

APTS - Q D30/D40/D50 DESCRIPTION



Since 2016, Transpolis has been manufacturing Abdominal Pressure Twin Sensors (patented by Gustave Eiffel University) for the Q-series infant to child dummies used for crash tests (front and side impact testing). APTS sensors are an essential tool for in-depth assessment of child restraint systems. This is a unique sensor to evaluate abdominal injury risk and submarining for occupant safety prediction.

The use of APTS has been specified in UNECE R129 regulation in replacement of the UNECE R44 (i.e Size regulation for Child Restraint Systems). Moreover, most NCAP programs worldwide use Q dummies in their injury assessment capabilities (passive safety). Each sensor is made of a soft and robust cylindrical elastomer bladder, filled with a specific liquid and sealed with a mechanical head. The sensor head includes a miniature pressure cell and signal conditioning electronics. The key design of the fluid-elastomer assembly enables a very high

biofidelity with the real stiffness of abdominal tissues.

The ability of the restraint system to meet injury regulatory criteria is assessed by recording the pressure inside the abdomen during the crash impact. The sensors are inserted vertically by pair in the abdomen. They are available in 3 variants:

- APTS - Q D30 for Q1 and Q1.5 child dummies
- APTS - Q D40 for Q3 and Q6 child dummies
- APTS - Q D50 for Q10 child dummies



TECHNICAL SPECIFICATIONS

Performance, environmental and electrical characteristics

| | | | |
|--|--|---|--|
| Range (bar / psi / kPa) | 5 / 73 / 500 | Safe temperature (°C) | -20 to 70 |
| Safe overload | 150% | Compensated temperature (°C) | 0 to 50 |
| Sensitivity (mV/bar) ⁽¹⁾ | 0.42 ±20% | Temperature effect on zero (%FS/°C) and output (%/°C) | ±1% and ±0.3% |
| Nominal range excitation (VDC) | 5 to 15 | Non linearity (%FS) | ±1.5% max. |
| Bridge excitation (VDC) ⁽²⁾ | 2.048 | Hysteresis (%FS) | ±1% max. |
| Cable | Length 9m, black polyurethane coated, 32AWG copper wire, outer diameter 2.6 mm | Bridge resistance (Ω) | 350 ±10% |
| Plug | Lemo FGG.00.306.CLAD35Z | Compliance EC directives | RoHS 3 directive (2015/863/EU) EMC directive (2014/30/EU) |
| TEDS (IEEE P1451.4) | DS2431 1024-bit EEPROM chip | | |

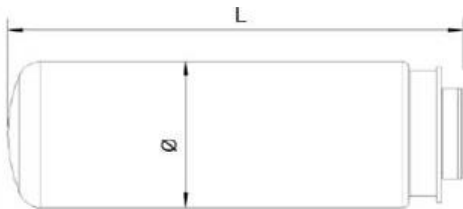
(1) With an excitation voltage from 5 VDC to 15 VDC

(2) Constant and regulated voltage (conditioning electronics in sensor head)

Mechanical characteristics

| Sensor reference P/N | APTS - Q D30 | APTS - Q D40 | APTS - Q D50 |
|---|-------------------|--|-------------------------|
| Dimensions L × ØD (mm) | 105 × 30 | 125 × 40 | 141 × 50 |
| Weight (g) ⁽³⁾ | 81±2% | 160±2% | 272±2% |
| Special abdomen P/N (Humanetics / Cellbond) | Q1/1.5 : 036-5005 | Q3 : 020-5005 / 140968 Q6 : 033-5005 / 149827 | Q10 : 010-4309 / 141578 |
| Biofidelity static response (bar/mm) ⁽⁴⁾ | 1.01/10.81 ±10% | 0.67/16.51 ±10% | 0.60/15.81 ±10% |

(3) Cable not included (4) Data obtained after static compression test with a belt: measurement of the pressure (bar) and the deflection (mm) with 250 N load.



NOTA 1. – APTS sensors are provided with a calibration and conformance certificate (pressure and bio fidelity) – see calibration service policy

NOTA 2. – APTS sensors are designed to support severe impact when used in standard conditions (see user manual).

NOTA 3. – Service maintenance and warranty conditions upon request

NOTA 4. – User manual, options list, safety datasheet, CE certificate upon request

NOTES

- Adapter cord assemblies on request
- Shorter cable length in option
- Other features:
 - Miniature strain gage pressure cell
 - High stability excitation voltage reference
 - TEDS ready
 - Robust and low ageing bladder elastomer
 - Robust polyurethane cable
- Standard compliance : ISO 6487, SAE J2570
- LEMO plug pin assignment

- | | |
|---------------------------|---------------------------|
| 1 + Excitation (red) | 4 – Signal output (white) |
| 2 – Excitation (black) | 5 + TEDS IO (yellow) |
| 3 + Signal output (green) | 6 GND |



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