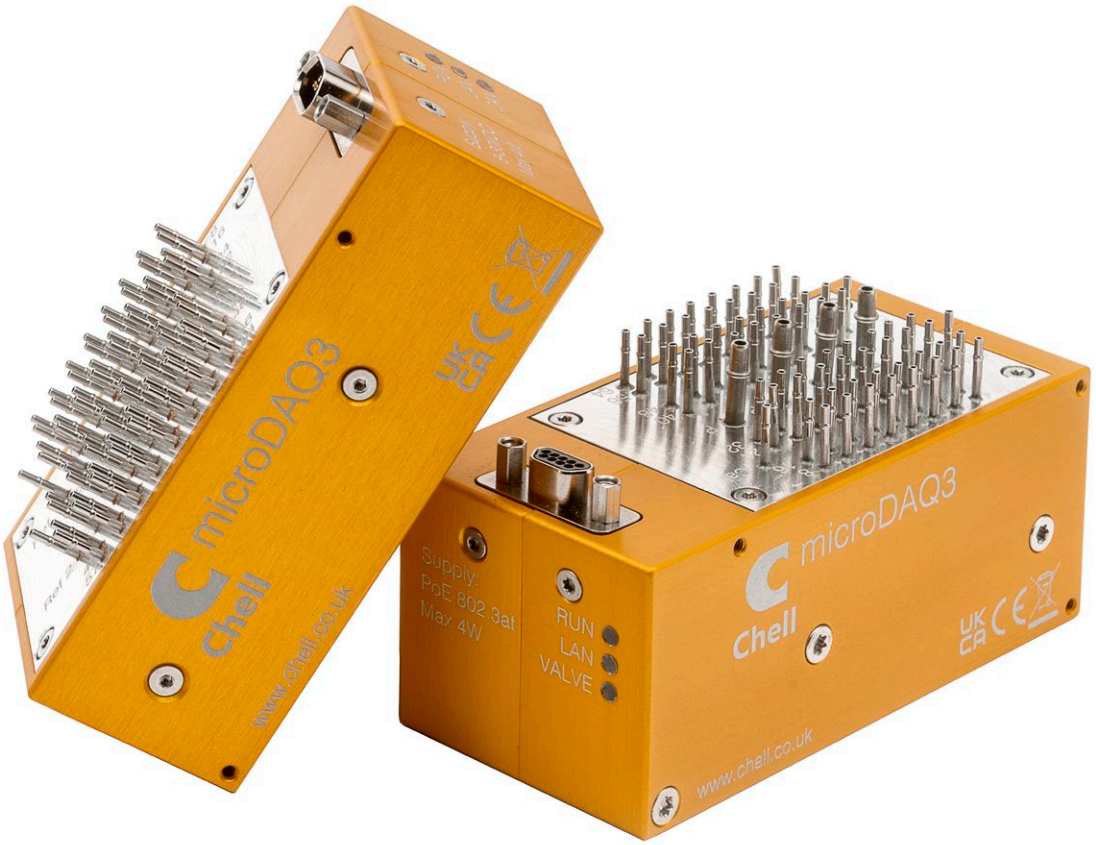

microDAQ3

64 Channel Advanced Pressure Scanner

- **New and advanced use of digital sensor technology.**
- **Unparalleled Data Quality: up to 0.01% of full scale**
- **High speed : 400Hz per channel**
- **Absolute and differential measurements**
- **Optional electrically driven valve for purge and re-zero**
- **Power-over-Ethernet**
- **Complete with IEEE 1588 PTPv2 time stamping**
- **Thermally compensated from -20 to 90°C**
- **24 bit ADC per channel**
- **Output over Ethernet (100Mbit TCP / UDP) and CAN**
- **Available with quick-disconnect top plate**
- **Fully configurable over Ethernet with embedded web server**

The Chell microDAQ3 is a leap forward in pressure scanning technology. The use of high accuracy digital sensors combined with an advanced processor design results in the most accurate - and most versatile pressure scanner on the market.

The microDAQ3 will output differential or absolute compensated engineering unit pressure data over Ethernet, CAN, IENA, and EtherCAT (see microCAT3) at speeds up to 400Hz per channel.

The microDAQ3 offers the option of an electrically driven valve that gives the scanner a purge and re-zero facility. The valve has been years in development and features precise positional measurement and current monitoring to ensure reliability.

The microDAQ3 is also the smallest digital pressure scanner on the market - even when fitted with the electrically driven valve. The non-valved option gives the user a further reduction in size when purge is not required.

The microDAQ3 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 MicroDAQ3 to almost entirely compensate for thermal effects over its wide operating range.

The microDAQ3 makes use of all the technology that Chell has developed with its MicroDAQ and nanoDaq range such as embedded web server, IEEE 1588 PTP time stamping, power-over-ethernet, CAN, hardware trigger and EtherCAT (see MicroCAT3).

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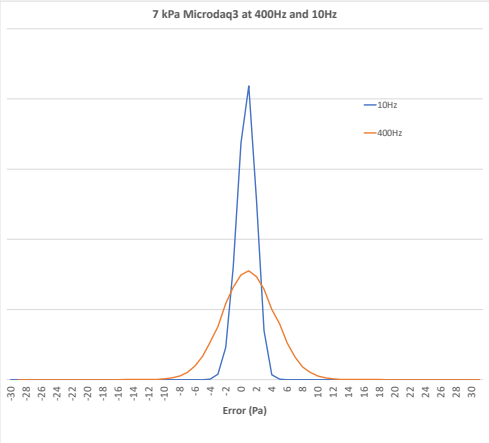
General	
Ranges Available	1, 2.5, 5, 7, 10,17, 35, 55, 103, 207 and 310 kPa
Number of channels	64
Maximum Acquisition Speed (measurements / channel / second)	400
Data Output	
PoE version (CC=01)	Ethernet (TCP/IP & UDP), IENA
DC Powered version (CC=02)	CAN and Ethernet (TCP/IP & UDP), IENA
Ethernet Specification	100Mbit TCP/IP or UDP (user configurable)
CAN Specification (DC Powered version only)	2.0B
Performance	
System Accuracy	See table below
Absolute Ranges	See table below
Reference pressure range (differential range ≤ 8 psid)	13 kPa to 160 kPa (1.89 psia to 23.2 psia)
Reference pressure range (differential range > 8 psid)	13 kPa to 400 kPa (1.89 psia to 58 psia)
Line pressure effect	Negligible
Proof Pressure (all ranges)	Ranges ≤ 8 psid :50 psig (64.5 psia), Ranges >8 psid:90 psig (105 psia)
Ouput Resolution	16 bit or ±range / 65536
System Resolution	24 bit
Mechanical	
Valved version Dimensions width x depth x height in mm)	80 x 38 x 34 excluding tubulations
Non-valved version Dimensions (width x depth x height in mm)	80 x 38 x 27 excluding tubulations
Weight (Valved / non-valved)	205g / 157g
Enclosure Sealing	IP54
Measurement ports	1.0 mm (0.04”) bulged tubulations
Purge ports (valved version only)	2.3 mm (0.09”) bulged tubulation
Maximum purge pressure	10 bar gauge
Purge Flow	22 SLPM at 1 bar purge, 46 SLPM at 2 bar purge and 66 SLPM at 3 bar purge
Power Supply	
Input supply (DC Powered version)	8-30 VDC
Power consumption (DC Powered version)	1W (non-valved), 4W (valved)
PoE Specification	IEEE 802.3at Type 1
Electrical Connector (DC Powered version)	Female 9-way micro-miniature ‘D’ type (suggested mate : Glenair MWDM2L-9PS - solder cup version)
Electrivcal Connector (PoE Version)	Male 9-way micro-miniature ‘D’ type (suggested mate : Glenair MWDM2L-9SS - solder cup version)
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	100 mbar abs (52,000 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)
Maximum relative humidity	95% at 50°C (non-condensing)
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

microDAQ3 Accuracy - A Metrology Approach



The performance and flexibility of the microDAQ3 calls for a different approach to specifying its accuracy. The table below details the resolution, standard deviation and errors with 95% confidence (2 x sigma). This is comparible with data from other manufacturers.

In addition to this, we have detailed the measurement uncertainty which takes into account the following sources of error:

- Uncertainty of the Chell calibration standards used in production
- Thermal errors from 0 to 90°C
- Drift errors over 12 months

Differential Range (+/-)*		Output Resolution (Pa)	Standard Deviation (Pa)	Error (95% Confidence) ±Pa	Error (95% Confidence) %FS	Uncertainty %FS
1 kPa	4” water	0.03	0.91	1.82	**0.2%**	0.4%
2.5 kPa	10” water	0.08	0.91	1.82	**0.07%**	0.15%
5 kPa	20” water	0.15	0.91	1.82	**0.04%**	0.08%
7 kPa	1 psi	0.21	1.1	2.26	**0.03%**	0.06%
10 kPa	1.5 psi	0.31	1.25	2.5	**0.03%**	0.04%
17 kPa	2.5 psi	0.52	1.5	3.0	**0.02%**	0.03%
35 kPa	5 psi	1	2.01	7.0	**0.02%**	0.03%
55 kPa	8 psi	1.7	1.71	11	**0.02%**	0.03%
-83 kPa to 103 kPa	-12 to 15 psi	3.15	3.0	20	**0.02%**	0.03%
-83 kPa to 207 kPa	-12 to 30 psi	6.3	5	40	**0.02%**	0.03%
-83 kPa to 300 kPa	-12 to 43.5 psi	9.5	9.0	60	**0.02%**	0.03%

* Differential range assumes a reference of 1 bar
%FS values refer to the percentage of the differential range as listed.
Data collected in accuracy mode with an average of 16.

Absolute Range		Output Resolution (Pa)	Standard Deviation (Pa)	Error (95% Confidence) ±Pa	Error (95% Confidence) %FS	Uncertainty %FS
15 to 115 kPa	2.2 psia to 16.8 psia	1.5	1.13	20	**0.02%**	0.025%
Extended range (for scanners calibrated at 55 kPa)						
13.0 to 160 kPa	1.885 psia to 23.2 psia	2.24	1.6	30	**0.02%**	0.025%
Absolute range for 15 psid scanners						
15.0 to 206 kPa	2.2 psia to 29.9 psia	2.9	3.5	40	**0.02%**	0.025%
Absolute range for 30 and 45 psid scanners						
0 to 400 kPa	0 psia to 58.01 psia	6.1	6	60	**0.02%**	0.025%

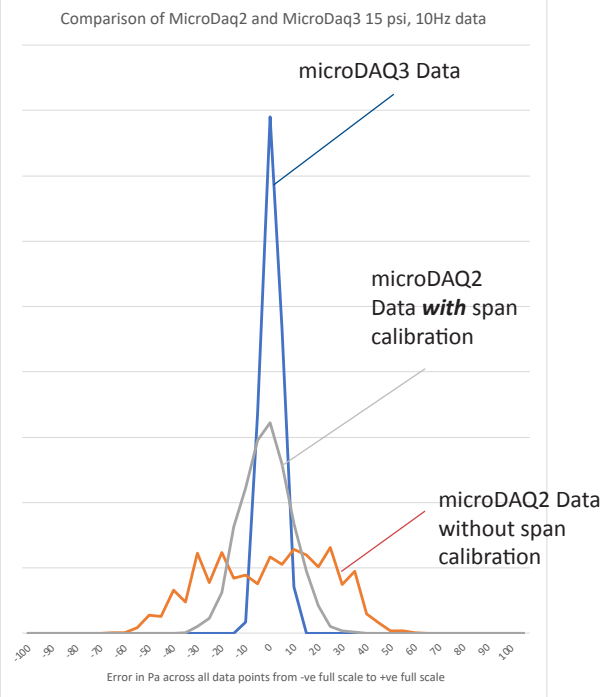
Data collected in accuracy mode with an average of 16
%FS values refer to the percentage of the maximum absolute values as listed.

Digital Transducers - A revolution in data quality

The digital transducers used in the microDAQ3 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 microDAQ3 when compared to the data from a microDAQ2 which incorporate a digitally thermally compensated scanner using conventional transducers. The microDAQ3 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.

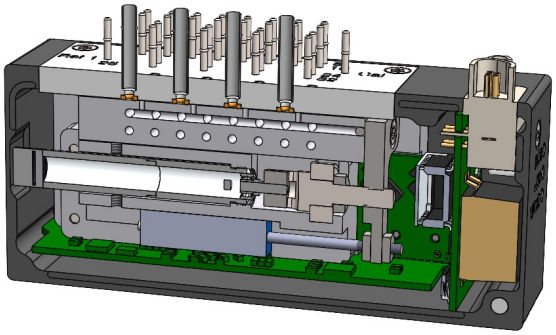


The Purge Valve:

We have been developing the new purge valve for the last few years. To remove the need to supply pneumatic pressures to the scanner, the new valve is electrically driven by a precision high-torque motor and gearbox. We continuously measure the position of valve (to 5 µm) and the current consumed by the motor to ensure reliable, repeatable performance.

The valve has been rigorously tested to 10,000 cycles and features a cycle count so that any necessary maintenace can be planned.

The purge flow through the valve has been characterised over a pressure range and provides a greater flow than scanners offered elsewhere.



Connecting to the microDAQ3

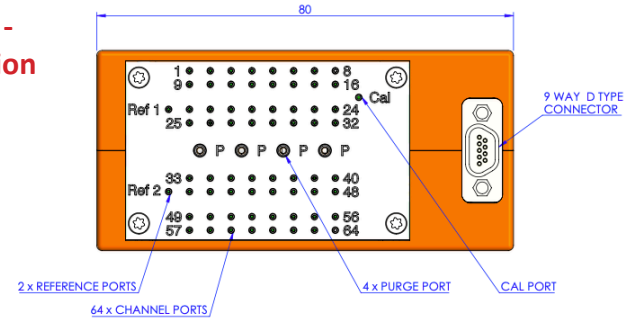
The microDAQ3 draws on the long history of the microDAQ products and provides the following interfaces:

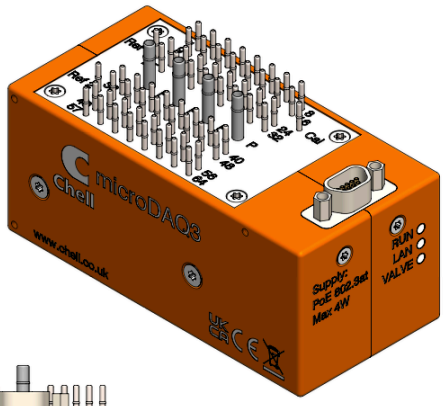
[1] Ethernet (TCP/IP and UDP)
[2] CAN (non PoE models only)
[3] IENA
[4] EtherCAT (see microCAT products)

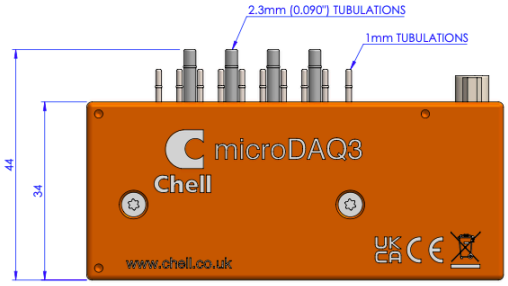
Connecting to the microDAQ couldn't be easier. The Ethernet comes directly out of the microDAQ so the customer can produce their own cables or use a Chell cable. In addition to the cables, we also provide a range of interfaces that simplify the connection further by breaking the cable out to standard RJ45 (Ethernet), BNC (Hardware trigger) and 'D' type (CAN connectors). These interfaces are available for 1, 2 and 8 scanners and also come with a plug-in DC power supply.

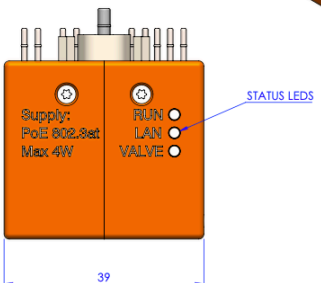
For Power-over-Ethernet (PoE) scanners, the connectivity is even simpler as only a cable and an off the shelf PoE enabled Ethernet switch is required.

Dimensions - Valved Version (BB=01)

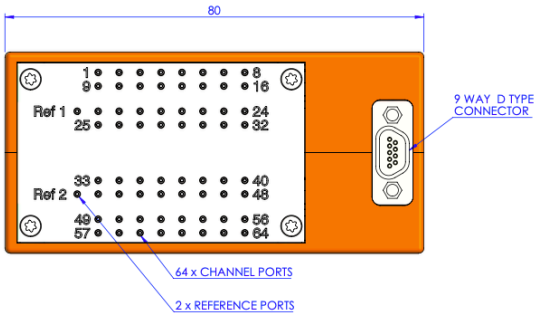


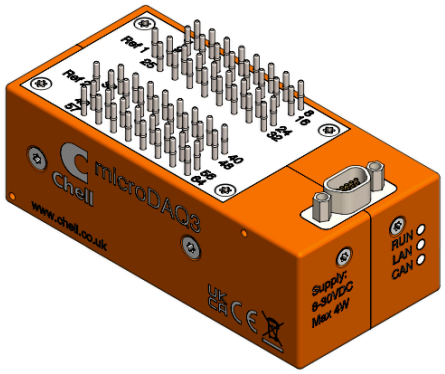


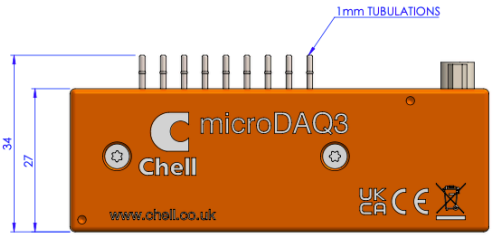


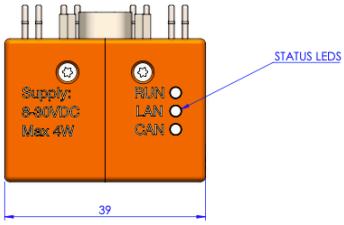


Dimensions - Non-Valved Version (BB=02)









Part Number:

64MD3 -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 = 310 kPa (45 psi)

BB = Valve
01 = With valve and 1 mm tubulations (2.3 mm for purge tubulations)
02 = Without valve and 1 mm tubulations
03 = With valve and quick disconnect top plate
04 = Without valve and quick disconnect top plate

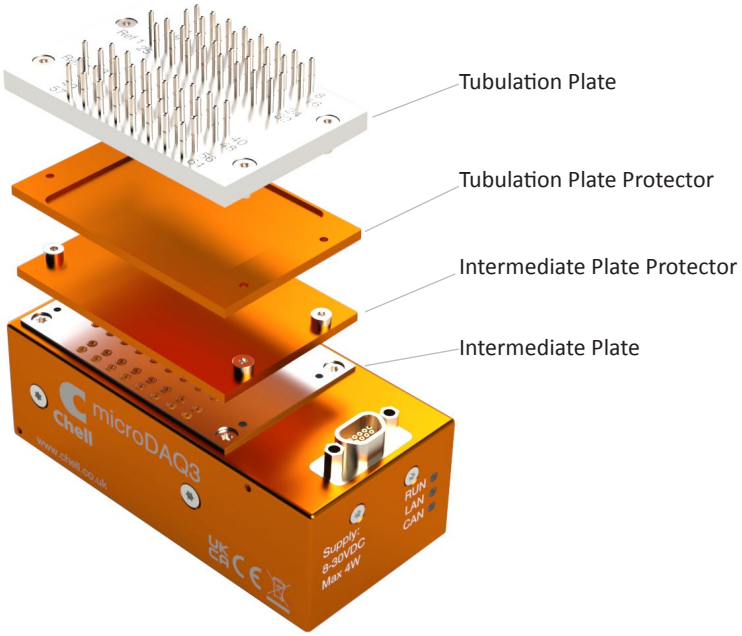
CC = Interface / Supply
01 = PoE (BB=01 only)
02 = DC supply with CAN and hardware trigger

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

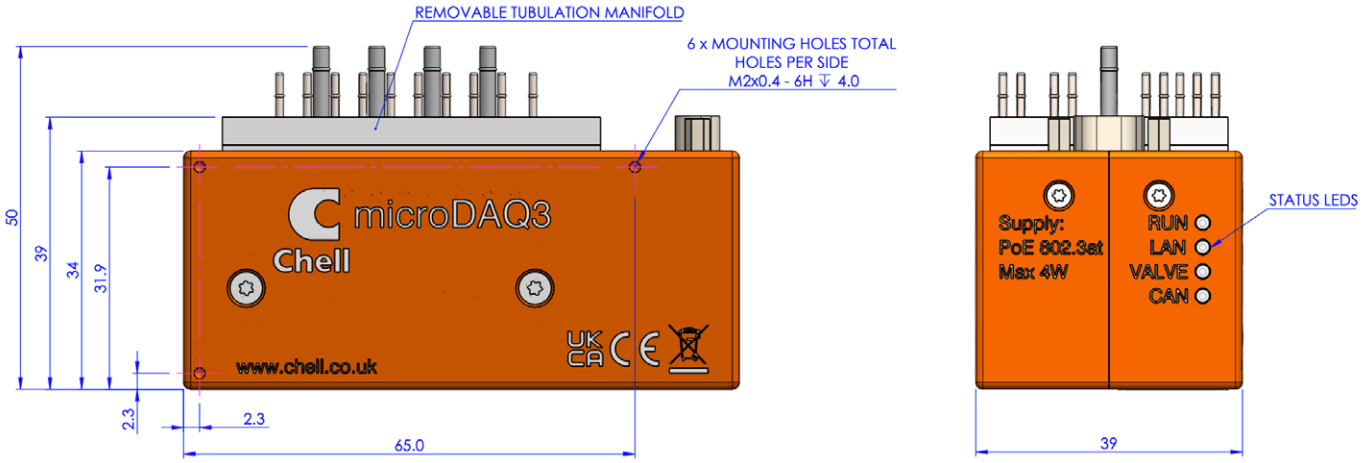
The Quick Disconnect Option

Both the valved and non-valved versions of the microDAQ3 are available with a quick disconnect option. Here the tubulation plate is removable and can be easily exchanged for another meaning the scanner can be moved between distinct sets of tubing.

The quick disconnect options comes as a set of four plates (intermediate, tubulation and 2 x protector plates). Additional tubulation plates and protector plates can be ordered individually.



Dimensions - Valved Version with QDC Option (BB=03)



Dimensions - Non-Valved Version with QDC Option (BB=04)