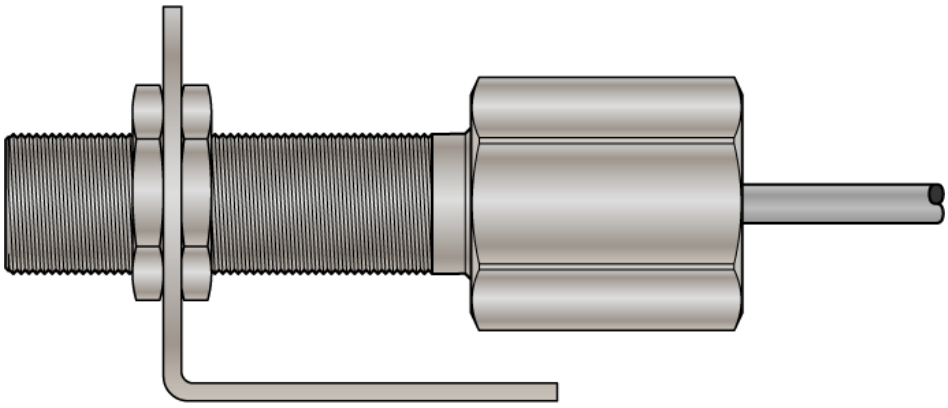
ELECTRO·SENSORS

ST420-DI

4-20mA

Shaft Tachometer Sensor/Transmitter



USERS MANUAL

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990-003901 Rev B

Description

The ST420-DI is an analog-output shaft speed sensor/transmitter. It detects magnetic pulses from a rotating shaft-mounted pulser target (disc or wrap) and outputs a smooth, continuous 4-20mA analog signal in direct proportion to the pulse frequency (rotating shaft speed). See the Output Function graph on p. 4.

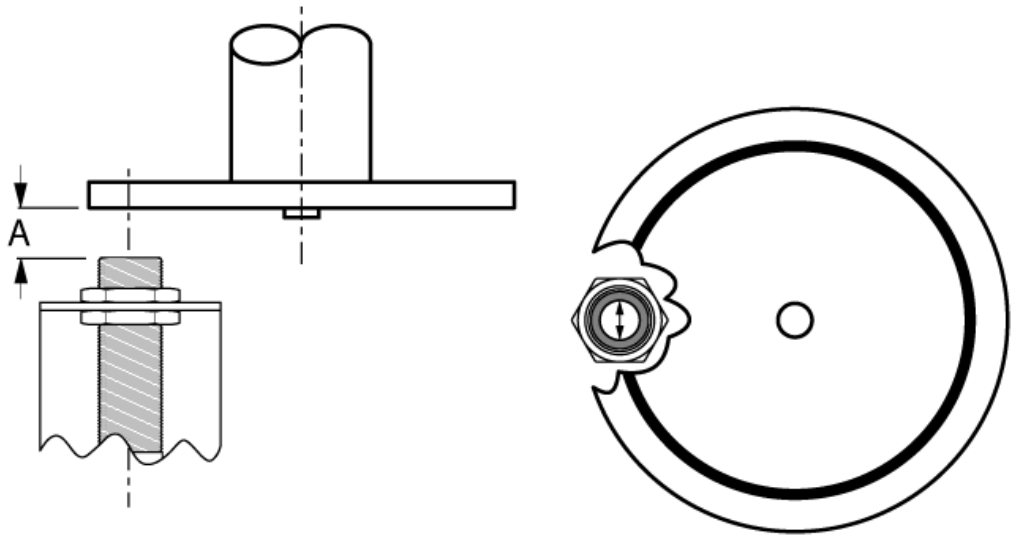
The ST420-DI combines a magnetic pulse detector, signal processing and 2-wire loop-powered 4-20mA circuitry into a stainless-steel M18x1 Type 4X sensor housing with a conduit port (½ NPT female). Mounting bracket and two stainless steel jam nuts are included.

Installation

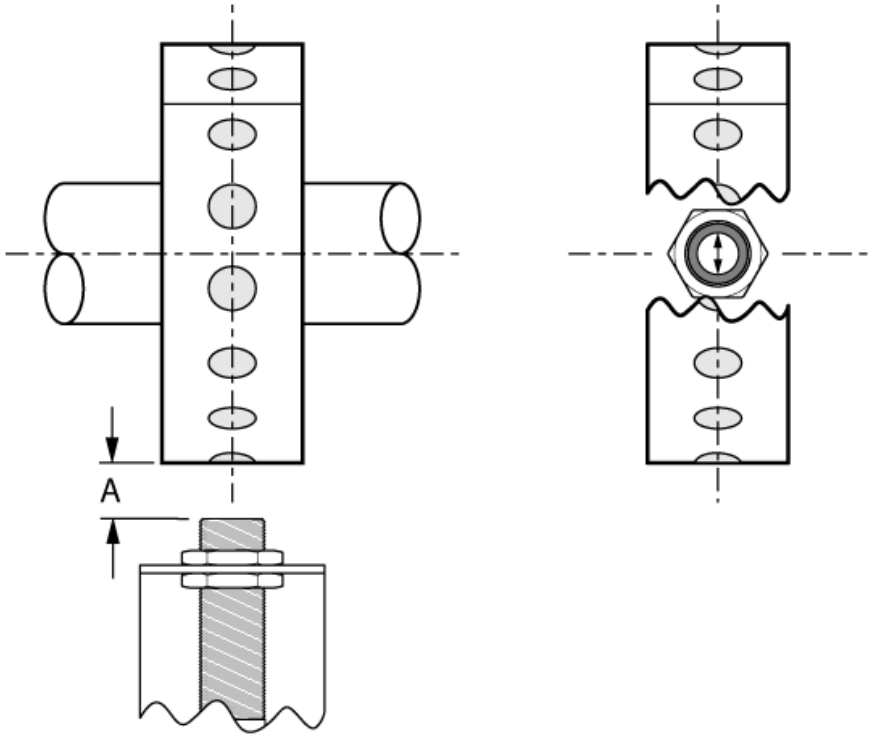
Mount the pulser target (disc or wrap) to the shaft.

Sensor and gap

Mount the ST420-DI with the arrow label aligned with the center path of the pulser target magnets as shown. Adjust the gap (A) to ¼ inch (6.35 mm).



With Pulser Disc

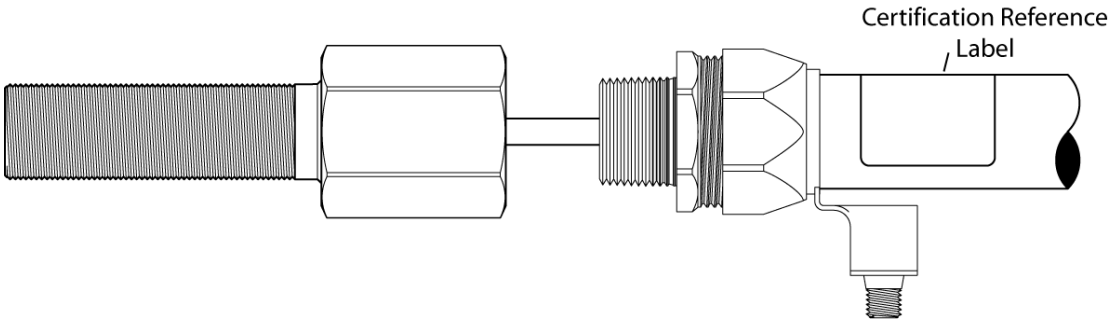


With Pulser Wrap

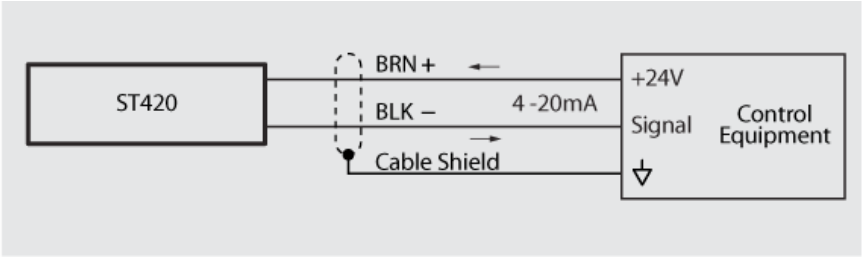
Installation (cont.)

Conduit

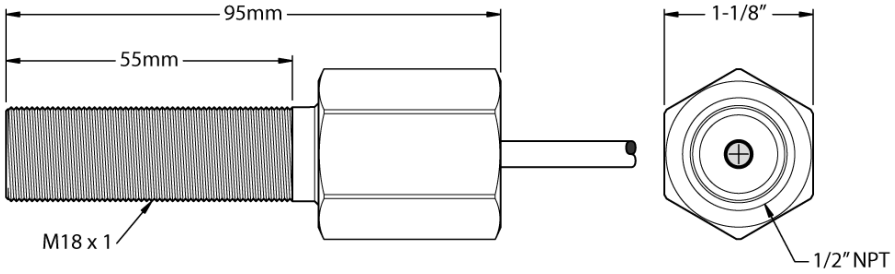
For Class II Div 1 installations, assemble Class II Div 1 rated conduit and fitting (with ground terminal) into the ST420-DI as shown. Use Teflon tape or suitable pipe dope sealant on the ½ NPT side of the fitting. Tighten enough to seal.
Apply the Certification Reference Label to the installed conduit as shown.
Properly earth the ground terminal per the applicable electrical codes.



Wiring Diagram



Dimensions



Specifications

Sensor Gap	1/4 in ±1/8 in
V (min → max)	8 → 30 Vdc (nominal loop power: 24Vdc)
Operating Temp	-20 → +80 °C (-4 → +176 °F)
Accuracy	Max error at 25°C ± 0.25%
	Max error over temp ± 0.50%
Output response time	< 9 mS

Cable

Type, length	shielded, 2 x 24 (7/32) AWG, 10 ft
Color code	Brown (V+), Black (V-); reverse-wiring protected

Approvals/ Ratings

Dust Ignition-proof for use in Class II and III, Div 1 and 2, Groups E, F, G when installed with a Class II, Div 1 rated fitting and conduit. See Installation (p. 2).
T5 Ta ≤ 80 °C IP65 Enclosure Type 4X

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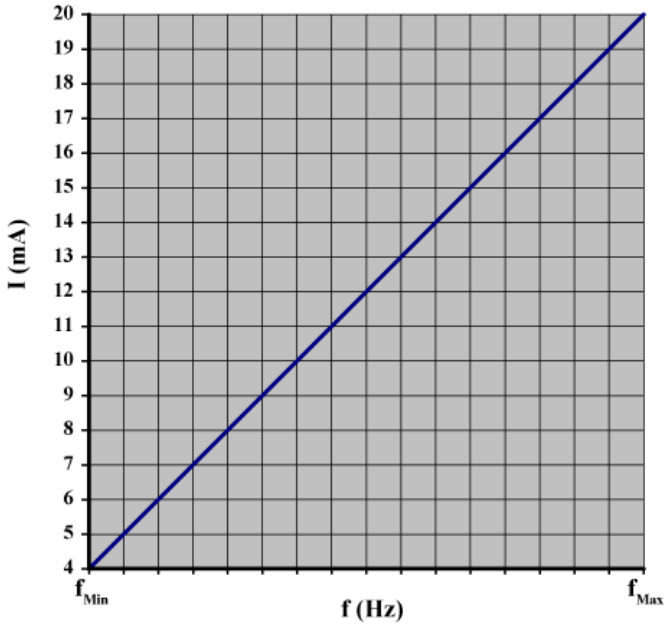
Output Function

$$I(f) = 4mA + 16mA*(f - f_{min})/(f_{max} - f_{min})$$
$$f(I) = f_{min} + (f_{max} - f_{min})*(I - 4mA)/16mA$$



rpm = f * 60/ppr, f = rpm * ppr/60
ppr is the number of disc/wrap pulses (magnets) per revolution.
f is the magnetic pulse frequency of disc/wrap magnets rotating past the sensor.
The ST420-DI detects each passing magnet as a pulse, regardless of north/south polarity.

Models/p.n.

Standard (stock) and custom (special order) models are available.

Model	p.n.	$f_{min} \rightarrow f_{max}$	ppr	rpm range @ ppr
ST420-DI-L	800-001900	.2667 → 26.67 Hz	8	2 → 200 rpm
ST420-DI-H	800-001901	.2667 → 266.7 Hz	8	2 → 2000 rpm
ST420-DI-C-XXXX	800-0019XX	Specified by customer		