CE   CANopen

Model Number

CVM42H

Heavy-duty encoder

Features

- **Sturdy construction**
- **Highly shock / vibration and soiling resistant**
- **Increased shaft load capacity**
- **Stainless steel housing**
- **IP69K**
- **Very small housing**

Description

This absolute rotary encoder with magnetic sampling provides a position value corresponding to the shaft position on its integrated CAN bus interface.

The very sturdy design of this encoder has been dimensioned for use in harsh environmental conditions and high mechanical stress.

The integrated CAN-bus interface supports all CANopen functions. Thus the following modes can be programmed to either enabled or disabled:

- Polled Mode
- Cyclic Mode
- Sync Mode

Technical data

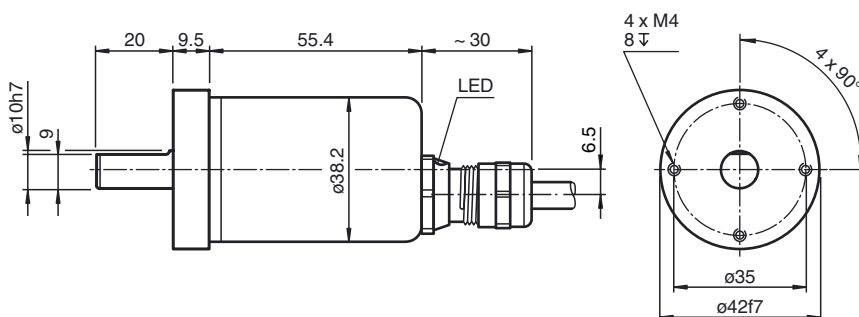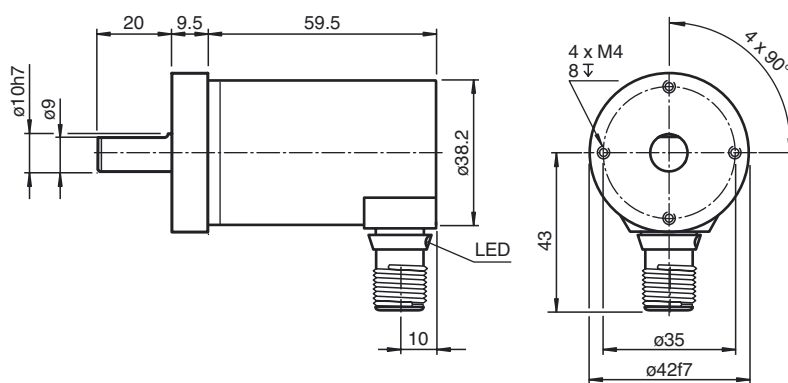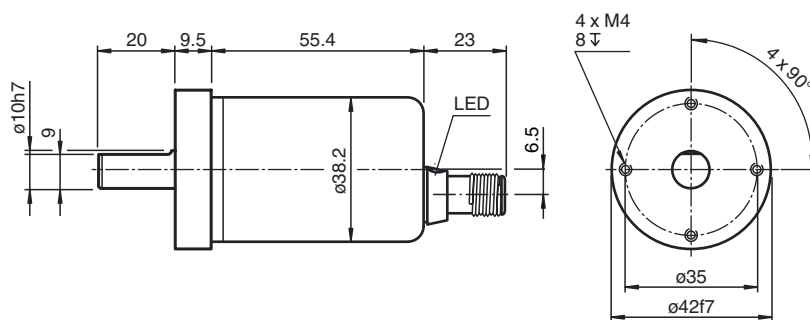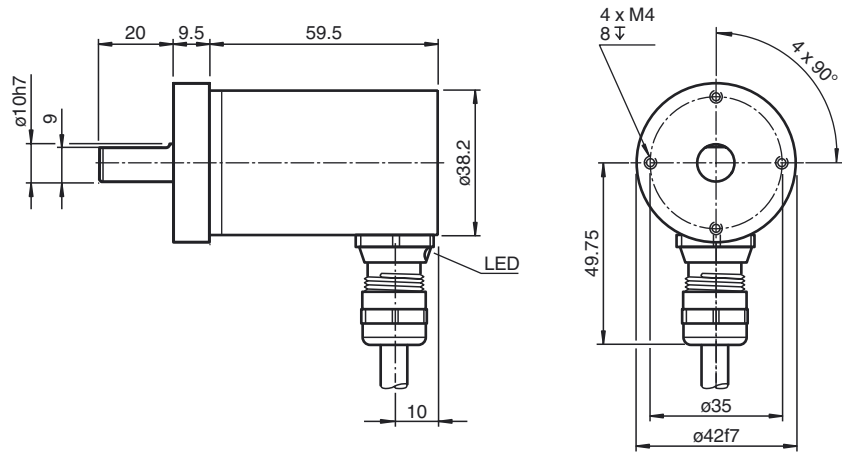| General specifications	
Detection type	magnetic sampling
Device type	Multiturn absolute encoder
Nominal ratings	
Linearity error	± 0.36 °
Indicators/operating means	
LED ERR	dual-LED, red
LED RUN	dual-LED, green
Electrical specifications	
Operating voltage U_B	10 ... 30 V DC
Power consumption P_0	≤ 1.5 W
Output code	binary code
Code course (counting direction)	adjustable
Interface	
Interface type	CANopen
Resolution	
Single turn	12 Bit
Multiturn	12 Bit
Overall resolution	24 Bit
Transfer rate	max. 1 MBit/s
Cycle time	500 µs
Standard conformity	ISO 11898
Connection	
Connector	M12 connector, 5 pin
Cable	2 m fixed cable , 5-wire , screened
Standard conformity	
Degree of protection	IEC/EN 60529
Climatic testing	DIN EN 60068-2-3 , 95 % , no moisture condensation
Emitted interference	EN 61000-6-4:2007
Noise immunity	EN 61000-6-2:2005
Shock resistance	DIN EN 60068-2-27, 300 g, 6 ms
Vibration resistance	DIN EN 60068-2-6, 30 g, 55 ... 2000 Hz
Ambient conditions	
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	98 % , no moisture condensation
Mechanical specifications	
Flange	servo flange 42 mm with 4 x Threading M4
Shaft dimensions Ø x l	10 mm x 20 mm
Degree of protection	IP65 / IP67 / IP68 / IP69k
Material	
Housing	Stainless steel 1.4404 / AISI 316L
Flange	Stainless steel 1.4404 / AISI 316L
Shaft	Stainless steel 1.4412 / AISI 440B
Mass	approx. 350 g
Rotational speed	max. 6000 min $^{-1}$
Moment of inertia	30 gcm^2
Starting torque	< 5 Ncm
Shaft load	
Axial	270 N
Radial	270 N

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Dimensions

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Electrical connection

Signal	Connector	Cable
CAN GND	1	green
V_S (10 ... 30 V DC)	2	red
GND	3	yellow
CAN-High	4	white
CAN-Low	5	brown
Shielding	Housing	screen
Pinout		

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Programmable CAN operating modes

Mode	Explanation
Polled mode	The connected host requests the current actual position value via a remote transmission request telegram. The absolute encoder reads in the current position, calculates all parameters that have been set and sends back the process actual value through the same CAN identifier.
Cyclic mode	The absolute encoder sends the current actual process value cyclically, without being prompted by the host. The cycle time can be programmed in milliseconds for values between 1 ms and 65536 ms.
Sync mode	After the sync telegram has been received by the host, the absolute encoder sends the current actual process value. If multiple nodes should respond to the sync telegram, the individual nodes report one after the other according to their CAN identifier. There is no programming of an offset time. The sync counter can be programmed so that the rotary encoder does not transmit until after a defined number of sync telegrams.

Programmable rotary encoder parameters

Parameter	Explanation
Operating parameter	The direction of rotation (complement) can be specified by parameter as the operating parameter. This parameter determines the direction of rotation in which the output code will ascend or descend.
Resolution per revolution	The "Resolution" parameter is used to program the rotary encoder so that a desired number of steps can be implemented in reference to one revolution.
Preset value	The preset value is the desired position value that must be achieved for a specific physical setting of the axis. The preset value parameter is used to set the actual position value to the desired actual process value.
Min. and max. limit switch	A total of two positions can be programmed. The absolute encoder sets one bit to high state in the 32 Bit actual process value if a value falls outside the range between these two positions.
Cam	8 freely programmable cams can be set within the overall resolution. This produces the functionality of a mechanical cam shifting mechanism.

Status LED

The rotary encoder is equipped with a two-color status LED. The LED lights up both red and green, and displays the physical bus status and the status of the CANopen state machine. The following statuses are defined:
- LED on
- LED off
- Led flickers (rapid flashing at approx. 10 Hz)
- Led flashes (slow flashing at approx. 2.5 Hz)
- Single flash (LED flashes once briefly, followed by a pause of approx. 1 s)
- Double flash (LED flashes twice briefly, followed by a pause of approx. 1 s)
- Triple flash (LED flashes three times briefly, followed by a pause of approx. 1 s)
- Quadruple flash (LED flashes four times briefly, followed by a pause of approx. 1 s)

If there is any conflict as to whether the red or the green LED should be activated, only the red LED is activated. In all other instances, the two-color LED will combine the behavior of the CAN Error LED (red) and the CAN Run LED (green).

Description of the CANopen Error LED (red)

Error LED (red)	CANopen status	Description
LED off	No error	Normal operating mode.
LED flickers	Auto bit rate/LSS	Automatic bit rate detection or LSS service in operation (alternating with Run LED).
LED flashes	Faulty configuration	General configuration error.
Single flash	Warning limit has been reached	At least one of the CAN controller error counters has reached or exceeded the warning limit (too many error frames).
Double flash	Error event	A guard event (NMT slave or NMT master) or a heartbeat event (heartbeat consumer) has occurred.
Triple flash	Sync error	The sync message was not received within the configured communication time-out. See object 1006h.
Quadruple flash	Event timer error	An anticipated PDO (process data object) was not received before the event timer expired.
On	No bus signal	The CAN controller has no connection to the bus.

Description of the CANopen Run LED (green)

Run LED (green)	CANopen status	Description
LED flickers	Auto bit rate/LSS	Automatic bit rate detection or LSS service in operation (alternating with Error LED).
LED flashes	PREOPERATIONAL	The device is in PREOPERATIONAL status.
Single flash	STOPPED	The device is in STOPPED status.
Double flash	-	Reserved
Triple flash	Program/firmware upload	Software is being uploaded to the device.
On	OPERATIONAL	The device is in OPERATIONAL status.

Order code

```
C  V  M  4  2  H  –  0  1  R        1  B  N  –  1  2  1  2
```

Number of bits singleturn
12   4096 (standard)

Number of bits multiturn
12   4096 (standard)

Option 2
N   Normal

Output code
B   Binary

Option 1
1   with Status-LED

Exit position
A   Axial
R   Radial

Connection type
BD   Device connector M12 x 1, 5 pin
K2   2 m cable

Shaft dimension/flange version
01R   Shaft Ø10 mm x 21 mm with 42 mm servo flange

Housing material
H   Heavy Duty

Principle of operation
M   Multiturn

Shaft version
V   Solid shaft

Data format
C   CAN bus

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