



HEIDENHAIN



**Functional
Safety**

Product Information

ECN 1325

EQN 1337

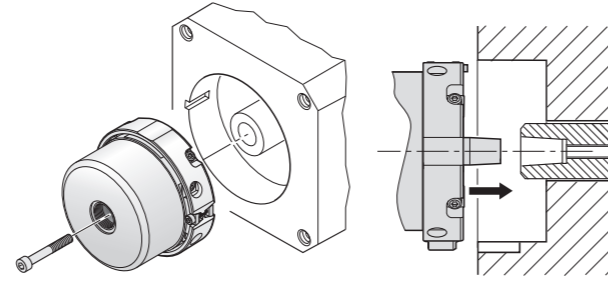
Absolute Rotary Encoders
with Tapered Shaft for
Safety-Related Applications

For HMC 2 connection
technology

07/2021

Mounting

The tapered shaft of the rotary encoder is pressed onto the measured shaft and fastened with a central screw. It is particularly important to ensure that the positive-locking element of the stator coupling securely engages the corresponding slot in the measured shaft. A screw with material bonding anti-rotation lock must be used (see *Mounting accessories*). The stator coupling is clamped by means of an axially tightenable screw in a location hole.



Motor-side requirements for safe mechanical coupling:

Mating shaft	Mating stator
Steel	Aluminum

Rotary encoders may exert a torque of up to 1 Nm on the mating shaft. The customer-side mechanical design must be made for this load.

Further information:

In addition, comply with the material specifications and other material characteristics in the *Encoders for Servo Drives* brochure (ID 208922-xx).

Mounting accessories

Screws

Screws (central screw, mounting screws) are not included in delivery and can be ordered separately.

ECN 1325, EQN 1337	Screws ¹⁾		Quantity
Central screw for shaft fastening	DIN 6912-M5x50-8.8-MKL	ID 202264-54	10 or 100

¹⁾With coating for material bonding anti-rotation lock

Please note the information on screws from HEIDENHAIN in the *Encoders for Servo Drives* brochure, under *Screws with material bonding anti-rotation lock* in the chapter *General mechanical information*.

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



EnDat 3 adapter (SA 1210)

Adapter for connecting an encoder with EnDat 3 (E30-R2) to the PWM 21

ID 1317260-01

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.



Integrated temperature evaluation

This rotary encoder features a temperature sensor integrated into the encoder electronics and an evaluation circuit for an external temperature sensor. In both cases, the respective digitized temperature value is transmitted purely serially via the EnDat protocol. Please bear in mind that neither the temperature measurement nor the transmission of the temperature value is safe in terms of functional safety. With regard to the internal temperature sensor (FID 0x21 SENSOR_TEMP_INT), the rotary encoder supports the two-stage cascaded signaling of a temperature exceedance. It consists of an EnDat warning and an EnDat error message. In compliance with the EnDat specification, when the temperature reaches the warning threshold for temperature exceedance of the internal temperature sensor, an EnDat warning is issued (HPF.STATUS.W "collective warning bit"). In addition, bit 26 (W10) "Temperature warning threshold exceeded" is set in the LPF with the FID=ERRMSG. This warning threshold for the internal temperature sensor is stored in the parameter SET.tempWarnLevel and can be individually adjusted. A device-specific default value is saved here before shipping. The temperature measured by the internal temperature sensor is higher by a device-specific and application-specific amount than the temperature at measuring point M1, as shown in the dimension drawing.

The encoder features a further, albeit non-adjustable trigger threshold for the EnDat error message (HPF.STATUS.F "collective error bit"). In addition, bit 8 (A8) "Permissible ambient conditions exceeded" is set in the LPF with the FID=ERRMSG. This trigger threshold may vary depending on the encoder model and is stated in the specifications. HEIDENHAIN recommends adjusting the warning threshold based on the application such that this threshold is sufficiently below the trigger threshold for the "Temperature exceeded" EnDat error message. Fulfillment of the encoder's intended use requires adherence to the operating temperature at measuring point M1.

Electrical connection: cables

ETFE output cable inside the motor housing $\varnothing 1.8 \text{ mm} \times 0.15 \text{ mm}^2$, without shielding; $A_P = 0.15 \text{ mm}^2$		
12-pin PCB connector (female) with strain relief $\varnothing 6.2 \text{ mm}$ and 8-pin M23 SpeedTEC rotatable angle flange socket (male, for communication)		ID 1275042-xx
12-pin PCB connector (female) with strain relief $\varnothing 6.2 \text{ mm}$ and 2 x ETFE twisted single wires (communication)		ID 1302701-xx ¹⁾
ETFE output cable inside the motor housing $2 \times 0.15 \text{ mm}^2$ for temperature sensor		
4-pin PCB connector (female) with heat shrink tubing and 2-pin connector (male, for temperature sensor)		ID 1302763-xx
PUR adapter cable $\varnothing 11 \text{ mm}$ with external shield (testing cable for PWM 21); 4 x 1.5 mm^2 (power wires) 2 x 0.75 mm^2 (shielded brake wires) 2 x 0.25 mm^2 (shielded communication wires); $A_P = 0.25 \text{ mm}^2$		
8-pin M23 SpeedTEC straight connector (female) and 3-pin connector (female, for power) and 4-pin connector (male, for brake wires) and 15-pin D-sub connector (male, for communication)		ID 1275291-xx

¹⁾ Comply with the EMC requirements described under "General electrical information" in the Interfaces of HEIDENHAIN Encoders brochure.

