

Pressure Logger

Quick Start Guide – Basic Operation

AVDD Engineering – Bristol, UK
Version 1.0

Low noise • Cross-channel calibration • USB/UART logging • Dual analog outputs



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1. Power and Startup

Connect the device to a computer using **USB Type-C**.

Data streaming starts automatically after power-up. No configuration software required.

The device powers on automatically and immediately begins streaming pressure data via:

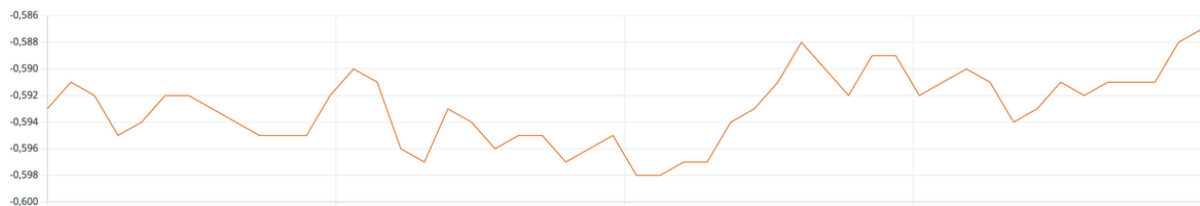
- **USB (CDC Virtual COM Port)**
- **UART 115200, 8N1, 3.3 V logic**

At startup, the device restores stored configuration:

- Sampling preset
- Pressure range
- Number of active logging channels
- Cross-channel calibration offsets

ZERO mode is temporary and is cleared on power-off.

Default power consumption: up to 50 mA (USB powered).



2. Reading Pressure Data

Pressure values are transmitted as a continuous **ASCII** stream.

Units: **hPa**

Resolution: **3 decimal places**

Examples:

```
“ P1:1013.257
  P1:1013.257 P2:1013.249
  P1:1013.257 P2:1013.249 P3:1013.261
  P1:1013.257 P2:1013.249 P3:1013.261 P4:1013.255 ”
```

Only active logging channels (1–4) are transmitted.

Transmission rate equals selected sampling preset:

- 25 Hz → 25 lines per second
- 75 Hz → 75 lines per second
- 100 Hz → 100 lines per second
- 200 Hz → 200 lines per second

3. Sampling Performance

Sampling Rate	RMS Noise (260–1260 hPa)	RMS Noise (260–4060 hPa)
25 Hz	0.32 Pa	0.57 Pa
75 Hz	0.63 Pa	1.43 Pa
100 Hz	0.83 Pa	1.95 Pa
200 Hz	1.50 Pa	3.78 Pa

The device is sensitive enough to detect pressure changes caused by slight heating of a sealed air volume (e.g., warming a tube by hand).

4. Buttons and Functions

Button 1 — MODE / ZERO

Short press:

Cycles through sampling presets:

25 → 75 → 100 → 200 Hz

Lower rate → lower noise

Higher rate → faster dynamic response

Long press (>1 s, release to activate):

Enables or disables **ZERO mode**

ZERO:

- Sets current pressure as reference
- Displays relative pressure change
- Does not modify stored calibration
- Does not affect analog output (DAC)

Button 2 — RANGE / CAL RESET

Short press:

Switches pressure range:

- 260–1260 hPa
- 260–4060 hPa

Lower range → lower noise

Extended range → higher measurable pressure

Long press (>1 s, release):

Restores stored calibration for the selected range.

Button 3 — CHANNEL / CROSS CAL

Short press:

Selects number of active logging channels (1–4).

All sensors are always measured — this affects logging only.

Long press (>1 s, release):

Starts **Cross-Channel Calibration (CROSS CAL)**

Before calibration:

- Connect all active channels to the same pressure source
- Wait for stable readings

Calibration offsets are stored in non-volatile memory.

Configuration Storage Behavior & Power-Up Behavior

The device stores the following parameters in non-volatile memory:

- Selected sampling preset
- Selected pressure range
- Number of active logging channels
- Cross-channel calibration offsets

These settings are automatically restored at power-up.

ZERO mode is temporary and is not stored.

ZERO mode is always disabled at startup. After power cycling, the device returns to the previously saved configuration without ZERO offset applied.

5. Analog Outputs (DAC)

Two analog outputs are available: CH1 → Channel 1, CH2 → Channel 2

Output range: **0–3.3 V (linear)**

Scaling:

Range 260–1260 hPa:

- 0–3.3 V → 0–1260 hPa → Sensitivity: **2.62 mV/hPa**

Range 260–4060 hPa:

- 0–3.3 V → 0–4060 hPa → Sensitivity: **0.81 mV/hPa**

DAC Resolution (12-bit)

$3.3 \text{ V} / 4096 \approx 0.806 \text{ mV per LSB}$

Equivalent pressure step:

- 260–1260 hPa range → $\approx$ **0.31 hPa per LSB**
- 260–4060 hPa range → $\approx$ **0.99 hPa per LSB**

Analog outputs are suitable for monitoring and control signals.

For highest effective resolution and analysis, use the digital data stream.

Analog Output Accuracy Notes

Analog accuracy depends on:

- DAC offset and gain error
- DAC non-linearity (INL/DNL)
- Reference and supply stability
- External load and grounding

Typical DAC error may be on the order of several LSBs.

For applications requiring accurate absolute voltage scaling, perform a simple two-point calibration using a voltmeter or receiving ADC.

ZERO mode does not affect DAC output.

6. Practical Tips

Leak testing:

- Use **25 Hz**
- Apply pressure
- Wait to stabilise
- Activate ZERO
- Monitor pressure drift

Dynamic pneumatic systems:

- Use **200 Hz**

Hydrostatic level measurement:

- Use **25–75 Hz**

Avoid:

- Heating tubes during leak testing
- Applying voltage above 3.3 V to UART/DAC pins
- Exceeding maximum pressure of 1 MPa (~10 bar)

7. Safety Notice

- Not intended for medical or life-support applications
- Electronics are not conformally coated — keep dry
- Do not mechanically probe inside pressure ports
- Do not exceed maximum pressure limits

Contact

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For full technical documentation, contact: info@avdd.co.uk

Ordering: <https://www.avdd.co.uk/ps-4ch/>