

# ABH-200-H

## Online humidity monitor · T/RH for warehouses

ABH-200 family — Online monitors & gateways · Data logger datasheet

On-board temperature and humidity monitor for pharma warehouses and humidity-critical storage — APIs, biologics, finished goods.

|            |                           |         |                  |                                         |
|------------|---------------------------|---------|------------------|-----------------------------------------|
| 2 channels | IP54 in use / IP65 capped | E-paper | 409,600 readings | Battery: Always on when powered (calc.) |
|------------|---------------------------|---------|------------------|-----------------------------------------|

## Specifications

|                      |                                                                                                                                                                           |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product type         | Online · Wi-Fi monitor                                                                                                                                                    |
| Sensing channels     | 2 — Temperature · Humidity                                                                                                                                                |
| Temperature          | SHT41 · $-40\dots+125\text{ °C}$ · $\pm 0.2\text{ °C typ}$ / $\pm 0.4\text{ °C max}$ (0–65 °C)                                                                            |
| Humidity             | SHT41 · $\pm 1.8\text{ %RH typ}$                                                                                                                                          |
| Measurement accuracy | $\pm 0.2\text{ °C typ}$ · $\pm 0.4\text{ °C max}$ (0–65 °C) on-board SHT41                                                                                                |
| Display & indication | 1.54" e-paper 200 × 200 · $-25\dots+50\text{ °C}$ · holds last reading while asleep                                                                                       |
| Connectivity         | Wi-Fi 2.4 GHz (ESP32-C3-MINI-1U) · MQTT over TLS 1.2+ — Internal FPC · $\leq 2.33\text{ dBi}$                                                                             |
| Power                | USB 5 V ( $\approx 24\text{ mA}$ ) · CR2032 RTC $\approx 10\text{ yr}$                                                                                                    |
| Battery life         | Always on when powered · RTC cell $\approx 10\text{ yr}$ — The leanest online unit in the line                                                                            |
| Memory               | 16 MB W25Q128JV · 409,600 readings · separate never-erased audit region                                                                                                   |
| Sample interval      | 1 s minimum · configurable                                                                                                                                                |
| Enclosure            | 88.2 × 69.9 × 16.8 mm · Healthcare-grade disinfectant-resistant PC/ABS · UL94 V-0 · white                                                                                 |
| Ingress protection   | IP54 in use / IP65 capped (design targets)                                                                                                                                |
| Mounting             | Keyhole (2×) + bonded 10×2 mm magnets                                                                                                                                     |
| Operating band       | $-25\text{ to }+50\text{ °C}$ (e-paper limit)                                                                                                                             |
| Firmware & transport | Signed .abhwf 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 power                                                                                                                                                               |

## Applications

|                                        |                                                                                               |
|----------------------------------------|-----------------------------------------------------------------------------------------------|
| Warehouses & humidity-critical storage | Many points, one record — T/RH monitors per zone, or low-cost BLE nodes collected by one hub. |
|----------------------------------------|-----------------------------------------------------------------------------------------------|

## 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.

|                              |                                                                                                                                                                                                                        |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Firmware updates</b>      | Signed .abhfw packages · dual-bank A/B · RSA-2048 · trial boot with automatic rollback                                                                                                                                 |
| <b>Data transport</b>        | MQTT over TLS 1.2+ with per-device credentials (mTLS supported) · X.509 identity                                                                                                                                       |
| <b>Offline evidence</b>      | 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.                                                        |
| <b>Calibration</b>           | Probe channel templates live in the ID EEPROM; the platform tracks NIST-traceable calibration certificates, due dates and reminders per probe.                                                                         |
| <b>Certification roadmap</b> | 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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