

Operating and Assembly Instructions

Incremental Hollow Shaft Encoder FGHJ 2

**Read the operating and assembly instructions prior to assembly, starting installation and handling!
Keep for future reference!**

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Manufacturer / publisher

Johannes Hubner
Fabrik elektrischer Maschinen GmbH
Siemensstraße 7
35394 Giessen
Germany
Phone: +49 641 7969 0
Fax: +49 641 73645
E-Mail: info@huebner-giessen.com
www.huebner-giessen.com

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1 General

1.1 Information about the operating and assembly instructions

These operating and assembly instructions provide important instructions for working with the device. They must be carefully read prior to starting all tasks, and the instructions contained herein must be followed.

In addition, applicable local regulations for the prevention of industrial accidents and general safety regulations must be complied with.

1.2 Scope of delivery

Incremental Hollow Shaft Encoder FGJ 2, operating and assembly instructions, cheese head screw M6x30-ISO 4762, circular spring device with a cylindrical shaft, special tool for mounting/dismantling.

1.3 Explanation of symbols

Warnings are indicated by symbols in these operating and assembly instructions. The warnings are introduced by signal words that express the scope of the hazard.

The warnings must be strictly heeded; you must act prudently to prevent accidents, personal injury, and property damage.



WARNING!

Indicates a possibly dangerous situation that can result in death or serious injury if it is not avoided.



CAUTION!

Indicates a possibly dangerous situation that can result in minor injury if it is not avoided.



CAUTION!

Indicates a possibly dangerous situation that can result in material damage if it is not avoided.



NOTES!

Indicates useful tips and recommendations as well as information for efficient and trouble-free operation.



NOTES!

Do not use a hammer or similar tool when installing the device due to the risk of damage occurring to the bearings or coupling!



DANGER!

Life-threatening danger due to electric shock!

Indicates a life-threatening situation due to electric shock. If the safety instructions are not complied with there is danger of serious injury or death. The work that must be executed should only be performed by a qualified electrician.

1.4 Disclaimer

All information and instructions in these (operating and assembly instructions) have been provided under due consideration of applicable guidelines, as well as our many years of experience.

The manufacturer assumes no liability for damages due to:

- Failure to follow the instructions in the operating and assembly instructions
- Non-intended use
- Deployment of untrained personnel
- Opening of the device or conversions of the device

In all other aspects the obligations agreed in the delivery contract as well as the delivery conditions of the manufacturer apply.

1.5 Copyright



NOTES!

Content information, text, drawings, graphics, and other representations are protected by copyright and are subject to commercial property rights.

It is strictly forbidden to make copies of any kind or by any means for any purpose other than in conjunction with using the device without the prior written agreement of the manufacturer. Any copyright infringements will be prosecuted.

1.6 Guarantee terms

The guarantee terms are provided in the manufacturer's terms and conditions.

1.7 Customer service

For technical information personnel is available that can be contacted by telephone, fax or email. See manufacturer's address on page 2.

2 Safety



DANGER!

This section provides an overview of all the important safety aspects that ensure protection of personnel, as well as safe and trouble-free device operation.

If these safety instructions are not complied with significant hazard can occur.

2.1 Responsibility of the owner

The device is used in commercial applications. Consequently the owner of the device is subject to the legal occupational safety obligations and subject to the safety, accident prevention and environmental protection regulations that are applicable for the device's area of implementation.

2.2 Personnel

Installation and commissioning as well as disassembly routines must be carried out by skilled technical staff only.

2.3 Intended use

The device has been designed and constructed exclusively for the intended use described here.

Series FGJ 2 Incremental Hollow Shaft Encoders are used for measurement of rotations, for instance of electrical and mechanical drives and shafts.

Claims of any type due to damage arising from non-intended use are excluded; the owner bears sole responsibility for non-intended use.

For UL and CSA:

For the use in NFPA 79 applications only.

Option S

The FGJ2 with option S has in addition to the incremental output a switching output.

The incremental hollow shaft encoder FGJ2 with option S has been designed and constructed exclusively for the intended use described here.

Series FGJ2 with option S Incremental Encoders are used for speed monitoring, for instance electrical and mechanical drives, hosting gear, and conveying machines.

The FGJ2 with option S is a device which generates a switching signal for a superior control system. This is realized with opening of a switch contact.

Claims of any type due to damage arising from non-intended use are excluded. The owner bears sole responsibility for none- intended use.

2.4 Improper use

The device may not be used in explosion-threatened areas.

On the device no other mechanical load may be exercised except his dead weight and the oscillations without fail appearing during the company and pushes.

Examples of inadmissible mechanical charges (incomplete listing):

- Connection of transport- or lifting means in the device, e.g., load hook for raising of an engine.
- Connection of packaging parts in the device, e.g., instep belts, tarpaulin, etc.
- Use of the device as a step, e.g., for going up of a person on an engine.

2.5 Personal protective equipment

For tasks such as assembly, disassembly or commissioning the use of personal protective equipment such as safety footwear and protective work clothing is required.

The regulations specified by the owner and that are locally specified apply.

2.6 Special dangers

Residual risks that have been determined based on a risk assessment are cited below.

2.6.1 Electrical current



DANGER!

Life-threatening danger due to electrical shock!

There is an imminent life-threatening hazard if live parts are touched. Damage to insulation or to specific components can pose a life-threatening hazard.

Therefore:

Immediately switch off the device and have it repaired if there is damage to the insulation of the power supply.

De-energize the electrical equipment and ensure that all components are connected for all tasks on the electrical equipment.

Keep moisture away from live parts. Moisture can cause short circuits.

2.6.2 Rotating shafts / hot surfaces



WARNING!

Danger of injury due to rotating shafts and hot surfaces!

Touching rotating shafts can cause serious injuries.

Therefore:

Do not reach into moving parts/shafts or handle moving parts/shafts during operation. Close to protect from injury all access openings in flanges with the corresponding plug screw, and provided you exposed rotating components with protective covers.

Do not open covers during operation. Prior to opening the covers ensure that all parts have come to a standstill.

The encoder can become hot during prolonged use.

In case of contact risk of burns is existing.

2.6.3 Safeguarding against restart



DANGER!

Life-threatening danger if restarted without authorization!

When correcting faults there is danger of the power supply being switched on without authorization.

This poses a life-threatening hazard for persons in the danger zone.

Therefore:

Prior to starting work, switch off the system and safeguard it from being switched on again.

3 Technical Data

3.1 Type plates

Below are some nameplates for different device models shown.

Without option S or LWL

JOHANNES HÜBNER CE GIESSEN	
Johannes Hübner · Fabrik elektr. Maschinen GmbH Siemensstrasse 7 · 35394 Giessen / Germany	
Incremental encoder FGHJ 2 AK-1024G-90G-NG/16K	
S/N 123456	Degree of protection IP 66 / Type 1
ID 12345	Pulse rate 1024
Y 2019	Max speed 6000 rpm
Outputs HTL	Supply voltage 12...30 V DC (Class2)
www.huebner-giessen.com	

With option S or LWL

JOHANNES HÜBNER CE GIESSEN	
Johannes Hübner · Fabrik elektr. Maschinen GmbH Siemensstrasse 7 · 35394 Giessen / Germany	
Incremental encoder with overspeed switch FGHJ 2 AK-1024G-90G-NG-S/16K	
S/N 123456	Year of manufacture 2019
Pulse rate 1024	Degree of protection IP66
Outputs HTL	Supply voltage 12...30 V DC
Max speed 6000 rpm	Switching speed 4000 rpm
Switch	max. 30 V DC / 500 mA
Made in Germany	www.huebner-giessen.com

JOHANNES HÜBNER CE GIESSEN	
Johannes Hübner · Fabrik elektr. Maschinen GmbH Siemensstrasse 7 · 35394 Giessen / Germany	
Incremental encoder FGHJ 2 AL-1024G-90G-NG	
S/N 123456	Degree of protection IP 66 / Type 1
ID 12345	Outputs Fibre optic cable 50/125 µm
Y 2018	Max speed 7000 rpm
Pulse rate 1024	Supply voltage 12...30 V DC (Class2)
www.huebner-giessen.com	

The type plate is located on the outside of the housing and contains the following information:

Englisch	Deutsch
Manufacturer, address	Hersteller, Anschrift
Type: Incremental Encoder, Year of manufacture	Typ: Inkrementaler Drehgeber, Baujahr
CE mark	CE-Kennzeichnung
Serial number (S/N)	Seriennummer (S/N)
Pulse rate	Impulszahl
Degree of protection	Schutzart
Supply voltage	Versorgungsspannung
Outputs	Ausgänge
Max. speed	Max. Drehzahl
Switching speed	Schalterdrehzahl

3.2 Electrical and mechanical data

Pulse Rates	600, 1024, 2048, others on request			
Connection data				
Supply voltage	12 V...30 VDC Ripple max. 10 % For UL and CSA Class 2 supplied			
No load-current	approx. 50 mA at 24 V			
Connection	screw-type terminal Type Phoenix ZFKDS 1,5-W-5,08 (0,25 mm ² - 1,5 mm ²)			
Connection (Option fiber optic)	St-fiber optic plug			
Outputs	Current limited, short-circuit proof push-pull line driver			
Pulse height (HTL)	approx. as supply voltage output saturation voltage < 0.4 V at I _L 30 mA			
Output current	150 mA peak			
Internal resistance	75 Ω at 24 V			
Slew rate	200 V / μs with C _L 100 pF			
Duty cycle	1 : 1 ± 5 %			
Square wave displacement 0°, 90°	90° ± 5 %			
Max. frequency	200 kHz			
Start-up time	< 50 ms			
Encoder temperature range	-25°C ... + 85°C			
Degree of protection acc. DIN EN 60529	Sealing	Mech. permissible speed	Rotor moment of inertia	Breakaway torque
IP66	with Labyrinth seal (aluminum housing)	≤ 6000 rpm	approx. 315 gcm ²	approx. 3,5 ...4 Ncm
IP66	With radial shaft seal (V4A - housing)	≤ 6000 rpm	approx. 315 gcm ²	approx. 3,5 ...4 Ncm
Vibration resistance aluminum housing	DIN EN 60068-2-6 / IEC 68-2-6 (10 ... 2000 Hz)		20 g (=200 m/s ²)	
Vibration resistance V4A - housing	DIN EN 60068-2-6 / IEC 68-2-6 (10 ... 2000 Hz)		4 g (=40 m/s ²)	
Shock resistance aluminum housing	DIN EN 60068-2-27 / IEC 68-2-27 (6 ms)		200 g (=2000 m/s ²)	
Shock resistance V4A - housing	DIN EN 60068-2-27 / IEC 68-2-27 (6 ms)		40 g (=400 m/s ²)	
Weight aluminum housing	approx. 2 kg			
Weight V4A - housing	approx. 4,8 kg			

3.3 Signal outputs

Signal outputs			
Basic channel 0° (A) and pulse channel 90° (B) Reference pulse (N) mechanically defined; one square-wave pulse per revolution Each with inverted signals	0°		<i>Incr. Output 0°</i>
	$\overline{0^\circ}$		<i>Incr. Output 0° Inverse</i>
	90°		<i>Incr. Output 90°</i>
	$\overline{90^\circ}$		<i>Incr. Output 90° Inverse</i>
	N		<i>Reference</i>
	\overline{N}		<i>Reference Inverse</i>

4 Overview additional options

4.1 Option S (overspeed switch)

The incremental hollow shaft encoder **FGJ 2** with option S has an insulated switching output. The switching function is realized with a semiconductor, the switching speed is set in our factory (switching hysteresis 10%).

If the set switching speed is exceeded, the switch opens.

It is recommended to save the switch circuit against an overcurrent with a fuse (0,5A).

Specification	Value
Deviation from switch:	Accuracy of measurement: 2% Switching time $T_{sw} < 3ms$
Switch data	0...30V DC/max 500mA Max. voltage drop at closed switch: 0,7V

4.2 Option LWL (signal transmission using fiber optics)

The signals 0°, 90° and marker pulse from the incremental encoder will be encoded and transmitted via fiber optics cable. Fiber optic cable types 50/125 µm or 62,5/125 µm are available.

4.3 Option AKK (double pulse output)

Incremental encoder with optic scanning in redundant design. This provides the following combinations of the output signals.

FG(HJ) 2	Output 1 (Basic unit)	Output 2 (double pulse output)
Redundant (number of pulses)	1024	1024
Redundant (number of pulses)	2048	2048
Combined (number of pulses)	1024	2048

4.4 Type code

	FGH	J	2	AK	1024	G	90G	NG	S	16K/ 17C
Incremental hollow shaft encoder										
with isolated bearings										
Series										
Connections										
AK: Terminal box										
AKK: Double pulse output										
AL: Terminal box with connector for ST-compatible fiber optic plug										
I: 10-pole flange connector ITT Cannon (not combinable with Option S) (Pin compatible with POG 10 DN 1024 I)										
Pulses per rotation										
600, 1024, 2048, others on request										
Basic version										
Basic channel 0° (A)										
Pulse channel 90° (B)										
each with inverted signals (not for LWL see chapter. 4.2)										
NG: Reference pulse with inverted signal										
S: Option S										
Hollow shaft bore										
16K cylindrical shaft with clamping										
17C cone shaft										
0,75 R with clamping ring										
12K cylindrical shaft with clamping										

JOHANNES HUEBNER FABRIK ELEKTRISCHER MASCHINEN GMBH
is listed by Underwriters Laboratories, see following Link:

<http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.html>

UL File Number: E351535

5 Transport, packaging and storage

5.1 Safety instructions for transport



CAUTION!

Material damage caused by improper transport!

Observe the symbols and information on the packaging:

- Do not throw - risk of breakage
- Keep dry
- Do not expose to heat above 40 °C or direct sunlight.

5.2 Incoming goods inspection

Check delivery immediately upon receipt for completeness and possible transport damage.

Inform the forwarder directly on receipt of the goods about existing transport damages (prepare pictures for evidence).

5.3 Packaging / disposal

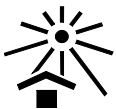
The packaging is not taken back and must be disposed of in accordance with the respective statutory regulations and local guidelines.

5.4 Storage of packages (devices)



Keep dry

Keep packages dry and free from dust; protect from moisture.



Protect against heat

Protect packages from heat above 40 °C and direct sunlight.

If you intend to store the device for a longer period of time (> 6 months) we recommend you use protective packaging (with desiccant).



NOTES!

Turn the shaft of the device every 6 month to prevent the bearing grease solidifying!

6 Installation and commissioning

6.1 Safety instructions



WARNING!

Observe the safety instructions contained in **Chapter 2** when dismantling the device!

Personnel

Installation and commissioning must be carried out by skilled technical staff only.

6.2 Technical information



NOTES!

Do not use a hammer or similar tool when installing the device due to the risk of damage occurring to the bearings or coupling!

Ambient temperature

The max. permissible ambient temperature depends on the speed and degree of protection of the device, the signal frequency, the length of the signal cable and the place of installation (please refer to Chapter 3.2).

Degree of protection

To fulfill degree of protection requirements the diameter of the connection cable must correspond to that of the cable gland (please refer to Chapter 12 Dimension drawings)!

Deep groove ball bearings

FGJH 2 incremental hollow shaft encoders are fitted with maintenance-free, greased "for-life" deep groove bearings. Bearings must be changed by the manufacturer only. Opening the encoder renders the guarantee null and void.

Screw retention

We recommend using Loctite® 243 threadlocker (medium strength) on all fastening screws to prevent loosening.

6.3 Required tools

- Spanners: 12 mm, 10 mm, 22 mm (e.g. DIN 894)
- Allen keys: 2 mm, 3 mm, 5 mm, 6 mm
- Flat-blade screwdrivers:
- Assembly grease
- Loctite® 243 (medium strength threadlocker)

6.4 Mounting preparations

1. Ensure all accessories are available (please refer to Chapter 12 Dimension drawings).



NOTES!

Fastening screws and earth cable are not included in the range of supply.

2. Preparing the place of attachment: Clean the (motor) shaft, centering, bolting surfaces and fastening threads; check for damage. Repair any damage!

6.5 Mounting hollow shaft type

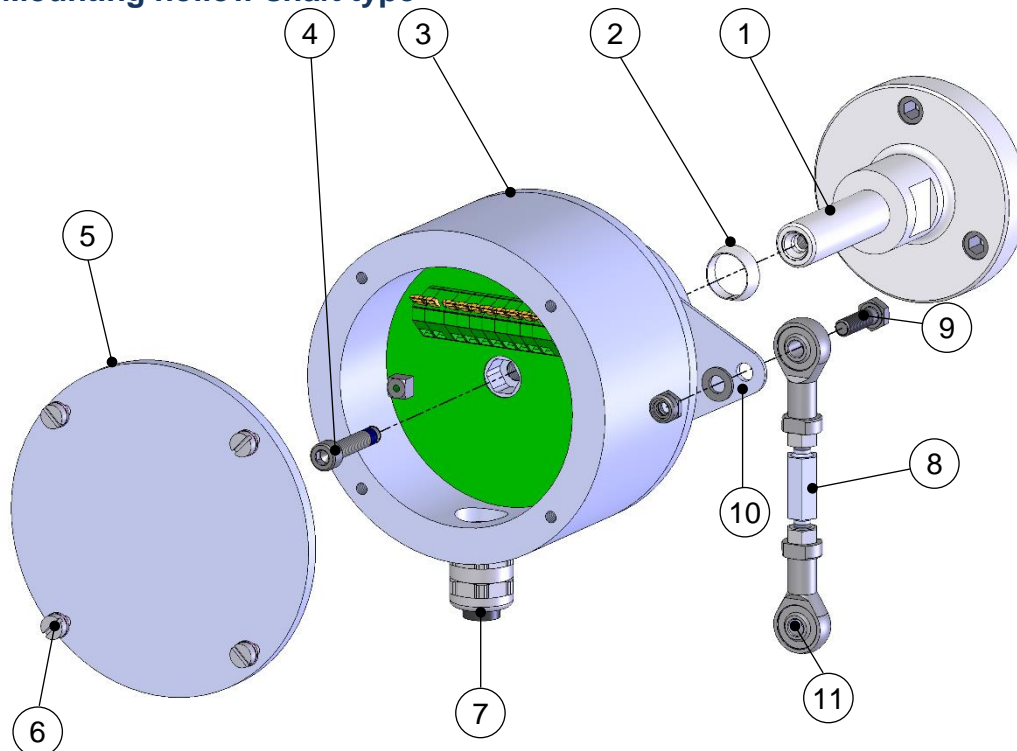


Fig. 1

1. Mount adapter shaft (1) and align using dial gauge.

NOTES!

The maximum radial run-out of the adapter shaft/motor shaft should not exceed 0,2 mm. We recommend a radial deviation of 0,03 mm.

If necessary, use the ball thrust adjustment screw to align the adapter shaft. Secure ball thrust screws with Loctite® 243. Remove unused ball thrust screws or secure with Loctite® 243. Max. tightening torque for M12 approx. 25 Nm, for M16 approx. 35 Nm.

Use parallel keys to DIN 6885.

Please also observe the supplement data sheet *Mounting accuracy for hollow shaft encoders*.

You should also observe the Installation instructions supplied with the adapter shaft when installing!



2. Lightly grease the adapter shaft, open the device.
3. Slide the circular spring device (2) onto the adapter shaft until it stops.
4. Mount the hollow shaft device (3) to the adapter shaft.

The hollow shaft encoder must slide smoothly on to the adapter shaft. In no delay with increased force, otherwise the bearing may be damaged. Where appropriate adapter shaft with emery cloth rework. The hollow shaft encoder does not strike hard against the shaft shoulder.

5. Secure the hollow shaft device with the aid of the hexagon socket head cap screw (4). (Fig.1) maximum tightening 6 Nm.



NOTES!

The cap screws have a coating with micro-encapsulated adhesive for securing screws. If screws are used without micro-adhesive coating the screws are with Loctite® 243 to be secured.

6. Close the hollow shaft device with cover (5) and 4 screws (6).
7. Fastening the torque bracket:

Bolt the link rod (8) with screw (9), washer and nut with torque bracket (10).

The ideal angle of torque bracket (10) to the link rod (8) is 90°.

Secure the link heads (11) of the link rod to a fixed point (for example on the motor housing).



NOTES!

Once fitted the link rod must rotate easily around the link rod heads! Failure to observe this point may result in damage to the bearings!



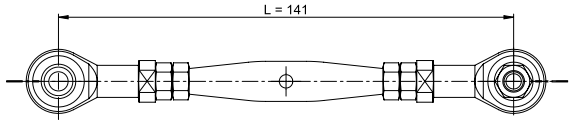
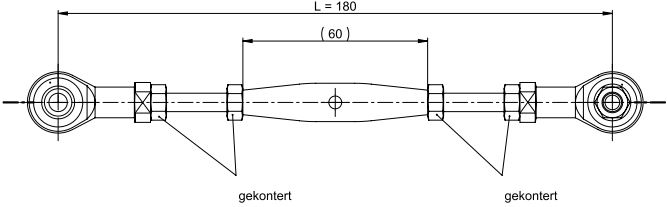
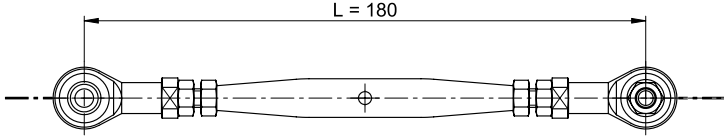
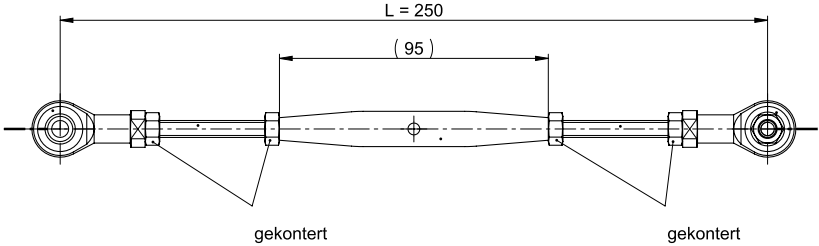
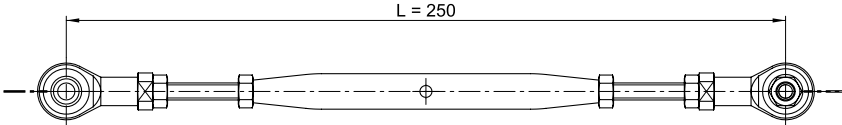
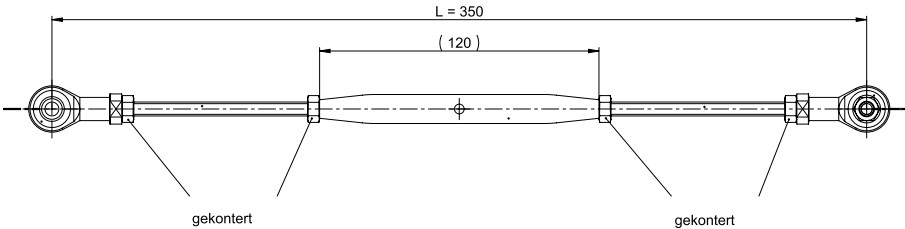
NOTES!

The link heads are maintenance free. However, ensure they remain free from soiling and paint!

6.6 Using the adjustable torque bracket (V2A)

The torque bracket is supplied completely screwed together. To adjust the length of the torque bracket, release the interlocked nuts. Turn the rigging screw to the left or to the right to adjust the torque bracket to the required length. Then tighten the hex nuts to lock the adjusted length.

Number	ID Number	Minimum length (mm)	Maximum length (mm)
1	21402	141	180
2	21403	180	250
3	21404	250	350

	<p>Number 1 min. length in mm</p>
	<p>Number 1 max. length in mm</p>
	<p>Number 2 min. length in mm</p>
	<p>Number 2 max. length in mm</p>
	<p>Number 3 min. length in mm</p>
	<p>Number 3 max. length in mm</p>

6.7 Shortenable torque bracket (V2A optional)

The torque arms in the table below can be shortened by the customer.
See dimension drawing HM 13 M 106952a Chapter 12.

Type	ID Number	Min. length (mm)	Max. length (mm)
D	21975	71	390
E	22057	71	430

6.8 Electrical connection and start up



NOTES!

You must observe applicable EMC guidelines when routing cables!



NOTES for UL and CSA!

Do only use copper cables!

6.8.1 Preparing cables

1. Strip cable insulation. The cable for the signal and supply line is shielded, the cable for the option S will not be shielded.
2. Crimp wire-end ferrules.

6.8.2 Electrical connection

1. Open the terminal box cover (5, Fig.1).



CAUTION!

Do not allow moisture to enter the terminal box when the cover is open!

2. Remove the cap of the cable gland (7, Fig.1).
3. Feed the cable into the terminal box trough the cable gland.



NOTES!

The signal cable shielding has to be connected directly to the housing via the EMC cable gland.

To achieve an effective shielding the cable shield must also be connected in the electrical cabinet.

4. Tighten the cable gland using a spanner.



NOTES!

Prior to delivery cable glands and blanking plugs are tightened finger tight only. To ensure that the terminal box is reliably sealed tighten all cable glands and blanking plugs before starting up for the first time.

5. Use a spanner to tighten the cable gland until the cable is securely clamped and properly sealed.



NOTES!

Prevent lateral pulling forces acting on the cable so as not to impair the degree of protection of the cable gland.

6. Connect the supply voltage, the signal cable and possibly option S (please refer to the connection diagrams, Chapter 13).



CAUTION!

Do not apply supply voltage to the signal outputs, as this will destroy the device!

7. Close the terminal box cover.



NOTES!

Before closing the terminal box cover check and if necessary clean both seal surfaces and the gasket.



CAUTION!

Ensure when closing the terminal box cover that no cable becomes jammed.

For encoders with option S only:

1. Remove the blind plug from inside of the housing
2. Remove the cable gland
3. Close the opening with the blind plug

7 Dismantling

7.1 Safety instruction

Personnel

Dismantling must be carried out by skilled technical staff only.



WARNING!

Observe the safety instructions contained in **Chapter 2** when dismantling the device!



NOTES!

Do not use a hammer or similar tool when dismantling the device due to the risk of damage occurring to the bearings or coupling!

7.2 Dismantling the encoder

Disconnect all electrical cable prior to beginning any work.

To dismantling the encoder follow the instructions given in Chapter 6.5 in the reverse order.

For dismantling first a threaded pin M6x10 ISO 7436 has to be screwed into the adapter shaft. With a screw M8, the encoder must be pressed. Optionally, the adapter shaft must be secured against turning

8 Faults

8.1 Faults table

Faults	Possible cause	Remedy
Switch does not close (only by option S)	No supply voltage <u>Control</u> : LED in the terminal box does not shine	Check connection cable and supply voltage
	<u>Error LED does not shine</u> : Rotation speed above the switching speed	Adjust the suitable rotation speed
	<u>Error LED is shining</u> : Evaluation of rotation speed is faulty.	Disconnect power supply and switch on again
Moisture in the terminal box	Soiled terminal box gasket or seal surfaces	Clean terminal box gasket and seal surfaces
	Damaged terminal box gasket	Replace terminal box gasket
	Cable gland/blanking plug not tightened	Tighten cable gland/blanking plug
	Unsuitable cable for cable gland	Use suitable cable and cable glands
No output signals	Supply voltage not connected	Connect supply voltage
	Connection cable reversed	Wire correctly
Output signals subject to interference	Unsuitable cable	Use data cable with conductors arranged as twisted pairs and common shield
	Cable shield not connected	Connect cable shield at both ends
	Cable routing not EMC compliant	Observe applicable EMC guidelines when routing cables
Signal interruptions	Signal end stage overloaded	Check pin assignment; observe connection diagram
		Do not assign unused outputs
	Outputs short-circuited	Do not connect outputs with supply voltage or GND

Contact Hubner-Service (page 2) if none of the remedies listed above provides a solution)!

9 Inspections

9.1 Safety instructions



WARNING!

Skilled technical staff only are permitted to inspect the device and its installation. Observe the safety instructions contained in **Chapter 2** when inspecting or working on the device!

9.2 Maintenance information

The device is maintenance-free. However, to guarantee optimum fault-free operations we recommend that you carry out the following inspections.

9.3 Inspection schedule

Interval	Inspections
Yearly	Inspect the coupling for damage and ensure it is free of play
	Ensure the fastening screws are properly tightened
	Ensure cable connections and connection terminals are securely seated
Following approx 16 000 – 20 000 hours of operation / higher levels of continuous load	Check deep groove ball bearings are running smoothly and listen for running noises
For FG(H)2 with option S, no extra inspection is required.	

10 Disposal

10.1 Disposal procedure

The manufacturer is not obliged to take back the device.

The device is classed as electronic equipment and subject to the WEEE Directive; observe local, country-specific laws when disposing of the device.

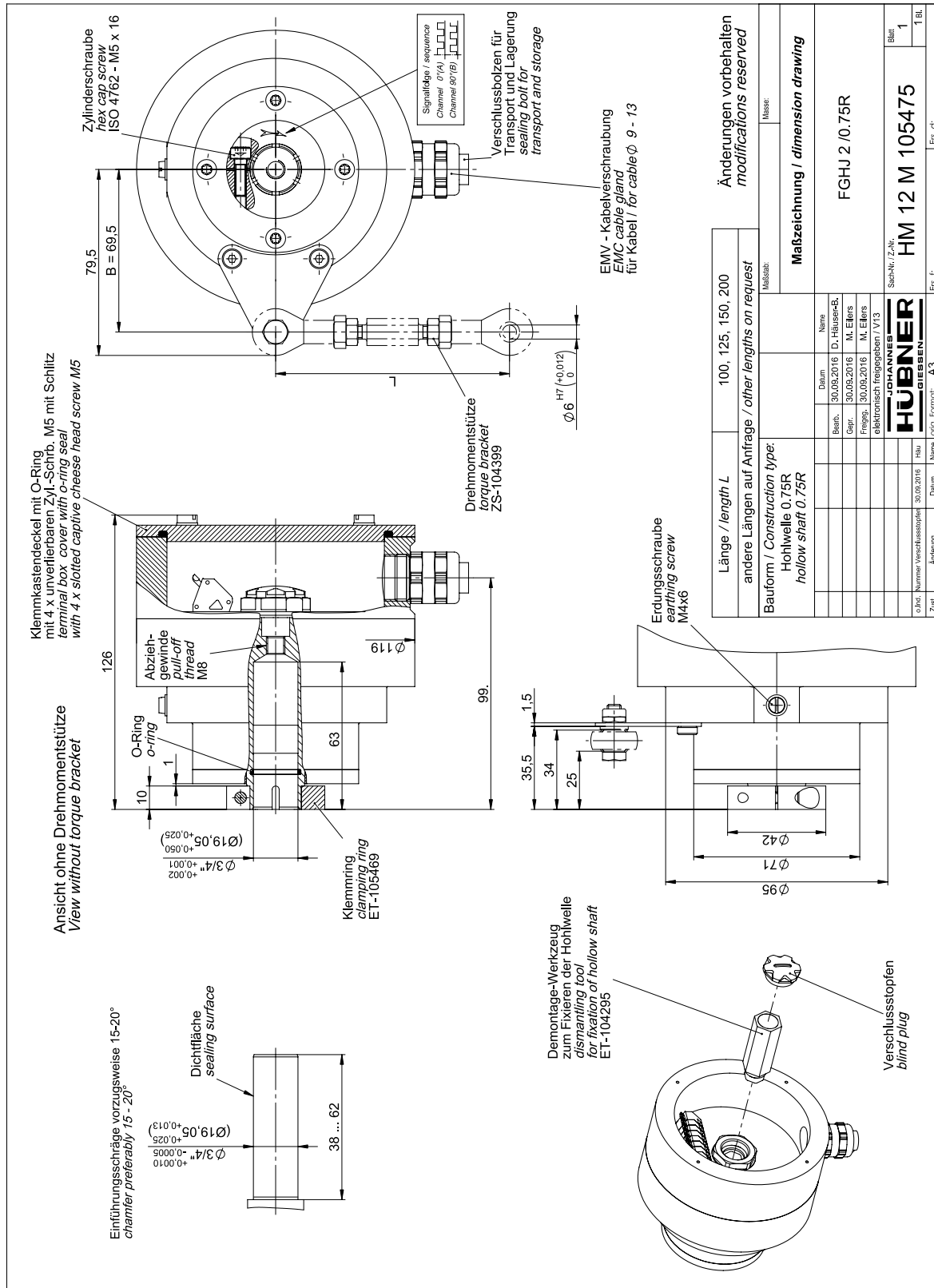
For information on environmentally sound disposal please contact your local authority or a specialist disposal company.

11 Replacement parts

The in the following listed spare parts can be covered when required about the service address on the page 2.

Spare part	Remark
EMC cable gland	M20 x 1,5, cable Ø 9...13 mm
Terminal box cover	Incl. o-ring and screws
Angle plug - 10-pole complete	

12 Dimension drawings



Ansicht ohne Drehmomentstütze
View without torque bracket

Klemmkastendeckel mit O-Ring
mit 4 x unverlierbaren Zyl.-Schr. M5 mit Schlitz
terminal box cover with O-ring seal
with 4 x slotted captive cheese head screw M5

Spannelement-Innenring geschlitzt
Locking element inner ring slotted
KT-107886

Beispiel einer Welle / example of shaft

Dichtfläche
sealing surface

Einführungsschräge vorzugsweise 15° - 20°
chamfer preferably 15° - 20°

Zyl.-Schr. ISO 4762 siehe Tabelle
cheese-head screw see table
mit Loctite® 243 gesichert
with Loctite® 243 secured
ET-104295

Montage-/ Demontage-Werkzeug
zum Fixieren der Hohlwelle
Mounting-/ dismantling tool
for fixation of hollow shaft
ET-104295

EMV - Kabelverschraubung
EMC cable gland
für Kabel / for cable ϕ 9 - 13

Änderungen vorbehalten
modifications reserved

Maßzeichnung / dimension drawing

Länge / length L	100, 125, 150, 200
andere Längen auf Anfrage / other lengths on request	
Bauform / Construction type:	Hohlwelle ϕ 12 K hollow shaft ϕ 12 K
Maßstab:	
Änderungen vorbehalten modifications reserved	
FGJH 2 /12K	
HM 15 M 108483	
Blatt 1	

Erdungsschraube
earthing screw
M4x6

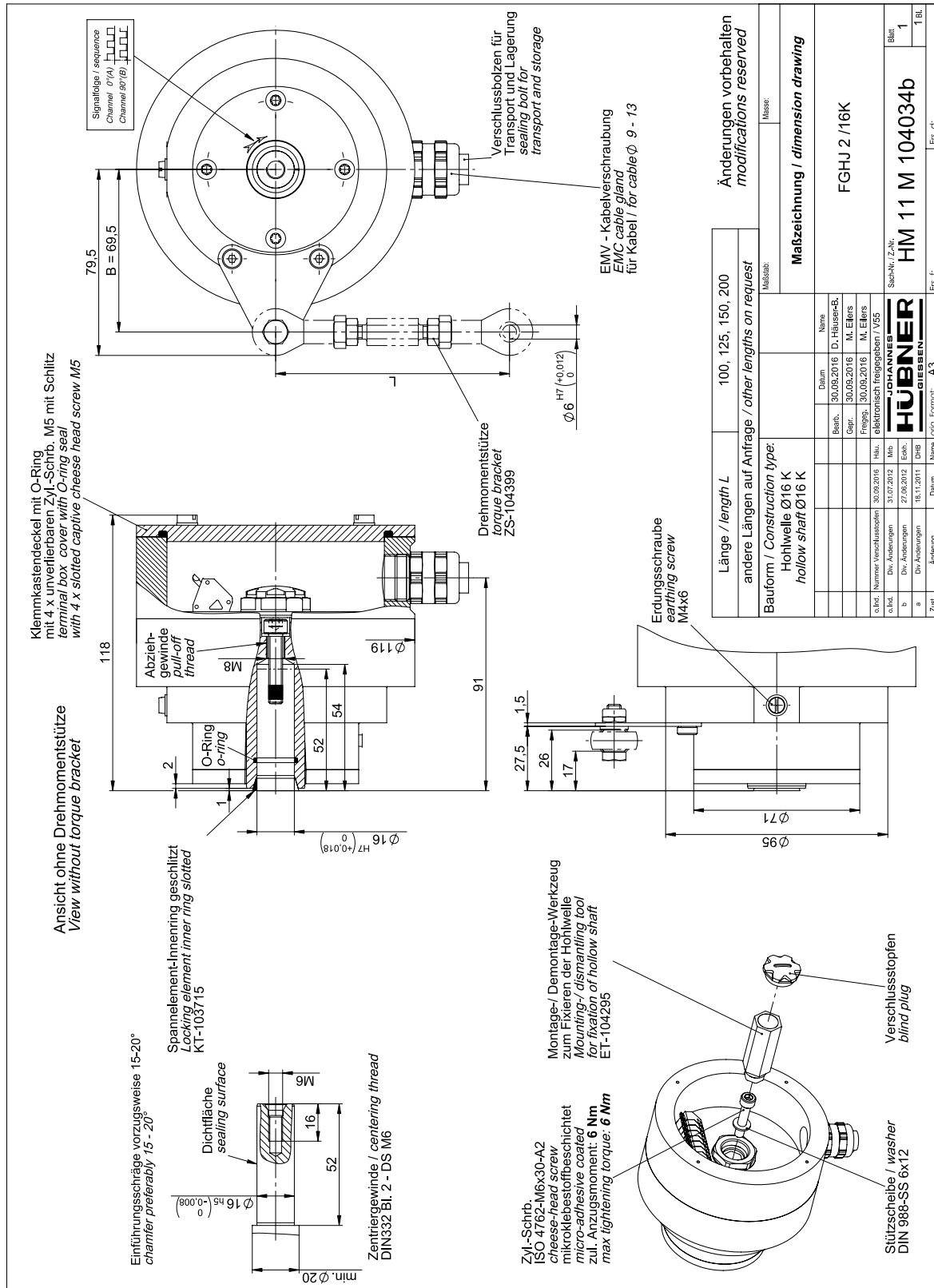
Werte

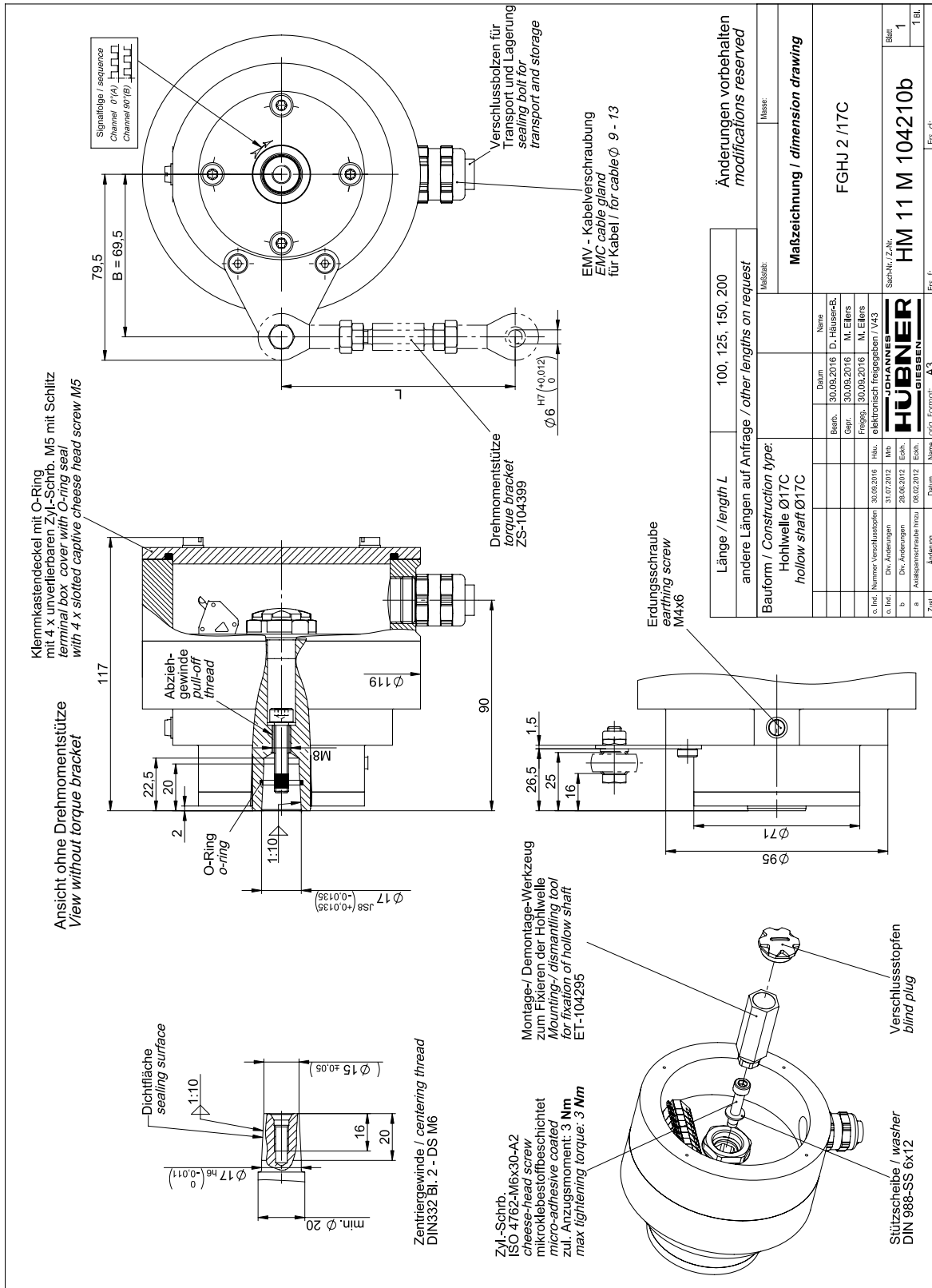
Wellenlänge shaft length	Schraube M5x ... ohne Scheibe screw M5x ... without washer	Anziehungsmoment tightening torque
53 ... 49	20	M5 5.7Nm M6 9.8Nm
48 ... 47	25	
46 ... 44	30	

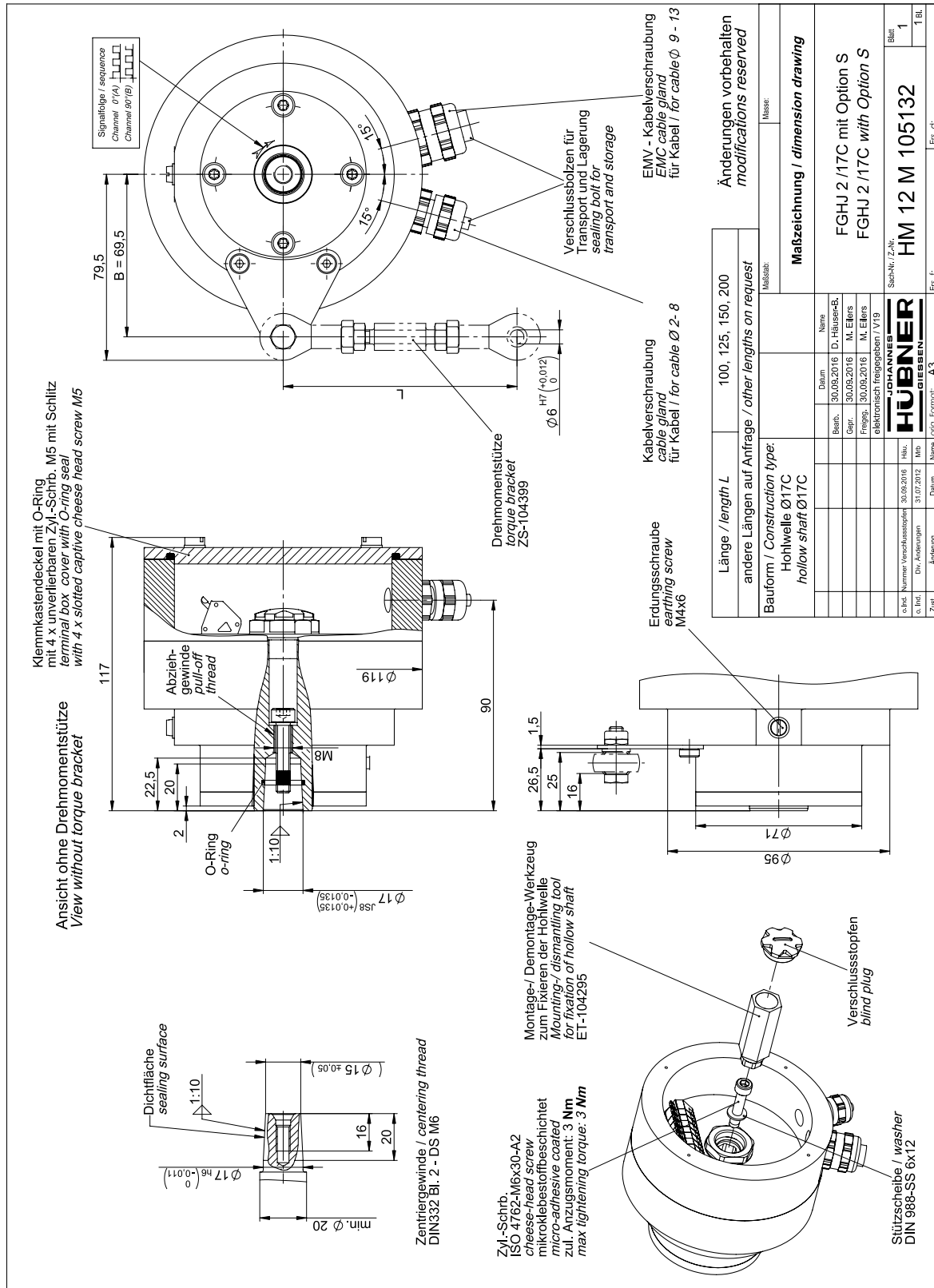
ET-108500 Scheibe / washer

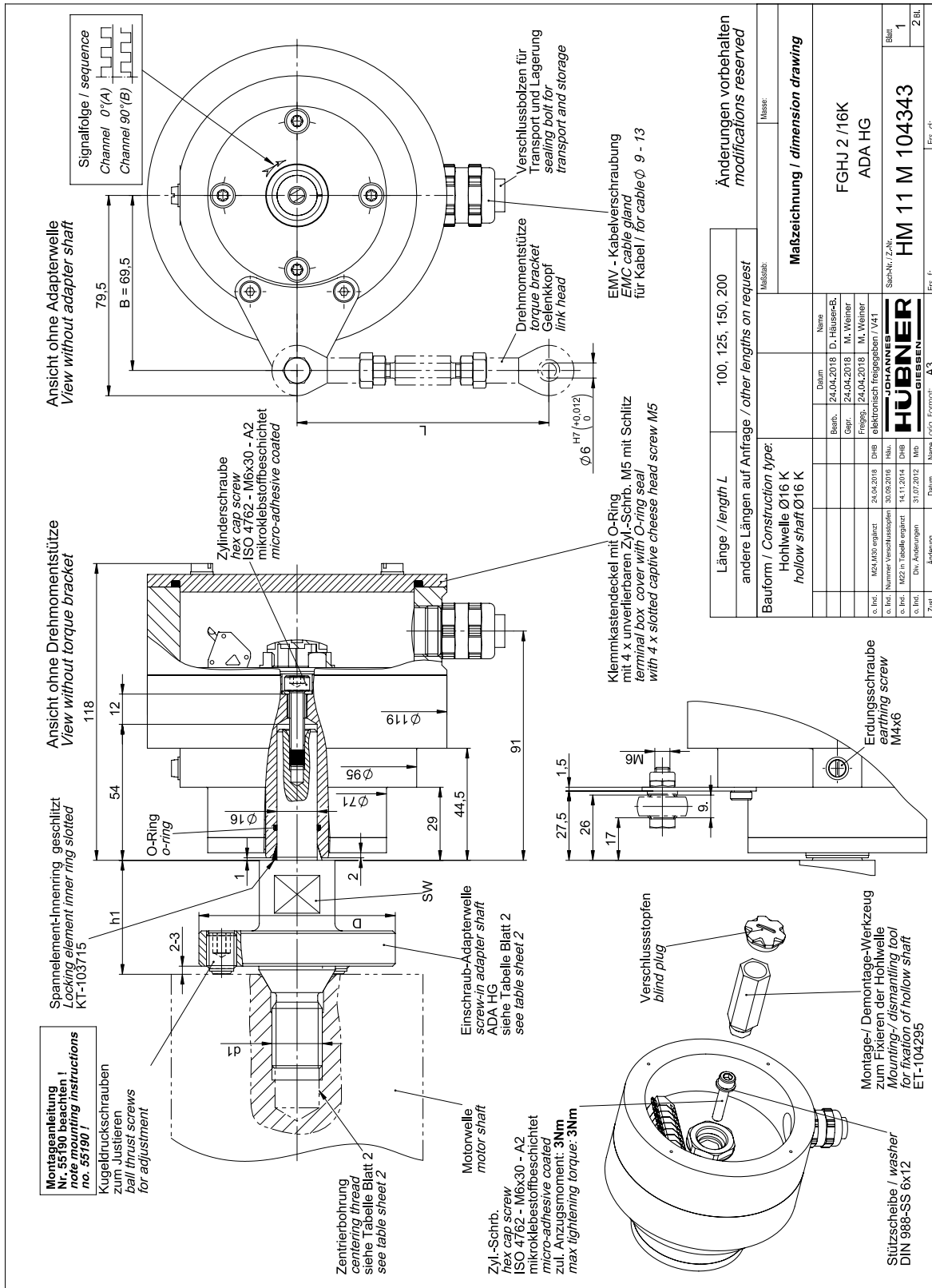
Verschlußstopfen
blind plug

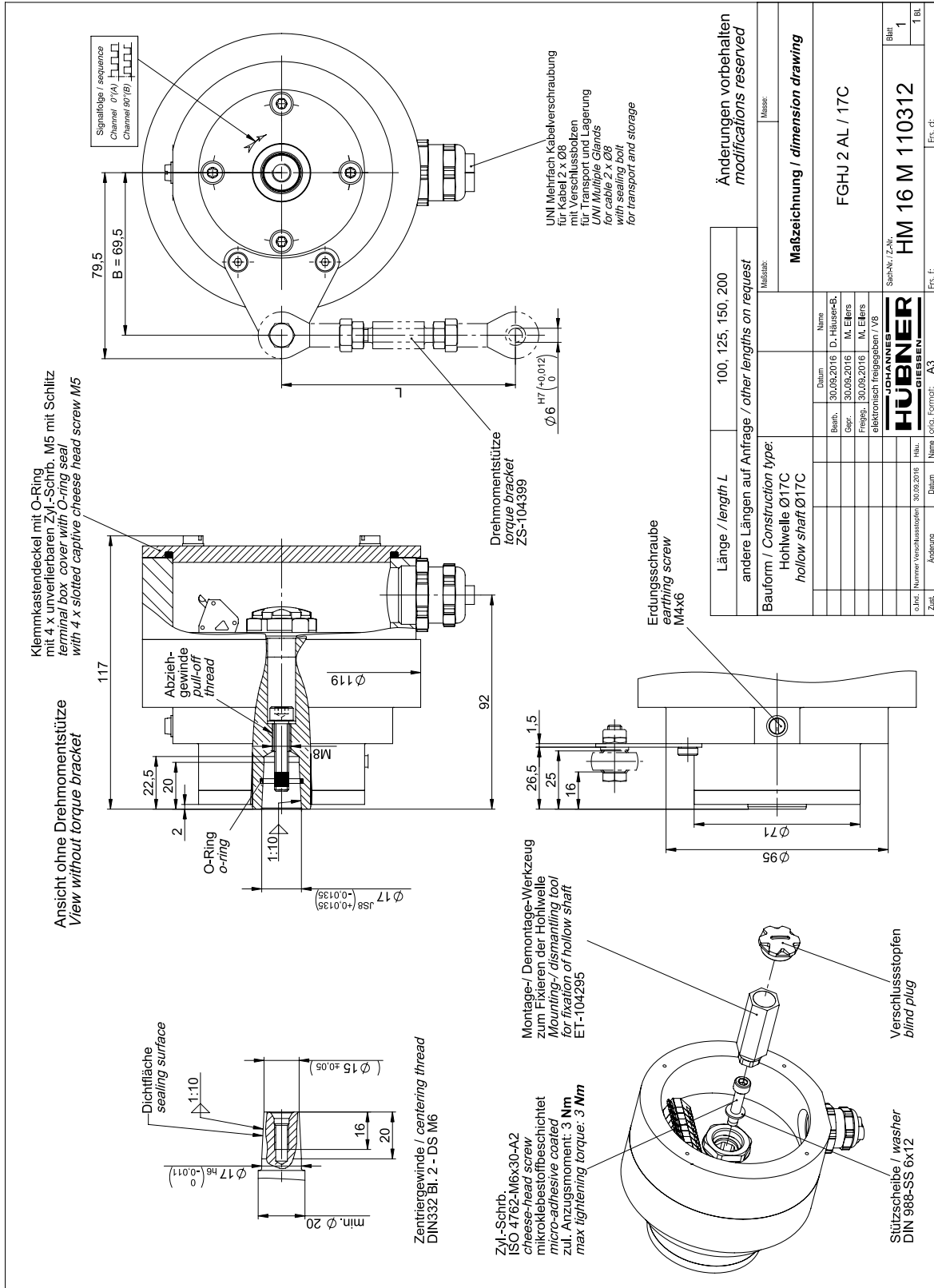
Signalfolge / sequence
Channel 0(A) 1(B) 2(C) 3(D) 4(E) 5(F) 6(G) 7(H) 8(I) 9(J) 10(K) 11(L) 12(M) 13(N) 14(O) 15(P) 16(Q) 17(R) 18(S) 19(T) 20(U) 21(V) 22(W) 23(X) 24(Y) 25(Z) 26(0) 27(1) 28(2) 29(3) 30(4) 31(5) 32(6) 33(7) 34(8) 35(9)

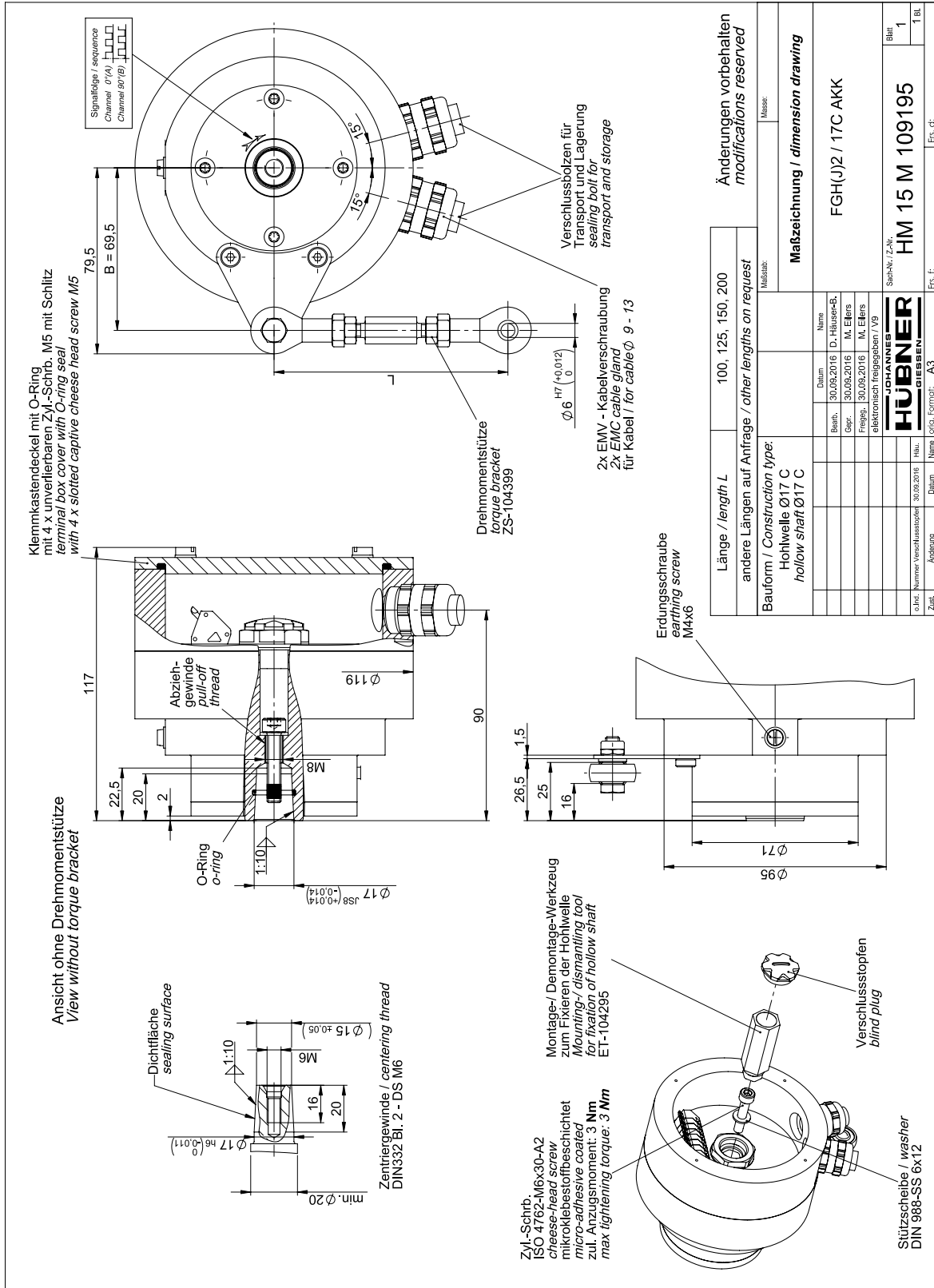


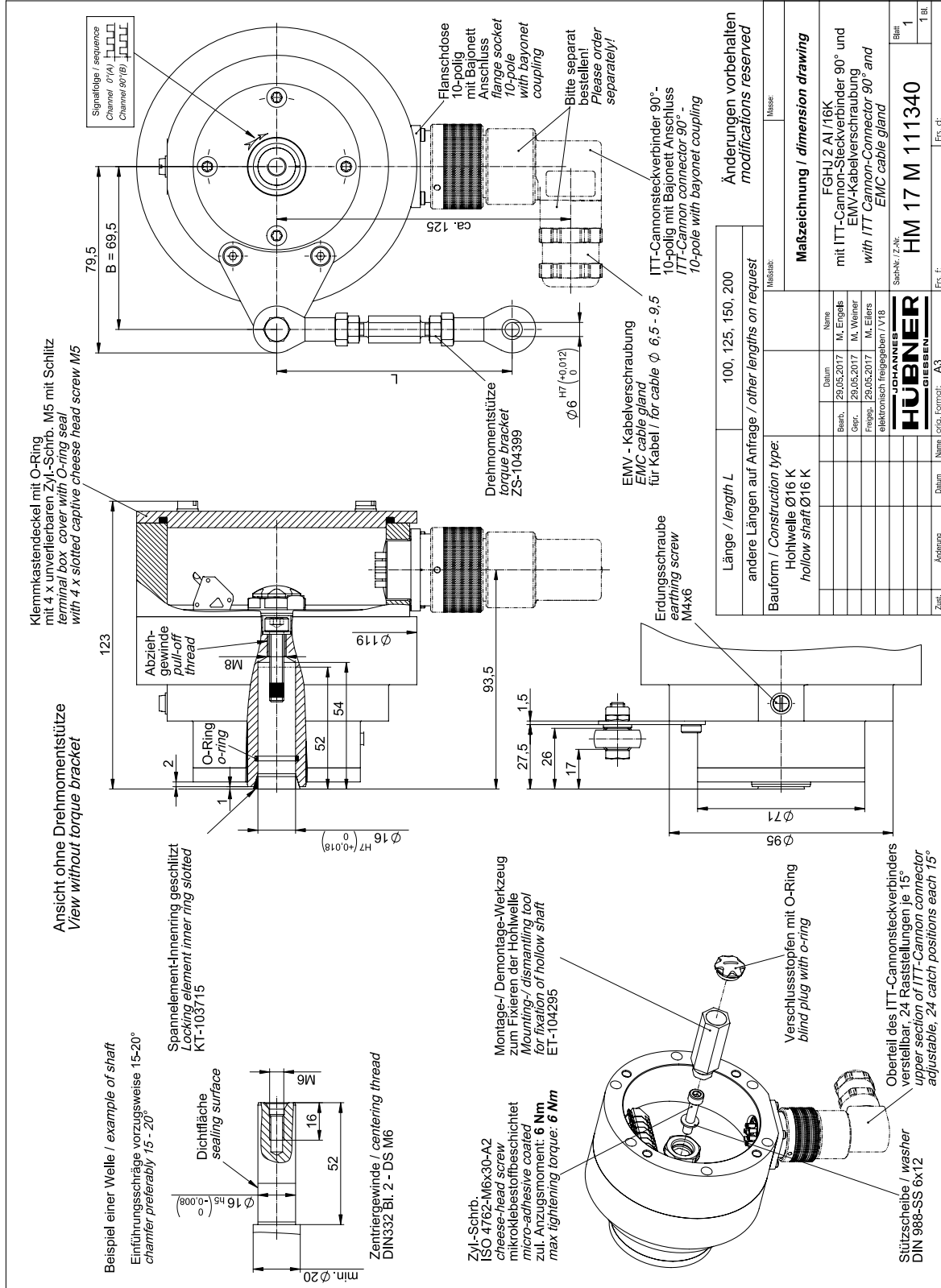












Signalfolge / sequence
 Channel 0*(A)
 Channel 90*(B)

$B = 69.5$

Klemmkastendeckel mit O-Ring
 mit 4 x unverlierbaren Zyl.-Schrb. M5 mit Schlitz
 terminal box cover with O-ring seal
 with 4 x slotted captive cheese head screw M5

Abziehgewinde pull-off thread
 M8

O-Ring
 o-ring

Abziehgewinde pull-off thread

$\varnothing 119$

ca. 93,3

Spannelement-Innerring geschlitz
 Locking element inner ring slotted
 KT-107686

Dichtfläche
 sealing surface

$\varnothing 12 \begin{smallmatrix} H7 \\ +0,018 \\ 0 \end{smallmatrix}$

52
 54

2

0,8

123

Ansicht ohne Drehmomentstütze
 View without torque bracket

Drehmomentstütze
 torque bracket
 ZS-104399

$\varnothing 6$

H7 (+0,012)
 0

Flanschdose
 10-polig
 mit Bajonet
 Anschluss
 flange socket
 10-pole
 with bayonet
 coupling

Bitte separat
 bestellen!
 Please order
 separately!

ITT-Cannonsteckverbinder 90°-
 10-polig mit Bajonet Anschluss
 ITT-Cannon connector 90°-
 10-pole with bayonet coupling

EMV - Kabelverschraubung
 EMC cable gland
 für Kabel / for cable $\varnothing 6.5 - 9.5$

Erdungsschraube
 earthing screw
 M4x6

1,5

27,3
 26
 17

$\varnothing 71$
 $\varnothing 95$

Verschlussstopfen
 mit O-Ring
 blind plug with o-ring

ET-108500 Scheibe / washer

Oberteil des ITT-Cannonsteckverbinders
 verstellbar, 24 Raststellungen je 15°
 upper section of ITT-Cannon connector
 adjustable, 24 catch positions each 15°

Montage-/ Demontage-Werkzeug
 zum Fixieren der Hohlwelle
 Mounting-/ dismantling tool
 for fixation of hollow shaft
 ET-104295

Zyl.-Schrb.
 ISO 4762 siehe Tabelle
 cheese-head screw
 see table
 mit Loctite® 243 gesichert
 with Loctite® 243 secured

Beispiel einer Welle / example of shaft

$\varnothing 12 \begin{smallmatrix} h8 \\ -0,008 \\ 0 \end{smallmatrix}$

M5 / M6

10

44 ... 53

Einführungsschräge vorzugsweise 15-20°
 chamfer, preferably 15 - 20°

min. $\varnothing 20$

Wellenlänge shaft length	Schraube M5x ... screw M5x ... with washer	Schraube M6x ... ohne Scheibe without washer	Anziehungsmoment tightening torque
53 ... 49	20	20	M5 5,7Nm
48 ... 47	25	25	M6 9,6Nm
46 ... 44	30	30	

Länge / length L		100, 125, 150, 200
andere Längen auf Anfrage / other lengths on request		

Bauf orm / Construction type:
Hohlwelle $\varnothing 12$ K
hollow shaft $\varnothing 12$ K

Maßstab

Änderungen vorbehalten
 modifications reserved

Maßzeichnung / dimension drawing

FGJH 2 AI/12K
 mit ITT-Cannon-Steckverbinder 90° und
 EMV-Kabelverschraubung
 with ITT Cannon-Connector 90° and
 EMC cable gland

Blatt
 1
 1 Rl.

Sachnr./Z.Nr.:
 HM 17 M 111341

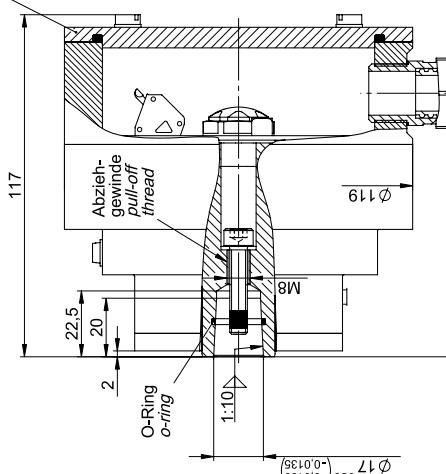
Err. dt.:
 Err. dt.: A3

JAHNKE
 HUBNER
 Name
 M. Engels
 M. Wiener
 M. Eilers

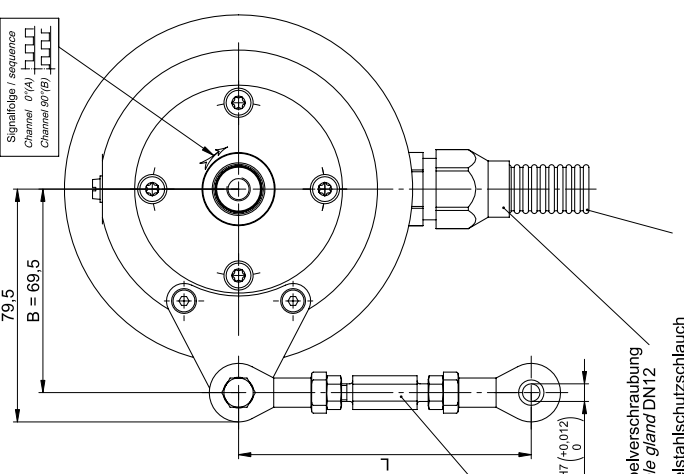
29.05.2017
 29.05.2017
 29.05.2017

Date
 Date
 Date

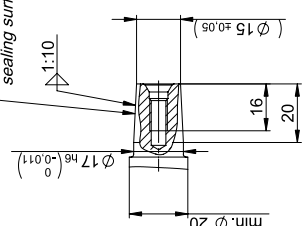
Ansicht ohne Drehmomentsstütze
View without torque bracket



Klemmkastendeckel mit O-Ring
terminal box cover with O-ring seal
mit 4 x unverlierbaren Zyl.-Schrb. M5 mit Schlitz
with 4 x slotted captive cheese head screw M5



Dichtfläche / sealing surface



Zentrierwinde / centering thread
DIN 332 Bl. 2 - DS M6

Yzl.-Schrb.
ISO 4762-M6x30-A4
cheese-head screw
mikroklebstoffbeschichtet
micro-adhesive coated
zul. Anzugsmoment: 3 Nm
max tightening torque: 3 Nm

Montage- / Demontage-Werkzeug
zum Fixieren der Hohlwelle
Mounting- / dismantling tool
for fixation of hollow shaft
ET-104295

Erdungsschraube
earthing screw
M4x6

Stützschibe / washer
DIN 988-SS 6x12

Verschlussstopfen
blind plug

Länge / length L 100, 125, 150, 200
andere Längen auf Anfrage / other lengths on request

Bauform / Construction type:
Hohlwelle Ø17C
hollow shaft Ø17C

Maßstab:

Maßzeichnung / dimension drawing

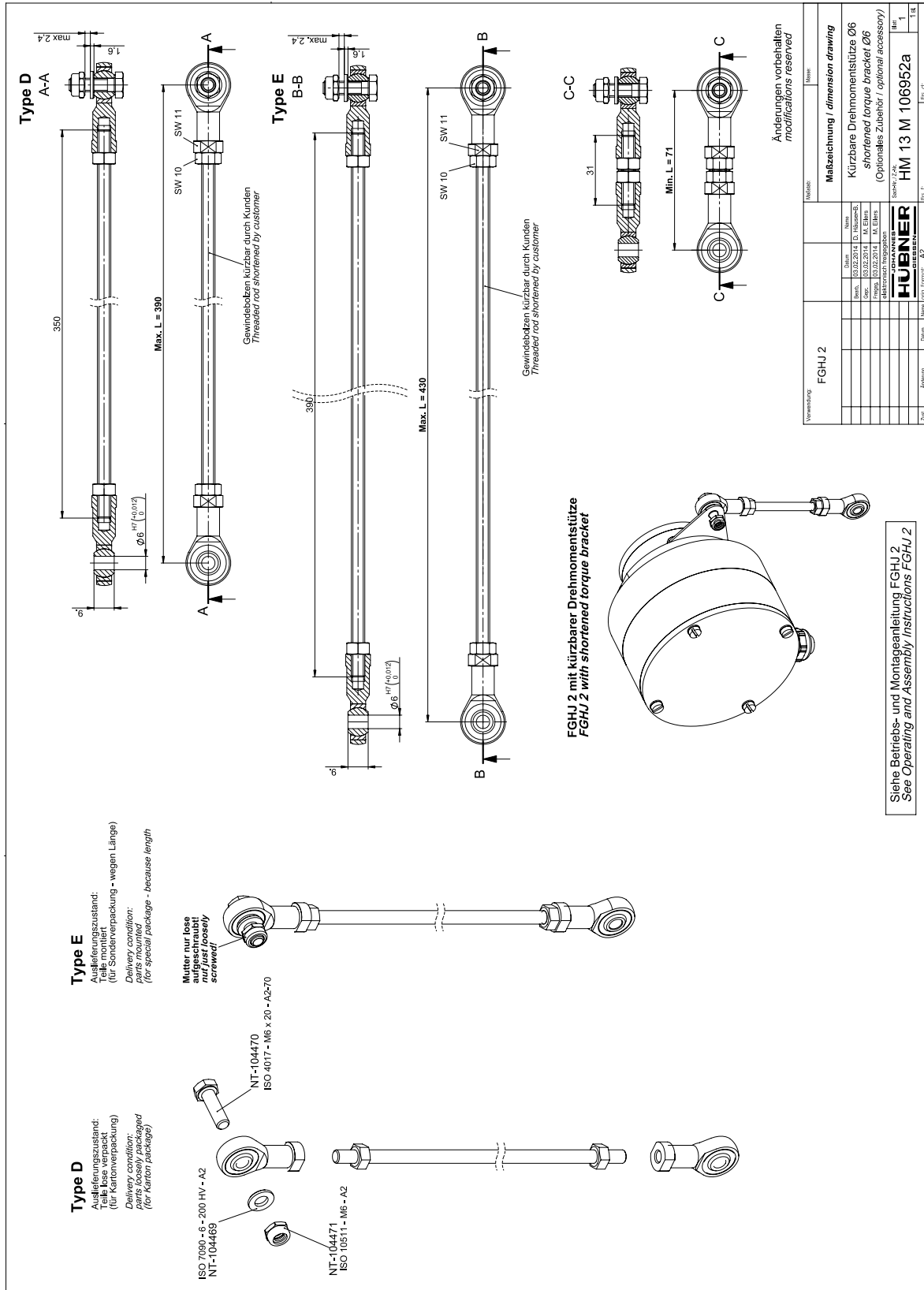
Änderungen vorbehalten
modifications reserved

Name	
Beinh.	M. Engels
Datum	31.08.2018
Gepr.	M. Eilers
Freigege.	M. Eilers
elektronisch freigegeben / V13	

FGJH 2 / 17C - V4A
mit Schutzschlauch
with protection tube

Sachnr./Z.Nr.
HM 18 M 112983

Zust. 1
Blatt 1 Bl.



13 Connection diagrams

13.1 Terminal box

	<p>NOTES! The connection diagrams are displayed in each terminal box cover!</p>
--	--

PN166-400d

Connection diagram			
1	0V		GND
2	+U		Power supply
3	0°		Incr. output 0°
4	0°		Incr. output 0° inverse
5	90°		Incr. output 90°
6	90°		Incr. output 90° inverse
7	N		Reference pulse
8	N		Reference pulse inverse
12			Overspeed switch (Optional)
13			

Shielding: Connection between cable shield and housing via EMC cable gland

PN166-420b

Connection diagram		
1	+U	Power supply
2	0V	GND
3	LWL	Fibre optic connection
4		Overspeed switch (Optional)
5		

Connection technology AK

Connection technology AL

PN166-430c

Connection diagram			
1	11	0V	GND
2	12	+U	Power supply
3	13	0°	Incr. output 0°
4	14	0°	Incr. output 0° inverse
5	15	90°	Incr. output 90°
6	16	90°	Incr. output 90° inverse
7	17	N	Reference pulse
8	18	N	Reference pulse inverse

Shielding: Connection between cable shield and housing via EMC cable gland

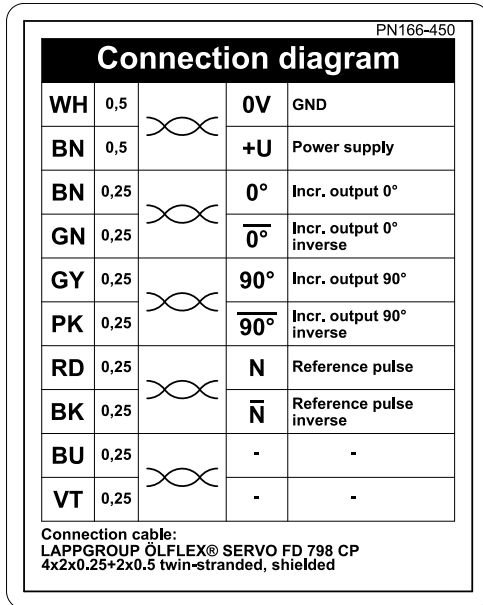
Connection technology AKK

13.2 Connection cable

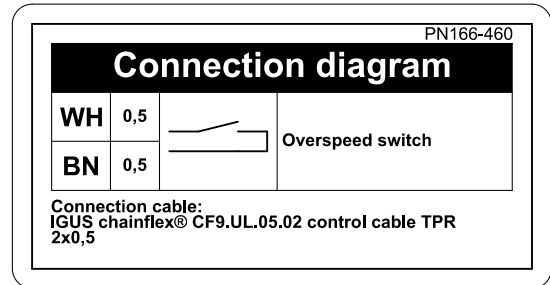


NOTES!

The connection diagrams are attached to each cable!

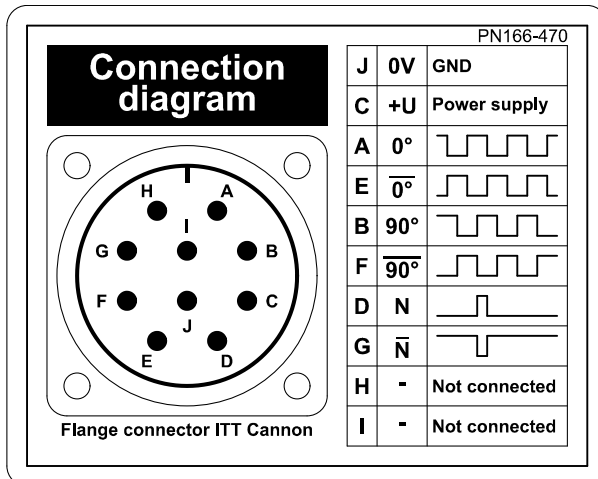


Connection cable



Connection cable (option S)

13.3 Flange connector ITT-Cannon



10-pole-flange connector ITT Cannon