

SeGMO-Positioning

Compact positioning drives
with high torques

GEL 6110

Technical information

Version 2024-03-06

General

The SeGMO-Positioning is a compact mechatronic unit consisting of a brushless DC motor, a 32-bit microprocessor, a compact power amplifier, a powerful gear and a magnetic-absolute multiturn encoder.

Active system protection against thermal overload and comprehensive system software allow load-dependent duty cycles well beyond 25 % ED.

With its high degree of protection (IP 67), the robust metal housing offers versatile application possibilities in various industrial sectors.

Features

- Nominal torques from 1.4 Nm to 18 Nm
- Housing made of stainless steel or aluminum
- Operating temperature range -10 °C to +60 °C
- Brushless DC motor
- Magnetic-absolute multiturn encoder
 - Detection range: 342 revolutions, also in de-energized state
- Degree of protection IP 67
- Integrated communication interfaces
CANopen (CiA 402); PROFIBUS-DP (V0/V1); sercos III; POWERLINK; PROFINET IO/RT; EtherCAT; EtherNet/IP; Modbus/TCP
- Optional with cULus Component Recognition

Advantages

- Either hybrid cable or connector outlet
- Onboard joystick for simple commissioning
- Monitoring equipment to aid trouble-free operation
- Ready for use directly after switching on the power supply due to absolute position detection of the magnetic-absolute multiturn encoder
- Maintenance-free electrical parts
- Maintenance-free gear due to sealed-for-life lubrication

Fields of application

- Packaging machines
- Food and bottling lines
- Wood and plastic processing machines
- Printing and bookbinding machines
- Large production facilities



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Variable in connection technology and communication interface

Right to technical changes and errors reserved.

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 **LENORD
+BAUER**

SeGMo-System

The SeGMo-System is suitable for efficient integration of several positioning drives and positioning displays in a machine or a system. The system comprises the following components:

- **SeGMo-Positioning:**
Positioning drive for fully automatic format setting
- **SeGMo-Motion:**
Positioning drive for cyclic operation
- **SeGMo-Box:**
Decentral control unit for up to 5 positioning drives
- **Modular SeGMo-Box:**
decentral control unit for up to 17 positioning drives or up to 48 positioning displays
- **SeGMo-Assist:**
Position display for manual adjustment procedures
- **SeGMo-Connect:**
Single cable concept (hybrid cable suitable for drag chain)
- **SeGMo-Lib:**
Prefabricated function blocks for integration in the higher level control system
- **SeGMo-Support Tool:**
Software for extended commissioning and configuration
- **SeGMo-Web:**
Software for real-time transmission of the modular SeGMo-Box
- **SeGMo-ImgConv Tool:**
Tool for converting image files into pictograms for SeGMo-Assist

SeGMo-Positioning:

The positioning drives are complete mechatronic systems with a batteryless multiturn encoder, gear and motor as well as integrated power and control electronics. We also offer these items for standalone use. With nominal torques of up to 18 Nm, they cover the typical power range for secondary axes.

SeGMo-Motion:

The positioning drives are complete mechatronic systems with gear and motor as well as integrated power and control electronics for cyclic operation.

SeGMo-Box:

Up to 5 positioning drives can be connected to the SeGMo-Box. The connection of position displays is not provided. The SeGMo-Box supports all common fieldbus and Industrial Ethernet communication interfaces.

Modular SeGMo-Box:

Every modular SeGMo-Box comprises a basic housing with individually equippable plug-in modules. By combining basic housings, up to 17 positioning drives or up to 48 position displays can be connected. A combination of positioning drives and position displays on a modular SeGMo-Box is possible. The power supply can be provided separately for each equipped plug-in module. The modular SeGMo-Box supports all common Industrial Ethernet communication interfaces.

SeGMo-Assist:

The position displays facilitate manual adjustment procedures by displaying nominal and actual positions. Products are available for rotary and linear applications. Another product without a measuring system supports the operator, for example, when changing format parts or tools.

SeGMo-Connect:

By using the positioning drives with a SeGMo-Box the cabling effort is considerably reduced by SeGMo-Connect. Instead of the usual two separate cables for internal bus communication and a third cable for power supply to the positioning drives, only **ONE** hybrid cable is connected. In combination with the SeGMo-Box and 5 connected positioning drives, the SeGMo-Connect typically reduces the number of cables from 15 to 5. The hybrid cable is designed for moveable use in drag chains. Its product variants are food grade quality, halogen-free and available as a cULus recognized component.

SeGMo-Motion



SeGMo-Positioning



SeGMo-Assist



SeGMo-Box



Modular(e) SeGMo-Box



Description of positioning drive

General description

The positioning drive belongs to the SeGMo-Positioning product group and is a component of the SeGMo system. It is an intelligent adjustment unit for mounting on a machine shaft end or for attachment to a machine shaft or spindle.

The positioning drive converts the movement commands into a mechanical rotary motion and actuates a machine shaft. Rotation of the positioning drive with the machine shaft is prevented by mounting a torque support.

Product construction

The positioning drive requires two supply voltages of 24 V to 30 V DC. The logic circuit supply voltage supplies the control electronics and the power circuit supply voltage supplies the power electronics for the motor.

The positioning drive is equipped with a mechanical manual emergency adjustment to operate the positioning drive in the event of a malfunction, for example power failure.

The mechanical manual emergency adjustment must not be activated on positioning drives with the holding brake option. This will damage the positioning drive.

The optional holding brake guarantees a reliable hold even under shock and vibration loads, especially in the case of vertical machine shafts.

The positioning drive can be configured with the SeGMo-Support Tool via the service connector (mini-USB).

The positioning drive requires a functional ground cable to be connected. Connection is via a setscrew (M4). We recommend a wire cross section of 4 mm² [12 AWG].

Direct connection to a higher level control system

The positioning drive with **ST** connection technology is intended for stand-alone use and is connected directly to a higher level control system. It supports fieldbus profiles and Industrial Ethernet protocols.

Positioning drives with integrated fieldbus have rotary switches for setting the bus address and baud rate as well as a joystick. During commissioning, the positioning drive can be operated using the joystick without previous programming of the higher level control system. Jog mode using the joystick is only possible in service mode. All elements are accessible from the rear.

Indirect connection to a higher level control system

The positioning drive is connected to a SeGMo-Box or a modular SeGMo-Box using SeGMo-Connect. The hybrid cable SeGMo-Connect handles bus communication and the power supply of the positioning drive. The positioning drive communicates with the SeGMo-Box via the system-internal fieldbus profile (communication interface **CO**). It is available as an option with a hybrid cable (connection technology **H1/H2/H3/S1/S2/S3/xx/Vx**) or plug connection (connection technology **HS**).

The positioning drive with **Vx** connection technology is pre-assembled and can be connected directly to SeGMo-Box GEL 6505.

Magnetic-absolute multiturn encoder

A magnetic absolute multiturn encoder makes reference search routines superfluous after a power failure or "EMERGENCY STOP". After the power supply is switched on, the positioning drive detects its position via the battery-less multiturn encoder and is ready for operation directly. When switched off, the output shaft can be adjusted by ± 171 revolutions without losing the absolute position. The multiturn encoder withstands high shock/vibration loads.

General information about SeGMo-Connect

Accessories for connecting to the SeGMo-Box

The SeGMo-Connect hybrid cable is designed for moveable use in drag chains. Its product variants are food grade quality, halogen-free and available as a cULus recognized component. The hybrid cable screen is under the outer sheath. The internal communication line is completely insulated and has multiple screening.

All positioning drives are available with hybrid cables and connectors and can be quickly and easily connected to the SeGMo-Box via the freely configurable and preassembled hybrid cables.

Quick disconnect connectors allow safe and quick disconnection from the power supply during maintenance and service work. Preassembled hybrid cables are available for connection.

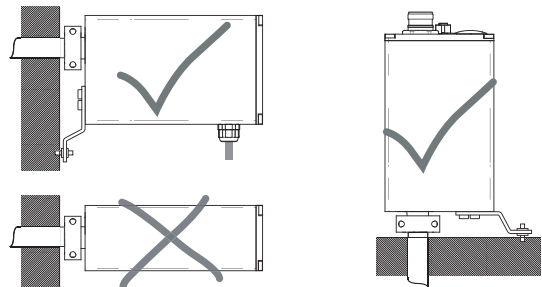
Connection accessories for stand-alone use

Mating connectors and cables for power supply are available for stand-alone use of positioning drives.

For more information on SeGMo-Connect connection accessories, please refer to "Technical Information BZK."

Mounting position

The positioning drive can be mounted with the narrow side horizontal or vertical to the machine shaft. The output shaft (fixed bearing) and the mounting point of the torque support (moving bearing) must be aligned to keep the mechanical loads on all components as low as possible. For horizontal mounting, the positioning drive must be mounted with the narrow side facing upwards.



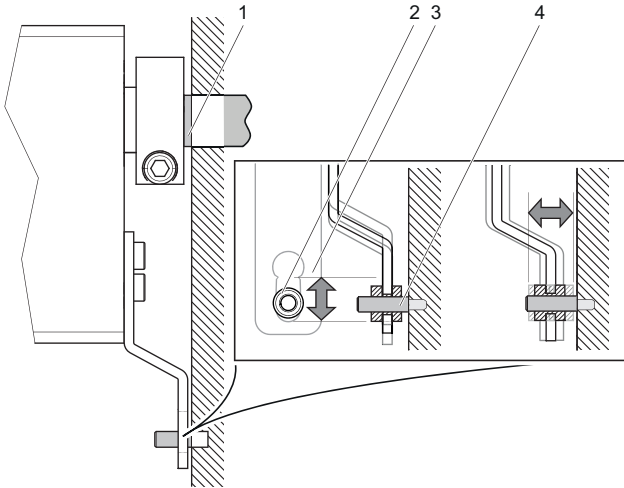
Permissible mounting position: horizontal (top left) and vertical (right); transverse position (bottom left)

- ⚠ Assembly in transverse position (with the wide side facing upwards) is only permissible after assessing the installation situation and subsequent approval by Lenord+Bauer.

Description of positioning drive

Assembly

The mounting concept provides for fixed-moving bearings. The machine shaft bears the weight of the position display via the fixed bearing. The positioning drive is mounted directly onto the machine shaft via a force-fit connection, for example with a semi-hollow shaft and clamping ring. The torque support prevents the positioning drive from rotating and compensates as a moving bearing for any imbalance movements occurring at the output shaft. The form and design of the torque support depend on the application. Various accessories are available for mounting.



Imbalance movements are absorbed at the moving bearing

- 1 Machine shaft
- 2 Torque support
- 3 Plain bearing
- 4 Headless screw

Operating modes

The positioning drive is **not** designed for continuous operation at nominal torque.

The positioning drive is designed for short term operation at nominal torque. The following intervals are applicable for a duty cycle (DuCy) of

- DuCy = 25 % at 100 % load torque, duty type S2
“base time 4 minutes: duty cycle (DuCy) = 1 minute, break duration (BD) = 3 minutes”
- DuCy ≤ 50 % at reduced load torque, depending on environmental parameters and application

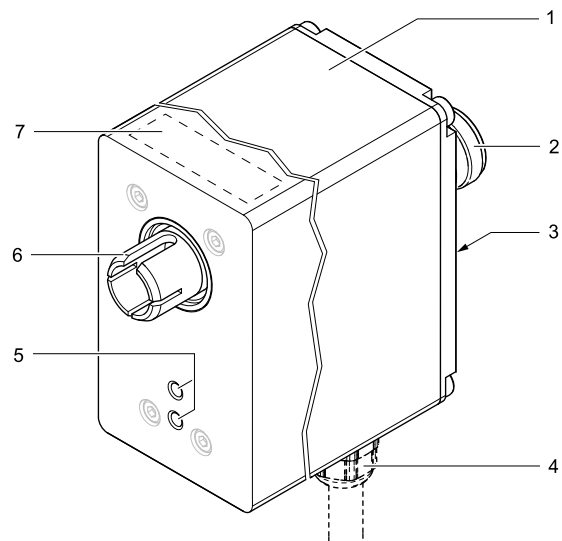
Other operating modes are secured by I²t- and temperature monitoring and an adjustable current limitation. A briefly increased breakaway torque is permitted within the scope of this protection.

Reliability

Important parameters are monitored, thus actively protecting the positioning drive from overload. The following monitoring devices support trouble-free operation:

- Soft start and stop via acceleration and deceleration ramp
- Over/undervoltage detection of supply voltage (power circuit and logic circuit)
- Lag error detection (output to motor shaft)
- Temperature monitoring of power amplifier and housing interior
- Overload protection of motor and power amplifier by I²t monitoring and in combination with the SeGMo-Box by the maximum current

Parts named



Positioning drive with semi-hollow shaft

- 1 Housing
- 2 Power supply connector (M23 male connector) with connection technology **ST**
- 3 Rear side: Connection and adjustment panel
- 4 Connection SeGMo-Connect with connection technology **H1/H2/H3/HS/S1/S2/S3/xx/Vx**
- 5 Thread bores for fastening a torque support
- 6 Output shaft
- 7 Zone for warning stickers

Positioning drive up to 10 Nm

Nominal torque (construction type)	01 (K)	02 (L)	03 (K)	05 (L)	07 (K)	10 (L)
Electrical data						
Supply voltage Logic circuit	24 V to 30 V DC (nominal supply voltage: 24 V DC)					
Supply voltage Power circuit	24 V to 30 V DC (nominal supply voltage: 24 V DC) (⚠ Maximum motor speed depends on voltage!)					
Maximum current consumption Logic circuit ⁽¹⁾	400 mA, external breaker required					
Current consumption Power circuit ⁽¹⁾ (maximum current consumption power circuit) ⁽²⁾	2.5 A (7 A)	3.5 A (7.5 A)	2.6 A (7 A)	3.6 A (7.5 A)	2.2 A (7 A)	3.1 A (7.5 A)
Duty cycle (DuCy) in % (load-dependent) ⁽¹⁾	DuCy = 25 % at 100 % load torque, duty type S2 "base time 4 minutes: duty cycle (DuCy) = 1 minute, break duration (BD) = 3 minutes" DuCy ≤ 50 % at reduced load torque, depending on environmental parameters and application					
Communication interfaces: Fieldbus	CANopen (CiA 402); PROFIBUS-DP (V0/V1)					
Communication interfaces: Industrial Ethernet	sercos III; POWERLINK; PROFINET IO/RT; EtherCAT; EtherNet/IP; Modbus/TCP					
Mechanical data						
Nominal torque output shaft ⁽¹⁾	1.4 Nm at 230 min ⁻¹	2 Nm at 230 min ⁻¹	3.5 Nm at 100 min ⁻¹	5 Nm at 100 min ⁻¹	7 Nm at 40 min ⁻¹	10 Nm at 40 min ⁻¹
Output shaft	Semi-hollow shaft, solid shaft ⁽³⁾ , Customized shaft ⁽³⁾					
Housing material	E: Stainless steel 1.4301 ⁽³⁾ A: Aluminum AlMgSi, anodized					
Weight E / A ⁽⁴⁾	3.0/1.6 kg	3.5/2.0 kg	3.0/1.6 kg	3.5/2.0 kg	3.0/1.6 kg	3.5/2.0 kg
Encoder data						
Resolution	1,000 increments per 360°					
Detection range	342 revolutions, also in de-energized state					
Positioning range	Not limited ⁽⁵⁾					

⁽¹⁾ At nominal supply voltage


⁽²⁾ External breaker required

⁽³⁾ upon request

⁽⁴⁾ depending on housing material (stainless steel/aluminum) and connection technology

⁽⁵⁾ When the logic circuit supply voltage is applied, an electronic counter detects the positioning range beyond the measuring system detection range.

Technical data

Nominal torque (construction type)	01 (K)	02 (L)	03 (K)	05 (L)	07 (K)	10 (L)
Ambient data						
Working temperature range	0 °C to +60 °C					
Operating temperature range	-10 °C to +60 °C					
Storage temperature range	-20 °C to +85 °C					
Maximum relative air humidity	95 %					
Condensation	Not permitted (condensation protection upon request)					
Degree of protection ⁽¹⁾	IP 67, DIN EN 60529:2014-09, shaft sealing ring (material: FKM)					
Dielectric strength	$\sqrt{2} \times 500$ V AC; as per DIN EN 61439-1:2012-06					
EMC ⁽²⁾	Electromagnetic immunity DIN EN 61000-6-1:2007-10 EN 61000-6-1:2007 DIN EN 61000-6-2:2006-03 + correction 1:2011-06 EN 61000-6-2:2005 + AC 2005 Electromagnetic emission DIN EN 61000-6-3:2011-09 + correction 1:2012-11 EN 61000-6-3:2007 + A1:2011+ AC:2012 DIN EN 61000-6-4:2011-09, EN 61000-6-4:2007 + A1:2011					
Vibration resistance	50 m/s ² (\approx 5g), 10 to 50 Hz; according to DIN EN 60068-2-6:2008-10					
Shock resistance	150 m/s ² (\approx 15 g); according to DIN EN 60068-2-27:2010-02					
UL data (version C)						
cULus recognized Component, E196161	UL 61800-5-1 CSA C22.2 number 274-13					
Input voltage (power circuit) U _{IN} ⁽³⁾	24 V to 30 V DC					
Input voltage (power circuit), continuous operation	45 VA	65 VA	45 VA	65 VA	45 VA	65 VA
Input voltage (power circuit), duty cycle (DuCy) = 1 minute, break duration (BD) = 3 minutes	60 VA	80 VA	60 VA	80 VA	60 VA	80 VA
UL enclosure type ⁽¹⁾	Type 1					
UL data (version C): Ambient temperatures						
Working temperature range	0 °C to +55 °C					
Operating temperature range	-10 °C to +55 °C					
Approvals						
European Economic Area	Conformity in accordance with <ul style="list-style-type: none"> ▪ EMC Directive 2014/30/EU ▪ Machinery Directive 2006/42/EC CE					
USA and Canada	Design C: (Certification as cULus recognized component) 					

⁽¹⁾ The degree of protection/UL enclosure type is only maintained if all blanking plugs are screwed in and all unused connectors (connection technology **ST**) are covered.

⁽²⁾ Use only screened cables.

⁽³⁾ Corresponds to the supply voltage Power circuit

Positioning drive from 15 Nm

Nominal torque (construction type)	15 (L)	18 (L)
Elektrische Daten		
Supply voltage Logic circuit	24 V to 30 V DC (nominal supply voltage: 24 V DC)	
Supply voltage Power circuit	24 V to 30 V DC (nominal supply voltage: 24 V DC) (⚡ Maximum motor speed depends on voltage!)	
Maximum current consumption Logic circuit ⁽¹⁾	400 mA, external breaker required	
Current consumption Power circuit ⁽¹⁾ (maximum current consumption power circuit) ⁽²⁾	3.1 A (7.5 A)	
Duty cycle (DuCy) in % (load-dependent) ⁽¹⁾	DuCy = 25 % at 100 % load torque, duty type S2 "base time 4 minutes: duty cycle (DuCy) = 1 minute, break duration (BD) = 3 minutes" DuCy ≤ 50 % at reduced load torque, depending on environmental parameters and application	
Communication interfaces: Fieldbus	CANopen (CiA 402); PROFIBUS-DP (V0/V1)	
Communication interfaces: Industrial Ethernet	sercos III; POWERLINK; PROFINET IO/RT; EtherCAT; EtherNet/IP; Modbus/TCP	
Mechanical data		
Nominal torque output shaft ⁽¹⁾	15 Nm at 30 min ⁻¹	18 Nm at 25 min ⁻¹
Output shaft	Semi-hollow shaft, solid shaft ⁽³⁾ , Customized shaft ⁽³⁾	
Housing material	A: Aluminum AlMgSi, anodized	
Weight E / A ⁽⁴⁾	- / 2.4 kg	- / 2.5 kg
Encoder data		
Resolution	1,000 increments per 360°	
Detection range	342 revolutions, also in de-energized state	
Positioning range	Not limited ⁽⁵⁾	

⁽¹⁾ At nominal supply voltage


⁽²⁾ External breaker required

⁽³⁾ upon request

⁽⁴⁾ depending on housing material (stainless steel/aluminum) and connection technology

⁽⁵⁾ When the logic circuit supply voltage is applied, an electronic counter detects the positioning range beyond the measuring system detection range.

Technical data

Nominal torque (construction type)	15 (L)	18 (L)
Ambient data		
Working temperature range	0 °C to +60 °C	
Operating temperature range	-10 °C to +60 °C	
Storage temperature range	-20 °C to +85 °C	
Maximum relative air humidity	95 %	
Condensation	Not permitted (condensation protection upon request)	
Degree of protection ⁽¹⁾	IP 67, DIN EN 60529:2014-09, shaft sealing ring (material: FKM)	
Dielectric strength	$\sqrt{2} \times 500$ V AC; as per DIN EN 61439-1:2012-06	
EMC ⁽²⁾	Electromagnetic immunity DIN EN 61000-6-1:2007-10 EN 61000-6-1:2007 DIN EN 61000-6-2:2006-03 + correction 1:2011-06 EN 61000-6-2:2005 + AC 2005 Electromagnetic emission DIN EN 61000-6-3:2011-09 + correction 1:2012-11 EN 61000-6-3:2007 + A1:2011+ AC:2012 DIN EN 61000-6-4:2011-09, EN 61000-6-4:2007 + A1:2011	
Vibration resistance	50 m/s ² (\approx 5g), 10 to 50 Hz; according to DIN EN 60068-2-6:2008-10	
Shock resistance	150 m/s ² (\approx 15 g); according to DIN EN 60068-2-27:2010-02	
UL data (version C)		
cULus recognized Component, E196161	UL 61800-5-1 CSA C22.2 number 274-13	
Input voltage (power circuit) U_{IN} ⁽³⁾	24 V to 30 V DC	
Input voltage (power circuit), continuous operation	65 VA	
Input voltage (power circuit), duty cycle (DuCy) = 1 minute, break duration (BD) = 3 minutes	80 VA	
UL enclosure type ⁽¹⁾	Type 1	
UL data (version C): Ambient temperatures		
Working temperature range	0 °C to +55 °C	
Operating temperature range	-10 °C to +55 °C	
Approvals		
European Economic Area	Conformity in accordance with <ul style="list-style-type: none"> ▪ EMC Directive 2014/30/EU ▪ Machinery Directive 2006/42/EC CE	
USA and Canada	Design C: (Certification as cULus recognized component) 	

⁽¹⁾ The degree of protection/UL enclosure type is only maintained if all blanking plugs are screwed in and all unused connectors (connection technology **ST**) are covered.

⁽²⁾ Use only screened cables.

⁽³⁾ Corresponds to the supply voltage Power circuit

Connector M23

Connection Technology **H1/H2/H3**

Technical data – Coupling/connector (connector size M23)	
Rated voltage	Maximum 30 V AC/DC
Current carrying capacity	As per DIN EN 60512
Contact type (coupling/connector)	Male contact/female contact
Housing material coupling/connector	Brass nickel-plated (others upon request)
Union nut material	Brass nickel-plated
Ambient temperature	-20 °C to +130 °C
Degree of protection ⁽¹⁾	IP 66/IP 67
Mating cycles	> 500
Vibration resistance	≤ 200 m/s ²
Certification	cULus recognized component (no. E247738)

Connector M17

Connection Technology **HS/S1/S2/S3**

Technical data – Coupling/connector (connector size M17)	
Rated voltage	Maximum 30 V AC/DC
Current carrying capacity	As per DIN EN 60512
Contact type (coupling/connector)	Male contact/female contact
Housing material coupling/connector	Brass, zinc die casting and plastic coated
Ambient temperature	-20 °C to +130 °C
Degree of protection ⁽¹⁾	IP 66/IP 67
Mating cycles	> 500
Certification	cULus recognized component (no. E247738)

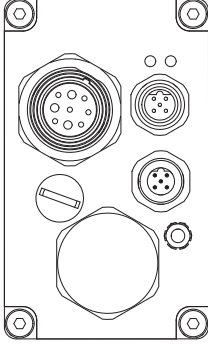
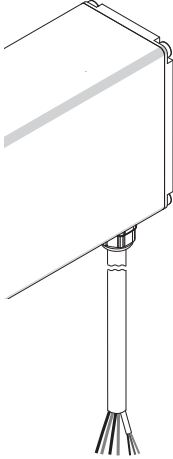
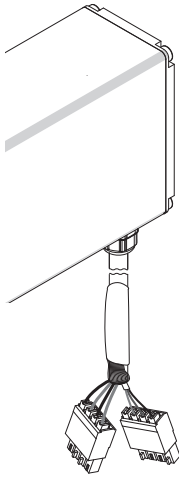
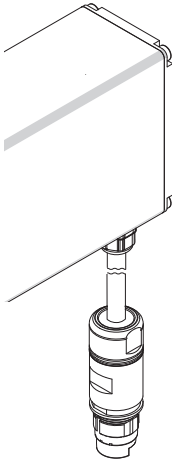
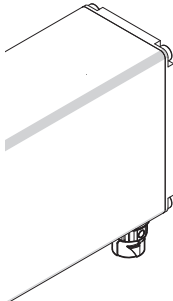
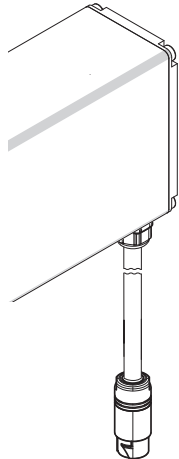
Technical data hybrid cable

Connection technology **H1/H2/H3/S1/S2/S3/Vx/xx**

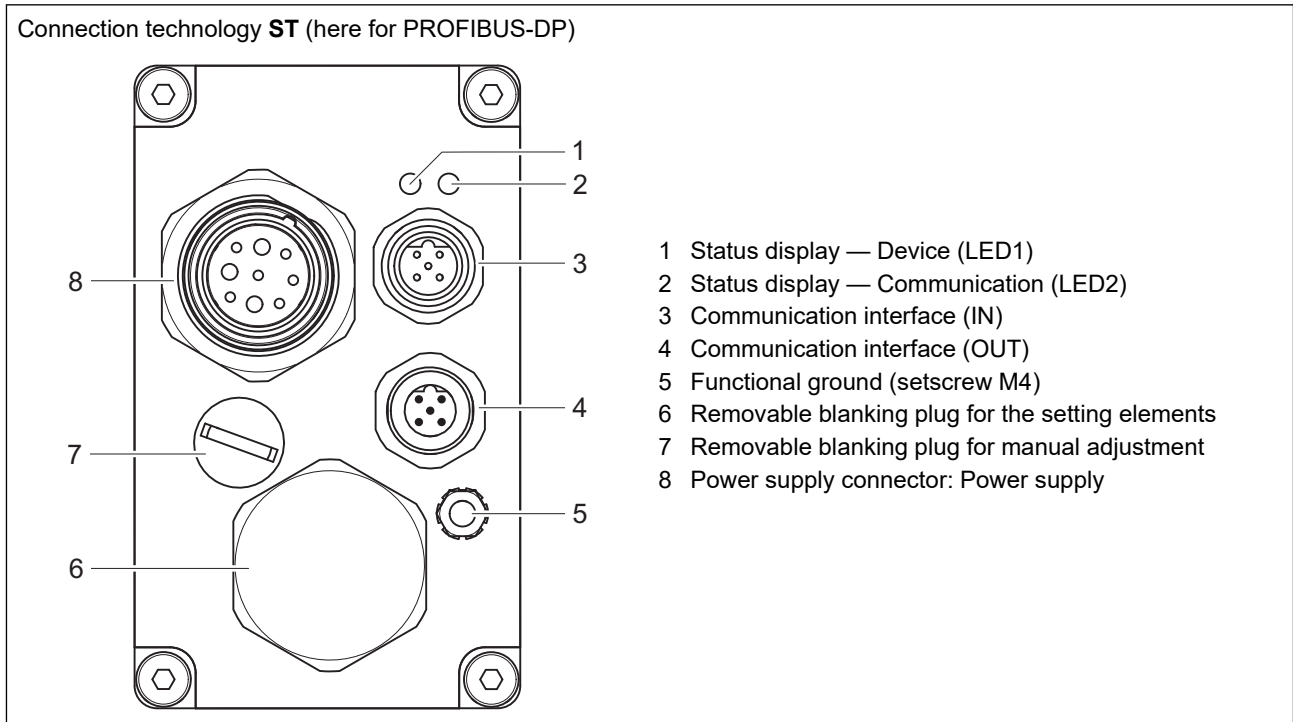
Hybrid cable	Design 0 (standard)	Design 1 (individual protection)	Design C (cULus recognized component)
Sheath material	PUR, black, glossy	PUR, black, matte	PUR, black, matte
Cable properties	screened	screened	screened
Suitable for drag chain	yes	yes	yes
Food grade quality	yes	no	no
Halogen-free	no	yes	yes
Cable diameter (d)	9.5 mm	9.5 mm	9.5 mm
Bending radius	permanently flexible: 10 × d fixed: 5 × d	permanently flexible: 15 × d free-moving: 10 × d fixed: 5 × d	permanently flexible: 15 × d free-moving: 10 × d fixed: 5 × d
Maximum peak operating voltage	350 V CAN-Bus 30 V DC (logic/power)	350 V CAN-Bus 30 V DC (logic/power)	300 V CAN-Bus 30 V DC (logic/power)
Temperature range	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C

⁽¹⁾ in screwed state, as per DIN EN 60529/DIN 40050

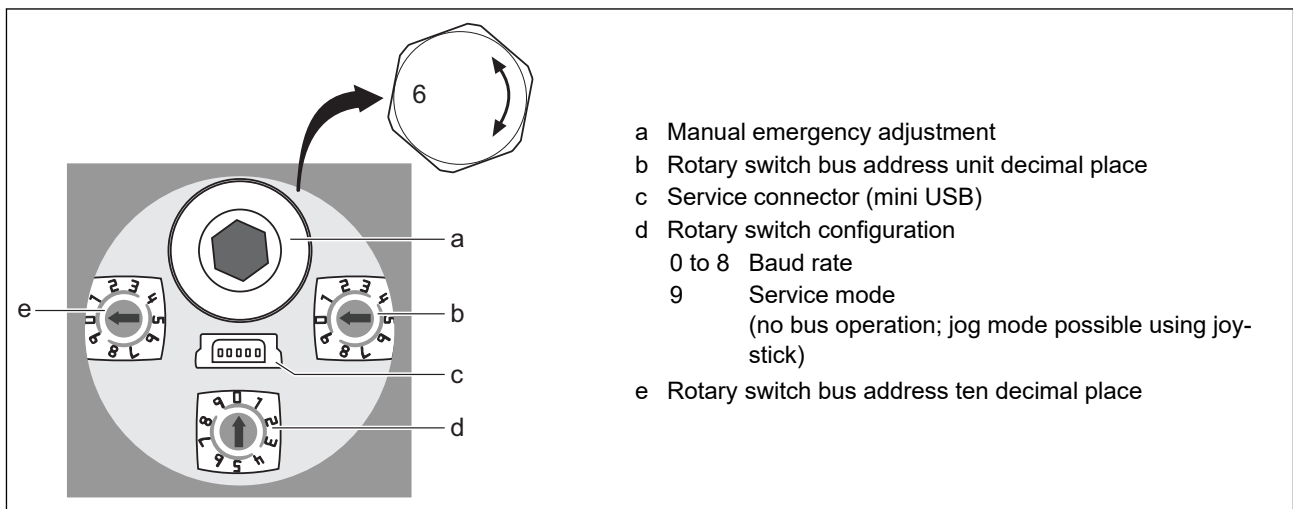
Overview — Connection Technologies

Connection Technology		
ST	xx Selectable cable length (1 m to 20 m)	Vx : Selectable cable length (maximum 20 m)
Direct connection to a higher level control system	Connection to SeGMo-Box GEL 6505 or GEL 65M	Connection to SeGMo-Box GEL 6505
Connector outlet	Hybrid cable with flying lead	Hybrid cable with spring-cage terminals for SeGMo-Box connection
		
Communication interfaces: CO (CANopen) DP (PROFIBUS-DP) EC (EtherCAT) IP (EtherNet/IP) MB (Modbus/TCP) PL (POWERLINK) RT (PROFINET IO / RT) SC (SERCOS III)	Communication interface CO (CANopen)	Communication interface CO (CANopen)
Connection Technology		
H1 : Cable length 30 cm H2 : Cable length 50 cm H3 : Cable length 100 cm	HS	S1 : Cable length 30 cm S2 : Cable length 50 cm S3 : Cable length 100 cm
Connection to SeGMo-Box GEL 6505 or GEL 65M via SeGMo-Connect (hybrid cable BZK)		
Hybrid cable with M23 connector (coupling with male contacts)	M17 panel-mounting socket with male contacts	Hybrid cable with M17 connector (coupling with male contacts)
		
Communication interface CO (CANopen)	Communication interface CO (CANopen)	Communication interface CO (CANopen)

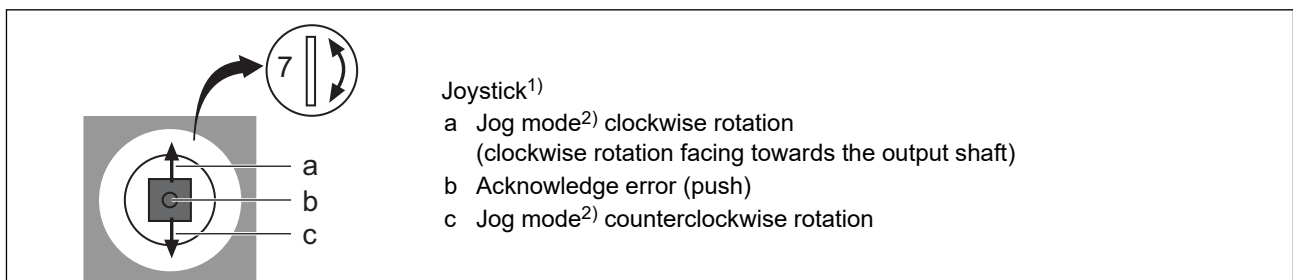
Rear side



Setting elements fieldbus variants (communication interfaces CO and DO)



Manual adjustment fieldbus variants (communication interfaces CO and DO)

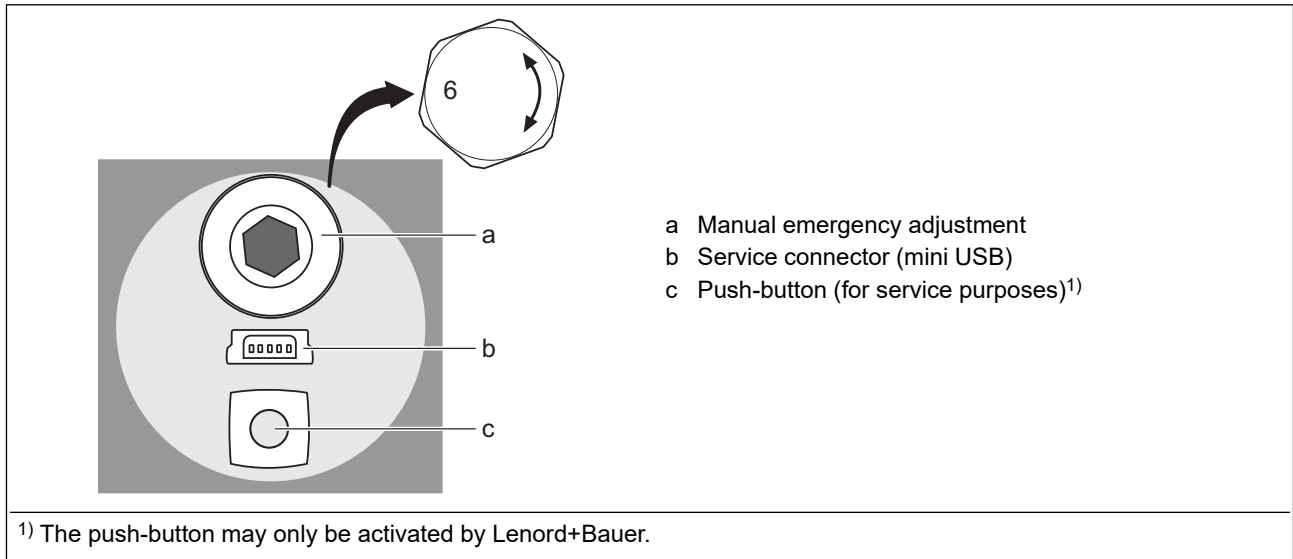


¹⁾ The joystick can only be used in service mode.

²⁾ Jog mode: Move the joystick in the indicated arrow direction.

Connection technology ST

Setting elements for Industrial Ethernet variants (communication interfaces EC/MB/SC/PL/RT/IP)



Assignment – Power supply connector

Power supply connector (plug-in view)	Pin designation	Signal identifier
<p>M23</p> <p>Male contact</p>	1	+24 V DC logic
	2	GND logic
	6	+24 V DC power
	8	GND power
	GND signals connected internally.	

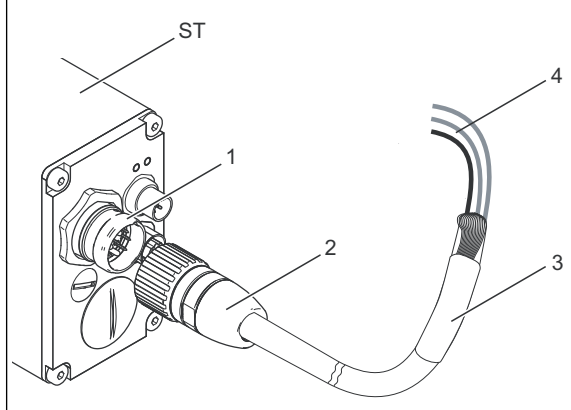
Assignment – Communication interfaces

CANopen	PROFIBUS-DP	Industrial Ethernet sercos III; POWERLINK; PROFINET IO/RT; EtherCAT; EtherNet/IP; Modbus/TCP																																								
<p>M12 A-coded</p> <p>IN OUT</p> <p>Male contact Female contact (plug-in view)</p>	<p>M12 B-coded</p> <p>IN OUT</p> <p>Male contact Female contact (plug-in view)</p>	<p>2 × M12 D-coded</p> <p>Switch sockets (plug-in view)</p>																																								
<table border="1"> <thead> <tr> <th>Pin</th> <th>IN/OUT</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Cable screen</td> </tr> <tr> <td>2</td> <td>unallocated</td> </tr> <tr> <td>3</td> <td>CAN-GND</td> </tr> <tr> <td>4</td> <td>CAN-High</td> </tr> <tr> <td>5</td> <td>CAN-Low</td> </tr> </tbody> </table>	Pin	IN/OUT	1	Cable screen	2	unallocated	3	CAN-GND	4	CAN-High	5	CAN-Low	<table border="1"> <thead> <tr> <th>Pin</th> <th>IN</th> <th>OUT</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>unallocated</td> <td>5 V bus voltage</td> </tr> <tr> <td>2</td> <td>A cable</td> <td>A cable</td> </tr> <tr> <td>3</td> <td>unallocated</td> <td>GND bus</td> </tr> <tr> <td>4</td> <td>B cable</td> <td>B cable</td> </tr> <tr> <td>5</td> <td>Cable screen</td> <td>Cable screen</td> </tr> </tbody> </table>	Pin	IN	OUT	1	unallocated	5 V bus voltage	2	A cable	A cable	3	unallocated	GND bus	4	B cable	B cable	5	Cable screen	Cable screen	<table border="1"> <thead> <tr> <th>Pin</th> <th>IN/OUT</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Transmission Data+</td> </tr> <tr> <td>2</td> <td>Receive Data+</td> </tr> <tr> <td>3</td> <td>Transmission Data-</td> </tr> <tr> <td>4</td> <td>Receive Data-</td> </tr> </tbody> </table>	Pin	IN/OUT	1	Transmission Data+	2	Receive Data+	3	Transmission Data-	4	Receive Data-
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4	Receive Data-																																									

Connection accessories for ST connection technology⁽¹⁾

Designation	Item number
PROFIBUS-DP mating connector, M12, B-coded input (female contact) ⁽²⁾	FS3016
PROFIBUS-DP mating connector, M12, B-coded output (male contact) ⁽²⁾	FS3017
PROFIBUS-DP terminating resistor, M12, B-coded (male contact) ⁽²⁾	FS3041
CANopen mating connector, M12, A-coded input (female contact) ⁽²⁾	FS3020
CANopen mating connector, M12, A-coded output (male contact) ⁽²⁾	FS3021
CANopen terminating resistor, M12, A-coded (male contact) ⁽²⁾	FS3040
Industrial Ethernet mating connector input/output, M12, D-coded (male contact) ⁽²⁾	FS3039
PROFIBUS-DP, 1 connector, male contact, 10 m cable ⁽²⁾	FS3024
PROFIBUS-DP, 1 connector, female contact, 10 m cable ⁽²⁾	FS3025
PROFIBUS-DP, 1 connector, male contact, 2 m cable ⁽²⁾	FS3026
PROFIBUS-DP, 1 connector, female contact, 2 m cable ⁽²⁾	FS3027
PROFIBUS-DP, 2 connectors, female/male contact, 2 m cable ⁽²⁾	FS3028
Ethernet network cable, M12 D-coded (male contact) on RJ45, 3 m cable ⁽²⁾	BK6921
"Mating connector Power supply" M23 (female contact)	FS3038
"Mating connector Power supply" M23 (female contact, 90° offset)	FS3067
Power supply cable M23 (female contact) and flying lead (SeGMo-Connect)	BZK23S1A__L ^(a)
Power supply cable M23 (female contact, 90° offset) and flying lead (SeGMo-Connect)	BZK23S2A__L ^(a)
^(a) for __ cable length specify in meters (minimum 3 m/maximum 20 m)	

Connection accessories power supply cable (SeGMo-Connect, see BZK Technical Information)

<p>Example power supply cable BZK23S1AxxL (xx = length in meters)</p> 	<p>Power supply cable for the positioning drive with ST connection technology</p> <p>Positioning drive with ST connection technology ST Positioning drive 1 Power supply connector</p> <p>Hybrid cable BZK23 2 Connector 1/Connector construction type S1 ("mating connector power supply", straight - with female contacts)</p> <p>3 Design A 16 AWG cULus Listed</p> <p>4 Connector 2: L (flying lead)</p>
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(1) Further accessories (for example fieldbus cables or couplings) upon request

(2) Not suitable for design C

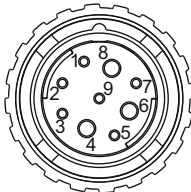
Connection technology ST

Connection accessories: Mating connector power supply (M23 female)

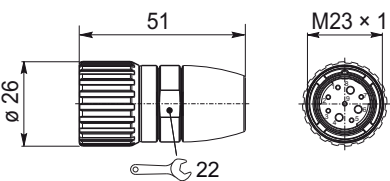
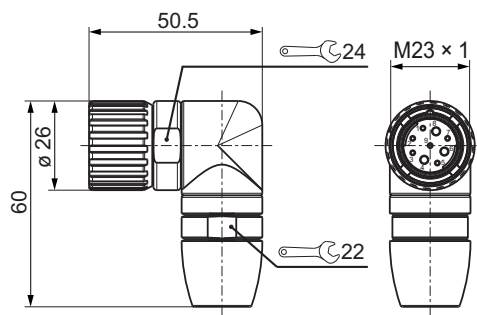
Technical data

Technical data – Mating connector power supply (connector size M23)	
Rated voltage	150 V
Maximum connection cross section	6 × 1.0 mm ² [18 AWG]/3 × 2.5 mm ² [14 AWG]
Contact type	Female contact
Housing material	Metal (GD-Zn/ CuZn Ni)
Ambient temperature	-40 °C to +100 °C
Degree of protection ⁽¹⁾	IP 67
Mating cycles	50
Certification	cULus recognized component (no. E153698)

Assignment

Mating connector Power supply (plug-in view)	Pin designation	Signal identifier
<p style="text-align: center;">M23</p>  <p style="text-align: center;">Female contact</p>	1	+ 24 V logic
	6	+ 24 V power
	8	GND logic and GND power
	GND signals connected internally in the positioning drive.	

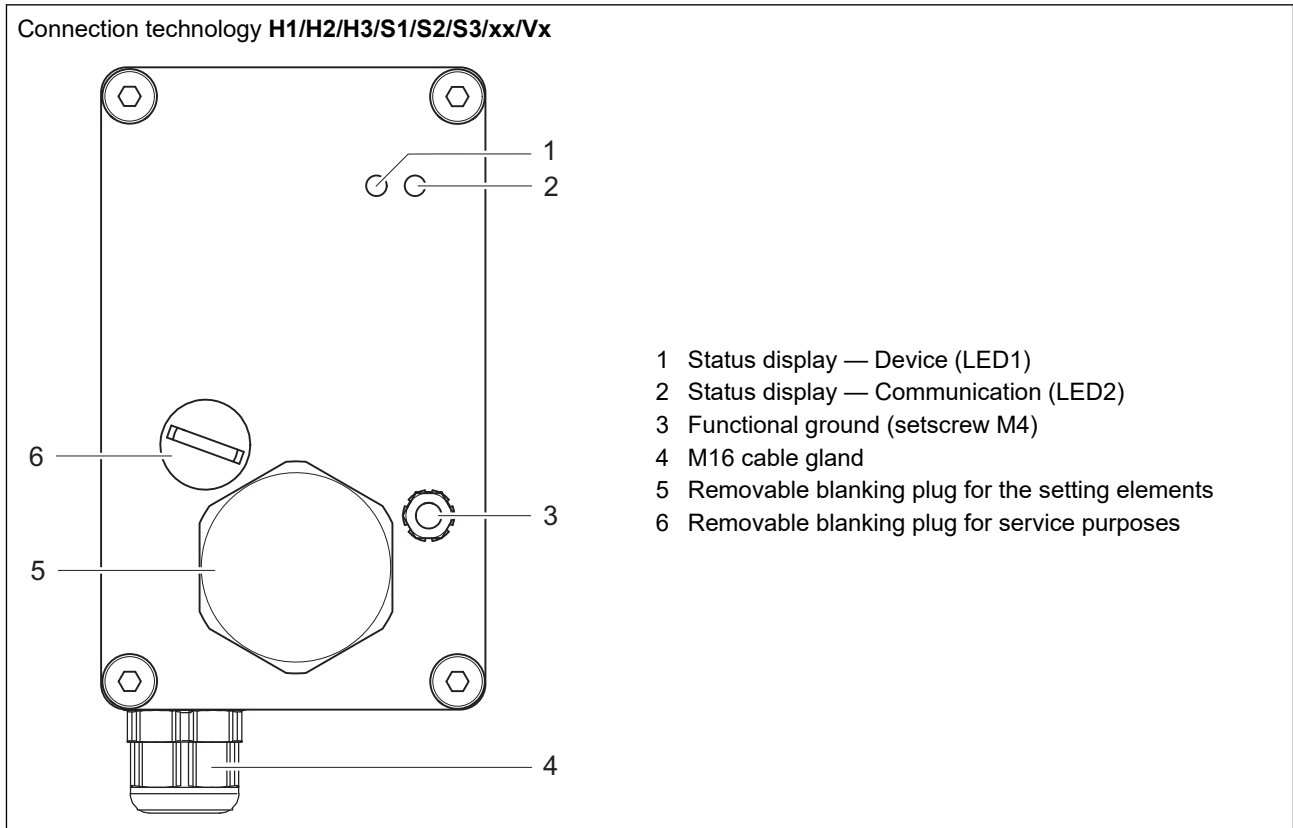
Dimensional drawings

<p>Item number FS3038</p> 	<p>Item number FS3067</p> 
All dimensions in millimeters	

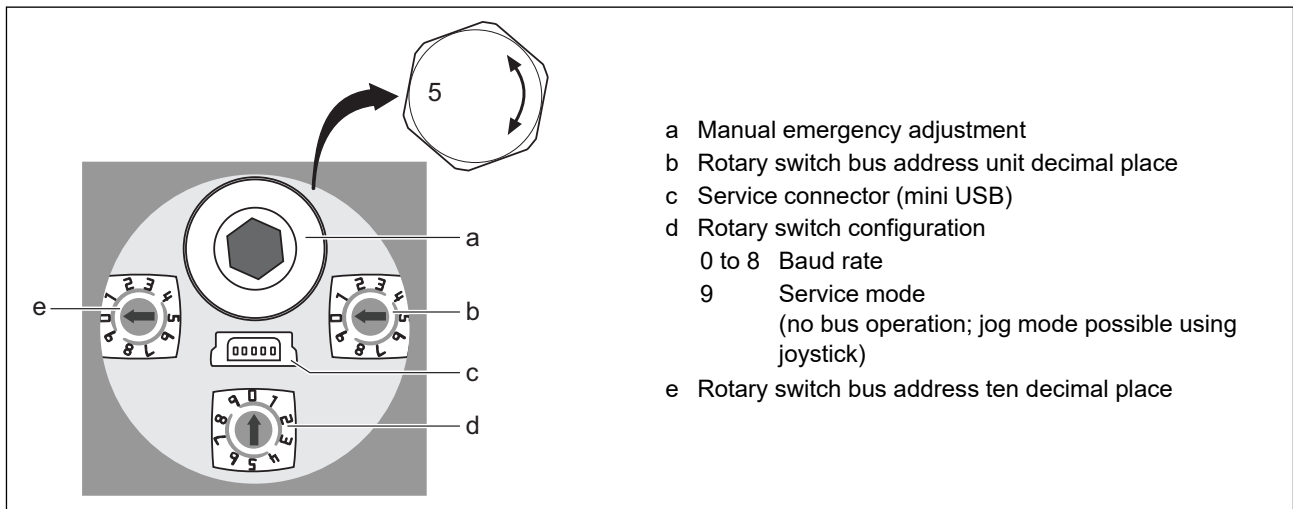
⁽¹⁾ in screwed state, as per DIN EN 60529/DIN 40050

Connection technology H1/H2/H3/S1/S2/S3/xx/Vx

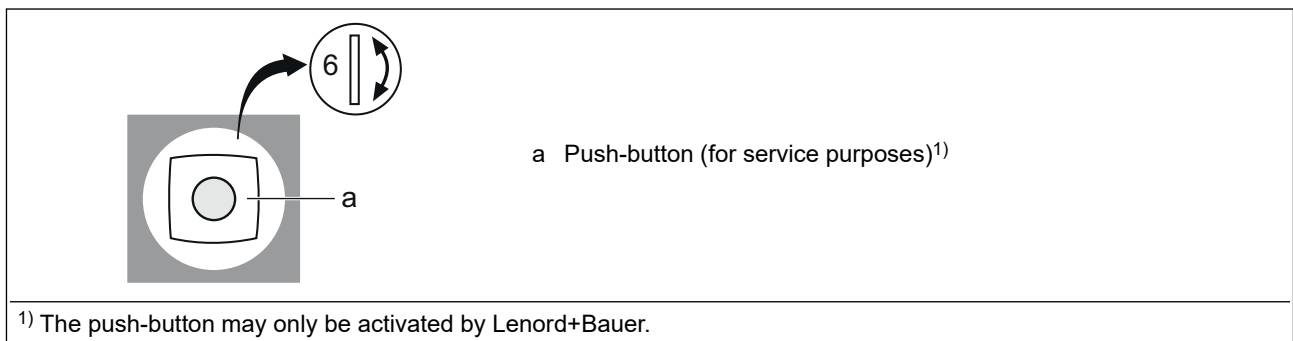
Rear side



CANopen setting elements (communication interface CO)



CANopen service purposes (communication interface CO)



Connection technology H1/H2/H3/S1/S2/S3/xx/Vx

Assignment for xx/Vx connection technology

Connection technology xx : flying lead				Connection technology Vx : preassembled for GEL 6505		Signal identifier
Core color/ Core Number	Cross section Design 0	Cross section Design 1	Cross section Design C	4-pin spring-cage terminal (internal communi- cation positioning drives) pin designation	4-pin spring-cage terminal (voltage supply positioning drives) pin designation	
red/1	0.5 mm ²	0.5 mm ² [20 AWG]	0.5 mm ² [20 AWG]	–	3	+24 V logic
red/2	1.5 mm ²	1.5 mm ² [16 AWG]	2.5 mm ² [14 AWG]	–	1	+24 V power
black/2	1.5 mm ²	1.5 mm ² [16 AWG]	2.5 mm ² [14 AWG]	–	2	GND power
black/1	0.5 mm ²	0.5 mm ² [20 AWG]	0.5 mm ² [20 AWG]	–	4	GND logic
black	0.14 mm ²	0.14 mm ² [26 AWG]	0.14 mm ² [26 AWG]	1	–	CAN-GND
green	0.25 mm ²	0.25 mm ² [24 AWG]	0.25 mm ² [24 AWG]	3	–	CAN-Low
yellow	0.25 mm ²	0.25 mm ² [24 AWG]	0.25 mm ² [24 AWG]	2	–	CAN-High

Connection accessories for xx connection technology

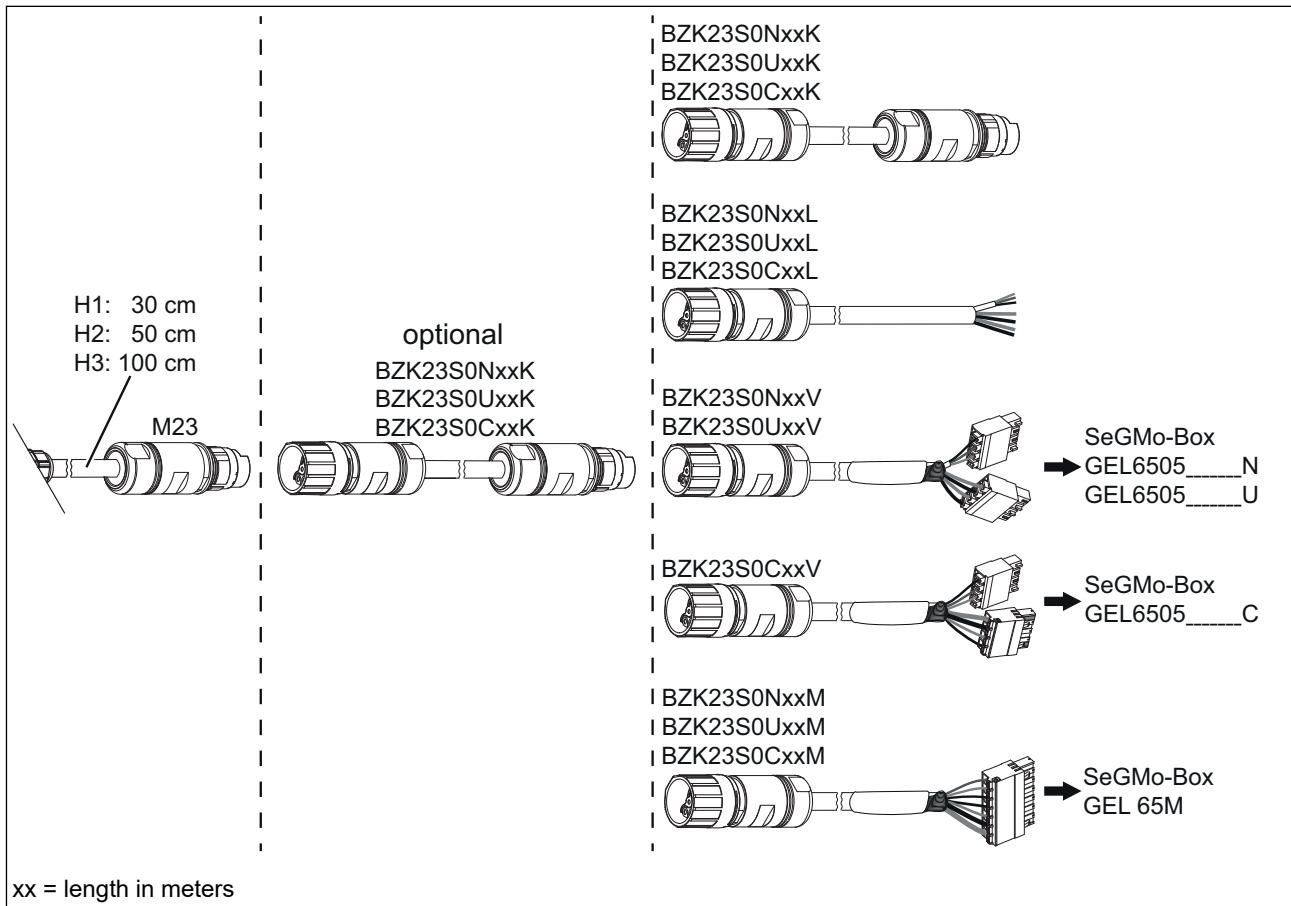
Designation	Item number:
Hybrid cable assembly for	
SeGMo-Box GEL 6505 in design N/U	89070
SeGMo-Box GEL 6505 in design C	ZB6505UL01
Modular SeGMo-Box GEL 65M, design N	ZB65MX01

Connection technology H1/H2/H3/S1/S2/S3/xx/Vx

Assignment for H1/H2/H3 connection technology

M23 connector		
Coupling with male contacts (plug-in view)	Pin designation	Signal identifier
	A	+24 V logic
	B	GND logic
	C	GND power
	D	+24 V power
	E	Cable screen
	7	CAN-High
	8	CAN-GND
	9	CAN-Low
	S	CAN screen

Connection accessories for H1/H2/H3 connection technology (SeGMo-Connect, see BZK Technical Information)



Connection technology H1/H2/H3/S1/S2/S3/xx/Vx

Assignment for S1/S2/S3 connection technology

M17 connector		
Coupling with male contacts (plug-in view)	Pin designation	Signal identifier
	A	+24 V logic
	B	+24 V power
	C	GND power
	1	GND logic
	2	CAN-GND
	3	CAN-Low
	4	CAN-High
Cable screen and CAN screen are connected to the metallic coupling housing and to the pin ⊕.		

Connection accessories for S1/S2/S3 connection technology (SeGMo-Connect, see BZK Technical Information)

S1: 30 cm
S2: 50 cm
S3: 100 cm

optional
BZK17S0NxxK
BZK17S0UxxK
BZK17S0CxxK

BZK17S0NxxK
BZK17S0UxxK
BZK17S0CxxK

BZK17S0NxxL
BZK17S0UxxL
BZK17S0CxxL

BZK17S0NxxV
BZK17S0UxxV

SeGMo-Box
GEL6505____N
GEL6505____U

BZK17S0CxxV

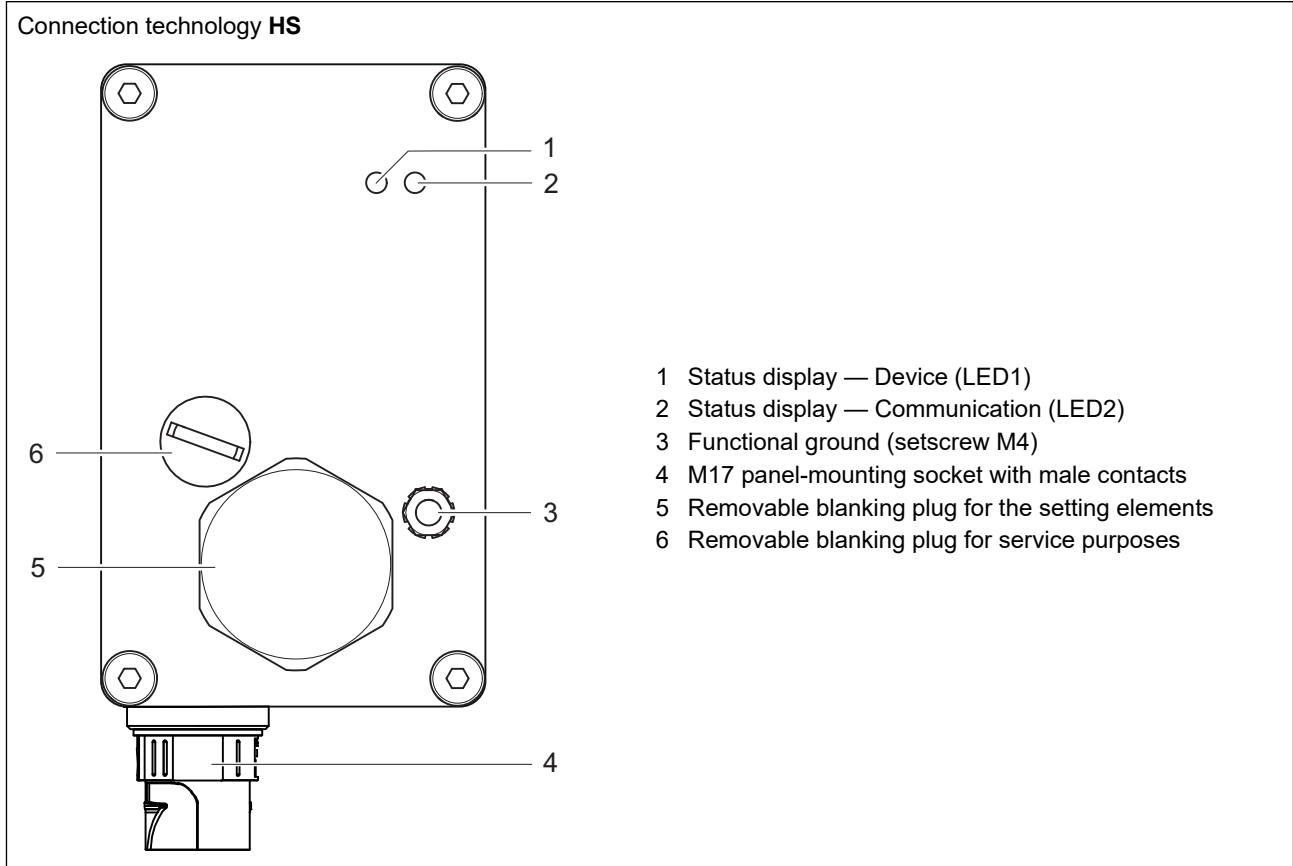
SeGMo-Box
GEL6505____C

BZK17S0NxxM
BZK17S0UxxM
BZK17S0CxxM

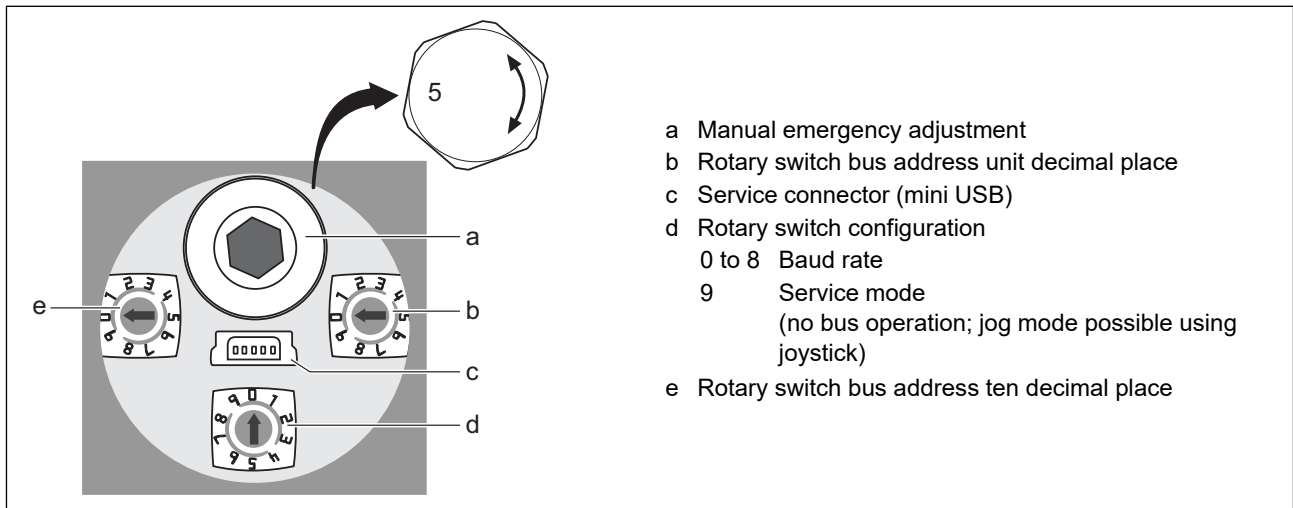
SeGMo-Box
GEL 65M

xx = length in meters

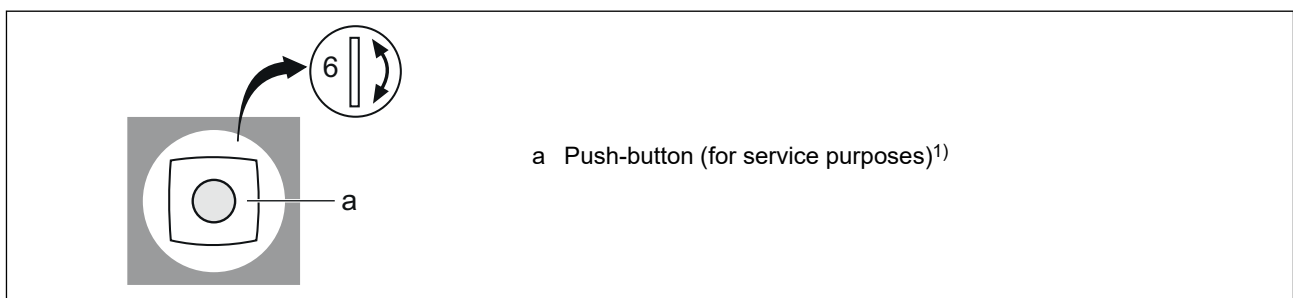
Rear side



CANopen setting elements (communication interface CO)



CANopen service purposes (communication interface CO)



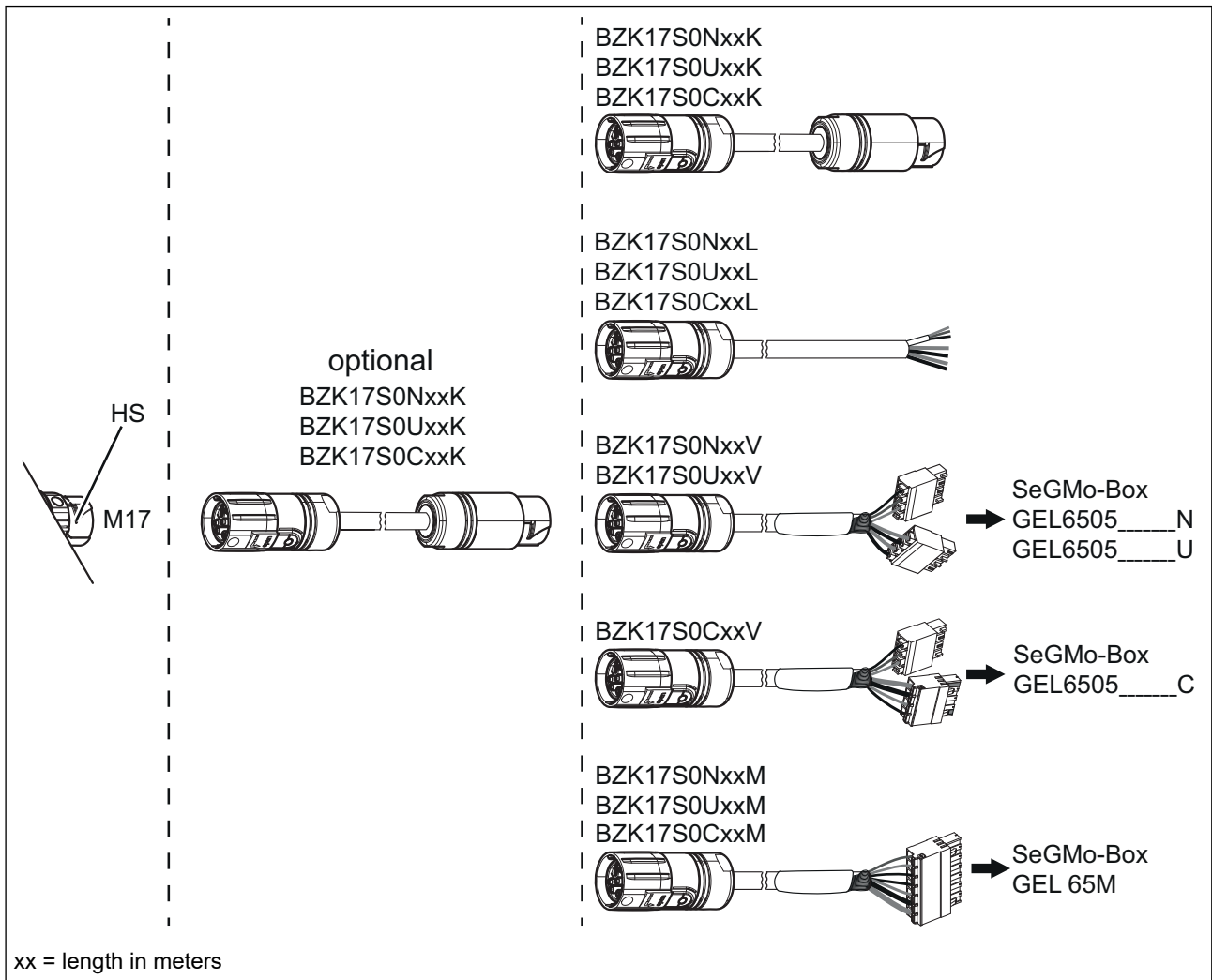
¹⁾ The push-button may only be activated by Lenord+Bauer.

Connection technology HS

Assignment for HS connection technology

M17 connector		
Panel-mounting socket with male contacts (plug-in view)	Pin designation	Signal identifier
	A	+24 V logic
	B	+24 V power
	C	GND power
	1	GND logic
	2	CAN-GND
	3	CAN-Low
	4	CAN-High

Connection accessories for HS connection technology (SeGMo-Connect, see BZK Technical Information)



Accessories for mounting and spare parts

Accessories for mounting

Accessories for mounting (not included in the scope of supply)

Designation	Item number:
Clamping ring for output shaft: — A / B / P — D — E / F / H — O / Q — I	MZ13651 MZ13701 MZ13711 MZ13761 MZ1379
Accessory set for GEL 6110 ≤ 10 Nm and GEL 6109 , comprising: ▪ 1 pc. torque support including plain bearing, item number: BG5012 ▪ 2 pc. screws M5×8, item number: VS2107 ▪ 1 pc. headless screw M5×20, item number: VS3412 ▪ 1 pc. assembly note bearing, item number: D-53H-6110_01	ZB6100
Accessory set for GEL 6110 ≥ 15 Nm , comprising: ▪ 1 pc. torque support including plain bearing, item number: BG5017 ▪ 4 pc. screws M5×8, item number: VS2107 ▪ 1 pc. headless screw M5×20, item number: VS3412 ▪ 1 pc. assembly note bearing, item number: D-53H-6110_01	ZB6101
Accessory set for replacing GEL 6110 ≤ 10 Nm with GEL 6110 ≥ 15 Nm , comprising: ▪ 1 pc. torque support including plain bearing, item number: BG5060 ▪ 4 pc. screws M5×8, item number: VS2107 ▪ 1 pc. headless screw M5×20, item number: VS3412 ▪ 1 pc. assembly note bearing, item number: D-53H-6110_01	ZB6102
Accessory set for GEL 6110 ≥ 15 Nm , comprising: ▪ 1 pc. torque support including plain bearing, item number: BG5061 ▪ 4 pc. screws M5×8, item number: VS2107 ▪ 1 pc. headless screw M5×20, item number: VS3412 ▪ 1 pc. assembly note bearing, item number: D-53H-6110_01	ZB6103
Accessories kit plain bearings, comprising: 5 pc. plain bearings, item number: OG0001	ZB61X01
Accessories kit headless screws, comprising: 5 pc. headless screws M5×20, item number: VS3412	ZB61X02
Accessories kit screws torque support, comprising: 10 pc. screws M5×8, item number: VS2107	ZB61X03

Spare parts

Warning stickers

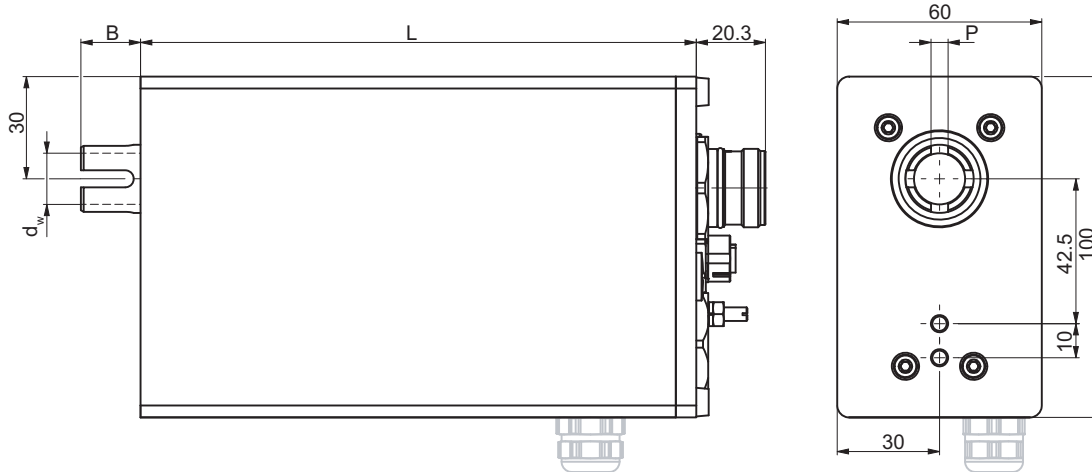
Designation
Warning sign "Warning automatic start-up", lateral length 25 mm, ASR A1.3 / ISO 7010, Warning sign W018
Warning sign "Warning for hot surface", lateral length 25 mm, ASR A1.3 / ISO 7010, Warning sign W017

Dimensional drawings

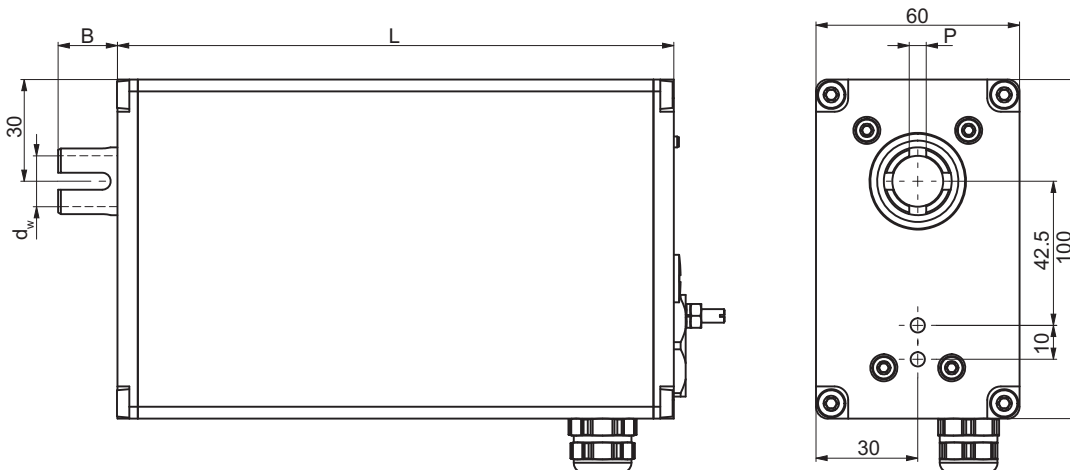
All dimensions in millimeters; general tolerance DIN ISO 2768 – mK

GEL 6110 (up to 10 Nm nominal torque)

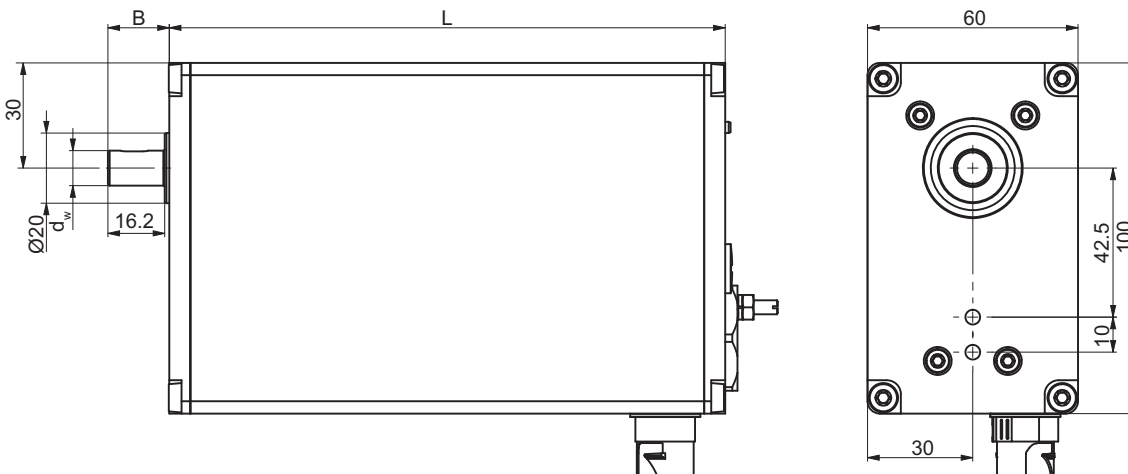
Output shaft: Semi-hollow shaft/Connection technology **ST**
 Housing material: Stainless steel
 (gray: hybrid cable connection technology **H1/H2/H3/S1/S2/S3/Vx/xx**)



Output shaft: Semi-hollow shaft/Connection technology **H1/H2/H3/S1/S2/S3/Vx/xx**
 Housing material: Aluminum

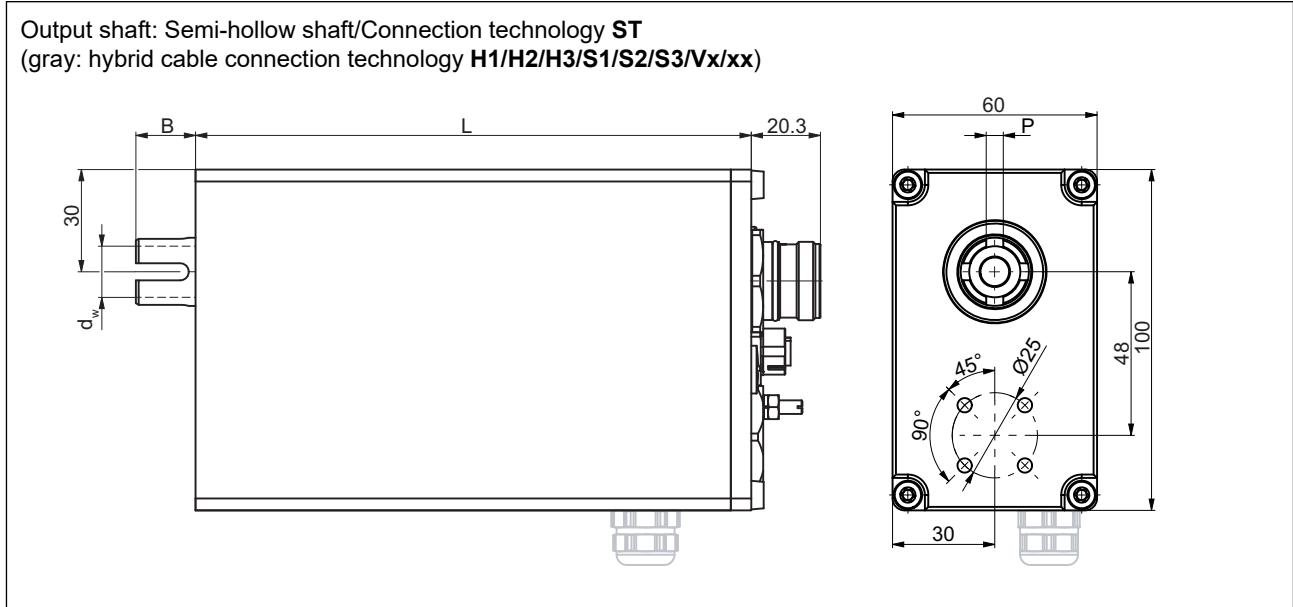


Output shaft: Solid shaft **K**/Connection technology **HS**
 Housing material: Aluminum



Dimensional drawings

GEL 6110 (from 15 Nm nominal torque)



Dimensions GEL 6110

Dimension L depending on construction type and housing material

Nominal torque	Construction type	Housing material Dimension L (length of housing)	
		Aluminum	Stainless steel
01, 03, 07	K	126	125
02, 05, 10	L	164	163
15	L	168.2	-
18	L	166.5	-

Dimension B/d_w/P depending on output shaft

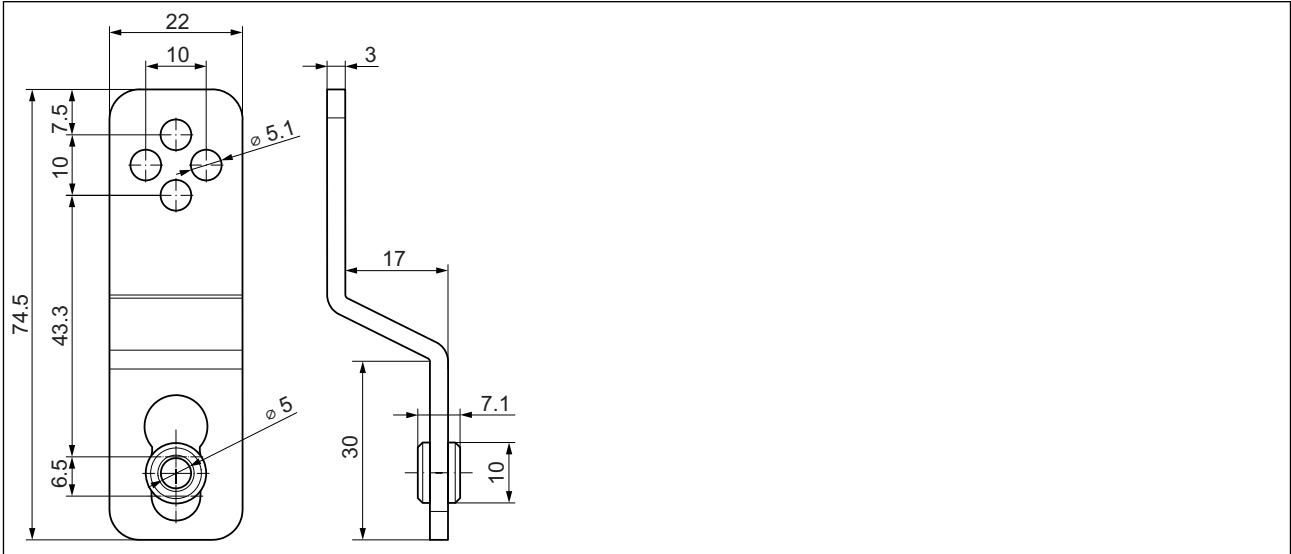
Dimensions/Output shaft	I	H	F	E	D	B	A	P	Q	O
Diameter d _w	8 ^{H7}	9 ^{H7}	10 ^{H7}	11 ^{H7}	12 ^{H7}	14 ^{H7}	15 ^{H7}	16 ^{H7}	18 ^{H7}	20 ^{H7}
Slot width P	2	3	3	4	4	5	5	5	5	5
B	17.5							19.5		
B (≥ 15 Nm)	23.5							25.5		

Dimension B/d_w depending on output shaft

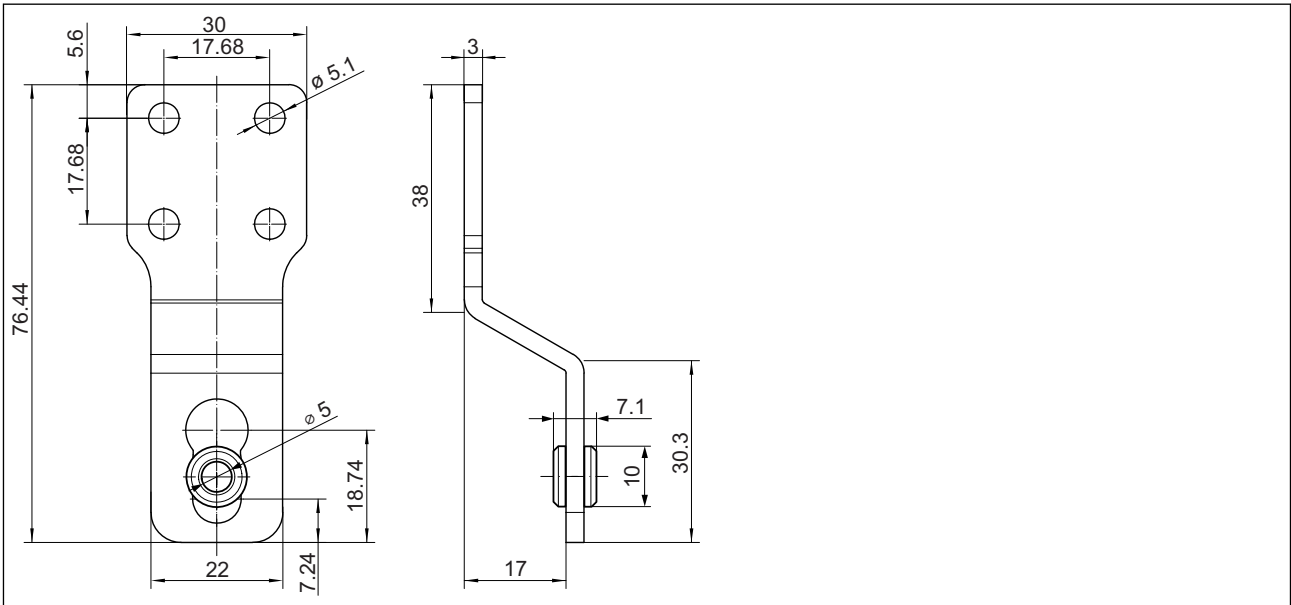
Dimensions/Output shaft	K
Diameter d _w	10 ^{h7}
B	17.4

Dimensional drawings

Accessory set ZB6100 (torque support including plain bearing)

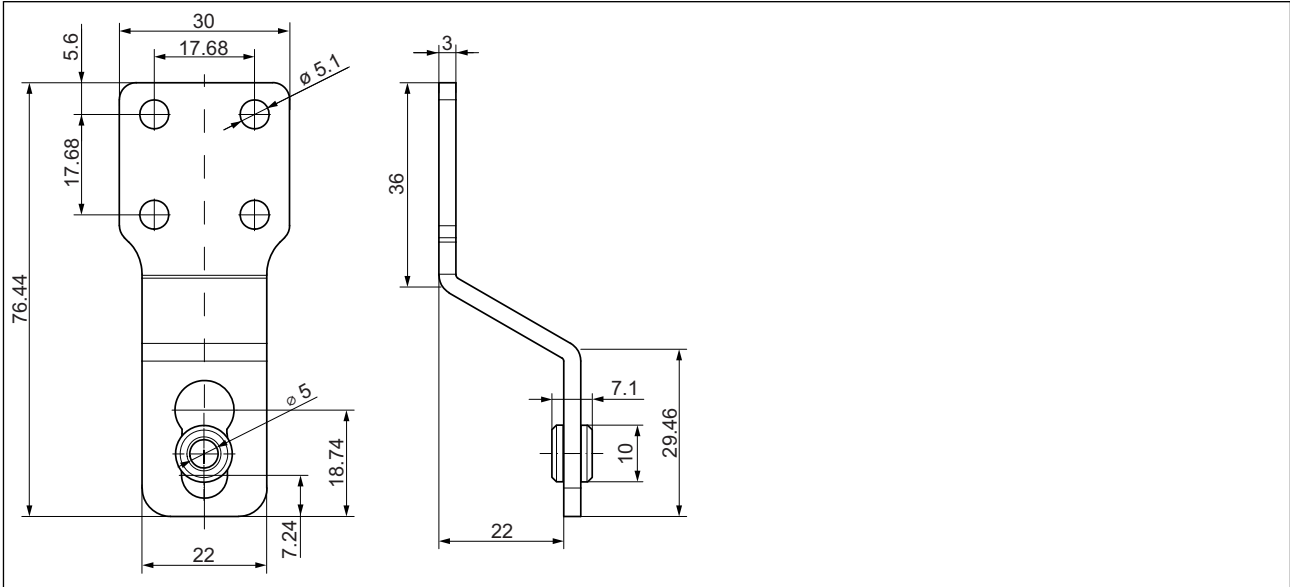


Accessory set ZB6101 (torque support including plain bearing)

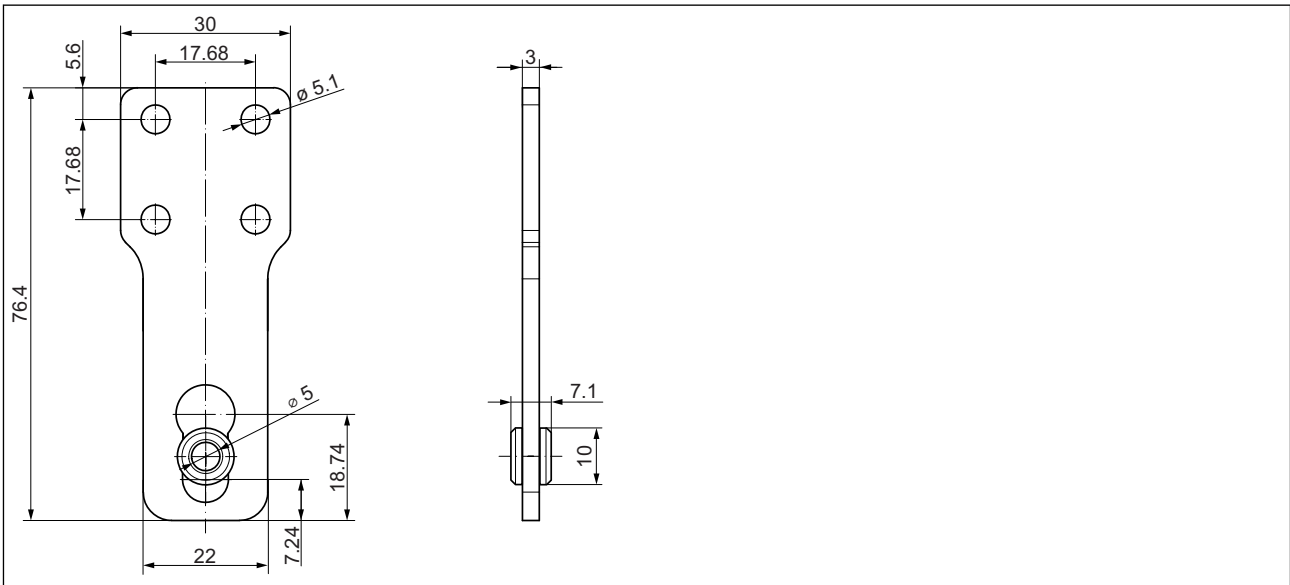


Dimensional drawings

Accessory set ZB6102 (torque support including plain bearing)

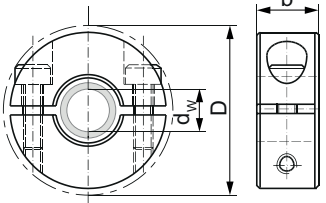


Accessory set ZB6103 (torque support including plain bearing)

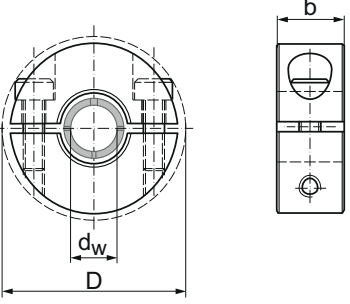


Dimensional drawings

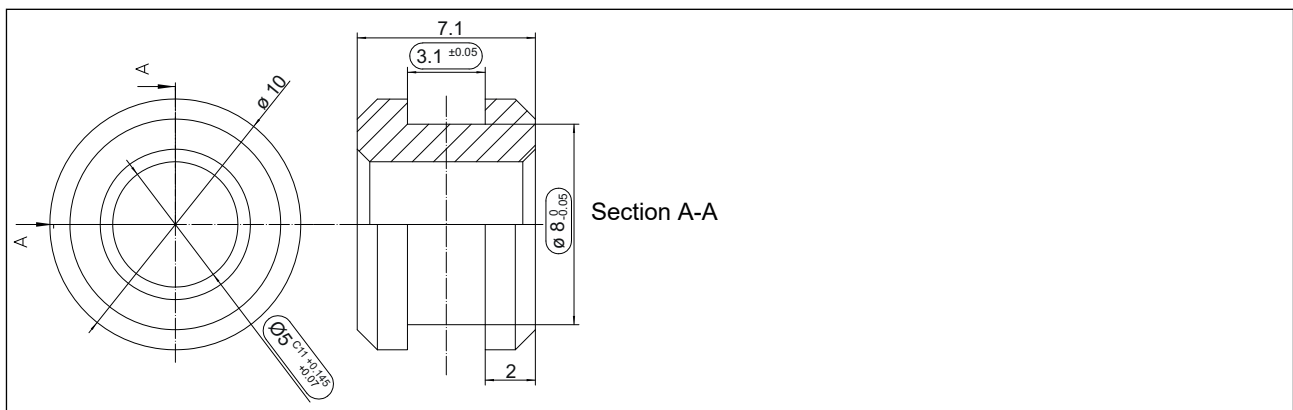
Clamping ring

Dimensions/item number clamping ring	MZ13711	MZ13701	MZ13651	MZ13761	
	Diameter output shaft d_w^{H7} (type code)	9 / 10 / 11 (H / F / E)	12 (D)	14 / 15 / 16 (B / A / P)	18 / 20 (Q / O)
	D	39.5	41.5	46.5	48.5
	b	13	13	15	15
	Screw DIN 912	M5	M5	M6	M6

Clamping ring

Dimensions/item number clamping ring	MZ1379	
	Diameter output shaft d_w^{H7} (type code)	8 (I)
	D	32
	b	11
	Screw DIN 912	M4

Plain bearing OG0001



Further mounting material made of stainless steel 1.4301: Centering pins, flange plates, etc. upon request.

Type code GEL 6110

6110	Communication interface		
	CO	CANopen CiA 402	
	DP	PROFIBUS-DP V0/V1	
	EC	EtherCAT	
	IP	EtherNet/IP	
	MB	Modbus/TCP	
	PL	POWERLINK	
	RT	PROFINET IO/RT	
	SC	sercos III	
	Nominal torque		
01	1.4 Nm at 230 min ⁻¹		
02	2 Nm at 230 min ⁻¹		
03	3.5 Nm at 100 min ⁻¹		
05	5 Nm at 100 min ⁻¹		
07	7 Nm at 40 min ⁻¹		
10	10 Nm at 40 min ⁻¹		
15	15 Nm at 30 min ⁻¹		
18	18 Nm at 25 min ⁻¹		
Output shaft (d_w in millimeter)			
A	15 H7 Semi-hollow shaft		
B	14 H7 Semi-hollow shaft		
D	12 H7 Semi-hollow shaft		
E	11 H7 Semi-hollow shaft ⁽¹⁾		
F	10 H7 Semi-hollow shaft ⁽¹⁾		
H	9 H7 Semi-hollow shaft ⁽¹⁾		
I	8 H7 Semi-hollow shaft ⁽¹⁾		
K	10 h7 Solid shaft ⁽¹⁾		
O	20 H7 Semi-hollow shaft ⁽¹⁾		
P	16 H7 Semi-hollow shaft		
Q	18 H7 Semi-hollow shaft		
Housing material			
A	Aluminum AlMgSi, anodized		
E	Stainless steel 1.4301 ⁽¹⁾		
Construction type			
K	Short		
L	Long		
Connection Technology			
ST	Connector (standard): M12 fieldbus, M23 power supply)		
HS	M17 panel-mounting socket with male contacts		
S1	30 cm hybrid cable and M17 coupling with male contacts		
S2	50 cm hybrid cable and M17 coupling with male contacts		
S3	100 cm hybrid cable and M17 coupling with male contacts		
H1	30 cm hybrid cable and M23 coupling with male contacts		
H2	50 cm hybrid cable and M23 coupling with male contacts		
H3	100 cm hybrid cable and M23 coupling with male contacts		
Vx	Hybrid cables pre-assembled with spring-cage terminals for SeGMO-Box GEL 6505, Cable length V1 = 1 m; V2 = 3 m; V3 = 5 m; V4 = 8 m; V5 = 10 m; V6 = 13 m; V7 = 15 m; V8 = 18 m; V9 = 20 m		
xx	xx m hybrid cable with flying lead, length in meters (xx = 01 to 20; standard: 3 m)		
Design			
0	Standard		
1	Individual protection		
C	cULus recognized component		
Option			
A	No additional option (default)		
B	Holding brake		
Degree of protection			
3	IP 67 (with shaft sealing ring and protection against humidity), version C: additionally UL enclosure type 1		

⁽¹⁾ upon request

Type code

Restrictions

Design

- The nominal torques **15** and **18** are only available in design **0** and **1** (Design **C** is in preparation.).

Connection Technology

- Connection technology **HS** is only available with housing material **A** (aluminum) and with communication interface **CO** (CANopen).
- Connection technologies **HS/H1/H2/H3/S1/S2/S3/xx/Vx** are only available with communication interface **CO** (CANopen).
- The communication interface **DP** with **ST** connection technology is only available in design **0**.

Output shaft

- Output shaft **I** is only available up to 5 Nm.
- Output shaft **K** is only available up to 10 Nm.
- Output shaft **H** is only available up to 10 Nm. Positioning drives > 5 Nm may only be used with a feather key.
- Positioning drives > 10 Nm are only available with output shaft **A/B/O/P/Q**.

i Positioning drives with output shafts < 10 mm may only be used with feather keys.

Nominal torque/Construction type/Housing material/Option

Nominal torque		Construction type (dimension L, length of housing)	Housing material	Option
01	1.4 Nm at 230 min ⁻¹	K (126 mm)	A (aluminum) E (stainless steel)	A (without holding brake)
03	3.5 Nm at 100 min ⁻¹	K (126 mm)	A (aluminum) E (stainless steel)	A (without holding brake)
07	7 Nm at 40 min ⁻¹	K (126 mm)	A (aluminum) E (stainless steel)	A (without holding brake)
02	2 Nm at 230 min ⁻¹	L (164 mm)	A (aluminum) E (stainless steel)	A (without holding brake) B (with holding brake)
05	5 Nm at 100 min ⁻¹	L (164 mm)	A (aluminum) E (stainless steel)	A (without holding brake) B (with holding brake)
10	10 Nm at 40 min ⁻¹	L (164 mm)	A (aluminum) E (stainless steel)	A (without holding brake) B (with holding brake)
15	15 Nm at 30 min ⁻¹	L (168.2 mm)	A (aluminum)	A (without holding brake) B (with holding brake)
18	18 Nm at 25 min ⁻¹	L (166.5 mm)	A (aluminum)	A (without holding brake)

Customized modifications

Customized special housings and customized shafts are available upon request as per approval drawing.

i Customized special designs are assigned a Y-number. A positioning drive marked with Y (example: 6110Yxxx) is a customized design with a special assembly and/or modified technical specifications. Depending on the customized modification, more or other documents may apply.

Notes for USA and Canada (design C)

Certification: cULus recognized component (document E196161)

General

- The positioning drives were only examined for the application area of NFPA 79 (Electrical Standard for Industrial Machinery).
- Mechanical hazards caused by moving parts must be evaluated as part of the final application.
- Suitability of connection cables and connectors must be evaluated as part of the final application.
- Protecting the motor against overload was not taken into account as part of the certification process and must be evaluated as part of the final application.
- Protecting the motor against excessive temperature was not taken into account as part of the certification process and must be evaluated as part of the final application.
- Protecting the motor against a blocked machine shaft was not taken into account as part of the certification process and must be evaluated as part of the final application.

Connection technologies **H1/H2/H3/HS/S1/S2/S3/Vx/xx**

- The positioning drives were examined and tested as an integral part of the SeGMo system for the "Factory Automation" area. The application is permissible only in combination with SeGMo-Boxes GEL6505B_____C (GPNY) and GEL6505A_____C (GPNY2) (document E483619).
- The positioning drives are only intended for use with SeGMo-Box GEL6505A_____C or GEL6505B_____C in combination with SeGMo-Connect BZK_____C_____.

Connection technology **ST**

- The positioning drives are not intended for direct connection to the power grid. Power supply must be provided by a power supply unit with UL listing as per UL 61010 or UL 508. The power supply unit must ensure electrical isolation to the main power supply. A breaker compliant with UL 248 must be fitted in the supply cable between the power supply unit and the positioning drive. Irrespective of the input voltage, the breaker must have a nominal value of $I = 100W/U_{IN}$ (input voltage U_{IN} : 24 V to 30 V DC).
- The positioning drives have been only evaluated for use in overvoltage category II.
- The positioning drives have been only evaluated for use in the "Factory Automation" area (GPNY).

Your notes

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