

ABH-300-AQ

Air-quality monitor · Cleanrooms & incubators

ABH-300 family — Industrial multi-channel · Data logger datasheet

CO₂, particulate matter and VOC channels alongside T/RH and pressure — cleanrooms, CO₂ incubators and controlled environments.

11 channels	IP54	E-paper	409,600 readings	Battery: ≈56 d USB-loss backup (calc.)
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Specifications

Product type	Industrial · Wi-Fi monitor
Sensing channels	11 — CO ₂ · Particulate + VOC · Ambient T + RH + pressure
CO ₂	SCD40/41 (Exp-B) · 400–5000 ppm
Particulate + VOC	SEN55 (Exp-B) · PM1/2.5/4/10 + VOC index
Ambient T + RH + pressure	SHT41 + BMP390 on-board
Measurement accuracy	±0.2 °C typ · ±0.4 °C max (0–65 °C) on-board SHT41
Display & indication	1.54" e-paper 200 × 200 · –25...+50 °C · holds last reading while asleep
Connectivity	Wi-Fi 2.4 GHz (ESP32-C3-MINI-1U) · MQTT over TLS 1.2+ — Internal FPC · ≤2 dBi
Power	USB 5 V + Molicel P28A 18650 pack
Battery life	≈56 d USB-loss backup (calculated, spec-compliant logging at firmware defaults; ≈35 d at –20 °C) — ≈56 d USB-loss backup (calculated)
Memory	16 MB W25Q128JV · 409,600 readings · separate never-erased audit region
Sample interval	1 s minimum · sensor-dependent
Enclosure	106.4 × 150.0 × 29.3 mm · PC/ABS · UL94 V-0 · UV-stabilised · RAL 7035 grey · vented
Ingress protection	IP54 (design target, vented for air quality)
Mounting	Keyhole (2×) + bonded magnets · M12 cable ports
Operating band	–25 to +50 °C (e-paper limit)
Firmware & transport	Signed .abhfw packages · dual-bank A/B · RSA-2048 · trial boot with automatic rollback · MQTT over TLS 1.2+ with per-device credentials (mTLS supported) · X.509 identity
Factory identity	ABH-[model]-[YYWW]-[5-digit sequence] — factory identity written to the ID EEPROM
Ports	USB-C · vented sensor bay

Applications

Cleanrooms & CO₂ incubators	CO ₂ , particulate and VOC channels alongside T/RH and pressure in a vented IP54 build.
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Part of the Abhilekh platform

One 80 × 50 mm 4-layer platform PCB — 145 parts, single-sided SMT — becomes 20 SKUs by BOM selection and a SKU record in the on-board ID EEPROM.

Firmware updates	Signed .abhfw packages · dual-bank A/B · RSA-2048 · trial boot with automatic rollback
Data transport	MQTT over TLS 1.2+ with per-device credentials (mTLS supported) · X.509 identity
Offline evidence	Plug an offline logger into a PC and it enumerates a FAT16 drive with README.TXT, DATA.CSV and an ECDSA P-256-signed REPORT.PDF — a self-verifying trip record.
Calibration	Probe channel templates live in the ID EEPROM; the platform tracks NIST-traceable calibration certificates, due dates and reminders per probe.
Certification roadmap	EN 12830:2018 — temperature recorders · CE — RED / EMC / safety · FCC Part 15 · WHO PQS E006 — vaccine cold chain · IEC 61010-1 / IEC 62368-1 · UN 38.3 / IEC 62133-2 — cells & packs — targets, not held certificates

The ABH line is at the design-frozen, pre-production stage: every enclosure has passed generated fit-check geometry (791/791 checks, 20/20 SKUs) and every battery-life, drop, thermal and IP figure shown is a calculated or simulated design estimate — measured values replace them as validation hardware runs. Regulatory marks above are the certification roadmap, not held certificates.

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