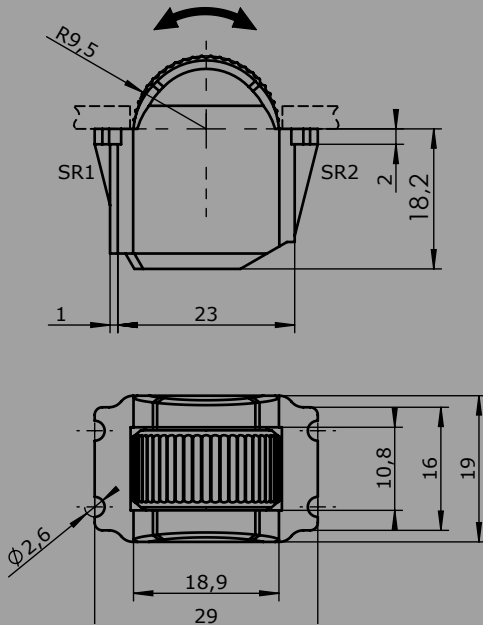


hole pattern and cut out

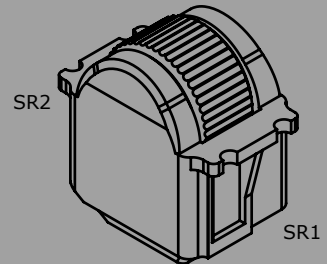
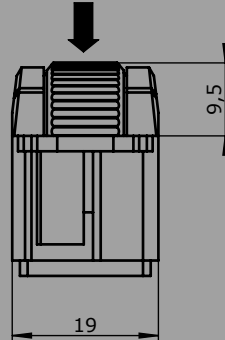


S16 Mounting Position vertical

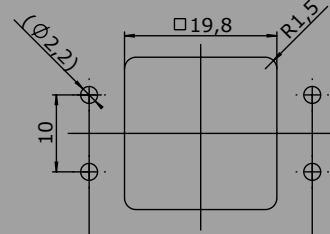
Thumbwheel 360° (18 Steps)



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
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!								

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

HD1 -2 -1 -1 -1 -E0111 -X

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*
- 9 Grey*

*Not possible with HD4 and HD5!

Symbol (only possible by HD1 til HD3!)

- 1 Without
- S.... Symbol according to ISO 7000 (example: S0244 - acoustic signal, horn / ISO 7000 symbol 0244)
- X Custom-made

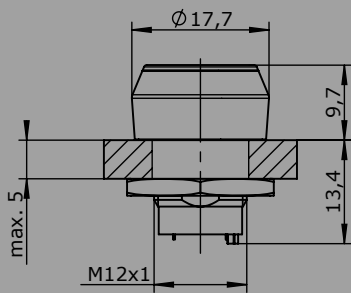
Interface

- 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

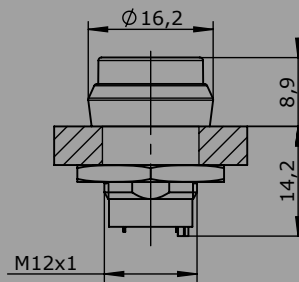
Special model

- X Special / customer specified

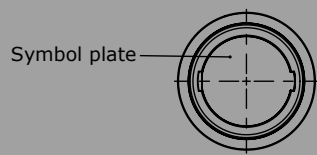
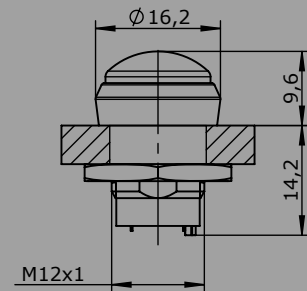
Edition:
HD1



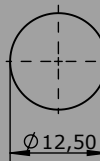
Edition:
HD2



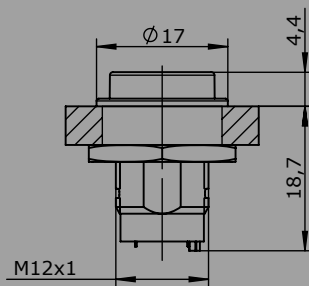
Edition:
HD4



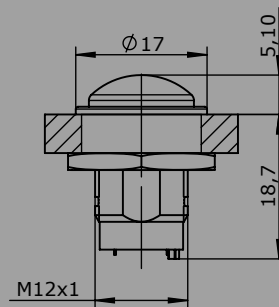
Hole pattern
HD1, HD2, HD4



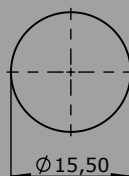
Edition:
HD3



Edition:
HD5



Hole pattern
HD3, HD5





The Palm Grip B36 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.



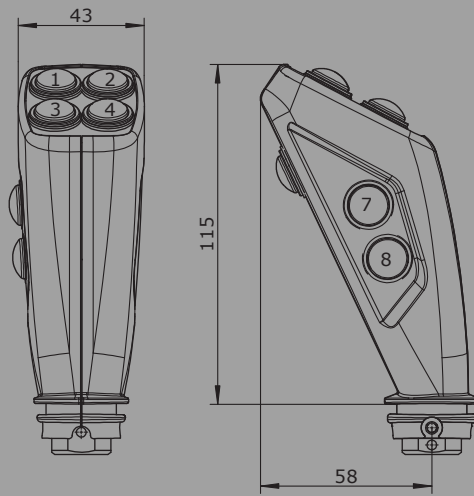
Technical data

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)

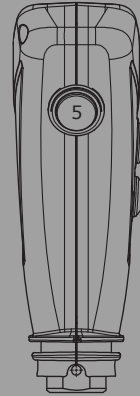
	B36	-2D	W	K	SE	S12	H13	-X
Basic unit								
B36 Palm Grip								
Digital actuating element								
D Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange								
HD Hall-Push Button (see page 158)								
W Rocker switch momentary (T) or maintained (R), colours: red, black, yellow, 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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + E907)								
V Vibration								
Analog actuating element								
S12 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)								
S16 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)								
V21 Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)								
HK Hall-Cross Switch (see page 150)								
H13 Hall-Rotary Grip, output 0,5...2,5...4,5 V inverse dual								
Special model								
X Special / customer specified								

B36R

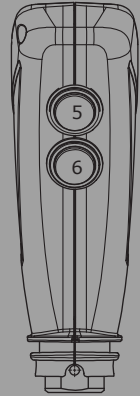
Hall push button installed Pos. 1-5
Hall push button installed Pos. 7-8



Hall push button installed Pos. 5

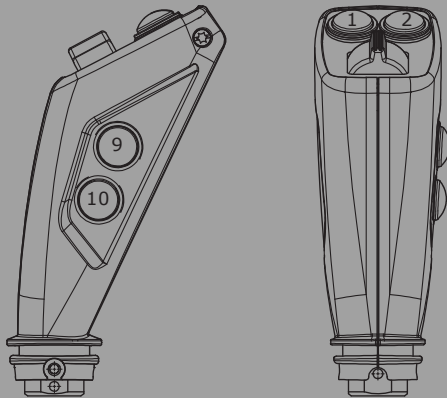


Hall push button installed Pos. 5-6

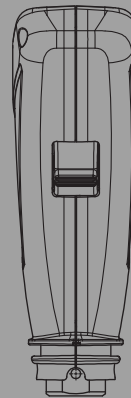


B36L

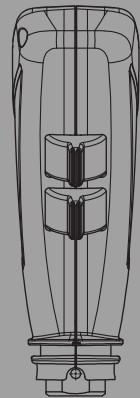
Hall push button installed Pos. 1+2, 9+10
Rocker S12 installed Pos. 3-4



Rocker S12 installed Pos. 6



Rocker S12 installed Pos. 5+6



Edition: B36
Rocker S12 installed Pos. 1-3
Rocker S12 installed Pos. 2-4



Edition: B36
Rocker S12 installed Pos. 1-2
Rocker S12 installed Pos. 3-4



Edition: B36
Rocker S12 installed Pos. 1-3
Hall push button installed Pos. 2+4



Edition: B36
Rocker S12 installed Pos. 1-2
Hall push button installed Pos. 3+4





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)

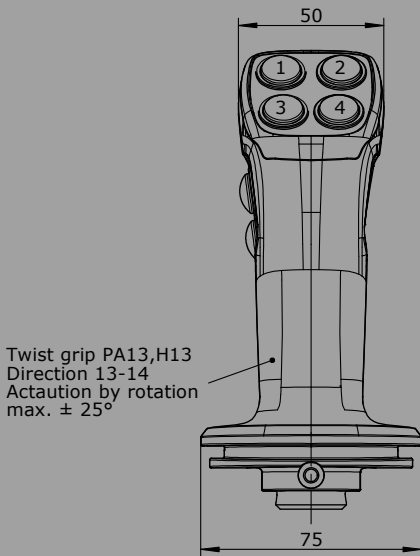


	B35	-2D	W	K	SE	S12	H13	-X
Basic unit								
B35 Palm Grip								
Digital actuating element								
D Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange								
HD Hall-Push Button (see page 158)								
W Rocker switch momentary (T) or maintained (R), colours: red, black, yellow, 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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx +E6xx + E7xx + E907)								
V Vibration								
Analog actuating element								
S12 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)								
S16 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)								
V21 Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)								
HK Hall-Cross Switch (see page 150)								
H13 Hall-Rotary Grip, output 0,5...2,5...4,5 V inverse dual								
Special model								
X Special / customer specified								

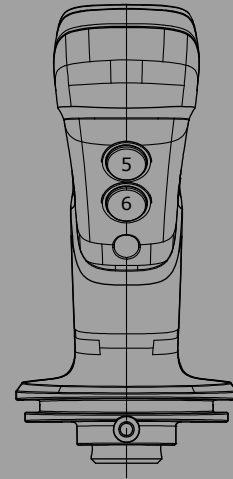
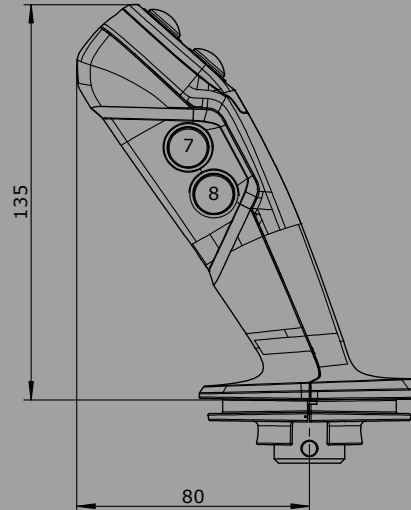
B35R

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

Hall push button installed Pos. 5 - 6



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

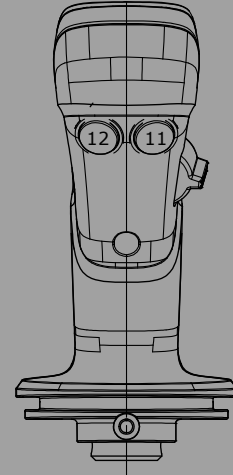
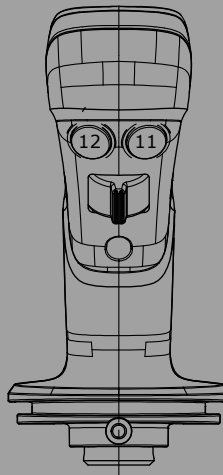
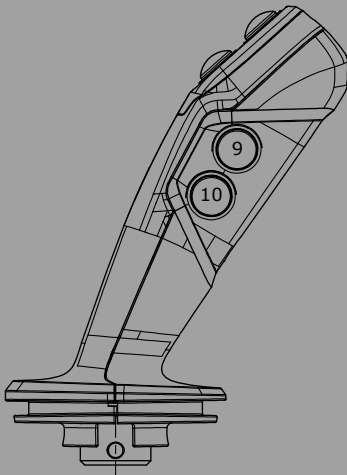


B35L

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

Hall push button installed Pos. 11 - 12
Rocker S12 installed Pos. 6

Hall push button installed Pos. 11 - 12
Rocker S12 can be installed on the side

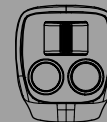
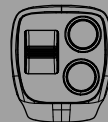
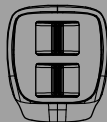
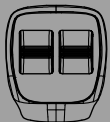


Edition: B35
Rocker S12 installed Pos. 1+3
Rocker S12 installed Pos. 2+4

Edition: B35
Rocker S12 installed Pos. 1+2
Rocker S12 installed Pos. 3+4

Edition: B35
Rocker S12 installed Pos. 1+3
Hall push button installed Pos. 2+4

Edition: B35
Rocker S12 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.

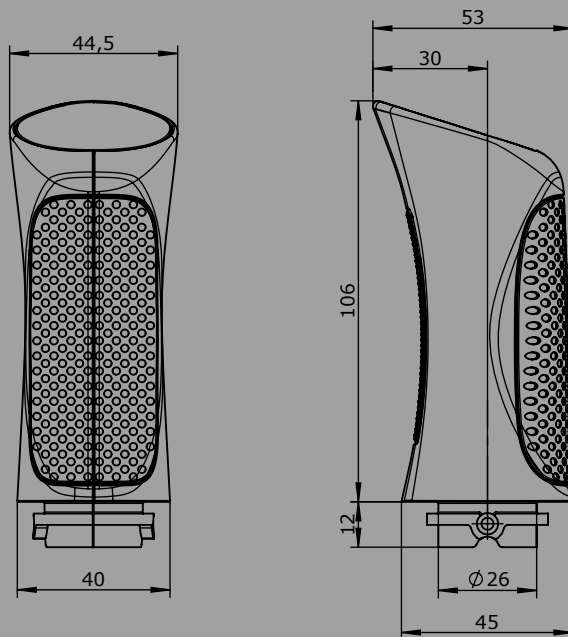


Technische Daten

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)

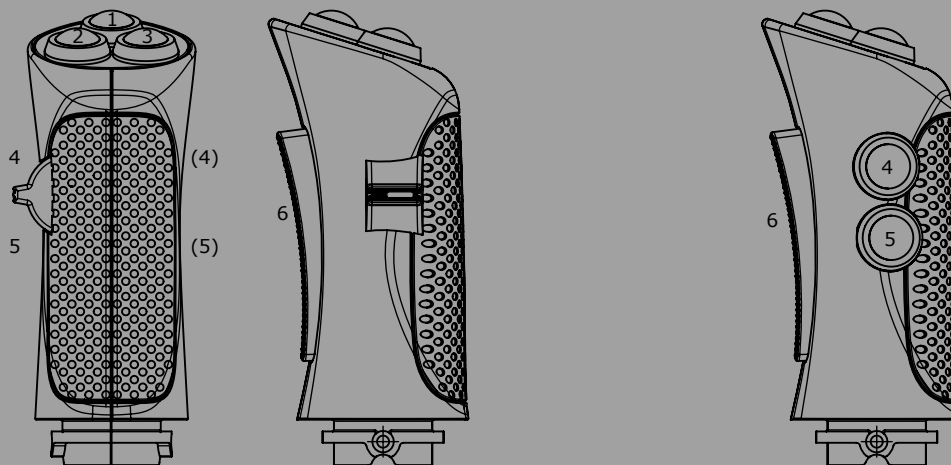
	B34L	Example -2D	W	S12	-X
Basic unit					
B34L	Palm Grip left				
B34R	Palm Grip right				
Digitale actuating element					
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange				
HD	Hall-Push Button (see page 158)				
W	Rocker switch momentary (T) or maintained (R), colours: 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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx +E6xx + E7xx + E907)				
Analog actuating element					
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)				
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)				
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





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

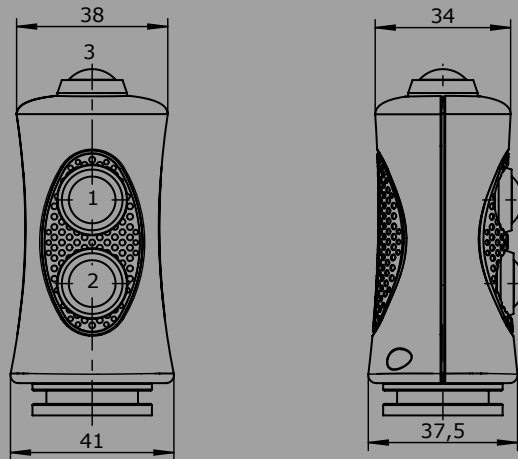
Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	*1 0,1A 24 V DC13



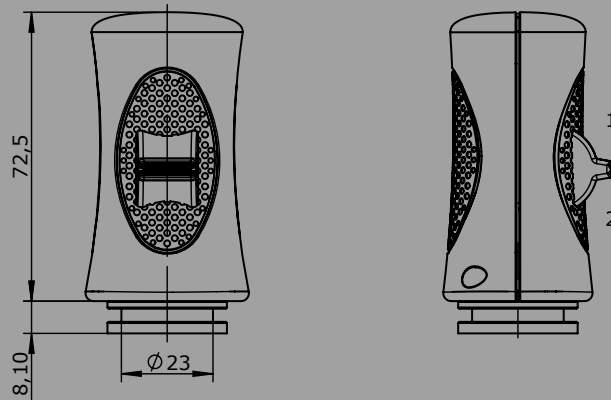
	B33L	Example -2D	S12	-X
Basic unit				
B33L Palm Grip left				
B33R Palm Grip right				
Digitale actuating element				
D Push Button KDA21 *1				
Colour: red, black, yellow, green, blue, white, orange				
HD Hall-Push Button (see page 158)				
Analog actuating element				
S12 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)				
S16 Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)				
Special model				
X Special / customer specified				

B33

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



Edition:
Rocker switch installed Pos. 1+2





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

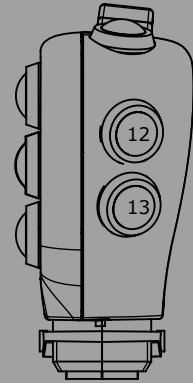
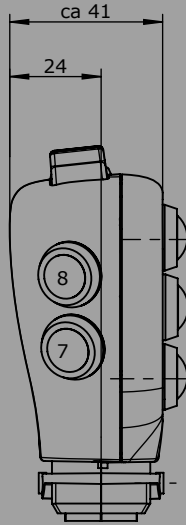
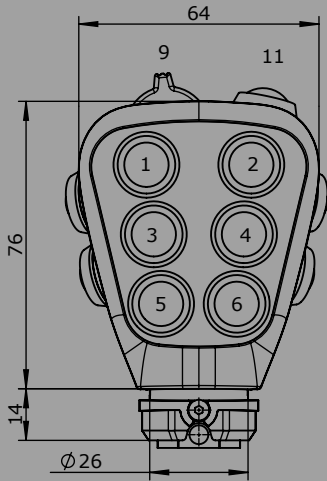
Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC 13 (*1 0,1A 24 V DC13)



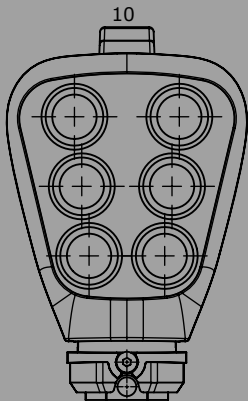
	Example B32L	-2D	W	SE	S12	-X
Basic unit						
B32L	Palm Grip left					
B32R	Palm Grip right					
Digitale actuating element						
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange					
HD	Hall-Push Button (see page 158)					
W	Rocker switch momentary (T) or maintained (R), 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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx) + E7xx + E907)					
Analog actuating element						
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)					
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)					
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)					
HK	Hall-Cross Switch (see page 150)					
Special model						
X	Special / customer specified					

B32

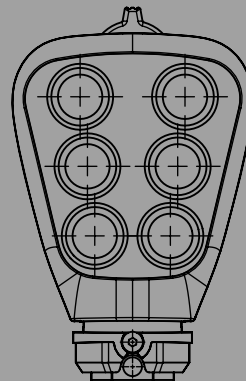
Push button
installed Pos. 1 - 8, 11 - 13
Rocker switch
installed Pos.9



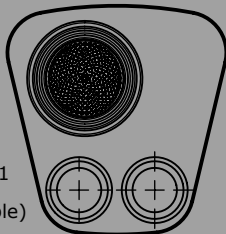
Push button
installed Pos. 1 - 8, 12 + 13
Rocker switch lengthwise
installed Pos. 10



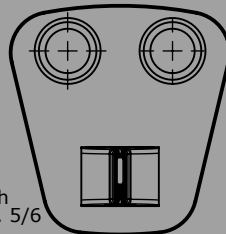
Rocker switch crosswise
installed Pos. 10



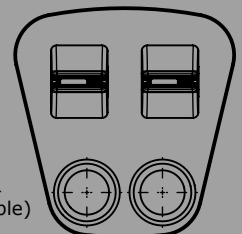
Edition:
Multi-axis controller V21
installed Pos. 1/3
(Pos. 9 - 11 not available)



Edition:
Rocker switch
installed Pos. 5/6



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





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)

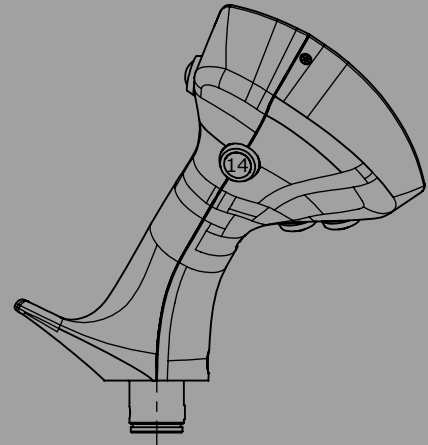
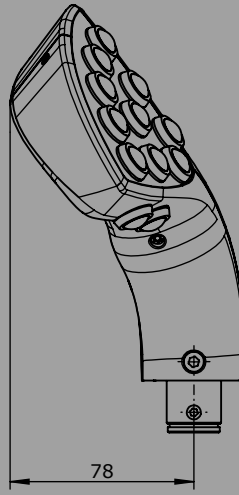
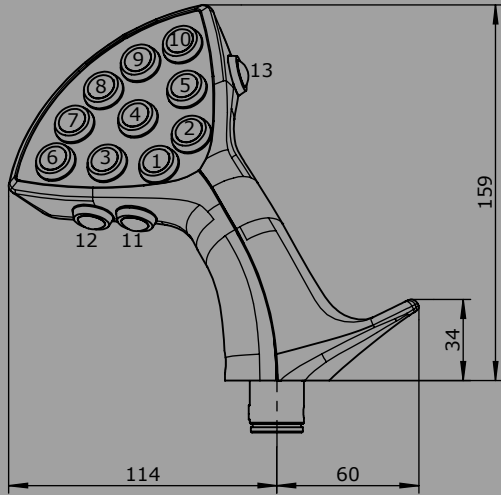


		Example						
		B31R	-2D	W	HK	S12	V21	-X
Basic unit								
B31L	Palm Grip left							
B31R	Palm Grip right							
Digital actuating element								
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange							
HD	Hall-Push Button (see page 158)							
W	Rocker switch momentary (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 153)							
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)							
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)							
HK	Hall-Cross Switch (see page 150)							
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 analoge 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							

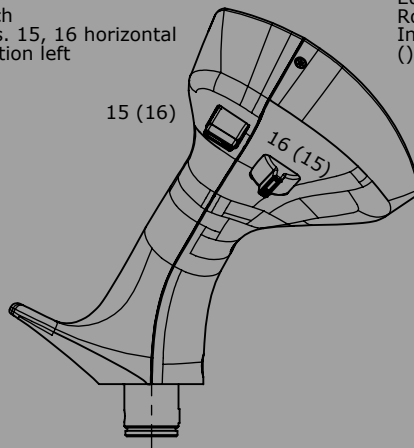
Technical details may vary based on configuration or application! Technical data subject to change without notice!

B31R

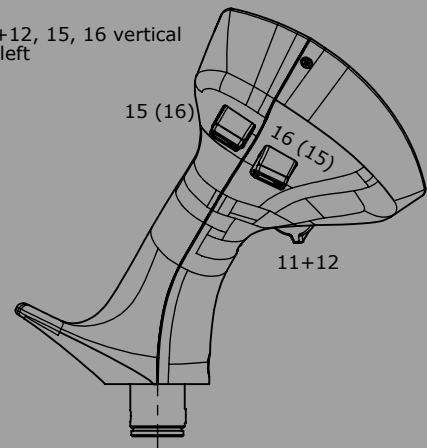
Edition:
Push button installed Pos. 1-14



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

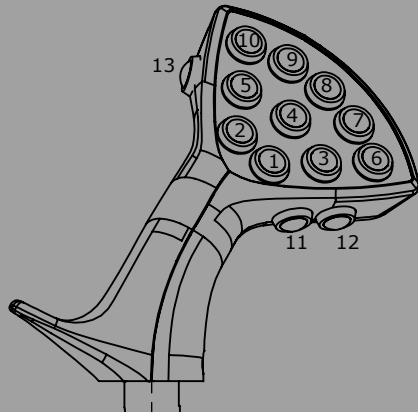


Edition:
Rocker switch
Installed Pos. 11+12, 15, 16 vertical
() = Installation left

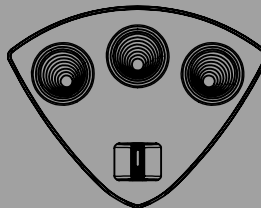


B31L

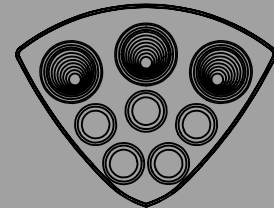
Edition:
Push button installed Pos. 1-14



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

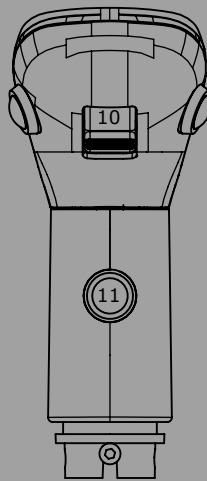
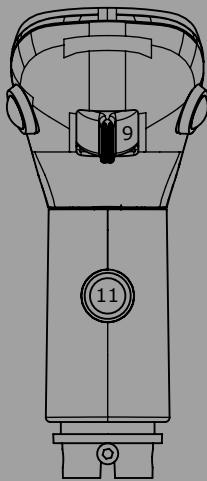
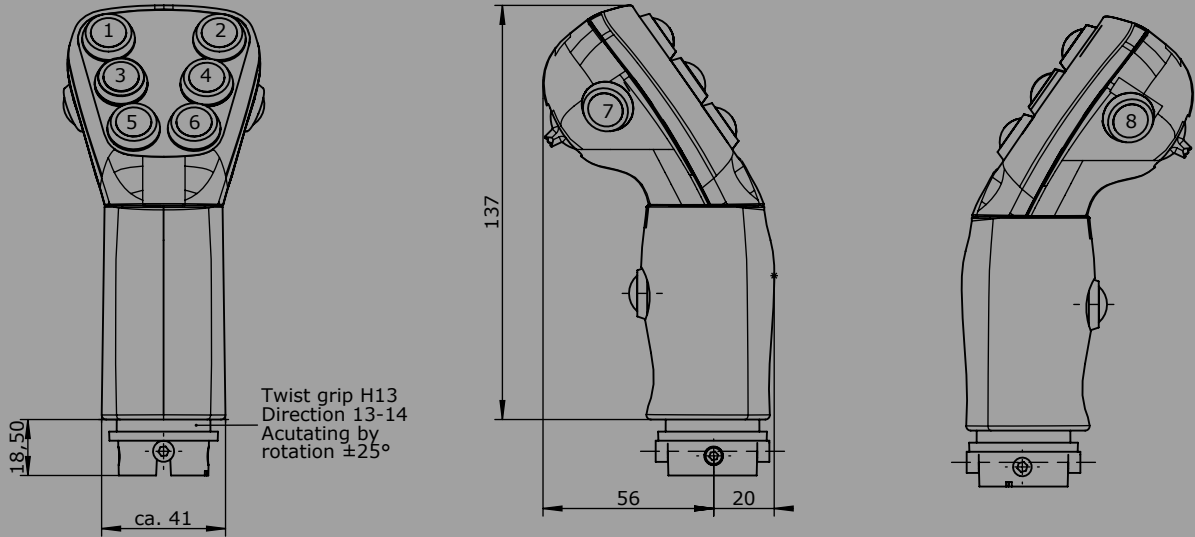
Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	1,5A 24 V DC 13 (*1 0,1A 24 V DC13)



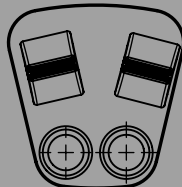
		Example							
		B30	-2D	W	SR	SE	S12	H13	-X
Basic unit									
B30	Palm Grip								
Digital actuating element									
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange								
HD	Hall-Push Button (see page 158)								
W	Rocker switch momentary (T) or maintained (R), colours: 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-0-R								
ST	Sliding switch T-0-T								
SE	Sensor Button capacitive with external control electronics								
S	Sensor Button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx) + E7xx + E907)								
Analog actuating element									
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)								
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)								
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)								
HK	Hall-Cross Switch (see page 150)								
H13	Hall-Rotary Grip Output 0,5...2,5...4,5 V inverse dual								
Special model									
X	Special / customer specified								

B30

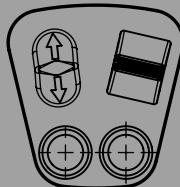
Push button
installed Pos. 1 - 8 +11
Rocker switch
installed Pos. 9+10



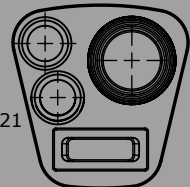
Edition:
installed Pos. 3+1
Rocker switch
installed Pos. 2+4
Rocker switch



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

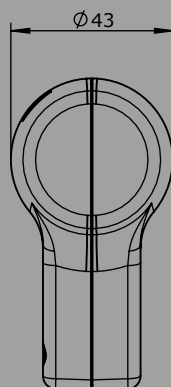
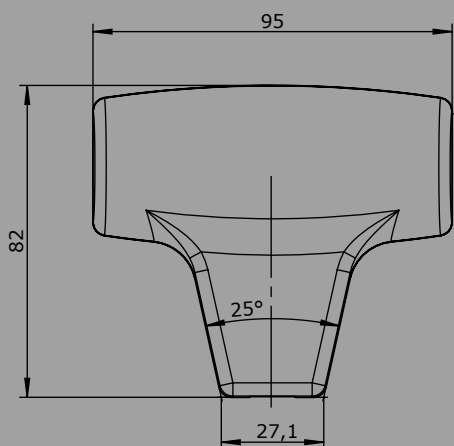
Operating temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	0,1A 24 V DC13



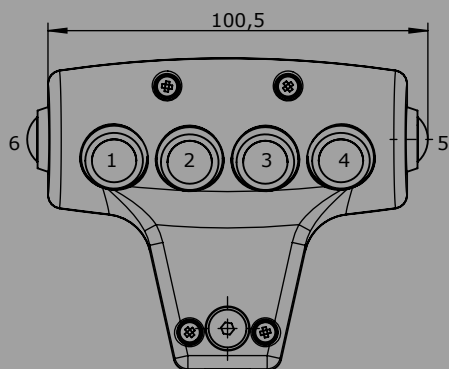
Example

	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 158)			
SE Sensor Button capacitive with external control electronics			
S Sensor Button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + E907)			
Special model			
X Special / customer specified			

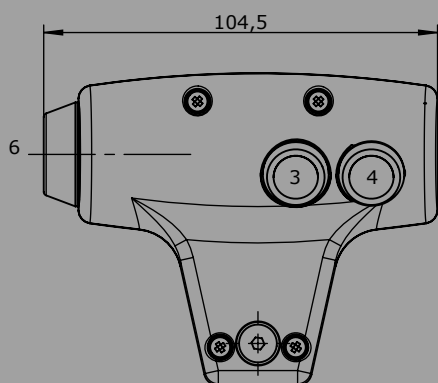
B29



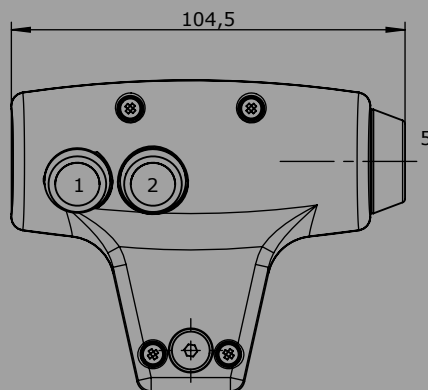
Edition:
Push button installed Pos. 1-6



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).

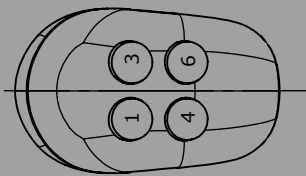
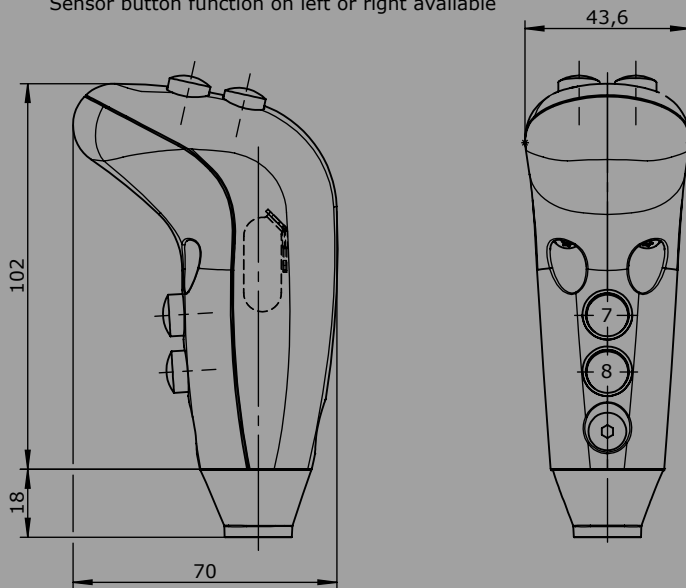
Technical data

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

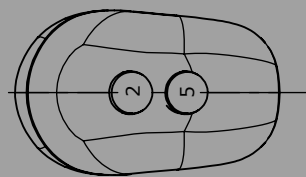


	Example			
	B28	-2D	SE	-X
Basic unit				
B28 Palm Grip				
Digital actuating element				
D Push Button (1,5A 24 V DC13) Colour: red, black, yellow, green, blue, grey				
SE Sensor Button capacitive with external control electronics				
S Sensor Button capacitive without external control electronics (Consistent with V85 / VV85 with interface E1xx to E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + E907)				
Special model				
X Special / customer specified				

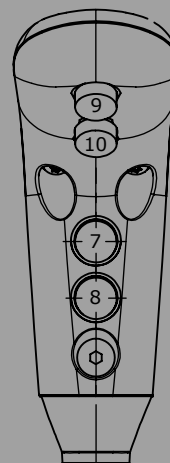
Edition:
Push button installed
Pos. 1,3,4,6,7,8
Sensor button function on left or right available



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





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.



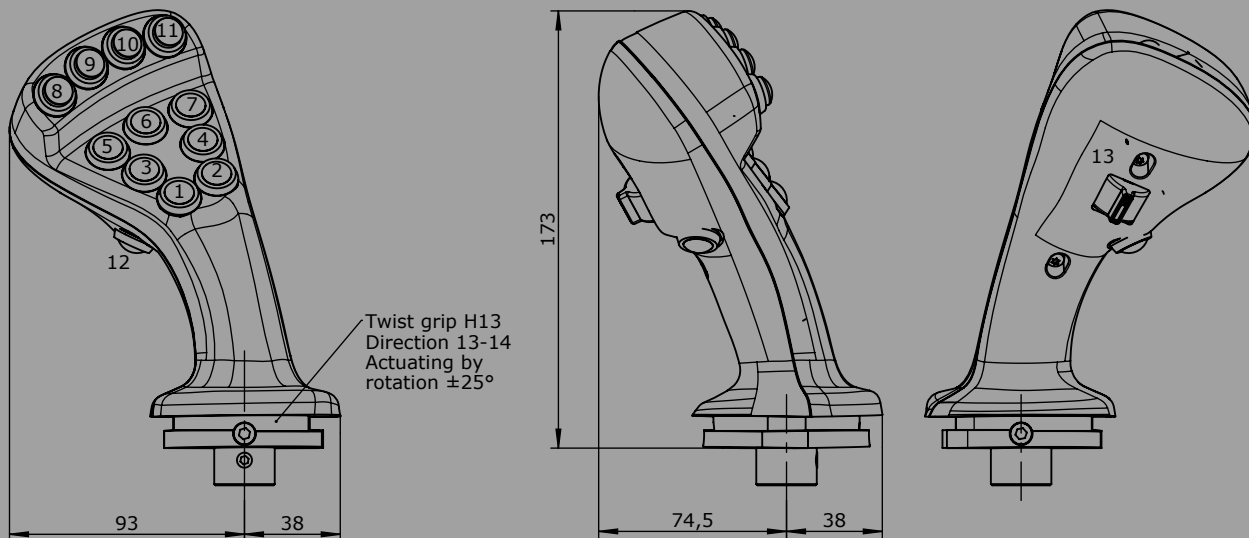
Technical data

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 158)							
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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + E907)							
V	Vibration							
Analog actuating element								
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)							
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)							
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)							
HK	Hall-Cross Switch (see page 150)							
H13	Hall-Rotary Grip Output 0,5...2,5...4,5 V inverse dual							
Special model								
X	Special / customer specified							

B26R

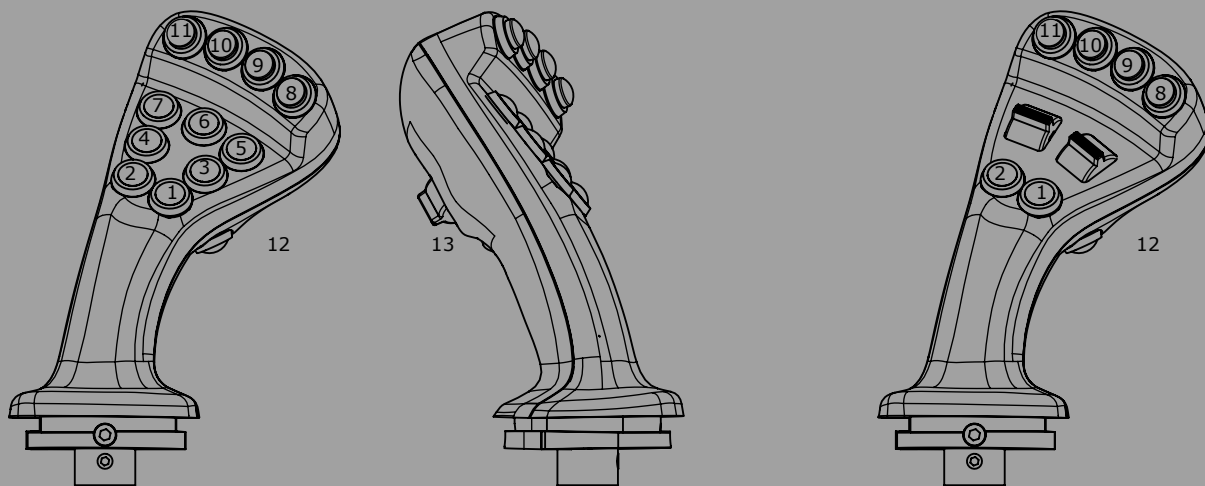
Edition:
Push button installed Pos. 1-12
Rocker switch installed Pos. 13



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)



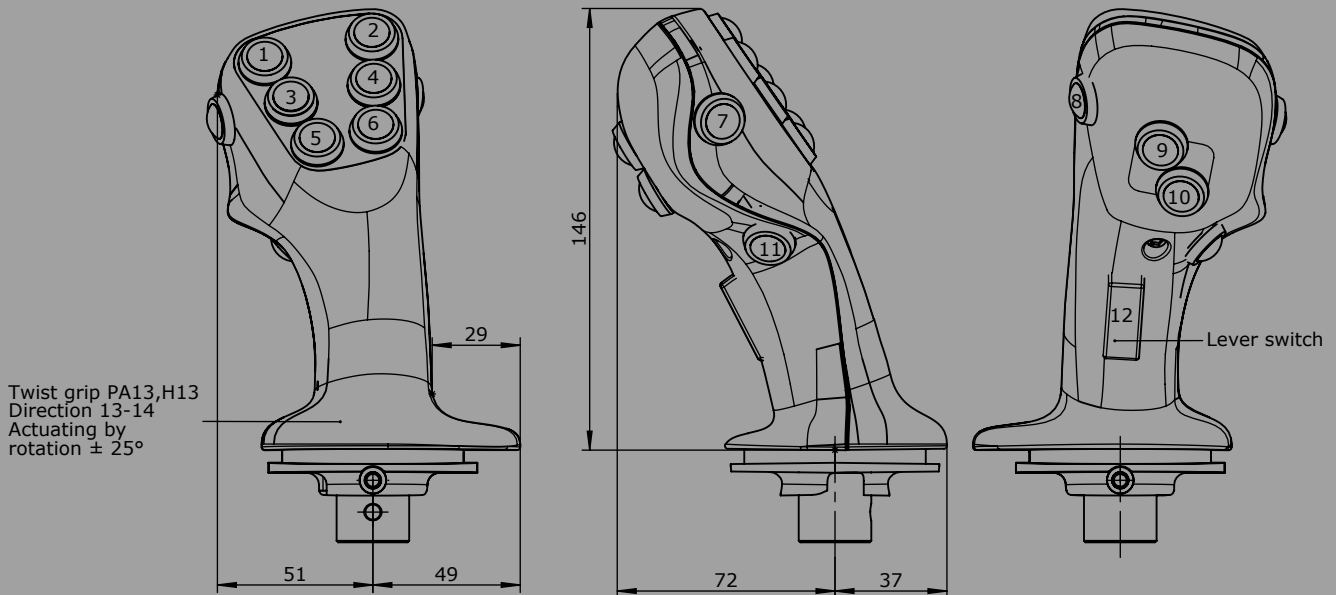
		Example							
		B25L	-2D	W	K	SE	V21	H13	-X
Basic unit									
B25L	Palm Grip left								
B25R	Palm Grip right								
Digital actuating element									
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange								
HD	Hall-Push Button (see page 158)								
W	Rocker switch 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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + E907)								
V	Vibration								
Analog actuating element									
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)								
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)								
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)								
HK	Hall-Cross Switch (see page 150)								
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 analog 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		

B25R

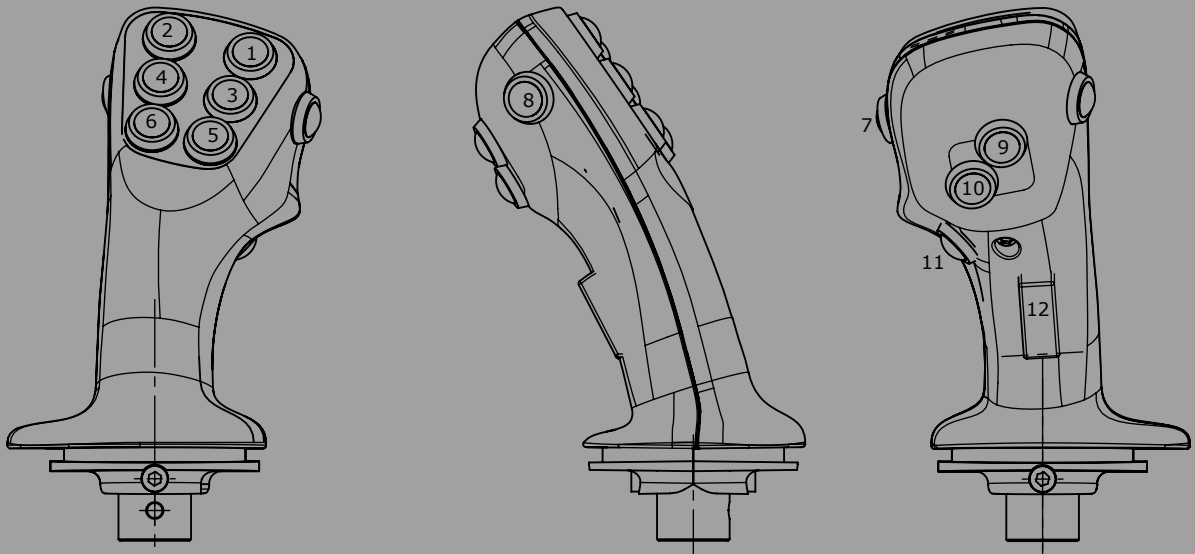
Push button installed Pos. 1 - 11
Lever switch installed Pos. 12

Thumbwheel S12
installed Pos. 9+10 possible



B25L

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



Edition: B25R
Thumbwheel S12 installed Pos. 3+1
Thumbwheel S12 installed Pos. 2+4

Edition: B25R
Sliding switch installed Pos. 3+1
Thumbwheel S12 installed Pos. 2+4

Edition: B25R
Multi-axis controller V21
installed Pos. 2+4
Thumbwheel S12 installed Pos. 5+6

Edition: B25R
Hall Push button
installed Pos. 1,2,5,6,15
Thumbwheel S12 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.



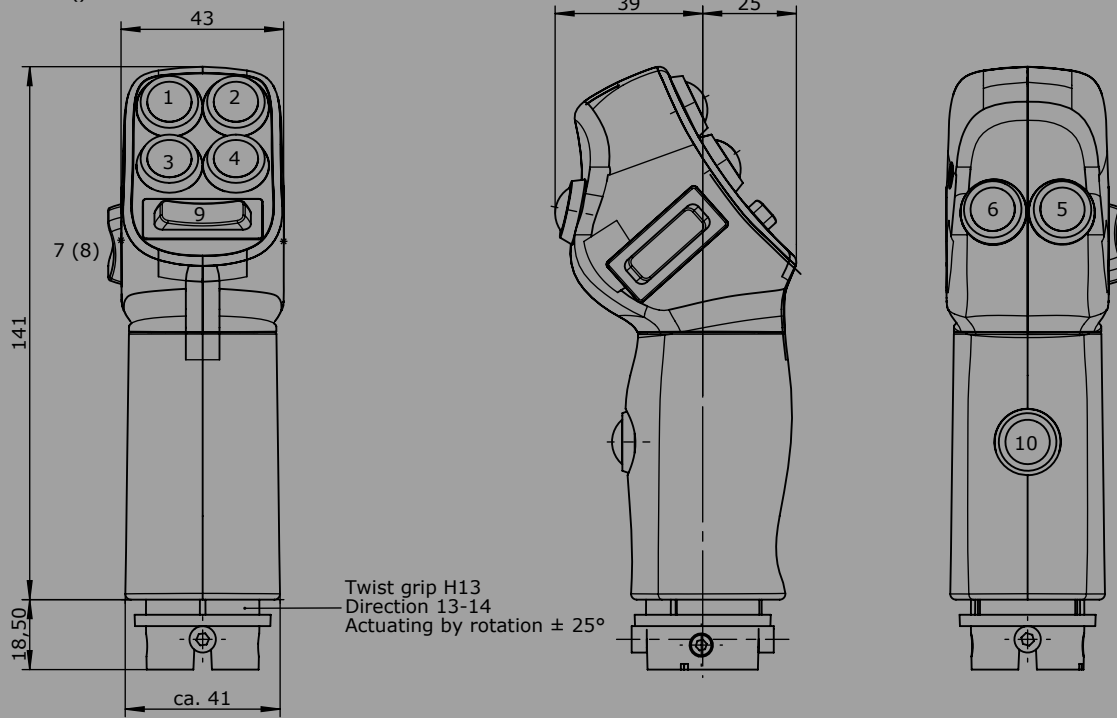
Technical data

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)

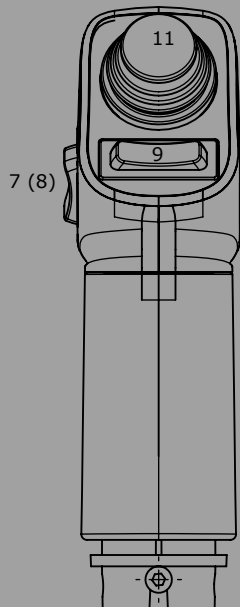
		Example B24	-D	2W	V21	-IWH	-X
Basic unit							
B24	Palm Grip						
Digital actuating element							
D	Push Button KDA21 *B Colour: red, black, yellow, green, blue, white, orange						
W	Rocker switch T-0-T						
W	Rocker switch 0-T						
W	Rocker switch R-0-T						
W	Rocker switch R-0-R						
W	Rocker 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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + E907)						
Analog actuating element							
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)						
H13	Hall-Rotary Grip Output 0,5...2,5...4,5 V inverse dual						
Additional option							
IWH	Colour ring white, illuminated						
IRD	Colour ring red, illuminated						
IBL	Colour ring blue, illuminated						
WH	Colour ring white						
RD	Colour ring red						
BL	Colour ring blue						
GN	Colour ring green						
YE	Colour ring yellow						
Special model							
X	Special / customer specified						

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

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



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



Palm Grip 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.



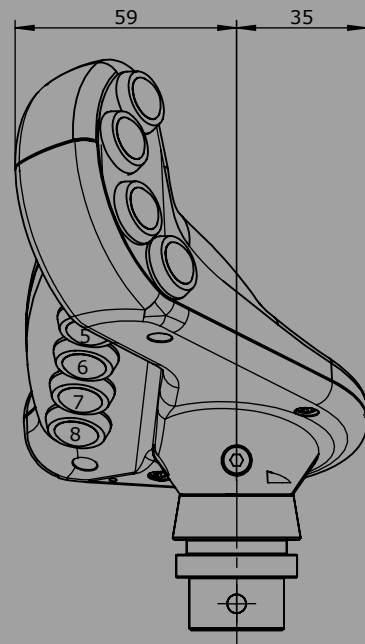
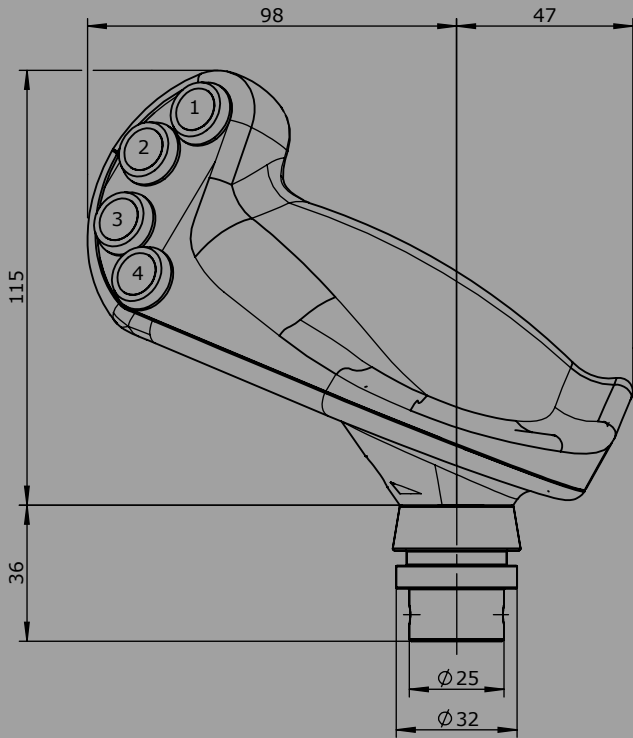
Technical data

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 158)				
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 153)				
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)				
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)				
HK	Hall-Cross Switch (see page 150)				
Special model					
X	Special / customer specified				

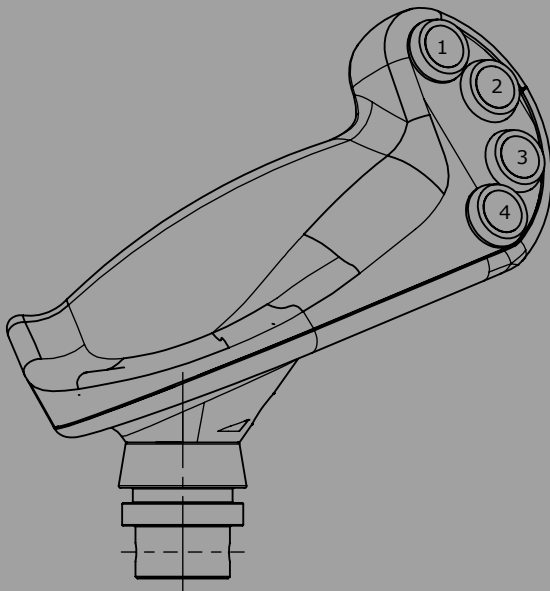
B23R

Push button installed Pos. 1 - 8

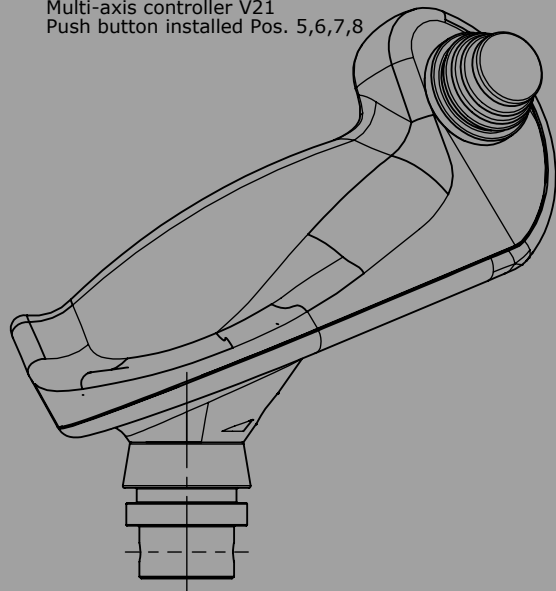


B23L

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)

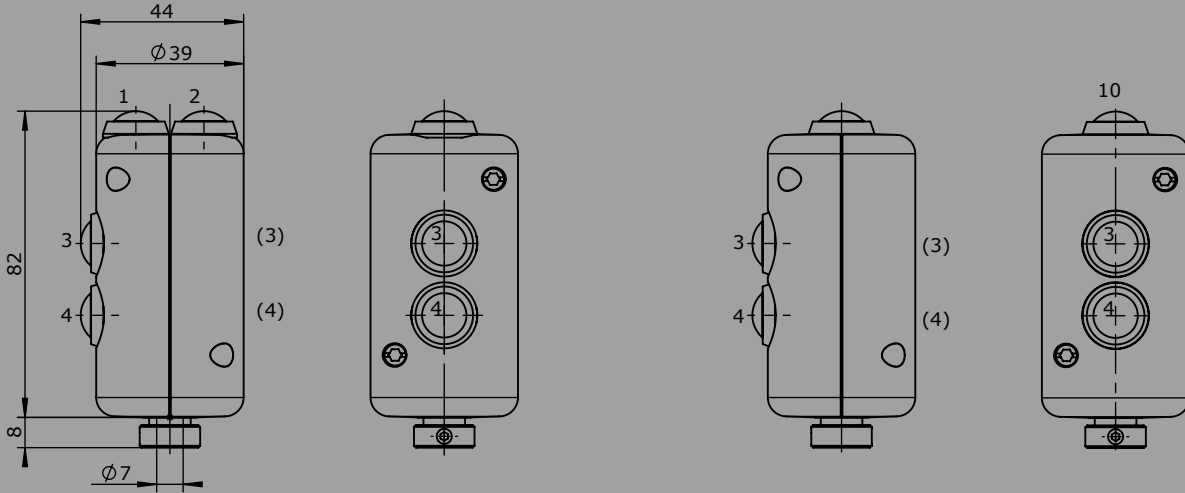


	B22AL	Example -4D	W	-X
Basic unit				
B22L	Palm Grip left			
B22R	Palm Grip right			
B22AL	Palm Grip left with support			
B22AR	Palm Grip right with support			
Digital actuating element				
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange			
HD	Hall-Push Button (see page 158)			
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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + E907)			
Special model				
X	Special / customer specified			

B22

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

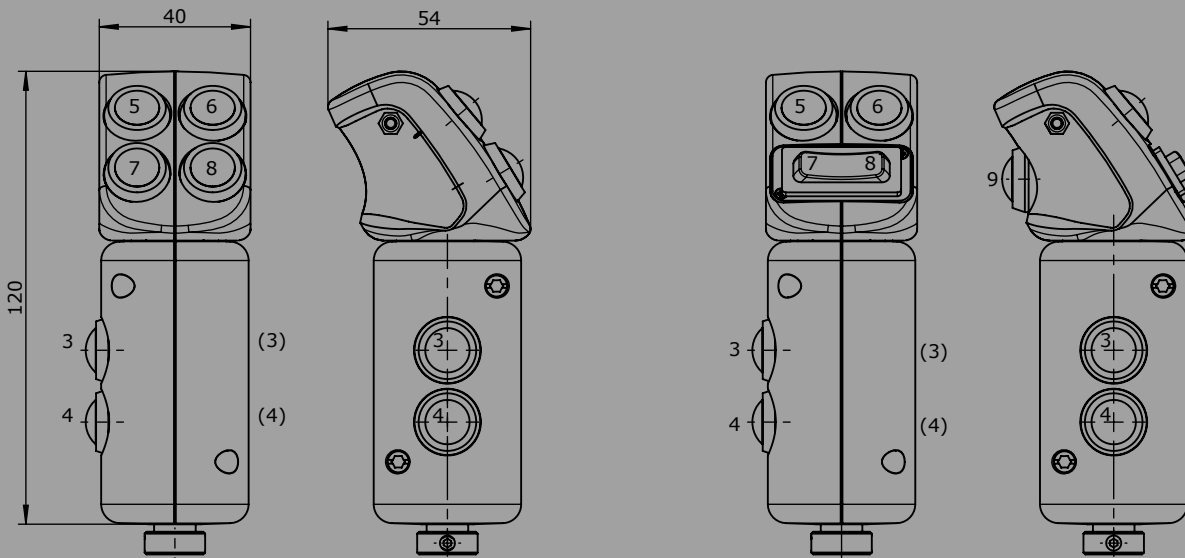
Edition:
Push button installed Pos. 3,4,10
Position push button left hand ()



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.

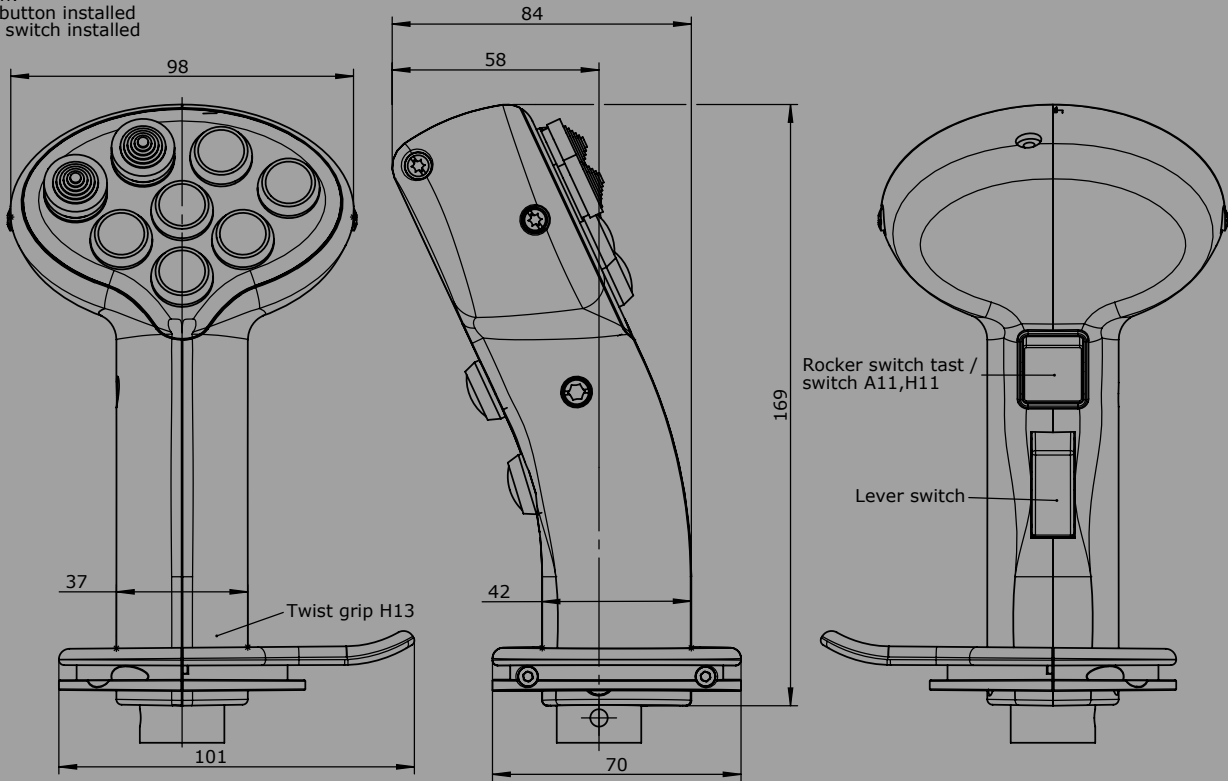
Technical data

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)

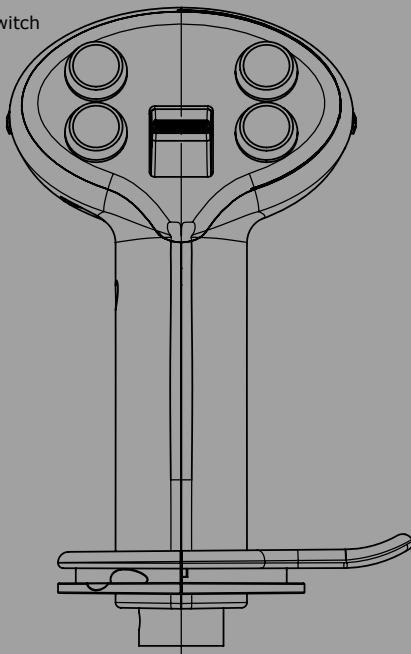


		Example						
		B20L	-2D	W	K	V21	H13	-X
Basic unit								
B20L	Palm Grip left with hand pad							
B20R	Palm Grip right with hand pad							
Digital actuating element								
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange							
HD	Hall-Push Button (see page 158)							
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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + E907)							
Analog actuating element								
S12	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 153)							
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)							
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)							
HK	Hall-Cross Switch (see page 150)							
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		

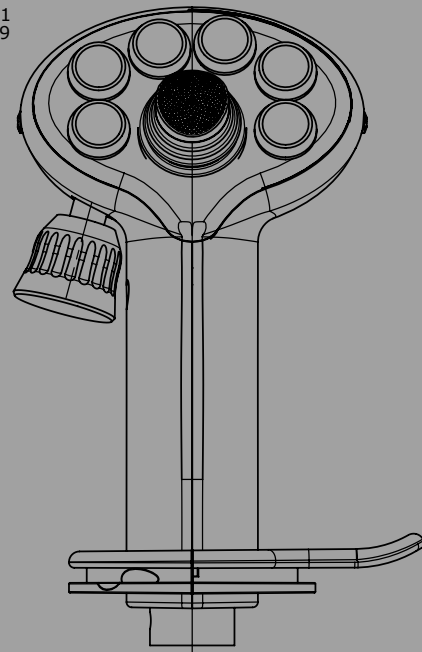
Edition:
Push button installed
Cross switch installed



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

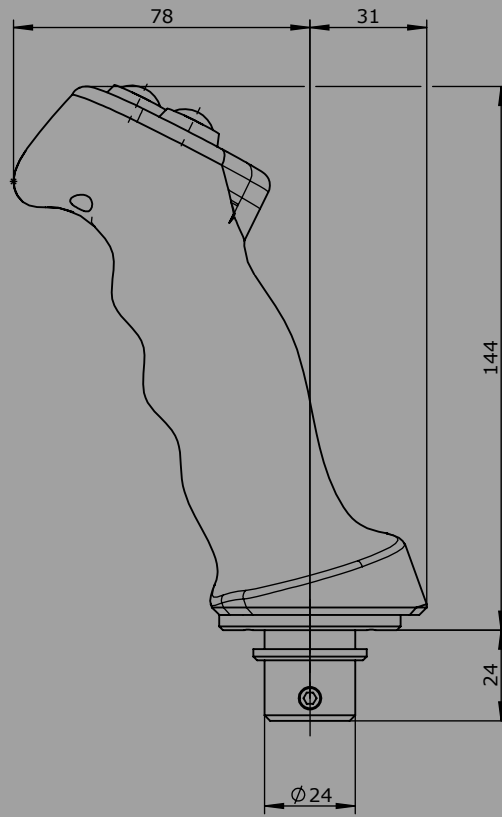
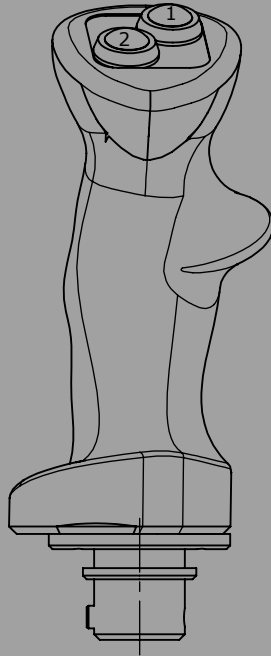
Operation temperature	-40°C to +85°C
Degree of protection	Control element up to IP67
Contact complement	0,1A 24 V DC13



	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.

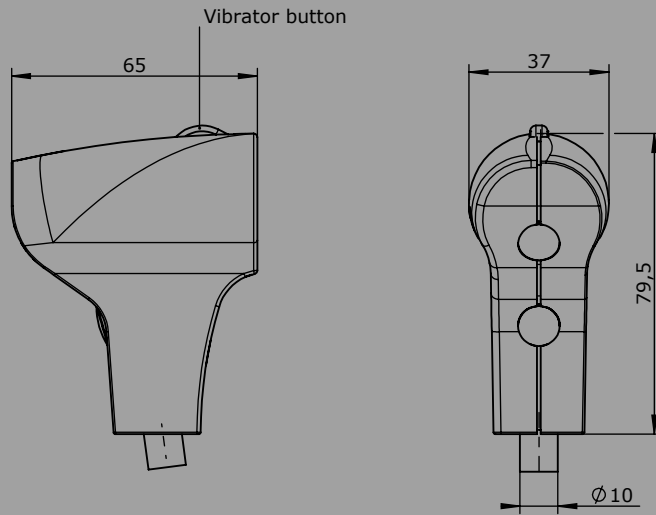
Technical data

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)



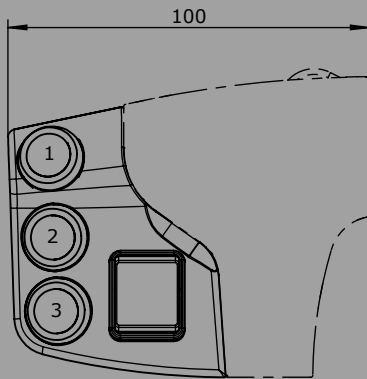
		B10AL	-3D	W	V	-X
Basic unit						
B10L	Palm Grip left					
B10R	Palm Grip right					
B10AL	Palm Grip left with growing part					
B10AR	Palm Grip right with growing part					
Digital actuating element						
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange					
HD	Hall-Push Button (see page 158)					
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

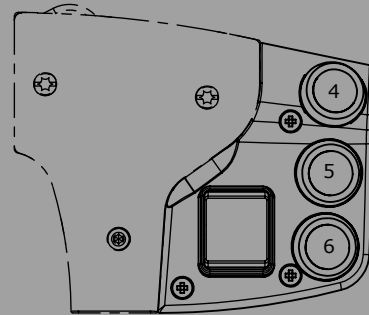


B10A

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.



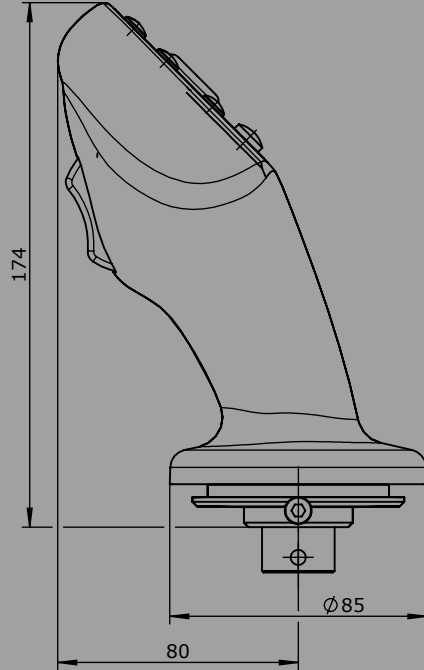
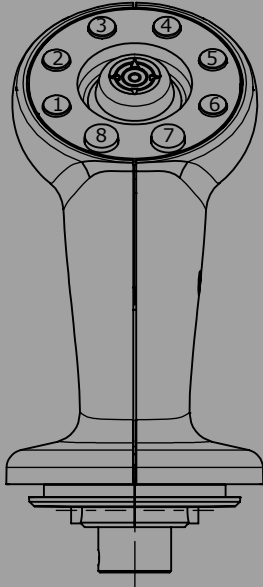
Technical data

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 142)							
PA11	Rocker analog Pos. 11 + 12 Potentiometer T394 2 x 5 kOhm with direction contacts							
H11	Rocker analog Pos. 11 + 12 Hall-Potentiometer Output 0,5...2,5...4,5 V inverse dual							
PA13	Rotary Grip Potentiometer T375 2 x 5 kOhm with direction contacts							
H13	Hall-Rotary Grip Output 0,5...2,5...4,5 V inverse dual							
Special model								
X	Special / customer specified							
Attachments								
Z01	Bellow KMD 109					10300009		
Z02	Bellow KMD 190					10300093		
Z03	Rosette KBF 905 with 4 screws M5x15 necessary for bellow KMD 190					5209900404		

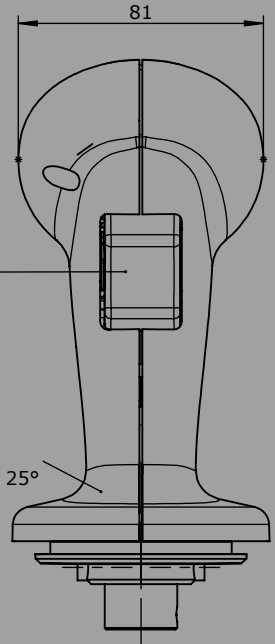
B9

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

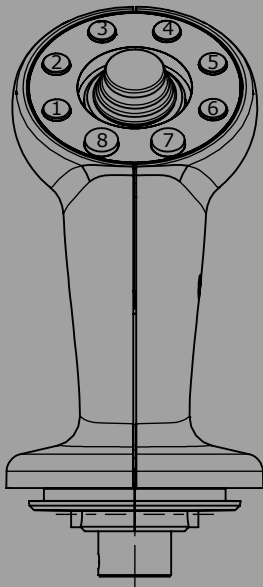


Rocker PA11, A11,H11
Direction 11-12

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)

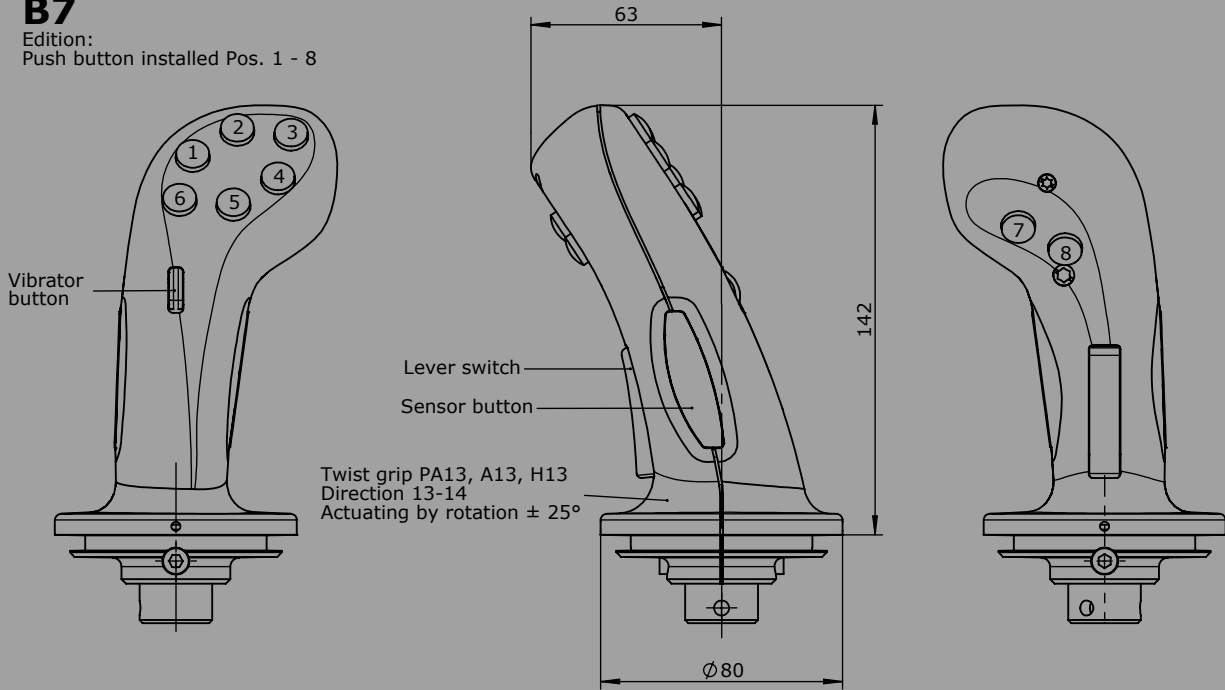


		Example							
		B7	-2D	W	K	SE	S9	PA13	-X
Basic unit									
B7	Palm Grip left								
B8	Palm Grip right								
Digital actuating element									
D	Push Button Colour: red, black, yellow, green, white, orange								
D	Push Button KDA21 *1 Colour: red, black, yellow, green, blue, white, orange								
HD	Hall-Push Button (see page 158)								
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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + 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 153)								
S16	Thumbwheel, output 0,5...2,5...4,5 V inverse dual (see page 156)								
V21	Mini-Joystick, output 0,5...2,5...4,5 V inverse dual (see page 142)								
HK	Hall-Cross Switch (see page 150)								
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

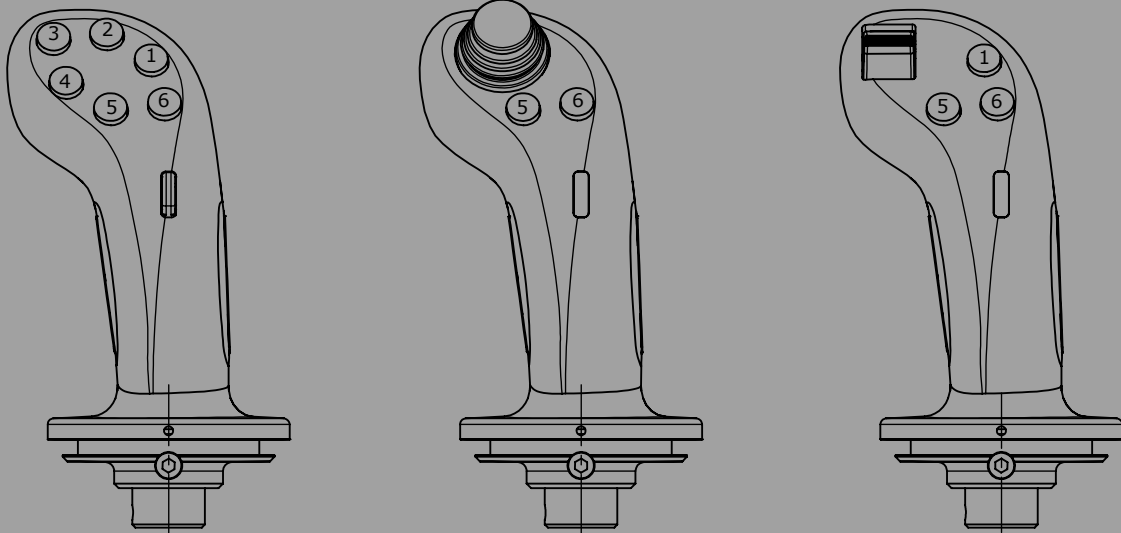


B8

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

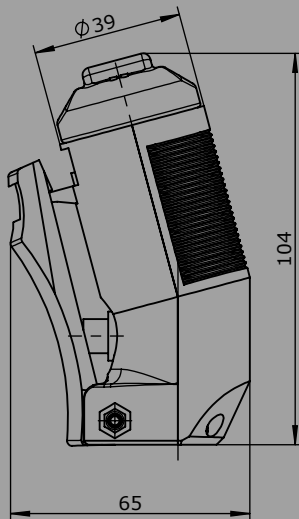
Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	1,5A 24 V DC13



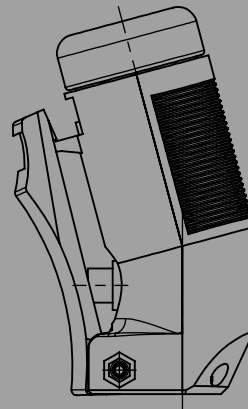
	B6	Example -D	K	-X
Basic unit				
B6 Palm Grip				
Digital actuating element				
D Push Button top				
W Rocker switch top T-0-T				
W Rocker switch top R-0-T				
W Rocker switch top R-0-R				
K* Lever switch				
* Included with the delivery of Palm Grip B6!				
Special model				
X Special / customer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

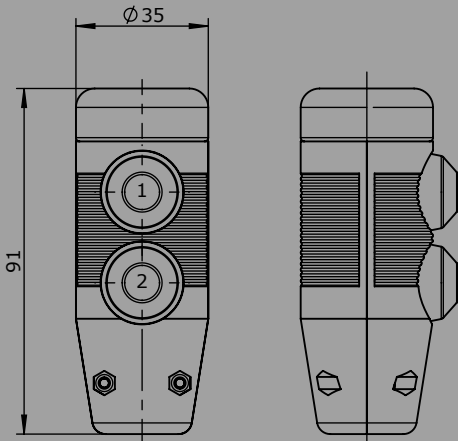
Technical data

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

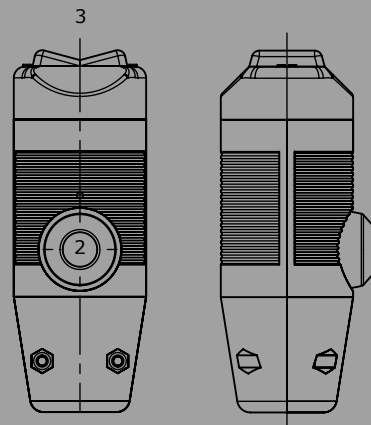


		Example			
		B5	-D	W	-X
Basic unit					
B5	Palm Grip				
Digital actuating element					
D	Push Button top				
D	Push Button side *5				
W	Rocker switch top T-0-T				
W	Rocker switch top R-0-T				
W	Rocker switch top R-0-R				
T	Push Button top mechanical operation <i>(Only possible in combination with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

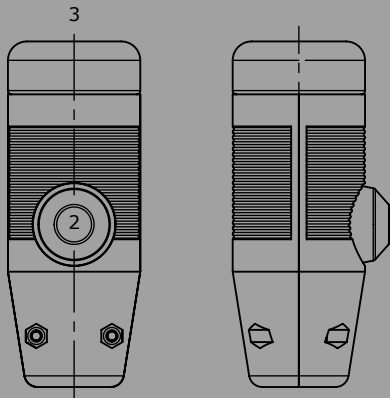
Edition:
Push button installed Pos. 1,2



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 E7xx, E907 and V25/V27 with interfaces E3xx + E4xx + E6xx + E7xx + 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

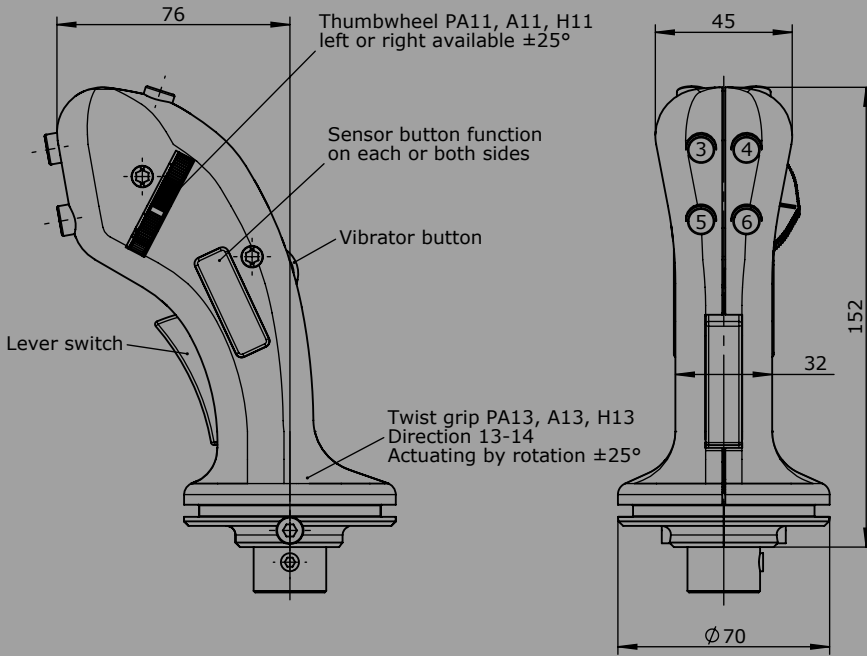
Special model

X	Special / customer specified
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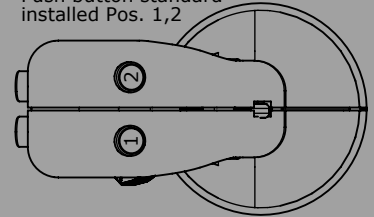
Attachments

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

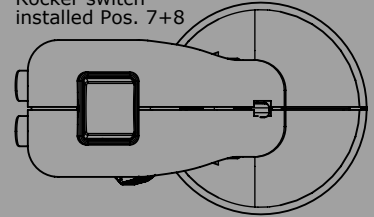
B3



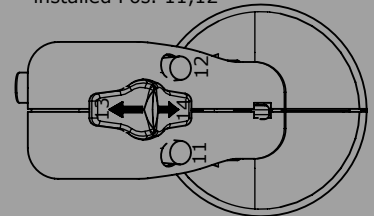
Edition:
Push button standard
installed Pos. 1,2



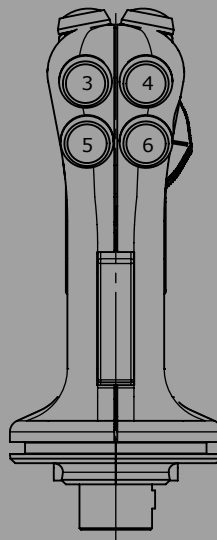
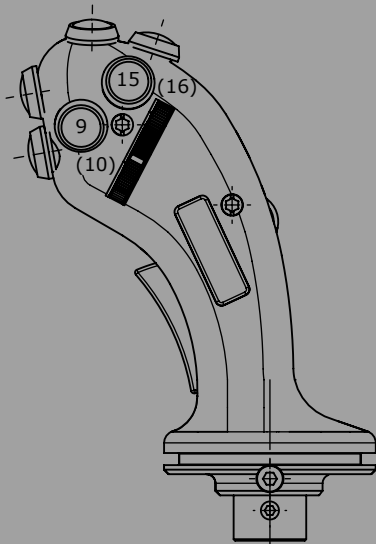
Edition:
Rocker switch
installed Pos. 7+8



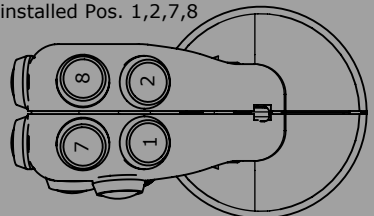
Edition:
Sliding switch
installed Pos. 13 + 14
Drive with potentiometer PA12 bzw.
Push button with 2 steps ZD
installed Pos. 11,12



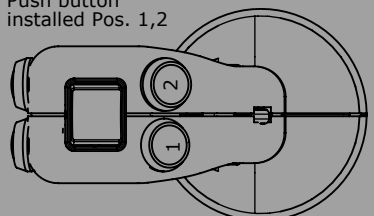
() = Installation right



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



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



Palm Grip 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

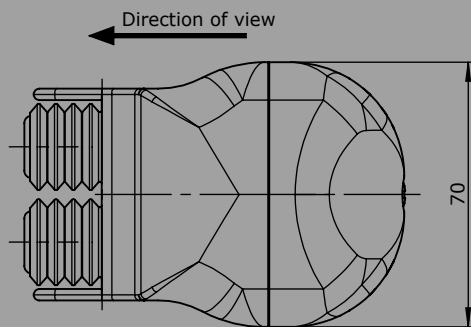
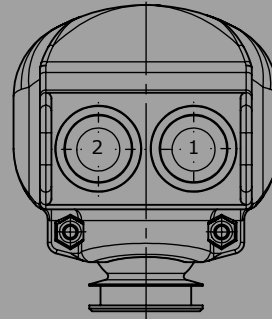
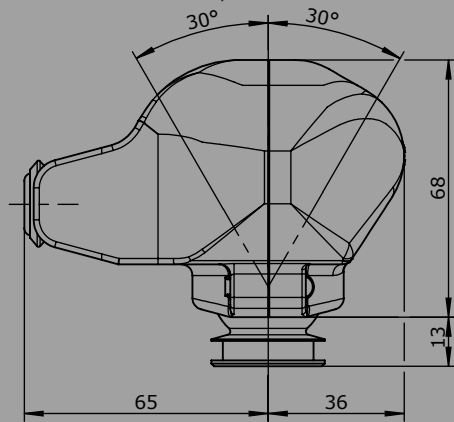
Operating temperature	-40°C to +85°C
Degree of protection	IP54
Contact complement	1,5A 24 V DC13 (*1 0,1A 24 V DC13)



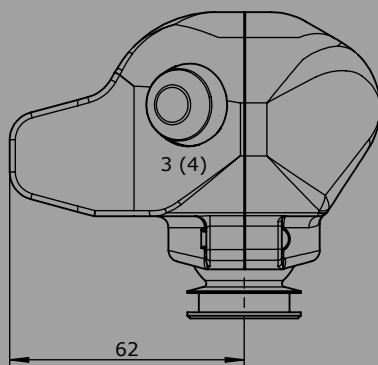
		Example			
		B2	-2D	PA15	-X
Basic unit					
B2	Palm Grip				
Digital actuating element					
D	Push Button KDA/70				
D	Push Button KDA21 *1				
	Colour: red, black, yellow, green, blue, white, orange				
HD	Hall-Push Button (see page 158)				
A15	2 push Button Pos. 1 + 2 interlocked				
Analog actuating 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

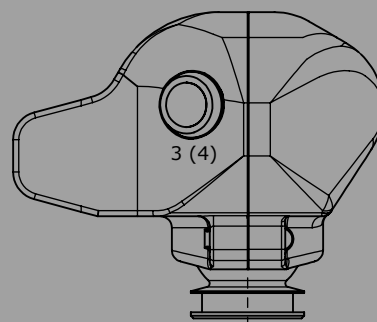
Edition:
Pusher installed Pos. 1,2



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.

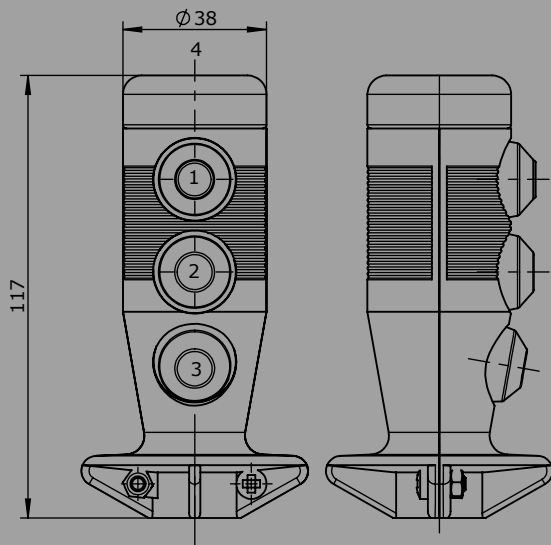
Technical data

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

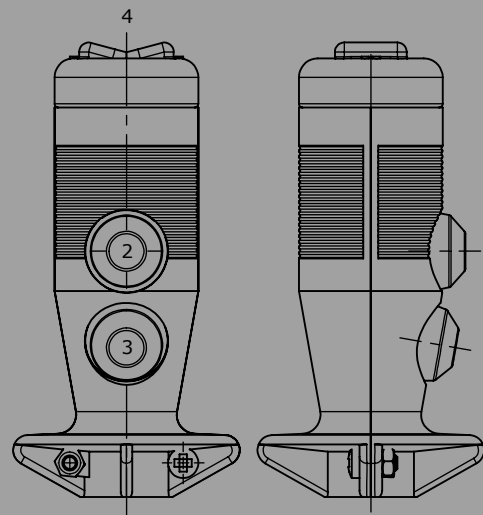


	B1	Example -2D	W	-X
Basic unit				
B1 Palm Grip				
Digital actuating element				
D Push Button top				
D Push Button side *1				
W Rocker switch top T-0-T				
W Rocker switch top R-0-T				
W Rocker switch top R-0-R				
T Push Button top with mechanical operation <i>(Only possible with Multi-Axis Controller or Single-Axis controller!)</i>				
K Lever switch				
KT Lever switch mechanical operation <i>(Only possible with Multi-Axis Controller or Single-Axis controller!)</i>				
Special model				
X Special / customer specified				

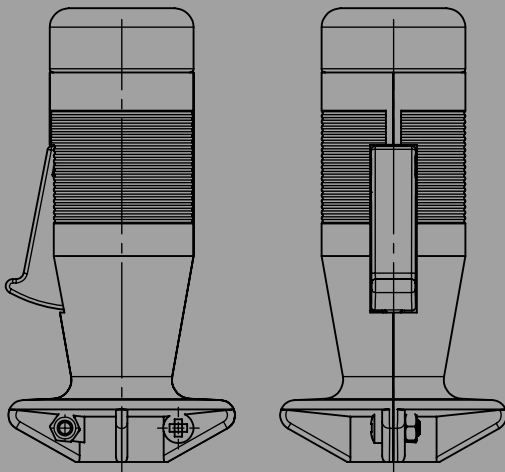
Edition:
Push button installed Pos. 1,2,3,4



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.



Standard colour:
Housing upper part: light grey RAL 7035 and anthracite RAL 7016
Housing bottom part: anthracite RAL 7016
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
Basic unit													
C1 Control Console 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													
2 Anthracite RAL 7016													
X Desired colour (on request!)													
Colour decor stripes													
1 Red RAL 3020													
2 Green RAL 6024													
3 Blue RAL 5017													
4 Yellow RAL 1004													
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 page 214)													

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

Mounting for equipment boxes

V Multi-Axis Controller (see page 1)

N Control-Switch (see page 118)

More Control Elements (see page 142 and 265)

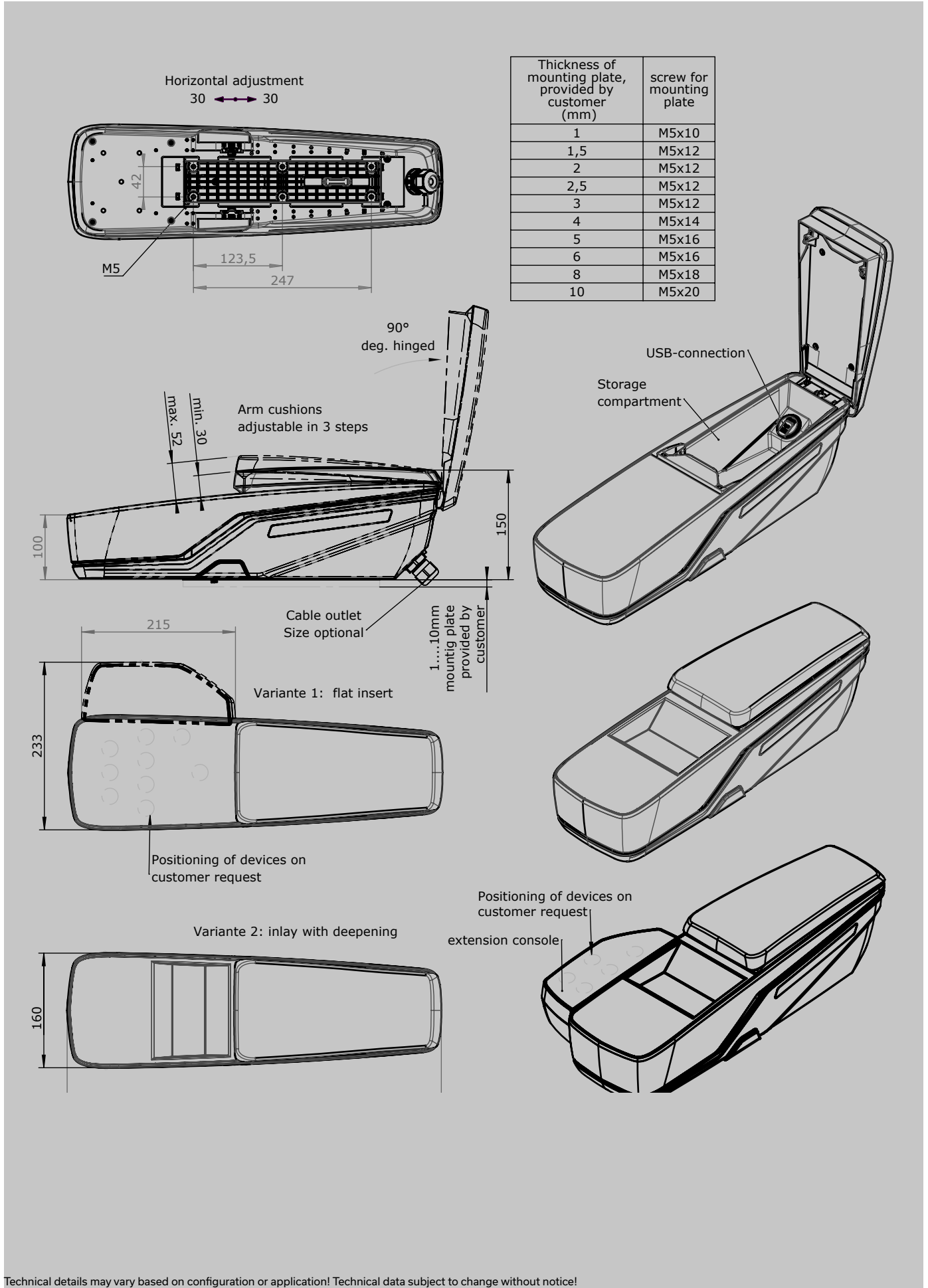
Wiring

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!

The Touch Display TD1 was developed for the rough use in working machines. It is available in 7" and 10.1" versions. It can be easily integrated into the machine via the CAN bus interface. Due to the wide reading angle and the strong brightness, optimal readability is guaranteed even in difficult lighting conditions.



Example

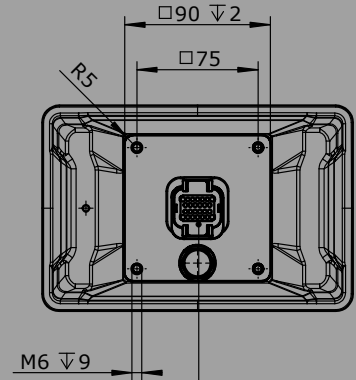
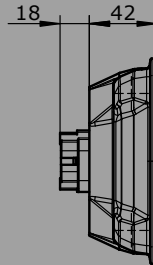
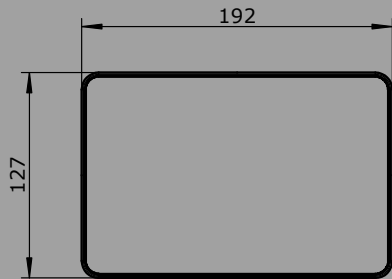
Basic unit

TD 1-7	Touch Display 7" 1024 x 600 pixel
TD 1-10	Touch Display 10,1" 1280 x 800 pixel

Technical information

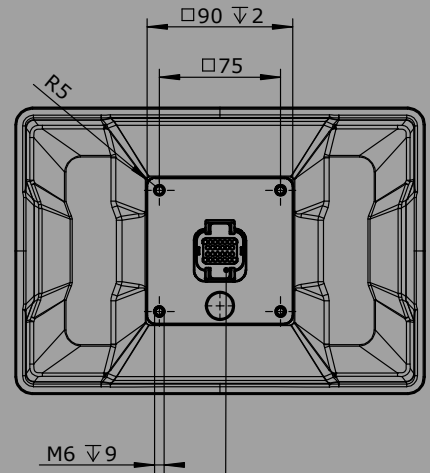
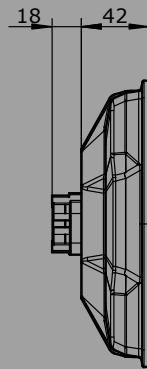
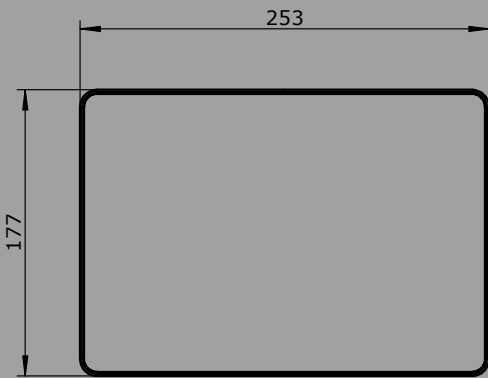
Viewing angle +/-85°
Color depth 24 bit
Contrast ratio 1000:1
Brightness type 850cd/sqm
Brightness dimmable in 16 steps
Capacitive touch panel
4-core CPU ARM A35 1.2GHz, 2GB RAM
CAN bus interface
eMMC 8GB internal
Integrated horn, external headset stereo output (for car speakers with amplifier)
USB B 2.0 Highspeed, 1500mA max. charging current
Wireless data transfer Bluetooth 4.0 or Bluetooth 5.0
Light sensor
Supply voltage 7 to 32V DC
2 digital outputs max. current 2A
5 digital inputs and ignition input
Internal real time clock
Protection class IP68
Pre-installed Linux distribution with all necessary drivers
Professional user interface can be programmed with Qt Library (LGPL)

TD1-7



Connector type Superseal 6437288-6

TD1-10



Connector type Superseal 6437288-6

The Display Controller DC1 is a robust CAN bus operating unit for controlling HMI displays. The module is designed for rough applications. Due to the individual design and illumination of the symbols, it can be integrated into any operating concept.

Technical data

Operation temperature	-40°C to +85°C
Degree of protection	IP67

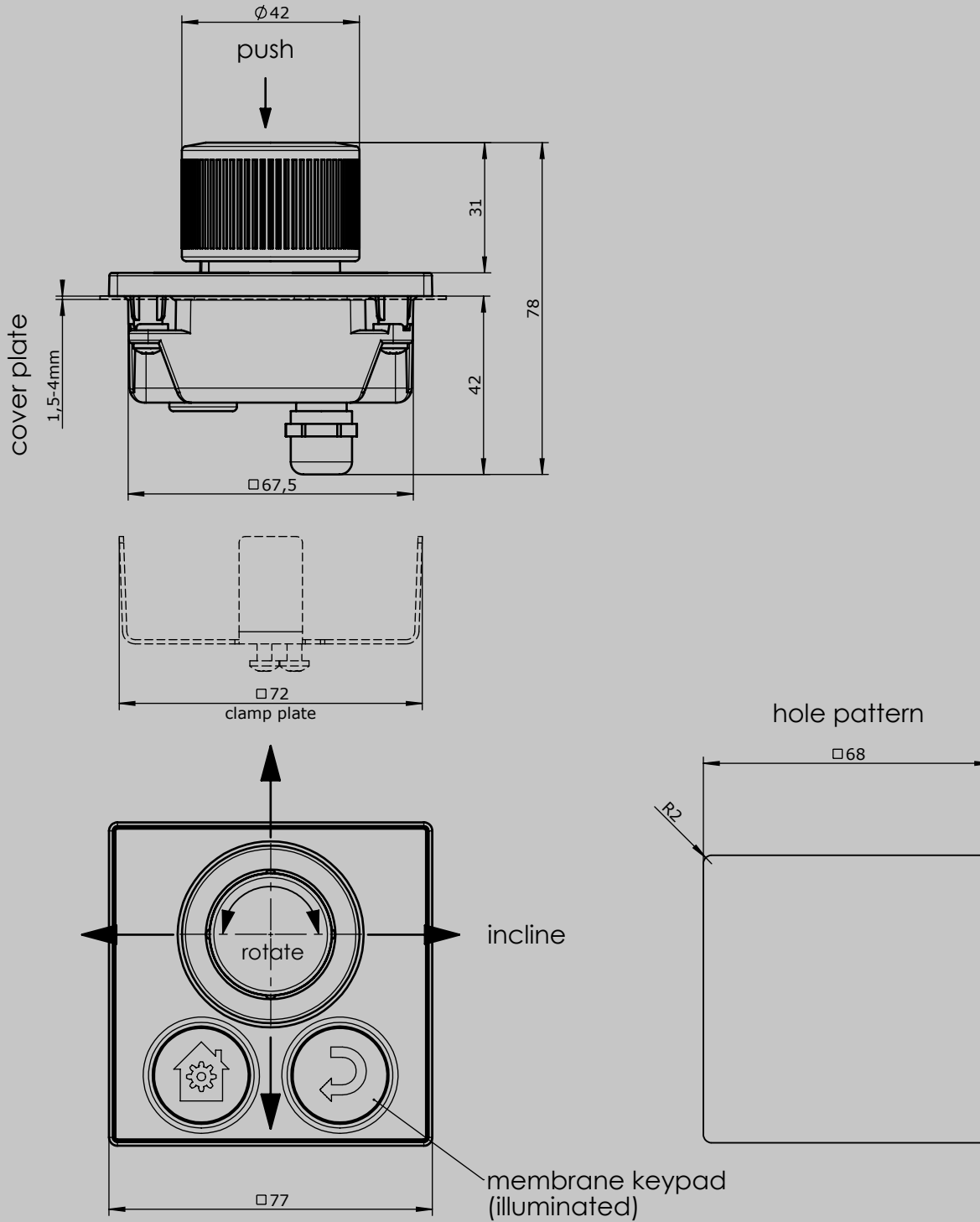
Functions

Joystick function	4 digital functions
Rotary function	20 detent points
Push button function	2 push buttons



	DC1	-1	-S3315	-S0924	-E3151	-X
Basic unit						
DC1 Display Controller						
Illumination						
1 RGB illuminated ring						
Symbol push button left						
0 Without symbol						
1 F1						
2 F2						
S Symbol according to ISO 7000 (example: S0244 - acoustic signal, horn / ISO 7000 symbol 0244)						
X Custom-made						
Symbol push button right						
0 Without symbol						
1 F1						
2 F2						
S Symbol according to ISO 7000 (example: S0244 - acoustic signal, horn / ISO 7000 symbol 0244)						
X Custom-made						
CAN						
Supply voltage	9-32 V DC					
Idle current consumption	50 mA (24V DC, excl. illumination)					
Protocol	CANopen CiA DS 301 or SAE J1939 (based on)					
Baud rate	20 KBit/s til 1 Mbit/s (standard 250KBit/s)					
Wiring	CAN cable 300 mm with plug DTM04-6P					
CAN					E3151	
CANopen Safety						
Supply voltage	9-32 V DC					
Idle current consumption	50 mA (24V DC, excl. illumination)					
Protocol	CANopen Safety EN50325-5					
Baud rate	20 KBit/s til 1 Mbit/s (standard 250KBit/s)					
Wiring	CAN cable 300 mm with plug DTM04-6P					
CANopen Safety					E4141	
Special model						
X Special / customer specified						

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



The steering controller LG2 is developed for the rough use in working machines. A long service life and high reliability is achieved by the latest contactless Hall technology. The CAN bus interface makes it easy to integrate the controller into any machine. The LG 2 is available with a handle or without a handle with a shaft outlet (12mm).

Technical data

Mechanical life LG2	10 million rotations
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)

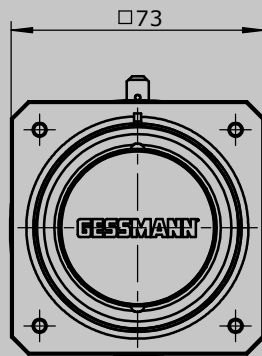
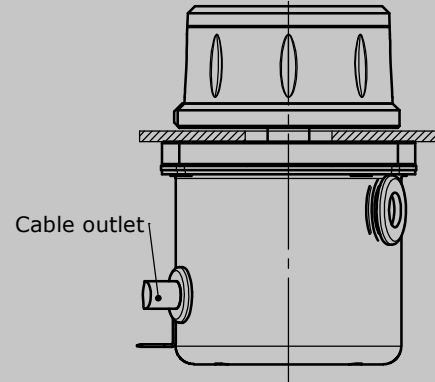
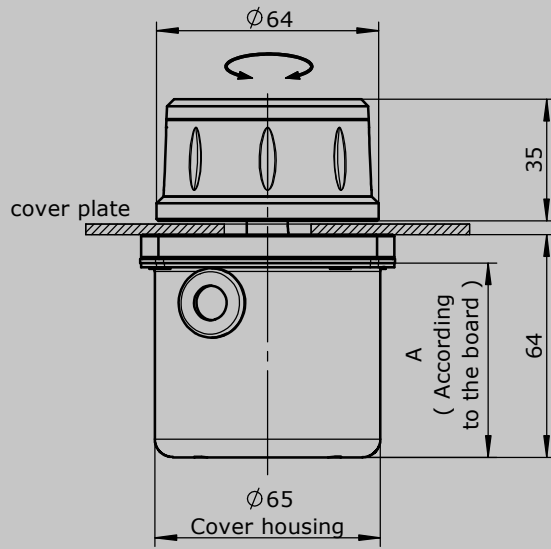


	LG2	-1	-R	E3161	-X
Basic unit					
LG2 Steering Encoder					
Grip					
0 Without					
1 With grip					
Axis 1					
R With friction brake, without detent					
Interface (description see on the following pages)					
E3xx CAN-interface					
E4xx CANopen Safety interface					
Special model					
X Special / customer specified					

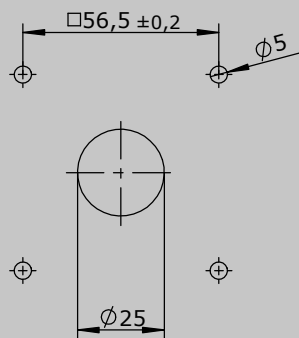
CAN		
Supply voltage	9-32 V DC	
Idle current consumption	120 mA (24 V DC)	
Protocol	CANopen CiA DS 301 or SAE J1939 (based on)	
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)	
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male) CAN (OUT) cable 300 mm with plug connector M12 (female)	
CAN		E316 1

CANopen Safety		
Supply voltage	9-32 V DC	
Idle current consumption	120 mA (24 V DC)	
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)	
CANopen Safety		E415 1

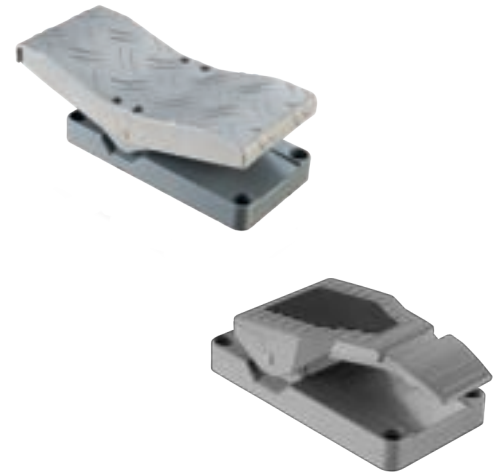
Attachments		
Z01	Mating connector M12 male insert with 2 m cable	20201140
Z02	Mating connector M12 female insert with 2 m cable	20202298



Hole pattern
(installed from below)



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°						
5	Pedal shape D 15°-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 (description see on the following pages)							
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 (see page 125)						
Special model							
X	Special / customer specified						

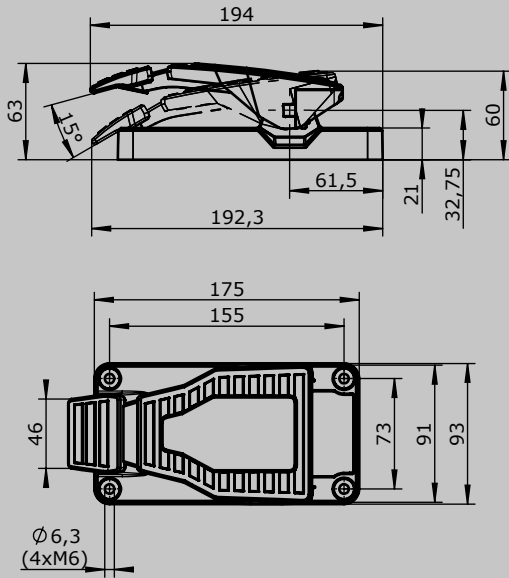
Digital output		
Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Wiring	Cable 500mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 125</i>)	
2 direction signals + 1 zero position signal (galvanically 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 125</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

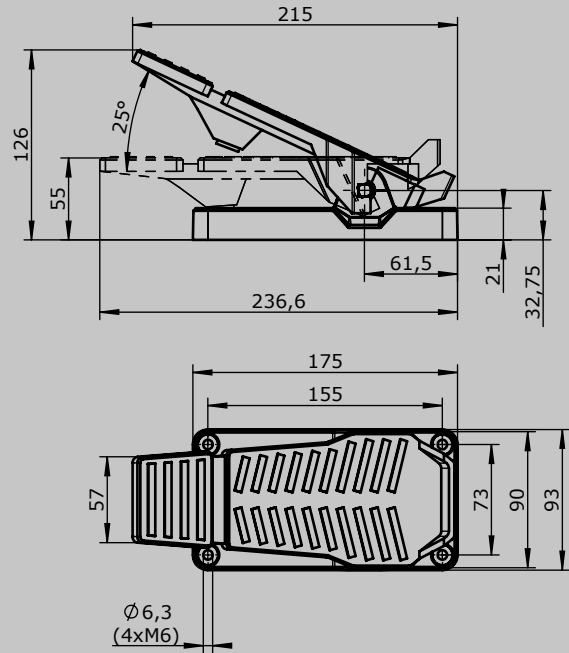
Voltage output		
Supply voltage	9-32 V DC (*11,5-32 V)	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Wiring	Cable 500mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 125</i>)	
0,5...2,5...4,5 V redundant + 2 direction 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	
0...5...10 V redundant + 1 direction signal + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC	E147 1	
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated), supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal	E136 1	
	Output options	
	Characteristic:	
	Inverse dual *1	1
	Dual *1	2
	Inverse dual with dead zone +/- 3° *1 (standard)	3
	Dual with dead zone +/- 3° *1	4
	*1 Not combinable with output E136X	
	Single *2	5
	Single with dead zone +/- 3° *2 (standard)	6
	*2 Not combinable with output E1121 and E1321, E1461 und E1471	
<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 125</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	

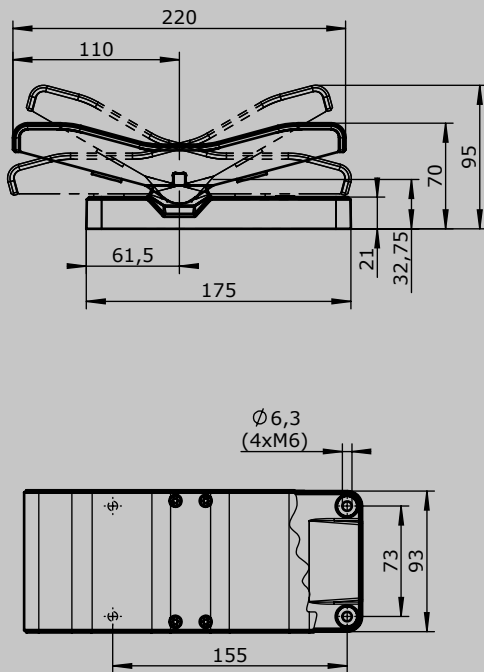
Pedal form A



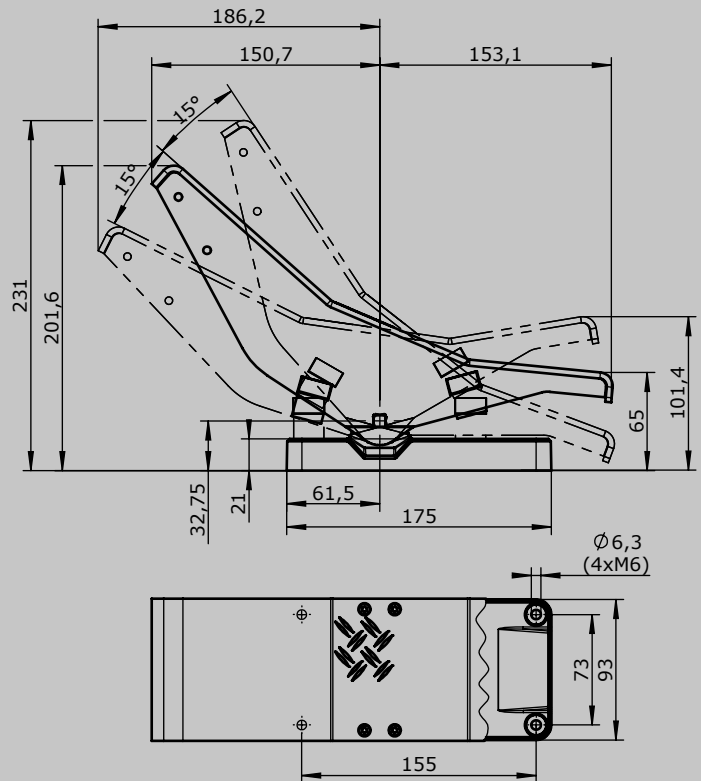
Pedal form B



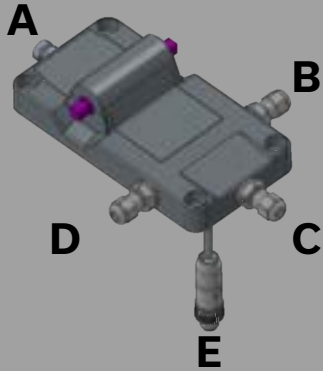
Pedal form C



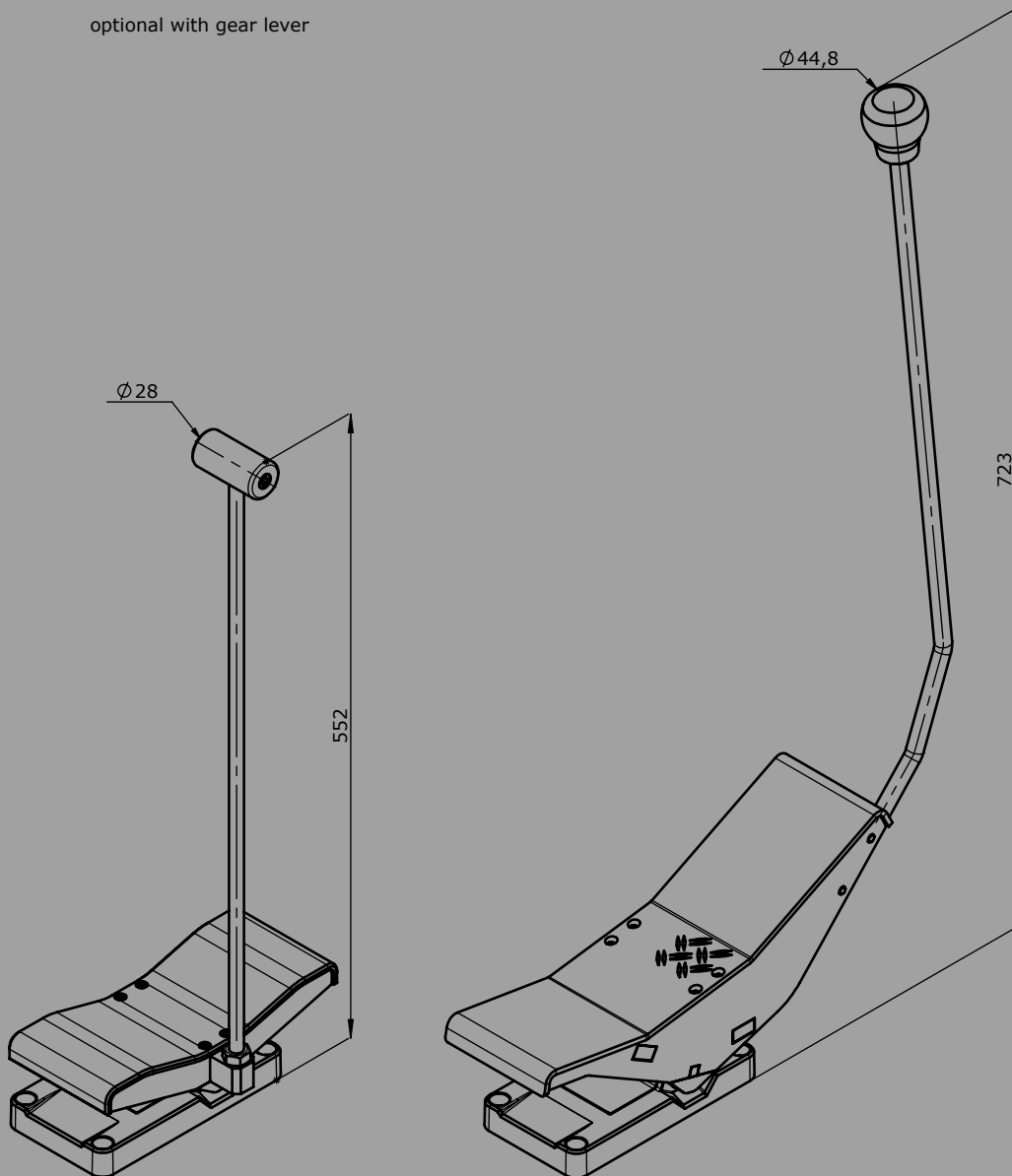
Pedal form D



Possible cable outputs



optional with gear lever



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.

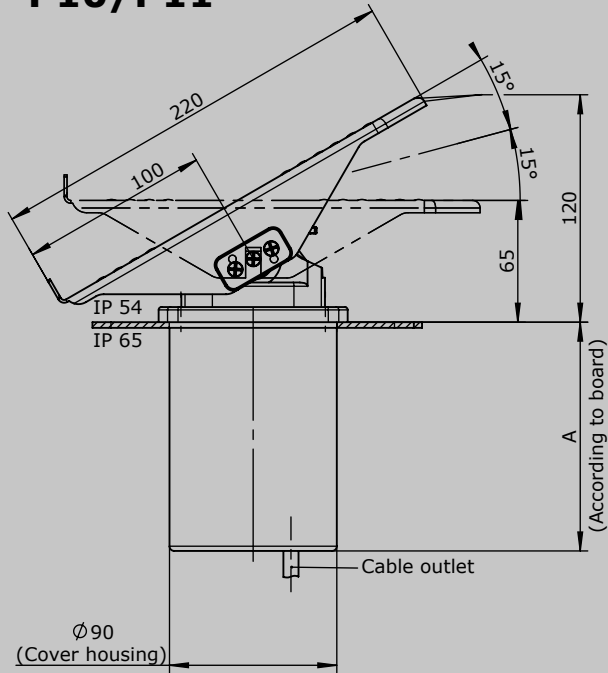
Technical data

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

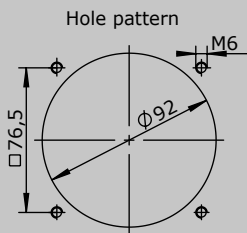
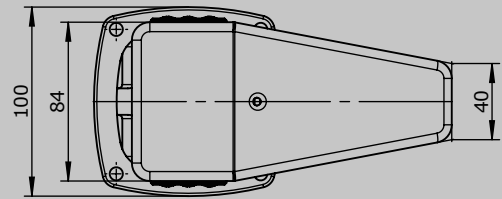
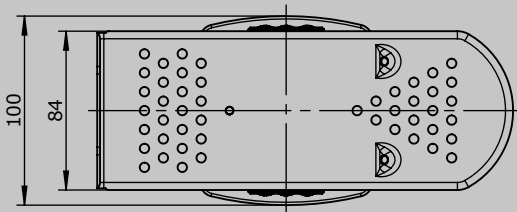
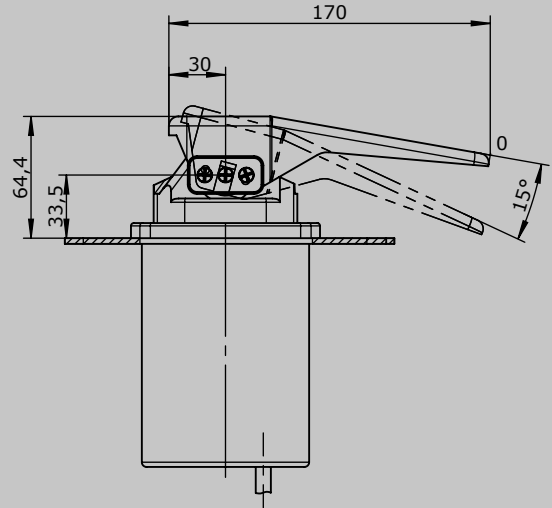


	P10	-1 Z	P	-A01	P224	-B	-X
Basic unit							
P10	Foot Pedal, 0-30°						
P11	Foot Pedal, 15°-0-15°						
P12	Foot Pedal, 0-15°						
Detent							
	Without						
R4	1-0-1						
Direction 1-2							
1	1 contact	Standard contact - arrangement see page 127					
2	2 contacts	z.B.					
3	3 contacts	MS11	A01				
		MS12	A02				
		MS13	A03				
		MS21	A05				
		<i>A99 contact - arrangement according customer request</i>					
Z	Spring return						
R	Friction brake						
(P)	Possibility of mounting potentiometer (Gessmann-types)						
P	Potentiometer	P222	T362	1 kOhm	I max. 1 mA		
		P223	T362	2 kOhm	I max. 1 mA		
		P224	T362	5 kOhm	I max. 1 mA		
		<i>More potentiometers on request!</i>					
Cover housing							
B	Cover housing with cable entry M20						
Special model							
X	Special / customer specified						

P10/P11



P12



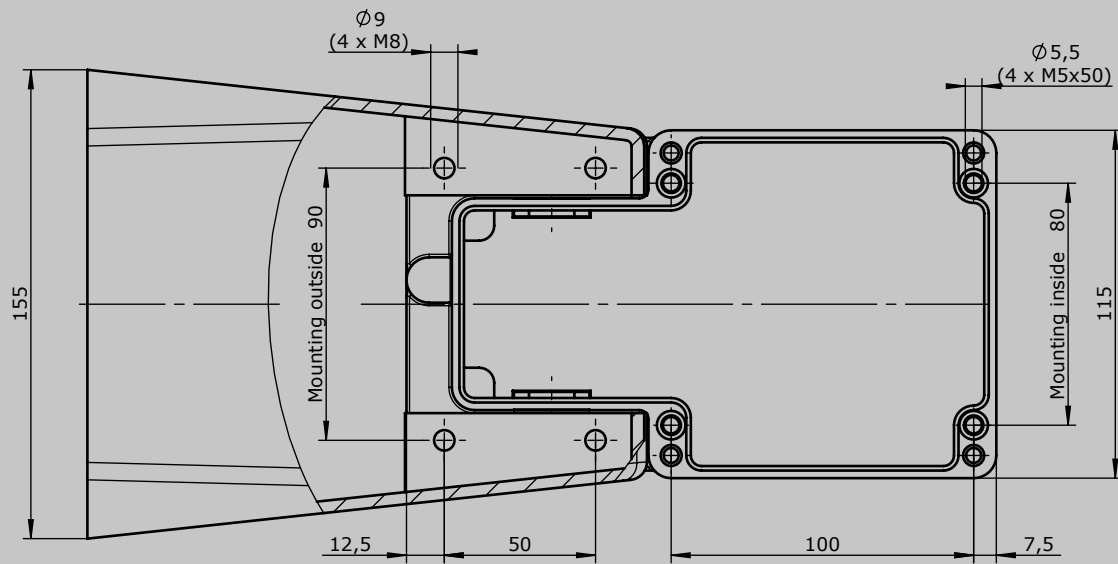
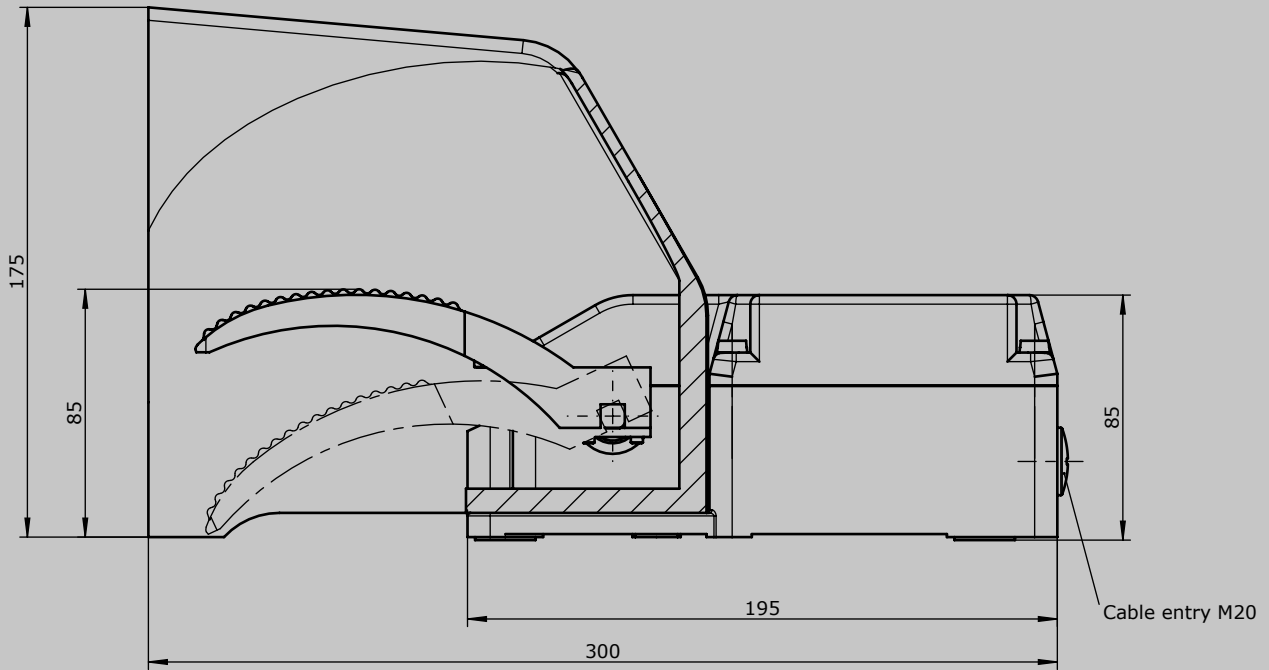
The Foot Pedal P8 / PP8 is a rugged switching devices for footing applications. The Foot Pedal is resistant to oil, maritime conditions e.g. offshore /vessels, UV radiation typically from the sun.

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	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 127					
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						



Foot Pedal

P7 / PP7



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.

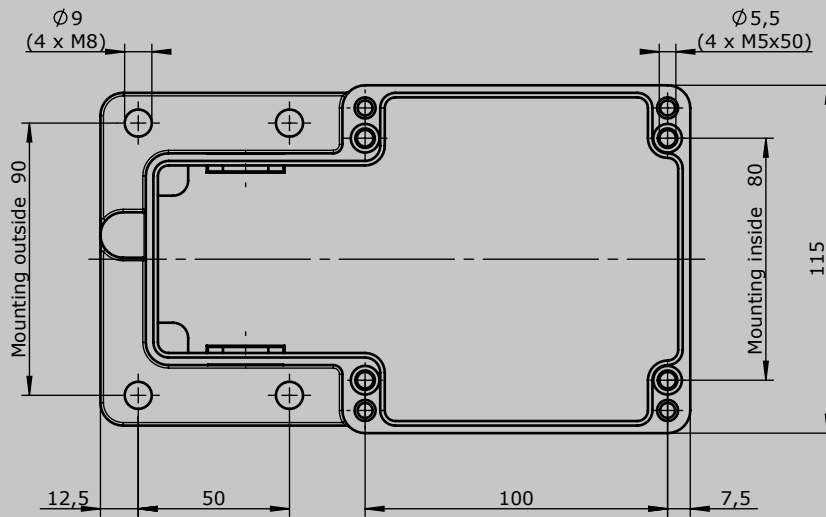
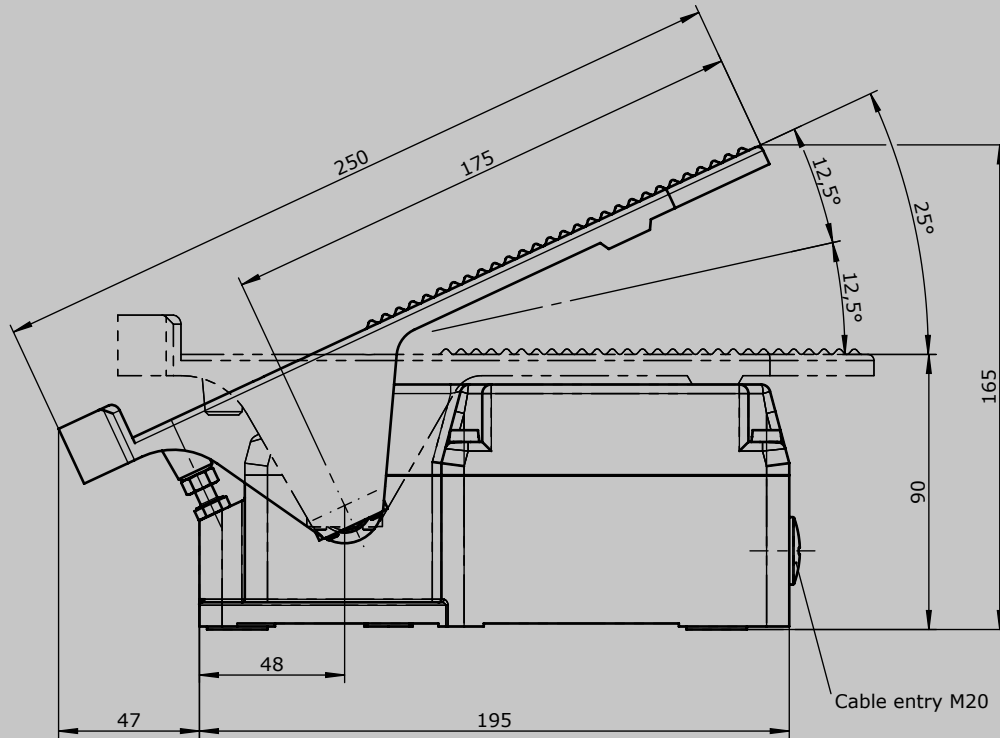
Technical data

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 127					
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	-LK3	/	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 90° left, 180° right with detent incl. 2-step release															
U3	Electric swiveling 90° left, 180° 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															
LK3	Horizontal manual adjustment +/- 470 mm															
Driver's Seat																
KFS11*	(Included in the delivery!)															
KFS9*																
KFS10*																
KFS12*																
*Description see Driver's Seat page 272																

KST311 -U2 -M1 -F3 -LK3 / KFS 11 / V85 / V85 / KL / X

Mounting for equipment boxes

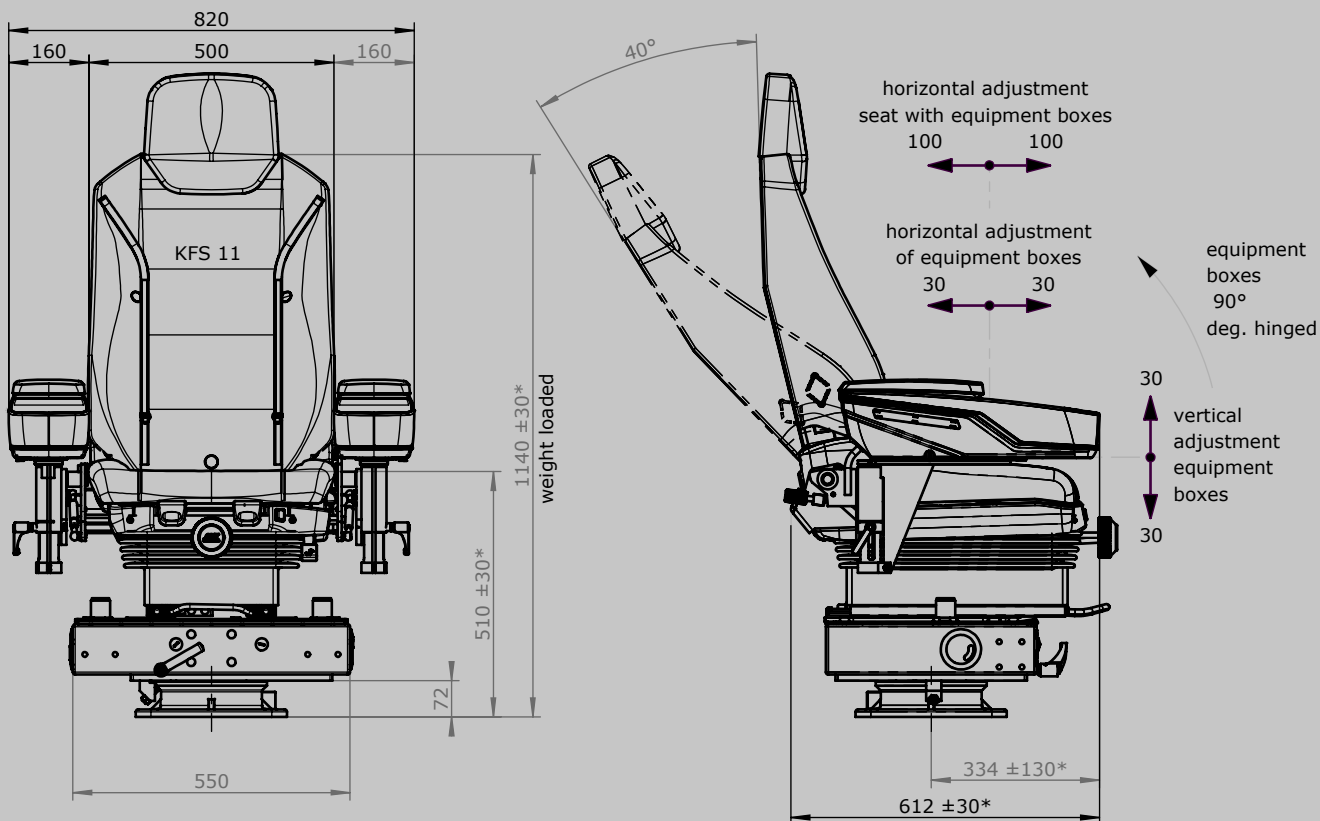
- V... Multi-Axis Controller (see section joysticks)
- S... Single-Axis Controller (see section joysticks)
- D... Double-Handle Controller (see section joysticks)
- N... Control-Switch (see page 118)
- ... More command and indicating devices (see page 142 and 265)

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



Variante 1: flat insert

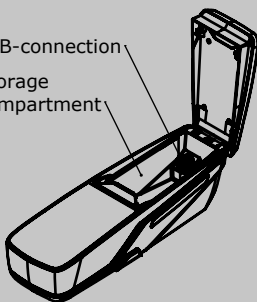


Positioning of devices on customer request

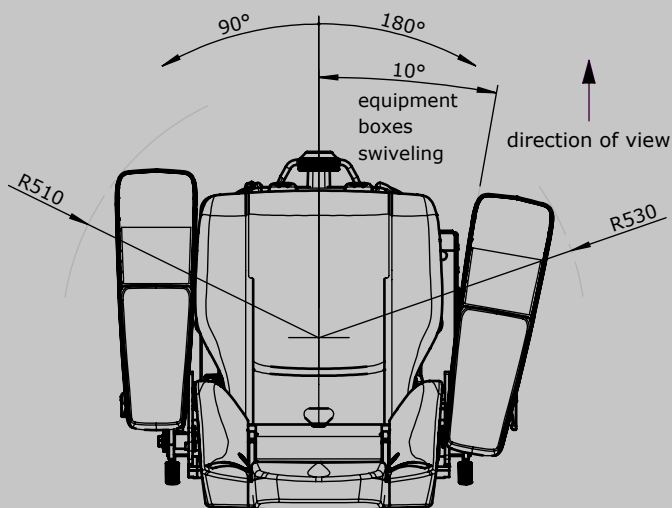
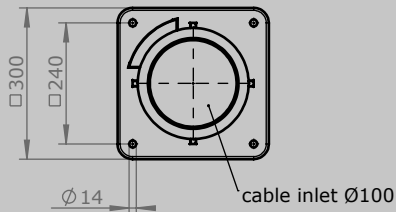
Variante 2: inlay with deepening



USB-connection
Storage compartment



floor mounting



*adjustable

Traversing Unit LK3



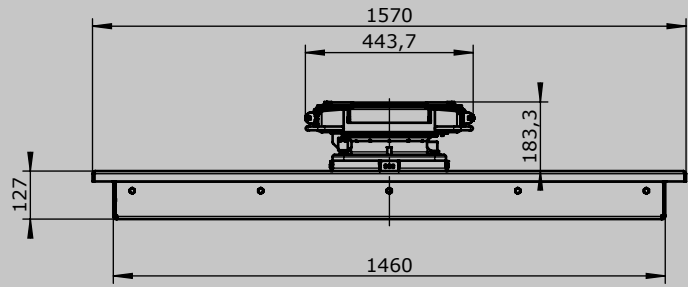
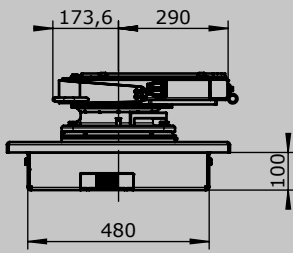
The LK 3 manual traversing unit can be used as an option for our Control Unit KST31. The traversing unit and the turning device can be conveniently unlocked with just one lever. A floor recessed version and a floor mounted version are available.

Surface treatment:
Primer and textured top coat
Standard color RAL 9011 black or 7035 light gray

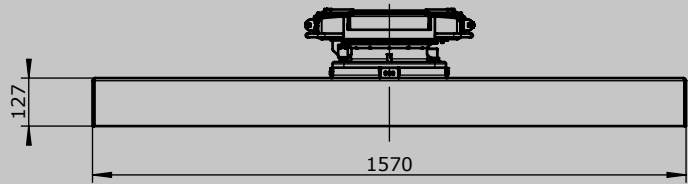
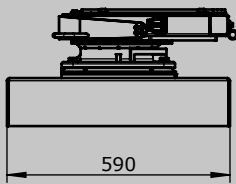


	LK3A	-1	-940	-1	-X
Basic unit					
LK3A Traversing unit rotatable, recessed in floor					
LK3B Traversing unit rotatable, mounted on floor					
Rotation unit					
1 Rotatable 90° left, 180° right with detent					
Travel					
940 mm					
Color					
1 RAL 9011 black					
2 RAL 7035 light gray					
Special model					
X Special / customer specified					
X Special painted					

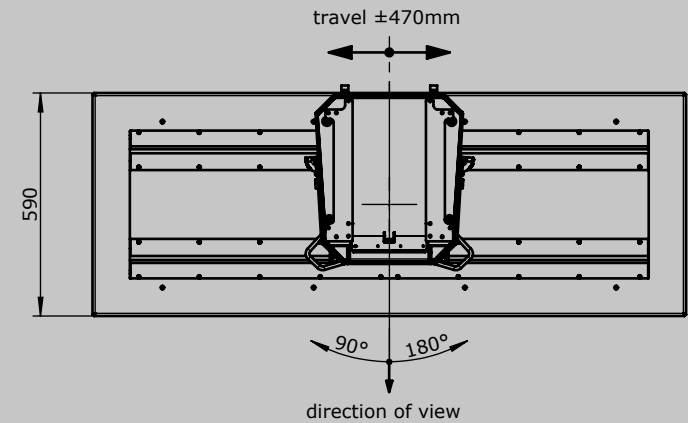
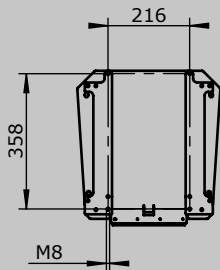
assembly installation



Assembly construction



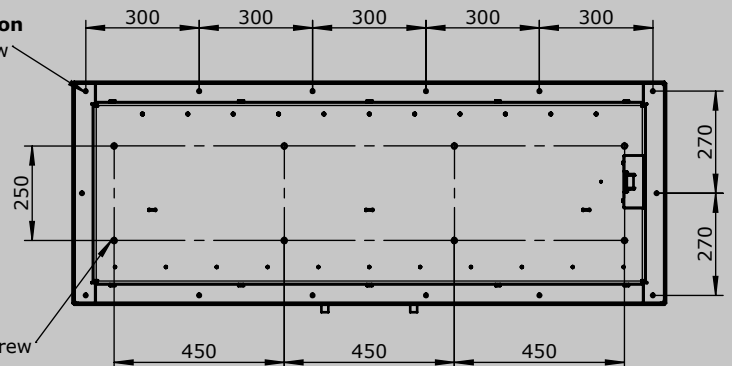
seat mounting



floor mounting

Floor mounting
Assembly installation
M8 countersunk screw

Floor mounting
Assembly construction
 $\varnothing 13$ for M12 cylinderhead screw



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 removable 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	Control Unit with inner equipment boxes version 1															
KST3011	Control Unit with inner equipment boxes version 1 and outside equipment boxes 160 mm wide															
KST3031	Control Unit with inner equipment boxes version 1 and outside equipment boxes 270 mm wide															
KST3041	Control Unit 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 90° left, 180° right with detent incl. 2-step release															
U3	Electric swiveling 90° left, 180° 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 272																

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

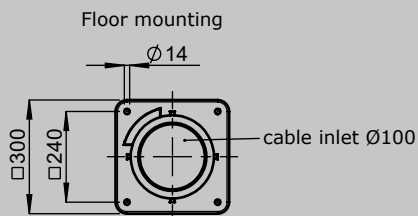
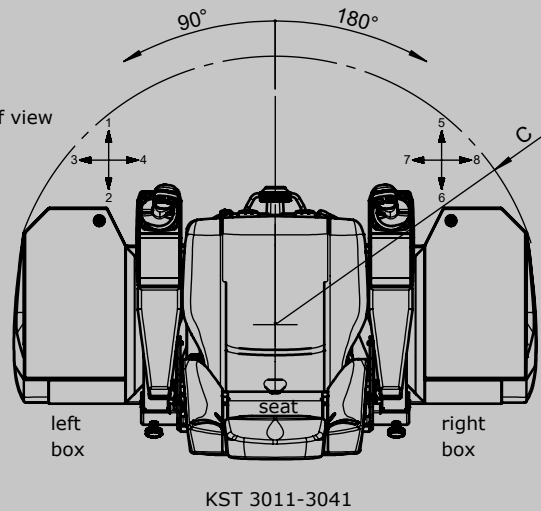
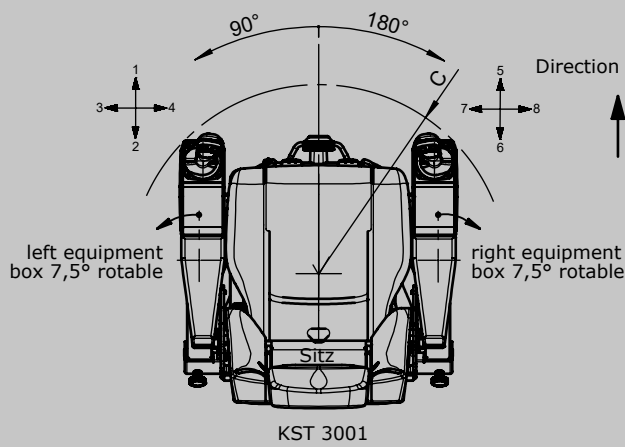
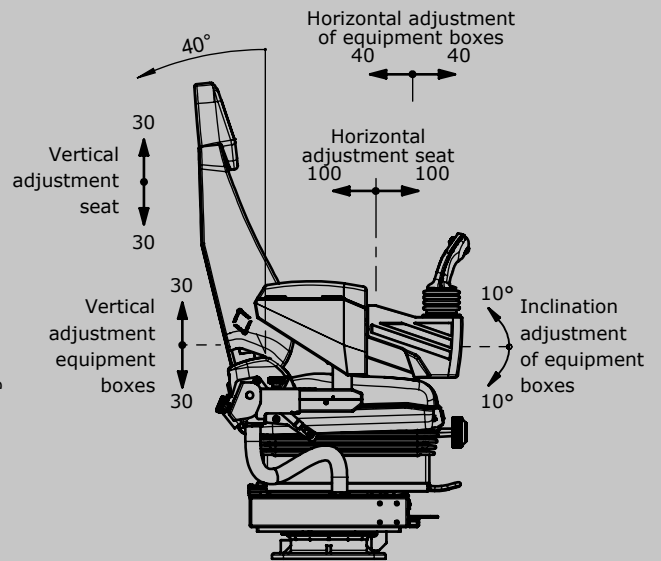
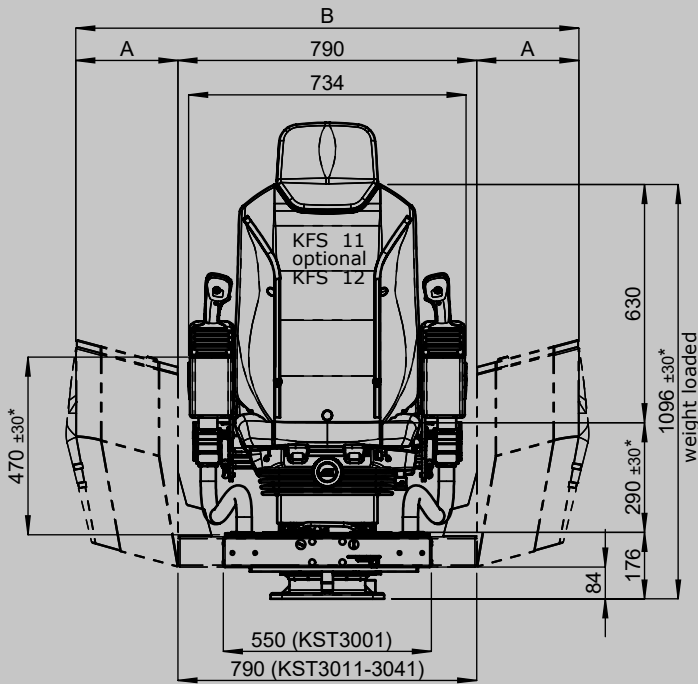
- V... Multi-Axis Controller (see section joysticks)
- S... Single-Axis Controller (see section joysticks)
- D... Double-Handle Controller (see section joysticks)
- N... Control-Switch (see page 118)
- ... More command and indicating devices (see page 142 and 265)

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



* 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



	KST19	-U1	-M1	-F3	-LK	/	KFS 10	/	V85	/	V85	/	KL	/	X
Basic unit															
KST19	Control Unit with equipment boxes														
Base unit															
U1	Swiveling 90° left, 180° right with friction brake														
U2	Swiveling 90° left, 180° 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/864														
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 272														

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 118)
...	More command and indicating devices (see page 142 and 265)

Wiring

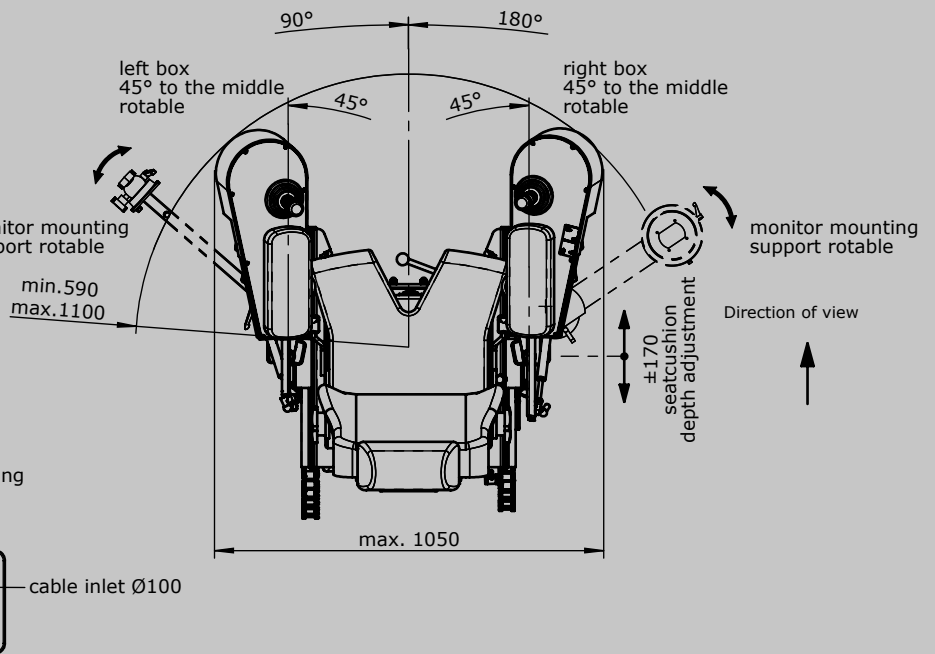
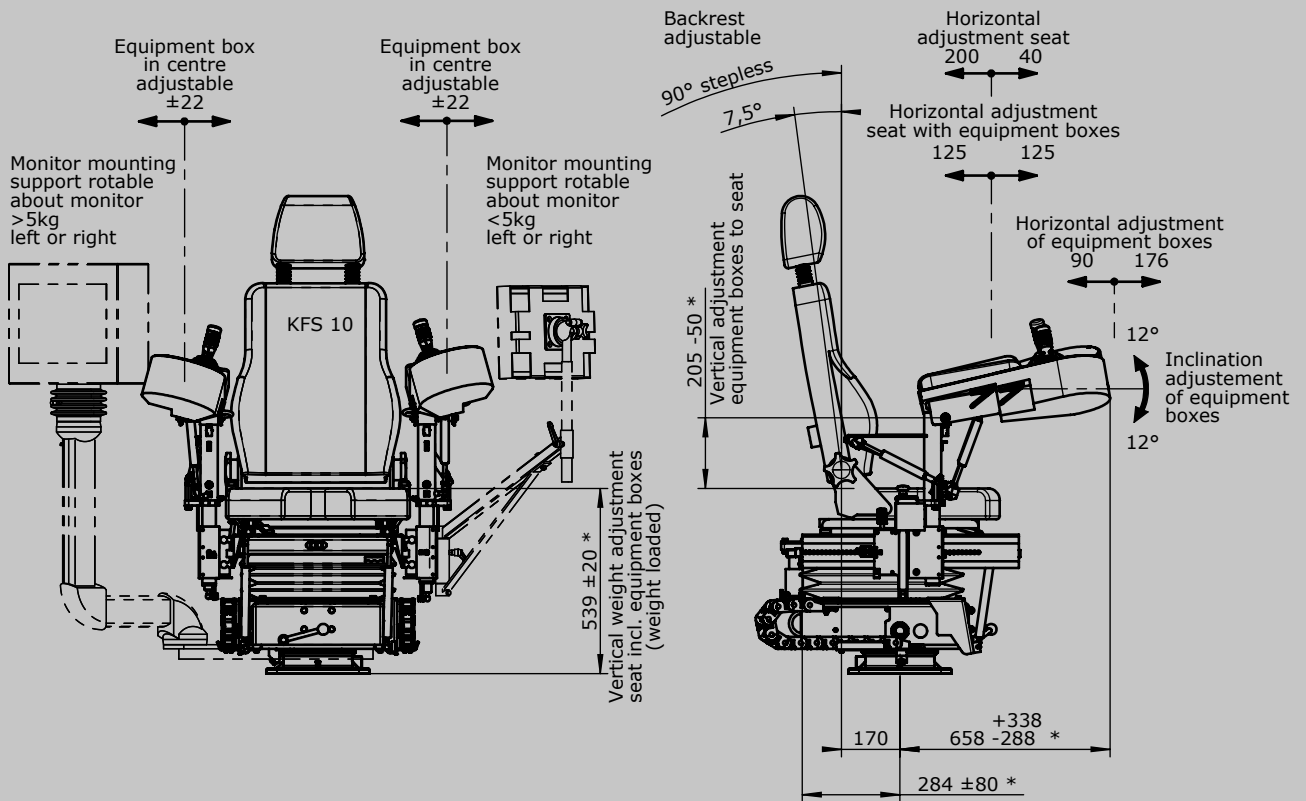
KL	Without wiring, but terminal block built in each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

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



	KST10	-U1	-M1	-F3	-LK	/	KFS 11	/	V85	/	V85.1	/	KL	/	X
Basic unit															
KST10	Control Unit with equipment boxes														
Base unit															
U1	Swiveling 90° left, 180° right with friction brake														
U2	Swiveling 90° left, 180° right with detent incl. 2-step release (standard)														
U3	Electric swiveling 90° left, 180° 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 272															

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

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 118)
- ... More command and indicating devices (see page 142 and 265)

Wiring

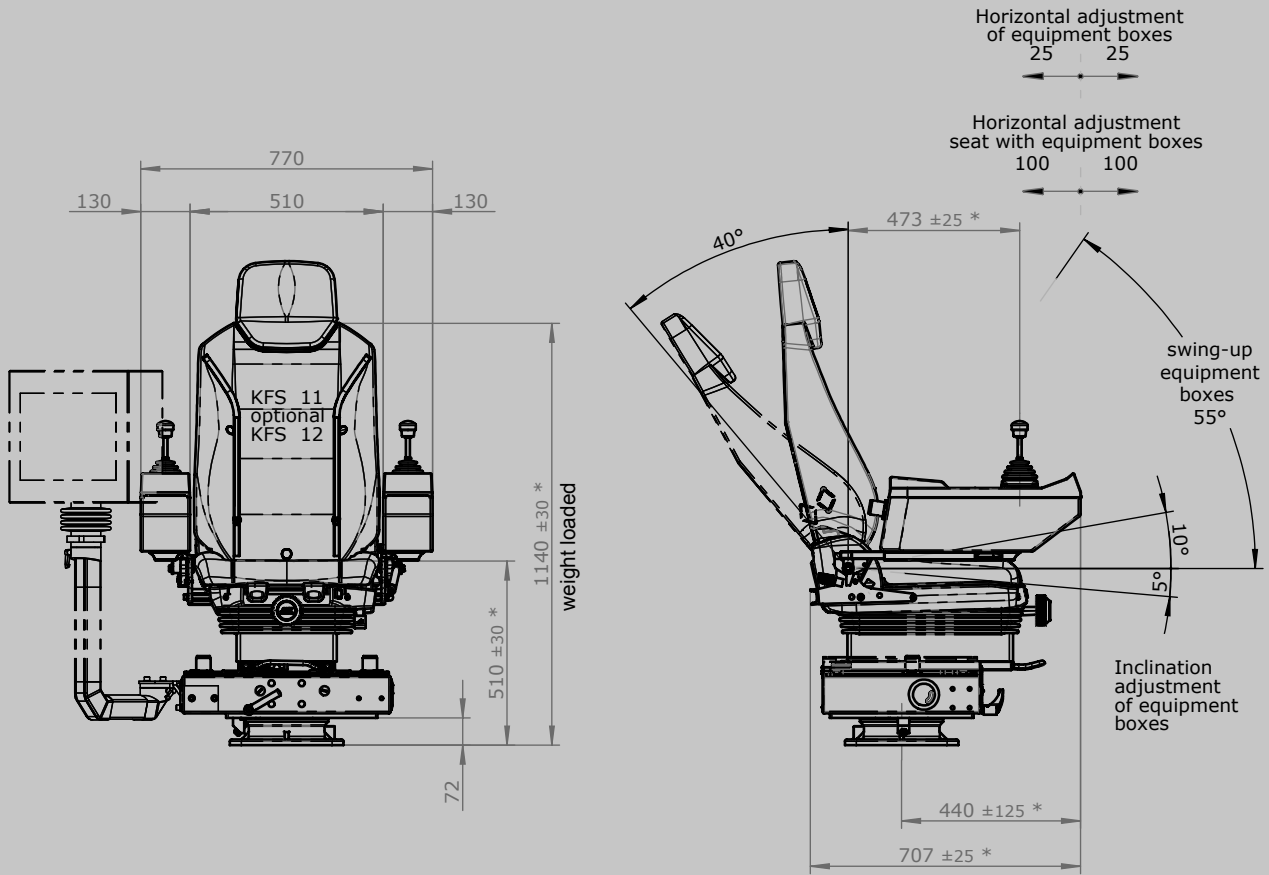
- KL Without wiring, but terminal block built in each terminal
- KLV On terminal block 4 mm² with single wire 1 mm² each terminal
- KLV On SPS (SPS provision) with single wire 1 mm² each terminal
- KLVA External wiring single wire highly flexible 1,5 mm², 5 m long each terminal

Special model

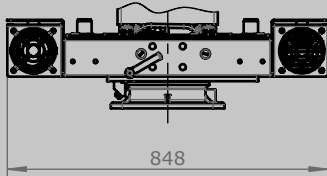
- X Special / customer specified
- X² Special painted

Option

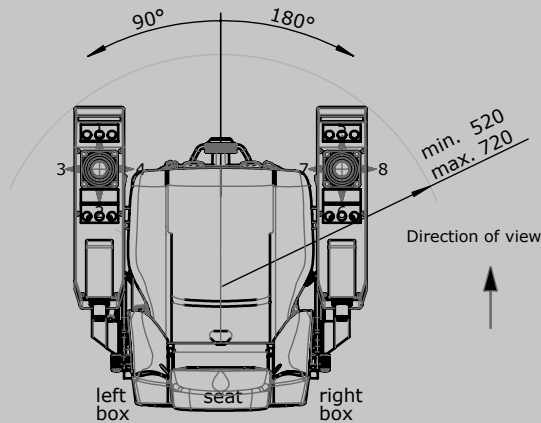
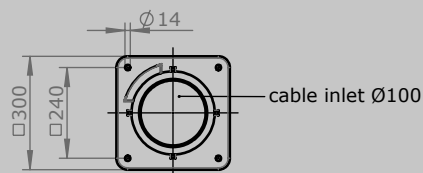
- Radio remote control system



with heating



Floor mounting



* 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



	KST41	-U1	-M1	-F3	-LK	/	KFS 11	/	V64	/	V64.1	/	KL	/	X
Basic unit															
KST41	Control Unit with equipment boxes 160 x 420 mm														
KST42	Control Unit with equipment boxes 200 x 420 mm														
Base unit															
U1	Swiveling 90° left, 180° right with friction brake														
U2	Swiveling 90° left, 180° right with detent incl. 2-step release (standard)														
U3	Electric swiveling 90° left, 180° 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 272															

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 118)
...	More command and indicating devices (see page 142 and 265)

Wiring

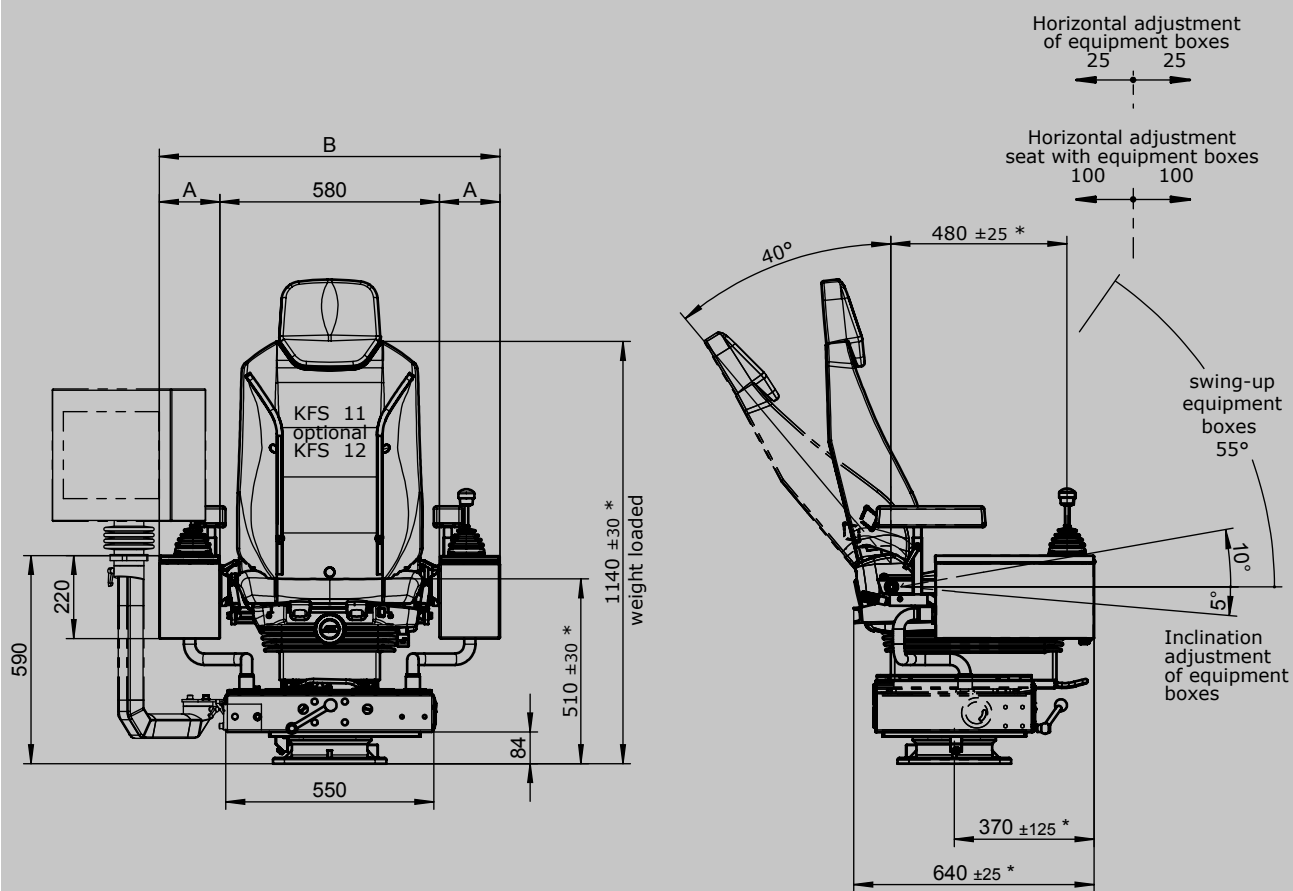
KL	Without wiring, each terminal block built in each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

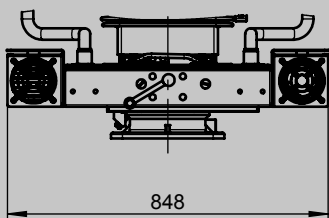
X	Special / customer specified
X ²	Special painted

Option

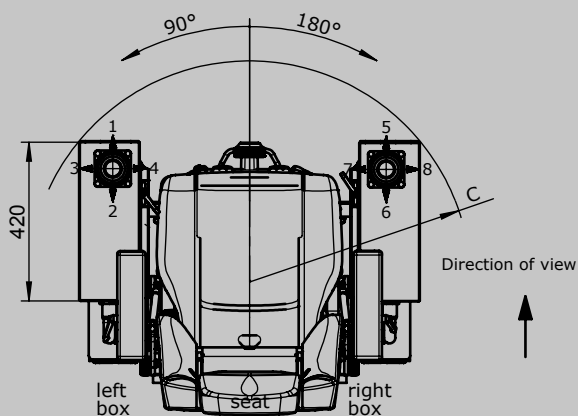
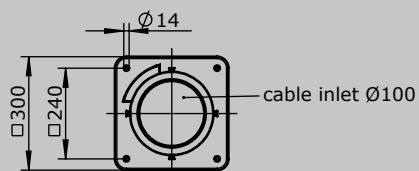
Radio remote control system



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 steplessly 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	Control Unit with equipment boxes 200 x 580 mm
KST52	Control Unit with equipment boxes 270 x 580 mm
KST54	Control Unit with equipment boxes 320 x 580 mm
	<i>Special boxes for request!</i>

Base unit

U1	Swiveling 90° left, 180° right with friction brake
U2	Swiveling 90° left, 180° right with detent incl. 2-step release (standard)
U3	Electric swiveling 90° left, 180° 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	Manual adjustment of equipment boxes horizontal adjustable +/- 75 mm
LK	Plate for horizontal manual adjustment for control units +/- 250 mm
	Label without engraving for Multi-axis-/ Single-Axis Controller
	Label with engraving for Multi-axis-/ Single-Axis Controller

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

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 272

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 118)*

... *More command and indicating devices (see page 142 and 265)*

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

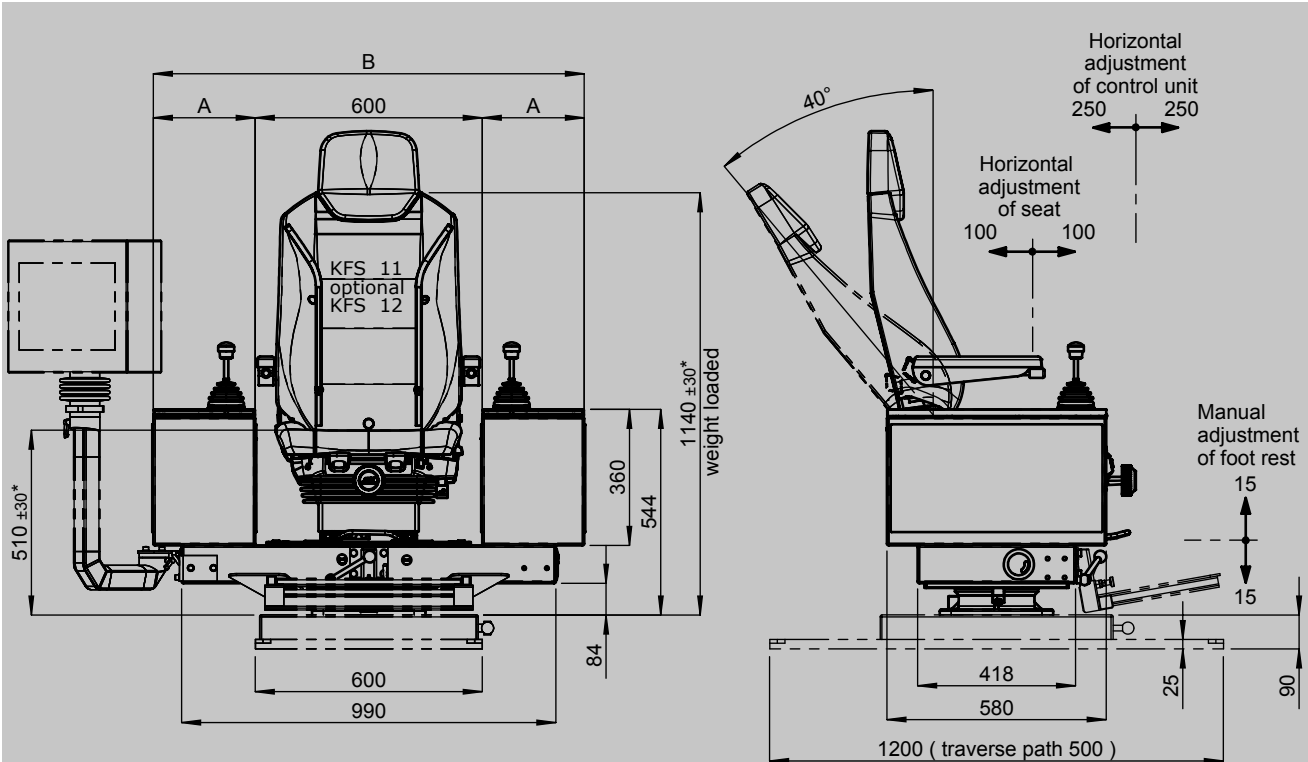
Special model

X Special / customer specified

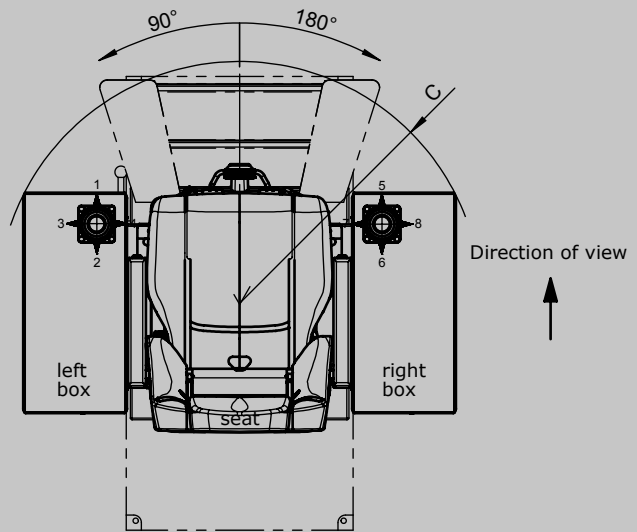
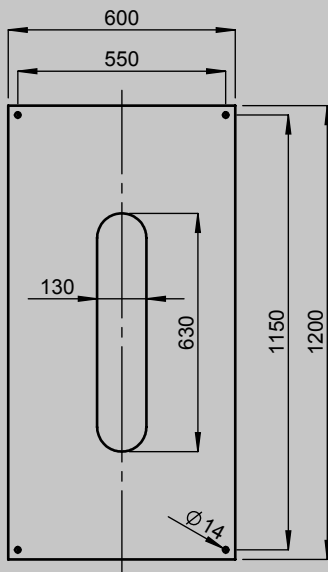
X1 Special painted

Option

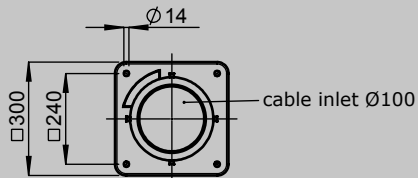
Radio remote control system



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



	KST6	-U2	-M1	-F3	-LK	/	KFS 11	/	V64	/	V64.1	/	KL	/	X
Basic unit															
KST6	Control Unit with equipment boxes														
Base unit															
U1	Swiveling 90° left, 180° right with friction brake														
U2	Swiveling 90° left, 180° right with detent incl. 2-step release (standard)														
U3	Electric swiveling 90° left, 180° 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 272															

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 118)
...	More command and indicating devices (see page 142 and 265)

Wiring

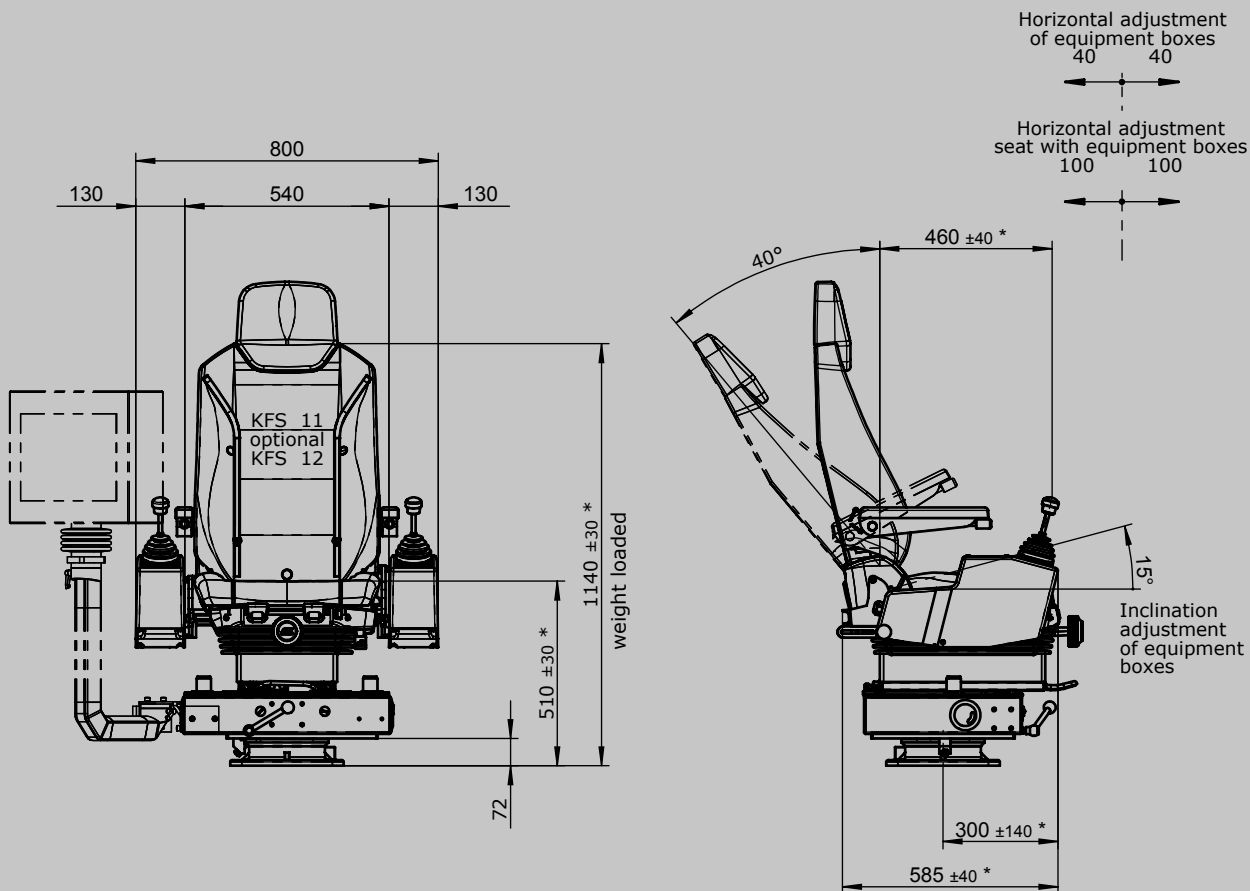
KL	Without, but terminal block built each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLW	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

Special model

X	Special / customer specified
X ²	Special painted

Option

Radio remote control system



* adjustable

Control Unit

KST 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



	KST8	-U1	-M1	-F3	-LK	/	KFS 11	/	V64	/	V64.1	/	KL	/	X
Basic unit															
KST8	Control Unit with equipment boxes														
Base unit															
U1	Swiveling 90° left, 180° right with friction brake														
U2	Swiveling 90° left, 180° right with detent incl. 2-step release (standard)														
U3	Electric swiveling 90° left, 180° 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 272															

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

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 118)
- ... More command and indicating devices (see page 142 and 265)

Wiring

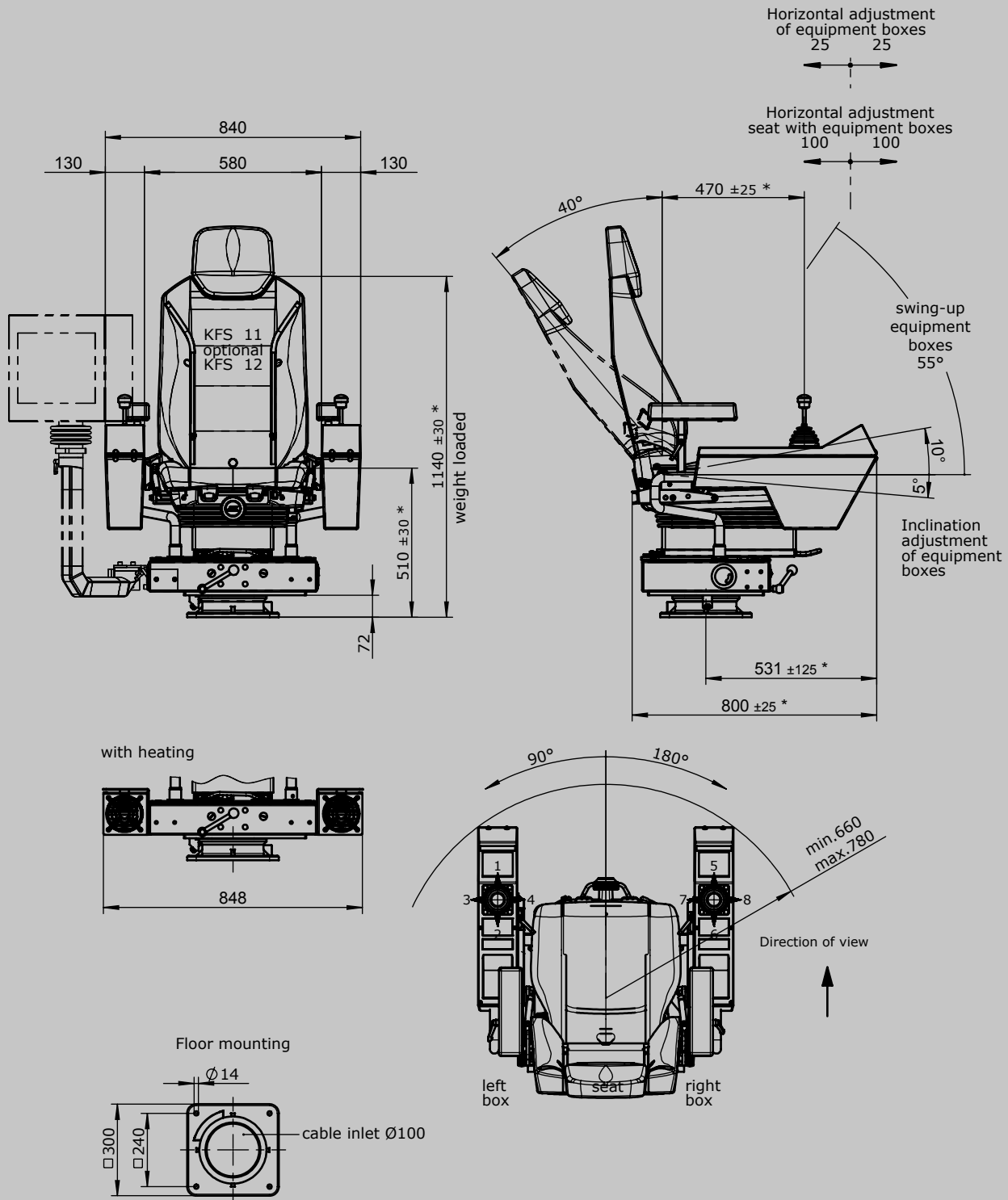
- KL Without wiring, but terminal block built each terminal
- KLV On terminal block 4 mm² with single wire 1 mm² each terminal
- KLV On SPS (SPS provision) with single wire 1 mm² each terminal
- KLVA External wiring single wire highly flexible 1,5 mm², 5 m long each terminal

Special model

- X Special / customer specified
- X² 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.

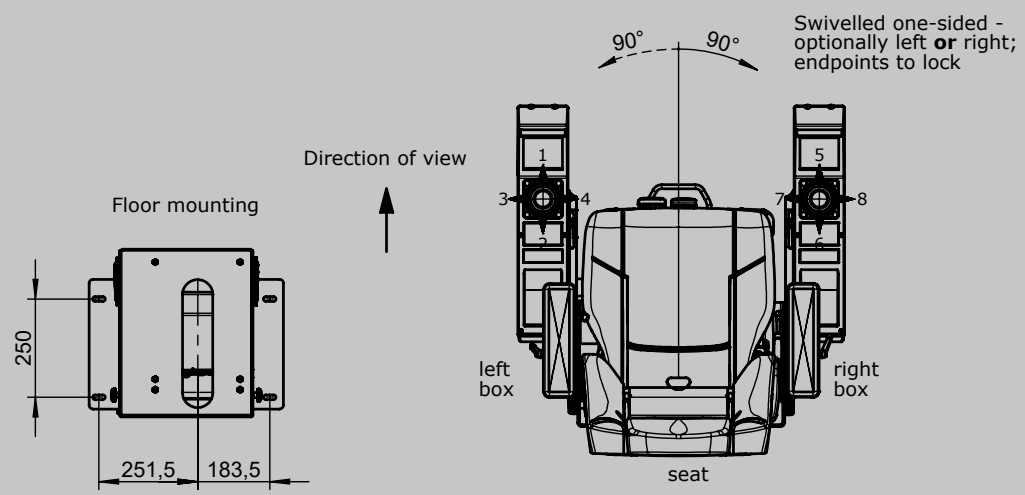
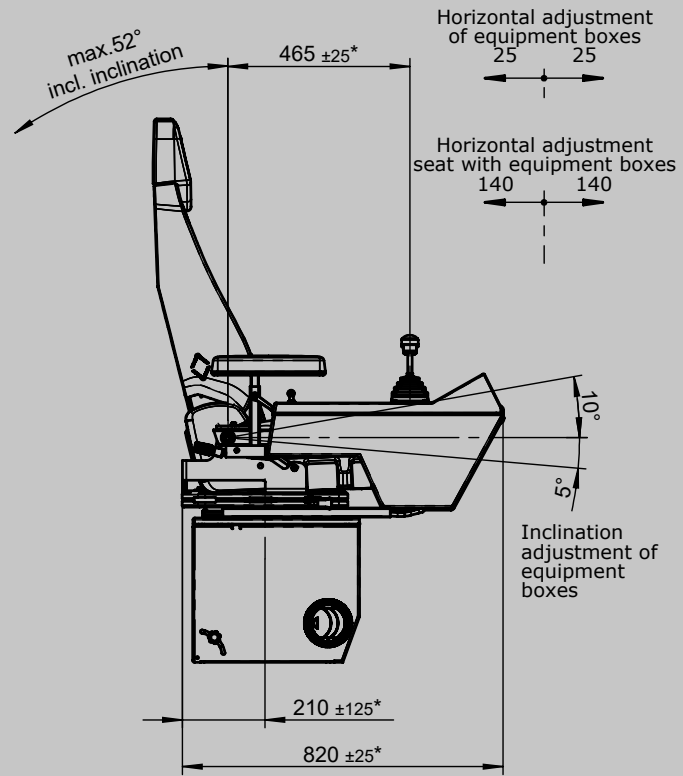
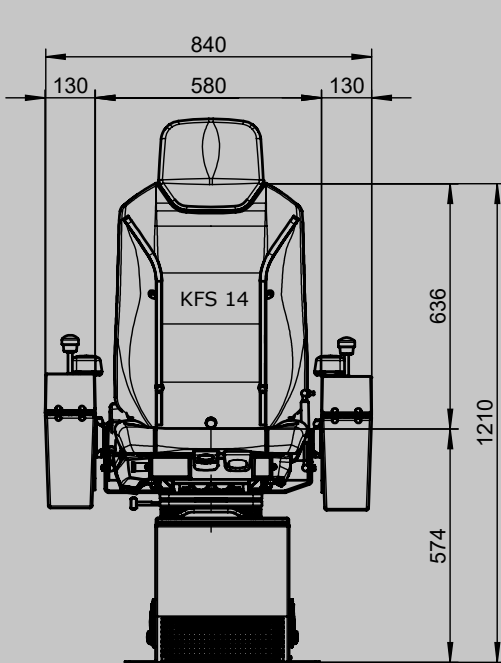
Surface treatment:

Base coat and textured varnish
Standard colour RAL 9011 black



		Example											
		KST85	-M1	/	KFS14	/	V64	/	V64.1	/	KL	/	X
Basic unit													
KST85	Control Unit with heating in the console base												
KST87	Control Unit 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 118)												
....	More command and indicating devices (see page 142 and 265)												
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												
KLW	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!



* adjustable

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

Control Unit KST 7



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



	KST7	-1	/	KFS11	/	V64	/	V64.1	/	KL	/	X
Basic unit												
KST7	Control Unit with equipment boxes 290 x 500 mm											
KST75	Control Unit 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 272												
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 118)											
...	More command and indicating devices (see page 142 and 265)											

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

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

Wiring

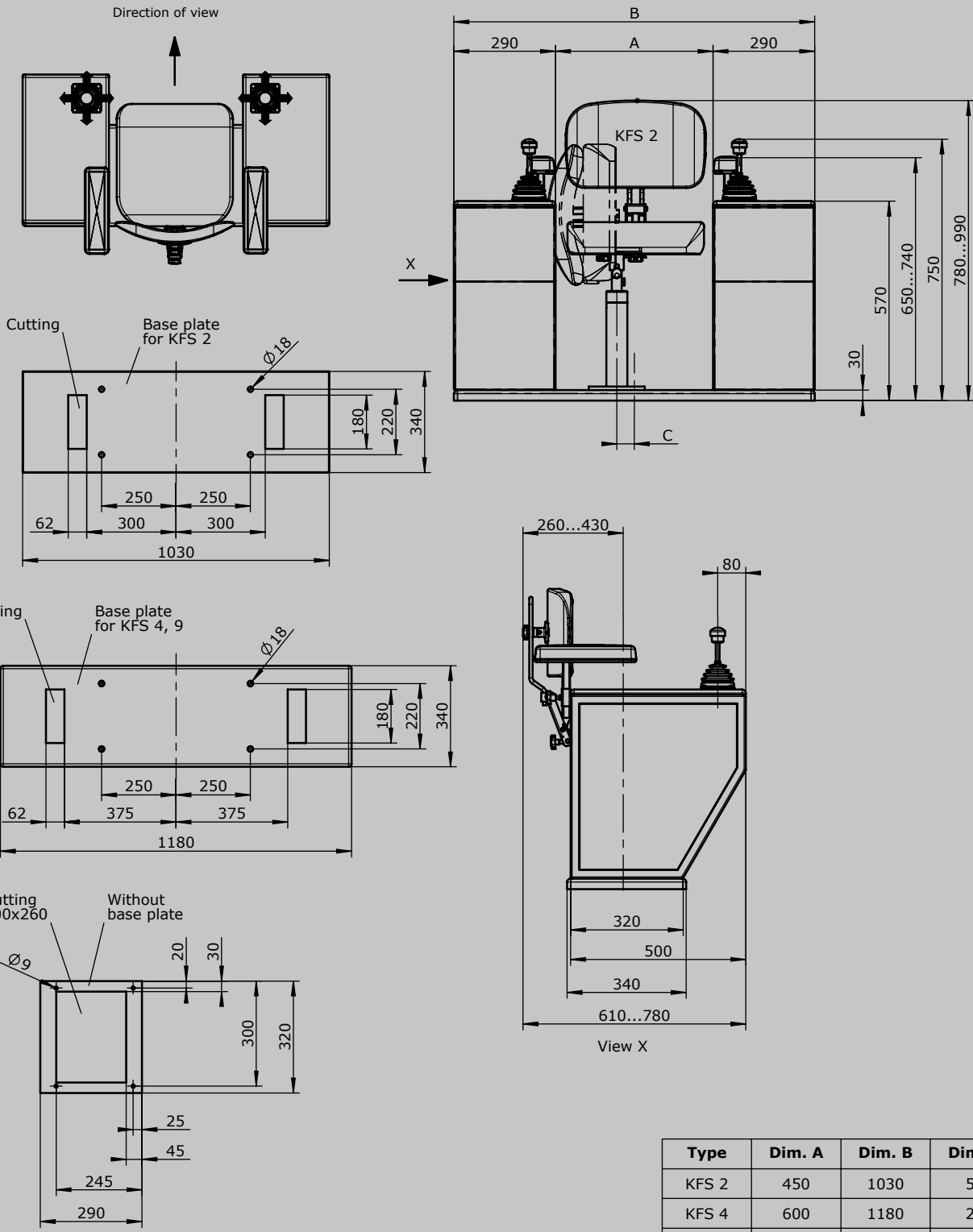
KL	Without wiring, but terminal block built each terminal
KLV	On terminal block 4 mm ² with single wire 1 mm ² each terminal
KLV	On SPS (SPS provision) with single wire 1 mm ² each terminal
KLVA	External wiring single wire highly flexible 1,5 mm ² , 5 m long each terminal

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

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

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

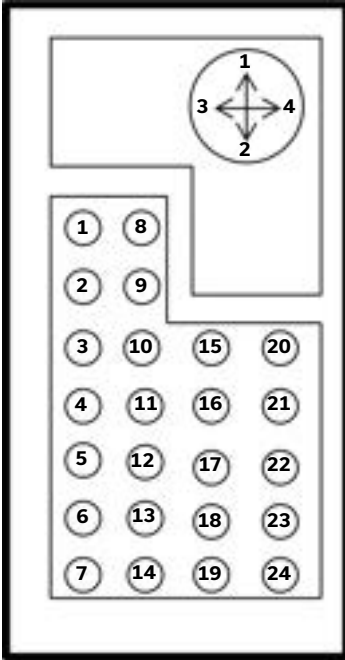


Command and indicating devices 22 mm (Siemens Typ 3SU) incl. indicating label	Contact-complement	Weight KG	Type
Push button	1 S	0,040	D
Selector switch 0-1	2 positions 1 S	0,050	W
Selector switch 1-0-2	3 positions 2 S	0,060	W
Key switch 0-1	2 positions 1 S	0,130	S
Key switch 1-0-2	3 positions 2 S	0,140	S
Mushroom key switch latching	1 S	0,080	PS
Mushroom head push button latching	1 Ö	0,060	PV
Illuminated push button diode 24 V DC/AC	1 S	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			
Profinet switch			

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.142 & 265) in our control units and housings if our Multi-Axis Controllers V62 (see p.72) are used. Additional command and indicating devices can be installed of Multi-Axis Controllers V64 or V11 (see p.72 or p.89) are used. (please enquire)

Control unit (see p. 232) 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!

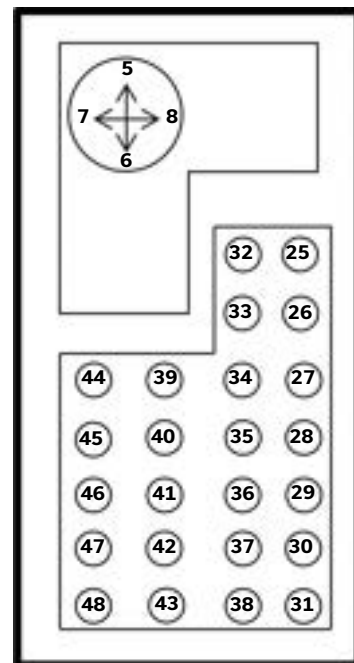
Ordering information



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.142 & 265) in our control units and housings if our Multi-Axis Controllers V62 (see p.72) are used. Additional command and indicating devices can be installed of Multi-Axis Controllers V64 or V11 (see p.72 or p.89) are used. (please enquire)

	No. of pieces max.	Control unit (see p.232) 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.142 & 265) or 1 pcs. monitoring device 72 x 72mm</p> <p>Multi-Axis Controller V64 (see p.72) or V11 (see p.89)</p> <p>Max. 3 pcs. installation of command and indicating devices 22 (see p.142 & 265)</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.142 & 265) or 1 pcs. monitoring device 72 x 72mm</p> <p>Multi-Axis Controller V64 (see p.72) or V11 (see p.89)</p> <p>Max. 3 pcs. installation of command and indicatin devices 22 (see p.142 & 265)</p> <p>Place to put on devices</p>	13	_____	_____	_____	_____	_____	_____
	14	_____	_____	_____	_____	_____	_____
	15	_____	_____	_____	_____	_____	_____
	16	_____	_____	_____	_____	_____	_____
	17	_____	_____	_____	_____	_____	_____
	18	_____	_____	_____	_____	_____	_____
	19	_____	_____	_____	_____	_____	_____
	20	_____	_____	_____	_____	_____	_____
	21	_____	_____	_____	_____	_____	_____
	22	_____	_____	_____	_____	_____	_____
	23	_____	_____	_____	_____	_____	_____
	24	_____	_____	_____	_____	_____	_____

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

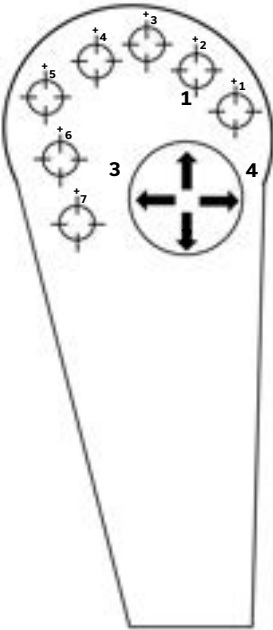
Customer _____

Order No. _____

Equipment box left

Multi-Axis Controller V11, V14, V25, V85
see p. 63, 50, 25, 10

max. 7 installations of command and indicating devices 22 (see p.142 & 265)

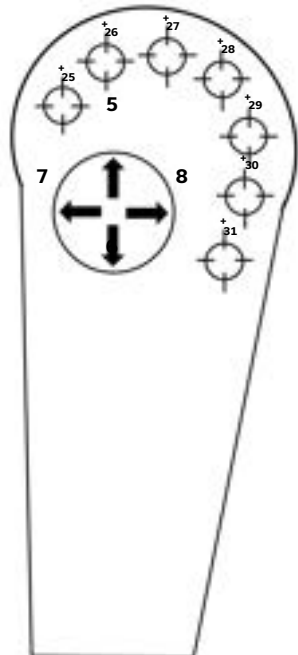


Pos. No.	Type	Colour	Label text (max. 2 x 12 characters)	Plant-ref.	Destination	Notes
1	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____	_____
6	_____	_____	_____	_____	_____	_____
7	_____	_____	_____	_____	_____	_____
8	_____	_____	_____	_____	_____	_____
9	_____	_____	_____	_____	_____	_____

Equipment box right

Multi-Axis Controller V11, V14, V25, V85
see p. 63, 50, 25, 10

max. 7 installations of command and indicating devices 22 (see p.142 & 265)



25	_____	_____	_____	_____	_____	_____
26	_____	_____	_____	_____	_____	_____
27	_____	_____	_____	_____	_____	_____
28	_____	_____	_____	_____	_____	_____
29	_____	_____	_____	_____	_____	_____
30	_____	_____	_____	_____	_____	_____
31	_____	_____	_____	_____	_____	_____

Ordering information

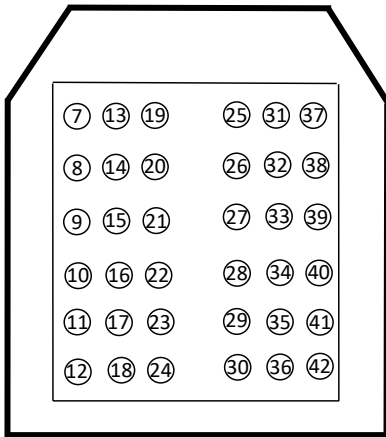
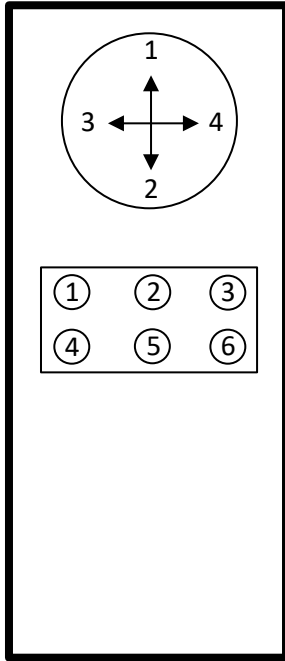
KST30



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. 232)

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

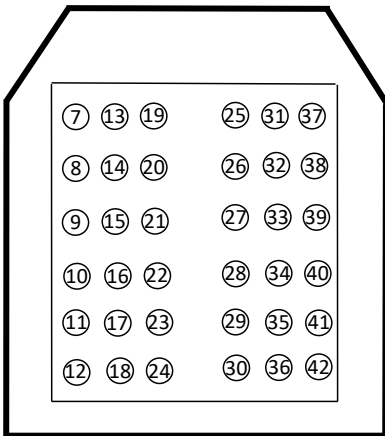
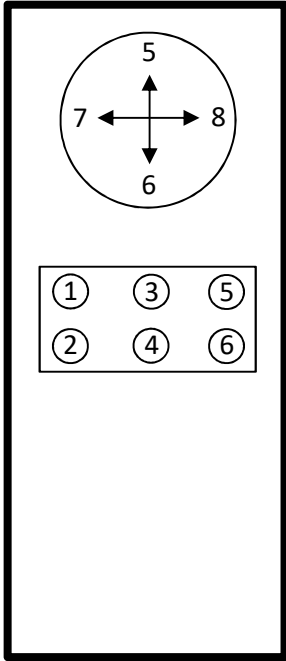


Customer _____

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	_____	_____	_____	_____	_____	_____
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	_____	_____	_____	_____	_____	_____



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.

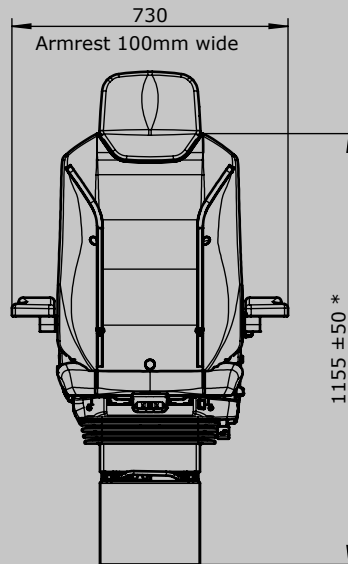
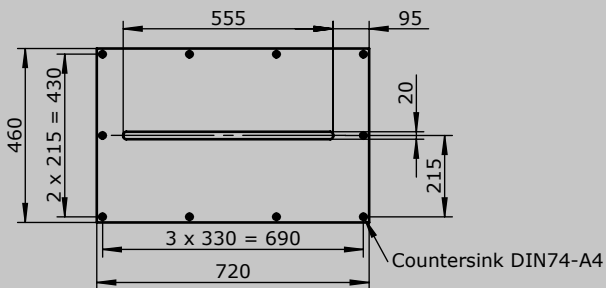
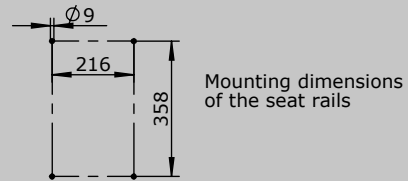
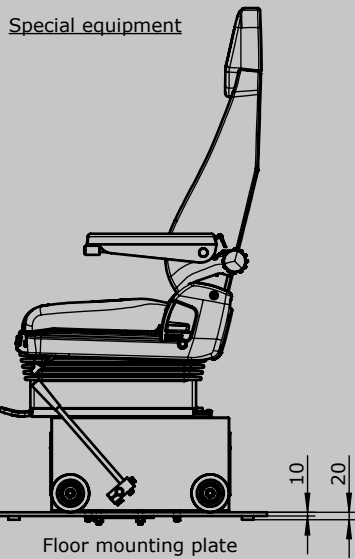
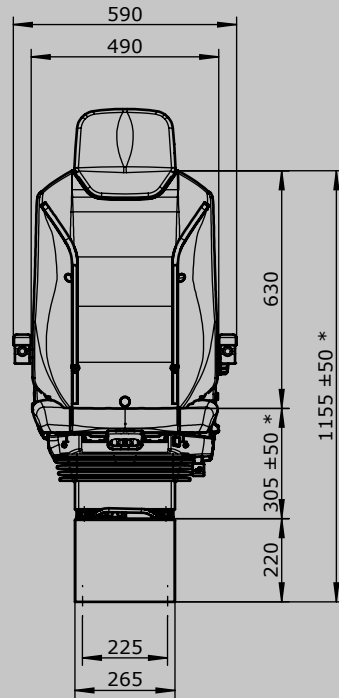
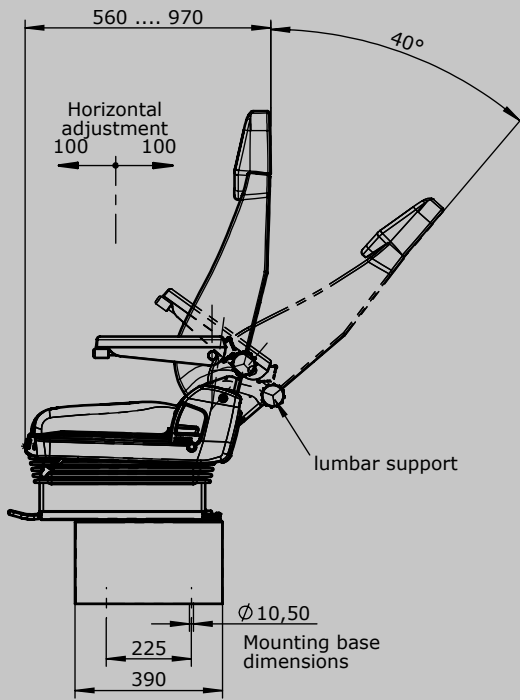
Technical data:

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
Basic unit			
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		



* 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.

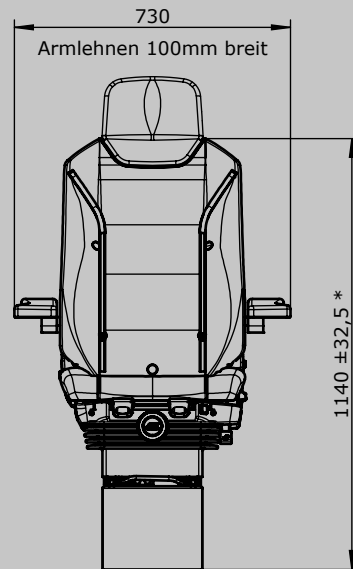
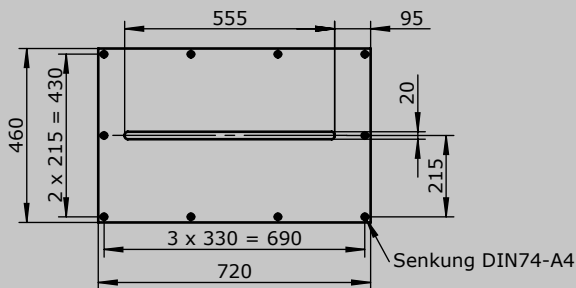
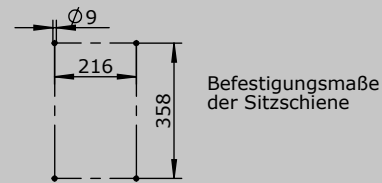
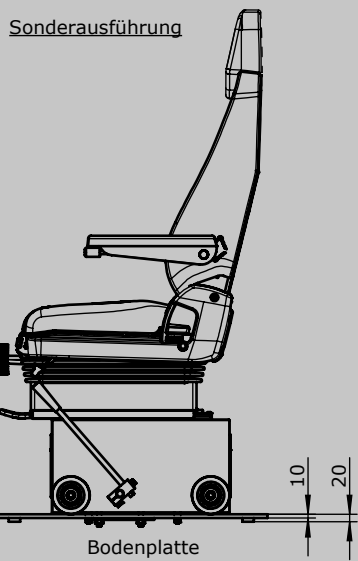
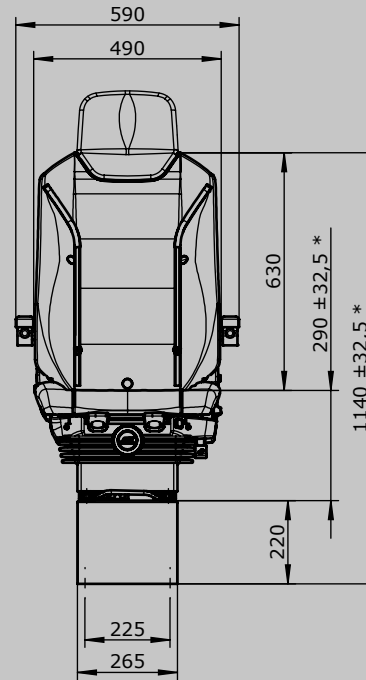
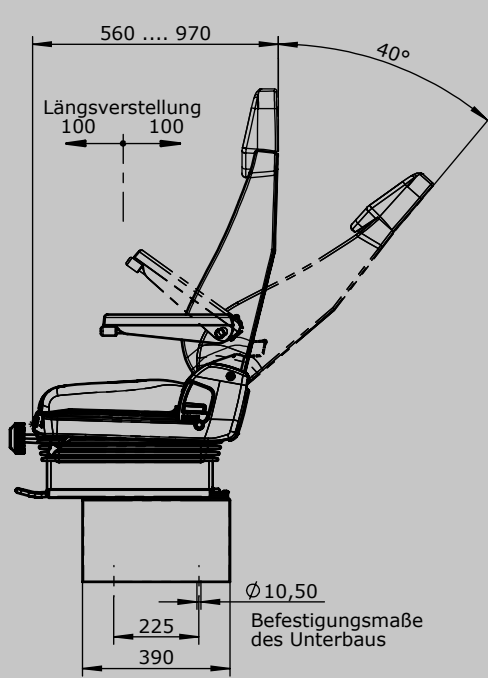
Technical data

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
Basic unit				
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)			



* 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.

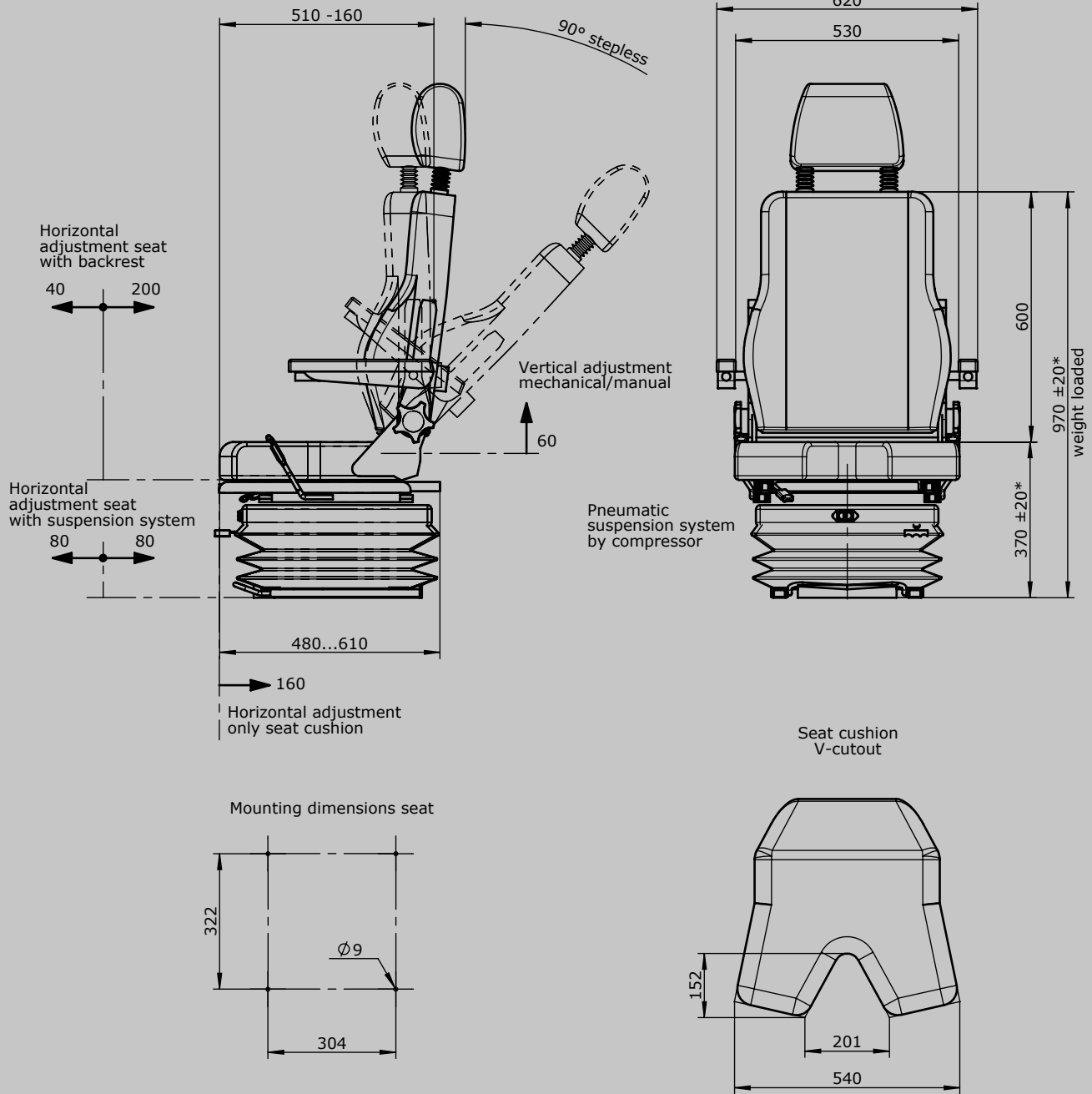
Technical data:

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
Basic unit						
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					



* adjustable



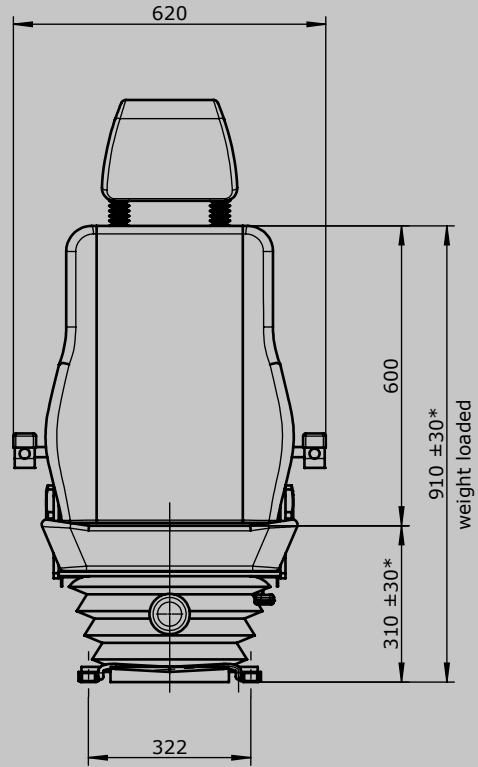
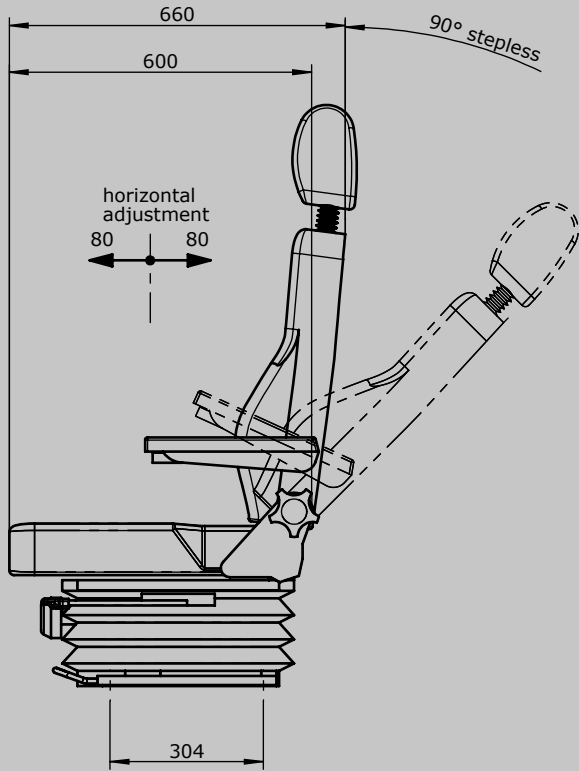
The Driver's Seat KFS9 is ergonomically designed and provides a high grade of comfort. The Driver's Seat is a low level mechanical suspension seat with an oil-hydraulic vibration absorption system with weight adjustment. Upon request, a pneumatic vibrating system with weight adjustment is available.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

Technical data

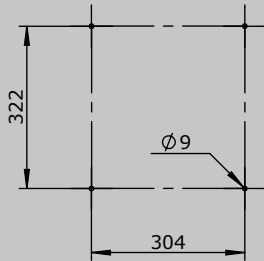
Suspension stroke	80 mm
Weight adjustment	50 - 150 kg (pneumatic)
	50 - 130 kg (mechanical)
Horizontal adjustment	160 mm
Inclination of the backrest	Max. 90°
Height and slope adjustment	60 mm



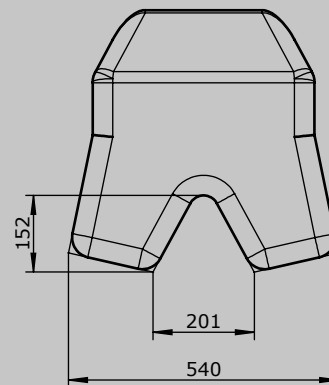
		Example				
		KFS 92	-A1	-L2	-S1	-P
Basic unit						
KFS91	Driver's Seat with air-permeable artificial leather cover black					
KFS92	Driver's Seat with textile cover black					
Attachments						
K	Headrest rain					
A1	Armrest adjustable (2 pieces) 50 mm wide					
A2	Armrest continuously adjustable (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.

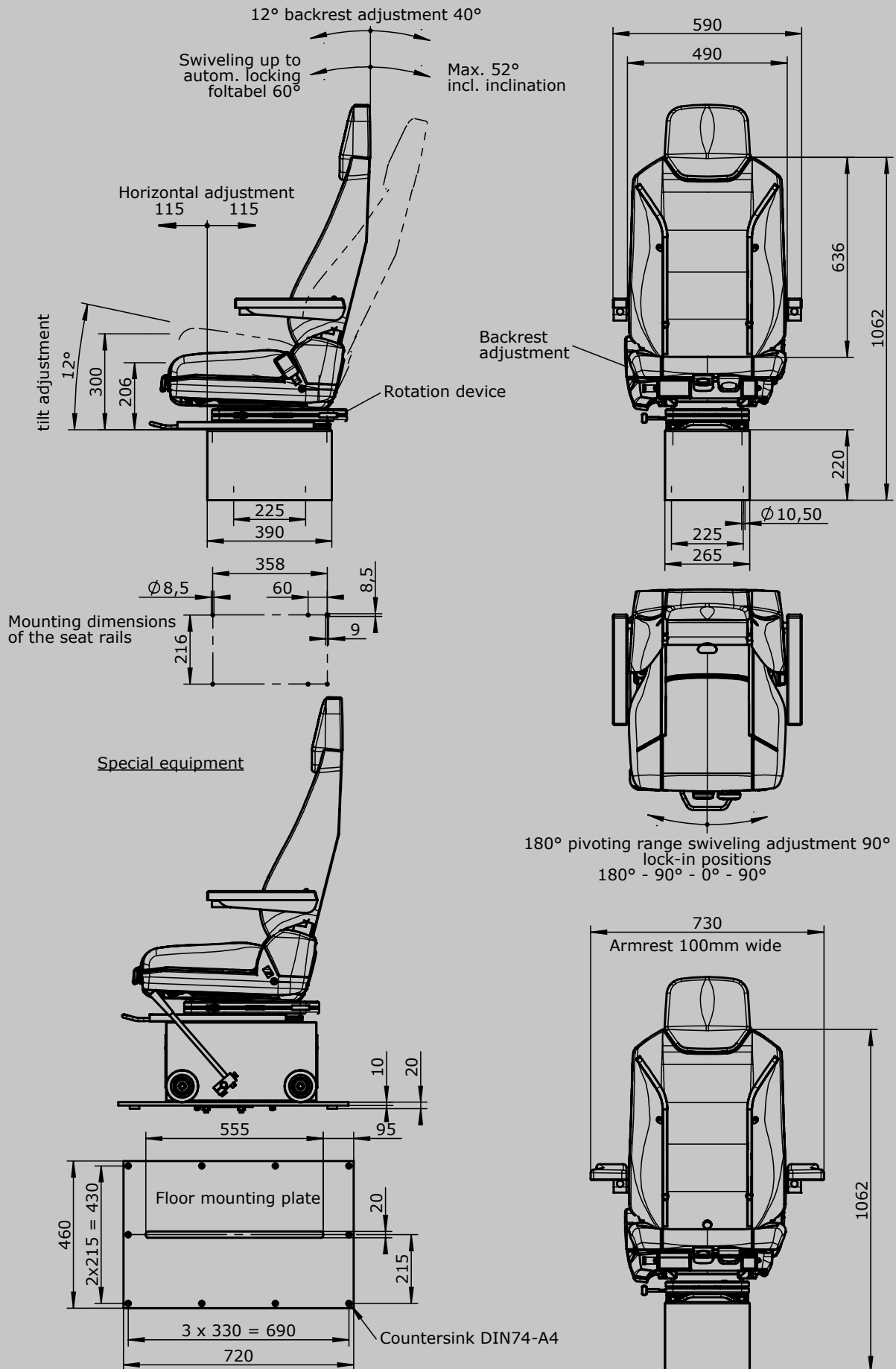
Technical data:

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



Example

		KFS 14	-A1	-S1	-U
Basic unit					
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)				



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

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.

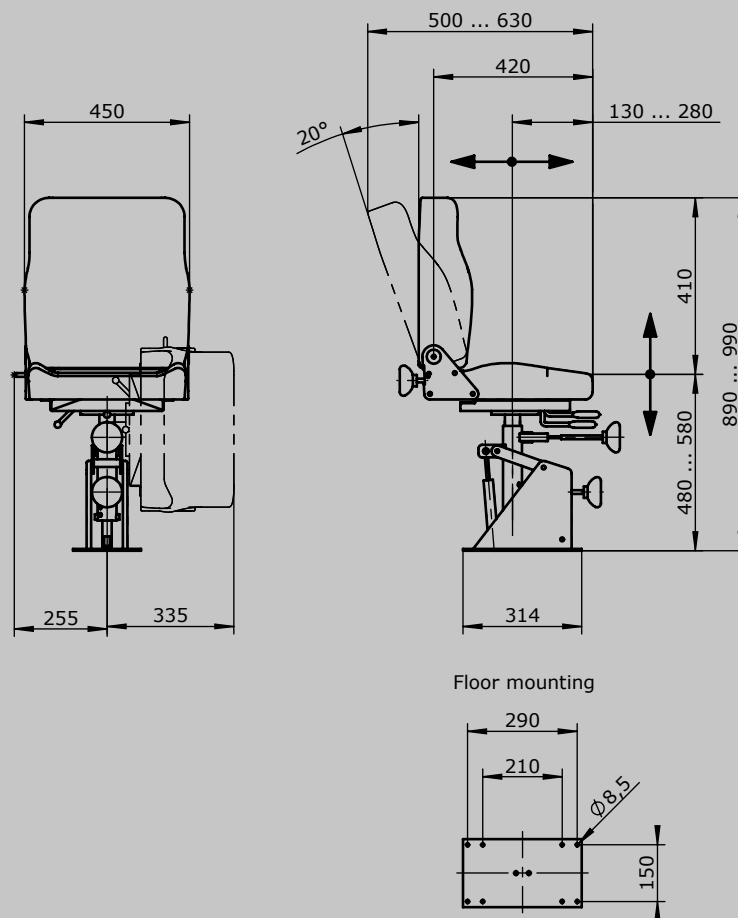
Technical data:

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



Example

		KFS 42	-A1
Basic unit			
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

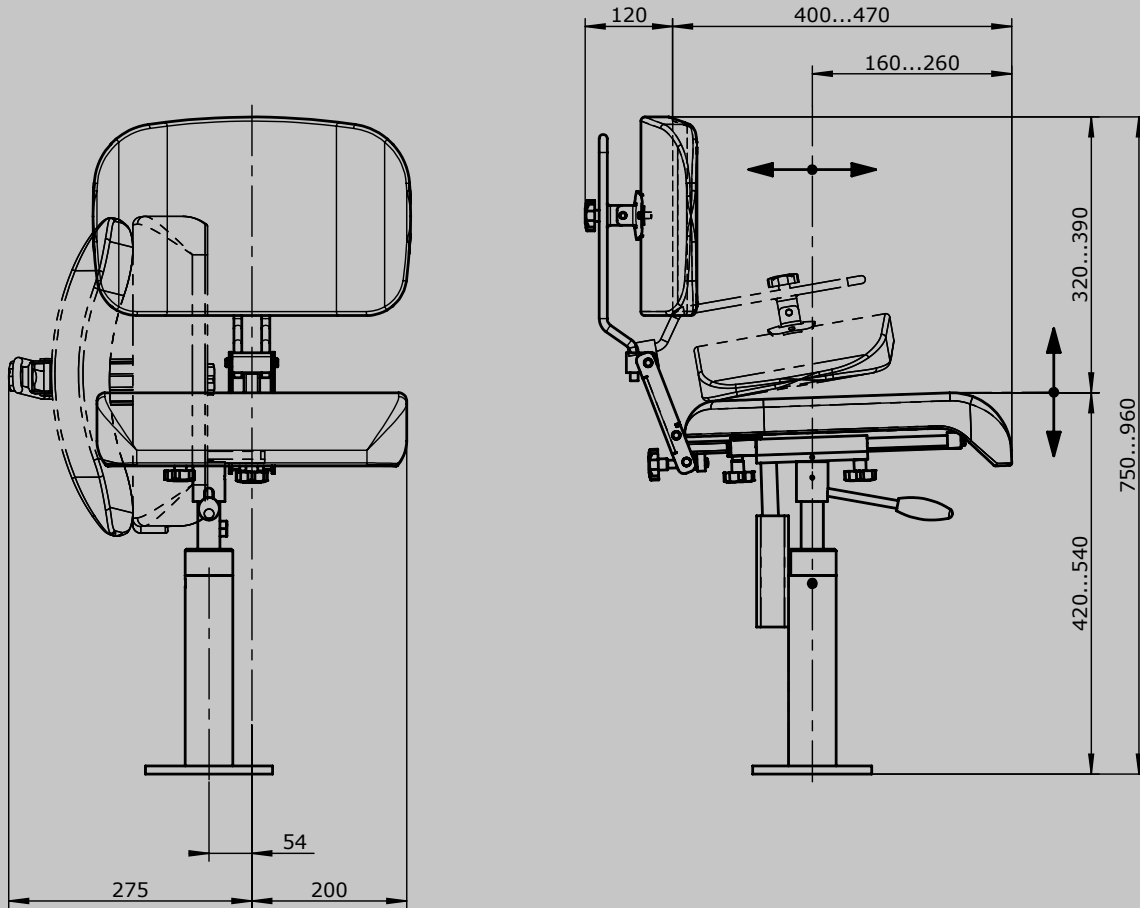


Example

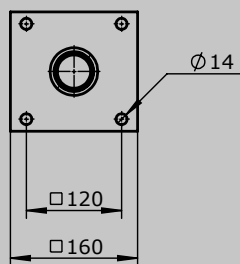
KFS 22

Basic unit

KFS21	Driver`s Seat with air-permeable artificial leather cover black
KFS22	Driver`s Seat 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:

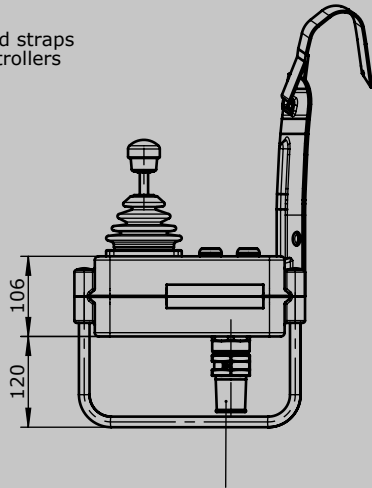
Operation temperature -40°C to +85°C
Degree of protection IP54



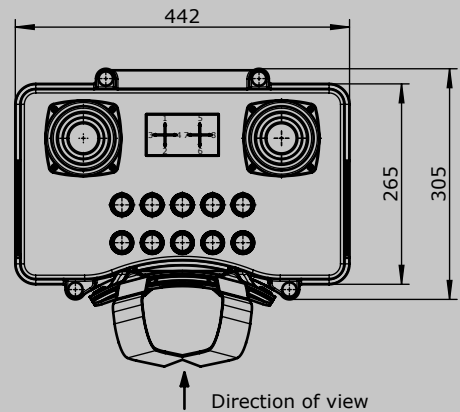
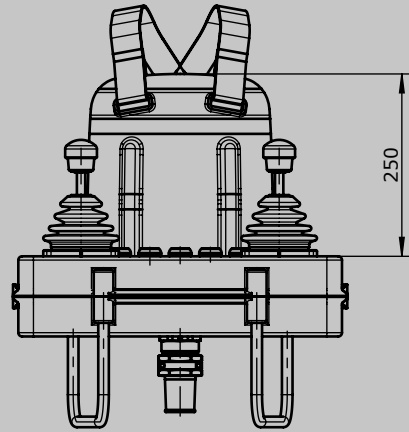
		Example							
		TS1	-SB 1	-RH 1	-K 3	-HS 1	/ V...	/ KLS	/ X
Basic unit									
TS1	Portable Control Unit with chest plate and straps								
TS11	Portable Control Unit with straps								
Attachment									
SB 1	Legs for control unit alu-tube 2 pieces								
SB 2	Legs for control unit stainless steel-tube 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 selection Joysticks)								
N	Control-Switch (see page 118)								
<i>More command and indicating devices (see page 142 and 265)</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!

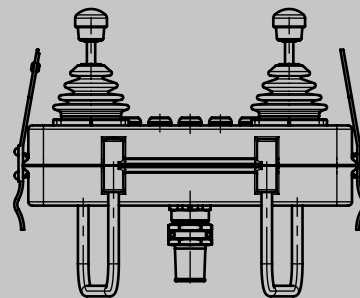
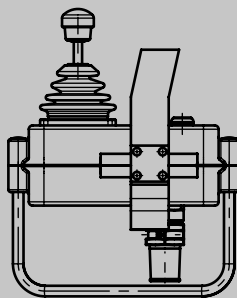
With chest plate and straps
with multi-axis controllers



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



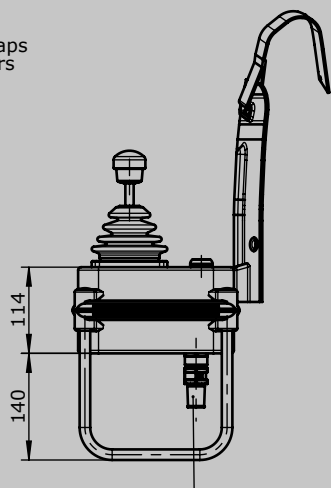
		TS2	-SB 1	-RH 1	Example		-K 3	-HS 1	/	V...	/	KLS	/	X
Basic unit														
TS2	Portable Control Unit with chest plate, straps													
TS21	Portable Control Unit with straps													
TS22	Portable Control Unit with bracket and straps													
Attachment														
SB 1	Legs for control unit alu-tube 2 pieces													
SB 2	Legs for control unit stainless steel-tube V2 A 2 pieces													
RH 1	Reeling hooks for control unit stainless steel V2 A													
K 1	Cable entry M32 cable 11 - 21 mm													
K 2	Cable entry M40 cable 19 - 28 mm													
K 3	Cable entry 180° swiveling M32 cable 11-21 mm													
HS 1	Plug in socket 16-pole male insert													
HB 1	Connector 16-pole female insert													
HS 2	Plug in socket 24-pole female insert													
HB 2	Connector 24-pole female insert													
HS 3	Plug in socket 32-pole male insert													
HB 3	Connector 32-pole female insert													
<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 selection Joysticks)													
S	Single-Axis Controller (see selection Joysticks)													
N	Control-Switch (see page 118)													
<i>More command and indicating devices (see page 142 and 265)</i>														

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

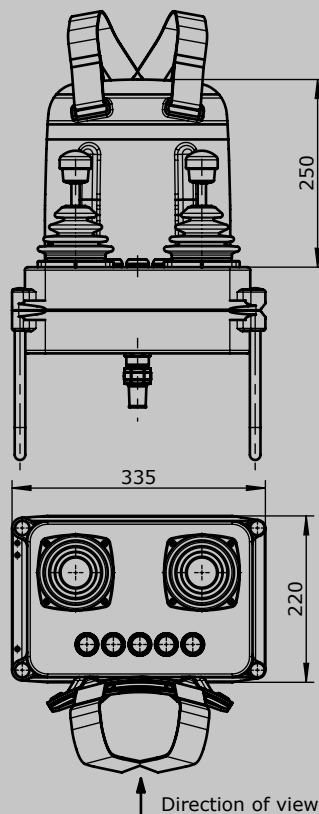
Cable and wiring				
Cable Oelflex Classic FD 810 P	18 x 1 mm ²	13,9 mm Ø	-5°C to +70°C	Each meter
Cable Oelflex Classic FD 810 P	25 x 1 mm ²	16,4 mm Ø	-5°C to +70°C	Each meter
Cable Oelflex Classic FD 810 P	34 x 1 mm ²	18,9 mm Ø	-5°C to +70°C	Each meter
Cable Ölflex Crane	18 x 1 mm ²	19,2 mm Ø	-25°C 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

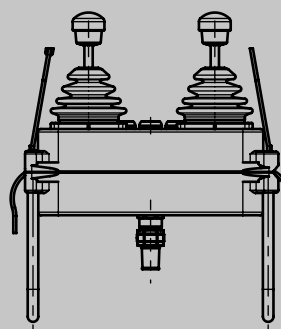
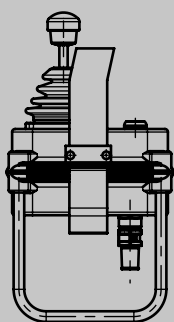
With chest plate and straps
with multi-axis controllers



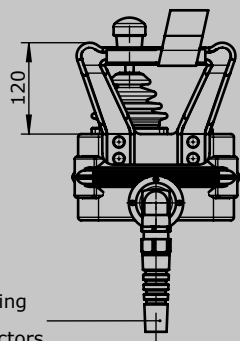
Cable entry
with anti-kink protection
and stain relief or connectors



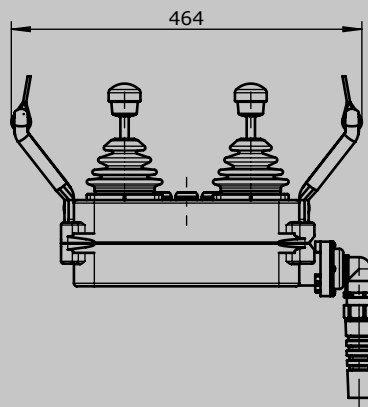
With adjustable carrying strap
with multi-axis controllers



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.

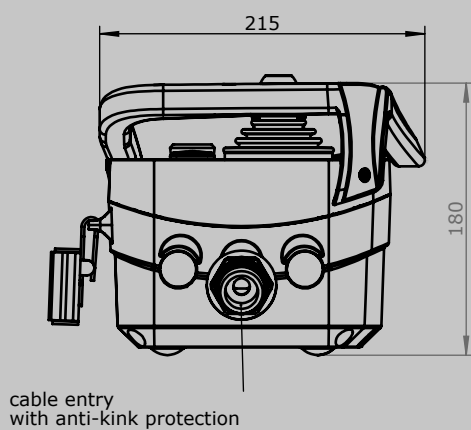
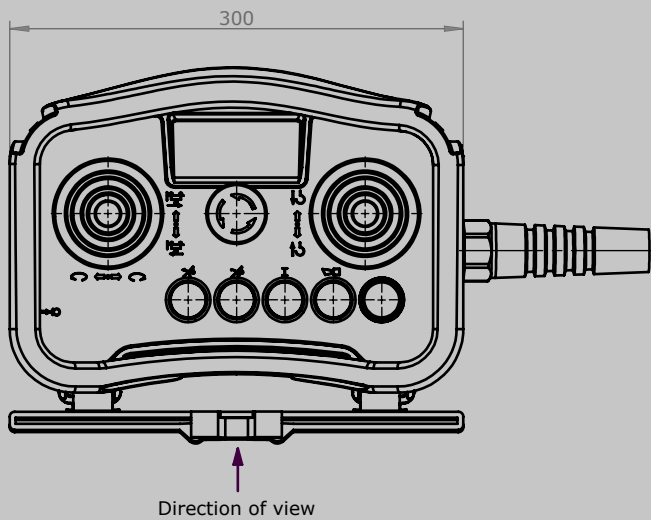
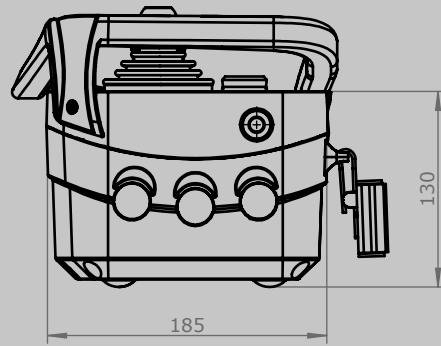
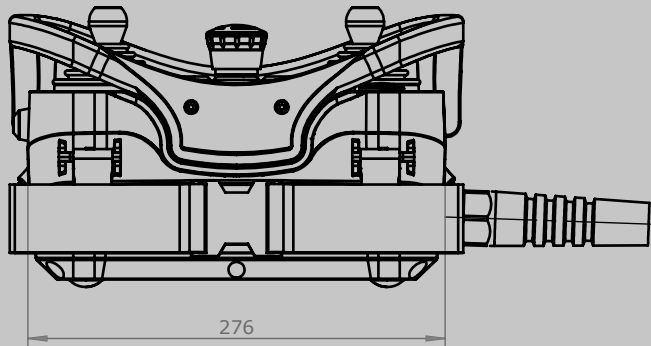
Technical data:

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 8 - 17 mm with bend protection										
K 2	Cable entry M32 cable 9 - 21 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 selection Joysticks)										
N	Control-Switch (see page 118)										
<i>More command and indicating devices (see page 142 and 265)</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

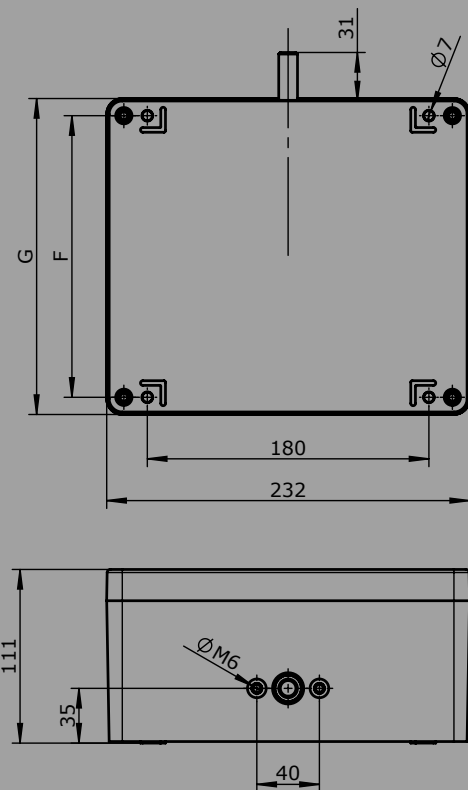
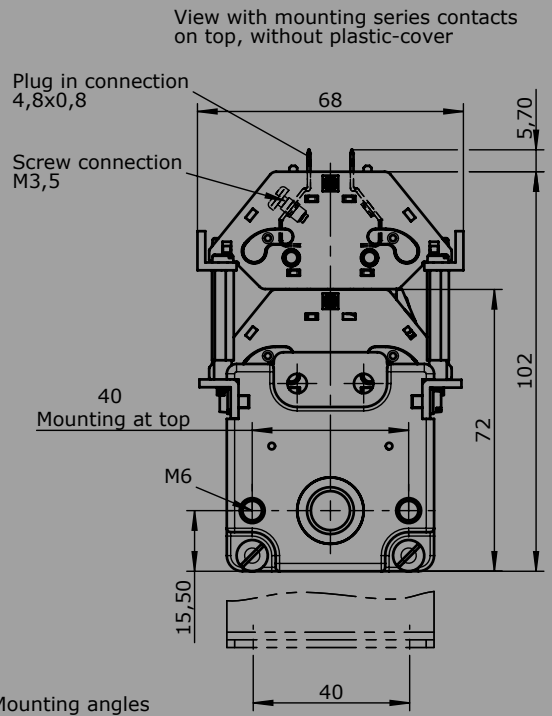
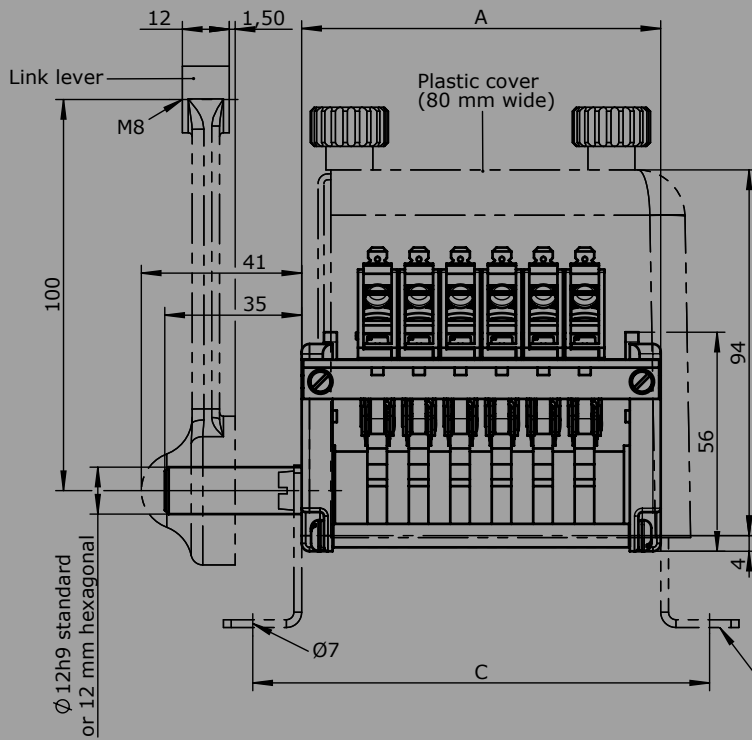


Switching capacity	NC	NO	Time constant
250 V DC	2A	1A	20 ms
125 V DC	4A	3A	20 ms
50 V DC	6A	6A	20 ms
30 V DC	10A	10A	20 ms
250 V DC15	6A	6A	

	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

SS 1.10 Normally closed



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.



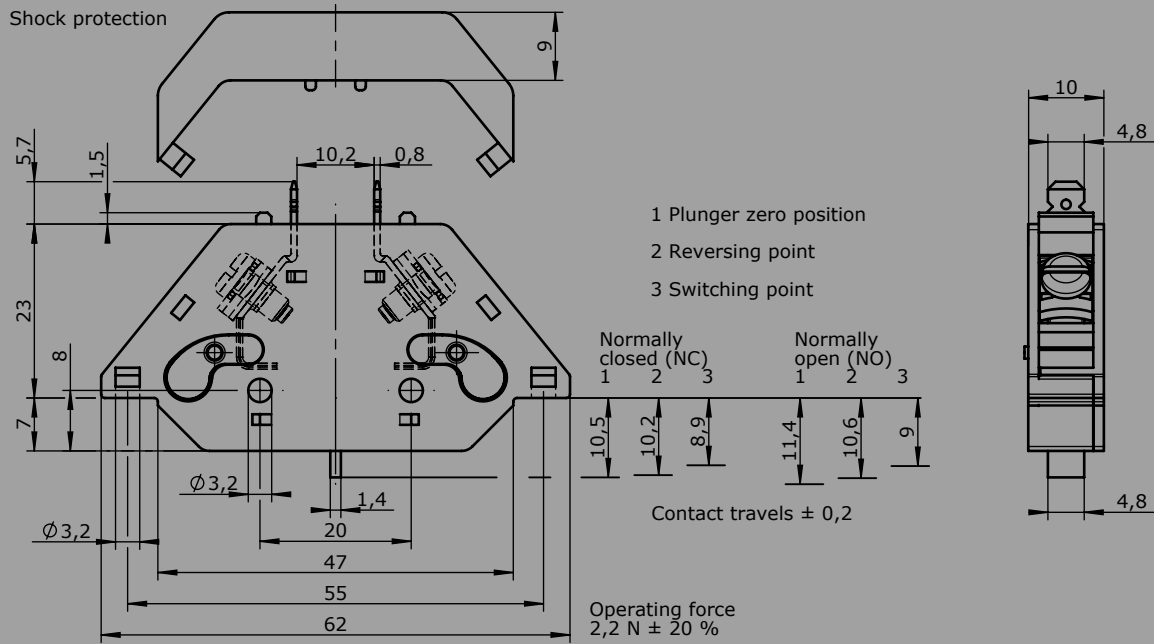
	Switching capacity		Time constant
	NC	NO	
250 V DC	2A	1A	20 ms
125 V DC	4A	3A	20 ms
50 V DC	6A	6A	20 ms
30 V DC	10A	10A	20 ms
250 V AC 15	6A	6A	

Technical data

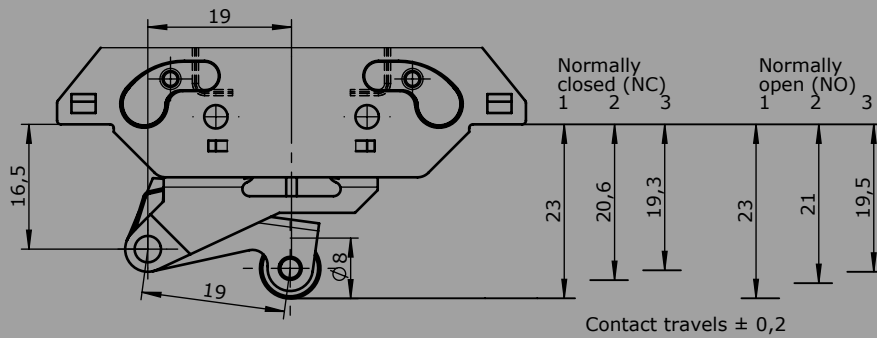
Mechanical life	2 million operating cycles
Electrical service life	50.000 operating cycles (at 2A 250 V DC L/R 20 ms)
Operation temperature	-40°C to +85°C
Degree of protection	IP40

	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				

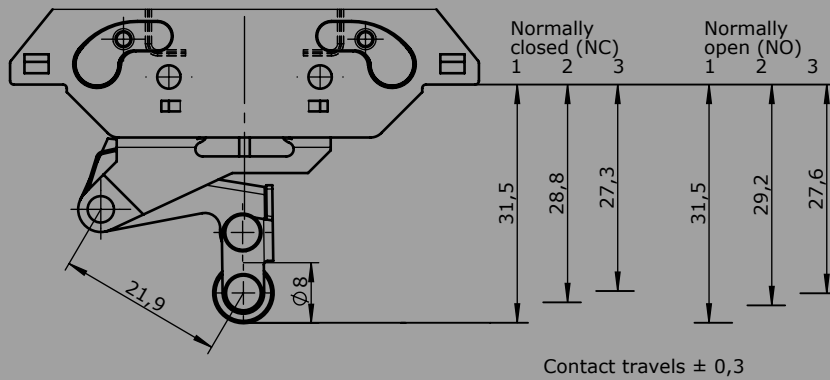
Technical details may vary based on configuration or application! Technical data subject to change without notice!



with roller lever



with toggle lever



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 (standard) includes a double cam disc conjointly lockable. The type GE 2 (standard) 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
Contact complement	2 A 250 V AC oder 3 A 24 V DC 13

	GE 1	-10	-4	-P	-U7	-P	-18	-30	-60	-90	-X
Basic unit											
GE1	Gear Limit Switch GE1 with mounting flange										
GE2	Gear Limit Switch GE2 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:

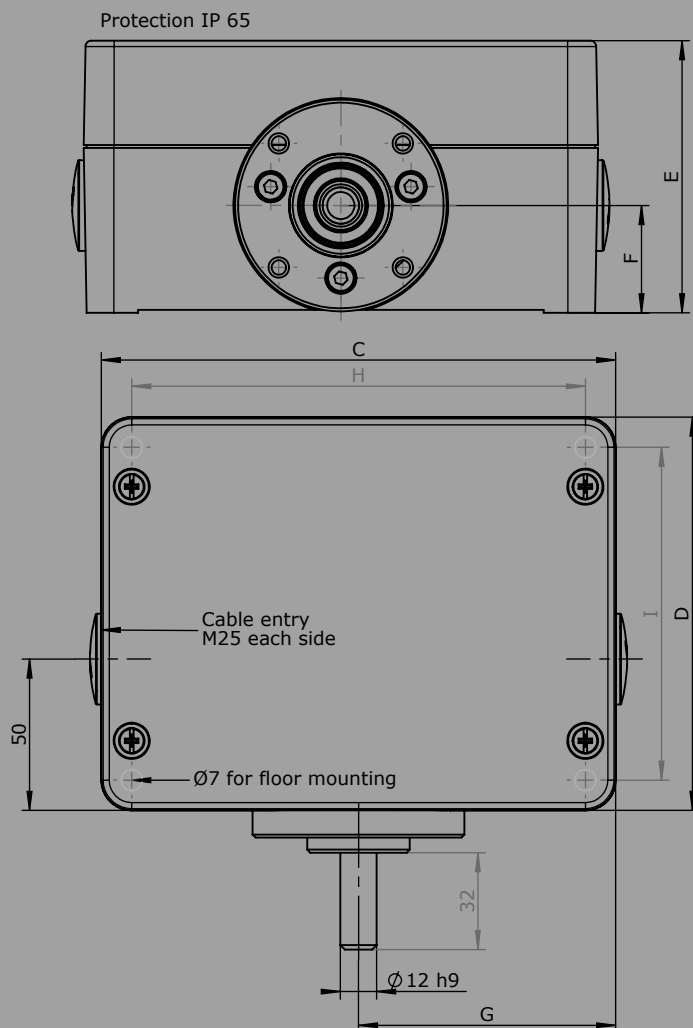
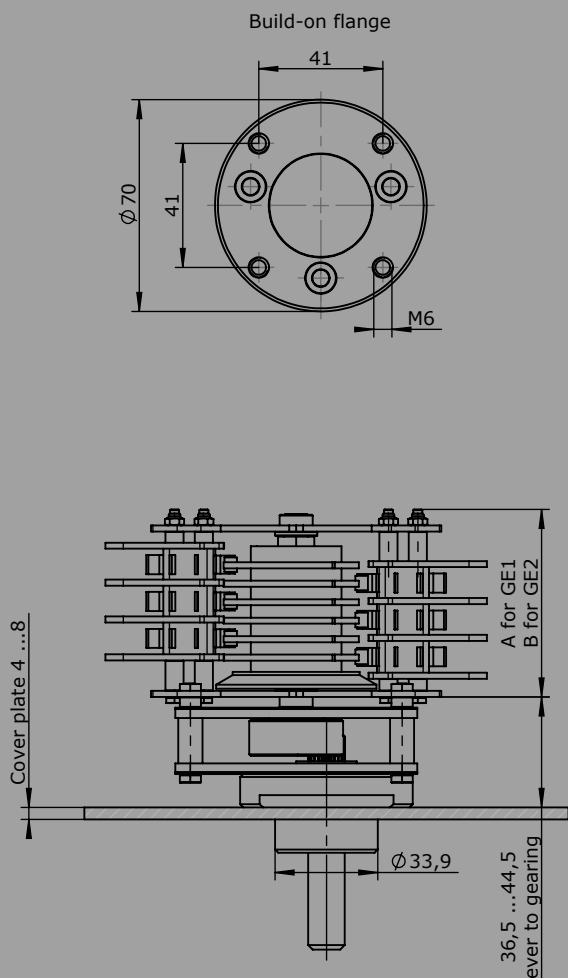
Illustration



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.

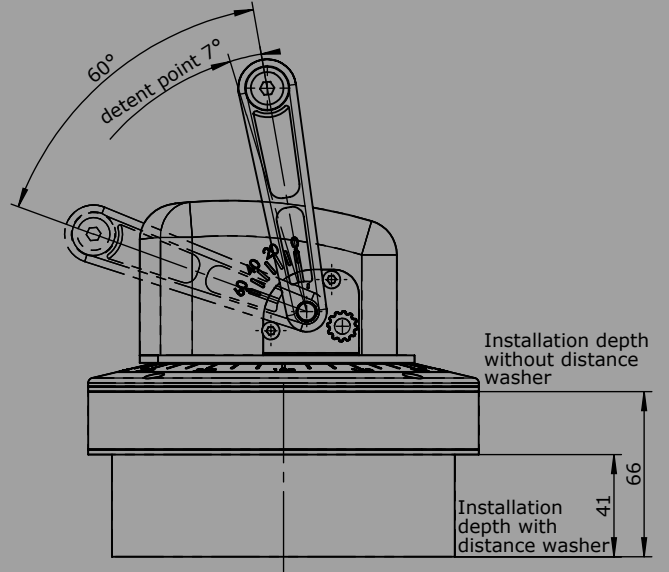
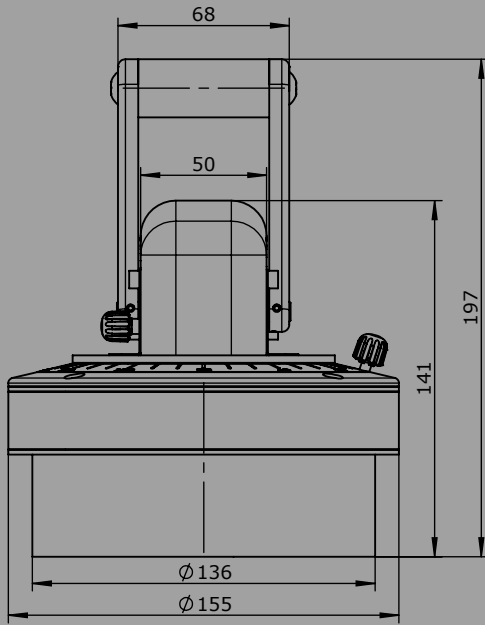
The AZ1 is resistant to oil, maritime climate, ozone and UV radiation.



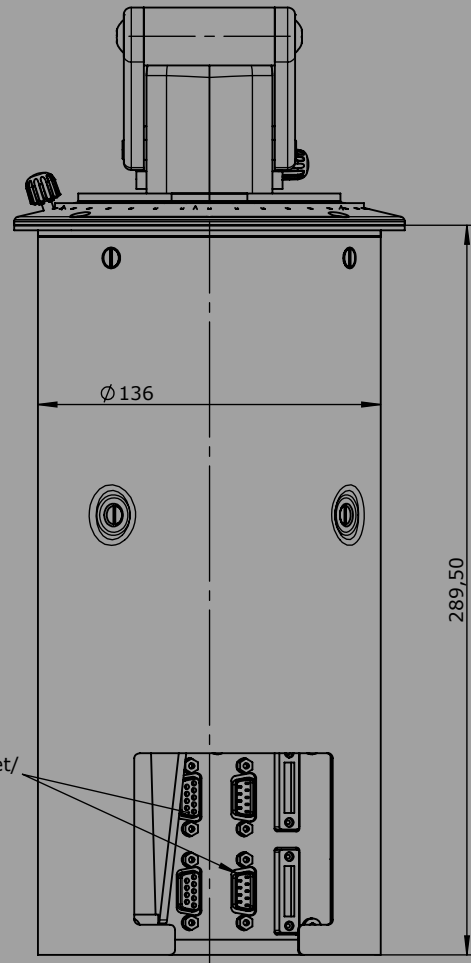
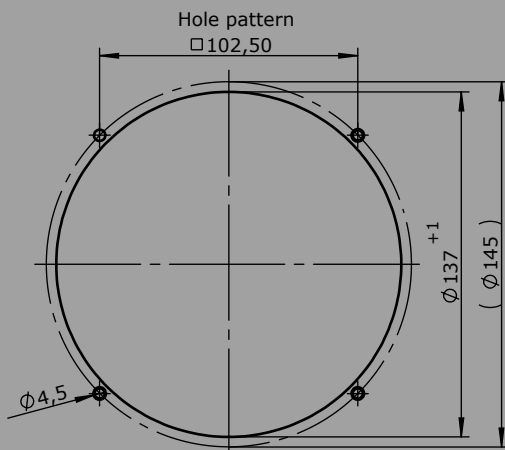
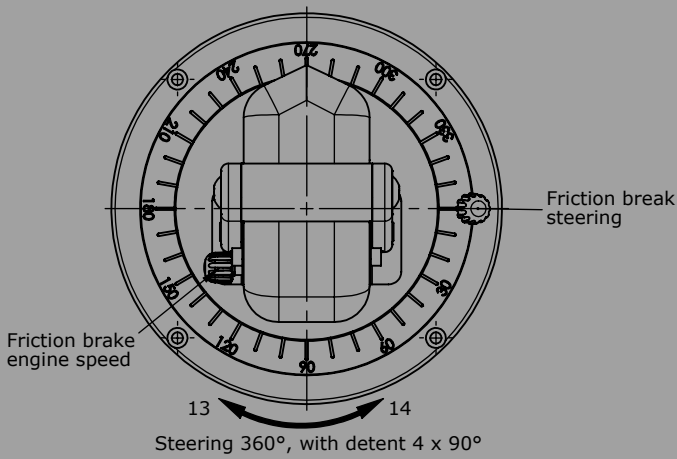
Technical data

Mechanical life AZ1	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		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		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		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												
D3 Double-Handle Controller													
Control-handle extended		S5											
S5 -20 mm													
Grip- control handle left			Q										
Q T-grip													
Grip- control handle right				Q									
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 125)													
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 Double-Handle Controller

Control-handle extended*

Standard 148 mm*

S5 -20 mm

S8 +20 mm

*Only available in combination with handle!

Grip-control-handle left

Knob

D Push button

Q T-grip

QD T-grip with push button side

Grip-control-handle right

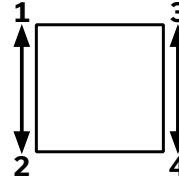
Knob

D Push button

Q T-grip

QD T-grip with push button side

Identification of the installation variants with switching directions:



D3

D3 S5 Q / Q - 2 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 127

e.g.

A98 MS0

A05 MS21

A050 MS21-0

A99 contact - arrangement according customer request

R Friction brake

(P) Mounting options for potentiometer and (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

Axis 2: direction 3-4 left

1	1 contact	Standard contact- arrangement see page 127		
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 125)		
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!			

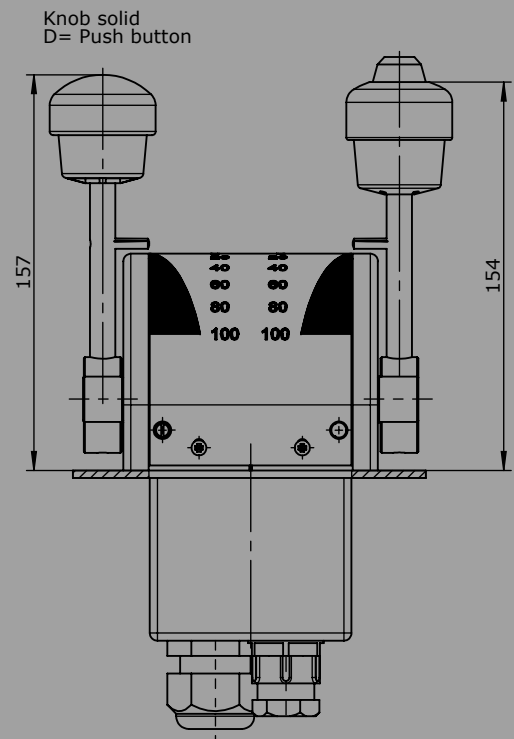
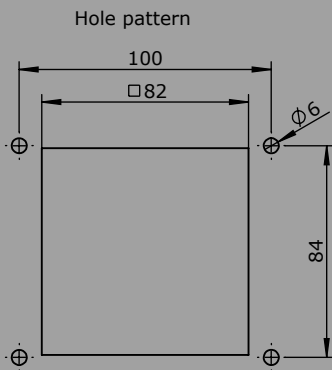
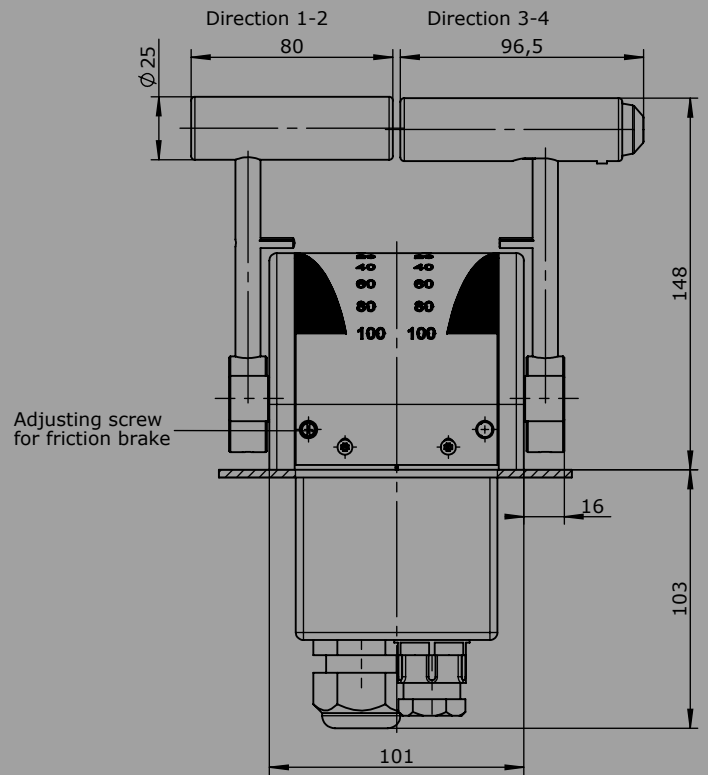
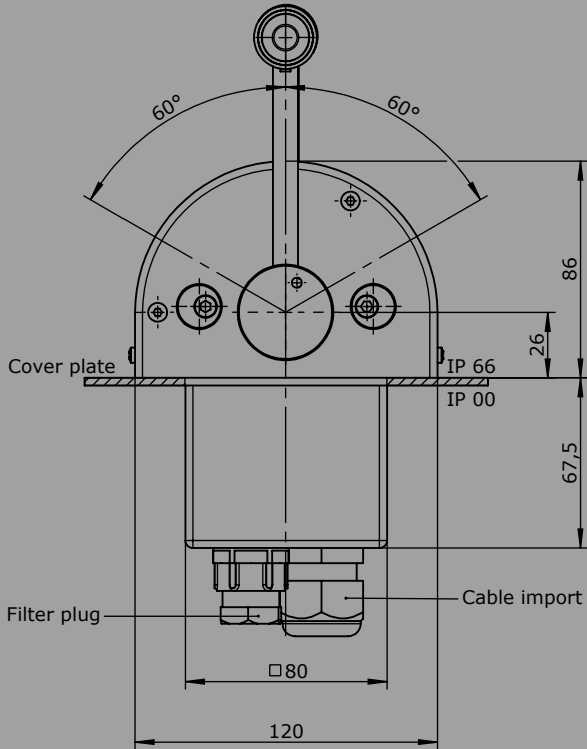
Current outputs

Supply voltage	18-36 V DC		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (standard plug connectors see page 125)		
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

Double-Handle Controller D3



T= grip
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

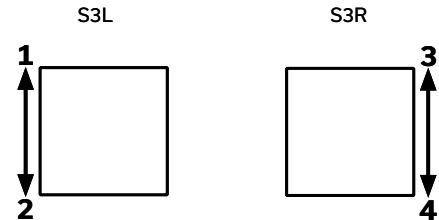


		S3L	S5	Q	-2 R P	-B	-A05 P484	-E1291	-S...	-X
Basic unit										
S3L	Single-Axis Controller left									
Control-handle extended										
S5	-20 mm									
Grip- control-handle left										
Q	T-grip									
Axis 1										
2	2 contacts (1,5A 24 V DC13)									
R	Friction brake									
P	Potentiometer									
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 125)									
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:



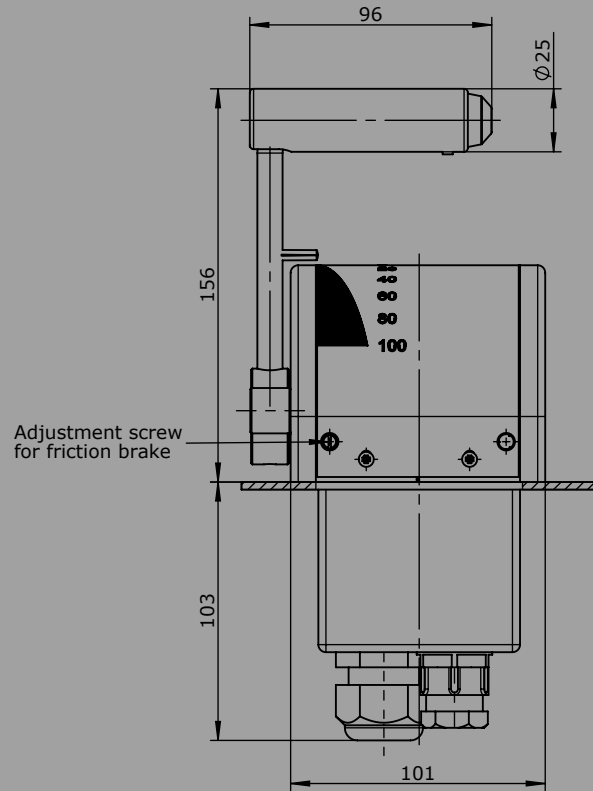
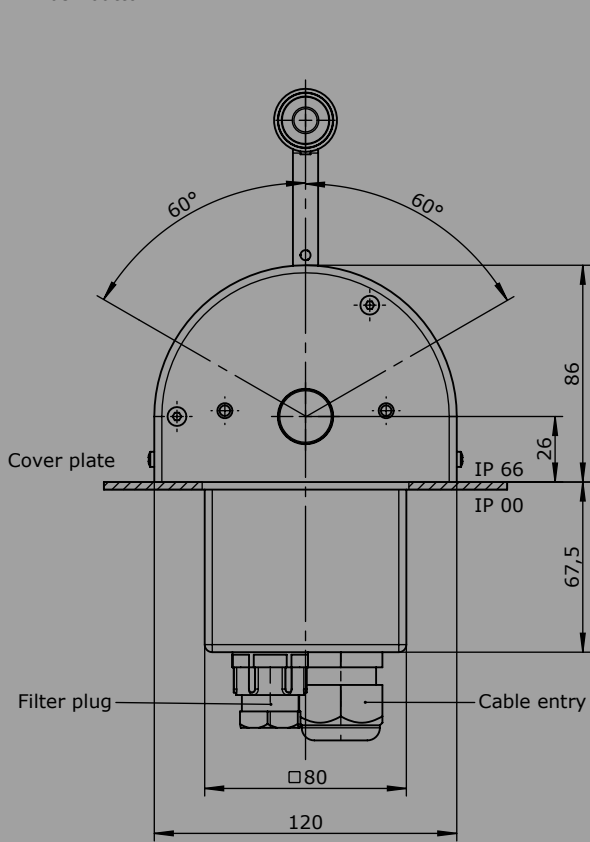
	S3L	S5	Q	-2 R P	-B	-A05	P484	-E1291	-S...	-X	
Axis 1: direction 1-2 left											
1	1 contact										
2	2 contacts										
3	3 contacts										
	Standard contact - arrangement see page 127										
	z.B.										
	A98										
	A05										
	A050										
	A99 contact - arrangement according 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									

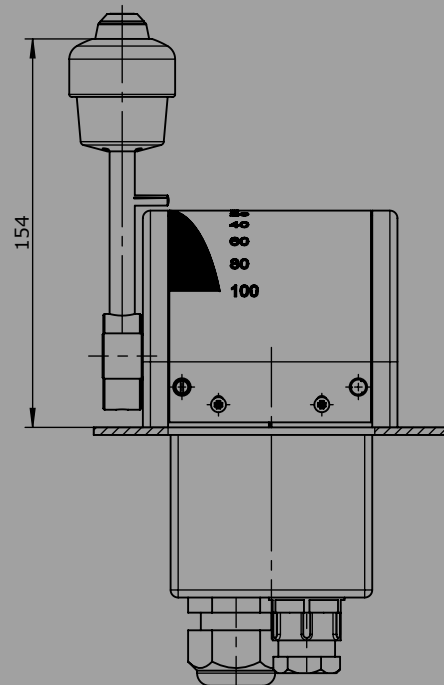
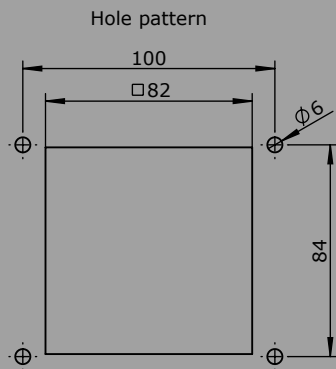
Voltage output			
Supply voltage	11,5-32 V DC		
Wiring	Cable 500 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 125</i>)		
0...5...10V	1 axis	E112 1	S
10...0...10V	1 axis	E141 1	
-10...0...+10V	1 axis	E140 1	
Voltage output with other value on request!			

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 125</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.

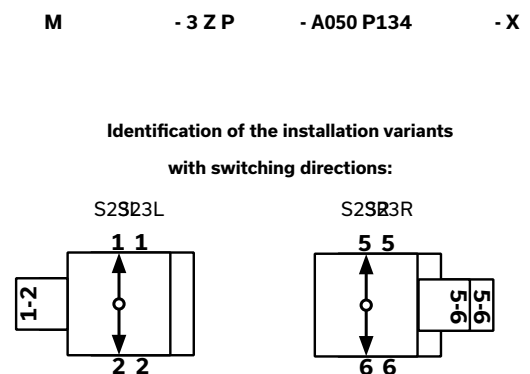
Technical data

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

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



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 127		
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 135		

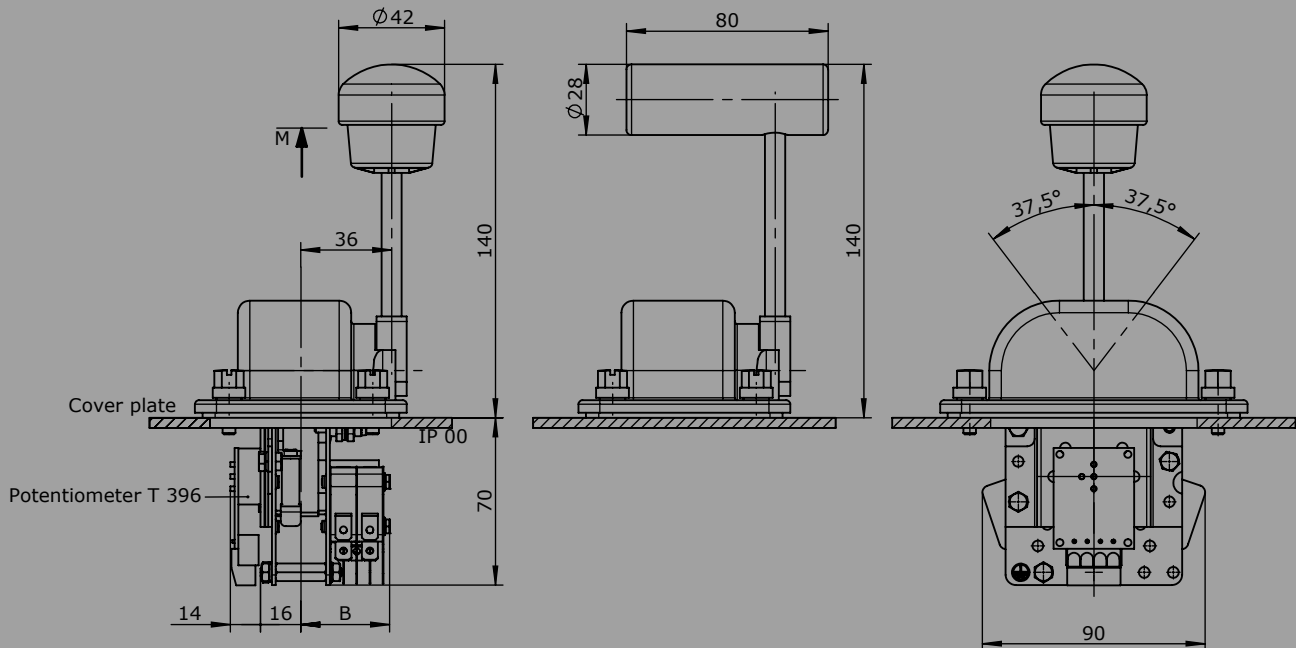
S23L S5 M - 3 Z P - A050 P134 - X

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

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.

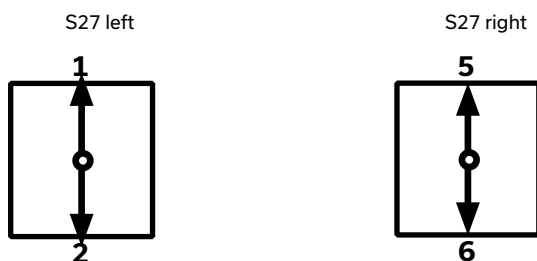
Technical data

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	-Z	-E...	-S...	-X
Basic unit						
S27L Single-Axis Controller left						
S27R Single-Axis Controller 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 125)						
Special model						
X Special / customer specific						

Identification of the installation variants with switching directions:



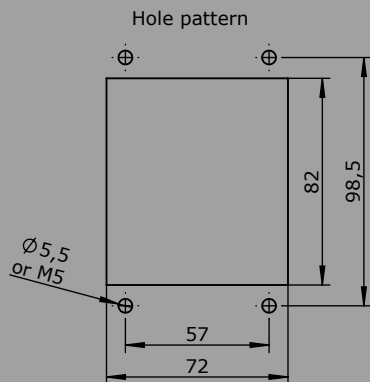
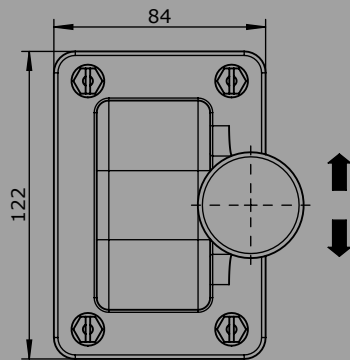
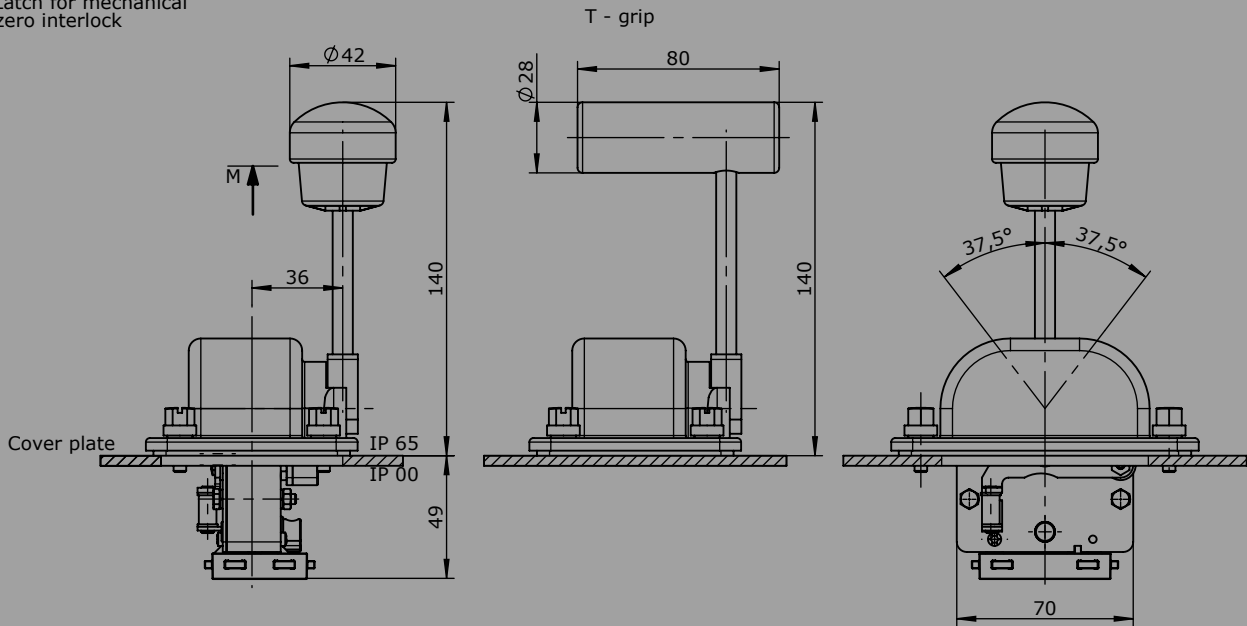
Digital Output		
Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA	
	Zero position signal 500 mA	
Wiring	Cable 500 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 125</i>)	S
2 direction signals + 1 zero position signal (galvanically 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 125</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 125</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
<i>Current output with other value on request!</i>		

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:

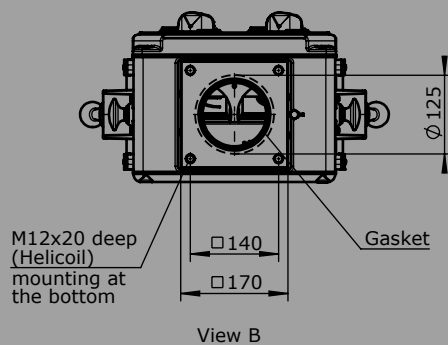
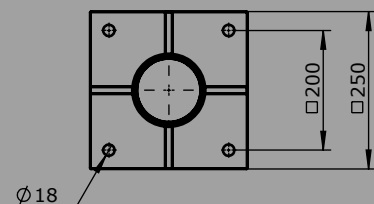
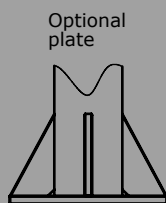
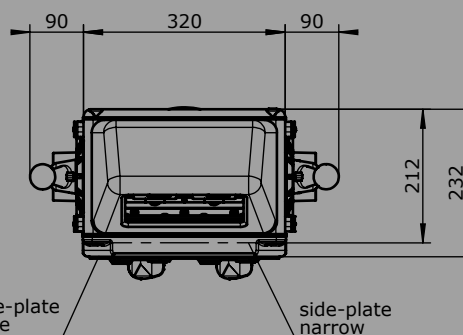
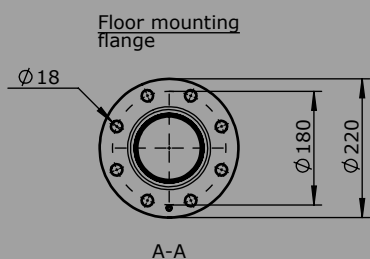
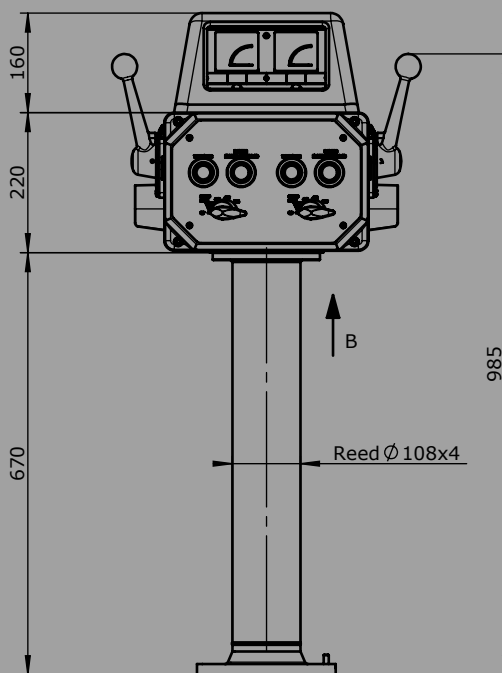
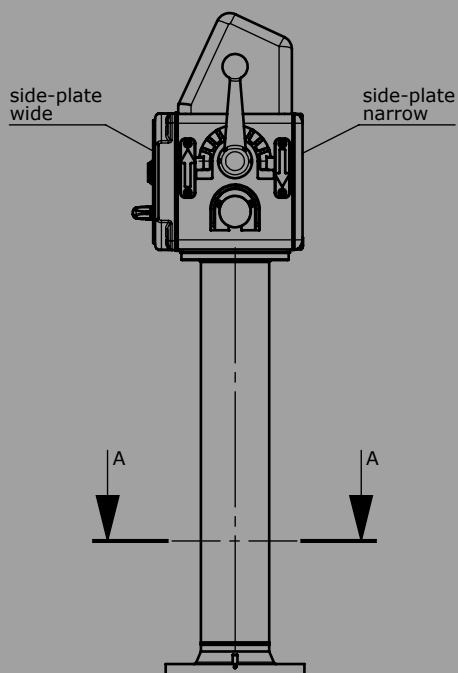
Operation temperature	-40°C to +85°C
Degree of protection	IP66

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 127										
02	4 contacts	z.B.										
03	6 contacts	A05	MS21									
04	8 contacts	A0500	MS21-00									
		A99 contact - arrangement according customer request										
Z	Spring return											
R	Friction brake											
P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA								
		P132	T396 2 x 1 kOhm	I max. 1 mA								
		P133	T396 2 x 2 kOhm	I max. 1 mA								
		P134	T396 2 x 5 kOhm	I max. 1 mA								
		P135	T396 2 x 10 kOhm	I max. 1 mA								
		More potentiometers on request!										

U22/32 / N61.../N62... / H / PW / 2D / PQ / KLV / X

Command and indicating devices							
H	Heating	20 Watt 220 or 110V 50/60 Hz					
PV	Mushroom head push button latching	22 latching with indicating label	1 NC				
P	Mushroom head push button	22 with indicating label	1 NO				
D	Push button	22 with indicating label	1 NO				
W	Selector switch 0-1	22 with indicating label	1 NO				
L	Indicator light	22 with indicating label	Diode 24 Volt				
L	Indicator light	22 with indicating label	Diode 230 Volt AC				
	Contact block additional		1 S or 1 Ö				
L	Indicator light	22 with indicating label	Diode 24 Volt protection IP65				
L	Indicator light	10 with indicating label	Diode 24 Volt protection IP65				
Display devices							
PQ	Powermeter PQ 72 1 mA DC		Engraved your instructions				
PQI	Powermeter PQ 72 1 mA DC illuminated 24 Volt		Engraved your instructions				
PQ	Powermeter PQ 72 x 36 1 mA DC		Engraved your instructions				
PQI	Powermeter PQ 72 x 36 1 mA DC illuminated 24 Volt		Engraved your instructions				
EQ	Amperemeter EQ 72 100/200/1A		Engraved your instructions				
EQI	Amperemeter EQ 72 100/200/1A illuminated 24 Volt		Engraved your instructions				
EQ	Amperemeter EQ 72 x 36 100/200/1A		Engraved your instructions				
EQI	Amperemeter EQ 72 x 36 100/200/1A illuminated 24 Volt		Engraved your instructions				
Wiring		KLV on terminal block 2,5mm ² with wire line 0,75 mm ²					
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:

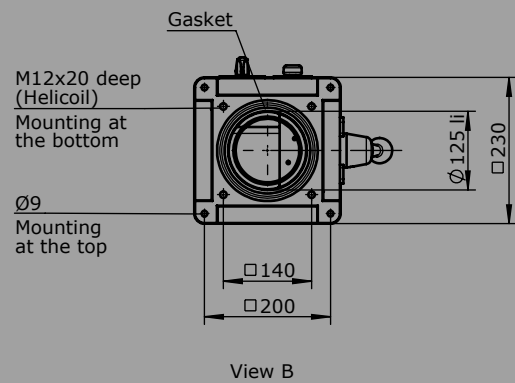
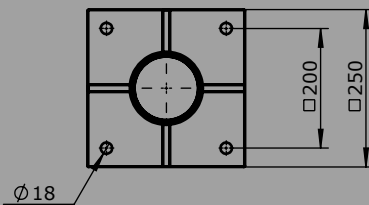
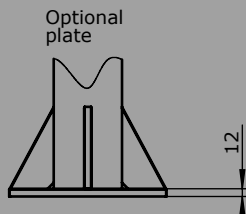
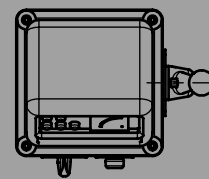
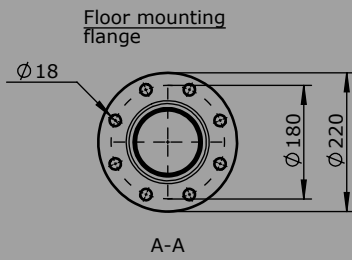
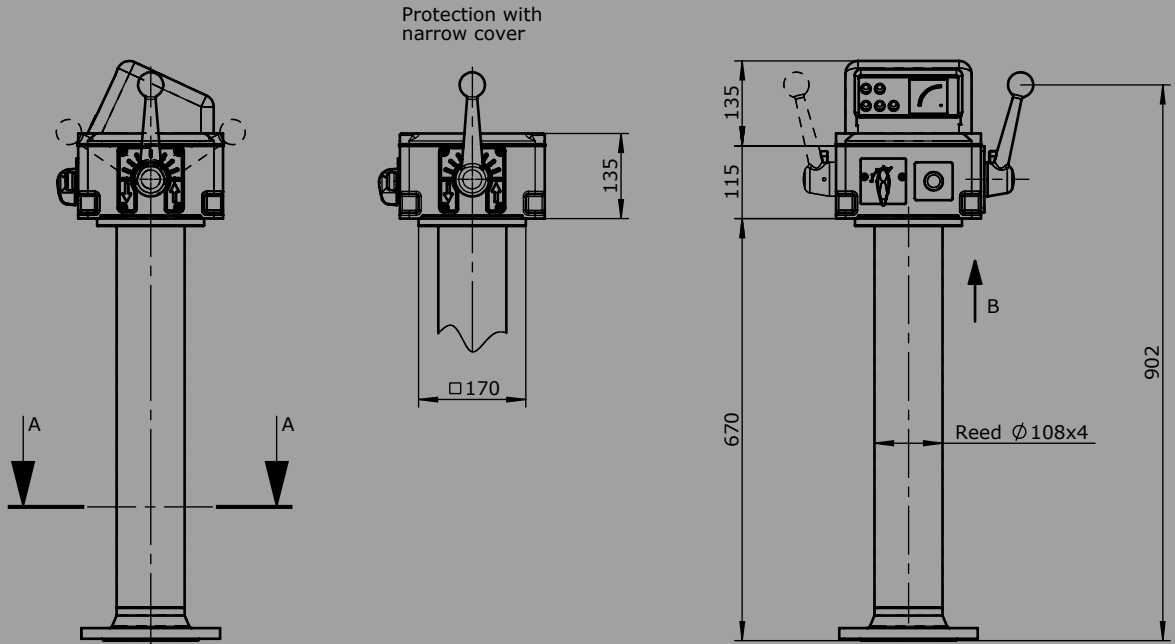
Operation temperature	-40°C to +85°C
Degree of protection	IP66



		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					
		-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 127					
02	4 contacts	z.B.					
03	6 contacts	A05	MS21				
04	8 contacts	A0500	MS21-00				
		A99 contact - arrangement according customer request					
Z	Spring return						
R	Friction brake						
P	Potentiometer	P131	T396 2 x 0,5 kOhm	I max. 1 mA			
		P132	T396 2 x 1 kOhm	I max. 1 mA			
		P133	T396 2 x 2kOhm	I max. 1 mA			
		P134	T396 2 x 5 kOhm	I max. 1 mA			
		P135	T396 2 x 10 kOhm	I max. 1 mA			
		More potentiometers on request!					

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

		U23/23	/	N61.../N62...	/	H / PW / 2D	/	PQ	/	KLV	/	X
Command and indicating devices												
H	Heating	20 Watt 220 or 110V 50/60 Hz										
PV	Mushroom head push button latching	22 latching with indicating label		1 Ö								
P	Mushroom head push button	22 with indicating label		1 S								
D	Push button	22 with indicating label		1 S								
W	Selector switch 0-1	22 with indicating label		1 S								
L	Indicator light	22 with indicating label		Diode 24 Volt								
L	Indicator light	22 with indicating label		Diode 230 Volt AC								
	Contact block additional			1 S or 1 Ö								
L	Indicator light	22 with indicating label		Diode 24 Volt protection IP65								
L	Indicator light	10 with indicating label		Diode 24 Volt protection IP65								
Display devices												
PQ	Powermeter PQ 72 1 mA DC			Engraved your instructions								
PQI	Powermeter PQ 72 1 mA DC illuminated 24 Volt			Engraved your instructions								
PQ	Powermeter PQ 72 x 36 1 mA DC			Engraved your instructions								
PQI	Powermeter PQ 72 x 36 1 mA DC illuminated 24 Volt			Engraved your instructions								
EQ	Amperemeter EQ 72 100/200/1A			Engraved your instructions								
EQI	Amperemeter EQ 72 100/200/1A illuminated 24 Volt			Engraved your instructions								
EQ	Amperemeter EQ 72 x 36 100/200/1A			Engraved your instructions								
EQI	Amperemeter EQ 72 x 36 100/200/1A illuminated 24 Volt			Engraved your instructions								
Wiring												
KLV on terminal block 2,5 mm ² with wire line 0,75 mm ²												
Special model												
X	Special / customer specified											



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Dealer

Djibouti

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