

Delta OHM

Member of GHM GROUP



THERMAL COMFORT DATA LOGGER MICROCLIMATE INDEX & IAQ MEASUREMENT

HD32.3TC

- ✔ **Bright and clear touch display**
Measurement and calculated values directly visible
- ✔ **High memory capacity**
Suitable for long lasting measurement cycles
- ✔ **Data immediately available**
Remotely accessible via FTP
- ✔ **Portable and independent**
24 hours continuous measurement without recharging
- ✔ **Fully compliant with ISO regulations**
ISO 7730 - ISO 7726 - ISO 7243 - ISO 9886 - ISO 8996 - ISO 11079

Thermal Comfort Data logger

HD32.3TC

Portable data logger suitable for indoor air quality and microclimate analysis (Indoor Air Quality, IAQ). All the data you need to have, in **just one logger and with just one data processing software!**

- Indices: **WBGT**, **PMV** (Predicted Mean Vote), **PPD** (Predicted Percentage of Dissatisfied), **DR** (draft rate), **TU** (local Turbulence intensity), **HI** (Heat Index), **UTCI** (Universal Thermal Climate Index), **TEP** (Perceived Equivalent Temperature).
- Measurements: **CO₂**, **VOC**, **PM1.0**, **PM2.5** and **PM10**
- Estimation of the **SARS-CoV-2 decay on surfaces**.

Microclimate
IAQ + PM
measurements



- **Three inputs** for probes with SICRAM module
- Probes **automatically recognized** by turning on the instrument
- **One RS485 serial port** for auxiliary probes

A **large memory capacity** allows long measuring cycles and the rechargeable battery guarantees an operating autonomy of at least 24 hours. A backlit color graphic LCD display with capacitive touch makes the navigation through the different screens and the visualization of the data **easy and immediate**. An **internal camera** allows storing pictures of the monitored environment. Moreover, the measurement data can be sent to an FTP server by using the **Wi-Fi connection**.

Reference Rules

- ISO 7726** Ergonomics of the thermal environment — Instruments for measuring physical quantities.
- ISO 7730** Ergonomics of the thermal environment — Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria.
- ISO 7243** Ergonomics of the thermal environment — Assessment of heat stress using the WBGT (wet bulb globe temperature) index.
- ISO 9886** Ergonomics — Evaluation of thermal strain by physiological measurements.
- ISO 8996** Ergonomics of the thermal environment — Determination of metabolic rate.
- ISO 11079** Ergonomics of the thermal environment — Determination and interpretation of cold stress when using required clothing insulation (IREQ) and local cooling effects.

Technical Specifications

| | | | |
|-------------------|------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------|
| Export Formats | PDF - CSV (with DeltaLog10) | Autonomy | 24 hours on maximum consumption |
| Display | LCD 480 x 800 pixel Capacitive touch screen | Operating conditions | -5...50 °C 0...90% RH no condensation |
| Camera resolution | 480 x 640 pixel | Protection degree | IP54 |
| Connectivity | USB Host and Device / RS485 powered/ Wi-Fi | Instrument uncertainty | ± 1 digit @ 20 °C |
| Storage capacity | 8 GB | Dimensions and weight | 185 x 90 x 40 mm - 500 gr |
| Logging Interval | From 1 second to 1 hour | Inputs | 3 inputs for probes with SICRAM module 1 input RS485 with M12 8-pole connector for PMsense-P |
| Power supply | Li-Ion battery rechargeable via USB | | |

Applications

There are numerous applications where the HD32.3TC provides a great solution:

Microclimate applications:

- ✓ Measurement of PMV, PPD global comfort indices and of DR local discomfort index in **Moderate Environments**
- ✓ Measurement of WBGT and PHS indexes in **Severe Hot Environments**
- ✓ Measurement of IREQ / DLE / RT and WCI indexes in **Cold Environments**

IAQ applications:

- ✓ Measurement of comfort conditions and indoor air quality, for example in schools, offices, factories, etc
- ✓ Sick building syndrome analysis
- ✓ Verification of the efficiency of Heating, Ventilation and Air Conditioning (HVAC) systems
- ✓ Building Automation



| PROBES | TP3207.2 / TP3207* | TP3276.2 / TP3275* | HP3201.2 / HP3201* | TP3204S* | HP3217.2R / HP3217R* | AP3203.2 / AP3203* |
|-------------------------------|--------------------|--------------------|------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Sensor | Pt100 | Pt100 | Pt100 | Pt100 | T= Pt100 RH= capacitive | NTC 10 kΩ |
| Measuring range | -40...100 °C | -30...120 °C | 4...80 °C | 4...80 °C | T= -40...100 °C RH= 0...100% | 0.02...5 m/s 0...80 °C |
| Accuracy | 1/3 DIN | 1/3 DIN | Class A | Class A | T = 1/3 DIN RH = ±1,5% (0...90% RH) / ±2% (90... 100% RH) @ T=15...35°C (±1.5 + 1.5% of the measurement) % @ T=remaining range | ±(0.05 + 5% of the measurement) m/s |
| Resolution | 0.1 °C | 0.1 °C | 0.1 °C | 0.1 °C | 0.1 °C / 0.1 %RH | 0.01 m/s |
| Temperature drift @20°C | 0.003% / °C | 0.003% / °C | 0.003% / °C | 0.003% / °C | 0.02% RH/°C | 0.06% /°C |
| Long term stability | 0.1 °C / year | 0.1 °C / year | 0.1 °C / year | 0.1 °C / year | 0.1% RH/ year | 0.12 °C / year |
| Response time T ₉₅ | 15 minutes | 15 minutes | 15 minutes | 15 minutes | 15 minutes | |
| Tank capacity and autonomy | | | 15 cc 96 hours @ RH=50%, T=23°C | 500 cc 15 days @ T= 40 °C | | |

* Probes with cable length 2 m.



For long lasting monitoring, the VTRAP tripod and a 4-probe holder are available.

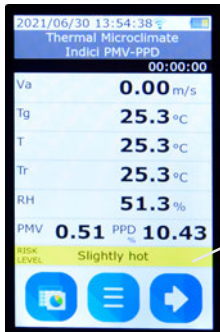
| PROBES | HP3217B4 | HP3217BV4 | PMsense-P |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------|
| Sensor | T/R.H.= CMOS / P _{atm} = piezoresistive CO ₂ = NDIR / VOC= Metal-Oxide film (<i>only BV4</i>) | | Laser scattering principle |
| Measuring range | T= -20...80 °C / R.H. = 0...100% P _{atm} = 300...1250 hPa / CO ₂ = 0...5000 ppm VOC index = 1...500 (dimensionless) | | 0...1000 µg/m ³ (for each pollutant) |
| Accuracy | T= 0.1 °C / RH = ±2% (0...80% RH) / P _{atm} = ± 0.5 hPa CO ₂ = ± (50 ppm + 3% of the measure) VOC index= relative qualitative measurement | | <5% linearity error <3% repeatability |
| Resolution | T= 0.1 °C / RH= 0.1 %RH / P _{atm} = 0.1 hPa CO ₂ = 1 ppm / VOC index = 1 | | 0.1 µg/m ³ |
| Temperature drift | P _{atm} = ± 0.75 Pa/°C (0...55 °C / 700...1100 hPa) CO ₂ = 1 ppm/°C (-20...45 °C) T = < 0.03 °C/year R.H. = < 0.25 %RH/year | | < 0.01 µg/m ³ /°C |
| Long term stability | P _{atm} = ± 0.33 hPa/year CO ₂ = 5% of the measure/5 years | | |
| Response time | T / R.H.= 10 s CO ₂ = < 120 s | | Measurements update rate 1 s |



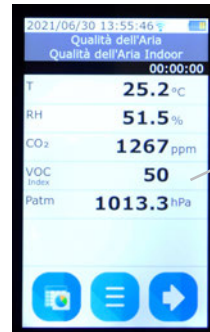
SP32TC probes holder

| Which probes do I need to measure following indexes? | Probes and measured parameters | | | | | | | | |
|------------------------------------------------------|--------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------|---------|-----------------------------|--------------------------------------------------------|---------------------------------------------------------|-------------------------|-----------------------|
| | TP3207.2 / TP3207 | TP3276.2 / TP3275 | HP3201.2 / HP3201 | TP3204S | AP3203.2 / AP3203 | HP3217.2R / HP3217R | HP3217B4 | HP3217BV4 | PMsense-P |
| | Air Temp. (T) | Globe thermometer temperature (T _g) | Natural wet bulb temperature (T _{nw}) <i>(the 2 probes are interchangeable)</i> | | Air Speed (V _a) | RH + Air Temp. <i>(also possible with HP3217B[V]4)</i> | Air Temp. - RH - Atmospheric Pressure - CO ₂ | As HP3217B4 + VOC Index | PM1.0, PM2.5 and PM10 |
| WBGT | A | B | C | C | | A | A | A | |
| Mean Radiant Temperature T _r | | A | | | B | C | C | C | |
| PMV | | A | | | B | C | C | C | |
| PPD | | A | | | B | C | C | C | |
| TU - DR | | | | | A | | | | |
| HI | | | | | | A | | | |
| UTCI | | A | | | B | C | C | C | |
| TEP | | A | | | B | C | C | C | |
| SARS-CoV-2 | | | | | | A | A | A | |
| CO ₂ | | | | | | | A | A | |
| VOC | | | | | | | | A | |
| PM1.0 / PM2.5 / PM10 | | | | | | | | | A |
| PHS | | A | | | B | C | C | C | |
| IREQ / DLE / RT / WCI | | A | | | B | C | C | C | |

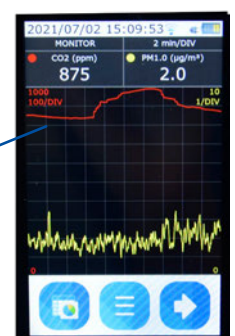
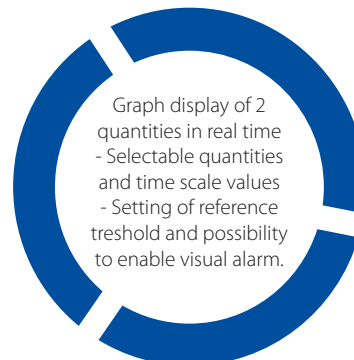
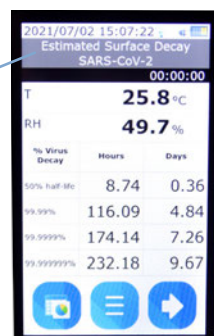
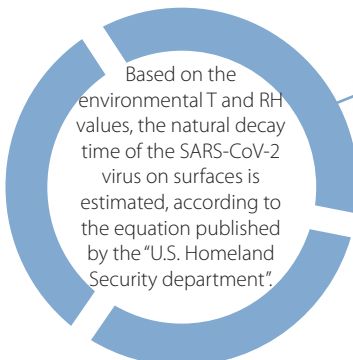
For the measurement of several parameters, a combination of more than one probe is required (e.g. for WBGT => A+B+C).
Probes with the same letter are interchangeable.



The colored bar in the PMV/PPD index, heat index, UTCI temperature and TEP temperature screens indicates the evaluation of thermal stress.



Detection of volatile organic compounds (VOC) - after the time of adaptation to the environment, the state of VOC pollution is expressed as an index variable from 1 to 500 (dimensionless)



In order to ensure the quality of our instruments, we are constantly re-evaluating our products. Improvements can imply changes in specification; we advise you to always check our website for the newest version of our documentation.

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