

Operating and Assembly Instructions

Incremental hollow shaft encoder FG14

**Read the Operating and Assembly Instructions prior to assembly, starting installation and handling!
Keep for future reference!**

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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 FGH 14, Operating and Assembly Instructions.

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 Intended use

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

Series FGH 14 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.

2.3 Improper use

**Warning:**

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

- Do not use the device in potentially explosive areas.
- The device must not be subjected to mechanical loads in addition to its own weight and unavoidable vibration and shock loads that arise during normal operations.

Examples for non-permitted mechanical loads (incomplete list):

- Fastening transport or lifting tackle to the device, for example a crane hook to lift a motor.
- Fastening packaging components to the device, for example ratchet straps, tarpaulins etc.
- Using the device as a step, for example by people to climb onto a motor.

2.4 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.

2.5 Personnel

Only trained, specialized personnel is allowed to perform installation, mounting, disassembly and commissioning work.

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



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 plate



The type plate and UKCA label are located on the side of the housing and contain the following information:

Englisch	Deutsch
Manufacturer, address	Hersteller, Anschrift
Type:	Typ:
Year of manufacture	Baujahr
CE mark	CE-Kennzeichnung
Item (ID)	Artikel (ID)
Serial number (S/N)	Seriennummer (S/N)
Pulse rate	Impulse
Degree of protection	Schutzart
Supply voltage	Versorgungsspannung
QR-Code	QR-Code

3.2 Electrical and mechanical data

Pulse rates	Value
Preferred Pulse Rates	700, 1024, 3000, 3600
Special pulse rates	1000, 1800

Connection data	
Supply voltage	12 V ... 30 V DC, Ripple max. 10 %
No load-current	approx. 100 mA at 30 V (without Option)
Outputs ¹⁾	Push-pull final stages, resistant to short-circuit
Pulse height (HTL)	approx. as supply voltage
Rated load	50 mA per output
Internal resistance	50 Ω per output
Slew rate	50 V / μs

1) Special output voltage 5V

(specify on order)

Supply voltage: 12 V...20 V DC or 20 V...30 V DC

Output: push-pull output stages with inverted signals.




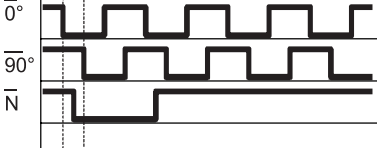
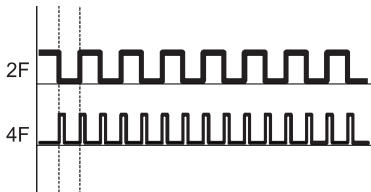
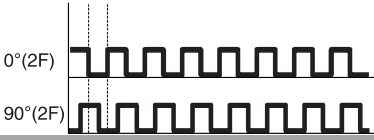
Pulse height: 5 V to RS 422.

Duty cycle	1 : 1 ± 5 %
Square wave displacement 0°, 90°	to 50 kHz < 3 % to 150 kHz < 5 %
Max. frequency	0 to 100 kHz (150 kHz on request)
Encoder temperature ranges	
Standard	0°C ... 70°C
Special temperature ranges	-25°C...+ 85°C
Special output voltage 5V (TTL)	
Signal amplitude	5V, RS422-compatible (TIA/EIA-Standard)
Supply voltage	12...30 V DC
Temperature range	
The max. permissible ambient temperature depends on the speed and the degree of protection of the device.	

Protection class DIN EN 60529	Sealing	Mechanical speed	Description	Breakaway torque
IP 54	Special seal	≤ 2500 min ⁻¹	Protection against dust and water spray	approx. 120...200 Ncm
IP 66 both sides	Radial shaft seal	≤ 800 min ⁻¹	Protection against dust and water spray	approx. 180...330 Ncm depending on type
IP 66	Radial shaft seal		Protection against dust and water spray	approx. 160...190 Ncm

Weight	Type EK Type EEK	approx. 27...32 kg approx. 29...34 kg
--------	---------------------	--

The FGH 14 is categorized in Group 1 and Class A in accordance with EN 55011 and is only intended for use in an industrial environment.

Signalausgänge																		
Basic version (n = pulses/revolution) One pulse channel (basic) with n direct square wave pulses, corresponding to the segment division and LED monitoring output. (optional).																		
Option 90 2 nd pulse channel as basic version, but with 90° electrical phase shift.																		
Option N / N2 Marker pulse, mechanically fixed. One square wave pulse per revolution.																		
Option G Additional inverted output signals for basic and 90° channels, marker pulse LED check.																		
Option F With 2 or 4 times as many pulses as the basic version. No direction of motion can be derived from the multiple number of pulses. Required: Option 90°																		
Option B Fast and precise sensing of rotational direction at each edge of the basic and 90° channels, Required: option 90°.	<table border="1"><thead><tr><th rowspan="2"></th><th colspan="2">Output</th><th rowspan="2"></th></tr><tr><th>L</th><th>R</th></tr></thead><tbody><tr><td>cw</td><td>0</td><td>1</td><td rowspan="2">Option B, B2</td></tr><tr><td>ccw</td><td>1</td><td>0</td></tr><tr><td>Still stand</td><td>0</td><td>0</td><td>Option B2</td></tr></tbody></table>		Output			L	R	cw	0	1	Option B, B2	ccw	1	0	Still stand	0	0	Option B2
	Output																	
	L	R																
cw	0	1	Option B, B2															
ccw	1	0																
Still stand	0	0	Option B2															
Option B2 As option B, but with standstill sensing.																		
Option V Electronic pulse doubling of basic and 90° channels by multiple evaluation.																		
Option L Power output up to 150 mA for basic channel, 90° channel and the corresponding inverted signals.																		
Option J Reduced rotational frequency modulation by means of optically adjusted pulse disk.																		
Option S Electronic overspeed switch with 2 programmable switching outputs, EGS4 version.																		

3.3 Type code

	FGH	14	EK	1000	G 90G	NG	2F	S	J	140P
Incremental Hollow Shaft Encoder										
Series										
Connections										
2x Connection = redundant encoder										
z.B. EEK: 2x terminal box										
EK/EEK: terminal box										
ES/EES: EMC Industrial plug										
ER/EER: 12-pole. round plug										
EC/EEC: 2 m connection cable										
Pulses per Revolutiion										
Basic signal output										
Basic channel 0° (A)										
Pulse channel 90° (B)										
Each with inverted signals										
NG: Reference pulse with inverted signal										
2F: Option 2F										
4F: Option 4F										
B: Option B										
B2: Option B2										
S: Option S (EGS 4 Technic in 2nd scanning head)										
L2: Option L2										
V: Option V										
J: Option J (J can be combined with V)										
Hollow shaft bore										
Only for hollow shaft										
Ø 93 ... Ø 150										
Drive shaft connection										
P: keyway										
K: clamping										
S: pressure sleeve										
C: taper										

4 Transport, packaging and storage

4.1 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.

4.2 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).

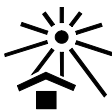
4.3 Packaging / disposal

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

4.4 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 stored for longer periods (> 6 months) we recommend sealing the devices in foil, possibly with a desiccant.

**NOTES!**

Turn encoder shafts every 6 months 10 times to prevent a possible hardening of the grease-filling of the ball bearings, which may lead to the destruction of the device.

5 Installation and commissioning

5.1 Safety instructions

Personnel

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



NOTES!

Observe the safety instructions contained in **Chapter 2** when installing or working on the device!

5.2 Mounting of the encoder (mechanical)

Mounting and disassembly by means of a hammer or similar tools is not permitted (warranty void).

5.2.1 Mounting Instruction for hollow shaft encoder

1. Adapter flange has to be mounted and to be aligned by dial gauge, if necessary optimize by ball thrust adjusting screws.
2. Ball thrust screws to be fastened with Loctite, remove non-fastened screws or fasten with Loctite! Max. torque for M12 approx. MD 25 Nm / M16 approx. MD 35 Nm.

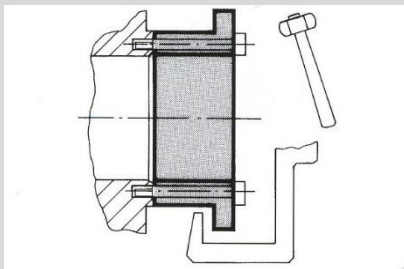


Fig. 1

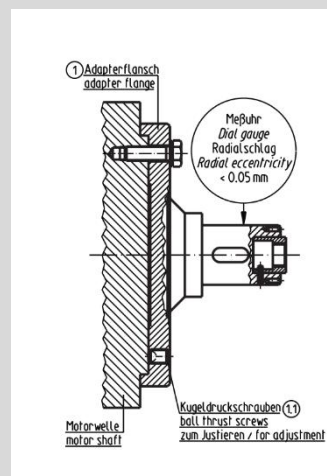


Fig. 2

The hollow shafts have tapped holes on both sides at the front. For removal use screws to attach the mounting sleeve (Fig. 1), and then use a puller to draw off the unit. A suitable mounting sleeve is recommended for each plant area (specify on ordering). Remove hollow shaft encoders using mounting sleeve only:

Mounting / removal sleeves for standard bores	
FGH 14... / 140P	Drg. no. D-52 833a-I
FGH 14... / 93 S and 150 K See separate assembly and disassembly instructions Nr.54728 (see Annex)	Drg. no. D-52 833a-II



NOTES!

The radial deviation of the shaft (Fig. 2, Pos. 1) should not exceed 0,05 mm.

- Use feather keys in accordance with DIN 6885.
- Mount the torque bracket / torque arm on the housing.



NOTES!

Comply with the information provided in the supplemental data sheet entitled "Mounting Accuracy of hollow shaft encoders".

- Check the mounting position relative to the terminal boy, adjust if necessary.
- Push the device onto the shaft that has been lightly greased.



CAUTION!

Danger of damage to shaft and device if improperly handled.

Ensure that there are no hard impacts on hollow shaft and housing.
Use the mounting sleeve.

- Secure the device with axial tightening plate and 4x M5-DIN 912 fastening screw (coated with micro-adhesive).
- Tighten the fastening screws on the link head of the torque bracket. Fix the nuts in place with locknuts.
- Check the attached torque brackets: The link rod must be easy to turn within the link head, and the link heads should not tilt. If this instruction is not followed there is a danger of bearing damage.
- Connect the cabling in the terminal box (⇒ Appendix, Connecting diagrams).

5.3 Installation

5.3.1 General rules

NOTES!

In environments with high drive power, external systems can generate high electromagnetic emissions. Adverse effects on FGH 14 operation can be avoided by observing the following guidelines:

- Uninterrupted, low-resistance machine grounding must be ensured across all parts of a plant. Ensure that the connections have good electrical contact. Poor conductivity can be caused, for example, by paint, lubricants, corrosion or similar. In practice, large cable cross-sections are required for low-resistance machine grounding.
- Generous mounting distances must be maintained from actuators with a high energy density, such as contactors, inverters, motors, solenoid valves and brakes.
- Shielding of cables must be carried out professionally, for example between the inverter and motor. Please observe the manufacturer's specifications.
- Inductances of relays, contactors, solenoid valves or brakes should be wired with suppressors. To prevent conducted interference coupling, this is necessary for relays or contactors that are connected directly to the inputs or outputs (IO). To prevent interference coupling via the air path, this also applies to all inductances in the near field of the installation. Suppressors must be connected directly to the coil: RC elements or varistors for operation with alternating current (AC) and freewheeling diodes or varistors for operation with direct current (DC), whereby freewheeling diodes are preferable.
- The FGH 14 is operated with low voltage of up to 30 V. To avoid interference coupling via the air path, it is important to plan cable routes with sufficient distance to power lines in accordance with the following diagram. This generally applicable diagram is to be used for all connections **inside** and **outside** control cabinets.

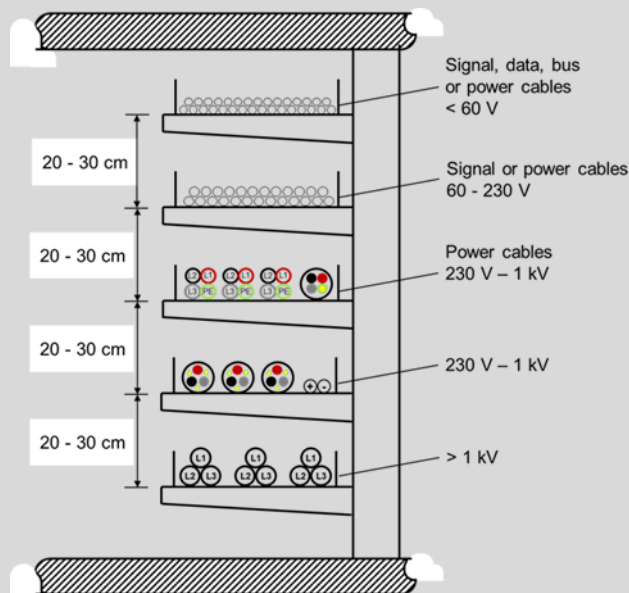

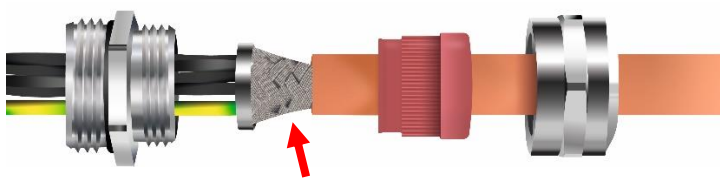


Figure :Scheme for planning cable routes

5.3.2 Connecting

	<ul style="list-style-type: none"> • Sufficient dimensioning of the power supply. • The conductor cross-section of the power supply cable must be designed so that the maximum voltage drop is less than 3 V. A wire cross-section of 0.75 mm² is recommended. Permissible cable diameter: 6,5...9,5 mm. (Cable diameter for UL-listed devices 8...9,5 mm). • A DC distribution network can comprise considerable cable lengths, which may be subject to interference. It is recommended that the FGH 14 is not operated on a heavily disturbed DC distribution network. If necessary, a separate power supply should be provided. To minimize interference, the DC distribution should be connected to the power supply unit in a star configuration and with symmetrical routing of the forward and return conductors (as a “twisted pair” or as a cable). • A shielded supply cable must be used for the electrical connection. The cable shield must be connected to the machine grounding on both sides. Shield connection terminals must be used to connect the cable shielding to a large surface area in the switch cabinet. The same applies to the shielding of signal cables. • A cable for connecting to ground potential must be connected to the ground terminal of the FGHJ 2, if not already pre-assembled (max. tightening torque 2.0 Nm). • A flat grounding strap consisting of fine stranded wire with a minimum cross-section of 6 mm² must be used for grounding. • The grounding strap must be permanently and permanently connected to a low-impedance, nearby grounding point on the system side. The grounding point must be bare metal, free of paint, non-conductive surface finishes, grease, oil and corrosion. The length of the grounding strap should not exceed 2 m.
---	---

5.3.3 Shield contacting for EMC cable gland with cone

Example –Figure: Cable gland with cone

The shield is placed on the cone. The insulation must be removed at this point. The shielding must remain intact in this area and must not be damaged.

5.4 Connecting the encoder

5.4.1 Connections

Cable glands are closed with a stopper to protect the devices on transport and storage.

Cable connections:

Have to be executed according to the encoder type.

Connection diagrams have to be considered!

See chapter 12 and in the terminal box cover. Use of connection cables with diameter of min. 11 mm max. 20 mm is essential to ensure the protection class. Cable outlet should show preferably downwards.

Option:

R: 12-pole round plug

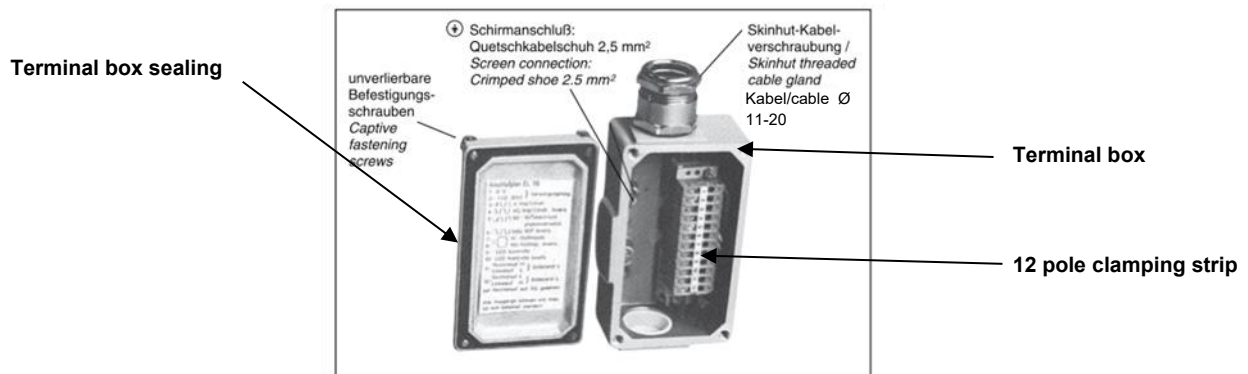
S: Industrial plug

C: Connecting cable

Wiring arrangement and shielding

(EMI measurement)

- The cable shield must be connected at both ends!
- The shield of the signal cable can be connected directly to the housing of the encoder by the cable gland.
- The general guidelines for EMC-compliant wiring must be observed.



Special Hint!

The encoder must be connected only by skilled technical staff.

Closing the terminal box cover.

Check the seal of the terminal box cover, clean it if soiled. Then duly close the cover.



Cable must not be pinched.

Attention with open terminal boxes:

Moisture should not get into the terminal box when connecting the cable.

5.4.2 Technical information

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 0).

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 5.4.1)

6 Dismantling

6.1 Safety instructions

Personnel

Dismantling must be carried out by skilled technical staff only.



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



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

6.2 Dismantling the encoder

To dismantling the encoder follow the instructions given in Chapter 5.2 in the reverse order.

7 Faults

7.1 Faults table

Faults	Possible cause	Remedy
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 Hübner-Service (page 2) if none of the remedies listed above provides a solution!		

8 Inspections

8.1 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!

8.2 Maintenance information

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

8.3 Inspection schedule

Interval	Inspections	Tasks
Yearly	Check coupling	Qualified person
	Check the fastening screws for firm seat	Qualified person
	Check the cable connections	Qualified person
After approx. 16000 to 20000 operating hours and high long-term loading	Check deep-groove ball bearing for ease of movement and noise.	Qualified person
	Worn ball bearings have to be replaced only by the Manufacturer	Hubner – Giessen Service

9 Incremental encoder with replaceable scanning head

Hollow shaft incremental encoder with bores
from Ø 93 mm up to Ø 150 mm

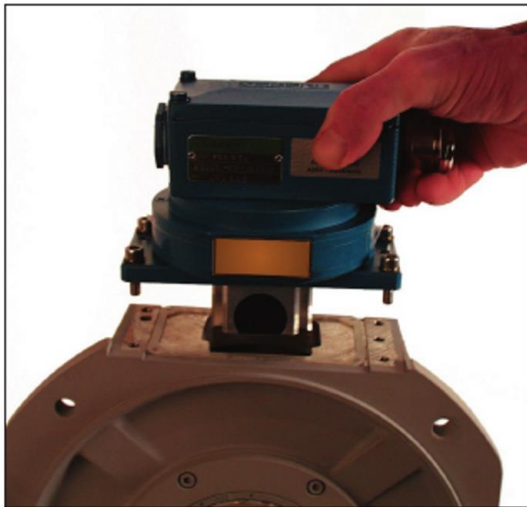
Suitable for harsh ambient conditions, such as in opencast mining, steel and rolling mills.

Pulse rate up to 4069 and

high enclosure protection, up to IP66.

This replaceable scanning head

can be exchanged on site without having to dismantle the whole encoder from the motor shaft.



Very advantageous for critical and involved mounting situations e.g. in restricted space.

The replaceable scanning head is provided with a mechanical stop and **adjustment** on site is **not necessary**.

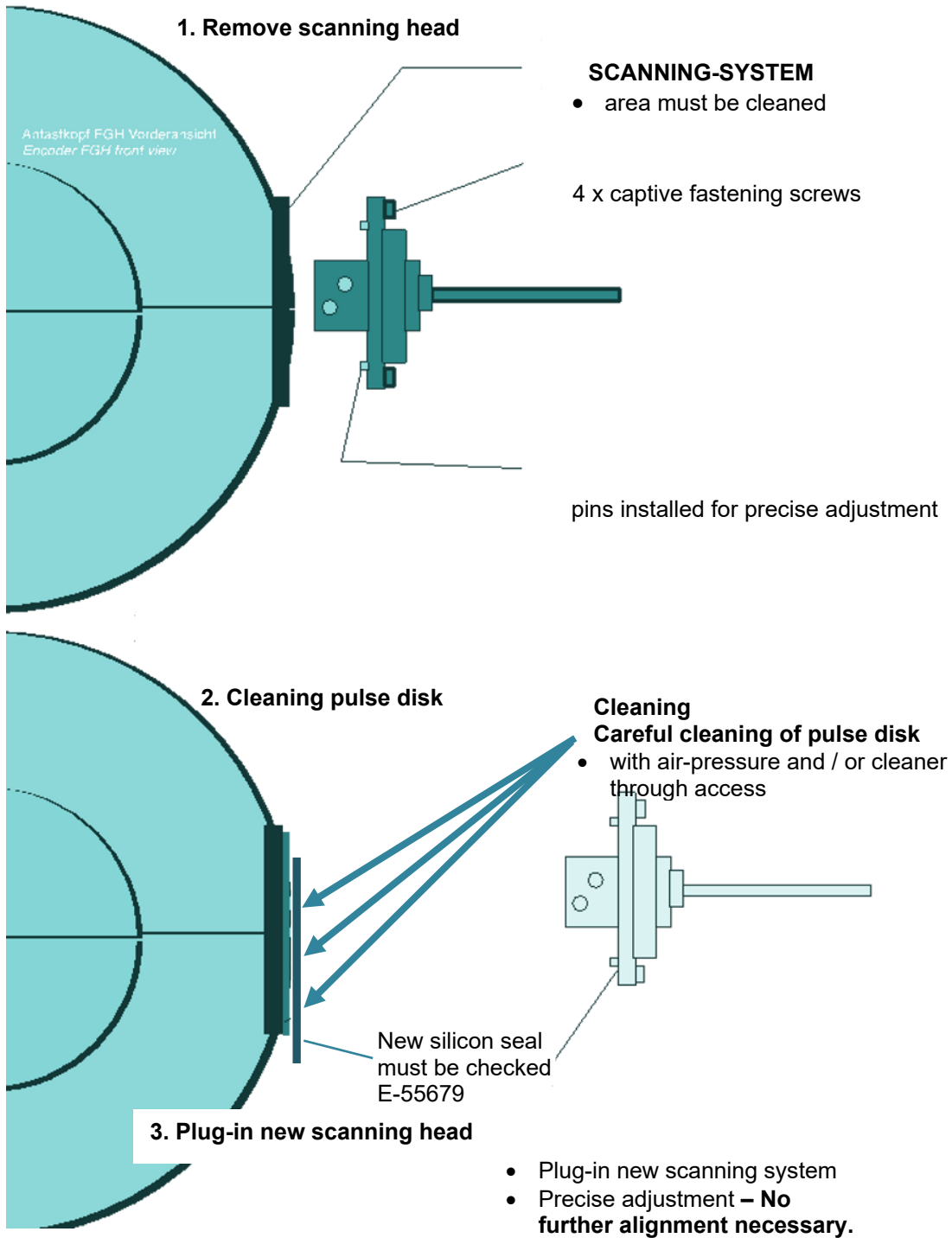
Electrical connections:

Terminal box, connection cable for plug or data transmission by fibre optic LWL immune to interferences. Moreover, under extreme ambient conditions (oily mist or fine dust) the pulse disk can be cleaned through the access opening that is provided.

The encoder is equipped with dimensionally oversized bearings thus creating a **very solid base for add-ons**.

9.1 Exchange of scanning-system

of Encoder FGH 14. Easy exchange of all optical and electronic components without removal of the encoder form motor shaft.



9.2 Pictures

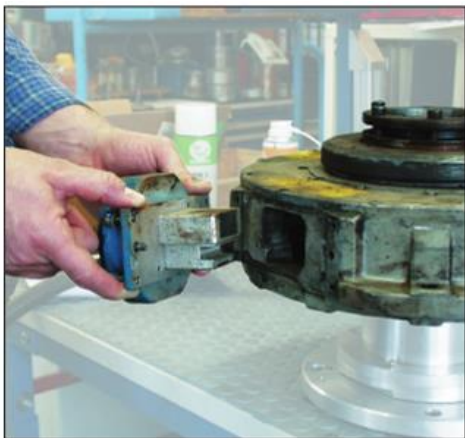
Photo No. 1 to 6: Sequence of disassembly / exchange = Scanning - System



1



2



3



4



5



6

10 Disposal

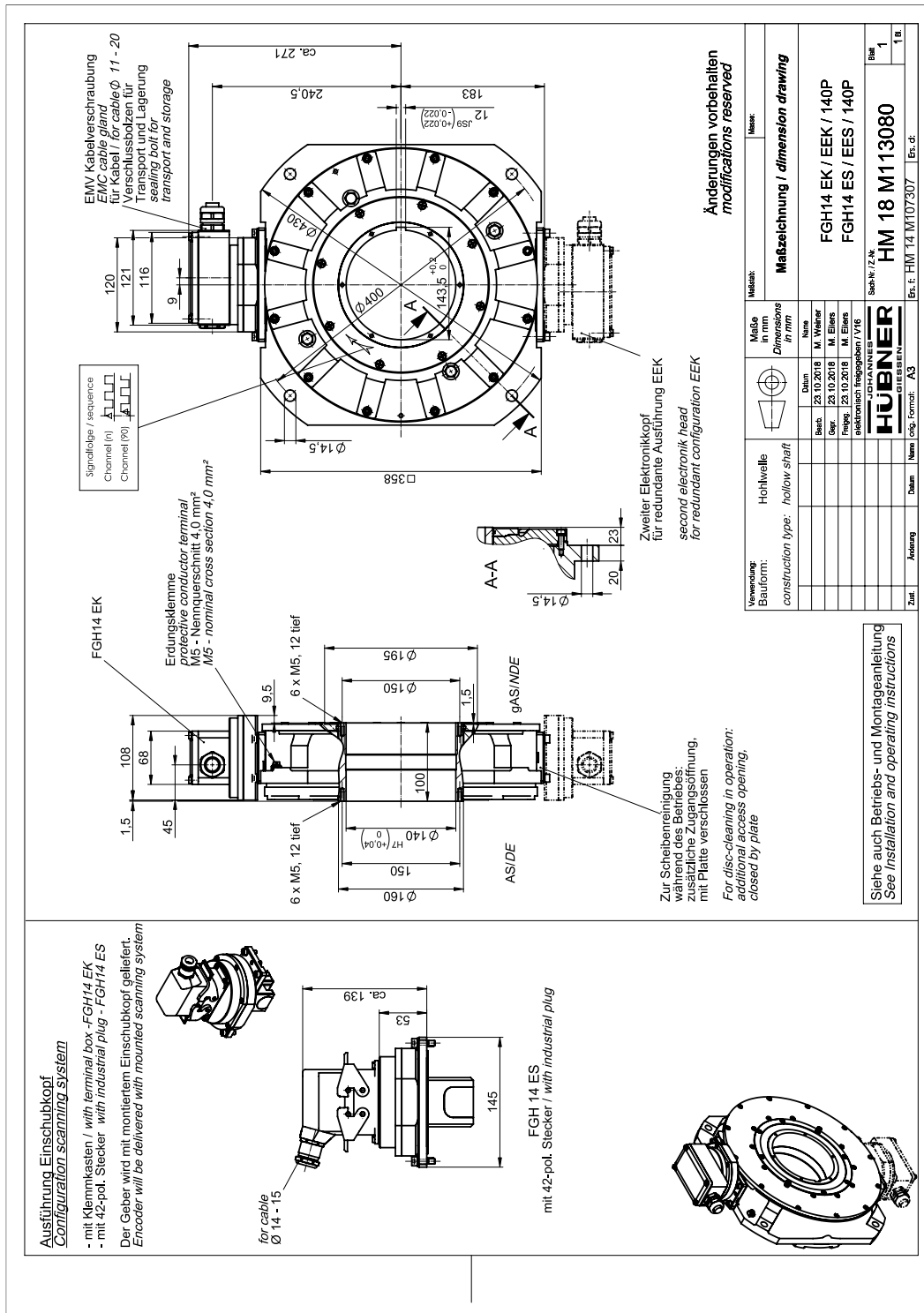
10.1 Disposal procedure

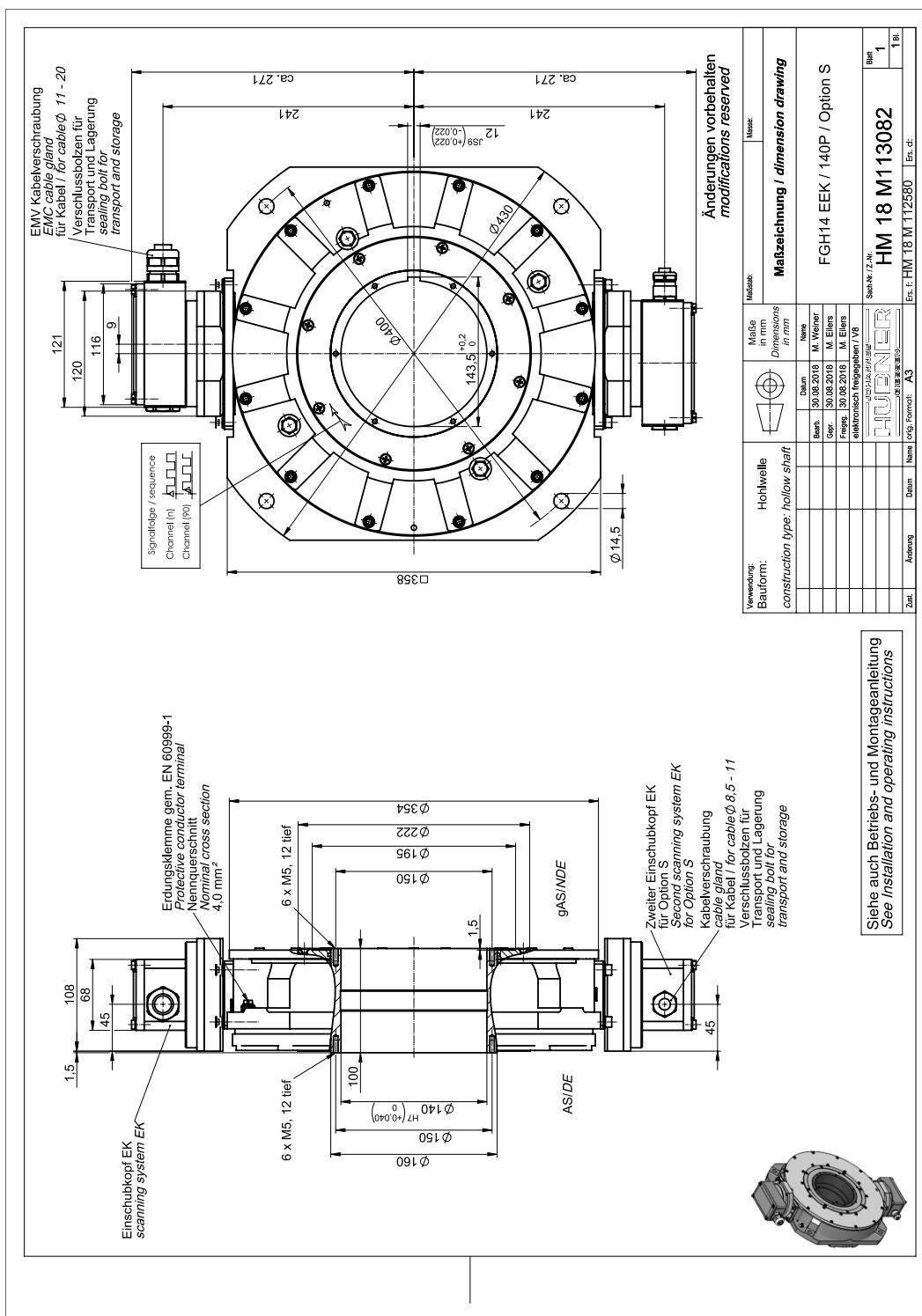
The manufacturer is not obliged to take back the device.

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 Dimension drawings





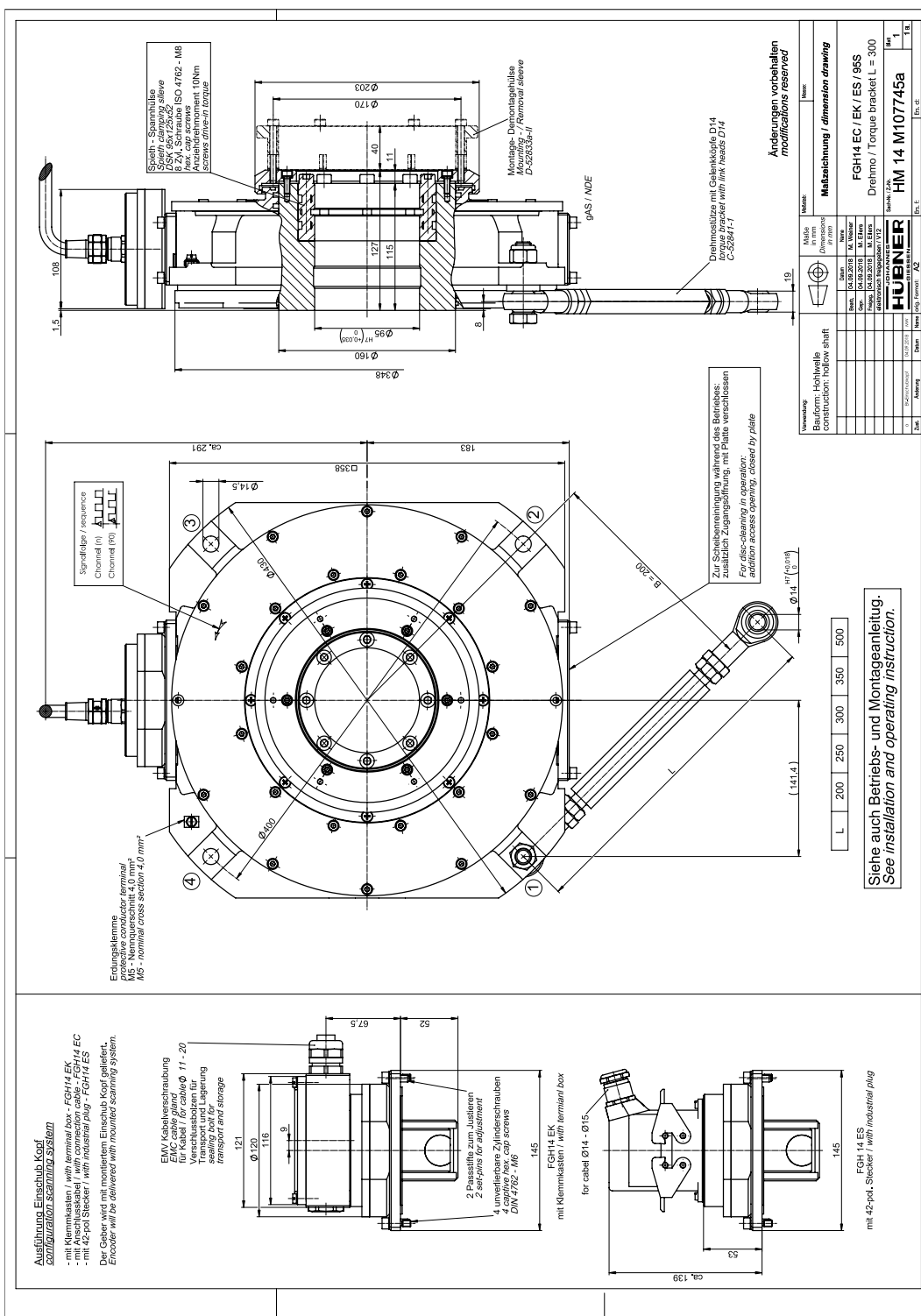
FGH 14 EEK... / 140P

Option S

HM 18 M 113082

**JOHANNES
HÜBNER
GIESSEN**





FGH 14 EC / 95 S

HM 14 M 107745a

12 Connection diagrams

12-pol. Bandklemme Typ Phoenix
12-pole strip clamping type Phoenix

Schirmung:
Der Schirm der Signalleitung ist über die Kabelverschraubung direkt mit dem Gehäuse verbunden.
Shield:
The shield of the signal cable is directly connected with the housing of the encoder by the cable gland.

Die Belegung der Anschlüsse ist aus der Typenbezeichnung ersichtlich
Availability of options see type description

z.B. e.g.: FG..K-1000 G - 90 G - N G

0° channel A
0° inv. channel A inv.
90° channel B
90° inv. channel B inv.
Nullimpuls marker
Nullimp. inv. marker inv.

	EL 816	EL 816-1	EL 816-2	EL 816-3	EL 816-4	EL 816-5	EL 816-6	EL 816-7
OV	1	1	1	1	1	1	1	1
+ ... V ¹⁾	2	2	2	2	2	2	2	2
0°	3	3; 7	3	3	3	3	3	3
0° inv.	4	4; 8	4	4	4	4	4	4
90°	5	5; 9	5	5	5	5	5	5
90° inv.	6	6; 10	6	6	6	6	6	6
N	7	---	---	7	7	7	---	7
N inv.	8	---	---	8	---	8	---	8
M	9	11	9	9	8	9	9	---
M inv.	10	12	10	10	---	10	10	---
2F	---	---	7	11	9	---	---	11
4F	---	---	8	12	10	---	7	12
4F inv.	---	---	---	---	---	8	---	---
R	11	---	11	---	11	---	11	9
L	12	---	12	---	12	---	12	10
Schallausgang 1	---	---	---	---	---	11	---	---
Schallausgang 2	---	---	---	---	---	12	---	---

+ ... V¹⁾ Versorgungsspannung nach Typenschildangabe
supply voltage see rating plate

Verwendung: FG .. (A)K

Allgemein-toleranzen DIN ISO 2768m

OFZ nach DIN ISO 1302

Maßstab:

Werkstoff:

Datum: Name

Bearb. 03.06.14 Diriam

Gepr. Norm

Benennung: Anschlussplan
Connection diagram

Zeichnungs Nr.: EL 816

Blatt

Zust. Änderung Datum: Name

FGH 14

Standard

Terminal box

Anschlusskabel direkt angelötet
6x2x0,56 paarig verseilt, geschirmt
Connection cable soldered-on directly
6x2x0,56 twin-stranded, shielded

rot red + (12 - 30)V } Versorgungsspannung
schwarz black 0V } supply voltage

orange orange 0° / channel A
schwarz black 0° inv. / channel A inv.
blau blue 90° / channel B
schwarz black 90° inv. / channel B inv.
gelb yellow Nullimpuls / marker
schwarz black Nullimpuls inv. / marker inv.
grün green LED Kontrolle / check H = o.k.
schwarz black LED Kontrolle inv. / check inv. L = o.k.

braun brown Rechtslauf / cw H } Stillstand L
schwarz black Linkslauf / ccw L }
braun brown Rechtslauf / cw L } Stillstand L
schwarz black Linkslauf / ccw H }

Schirm ist mit Gehäuse verbunden
shield is connected to casing
alternativ/alternative
Der Schirm der Signalleitung ist über die Kabelverschraubung direkt mit dem Gehäuse verbunden.
The shield of the signal cable is directly connected with the housing of the encoder by the cable gland.

Typ: HE-2LVCC-CY AWG 20b
VDE 0881 zugelassen
acc. to VDE 0881
Querschnitt: 0,56 mm?
cross-section
Temperatur: -30°C bis +105°C
temperature
fest verlegt
fixed installation
bewegt
flexing
Außendurchmesser: 10,1 mm
Outside dia

Die Belegung der Anschlüsse ist aus der Typenbezeichnung ersichtlich
Availability of options see type description

z.B. e.g.: FG..C-1000 G - 90 G - N G

0° channel A
0° inv. channel A inv.
90° channel B
90° inv. channel B inv.
Nullimpuls marker
Nullimp. inv. marker inv.

Verwendung: FG..C

Allgemein-toleranzen DIN ISO 2768m

OFZ nach DIN ISO 1302

Maßstab:

Werkstoff:

Datum: Name

Bearb. 11.12.91 Martis

Gepr. 11.11.14 DI

Norm

Benennung: Anschlussplan
Connection diagram

Zeichnungs Nr.: EL 205

Blatt

Zust. Änderung Datum: Name

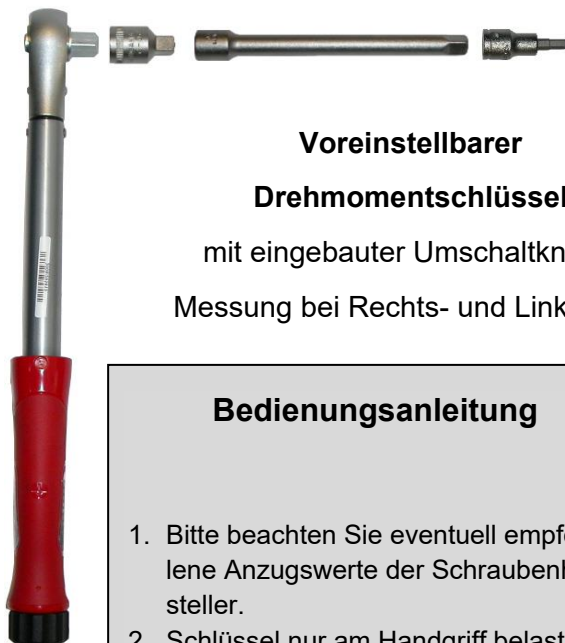
FGH 14

Standard

Connection cable

13 Annex

<div><div>JOHANNES</div><div>HÜBNER</div><div>GIESSEN</div></div> <div>ideas and solutions</div>	<div>Mounting and Removal Instruction of Incremental Hollow Shaft Encoder</div> <div>Encoder TYPE: FGH 14.../ .S</div> <div>Mounting Tool: with torque wrench</div>	<div>2010-01-04</div>
<div>Type: FGH 14... / .S bore: Ø 93, Ø 107,95 – Spieth clamp- bore: Ø 95 – Spieth clamp-</div> <div>TQ = 25 Nm or TQ = 18,5 ft lbs TQ = 10 Nm TQ = 7,5 ft lbs</div>	<div>Type: FGH 14... / 150 K bore: Ø 150</div> <div>TQ = 50 Nm or TQ = 37 ft lbs</div>	
<div>Torque wrench of type 10-60 Nm 1/2", hexagonal bore 6 mm</div>	<div>Torque wrench or type 10-60 Nm 1/2", hexagonal bore 8 mm</div>	



**Voreinstellbarer
Drehmomentschlüssel**
mit eingebauter Umschaltknarre
Messung bei Rechts- und Linksgang



Pre-set Torque Wrench
with reversible ratchet
right and left side measuring

Bedienungsanleitung

1. Bitte beachten Sie eventuell empfohlene Anzugswerte der Schraubenhersteller.
2. Schlüssel nur am Handgriff belasten.
3. Den Drehmomentschlüssel vor Belastung mit vollem Anzugswert zunächst nur mit 75% betätigen, dann mit vollem Wert nachsetzen.
4. Schlüssel langsam und stetig steigend belasten, keinesfalls ruckartig, da sonst fehlerhafte Anzeige.
5. Das voreingestellte Drehmoment ist erreicht, wenn der Schlüssel ein hör- und fühlbares „KLICK“ –Signal abgibt.
6. Falls Schlüssel nicht mehr in Gebrauch, auf kleinste Skalaanzeige zurückstellen.

Operating instruction

1. Please, obey any recommended tightening torques.
2. Apply torque loads only by using the plastic handle.
3. Firstly, pre-set torque wrench at a lower load – about 75% than required – re-set the wrench and tighten again.
4. Use wrench by smooth and continuous pull to ensure more accurate results.
5. The pre-set torque is reached as soon as the audible and sensible “CLICK” –Signal is noticed.
6. Reduce torque setting to its lowest figure when the wrench is not in use.



Wartungs- und Bedienungsanleitung *Maintenance and operation instructions* for encoders Type: FG../EGS../AM../UO..

Ergänzung 01/2007

Wartungs- und Bedienungsanleitung für Drehgeber

Aufstellung und Inbetriebnahme:

- sorgfältige Behandlung: beim Transportieren, Lagern; Anbau
 - lagern: trocken, evtl. mit Trockenmittel, vakuumverpackt, nicht über 40 °C; nicht über 4 – 6 Monate, sonst Rücksprache mit = HÜBNER-GIESSEN =
 - Kupplung leichtgängig auf Geberwelle aufziehen eventuell Kupplungsbohrung nachreiben (Passung G7)
 - Kupplungsnahe mit Gewindestift fixieren
 - verdrehsteife und spielfreie Kupplung verwenden
 - **keine harten Schläge auf Gebergehäuse und Geberwelle**
 - genauer zentrischer Anbau, besonders bei Bauform B3 beachten
 - für Hohlwellengeber FGH...: Rundlauf der Antriebswelle Genauigkeit < 0,05mm siehe Montageanleitung Nr. 54570-1
 - Axialbewegung verursacht Drehbewegung des Gehäuses
 - längerer Drehmo-Stützarm reduziert Gehäuseverdrehwinkel
- Montage / Demontage nur mittels Montagehülse bzw. Abziehvorrichtung.
- Hohe Impulszahl erfordert hohe Rundlaufpräzision.**
Verspannungsfreier Anbau der Drehmomentstütze mit **spielarmen Gelenkköpfen**.

BEACHTET! WARTUNG! Gelenkköpfe
1 – 2 mal im Jahr auf Leichtgängigkeit prüfen, von Hand drehbar! Behandeln mit Teflonspray oder leicht einölen. Bei Reparaturen Gelenkköpfe mitsenden!

Zur Erfüllung der Schutzart muß das Anschlusskabel passend zur Kabelverschraubung / Tülle sein (siehe Maßbildangabe).

Wartung: Keine erforderlich!

- Lebensdauer geschmierte Rillenkugellager haben eine Standzeit von ca. 20.000 – 35.000 Stunden (Abhängig von Umgebungsbedingungen, Drehzahl und Belastung).

Die **justierte Geberoptik** erlaubt **keine Demontage** beim Kunden, **Eingriff** in den Geber **bewirkt Verlust des Garantieanspruchs**.
Deshalb Lagerwechsel nur durch HÜBNER-GIESSEN

Beachte:

- max. zulässige Drehzahl
- Umgebungstemperatur
- Versorgungsspannung
- Anschluss nach Schaltbild
- Abnehmbares Steckerteil, Crimpkontakte und Schaltbild sind in einer Tüte am Gerät angebracht
- Seitliche Kabelzugkräfte am Stecker können Auflage bzw. Schutzart beeinträchtigen
- Abgeschirmtes Anschlusskabel **passend** zur Verschraubung, wichtig zur Einhaltung der Schutzart.

Diese, obig dargestellte, allgemeine Wartungs- und Bedienungsanleitung mit Anschlußplan liegt jeder Lieferung bei!

Maintenance and operation instructions for encoders

Installation and commissioning:

- carefully handling during transport, storage, fitting
 - **store dry, if necessary use desiccant vacuum packing, storing temperature: max. 40 °C,**
 - **storing duration: not more than 4 – 6 months.**
For other conditions ask = HÜBNER GIESSEN =
 - **fit the coupling smoothly onto the shaft**
if necessary finish ream the coupling bore (fit G7)
 - use a set screw to lock the coupling hub
 - use a torsion resistant backlash-free coupling
 - **no hard blows on encoder casing and shaft**
 - ensure precisely centered mounting, especially with construction type B3
 - for hollow shaft encoder FGH...: max. drive shaft concentricity tolerance < 0,05 mm see mounting instructions No. 54570-1
- Axial motion will cause rotational frequency modulation on housing. Longer lever arms will reduce the housing twist.

Mounting / removal using mounting sleeve or puller tool only

High pulse rate requires high concentricity.
Stress-free mounting of the torque bracket with **low-play heads**.

IMPORTANT FOR MAINTENANCE! link heads
to be checked once or twice a year. Must be manually easily turnable! Treat with Teflon spray or grease slightly! Please attach link heads for repair shipments!

To comply with protection requirements, the connecting cable must fit the inlet Pg cable gland (see dimension drawings).

Servicing: none needed!

- Permanently lubricated grooved ball bearings have a working life of approx. 20.000 – 35.000 hours (depending on environmental conditions, speed and load)

The **adjusted encoder optics** must not be disassembled by the customer. **Tempering with the encoder invalidates the warranty.** For this reason, bearings may only be changed by HÜBNER-GIESSEN.

Note:

- max. permissible speed
- ambient temperature
- supply voltage
- connection according to circuit diagram
- detachable plug parts, crimp contacts and circuit diagram are supplied in a bag attached to the unit
- Lateral cable stresses at the plug may impair connection and degree of protection
- screened connection cable **matched** to cable gland is important to comply with protection requirements.

The a.m. general maintenance and operating instructions, including connection scheme will accompany the goods to be delivered.

JOHANNES HÜBNER · Fabrik elektrischer Maschinen GmbH

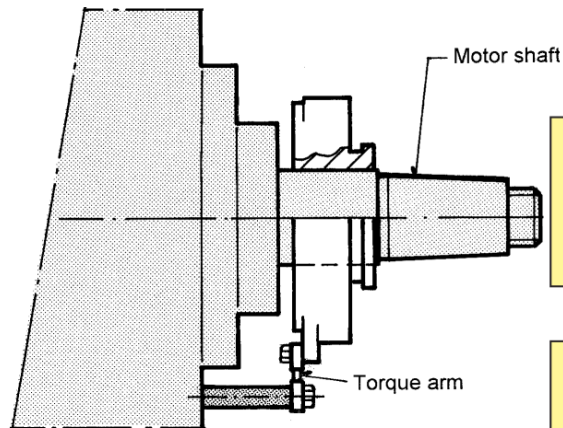
Siemensstrasse 7 · D-35394 Giessen/Germany
Tel. +49 6 41/ 79 69-0 · Fax +49 6 41/ 7 36 45 · email: info@huebner-giessen.com
www.huebner-giessen.com



Mounting and Removal Instructions
of Incremental Hollow Shaft Encoder
all Versions TYPE: FGH 14...
or FGH 14 EC...

No. 54 728

02-07



Spacer length of
Type FGH 14..mod.
only für modified unit

ATTENTION!!

check spacer
length on encoder
exchange!!!




Motor	Motor-shaft Ø	Spacer-length
Hoist	150	3,65"
Crowd	93	2,92"
Swing	93	2,14"

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www.huebner-giessen.com

	Mounting and Removal Instructions <i>of Incremental Hollow Shaft Encoder</i> All Versions TYPE: FGH 14...	No. 54 728
---	---	-------------------



Remove fastening
screw M 14 of **torque bracket**

Fasten fitting sleeve
with captive hexagonal cap
screws M6
(Drwg-No. D 52833a-II)
Remove encoder by means
of removal tool!!

Note:
Don't remove by
blows or force directly
on housing, this may
cause considerable
damage!!



Clean **motor shaft** extension,
remove it from rust an **finish**
smoothly
particularly the bore holes
of **old radial set screws**

Note:
Easy mounting of
encoder on shaft by
means of
Spieth-pressure sleeve
or clamping device!


Grease shaft surface
slightly!!

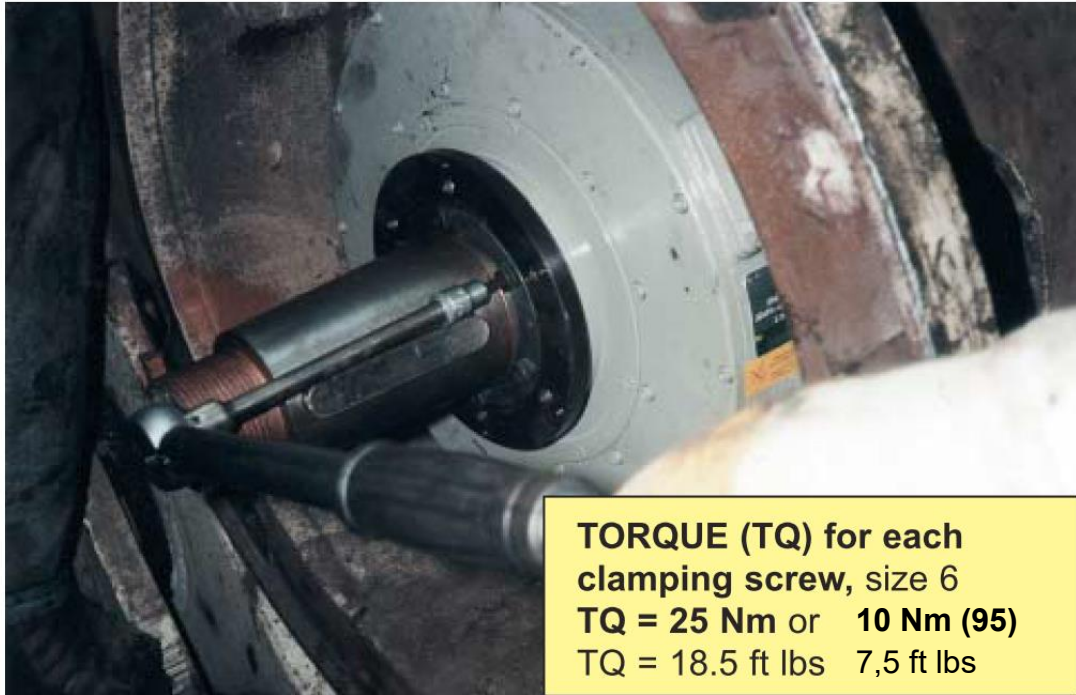
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	Mounting and Removal Instructions of Incremental Hollow Shaft Encoder TYPE: FGH 14.../S	No. 54 728
bore: \varnothing 93, \varnothing 107,95 = Spieth clamp = bore: \varnothing 95		



**TORQUE (TQ) for each
clamping screw, size 6**
TQ = 25 Nm or 10 Nm (95)
TQ = 18.5 ft lbs 7,5 ft lbs

Foto shows: **Spieth-Clamp** of type DS 93.125.52
with hexagonal head cap screws M 8

1. Push the clamping sleeve between motor shaft and hollow shaft bore without using force
- 2. Use no hard blows on transmitter casing and shaft**
3. Tighten the clamping screws evenly in diagonal order until initial assembly play is eliminated
4. Continue tightening evenly and gradually in diagonal sequence until you have achieved full torque of 25 Nm / 18.5 ft lbs
5. **Use torque wrench** of type 10-60 Nm 3/8, hexagonal bore 6 mm
6. Fasten torque bracket
7. Take care of spacer length and bracket arm length (on exchange)
8. Test of mounted torque bracket:
link rod must be easily turnable in link rod head, no distortion!!

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<p>JOHANNES HÜBNER GIESSEN</p>	<p>Mounting and Removal Instructions of Incremental Hollow Shaft Encoder TYPE: FGH 14.../150K</p>	<p>No. 54 728</p>
<p>bore: ø 150</p>		

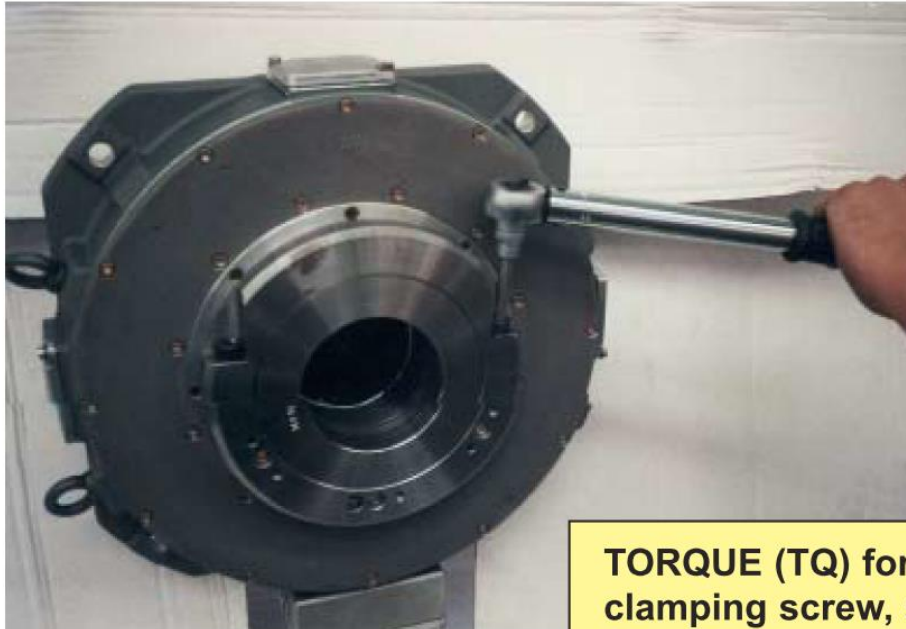


Foto shows: **Clamping device bore: ø 150**
with hexagonal head cap screws M 10

**TORQUE (TQ) for each
clamping screw, size 8**
TQ = 50 Nm or
TQ = 37 ft lbs

1. Push the clamping device between motor shaft and hollow shaft bore without using force
2. **Use no hard blows on transmitter casing and shaft**
3. Tighten the clamping screws M10 DIN 912 (micro-adhesive coated)
Torque of 50 Nm / 37 ft lbs
4. **Torque wrench** of type 10-60 Nm 3/8, hexagonal bore 8 mm
6. Fasten torque bracket
7. Take care of spacer length and bracket arm length (on exchange)
8. Test of mounted torque bracket:
link rod must be easily turnable in link rod head, no distortion!!

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