

P599 Series Electronic Pressure Transducers

Product/Technical Bulletin

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Introduction

The P599 Series Electronic Pressure Transducers are compact, economical, rugged, direct-mount pressure transducers designed for use in commercial and industrial refrigeration and air conditioning applications. These transducers provide a proportional analog signal based on the sensed pressure.

The P599 Series Transducers feature environmentally protected electronics with stainless steel construction. The digitally compensated P599 Transducers are highly accurate over a broad temperature range, resisting the effects of wide ambient temperature swings, high humidity, condensation, and icing.

The pressure port is machined from 304L stainless steel. No o-rings or organic materials are exposed to the pressure media, allowing for a leak-proof, all-metal, sealed pressure system. The P599 Series Transducers operate with any corrosive or non-corrosive refrigerants that are compatible with stainless steel (304L SS), including water condensate, carbon dioxide, glycol, most refrigerants (including ammonia), and many other compatible fluids and gases. The P599 Transducers also can be used with the following natural refrigerants: NH₃ (ammonia) and CO₂ (carbon dioxide) in accordance with hazardous location requirements.

The P599 Series provides transducers in a variety of pressure ranges, covering most common refrigeration and air conditioning applications.

Features and Benefits

- **Industrial Duty Design**—Offers a sealed design that includes a snubber to dampen pressure pulsations and has no o-rings for reliable performance in the most harsh environments.
- **10 Million Plus Full Scale Pressure Cycle Rated Life Span**—Provides life use with no degradation of accuracy or performance over the life of the transducer.
- **Approved for Today's Refrigerants**—Use with an extensive number of refrigerants, including HCFC, HFC, CO₂, and ammonia.
- **Environmentally Protected Electronics**—Provide high vibration tolerance and prevent ingress and egress that can occur through suction line icing and thawing.

Figure 1: P599 Electronic Pressure Transducers



Application

IMPORTANT: The P599 Series Electronic Pressure Transducer is intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the P599 Transducer could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the P599 Transducer.

IMPORTANT : Le P599 Series Electronic Pressure Transducer est destiné à transmettre des données entrantes à un équipement dans des conditions normales de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du P599 Transducer risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du P599 Transducer.

P599 Series Electronic Pressure Transducers provide a proportional analog signal, based on the sensed fluid pressure, to a variety of controls.

P599 Transducers provide several output signal options: 0.5 to 4.5 VDC ratiometric, 0 to 10 VDC, and 4 to 20 mA. The 0 to 5 VDC and 1 to 5 VDC output signals are also available on non-standard, bulk order purchases. See [Ordering Bulk Quantities of Non-Standard P599 Transducers](#) for more information on non-standard models.

Typical applications include:

- HVAC and refrigeration applications
- Chillers
- Pumps and compressors
- Industrial process control
- Heat pump
- Fan speed controls
- Agricultural applications

Installation

See [Mounting](#) and [Wiring](#) for information on installing the P599 Series Electronic Pressure Transducers.

Mounting

The compact, lightweight P599 Transducer mounts directly to most refrigeration equipment pressure tap ports.

NOTICE

Risk of Property Damage.

Mount the pressure control separately from the electrical cabinet and seal all electrical piping to prevent ammonia from migrating to electrical components. Where there may be exposure to ammonia, use only ammonia-compatible control modules and pressure connections. System shutdown due to improper adjustment may cause property damage.

NOTICE

Risque de dégâts matériels.

Installer le régulateur de pression séparément de l'armoire électrique et étanchéfier tous les conduits électriques afin d'éviter que de l'ammoniac n'entre en contact avec des composants électriques. En cas d'exposition potentielle à de l'ammoniac, utiliser uniquement des modules de régulation et des raccords de pression compatibles avec la présence d'ammoniac.- L'arrêt du système en raison d'un réglage inapproprié risque de provoquer des dégâts matériels.

IMPORTANT: When installing the P599 Transducers, observe all regulations governing the handling and containment of hazardous or regulated materials (refrigerants or lubricants).

IMPORTANT: Locate pressure tap points on the top side of the refrigerant lines to reduce risk of equipment damage or malfunction caused by accumulation of oil, liquids, or sediment at the transducer-to-refrigeration port pressure connection.

IMPORTANT: Avoid severe pressure pulsations on high-side pressure connections by positioning the transducer away from compressor discharge.

To mount the P599 Transducer:

1. Hand thread the P599 Transducer to the pressure tap point.
2. Tighten the connection using the provided wrench flats to avoid damaging the transducer. See *Technical Specifications* for recommended assembly torque values.
3. Perform a leak test on the connection before putting the system into operation.

Wiring

Observe the following guidelines when wiring the P599 Transducer:

- Ensure wiring conforms to the regional, national, and local electrical codes and regulations.
- Do not exceed the transducer's electrical ratings (Table 8).
- Do not extend the wiring harness leads more than 76 m (250 ft). Use 22 AWG stranded, twisted, 3-wire, shielded cable to extend wiring harness leads.
- Do not run low-voltage cable in conduit or wiring troughs with high-voltage wires.
- Ensure that the shielded cable is terminated according to code and the control's instructions.

Wiring in Hazardous Locations

P599 Transducers are cUL Recognized for use in Class I, Division 2 Groups A, B, C, and D locations. Follow these additional guidelines when wiring or servicing a P599 Transducer in a nonhazardous location.

WARNING

Risk of Explosion or Fire.

Do not disconnect the P599 Series Electronic Pressure Transducer while its circuit is energized, unless the area is known to be nonhazardous. Disconnecting the P599 Transducer in a hazardous area while its electrical circuit is energized may result in an explosion or fire, and may cause serious injury or death.

AVERTISSEMENT

Risque de explosion ou incendie.

Ne pas déconnecter le P599 Series Electronic Pressure Transducer lorsque son circuit est sous tension, sauf s'il est avéré que la zone est non dangereuse. La déconnexion du P599 Transducer dans une zone dangereuse alors que son circuit électrique est sous tension risque d'entraîner une explosion ou un incendie et de provoquer des blessures graves, voire mortelles.

Checking Transducer Operation

IMPORTANT: The P599 Transducer is a precision sensing device and testing accuracy is typically beyond the capability of field diagnostic tools.

Before applying power, check all wiring connections. After applying power, operate controlled equipment under normal conditions and use a reliable set of pressure meters to verify that the transducer and the associated control are operating properly.

0.5 to 4.5 VDC Ratiometric Versions

The ratiometric versions of the P599 Transducer receive a constant 5 VDC input supply voltage and vary the output signal voltage, based on the sensed pressure. The output voltage varies from 10% to 90% of the supply voltage, providing a 0.5 to 4.5 VDC output signal.

Note: The 0.5 to 4.5 VDC ratiometric transducers are rated for 5.0 ±0.25 VDC, Safety Extra-Low Voltage (SELV). Exceeding the supply voltage rating can damage the transducer and void any warranties.

To verify that the transducer is working properly:

1. With the transducer in place and the controlled system pressure stabilized, measure the pressure at the transducer with an accurate and reliable pressure meter. This value is the **measured pressure (P)**.
2. Determine the maximum (**Pmax**) and minimum (**Pmin**) pressure values for the transducer's pressure range (Table 1 and Table 4).
3. Measure the voltage between Supply wire (red) and Common wire (black). Use this value in Step 3 as the **measured supply voltage, Vs**.
4. Use the equation in Figure 2 to determine the **calculated output voltage** for the ratiometric transducer.
5. Using your multimeter, measure the DC voltage between the transducer output and common (-) pins. See Table 9 for the pin out configuration. This is the **measured output voltage**.
6. Compare the calculated output voltage (Step 4) and the measured output voltage (Step 5). If the measured output voltage differs greatly from the calculated output voltage, replace the transducer.

Note: It is normal for the transducer reading to differ somewhat from pressure meter readings due to voltmeter and pressure meter tolerances or other factors.

0 to 5 VDC, 1 to 5 VDC, and 0 to 10 Versions

To verify that the transducer is working properly:

1. With the transducer in place and the controlled system pressure stabilized, measure the pressure at the transducer with an accurate and reliable meter. This value is the **measured pressure (P)**.
2. Determine the maximum (**Pmax**) and minimum (**Pmin**) pressure values for the transducer's pressure range (Table 1 and Table 4).
3. Use the equation in Figure 3 to determine the **calculated output voltage** for the 0 to 10 VDC transducers.
4. Measure the voltage between the transducer output and common (-) pins. See Table 9 for the pin out configuration. This is the **measured output voltage**.
5. Compare the calculated output voltage (Step 3) and the measured output voltage (Step 4). If the measured output voltage differs greatly from the calculated output voltage, replace the transducer.

Note: Under normal conditions, the transducer reading can differ somewhat from pressure meter readings due to voltmeter and pressure meter tolerances or other factors.

Figure 2: Voltage Calculation for 0.5 to 4.5 VDC Ratiometric Transducers

$$V_o = V_s \left[0.1 + 0.8 \left(\frac{P - (P_{min})}{P_{max} - (P_{min})} \right) \right] \text{ VDC}$$

V_o = Calculated Output Voltage
 V_s = Measured Supply Voltage
 P = Measured Pressure
 P_{max} = Max Span
 P_{min} = Min Span

FIG2d11_ratio_form

Figure 3: Voltage Calculation for Voltage Regulation Transducers

$$V_o = 10 \left(\frac{P - (P_{min})}{P_{max} - (P_{min})} \right) \text{ VDC}$$

V_o = Calculated Output Voltage
 P = Measured Pressure
 P_{max} = Max Span
 P_{min} = Min Span

FIG3d11_10V

4 to 20 mA Versions

To verify that the P599 Transducer is working properly:

1. With the transducer in place and the controlled system pressure stabilized, measure the pressure at the transducer with an accurate and reliable gauge. This is the **measured pressure (P)**.
2. Determine the maximum (**P_{max}**) and minimum (**P_{min}**) pressure values for the transducer's pressure range (Table 3 and Table 6).
3. Use the equation in Figure 4 to determine the **calculated output current** for the 4 to 20 mA transducers.
4. Measure the transducer output current. To measure the transducer output current: Disconnect the common (-) wire. Set your multimeter to milliamperes (mA). Then connect the multimeter's red test-lead to the transducer output common (-) PIN wire and the multimeter's black test-lead to the common (-) wire. The milliamperes (mA) reading on your multimeter is the **measured output current**. See Table 9 for the pin out configuration.
5. Compare the calculated output current (Step 3) to the measured output current (Step 4). If the current from measured output differs greatly from that in the calculated output, replace the transducer.

Note: Under normal conditions, the transducer reading can differ somewhat from pressure meter readings due to multimeter and pressure gage tolerances or other factors.

Repair Information

Do not attempt to repair or recalibrate the P599 Series Electronic Pressure Transducers. If a transducer does not perform according to specifications, contact your nearest Authorized Johnson Controls/PENN® Distributor or Sales Representative for a replacement.

Ordering Information

The standard (general application) P599 Transducers listed in Table 1 through Table 6 are available for sale as single piece items. P599 Transducer product code numbers ending in -xxxC are transducers only. P599 Transducer product code numbers ending in -xxxK are kits, and include a transducer and a 2 m (6.6 ft.) wiring harness with Packard® connector.

Table 7 lists the product code numbers for ordering wiring harnesses for P599 Transducers with integral Packard connectors.

For non-standard P599 Transducers model variations not included in Table 1 through Table 6, see [Ordering Bulk Quantities of Non-Standard P599 Transducers](#) for more information regarding non-standard models.

Figure 4: Current Calculation for 4 to 20 mA Transducers

$$I = 4 + 16 \left(\frac{P - (P_{min})}{P_{max} - (P_{min})} \right) \text{ mA}$$

I = Calculated Output Current
P = Measured Pressure
P_{max} = Max Span
P_{min} = Min Span

FIG4d1_mA

Figure 5: Standard North American P599 Transducer Examples



Table 1: P599 Transducer Standard Models, 0.5 to 4.5 VDC Ratiometric with a Packard Connector for PSI Applications

Product Code Number	Pressure Range		Pressure Port	Individual or Kit
	Minimum Pressure (Pmin)	Maximum Pressure (Pmax)		
P599RAPS100C	-10 psi (20 in. Hg)	100 psi	1/8 in. - 27 NPT external	Individual
P599RAPS100K				Kit
P599RCPS100C			1/4 in. SAE 45° internal flare with depressor	Individual
P599RCPS100K				Kit
P599RAPS101C	0 psi	100 psi	1/8 in. - 27 NPT external	Individual
P599RAPS101K				Kit
P599RCPS101C			1/4 in. SAE 45° internal flare with depressor	Individual
P599RCPS101K				Kit
P599RAPS102C	0 psi	200 psi	1/8 in. 27 NPT external	Individual
P599RAPS102K				Kit
P599RCPS102C			1/4 in. SAE 45° internal flare with depressor	Individual
P599RCPS102K				Kit
P599RAPS105C	0 psi	500 psi	1/8 in. 27 NPT external	Individual
P599RAPS105K				Kit
P599RCPS105C			1/4 in. SAE 45° internal flare with depressor	Individual
P599RCPS105K				Kit
P599RAPS107C	0 psi	750 psi	1/8 in. - 27 NPT external	Individual
P599RAPS107K				Kit
P599RCPS107C			1/4 in. SAE 45° internal flare with depressor	Individual
P599RCPS107K				Kit

Table 2: P599 Transducer Standard Models, 0 to 10 VDC with the Packard Connector for PSI Applications (Part 1 of 2)

Product Code Number	Pressure Range		Pressure Port	Individual or Kit
	Minimum Pressure (Pmin)	Maximum Pressure (Pmax)		
P599VAPS101C	0 psi	100 psi	1/8 in. - 27 NPT external	Individual
P599VAPS101K				Kit
P599VCPS101C			1/4 in. SAE 45° internal flare with depressor	Individual
P599VCPS101K				Kit

Table 2: P599 Transducer Standard Models, 0 to 10 VDC with the Packard Connector for PSI Applications (Part 2 of 2)

Product Code Number	Pressure Range		Pressure Port	Individual or Kit
	Minimum Pressure (Pmin)	Maximum Pressure (Pmax)		
P599VAPS105C	0 psi	500 psi	1/8 in. - 27 NPT external	Individual
P599VAPS105K				Kit
P599VCPS105C			1/4 in. SAE 45° internal flare with depressor	Individual
P599VCPS105K				Kit
P599VAPS107C	0 psi	750 psi	1/8 in. - 27 NPT external	Individual
P599VAPS107K				Kit
P599VCPS107C			1/4 in. SAE 45° internal flare with depressor	Individual
P599VCPS107K				Kit

Table 3: P599 Transducer Standard Models, 4 to 20 mA with the Packard Connector for PSI Applications

Product Code Number	Pressure Range		Pressure Port	Individual or Kit
	Minimum Pressure (Pmin)	Maximum Pressure (Pmax)		
P599AAPS101C	0	100	1/8 in. - 27 NPT external	Individual
P599AAPS101K				Kit
P599ACPS101C			1/4 in. SAE 45° internal flare with depressor	Individual
P599ACPS101K				Kit
P599AAPS105C	0	500	1/8 in. 27 NPT external	Individual
P599AAPS105K				Kit
P599ACPS105C			1/4 in. SAE 45° internal flare with depressor	Individual
P599ACPS105K				Kit
P599AAPS107C	0	750	1/8 in. - 27 NPT external	Individual
P599AAPS107K				Kit
P599ACPS107C			1/4 in. SAE 45° internal flare with depressor	Individual
P599ACPS107K				Kit

Figure 6: Standard European P599 Transducer Examples

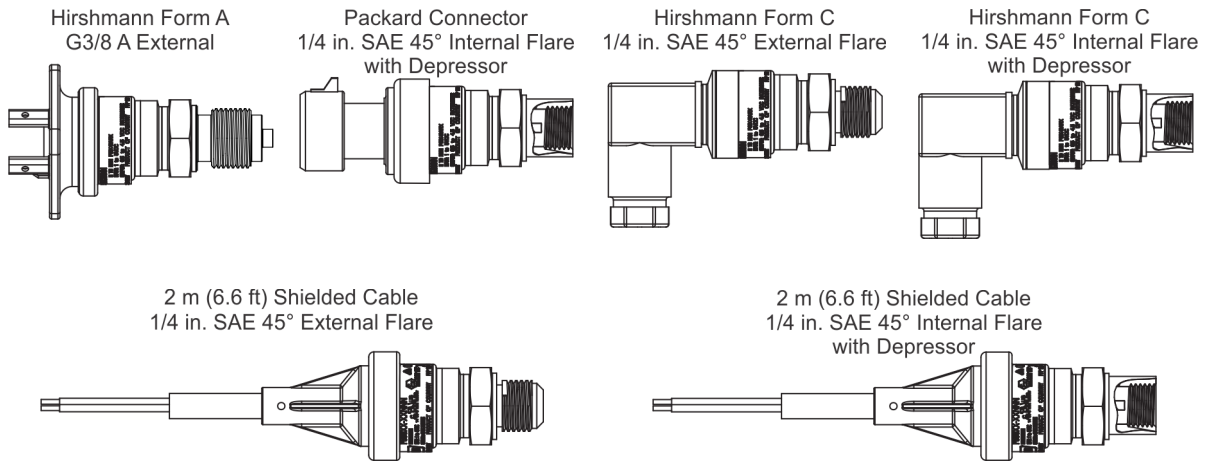


Table 4: P599 Transducer Standard Models, 0.5 to 4.5 VDC Ratiometric for BAR Applications

Product Code Number	Pressure Range		Pressure Port	Electrical connector
	Minimum Pressure (Pmin)	Maximum Pressure (Pmax)		
P599RCHS401C	-1 bar	8 bar	1/4 in. SAE 45° internal flare with depressor	Hirschmann® Form C
P599RCPS401C				Packard
P599RCPS402C	-1 bar	15 bar		Packard
P599RCHS404C	0 bar	30 bar		Hirschmann Form C
P599RCPS404C				Packard
P599RCSS409C	0 bar	35 bar		Shielded cable
P599RCPS405C	0 bar	50 bar		Packard
P599RCSS411C	0 bar	52 bar		Packard
P599RJJS412C	-1 bar	59 bar	G3/8 A external	Hirschmann Form A
P599RJJS413C	-1 bar	159 bar		

Table 5: P599 Transducer Standard Models, 0 to 10 VDC for BAR Applications

Product Code Number	Pressure Range		Pressure Port	Electrical connector
	Minimum Pressure (Pmin)	Maximum Pressure (Pmax)		
P599VBHS401C	-1 bar	8 bar	1/4 in. SAE 45° external flare	Hirschmann Form C
P599VCHS401C			1/4 in. SAE 45° internal flare with depressor	
P599VCPS401C			1/4 in. SAE 45° internal flare with depressor	Packard
P599VBSS401C			1/4 in. SAE 45° external flare	Shielded cable
P599VCSS401C			1/4 in. SAE 45° internal flare with depressor	
P599VCPS406C	-1 bar	9 bar	1/4 in. SAE 45° internal flare with depressor	Packard
P599VBSS402C	-1 bar	15 bar	1/4 in. SAE 45° external flare	Shielded cable
P599VCHS402C			1/4 in. SAE 45° internal flare with depressor	Hirschmann Form C
P599VBHS404C	0 bar	30 bar	1/4 in. SAE 45° external flare	Hirschmann Form C
P599VCHS404C			1/4 in. SAE 45° internal flare with depressor	
P599VCPS404C			1/4 in. SAE 45° internal flare with depressor	Packard
P599VBSS404C			1/4 in. SAE 45° external flare	Shielded cable
P599VCSS404C			1/4 in. SAE 45° internal flare with depressor	
P599VCPS407C	-1 bar	39 bar	1/4 in. SAE 45° internal flare with depressor	Packard
P599VCHS405C	0 bar	50 bar	1/4 in. SAE 45° internal flare with depressor	Hirschmann Form C
P599VCSS405C				Shielded cable

Table 6: P599 Transducer Standard Models, 4 to 20 20 mA for BAR Applications

Product Code Number	Pressure Range		Pressure Port	Electrical connector
	Minimum Pressure (Pmin)	Maximum Pressure (Pmax)		
P599ABHS401C	-1 bar	8 bar	1/4 in. SAE 45° external flare	Hirschmann Form C
P599ACHS401C			1/4 in. SAE 45° internal flare with depressor	
P599ACPS401C			1/4 in. SAE 45° internal flare with depressor	Packard
P599ABSS401C			1/4 in. SAE 45° external flare	Shielded cable
P599ACSS401C			1/4 in. SAE 45° internal flare with depressor	
P599ABHS402C	-1 bar	15 bar	1/4 in. SAE 45° external flare	Hirschmann Form C
P599ACHS402C			1/4 in. SAE 45° internal flare with depressor	
P599ACPS402C			1/4 in. SAE 45° internal flare with depressor	Packard
P599ACPS403C	0 bar	15 bar	1/4 in. SAE 45° internal flare with depressor	Packard
P599ABHS404C	0 bar	30 bar	1/4 in. SAE 45° external flare	Hirschmann Form C
P599ACHS404C			1/4 in. SAE 45° internal flare with depressor	
P599ACPS404C			1/4 in. SAE 45° internal flare with depressor	Packard
P599ABSS404C			1/4 in. SAE 45° external flare	Shielded cable
P599ACSS404C			1/4 in. SAE 45° internal flare with depressor	
P599ACHS405C	0 bar	50 bar	1/4 in. SAE 45° internal flare with depressor	Hirschmann Form C
P599ACPS405C				Packard
P599ACSS405C				Shielded cable

Table 7: Wire Harnesses for Use with Packard Connectors

Product Code Number	Length
WHA-PKD3-200C	2.0 m (6.6 ft)
WHA-PKD3-400C	4.0 m (13 ft)
WHA-PKD3-600C	6.0 m (19.63 ft)

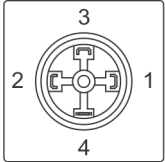
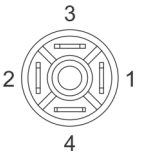
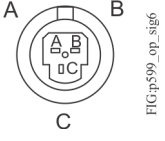
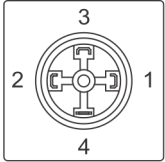
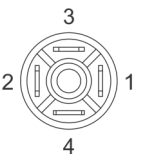
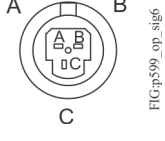
Ordering Bulk Quantities of Non-Standard P599 Transducers

Table 8 is a product code matrix that identifies all of the potential P599 Series Electronic Pressure Transducer models and product code numbers. This table shows the P599 Transducer product code matrix and the potential non-standard transducer models that can be built. Not all non-standard models are available. Non-standard models are only sold in bulk quantity orders of 100 or more. Contact your Johnson Controls Sales Representative for more information regarding bulk purchase of non-standard P599 Transducers.

Table 8: P599 Transducer Product Code Matrix

Selection Chart	Code Letter/Number and Description	P599	A	C	P	S	1	0	0	C
Transducer Base No.										
Output Signal	A = 4 to 20 mA B = 0 to 5 VDC C = 1 to 5 VDC R = Ratiometric: 0.5 to 4.5 VDC V = 0 to 10 VDC									
Pressure Port Connection	A = 1/8"-27 NPT external port B = 1/4" SAE 45° flare external port C = 1/4" SAE 45° flare internal port D = 1/4"-18 NPT external port E = 1/2"-20 UNF-2A SAE external port F = 1/4"-18 NPTF external port (Class 1) G = M16 X 1.5 Ermeto® external port									
Electrical Connection	A = AMP H = Hirschmann® Form C with mating cable socket J = Hirschmann Form A P = Packard S = Shielded cable T = M12 X 1P									
Pressure Mode Units	A = Absolute S = Sealed Gage									
Pressure Code	100 to 199 = Pressure codes for psi models 400 to 499 = Pressure codes for bar models									
Packaging	C = Individual D = Bulk (50 units unless otherwise specified in model specifications) K = Kit: Transducer and Cable (Packard only; contact Johnson Controls for other kits.)									

Table 9: P599 Output Signal and Electrical Connection Chart




Electrical Connection Code	J	H	P
Output Signal	Hirschmann Form A	Hirschmann Form C	Packard
4 to 20 mA	 <p>FIG:pp599_op_sig4</p> <p>Pin 1: (+) Supply Pin 2: (-) Reference Pin 3: Not Used Pin 4: Not Used</p>	 <p>FIG:pp599_op_sig3</p> <p>Pin 1: (+) Supply Pin 2: (-) Reference Pin 3: Not Used Pin 4: Not Used</p>	 <p>FIG:pp599_op_sig6</p> <p>Pin A: (-) Reference Pin B: (+) Supply Pin C: Not Used</p>
0 to 5 VDC	 <p>FIG:pp599_op_sig4</p> <p>Pin 1: (+) Supply Pin 2: (-) Common Pin 3: Output Pin 4: Not Used</p>	 <p>FIG:pp599_op_sig3</p> <p>Pin 1: (+) Supply Pin 2: (-) Common Pin 3: Output Pin 4: Not Used</p>	 <p>FIG:pp599_op_sig6</p> <p>Pin A: (-) Common Pin B: (+) Supply Pin C: Output</p>
1 to 5 VDC			
Radiometric 0.5 to 4.5 VDC			
0 to 10 VDC			

Technical Specifications

P599 Series Electronic Pressure Transducers (Part 1 of 2)

Signal Output Types	0.5 to 4.5 VDC Ratiometric 0 to 10 VDC 4 to 20 mA 0 to 5 VDC 1 to 5 VDC
Pressure Port Type [Required Assembly Torque]	1/8 in. - 27 NPT, external thread ANSI B1.20.1 [16.26 N•m (12 ft•lb)] 1/4 in. SAE 45° flare, external thread [16.26 N•m (12 ft•lb)] 1/4 in. SAE 45° flare with Schrader® Valve depressor, internal thread [16.26 N•m (12 ft•lb)] 1/4 in. - 18 NPT, external thread ANSI B1.20.1 [20.33 N•m (15 ft•lb)] 1/2 in. - 20 UNF-2A external, [20.33 N•m (15 ft•lb)] 1/4 in. - 18 NPTF external, [20.33 N•m (15 ft•lb)] M16 X 1.5 Ermeto, internal thread, ISO 8434-1 [33.89 N•m (25 ft•lb)]
Electrical Connector	AMP, 174357-2 Hirschmann Form C, 9.5 mm EN 175 301 - 803 Hirschmann Form A, 18 mm EN 175 301 - 803 Packard, Metri-Pack 150 series, P2S Shielded cable; shield not connected to the sensor body M12 X 1P, DS/EN 60947-5-2
Units of Measurement	BARS (PSIS) BARA (PSIA)
Temperature Range	Compensated temperature, -40° to 125°C (-40° to 257°F) Media temperature (pressure side), -40° to 125°C (-40° to 257°F) Operating temperature (ambient air), -40 to 100°C (-40° to 212°F) Storage temperature, -40° to 125°C (-40° to 257°F)

P599 Series Electronic Pressure Transducers (Part 2 of 2)

Accuracy	Total accuracy, +/- 1.5% Best-Fit Straight Line (BFSL), +/- 0.5% Long term stability (1 year), +/- 1.25%
Required Output Signal Supply Voltage	0.5 to 4.5 VDC Ratiometric: 4.75 to 5.25 VDC 0 to 10 VDC: 12 to 33 VDC 4 to 20 mA: 9 to 32 VDC 0 to 5 VDC and 1 to 5 VDC: 9 to 33 VDC
Maximum Signal Input Current	0.5 to 4.5 VDC Ratiometric: 3 mA 0 to 10 VDC: 5 mA 4 to 20 mA: 24 mA 0 to 5 VDC and 1 to 5 VDC: 5 mA
Electrical Protection	Standard response time, 5 mS, +/- 4 mS Output impedance greater than 25 ohm Output load shall be greater than 10K ohm (resistance signal out can support for volt out models) Reverse wiring protection (+ and common) (+ and signal out) (common and signal out) Short-circuit protected (signal out at maximum span to earth) Minimum ohms (body to term) 100 M ohm at 500 VDC
Physical	Pressure cycles: 10 million full scale Burst pressure for transducers with Pmax < 52 bar (750 psi): 259 bar (3750 psi) Burst pressure for transducers with Pmax > 52 bar (750 psi): 1034 bar (15,000 psi) Proof pressure: 3x full-scale (Pmax) for 1 minute Minimum pressure: 0 bar (0 psia) indefinitely Proof pressure 2x full-scale indefinitely Vibration: 16.4 G Random Mechanical shock: EN 60068-2-27 (25 g, 11 ms, half sine) Shock/drop (4 meter 6 times any axis) Piezoresistive sensor filled with silicone oil All media side materials 304L stainless steel Mechanical damping: Built-in snubber
Field Installed Electrical Connection IP Ratings	AMP, IP67 Hirschmann A, IP65 Hirschmann C, IP65 Packard, IP67 Cable, IP67 M12 X 1P, IP67 Factory Assembled Environmental Protection, IP67 stainless steel sensor body to plastic seal
Compliance   	United States: Controllers, Refrigeration - Component, SDFY2.SA516; Controllers, Refrigeration for use in Hazardous Locations - Component STDX2.E483641; Class I, Division 2, Group A, B, C, and D FCC Part 15 Class B Canada: Controllers, Refrigeration - Component, SDFY8.SA516 Controllers, Refrigeration for use in Hazardous Locations - Component STDX8.E483641; Class I, Division 2, Group A, B, C, and D Europe: LVD, EMC, RoHS, WEEE Australia/New Zealand: RCM, Emissions Compliant

North American Emissions Compliance

United States

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canada

This Class (B) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (B) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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