English

JOHANNES HÜBNER GIESSEN

ideas and solutions

Operating and assembly instructions

Incremental encoder FG(HJ) 40-2

Read the operating and assembly instructions before assembly, before starting installation and or any other work!
Keep for future reference!

Download PDF

Translation of the original operating and assembly instructions
ID-80678-R0

FG(HJ)40-2_MANUAL-en_R0

Manufacturer / author
Johannes Hübner
Fabrik elektrischer Maschinen GmbH
Siemensstr. 7
35394 Giessen
Germany
Phone: +49 641 7969 0
Fax: +49 641 73645
Internet: www.huebner-giessen.com
E-mail: info@huebner-giessen.com

Trademarks

Brand and product names are trademarks or registered trademarks of their respective owners.

Protected trademarks ™ or ® are not always designated as such in this manual. However, this does not mean that they may be used freely.

Copyright protection

Reservation of rights

Table of contents

1 General information

1.1 Information on the operating and assembly instructions

This operating and assembly instructions provides important information on how to use the device. It must be read carefully before beginning any work and observed.
Furthermore, local accident prevention regulations and general safety regulations applicable in the area where the device is used must be observed.

1.2 Scope of delivery

Incremental encoder, attachment material, operating and assembly instructions

1.3 Explanation of symbols

Warning notices in this operating and assembly instructions are designated using symbols. Information is proceeded by signal words which express the extent of the danger involved. Always comply with these notices, and use caution to avoid accidents, personal injury and property damage.

	**DANGER!** Indicates life-threatening situations. Failure to observe the safety information may result in serious injuries or death.
	**WARNING!** Indicates a potentially hazardous situation that could lead to death or severe injury if it is not avoided.
	**CAUTION!** Indicates a potentially hazardous situation that could lead to minor or slight injuries if it is not avoided.
	**CAUTION!** Indicates a potentially hazardous situation that could lead to property damage if it is not avoided.
	**(WARNING) NOTICE!** Emphasises useful tips and recommendations, and provides information useful for efficient, smooth operation.

1.4 Limitation of liability

All information and notes in this operating and assembly instructions have been compiled in accordance with the applicable standards and regulations, as well as our long years of knowledge and experience. The manufacturer accepts no liability for damage caused by:

- Failure to observe the operating and assembly instructions
- Improper use
- Use of untrained personnel

The device may only be opened as described in this manual.

In all other respects, the obligations agreed in the supply contract and the manufacturer's terms of delivery shall apply.

1.5 Warranty provisions

Warranty provisions are outlined in the manufacturer's General Delivery Conditions.
The device may only be opened as described in this manual. Any other opening of the device will void the warranty.

1.6 Customer service

Contact persons are available by phone, fax or e-mail for technical questions. See the manufacturer’s address on page 2.

2 Safety

DANGER!

This section provides an overview of all the significant safety aspects necessary to protect personnel and ensure safe, fault-free operation of the device. Failure to observe this information may result in significant danger.

2.1 Responsibility of the operator

The device is used in commercial applications. The operator of the device is therefore subject to the statutory obligations regarding occupational safety and the safety, accident prevention and environmental regulations applicable to the area of application of the device.

2.2 Proper use

The device is designed and constructed exclusively for the proper use described here.
The device is an and is used to detect rotational movements, e.g. by electrical and mechanical drives and shafts.

2.3 Improper use

DANGER!

The device must not be used in potentially explosive atmospheres or in environments with radioactive radiation.

The device must not be used for medical purposes.

WARNING!

This device is not intended for use in residential areas and cannot ensure adequate protection of radio reception in such environments.

No mechanical stress other than its own weight and the vibrations and shocks that inevitably occur during operation may be exerted on the device.

Examples of impermissible mechanical loads (incomplete list):

- Attachment of transport or lifting equipment to the device, e.g. load hook for lifting a motor.
- Attachment of packaging parts to the device, e.g. tension belts, tarpaulins, etc.
- Use of the device as a step, e.g. for a person to climb onto a motor.

2.4 Personnel

Assembly, disassembly, maintenance and commissioning may only be carried out by qualified personnel.

2.5 Personal protective equipment

When performing tasks such as assembly, disassembly, maintenance or commissioning, personal protective equipment such as safety footwear and protective work clothing must be worn in order to

minimise health risks. The regulations specified by the operator and the locally applicable regulations apply.

2.6 Special hazards

The following section lists residual risks that have been identified on the basis of a risk assessment.

2.6.1 Electric current

DANGER!

Danger to life due to electric current!
Contact with live parts poses an immediate danger to life. Damage to the insulation or individual components can be life-threatening.
If the insulation is damaged, switch off the power supply immediately and arrange for repairs. Before carrying out any work on the electrical system, disconnect it from the power supply and check that it is voltage-free. Keep moisture away from live parts. Otherwise this may lead to a short circuit.

2.6.2 Rotating shafts / hot surfaces

WARNING!

Risk of injury through rotating shafts and hot surfaces!
Touching rotating shafts can cause serious injuries.
During operation, do not touch moving components or handle rotating shafts. To prevent injuries, close all access openings in intermediate flanges with the corresponding screw plugs and fit exposed rotating components with protective covers. Do not open covers during operation. Before opening covers, ensure that no parts are moving. The encoder may become very hot during prolonged operation. Touching may cause burns!

2.6.3 Securing against restarting

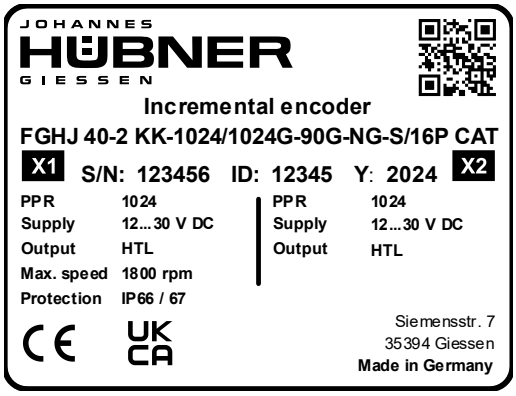
DANGER!

Danger to life due to unauthorised restarting!
When carrying out work, e.g. to rectify faults, there is a risk that the power supply may be switched back on without authorisation. This poses a danger to life to persons in the danger zone.
Before starting work, switch off all power supplies and secure them against being switched back on.

3 Technical data

3.1 Type plates

The following image shows an example of a type plate. The type plate is located on the outside of the housing, and includes the following information:



- Manufacturer, type, address, CE marking, UKCA marking, certification information, QR code
- Serial number (S/N)
- Part no. (ID)
- Date of manufacture (Y)
- Pulse rate (PPR)
- Supply voltage (Supply)
- Output
- Max. speed
- Protection class (Protection)

3.2 Type designation

	FG	40-2	K	K	-	1024	/	1024	G-90G-NG	-S	/20P
Incremental encoder *FG* Solid shaft, insulated *FGHJ* Hollow shaft, insulated											
Series											
Connection terminal box 1 *K* Terminal strip *T* 12-pin M23 connector *R* 12-pin connector (Burndy type) *C* Fixed cable *S* 15-pin industrial connector *I* 10-pin ITT Cannon connector											
Connection terminal box 2 - No terminal box 2 *K* Terminal strip *T* 12-pin M23 connector *R* 12-pin connector (Burndy type) *C* Fixed cable *S* 15-pin industrial connector *I* 10-pin ITT Cannon connector											
Pulse rate terminal box 1 *1 - 100,000*											
Pulse rate terminal box 2 *1 - 100,000*											
Signal output A (0°), B (90°), Z (zero pulse), status, each also inverted											
Option No option *-S* Speed switch											
Shaft Solid shaft Ø 11 g6 mm (optional Ø 14 g6 mm) Hollow shaft: */16P* Feather key, Ø 16 H7 mm */20P* Feather key, Ø 20 H7 mm */16K* Clamp, Ø 16 H7 mm */25K* Clamp, Ø 25 H7 mm											

3.3 Electrical data

Supply voltage +U	12 … 30 VDC
Pulse rates	1 … 100,000 (preset selectable)
Idling power consumption	< 100 mA
Terminal strip	Weidmüller PCB terminal type LM1N 5.08 Clamping range: 0.2 mm² … 2.5 mm² Tightening torque: 0.4 - 0.5 Nm
Outputs	Current-limited, short-circuit resistant push-pull line drivers with integrated characteristic impedance adjustment for 30 … 140 Ω lines.
Signal level	HTL: U_{HIGH} ≥ +U - 2 V U_{LOW} ≤ 0.5 V at I_L = 30 mA TTL: 5V, RS422-compatible
Output current I_L	< 50 mA at +U = 24 V (per output)
Duty cycle	50% ± 3% (≤ 65,536 PPR)
Phase shift 0°, 90°	90° ± 3% (≤ 16,384 PPR)
Output frequency	≤ 200 kHz (see chapter 3.5.1)
Cable length	≤ 350 m (see chapter 3.5.1)
Start time	< 100 ms (after switching on the supply voltage)
Shaft insulation	1 kV

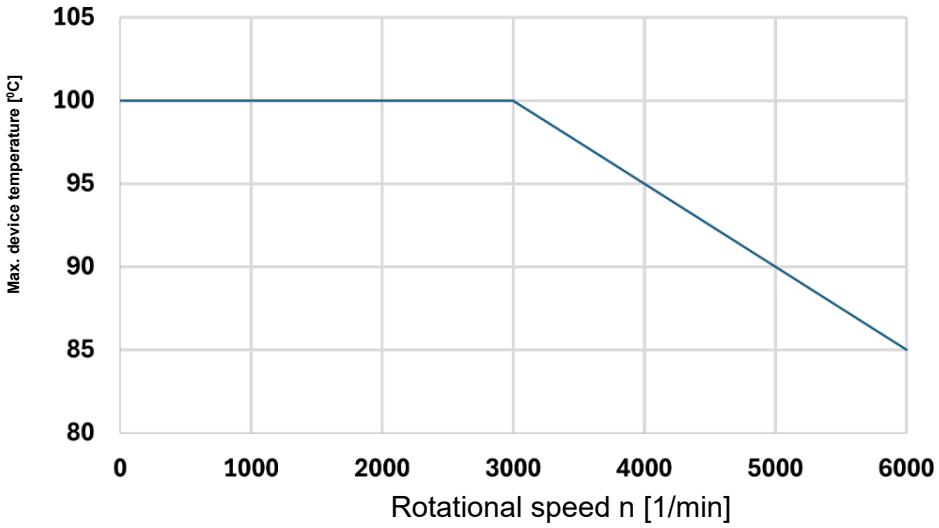
3.4 Mechanical data

Device temperature	-40°C … +85°C -40°C … +100°C (optional)
Protective class	IP66/IP67 according to DIN EN 60529
Cable gland	M20x1.5, sealing range: ø 5 ... 14 mm Optional: sealing range ø 11 … 20 mm Type: Pflitsch blueglobe TRI
Breakaway torque	Approx. 3.5 Ncm
Permitted angular acceleration	≤ 10^4 rad/s²
Vibration resistance	≤ 20 g (sinusoidal 55-500 Hz; EN 60068-2-6:2008)
Shock resistance	≤ 200 g (half sine 6 ms; EN 60068-2-27:2009)
Resistance	Seawater

3.4.1 Solid shaft

Mechanical speed	≤ 7000 min^{-1}
Rotor moment of inertia	Approx. 500 gcm²
Shaft load	≤ 350 N (axial/radial)
Shaft dimensions	11g6 x 30 mm, 14g6 x 30 mm
Mass	2.9 kg to 4.6 kg

3.4.2 Hollow shaft

Mechanical speed	≤ 6000 min^{-1}
Rotor moment of inertia	Approx. 1560 gcm²
Shaft dimensions	With feather keyway: 16 H7 mm, 20 H7 mm With clamp: 16 H7 mm, 25 H7 mm
Mass	3.2 kg to 3.8 kg
Max. device temperature with option -40…+100 °C	

3.5 Cable

A shielded connection cable with the following specifications must be used for the electrical connection of the encoder:

- Number of wires: 10
- Outer diameter: 5 - 14 mm
- Cable construction: pair stranding
- Wire cross-section: min. 0.25 mm^2
- Shield: braid of tinned copper wires, coverage 85% or more

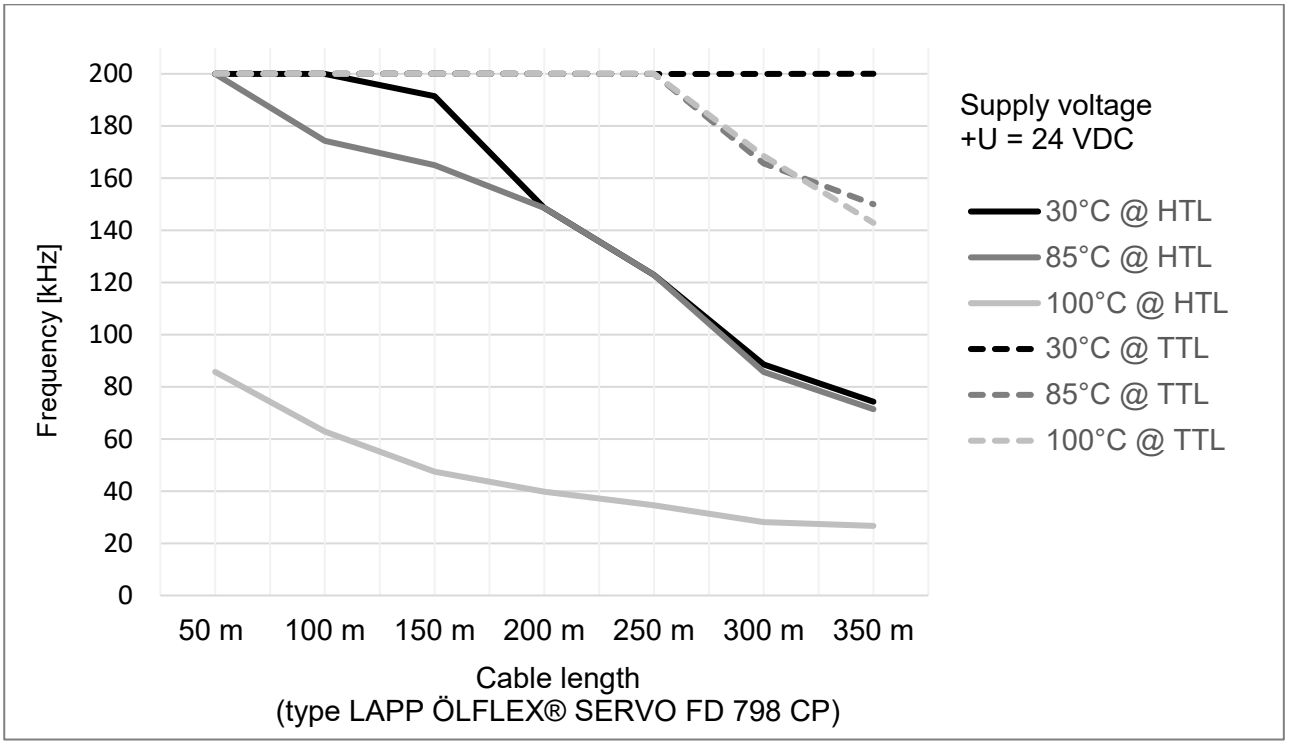
The following cable properties should be selected according to the application:

- UV resistance for outdoor use
- Media resistance
- Mobility for travel distances (e.g. for drag chains)
- Temperature range

For typical applications, a cable such as LAPP ÖLFLEX® SERVO FD 798 CP, which is available as an accessory, can be used.

3.5.1 Cable lengths

The diagram shows the permissible cable lengths for HTL/TTL output signals depending on the output frequency at different device temperatures.

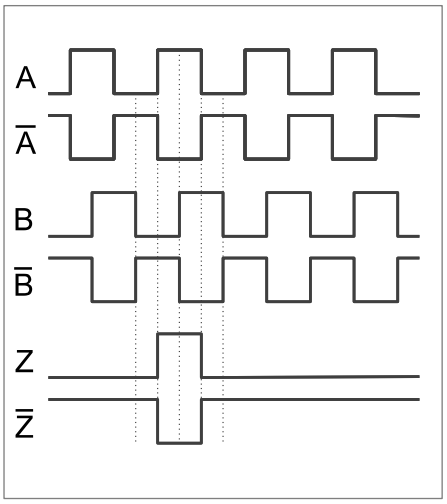


NOTE!
Other cable types and increased mechanical loads may result in different values.

3.6 Functions

3.6.1 Incremental output

The incremental output consists of pulse tracks A (0°), B (90°) and the zero pulse Z (N). The zero pulse is a rectangular pulse per revolution, synchronised with track A, with a width of 180°.
All signals are output with their corresponding inverted signals.
With the direction of rotation clockwise when looking at the shaft/flange, the signal curve is as shown in the adjacent figure.



Incremental output

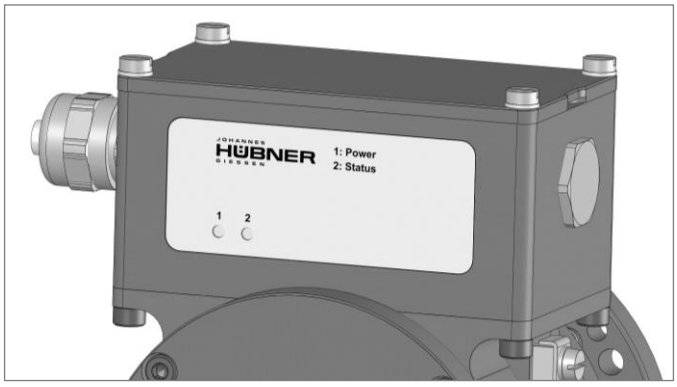
3.6.2 Status output ST

The device monitors internal system diagnostics such as overtemperature or scanning malfunctions. In the event of a fault, the status output ST and the corresponding inverted output switch:

- Status output ST = Active-Low
- Status output /ST = Active-High

3.6.3 LED display

For diagnostic purposes, the encoder has LED displays on the exterior.



Power:

- Off = no voltage at the device
- Green = voltage at the device

Status:

- Green = OK
- Red = device in error state (see chapter 5.4)

	NOTE! The behaviour of the status LED is synchronised with the status output ST.

4 Installation

4.1 Tools

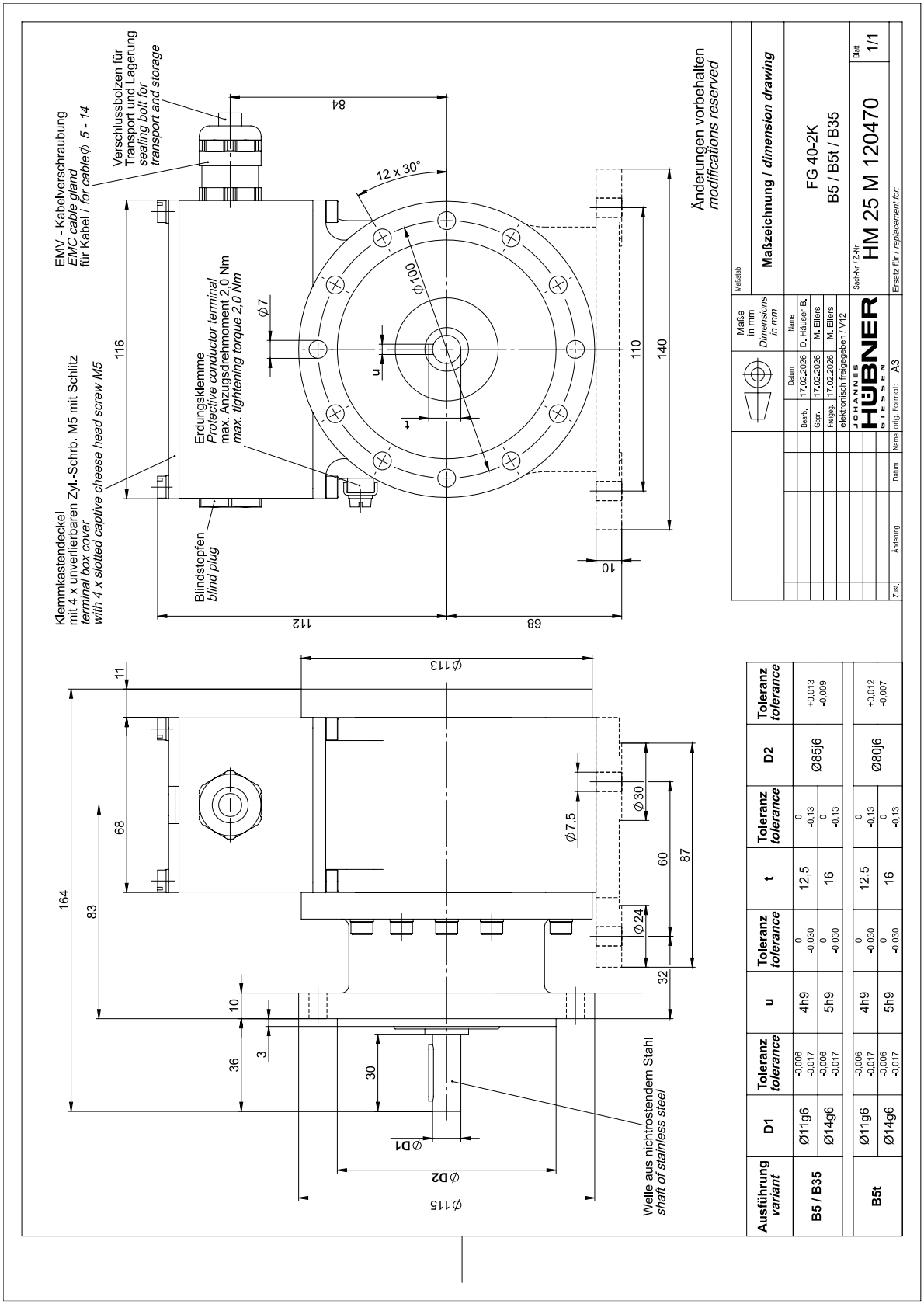
- Hexagonal wrench: size 10 (flange)
- Hexagonal wrench: size 22, size 24 (cable gland)
- Flat-blade screwdriver 1.2 mm x 6.5 mm (terminal box cover, protective conductor terminal)
- Flat-blade screwdriver 0.6 x 3.5 mm (connection terminals)
- Mounting grease
- Loctite® 243 (medium-strength threadlocker)

NOTE!

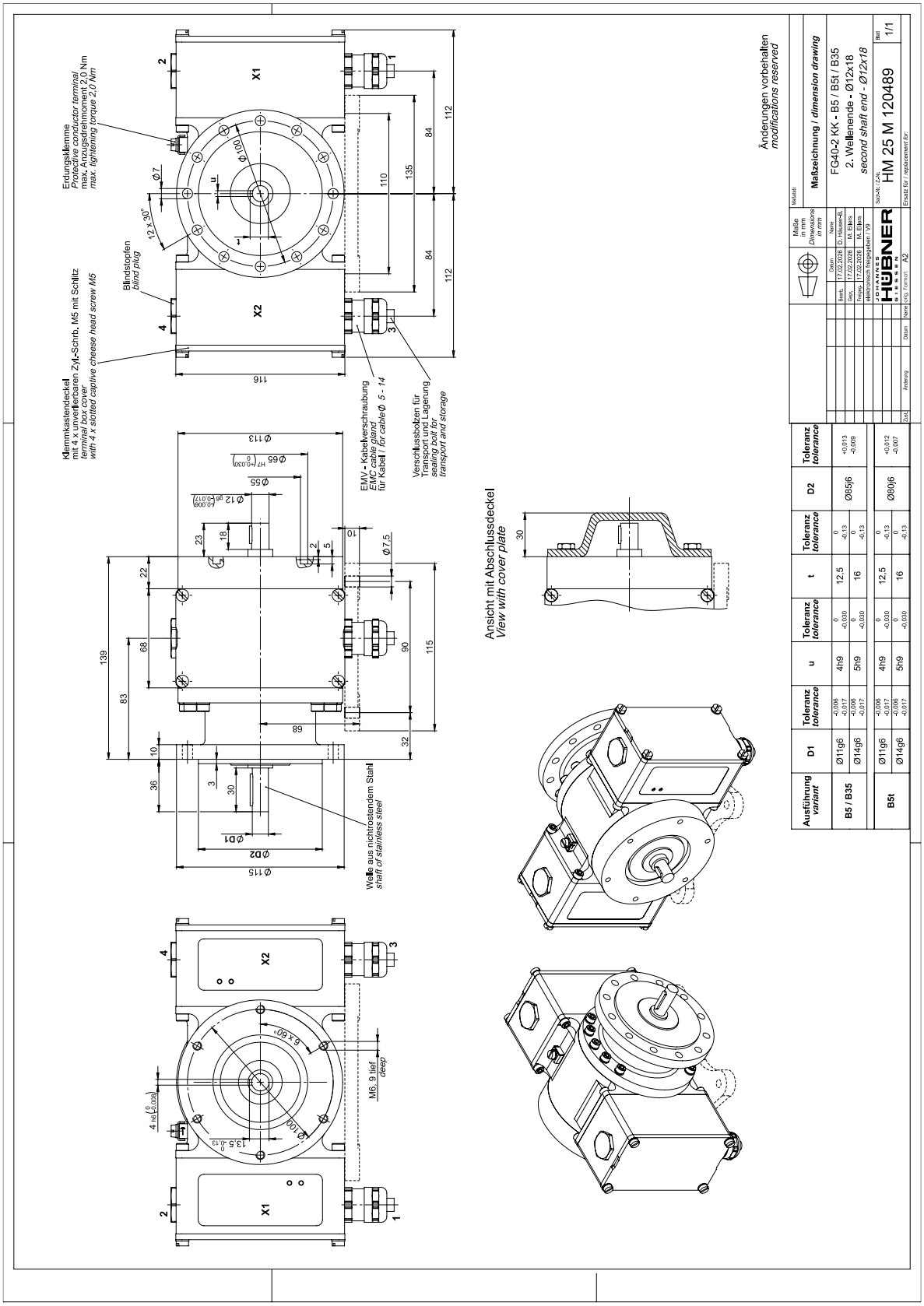
Use of a hammer or similar tools during installation is not permitted, due to the danger of damage to the ball bearings and couplings!

4.2 Dimensional drawings

4.2.1 Design B5 (flange)

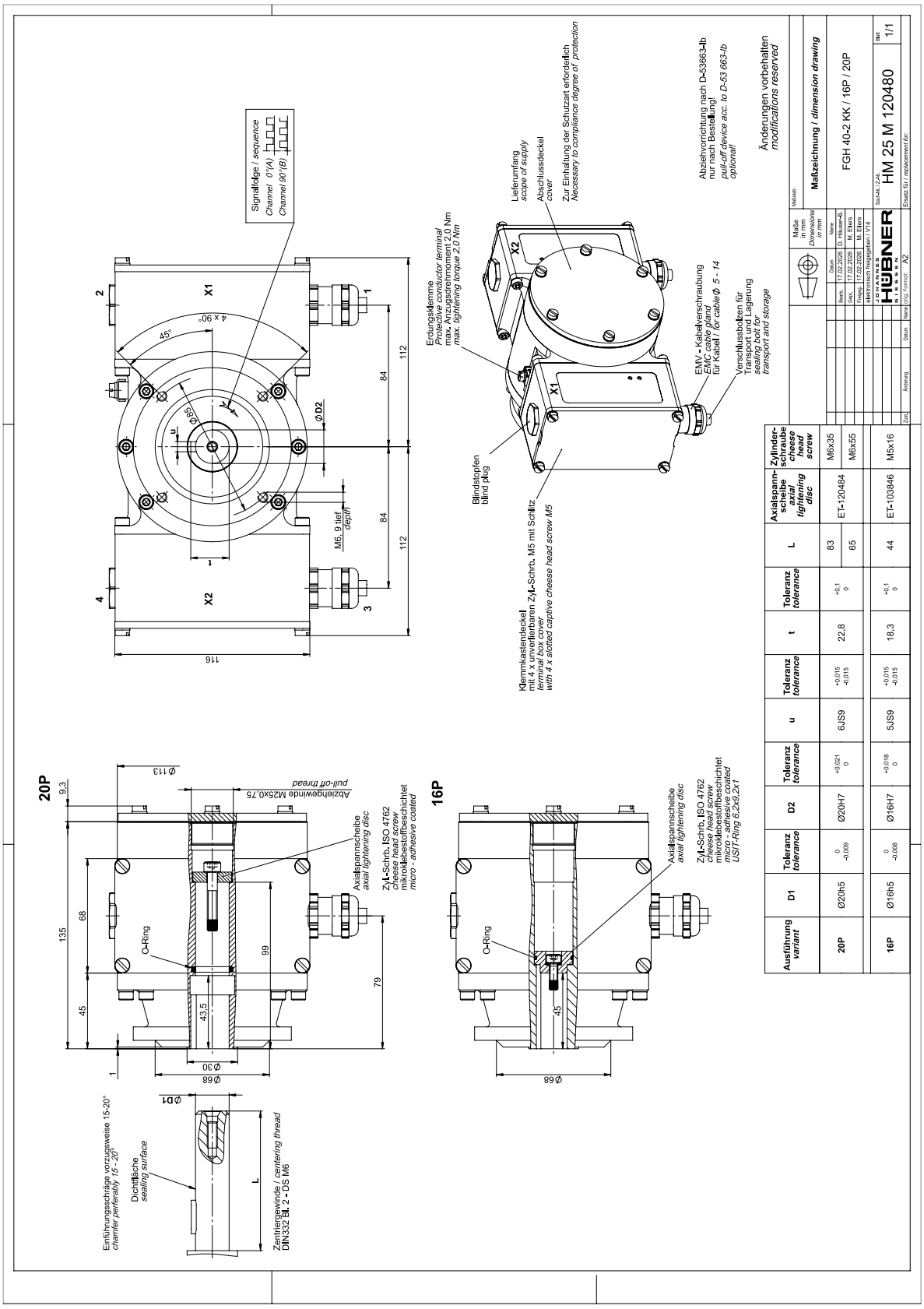


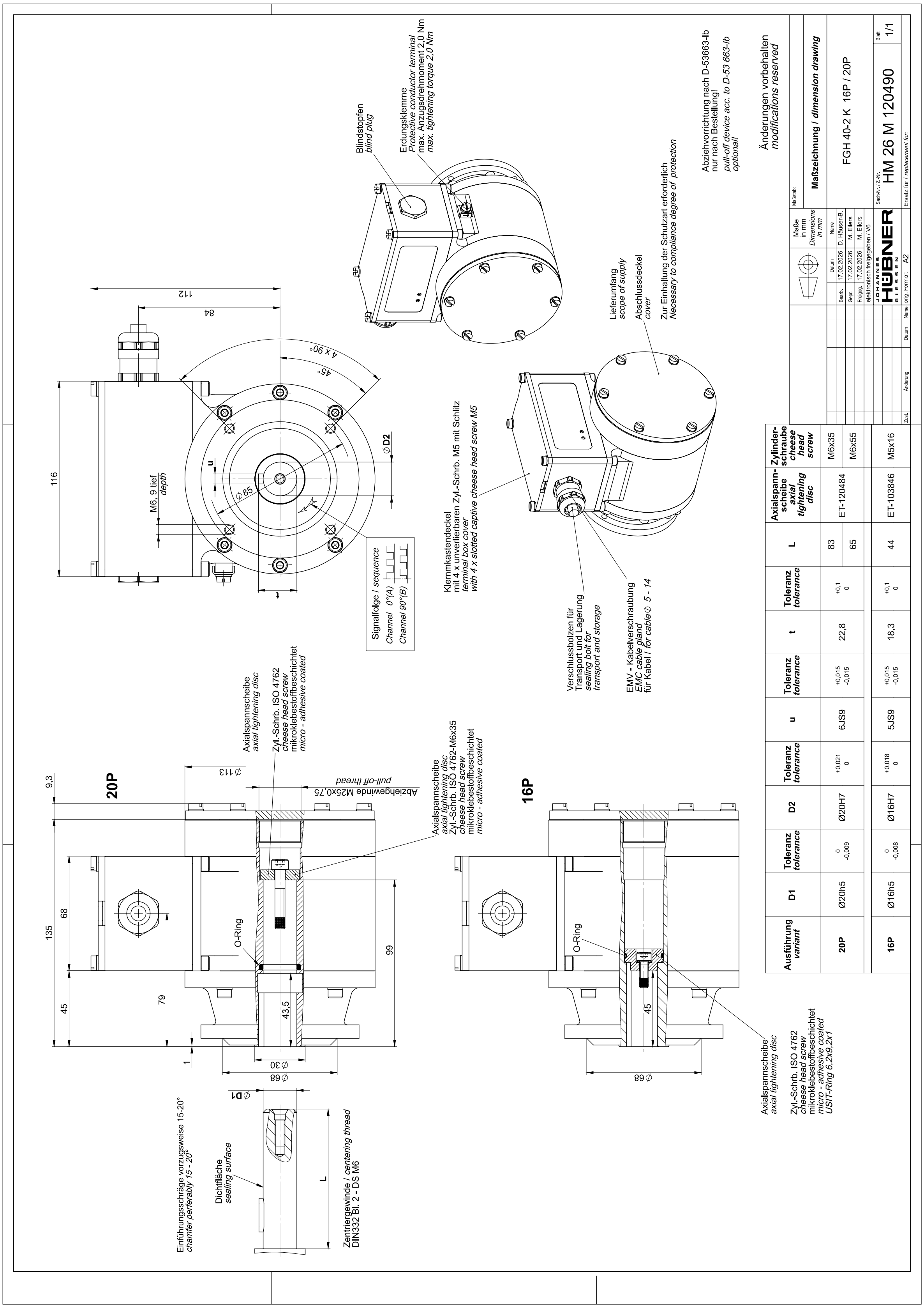
Ausführung variant	D1	Toleranz tolerance	u	Toleranz tolerance	t	Toleranz tolerance	D2	Toleranz tolerance
B5 / B35	Ø11g6	-0,006 -0,017	4h9	0 -0,030	12,5	0 -0,13	Ø85j6	+0,013 -0,009
	Ø14g6	-0,006 -0,017	5h9	0 -0,030	16	0 -0,13		
B5t	Ø11g6	-0,006 -0,017	4h9	0 -0,030	12,5	0 -0,13	Ø80j6	+0,012 -0,007
	Ø14g6	-0,006 -0,017	5h9	0 -0,030	16	0 -0,13		



Ausführung variant	D1	Toleranz tolerance	u	Toleranz tolerance	t	Toleranz tolerance	D2	Toleranz tolerance
B5 / B35	Ø11g6	-0,006 -0,017	4h9	0 -0,030	12,5	0 -0,13	Ø85j6	+0,013 -0,009
	Ø14g6	-0,006 -0,017	5h9	0 -0,030	16	0 -0,13		
B5t	Ø11g6	-0,006 -0,017	4h9	0 -0,030	12,5	0 -0,13	Ø80j6	+0,012 -0,007
	Ø14g6	-0,006 -0,017	5h9	0 -0,030	16	0 -0,13		

4.2.2 Hollow shaft design





Ausführung variant	D1	Toleranz tolerance	D2	Toleranz tolerance	u	Toleranz tolerance	t	Toleranz tolerance	L	Axialspannscheibe axial tightening disc	Zylinderschraube cheese head screw
20P	Ø20h5	0 / -0,009	Ø20H7	+0,021 / 0	6JS9	+0,015 / -0,015	22,8	+0,1 / 0	83 / 65	ET-120484	M6x35 / M6x55
16P	Ø16h5	0 / -0,008	Ø16H7	+0,018 / 0	5JS9	+0,015 / -0,015	18,3	+0,1 / 0	44	ET-103846	M5x16

4.3 Assembly

CAUTION!

During work on the device, the safety instructions in chapter 2 must be observed!

NOTE!

Installation errors

- cause radial forces on the encoder shaft.
- reduce the service lives of the ball bearings and coupling.
- impair signal quality (harmonics).

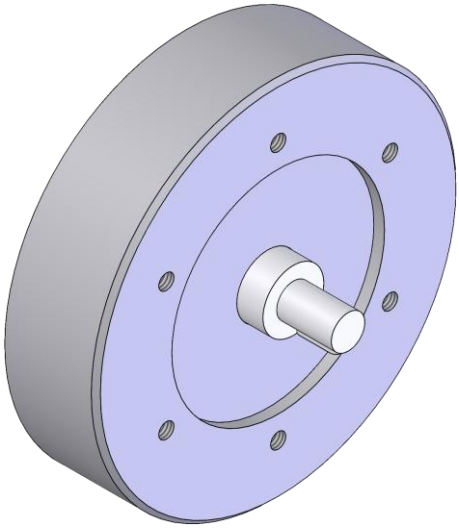
Angular errors and parallel misalignment between the (motor) shaft and the encoder shaft are considered installation errors and should be kept to a minimum!

All assembly instructions described below are examples only and may vary depending on the attached parts used.

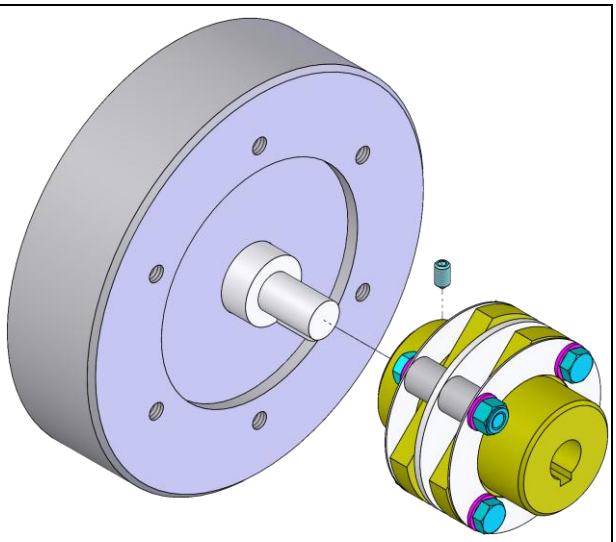
Check that the delivery is complete (see Scope of delivery, chapter 1.2).

Before assembly, clean the attachment location and check for damage. Repair any damage.

4.3.1 Design B5 (flange)



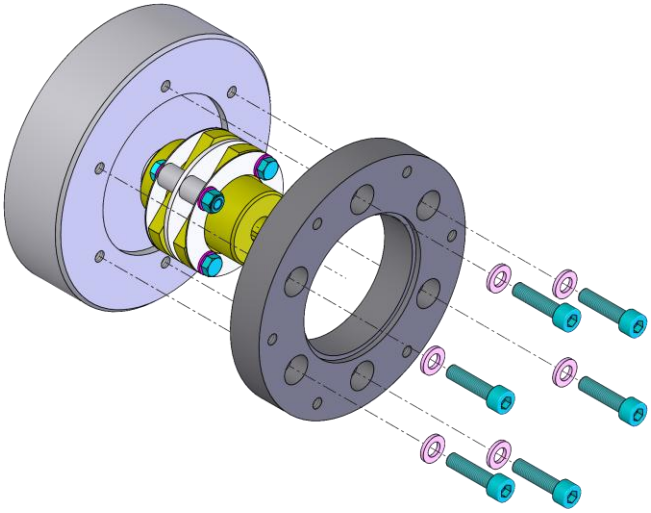
1. Clean the shaft and centring device and lightly grease them

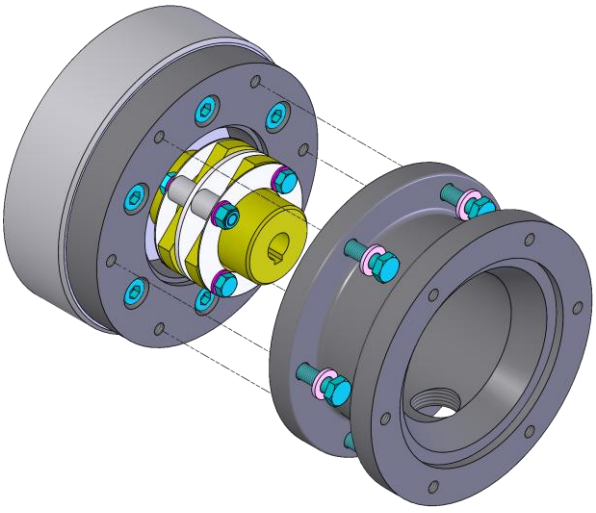


2. Fit the coupling smoothly onto the customer's shaft

Adjust the drill holes for used couplings if necessary.

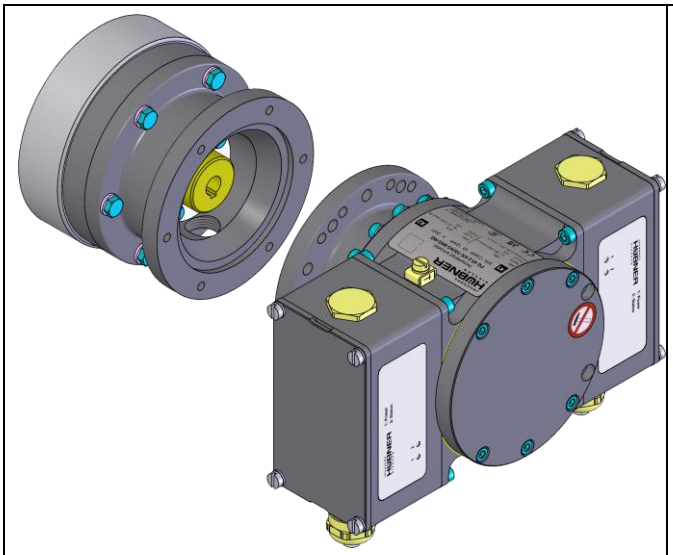
Secure the coupling hub with a grub screw or regular screw (depending on the coupling design).





3. Fasten the intermediate flange and, if necessary, the adapter disc to the attachment point

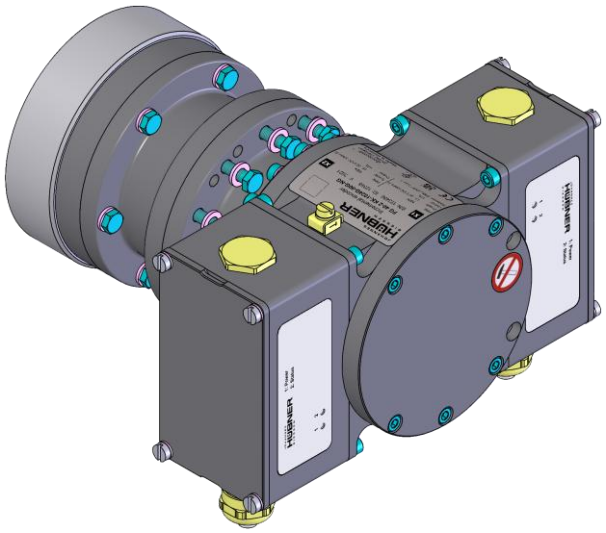
Lightly grease the centring device. Screw plug facing down.



4. Insert the encoder into the coupling and intermediate flange

Lightly grease the shaft.

Cable outlets facing down or to the side.



5. Fasten the encoder to the coupling and intermediate flange

Fit the encoder on the intermediate flange using ISO 4017 M6x20 10.9 screws. Tightening torque 10 Nm.

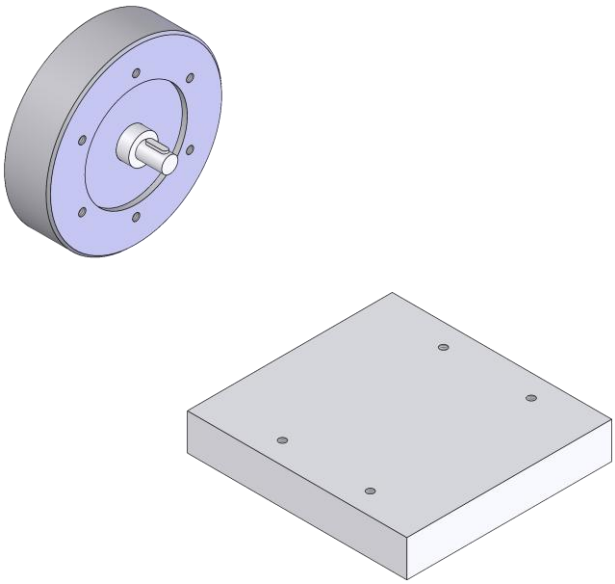
Unscrew the screw plug from the intermediate flange.

Secure the coupling hub to the encoder shaft using a grub screw or regular screw (depending on the coupling design).

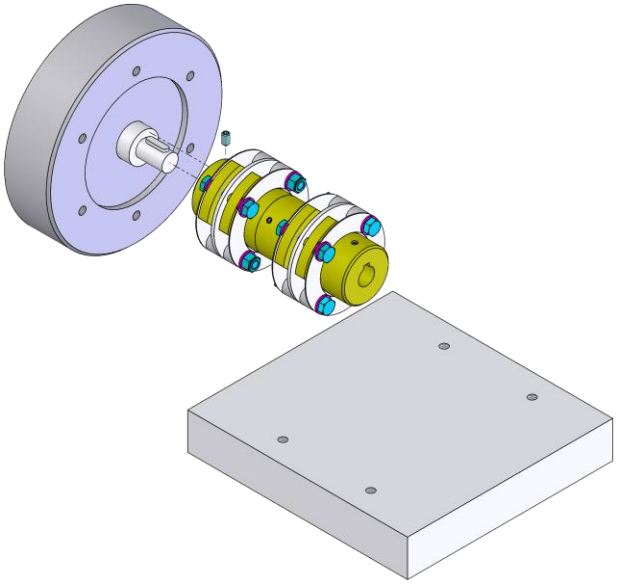
Tighten the screw plug on the intermediate flange again.

4.3.2 Design B35 (flange and base)

	**NOTE!** Encoders in B35 design can be attached using the flange (B5, see section 4.3.1) or the base (B3).



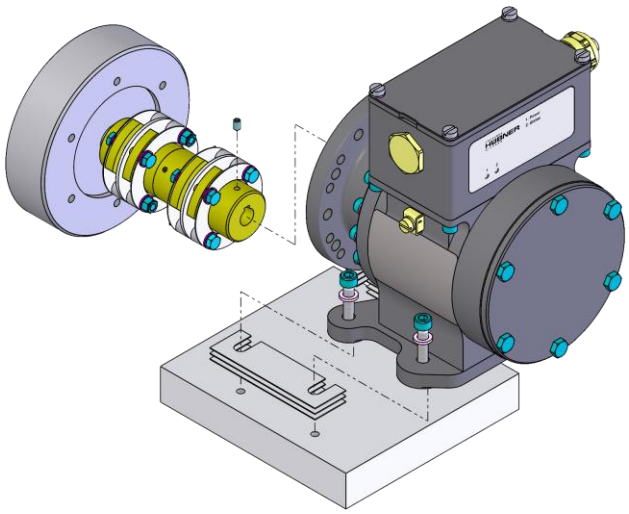
1. Clean the shaft and centring device and lightly grease them



2. Fit the coupling smoothly onto the customer's shaft

Adjust the drill holes for used couplings if necessary.

Secure the coupling hub with a grub screw or regular screw (depending on the coupling design).



3. Fit the encoder

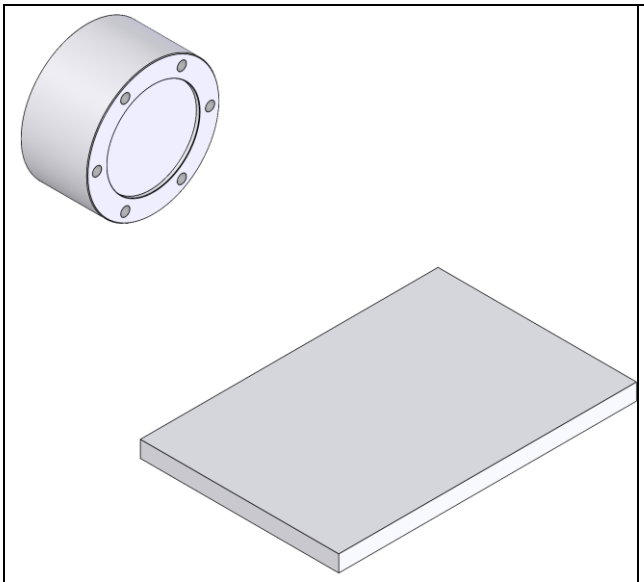
Lightly grease the encoder shaft and insert it into the coupling.

Attach the base of the encoder to the customer interface using ISO 4762 M6x30 10-9 cheese head screws. Compensate for lateral offset if necessary.

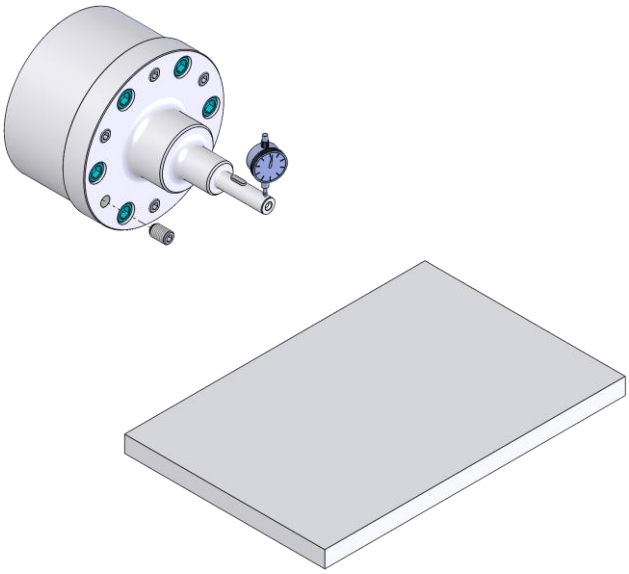
Compensate for any height differences with spacer plates if necessary.

Secure the coupling hub to the encoder shaft using a grub screw or regular screw (depending on the coupling design).

4.3.3 Hollow shaft design



1. Clean and lightly grease the customer's shaft and centring device



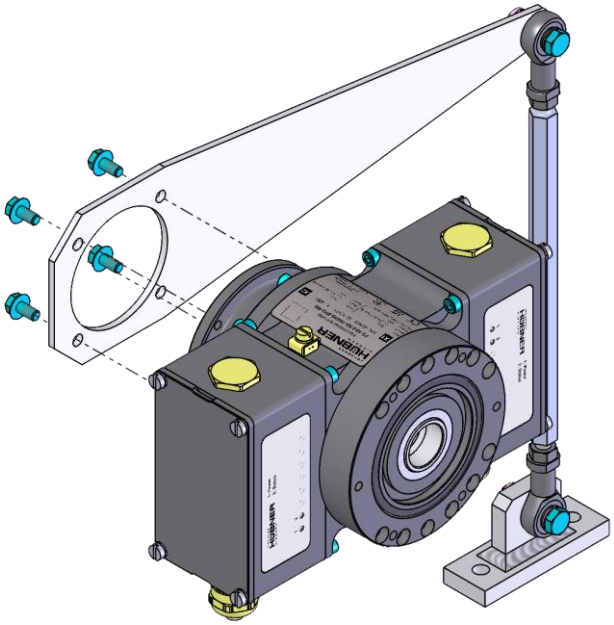
2. Fit the adapter shaft onto the customer's shaft and align it using a dial gauge

Lightly grease the adapter shaft.

The radial run-out of the adapter shaft may be a max. of 0.05 mm.

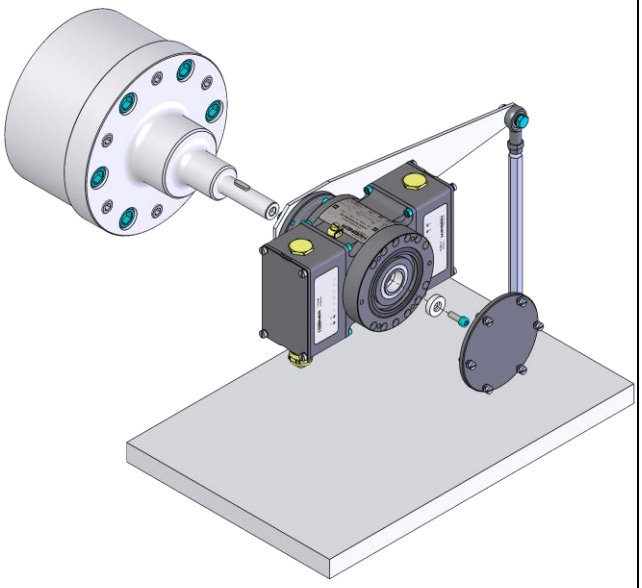
Clean the shaft and centring device and lightly grease them.

Use the ball pressure screws to align the adapter shaft if necessary. Secure ball pressure adjustment screws with Loctite® 243. Remove any unused ball pressure adjustment screws or secure them with Loctite® 243.



3. Secure the support arm of the torque support to the encoder using screws

The support arm of the torque support can be attached to the device in four different directions.



4. Fit the encoder on the adapter shaft

Remove the cover plate of the encoder.

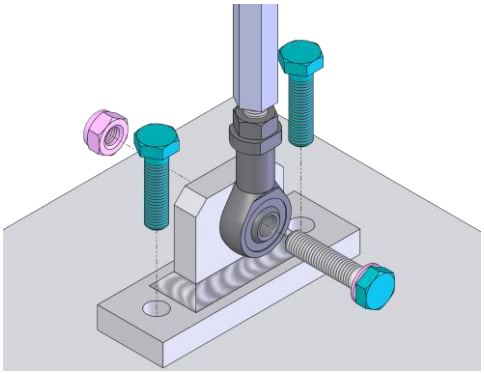
Slide the encoder smoothly onto the adapter shaft.

Do not strike the encoder hard against the shaft collar.

Cable outlets facing down or to the side.

Attach the encoder.

Fit the encoder cover plate.



5. Fastening of the torque support

Fastening with base plate: the base plate is screwed to a fixed point, e.g. motor housing, or to the foundation.

Fastening without base plate: the free joint head of the torque rod is screwed directly to a fixed point, e.g. on the motor housing.

Ideal angle between support arm and torque rod: 90°.

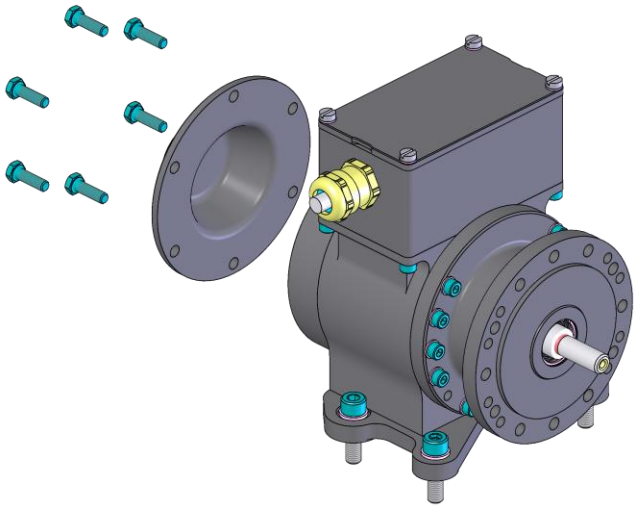
Joint heads must be easy to turn.

Keep joint heads free of contamination or paint.

4.3.4 Attachments

	**NOTE!** Encoders in B5/B14 design have a second shaft end with integrated coupling half and a B14 flange on the opposite drive side, to which another device with a B5 flange can be attached, e.g. an incremental encoder, absolute encoder or speed switch. A second coupling half with an elastomer ring is required for attachment and is available as an accessory. Up to four devices can be combined in this way.

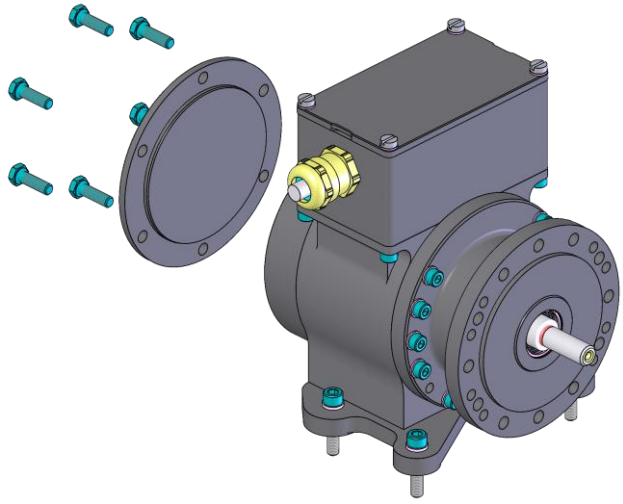
4.3.4.1 2nd shaft end 12x18



1. Remove the cover plate

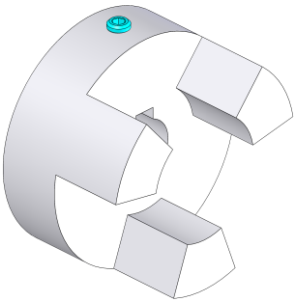
When delivered, the second shaft end is closed by a cover plate and 6 x M6x20 hexagon screws.
Remove the 6 x M6x20 hexagon screws and take off the cover plate.
Fit the attachment according to chap. 4.2.1.

4.3.4.2 2nd shaft end EK20



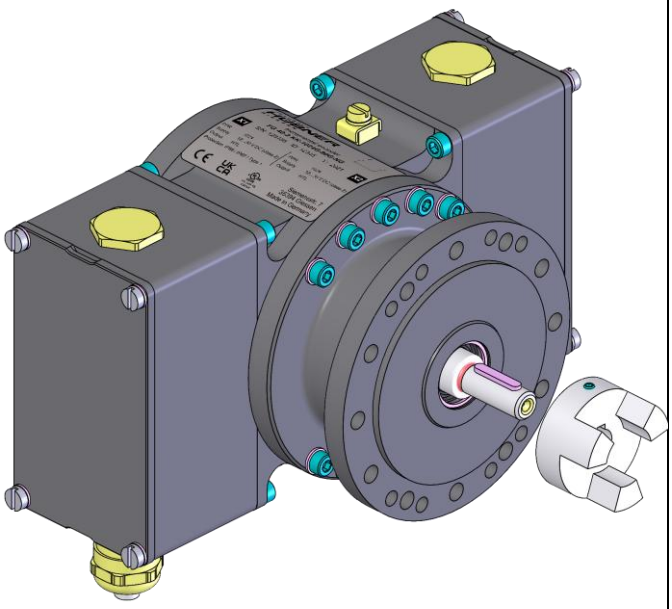
1. Remove the cover plate

When delivered, the second shaft end is closed by a cover plate and 6 x M6x20 hexagon screws. Remove the 6 x M6x20 hexagon screws and take off the cover plate.



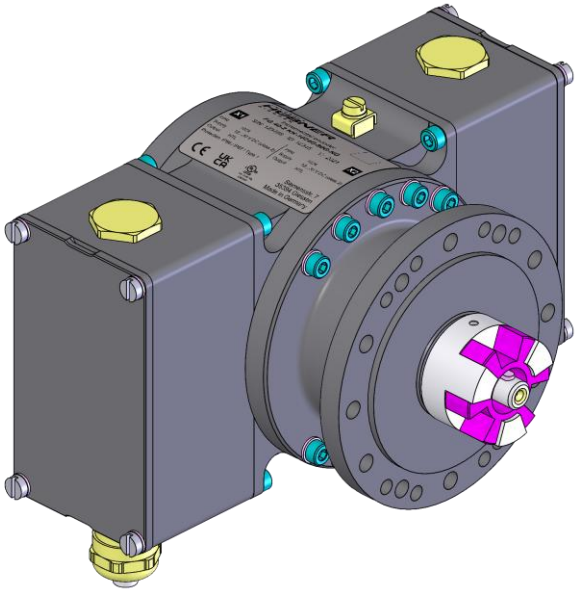
2. Prepare the clutch half

Loosen the grub screw on the clutch half.



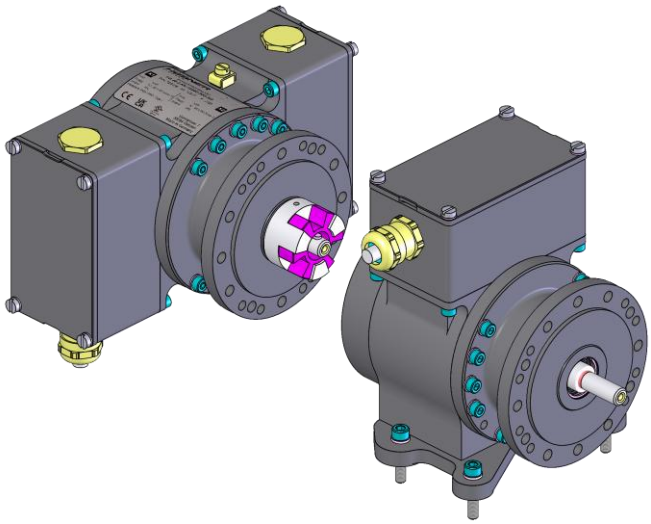
3. Fit the coupling half

Push the coupling half onto the shaft as far as it will go.



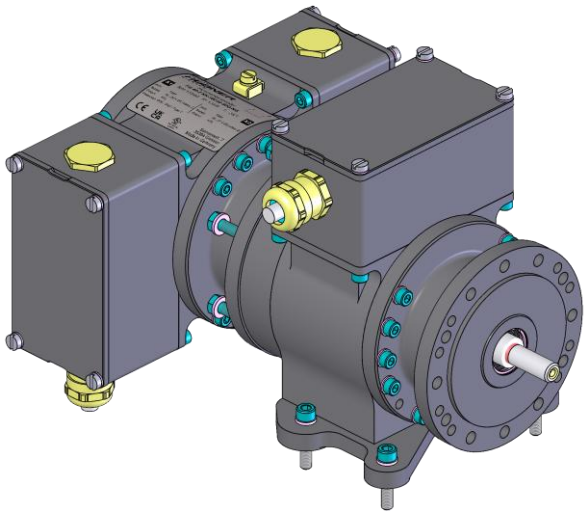
4. Fasten the coupling half

Tighten the grub screw.
Insert the elastomer ring into the coupling half.



5. Fit the add-on device

Fit the add-on device to the B14 flange of the encoder.



6. Fasten flange screws

Fasten the add-on device with 6 x M6x20 hexagon screws. Tightening torque 10 Nm.

WARNING!

The second shaft end must always be closed with the cover plate to prevent injuries and ensure the protection class of the device, unless another device is attached!

NOTE!

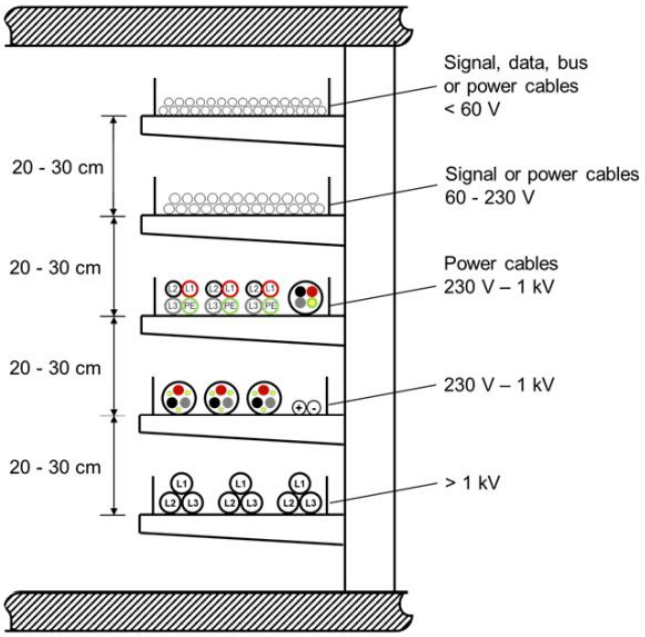
- When the cover plate is open, ensure that no liquids or dirt get into the device.
- Refit the cover plate if there are any delays in installation.

4.4 EMC

NOTE!
The FG 40-2 is categorised in Group 1 and Class A in accordance with EN 55011 and is only intended for use in an industrial environment.

In environments with high drive power, external systems can generate high electromagnetic emissions. Impairment of the encoder's operation can be avoided by observing the following instructions:

- Uninterrupted, low-resistance machine earthing must be ensured across all parts of a system.
- Do not connect any other actuators with high energy density (e.g. frequency converters, solenoid valves, contactors) to the power supply of the device and maintain a generous installation distance from these. Use interference suppression elements for relays and contactors.
- The encoder is operated with a low voltage of up to 30 V. To prevent interference coupling through the air, it is important to plan cable routes with sufficient distance from power lines in accordance with the following diagram.



4.5 Connection

4.5.1 Terminal strip

A suitable shielded cable must be selected for connecting the encoder (see chapter 3.5).

NOTE!

- Cable glands and blind plugs are only tightened by hand before delivery. Before commissioning, retighten all cable glands and blind plugs to ensure that the terminal box is securely sealed.
- If necessary, the positions of the blind plug and cable gland can be swapped.
- Avoid lateral tensile forces on cables and connectors so as not to compromise the protection class of the cable gland.
- Observe the minimum bending radius of the cable used.
- Sealing inserts in cable gland:
  For cable diameter 5 - 9 mm: use both sealing inserts
  For cable diameter 9 - 14 mm: remove the inner sealing insert
- Shield terminals, which are also available as accessories from Johannes Hübner Fabrik elektrischer Maschinen GmbH, must be used to attach the cable shielding in the control cabinet.
- Assembly instructions for cable glands: available for download on the Johannes Hübner Gießen website and on the manufacturer's website.

1. Strip approx. 120 mm of insulation from the end of the cable that is inserted into the encoder.
2. Shorten the braided shield to a maximum of 14 mm. If necessary, protect and secure the end of the braided shield with insulating tape.
3. Open the terminal box cover.
4. Loosen the cable gland and guide the cable through the cable gland, twisting it slightly.
5. Tighten the cable gland using a hexagonal wrench until the cable is securely clamped, sealed and the shield is connected to the spring. The blue sealing insert of the cable gland should be flush with the upper edge of the cable gland (max. tightening torque 10.0 Nm).
6. Crimp the wire end ferrules onto the individual strands and connect them according to the connection diagram (see chapter 4.6).
7. Close the cover on the junction box.

CAUTION!

- No moisture may enter the junction box when the box is open.
- Before closing, check the sealing surface and seal of the terminal box cover for cleanliness and clean both surfaces if necessary.
- When closing, ensure that no cables are trapped.

4.5.2 Connector

1. Connect suitable cable (see chapter 3.5) to mating connector
2. Connect the signal cable shield directly to the connector housing
3. Connect according to the connection diagram (see chapter 4.6)

4.5.3 Pre-assembled cable

1. Connect according to the connection diagram (see chapter 4.6)

4.5.4 Protective conductor terminal

An earthing strap must be connected to the protective conductor terminal of the encoder (max. tightening torque 2.0 Nm).

NOTE!

We recommend using an earthing strap made of braided fine strands with a cross-section ≥ 6 mm².
A suitable earthing strap is available as an accessory from Johannes Hübner Fabrik elektrischer Maschinen GmbH.

- To earth the encoder, the connected earthing strap must be permanently and inseparably connected to a well-chosen, nearby earthing point, ideally on the main structure of the installation.
- The earthing point must be bare metal, free of paint, non-conductive surface finishes, grease, oil and corrosion. The earthing point must be protected against long-term corrosion, for example by installing it in a dry location.
- The earthing strap should be connected to the earthing point from the encoder using the shortest possible length. The earthing strap may need to be shortened for this.

4.6 Connection diagrams

!	**CAUTION!** Applying the supply voltage to the signal outputs will destroy the device!

4.6.1 Terminal strip

PN235-400

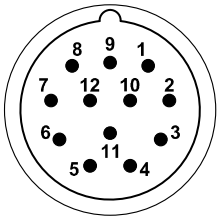
Connection diagram

1	0V		Ground (GND)
2	+U		Supply voltage
3	A	⎍⎍⎍	Incr. output 0°
4	$\overline{A}$	⎍⎍⎍	Incr. output 0° inverse
5	B	⎍⎍⎍	Incr. output 90°
6	$\overline{B}$	⎍⎍⎍	Incr. output 90° inverse
7	Z	⎍	Marker pulse
8	$\overline{Z}$	⎍	Marker pulse inverse
9	ST	⎍	Status
10	$\overline{ST}$	⎍	Status inverse

4.6.2 12-pin M23 connector

PN235-405

Connection diagram



12-pin M23 connector
N-coding, standard (CW)

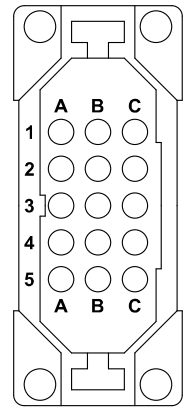
10	0V		Ground (GND)
12	+U		Supply voltage
5	A	⎍⎍⎍	Incr. output 0°
6	$\overline{A}$	⎍⎍⎍	Incr. output 0° inverse
8	B	⎍⎍⎍	Incr. output 90°
1	$\overline{B}$	⎍⎍⎍	Incr. output 90° inverse
3	Z	⎍	Marker pulse
4	$\overline{Z}$	⎍	Marker pulse inverse
7	ST	⎍	Status
9	$\overline{ST}$	⎍	Status inverse

Connector type: PHOENIX CONTACT, CA-12P1N8A6L00, 1624026

4.6.3 15-pin industrial connector

PN235-404

Connection diagram



15-pin industrial plug

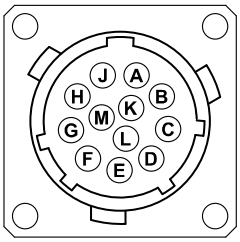
C5	0V		Ground (GND)
A5	+U		Supply voltage
A1	A		Incr. output 0°
A2	$\overline{A}$		Incr. output 0° inverse
A3	B		Incr. output 90°
A4	$\overline{B}$		Incr. output 90° inverse
B3	Z		Marker pulse
B4	$\overline{Z}$		Marker pulse inverse
B5	ST		Status
C3	$\overline{ST}$		Status inverse

Crimp contacts: 0.75 - 1.00 mm²

4.6.4 12-pin round connector (Burndy type)

PN235-402

Connection diagram



12-pin circular connector with bayonet lock

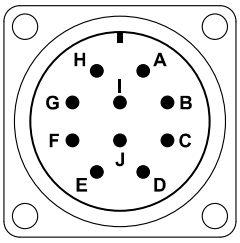
A	0V		Ground (GND)
B	+U		Supply voltage
C	A		Incr. output 0°
D	$\overline{A}$		Incr. output 0° inverse
E	B		Incr. output 90°
F	$\overline{B}$		Incr. output 90° inverse
G	Z		Marker pulse
H	$\overline{Z}$		Marker pulse inverse
J	ST		Status
K	$\overline{ST}$		Status inverse

Connector type: SOURIAU, UT001412PH6

4.6.5 10-pin ITT Cannon connector

PN235-406

Connection diagram



10-pin flange connector
ITT Cannon

J	0V		Ground (GND)
C	+U		Supply voltage
A	A		Incr. output 0°
E	$\overline{A}$		Incr. output 0° inverse
B	B		Incr. output 90°
F	$\overline{B}$		Incr. output 90° inverse
D	Z		Marker pulse
G	$\overline{Z}$		Marker pulse inverse
H	ST		Status
I	$\overline{ST}$		Status inverse

Connector type: ITT CANNON, CA02COME18-1PB01

4.6.6 Pre-assembled cable LAPP

PN235-401

Connection diagram

WH	0.5		0V	Ground (GND)
BN	0.5		+U	Supply voltage
BN	0.25		A	Incr. output 0°
GN	0.25		$\overline{A}$	Incr. output 0° inverse
GY	0.25		B	Incr. output 90°
PK	0.25		$\overline{B}$	Incr. output 90° inverse
RD	0.25		Z	Marker pulse
BK	0.25		$\overline{Z}$	Marker pulse inverse
VT	0.25		ST	Status
BU	0.25		$\overline{ST}$	Status inverse

Connection cable: 4x2x0.25+2x0.5

Cable type: LAPP ÖLFLEX® SERVO FD 798 CP 4x2x0.25+2x0.5
Colour code according to IEC 60757

4.6.7 Pre-assembled cable METROFUNK

PN235-403

Connection diagram

BK	0.56		0V	Ground (GND)
RD	0.56		+U	Supply voltage
OG	0.56		A	Incr. output 0°
BK	0.56		$\overline{A}$	Incr. output 0° inverse
BU	0.56		B	Incr. output 90°
BK	0.56		$\overline{B}$	Incr. output 90° inverse
YE	0.56		Z	Marker pulse
BK	0.56		$\overline{Z}$	Marker pulse inverse
GN	0.56		ST	Status
BK	0.56		$\overline{ST}$	Status inverse

Connection cable: 6x2x0.56

Cable type: METROFUNK 6P x AWG 20 C UL
Colour code according to IEC 60757

4.7 Disassembly

NOTE!

Using a hammer or similar tools during disassembly is not permitted, due to the danger of damage to the ball bearings and couplings!

1. Before disassembly, remove all electrical connection cables from the device.
2. Disassemble the encoder in the reverse order of assembly.

4.7.1 Hollow shaft

An extractor is available as a separate accessory to facilitate the removal of devices with hollow shafts.

5 Inspections

5.1 Safety information

CAUTION!
When inspecting and performing other work on the device, observe the safety instructions in chapter 2!

5.2 Maintenance information

The device is maintenance-free. However, the following inspections are recommended to ensure optimal, fault-free operation.

5.3 Inspection plan

Interval	Inspections
Annual	• Check coupling to ensure it is free from play and damage • Check the attachment screws to ensure they are tight • Check cable connections and terminals to ensure they are tight
After approx. 16,000...20,000 operating hours and high continuous load	Check deep groove ball bearings for smooth running and bearing noise. The bearings may only be exchanged by the manufacturer.

5.4 Error table

Error	Possible cause	Troubleshooting
Status LED lights up red	Connection cable incorrectly connected	Check the wiring, restart the device
	Device temperature outside specification	Lower device temperature
	Speed too high	Check max. speed
Moisture in the terminal box	Terminal box cover seal or sealing surface contaminated	Clean the terminal box cover seal and sealing surface
	Terminal box cover seal damaged	Replace terminal box cover seal
	Cable gland/ blind plug not tightened	Tighten cable gland/ blind plug
	Cable and cable gland do not match	Adapt cable and cable gland

No output signals available	Power supply not connected (power LED is not lit)	Connect the supply voltage
	Connection cable incorrectly connected	Check wiring according to connection diagram
Output signals subject to interference	Cable unsuitable	Use a suitable cable (see chapter 3.5)
	Cable shield not connected	Connect the cable shield on both sides (see chapter 4.5)
	Cable routing not carried out in accordance with EMC requirements	Observe the general guidelines for EMC-compliant cable routing and the information in chapter 4.4
Signal drop-out	Signal output stages overloaded	Check the pin assignment according to the connection diagram; do not assign unused outputs
	Outputs short-circuited	Do not connect outputs to supply voltage or GND

If none of these measures resolve the issue, please contact customer service (see page 2).

6 Transportation, packaging and storage

6.1 Incoming goods controlling

The delivery must be checked promptly for transportation damage and to ensure it is complete upon receipt.
If there is transportation damage, the carrier must be informed directly upon delivery (take photos as evidence).

6.2 Packaging (disposal)

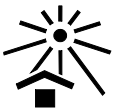
Packaging will not be taken back, and must be disposed of according to applicable statutory specifications and local regulations.

6.3 Transport and storage of packages (devices)

Storage temperature range: -10 ... +40 °C

CAUTION!
Do not throw, danger of breakage!

CAUTION!
Protect against wetness!
Protect packages against wetness, store in a dry and dust-free location.



CAUTION!
Protect against heat!
Protect packages from direct sunlight.

NOTE!

- Rotating the shaft of the device every 6 months prevents the bearing grease from hardening.
- In case of long storage times (> 6 months), we recommend packaging the devices in protective packaging (with desiccants).

6.4 Disposal

The manufacturer is not obligated to take back the devices.
The device must be treated as special electronic waste, and must be disposed of according to specific national law.
Local municipal authorities or speciality disposal companies can provide information on environmentally-appropriate disposal.

6.5 Returning equipment (repair/goodwill/warranty)

Service requests (repair/goodwill/warranty) can be submitted directly using the following online form: https://www.huebner-giessen.com/service-support/after-sales-service/

There you will also find contact details for our customer service team and questions and answers related to the processing.

Devices that have come into contact with radioactive radiation or materials will not be taken back. Devices that have come into contact with biological or chemical substances that could be hazardous to health must be decontaminated before they are returned. A clearance certificate must be enclosed.

7 Accessories

We offer suitable accessories and tailor-made engineering support for the attachment of the encoder.

For further information on accessories, please contact our Sales department.

7.1 Design B5 (flange)

Couplings with feather keyways for a secure positive connection

Intermediate flange incl. matching adapter disc as a mechanical interface to the machine housing

7.2 Design B35 (flange and base)

Couplings with feather keyways for a secure positive connection

Friction-enhancing discs and spacer plates

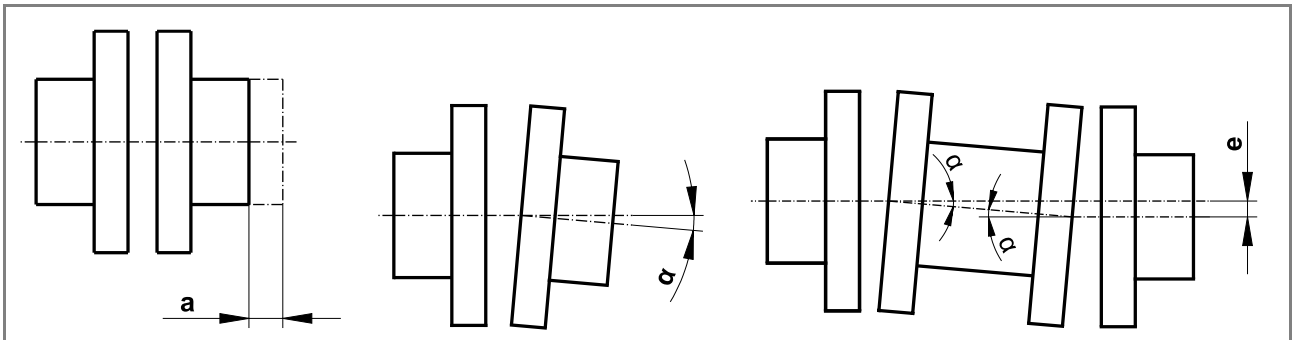
7.3 Hollow shaft design

Adapter shafts (flange or screw-in adapter shafts) with keyway for a secure, positive locking connection

Torque supports with matching support arm and support lengths

7.4 Couplings

Our backlash-free, torsionally rigid couplings HK(I) 5 and HKD(I) 5 tolerate the following attachment offsets:



Coupling	Axial offset a	Angular offset α	Parallel offset e
HK 5	± 1 mm	0.5°	-
HKD 5	± 1.5 mm	0.5°	± 0.5 mm

7.5 Cable

A shielded connection cable of type LAPP ÖLFLEX® SERVO FD 798 CP (4x2x0.25 mm²+2x0.5 mm²) is available as an accessory for the electrical connection of the encoder.

7.6 Cable conduit systems

For optimum protection of encoder cabling in extreme environmental conditions, we offer specially designed cable conduit systems with matching screw fittings and sealing inserts, as well as integrated shield support and strain relief.

7.7 Earthing strap

A suitable earthing strap made of braided fine strands with a cross-section ≥ 6 mm² is available as an accessory.

7.8 Extractor

An extractor is available as a separate accessory to facilitate the removal of devices with hollow shafts.