Model Number

ASM36M-******

Features

- **Very small housing**
- **High climatic resistance**
- **Up to 25 Bit multiturn**
- **SSI interface**
- **Optically isolated interface**
- **Surge and reverse polarity protection**

Description

This multiturn absolute encoder transmits a position value corresponding to the shaft setting via the SSI interface (Synchronous Serial Interface).

The ASM36M series are encoders with internal magnetic sampling.

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. It is possible to select the counting direction with the function input.

Technical data

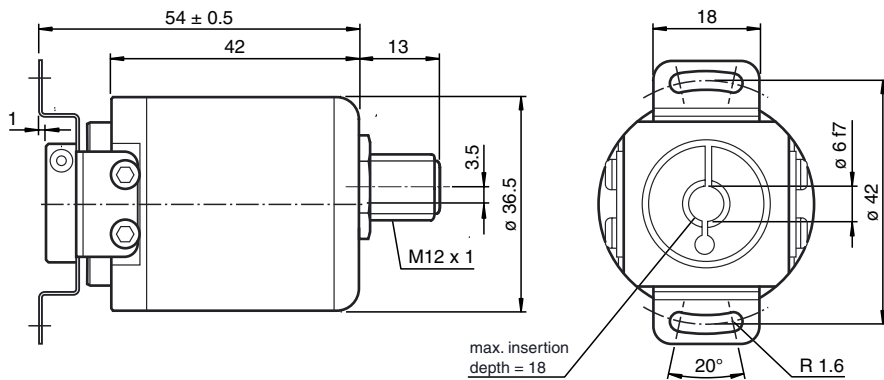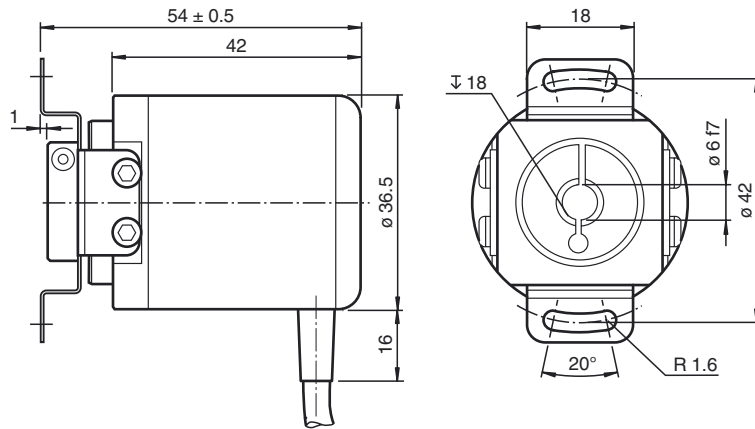| General specifications	
Detection type	magnetic sampling
Device type	Multiturn absolute encoder
Electrical specifications	
Operating voltage U_B	4.5 ... 30 V DC
Power consumption P_0	approx. 2 W
Output code	Gray code, binary code
Code course (counting direction)	adjustable
Interface	
Interface type	SSI
Resolution	
Single turn	up to 13 Bit (hysteresis: 0.1 °)
Multiturn	up to 12 Bit
Overall resolution	up to 25 Bit
Transfer rate	0.1 ... 2 MBit/s
Cycle time	< 600 µs
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
Cable	Ø6 mm, 4 x 2 x 0.14 mm^2, 1 m
Standard conformity	
Degree of protection	acc. DIN EN 60529
Connection side	cable models: IP54 connector models: IP65
Shaft side	IP54
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, 6 ms
Vibration resistance	DIN EN 60068-2-6, 10 g, 10 ... 1000 Hz
Ambient conditions	
Operating temperature	cable, flexing: -5 ... 70 °C (-23 ... 158 °F), cable, fixed: -30 ... 70 °C (-22 ... 158 °F) connector models: -30 ... 85 °C (-22 ... 185 °F)
Storage temperature	cable models: -30 ... 70 °C (-22 ... 158 °F) connector models: -30 ... 85 °C (-22 ... 185 °F)
Relative humidity	98 % , no moisture condensation
Mechanical specifications	
Material	
Housing	nickel-plated steel
Flange	aluminum
Shaft	Stainless steel
Mass	approx. 150 g , with cable
Rotational speed	max. 12000 min^{-1}
Moment of inertia	30 gcm^2
Starting torque	< 3 Ncm
Shaft load	
Axial	40 N
Radial	110 N

Dimensions
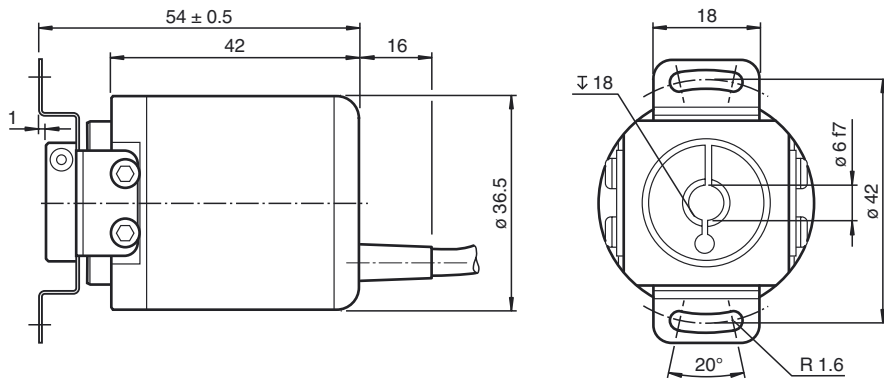
Recessed hollow shaft

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

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Electrical connection

Signal	Wire end	Connector
GND (encoder)	White	1
U_b (encoder)	Brown	2
Clock (+)	Green	3
Clock (-)	Yellow	4
Data (+)	Grey	5
Data (-)	Pink	6
Preset	Black or Blue	7
Counting direction	Red	8
Shielding	Shielding	Housing
Pinout	-	

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
S:	Special bit
MSB:	Most significant bit
LSB:	Least significant bit

$T = 1/f$:	Duration of period of clock signal $\leq$ 1 MHz
T_m:	Monoflop time 10 µs ... 30 µs
T_p:	Clock pause $\geq$ monoflop time ($T_p \geq T_m$)
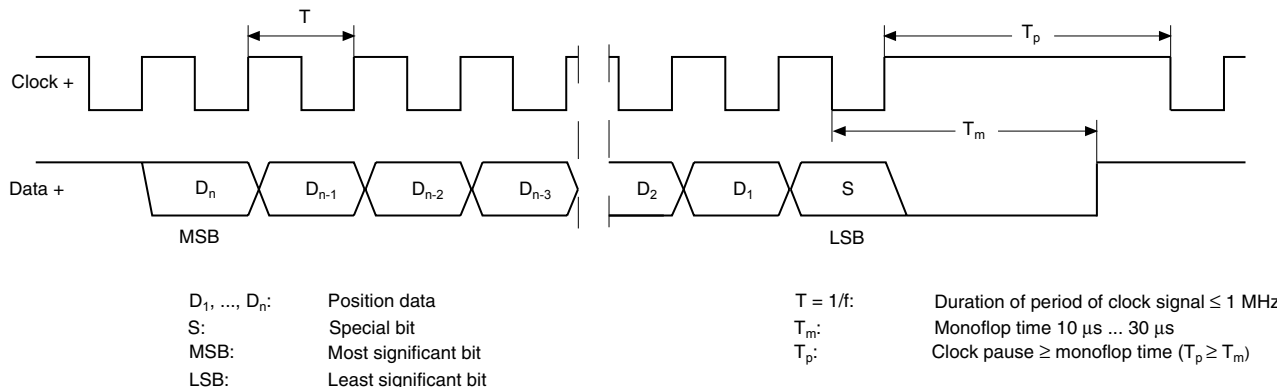
SSI output format Standard

- 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

Rotary encoder | Interface electronics

Line length

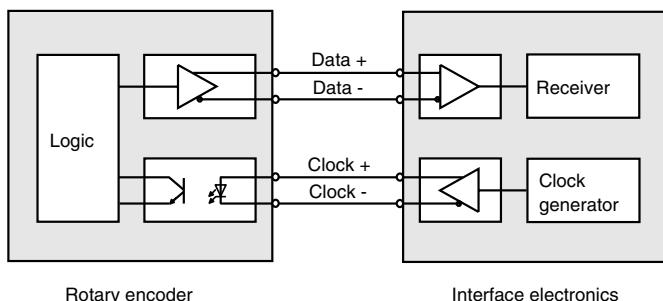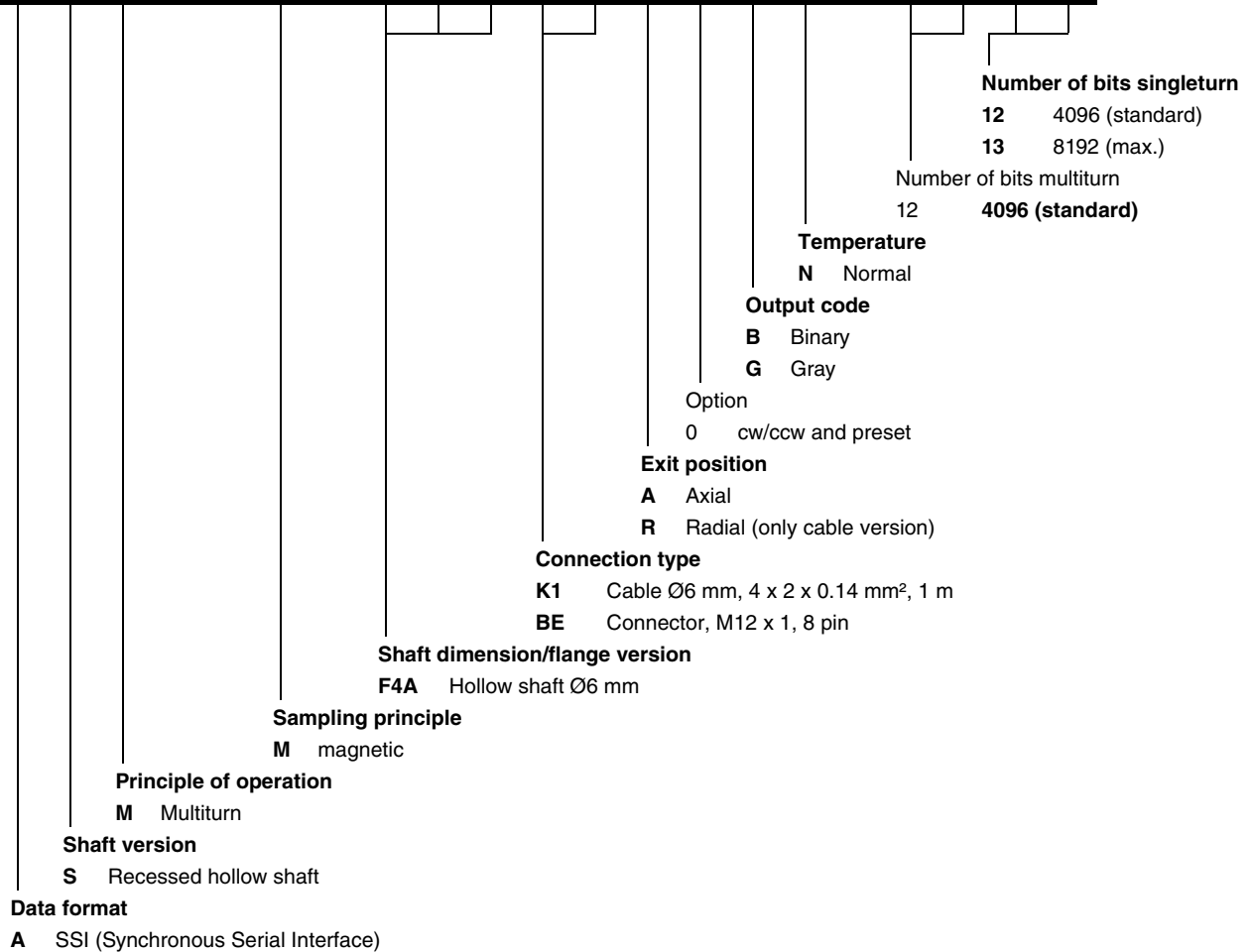| Line length in m	Baudrate in kHz
< 50	< 400
< 100	< 300
< 200	< 200
< 400	< 100

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Order code

| A | S | M | 3 | 6 | M | – | F | 4 | A | | | 0 | | N | – | 1 | 2 | | |

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

Number of bits multiturn
12 **4096 (standard)**

Temperature
N Normal

Output code
B Binary
G Gray

Option
0 cw/ccw and preset

Exit position
A Axial
R Radial (only cable version)

Connection type
K1 Cable Ø6 mm, 4 x 2 x 0.14 mm², 1 m
BE Connector, M12 x 1, 8 pin

Shaft dimension/flange version
F4A Hollow shaft Ø6 mm

Sampling principle
M magnetic

Principle of operation
M Multiturn

Shaft version
S Recessed hollow shaft

Data format
A SSI (Synchronous Serial Interface)

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

Pepperl+Fuchs Group　　　　USA: +1 330 486 0001　　　　Germany: +49 621 776 4411　　　　Singapore: +65 6779 9091
www.pepperl-fuchs.com　　　fa-info@us.pepperl-fuchs.com　　fa-info@de.pepperl-fuchs.com　　fa-info@sg.pepperl-fuchs.com

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