



Model Number

PVM78E

Features

- Up to 30 Bit multiturn
- ATEX approval
- IECEx approval
- Flameproof enclosure
- Removable connection cap

Description

This series of PROFIBUS rotary encoders is based on the modern fast technology of singleturn sampling and the mechanical gear box of the multiturn unit. The absolute encoder corresponds to the PROFIBUS profile for encoders, order no. 3.062. Operation is supported based on Class 1 and Class 2.

For operation based on Class 1, position data and diagnostic data bytes 1 ... 16 are available. In addition, the direction of the code can be selected as either cw ascending (clockwise rotation, code course ascending) or cw descending (clockwise rotation, code course descending).

If the rotary encoder is operated according to Class 2, additional functions to those from Class 1 are available. These include scaling of the resolution per revolution and the overall resolution, as well as the preset function. In addition, expanded diagnostic reporting is supported.

Besides, the rotary encoder offers extended functionalities such as speed transfer, extended scaling functions, programmable limit switches and a commissioning mode.

The removable connecting hood contains a slide switch for setting the terminating resistor and the rotary switches for setting the address. Assign a fixed address and bus termination to the encoder with this switches.

The device is designed for shaft mounting and is available in servo flange or clamping flange design.

Technical Data

General specifications

Detection type	photoelectric sampling
Device type	Multiturn absolute encoder

Functional safety related parameters

MTTF _d	37 a
Mission Time (T _M)	20 a
L ₁₀	7.7 E+9 at 3000 rpm
Diagnostic Coverage (DC)	0 %

Electrical specifications

Operating voltage U _B	10 ... 30 V DC
No-load supply current I ₀	max. 230 mA at 10 V DC max. 100 mA at 24 V DC
Time delay before availability t _v	< 1000 ms
Linearity	± 2 LSB at 16 Bit, ± 1 LSB at 13 Bit, ± 0,5 LSB at 12 Bit
Output code	binary code
Code course (counting direction)	programmable, cw ascending (clockwise rotation, code course ascending) cw descending (clockwise rotation, code course descending)

Interface

Interface type	PROFIBUS
Resolution	
Single turn	up to 16 Bit
Multiturn	up to 14 Bit
Overall resolution	up to 30 Bit
Transfer rate	0.0096 ... 12 MBit/s
Standard conformity	PNO profile 3.062, RS-485

Connection

Cable	Ø9.6 mm, 7-core
Terminal compartment	see ordering information

Standard conformity

Degree of protection	DIN EN 60529, IP66
Climatic testing	DIN EN 60068-2-3, 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, 3 ms
Vibration resistance	DIN EN 60068-2-6, 10 g, 10 ... 2000 Hz

Ambient conditions

Operating temperature	-40 ... 70 °C (-40 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)

Mechanical specifications

Material	
Combination 1	housing: anodized aluminum flange: anodized aluminum shaft: Stainless steel 1.4401 / AISI 316
Combination 2 (Inox)	housing: stainless steel 1.4404 / AISI 316L flange: stainless steel 1.4404 / AISI 316L shaft: Stainless steel 1.4401 / AISI 316
Mass	approx. 2600 g (combination 1) approx. 3900 g (combination 2)
Rotational speed	max. 3000 min ⁻¹
Moment of inertia	180 gcm ²
Starting torque	≤ 4 Ncm
Shaft load	
Axial	60 N
Radial	80 N

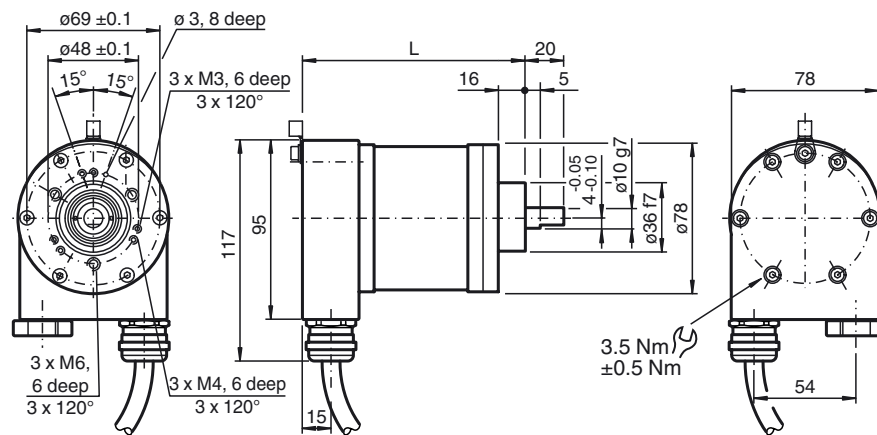
Data for application in connection with hazardous areas

EU-type examination certificate	ITS 15 ATEX 18372X IECEx ITS 15.0061X
Marking	⊕ II 2G Ex d IIC T5 Gb ⊕ II 2D Ex tb IIIC T100°C Db
Directive conformity	
Directive 2014/34/EU	IEC 60079-0:2011 , EN 60079-0:2012+A11:2013 , IEC 60079-1:2014 , EN 60079-1:2014 , IEC 60079-31:2013 , EN 60079-31:2014

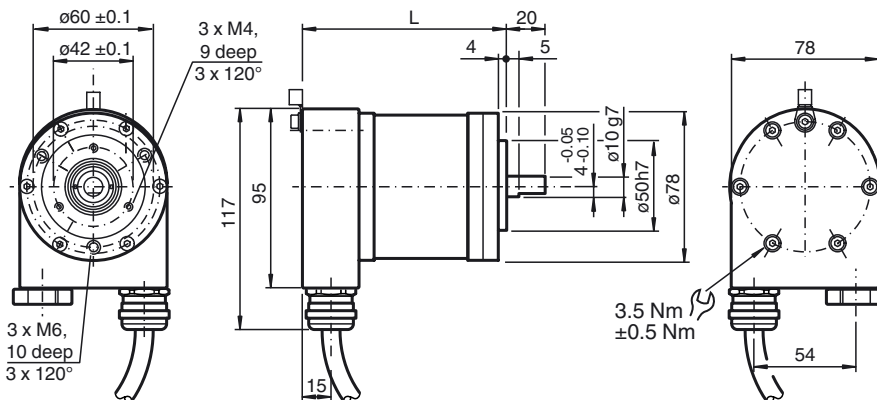
Dimensions

Encoder length L

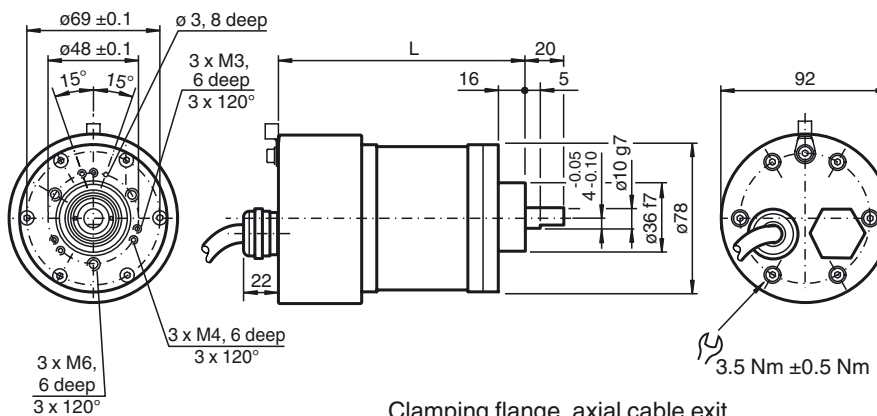
Version		Length L
Radial cable exit	Clamping flange	109 mm
	Servo flange	109 mm
Axial cable exit	Clamping flange	125 mm
	Servo flange	125 mm



Clamping flange, cable exit radial

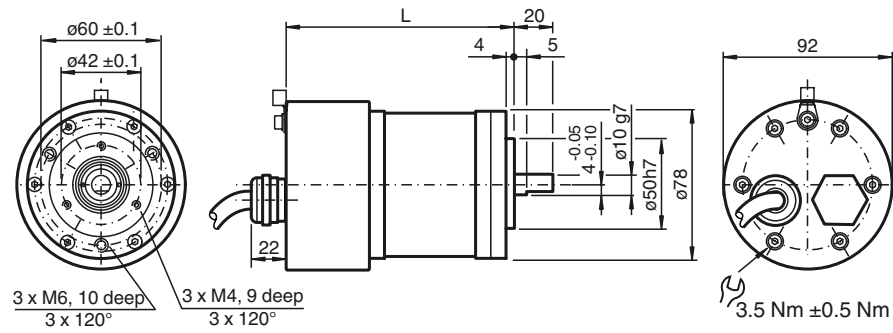


Servo flange, radial cable exit



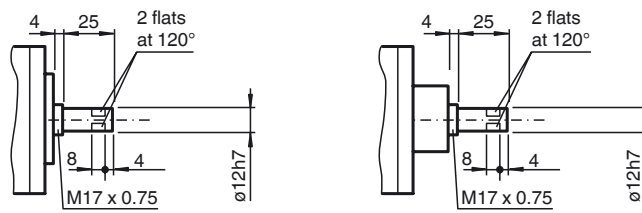
Clamping flange, axial cable exit

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Servo flange, axial cable exit

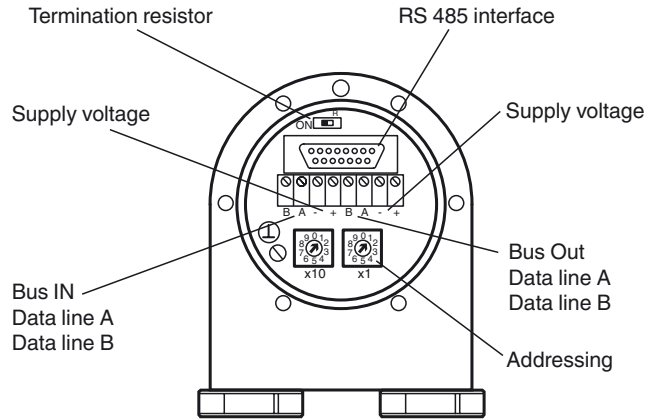
Shaft 12 mm



Electrical connection

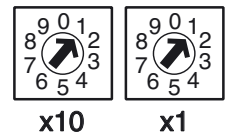
Signal	Terminal	Cable Ø9.6 mm, 7-core	Description
GND encoder	-	1	- Supply voltage
U_S encoder	+	2	+ Supply voltage
RxD/TxD-P	B	3	Data wire B (pair 1), bus in
RxD/TxD-N	A	4	Data wire A (pair 1), bus in
RxD/TxD-P	B	5	Data wire B (pair 2), bus out
RxD/TxD-N	A	6	Data wire A (pair 2), bus out
potential earth	⊥	GN/YE	

Indicating and operating elements



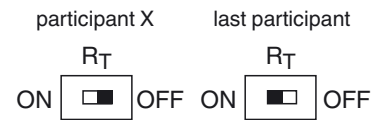
Adjusting the participant address

The participant address can be adjusted with the rotary switches. The address can be defined between 1 and 99, and may only be assigned once.

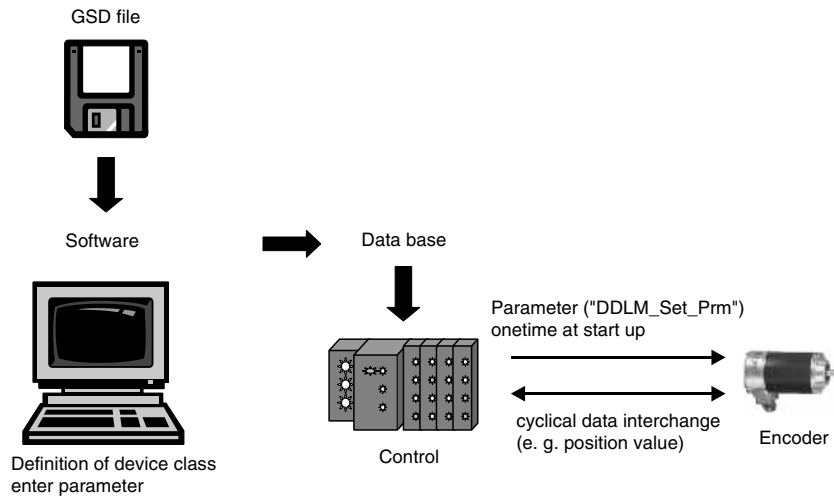


Adjusting the termination resistor

The terminating resistor R_T (220 Ω) can be connected to the circuit by means of the switch:



Principle of data transmission



Parameter table encoder classes P+F 2.1 and P+F 2.2

Octet number (Byte)	Parameter	Bit number
1...8	PROFIBUS standard parameters	
9	Direction of rotation	0
	Class 2 functionality	1
	Commissioning Diagnostics	2
	Scaling function	3
	Reserved	4
	Reserved	5
	Activate manufacturer specific parameters (Octet 26)	6
	Reserved	7
10 ... 13	Desired measuring steps (reference: Octet 26, Bit 0 and 1)	
14 ... 17	Overall resolution	
18 ... 25	Reserved	
26	Reference for desired measuring steps	0
		1
	Activate commissioning mode	2
	Reduced diagnosis	3
	Reserved	4
	Activate lower software limit switch	5
	Activate upper software limit switch	6
	Activation of the parameters from Octet 27	7
27 ... 30	Lower limit switch	
31 ... 34	Upper limit switch	
35 ... 38	Physical measuring steps	
39	Reserved	0
	Rotary encoder type (singleturn or multiturn)	1
	Reserved	2
	Reserved	3
	Selection of the unit for speed transfer	4
		5
	Reserved	6
	Reserved	7

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Ordering information



P	V	M	7	8	E	-	0				0	B	-			
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<p>Shaft version V Solid shaft</p> <p>Functional principle M Multiturn</p> <p>Option 1 E Explosion-proof, standard IP66</p>	<p>Shaft dimension 01 Shaft Ø10 mm x 20 mm 02 Shaft Ø12 mm x 25 mm</p>	<p>Flange version 1 Clamping flange 2 Servo flange</p>	<p>Connection type K2 Cable, 7-wire, 2 m K5 Cable, 7-wire, 5 m DR Terminal compartment, 2 cable glands KR Terminal compartment, 1 cable gland, 1 stopping plug</p>	<p>Exit position A Axial R Radial</p>	<p>Option 0 None</p>	<p>Output code B Binary</p>	<p>Housing material N Aluminum I INOX 1.4404 (AISI 316L)</p>	<p>Number of multiturn bits 12 4096 14 16384</p> <p>Number of singleturn bits 12 4096 13 8192 16 65536</p>
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Data format
P PROFIBUS

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