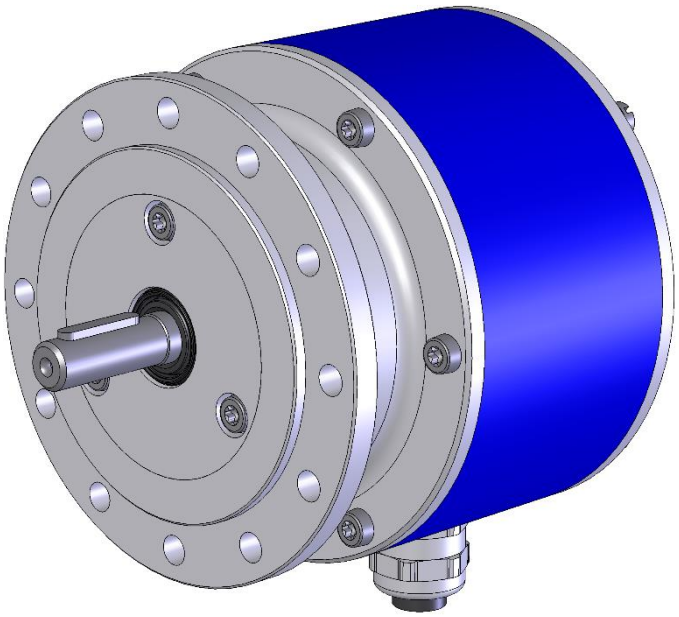
English

JOHANNES HÜBNER GIESSEN

ideas and solutions



Operating and Assembly Instructions
Incremental Encoder FG 2

c UL us LISTED

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

Translation of the original operating and assembly instructions FG2_MANUAL-en_R13(2023-06-29)ID77295.docx
ID 77295

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Johannes Hübner Fabrik elektrischer Maschinen GmbH is listed by Underwriters Laboratories.

UL certificates can be requested from us.

An overview of our UL devices can be found at the following link:

https://iq.ulprospector.com/info

UL File Number: E351535

Type	UL model No.
FG 2	FG 2 AK-XXXX
FG2 Option S	FG 2 AK-XXXX-S
FG2 KK	FG 2 AKK-XXXX
FG2 mit LWL	FG 2 AL-XXXX

Subject to errors and changes due to technical improvements.

Directory

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 Encoder FG 2, 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 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 FG 2 Incremental 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 FG 2 with option S has in addition to the incremental output a switching output.
The incremental encoder FG 2 with option S has been designed and constructed exclusively for the intended use described here.
Series FG 2 with option S Incremental Encoders are used for speed monitoring, for instance of electrical and mechanical drives, hoisting gear and conveying machines.

The FG 2 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 non-intended use.

2.4 Improper use

- 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.

2.5 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!

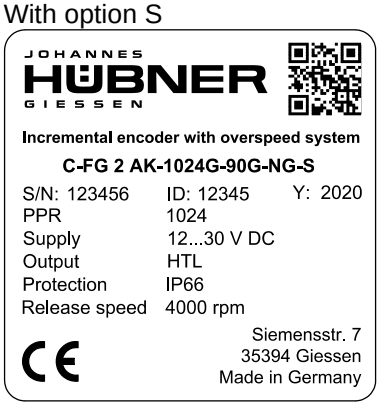
Life-threatening danger if restarted without authorization!
When correcting faults there is danger of the power supply being switched on without authorization.
This poses a life-threatening hazard for persons in the danger zone.
Therefore:
Prior to starting work, switch off the system and safeguard it from being switched on again.

3 Technical Data

3.1 Type plate

Below are some nameplates for different device models shown.
Without option S or LWL

With option S

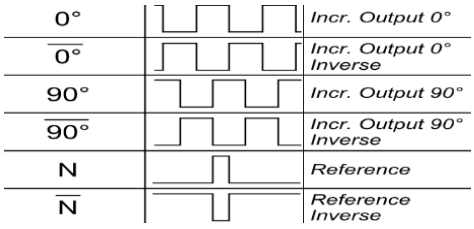


The type plate and UKCA label are located on the side of the housing.
Type plate information:

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
Certification (only encoders with UL)	Zertifizierung (nur Drehgeber mit UL)
QR-Code	QR-Code

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 mm² - 1,5 mm²)		
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 per output	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		
Special Encoder temperature range	-40°C … + 85°C		
Degree of protection acc.DIN EN 60529	Sealing	Rotor moment of inertia	Breakaway torque
IP 66 (UL and CSA Type 1)	with radial shaft seal	approx. 100 gcm²	approx. 3 Ncm
Vibration resistance	DIN EN 60068-2-6 / IEC 68-2-6 (10 … 2000 Hz)		20 g (=200 m/s²)
Shock resistance	DIN EN 60068-2-27 / IEC 68-2-27 (6 ms)		200 g (=2000 m/s²)
Max. encoder shaft load	$F_{a,\ max.}$ (axial) = 100 N $F_{r,\ max.}$ (radial) = 120 N		
Shaft dimensions	11j6 x 30 mm		
Mech. permissible speed	≤ 7000 rpm		
Weight	approx. 2 kg		

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	

4 Overview additional options

4.1 Option S (overspeed switch)

The incremental encoder FG 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

	FG	2	AK	1024	G	90G	NG	S
Incremental encoder								
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								

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 Goods inward inspection

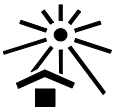
Check the delivery immediately upon receipt for transit damage or short delivery.
Inform the carrier immediately on receipt if you determine that damage has occurred during transit (take photos as proof).

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

Personnel

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

WARNING!

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

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 fulfil 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

FG 2 incremental 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: 10 mm, 22 mm
- Allen keys: 2 mm, 3 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 the encoder

NOTES!
For a mounting example please refer to dimension drawing HM 11 M 104353 Chapter 12

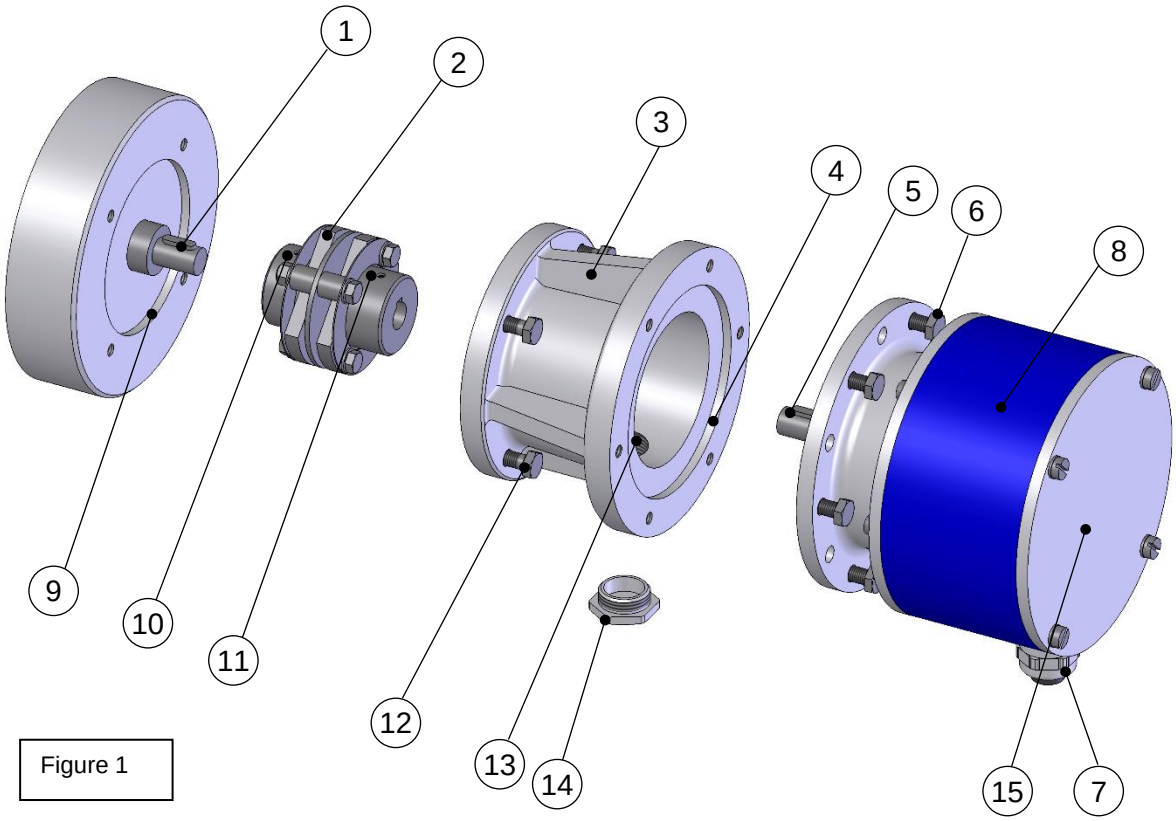


Figure 1

1. Lightly grease the (Motor) Schaft (1) an Centerin (9).
2. Fit coupling (2) onto (motor) shaft.

NOTES!
You must be able to mount the coupling without force. Ream out the bores of used couplings, if necessary!

3. Secure the coupling hub on the (motor) shaft with a grub screw or cheese head screw (10) (depending on the coupling type).
4. Fasten the intermediate flange (3) to the motor using the fastening screws (12).

NOTES!
If possible, fit the intermediate flange in a manner that ensures the screwed sealing plug (14) points downwards!

5. Lightly grease the encoder shaft (5) and centering (4).
6. Fit the encoder (8) into both the centering (4) and coupling hub at the same time.

NOTES!
You must be able to mount the coupling without force. Ream out the bores of used couplings, if necessary!

NOTES!
If possible, fit the device in a manner that ensures the cable gland (7) points downwards.

7. Secure the encoder with 6 screws (6).
8. Remove the sealing plug (14) from the access bore (13) to the coupling.
9. Secure the coupling hub on the encoder shaft with a grub screw or cheese head screw (11) (depending on the coupling type).

NOTES!
To carry out this task, it may be necessary to turn the (motor) shaft to the correct position.

10. Replace the sealing plug (14) to seal the access bore to the coupling.

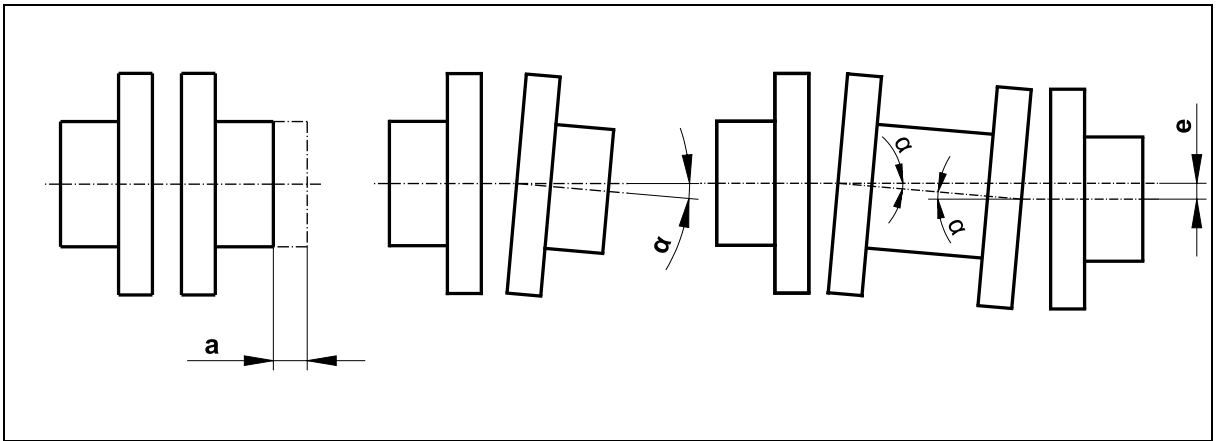
6.6 Mounting tolerances

NOTES!
Angle misalignment and parallel displacement between the (motor) shaft and the encoder shaft are mounting errors and should be kept as small as possible.

Mounting errors

- Cause radial forces to act on the encoder shaft.
- Reduce the service life of the bearings and the coupling.
- Degrade the quality of the signals (harmonic content).

Mounting tolerances for our zero-backlash, torsion-resistant couplings HK 5 and HKD 5:



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

6.7 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!

6.7.1 Preparing cables

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

6.7.2 Electrical connection

1. Open the terminal box cover (15, Fig.1).

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

2. Remove the cap of the cable glands (17, Fig.1).
3. Feed the cable into the terminal box trough the cable glands.

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 cables are 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 instructions

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.

8 Faults

8.1 Faults table

Faults	Possible cause	Remedy
Switch does not close (only by option S)	No supply voltage Control: LED in the terminal box does not shine	Check connection cable and supply voltage
	Error LED does not shine: Rotation speed above the switching speed	Adjust the suitable rotation speed
	Error LED is shining: 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 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.

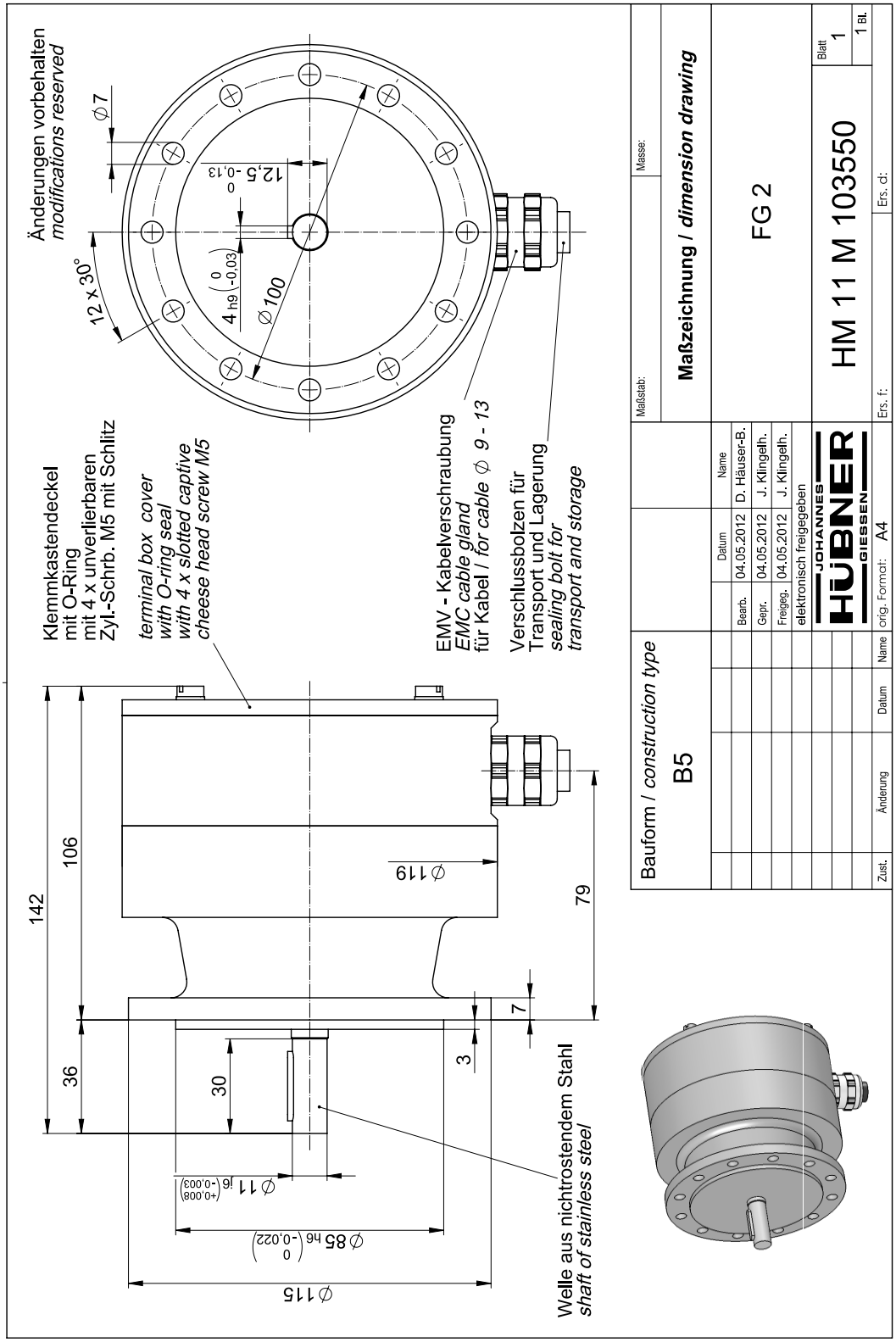
For information on environmentally sound disposal please contact your local authority or a specialist disposal company.

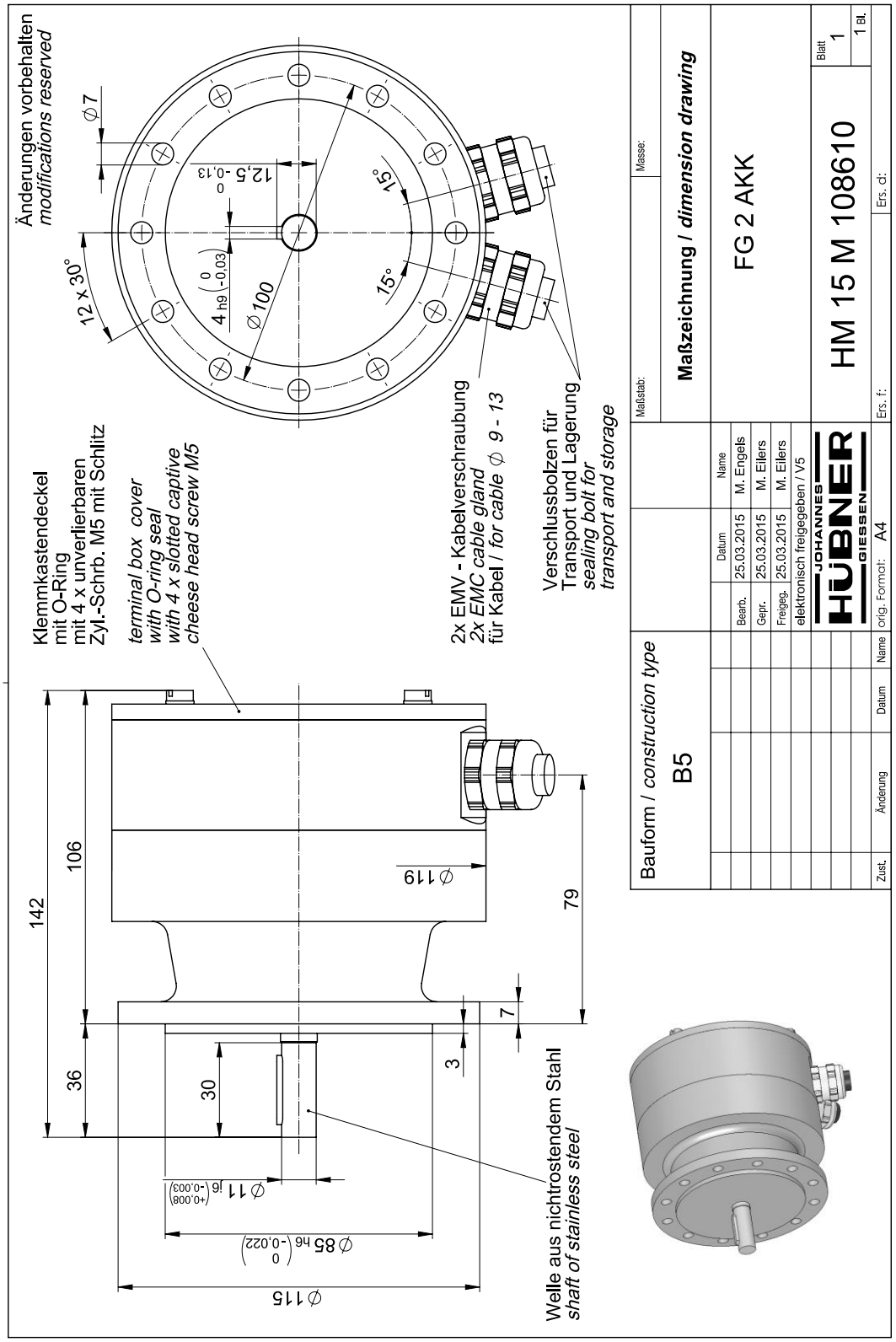
11 Replacement parts

The replacement parts listed below can be obtained via the service address on page 2.

Replacement parts	Comment
EMC cable gland	M 20 x 1.5, cable Ø 9…13 mm
Terminal box cover	Including O-Ring and screws
Screw plug	For closing the access to the coupling
10-pole angle connector, complete	

12 Dimension drawings




Änderungen vorbehalten
modifications reserved
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
2x EMV - Kabelverschraubung
2x EMC cable gland
für Kabel / for cable ∅ 9 - 13
Verschlussbolzen für
Transport und Lagerung
sealing bolt for
transport and storage
Welle aus nichtrostendem Stahl
shaft of stainless steel
12 x 30°
15°
15°
∅ 7
∅ 100
142
106
36
30
3
7
79
∅ 119
∅ 115
Bauform / construction type
B5
Maßzeichnung / dimension drawing
FG 2 AKK
HM 15 M 108610
Bearb. 25.03.2015 M. Engels
Gepr. 25.03.2015 M. Eilers
Freigeg. 25.03.2015 M. Eilers
elektronisch freigegeben / V5
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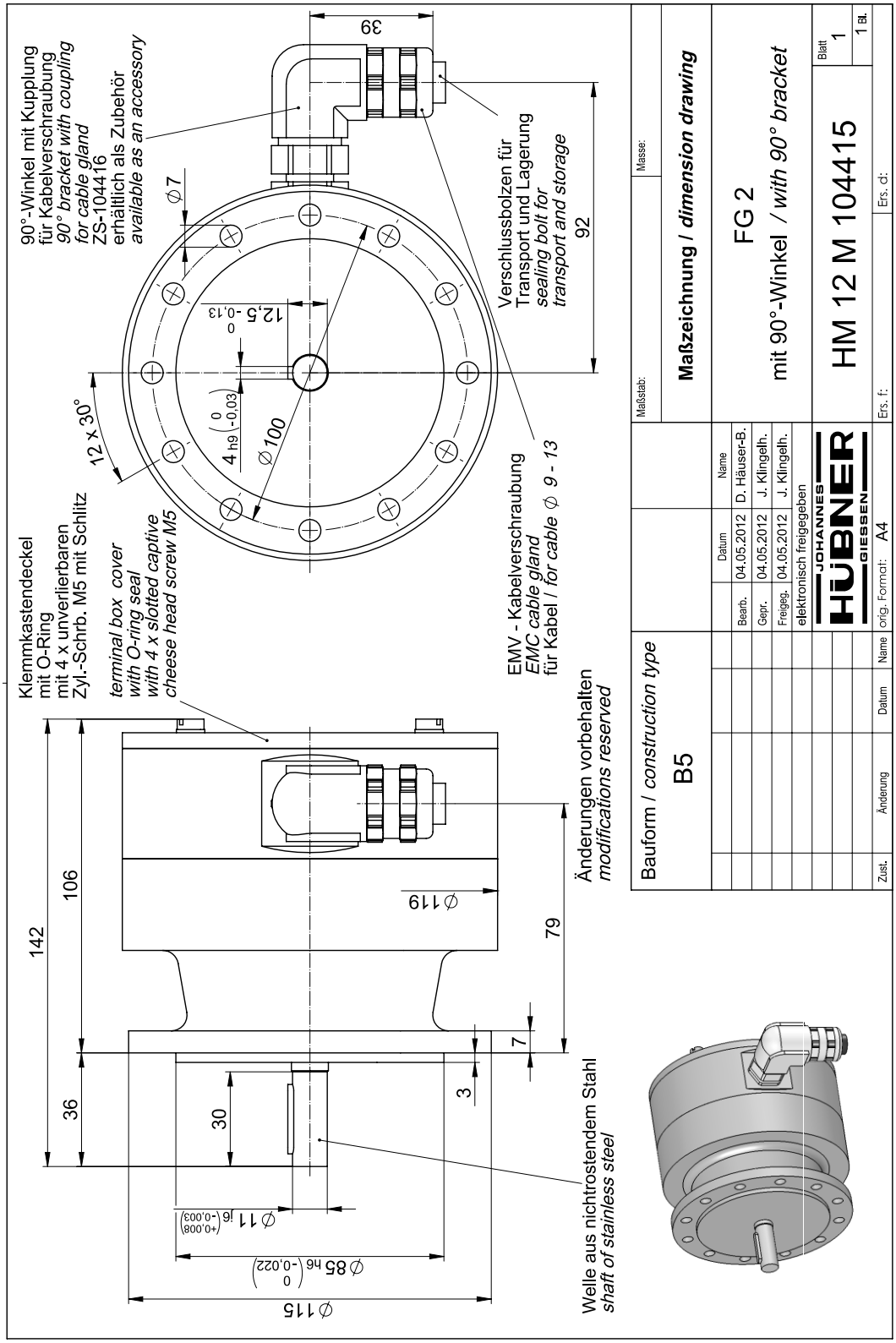
1 Bl.
orig. Format: A4
Ers. f:
Ers. d:


90°-Winkel mit Kupplung
für Kabelverschraubung
90° bracket with coupling
for cable gland
ZS-104416
erhältlich als Zubehör
available as an accessory
39
Verschlussbolzen für
Transport und Lagerung
sealing bolt for
transport and storage
92
12 x 30°
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
EMV - Kabelverschraubung
EMC cable gland
für Kabel / for cable ∅ 9 - 13
Änderungen vorbehalten
modifications reserved
142
106
36
30
3
7
79
∅119
∅115
Welle aus nichtrostendem Stahl
shaft of stainless steel
Maßstab:
Masse:
Maßzeichnung / dimension drawing
FG 2
mit 90°-Winkel / with 90° bracket
HM 12 M 104415
Blatt 1
1 Bl.
Bauform / construction type
B5
Beartb. 04.05.2012 D. Häuser-B.
Gepr. 04.05.2012 J. Klingelh.
Freigeg. 04.05.2012 J. Klingelh.
elektronisch freigegeben
Zust. Änderung Datum Name
orig. Format: A4
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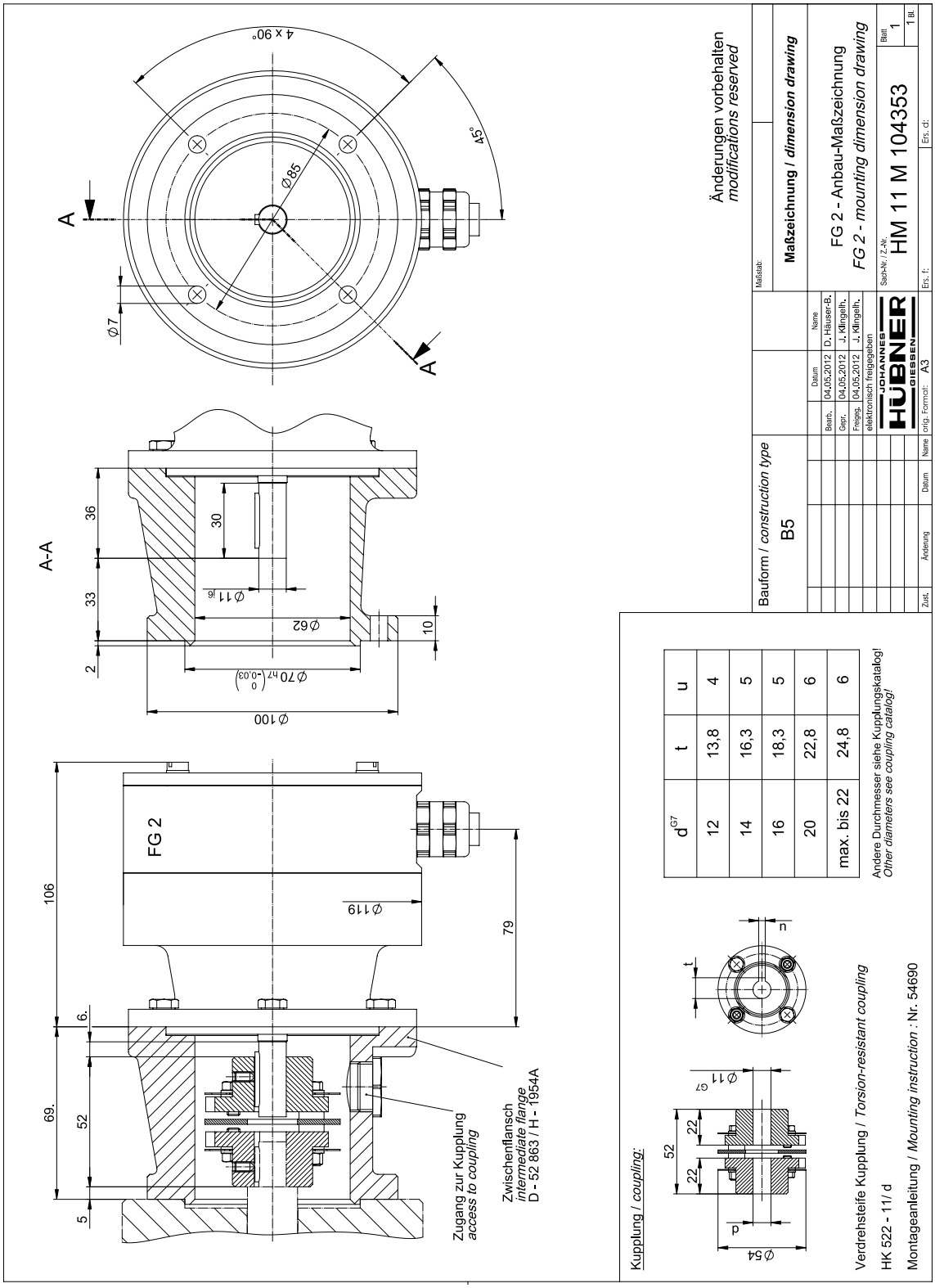
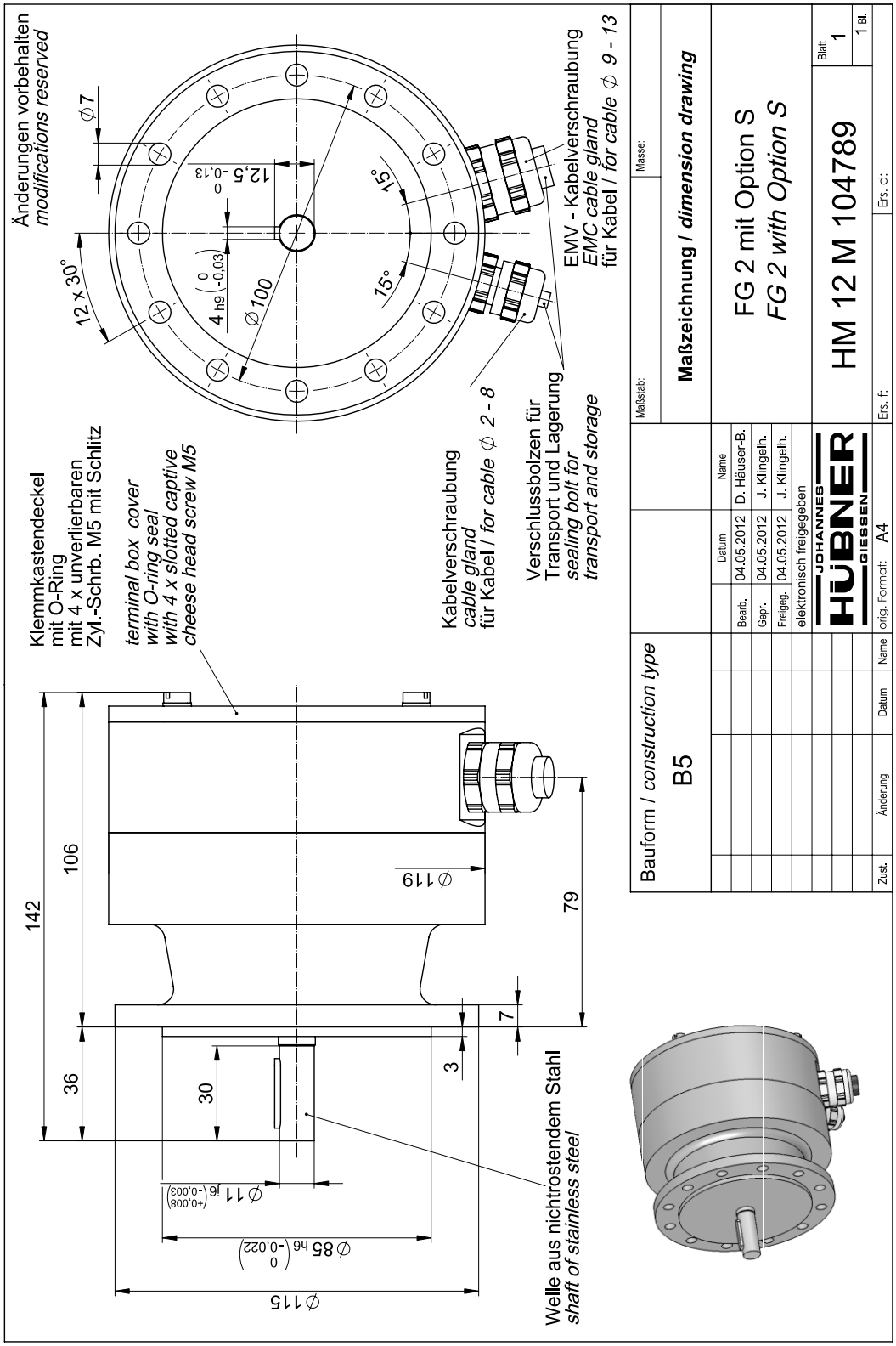
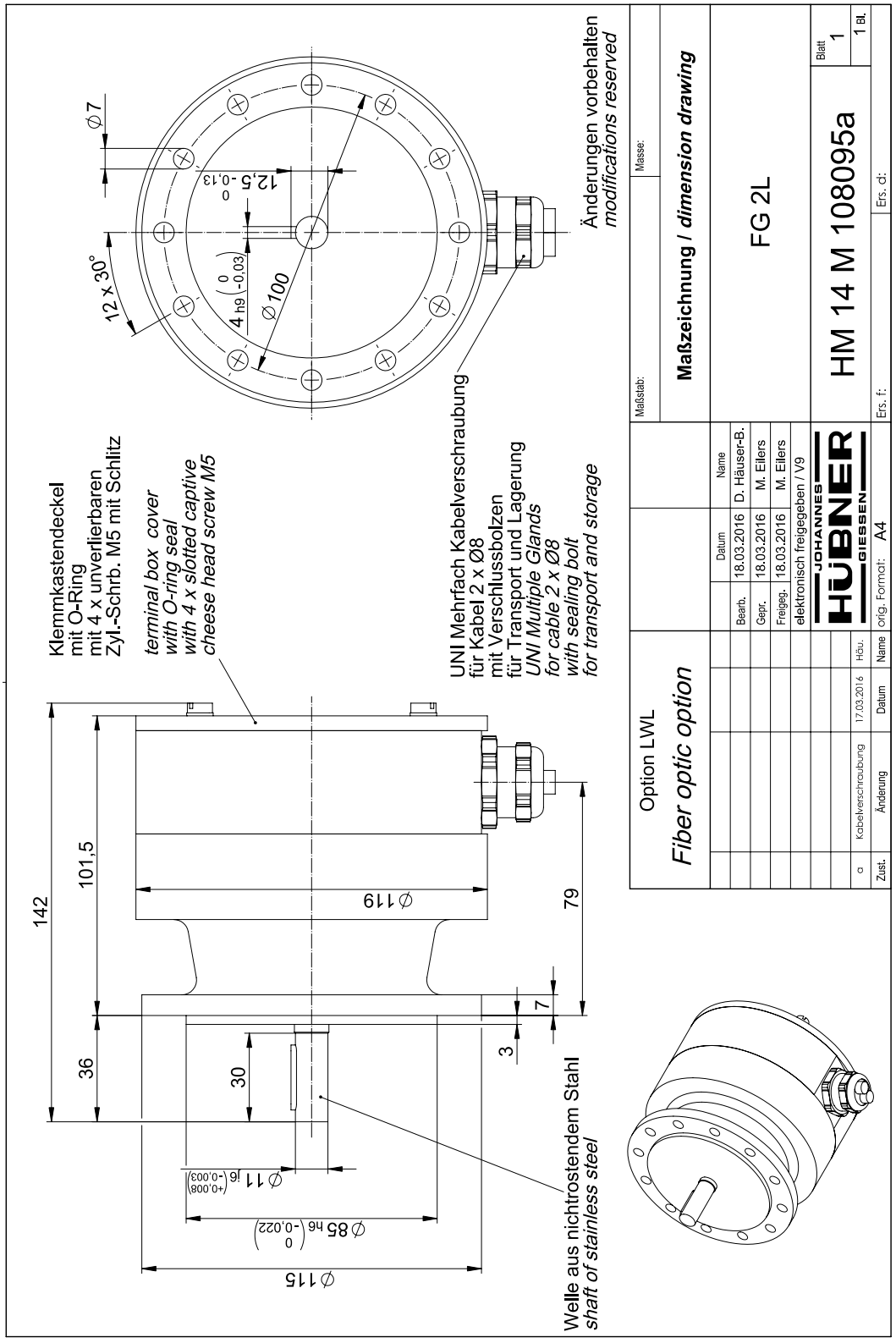
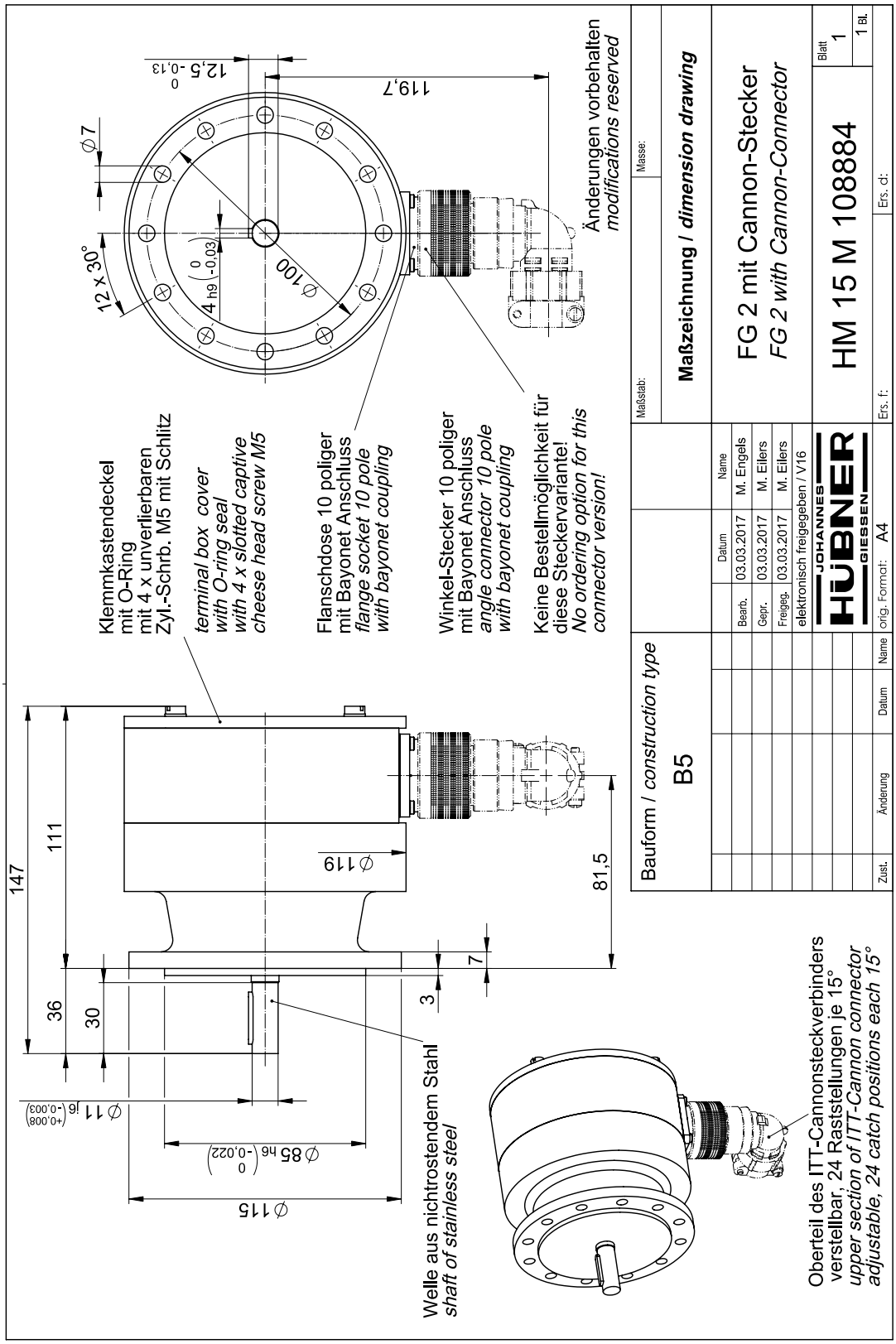
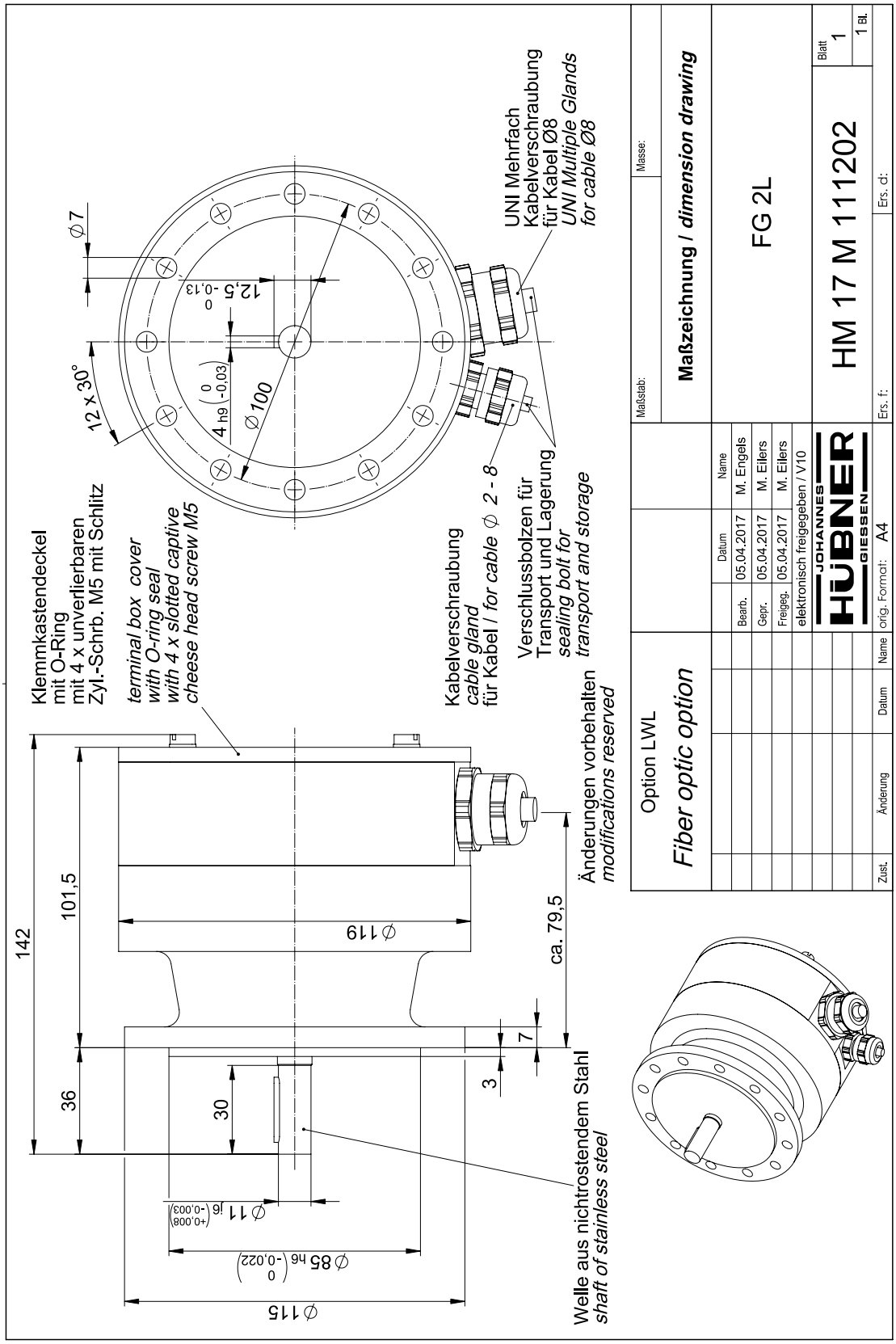
Ers. d:

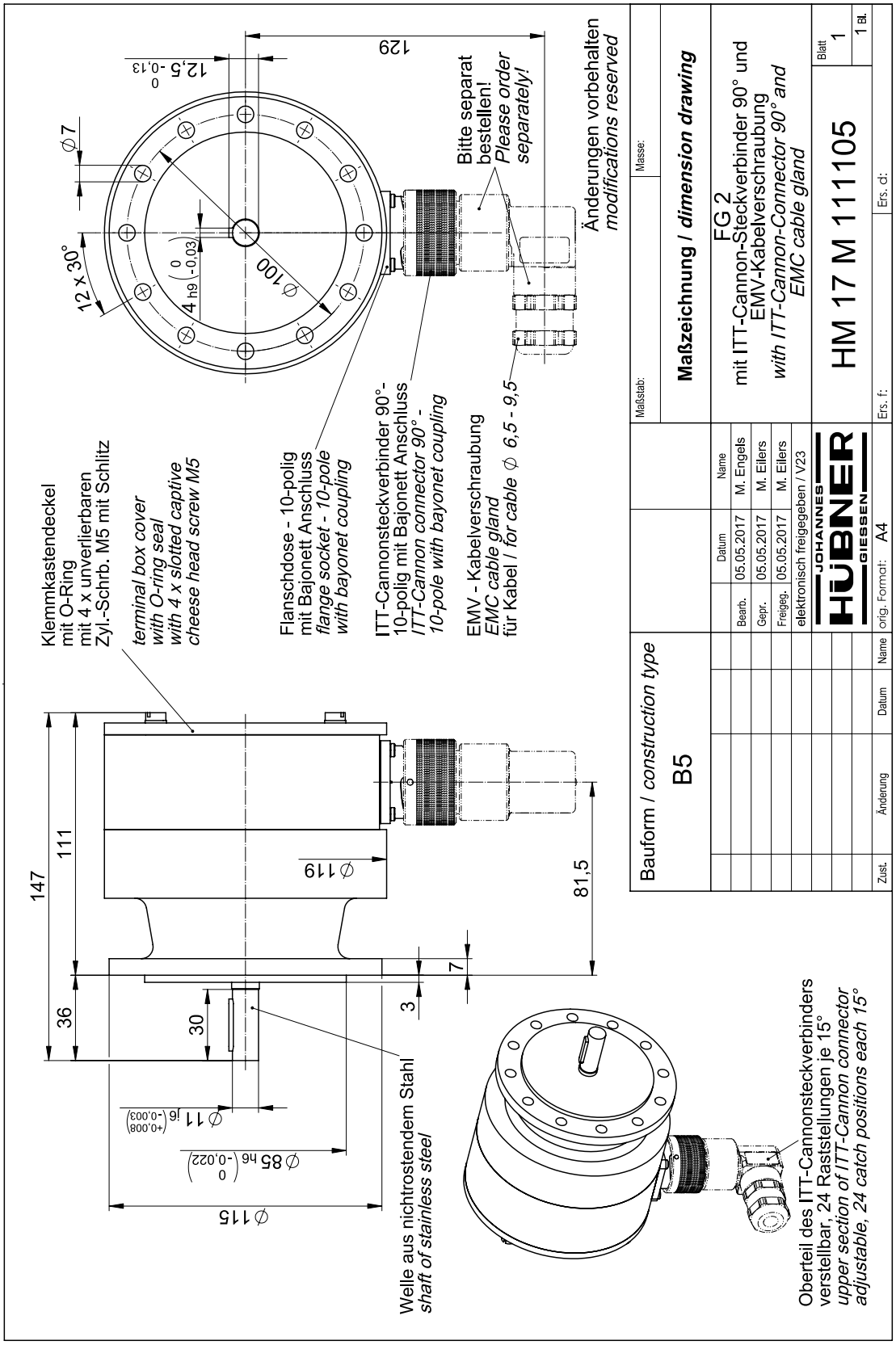

4 x 90°
45°
Ø85
Ø7
A
A
A-A
36
30
33
2
Ø11 f6
Ø62
10
Ø70 h7 (0 -0,03)
Ø100
FG 2
106
6.
69.
52
5
Ø119
79
Zugang zur Kupplung
access to coupling
Zwischenflansch
intermediate flange
D - 52 863 / H - 1954A
Änderungen vorbehalten
modifications reserved
Maßstab:
Maßzeichnung / dimension drawing
Bauform / construction type
B5
Name
Datum
Bearb. D. Häuser-B. 04.05.2012
Gepr. J. Klingeln. 04.05.2012
Freigeg. J. Klingeln. 04.05.2012
elektronisch freigegeben
orig. Format: A3
Sach-Nr. / Z.-Nr.
HM 11 M 104353
Blatt 1
1 Bl.
Ers. f.:
Ers. d.:
Zust. Änderung Datum Name
FG 2 - Anbau-Maßzeichnung
FG 2 - mounting dimension drawing
Kupplung / coupling:
d G7 | t | u
12 | 13,8 | 4
14 | 16,3 | 5
16 | 18,3 | 5
20 | 22,8 | 6
max. bis 22 | 24,8 | 6
Andere Durchmesser siehe Kupplungskatalog!
Other diameters see coupling catalog!
Ø11 G7
52
22
22
d
Ø54
Verdrehsteife Kupplung / Torsion-resistant coupling
HK 522 - 11/ d
Montageanleitung / Mounting instruction : Nr. 54690


Änderungen vorbehalten
modifications reserved
EMV - Kabelverschraubung
EMC cable gland
für Kabel / for cable ∅ 9 - 13
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
Kabelverschraubung
cable gland
für Kabel / for cable ∅ 2 - 8
Verschlussbolzen für
Transport und Lagerung
sealing bolt for
transport and storage
Welle aus nichtrostendem Stahl
shaft of stainless steel
Bauform / construction type
B5
Maßzeichnung / dimension drawing
FG 2 mit Option S
FG 2 with Option S
HM 12 M 104789
Maßstab:
Masse:
Blatt 1
1 Bl.
Ers. f:
Ers. d:
Bearb. 04.05.2012 D. Häuser-B.
Gepr. 04.05.2012 J. Klingelh.
Freigeg. 04.05.2012 J. Klingelh.
elektronisch freigegeben
orig. Format: A4
Zust. Änderung Datum Name


Änderungen vorbehalten
modifications reserved
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
UNI Mehrfach Kabelverschraubung
für Kabel 2 x Ø8
mit Verschlussbolzen
für Transport und Lagerung
UNI Multiple Glands
for cable 2 x Ø8
with sealing bolt
for transport and storage
Welle aus nichtrostendem Stahl
shaft of stainless steel
Option LWL
Fiber optic option
Maßstab:
Masse:
Maßzeichnung / dimension drawing
FG 2L
HM 14 M 108095a
Blatt 1
1 Bl.
Ers. f:
Ers. d:
orig. Format: A4
Name
Datum
Bearb. 18.03.2016 D. Häuser-B.
Gepr. 18.03.2016 M. Eilers
Freigeg. 18.03.2016 M. Eilers
elektronisch freigegeben / V9
a Kabelverschraubung 17.03.2016 Häu.
Zust. Änderung Datum Name


Änderungen vorbehalten
modifications reserved
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
Flanschdose 10 poliger
mit Bayonet Anschluss
flange socket 10 pole
with bayonet coupling
Winkel-Stecker 10 poliger
mit Bayonet Anschluss
angle connector 10 pole
with bayonet coupling
Keine Bestellmöglichkeit für
diese Steckervariante!
No ordering option for this
connector version!
Welle aus nichtrostendem Stahl
shaft of stainless steel
Oberteil des ITT-Cannonsteckverbinders
verstellbar, 24 Raststellungen je 15°
upper section of ITT-Cannon connector
adjustable, 24 catch positions each 15°
Maßstab:
Masse:
Maßzeichnung / dimension drawing
FG 2 mit Cannon-Stecker
FG 2 with Cannon-Connector
HM 15 M 108884
Blatt 1
1 Bl.
Bauform / construction type
B5
Bearb. 03.03.2017 M. Engels
Gepr. 03.03.2017 M. Eilers
Freigeg. 03.03.2017 M. Eilers
elektronisch freigegeben / V16
JOHANNES HÜBNER GIESSEN
orig. Format: A4
Ers. f:
Ers. d:
Zust. Änderung Datum Name


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
UNI Mehrfach
Kabelverschraubung
für Kabel Ø8
UNI Multiple Glands
for cable Ø8
Kabelverschraubung
cable gland
für Kabel / for cable ϕ 2 - 8
Verschlussbolzen für
Transport und Lagerung
sealing bolt for
transport and storage
Änderungen vorbehalten
modifications reserved
Welle aus nichtrostendem Stahl
shaft of stainless steel
Option LWL
Fiber optic option
Maßzeichnung / dimension drawing
FG 2L
HM 17 M 111202
Maßstab:
Masse:
Blatt 1
1 Bl.
Ers. f:
Ers. d:
orig. Format: A4
Name
Datum
M. Engels
M. Eilers
M. Eilers
05.04.2017
elektronisch freigegeben / V10
Zust.
Änderung


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
Flanschdose - 10-polig
mit Bajonett Anschluss
flange socket - 10-pole
with bayonet coupling
ITT-Cannonsteckverbinder 90°-
10-polig mit Bajonett Anschluss
ITT-Cannon connector 90° -
10-pole with bayonet coupling
EMV - Kabelverschraubung
EMC cable gland
für Kabel / for cable ∅ 6,5 - 9,5
Bitte separat
bestellen!
Please order
separately!
Änderungen vorbehalten
modifications reserved
12 x 30°
∅7
∅100
4 h9
129
12,5 -0,13
147
111
36
30
3
7
81,5
∅119
∅115
∅85 h6
∅11 j6
Welle aus nichtrostendem Stahl
shaft of stainless steel
Oberteil des ITT-Cannonsteckverbinders
verstellbar, 24 Raststellungen je 15°
upper section of ITT-Cannon connector
adjustable, 24 catch positions each 15°
Bauform / construction type
B5
Maßstab:
Masse:
Maßzeichnung / dimension drawing
FG 2
mit ITT-Cannon-Steckverbinder 90° und
EMV-Kabelverschraubung
with ITT-Cannon-Connector 90° and
EMC cable gland
HM 17 M 111105
Blatt 1
1 Bl.
Bearb. 05.05.2017 M. Engels
Gepr. 05.05.2017 M. Eilers
Freigeg. 05.05.2017 M. Eilers
elektronisch freigegeben / V23
orig. Format: A4
Ers. f:
Ers. d:
Zust. Änderung Datum Name

13 Connection diagrams

13.1 Terminal box

NOTES!
The connection diagrams are displayed in each terminal box cover!

PN166-400d

Connection diagram

1	0V		GND
2	+U		Power supply
3	0°	⎍⎍⎍	Incr. output 0°
4	$\overline{0°}$	⎍⎍⎍	Incr. output 0° inverse
5	90°	⎍⎍⎍	Incr. output 90°
6	$\overline{90°}$	⎍⎍⎍	Incr. output 90° inverse
7	N	⎍⎍⎍	Reference pulse
8	$\overline{N}$	⎍⎍⎍	Reference pulse inverse
12			Overspeed switch (Optional)
13			

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

Connection technology AK

PN166-420b

Connection diagram

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

Connection technology AL

PN166-430c

Connection diagram

1	11	0V		GND
2	12	+U		Power supply
3	13	0°	⎍⎍⎍	Incr. output 0°
4	14	$\overline{0°}$	⎍⎍⎍	Incr. output 0° inverse
5	15	90°	⎍⎍⎍	Incr. output 90°
6	16	$\overline{90°}$	⎍⎍⎍	Incr. output 90° inverse
7	17	N	⎍⎍⎍	Reference pulse
8	18	$\overline{N}$	⎍⎍⎍	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!

PN166-450

Connection diagram

WH	0,5		0V	GND
BN	0,5		+U	Power supply
BN	0,25		0°	Incr. output 0°
GN	0,25		$\overline{0°}$	Incr. output 0° inverse
GY	0,25		90°	Incr. output 90°
PK	0,25		$\overline{90°}$	Incr. output 90° inverse
RD	0,25		N	Reference pulse
BK	0,25		$\overline{N}$	Reference pulse inverse
BU	0,25		-	-
VT	0,25		-	-

Connection cable:
LAPPGROUP ÖLFLEX® SERVO FD 798 CP
4x2x0.25+2x0.5 twin-stranded, shielded

Connection cable

PN166-460

Connection diagram

WH	0,5		Overspeed switch
BN	0,5		

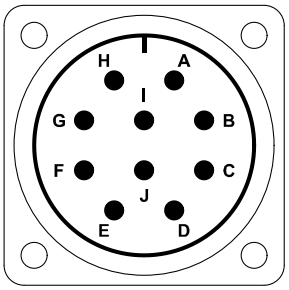
Connection cable:
IGUS chainflex® CF9.UL.05.02 control cable TPR
2x0,5

Connection cable (option S)

13.3 Flange connector ITT-Cannon

PN166-470

Connection diagram



Flange connector ITT Cannon

J	0V	GND
C	+U	Power supply
A	0°	
E	$\overline{0°}$	
B	90°	
F	$\overline{90°}$	
D	N	
G	$\overline{N}$	
H	-	Not connected
I	-	Not connected

10-pole-flange connector ITT Cannon