7. P Female Series

7.1 Technical specifications P Female Series

Carel type P pressure transducers, is a cost effect, high accuracy product that use piezoresistive technology, with a 0.5...4.5 ratiometric output and brass housing body. Excellent EMC features, make this sensors suitable for harshest environments.
These sensors can be directly installed on the refrigerant pipe (capillary tube is not needed)
Compatible with the most common refrigerants.

Electrical	
Power supply (protected against polarity reversal)	5Vdc ±10%
Power supply overvoltage	18Vdc
Maximum reverse voltage	11Vdc
Current consuption	5mA typical
Output voltage	0.5…4.5Vdc ratiometric
Shorcircuit protection	yes
Output load	>47kΩ
Response time	10ms max
Insulation resistance	1GΩ @ 50Vdc
Electrical connector	Male, 3 way Metri-Pack 150
Insulation material of electrical connector	PBT 30GF
Electrical contact material and surface finish material	Cu Zn20, Ni 2...3µm Sn 5 ±2,5µm
Cable	See SPKC****** accessory

Performance	
Operating temperature	-40T135°C
Operating humidity	0-90%rH
Fluid temperature	-40T135°C
Storage temperature	-40T150°C
Ingress protection	IP55, IP67 depends on connector plugged in. For more details, see sensor table and SPKC****** accessory and table."
Accuracy (including linearity, hysteresis, repeatability, calibration error) static error @25°C at 5.0 or 24 Vdc	±1.2% FS
Temperature error	±0.013%F.S./°C
Total error band (including linearity, hysteresis, repeatability, calibration error) relative to all operating temperature and humidity @ 5.0 or 24 Vdc	±1.5%FS at 5Vdc (0T50°C) ±2.1% FS at 5Vdc (-40T90°C) ±2.6% FS at 5Vdc (90T135°C)"
Life cycle	10 million cycles, 0…100 %FS

Physical	
Vibrations IEC 60068-2-64	12g (rms)
Shock IEC 60068-2-27	50g 6ms
Drop form any axis	1.5m (Falling from 1.5 meter high)
Material in contact with refrigerant	Ceramic, brass and HNBR o-ring
Body housing	Brass
Tightening torque	12 to 16 Nm
Mechanical connection	Female, 7/16"-20UNF - in 45° Flare
Series pressure range	From 4.2barg to 45barg
Over pressure	See table
Burst pressure	See table
Refrigerant compatibility	R12, R22, R134A, R404A, R407C, R410A, R448A, R449A, R452A, R502, R507, R513A, R744, HFO 1234ze, R290, R32, water (temperature >3°C). Not compatible with R717 (ammonia), not suitable to be used with glycol added to water.
Vacuum pressure (referred to refrigerant circuit)	0 bar absolute
Weight	30g (Net weight)

EMC	
Electrostatic discharges: EN 61000-4-2	±4kV contact, ±8kV in air
Radiated immunity: EN 61000-4-3	10V/m (80MHz ÷ 1GHz) 3V/m (1,4Ghz ÷ 2Ghz) 1V/m (2Ghz ÷ 2,7Ghz)
Burst: EN 61000-4-4	±1kV
Surge: EN 61000-4-5	±500V
Immunity to conducted radio-frequency disturbance: EN 61000-4-6	10V (150kHz ÷ 80Mhz)
Magnetic fields at power supply frequency: EN 61000-4-8	30 A/m continuous 300 A/m impulsive

Compliant with:	
Compliances	• REACH • RoHS • CE
UL certified	File E493623

Part numbers

Carel code	Pressure (psi)		Pressure (bar)		Pressure (kPa)		Over pressure			Burst pressure		
	0.5 V	4.5 V	0.5 V	4.5 V	0.5 V	4.5 V	psi	bar	kPa	psi	bar	kPa
SPKT0053P* (1)	-15	60	-1	4,2	-100	420	360	25	2500	1595	110	11000
SPKT0013P* (1)	-15	135	-1	9,3	-100	930	430	30	3000	1595	110	11000
SPKT00E3P* (1)	-15	185	-1	12,8	-100	1280	550	38	3800	1595	110	11000
SPKT0043P* (1)	0	250	0	17,3	0	1730	780	54	5400	1595	110	11000
SPKT00F3P* (1)	0	300	0	20,7	0	2070	900	62	6200	1595	110	11000
SPKT0033P* (1)	0	500	0	34,5	0	3450	1010	70	7000	2494	172	17200
SPKT00B6P* (1)	0	650	0	45	0	4500	1310	91	9100	2494	172	17200

Notes

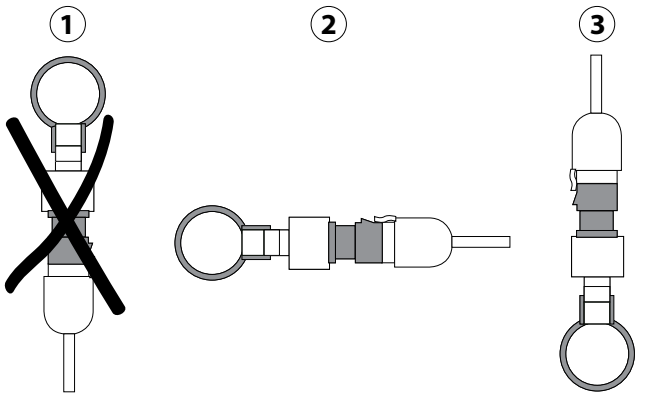
Measure type: Sealed gauge

Full span definition: FS (full span) = MAX output - MIN output = 4V

Prescriptions: Important, for the purpose of protecting the sensor against damage due to inducted overvoltage and incorrect use, it is recommended to proceed as follows.

- **Power supply:** pressure sensors must be powered by a PELV source. If not connected to a Carel controller, protect with a 50 mA fuse on the positive of power supply.
- **Connection cable:** avoid winding the cable in spirals and adequately the separate cable from power cables.

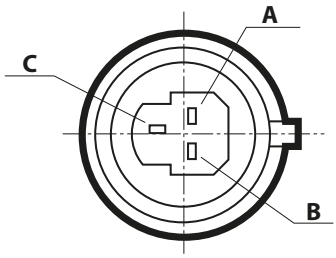
Installation



1	NOT RECOMMENDED
2	RECOMMENDED
3	ACCEPTED

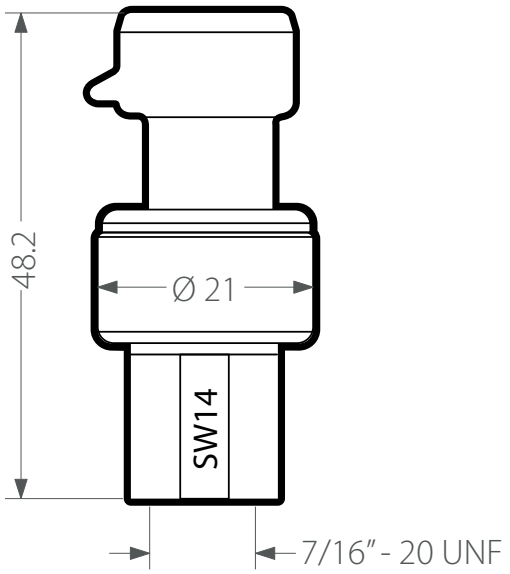
Do not use sealing glue or copper gasket for mechanical connection

Electrical connection drawing



A	Ground - PIN n.3
B	Power supply - PIN n.1
C	Output signal - PIN n.2

Dimensions



8. P Female Series IP69K

8.1 Technical specifications P Female Series IP69K

Carel type P pressure transducers, is a cost effect, high accuracy product that use piezoresistive technology, with a 0.5...4.5 ratiometric output and brass housing body.
Excellent EMC features, make this sensors suitable for harshest environments.
These sensors can be directly installed on the refrigerant pipe (capillary tube is not needed)
Compatible with the most common refrigerants.

Electrical	
Power supply (protected against polarity reversal)	5Vdc ±10%
Power supply overvoltage	18Vdc
Maximum reverse voltage	11Vdc
Current consuption	5mA typical
Output voltage	0.5…4.5Vdc ratiometric
Shorcircuit protection	yes
Output load	>47kΩ
Response time	10ms max
Insulation resistance	1GΩ @ 50Vdc
Electrical connector	Male, 3 way Metri-Pack 150
Insulation material of electrical connector	PBT 30GF
Electrical contact material and surface finish material	Cu Zn20, Ni 2...3µm Sn 5 ±2,5µm
Cable	See SPKC****** accessory

Performance	
Operating temperature	-40T135°C
Operating humidity	0-90%rH
Fluid temperature	-40T135°C
Storage temperature	-40T150°C
Ingress protection	IP69K, only with IP69K cable (SPKC***2*) plugged in, for more details, see sensor table and SPKC***** accessory and table.
Accuracy (including linearity, hysteresis, repeatability, calibration error) static error @25°C at 5.0 or 24 Vdc	±1.2% FS
Temperature error	±0.013%F.S./°C
Total error band (including linearity, hysteresis, repeatability, calibration error) relative to all operating temperature and humidity @ 5.0 or 24 Vdc	±1.5%FS at 5Vdc (0T50°C) ±2.1% FS at 5Vdc (-40T90°C) ±2.6% FS at 5Vdc (90T135°C)
Life cycle	10 million cycles, 0…100 %FS

Physical	
Vibrations IEC 60068-2-64	12g (rms)
Shock IEC 60068-2-27	50g 6ms
Drop form any axis	1.5m (Falling from 1.5 meter high)
Material in contact with refrigerant	Ceramic, brass and HNBR o-ring
Body housing	Brass
Tightening torque	12 to 16 Nm
Mechanical connection	Female, 7/16"-20UNF - in 45° Flare
Series pressure range	From 4.2barg to 45barg
Over pressure	See table
Burst pressure	See table
Refrigerant compatibility	R12, R22, R134A, R404A, R407C, R410A, R448A, R449A, R452A, R502, R507, R513A, R744, HFO 1234ze, R290, R32, water (temperature >3°C). Not compatible with R717 (ammonia), not suitable to be used with glycol added to water.
Vacuum pressure (referred to refrigerant circuit)	0 bar absolute
Weight	30g (Net weight)

EMC	
Electrostatic discharges: EN 61000-4-2	±4kV contact, ±8kV in air
Radiated immunity: EN 61000-4-3	10V/m (80MHz ÷ 1GHz) 3V/m (1,4Ghz ÷ 2Ghz) 1V/m (2Ghz ÷ 2,7Ghz)
Burst: EN 61000-4-4	±1kV
Surge: EN 61000-4-5	±500V
Immunity to conducted radio-frequency disturbance: EN 61000-4-6	10V (150kHz ÷ 80Mhz)
Magnetic fields at power supply frequency: EN 61000-4-8	30 A/m continuous 300 A/m impulsive

Compliant with:	
Compliances	• REACH • RoHS • CE
UL certified	File E493623

Part numbers

Carel code	Pressure (psi)		Pressure (bar)		Pressure (kPa)		Over pressure			Burst pressure		
	0.5 V	4.5 V	0.5 V	4.5 V	0.5 V	4.5 V	psi	bar	kPa	psi	bar	kPa
SPKT0153P* (1)	-15	60	-1	4,2	-100	420	360	25	2500	1595	110	11000
SPKT0113P* (1)	-15	135	-1	9,3	-100	930	430	30	3000	1595	110	11000
SPKT01E3P* (1)	-15	185	-1	12,8	-100	1280	550	38	3800	1595	110	11000
SPKT0143P* (1)	0	250	0	17,3	0	1730	780	54	5400	1595	110	11000
SPKT01F3P* (1)	0	300	0	20,7	0	2070	900	62	6200	1595	110	11000
SPKT0133P* (1)	0	500	0	34,5	0	3450	1010	70	7000	2494	172	17200
SPKT01B6P* (1)	0	650	0	45	0	4500	1310	91	9100	2494	172	17200

*(1) = 0 single pack, 1 multiple pack 50pcs, 3 distribution pack

Notes

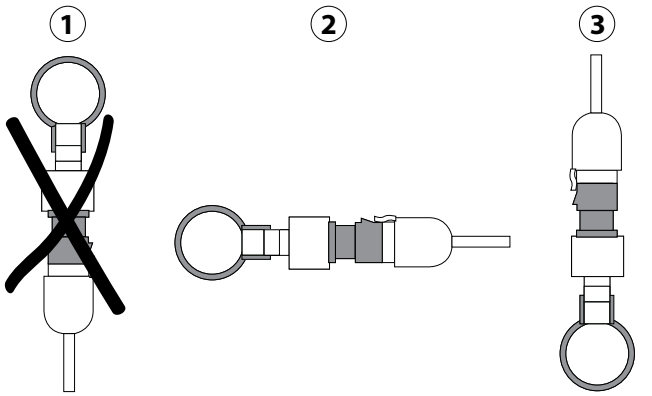
Measure type: Sealed gauge

Full span definition: FS (full span) = MAX output - MIN output = 4V

Prescriptions: Important, for the purpose of protecting the sensor against damage due to inducted overvoltage and incorrect use, it is recommended to proceed as follows.

- **Power supply:** pressure sensors must be powered by a PELV source. If not connected to a Carel controller, protect with a 50 mA fuse on the positive of power supply.
- **Connection cable:** avoid winding the cable in spirals and adequately the separate cable from power cables.

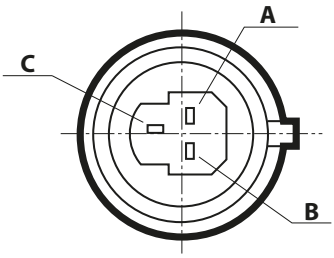
Installation



1	NOT RECOMMENDED
2	RECOMMENDED
3	ACCEPTED

Do not use sealing glue or copper gasket for mechanical connection

Electrical connection drawing



A	Ground - PIN n.3
B	Power supply - PIN n.1
C	Output signal - PIN n.2

Dimensions