

Full manuals available at: <https://pulsarmeasurement.com/downloads/instruction-manuals/>



The PULSAR REFLECT™ (8m, 20m and 36m ranges) are FMCW non-contacting radar level measuring sensors designed to meet the requirements of today's demanding process level measurement applications for liquids and solids.

Bluetooth radio allows local setup and monitoring via a smart-phone application. Primary communication is via HART modem & 4-20mA loop. For further information please refer to the full manual or consult Pulsar for assistance.

Install the sensor directly above the material to be measured, at a 90° angle.
Avoid positioning near filling or emptying areas.
Check there are no obstructions between the sensor and the material.

Intrinsically safe Ex ia: This model must be connected via an intrinsic safety barrier. A typical Zener barrier is described below. Entity parameters are:
Power & signal: $U_i = 28V$, $I_i = 162mA$, $P_o = 0.85W$. $R_s \geq 234\Omega$

| Colour | Description | Comments |
|--------|----------------|------------------------|
| Red | DC Power +Ve | +12V to +28V DC max. |
| Black | DC 0V / ground | Connect to same point. |
| Green | Cable Screen | |

4. The sensor shall only be connected via a resistive barrier with the following specifications: Resistance $\geq 234\Omega$.

Incorrect disposal can cause adverse effects to the environment.

Dispose of the device components and packaging material in accordance with regional environmental regulations including regulations for electrical / electronic products.

Transducers/Radars

Remove power, disconnect the Transducer/Radar, cut off the electrical cable and dispose of cable and Transducer in accordance with regional environmental regulations for electrical / electronic products.

| | |
|-------------------------------------|--|
| Enclosure material | Valox 357U (PBT+PC), standard |
| Enclosure protection | IP68 |
| Mounting connection | Via 1" NPT rear mounting thread Optional 1.5" NPT front-thread adapter |
| Dimensions | 162x103mm (6.38"x4.06") maximum |
| Weight | 1.5kg (3.3lbs) |
| Measurement range | R36: 0.075 to 36m (0.25 to 118.11 ft) R20: 0.075 to 20m (0.25 to 65.6 ft.) R8: 0.075 to 8m (0.25 to 26.2 ft) |
| Standard cable lengths | 5, 10, 20, and 30m (16.4, 32.8, 65.5, and 98.4ft) |
| Cable extensions | 2-core screened |
| Maximum separation | 300m (984 ft) |
| Frequency | V-Band |
| Beam angle (full) | 6° |
| Accuracy | ±2mm (0.079in) |
| Repeatability | ±1mm (0.039in) |
| Min / max temperature (electronics) | -40°C to +80°C (-40°F to 176°F) |
| Supply voltage | 12V min. (mA loop with Rs= 0Ω) 17V min. (HART with Rs= 250Ω) 28V DC max. |
| Hazardous area approval | Class I,II,III, Division 1, Groups A,B,C,D,E,F,G Class 1, Zone 0, AExia IIC T4, Ga Class 1, Zone 20, AExia IIIC T100°C, Da |
| Regulatory approvals | FCC, CE, cFmus, IECEx, ATEX, UKEx. |

- World beating long range non-contact radar level sensor.
- Class-leading performance, range and exceptionally narrow beam angle.
- Excellent accuracy and repeatability.
- State of the art, proven, algorithms for ignoring unwanted targets (DATEM).
- Measure contents through non-conductive container walls.
- Unaffected by fog, haze, mist or rain.
- Independent of ambient temperature.
- Immune to inert gas, vapour, steam or pressure.
- 4-20mA loop & HART communications.
- No extra antenna selections required no matter what the application.
- Easy installation & alignment using integral REFLECT *Tilt*™ indicator.
- Easy setup & commissioning using Bluetooth radio communications.

Light indicators

NOTE: The Reflect sensor is normally supplied set to installation mode 1, REFLECT *Tilt*™ mode. After installation, this must be changed to health indicator **mode 7** for normal operation, either by rotating sensor or via web app as described below.

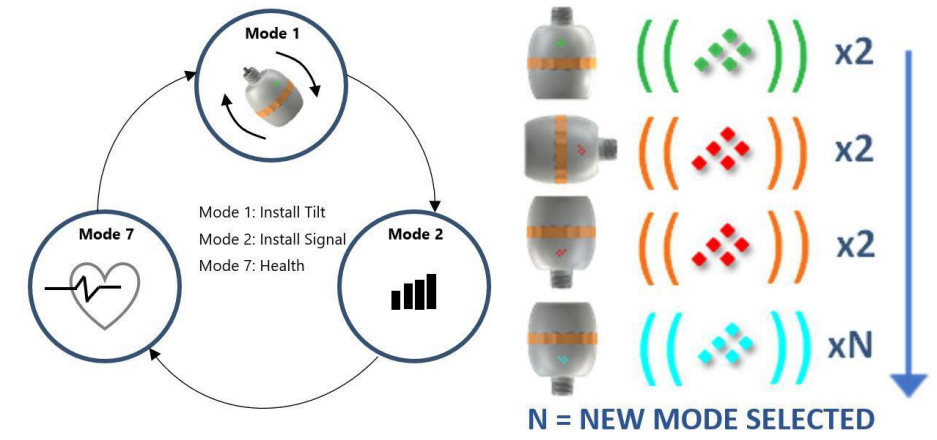
Indicator mode applications:

| Mode P241 | Description | Function | mA output |
|-------------------|--------------------------------|---|------------|
| 0 | OFF | Any | Dynamic |
| 1 (As shipped) | REFLECT <i>Tilt</i> ™ – liquid | Long flash, colours related to tilt angle of installation. | 20mA fixed |
| 2 | REFLECT <i>Tilt</i> ™ – solid | Long flash, colours related to signal strength. | 20mA fixed |
| 4 | Measurement – liquid | Short flash, colours related to tilt angle of material being measured. | Dynamic |
| 5 | Measurement – solid | Short flash, colours related to average signal strength. | Dynamic |
| 7 | Health | Short flash, Indicator follows NAMUR standard for self-monitoring and diagnostics of field devices. | Dynamic |

| Mode P241 | LED functions: | | |
|-----------|---|---|--|
| | GREEN | AMBER | RED |
| 0 | OFF | OFF | OFF |
| 1 | Level with horizontal. | Between pass & fail. | Not level. |
| 2 | Raw echo strength above threshold 1 (P242). | Raw echo strength above threshold 2 (P243). | Raw echo strength below both thresholds. |
| 4 | Level with horizontal. | Between pass & fail. | Not level. |
| 5 | Averaged echo strength above P242. | Averaged echo strength above P243. | Averaged echo strength weak. |

Mode 7: Health indicator mode description:

| Critical (RED) | Warning (AMBER) | Maintenance (BLUE) | Healthy (GREEN) |
|---|---------------------------------|-------------------------------|---------------------|
| Echo loss Temperature limit Voltage limit Alarm flag RADAR unresponsive for 5 times Ping timeout (45s) | Measurement is outside of gate. | Accelerometer not calibrated. | Operating normally. |



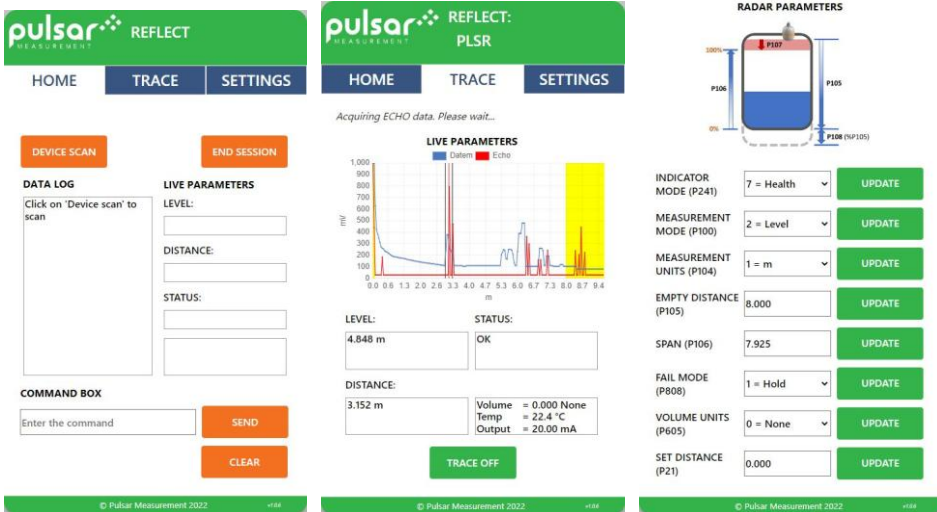
Bluetooth Application

Home page: Allows Bluetooth connection / disconnection, parameter queries, readings and status.

Trace page: Real time echo trace, DATEM and readings.

Settings: User options to view and update parameters for the Bluetooth communications and REFLECT sensor.

Note: If a Bluetooth password has been set, when 'pair' is selected, a prompt will appear to enter the password.



The Bluetooth radio link may connect to a laptop PC or smart phone after navigating to the Pulsar Bluetooth application. This is available at the following URL:

<https://pulsarmeasurement.com/web-app/> or use QR code →

Bluetooth Requirements: Any device with Bluetooth 4.0 and above.
PC: Chrome or Edge browser. Android: Chrome or Edge browser.
iOS: Download "Bluefy – Web BLE Browser" from App store.

Open web app. → Device scan → Click on device to pair
→ Able to view trace → Successful connection.

If using an iOS device, please scan the QR code and copy the URL link using your share button and paste to the Bluefy App to access the Web page.



Identification & Connection

Reflect

D-804-1420-B

Class I Div.1 Group A, B, C & D, T4.
Class II Div.1 Group E, F & G, T4.
Class III, T4.
Class I, Zone 0, AEx/Exia IIC T4 Ga.
Zone 20, AEx/Exia IIIC T100°C Da.
T.amb.: -40 C to +80 C.

Electro-Static hazard:

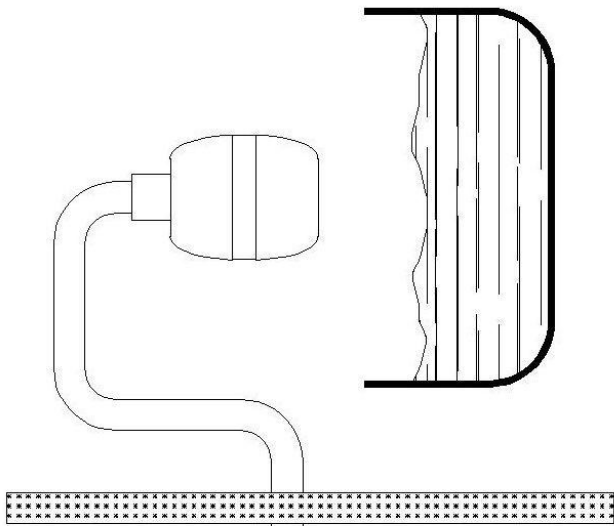
Clean only with a damp cloth.

Danger Electro-Statique:

Nettoyer uniquement avec un chiffon humide.

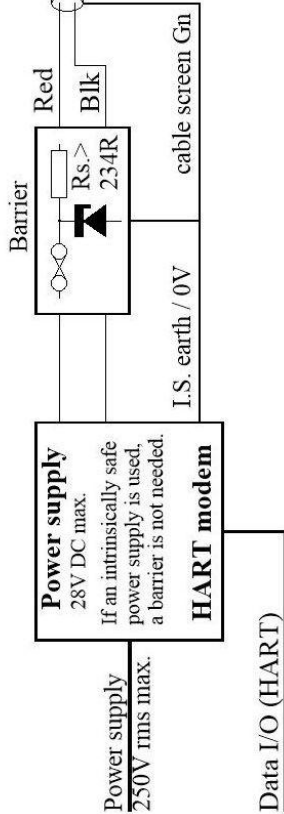
Entity parameters:

Ui = 28V,
Ii = 162mA,
Pi = 0.85W.



SAFE AREA

Reflect model:
The installation, including the barrier earthing arrangements, must comply with the requirements in the country of use; e.g. ANSI/ISA RP12.6 (Installation of Intrinsically Safe systems for hazardous / classified locations) and the National Electrical Code.



Le Canada:

L'installation doit être conforme à CEC part 1.

Le système ne doit pas être alimenté par, ni contenir, dans des conditions normales ou anormales, une source de tension par rapport à la terre dépassant 250V rms ou 250V DC. L'INSTALLATION DOIT ÊTRE CONFORME AUX DIRECTIVES DU FABRICANT.

Canada:

Installation must be in accordance with CEC part 1

The system must not be supplied from, nor contain, under normal or abnormal conditions, a source of potential with respect to earth exceeding 250V rms or 250V DC. INSTALLATION MUST BE IN ACCORDANCE WITH THE MANUFACTURER'S GUIDELINES.