

# OVERVIEW

# ROTARY ENCODERS

Edition 2007





In automation, rotary encoders are used as sensors for angle, position, speed and acceleration. By the use of spindles, gear racks, measuring wheels or cable pulls, linear movements can also be picked up. They convert the actual value of a mechanical parameter into electrical signals which can be processed by counters, tachometers, programmable logic controllers and industrial PCs.

## INCREMENTAL ENCODERS

Incremental encoders supply a certain number of pulses for each shaft revolution. The measurement of the cycle duration or the counting of the pulses per unit of time supplies the speed of a movement. If the pulses after a reference point are added, the calculated value represents a parameter for the scanned angle or the distance covered. Two-channel encoders – with a phase shift of 90 deg. – enable the follow-up electronic equipment to recognise the direction of rotation of the shaft and thus permit bidirectional positioning tasks. In addition, three-channel incremental encoders provide a so-called zero signal for each revolution.



# INCREMENTAL ENCODERS

## INCREMENTAL ENCODERS

### SPECIAL DESIGNS



	Series 10	Series 20	Series 30	Series 60
Number of pulses	≤ 5,000	≤ 2,500	≤ 5,000	≤ 1,250
Design [mm]	ø58	55 x 55	ø90	74 x 74
Flange type	Clamping flange, servo flange, square flange	Square flange	Clamping flange	Square flange
Spigot [mm]	ø36, ø50	–	ø40	–
Solid shaft [mm]	ø6 x 10, ø10 x 20	ø6 x 20	ø12 x 25	ø12 x 25
Hollow shaft [mm]	–	–	–	ø7
Recessed hollow shaft [mm]	–	–	–	–
Max. rotational speed [min <sup>-1</sup> ]	10,000	3,000	6,000	6,000
Max. shaft load, axial [N]	60	10	60	40
Max. shaft load, radial [N]	80	10	80	60
Operating voltage [V DC]	5 or 10 ... 30	5 or 10 ... 30	5 or 10 ... 30	10 ... 30
Output type	Push-pull, RS 422	Push-pull, RS 422	Push-pull, RS 422	Push-pull
Max. output frequency [kHz]	100	160	100	50
Signal outputs	$\bar{A}$ , A, $\bar{B}$ , B, 0, $\bar{0}$	A, B, 0	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, B, 0
Protection class	IP65	IP40	IP65	IP50

## INCREMENTAL ENCODERS

### SINUS-COSINUS OUTPUT



**RHS58**

Pulse count	2,048 (interpolateable)
Design [mm]	ø58
Flange type	Hollow shaft
Spigot [mm]	–
Solid shaft [mm]	–
Hollow shaft [mm]	ø10, ø12, ø15
Recessed hollow shaft [mm]	–
Max. rotational speed [min <sup>-1</sup> ]	6,000
Max. shaft load, axial [N]	–
Max. shaft load, radial [N]	–
Operating voltage [V DC]	5 V
Output type	Sinus-cosinus
Max. output frequency [kHz]	200
Signal outputs	$\bar{A}$ , A, $\bar{B}$ , B, 0, $\bar{0}$
Protection class	IP54



## INCREMENTAL ENCODERS

### R-LINE



**RHI58**

**RSI58**

**RVI58**

Number of pulses		≤ 5,000	≤ 5,000	≤ 10,000
Design	[mm]	ø58	ø58	ø58
Flange type		–	–	clamping flange, servo flange
Spigot	[mm]	–	–	ø36, ø50
Solid shaft	[mm]	–	–	ø6 x 10, ø10 x 20
Hollow shaft	[mm]	ø10, ø12	–	–
Recessed hollow shaft	[mm]	–	ø10 x 20, ø12 x 20	–
Max. rotational speed	[min <sup>-1</sup> ]	6,000	12,000	12,000
Max. shaft load, axial	[N]	–	–	40
Max. shaft load, radial	[N]	–	–	60
Operating voltage	[V DC]	5 or 10 ... 30	5 or 10 ... 30	5 or 10 ... 30
Output type		Push-pull, RS 422	Push-pull, RS 422	Push-pull, RS 422
Max. output frequency	[kHz]	200	200	200
Signal outputs		A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$
Protection class		IP54	IP54	IP65

## INCREMENTAL ENCODERS

### R-LINE



**RVI50**

**RVI78**

**RHI90**

Number of pulses		≤ 2,500	≤ 5,000	≤ 2,500
Design	[mm]	ø50	ø78	ø90
Flange type		Clamping flange	Servo flange	–
Spigot	[mm]	ø30	ø42	–
Solid shaft	[mm]	ø8 x 15	ø10 x 23	–
Hollow shaft	[mm]	–	–	ø16, ø20, ø24, ø25, ø30, ø38, ø45
Recessed hollow shaft	[mm]	–	–	–
Max. rotational speed	[min <sup>-1</sup> ]	10,000	6,000	3,500
Max. shaft load, axial	[N]	30	50	–
Max. shaft load, radial	[N]	50	100	–
Operating voltage	[V DC]	5 or 4.75 ... 30	10 ... 30	5 or 10 ... 30
Output type		Push-pull, RS 422	Push-pull	Push-pull
Max. output frequency	[kHz]	160	100	120
Signal outputs		A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, B, 0	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$
Protection class		IP65	IP50, IP65	IP65

## INCREMENTAL ENCODERS

### T-LINE



**TVI40**

**TSI40**

**THI40**

Number of pulses		≤ 1,024	≤ 1,024	≤ 1,024
Design	[mm]	ø40	ø40	ø40
Flange type		Clamping flange	–	–
Spigot	[mm]	ø20	–	–
Solid shaft	[mm]	ø6 x 15, ø8 x 15	–	–
Hollow shaft	[mm]	–	–	ø6, ø6,35, ø8
Recessed hollow shaft	[mm]	–	ø4 x 15, ø6 x 15	–
Max. rotational speed	[min <sup>-1</sup> ]	6,000	6,000	6,000
Max. shaft load, axial	[N]	20	–	–
Max. shaft load, radial	[N]	30	–	–
Operating voltage	[V DC]	4.75 ... 30	4.75 ... 30	4.75 ... 30
Output type		Push-pull, RS 422-function	Push-pull, RS 422-function	Push-pull, RS 422-function
Max. output frequency	[kHz]	100	100	100
Signal outputs		A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$
Protection class		IP54	IP54	IP54

## INCREMENTAL ENCODERS

### T-LINE



**TVI50**

**TSI58**

**THI58**

Number of pulses		≤ 1,024	≤ 1,500	≤ 1,500
Design	[mm]	ø50	ø58	ø58
Flange type		Clamping flange	Clamping flange Servo flange	–
Spigot	[mm]	ø30	ø36, ø50	–
Solid shaft	[mm]	ø8 x 15	ø6 x 10, ø10 x 20	–
Hollow shaft	[mm]	–	–	ø10, ø12, ø15
Recessed hollow shaft	[mm]	–	–	–
Max. rotational speed	[min <sup>-1</sup> ]	6,000	6,000	6,000
Max. shaft load, axial	[N]	20	20	–
Max. shaft load, radial	[N]	40	40	–
Operating voltage	[V DC]	4.75 ... 30	4.75 ... 30	4.75 ... 30
Output type		Push-pull, RS 422-function	Push-pull, RS 422-function	Push-pull, RS 422-function
Max. output frequency	[kHz]	100	100	100
Signal outputs		A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$
Protection class		IP54	IP54	IP54

Absolute encoders provide a distinctly coded numerical value for each shaft position. In positioning tasks in particular, the absolute encoders relieve the follow-up electronics of computation tasks so that complicated and expensive input components can be dispensed with. Moreover, reference runs when the machine is switched on or after a power failure are no longer required as the current position value is available immediately. Parallel absolute encoders transmit the position value to the analysing electronics parallel through several cables. In case of serial absolute encoders the output data can be transmitted by means of standardised interfaces and standardised protocols. Whilst in the past frequently point-to-point connections were set up for serial data transmission, field bus systems are being used increasingly today.

## FUNCTION

### SINGLETURN

In case of singleturn encoder, a revolution of the encoder ( $360^\circ$ ) is divided up into a maximum of 65,536 measuring steps (16 Bit). After each complete revolution, the coding process starts at the initial value. The encoder electronics does not recognise how many revolutions have been carried out.

### MULTITURN

In this configuration, a gear has been integrated – in addition to the disc coded in the singleturn configuration. This gear has been geared down and coded in such a way that up to 16,384 revolutions (14 bit) can be picked up. Thus, the overall resolution amounts to 16 bit (singleturn resolution) plus 14 bit (speed), totalling 30 bit. On account of the high number of measuring this type of encoder can be used to divide very long linear distances into small measuring steps.



## INTERFACES

The Pepperl+Fuchs encoder portfolio includes the most varied range of current interfaces for absolute encoders to be found on the market:

### PARALLEL INTERFACE

The emphasis for this interface is on rapid data transfer. Position data is read directly out of the gray-code code disc.

### SSI-INTERFACE

The Synchronous Serial Interface (SSI) was specially developed for transferring the output data of an absolute encoder to a control device. The control module sends a clock bundle and the absolute encoder responds with the position value.

### AS-INTERFACE

In modern machines and systems, binary sensors are networked extensively with AS-Interface. In order to meet the real-time demands, a multislave solution using the AS-Interface encoder was created.

### CAN

Pepperl+Fuchs offers two rotary encoders in accordance with CAN standard:

- CANopen encoder to DSP406 (Class 1 and Class 2)

### DeviceNet

The product range is completed by DeviceNet encoders. The integrated interface supports all DeviceNet functions.

### PROFIBUS

The absolute encoders in this series satisfy the PROFIBUS profile for encoders, order no. 3.062. Operation is supported based on Class 1 and Class 2.

### ETHERNET

The Ethernet encoders support the TCP/IP and Powerlink protocols. Parameterisation takes place with the Java Applets provided by the internal Web server.

# ABSOLUTE ENCODERS

## ABSOLUTE ENCODERS



	<b>ASS58</b> <b>ASS58-H</b>	<b>ASM58</b> <b>ASM58-H</b>	<b>AVS58</b> <b>AVS58-H</b>	<b>AVM58</b> <b>AVM58-H</b>	<b>AHS58</b> <b>AHS58-H</b>	<b>AHM58</b> <b>AHM58-H</b>
Resolution Singleturn	65,536	65,536	65,536	65,536	65,536	65,536
Resolution Multiturn	1	16,394	1	16,394	1	16,394
Design [mm]	ø58		ø58		ø58	
Flange type	-		Clamping flange, servo flange		-	
Spigot [mm]	-		ø36, ø50		-	
Solid shaft [mm]	-		ø6 x 10, ø10 x 20		-	
Hollow shaft [mm]	-		-		ø12	
Recessed hollow shaft [mm]	ø10 x 30, ø12 x 30, ø15 x 30		-		-	
Max. rotational speed [min <sup>-1</sup> ]	6,000		6,000		3,000	
Max. shaft load, axial [N]	-		40		-	
Max. shaft load, radial [N]	-		110		-	
Operating voltage [V DC]	10 ... 30		10 ... 30		10 ... 30	
Interfaces	SSI		SSI		SSI	
Output type	RS 422		RS 422		RS 422	
Selection of counting direction	Yes		Yes		Yes	
LATCH	-		-		-	
TRISTATE	-		-		-	
PRESET 1	Yes (only ASS58, ASM58)		Yes (only AVS58, AVM58)		-	
PRESET 2	-		-		-	
Protection class	IP65		IP65		IP64	

## ABSOLUTE ENCODERS



	<b>BSS58</b>	<b>BSM58</b>	<b>BVS58</b>	<b>BVM58</b>
Resolution Singleturn	8,192	8,192	8,192	8,192
Resolution Multiturn	1	4,096	1	4,096
Design [mm]	ø58		ø58	
Flange type	-		Clamping flange, servo flange	
Spigot [mm]	-		ø36, ø50	
Solid shaft [mm]	-		ø6 x 10, ø10 x 20	
Hollow shaft [mm]	-		-	
Recessed hollow shaft [mm]	ø10 x 20, ø12 x 20		-	
Max. rotational speed [min <sup>-1</sup> ]	10,000	6,000	10,000	6,000
Max. shaft load, axial [N]	-		40	
Max. shaft load, radial [N]	-		60	
Operating voltage [V DC]	29.5 ... 31.6		29.5 ... 31.6	
Interfaces	AS-Interface		AS-Interface	
Output type	-		-	
Selection of counting direction	Yes		Yes	
LATCH	Yes		Yes	
TRISTATE	-		-	
PRESET 1	Yes		Yes	
PRESET 2	-		-	
Protection class	IP65		IP65	

ABSOLUTE ENCODERS

# CANopen



	CSS58	CSM58	CVS58	CVM58
Resolution Singleturn	65,536	65,536	65,536	65,536
Resolution Multiturn	1	16,384	1	16,384
Design [mm]	ø58		ø58	
Flange type	-		clamping flange, servo flange	
Spigot [mm]	-		ø36, ø50	
Solid shaft [mm]	-		ø6 x 10, ø10 x 20	
Hollow shaft [mm]	-		-	
Recessed hollow shaft [mm]	ø10 x 30, ø12 x 30, ø15 x 30		-	
Max. rotational speed [min <sup>-1</sup> ]	12,000		12,000	
Max. shaft load, axial [N]	-		40	
Max. shaft load, radial [N]	-		110	
Operating voltage [V DC]	10 ... 30		10 ... 30	
Interfaces	CANopen		CANopen	
Output type	DSP406, Class 1 and 2		DSP406, Class 1 and 2	
Selection of counting direction	yes		yes	
LATCH	-		-	
TRISTATE	-		-	
PRESET 1	yes		yes	
PRESET 2	-		-	
Protection class	IP65		IP65	

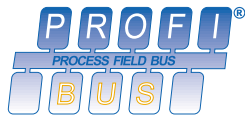
ABSOLUTE ENCODERS

# DeviceNet™



	DSS58	DSM58	DVS58	DVM58
Resolution Singleturn	65,536	65,536	65,536	65,536
Resolution Multiturn	1	16,384	1	16,384
Design [mm]	ø58		ø58	
Flange type	-		clamping flange, servo flange	
Spigot [mm]	-		ø36, ø50	
Solid shaft [mm]	-		ø6 x 10, ø10 x 20	
Hollow shaft [mm]	-		-	
Recessed hollow shaft [mm]	ø10 x 30, ø12 x 30, ø15 x 30		-	
Max. rotational speed [min <sup>-1</sup> ]	12,000		12,000	
Max. shaft load, axial [N]	-		40	
Max. shaft load, radial [N]	-		110	
Operating voltage [V DC]	10 ... 30		10 ... 30	
Interfaces	DeviceNet		DeviceNet	
Output type	-		-	
Selection of counting direction	Yes		Yes	
LATCH	-		-	
TRISTATE	-		-	
PRESET 1	Yes		Yes	
PRESET 2	-		-	
Protection class	IP65		IP65	

## ABSOLUTE ENCODERS



	PSS58	PSM58	PVS58	PVM58
Resolution Singleturn	65,536	65,536	65,536	65,536
Resolution Multiturn	1	16,384	1	16,384
Design [mm]	ø58		ø58	
Flange type	-		Clamping flange, servo flange	
Spigot [mm]	-		ø36, ø50	
Solid shaft [mm]	-		ø6 x 10, ø10 x 20	
Hollow shaft [mm]	-		-	
Recessed hollow shaft [mm]	ø10 x 30, ø12 x 30, ø15 x 30		-	
Max. rotational speed [min <sup>-1</sup> ]	6,000		6,000	
Max. shaft load, axial [N]	-		40	
Max. shaft load, radial [N]	-		110	
Operating voltage [V DC]	10 ... 30		10 ... 30	
Interfaces	PROFIBUS		PROFIBUS	
Output type	RS 485		RS 485	
Selection of counting direction	Yes		Yes	
LATCH	-		-	
TRISTATE	-		-	
PRESET 1	Yes		Yes	
PRESET 2	-		-	
Protection class	IP65		IP65	

## ABSOLUTE ENCODERS

ETHERNET



	ESS58	ESM58	EVS58	EVM58
Resolution Singleturn	65,536	65,536	65,536	65,536
Resolution Multiturn	1	16,384	1	16,384
Design [mm]	ø58		ø58	
Flange type	-		Clamping flange, servo flange	
Spigot [mm]	-		ø36, ø50	
Solid shaft [mm]	-		ø6 x 10, ø10 x 20	
Hollow shaft [mm]	-		-	
Recessed hollow shaft [mm]	ø10 x 30, ø12 x 30, ø15 x 30		-	
Max. rotational speed [min <sup>-1</sup> ]	6.000		6.000	
Max. shaft load, axial [N]	-		40	
Max. shaft load, radial [N]	-		110	
Operating voltage [V DC]	10 ... 30		10 ... 30	
Interfaces	Ethernet: TCP/IP or Powerlink		Ethernet: TCP/IP or Powerlink	
Skalierung der Resolution	Yes		Yes	
Selection of counting direction	Yes		Yes	
PRESET	Yes		Yes	
Protection class	IP65		IP65	

## ABSOLUTE ENCODERS



**FSS58**



**FVS58**

Resolution Singleturn		65,536	65,536
Design	[mm]	ø58	ø58
Flange type		–	Clamping flange, servo flange
Spigot	[mm]	–	ø36, ø50
Solid shaft	[mm]	–	ø6 x 10, ø10 x 20
Hollow shaft	[mm]	–	–
Recessed hollow shaft	[mm]	ø10 x 30, ø12 x 30, ø15 x 30	–
Max. rotational speed	[min <sup>-1</sup> ]	12,000	12,000
Max. shaft load, axial	[N]	–	40
Max. shaft load, radial	[N]	–	60
Operating voltage	[V DC]	10 ... 30	10 ... 30
Interfaces		Parallel	Parallel
Output type		Push-pull	Push-pull
Selection of counting direction		Yes	Yes
LATCH		Yes	Yes
TRISTATE		–	–
PRESET 1		Yes	Yes
PRESET 2		–	–
Protection class		IP65	IP65

## ABSOLUTE ENCODERS



**FSM58**



**FVM58**

Resolution Singleturn		65,536	65,536
Resolution Multiturn		16,384	16,384
Design	[mm]	ø58	ø58
Flange type		–	clamping flange, servo flange
Spigot	[mm]	–	ø36, ø50
Solid shaft	[mm]	–	ø6 x 10, ø10 x 20
Hollow shaft	[mm]	–	–
Recessed hollow shaft	[mm]	ø10 x 30, ø12 x 30, ø15 x 30	–
Max. rotational speed	[min <sup>-1</sup> ]	12,000	12,000
Max. shaft load, axial	[N]	–	–
Max. shaft load, radial	[N]	–	–
Operating voltage	[V DC]	10 ... 30	10 ... 30
Interfaces		Parallel	Parallel
Output type		Push-pull	Push-pull
Selection of counting direction		Yes	Yes
LATCH		Yes	Yes
TRISTATE		–	–
PRESET 1		Yes	Yes
PRESET 2		–	–
Protection class		IP65	IP65

Pepperl+Fuchs offers rotary encoders with two different ignition protection types. It is distinguished between the ignition protection type “flame proof enclosure” (EEx d) and the ignition protection type “Intrinsic Safety” (EEx i).

## IGNITION PROTECTION TYPE EEX D (DIN EN 50016/VDE/0170/0171 SECTION 5)

Devices of ignition protection type EEx d are designed in a way that their housings are not damaged in case of an explosion of an explosive mixture inside the housing. Thus, a propagation of the explosion to the surrounding explosive atmosphere is prevented. The following devices are available:

### ■ Incremental encoders:

Series 14 with parallel push-pull interface

### ■ Absolute encoders:

Series AVS14 and AVM14 with SSI interface

Series CVM14 with CAN interface

Series DVM14 with DeviceNet interface

Series PVS14 and PVM14 with PROFIBUS interface

## IGNITION PROTECTION CLASS EEX I (DIN EN 50020)

In case of the ignition protection type EEx i the values of the voltage and the current are kept at such a low level that the occurrence of an ignition spark is prevented, thus preventing the ignition of an explosive atmosphere. The following devices are designed in accordance with this ignition protection type:

### ■ Incremental encoders:

Series RVI84 with NAMUR<sub>1</sub> interface in accordance with DIN EN 60947-5-6.

## ZONE 2/ZONE 22

Beside the Protection types EEx d and i Pepperl+Fuchs also offers rotary encoders for use in Zone 2/Zone 22.

### ■ Absolute encoders

Series PVS/PVM58X and PSS/PSM58X with PROFIBUS-interface

### ■ Incremental encoders

Series RVI58X and RSI58X

## EX-ENCODERS

### ABSOLUTE ENCODERS



PSS58X · PSM58X · PVS/PVM58X



PVS14

PVM14

Ex-designation	Ⓔ II 3G EEx nA II T4 Ⓔ II 3D IP64 T 120 °C	Ⓔ II 2G EEx d II C T6	Ⓔ II 2G EEx d II C T6
EC-type examination certificate	ZELM 06 ATEX 3290 X	ZELM 02 ATEX 0078	ZELM 02 ATEX 0078
Resolution Singleturn	65,536	8,192	8,192
Resolution Multiturn	16,384	1	4,096
Design [mm]	ø58	ø116	
Flange type	Clamping flange, servo flange		
Spigot [mm]	ø36	ø40	
Solid shaft [mm]	ø10, ø6	ø12 x 25	
Hollow shaft [mm]	ø10, ø12, ø15	–	
Recessed hollow shaft [mm]	–	–	
Max. rotational speed [min <sup>-1</sup> ]	6,000	6,000	
Max. shaft load, axial [N]	40	60	
Max. shaft load, radial [N]	110	80	
Operating voltage [V DC]	10 ... 30	10 ... 30	
Interfaces	PROFIBUS		
Output type	–		
Selection of counting direction	–		
LATCH	–		
TRISTATE	–		
PRESET 1	–		
PRESET 2	–		
Protection class	IP66		

## EX-ENCODERS

### ABSOLUTE ENCODERS



**AVS14**

**AVM14**

**CVM14**

**DVM14**

Ex-designation	Ⓔ II 2G EEx d II C T6		Ⓔ II 2G EEx d II C T6	Ⓔ II 2G EEx d II C T6
EC-type examination certificate	ZELM 02 ATEX 0078 X		ZELM 02 ATEX 0078 X	ZELM 02 ATEX 0078 X
Resolution Singleturn	4,096	4,096	8,192	8,192
Resolution Multiturn	1	4,096	4,096	4,096
Design [mm]	ø116		ø116	ø116
Flange type	Clamping flange		Clamping flange	Clamping flange
Spigot [mm]	ø40		ø40	ø40
Solid shaft [mm]	ø12 x 25		ø12 x 25	ø12 x 25
Hollow shaft [mm]	-		-	ø12
Recessed hollow shaft [mm]	-		-	-
Max. rotational speed [min <sup>-1</sup> ]	6,000		6,000	3,000
Max. shaft load, axial [N]	60		60	60
Max. shaft load, radial [N]	80		80	80
Operating voltage [V DC]	10 ... 30		10 ... 30	10 ... 30
Interfaces	SSI		CANopen	DeviceNet
Output type	RS 422		DSP406, Class 1 and 2	-
Selection of counting direction	Yes		-	-
LATCH	-		-	-
TRISTATE	-		-	-
PRESET 1	-		-	-
PRESET 2	-		-	-
Protection class	IP66		IP66	IP66

## EX-ENCODERS

### INCREMENTAL ENCODERS



**SERIES 14**

**RV184**

**RV158X**

**RSI58X**

Ex-designation	Ⓔ II 2G EEx d II C T6 Ⓔ II 2D IP66 T 80 °C	Ⓔ II 2G EEx ia II C T6	Ⓔ II 3G EEx nA II T4 Ⓔ II 3D IP65 T 105 °C	
EC-type examination certificate	ZELM 02 ATEX 0078 X	94/9/EG	ZELM 96 ATEX 3297 X	
Number of pulses	≤ 5,000	≤ 25	≤ 5,000	
Design [mm]	ø116	ø78	ø58	
Flange type	Clamping flange	Servo flange	Clamping or servo flange	Hollow shaft flange
Spigot [mm]	ø40	ø56	ø66	-
Solid shaft [mm]	ø10 x 25	ø10 x 23	ø10 or ø6	-
Hollow shaft [mm]	-	-	-	-
Recessed hollow shaft [mm]	-	-	-	ø12 or ø10
Max. rotational speed [min <sup>-1</sup> ]	6,000	3,000	6,000	6,000
Max. shaft load, axial [N]	60	50	40	-
Max. shaft load, radial [N]	80	100	60	-
Operating voltage [V DC]	5 or 10 ... 30	8	5 or 10 ... 30	5 or 10 ... 30
Output type	Push-pull, RS 422	NAMUR	Push-pull, RS 422	Push-pull, RS 422
Max. output frequency [kHz]	100	5	200	200
Signal outputs	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, B	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$	A, $\bar{A}$ , B, $\bar{B}$ , 0, $\bar{0}$
Protection class	IP66	IP65	IP65	IP54





## MOUNTING AIDS

- Eccentric clamping elements
- Mounting brackets
- Mounting bell



## COUPLING

- Spring steel coupling
- Spring disc coupling
- Bellows coupling
- Precision coupling
- Helical coupling



## MEASURING WHEELS

- Circumference 200 mm
- Circumference 500 mm
- Plastic
- Pimpled rubber
- Knurled aluminium
- Knurled plastic



## CABLE SOCKETS

- Amphenol
- Coninvers
- SUB-D
- Souriau
- Binder



## CABLE PULLS

- Measuring range 1,000 mm
- Measuring range 2,000 mm
- Measuring range 3,000 mm
- Measuring range 5,000 mm
- Measuring range 15,000 mm



## EVALUATION

- Counters



# FACTORY AUTOMATION – SENSING YOUR NEEDS



Pepperl+Fuchs sets the standard in quality and innovative technology for the world of automation. Our expertise, dedication, and heritage of innovation have driven us to develop the largest and most versatile line of industrial sensor technologies and interface components in the world. With our global presence, reliable service, and flexible production facilities, Pepperl+Fuchs delivers complete solutions for your automation requirements – wherever you need us.

## Contact

Pepperl+Fuchs GmbH  
Königsberger Allee 87  
68307 Mannheim · Germany  
Tel. +49 621 776-4411 · Fax +49 621 776-27-4411  
E-mail: [fa-info@de.pepperl-fuchs.com](mailto:fa-info@de.pepperl-fuchs.com)

## Worldwide Headquarters

Pepperl+Fuchs GmbH · Mannheim · Germany  
E-mail: [info@de.pepperl-fuchs.com](mailto:info@de.pepperl-fuchs.com)

## USA Headquarters

Pepperl+Fuchs Inc. · Twinsburg · USA  
E-mail: [sales@us.pepperl-fuchs.com](mailto:sales@us.pepperl-fuchs.com)

## Asia Pacific Headquarters

Pepperl+Fuchs PTE Ltd · Singapore  
Company Registration No. 1999003130E  
E-mail: [sales@sg.pepperl-fuchs.com](mailto:sales@sg.pepperl-fuchs.com)

[www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

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