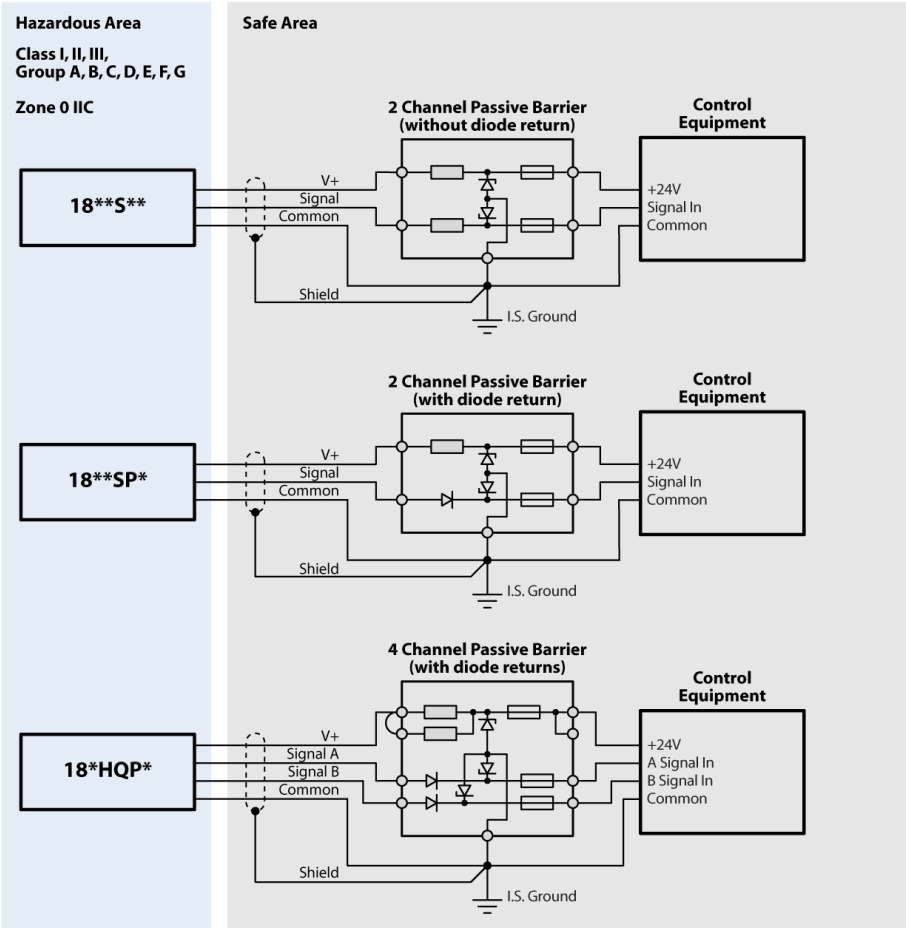


Series 18 shaft rotation speed sensors

I.S. Control Drawing

Wiring diagrams



Intrinsically Safe Class I, II, III, Division 1, Groups A, B, C, D, E, F, G
 T5 Ta ≤ 85°C (18B****-***-W, 18R****-***-W, 18F****-***-W)

AEx/Ex ia IIC
 T5 Ta ≤ 80°C (all others) IP65 4X

Interconnection of Series 18 intrinsically safe sensors and associated apparatus shall satisfy the following:

Entity Parameters	Equip.	Barrier	Notes
$U_i = 30 \text{ Vdc}$	$U_i >$	U_o	U_o is barrier max open-circuit voltage
$I_i = 100 \text{ mA}$	$I_i >$	I_o	I_o is barrier max short-circuit current
$P_i = 0.70 \text{ W}$	$P_i >$	P_o	If P_o is not known, use $P_o = (U_o * I_o) / 4$
$C_i = 0.042 \mu\text{F}$	$C_i + C_c <$	C_o	$C_c = (\text{cable pF/ft}) * \text{length (in ft)}$, C_o is the barrier max allowed external capacitance
$L_i = 0 \mu\text{H}$	$L_i + L_c <$	L_o	$L_c = (\text{cable } \mu\text{H/ft}) * \text{length (in ft)}$, L_o is the barrier max allowed external inductance

The highest associated apparatus values (U_o , I_o , and P_o) specified for any connection combination shall not exceed the parameters (U_i , I_i , P_i) of the intrinsically safe Series 18 sensors. Multiple associated apparatus shall not be connected to a single Series 18 sensor unless the associated apparatus are specifically certified for use in combination with each other. See Series 18 I.S. Barriers Application Note (p. 2 of this document) for recommended single barrier solutions. Selected barriers must be third party approved as providing intrinsically safe circuits for the application.

The transmitter-barrier cable length is limited by the C_c , L_c restrictions given above.

If the cable pF/ft and/or $\mu\text{H/ft}$ values are unknown, use 60 pF/ft and/or 0.2 $\mu\text{H/ft}$.

The DIN rail (I.S. Ground) must be insulated from the surrounding cabinet (and all other potentials) and connected to earth ground at the 24V supply only. See NEC Article 504, CEC Section 18.

All installations must be in accordance with the barrier manufacturer's control drawing. US installations must be in accordance with Article 504 of the National Electrical Code, ANSI/NFPA 70. Canadian installations must be in accordance with section 18 of the Canadian Electrical Code.

When required by the manufacturer's control drawing, the barrier must be connected to a suitable ground electrode per the National Electrical Code, ANSI/NFPA 70 or the Canadian Electrical Code, as applicable. The resistance of the ground path must be less than 1 ohm.

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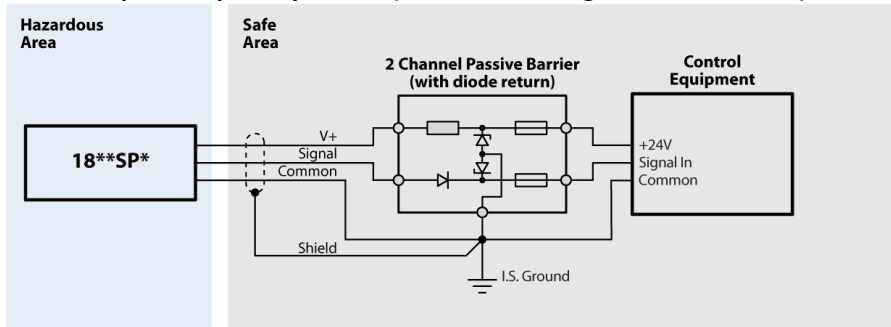
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990-006100 Rev A

Series 18 shaft rotation speed sensors

I.S. Barriers Application Note

I.S. installations must meet the requirements of the I.S. Control Drawing (990-006100) and all applicable electrical codes. Signals must be terminated with resistance at Signal In (pull-up to +24V for 18***N*, pull-down to Common for 18***P*). This resistance may be internal (to the Control Equipment), external (a separate resistor), or a combination of both. The minimum total resistance from the sensor Signal output to +24V (NPN) or Common (PNP) should be 2.4kΩ. Electro Sensors recommends PNP-output, un-terminated (18***PO) models for use with IS barriers when feasible (contact Electro Sensors for assistance). Depending on the Control Equipment Signal In specifications, larger termination resistance may be required to reduce the effect of barrier series resistance on signals. See the Notes under 2-channel positive-polarity barrier (no series diode return). Three Series 18 compatible passive Zener Barrier types with part numbers, connections and notes are shown below. Note the Series 18 models and their compatible barriers. Signaling (S or Q) and output(s) (N or P) determine barrier compatibility.

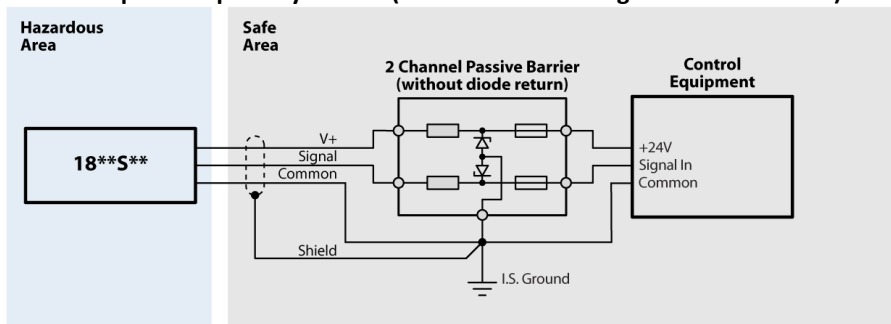
2-channel positive-polarity barrier (series diode in signal return channel)



Examples: MTL 7787+, Pepperl Fuchs Z787 (~330Ω max series resistance, V+ channel)

Notes: Use this barrier type for 18**SP* (single signal, PNP). This barrier type WILL NOT work with 18***N* (NPN).

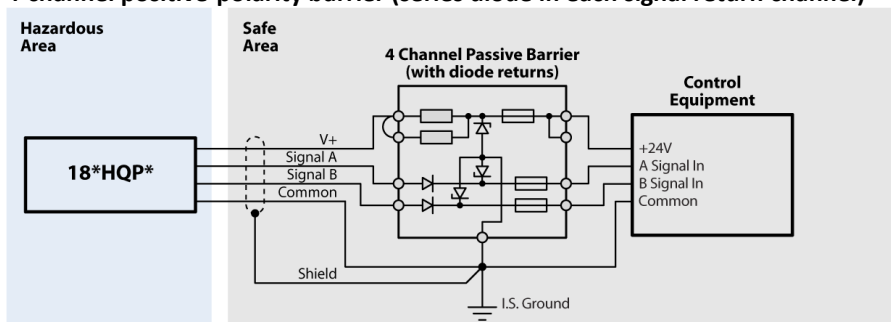
2-channel positive-polarity barrier (no series diode in signal return channel)



Examples: Pepperl Fuchs Z778, Pepperl Fuchs Z978, MTL 7778ac (~660Ω max series resistance, each channel)

Notes: This barrier type works with all single-signal Series 18 models (18**S**, NPN or PNP output). However, consider the effect of the barrier channel series resistance at the Control Equipment Signal In. For example, if Signal In is voltage sensing with maximum 1V LOW threshold, 18**SN* (NPN) will require a minimum 20kΩ termination resistance (from Signal In to +24V) to ensure signal LOW < 1V. When the Control Equipment Signal In can accommodate PNP open-collector, 18***PO models and series diode return barrier types are recommended.

4-channel positive-polarity barrier (series diode in each signal return channel)



Examples: MTL 7789+, Pepperl Fuchs Z789 (~660Ω max series resistance, each V+ channel)

Notes: Use this barrier type for 18*HQP* (quadrature, PNP). This barrier type WILL NOT work with 18***N* (NPN).