HEIDENHAIN

Product Information

MRP 8100 Series

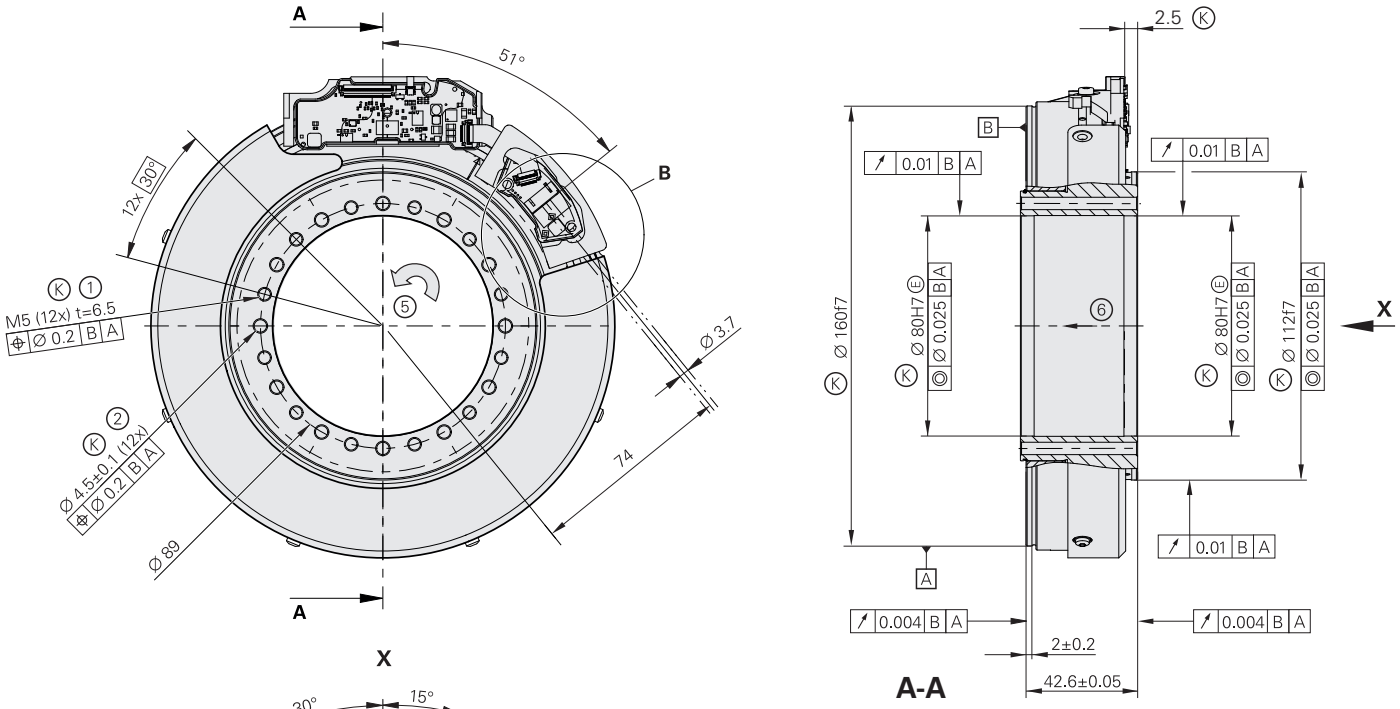
Angle Encoder Modules

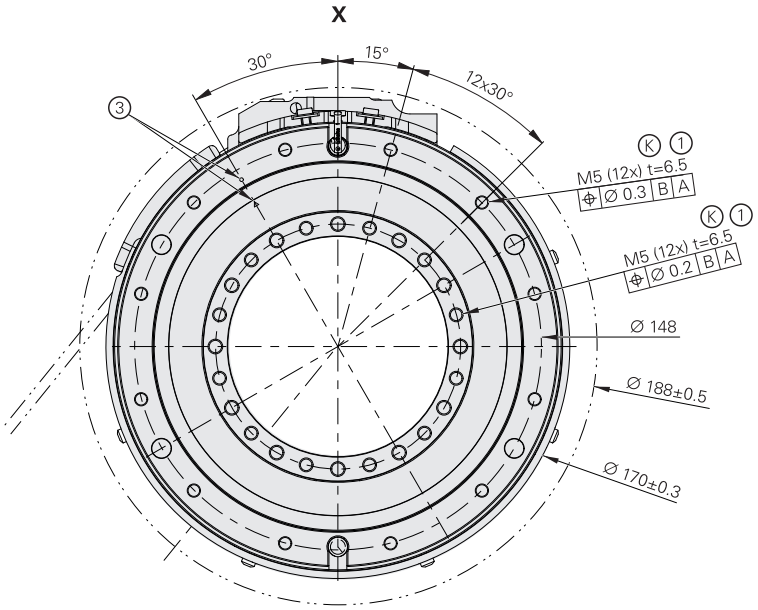
01/2021

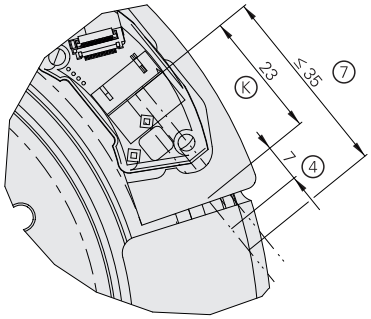
MRP 8100 series

Angle encoder modules with integrated encoder and bearing

- **Compact dimensions**
- **High measuring and bearing accuracy**
- **Hollow shaft Ø 80 mm**
- **Axial load up to 1500 N**



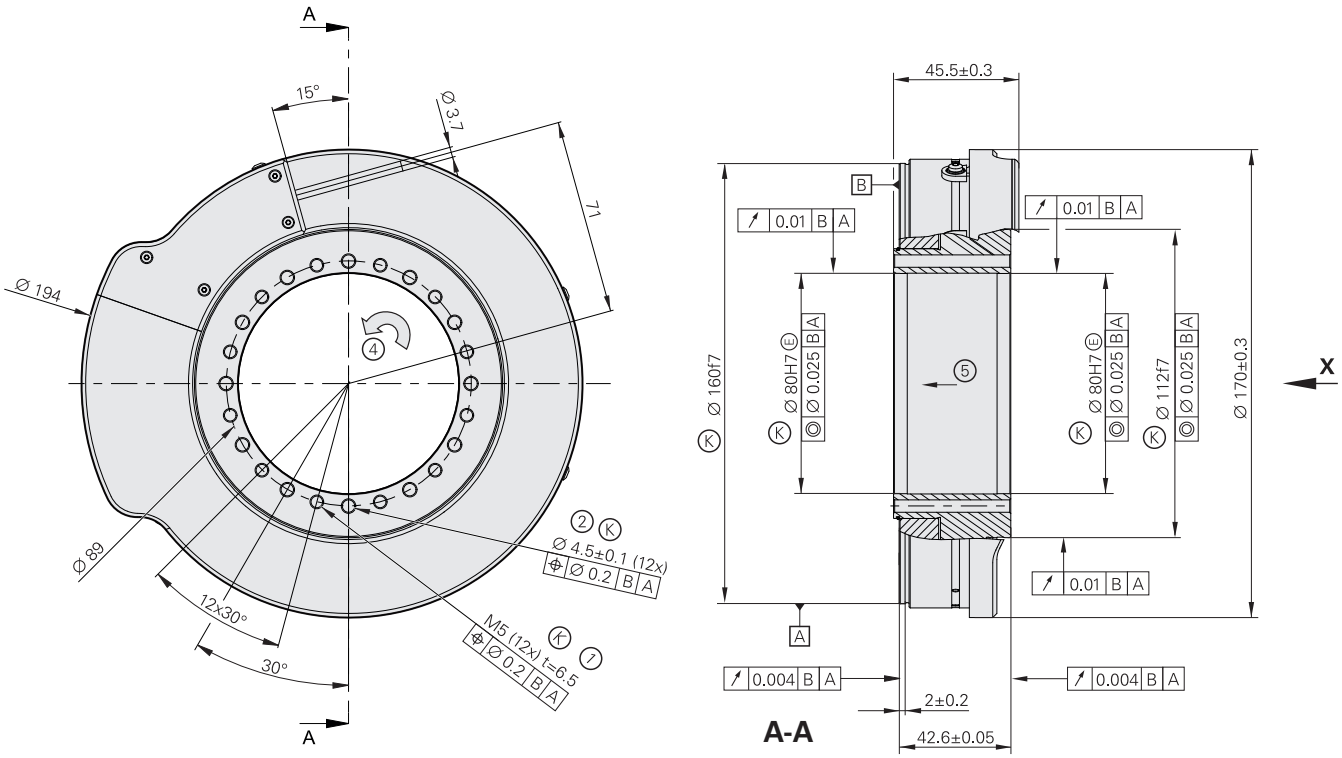


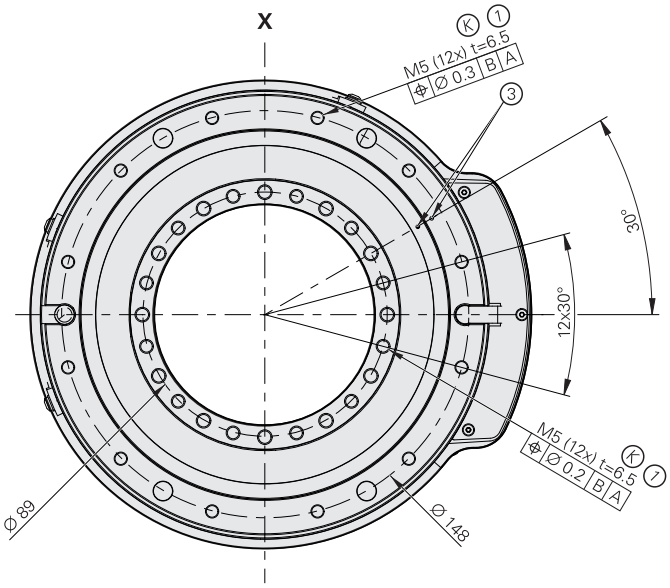


B
2:1

mm
Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm

Ⓚ = Required mating dimensions
1 = Tightening torque of the M5 – 8.8 cylinder head screws: 4.5 Nm ±0.25 Nm
2 = Tightening torque of the M4 – 8.8 cylinder head screws: 2.5 Nm ±0.15 Nm
3 = Marking of the 0° position ±5°
4 = Customer is responsible for shielding cover
5 = Direction of shaft rotation for ascending position values
6 = Recommended direction of force;
the recommended direction of force is to be maintained if dynamic overloading is possible
7 = Cable support





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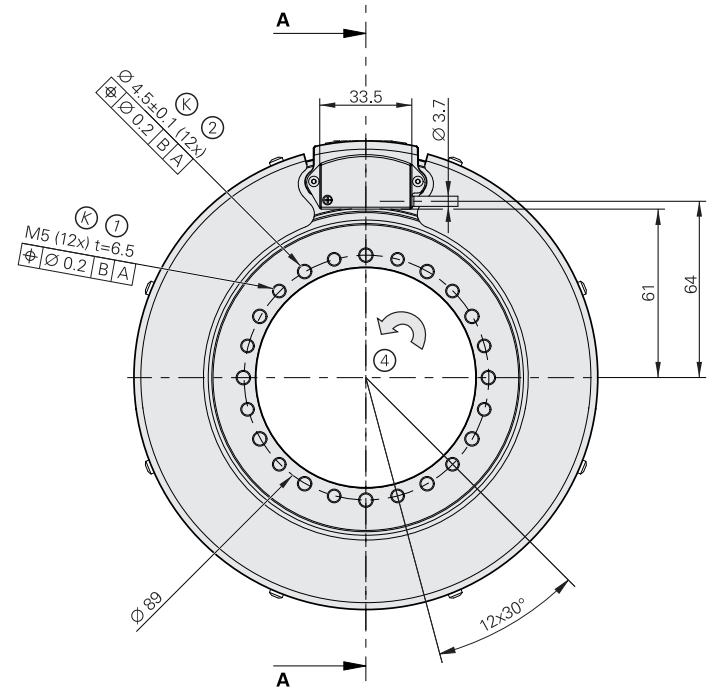

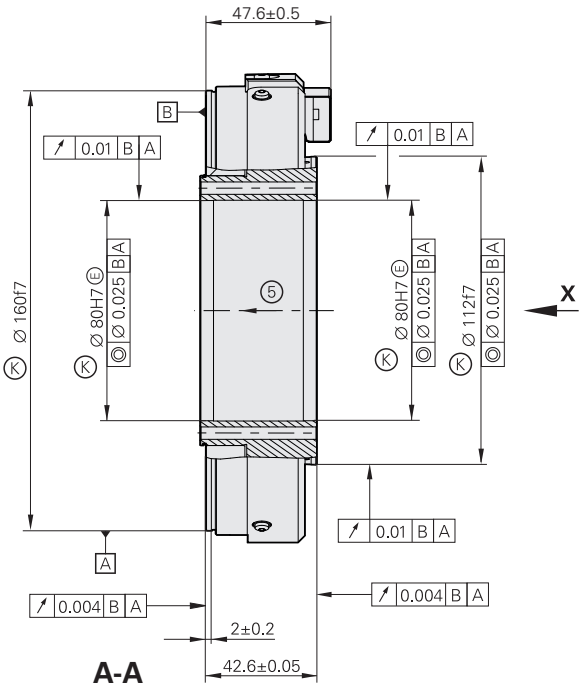

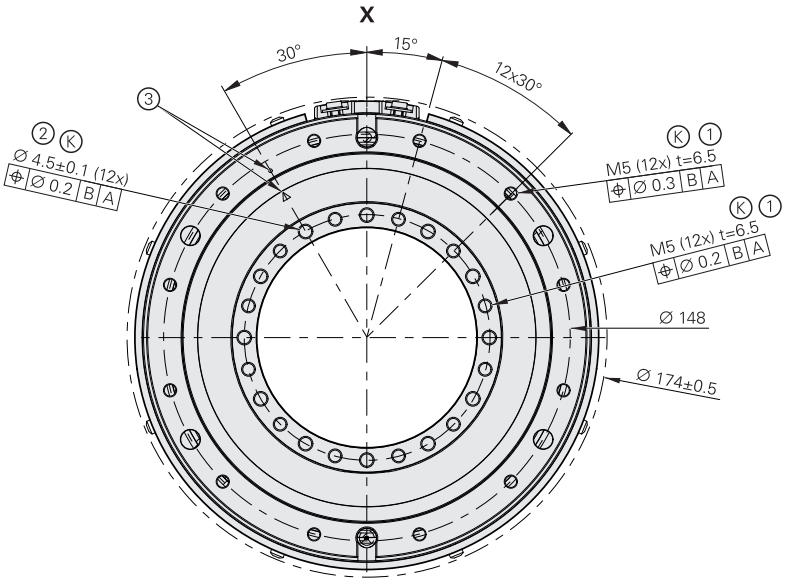

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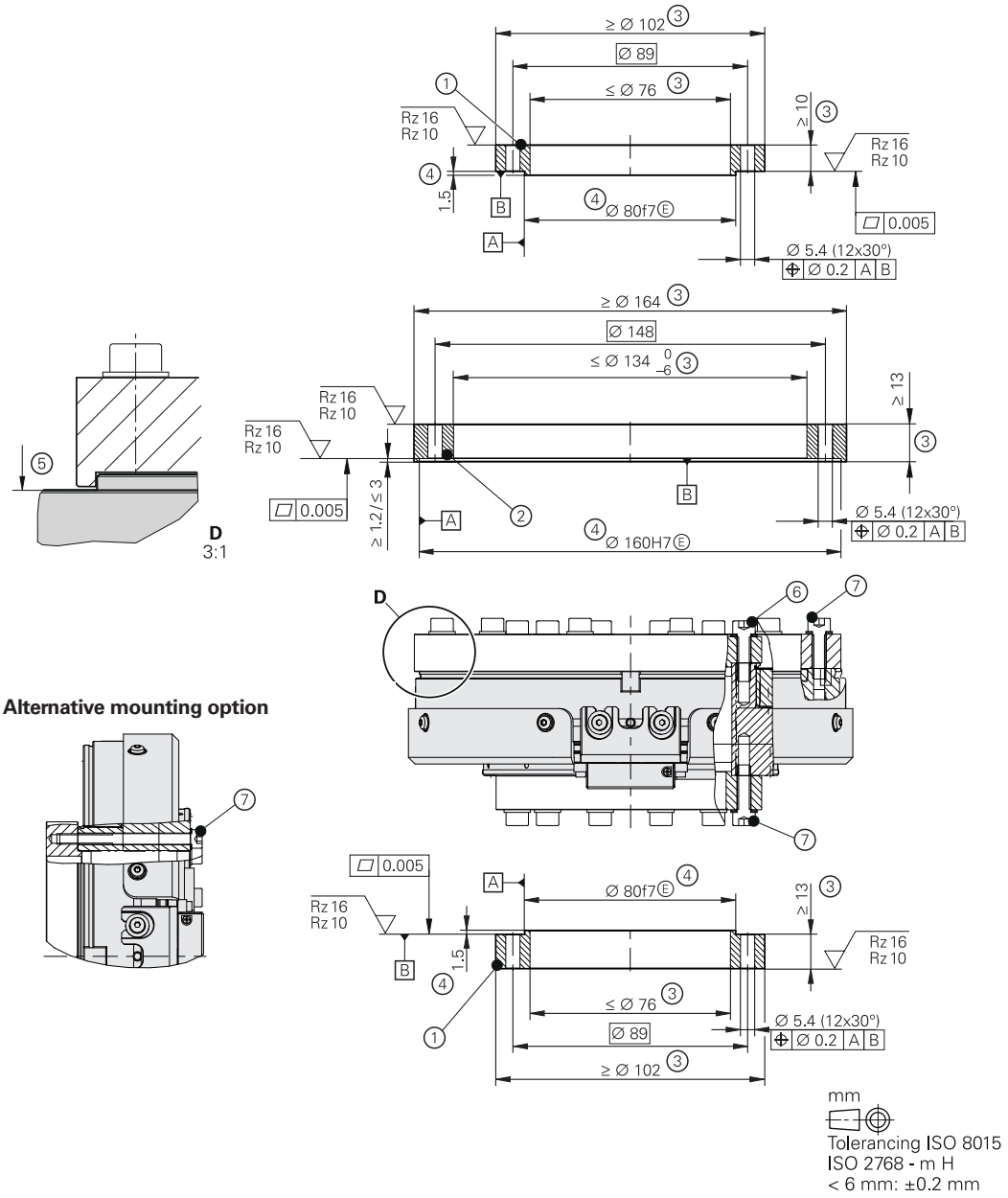


Alternative mounting option

1 = Rotor
2 = Stator (do not use as rotor)
3 = Required mounting dimensions for the transfer of the maximum permissible load as per the specifications
4 = Optional: recommended mating dimensions
5 = Do not use the edge as a stop surface!
6 = Screw: ISO 4762 – M5 – 8.8. Materially bonding threadlocker required. Washer: ISO 7092 – -5 – 200HV; tightening torque: 4.5 Nm ±0.25 Nm
7 = Screw: ISO 4762 – M4 – 8.8. Materially bonding threadlocker required. Washer: ISO 7092 – -4 – 200HV; tightening torque: 2.5 Nm ±0.15 Nm

Specifications

Encoders	***Incremental*** **MRP 8180**	***Absolute*** **MRP 8110**
Measuring standard	OPTODUR circular scale	DIADUR circular scale
Signal periods	63000	32768
System accuracy*	±1″ or ±2″	
Position error per signal period	±0.10″	±0.20″
Repeatability	*From both directions:* 0.2″	*From both directions:* 0.5″
RMS position noise	Typically 0.003″	Typically 0.010″
Interface	⁓ 1 V_{PP}	EnDat 2.2
Ordering designation	–	EnDat22
Position values per rev.	–	29 bits
Clock frequency Calculation time t_{cal}	–	≤ 16 MHz ≤ 5 µs
Reference marks	150 (distance-coded)	–
Cutoff frequency –3 dB	≥ 500 kHz	–
Electrical connection	1.5 m cable with 15-pin D-sub connector; interface electronics inside the connector	15-pin header; adapter cable with quick connector as accessory
Cable length	≤ 30 m (with HEIDENHAIN cable)	
Supply voltage	DC 5 V ±0.25 V	DC 3.6 V to 14 V
Power consumption (max.)	*5.25 V:* ≤ 950 mW	*3.6 V:* ≤ 1.1 W *14 V:* ≤ 1.3 W
Current consumption (typical)	175 mA (without load)	*5 V:* 140 mA (without load)

* Please select when ordering

MRP 8180

MRP 8110

MRP 8110 with cover

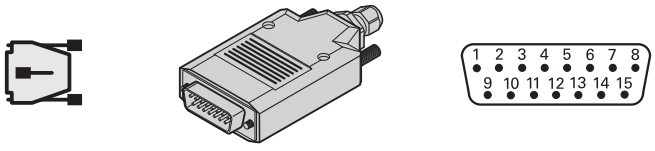
Bearings	***Incremental*** **MRP 8180**	***Absolute*** **MRP 8110**
Shaft	Hollow through shaft D = 80 mm	
Max. permissible axial load[1)]	1500 N (centered load)	
Max. permissible radial load[1)]	800 N	
Max. permissible tilting torque[1)]	100 Nm	
Contact stiffness	*Axial:* 1000 N/µm *Radial:* 500 N/µm (calculated values)	
Resistance to tilt	1700 Nm/mrad (calculated value)	
Mechanically perm. speed	300 rpm	
Moment of friction	≤ 0.4 Nm	
Starting torque	≤ 0.4 Nm	
Max. transferable shaft torque[1)]	20 Nm	
Moment of inertia of rotor	$5 \cdot 10^{-3}$ kgm^2	
Radial guideway accuracy	≤ 0,25 µm (measured at distance h = 75 mm from the mating surface of the rotor[2)])	
Non-reproducible radial guideway accuracy	≤ 0.30 µm (measured at distance h = 75 mm from the mating surface of the rotor[2)])	
Axial guideway accuracy	≤ ±0.25 µm	
Axial runout of the shaft*	≤ 4 µm or ≤ 2 µm	
Wobble of the axis	0.7″	
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 200 m/s^2 (EN 60068-2-6) ≤ 100 m/s^2 (EN 60068-2-27) (without load)	
Protection EN 60529[3)]	IP20	IP00[4)] or IP40
Operating temperature **Storage temperature**	0 °C to 50 °C 0 °C to 50 °C	
Relative air humidity	≤ 75 % without condensation	
Mass	4 kg	

* Please select when ordering
1) Purely static load, without additional vibrations or shock load
2) See the *Measuring and bearing accuracy* section in the *Angle Encoder Modules* brochure
3) When mounted
4) The electromagnetic compatibility of the complete system must be ensured by taking the correct measures during installation.

Electrical connection

~ 1 V_{PP} pin layout

15-pin D-sub connector

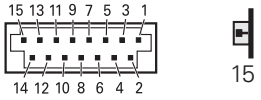


	Power supply				Incremental signals						Other signals		
	4	**12**	**2**	**10**	**1**	**9**	**3**	**11**	**14**	**7**	**5/6/8/15**	**13**	**/**
	U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**A+**	**A–**	**B+**	**B–**	**R+**	**R–**	**Vacant**[1)]	**Vacant**[1)]	**Vacant**
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	/	Violet	Yellow

EnDat pin layout

8-pin M12 coupling or flange socket

15-pin PCB connector



15

	Power supply				Position values			
M12	**8**	**2**	**5**	**1**	**3**	**4**	**7**	**6**
15	**13**	**11**	**14**	**12**	**7**	**8**	**9**	**10**
	U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow

Cable shield connected to housing; **U_P** = Power supply voltage
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!

HEIDENHAIN

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This Product Information document 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.

Further information:

Comply with the requirements described in the following documents to ensure the correct operation of the encoder.

- *Angle Encoder Modules* brochure 1102713-xx
- *Interfaces of HEIDENHAIN Encoders* brochure 1078628-xx
- *Cables and Connectors* brochure 1206103-xx
- Mounting Instructions 1289121-xx