



HEIDENHAIN

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Product Information

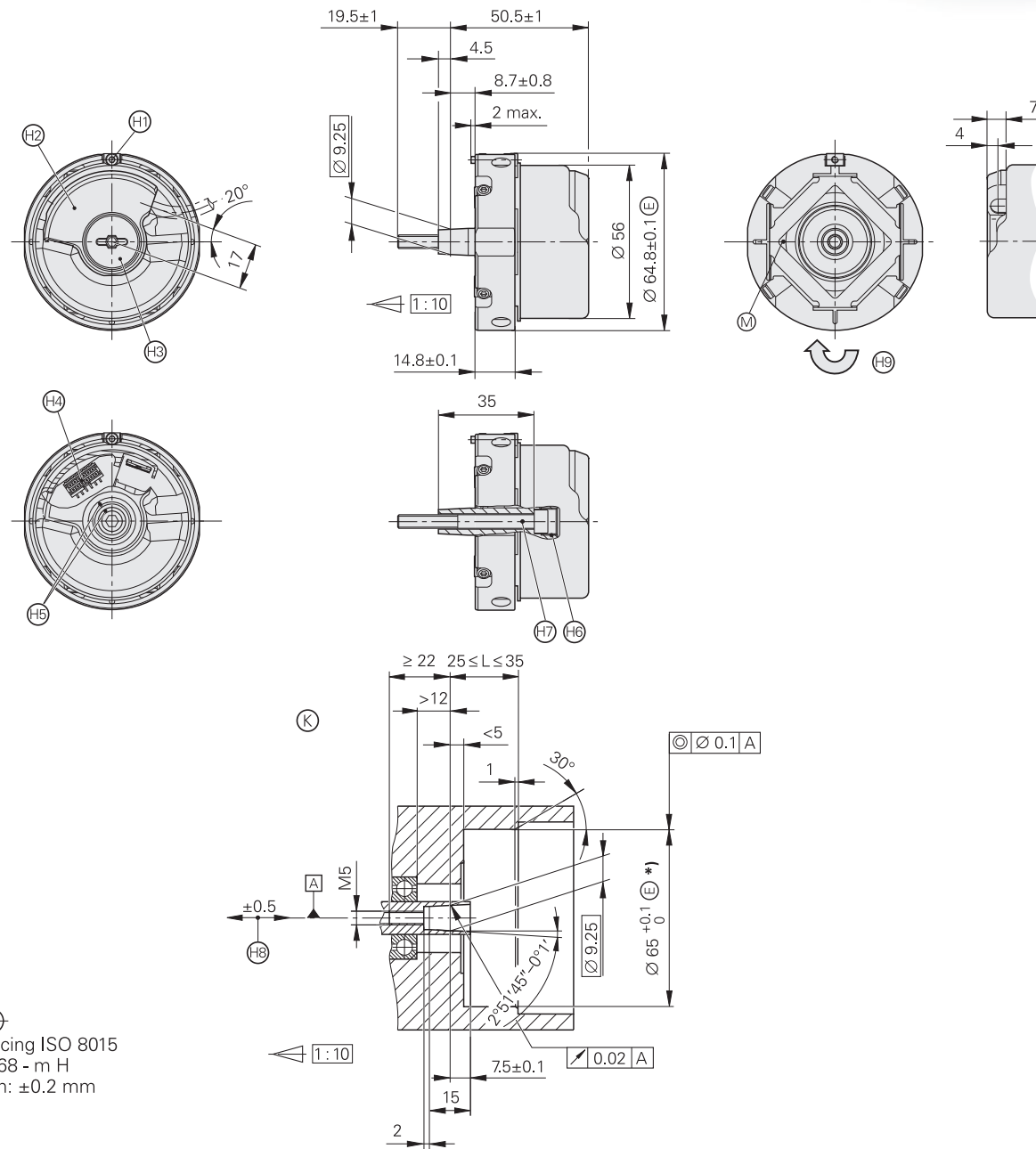
ECN 1313
EQN 1325
ECN 1325
EQN 1337

Absolute Rotary Encoders
with Tapered Shaft

ID 768295-xx
ID 1178020-xx
ID 827039-xx
ID 1178019-xx

Absolute rotary encoders

- 06 stator coupling for axial mounting
- 65B tapered shaft



- Ⓐ = Bearing of mating shaft
- Ⓚ = Required mating dimensions
- Ⓜ = Measuring point for operating temperature
- 1 = Clamping screw for coupling ring: width A/F 2; tightening torque: 1.25 Nm –0.2 Nm
- 2 = Die-cast cover
- 3 = Screw plug: widths A/F 3 and 4; tightening torque: 5 Nm +0.5 Nm
- 4 = ECN/EQN: 12-pin PCB connector
ECN/EQN: 14-pin + 4-pin PCB connector
- 5 = ECN/EQN: zero position of shaft and housing
- 6 = M10 back-off thread
- 7 = Self-locking screw: DIN 6912 M5x50; width A/F 4; tightening torque: 5 Nm +0.5 Nm
- 8 = Compensation of mounting tolerances and thermal expansion; no dynamic movement permitted
- 9 = Direction of shaft rotation for ascending position values

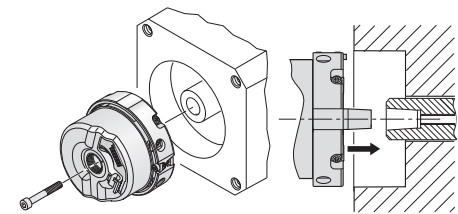
	Absolute			
	ECN 1313	ECN 1325	EQN 1325	EQN 1337
Interface	EnDat 2.2			
Ordering designation	EnDat01	EnDat22	EnDat01	EnDat22
Position values per rev.	8192 (13 bits)	33554432 (25 bits)	8192 (13 bits)	33554432 (25 bits)
Revolutions	–		4096 (12 bits)	
Elec. permiss. shaft speed/ deviations ²⁾	512 lines: 5000 rpm/±1 LSB 12000 rpm/±100 LSB 2048 lines: 1500 rpm/±1 LSB 12000 rpm/±50 LSB	15000 rpm (for continuous position values)	512 lines: 5000 rpm/±1 LSB 12000 rpm/±100 LSB 2048 lines: 1500 rpm/±1 LSB 12000 rpm/±50 LSB	15000 rpm (for continuous position values)
Calculation time t _{cal} Clock frequency	≤ 9 µs ≤ 2 MHz	≤ 7 µs ≤ 8 MHz	≤ 9 µs ≤ 2 MHz	≤ 7 µs ≤ 8 MHz
Incremental signals	~ 1 V _{PP} ¹⁾	–	~ 1 V _{PP} ¹⁾	–
Line count*	512 2048	2048	512 2048	2048
Cutoff frequency –3 dB	2048 lines: ≥ 400 kHz 512 lines: ≥ 130 kHz	–	2048 lines: ≥ 400 kHz 512 lines: ≥ 130 kHz	–
System accuracy	512 lines: ±60"; 2048 lines: ±20"			
Electrical connection	12-pin	16-pin with connection for temperature sensor ³⁾	12-pin	16-pin with connection for temperature sensor ³⁾
Supply voltage	DC 3.6 V to 14 V			
Power consumption (maximum)	3.6 V: ≤ 0.6 W 14 V: ≤ 0.7 W		3.6 V: ≤ 0.7 W 14 V: ≤ 0.8 W	
Current consumption (typical)	5 V: 85 mA (without load)		5 V: 105 mA (without load)	
Shaft	Tapered shaft (Ø 9.25 mm); taper: 1:10			
Mech. permiss. shaft speed n	≤ 15000 rpm		≤ 12000 rpm	
Starting torque (typical)	0.01 Nm (at 20 °C)			
Moment of inertia of rotor	2.6 · 10 ^{–6} kgm ²			
Natural frequency f _N (typical)	1800 Hz			
Permissible axial motion of measured shaft	±0.5 mm			
Vibration 55 Hz to 2000 Hz Shock 6 ms	≤ 300 m/s ^{2 4)} (EN 60068-2-6) ≤ 2000 m/s ² (EN 60068-2-27)			
Operating temperature	–40 °C to 115 °C			
Protection EN 60529	IP40 when mounted			
Mass	≈ 0.25 kg			
ID number	768295-xx	1178019-xx	827039-xx	1178020-xx

1) Deviating tolerances	Signal amplitude:	0.8 V _{PP} to 1.2 V _{PP}
	Asymmetry:	0.05
	Amplitude ratio:	0.9 to 1.1
	Phase angle:	90° elec. ±5° elec.
	Signal-to-noise ratio E, F:	≥ 100 mV

3) Evaluation optimized for KTY 84-130
4) Valid as per standard at room temp.;
the following applies at
operating temps. up to 100 °C: $\leq 300 \text{ m/s}^2$;
up to 115 °C: $\leq 150 \text{ m/s}^2$

Mounting

The tapered shaft of the rotary encoder is pressed onto the measured shaft and fastened with a central screw. The stator coupling is clamped by means of an axially tightenable screw in a location hole.



Mounting accessories

Mounting aid
To avoid damage to the cable, use the mounting aid to connect and disconnect the cable assembly. The pulling force must be applied solely to the connector and not to the wires.

ID 1075573-01

For more mounting information and mounting aids, see the Mounting Instructions and the *Encoders for Servo Drives* brochure. The mounting quality can be inspected with the PWM 21 and ATS software.



Electrical connection: cables

Output cables for ECN 1313/EQN 1325 with EnDat01

EPG output cables inside the motor housing $\varnothing$ 4.5 mm (with shield crimp $\varnothing$ 6.1 mm); [16 $\times$ 0.057 mm ²] and TPE wires 2 $\times$ 0.25 mm ² for temperature sensor		
With 12-pin PCB connector and 17-pin M23 angle flange socket (male)		ID 332201-xx
With 12-pin PCB connector and unstripped cable end		ID 332202-xx

Output cables for ECN 1325/EQN 1337 with EnDat22

EPG output cables inside the motor housing $\varnothing$ 3.7 mm (with shield crimp $\varnothing$ 6.1 mm); [1 $\times$ (4 $\times$ 0.06 mm ²) + 4 $\times$ 0.06 mm ²] and TPE wires 2 $\times$ 0.16 mm ² for temperature sensor		
With 16-pin PCB connector and 9-pin M23 SpeedTEC angle flange socket (male)		ID 1120948-xx
With 16-pin PCB connector and stripped cable end		ID 1143830-xx

Comply with the EMC requirements under “General electrical information” in the *Interfaces of HEIDENHAIN Encoders* brochure

SpeedTEC is a registered trademark of TE Connectivity Industrial GmbH.

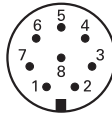


Electrical connection

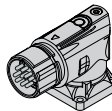
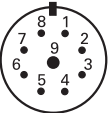
EnDat22 pin layout

8-pin M12 coupling or flange socket

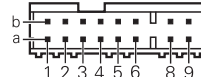




9-pin M23 SpeedTEC angle flange socket

16-pin PCB connector

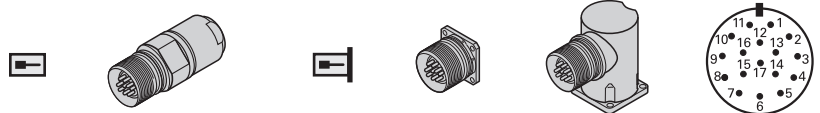
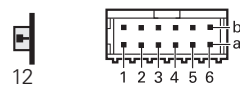
	Power supply				Serial data transmission				Other signals ¹⁾	
 M12	8	2	5	1	3	4	7	6	/	/
 M23	3	7	4	8	5	6	1	2	/	/
 16	1b	6a	4b	3a	6b	1a	2b	5a	8a	8b
	U _P	Sensor U _P	0V	Sensor 0V	DATA	$\overline{\text{DATA}}$	CLOCK	$\overline{\text{CLOCK}}$	T ²⁾ ₊	T ²⁾ ₋
	Brown/ Green	Blue	White/ Green	White	Gray	Pink	Violet	Yellow	Brown	Green

¹⁾ Only for adapter cables inside the motor housing
²⁾ Connections for external temperature sensor; evaluation optimized for KTY 84-130 (see *Temperature measurement in motors* in the *Encoders for Servo Drives* brochure)

Cable shield connected to housing; **U_P** = Power supply voltage; **T** = Temperature
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!
Note for safety-related applications: Only completely assembled HEIDENHAIN cables are qualified.
Do not modify cables or exchange their connectors without first consulting with HEIDENHAIN Traunreut.

SpeedTEC is a registered trademark of TE Connectivity Industrial GmbH.

EnDat01 pin layout

17-pin M23 coupling or flange socket						12-pin PCB connector							
													
	Power supply					Incremental signals ¹⁾				Serial data transmission			
 	7	1	10	4	11	15	16	12	13	14	17	8	9
 12	1b	6a	4b	3a	/	2a	5b	4a	3b	6b	1a	2b	5a
	U _P	Sensor U _P	0V	Sensor 0V	Internal shield	A+	A-	B+	B-	DATA	DATA	CLOCK	CLOCK
	Brown/ Green	Blue	White/ Green	White	/	Green/ Black	Yellow/ Black	Blue/ Black	Red/ Black	Gray	Pink	Violet	Yellow

	Other signals	
 	5	6
 12	/	/
	T ₊ ²⁾	T ₋ ²⁾
	Brown ²⁾	White ²⁾

Cable shield connected with housing; **U_P** = Power supply voltage; **T** = Temperature
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!
¹⁾ Only with the EnDat01 ordering designation
²⁾ Connections for an external temperature sensor (only for output cables inside the motor, see *Temperature measurement in motors*); if used, please refer to the information about electromagnetic compatibility in the *General electrical information* section of the *Interfaces of HEIDENHAIN Encoders* brochure.



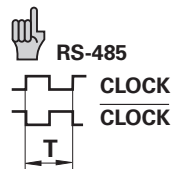
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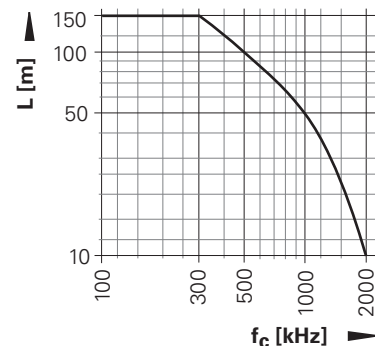
More information:

Comply with the requirements described in the following documents to ensure correct and intended operation:	
• Brochure: <i>Encoders for Servo Drives</i>	208922-xx
• Brochure: <i>Cables and Connectors</i>	1206103-xx
• Brochure: <i>Interfaces of HEIDENHAIN Encoders</i>	1078628-xx
• Mounting Instructions: <i>ECN 1313, EQN 1325, ECN 1325, EQN 1337</i>	1139530-xx

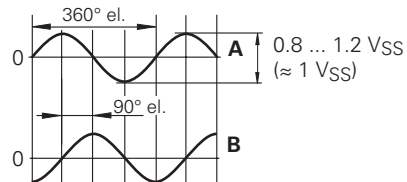


Up = 5 V ± 5%
(max. 200 mA)
am Gerät, at encoder

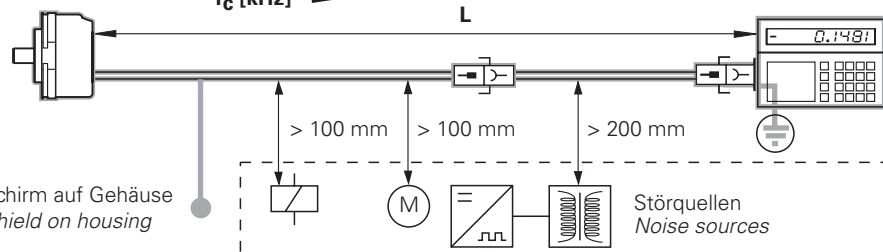
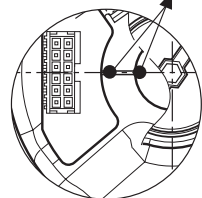
EN 50 178/4.98; 5.2.9.5
IEC 364-4-41: 1992; 411 (PELV/SELV)
(siehe, see HEIDENHAIN D 231 929)



$$f_c = \frac{1}{T}$$



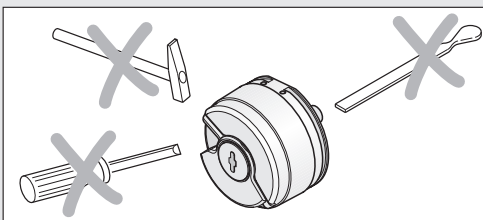
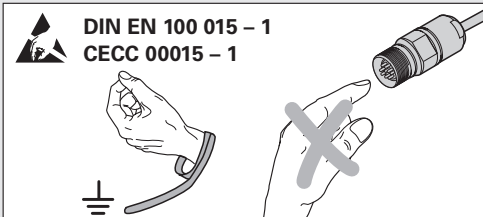
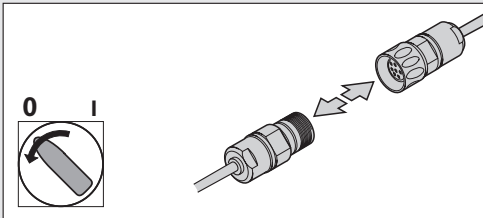
Nullposition Welle - Kappe
Zero position for shaft/cap alignment



Achtung:
Die Parameter im Speicherbereich des OEM müssen im Servicefall angeglichen werden.
CAUTION:
The parameters in the OEM memory area must be adjusted if service becomes necessary.

	 $T \geq -40^\circ\text{C}$ (-40 °F)	 $T \geq -10^\circ\text{C}$ (14 °F)
Ø 4.5 mm	$R_1 \geq 18 \text{ mm}$	/
	$R_1 \geq 40 \text{ mm}$	$R_2 \geq 100 \text{ mm}$

	°C (°F)	
		$-30 \dots 80^\circ\text{C}$ (-22 ... 176 °F)



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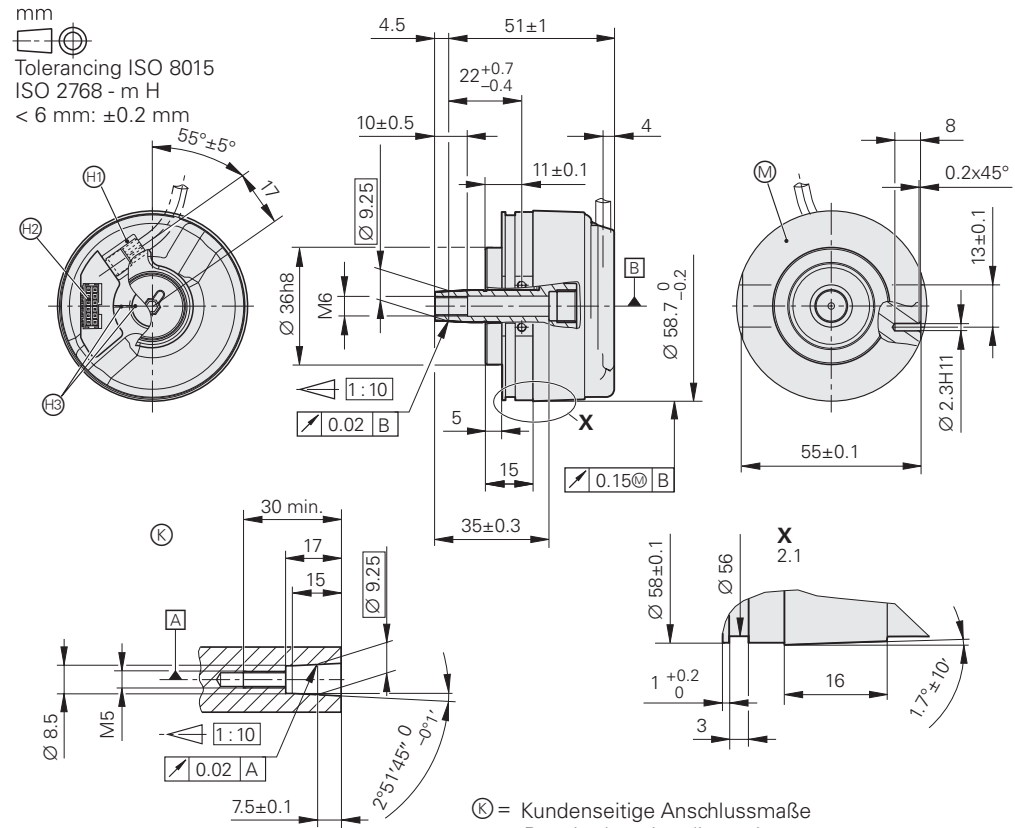
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EQN 1325.020
EnDat01

4/2006

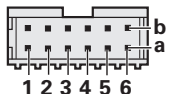


EQN 1325.020 EnDat01



- ⓐ = Lagerung Kundenwelle
Bearings for customer shaft
- ⓑ = Lagerung Geber
Bearings for encoder
- ⓓ = Messpunkt Arbeitstemperatur
Measuring point for operating temperature
- ⓔ = Befestigung für Kabel mit Crimp-Hülse Ø 6+0.3 x10
Attachment for cable with crimp sleeve Ø 6+0.3 x10
- ⓕ = Stiftleiste 12-pol.
Plug connector, 12-pin
- ⓖ = Referenzmarkenlage Welle - Kappe
Reference mark for shaft/cap alignment

62S12-78

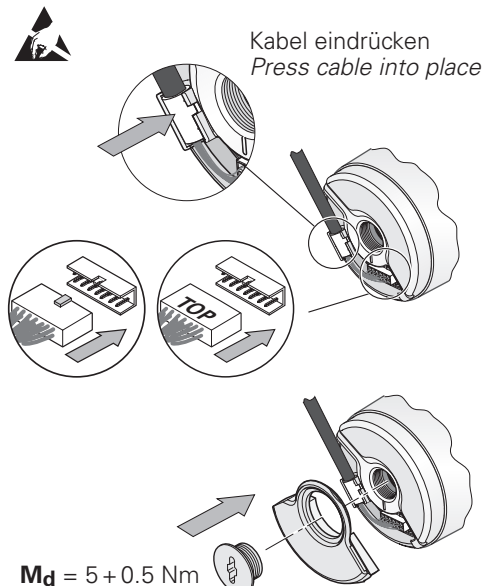


Außenschirm auf Gehäuse
External shield on housing

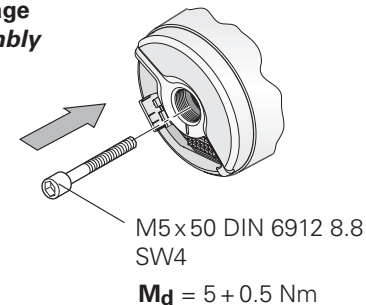
1b	6a	4b	3a	2a	5b	4a	3b	6b	1a	2b	5a
Up	Sensor Up	0 V	Sensor 0 V	A+	A-	B+	B-	DATA	DATA	CLOCK	CLOCK

Die Sensorleitung ist intern mit der Versorgungsleitung verbunden.
The sensor line is connected internally with the power supply.

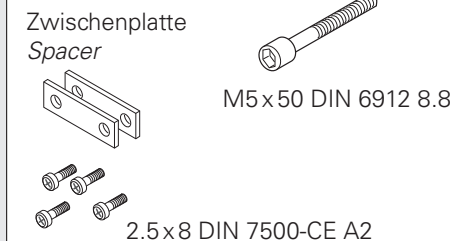
Elektrischen Anschluss herstellen Electrical connection



Montage Assembly



Montagesatz im Lieferumfang Mounting kit included



Zwei Möglichkeiten zum Abdrücken während der Demontage des Drehgebers Two ways of pressing the encoder out during dismounting

