



# HEIDENHAIN



Product Information

**ECN 1113**

**EQN 1125**

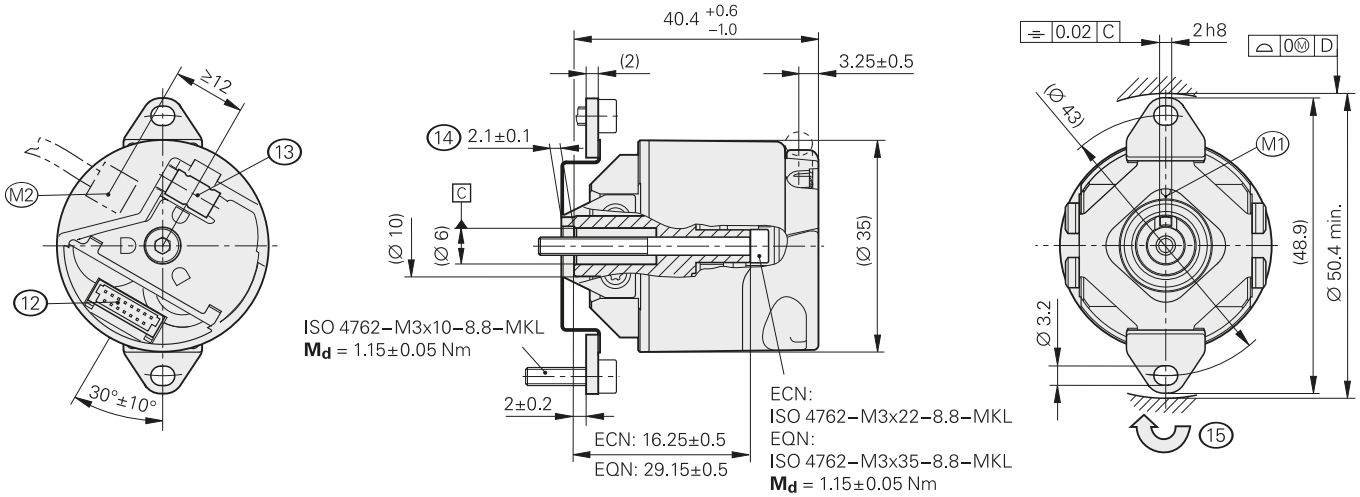
Absolute Rotary Encoders  
with SSI Interface

February 2017

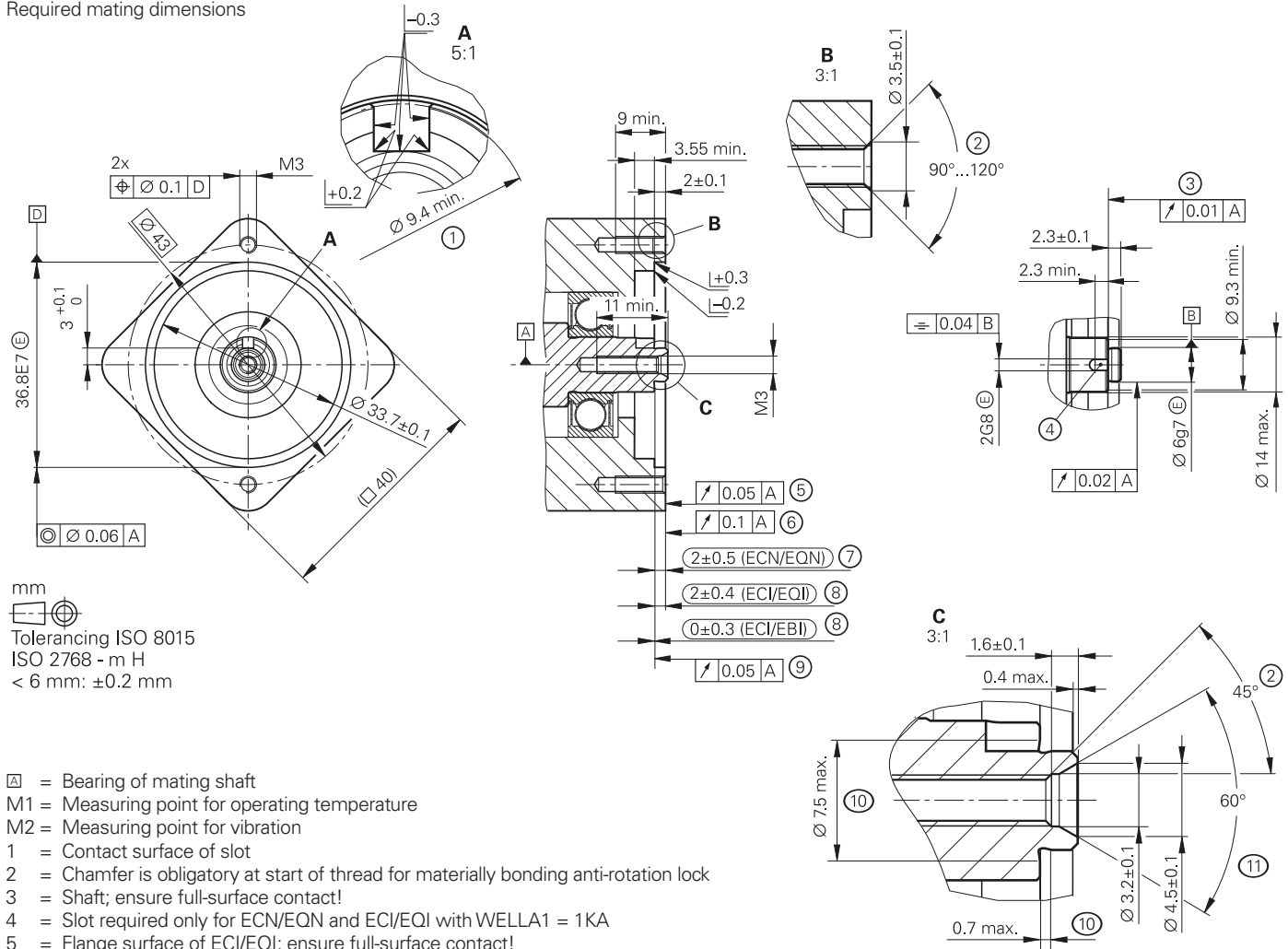
# ECN/EQN 1100 series

## Absolute rotary encoders

- 75A stator coupling for plane surface
- Blind hollow shaft



### Required mating dimensions



- ☒ = Bearing of mating shaft
- M1 = Measuring point for operating temperature
- M2 = Measuring point for vibration
- 1 = Contact surface of slot
- 2 = Chamfer is obligatory at start of thread for material bonding anti-rotation lock
- 3 = Shaft; ensure full-surface contact!
- 4 = Slot required only for ECN/EQN and ECI/EQI with WELLA1 = 1KA
- 5 = Flange surface of ECI/EQI; ensure full-surface contact!
- 6 = Coupling surface of ECN/EQN
- 7 = Maximum permissible deviation between shaft and coupling surfaces. Compensation of mounting tolerances and thermal expansion for which ±0.15 mm of dynamic axial motion is permitted
- 8 = Maximum permissible deviation between shaft and flange surfaces. Compensation of mounting tolerances and thermal expansion
- 9 = Flange surface of ECI/EBI; ensure full-surface contact!
- 10 = Undercut
- 11 = Possible centering hole
- 12 = 15-pin PCB connector
- 13 = Cable gland with crimp sleeve, diameter 4.3±0.1 – 7 long
- 14 = Positive locking element. Ensure correct engagement in slot 4, e.g. by measuring the device overhang
- 15 = Direction of shaft rotation for output signals as per the interface description

	<b>Absolute</b>	
	<b>ECN 1113</b>	<b>EQN 1125</b>
<b>Interface</b>	SSI	
Ordering designation	SSI39r1	SSI41r1
Position values/revolution	8192 (13 bits)	
Revolutions	–	4096 (12 bits)
Elec. permissible speed/ deviations <sup>2)</sup>	12 000 rpm/±12 LSB	
Calculation time $t_{cal}$ Clock frequency	≤ 5 μs ≤ 1 MHz	
Incremental signals	~ 1 V <sub>PP</sub> <sup>1)</sup>	
Line count	512	
Cutoff frequency –3 dB	≥ 190 kHz	
<b>System accuracy</b>	±60"	
<b>Electrical connection</b>	Via 15-pin PCB connector	
Voltage supply	DC 4.75 V to 30 V	
Power consumption (max.)	4.75 V: ≤ 0.53 W 30 V: ≤ 0.86 W	
Current consumption (typical)	5 V: 70 mA 24 V: 20 mA	
<b>Shaft</b>	Blind hollow shaft Ø 6 mm with positive fit element	
Mech. permissible speed	12 000 rpm	
Starting torque	≤ 0.001 Nm (at 20 °C)	≤ 0.002 Nm (at 20 °C)
Moment of inertia of rotor	≈ 0.4 · 10 <sup>-6</sup> kgm <sup>2</sup>	
Permissible axial motion of measured shaft	±0.5 mm	
<b>Vibration</b> 55 Hz to 2000 Hz <b>Shock</b> 6 ms	≤ 200 m/s <sup>2</sup> (EN 60 068-2-6) ≤ 1000 m/s <sup>2</sup> (EN 60 068-2-27)	
<b>Max. operating temperature</b>	100 °C	
<b>Min. operating temperature</b>	–40 °C	
<b>Protection</b> EN 60529	IP40 when mounted	
<b>Mass</b>	≈ 0.1 kg	
<b>Valid for ID</b>	Upon request	1198510-01

<sup>1)</sup> Restricted tolerances  
Signal amplitude 0.80 V<sub>PP</sub> to 1.2 V<sub>PP</sub>  
Asymmetry: 0.05  
Amplitude ratio: 0.9 to 1.1  
Phase angle: 90° ±5° elec.

<sup>2)</sup> Velocity-dependent deviations between the absolute and incremental signals

# Electrical connection

## Pin layout

15-pin PCB connector												
	Voltage supply				Incremental signals				Position values			
M12	<b>14</b>	<b>12</b>	<b>13</b>	<b>11</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
	<b>0V</b>	<b>Sensor</b> 0V	<b>U<sub>P</sub></b>	<b>Sensor</b> U <sub>P</sub>	<b>A+</b>	<b>A-</b>	<b>B+</b>	<b>B-</b>	<b>DATA</b>	<b>DATA</b>	<b>CLOCK</b>	<b>CLOCK</b>

Other signals			
M12	<b>5</b>	<b>6</b>	<b>15</b>
	<b>Direction of rotation</b>	<b>Zero reset</b>	<b>/</b>

**Cable shield** connected to housing; **U<sub>P</sub>** = Power supply voltage

**Sensor:** The sensor line is connected in the encoder with the corresponding power line.

Vacant pins or wires must not be used.

## HEIDENHAIN

**DR. JOHANNES HEIDENHAIN GmbH**

Dr.-Johannes-Heidenhain-Straße 5

**83301 Traunreut, Germany**

☎ +49 8669 31-0

FAX +49 8669 32-5061

E-mail: info@heidenhain.de

[www.heidenhain.de](http://www.heidenhain.de)

This Product Information supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the Product Information document edition valid when the order is made.

**Related documents:** Adhere to the information in the following documents to ensure the correct and intended operation of the encoder:

- Brochure: *Encoders for Servo Drives*, 208922-xx
- Mounting Instructions: *ECN 1113*, *EQN 1125*, 1198655-xx
- Brochure: *Interfaces of HEIDENHAIN Encoders*, 1078628-xx