Model Number

AVS42H-0

Heavy-duty encoder

Features

- **Sturdy construction**
- **Highly shock / vibration and soiling resistant**
- **Increased shaft load capacity**
- **SSI interface**
- **Stainless steel housing**
- **IP69K**
- **Very small housing**

Description

This absolute rotary encoder with magnetic sampling provides a position value corresponding to the shaft position on its integrated SSI interface (Synchronous Serial Interface).

The very sturdy design of this encoder has been dimensioned for use in harsh environmental conditions and high mechanical stress.

The control module sends a start sequence 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.

Technical data

General specifications	
Detection type	magnetic sampling
Nominal ratings	
Linearity error	± 0.36 °
Electrical specifications	
Operating voltage U_B	4.5 ... 30 V DC
Power consumption P_0	≤ 1.5 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 13 Bit
Overall resolution	up to 13 Bit
Transfer rate	0.1 ... 2 MBit/s
Voltage drop	U_B - 2.5 V
Standard conformity	RS 422
Input 1	
Input type	Selection of counting direction (cw/ccw)
Signal voltage	
High	4.5 V ... U_B (cw descending)
Low	0 ... 2 V or unconnected (cw ascending)
Input current	< 6 mA
Switch-on delay	< 1.1 s
Input 2	
Input type	zero-set (PRESET 1) with falling edge
Signal voltage	
High	4.5 V ... U_B
Low	0 ... 2 V
Input current	< 6 mA
Signal duration	≥ 1.1 s
Connection	
Connector	M12 connector, 8-pin
Standard conformity	
Degree of protection	acc. DIN EN 60529
Climatic testing	DIN EN 60068-2-3 , 95 % , no moisture condensation
Emitted interference	EN 61000-6-4:2007
Noise immunity	EN 61000-6-2:2005
Shock resistance	DIN EN 60068-2-27, 300 *g*, 6 ms
Vibration resistance	DIN EN 60068-2-6, 30 g, 55 ... 2000 Hz
Ambient conditions	
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	95 % , no moisture condensation
Mechanical specifications	
Flange	servo flange 42 mm with 4 x Threading M4
Shaft dimensions Ø x l	10 mm x 21 mm
Degree of protection	IP66 / IP68 / IP69K
Material	
Housing	Stainless steel 1.4305 / AISI 303
Flange	Stainless steel 1.4305 / AISI 303
Shaft	stainless steel 1.4104 / AISI 430F
Mass	approx. 350 g
Rotational speed	max. 6000 min^{-1}
Moment of inertia	30 gcm^2
Starting torque	< 5 Ncm
Shaft load	
Axial	270 N
Radial	270 N

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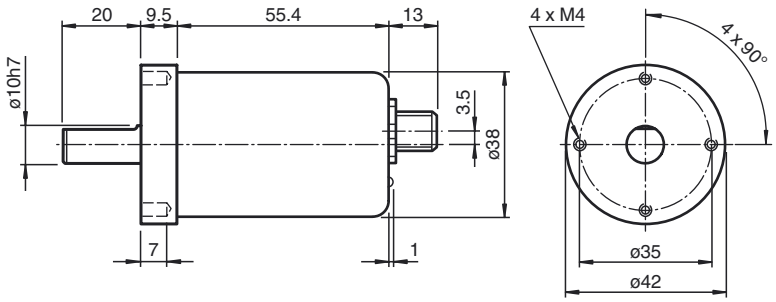
Dimensions



Electrical connection

Signal	Connector
GND (encoder)	1
U_b (encoder)	2
Clock (+)	3
Clock (-)	4
Data (+)	5
Data (-)	6
Preset	7
Counting direction	8
Shielding	Housing
Pinout	

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Refer to “General Notes Relating to Pepperl+Fuchs Product Information”.
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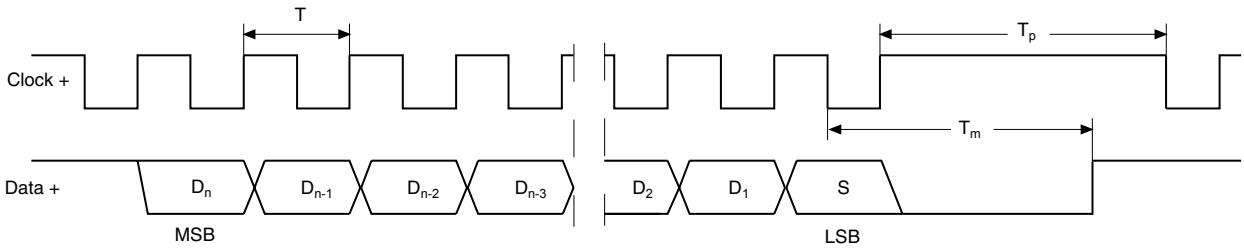
Description

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



D_1, ..., D_n:	Position data	T = 1/f:	Duration of period of clock signal ≤ 1 MHz
S:	Special bit	T_m:	Monoflop time 10 µs ... 30 µs
MSB:	Most significant bit	T_p:	Clock pause ≥ monoflop time ($T_p \geq T_m$)
LSB:	Least significant bit		

SSI output format Standard

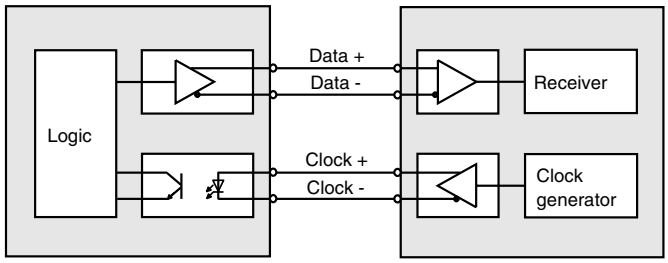
- At idle status signal lines "Data +" and "Clock +" are at high level (5 V).
- The first time the clock signal switches from high to low, the data transfer in which the current information (position data (D_n) and special bit (S)) is stored in the encoder is introduced.
- The highest order bit (MSB) 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

Inputs

The selection of the counting direction input (V/R) is activated with 0-level. The zero-set input (PRESET 1) is activated with 1-level.

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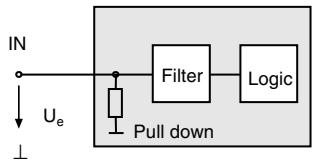
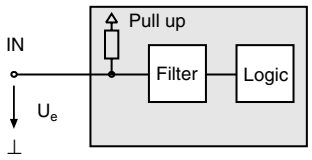
zero-set input (PRESET 1)



Input for selection of counting direction (V/R)



Order code

A	V	S	4	2	H	–	0	1	R	B	E	A	0		N	–	0	0		

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

Temperature
N Normal

Output code
B Binary
G Gray

Option
0 cw/ccw and preset

Exit position
A Axial

Connection type
BE Connector, M12 x 1, 8 pin

Shaft dimension/flange version
01R Shaft Ø10 mm x 21 mm with 42 mm servo flange

Version
H Heavy duty

Principle of operation
S Singleturn

Shaft version
V Solid shaft

Data format
A SSI (Synchronous Serial Interface)

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