picoDAQ

Miniature Digital Pressure Scanner

- **16 channel Intelligent pressure scanner module with engineering unit output.**
- **User selectable absolute or differential measurement**
- **Up to 0.03% FS accuracy output.**
- **With IEEE 1588 PTPv2 time stamping**
- **Thermally compensated from 0 to 100°C (-20 to 100°C optional)**
- **Output over Ethernet (100Mbit TCP / UDP) and CAN.**
- **Uses CAN-FD and 'classic' CAN (2.0B)**
- **Rugged enclosure for on-vehicle applications. Sealed to IP67**
- **Fully configurable over Ethernet with embedded web server.**

The picoDAQ is a new slim line scanner providing a high accuracy pressure scanning solution for confined spaces

The picoDAQ is designed to mate with integrated pressure tappings via its O-ring manifold.

The picoDAQ is a fully configurable smart pressure scanner that will output pressure data in engineering units over Ethernet and CAN. The data output over all interfaces is identical to the picoDAQ's sister products; the nanoDaq and the microDAQ3.

The picoDAQ makes use of 17 absolute transducers which are thermally compensated and conditioned to provide 16 absolute or differential measurements relative to the one reference port.

The user can select a number of operating parameters using the embedded web server. These include; absolute or differential, TCP and UDP setup, data averaging and units, CAN setup and time stamp configuration.

The picoDAQ features a hardware implementation of the IEEE 1588 PTPv2 time stamping protocol which allows the pressure data to be time stamped to a resolution of 1µSecond.

The picoDAQ also features a hardware trigger allowing the pressure acquisition to be synchronised to an external TTL pulse.

The picoDAQ is contained within a miniature package which is sealed to IP67 enabling it to be used in harsh environments.

The transducers within the picoDAQ have a very high proof pressure (50 psig or 90 psig depending on range) which reduces the chances of in-field transducer damage.

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General	
Differential ranges available	1, 2.5, 5, 7, 10,17, 35, 55, 103, 207 and 310 kPa
Number of channels	16
Maximum Acquisition Speed (measurements / channel / second)	200
Data Output	
Output formats	CAN and Ethernet (TCP/IP & UDP), IENA
Ethernet Specification	100Mbit TCP/IP or UDP (user configurable)
CAN Specification	'classic' CAN (2.0B) and CAN-FD (user configurable)
Performance	
System Accuracy	See table below
Absolute Ranges	160 kPa and 400 kPa
Calibrated absolute pressure range (differential range ≤ 8 psid)	14 kPa to 160 kPa (2.0 psia to 23.2 psia)
Calibrated absolute pressure range (differential range > 8 psid)	14 kPa to 400 kPa (2.0 psia to 58 psia)
Line pressure limitation	Negligible - as long as all measured pressures are within absolute pressures above
Proof Pressure (all ranges)	Ranges ≤ 8 psid :50 psig (64.5 psia), Ranges >8 psid:90 psig (105 psia)
Output Resolution	16 bit or ±range / 65536
System Resolution	24 bit
Mechanical	
Dimensions	91.8 x 18.9 x 9.6
Weight	24g
Enclosure Sealing	IP67
Measurement ports	Manifold with 'O' rings : 1mm C/S by 1mm I/D
Power Supply	
Input supply	8-25 VDC
Power consumption	1VA Max
Electrical Connector	A29100-009 (suggested mate : MNPO-09-WD)
Environment	
Operating Temperature Range	-40 to +100°C
Compensated Temperature Range	0 to +100°C (optional -20 to +100°C)
Storage Temperature Range	-40 to +100°C
Ambient Pressure	5 mbar abs (100,000 ft) to 2.5 bar abs
Vibration	Engine standard vibration test to DO160E category S, curve W with duration of 1 hr/axis. Fan blade (20 g 2 kHz)
Shock	Fan blade out to DO160F section 7 (40g 11 m/s)
Timing / Data Synchronisation	
Time Stamping	IEEE 1588 PTPv2
Time Stamping Resolution	1µs
Hardware Trigger	5 V TTL pulse, maximum 200 Hz, minimum 2 Hz

picoDAQ Performance

* Measurement uncertainty includes all non-linearity, repeatability and thermal gain errors over the compensated temperature range. Differential range assumes a reference pressure of 1 bar.

Differential Range (+/-)		Output Resolution (Pa)	Standard Deviation (Pa)	Measurement Uncertainty* Pa	%FS
1 kPa	4" water	0.03	5	20	2%
2.5 kPa	10" water	0.08	5	20	0.8%
5 kPa	20" water	0.15	5	20	0.4%
7 kPa	1 psi	0.21	5	20	0.3%
10 kPa	1.5 psi	0.31	5	20	0.2%
17 kPa	2.5 psi	0.52	5	20	0.1%
35 kPa	5 psi	1	7	20	0.06%
55 kPa	8 psi	1.7	7	20	0.04%
-83 kPa to 103 kPa	-12 to 15 psi	3.15	15	50	0.05%
-83 kPa to 207 kPa	-12 to 30 psi	6.3	18	70	0.03%
-83 kPa to 300 kPa	-12 to 43 psi	9.5	20	100	0.03%

Absolute Range		Output Resolution (Pa)	Standard Deviation (Pa)	Measurement Uncertainty* ±Pa	%FS
15 to 115 kPa	2.2 psia to 16.8 psia	1.5	1.13	50	0.04%
Extended range (for scanners calibrated at 55 kPa)					
13.0 to 160 kPa	1.885 psia to 23.2 psia	2.24	1.6	60	0.04%
Absolute range for 15 psid scanners					
15 to 206 kPa	2.2 psia to 29.9 psia	2.9	3.5	50	0.02%
Absolute range for 30 and 45 psid scanners					
15 to 400 kPa	2.2 psia to 58.01 psia	6.1	6	90	0.02%

Absolute range can be user defined within the above limits.
Lowest absolute calibrated pressure is 14 kPa as standard (please contact us for lower pressures)
Lowest measurable absolute pressure for ranges up to 160kPa is 11kPa.
Lowest measurable absolute pressure for 206 and 400 kPa range ranges is 0.5kPa.
Data collected in accuracy mode with an average of 16
%FS values refer to the percentage of the maximum absolute values as listed.

Absolute Transducers - More information and better performance

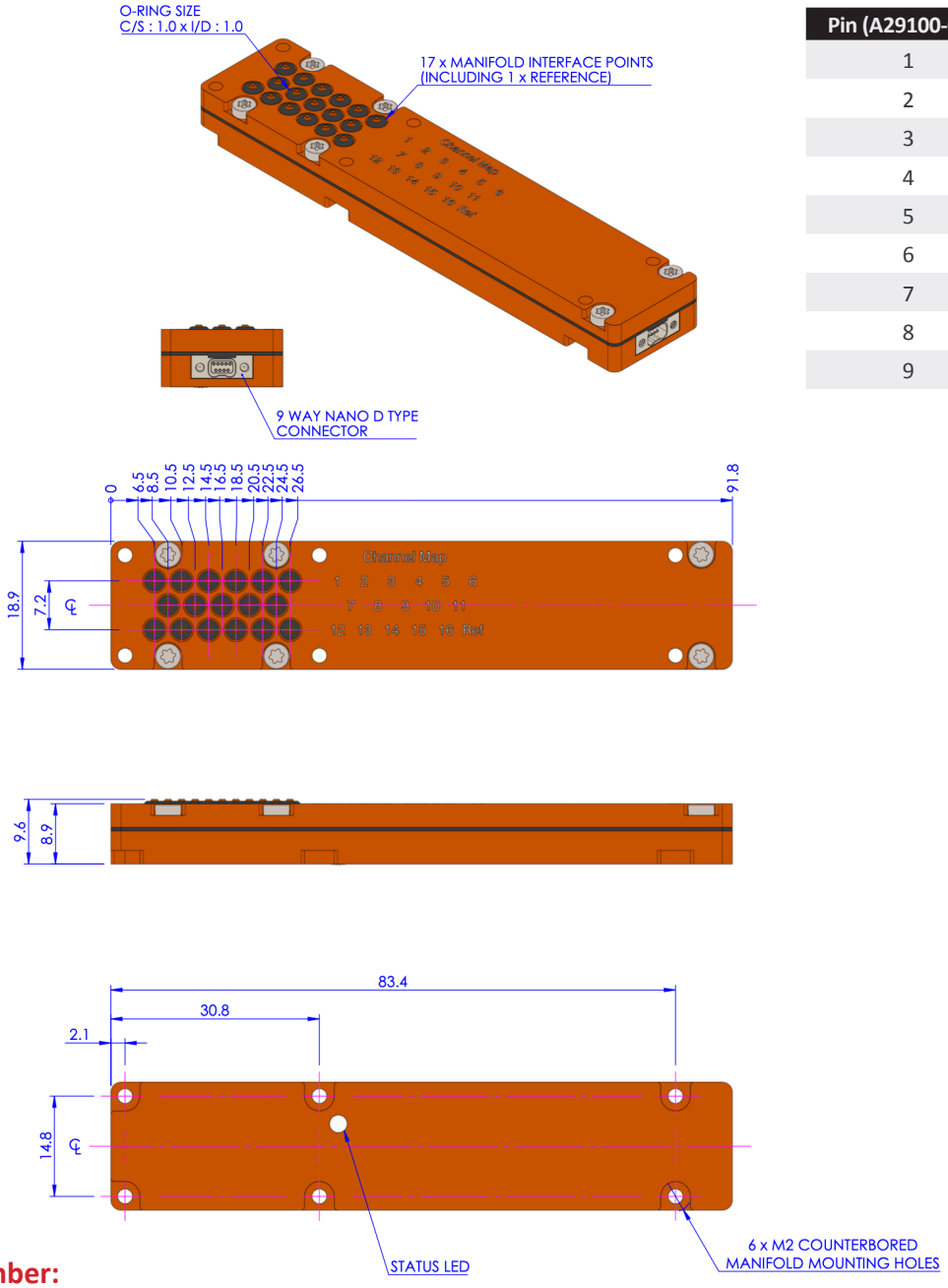
The picoDAQ is available with two ranges of absolute sensors; 160kPa and 400 kPa absolute which are used for both the measurement and reference ports. The picoDAQs are calibrated over their full absolute range (see above) and the absolute output can be configured to suit the use case to optimise the resolution of the 16-bit output.

For differential outputs, the reference port is subtracted from the measurement ports to provide a differential output. The picoDAQ's are purchased pre-configured for a particular differential range to maximise the resolution of the 16-bit output. Line pressures can be accommodated as long as the range of pressures measured falls within the absolute range of the sensors.

The use of absolute transducers in the picoDAQ leads to several advantages:

- The ability for the user to switch between differential and absolute measurements.
- The ability to output differential measurements ***and*** the absolute value of the reference removing the need for external barometric transducers.
- The option to output absolute values for all channels and thereby removing the need for a reference all together.
- The lack of an internal reference cavity (and therefore volume) means the scanner responds much faster to changes in reference pressure (for example, changes in altitude) improving data quality.

Dimensions



Pin (A29100-009)	Function
1	0v
2	Ethernet Rx+
3	CAN low
4	Ethernet Tx+
5	Supply (8-25 VDC)
6	Trigger in (TTL)
7	Ethernet Rx-
8	Ethernet Tx-
9	CAN high

Part Number:

16PCD -AABB

AA = Range
01 = 1 kPa (4” water)
02 = 2.5 kPa (10” water)
03 = 5 kPa (20” water)
04 = 7 kPa (1 psi)
05 = 10 kPa (1.5 psi)
06 = 17 kPa (2.5 psi)
07 = 35 kPa (5 psi)
08 = 55 kPa (8 psi)
09 = 103 kPa (15 psi)
10 = 207 kPa (30 psi)
11 = 310 kPa (45 psi)

BB = Calibrated Temperature Range
01 = 0 to 100°C
02 = -20 to 100°C