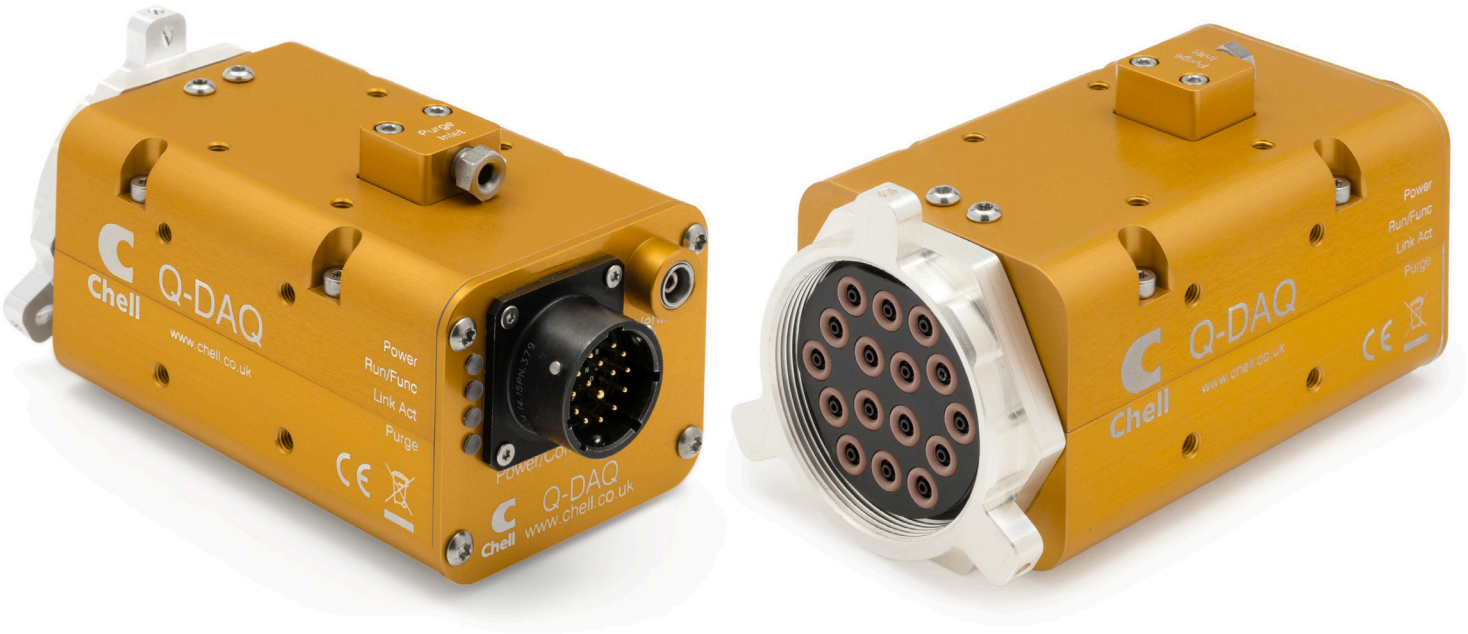

Q-DAQ-V

16 Channel Industrial Pressure Scanner

- **New and advanced use of digital sensor technology**
- **Unparalleled Data Quality: up to 0.02% of full scale**
- **High speed : 400Hz per channel**
- **Absolute and differential measurements**
- **Electrically driven purge valve**
- **Compact size**
- **Complete with IEEE 1588 PTPv2 time stamping**
- **Thermally compensated from 0 to 90°C (-20 to 90°C optional) with internal heaters**
- **24 bit ADC per channel**
- **Output over Ethernet (100Mbit TCP / UDP) and CAN**
- **Fully configurable over Ethernet with embedded web server**

The Chell Q-DAQ-V is a development from the high accuracy microDAQ3 series. It is an industrial scanner utilising the well know SQDC range of pneumatic connector. This connector gives the user a rugged, vibration tolerant quick-disconnect fitting capable of interfacing with 1mm and 1.6mm (1/16") flexible or solid tubing.

The Q-DAQ-V will output differential or absolute compensated engineering unit pressure data over Ethernet, CAN and IENA at speeds up to 400Hz per channel. When using differential mode, one of the 16 channels is nominated as a reference making the Q-DAQ-V a 15 channel differential unit.

The Q-DAQ-V features an electrically driven purge valve and internal heaters making the Q-DAQ-V ideal for both flight and ground based applications.

The Q-DAQ-V makes use of high accuracy transducers which are combined with two 24-bit ADC's per port - one for pressure and one for temperature. This precise temperature measurement allows the Q-DAQ-V to almost entirely compensate for thermal effects over its wide operating range.

The Q-DAQ-V makes use of all the technology that Chell has developed with its scanner range such as embedded web server, IEEE 1588 PTP time stamping, CAN, hardware trigger and a power supply that will automatically use Power-over-Ethernet if it is available.

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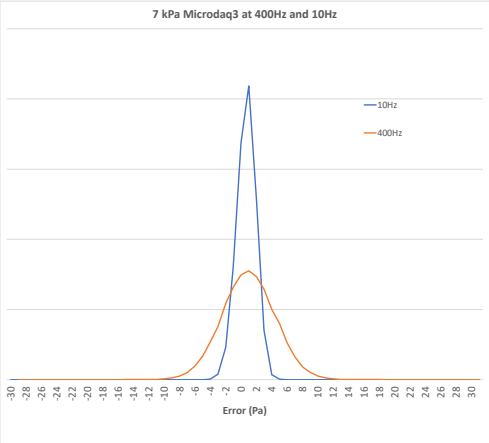
General	
Differential ranges available	1, 2.5, 5, 7, 10,17, 35, 55, 103, 207 and 310 kPa
Number of channels	16 absolute / 15 differential with nominated reference
Maximum Acquisition Speed (measurements / channel / second)	400
Data Output	
Output type	CAN and Ethernet (TCP/IP & UDP), IENA
Ethernet Specification	100Mbit TCP/IP or UDP (user configurable)
CAN Specification	2.0B and FD
Performance	
System Accuracy	See table below
Absolute Ranges	160 kPa and 400 kPa
Calibrated absolute pressure range (differential range ≤ 8 psid)	0.5 kPa to 160 kPa (0.07 psia to 23.2 psia)
Calibrated absolute pressure range (differential range > 8 psid)	0.5 kPa to 400 kPa (0.07 psia to 58 psia)
Line pressure limitation	None - 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 or 32 bit IENA
System Resolution	24 bit
Mechanical	
Dimensions (width x depth x height in mm)	See drawing below
Weight (without mating SQDC)	36g
Enclosure Sealing	IP67
Measurement ports	via appropriate SQDC bulkhead fitting
Purge Flow	Purge flow = (8 x purge supply in barg) SLPM
Power Supply	
Input supply	8-30 VDC or PoE IEEE 802.3at (Type 1 and 2) 25W auto sensing
Power consumption	0.5A at 24VDC (0.2A without heaters)
Electrical Connector	09-49-15KPT06FS or M12 connector
Environment	
Operating Temperature Range	-40 to +90°C
Compensated Temperature Range	0 to +90°C (optional -20 to +90°C)
Storage Temperature Range	-40 to +90°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)
Radiated emissions	MIL-STD-461-G*: RE102 (Space)
* This product should not be used for safety critical applications and should not be relied upon to protect against loss of life or material damage	
Timing / Data Synchronisation	
Time Stamping	IEEE 1588 PTPv2
Time Stamping Resolution	1µs
Hardware Trigger (DC powered version only)	5 V TTL pulse, maximum 400 Hz, minimum 2 Hz

Q-DAQ-V Accuracy - A Metrology Approach



The performance and flexibility of the Q-DAQ-V calls for a detailed and transparent approach to specifying its accuracy. The table below details the resolution, standard deviation and errors with 95% confidence (2 x sigma). The error figure below includes all the contributions from:

- Limit of accuracy (linearity)
- Repeatability
- Stability (noise)
- Long term drift (12 months)
- Thermal errors from 0 to 90°C (optionally -20 to 90°C)
- Resolution limitations
- Line pressure effects

For more details on how the performance specifications are derived, please see our application notes on the subject.

Differential Ranges

Differential Range (+/-)[1]		Max Absolute Range[2]	Output Resolution (Pa)	Standard Deviation (Pa)[3]	Error (95% Confidence) ±Pa	Error (95% Confidence) %FS[4]
1 kPa	4” water	0.5 to 175kPa	0.03	0.91	1.82	**0.2%**
2.5 kPa	10” water	0.5 to 175kPa	0.08	0.91	1.82	**0.07%**
5 kPa	20” water	0.5 to 175kPa	0.15	0.91	1.82	**0.04%**
7 kPa	1 psi	0.5 to 175kPa	0.21	1.1	2.26	**0.03%**
10 kPa	1.5 psi	0.5 to 175kPa	0.31	1.25	2.5	**0.03%**
17 kPa	2.5 psi	0.5 to 175kPa	0.52	1.5	3.0	**0.02%**
35 kPa	5 psi	0.5 to 175kPa	1	2.01	7.0	**0.02%**
55 kPa	8 psi	0.5 to 175kPa	1.7	1.71	11	**0.02%**
-83 kPa to 103 kPa	-12 to 15 psi	0.5 to 400 kPa	3.15	3.0	20	**0.02%**
-83 kPa to 207 kPa	-12 to 30 psi	0.5 to 400 kPa	6.3	5	40	**0.02%**
-83 kPa to 300k Pa	-12 to 43.5 psi	0.5 to 400 kPa	9.5	9.0	60	**0.02%**
For 100 and 150 psi ranges, see 32MD3-HP						

1) Differential range assumes a reference of 1 bar. Reference pressure can vary as long as all measurements are within the Max Absolute Range[2] of the transducers.
2) Max absolute range of the transducers.
3) Data collected at 100Hz with an average of 16 and after re-zero.
4) %FS values refer to the percentage of the differential range as listed. See above for error definition.

Absolute Ranges

Absolute Range		Output Resolution (Pa)	Standard Deviation (Pa)[1]	Error (95% Confidence) ±Pa	Error (95% Confidence) %FS[2]
Absolute range for differential ranges up to 55 kPa (8 psi)					
0.5 to 160 kPa	0.07 psia to 23.2 psia	2.24[3]	1.6	30	**0.02%**
Absolute range for differential ranges of 103, 207 and 300 kPa (15, 30 and 43.5 psi)					
0.5 to 400 kPa	0.07 psia to 58.01 psia	6.1[3]	6	60	**0.02%**

1) Data collected at 100Hz with an average of 16 and after re-zero.
2) %FS values refer to the percentage of the maximum absolute values as listed.
3) Absolute range can be user configured to improve resolution.

Absolute Transducers - More information and better performance

The Q-DAQ-V is available with two ranges of absolute sensors; 160kPa and 400 kPa absolute which are used for both the measurement and reference ports. The Q-DAQ-Vs 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 ports is subtracted from the measurement ports to provide a differential output. The Q-DAQ-V'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 Q-DAQ-V leads to several advantages:

- The ability for the user to switch between differential and absolute measurements.
- Unparalleled differential and absolute measurement performance.
- 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.

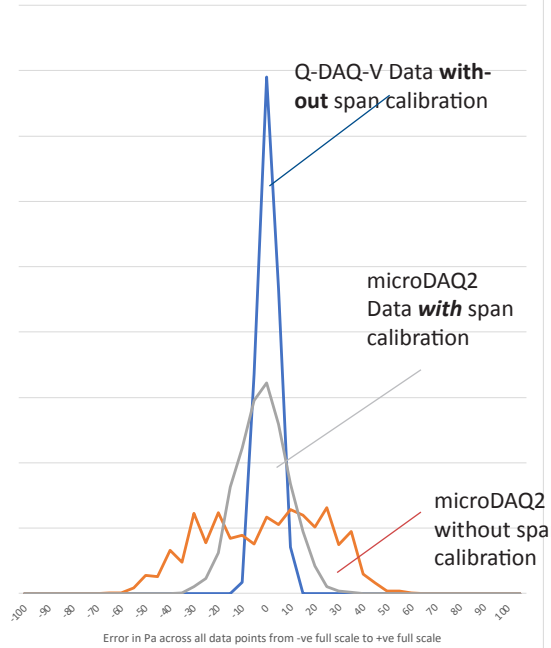
Digital Transducers - A revolution in data quality

The digital transducers used in the Q-DAQ-V provide unparalleled data quality. When the pressure and temperature output for each transducer are processed with our proprietary thermal compensation routine, the results set a new standard for pressure scanners and a considerable improvement over the microDAQ2 product range.

The histogram opposite shows a 15 psid Q-DAQ-V when compared to the data from a microDAQ2 which incorporate a digitally thermally compensated (DTC) scanner using conventional analogue transducers.
The Q-DAQ-V produces superior data to conventional compensated scanners - even when the older scanners are used with on-line calibration!

This performance removes the need for on-line calibration and, in most cases, rezero.

Comparison of Q-DAQ-V with analogue scanner technology



Connecting to the Q-DAQ-V

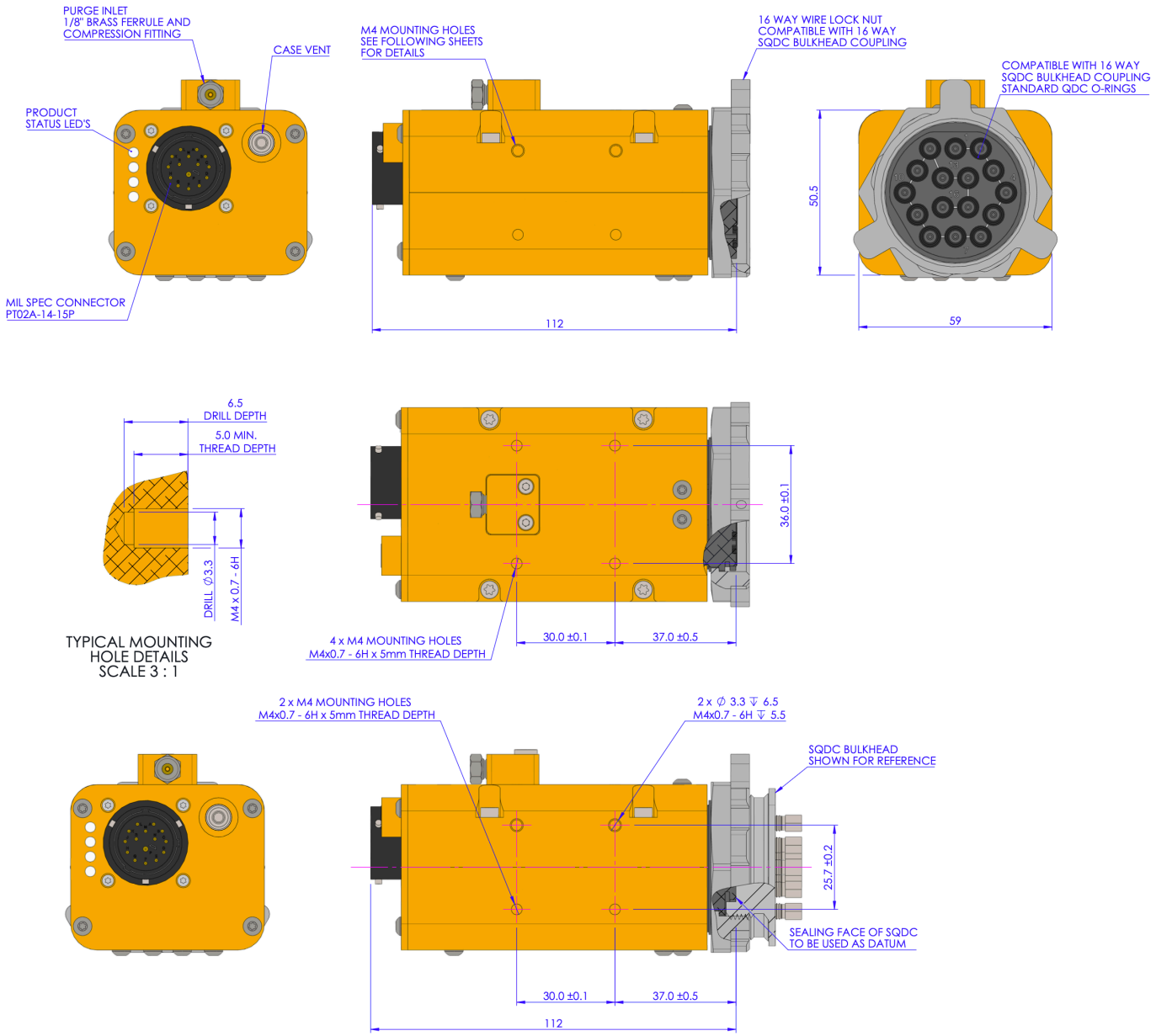
The Q-DAQ-V draws on the long history of the microDAQ products and provides the following interfaces:

[1] Ethernet (TCP/IP and UDP)
[2] CAN (non PoE models only)
[3] IENA

Connecting to the Q-DAQ-V couldn't be easier. The Ethernet comes directly out of the Q-DAQ-V so the customer can produce their own cables or use a Chell cable. In addition to the cables, we also provide a range of interfaces that simplify the connection further.

Shown here is the TP-DAQ which is designed to convert the standard IENA output from the Q-DAQ-V to iDDS for test cell installations that utilize iDDS.

Dimensions



Part Number:

16QDV -AABBCCDD

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 = 300 kPa (43.5 psi)

BB = Valve
01 = With valve

CC = Interface / Supply
01 = DC/PoE supply with CAN and hardware trigger (24N connector)
02 = DC/PoE supply with CAN and hardware trigger (M12 connector)

DD = Calibrated Temperature Range
01 = 0 to 90°C
02 = -20 to 90°C