

Incremental rotary encoder

RVS58S-*******Z

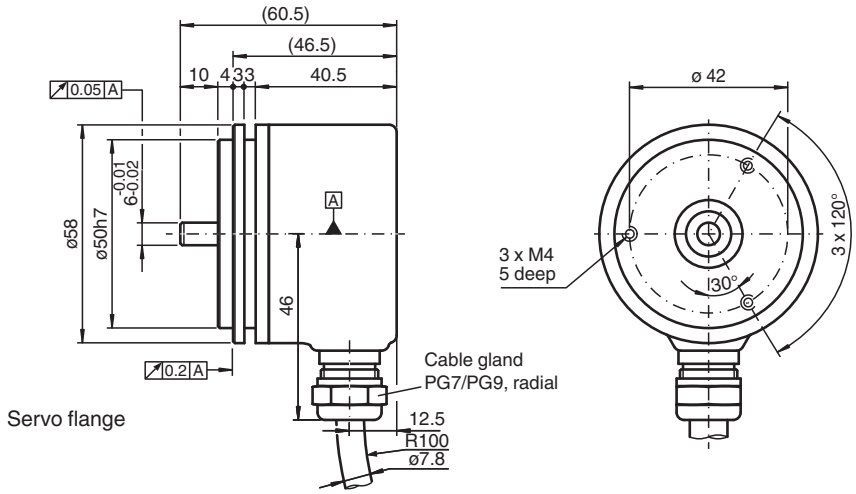
- Safe rotary encoder, thanks to integrated functional safety
- Usable up to SIL 3 acc. to IEC 61508
- TÜV certified
- Suitable as motor feedback system for safe drives in accordance with IEC 61800-5-2
- Incremental encoder with sin/cos interface
- 1024 or 2048 signal periods
- Thermally stabilized with the highest precision for high resolution interpolation

Function

The RVS58S – a combination of precision and integrated safety technology for demanding requirements.
The RVS58S rotary encoder is suitable for use in safety-aligned systems up to
- SIL3 in accordance with IEC 61508
- Performance Level e in accordance with IEC 13849
- Category 4 in accordance with DIN EN 954-1

given the corresponding prerequisites with regard to the diagnostic capability of the higher-level control/evaluation system.
Typical applications for this rotary encoder are found in safety-evaluated drive technology (Motor feedback). Thanks to the 1 Vss sine/cosine interface the RVS58S is compatible with the current drive converters available on the market, as are required for the fine positioning of drives and servo-drive systems in industrial applications.
A clear increase in precision and the smooth running of the drive at an attractive price, including certificated safety in accordance with the applicable standards, enable this rotary encoder to be used in a wide variety of applications.

Dimensions



Technical Data

General specifications		
Detection type		photoelectric sampling
Pulse count		1024 and 2048
Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 3
Performance level (PL)		PL e
$MTTF_d$		709 a
Mission Time (T_M)		10 a

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Technical Data

PFH_d		4.35 E-9 1/h
PFD		3.1 E-5
L_{10}		70 E+9 at 6000 rpm
Diagnostic Coverage (DC)		98.9 %
Electrical specifications		
Operating voltage	U_B	5 V DC ± 5 %
No-load supply current	I_0	max. 70 mA
Output		
Output type		sine / cosine
Amplitude		1 V_{ss} ± 10 %
Load current		max. per channel 10 mA , short-circuit protected, reverse polarity protected
Output frequency		max. 200 kHz (3 dB limit)
Connection		
Cable		Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m
Standard conformity		
Degree of protection		DIN EN 60529, IP65
Climatic testing		DIN EN 60068-2-78 , no moisture condensation
Emitted interference		EN 61000-6-4:2007/A1:2011
Noise immunity		DIN EN 61000-6-2 , advanced testing level to IEC 61326-3-1 EN 61326-3-1:2008
Shock resistance		DIN EN 60068-2-27, 100 *g*, 3 ms
Vibration resistance		DIN EN 60068-2-6, 10 g, 55 ... 2000 Hz
Functional safety		IEC 61508:2010 (SIL3) EN 62061:2005/A2:2015 EN/ISO 13849-1:2015 IEC 61800-5-2:2016 Suitable up to SIL 3, PL e depending from configuration, see instruction leaflet
Approvals and certificates		
UL approval		cULus Listed, General Purpose, Class 2 Power Source
TÜV approval		Cert. no. Z10 068273 0003
Ambient conditions		
Operating temperature		-5 ... 80 °C (23 ... 176 °F) , cable, movable installation -20 ... 80 °C (-4 ... 176 °F), cable, fixed installation
Storage temperature		-40 ... 100 °C (-40 ... 212 °F)
Mechanical specifications		
Material		
Housing		powder coated aluminum
Flange		3.1655 aluminum
Shaft		Stainless steel 1.4305 / AISI 303
Mass		approx. 350 g
Rotational speed		max. 12000 min^{-1}
Moment of inertia		≤ 25 gcm^2
Starting torque		≤ 1.5 Ncm
Shaft load		
Axial		40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}
Radial		60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}
Dimensions		
Length		50.5 mm
Diameter		58 mm

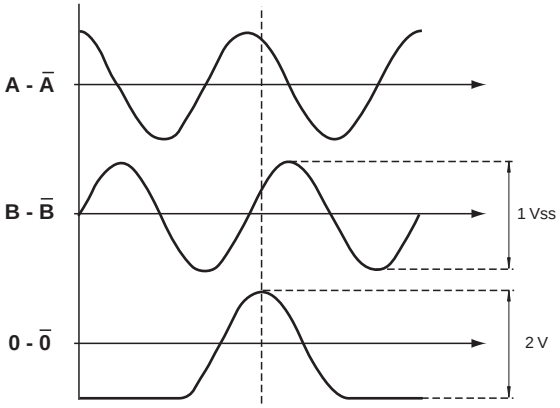
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Connection

Signal	Cable Ø6.5 mm, 8-core
GND	White
U_b	Brown
A / cos	Green
B / sin	Grey
$\overline{A}$ / $\overline{cos}$	Yellow
$\overline{B}$ / $\overline{sin}$	Pink
0	Blue
$\overline{0}$	Red
Screen	-

Operation

Signal outputs



↻ cw - flange view

measured in difference mode

Type Code

Order code

R	V	S	5	8	S	–				K	1	R	6	Z	N	–					

Pulse count 1024, 2048

Option

N normal:

Power supply / Output switching

Z 5 V, sine/cosine

Signal output

6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Outgoing circuit

R radial

Connection type

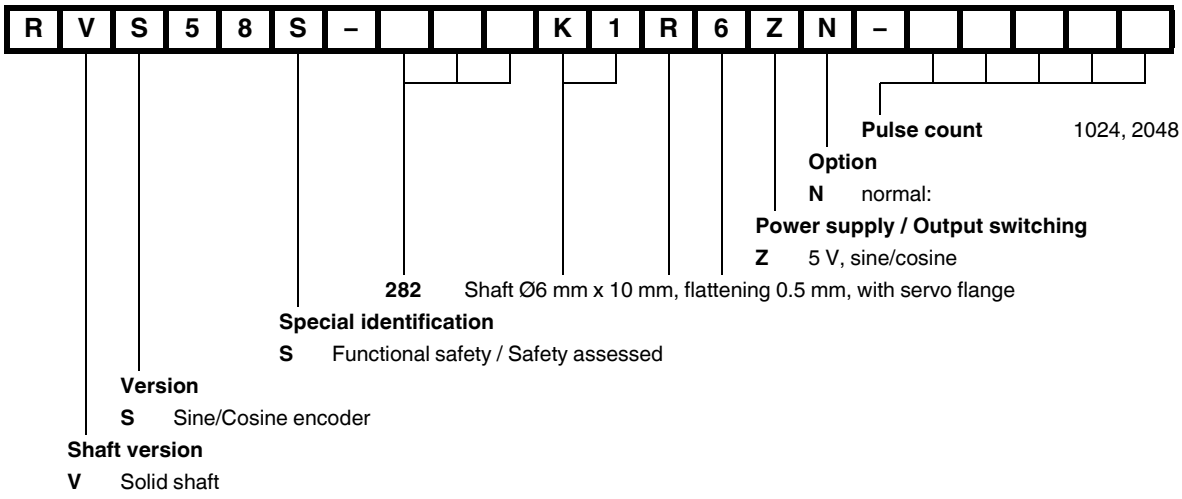
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm², 1 m

Shaft dimension/Flange version

032 Shaft Ø6 mm x 10 mm with servo flange

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Order code



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 mm^2.
- Cable cross-section at least 0,14 mm^2.
- 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.

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.

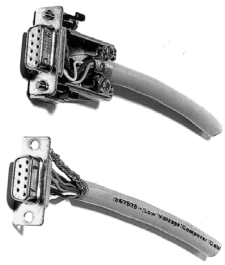
One basic goal in HF engineering is to pass the HF energy to earth at an impedance as low as possible as otherwise energy would discharge into the cable. A low impedance is achieved by a large-surface connection to metal surfaces.

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.

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Advantage:	metalised connector, shield clamped with the strain relief clamp
Disadvantage:	soldering shield on



Safety instructions

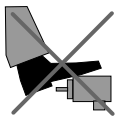
Please observe the national safety and accident prevention regulations as well as the subsequent safety instructions in these operating instructions when working on encoders.

If failures cannot be remedied, the device has to be shut down and has to be secured against accidental operation.

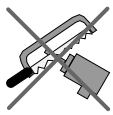
Repairs may be carried out only by the manufacturer. Entry into and modifications of the device are not permissible.

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

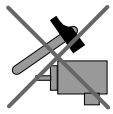
Tighten all screws and plug connectors prior to operating the encoder.



Do not stand on the encoder!



Do not remachine the drive shaft!



Avoid impact!



Do not remachine the housing!

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