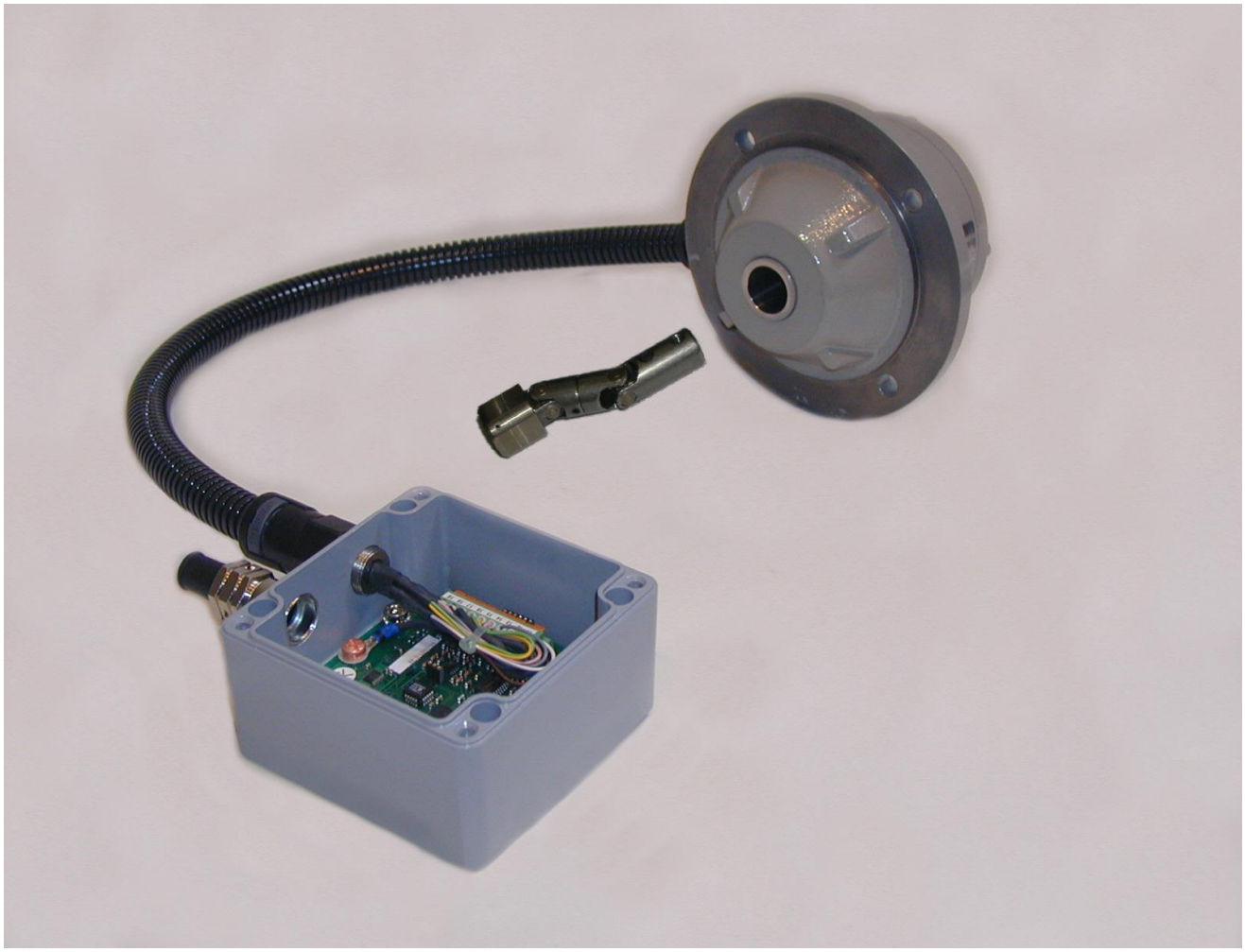
English

JOHANNES HÜBNER GIESSEN

ideas and solutions



Operating and Assembly Instructions

Inductive encoder IG C

with Resolver-Digital-Converter in a aluminum housing
type RDC

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

Trademark
Brand names and product names are trademarks or registered trademarks of their respective owner. Protected trademarks bearing a ™ or ® symbol are not always depicted as such in the manual. However, the statutory rights of the respective owners remain unaffected.

Manufacturer / publisher
Johannes Hübner
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
Headquarters:	Giessen
Court of registration:	Giessen
Commercial register number:	HRB 126

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

Scope of delivery includes the inductive encoder IG C, self locking nut M6 and the 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 reached per 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 devices area of implementation.

2.2 Intended use

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

Series inductive encoder IG C are used for speed monitoring, for instance of electrical and mechanical drives, hoisting gear, and conveying machines.

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

- 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 Personnel

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

2.5 Personal protective equipment

Wear personal protective equipment such as safety shoes and safety clothing to minimise risks to health and safety when carrying out work such as installation, disassembly or commissioning. Adhere to all applicable statutory regulations as well as the rules and standards determined by the owner.

2.6 Special dangers

Residual risks that have been determined based on a risk analysis 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

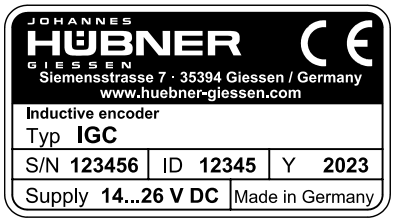
DANGER!

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

Type plate example:



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

- Manufacturer, address
- CE-marking
- Type, date of manufacturing (Y)
- Serial number (S/N)
- Order number (ID)
- Supply voltage:

3.2 Electrical and mechanical data

Data inductive encoder	
Construction type	B 10 with own bearings complete with precision cardan joint shaft
Degree of protection	IP 56 (IP 66) with radial shaft sealing
Electrical connections	Directly fixed cable with solid PMA- protection tube

Data Resolver-Digital-Converter	
Supply voltage	14…26 VDC
Pulse rate	1024 symmetrical square wave pulses
Signal amplitude	approx. as supply voltage
No load-current	approx. 70 mA
Pulse hight	HTL, approx. as supply voltage
Frequency range	0 up to 100 kHz
Options	Option (90): 90 dgr. phase displacement to basic pulse Option (N): marker pulse, mechanically fixed Option (G):inverted signals Option (B): direction of rotation signal
Degree of protection	IP 56 (IP 66)

Temperature range	-25°C… +85°C

NOTES!
Fastening screws and seal for mounting the inductive encoder on the motor side are not included in the scope of delivery.

4 Transport, packaging and storage

4.1 Safety information concerning 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 Goods inward inspection

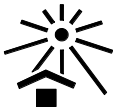
Check the delivery immediately upon receipt for transit damage or short delivery.
Inform the carrier immediately on receipt if you determine that damage has occurred during transit (take photos as proof).

4.3 Packaging (disposal)

The packaging is not taken back; dispose of according to the respective valid statutory provisions and local regulations.

4.4 Storing 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!

5 Mounting and commissioning

NOTES!
Mounting according mounting instructions in Chapter 5.5.

5.1 Safety instructions

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

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

5.2 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).

Deep groove ball bearings
The inductive encoder IG C is 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.

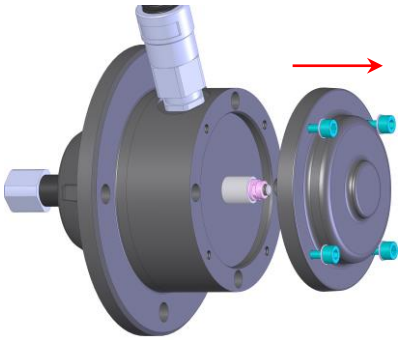
5.3 Required tools

- Spanners: 10 mm
- Allen keys: 5 mm
- Torque wrench
- Plug in insert with extension 10 mm
- Reversing ratched
- Assembly grease
- Loctite® 243 (medium strength threadlocker)

5.4 Mounting preparations

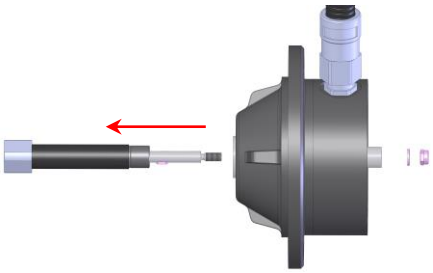
1. Ensure all accessories are available (please refer to Chapter 1.2 scope of delivery).
2. Preparing the place of attachment: Clean the (motor) shaft, centering, bolting surfaces and fastening threads; check for damage. Repair any damage!

5.5 Mounting the inductive encoder



Step 1:

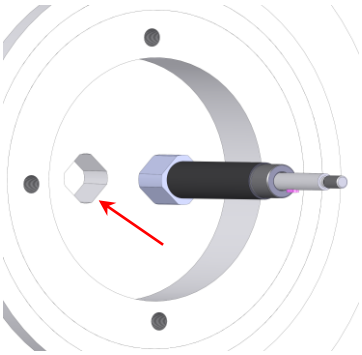
Remove the 4 screws M6x20 and then disassemble the cover from the inductive encoder. Keep the 4 screws M6x20 and the cover for later assembly.



Step 2:

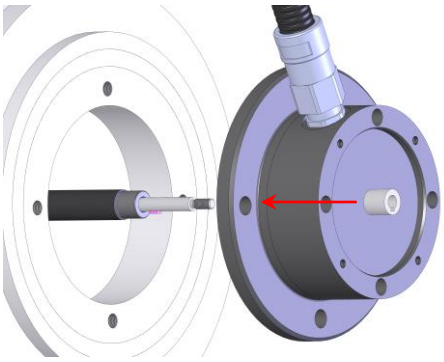
Remove the self-locking nut ISO 10511-M6 and the washer ISO 7089-6 and disassemble the precision cardan joint shaft in the direction of the arrow.

NOTE: The self-locking nut ISO 10511-M6 must not be re-used after complete tightening.



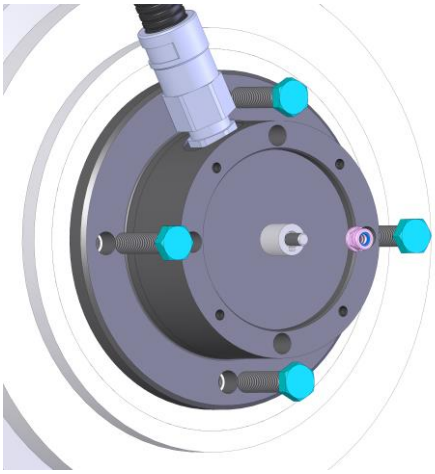
Step 3:

Mounting of the precision cardan joint shaft into the motor shaft.



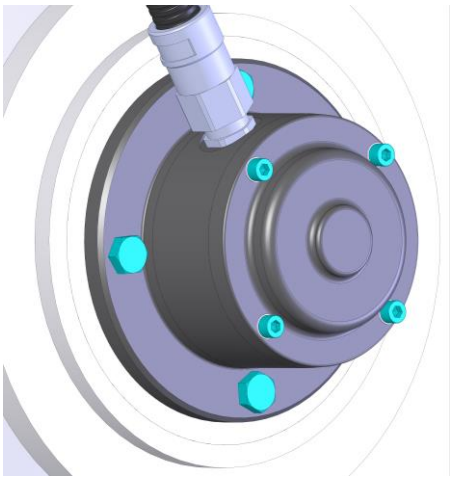
Step 4:

Slide the inductive encoder to the previously installed precision cardan joint shaft.



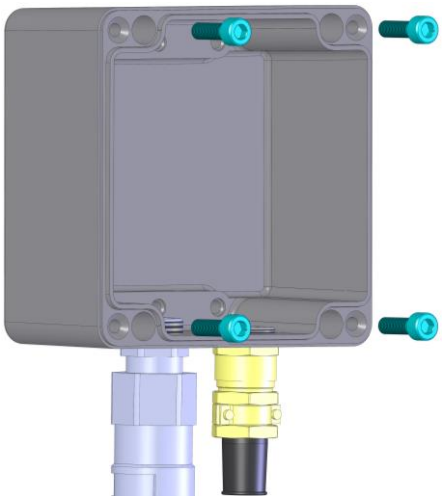
Step 5:

Attach the inductive encoder with 4 screws.
Then secure the precision cardan joint shaft with self-locking nut ISO 10511-M6 and washer ISO 7089-6.



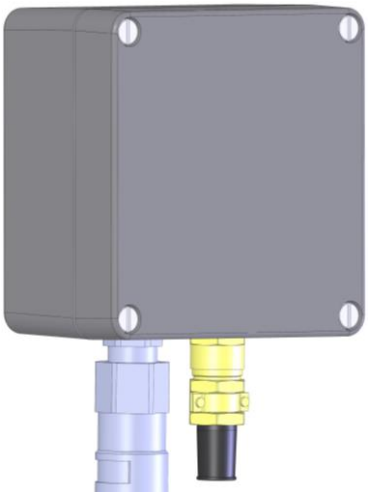
Step 6:

Fit the cover and screw it together with the 4 screws M6x20 from step 1.



Step 7:

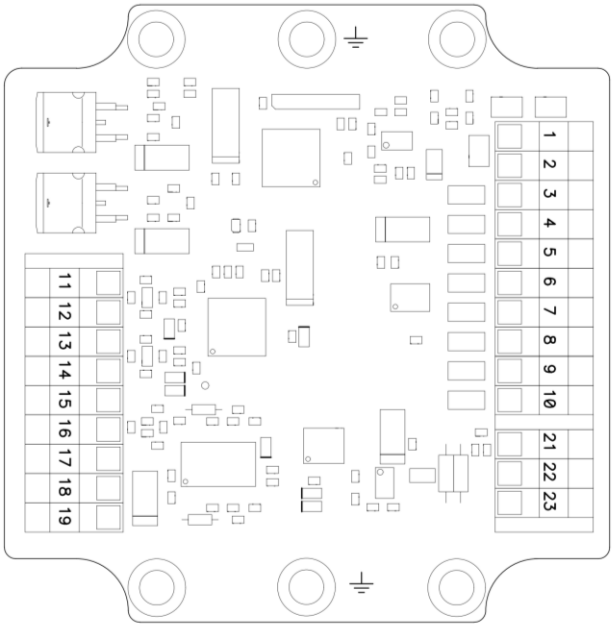
Fix the housing with built-in evaluation electronics with 4 screws at a fixed point.



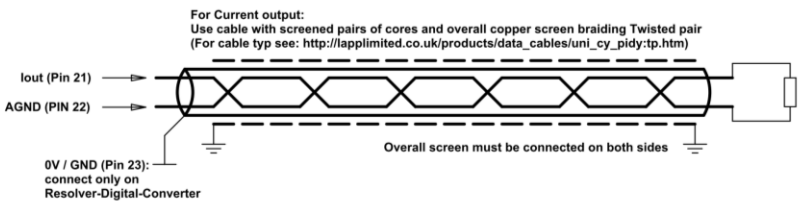
Step 8:

Close the housing with a built-in evaluation electronics with the cover.

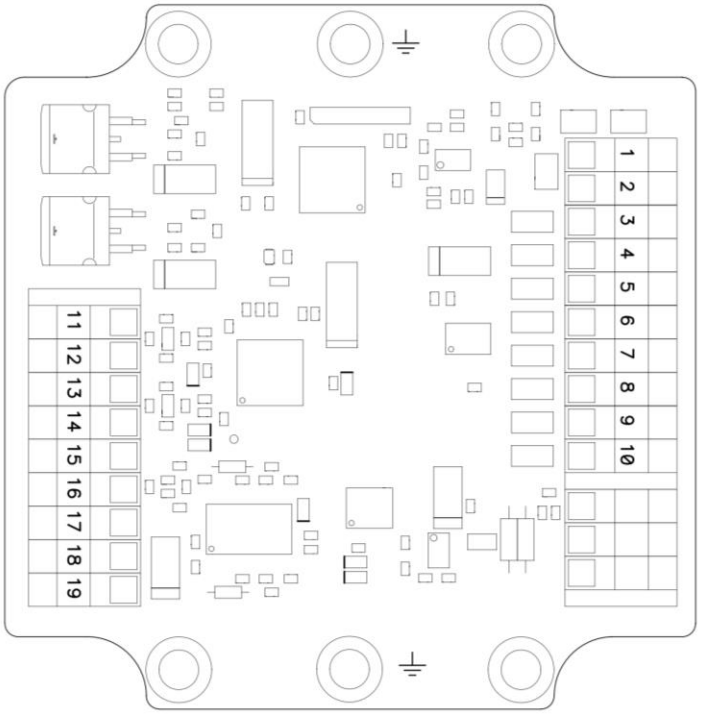
6 Connection diagrams



Anschlußplan EL 654 / connection diagram EL 654			
1	0V	GND	GND
2	+(14..26)V	Versorgungsspannung	Supply voltage
3	n	Ausgang: 0°	Output: 0°
4	nG	Ausgang: 0° invers	Output: 0° invers
5	90	Ausgang: 90°	Output: 90°
6	90G	Ausgang: 90° invers	Output: 90° invers
7	N	Nullimpuls	Marker
8	NG	Nullimpuls invers	Marker invers
9	B	Rechtslauf H-Signal	Clockwise H-Signal
10	BG	Rechtslauf L-Signal	Clockwise L-Signal
		Signalamplitude: +(14..26)V	Signallevel +(14..26)V
Resolver			
11	S1	Grau Sekundär +cos	Grey Secondary +cos
12	S3	Rosa Sekundär -cos	Pink Secondary -cos
13	S2	Gelb Sekundär +sin	Yellow Secondary +sin
14	S4	Grün Sekundär -sin	Green Secondary -sin
15	R1	Braun Primär	Brown Primary
16	R2	Weiß Primär	White Primary
17	S(R1/R2)	Schirmung von R1/R2	Screening of R1/R2
18	S(S1/S3)	Schirmung von S1/S3	Screening of S1/S3
19	S(S2/S4)	Schirmung von S2/S4	Screening of S2/S4
21	Iout	Stromausgang 0..20mA	Current output 0..20mA
22	Iin	Stromeingang	Current input
23	GND	Schirmung von Iout/Iin	Screening of Iout/Iin
⏚		Gesamtschirm Resolver Schirmung Ausgangskabel	Overall screen resolver Screening output cable



Connection diagram	Resolver-Digital-Converter	EL 654



Anschlußplan EL 660 / connection diagram EL 660			
1	0V	GND	GND
2	+(14..26)V	Versorgungsspannung	Supply voltage
3	n	Ausgang: 0°	Output: 0°
4	nG	Ausgang: 0° invers	Output: 0° invers
5	90	Ausgang: 90°	Output: 90°
6	90G	Ausgang: 90° invers	Output: 90° invers
7	N	Nullimpuls	Marker
8	NG	Nullimpuls invers	Marker invers
9	B	Rechtslauf H-Signal	Clockwise H-Signal
10	BG	Rechtslauf L-Signal	Clockwise L-Signal
		Signalamplitude: +(14..26)V	Signallevel +(14..26)V
Resolver			
11	S1	Grau Sekundär +cos	Grey Secondary +cos
12	S3	Rosa Sekundär -cos	Pink Secondary -cos
13	S2	Gelb Sekundär +sin	Yellow Secondary +sin
14	S4	Grün Sekundär -sin	Green Secondary -sin
15	R1	Braun Primär	Brown Primary
16	R2	Weiß Primär	White Primary
17	S(R1/R2)	Schirmung von R1/R2	Screening of R1/R2
18	S(S1/S3)	Schirmung von S1/S3	Screening of S1/S3
19	S(S2/S4)	Schirmung von S2/S4	Screening of S2/S4
⏚		Gesamtschirm Resolver Schirmung Ausgangskabel	Overall screen resolver Screening output cable

Drehrichtungswechsel:
Ein Drehrichtungswechsel der Ausgangssignale kann durch tauschen der Resolver-signalleitungen S1/S3 (Anschlusspins 11 u. 12) herbeigeführt werden.

Connection diagram	Resolver-Digital-Converter	EL 660

6.1 Dismantling

6.1.1 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 installing the device due to the risk of damage occurring to the bearings or coupling!

6.1.2 Dismantling the inductive encoder

To dismantling the inductive encoder follow the instructions given in Chapters 5.5 in the reverse order.

7 Faults

7.1 Fault table

Faults	Possible cause	Remedy
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)!		

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.

9 Disposal

9.1 Disposal procedure

The manufacturer is not obliged to take back the device.

The device is classed as electronic equipment; 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.

10 Dimension drawing