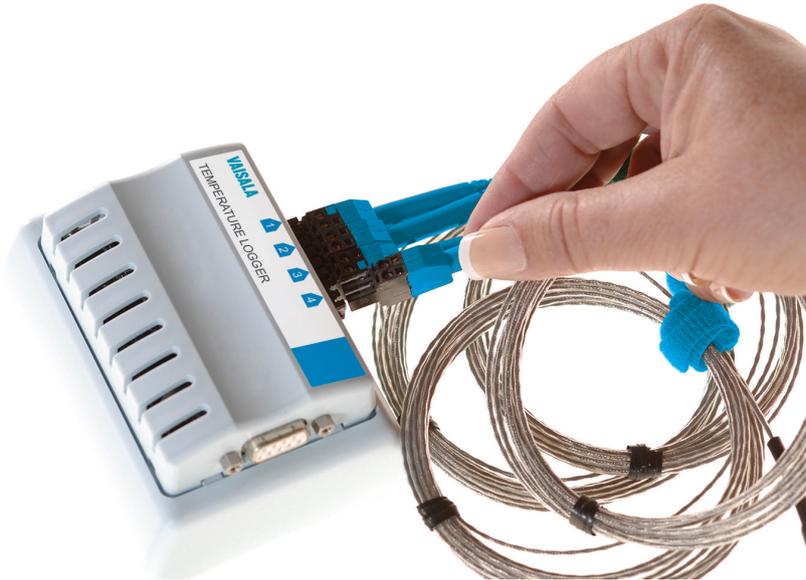




## Mid-Range Data Loggers

for Temperature, Humidity and Contact Channel Measurement



### Designed for Controlled Environments

- Drug Discovery, R&D
- Early Phase Clinical Trials
- Blood and Tissue Banks
- Hospitals and Pharmacies
- Nutraceutical Manufacturing
- Food and Dietary Supplement Applications
- Aerospace
- Semiconductors
- Museums and Archives

Vaisala's Mid-Range data loggers are designed for early phase drug and device development applications where speed and economy are critical. The MR loggers can be used with Vaisala software to monitor and analyze environmental data and provide presentation-quality records that are easily exported to PDF and spreadsheets.

### Simplified Calibration

Easy to install and configure, the MR loggers are calibrated with an abbreviated process that provides reliable accuracy in operating environments between -55 °C to +50 °C. The MR loggers include calibrations traceable to SI units through national metrology institutes.<sup>1)</sup> To ensure cGMP, ISO 9000 and HACCP quality standards. Optional services are available, including extended warranties and onsite calibration.

### Easy Configuration

Connectivity options include USB, wireless, and Power over Ethernet with a vNet PoE network interface. When MR loggers are used with vNet PoE device, installation takes minutes. With the vNet device, loggers are automatically identified on your network by the software.

### Lean Validation

For applications that require validation, we offer efficient and practical protocols that allow for quick verification of data logger functions. See information on IQOQ documents under "Accessories" on page 3.

### Software Options

Whether you need multistage alarming sent via text, email, PC display or dial-out, or to perform a comprehensive mapping study, Vaisala has user-friendly software designed for use in regulated environments, including:

- viewLinc Continuous Monitoring and Alarming
- vLogSP for Validation/Mapping applications

### Data Logger Options

Six versions of the MR Loggers are available with up to four channels of Temperature-Only, Temperature + Humidity, or Boolean contact channel for door switches/alarm contact recording:

- DL1000MR - 1 internal temperature channel
- DL1016MR - 2 channel temperature with probes
- DL1016MRB - 2 channel with 1 temperature probe, and 1 contact input
- DL1416MR - 4 channel temperature with probes
- DL1416MRB - 2 channel temperature with probes, and 2 contact inputs
- DL2000MR - 2 internal channels Temperature and RH

<sup>1)</sup> Measurement results are traceable to the International System of units (SI) through national metrology institutes (NIST USA, MIKES Finland, or an equivalent) or ISO/IEC 17025 accredited calibration laboratories.

# Technical Data

## General

|                         |   |
|-------------------------|---|
| Interfaces              | RS-232 serial, Ethernet, USB, WiFi, vNet PoE network interface  |
| Software                | <ul style="list-style-type: none"><li>vLog Validation/Mapping</li><li>viewLinc Continuous Monitoring &amp; Alarming</li><li>OPC Server to add Vaisala loggers to any OPC compatible monitoring system</li></ul> |
| Internal clock accuracy | ±1 min. /month<br>0 to +50 °C (+32 to +122 °F)  |
| Power source            | Internal 10-year lithium battery <sup>1)</sup>  |
| EMC compliance          | FCC Part 15 and CE<br>EN 50581:2012<br>EN 55032:2012/AC:2013 Class B<br>EN 61326-1:2013   |
| RoHS compliance         | 2011/65/EU  |

<sup>1)</sup> Battery life specified with sample interval of 1 min. or longer.

## Memory

|                             |  |
|-----------------------------|--|
| Memory type                 | Non-volatile EEPROM  |
| Memory mode                 | User-selectable wrap (FIFO) or stop when memory is full  |
| Sampling rates              | User-selectable rates from once every 10 seconds to once per day (Battery life specified with sample interval of 1 min. or longer) |
| <b>Data Sample Capacity</b> |  |
| DL1000MR                    | 48 100 12-bit samples  |
| DL1016MR/MRB                | 68 600 16-bit samples  |
| DL1416MR/MRB                | 101 375 16-bit samples   |
| DL2000MR                    | 122 197 12-bit samples   |

## Mechanical Specifications

|            |   |
|------------|---|
| Dimensions | 85 × 59 × 26 mm (3.4 × 2.3 × 1 in)  |
| Weight     | 76 g (2.7 oz)   |
| Mounting   | 3M Dual Lock™ Fasteners<br>Snap-in connector for secure probe connections |

## Temperature Sensors

|                      |   |
|----------------------|---|
| Internal sensor type | Precision-tolerance epoxy encapsulated NTC thermistor |
| Cable construction   | 2 mm (0.07") Diameter, Teflon coated cable            |

### External Temperature Probes

|            |                 |
|------------|-----------------|
| Sensor tip | Stainless steel |
| Diameter   | 3.2 mm (1/8 in) |
| Length     | 38 mm (1.5 in)  |

### Probe Cable Lengths

|              |               |
|--------------|---------------|
| DL1016MR/MRB | 3 m (10 ft)   |
| DL1416MR/MRB | 7.6 m (25 ft) |

# Technical Data

## DL1000MR Internal Temperature Sensor

### Range and Accuracy

|  |                                     |
|--|-------------------------------------|
| Logger operating range   | -35 ... +85 °C<br>(-31 ... +185 °F) |
| Calibrated measurement range   | -25 ... +70 °C<br>(-13 ... +158 °F) |
| Resolution   | 0.02 at +25 °C (0.04 at +77 °F)     |
| Accuracy over temperature range <sup>1)</sup><br>at -25 ... +70 °C (-13 ... +122 °F) | ±0.5 °C (±0.9 °F)                   |

<sup>1)</sup> Initial accuracy includes all known influence quantities present at the time of calibration including calibration uncertainty, mathematical fit, data logger resolution, hysteresis and reproducibility. Not included is any drift related to atypical contamination or misuse.

## DL2000MR Internal Temperature/ RH Sensor

### Temperature Range and Accuracy

|  |                                       |
|--|---------------------------------------|
| Operating Range  | -35 ... +85 °C (-31 ... +185 °F)      |
| Calibrated Measurement Range   | -25 ... +70 °C (-13 ... +158 °F)      |
| Accuracy over temperature range <sup>1)</sup><br>at -25 ... +70 °C (-13 ... +122 °F) | ±0.5 °C (±0.9 °F)                     |
| Resolution   | 0.02 °C at +25 °C (0.04 °F at +77 °F) |

### Relative Humidity Range and Accuracy

|   |   |
|---|---|
| Calibrated measurement points   | <ul style="list-style-type: none"><li>45 %RH at +10 °C (+50 °F)</li><li>10 %RH and 80 %RH at +25 °C (+77 °F)</li><li>45 %RH at +25 °C (+77 °F)</li><li>45 %RH at +45 °C (+113 °F)</li></ul> |
| Operating Range   | 0 ... 100 %RH (non-condensing)  |
| Temperature range +20 ... +30 °C<br>(68 ... 86 °F)                                | 10 ... 90 %RH ±2.0 %RH  |
| Temperature range -20 ... +20 °C,<br>+30 ... +70 °C (-4 ... 68 °F, 86 ... 158 °F) | 10 ... 90 %RH ±3.0 %RH  |
| Resolution  | 0.05 %RH  |
| Humidity sensor   | Vaisala HUMICAP® 180R   |
| Stability   | ±2 %RH over 2 years   |

<sup>1)</sup> Initial accuracy includes all known influence quantities present at the time of calibration including calibration uncertainty, mathematical fit, data logger resolution, hysteresis and reproducibility. Not included is any drift related to atypical contamination or misuse.

## DL1016/1416MR External Temperature Sensors

### Range and Accuracy

|  |  |
|--|--|
| Logger operating range   | 0 ... +50 °C (32 ... +122 °F)            |
| Probe operating range  | -95 ... +70 °C (-139 ... +158 °F)        |
| Calibrated measurement range   | -55 ... +50 °C (-130 ... +122 °F)        |
| Resolution   | 0.01 °C at +25 °C<br>(0.02 °F at +77 °F) |
| Accuracy over temperature range <sup>1)</sup><br>at -55 ... +50 °C (-67 ... +122 °F) | ±0.5 °C (±0.9 °F)                        |

<sup>1)</sup> Specification for external channels is for a probe calibrated to the specified channel of the data logger, with the logger at 0 °C to +50 °C (32 °F to +122 °F)

## Accessories

### Temperature Probe

EPT-TDB: Thermal Dampening Block, for use in refrigerators and freezers. The block simulates a glycol bottle to reduce alarms generated by opening and closing doors.

### Boolean Contact Cables

EPT-DS-25 Available cable with magnetic contact switch – 7.6 m (25') for use with MRB loggers.

### Validation Documents

|                                   |  |
|-----------------------------------|--|
| VL-VPE-VLNC-43 Express Validation | IQ is eight tests, OQ is eleven tests.<br>Testing includes security testing for users. |
|-----------------------------------|--|



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