

PP Series Pressure Probes

Pressure transducers for HVAC / R applications

CONTENTS

STAINLESS STEEL BODY, EMBEDDED CABLE	2
1. Description	2
2. Dimension	2
3. Power Supply connection	3
4. Features, Benefits & Applications	3
5. Available Codes	3
6. Technical Data	4
BRASS OR ZINC PLATED STEEL, PACKARD CONNECTION.....	6
1. Description	6
2. Power Supply connection & Dimensions	6
3. Features, Benefits & Applications	7
4. Available Codes	7
5. Technical Data	8
NICKEL PLATED BODY, PACKARD CONNECTION	10
1. Description	10
2. Dimension	10
3. Power Supply connection	11
4. Features, Benefits & Applications	11
5. Available Codes	12
6. Technical Data	13

STAINLESS STEEL BODY, EMBEDDED CABLE

1. Description

The PPR & PP pressure transducers are sensors that convert physical pressure into a ratiometric or current analog signal.

The product's technical top performances are achieved by piezoresistive technology, with chip-in-oil housing. The sensor is temperature compensated, and the system is protected from overvoltage and short-circuits. Also, it comes with embedded cable.

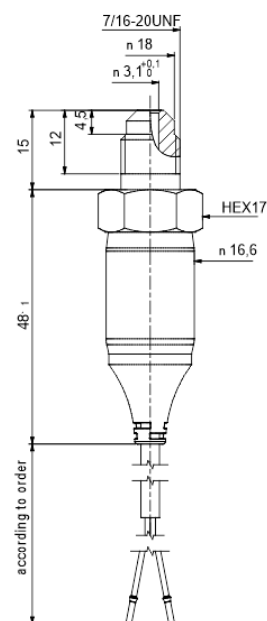
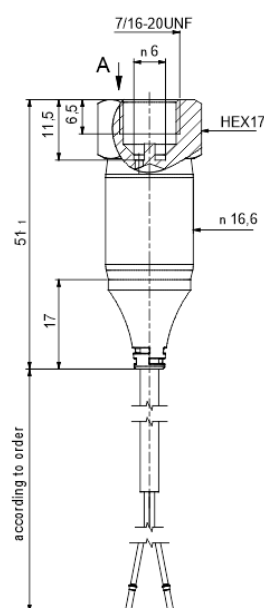
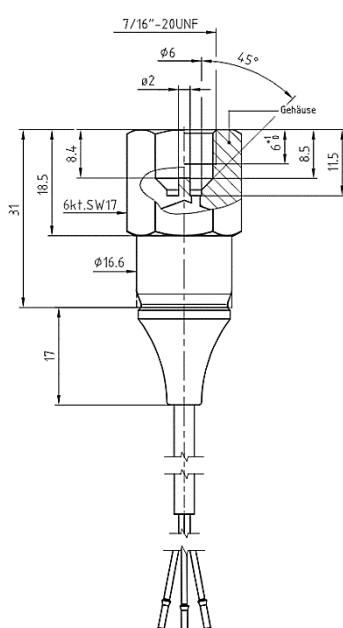
This Dixell historical pressure leverages the long experience in the field, providing exceptional reliability, plus exceptional accuracy. In fact, this probe is widely used in both air conditioning and refrigeration applications. The product is outstanding due to its extreme ruggedness towards electromagnetic fields.



2. Dimension

Mechanical connector

0,5÷4,5V Ratiometric Output	4÷20mA Current Output	
Female	Female	Male



3. Power Supply connection

0,5÷4,5V Ratiometric Output

Pin function	Cable colors match
Supply - V _{IN}	Brown
Return - V _{OUT}	White
Ground - GND	Green

4÷20mA Current Output

Pin function	Cable colors match
Supply - V _{IN}	Brown
Return - V _{OUT}	White
Not used	(Only two wires)

4. Features, Benefits & Applications

Features

- Piezoresistive chip-in-oil sensing element
- Fully welded with no gasket
- Corrosion resistance
- Durable design
- High precision
- Overvoltage and short-circuit protected

Benefits

- No gasket compatibility needed
- High precision
- Reliable
- Electrically safe client application

This pressure transducer brings unique features, that results in a robust product with optimal operation characteristics.

Application

- Evaporator and condenser pressure reading
- Compressor suction and discharge monitoring

Application Benefits

- Energy management via subcooling and superheat calculations for electronic expansion valve control
- High/low pressure alarms from sensor's detection
- Managing compressor staging and unloading

5. Available Codes

Pressure Transducer							
Part Number	How to Order	Output	Pressure Range	Body material	Electrical connection	Pressure connection	Gasket material
			[bar relative]				
BE079302 00	PPR15	0,5÷4,5 V	0 ÷ 15	Stainless Steel	Embedded 2m cable	Female	No gasket
BE079302 02	PPR30		0 ÷ 35	Stainless Steel	Embedded 2m cable	Female	No gasket
BE009002 00	PP07	4÷20 mA	-0,5 ÷ 7	Stainless Steel	Embedded 2m cable	Male	No gasket
BE009302 00	PP07			Stainless Steel	Embedded 2m cable	Female	No gasket
BE009002 05	PP11		-0,5 ÷ 11	Stainless Steel	Embedded 2m cable	Male	No gasket
BE009008 00	PP11			Stainless Steel	Embedded 8m cable	Male	No gasket
BE009302 07	PP11			Stainless Steel	Embedded 2m cable	Female	No gasket
BE009002 04	PP30		0 ÷ 30	Stainless Steel	Embedded 2m cable	Male	No gasket
BE009302 04	PP30			Stainless Steel	Embedded 2m cable	Female	No gasket
BE009002 07	PP50		0 ÷ 50	Stainless Steel	Embedded 2m cable	Male	No gasket
BE009302 05	PP50			Stainless Steel	Embedded 2m cable	Female	No gasket
BE009306 05	PP50			Stainless Steel	Embedded 6m cable	Female	No gasket
BE009302 08	PP60		0 ÷ 60	Stainless Steel	Embedded 2m cable	Female	No gasket
BE009306 08	PP60			Stainless Steel	Embedded 6m cable	Female	No gasket
BE009302 06	PP160		0 ÷ 160	Stainless Steel	Embedded 2m cable	Female	No gasket

6. Technical Data

GENERAL FEATURES	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Operating pressure (Relative: sealed gauge @ 1 bar abs)	Depending on pressure range Overall from -0,5 to 160 bar rel	
Pressure connector	Female: 7/16-20UNF-2B threaded connection equivalent to 1/4" SAE Female Flare with Schrader Deflator Male: 7/16-20UNF-2A threaded connection	
Electrical connector	Embedded cable	
Operating temperature	-40°C to +125°C	-40°C to +100°C
Storage temperature	-40°C to +125°C	-40°C to +100°C
Over pressure Based on sensor's pressure range	2,5x Operating pressure	2x Operating pressure
Burst pressure Based on sensor's pressure range	>4x Operating pressure	>4x Operating pressure
Fluid compatibility	See table "Seal Materials"	

ELECTRICAL FEATURES	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Power supply	4.5 to 5.5 V _{DC}	8 to 32 V _{DC}
Output	0.5 to 4.5 V _{DC}	4 to 20 mA
Supply current	8 mA max	3,2 to 22,3 mA
Output load [Ω]	> 5 K Ω (minimum value)	< (V - 8) / 0,025 (maximum value) V=Voltage supplied
Overvoltage Protection	24 V _{DC}	32 V _{DC}
Polarity reversal protection	-24 V _{DC}	-32 V _{DC}
Short Circuit Protected	Yes	Yes
Response time (typical)	5 ms	5 ms max

ACCURACY	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Static error band @ 25°C & F.S. = 5V _{DC} (linearity, hysteresis, repeatability and calibration)	±0,25% F.S.	±0,25% F.S. typical (±0,5% F.S. max)
Total error band (over operating temperature range)	±1.0% F.S. (0°C to +50°C) ±1.5% F.S. (-10°C to +80°C) ±2.5% F.S. (-40°C to +125°C)	±1.0% F.S. (0°C to +50°C) ±1.5% F.S. (-10°C to +80°C) ±3.5% F.S. (-40°C to +100°C)

CERTIFICATIONS / EMC FEATURES	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
EMC (512MHz to 1 GHz)	30 V/m	10 V/m
EMC (1 MHz to 512 MHz)	30 V/m	10 V/m
ESD	±8 kV in air	±15 kV in air

INSTALLATION	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Fixing torque	15 Nm	

MECHANICAL FEATURES		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Protection degree	IP67		
Housing material	AISI 316L (Stainless steel)		
Connector material	Black thermoplastic polyurethane TPU95-A		
Pressure seal material	No internal seal, fully welded		

PERFORMANCE FEATURES		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Life cycle	10M F.S. cycles	10M F.S. cycles	

SEAL MATERIALS		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
• Fluid compatibility by refrigerant class			
A1 – No flame propagation	Material compatibility: the product is suitable with all refrigerants compatible with the stainless-steel body material (All parts in contact with the fluid are in stainless steel AISI 316L)		
A2L – Lower flammability			
B2L – Lower flammability			
A3 – Higher flammability			

APPROVALS		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Compliance	CE, RoHS		
When the pressure transducers are used in systems employing flammable refrigerants, a dedicated risk assessment must be carried out by the user to ensure compliance with all applicable legislation and regulations such as, but not limited to EN 378. Furthermore, this product series is not suitable or intended for use in potentially explosive environments (ATEX).			

BRASS OR ZINC PLATED STEEL, PACKARD CONNECTION



1. Description

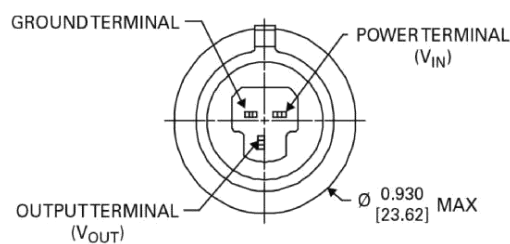
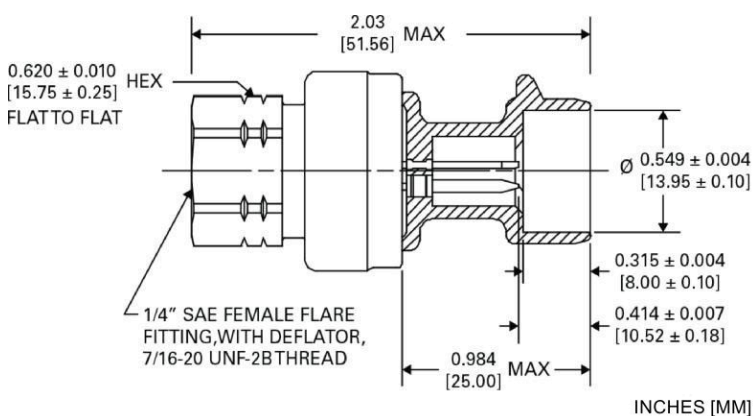
The PPR & PPC pressure transducers are sensors that convert physical pressure into a ratiometric or current analog signal.

The compact design, proven long-term reliability and accuracy make this sensor ideal for both demanding air conditioning and refrigeration applications. Flexibility of connection is ensured by a range of cable lengths readily available for Packard mating.

This transmitter's technical state-of-the-art capabilities are possible thanks to the ceramic capacitive sensor element, the system is protected from overvoltage and short-circuits. All the above, and more, enable the CE, RoHS, REACH and UL certifications, for use in both air conditioning and refrigeration applications.

2. Power Supply connection & Dimensions

0,5÷4,5V Ratiometric Output



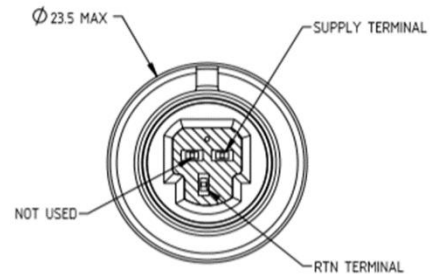
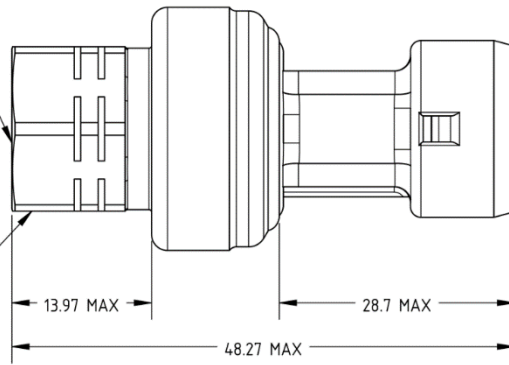
Pin function	Cable colors match*
Supply - V _{IN}	Black
Return - V _{OUT}	White
Ground - GND	Green

* with Dixell cables

4÷20mA Current Output

1/4" SAE FEMALE FLARE FITTING, WITH DEFLATOR 7/16"-20 UNF-2B THREAD

5/8" HEX UNDER BODY



Pin function	Cable colors match*
Supply - V _{IN}	Black
Return - V _{OUT}	White
Not used	(Green)

* with Dixell cables

3. Features, Benefits & Applications

Features

- Ceramic capacitive sensing element
- Accurate performance
- Compact and durable design
- Overvoltage and short-circuit protected

Benefits

- Reliable over time
- Space saving
- Electrically safe client application

This pressure transducer brings intrinsic characteristics which enable the delivery of valuable advantages and convenience, that in turn makes possible optimal operation in the customer interest.

Application

- Evaporator and condenser pressure reading
- Compressor suction and discharge monitoring

Application Benefits

- Energy management via subcooling and superheat calculations for electronic expansion valve control
- High/low pressure alarms from sensor's detection
- Managing compressor staging and unloading

4. Available Codes

Pressure Transducer							
Part Number	How to Order	Output	Pressure Range	Body	Electrical Connection	Pressure Connection	Gasket
			[bar relative]	Material			material
BH51320A 03	PPR13S-ABF10	0,5÷4,5 V	-1 ÷ 12,8	Brass	Packard	Female	Neoprene
BH52120A 03	PPR21S-ABF10		0 ÷ 20,7	Brass	Packard	Female	Neoprene
BH53520A 03	PPR35S-ABF10		0 ÷ 34,5	Brass	Packard	Female	Neoprene
BH54530A 03	PPR45S-APF10		0 ÷ 45	Zinc plated steel	Packard	Female	Neoprene
BH21120A 03	PPC11S-ABF10	4÷20 mA	-1 ÷ 11	Brass	Packard	Female	Neoprene
BH23020A 03	PPC30S-ABF10		0 ÷ 30	Brass	Packard	Female	Neoprene
BH25030A 03	PPC50S-APF10		0 ÷ 50	Zinc plated steel	Packard	Female	Neoprene

Cable						
Part Number	How to Order	Connection type	Length [m]	UV protected	Wires	Terminal finishes
DD520902 00	CAB PKD 02	Packard	2	No	3	Tinned
DD520905 00	CAB PKD 05	Packard	5	No	3	Tinned
DD522902 00	CAB PKD 02-UV	Packard	2	Yes	3	Tinned
DD522905 00	CAB PKD 05-UV	Packard	5	Yes	3	Tinned

For further cable and transducer options please contact Dixell.

5. Technical Data

GENERAL FEATURES	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Operating pressure (Relative: sealed gauge @ 1 bar abs)	Depending on pressure range Overall from -1 to 50 bar rel	
Pressure connector	1/4" SAE female flare with deflator 7/16"-20 UNF-2B thread	
Electrical connector	Packard Metri-Pack: Nema 4X, IP65	
Operating temperature	Depending on seal material ¹⁾	
Storage temperature	-40°C to +150°C	
Over pressure Based on sensor's pressure range	1 to 5 bar = 5x operating P 7 to 20 bar = 3x operating P >34,5 bar = 2x operating P	> 1,5 x operating pressure
Burst pressure Based on sensor's pressure range	Up to 34.5 bar = 5x operating P Above 34.5 bar = 3x operating P	> 3 x operating pressure
Fluid compatibility	Depending on seal material ¹⁾	
1) See paragraph "Seal Materials"		

ELECTRICAL FEATURES	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Power supply	4.5 to 5.5 V _{DC}	6 to 30 V _{DC}
Output	Ratiometric: 0.5 to 4.5 V _{DC} typical	Current: 4 to 20 mA
Supply current	7 mA (max @ 5.5 V _{DC} no load)	4 to 20 mA
Output current	2.5 mA (max sinked or source)	4 to 20 mA
Output load [Ω]	10K Ω typical	$< (V - 7) / 0,02$ V=Voltage supplied
Overvoltage Protection	16 V _{DC}	39 V _{DC}
Polarity reversal protection	-14 V _{DC}	-39 V _{DC}
Short Circuit Protected	Yes	Yes
Response time (typical)	10ms	10ms max

ACCURACY	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Static error band @ 25°C & F.S. = 5V _{DC} (linearity, hysteresis, repeatability and calibration)	±0.8% F.S.	±1% F.S.
Total error band (over operating temperature range)	±1.0% (-20°C to +85°C) ±1.5% (-40°C to +125°C)	±2% (-20 to 100°C) -3,5% / +2% (-20 to 135°C)

CERTIFICATIONS / EMC FEATURES	0,5÷4,5V Ratiometric Output	4÷20mA Current Output
EMC (512MHz to 1 GHz)	50 V/m	30 V/m
EMC (1 MHz to 512 MHz)	100 V/m	100 V/m
ESD	15 kV	8 kV in air, 4 kV in contact

INSTALLATION		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Fixing torque: depending on mating material			
• Steel (12L14)		12.6÷16 Nm	
• Brass, ½ hard		12.6÷16 Nm	
• Steel, soft		9.8÷12.4 Nm	
• Naval Brass, soft		9.0÷11.5 Nm	
• Brass, soft		6.2÷7.9 Nm	
• Aluminum		4.8÷6.2 Nm	
• Copper, soft		3.5÷4.4 Nm	

MECHANICAL FEATURES		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Protection degree		IP65	
Housing material		Brass, or zinc coated steel (galvanized)	
Connector material		Polyetherimide resin (PEI) 20% glass, black color	
Pressure seal material		Neoprene (typical) or HNBR gasket	

PERFORMANCE FEATURES		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Cycle life		10M F.S. cycles	10M F.S. cycles
Drop (any axis)		1.5m	1.5m
Random vibration		11g (50 to 2000 Hz)	10g (25 to 2000 Hz)

SEAL MATERIALS		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Neoprene			
• Fluid compatibility by refrigerant class			
A1 – No flame propagation		R12, R22, R134a, R404a, R407c, R410a, R502, R507	
A2L – Lower flammability		R32, R1234yf, R1234ze	
A3 – Higher flammability		R290, R600, R600a	
• Maximum Seal Temperature Range		-40°C to 120°C	-40°C to 120°C
HNBR (Hydrogenated Nitrile)			
• Fluid compatibility by refrigerant class			
A1 – No flame propagation		R134a, R404a, R407c, R410a, R507	
A2L – Lower flammability		R32	
A3 – Higher flammability		R290, R600a	
• Maximum Seal Temperature Range		-20°C to 135°C	-20°C to 135°C

APPROVALS		0,5÷4,5V Ratiometric Output	4÷20mA Current Output
Compliance		CE, RoHS, REACH, UL	CE, RoHS, REACH
When the pressure transducers are used in systems employing flammable refrigerants, a dedicated risk assessment must be carried out by the user to ensure compliance with all applicable legislation and regulations such as, but not limited to EN 378. Furthermore, this product series is not suitable or intended for use in potentially explosive environments (ATEX).			

NICKEL PLATED BODY, PACKARD CONNECTION

1. Description

The PPC pressure transducer is a 4-20mA that converts the physical pressure into a current analog signal. This Dixell-Emerson branded sensor is characterized by long-term stability and accuracy, ideal for both demanding air conditioning and refrigeration applications.

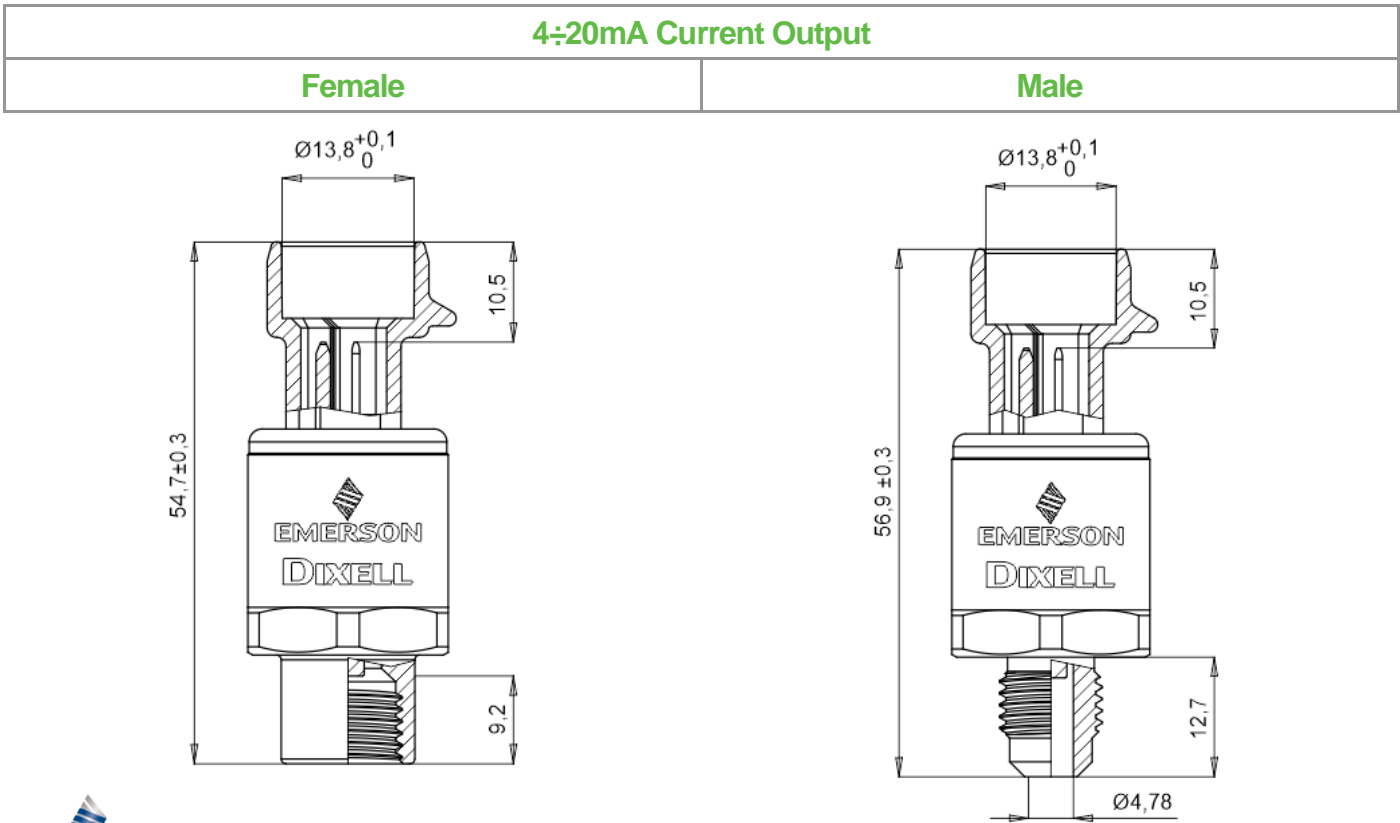
The black body is due to nickel treatment of the brass surface which prevents brass oxidation while delivering an exclusive look, thus ensuring durability and, at the same time, being aesthetically pleasant.

Flexibility of connection is ensured by a range of cable lengths readily available for Packard mating.

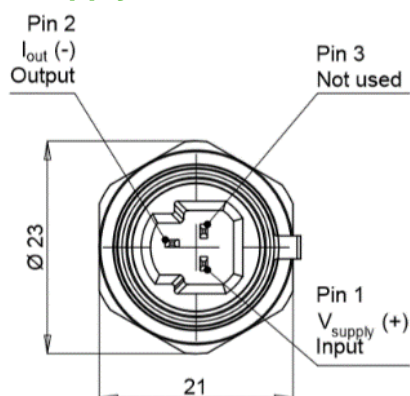


2. Dimension

Mechanical connector



3. Power Supply connection



Pin function	Cable colors match*
Supply - V_{IN}	Black
Return - V_{OUT}	White
Not used	(Green)

* with Dixell cables

4. Features, Benefits & Applications

Features	Benefits
<ul style="list-style-type: none"> 150°C max fluid temperature Capacitive ceramic measuring cell Reliable against vibrations and shocks Robust and durable design Accuracy and long-term stability Current 4-20mA output Power supply polarity reversal protected 	<ul style="list-style-type: none"> Suitable for high temperature measurement (e.g. compressor discharge) Reliable over time Stable signal on cable, immune to disturbance over long distances Improved energy saving of overall application Electrically safe client application

Accurate and reliable pressure measurement is paramount for effective process control. The capacitive ceramic absolute sensor is a dry cell requiring no oil fill and provides a high degree of accuracy and reliability. The measurement cell operates on the principle of capacitance measurement.

Ceramic sensors do not fatigue or bend out of shape as metal would do in vacuum conditions. The deflection responds proportionally and returns to the rest position when the pressure or vacuum is released.

Also, this sensor's ceramic is well suited for abrasive process conditions because of the durable material of construction.

Vibration and pulsating pressure on the gauge are of minimum concern, because the sensor has no fill to transmit the vibration from the outside in. The sensor holds calibration reliably time after time, providing perfect match for durable and safe applications.

Application	Application Benefits
<ul style="list-style-type: none"> Evaporator and condenser pressure reading Compressor suction and discharge monitoring 	<ul style="list-style-type: none"> Energy management via subcooling and superheat calculations for electronic expansion valve control High/low pressure alarms from sensor's detection Managing compressor staging and unloading Qualified up to 150°C fluid measurement

The final application will have the fluid or refrigerant gas to be in contact with three materials: the ceramic disc, the seal gasket and the body material:

- Chemical compatibility is of minor concern thanks to the resistive nature of the ceramic material;
- Gasket compatibility depends on the expected refrigerant to be used. Please refer to the "Seal Material" section in "Technical Data" paragraph;
- The transducer's body material is made of nickel-plated brass: it delivers superior corrosive resistance and it's suited for all refrigerants except ammonia, for which steel is required.

All above parts must endure fluid corrosivity over time, and the internal electronics have to perform correctly at the maximum operative temperature that, with this special pressure transducer, is as high as 150°C.

5. Available Codes

Pressure Transducer							
Part Number	How to Order	Output	Pressure Range	Body	Electrical Connection	Pressure Connection	Gasket
			[bar relative]	Material			material
BG01110A 01	PPC11A-ANF00	4÷20 mA	-0,5 ÷ 11	Nickel plated brass	Packard	Female	EPDM
BG01111A 01	PPC11A-ANM00					Male	EPDM
BG03010A 01	PPC30A-ANF00		0 ÷ 30	Nickel plated brass	Packard	Female	EPDM
BG03011A 01	PPC30A-ANM00					Male	EPDM
BG05010A 01	PPC50A-ANF00		0 ÷ 50	Nickel plated brass	Packard	Female	EPDM
BG05011A 01	PPC50A-ANM00					Male	EPDM

Cable					
Part Number	Length [m]	Connection type	UV protected	Wires	Terminal finishes
DD520902 00	2	Packard	No	3	Tinned
DD520905 00	5	Packard	No	3	Tinned
DD522902 00	2	Packard	Yes	3	Tinned
DD522905 00	5	Packard	Yes	3	Tinned

For further cable and transducer options please contact Dixell

6. Technical Data

GENERAL FEATURES		4÷20mA Current Output
Operating pressure [bar absolute pressure]	0,5÷12 bar abs 1÷31 bar abs 1÷51 bar abs	
Pressure connector	Female: 7/16-20UNF-2B threaded connection equivalent to 1/4" SAE female flare with Schrader Deflator Male: 7/16-20UNF-2B threaded connection equivalent to 1/4" SAE male flare fitting	
Electrical connector	Mating with Packard	
Operating temperature	-40°C to +150°C	
Storage temperature	-40°C to +150°C	
Over pressure Based on sensor's pressure range	0,5÷12 bar = 24 bar 1÷31 bar = 62 bar 1÷51 bar = 102 bar	
Burst pressure Based on sensor's pressure range	0,5÷12 bar = 36 bar 1÷31 bar = 93 bar 1÷51 bar = 153 bar	
Fluid compatibility	Depending on seal material ¹⁾	
1) See paragraph "Seal Materials"		

ELECTRICAL FEATURES		4÷20mA Current Output
Power supply	8 to 30 V _{DC}	
Output	Current: 4 to 20 mA	
Supply current	4 to 20 mA	
Output current	4 to 20 mA	
Output load [Ω]	$< (V - 8) / 0,025$ V=Voltage supplied	
Overvoltage protection	33 V _{DC}	
Polarity reversal protection	-28 V _{DC}	
Short circuit protected	Yes	
Response time (typical)	5 ms	

ACCURACY		4÷20mA Current Output
Static error band @ 25°C & F.S. (linearity, hysteresis, repeatability and calibration)	Max $\pm 0.5\%$ F.S.	
Total error band (over operating temperature range)	Max $\pm 1.0\%$ (0°C to +50°C) Max $\pm 1.5\%$ (-10°C to +80°C) Max $\pm 2.0\%$ (-40°C to +125°C)	

INSTALLATION		4÷20mA Current Output
Fixing torque	12÷16 Nm (with calibrated wrench)	

MECHANICAL FEATURES		4÷20mA Current Output
Protection degree	IP67 with and w/o cable plugged	
Housing material	Nickel coated brass (nickel plated)	
Connector material	Polymer	
Pressure seal material	EPDM	

PERFORMANCE FEATURES		4÷20mA Current Output
Cycle life	10M F.S. cycles	
Drop (any axis)	1.5m	
Vibration (IEC 60068-2-64:2008)	12 g (rms)	
Shock (IEC 60068-2-27:2008)	75 g, 11 ms	

CERTIFICATIONS / EMC FEATURES		4÷20mA Current Output
Electrostatic discharge (CEI EN 61000-4-2:2011)	±4 kV contact ±8 kV air	
Radiated immunity (CEI EN 61000-4-3:2007)	10 V/m (80 MHz ÷ 1 GHz) 3 V/m (1.4 GHz ÷ 2 GHz) 1 V/m (2 GHz ÷ 2.17 GHz)	
Electrical fast transient/Burst (CEI EN 61000-4-4:2013)	±2 kV	
Surge (CEI EN 61000-4-5:2007)	±1 kV	
Conducted immunity (CEI EN 61000-4-6:2014)	10 V (0.15 ÷ 80 MHz)	

SEAL MATERIALS		4÷20mA Current Output
EPDM (Ethylene Propylene Diene Monomer)		
• Fluid compatibility by refrigerant class		
A1 – No flame propagation	R134a, R404a, R407c, R410a, R502, R507, R744, PAG or POE oil	
A2L – Lower flammability	R32, R1234ze	
A3 – Higher flammability	R290	

APPROVALS		4÷20mA Current Output
Compliance	CE, RoHS, REACH	
When the pressure transducers are used in systems employing flammable refrigerants, a dedicated risk assessment must be carried out by the user to ensure compliance with all applicable legislation and regulations such as, but not limited to EN 378. Furthermore, this product series is not suitable or intended for use in potentially explosive environments (ATEX).		