P + T SENSOR, is a ratiometric pressure device based on a piezoresitive ceramic technology

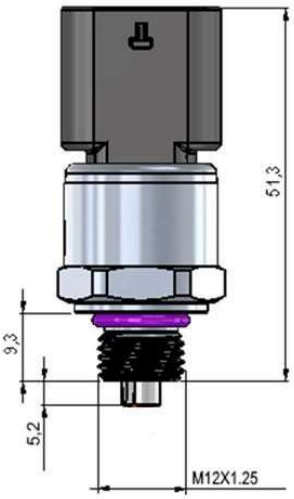
and a temperature sensor based on negative temperature coefficient resistor .

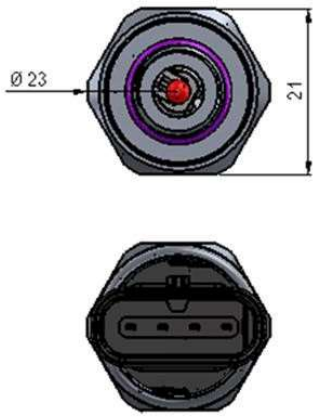
It is available for HIGH AND LOW PRESSURE APPLICATIONS

OPTION "F"
(HIGH SIDE A/C
PRESSURE TRANSDUCER)

OPTION "G"
(LOW SIDE A/C
PRESSURE TRANSDUCER)

DIMENSIONS





*External dimensions are identical for both transducers

GENERAL FEATURES		
	LOW SIDE	**HIGH SIDE**
Pressure ranges	**0 to 11 bar abs**	**0,5 to 37 bar abs**
Over pressure(1)	**30 bar abs**	**45 bar abs**
Burst pressure(2)	**36 bar abs**	**85 bar abs**
Pressure connection	**M12 x 1,25 (Male)**	
Pressure connection materials	**Aluminum**	
Tightening torque	**5.5 to 12 Nm**	
Electrical connection	**120-S-004-1 (Key Option G)**	**120-S-004-1 (Key Option F)**
Electrical connection material	**PPA GF40**	
ELECTRICAL FEATURES		
Power supply (Vdd)	**5 Vdc ± 10%**	
Supply current (Idd)	**15mA max**	
Output voltage (Vout)	**5% Vdd to 95% Vdd**	**7% Vdd to 95% Vdd**
Output load (Pressure signal)	**≥ 7,5KΩ Pull UP or Pull DOWN**	
Output response time	**< 10ms** (typical)	
Overvoltage protection	**+18 Vdc**	
Reverse voltage protection	**-14 Vdc**	
Short circuit protected	**Yes**	
TEMPERATURE SENSOR		
R (25°C)	**10KΩ**	
B25/85°C	**3977K ± 0,75%**	
NTC response time	**< 2,4 s typical** (0 to 63,2%)	
Output load (Temperature signal)	**5,9KΩ Pull UP – Reference value**	
PERFORMANCE FEATURES		
Operating temperature range	**-40°C to 140°C**	
Storage temperature range	**-40°C to 150°C**	
Accuracy (Linearity, Hysteresis, Repeatability, Calibration. Static error band @25°C)	**± 0,9% Vdd**	
Total error band(3) (Over Operating Temperature range)	**± 1,8% Vdd (-40…140°C)**	
IP Code	**IP67**	
Fluids compatibility	**Compressor oil either PAG or POE, R134a and/or 1234yf refrigerants**	
Vacuum pressure (referred to refrigerant circuit)	**0 bar (abs)**	

(1) Overpressure: The absolute maximum rating for pressure which may be safely applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressure may cause permanent damage to the product.

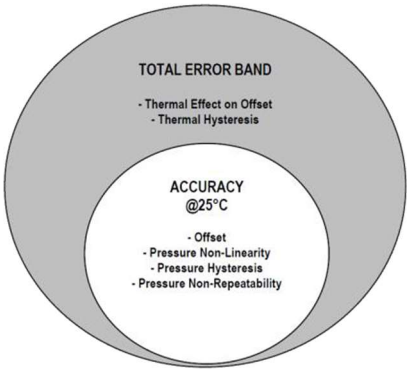
(2) Burst Pressure: The maximum pressure that may be applied to the product without causing escape of the pressure media. The product should not be expected to function after exposure to any pressure beyond the rated burst pressure. This rating is also the case burst rating of the product.

(3) Total Error Band: The maximum deviation from the ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, pressure non-linearity, pressure hysteresis, repeatability, thermal effect on offset, and thermal hysteresis. See Figure 1.

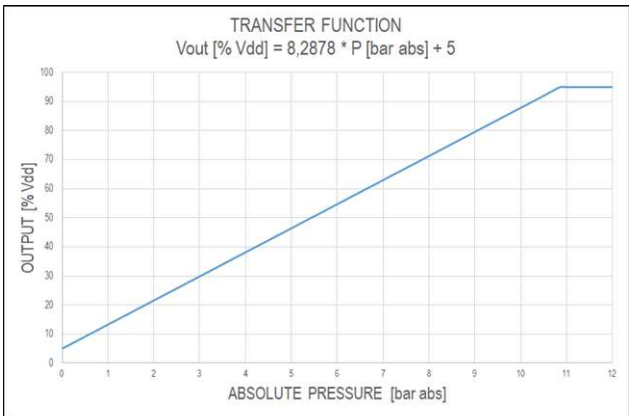
EMC FEATURES (International EMC standards and major Car Makers EMC standards)	
RF Emissions – Artificial Network Measurement (AN Test) (Conducted Emissions on Supply Lines) (CISPR 25)	**0,100 – 30MHz** **30 – 76MHz** **76 – 108MHz** **108 – 174MHz**
RF Emissions - Current Probe Measurement (Current on All Lines in Harness) (CISPR 25)	**0,100 – 30MHz** **30 – 76MHz** **76 – 108MHz** **108 – 174MHz**
RF Emissions – Antenna Measurements (RE-Test, ALSE method)	**30 – 75MHz** **75 – 400MHz** **400 – 1000MHz** **0,100 – 0,160MHz** **0,150 – 0,280MHz** **0,520 – 1,730MHz** **76 – 108MHz** **108 – 166MHz** **166 – 241MHz** **310 – 320MHz** **420 – 430MHz** **430 – 438MHz** **438 – 450MHz** **717 – 728MHz** **734 – 746MHz** **746 – 756MHz** **758 – 803MHz** **791 – 821MHz** **851 – 894MHz** **925 – 960MHz** **1452 – 1497MHz** **1574 – 1577MHz** **1595,5 – 1609,875MHz** **1805 – 1880MHz** **1880 – 1920MHz** **1930 – 1990MHz** **2110 – 2170MHz** **2320 – 2345MHz** **2402 – 2497MHz** **2496 – 2690MHz** **5170 – 5330MHz** **5490 – 5730MHz** **5735 – 5835MHz**
Bulk Current Injection (BCI-Test) Test (ISO 11452-4)	**0,1 – 2,38MHz** **2,38 – 15MHz** **15 – 88MHz** **88 – 400MHz**
RF Immunity – Antenna Irradiation (ALSE-Test) (ALSE with a Ground Plane) Test (ISO 11452-2)	**200 – 380MHz, CW and AM, 1kHz at 80%** **380 – 520MHz, CW and AM, 1kHz at 80%** **520 – 806MHz, CW and AM, 1kHz at 80%** **806 – 915MHz, CW and PM, 577µs duration, 217 Hz repetition rate** **915 – 1200MHz, CW** **1200 – 1400MHz, CW and PM, 3µs duration, 300Hz repetition rate** **1400 – 1710MHz, CW** **1710 – 1980MHz, CW and PM, 577µs duration, 217 Hz repetition rate** **1980 – 2700MHz, CW** **2700 – 3200MHz, CW and PM, 3µs duration, 300Hz repetition rate and ≤1,05µs duration, Pulse Repetition Frequency ≤1200Hz**
Electrostatic Discharge – ESD Handling Test (ESDH-Test) (ISO 10605)	**±15kV contact** **±15kV air**
Electrostatic Discharge – Indirect Discharge (ESDI Test) (Field Coupled) (ISO 10605)	**±15kV field coupled contact**
Electrostatic Discharge – Direct Discharge (ESDD Test) (Direct Coupled ESD, Both Air Discharge and Direct Discharge) (ISO 10605)	**±8kV contact** **±15kV air**

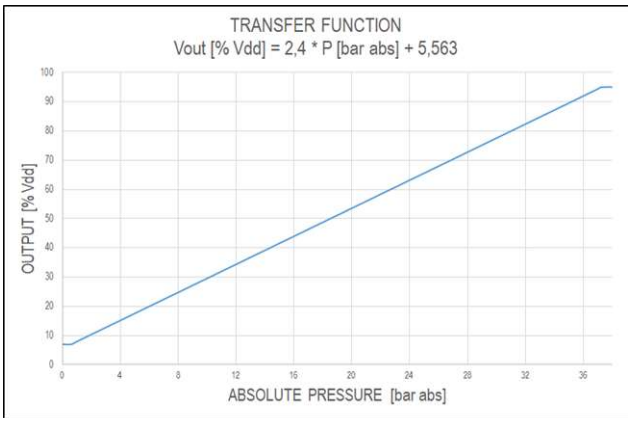
ENVIRONMENTAL FEATURES (International ENVIRONMENTAL standards and major Car Makers ENVIRONMENTAL standards)	
Mechanical Shock - Collision	Shock Load: **500m/s²** Shock Pulse Duration: **11 Milliseconds** Shock Pulse per Axis: **10** Number of Axis Tested: **1 (Vehicle orientation)** Total Number of Shock Pulses: **18**
High Temperature Operation Endurance (HTOE)	Test temperature: **140°C** Test duration: **240h** Monitoring: **Yes**
Low Temperature Operation Endurance (LTOE)	Test temperature: **-40°C** Test duration: **96h** Monitoring: **Yes**
Vibration Test with Thermal Cycle	Tmax: **140°C** Tmin: **-40°C** Vibration Excitation: **Wide-Band random vibration** Test duration for each spatial axis: **8h** RMS value of acceleration: **27,8m/s²** Number of Axis Tested: **1 (Vehicle orientation)**
Life Cycle Durability	Total Pressure Cycles: **2 million F.S. cycles** Pressure Cycling Range: **0 to F.S. pressure** Temperature Cycling Range: **-40°C to 140°C**
Thermal Shock	Cold Chamber Temperature: **-40°C** Hot Chamber Temperature: **140°C** Dwell Time at each Temp. Level: **15 Minutes** Transfer Time from Cold to Hot: **< 30 Seconds** Total Time for Cold-Hot Cycle: **30 Minutes** Total Number of Cold-Hot Cycles: **250 Cycles**

Figure 1.



Pressure transfer function:





NTC:

TEMPERATURE [°C]	R NOMINAL [Ω]	R MIN [Ω]	R MAX [Ω]
-40	333562	321654	345877
-30	176081	170611	181710
-20	96807	94221	99454
-10	55253	54004	56525
0	32640	32028	33260
10	19902	19601	20205
20	12493	12348	12639
25	10000	9900	10100
30	8056	7962	8150
40	5325	5247	5403
50	3601	3537	3665
60	2487	2436	2538
70	1751	1711	1792
80	1256	1224	1288
90	916	890	941
100	678	658	699
110	510	493	526
120	388	375	402
130	299	289	310
140	234	225	243
150	184	177	192