

Operating and Assembly Instructions

Hollow shaft absolute encoder

AMSH 40 Multiturn

ASSH 40 Singleturn

ASPAH 40 Parallel

**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 TM 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
Internet: www.huebner-giessen.com
E-Mail: info@huebner-giessen.com

The manual has been drawn up with the utmost care and attention. Nevertheless, we cannot exclude the possibility of errors in form and content. It is strictly forbidden to reproduce this publication or parts of this publication in any form or by any means without the prior written permission of Johannes Hübner Fabrik elektrischer Maschinen GmbH.

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

UL model No.

Models AMYH 40 X, ASYH 40 X, AMYH 41 X, ASYH 41 X, AMYH 60 X and ASYH 60 X followed by any letters and digits. Where „H“ designates no letter, H or HJ, „Y“ designates any one or two letters and „X“ designates K, KK, M, T, C, D, E or F.

Subject to errors and changes due to technical improvements.

Copyright © Johannes Hübner Fabrik elektrischer Maschinen GmbH

All rights reserved.

Subject to errors and changes due to technical improvements.

Copyright © Johannes Hübner Fabrik elektrischer Maschinen GmbH

All rights reserved.

Table of contents

Table of contents	3
1 General	5
1.1 Information about the Operating and Assembly Instructions.....	5
1.2 Scope of delivery	5
1.3 Explanation of symbols	5
1.4 Disclaimer	6
1.5 Copyright	6
1.6 Guarantee terms	6
1.7 Customer service	6
2 Safety	6
2.1 Responsibility of the owner	6
2.2 Intended use	6
2.3 Improper use.....	7
2.4 Personal protective equipment.....	7
2.5 Personnel.....	7
2.6 Special dangers	7
2.6.1 Electrical current	7
2.6.2 Rotating shafts / hot surfaces	7
2.6.3 Safeguarding against restart	7
3 Technical data	8
3.1 Type plate examples	8
3.2 Type key	9
3.3 Electrical data AMSH 40	10
3.4 Electrical data ASSH 40 (SSI).....	10
3.5 Electrical data ASPAH 40 (Parallel)	10
3.6 Electrical data optional incremental outputs	11
3.7 Data transmission modes using the example of an AMS 40-1312 encoder	12
4 Mechanical Data	13
5 Transport, packaging and storage	14
5.1 Safety information concerning transport	14
5.2 Goods inward inspection	14
5.3 Packaging (disposal).....	14
5.4 Storing packages (devices)	14
6 Installation and commissioning	15
6.1 Safety instructions.....	15
6.2 Technical information	15
6.3 Required tools.....	15
6.4 Mounting preparations	16
6.5 Mounting the hollow shaft absolute encoder with feather key(example AMSH 40)	16

6.6	Mounting the hollow shaft absolute encoder with locking element (example AMSH 40)	18
7	Inspections.....	20
7.1	Safety instructions.....	20
7.2	Maintenance information.....	20
7.3	Inspection schedule	20
8	Disposal.....	20
8.1	Disposal procedure	20
9	Replacement parts.....	20
10	Connecting the hollow shaft absolute encoder (electrically)	21
10.1	Connections	21
11	Connection diagrams	22
11.1	Connection diagram AMSH 40/ASSH 40 standard.....	22
11.2	Connection diagram ASPAH 40 (Parallel)	24
11.3	Connection diagram AMSH 40/ASSH 40 (SSI)	27
11.4	Connection diagram optional incremental outputs.....	28
12	Dimension drawings ASSH/ASPAH/AMSH/AMSIH 40 K.....	30

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

Hollow shaft absolute encoder AMSH 40, ASSH 40, ASPAH 40, axial tensioning screws
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 AMSH 40, ASSH 40, ASPAH 40 are used for position detection.

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.

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.

It is not permitted to use the device in nuclear plants and aircraft.

2.4 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.

2.5 Personnel

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

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.

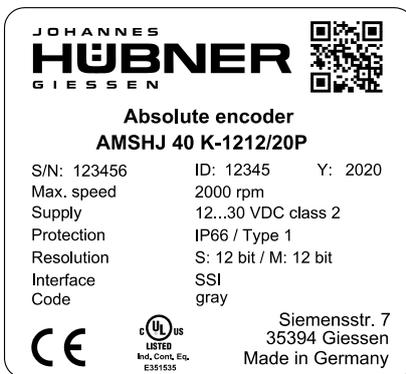
This poses a life-threatening hazard for persons in the danger zone.

Therefore:

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

3 Technical data

3.1 Type plate examples



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

Type plate information:

- Manufacturer, address
- Type, year of construction
- CE-mark
- Serial number (S/N)
- Item (ID)
- Max. speed
- Degree of protection
- Supply voltage
- Interface, Code
- Singleturn resolution
- Number of pulses (Devices with additional incremental outputs)
- Outputs (Devices with additional incremental outputs)
- Certification
- QR-Code

3.2 Type key

	AM	S	I	H	J	40	KK	1312	FG	1024G	90G	NG	/20P
Absolute encoder													
M = multiturn													
S = singleturn													
S = SSI-interface													
PA = Parallel-interface													
Incremental output (without reference pulse)													
Hollow shaft design													
With isolated bearings „HYBRID BEARINGS“													
Series													
Connection													
K = 1 terminal box													
KK = 2 terminal boxes													
R = 12 pole round plug													
S = 15 pole industrial plug													
T = 12 pole round plug M 23													
Resolution:													
Singleturn 13 Bit													
Multiturn 12 Bit													
Incremental output													
Number of pulses (pulses per revolution)													
Basic signal output													
Basic channel 0° (A)													
Pulse channel 90° (B)													
each with inverted signals													
NG: Option reference pulse with inverted signal (not with AMSI/ASSI)													
Hollow shaft diameter													
20P = Ø20 H7 with keyway													
16K = with clamping = Ø16 H7													

3.3 Electrical data AMSH 40

Supply voltage	12 V ... 30 V DC For UL and CSA Class 2 supplied
No-load power consumption	Approx. 1 W
Resolution single turn	Max. 16 Bit (65536 steps per revolution) see type plate
Resolution multi turn	12 Bit (4096 revolutions)

3.4 Electrical data ASSH 40 (SSI)

Supply voltage	12 V ... 30 V DC For UL and CSA Class 2 supplied
No-load power consumption	approx. 1 W
Resolution single turn	13 Bit (8192 steps per revolution)
Data format	SSI, binär / Gray-Code (see type plate)
SSI-Interface	
Clock input	RS 422 / 5 V
Input current	6 mA
Clock frequency	80 kHz ... 1 MHz
Clock rate / transmission	13
SSI time out	> 30 μ s (without data repetition) < 20 μ s (with data repetition)
Data output	RS 422 / 5 V
Control-I/O	
V/R, Z (input)	5 ... 30 V / 6 mA
State (output)	HTL

3.5 Electrical data ASPAH 40 (Parallel)

Supply voltage	12 V ... 30 V DC For UL and CSA Class 2 supplied
No-load power consumption	approx. 1 W
Resolution single turn	13 Bit (8192 steps per revolution)
Data format	Parallel, Gray-Code
Outputs	current limited Push – Pull – line drivers Bit 1 to Bit 13, Error Examples: 13 Bit: (internal connector 1-15) 10 Bit: (internal connector 1-12)
Signal amplitude (HTL)	approx. supply voltage
Output current	max. 50 mA
Error output	low active

3.6 Electrical data optional incremental outputs

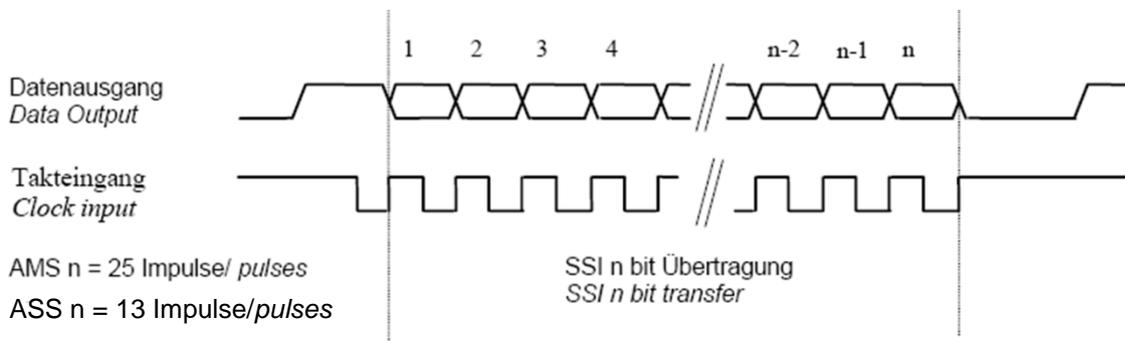
Incremental output 1 and 2	
Supply voltage	12 V ... 30 V DC For UL and CSA Class 2 supplied
No load power consumption	approx. 2 W
Number of pulses	2048, 4096, 8192 (siehe Typenschild)
Outputs	current limited push-pull line driver 0°, 90°, N, Error, each with inverted signals
Signal amplitude (HTL)	approx. supply voltage
Output current 0°, 90°	approx. 150 mA
Output current N, ERR	approx. 50 mA
Duty cycle	1:1 ± 0,1
Phase shift	90° ± 10°
Error output	low active

3.7 Data transmission modes using the example of an AMS 40-1312 encoder

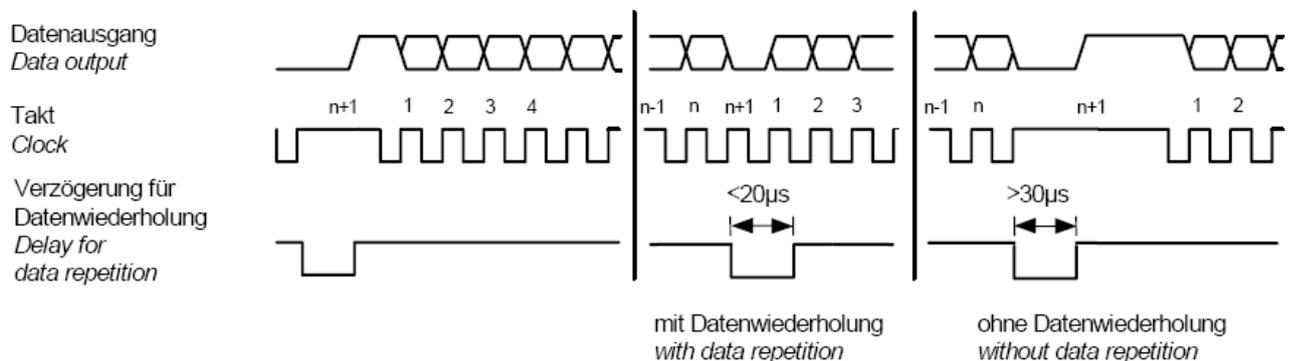
The data transmission is affected according to the SSI procedure (Serial Synchronous Interface). The encoder is supplied with 25 clock pulses (AMS) or 13 clock pulses (ASS) at the inputs "CLCK" and "CLCKG" (inverted) via an optocoupler input. Synchronously to this, 25 data bits (AMS) or 13 data bits (ASS) are output via an RS 422 interface at the "DATA" output and inverted at the "DATAG" output.

The inactive level of clock signal is normally set at HIGH. On first falling edge the encoder position will be read from the code discs. The first transmission bit will then be supplied to the encoder output with the rising edge of clock 1 enabling the receiver unit to read the transmission bit with the falling edge of clock 1. This procedure will be repeated up to clock 13 and in this manner all data bits will be transmitted.

Data transmission will end at rising edge of clock input. In normal operation the output will be set to level „HIGH“ after approx. 25 µs and readiness for next data transmission will be indicated to the receiver unit.



If a new data transfer is started within 20 µs, no data reading from the code discs will be made but data of the previous cycle will be transmitted again (data repetition).



Status-output

A signal indicating operation of the encoder will be generated on the output „Status“ as follows: While operating accurately a high level will be generated on „Status“. Low on signal „Status“ indicates non-correct operating of the SSI encoder.

Control input V/R

Position values when the shaft rotates clockwise.

Control input V/R

Position values when the shaft rotates clockwise.

Standard:

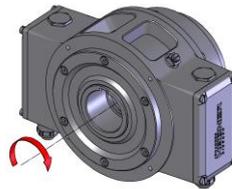
0 V to terminal V/R

or no available connection : Position increasing ↑

Reversion:

U_B to terminal V/R:

Position decreasing ↓



Control input Z

The current position data is set to the preset value when having a pulse from min. 100 ms length (+10 V ... +30 V)

4 Mechanical Data

Device temperature range				
Standard	-25°C ... + 85°C	For UL and CSA -25°C ... + 70°C		
Protection class acc. to DIN EN 60529	Sealing	Permissible speed	Rotor moment of inertia	Breakaway torque
IP66	with labyrinth seal	≤ 4000 rpm (*) ≤ 3000 rpm	approx. 1325 gcm ²	approx. 10 Ncm
IP66	with axial shaft seal	≤ 2000 rpm (*) ≤ 2000 rpm	approx. 1175 gcm ²	approx. 25 Ncm
IP66	with radial shaft seal (for special applications, e.g. wet areas in rolling mills)	≤ 2000 rpm (*) ≤ 2000 rpm	approx. 1175 gcm ²	approx. 30 Ncm
(UL and CSA Type 1)				

(*) with isolated bearings – hybrid bearings –

The permissible speed may be lower for devices with additional incremental outputs depending on the number of pulses (see nameplate).

Weight	Type K Type KK	approx. 4,2 kg approx. 5 kg
--------	-------------------	--------------------------------

5 Transport, packaging and storage

5.1 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.

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)

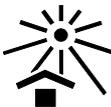
The packaging is not taken back; dispose of according to the respective valid statutory provisions and local regulations.

5.4 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!

6 Installation and commissioning

6.1 Safety instructions



NOTES!

During installation and commissioning, the safety instructions in **chapter 2** must be observed!

Personnel

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

6.2 Technical information



NOTES!

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

Ambient temperature

The max. permissible ambient temperature depends on the speed and the mounting situation.

Degree of protection

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

Deep groove ball bearings

The hollow shaft absolute encoders ASEH 60, ASPAH 60, ASSH 60 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, 13 mm, 22 mm, 24 mm
- Allen keys:
- Flat blade screwdrivers:
- Assembly grease (acid-free)
- 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 hollow shaft absolute encoder with feather key (example AMSH 40)

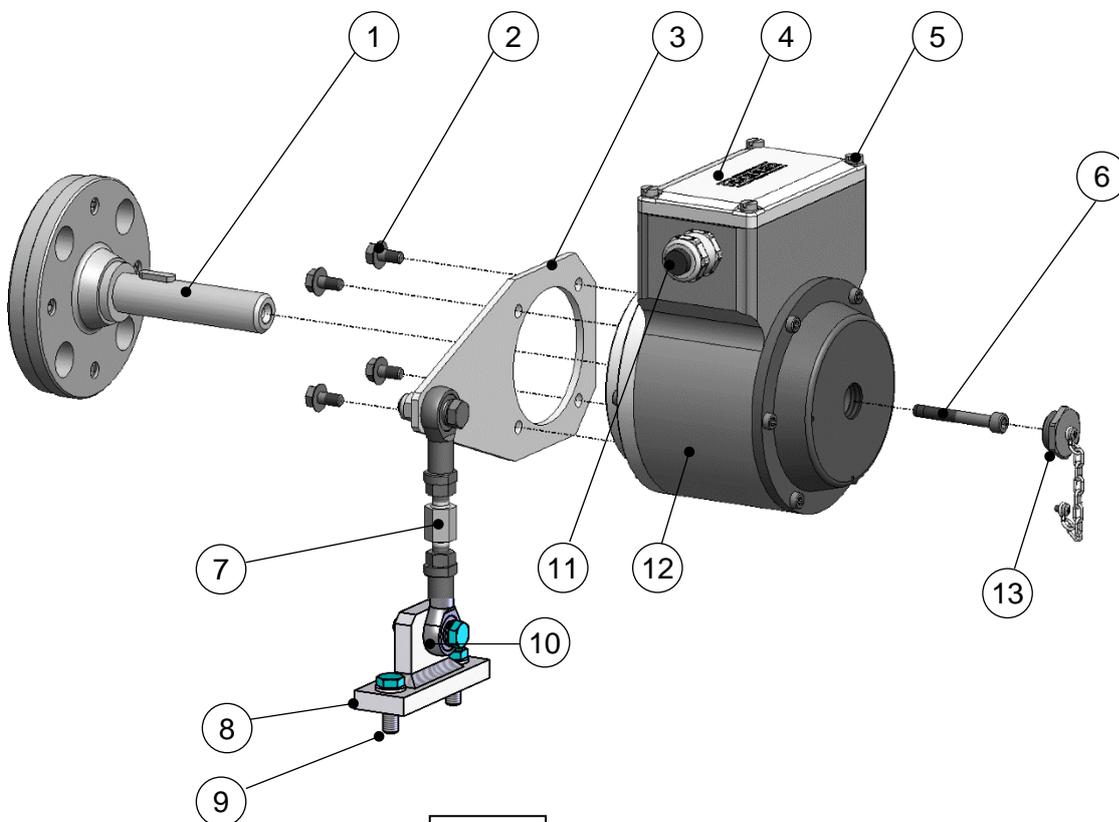


Fig. 1:



NOTES!

Follow with the assembly to the scope of supply of the adapter shaft belonging assembly instructions. It contains tips to the alignment and to the necessary cultivation exactness of the adapter shaft.

1. Lightly grease the adapter shaft (1).
2. Secure the torque bracket (3) to the hollow-shaft device (12) with 4 tensilock screws (2).



NOTES!

When fitting to the device it is possible to align the torque bracket in four different directions. If possible fit the device in a manner that ensures the cable gland points downwards!

3. Mount the hollow shaft device to the adapter shaft.
4. Secure the hollow-shaft device with the hexagon socket head cap screw (6). (Fig. 1).



NOTES!

The axial tensioning disc is supplied with several hexagon head socket cap screws of different lengths. To select the suitable hexagon head socket cap screw please refer to the dimensioning drawings in Chapter 12

The hexagon head socket cap screws are coated with a microencapsulated adhesive as locking agent.

5. Mount the captive cover screw (13).
6. Fastening the torque bracket:
Fastening without base plate:
Secure the link rod head (10) of the link rod (7) to a fixed point (for example on the motor housing).

Fastening with base plate:

Secure the base plate (8) to a fixed point with two hexagon head screws (9), (for example on the motor housing or the foundations).



HINWEIS!

Observe with the assembly of the torque bracket also the information of the brochure "Considerations for the choice of the torque arms".

Once fitted the link rod must rotate easily around the link rod heads!

Failure to observe this point may result in damage to the bearings! The link heads are maintenance free. However, ensure they remain free from soiling and paint!



NOTES!

The hollow shaft absolute encoder must be closed with the captive cover screw (13) to ensure the degree of protection.

6.6 Mounting the hollow shaft absolute encoder with locking element (example AMSH 40)

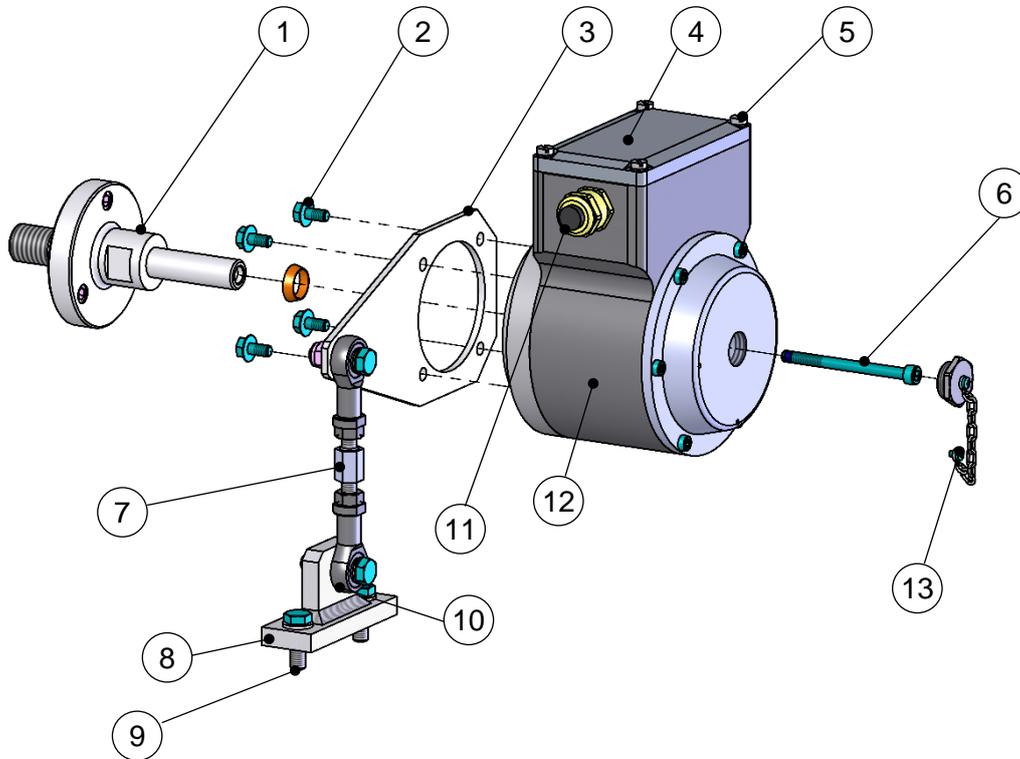


Fig. 2:

1. Grease lightly the adapter shaft (1).
2. Slide the locking element (14) onto the adapter shaft until it stops.
3. Secure the torque bracket (3) to the hollow-shaft device (12) with 4 tensilock screws (2).



NOTES!

When fitting to the device it is possible to align the torque bracket in four different directions. If possible fit the device in a manner that ensures the cable gland points downwards!

4. Mount the hollow-shaft device to the adapter shaft.
5. Secure the hollow-shaft device with the hexagon socket head cap screw (6). (Fig. 2). Maximum tightening torque 6 Nm.



NOTES!

The scope of delivery includes several hexagon head socket cap screws of different lengths. To select the suitable hexagon head socket cap screw please refer to the dimensioning drawings in Chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**

The hexagon head socket cap screws are coated with a microencapsulated adhesive as locking agent.

6. Mount the captive cover screw (13).
7. Fastening the torque bracket:

Fastening without base plate:

Secure the link rod head (10) of the link rod (7) to a fixed point (for example on the motor housing).

Fastening with base plate:

Secure the base plate (8) to a fixed point with two hexagon head screws (9), (for example on the motor housing or the foundations).



HINWEIS!

Observe with the assembly of the torque bracket also the information of the brochure "Considerations for the choice of the torque arms".

Once fitted the link rod must rotate easily around the link rod heads!

Failure to observe this point may result in damage to the bearings! The link heads are maintenance free. However, ensure they remain free from soiling and paint!



NOTES!

The hollow shaft absolute encoder must be closed with the captive cover screw (13) to ensure the degree of protection.

7 Inspections

7.1 Safety instructions



NOTES/PERSONNEL!

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!

7.2 Maintenance information

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

7.3 Inspection schedule

Interval	Inspections	Execution
Yearly	Ensure the fastening screws are properly tightened	
	Ensure cable connections and connection terminals are properly tightened	
After approx. 16 000 – 20 000 hours of operation or higher levels of continuous load	Check deep groove ball bearings for noise, running smoothly.	

8 Disposal

8.1 Disposal procedure

The manufacturer is not obligated to take back electronics waste. The device consists of hybrid components, and in part must be disposed of as special waste (electronic scrap) according to country-specific legislation.

Local municipal authorities or specialized disposal companies provide information on environmentally responsible disposal.

9 Replacement parts

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

Replacement parts	Bemerkung
Captive lock screw	To close the end cover
Axial tensioning screw	
EMC cable gland	including closing plug for transport and storage
O-ring for hollow shaft	



NOTES!

When ordering replacement parts always specify the serial number of the device!

10 Connecting the hollow shaft absolute encoder (electrically)

10.1 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 connection diagram and in the terminal box.

Use of connection cables with diameter of min. 9 mm – max. 13 mm is essential to ensure the protection class. Cable outlet should show preferably downwards.

Wiring arrangement and shielding:

(EMC measurement)

The cable shielding has to be connected on both ends!

The shield of the signal cable can be connected directly to the housing of the encoder by the cable gland.

The common guidelines for EMC concerned cable routing have to be considered!

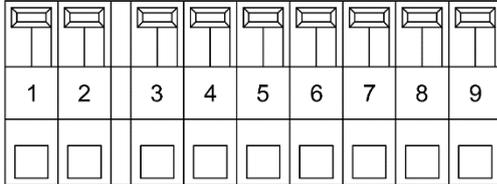


NOTES for UL and CSA!

Do only use copper cables.

11 Connection diagrams

11.1 Connection diagram AMSH 40/ASSH 40 standard



Anschlussdaten:

K1,K2
Aderquerschnitt
0,25-1,5 [mm²]
K3...K9
Aderquerschnitt
0,25-0,5 [mm²]

Connection data:

K1,K2
wire section
0.25-1.5 [mm²]
K3...K9
wire section
0.25-0.5 [mm²]

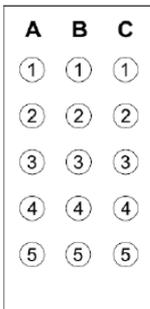
Connection diagram PN178-410	
Internal connector	Function
1	GND
2	+UB
3	CLCK
4	CLCKG
5	DATA
6	DATAG
7	STATUS
8	V/R
9	Z

AMSH / ASSH 40

standard terminal box

PN 178-410

Ansicht auf Steckdoseneinsatz
Socket insert view



Anschlussdaten:
Crimpkontakte für Drahtq. erschnitte
0,75-1,0 [mm²]
Connection data:
Crimp contacts for cross-sectional data of wire
0,75-1,0 [mm²]

Shieldung:
Der Schirm der Signalleitung muss über die Kabelverschraubung direkt mit dem Gehäuse verbunden werden.

Shielding:
The shield of the signal cable has to be connected directly to the housing of the encoder by the cable gland.

EMV-Industriestecker EMC industrial plug		Anschlussplan Connection diagram		PN178-440 PN178-440	
C5	0V		GND	GND	
A5	12...30V		Versorgungsspannung	Power Supply	
A1	-		-	-	
A2	-		-	-	
A3	-		-	-	
A4	-		-	-	
B1	V/R		Steuereingang V/R	Control input V/R	
B2	Z		Steuereingang Z	Control input Z	
B3	-		-	-	
B4	-		-	-	
B5	STATUS		Status-Ausgang (Low aktiv)	Status output (Low active)	
C1	DATA		Daten	Data	
C2	DATAG		Daten invers	Data inverse	
C3	CLCK		Takt	Clock	
C4	CLCKG		Takt invers	Clock inverse	

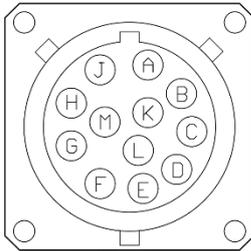
AMSH / ASSH 40

EMC industrial plug

PN 178-440

Ansicht auf Steckdoseneinsatz

Socket insert view



Crimpkontakte für Drahtquerschnitte
0,52 bis 1,5mm²

Crimp contacts for cross-sectional data
of wire from 0.52 up to 1.5mm²

Schirmung:
Der Schirm der Signalleitung ist direkt
mit dem Steckergehäuse zu verbinden.

Shield:
The shield of the signal cable is directly
to be connected with the socket housing.

Crimpzange: Burndy Nr. MR 8 GE 5
Crimping tool: Burndy No. MR 8 GE 5

Burndy-Stecker <i>Burndy plug</i>		Anschlussplan <i>Connection diagram</i>		PN178-450 <i>PN178-450</i>
A	CLCK	Takt		<i>Clock</i>
B	CLCKG	Takt invers		<i>Clock inverse</i>
C	DATA	Daten		<i>Data</i>
D	DATAG	Daten invers		<i>Data inverse</i>
E	-	-		-
F	-	-		-
G	STATUS	Status-Ausgang (low aktiv)		<i>Status output (low active)</i>
H	V/R	Steuereingang V/R		<i>Control input V/R</i>
J	Z	Steuereingang Z		<i>Control input Z</i>
K	-	-		-
L	+UB	Versorgungsspannung		<i>Power Supply</i>
M	GND	GND		<i>GND</i>

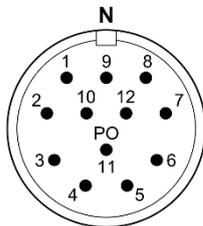
AMSH / ASSH 40

12-pole. round plug

PN 178-450

Ansicht auf Geräteanschluss

Socket insert view



Schirmung:
Der Schirm der Signalleitung ist direkt
mit dem Steckergehäuse zu verbinden.

Shield:
The shield of the signal cable is
connected at the socket housing.

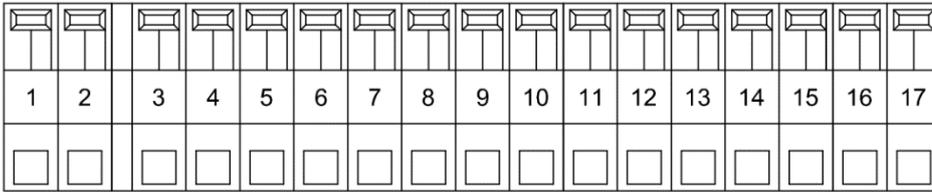
M23-Stecker <i>M23 plug</i>		Anschlussplan <i>Connection diagram</i>		PN178-460 <i>PN178-460</i>
1	GND	GND		<i>GND</i>
2	+UB	Versorgungsspannung		<i>Power Supply</i>
3	CLCK	Takt		<i>Clock</i>
4	CLCKG	Takt invers		<i>Clock inverse</i>
5	DATA	Daten		<i>Data</i>
6	DATAG	Daten invers		<i>Data inverse</i>
7	Z	Steuereingang Z		<i>Control input Z</i>
8	V/R	Steuereingang V/R		<i>Control input V/R</i>
9	STATUS	Status-Ausgang (low aktiv)		<i>Status output (low active)</i>
10	-	-		-
11	-	-		-
12	-	-		-

AMSH / ASSH 40

12-pole. round plug M23

PN 178-460

11.2 Connection diagram ASPAH 40 (Parallel)



17 pol. Print-Zugfederklemme Typ Phoenix ZFKDS
17 pole printed circuit spring terminal block type Phoenix ZFKDS

Anschlussdaten: **Connection data:**
Aderquerschnitt wire section
0,25-0,5 [mm²] 0.25-0.5 [mm²]

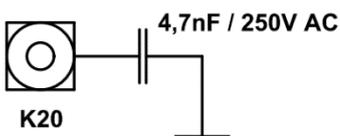
Schirmung:

Der Schirm der Signalleitung kann über die Kabelverschraubung direkt mit dem Gehäuse verbunden werden.
Alternativ kann der Kabelschirm an K20 über einen Kondensator (4,7nF / 250V AC) mit dem Gebergehäuse verbunden werden.

Shielding:

The shield of the signal cable can be connected directly to the housing of the encoder by the cable gland.
Alternatively the shield of the signal cable can be connected to K20 via a capacitor (4.7nF / 250V AC) to the housing of the encoder.

Alternativer Schirmanschluss Alternative Shielding



Connection diagram PN171-400	
Internal connector	Function
1	0 Volt
2	+E Volt
3	Bit 1 (MSB)
4	Bit 2
5	Bit 3
6	Bit 4
7	Bit 5
8	Bit 6
9	Bit 7
10	Bit 8
11	Bit 9
12	Bit 10
13	Bit 11
14	Bit 12
15	Bit 13
16	—
17	Error

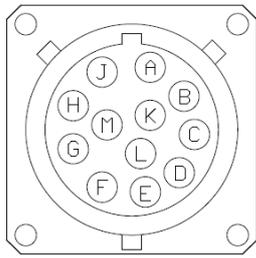
ASPAH 60

Terminal box

PN 171-400

Connection diagram PN171-401		
Function	Colour	Internal connector
0 Volt	White	1
+E Volt	Brown	2
Bit 1 (MSB)	Brown/Green	3
Bit 2	White/Green	4
Bit 3	Blue/Red	5
Bit 4	Grey/Pink	6
Bit 5	Violet	7
Bit 6	Black	8
Bit 7	Red	9
Bit 8	Blue	10
Bit 9	Pink	11
Bit 10	Grey	12
Bit 11	Grey/Brown	13
Bit 12	White/Pink	14
Bit 13	Pink/Brown	15
Case	Shield	

Ansicht auf Steckdoseneinsatz
Socket insert view



Crimpkontakte für Drahtquerschnitte
0,52 bis 1,5mm²
*Crimp contacts for cross-sectional data
of wire from 0.52 up to 1.5mm²*

Schirmung:
Der Schirm der Signalleitung ist direkt mit dem Steckergehäuse zu verbinden.

Shield:
The shield of the signal cable is directly to be connected with the socket housing.

Crimpzange: Burndy Nr. MR 8 GE 5
Crimping tool: Burndy No. MR 8 GE 5

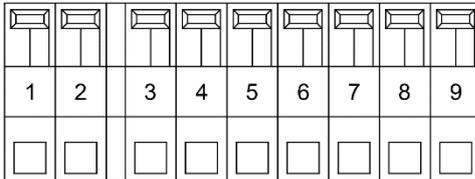
Burndy-Stecker <i>Burndy plug</i>		Anschlussplan <i>Connection diagram</i>		PN178-470 <i>PN178-470</i>
A	GND	GND		<i>GND</i>
B	+UB	Versorgungsspannung		<i>Power Supply</i>
C	Bit 1 (MSB)	Daten-Bit 1		<i>Data Bit 1</i>
D	Bit 2	Daten-Bit 2		<i>Data Bit 2</i>
E	Bit 3	Daten-Bit 3		<i>Data Bit 3</i>
F	Bit 4	Daten-Bit 4		<i>Data Bit 4</i>
G	Bit 5	Daten-Bit 5		<i>Data Bit 5</i>
H	Bit 6	Daten-Bit 6		<i>Data Bit 6</i>
J	Bit 7	Daten-Bit 7		<i>Data Bit 7</i>
K	Bit 8	Daten-Bit 8		<i>Data Bit 8</i>
L	Bit 9	Daten-Bit 9		<i>Data Bit 9</i>
M	-	-		<i>-</i>

ASPAH 40

12 pole round plug

PN 178-470

11.3 Connection diagram AMSH 40/ASSH 40 (SSI)



Anschlussdaten:

K1,K2
Aderquerschnitt
0,25-1,5 [mm²]
K3...K9
Aderquerschnitt
0,25-0,5 [mm²]

Connection data:

K1,K2
wire section
0.25-1.5 [mm²]
K3...K9
wire section
0.25-0.5 [mm²]

Connection diagram PN178-410	
Internal connector	Function
1	GND
2	+UB
3	CLCK
4	CLCKG
5	DATA
6	DATAG
7	STATUS
8	V/R
9	Z

ASSH 60

Terminal box

PN 178-410

Anschlusskabel

6x2x0,56 paarig verseilt, geschirmt
eine Seite offene Enden

Connection cable

6x2x0.56 twin-stranded, shielded
one side open ends

Typ: HE-2LVCC-CY AWG 20b

VDE 0881 zugelassen

acc. to VDE 0881

Querschnitt: 0,56 mm²

Cross-section: 0.56 mm²

Temperatur: -20°C bis +105°C

Temperature: -20°C up to +105°C

Aussendurchmesser: 10,1mm

Outside dia: 10.1mm

Schirm ist mit Gehäuse verbunden

shield is connected to casing

Connection diagram PN178-411			
	black	0V	GND
	red	12..30V	Power Supply
	orange	CLCK	SSI clock input
	black	CLCKG	SSI clock input Inverse
	blue	DATA	SSI data output
	black	DATAG	SSI data output Inverse
	green	STATE	State Output (Low = Error)
	black	-	n.c.
	yellow	V/R	counting direction
	black	-	n.c.
	brown	Z	Zero point setting
	black	-	n.c.

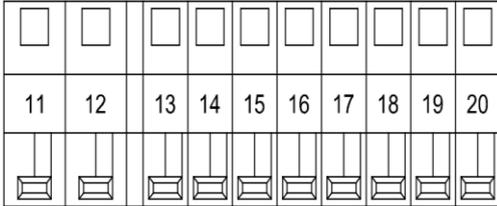
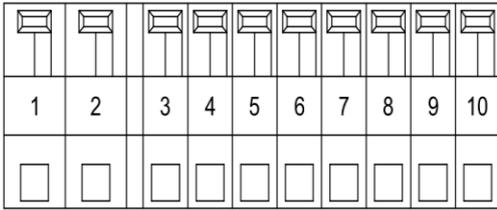
n.c. = not connected

AMSH 40/ASSH 40 (SSI)

Cable

PN 178-411

11.4 Connection diagram optional incremental outputs



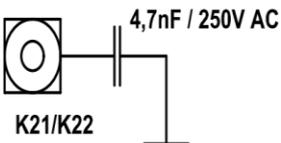
2x10 pol. Print-Zugfederklemme Typ Phoenix ZFKDS
 2x10 pole printed circuit spring terminal block type Phoenix ZFKDS

Anschlussdaten:	Connection data:
K1,K2 / K11,K12	K1,K2 / K11,K12
Aderquerschnitt	wire section
0,25-1,5 [mm ²]	0,25-1,5 [mm ²]
K3...K10 / K13...K20	K3...K10 / K13...K20
Aderquerschnitt	wire section
0,25-0,5 [mm ²]	0,25-0,5 [mm ²]

Schirmung:

Der Schirm der Signalleitung kann über die Kabelverschraubung direkt mit dem Gehäuse verbunden werden.
 Alternativ kann der Kabelschirm an K21/K22 über einen Kondensator (4,7nF / 250V AC) mit dem Gebergehäuse verbunden werden.

Alternativer Schirmanschluss
Alternative Shielding



Klemmkasten		Anschlussplan		PN171-420	
Terminal box		Connection diagram		PN171-420	
System 1	System 2				
1	11	0V		GND	GND
2	12	12...30V		Versorgungsspannung	Power Supply
3	13	0°		Inkr. Ausgang 0°	Incr. Output 0°
4	14	0°		Inkr. Ausgang 0° Invers	Incr. Output 0° Inverse
5	15	90°		Inkr. Ausgang 90°	Incr. Output 90°
6	16	90°		Inkr. Ausgang 90° Invers	Incr. Output 90° Inverse
7	17	N		Nullimpuls	Reference
8	18	N		Nullimpuls Invers	Reference Inverse
9	19	ERR		Fehlerausgang (Low aktiv)	Error Output (Low active)
10	20	ERR		Fehlerausgang (High aktiv)	Error Output (High active)

Shielding:

The shield of the signal cable can be connected directly to the housing of the encoder by the cable gland.
 Alternatively the shield of the signal cable can be connected to K21/K22 via a capacitor (4.7nF / 250V AC) to the housing of the encoder.

Connection cable 1					
1		black	0V		GND
2		red	12..30V		Power Supply
3		orange	0°		Incr. Output 0°
4		black	0°		Incr. Output 0° Inverse
5		blue	90°		Incr. Output 90°
6		black	90°		Incr. Output 90° Inverse
7		yellow	N		Reference
8		black	N		Reference Inverse
9		green	ERR		Error Output (Low activ)
10		black	ERR		Error Output (High activ)

Connection cable 2					
11		black	0V		GND
12		red	12..30V		Power Supply
13		orange	0°		Incr. Output 0°
14		black	0°		Incr. Output 0° Inverse
15		blue	90°		Incr. Output 90°
16		black	90°		Incr. Output 90° Inverse
17		yellow	N		Reference
18		black	N		Reference Inverse
19		green	ERR		Error Output (Low activ)
20		black	ERR		Error Output (High activ)

Incremental outputs

Cable

PN 171-421

12 Dimension drawings ASSH/ASPAH/AMSH/AMSIH 40 K

Standardausführung / standard configuration
Einführungsschräge vorzugsweise 15-20° / chamfer preferably 15-20°

Dichtfläche / sealing surface

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

Zyl.-Schr. ISO 4762 - M6x45
cheese-head screw
mikroklebstoffbeschichtet
micro - adhesive coated

Abdrückgewinde
pull-off thread
M7x1.0

O-Ring

Blindstopfen
blind plug

Montagezugang
mounting access
unverlierbare
Verschlusschraube
captivity screw
SW 24

Erdungsklemme gem. EN 60999-1
Protective conductor terminal
Nennquerschnitt
Nominal cross section
4,0 mm²

EMV-Kabelverschraubung
EMC-cable gland
für Kabel / for cable Ø 9 - 13
Lagerung
sealing bolt
for transport and storage

Verschraubung
fastener

Abziehvorrichtung nach ZS-109649
nur nach Bestellung!
pull-off device acc. to ZS-109649
optional

Änderungen vorbehalten
modifications reserved

ASSH 40 K
Hohlwellen-Absolutwert-Drehgeber
Multiturn with SSI Schnittstelle
hollow shaft absolute encoder
multiturn with SSI interface

ASSH 40 K
Hohlwellen-Absolutwert-Drehgeber
Multiturn mit SSI Schnittstelle
hollow shaft absolute encoder
multiturn with SSI interface

ASPAH 40 K
Hohlwellen-Absolutwert-Drehgeber
Singleturn mit Parallelschnittstelle
hollow shaft absolute encoder
singleturn with parallel interface

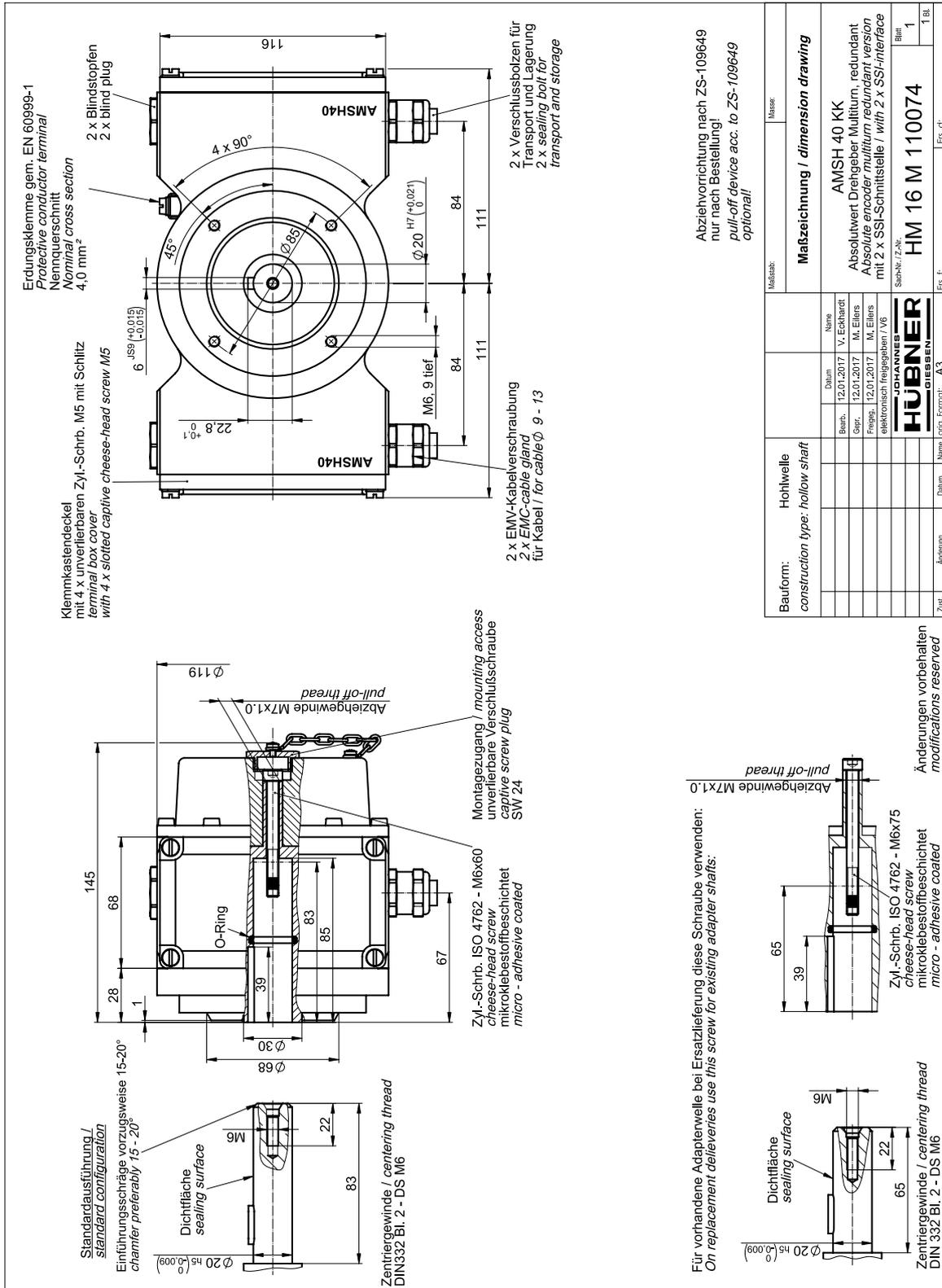
AMSIH 40 K
Hohlwellen-Absolutwert-Drehgeber
Multiturn mit SSI Schnittstelle und
einem inkrementalen Ausgang
hollow shaft absolute encoder
multiturn with SSI interface and
one incremental output

Bauform: Hohlwelle
construction type: hollow shaft

Maße
Dimensions
in mm

Maße		Name	
Bezeichnung	Datum	13.06.2018	D. Häuser-B.
Gepr.	13.06.2018	M. Weiner	
Freigepr.	13.06.2018	M. Weiner	
elektronisch freigeben / V21			
HUBNER			
GIEßEREI			
Such-Nr. / Z.Nr. HM 13 M 106280b			
Blatt 1			
Ers. f. 1 Bl.			

ASSH/ASPAH/AMSH/AMSIH 40 K HM 13 M 106280b



AMSH 40 KK

HM 16 M 110074

