SSI Interface Absolute Rotary Encoder

ASS58/ASM58 Series

CE

SSI SYNCHRON SERIELLES INTERFACE
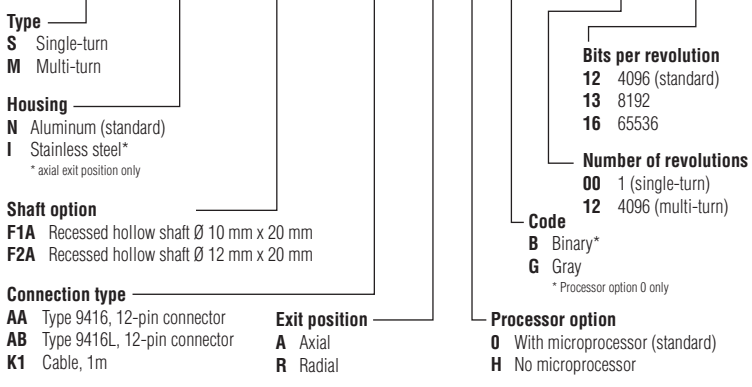
Pepperl+Fuchs' ASS58/ASM58 series absolute encoders feature recessed hollow shafts and communicate via SSI (synchronous serial interface). The encoder is mounted directly to the shaft using set screws. The torque rest is used to prevent the encoder from rotating. Available in either single-turn with 16-bit resolution, or multi-turn with 28-bit resolution versions. These encoders are rated IP65 and feature a rugged aluminum housing.

- SSI compatible
- Industrial standard 58 mm diameter housing
- Single or multi-turn
- IP65
- 10 or 12 mm recessed hollow shaft

Technical Data

Electrical

Supply Voltage	10-30 VDC
Current Consumption	≤140 mA
Output Code	Gray, binary
Linearity	±1 LSB
Counting Direction (shaft end view)	Clockwise ascending (factory preset)
Interface	
Type	SSI
Transfer rate	0.05-1.5 MBaud
Monoflop time	20 ± 10 ms
Resolution	
Bits/steps per turn	16-bit/65536 max.
Bits/number of turns	12-bit/4096 max.
Overall Resolution	
Single-turn	16-bit
Multi-turn	28-bit
Standard Conformity	RS-422
Inputs	
Type	Selection of counting direction (V/R)
	Preset 1
Signal voltage	10-30 V (high)
	0-2 V (low)
Input current	<6 mA
Switch-on/off delay	<0.1 ms

Mechanical

Material (standard model)	
Housing	Powder-coated aluminum
Flange	Aluminum
Shaft	Stainless steel
Pulse disc	Glass
Material (stainless model)	
Housing	Stainless steel
Flange	Stainless steel
Shaft	Stainless steel
Pulse disc	Glass
Weight	
Standard	≈16 oz.
Stainless	≈27 oz.
Maximum Rotational Speed	6,000 rpm
Moment of Inertia	≤4.3 x 10^{-4} oz-in-sec^2
Starting Torque at 20°C	≤2.1 in-oz
Shaft Loading	
Angle offset	1°
Axial offset	≤1 mm
Bearing Working Life	>2 x 10^{10} revolutions

Environmental

Storage Temperature	-25°C to +85°C (-13°F to +185°F)
Operating Temperature	-20°C to +70°C (-4°F to +158°F)
Humidity	98% RH non-condensing
Shock Resistance	100 G for 3 ms
Vibration Resistance	10 G, 10-2,000 Hz
Enclosure Rating	IP65

Connection Types

Connector	Type 9416, 12-pin
	Type 9416L, 12-pin
Cable	Ø7 mm, 12 x #26 AWG, 1 m length

ASS58/ASM58 Series Order Code

AS☐58☐-☐☐☐☐☐☐☐☐N-☐☐☐☐

Type
- **S** Single-turn
- **M** Multi-turn

Housing
- **N** Aluminum (standard)
- **I** Stainless steel*
  - * axial exit position only

Shaft option
- **F1A** Recessed hollow shaft Ø 10 mm x 20 mm
- **F2A** Recessed hollow shaft Ø 12 mm x 20 mm

Connection type
- **AA** Type 9416, 12-pin connector
- **AB** Type 9416L, 12-pin connector
- **K1** Cable, 1m

Exit position
- **A** Axial
- **R** Radial

Code
- **B** Binary*
- **G** Gray
  - * Processor option 0 only

Processor option
- **0** With microprocessor (standard)
- **H** No microprocessor

Number of revolutions
- **00** 1 (single-turn)
- **12** 4096 (multi-turn)

Bits per revolution
- **12** 4096 (standard)
- **13** 8192
- **16** 65536

Example: ASS58N-011AAR0GN-0013

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Dimensions

mm (in.)

Connection type AA or AB
Style 9416☐ 12-pin connector

Connection type K1
1 m cable
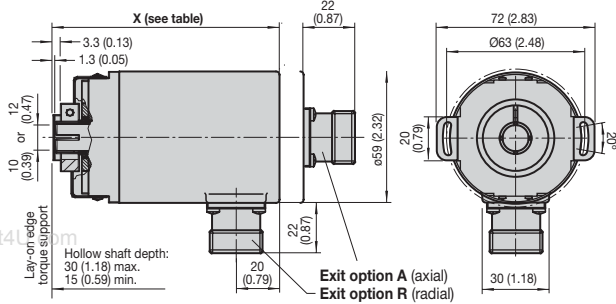
Dimension X

Single-turn	76 (3.00)
Multi-turn	98 (3.86)

Lay-on edge torque support

Hollow shaft depth:
30 (1.18) max.
15 (0.59) min.

Exit option A (axial)
Exit option R (radial)
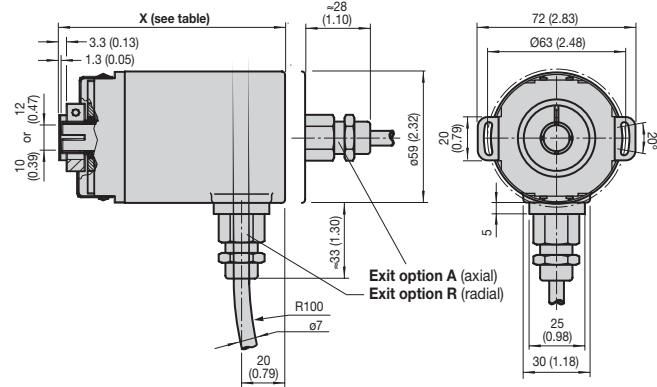
Electrical Connection

Signal	AA Type 9416, 12-pin quick disconnect	AB Type 9416L, 12-pin quick disconnect	K1 12-conductor cable, Ø 7 mm	Description
Power Source U_B	2	8	Brown	Power supply
GND	1	1	White	Power supply
Clock (+)	3	3	Green	Positive cycle line
Clock (–)	4	11	Yellow	Negative cycle line
Data (+)	5	2	Gray	Positive transmission data
Data (–)	6	10	Pink	Negative transmission data
Reserved	7	12	Blue	Not wired, reserved
V/R	8	5	Red	Input for selection of counting direction
Preset	9	9	Black	Zero setting input
Reserved	10	4	Violet	Not wired, reserved
Reserved	11	6	Gray/Pink	Not wired, reserved
Reserved	12	7	Red/Blue	Not wired, reserved

AS58/ASM58 Series

SSI Interface Absolute Rotary Encoder
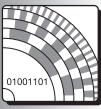
Series ASS58/ASM58 Programming

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 signal and the absolute encoder responds with the position value.

Thus only 4 lines are required for the clock and data, regardless of the rotary encoder resolution. The RS-422 interface is galvanically isolated from the power supply.
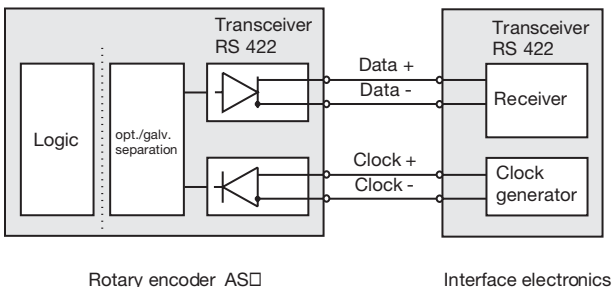
SSI Data Transfer
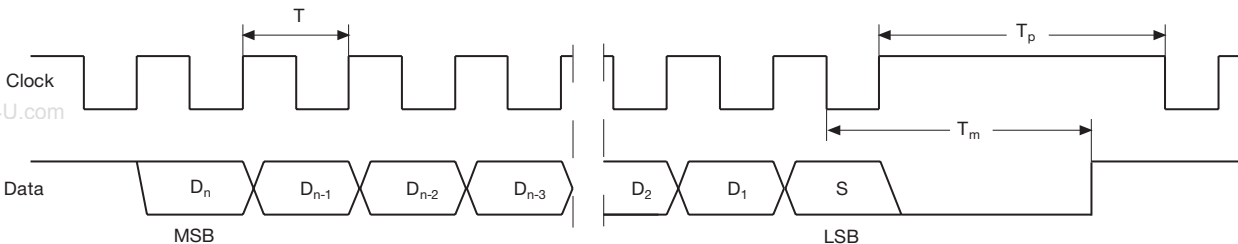
$D_1, ..., D_n$:	Position data
S:	Special bit
MSB:	Most significant bit
LSB:	Least significant bit

$T = 1/f$:	Duration of period, $f < 1$ MHz
T_m:	Monoflop time 10-30 μs
T_p:	Clock pause $\geq$ monoflop time $T_p \geq T_m$

Block Diagram

Rotary encoder AS□   Interface electronics

Line Length

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

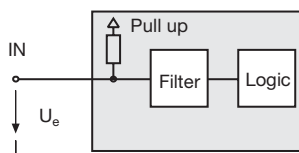### Inputs

The selection of the counting direction input is activated with 0-level. The PRESET input is activated with 1-level.

PRESET Input
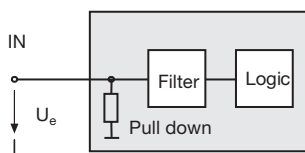
Input for selection of counting direction

Clock Input (2-wire):

Optically and galvanically isolated clock input in accordance with I/O Standard RS-422. The control module clock synchronizes the data transfer between the encoder and the interface electronics. A terminating resistor with a resistance of 120 Ω is incorporated between the clock lines "Clock +" and "Clock -".

⚠ The pulse diagram is shifted by exchanging the clock lines.

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