



# HEIDENHAIN



Preliminary  
Product Information

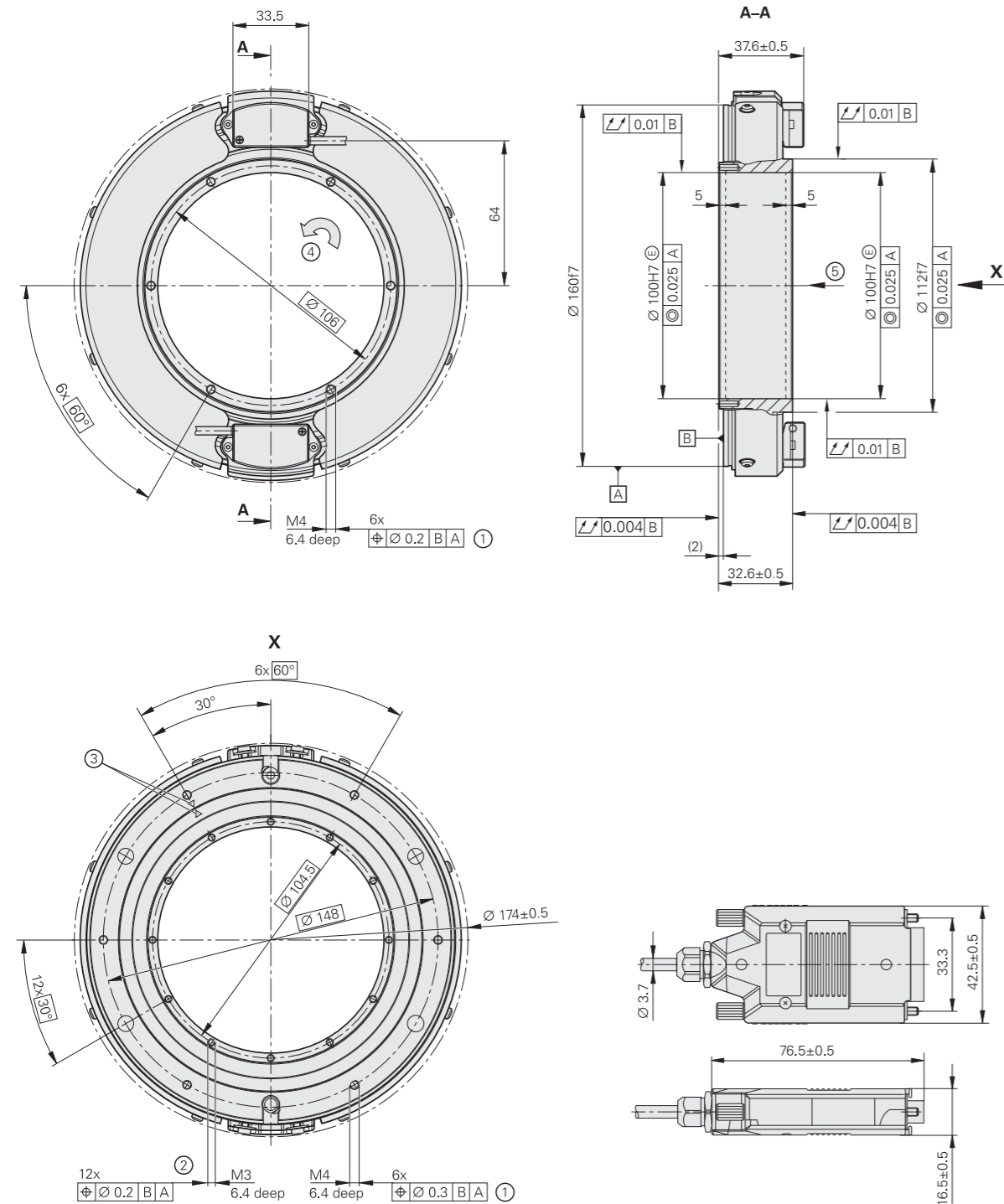
## **MRP 8081**

Angle Encoder Module with  
Two Scanning Heads and  
Compensation Data

# MRP 8081

Angle encoder module with two scanning heads and compensation data

- Very high system accuracy
- Resilient angle measurement
- Hollow shaft Ø 100 mm
- Axial load of up to 300 N



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

- 1 = Tightening torque of the M4 – 8.8 cylinder head screws: 2.5 Nm ±0.13 Nm
- 2 = Tightening torque of the M3 – 8.8 cylinder head screws: 1.1 Nm ±0.05 Nm
- 3 = Marking of the 0° position ±5°
- 4 = Direction of shaft rotation for ascending position values
- 5 = Required direction for axial forces

## Transferable accuracy

In order to achieve accuracies in the high-end range, customers must often perform a very complex and time-consuming calibration of the entire machine. Under the motto “transferable accuracy,” HEIDENHAIN contributes to facilitating the mounting process for the customer and to transferring the high accuracy of our encoders to the customer’s application without any losses. For the MRP 8081 encoders, this is achieved based on the following features:

- Sturdy, mechanical interface for mounting on the customer side
- Combination of rigid bearing unit and already adjusted scanning
- Second scanning head for position calculation for resilient angle measurement
- Compensation data for boosting the system accuracy

### Electrical connection

The MRP 8081 angle encoder module provides two separate connections (D-sub, 15-pin) with 1 V<sub>PP</sub> interface. The EIB 74x and EIB 1512 signal converters that are available from HEIDENHAIN can be used to operate the encoder. The encoder can also be connected to subsequent electronics from third-party suppliers if they provide two 1 V<sub>PP</sub> inputs.

### Compensation data file

The included compensation data file in CSV format basically contains a two-dimensional table. In this table, the angular positions from the two scanning heads, which have already been taken into account in the calculation, are assigned the corresponding compensation values for boosting the accuracy. The compensation data file is provided on a USB stick together with the encoder.

### Position calculation with an EIB 1512

If an EIB 1512 signal converter is used, then the two position inputs from the 1 V<sub>PP</sub> scanning heads are used to calculate one position at the output with the EnDat 2.2 interface.

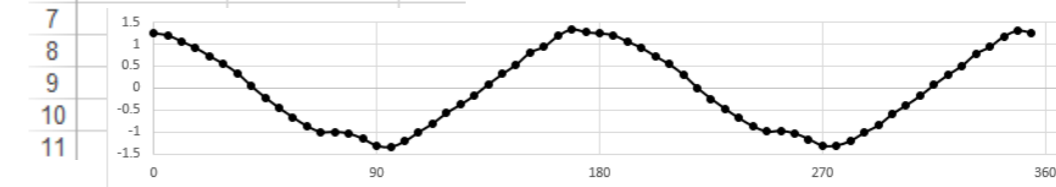
### Position calculation with an EIB 74x or subsequent electronics from third-party suppliers

The following equation needs to be implemented for position calculation:

$$X_{avg} = \frac{(X1_{abs} + X2_{abs})}{2}$$

- X1<sub>abs</sub>: input signal from scanning head 1
- X2<sub>abs</sub>: input signal from scanning head 2
- X<sub>avg</sub>: arithmetic mean value of inputs X1<sub>abs</sub> and X2<sub>abs</sub>

	A	B
1	X <sub>avg</sub> [°]	Corr [°]
2	0	-0.00461
3	0.1	-0.01568
4	0.2	-0.0254
5	0.3	-0.03566
6	0.4	-0.04636



# Specifications

Encoder	Incremental MRP 8081
<b>Measuring standard</b>	OPTODUR circular scale
Signal periods	63000
<b>System accuracy</b>	±0.40"
Position error per signal period	±0.10"
Repeatability	From both directions: 0.2"
RMS position noise	Typically 0.003"
<b>Interface</b> <sup>1)</sup>	2 x $\sim$ 1 V <sub>PP</sub>
Reference marks	150 (distance-coded)
Cutoff frequency -3 dB	≥ 500 kHz
<b>Electrical connection</b> <sup>1)</sup>	2 x 1.5 m cable with 15-pin D-sub connector; interface electronics inside the connector
Cable length <sup>1)</sup>	≤ 30 m (with HEIDENHAIN cable)
Supply voltage <sup>1)</sup>	DC 5 V ±0.25 V
Power consumption <sup>1)</sup> (maximum)	5.25 V: ≤ 950 mW
Current consumption (typical) <sup>1)</sup>	175 mA (without load)

<sup>1)</sup> Separate electrical connection for each scanning head



MRP 8081

Bearing	Incremental MRP 8081
<b>Shaft</b>	Hollow through shaft D = 100 mm
Max. permissible axial load <sup>1)</sup>	300 N (centered load)
Max. permissible radial load <sup>1)</sup>	100 N
Max. permissible tilting torque <sup>1)</sup>	6 Nm
Contact stiffness	Axial: 684 N/μm Radial: 367 N/μm (calculated values)
Resistance to tilt	1250 Nm/mrad (calculated value)
Mech. permissible speed	300 rpm
Moment of friction	≤ 0.2 Nm
Starting torque	≤ 0.2 Nm
Max. transferable shaft torque <sup>1)</sup>	10 Nm
Moment of inertia of rotor	$2.8 \cdot 10^{-3} \text{ kgm}^2$
Radial guideway accuracy	≤ 0.15 μm (measured at distance h = 70 mm from the mating surface of the rotor <sup>2)</sup> )
Non-reproducible radial guideway accuracy	≤ 0.20 μm (measured at distance h = 70 mm from the mating surface of the rotor <sup>2)</sup> )
Axial guideway accuracy	≤ ±0.15 μm
Axial runout of the shaft	≤ 4 μm
Wobble of the axis	0.5"
<b>Vibration</b> 55 Hz to 2000 Hz <b>Shock</b> 6 ms	≤ 200 m/s <sup>2</sup> (EN 60068-2-6) ≤ 100 m/s <sup>2</sup> (EN 60068-2-27) (without load)
<b>Protection</b> EN 60529 <sup>3)</sup>	IP20
<b>Operating temperature</b> <b>Storage temperature</b>	0 °C to 50 °C 0 °C to 50 °C
<b>Relative air humidity</b>	≤ 75 % without condensation
<b>Mass</b>	2.15 kg (without cable or connector)



<sup>1)</sup> Purely static load, without additional vibrations or shock load

<sup>2)</sup> See the *Measuring and bearing accuracy* section in the *Angle Encoder Modules* brochure

<sup>3)</sup> When mounted

# Electrical connection

~ 1 V<sub>PP</sub> pin layout

15-pin D-sub connector														
	Power supply				Incremental signals						Other signals			
	<b>4</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>1</b>	<b>9</b>	<b>3</b>	<b>11</b>	<b>14</b>	<b>7</b>	<b>5/6/8/15</b>	<b>13</b>	<b>/</b>	
	<b>U<sub>P</sub></b>	<b>Sensor</b> U <sub>P</sub>	<b>0V</b>	<b>Sensor</b> 0V	<b>A+</b>	<b>A-</b>	<b>B+</b>	<b>B-</b>	<b>R+</b>	<b>R-</b>	<b>Vacant<sup>1)</sup></b>	<b>Vacant<sup>1)</sup></b>	<b>Vacant</b>	
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	/	Violet	Yellow	

**Cable shield** connected to housing; **U<sub>P</sub>** = 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 placed.



### Further information:

To ensure proper and intended use, comply with the specifications in the following documents.

- Brochure: *Angle Encoder Modules* 1102713-xx
- Brochure: *Interfaces of HEIDENHAIN Encoders* 1078628-xx
- Brochure: *Cables and Connectors* 1206103-xx