Angle Sensor

HAT 1425 for joint integration

CANopen Safety
Two-chamber design
Enhanced functional safety

Magnetic	Absolute	Singleturn, 14 bit

CANopen safety easy to use

E13

Functional Safety
PL d
SIL 2

Features

- Contactless, magnetic measurement
- Particularly suited for the integration inside of joints and in bolts
- Simple fixing of a flat lever without connection shaft
- IP 6K9K (two-chamber design)
- Functional safety SIL 2 acc. to EN 61508 PL d acc. to ISO 13849

Description

HAT 1400 is an absolute measuring singleturn angle sensor.

Thanks to its compact design and its small diameter, the sensor is particularly suited for the integration inside of joints and in bolts. A connection with two screwing bores enables simple fixing of a flat lever without connection shaft.

Due to its two-chamber design, the electronic unit is completely encapsulated which means it meets IP 6K9K if the electrical connection is carried out accordingly.

The sensors meet the safety requirements according to SIL2 (IEC 61508) and PL d (ISO 13849).

The measured value is digitized 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.

Application fields

Thanks to its non-contact magnetic measuring method and its robust design, the HAT 1400 is ideally suited for the measurement of the rotational angle in mobile machines.

The sensor is therefore particularly suitable for a large variety of applications in the automobile industry and in mobile work machines, especially for applications with increased safety requirements.

Especially for the use in public traffic vehicles, HAT 1425 is approved for road vehicles according ECE type approval via the E13 approval.

Technical details

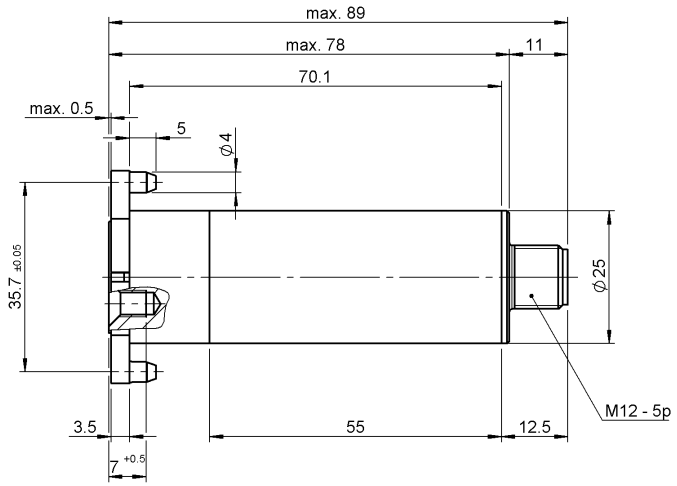
Input data		
Measurement range		0 .. 360 °
Direction of rotation		No orientation restrictions
Max. axial load		60 N
Max. radial load		100 N
Material, housing		Stainless steel
Material, rotatable fixing ring		Stainless steel
Output data		
Output signal		CANopen Safety
Resolution		14 bit
Accuracy (at room 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
E1 mark		E13*10R05/01*15314*00
Vibration resistance acc. to DIN EN 60068-2-6: 2008		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: 2010		20 g (11 ms in 3 axes)
Protection type to DIN EN 60529 [1)]		IP 67, IP 6K9K (electronics)
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 to 1 Mbit/s according to DS305 V2.2
Transmission services - SRDO / PDO - Transfer		 Measured value as 32 bit synchronous, asynchronous, cyclical
Node ID/ Baud rate		Adjustable via LSS
Safety-related data		
Performance Level	Based on PL	DIN EN ISO 13849-1:2008
	PL	d
	Architecture	Category 2
Safety Integrity Level	Based on SIL	DIN EN 61508:2010
	SIL	2
	Architecture	1oo1 / 1oo2
Other data		
Supply voltage		9 .. 36 V DC
Residual ripple of supply voltage		≤ 5 %
Power consumption		< 1.4 W
Weight		With fixing ring: ~ 135 g with mounting flange: ~ 166 g

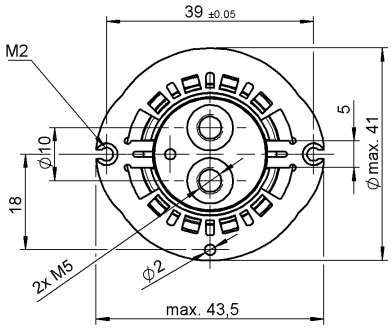
Note: Reverse polarity protection of the supply voltage, overvoltage, override and short circuit protection are provided.

[1)] With mating connector of corresponding protection type fitted

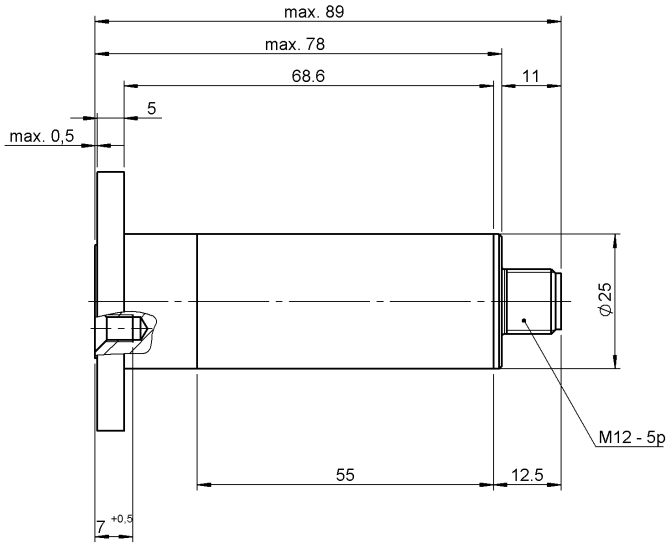
Dimensions

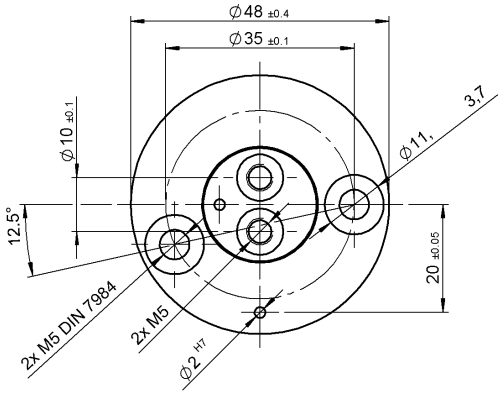
Mounting M04 (fixing ring)



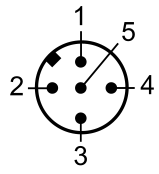


Mounting M05 (mounting flange)





Pin connections

M12x1, 5 pole	Pin	Output signal: F1X	
		Signal	Description
	1	CAN_SHLD	Shield/housing
	2	CAN_V+	External supply +
	3	CAN_GND	Ground / 0 V / V -
	4	CAN_H	Bus line dominant high
	5	CAN_L	Bus line dominant low

Model code

HAT 1 4 25 - F13 - XXXX - P01 - DK21 - MXX - S2PD - 000

Resolution
4 = 14 Bit

Housing diameter
25 = 25 mm

Output signal
F13 = CANopen Safety

Measuring range in ° and rotational direction [1)]
360R = 360°, clockwise rotation
360L = 360 °, anti-clockwise

Connection code, electrical
P01 = Installation plug M12x1; 5 pole, axial

Mechanical connection
DK21 = Rotatable fixing ring Ø21 with 2x M5 bores

Fixing type
M04 = Fixing ring (supplied with the device)
M05 = Mounting flange

Functional Safety
S2PD = SIL2 to IEC 61508 and PLd to DIN EN 13849-1

Modification number
000 = Standard

Accessories:
Appropriate accessories, such as mating connectors, can be found in the Accessories brochure.

Note:
Special models on request
[1)] Viewed from the fixing side

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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