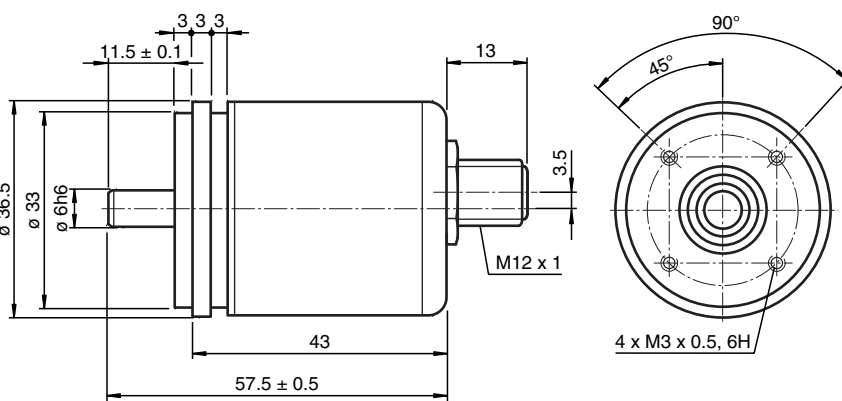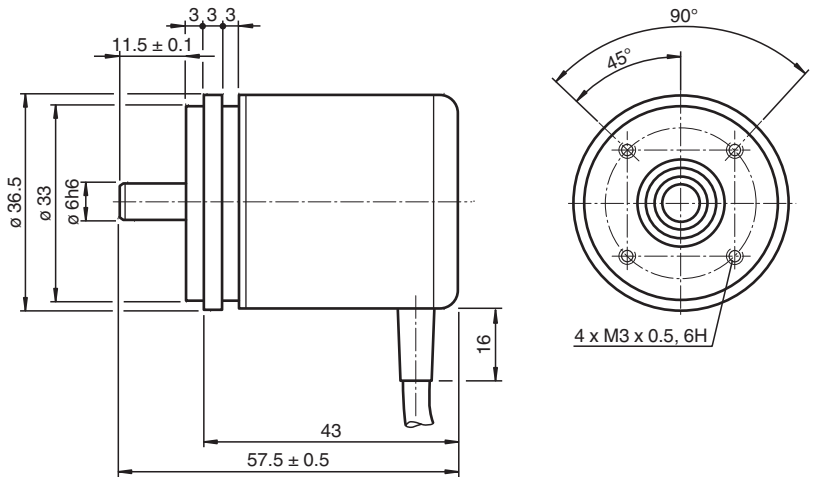# Multiturn absolute encoder
CVM36M-******

- Very small housing
- High climatic resistance
- Up to 25 Bit multiturn
- Galvanically isolated CAN interface
- Surge and reverse polarity protection
- 2 limit switches
- 8 cam switches

CANopen®

Technical Data

General specifications

Detection type	magnetic sampling
Device type	Multiturn absolute encoder

Electrical specifications

Operating voltage	U_B	10 ... 30 V DC

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Technical Data

Power consumption	P_0	approx. 2 W
Time delay before availability	t_v	< 250 ms
Linearity		± 0.36 °
Output code		binary code
Code course (counting direction)		adjustable
Interface		
Interface type		CANopen
Resolution		
Single turn		up to 13 Bit (hysteresis: 0.1 °)
Multiturn		up to 12 Bit
Overall resolution		up to 25 Bit
Transfer rate		max. 1 MBit/s
Standard conformity		DSP 406, CLASS 2
Connection		
Connector		M12 connector, 5 pin
Cable		Ø6 mm, 4 x 2 x 0.14 mm², 1 m
Standard conformity		
Degree of protection		acc. DIN EN 60529
Connection side		cable models: IP54 connector models: IP65
Shaft side		IP65
Climatic testing		DIN EN 60068-2-3 , 98 % , no moisture condensation
Emitted interference		EN 61000-6-4:2007
Noise immunity		EN 61000-6-2:2005
Shock resistance		DIN EN 60068-2-27, 100 g, 6 ms
Vibration resistance		DIN EN 60068-2-6, 10 g, 10 ... 1000 Hz
Ambient conditions		
Operating temperature		cable, flexing: -5 ... 70 °C (-23 ... 158 °F), cable, fixed: -30 ... 70 °C (-22 ... 158 °F) connector models: -30 ... 85 °C (-22 ... 185 °F)
Storage temperature		cable models: -30 ... 70 °C (-22 ... 158 °F) connector models: -30 ... 85 °C (-22 ... 185 °F)
Relative humidity		98 % , no moisture condensation
Mechanical specifications		
Material		
Housing		nickel-plated steel
Flange		Aluminum
Shaft		Stainless steel
Mass		approx. 150 g , with cable
Rotational speed		max. 12000 min $^{-1}$
Moment of inertia		30 gcm²
Starting torque		< 3 Ncm
Shaft load		
Axial		20 N
Radial		40 N

Accessories

	9108, 6	Measuring wheel
	9109, 6	Measuring wheel for shaft diameter 6 mm

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

Accessories

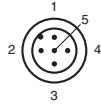|	9110, 6	Measuring wheel for shaft diameter 6 mm
	9113, 6	Measuring wheel for shaft diameter 6 mm
	V15-G-PG9	Female connector M12 straight A-coded 5-pin, for cable diameter 6 - 8 mm, field-attachable

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Function

This absolute rotary encoder provides a position value corresponding to the shaft position on its integrated CAN bus interface. The rugged miniature series Cxx**36M** encoders are based on magnetic sampling.

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

Connection

Signal	Wire end	5-pin, M12 x 1 connector
CAN GND	green	1
$+V_S$	red	2
GND	yellow	3
CAN-High	white	4
CAN-Low	brown	5
Shielding	Shielding	Housing
Pinout		

Programming

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.

Order code

| C | V | M | 3 | 6 | M | – | 0 | 3 | S | | | | 0 | B | N | – | 1 | 2 | | |

Number of bits singleturn
12 4096 (standard)
13 8192 (max.)

Number of bits multiturn
12 4096 (standard)

Temperature
N Normal

Output code
B Binary

Option
0 none

Exit position
A Axial
R Radial (only cable version)

Connection type
K1 Cable Ø6 mm, 4 x 2 x 0.14 mm², 1 m
BD Connector, M12 x 1, 5 pin

Shaft dimension/flange version
03S Shaft Ø6 mm x 11.5 mm with servo flange

Sampling principle
M magnetic

Principle of operation
M Multiturn

Shaft version
V Solid shaft

Data format
C CANopen

Installation

Anti-interference measures

The use of highly sophisticated microelectronics requires a consistently implemented anti-interference and wiring concept. This becomes all the more important the more compact the constructions are and the higher the demands are on the performance of modern machines.

The following installation instructions and proposals apply for "normal industrial environments". There is no ideal solution for all interfering environments.

When the following measures are applied, the encoder should be in perfect working order:
- Termination of the serial line with a 120 Ω resistor (between Receive/Transmit and Receive/Transmit) at the beginning and end of the serial line (e. g. the control and the last encoder).
- The wiring of the encoder should be laid at a large distance to energy lines which could cause interferences.
- Cable cross-section of the screen at least 4 mm².
- Cable cross-section at least 0,14 mm².
- The wiring of the screen and 0 V should be arranged radially, if and when possible.
- Do not kink or jam the cables.
- Adhere to the minimum bending radius as given in the data sheet and avoid tensile as well as shearing load.

Operating instructions

Every encoder manufactured by Pepperl+Fuchs leaves the factory in a perfect condition. In order to ensure this quality as well as a faultless operation, the following specifications have to be taken into consideration:
- Avoid any impact on the housing and in particular on the encoder shaft as well as the axial and radial overload of the encoder shaft.
- The accuracy and service life of the encoder is guaranteed only, if a suitable coupling is used.
- The operating voltage for the encoder and the follow-up device (e. g. control) has to be switched on and off simultaneously.
- Any wiring work has to be carried out with the system in a dead condition.
- The maximum operating voltages must not be exceeded. The devices have to be operated at extra-low safety voltage.

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

**Notes on connecting the electric screening**

The immunity to interference of a plant depends on the correct screening. In this field installation faults occur frequently. Often the screen is applied to one side only, and is then soldered to the earthing terminal with a wire, which is a valid procedure in LF engineering. However, in case of EMC the rules of HF engineering apply.

One basic goal in HF engineering is to pass the HF energy to earth at an impedance as low as possible as otherwise energy would discharge into the cable. A low impedance is achieved by a large-surface connection to metal surfaces.

The following instructions have to be observed:

- Apply the screen on both sides to a "common earth" in a large surface, if there is no risk of equipotential currents.
- The screen has to be passed behind the insulation and has to be clamped on a large surface below the tension relief.
- In case of cable connections to screw-type terminals, the tension relief has to be connected to an earthed surface.
- If plugs are used, metallised plugs only should be fitted (such as sub D plugs with metallised housing). Please observe the direct connection of the tension relief to the housing.

Advantage: metalised connector, shield

clamped with the strain

relief

clamp

Disadvantage: soldering shield on
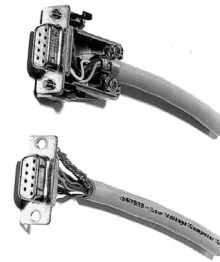
Safety instructions

Please observe the national safety and accident prevention regulations as well as the subsequent safety instructions in these operating instructions when working on encoders.

If failures cannot be remedied, the device has to be shut down and has to be secured against accidental operation.
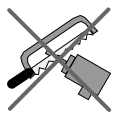
Repairs may be carried out only by the manufacturer. Entry into and modifications of the device are not permissible.

Tighten the clamping ring only, if a shaft has been fitted in the area of the clamping ring (hollow shaft encoders).

Tighten all screws and plug connectors prior to operating the encoder.
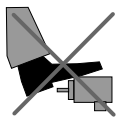
Do not stand on the encoder!

Do not remachine the drive shaft!

Avoid impact!

Do not remachine the housing!

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

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