Series 18

Intrinsically Safe
Pulse frequency output
Shaft Rotation Speed Sensors

USERS MANUAL

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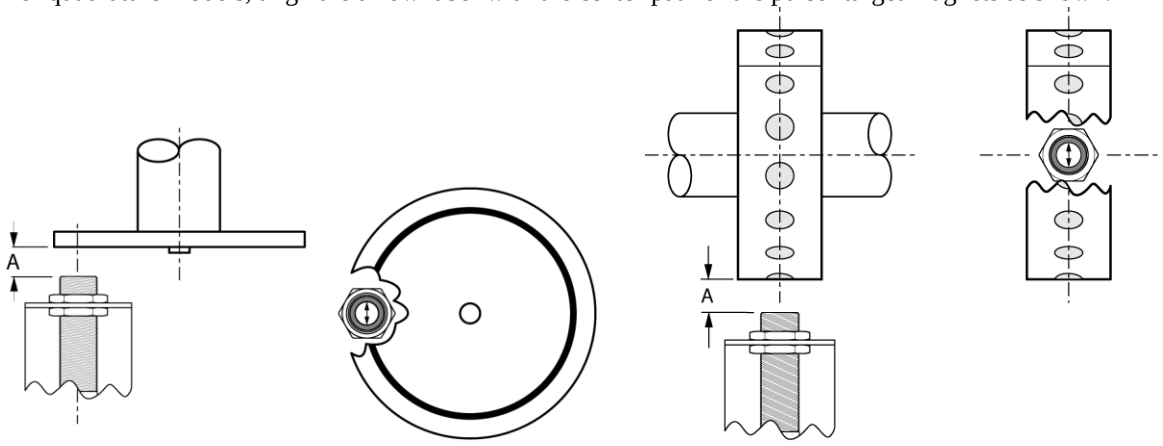
990-005000 Rev C

Description

Series 18 sensors detect passing magnets from a shaft-mounted pulser target and output a square-wave pulse signal with frequency proportional to the shaft rotation speed.
All models operate down to (and including) zero speed.
Signal, output and termination options provide speed or speed + direction signaling and compatibility with plc inputs, tachometers, data acquisition modules and various frequency meters.
Options include four stainless-steel M18x1 housings, Hall-effect and Magnetoresistive sensing, single or quadrature signaling and NPN (sinking) or PNP (sourcing) transistor outputs (open-collector or terminated).
All models operate from standard 24Vdc.
All models are factory filled and sealed against entrance of liquids and dust.
All models come standard with a mounting bracket and two stainless steel hex jam nuts.

Installation Gap/Allignment

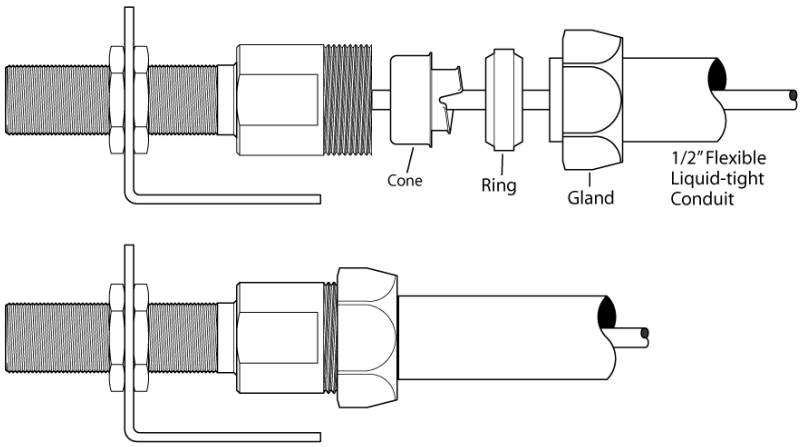
Mount the pulser target (disc or wrap) to the shaft.
Mount the sensor as shown. Adjust the gap (A) per the model specification.
For quadrature models, align the arrow label with the center path of the pulser target magnets as shown.



With pulser disc (18*HQ shown)** **With pulser wrap (18*HQ** shown)**

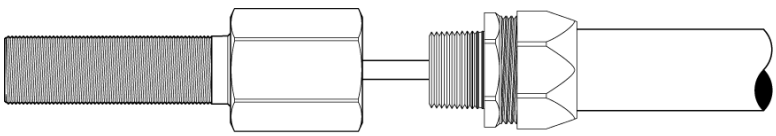
Installation 18F**

Assemble ½ in flexible liquid-tight conduit into 18F models as shown.
Slide the gland and ring over the end of the conduit and screw the cone into (and over) the end of the conduit.
Install the conduit over the cable and secure it to the sensor housing by tightening the gland enough to seal – do not over-tighten.



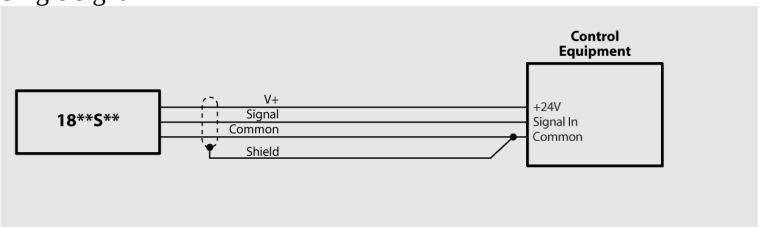
Installation 18R**

Assemble conduit and fitting into 18R models as shown.
To obtain a watertight seal, use teflon tape or suitable pipe dope sealant on the ½ NPT side of the fitting.
Tighten enough to seal.

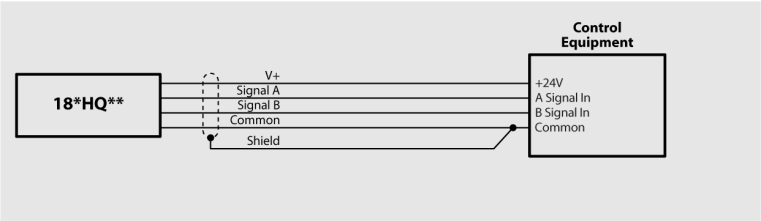


Wiring (non-I.S.)

Single signal



Quadrature signal



Notes:

Connect the cable shield to signal input common at the receiving equipment only.
Do not connect the cable shield to earth or chassis ground; leave the signal input common floating.
For open-collector models (18****O), a minimum 2.4kΩ termination resistance is required on each signal, preferably located at the control equipment signal input(s): Signal In to Common (pull-down) for 18***P*, Signal In to +V (pull-up) for 18***N*; external or internal.

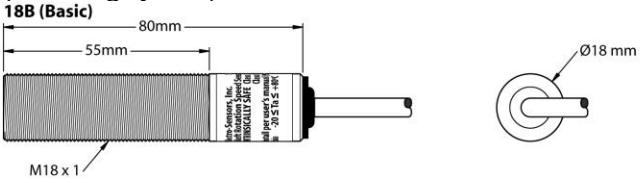
Wiring (I.S.)

I.S. installations must be wired per the Series 18 I.S. Control Drawing 990-006100.

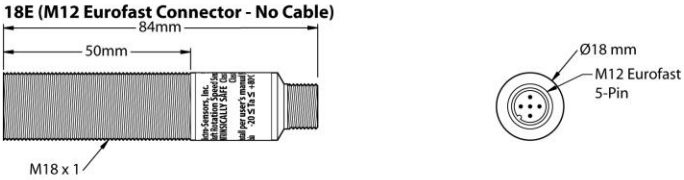
Dimensions

(4 housing options)

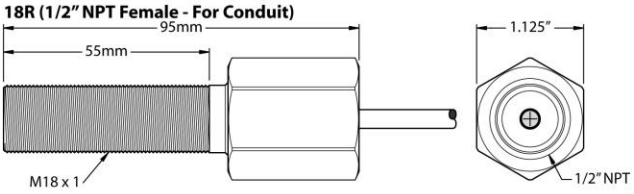
18B (Basic)



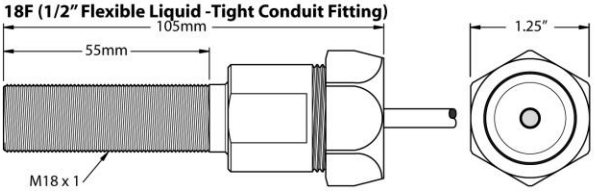
18E (M12 Eurofast Connector - No Cable)



18R (1/2" NPT Female - For Conduit)



18F (1/2" Flexible Liquid -Tight Conduit Fitting)



Output Functions

f_{pulse}(Hz) = RPM * PPR / 60 RPM = f_{pulse}(Hz) * 60 / PPR

RPM is the shaft revolutions-per-minute.

PPR is the number of signal pulses per pulser target (shaft) revolution – for the pulser target and sensor used.

Note:

PPR (18*H***, Hall-Effect sensing) = number of pulser N-S magnet pairs (1/2 the pulser target magnets).
PPR (18*MS**, Magnetoresistive sensing) = number of pulser target magnets.
Magnetoresistive (18*MS**) gives 2X the PPR and frequency of Hall-Effect (18*H***).
Some pulser target restrictions exist for Magnetoresistive (18*MS**) - consult factory.

Model number

18 __ __ __ __ __ - __ __ __ **-W**: wide-temp option (otherwise blank, available for 18B/R/F only)
- **Cable length, ft** (18B/R/F only, use leading zeros; 18E blank) – 010 is standard
- **O**: open-collector (un-terminated) output(s)
- **T**: terminated output(s) (internal 10kΩ: pull-up for 18***NT, pull-down for 18***PT)
- **N**: NPN (sinking) output(s)
- **P**: PNP (sourcing) output(s)
- **S**: single signal: speed only
- **Q**:quadrature signal (Signal A, Signal B; 18*HQ** only): speed and direction
- **H**: Hall-Effect sensing (one signal pulse per pulser target N-S magnet pair)
- **M**: Magnetoresistive sensing (one signal pulse per pulser target magnet)
- **B**: M18x1 housing (Basic)
- **E**: M18x1 housing with 5-pin male M12 (Eurofast) connector – no cable
- **R**: M18x1 housing with ½ NPT female conduit port
- **F**: M18x1 housing with ½ in (Flexible) liquid-tight conduit fitting

Examples:	18BHSNO-010	Basic housing, Hall-effect sensing, single signal, NPN output, open-collector, 10ft cable (standard length), standard temp (not wide-temp)
	18EHQPT	M12 (Eurofast) connector, Hall-effect sensing, quadrature signal, PNP outputs, terminated (internal 10kΩ pull-down resistors)
	18FMSPO-025-W	Flexible liquid-tight conduit fitting, Magnetoresistive sensing, single signal, PNP output, open-collector, 25ft cable, wide-temp

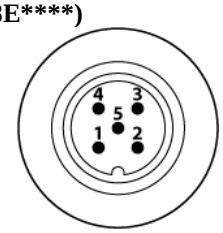
Cable (18B/R/F**)**

Type: UL 2464, shielded, 3 or 4 conductor, 24 AWG (all 18B/R/F without -W option)
Teflon jacket, shielded, 3 or 4 conductor, 22 AWG (all 18B/R/F with -W option)

Conductors:

Red	V+
Black	Common
White	Signal (18**S**-***), Signal A (18*HQ**-***)
Green	Signal B (18*HQ**-*** only)

Connector/pin-out (18E**)**



M12 male, 5-pin (mates with M12 female on cord-set)

1	unconnected
2	V+
3	Common
4	Signal (18E*S**), Signal A (18EHQ**)
5	Signal B (18EHQ** only, else unconnected)

Specifications

Sensor Gap		1/4 in ±1/8 in (using pulser targets with ½" magnets)
V+		10 → 26 Vdc
I (V+) (no Signal load)		10 mA max (18****O)
I (Signal or Signal A/B)		10 mA max (NPN sink / PNP source) – each output
Ro (18****T only)		10 kΩ Signal to V+ (18***NT), Signal to Common (18***PT)
Operating Temp		-40 → +100 °C (-40 → 212 °F) (18*****-***-W only)
		-30 → +80 °C (-22 → 176 °F) (18E**** only)
		-20 → +80 °C (-4 → 176 °F) (all others)
Frequency (f_{pulse})		0 → 20,000 Hz

Approvals/ Ratings

Intrinsically Safe: Class I Div 1 (A, B, C, D), Class 2 Div 1 (E, F, G); AEx[ia] IIC
Install for I.S. per the Series 18 I.S. Control Drawing 990-006100

T4	Ta ≤ 100 °C	(18B****-***-W, 18R****-***-W, 18F****-***-W)
T5	Ta ≤ 80 °C	(all others)
IP65	4X	(all 18R****-*** and 18F****-***)

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