



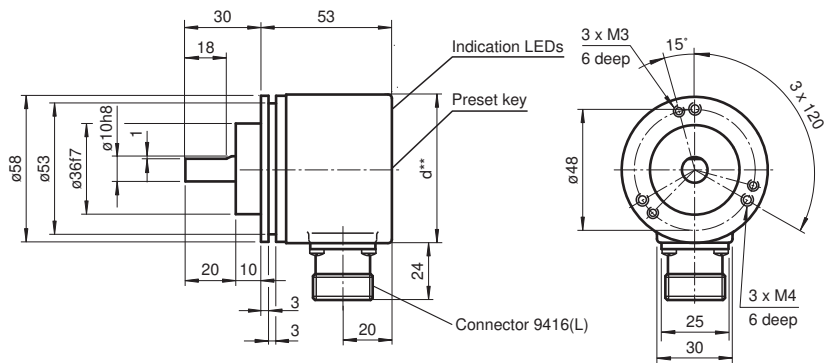
Singleturn absolute encoder

AVS58-K*

- Industrial standard housing Ø58 mm
- 16 Bit singleturn
- Data transfer up to 2 MBaud
- Optically isolated RS 422 interface
- Servo or clamping flange
- Zero-set function electrically and by preset key

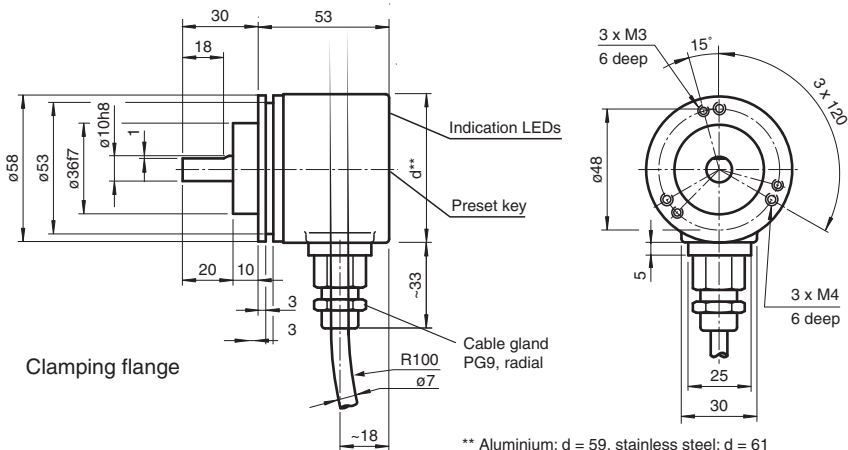


Dimensions



** Aluminium: d = 59, stainless steel: d = 61

Clamping flange



** Aluminium: d = 59, stainless steel: d = 61

Clamping flange

Release date: 2022-04-21 Date of issue: 2022-12-12 Filename: t23720_eng.pdf

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

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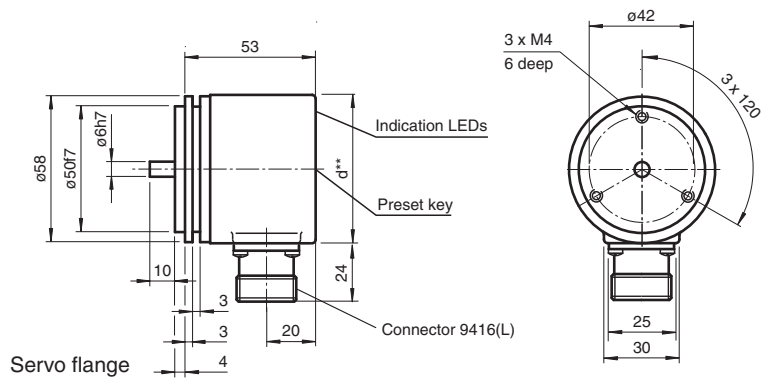
USA: +1 330 486 0001
fa-info@us.pepperl-fuchs.com

Germany: +49 621 776 1111
fa-info@de.pepperl-fuchs.com

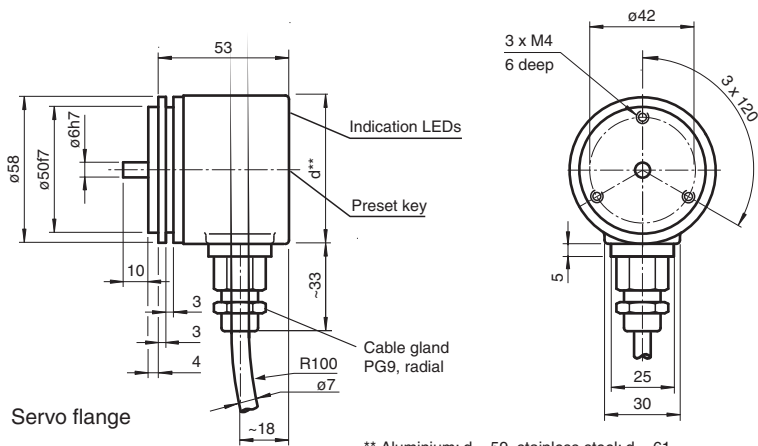
Singapore: +65 6779 9091
fa-info@sg.pepperl-fuchs.com

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Dimensions



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Technical Data

Functional safety related parameters		
MTTF _d		170 a
Mission Time (T _M)		20 a
L _{10h}		1.9 E+11 at 6000 rpm and 20/40 N axial/radial shaft load
Diagnostic Coverage (DC)		0 %
Indicators/operating means		
LED green		supply voltage/preset key pressed
LED red		internal diagnostic test failed
Electrical specifications		
Operating voltage	U _B	10 ... 30 V DC
Power consumption	P ₀	≤ 1 W
Linearity		± 2 LSB at 16 Bit, ± 1 LSB at 13 Bit, ± 0,5 LSB at 12 Bit
Output code		Gray code, binary code
Code course (counting direction)		cw descending (clockwise rotation, code course descending)
Interface		
Interface type		SSI
Monoflop time		20 ± 10 µs
Resolution		
Single turn		up to 16 Bit
Overall resolution		up to 16 Bit
Transfer rate		0.1 ... 2 MBit/s
Voltage drop		U _B - 2.5 V

Release date: 2022-04-21 | Date of issue: 2022-12-12 | Filename: t23720_eng.pdf



Technical Data

Standard conformity	RS 422
Input 1	
Input type	Selection of counting direction (cw/ccw)
Signal voltage	
High	4.5 ... 30 V or open input (cw ascending)
Low	0 ... 1 V (cw descending)
Input current	< 6 mA
Signal duration	min. 10 ms
Switch-on delay	< 0.001 ms
Input 2	
Input type	zero-set (PRESET 1)
Signal voltage	
High	4.5 ... 30 V
Low	0 ... 1 V or open input
Input current	< 6 mA
Signal duration	min. 10 ms
Switch-on delay	< 100 ms after falling input flank
Connection	
Connector	type 9416 (M23), 12-pin, type 9416L (M23), 12-pin
Cable	Ø7 mm, 6 x 2 x 0.14 mm ² , 1 m
Standard conformity	
Degree of protection	DIN EN 60529, IP65
Climatic testing	DIN EN 60068-2-3, 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
Approvals and certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
Ambient conditions	
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Mechanical specifications	
Material	
Combination 1	housing: powder coated aluminum flange: aluminum shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Mass	approx. 460 g (combination 1) approx. 800 g (combination 2)
Rotational speed	max. 12000 min ⁻¹
Moment of inertia	≤ 30 gcm ²
Starting torque	< 3 Ncm (version without shaft seal)
Shaft load	
Axial	40 N
Radial	110 N

Accessories

	9203	Angled flange
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Accessories

	<p>9300</p>	<p>Mounting bracket for servo flange</p>
	<p>MBT-36ALS</p>	<p>Spring-loaded mounting bracket with a diameter of 36 mm</p>

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Function

This singleturn absolute encoder with modern fast technology transmits a position value corresponding to the shaft setting via the SSI interface (Synchronous Serial Interface). The resolution of the AVS58-K is maximum 65536 steps per revolution.

The devices of the ASM58-K series are equipped with a microcontroller.

The control module sends a clock bundle to the absolute encoder to obtain the position data. The rotary encoder then sends the position data synchronous to the cycles of the control module.

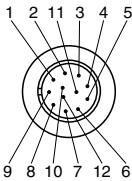
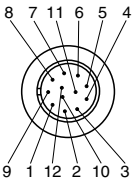
It is possible to select the following items with function inputs

- the counting direction and
- the zero-set function (preset value)

Another feature of this absolute encoder is the built in preset key at the rear housing side. By means of this, the position value can be locally set to zero. For status and diagnosis indication furthermore it is equipped with 2 LEDs.

This singleturn absolute encoder is available either in clamp flange design with a shaft diameter of 10 mm x 20 mm or in a servo flange design with a shaft diameter of 6 mm x 10 mm. The electrical connection is made by a 12-pin round plug connector. It is also possible to obtain a version with a 1 m cable connector.

Connection

Signal	Cable Ø7 mm, 12-core	Connector 9416, 12-pin	Connector 9416L, 12-pin	Explanation
GND (encoder)	White	1	1	Power supply
U _b (encoder)	Brown	2	8	Power supply
Clock (+)	Green	3	3	Positive cycle line
Clock (-)	Yellow	4	11	Negative cycle line
Data (+)	Grey	5	2	Positive transmission data
Data (-)	Pink	6	10	Negative transmission data
Reserved	Black	7	12	Not wired, reserved
V/R	Red	8	5	Input for selection of counting direction
PRESET 1	Blue	9	9	zero-setting input
Reserved	Violet	10	4	Not wired, reserved
Reserved	Grey/Pink	11	6	Not wired, reserved
Reserved	Red/Blue	12	7	Not wired, reserved
				

Interface

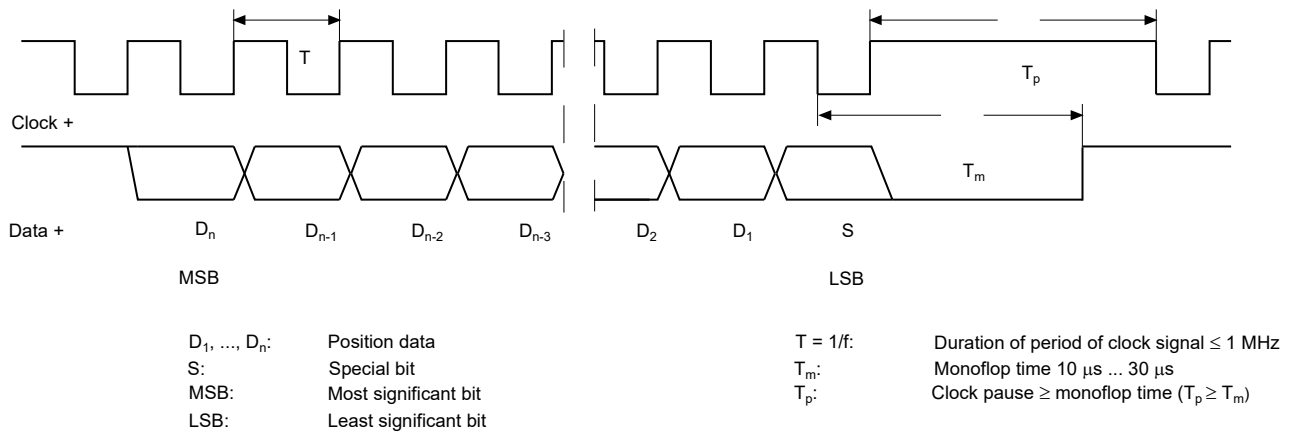
Description

The Synchronous Serial Interface 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.

Thus only 4 lines are required for the clock and data, no matter what the resolution of the rotary encoder is. The RS 422 interface is optically isolated from the power supply.

SSI signal course Standard

Release date: 2022-04-21 Date of issue: 2022-12-12 Filename: 123720_eng.pdf



SSI output format Standard

- At idle status signal lines "Data +" and "Clock +" are at high level (5 V).
- The first time the clock signal switches from high to low, the data transfer in which the current information (position data (D_n) and special bit (S)) is stored in the encoder is introduced.
- The highest order bit (MSB) is applied to the serial data output of the encoder with the first rising pulse edge.
- The next successive lower order bit is transferred with each following rising pulse edge.
- After the lowest order bit (LSB) has been transferred the data line switches to low until the monoflop time T_m has expired.
- No subsequent data transfer can be started until the data line switches to high again or the time for the clock pause T_p has expired.
- After the clock sequence is complete, the monoflop time T_m is triggered with the last falling pulse edge.
- The monoflop time T_m determines the lowest transmission frequency.

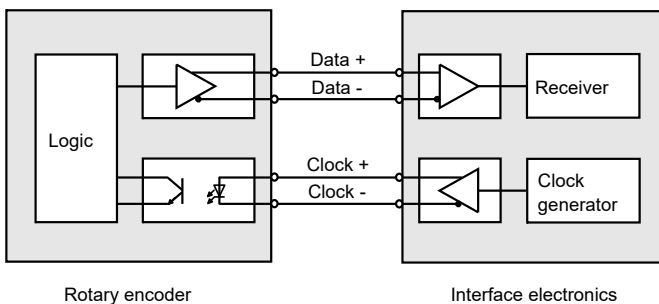
SSI output format ring slide operation (multiple transmission)

- In ring slide operation, multiple transmission of the same data word over the SSI interface makes it possible to offer the possibility of detecting transmission errors.
- In multiple transmission, 25 bits are transferred per data word in standard format.
- If the clock change is not interrupted after the last falling pulse edge, ring slide operation automatically becomes active. This means that the information that was stored at the time of the first clock change is generated again.
- After the first transmission, the 26th pulse controls data repetition. If the 26th pulse follows after an amount of time greater than the monoflop time T_m , a new current data word will be transmitted with the following pulses.



If the pulse line is exchanged, the data word is generated offset.
 Ring slide operation is possible up to max. 13 bits.

Block diagram



Line length

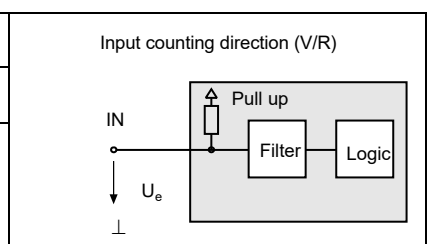
Line length in m	Baudrate in kHz
< 50	< 400
< 100	< 300
< 200	< 200
< 400	< 100

Operation

Inputs

Input for selection of counting direction (V/R)

Level	counting direction by cw revolution (with view onto the shaft)
High (input open or connected to +UB)	ascending
Low (Input connected to GND)	descending



Release date: 2022-04-21 Date of issue: 2022-12-12 Filename: t23720_eng.pdf

Zero-set input (Preset)

Level	Funktion	Zero-set input (Preset)
Low (input open or connected to GND)	Output position value	
High (Input connected to +U _B or U _e > 4,5 V)	Activation with falling edge (min. 100 ms)	

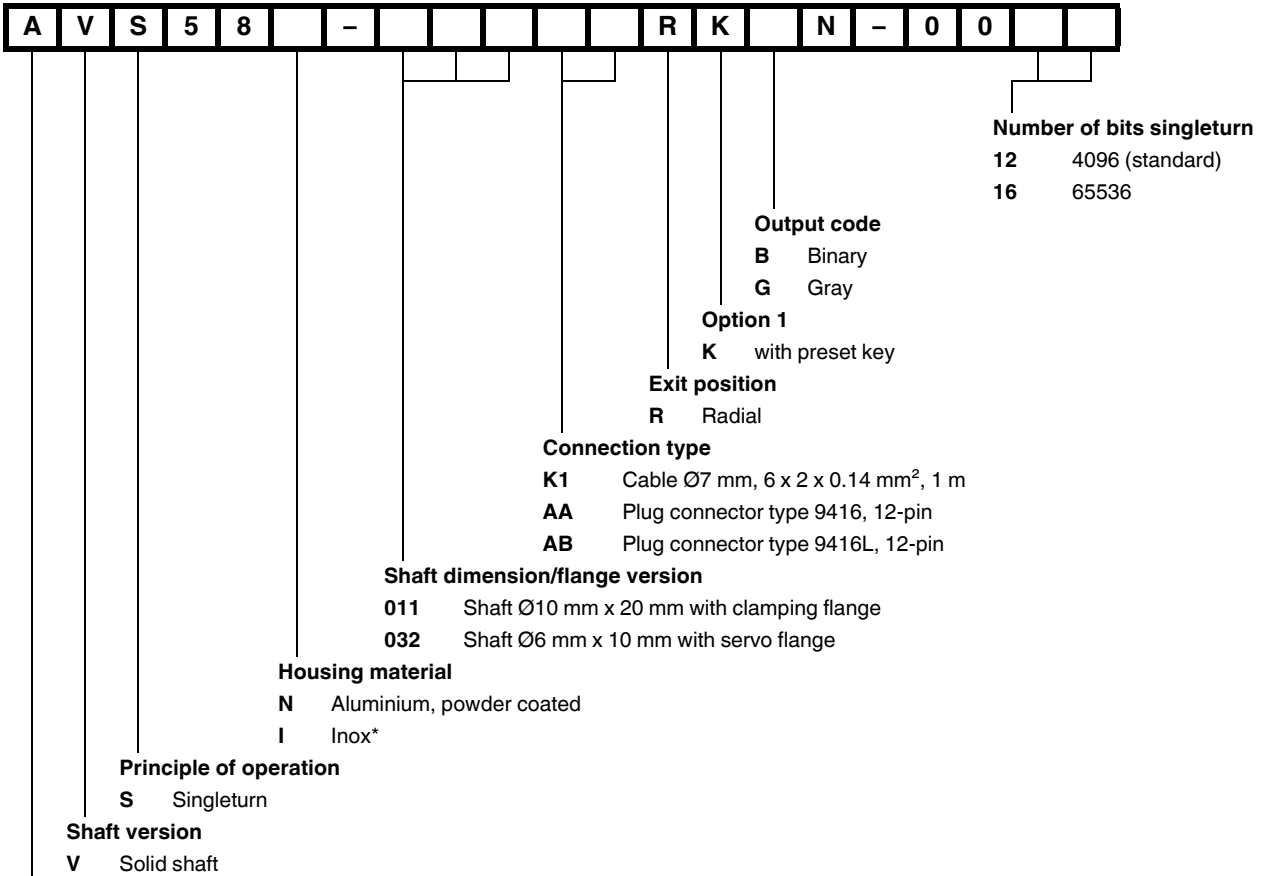
Indicators/operation means

Preset key	Manually zero setting of the position value.	
LED green	<ul style="list-style-type: none"> Lights up with supplied encoder Goes off while preset key is pressed 	
LED red	Alarm/error indication <ul style="list-style-type: none"> pre-fault indication (data output ist continued) internal memory error (all data bits are set to high level permanently) 	

Type Code

Release date: 2022-04-21 Date of issue: 2022-12-12 Filename: t23720_eng.pdf

Order code



Data format

A SSI (Synchronous Serial Interface)

*Housing material I only available with plug connector types.

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.

Notes on connecting the electric screening

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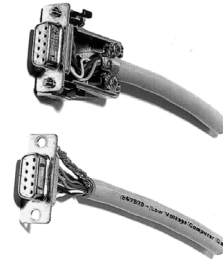
The immunity to interference of a plant depends on the correct screening. In this field installation faults occur frequently. Often the screen is applied to one side only, and is then soldered to the earthing terminal with a wire, which is a valid procedure in LF engineering. However, in case of EMC 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:	metallised connector, shield
relief	clamped with the strain clamp
Disadvantage:	soldering shield on

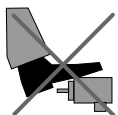


Safety instructions

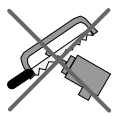
Please observe the national safety and accident prevention regulations as well as the subsequent safety instructions in these operating instructions when working on encoders.

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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