



## Angle Sensor HAT 3800

Magnetic Absolute Singleturn, 18 bit

CANopen Safety  
Increased Functional Safety



### Description:

HAT 3836 is a high resolution absolute measuring singleturn angle sensor.

Thanks to its non-contact magnetic measuring method and its robust design, HAT 3800 is ideally suited for rotational angle measurement in mobile machines as well as in stationary applications.

The sensor version designed for applications with increased functional safety meets the safety requirements according to SIL2 (IEC 61508) or PL d (ISO 13849), respectively.

In the CANopen version, the measured signal is digitised and made available to the CAN field bus system via the CANopen protocol. The instrument parameters can be viewed and configured by the user via the CANopen object directory using standard CAN software.

The sensor is therefore ideally suited for mobile machines and stationary applications, especially in applications with increased safety requirements and wherever high-resolution data acquisition is required.

Especially for the use in public traffic vehicles, HAT 3800 has  $E_{13}$  approval (approved for road vehicles) in accordance with ECE type approval.

### Technical data:

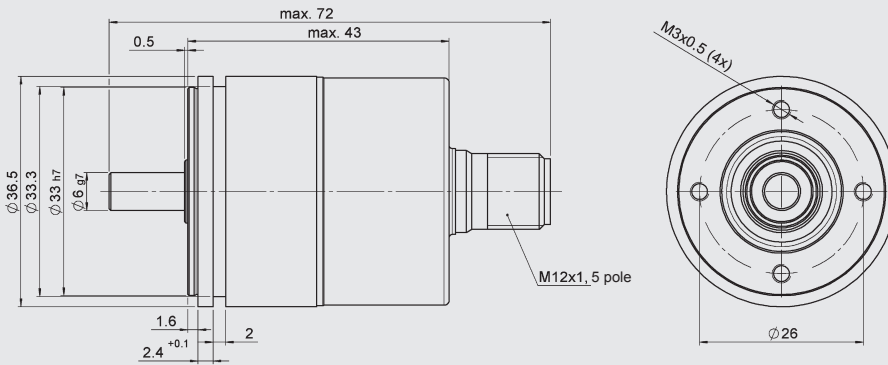
Input data	
Measuring range	0 .. 360 °
Direction of rotation	No orientation restrictions
Max. speed	1,000 rpm
Max. axial load	60 N
Max. radial load	100 N
Housing material	Stainless steel
Shaft material	Stainless steel
Output data	
Output signal	CANopen Safety
Resolution	18 bit
Accuracy (at room temperature)	± 0.1 ° typ. ± 0.2 ° max.
Accuracy (over the temperature range)	± 0.05 ° / 10 K typ. ± 0.1 ° / 10 K max.
Repeatability	± 0.05 °
Angle increase	cw / ccw (factory-set)
Environmental conditions	
Operating temperature range	-40 .. +85 °C
Storage temperature range	-40 .. +85 °C
CE mark	EN 61000-6-1 / 2 / 3 / 4
$E_{13}$ mark	E13*10R00*10R05*14137*00
Vibration resistance acc. to DIN EN 60068-2-6: 2010	7.5 mm (5 Hz ≤ f < 8.2 Hz) 2 g (8.2 Hz ≤ f < 2000 Hz)
Shock resistance acc. to DIN EN 60068-2-27: 2011	20 g (11 ms in 3 axes)
Protection class acc. to DIN EN 60529 <sup>1)</sup>	IP 67
Protocol data for CANopen Safety	
Communication profile	CiA DS 301 V4.2.0 / DS 304 V1.0.1
NMT-Services	CiA DSP 302 V4.1
Layer setting services and protocol	CiA DSP 305 V2.2
Encoder Device Profile	CiA DS 406 V3.2
Baud rates	10 kbit/s .. 1 Mbit/s acc. to DS305 V2.2
Transmission services - PDO - Transfer	Measured value as 32 bit and float synchronous, asynchronous, cyclical
Node ID / baud rate	Adjustable via LSS
Safety-related data	
Performance level	
Based on	DIN EN ISO 13849-1:2008
PL	d
Architecture	Category 2
Safety Integrity Level	
Based on	DIN EN 61508:2010
SIL	2
Other data	
Supply voltage	9 .. 36 V DC
Residual ripple of supply voltage	≤ 5 %
Power consumption	< 1.4 W
Life expectancy	1.5 * 10 <sup>9</sup> rotations at 1000 rpm
Weight	approx. 180 g

Note: Reverse polarity protection of the supply voltage, overvoltage, override and short circuit protection are provided.

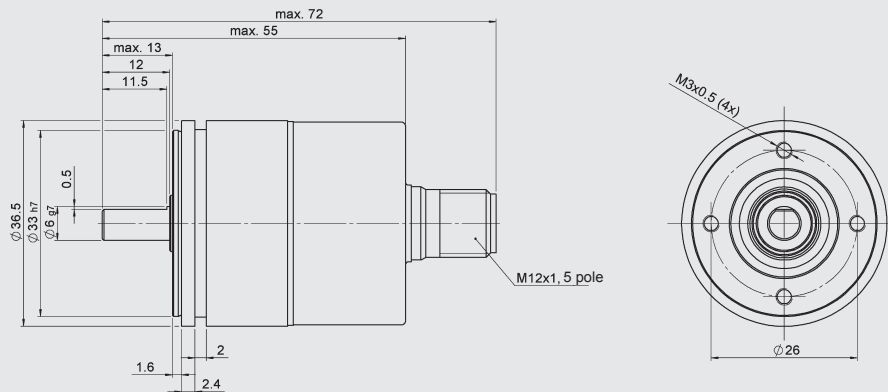
<sup>1)</sup> With mounted mating connector in corresponding protection class

## Dimensions:

### Solid shaft:



### D-shape:



## Model code:

**HAT 38 36 - F13 - XXXX - P01 - XXXX - M01 - S2PD - 000**

### Resolution

8 = 18 bit

### Flange diameter

36 = 36 mm

### Output signal

F13 = CANopen Safety

### Measuring range in ° and direction of rotation

360R = 360°, clockwise

360L = 360°, anticlockwise

### Electrical connection

P01 = male M12x1, 5 pole axial

### Mechanical connection

V126 = solid shaft, length 12 mm, diameter 6 mm

D126 = D-shape, length 12 mm, diameter 6 mm

### Type of installation

M01 = synchro flange with 4 threaded holes

### Functional safety

S2PD = SIL2 acc. to IEC 61508 and PLd – Cat 2 acc. to DIN EN 13849-1

### Modification

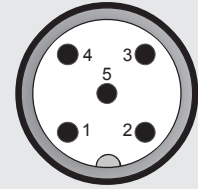
000 = standard

### Accessories:

Appropriate accessories, such as elastic couplings and mating connectors, can be found in the Accessories brochure.

## Pin connections:

M12x1, 5 pole



PIN	Signal	Description
1	n.c.	
2	+U <sub>B</sub>	Supply+
3	-U <sub>B</sub>	Supply-
4	CAN_H	Bus line dominant high
5	CAN_L	Bus line dominant low

## Note:

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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