

Product Catalog

Continuous Monitoring Systems



VAISALA

Observations for a better world

Vaisala Industrial Measurements

Vaisala's Industrial Measurements business area serves customers in multiple industries with over 40 years of industry knowledge. Our products improve quality, productivity, yield, energy efficiency, and help our customers fulfill regulatory compliance. Industrial Measurements' customers operate in different types of environments from semiconductor factories and high-rise buildings to power plants and small incubators where reliable measuring and monitoring of the ambient conditions are a prerequisite for successful operations. Customers use our products and systems to measure and monitor parameters such as temperature, humidity, dew point, pressure, carbon dioxide, hydrogen peroxide vapor, methane, moisture in oil, dissolved gases in transformer oil and the dissolved solids in liquids.

Our Life Cycle Services provide comprehensive care through the life cycle of our measurement instruments. As a trusted partner to our global customers, we enable sustainable decisions by maintaining the most accurate measurement data throughout the entire product and system life cycle. Our calibration and repair services are provided worldwide with fast deliveries and convenient logistics.

Life science and pharmaceutical industry

For over 50 of the world's top pharmaceutical manufacturers, Vaisala provides measurement devices for almost all critical parameters as well as environmental monitoring solutions designed for regulated applications. With comprehensive measurement and monitoring solutions and support services, Vaisala systems ensure the quality and safety of pharmaceutical and biotechnology products, while helping maintain compliance with global regulations and standards.

This product catalog gives an overview of our products to help you select what suits your needs best. For more information, visit us at www.vaisala.com or contact us at www.vaisala.com/requestinfo.



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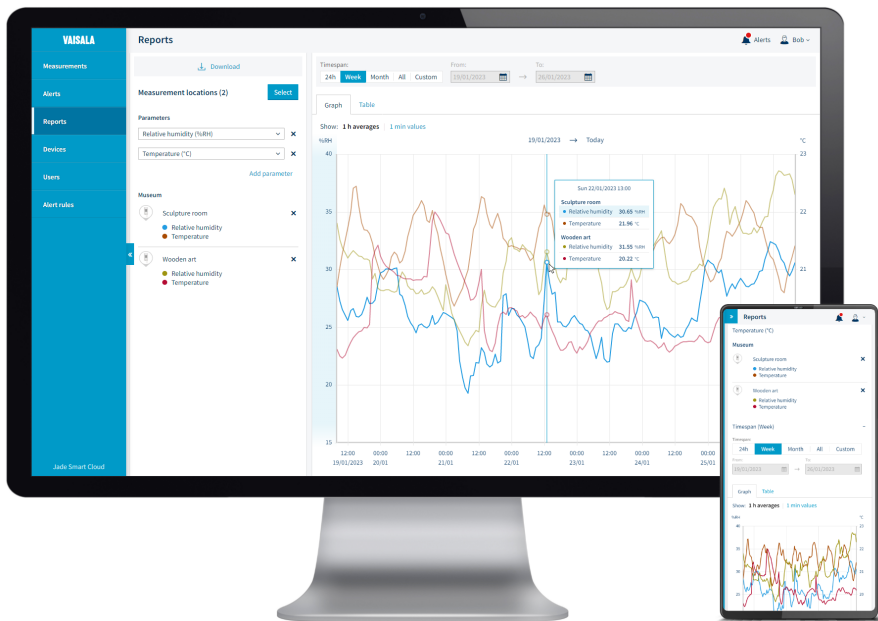
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System introduction:

Jade Smart Cloud Monitoring System for industrial applications



Choose Jade when you need:

- Access to your measurement data anywhere & anytime
- Fast and easy installation
- Easy access via web browser on any device
- Mobile optimized remote monitoring and alarming
- Secure data storage on the cloud
- Adaptable and scalable configurations for changing applications
- Simple to use system for any industrial monitoring need

Vaisala Jade Smart Cloud combines high-class industrial measurements with easy-to-use cloud-based remote monitoring to enable new levels of competence and flexibility for professionals.

Flexible and reliable

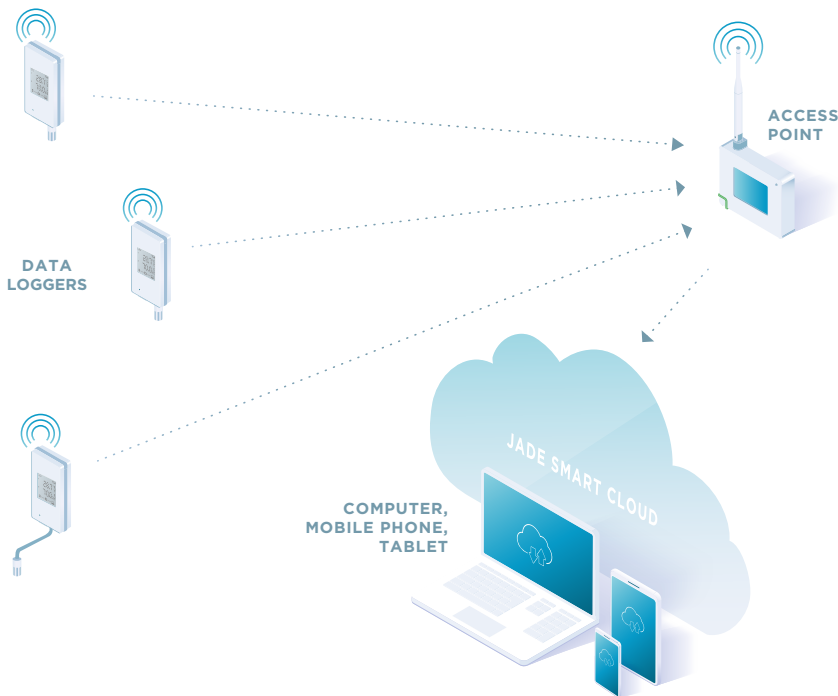
Jade Smart Cloud provides a flexible, reliable, and effective way to monitor humidity, temperature and other parameters online in your applications. This provides actionable insights into long-term conditions, site analytics, optimization, maintenance and process improvements.

Modularity for demanding applications

Jade Smart Cloud is a modular monitoring solution. The compatible devices and gateways come with built-in connectivity and they are delivered ready-to-use. Various Vaisala measurement probes are supported to fulfill even the highest standards required for measurements.

The system is ideal for demanding environments, like museums and archives, food and beverage, warehouses, R&D and university laboratories, construction, and other industrial monitoring applications.





Features

- Online service for monitoring of measurement parameters such as humidity and temperature
- Secure cloud storage of data
- Management of measurement locations using an intuitive system of sites and locations
- Connect using a web browser on your mobile phone, tablet or computer
- Add devices and users based on your needs
- No device pairing needed, as devices are associated with a specific cloud account when they are purchased

Vaisala Jade Smart Cloud is a convenient cloud-based data service for managing measurement data. The application can be accessed through a web browser on your mobile phone, tablet, or computer, making it ideal for professionals who want access to quality measurement data anywhere and at any time.

Easy setup

The system is very easy to get started with. No device pairing is needed, as the devices are associated with a Jade Smart Cloud account when they are purchased. New devices become automatically available in the system. With the intuitive user interface, users can assign devices to measurement locations. Measurement locations can then be organized into measurement groups and sites for easy navigation.

Licensing

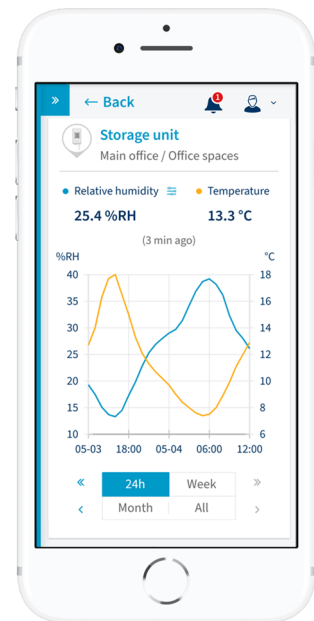
Access to the user interface, as well as features that are enabled, are based on license tiers. Basic tier provides the essential management features. Additional tiers will be made available later.

The number of active devices that can send their data to the cloud is controlled using device connection subscriptions. All data is safely stored in the cloud.

Web application

The web application user interface is built on modern web technologies and supported by all major desktop and mobile browsers. There is no app to install and maintain. The user interface is always available online at:

<https://jade.vaisala.com>



Graph on mobile screen

Technical data

Web application

Web address	https://jade.vaisala.com
Web interface protocol	TLS 1.2
Supported Internet browsers	All modern and up-to-date browsers, including, but not limited to: Google Chrome™ Apple Safari® Microsoft Edge® Mozilla Firefox®
User interface languages	English, Finnish, French, German, Portuguese, Spanish, Swedish

License tiers

Feature	Basic tier
Live measurement data	✓
Viewing historical measurement data using graph or table view	✓
Exporting measurement data reports in PDF and CSV format	✓
Organizing measurement locations under groups and sites	✓
Device and probe details, including calibration date	✓
Alerts for measurement locations and devices	✓
User configurable alert rules	✓
Alert notifications by email	✓
Inviting new users to access your account	✓
User rights and site access control using Administrator, Operator, and Viewer roles	✓

Supported devices

Device model	Connection requirements
CWL100 Cloud Wireless Data Logger	Connects wirelessly through CA10 Cloud Access Point. The access point must be associated with the same customer account. See CWL100 Data Logger Datasheet (B211912EN) .
CA10 Cloud Access Point	Ethernet network with Internet connection. See CA10 Access Point Datasheet (B211911EN) .



Features

- Connects up to 32 CWL100 wireless data loggers to Vaisala Jade Smart Cloud
- Display shows connection status of data loggers and cloud service
- Long range LoRa™ radio with over 100 m (328 ft) typical indoor range
- End-to-end encryption ensures secure data transmission and storage
- Powered by Power over Ethernet (PoE) or DC adapter
- Requires Internet connection through cabled Ethernet network or cellular modem

Cloud Access Point CA10 is a wireless networking hardware device for connecting CWL100 data loggers to Vaisala Jade Smart Cloud service.

CA10 and Jade Smart Cloud

CA10 access point transfers measurement data from wireless CWL100 data loggers to Jade Smart Cloud service, and enables management of the data loggers from the cloud interface. Data is encrypted during transfers to protect against eavesdropping, data tampering, and transfer errors.

CA10 access points and CWL100 data loggers are associated with a specific cloud account when they are purchased, so there is no need for the user to do any device pairing. CA10 always requires power and Internet connection for operation.

Redundancy

Redundancy of the wireless connection is achieved through use of multiple access points and free connection capacity in the system. If a data logger has a connection problem, it will automatically connect to another available nearby access point in the system. At least two access points with free capacity are needed for failover to function.

In case of temporary network disruptions, the CWL100 data loggers can record up to 30 days of measurements. Recorded data can be downloaded directly from the data logger through the USB port.

Time synchronization

CA10 requires accurate time to operate its LoRa wireless connection, and to maintain correct time on the connected data loggers. To achieve the accurate time, CA10 automatically synchronizes with Network Time Protocol (NTP) servers over the Internet.

Technical data

Wireless

Networking standards	LoRa™
Wireless connection capacity	Up to 32 supported devices
Modulation	LoRa chirp spread spectrum modulation
Output power	13 dBm (20 mW)
Antenna	Non-removable external antenna
Typical range (indoors)	At least 100 m (approx. 330 ft)
Maximum number of access points in an area	8
Frequency bands	
Model CA10E	868 MHz
Model CA10A	915 MHz

General

Compatible host systems	Vaisala Jade Smart Cloud
Supported devices	CWL100 data logger
Display language	English
Internal clock	Synchronizes with Network Time Protocol (NTP) servers over the Internet

Requirements for connectivity

Cabled Ethernet network with Internet connection (can be provided using a cellular modem)

Network provides IP address through DHCP

CA10 must be able to access TCP port 443 and UDP port 123

Inputs and outputs

Operating voltage using dedicated power supply connector	10 ... 30 V DC
PoE power class	Class 0
Power consumption	Max. 13 W

Ethernet interface

Supported standards	10BASE-T, 100BASE-TX
IPv4 address assignment	DHCP (automatic)

Connectors

Power supply connector	2.0 mm center pin locking type DC power jack
Service port	Micro-USB (2.0)
Expansion port	USB type A (2.0)
Ethernet	8P8C (RJ-45)

Operating environment

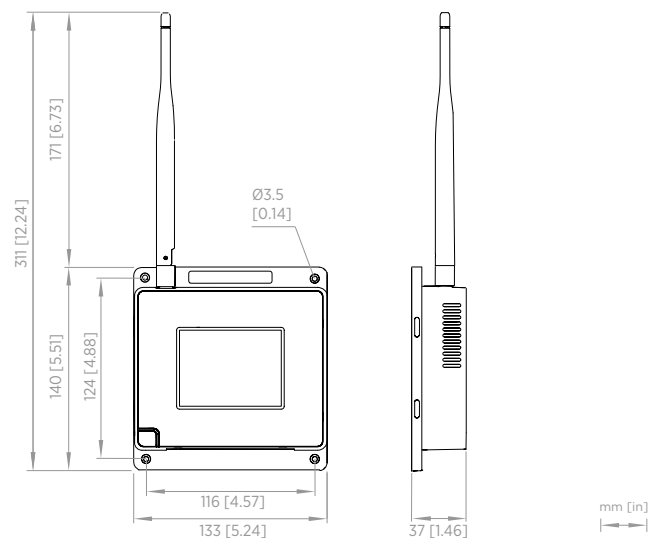
Operating environment	Indoor use
IP rating	IP30
Operating temperature	-20 ... +60 °C (-4 ... +140 °F)
Operating humidity	0 ... 90 %RH, non-condensing
Storage temperature	-20 ... +60 °C (-4 ... +140 °F)

Compliance

Electromagnetic compatibility (EMC)	IEC/EN 61326-1, industrial environment
Electrical safety	IEC/EN 61010-1
CA10E model	
EU directives and regulations	RoHS Directive (2011/65/EU) amended by 2015/863 Radio Equipment Directive, RED (2014/53/EU)
Radio standards and approvals	ETSI EN 300 220-2 ETSI EN 301 489-1 ICASA No: TA-2022/0596 IMDA No: DB105576 Serbia: V005 21
Compliance marks	AAA, CE, ICASA, UKCA
CA10A model	
Radio standards and approvals	Anatel ID: 04763-19-12322 AS/NZS 4268 FCC ID: 2AO39-AP10A IC ID: 23830-AP10A
Compliance marks	ANATEL, RCM

Mechanical specifications

Housing color	White
Mounting methods	Screws, tie wrap
Weight	386 g (13.6 oz)
Dimensions (H × W × D)	311 × 133 × 37 mm (12.24 × 5.24 × 1.46 in)
Materials	
Housing	PC/ABS blend
Display window	Chemically strengthened glass
Antenna	ABS



CA10 access point dimensions



Features

- Reliable >100 m (approx. 330 ft) wireless range utilizing LoRa™ radio technology
- Detachable high-accuracy relative humidity and temperature probes
- Typical battery life of 18 months
- Uses standard alkaline batteries
- Optional magnetic mounting bracket available

CWL100 Cloud Wireless Data Logger uses long range LoRa wireless technology. It can be used to monitor temperature and humidity in a wide range of environments such as warehouses, production areas, cleanrooms, and laboratories. CWL100 is also suitable for construction moisture measurement.

LoRa wireless

CWL100 connects wirelessly to Vaisala Jade Smart Cloud service, which provides real-time data, trend graphs, and alerts. The LoRa modulation technique provides a robust wireless signal that is extremely reliable over long distances and in complex, obstructed conditions. This wireless technology allows the data logger's signal to travel over 100 m (approx. 330 ft) indoors without the aid of signal amplifiers or repeaters. Wireless communications are encrypted to ensure data integrity and security.

Measurements are updated on the local display and stored on the data logger's local memory every 60 seconds, and sent through the wireless connection every 4 minutes. Jade Smart Cloud service stores the data in the original 1-minute resolution.

In case of a temporary network disruption the data logger can record up to 30 days of measurements. Recorded data can be downloaded directly from CWL100 through the USB port.

Versatility and convenience

CWL100 requires no startup configuration, and the included mounting bracket supports several installation methods. Detailed custom display shows the latest measurement results, battery status, and signal strength of the current access point connection. The housing is classified IP54 to protect the device from dust and cleaning.

CWL100 is powered by 2 standard AA size 1.5 V batteries (LR6 alkaline or FR6 lithium) for 18 months of operation at approximately 20 °C (68 °F). When fresh batteries are inserted during yearly calibration, battery replacement between calibrations is not needed.

Detachable probe

CWL100 supports several probe types for humidity and temperature measurement. Models with plastic housing are suitable for ambient measurements and provide a fast temperature response time. Stainless

steel probes are robust and suitable for demanding applications such as construction moisture measurement using the borehole method.

The probes use Vaisala HUMICAP® humidity sensors and platinum temperature sensors for superior stability. Probes can be integrated with the CWL100 housing or connected using a cable.

The probe is detachable, and easy to switch out for calibration. Jade Smart Cloud service detects the changed probe information automatically and maintains accurate and complete historical records.

Probe options

Probe model	Measurement	Application ¹⁾	Measurement temperature	Mounting	Calibration certificate
HMP63	RH + T	General purpose humidity and temperature probe. Ideal for ambient measurement.	-40 ... +60 °C (-40 ... +140 °F)	Integrated or cable probe	No
HMP63T	T	General purpose temperature probe. Ideal for ambient measurement.	-40 ... +60 °C (-40 ... +140 °F)	Integrated or cable probe	No
HMP110	RH + T	Robust probe for demanding conditions. Suitable for structural humidity measurement using the borehole method.	-40 ... +80 °C (-40 ... +176 °F)	Cable probe only	Yes
HMP115	RH + T	Calibrated probe for high accuracy general purpose humidity and temperature measurement.	-40 ... +60 °C (-40 ... +140 °F)	Integrated or cable probe	Yes
HMP115T	T	Calibrated probe for high accuracy general purpose temperature measurement.	-40 ... +60 °C (-40 ... +140 °F)	Integrated or cable probe	Yes
TMP115	T	Wide-range temperature probe. Suitable for measurement in extremely cold temperatures. Available as 50 cm (1 ft 7.7 in) and 3 m (9.8 ft) long versions.	-196 ... +90 °C (-320 ... +194 °F)	Integrated or cable probe	Yes

1) See probe datasheets for detailed probe specifications and probe-specific accessories.

Accessories

Accessory	Item code	HMP63	HMP110	HMP115/T	TMP115
Probe cable 1.5 m	CBL210555-1M5SP	✓	✓	✓	✓
Probe cable 3 m	CBL210555-3MSP	✓	✓	✓	✓
Probe cable 10 m	CBL210555-10MSP	✓	✓	✓	✓
Flat cable 3 m	CBL210647SP	✓	✓	✓	✓

Accessories for concrete moisture measurement

Accessory	Item code	HMP63	HMP110	HMP115/T	TMP115
Plastic tube set (12 pcs)	19266HM		✓		
Long (200 mm) plastic tube set (12 pcs)	245789		✓		
Rubber plugs (12 pcs)	233976		✓		
Plastic flange set (12 pcs)	26529HM		✓		
Long rubber plug for wet concrete (12 pcs)	26530HM		✓		



HMP63/T and HMP115/T probes



HMP110 probe



TMP115 probe

Technical data

Wireless

Networking standards	LoRa™
Modulation	LoRa chirp spread spectrum modulation
Output power	13 dBm (20 mW)
Antenna	Internal
Typical range (indoors)	At least 100 m (approx. 330 ft)
Range with line-of-sight	Over 500 m (1640 ft)
Frequency bands	868 MHz and 915 MHz

Memory

Sample capacity	30 days (43200 samples per channel)
Memory type	Non-volatile EEPROM
Memory mode	Ring buffer (FIFO)
Sampling rate	One sample / channel / minute (non-changeable)

General

Compatible probes	HMP63, HMP63T, HMP110, HMP115, HMP115T, TMP115
Batteries	2 × AA sized, 1.5 V (LR6 or FR6)
Operation time at 20 °C (68 °F) without external power supply	18 months
Internal clock accuracy	±30 s/month Synchronizes time from CA10 access point

Compliance

Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
Electrical safety	EN 61010-1
868 MHz model	
EU directives and regulations	RoHS Directive (2011/65/EU) amended by 2015/863 Radio Equipment Directive, RED (2014/53/EU)
Radio standards and approvals	ETSI EN 300 220-2 ETSI EN 301 489-1 ICASA No: TA-2022-0748 IMDA No: DB105576 Serbia: I005 21
Compliance marks	AAA, CE, ICASA, UKCA
915 MHz model	
Radio standards and approvals	Anatel ID: 04761-19-12322 AS/NZS 4268 FCC ID: 2A039-RFL100A IC ID: 23830-RFL100A
Compliance marks	ANATEL, RCM

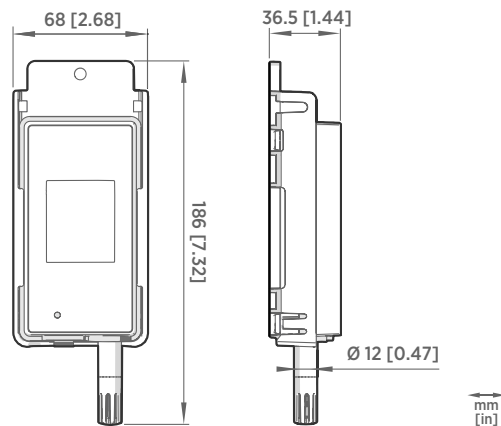
Operating environment

Storage temperature	-40 ... +60 °C (-40 ... +140 °F)
Operating humidity	0-100 %RH, non-condensing
IP rating	IP54
Operating temperature ¹⁾	
with alkaline batteries	+2 ... +60 °C (+35.6 ... +140 °F)
with lithium batteries	-20 ... +60 °C (-4 ... +140 °F)

¹⁾ For both alkaline and lithium, battery temperature operating specifications apply.

Mechanical specifications

Housing color	White
Mounting methods	Screws, tie-wrap, hook, or magnetic mounting bracket (optional accessory)
Probe interface	4-pin female M8 connector
Service port	USB 2.0 with micro-USB connector
Dimensions (H × W × D) with HMP115 probe	
Without mounting bracket	158 × 62 × 31 mm (6.22 × 2.4 × 1.22 in)
With mounting bracket	186 × 68 × 36.5 mm (7.32 × 2.68 × 1.44 in)
Weight	
With batteries (2 pcs alkaline), HMP115 probe, and magnetic mounting bracket	254 g (8.96 oz)
Materials	
Housing	PC/ABS blend
Display window	PMMA (acrylic)
Sealings	TPE



CWL100 dimensions with HMP115 probe



System introduction: viewLinc Continuous Monitoring System for GxP-regulated environments



Choose viewLinc when you need:

- Unlimited parameters and gap-free data for compliance
- Easy-to-use IQOQ protocols, GxP documentation
- A full suite of service options, including: installation, validation, and global calibration
- Validated data that can be shared with external control and automation systems

Designed for life science and GxP-regulated environments, Vaisala's viewLinc Continuous Monitoring System (CMS) ensures gap-free data, reliable alarming, and records that comply global regulatory requirements such as 21 CFR Part 11 and Annex 11.

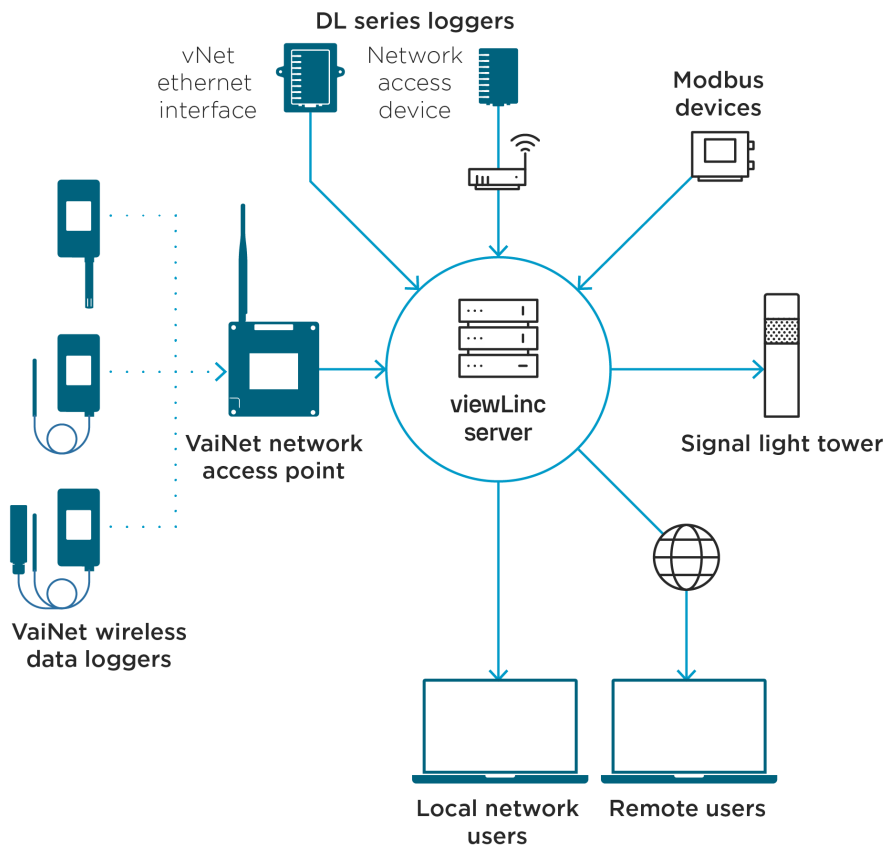
Versatile and reliable

Ideal for cleanrooms, laboratories, GDP warehouses, and hospitals, the viewLinc Enterprise Server-based system provides a web-based interface for remote monitoring, secure audit trail, customizable reporting, and reliable alarming through email, text, phone, or signal tower and annunciator.

Flexible connectivity

The system scales easily, includes nine language versions, and offers flexible connectivity options, including: Ethernet, PoE, Wi-Fi, and Vaisala's powerful wireless technology, VaiNet.





Features

- Software for continuous monitoring of temperature, humidity, and other parameters
- Eleven language versions for enterprise-wide, multi-site use
- Preconfigured and custom reports
- Windows Active Directory for easy user management
- Configurable alarm notifications: email, SMS, voice calls, signal towers, browser alerts
- Scheduled threshold alarming and alarm notification delivery times to accommodate maintenance periods or work shifts
- Interactive tours for novice users
- Licensed features: Voice/SMS web service, 3rd-party Modbus devices, Vaisala OPC UA Server, REST API

Vaisala viewLinc Enterprise Server software lets you network Vaisala data loggers or Modbus devices using a combination of wired and wireless connections. It supports installations of one or two measurement points, or large systems that monitor thousands of locations. Through user engagement and agile development, Vaisala delivers an always-improving product with new features and better performance. viewLinc is uniquely suited to helping enterprises in GxP-regulated industries ensure their applications and environments achieve and demonstrate compliance with stringent quality guidelines and processes. From its data integrity, access controls, and encryption to its validation protocols, viewLinc provides a faster and simpler implementation of your compliant monitoring system.

Upgrading

- Only viewLinc 4.3.6 and higher can upgrade to 5.2 directly. Lower versions must first upgrade to 4.3.6.
- During upgrade, confirm list of previously provided hostnames/aliases so users can connect to viewLinc.
- ViewLinc5.2 uses Transport Layer Security (TLS) 1.3, so all Vaisala VaiNet API0 Access Points in the installation need firmware version 4.5 or newer. API0s version F and older must be replaced.

System requirements

- A dedicated server (virtual server is recommended) continuously available 24/7 to run viewLinc software
- At least one Vaisala data logger or transmitter
- Vaisala cables to connect data loggers and set up wireless transmitters

Continuous reliability

- Accessible via browser on any network computer or mobile device

- Runs as a Microsoft® Windows® service
- Supports UTF-8 compliant multi-byte character sets

Licensing

- License key required for each installation and determines the number of devices
- Additional licenses enable voice or SMS web notifications, Vaisala OPC UA Server integration, the viewLinc REST API, or third-party Modbus devices

Technical data

Requirements based on system size

System size in measurement points	1 ... 20	21 ... 400	400+
Dedicated or shared server	Either	Either	Dedicated
CPU	1.6 GHz dual core	1.6 GHz dual core	3.2 GHz quad core
RAM	8 GB	12 GB	16 GB
Disk space increase/year	1.5 GB/year for 20 data points	15 GB/year for 200 data points	75 GB/year for 1000 data points
Continuous free disk space for reports ¹⁾	2 GB	4 GB	10 GB

¹⁾ 1 month duration with 1 minute scan/sample

Server requirements

Availability	Dedicated server (a virtual server is recommended) available 24 hours a day, 7 days a week
Server management	<p>Connected to an uninterruptible power supply (UPS)</p> <p>A tested backup solution with support for open file backup</p> <p>Synchronizes time with a Network Time Protocol (NTP) server</p>
Operating system	<p>Windows Server® 2022</p> <p>Windows Server® 2022 Datacenter Edition</p> <p>Windows Server® 2019</p> <p>Windows Server® 2019 Datacenter Edition</p> <p>Windows Server® 2016</p> <p>Windows Server® 2016 Datacenter Edition</p> <p>Windows® 10 Enterprise (64-bit)</p> <p>Windows® 11 Pro</p>
Application disk space	350 MB
Database disk space ¹⁾	200 KB/data point ²⁾ /day
Network traffic ³⁾	Approx. 100 KB/minute/device
Web interface protocol ⁴⁾	TLS 1.3
Security certificate for web interface	Authorized TLS certificate and key ⁵⁾
Email encoding	RFC 2047
Secure email protocol	TLS 1.3

¹⁾ Not applicable to Device Host installation.

²⁾ Data points are device channels monitoring and recording data.

³⁾ Depends on number of devices, system configuration and type of communication devices used.

⁴⁾ viewLinc 5.2 includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. <http://www.openssl.org/>

⁵⁾ viewLinc-signed certificate and key can be generated during installation.

Client requirements

Internet browser	<p>Google Chrome™</p> <p>Microsoft® Edge™</p>
Computer clients	Any network computer with a supported Internet browser, a minimum 2.4 GHz CPU, and 4 GB of RAM.
Display and tablet clients	Touchscreen or mouse-operated panel with a supported Internet browser. Must be connected to the same network as viewLinc Enterprise Server.

Wireless device connectivity

RFL100 series ¹⁾	Connects using Vaisala VaiNet protocol. Requires installation of an AP10 access point.
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¹⁾ VaiNet devices not available in all regions.

Wired device connectivity

DL series using vNet device	vNet Power-over-Ethernet devices are 802.3af compliant and work with both end-point and mid-span systems. viewLinc Aware automatically detects and configures vNet devices. ¹⁾ Requires vNet device drivers (provided).
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DL series using single or multi-port Ethernet device	Ethernet connectivity devices must be configured with static or reserved IP addresses. If the devices are being installed on different subnets, they need to be configured before being installed. Ethernet device drivers must be installed on each server used to connect Vaisala devices.
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DL series using USB cable	Connect devices directly to viewLinc Device Hosts using a USB-to-logger cable. Requires USB ports.
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Modbus devices (RTU or TCP)	<ul style="list-style-type: none"> Connect Modbus RTU devices directly to viewLinc Device Hosts using a USB-to-serial cable Connect Modbus RTU devices to viewLinc over the Ethernet network using a Serial to Ethernet adapter (like a Digi PortServer) Connect Modbus TCP devices to viewLinc over the Ethernet network <p>RTU devices require serial COM ports. TCP devices require a static IP address.</p>
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Signal tower (light and/or buzzer)	Connect devices according to manufacturer directions. Preconfigured device settings are selectable in viewLinc. Note that you must assign a static or reserved IP address for signal towers.
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¹⁾ vNet devices maintain a low power rating by operating at a network speed of 10 Mbps. To ensure your network devices can operate at different speeds, set the network speed for the connected vNet port (see vNet User Guide).

Network ports

Default	Type	Used by
80	TCP	Signal towers
389	TCP	Active Directory (less secure)
443	TCP	viewLinc web interface
502	TCP	Modbus TCP-enabled devices
636	TCP	Active Directory (secure connection)
771	TCP	vNet and multi-port Ethernet devices
950	TCP	Moxa serial-to-Wi-Fi devices
9065	UDP	viewLinc Aware service for vNet discovery
12500	TCP	Twilio web services
12600	TCP/UDP	AP10 and viewLinc device host
55000	TCP	Vaisala OPC UA Server



Features

- One AP10 supports up to 32 VaiNet data loggers
- Powered by Power over Ethernet (PoE) or DC adapter
- Minimal infrastructure and no signal amplifiers needed
- Uses HTTPS communication and encryption to ensure secure data transmission
- Chirp spread spectrum wireless modulation is resistant to multi-path fading
- Secure firewall and tamper-proof data backup

VaiNet Access Point AP10 is a wireless networking hardware device for Vaisala's proprietary wireless technology: VaiNet. AP10 can connect up to 32 wireless RFL100 data loggers to Vaisala viewLinc Monitoring System.

AP10 in viewLinc Monitoring System

AP10 access point transfers measurement data from wireless VaiNet data loggers to the viewLinc Enterprise Server, and enables the remote configuration and management of VaiNet data loggers by the viewLinc administrator. A wired Ethernet network connection between AP10 and viewLinc Enterprise Server is required.

Registration of new data loggers is handled by viewLinc Enterprise Server software. Whenever a new data logger is added to the system, AP10 automatically identifies it and forwards its information to viewLinc. Once accepted in viewLinc, VaiNet data loggers stay synchronized, even in situations where other nearby VaiNet networks overlap.

Data integrity

Data is encrypted during VaiNet transfers to protect against eavesdropping, data tampering, and transfer errors. Both the access point and the viewLinc Enterprise Server software verify that the data has been received correctly. Once the data is verified, it is stored to viewLinc's secure database and protected from tampering and loss.

Redundancy

Redundancy of the wireless connection is achieved through use of multiple VaiNet access points and free connection capacity in the system. If a VaiNet data logger has a connection problem, it will automatically connect to another available access point in the system.

At least two access points with free capacity are needed for failover to function.

Time synchronization

AP10 requires accurate time to operate its VaiNet wireless connection, and to maintain correct time on the connected data loggers. To achieve the accurate time, AP10 synchronizes with Network Time Protocol (NTP) servers.

AP10 synchronizes with default NTP servers over the Internet. To allow AP10 to operate without an Internet connection, configure it to use your local NTP server.

Technical data

Wireless

Networking standards	Vaisala VaiNet
Wireless connection capacity	Up to 32 supported devices
Modulation	Chirp spread spectrum modulation
Output power	13 dBm (20 mW)
Antenna	Non-removable external antenna
Typical range (indoors)	At least 100 m (approx. 330 ft)
Maximum number of access points in an area	
Standard system	8
Large system ¹⁾	32
Frequency bands	
Model AP10C	500 MHz
Model AP10E	868 MHz
Model AP10A	915 MHz
Model AP10J	920 MHz
Model AP10T	922 MHz

¹⁾ Subject to additional installation requirements. See [Guidelines for Large VaiNet Systems \(M212596EN\)](#).

General

Compatible viewLinc versions	5.0 and above
Supported wireless devices	RFL100 data logger
User interfaces	Web browser interface Touchscreen interface
User interface languages	English, German, French, Portuguese, Spanish, Swedish, Chinese, Japanese
Internal clock	Synchronizes with Network Time Protocol (NTP) server. NTP server connection required for operation.

Inputs and outputs

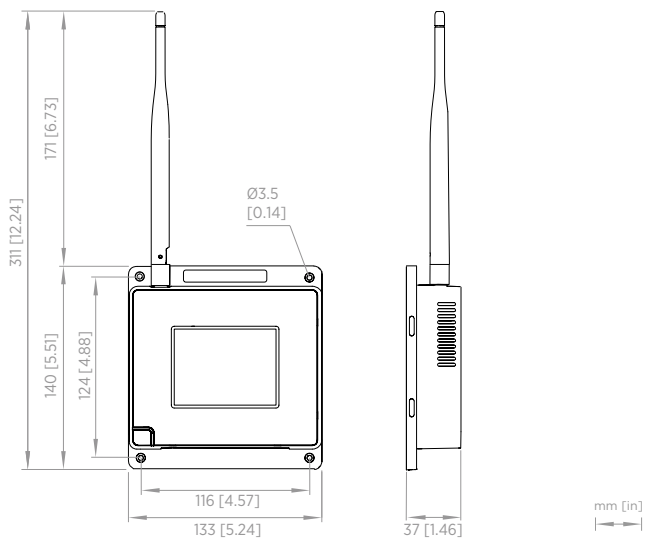
Supply voltage using dedicated power supply connector	10–30 V DC
PoE power class	Class 0
Power consumption	Max. 13 W
Ethernet interface	
Supported standards	10BASE-T, 100BASE-TX
IPv4 address assignment	DHCP (automatic), static
Connectors	
Power supply connector	2.0 mm center pin locking type DC power jack
Service port	Micro-USB (2.0)
Expansion port	USB type A (2.0)
Ethernet	8P8C (RJ-45)

Operating environment

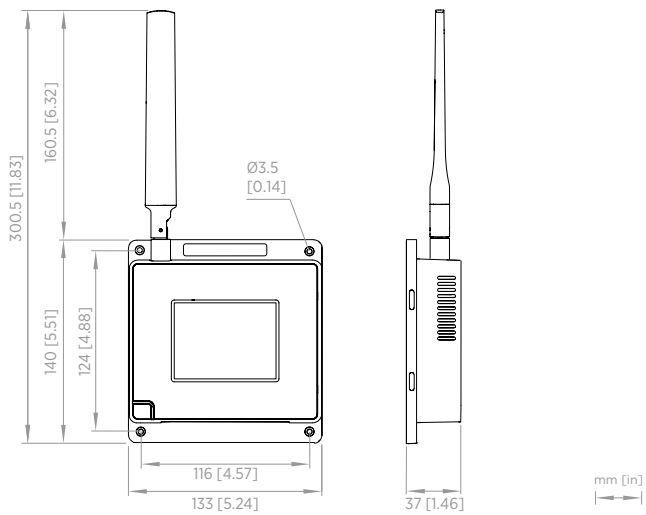
Operating environment	Indoor use
IP rating	IP30
Operating temperature	–20 ... +60 °C (–4 ... +140 °F)
Operating humidity	0–90 %RH, non-condensing
Storage temperature	–20 ... +60 °C (–4 ... +140 °F)

Compliance

Electromagnetic compatibility (EMC)	IEC/EN 61326-1, industrial environment
Electrical safety	IEC/EN 61010-1
AP10E model	
EU directives and regulations	RoHS Directive (2011/65/EU) amended by 2015/863 Radio Equipment Directive, RED (2014/53/EU)
Radio standards and approvals	ETSI EN 300 220-2 ETSI EN 301 489-1 ICASA No: TA 2020-7918 IMDA No: DB105576 TRA No: ER67585/18 Serbia: I005 21
Compliance marks	AAA, CE, ICASA, UKCA
AP10A model	
Radio standards and approvals	Anatel ID: 04763-19-12322 AS/NZS 4268 FCC ID: 2AO39-AP10A IC ID: 23830-AP10A NOM ID: 1901C00393
Compliance marks	ANATEL, NOM, NYCE, RCM
AP10J model	
Radio standards and approvals	MIC ID: 012-200006
Compliance marks	GITEKI
AP10C model	
Radio standards and approvals	China MIIT 工业和信息化部公告 2019 年第 52 号
Compliance marks	China RoHS
AP10T model	
Radio standards and approvals	NCC ID: CCAP21LP1250T6
Compliance marks	NCC



AP10 access point dimensions



AP10C model dimensions

Mechanical specifications

Housing color	White
Mounting methods	Screws, tie wrap
Weight	386 g (13.62 oz)
Dimensions (H × W × D)	
AP10C model	300.5 × 133 × 37 mm (11.83 × 5.24 × 1.46 in)
Other models	311 × 133 × 37 mm (12.24 × 5.24 × 1.46 in)
Materials	
Housing	PC/ABS blend
Display window	Chemically strengthened glass
Antenna	ABS



Features

- Industry-leading measurement precision
- Interchangeable high-accuracy probes for T, RH, and CO₂
- 30-day memory buffer
- Typical battery life of 18 months in RH and T measurement
- Uses standard alkaline batteries
- Probe calibrations are traceable to SI units through national metrology institutes or accredited calibration laboratories
- Cost-effective alternative to chart recorders

RFL100 Data Logger uses Vaisala's proprietary VaiNet wireless technology. It can be used to monitor temperature (T), relative humidity (RH), and carbon dioxide level (CO₂) in a wide range of environments. Suitable applications include warehouses, production areas, cleanrooms, laboratories, incubators, fridges, cold storage areas, and freezers down to -196 °C (approx. -320 °F).

VaiNet wireless

RFL100 connects wirelessly to Vaisala viewLinc Monitoring System, which provides real-time trends, alarms, and historical reporting. VaiNet wireless technology provides a robust wireless signal that is extremely reliable over long distances and in complex, obstructed conditions. This wireless technology allows the data logger's signal to travel over 100 m (approx. 330 ft) indoors without the aid of signal amplifiers or repeaters. Wireless communications are encrypted to ensure data integrity and security.

Measurements are updated and stored every 60 seconds, and sent from the data logger every 4 minutes. In case of temporary network disruptions, the data logger can record up to 30 days of measurements that are automatically transmitted to the viewLinc Enterprise Server software when communications are restored. Recorded data can also be downloaded directly from RFL100 through the USB port.

Versatility and convenience

RFL100 requires no startup configuration, and the included mounting bracket supports several installation methods. Detailed custom display shows the latest measurement results, alarm and battery status, and signal strength of the current access point connection. The housing is classified IP54 to protect the device from dust and cleaning.

RFL100 is powered by two standard AA size 1.5 V batteries (LR6 alkaline or FR6 lithium) for 18 months of operation at approximately 20 °C (68 °F) in RH and T measurement. When fresh batteries are inserted during yearly calibration, battery replacement between calibrations is not needed. External power is required for CO₂ measurement, with the batteries serving as backup in case the external power becomes unavailable.



Interchangeable probes

The probes are detachable and easy to switch out for calibration. viewLinc Enterprise Server detects the changed probe information automatically and maintains accurate and complete historical records.

RH and T probes use Vaisala HUMICAP® humidity sensors and platinum temperature sensors (Pt100 and Pt1000 type) for superior stability. Probes can be integrated with the RFL100 housing or connected using a cable.

CO₂ measurement is provided by the GMP251 probe that uses Vaisala's patented, latest-generation CARBOCAP® technology with exceptional stability. The probe automatically compensates the CO₂ measurement according to ambient temperature.

Probe options

Probe	Description ¹⁾	Installation notes
HMP110, HMP110T, and HMP110REF 	<p>Humidity and temperature probe for measurement in demanding conditions. Robust stainless steel construction. Temperature-only version HMP110T available.</p> <p>Plastic grid filter provides the fastest response time. For added protection, select the membrane filter, the PTFE filter, or the stainless steel sintered filter.</p> <p>Measurement temperature range $-40 \dots +80 \text{ }^{\circ}\text{C}$ ($-40 \dots +176 \text{ }^{\circ}\text{F}$).</p>	<p>Suitable for measurement inside chambers, incubators, fridges, and freezers.</p> <p>Versatile mounting options using accessories.</p> <p>Must be connected to RFL100 using a cable.</p> <p>A constant output probe version HMP110REF is also available for validating installations. The constant output version does not measure – instead, it outputs unchanging humidity and temperature values.</p>
HMP115 and HMP115T 	<p>Humidity and temperature probe for general purpose measurement. Temperature-only version HMP115T available.</p> <p>Plastic grid filter provides the fastest response time. For added protection, select the membrane filter or the PTFE filter.</p> <p>Measurement temperature range $-40 \dots +60 \text{ }^{\circ}\text{C}$ ($-40 \dots +140 \text{ }^{\circ}\text{F}$).</p>	<p>Ideal choice for ambient measurement.</p> <p>Can be integrated with the RFL100 housing or connected using a cable.</p>
TMP115 	<p>Temperature probe for measurement in a wide range of conditions.</p> <p>Available as 50 cm (1 ft 7.7 in) and 3 m (9.8 ft) long versions. Length includes the probe body and sensor tip.</p> <p>Measurement temperature range $-196 \dots +90 \text{ }^{\circ}\text{C}$ ($-320 \dots +194 \text{ }^{\circ}\text{F}$).</p> <p>Operating temperature range of the probe body is $-40 \dots +60 \text{ }^{\circ}\text{C}$ ($-40 \dots +140 \text{ }^{\circ}\text{F}$).</p>	<p>Suitable for measurement inside chambers, fridges, and freezers.</p> <p>Can be integrated with the RFL100 housing or connected using a cable.</p> <p>Sensor tip withstands immersion in glycol and liquid nitrogen.</p> <p>Use the thermal dampener block accessory (item code 236310SP) to add thermal mass to the sensor tip.</p>
GMP251 	<p>Carbon dioxide probe for %-level measurements. Designed for use in demanding applications such as life science incubators.</p> <p>Measurement temperature range $-40 \dots +60 \text{ }^{\circ}\text{C}$ ($-40 \dots +140 \text{ }^{\circ}\text{F}$).</p> <p>When ordered with the RFL100 data logger, the probe is delivered with a mounting kit that includes a probe holder designed for use with GMP251 and the other supported probes. The kit also includes a magnetic holder for the Probe Splitter M8/M12 accessory.</p>	<p>Must be connected using the Probe Splitter M8/M12 accessory. Any one of the other supported probes can be connected at the same time in the M8 connector of the probe splitter.</p> <p>Requires use of external power supply due to power consumption. Data logger batteries provide a backup in case the external power is not available.</p> <p>Logged temperature data is limited to range $-40 \dots +60 \text{ }^{\circ}\text{C}$ ($-40 \dots +140 \text{ }^{\circ}\text{F}$) when GMP251 is connected.</p>

1) See probe datasheets for detailed probe specifications.

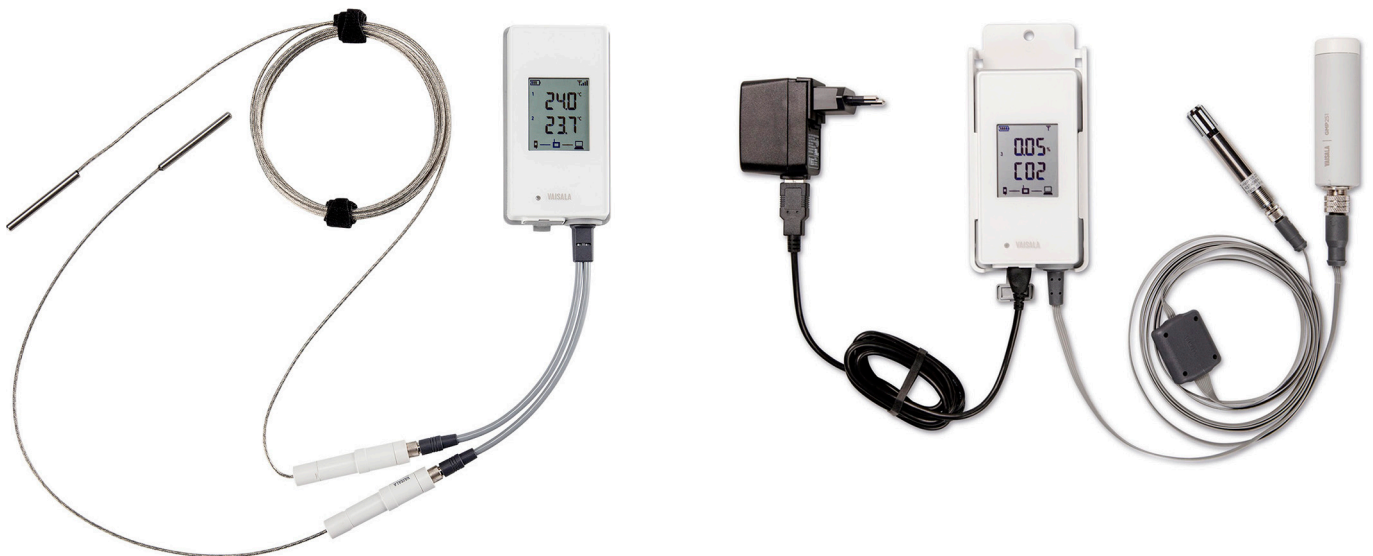
Accessories

Accessories

Accessory ¹⁾	Item code
Probe cable for RFL100, 1.5 m	CBL210555-1M5SP
Probe cable for RFL100, 3 m	CBL210555-3MSP
Probe cable for RFL100, 10 m	CBL210555-10MSP
Flat cable for RFL100, 3 m	CBL210647SP
Probe holder (5 pcs) for Ø 12 mm probes	ASM213382SP
CO ₂ probe mounting kit	ASM214253SP
Probe splitter M8 (for connecting two T probes)	CBL210834SP
Probe splitter M8/M12 (for connecting a CO ₂ probe)	CBL211050SP
1 m high-temperature cable M12 (for CO ₂ probe) ²⁾	271038SP
1 m high-temperature cable M8 (for RH/T probe in CO ₂ applications) ²⁾	271039SP
Universal power supply (100–240 V AC / 5 V DC) with micro-USB connector	ASM214178SP

1) See probe datasheets for probe-specific accessories.

2) High-temperature cables are extensions for the probe splitter M8/M12 in CO₂ applications. They tolerate –20... +180 °C (–4... +356 °F) temperatures and can remain inside an incubator during a typical heat sterilization cycle. Due to heat conduction, leave half of the cable in ambient temperature when installed.



RFL100 with two TMP115 probes (left) and with GMP251 and HMP110 probes (right)

Technical data

Wireless

Networking standards	Vaisala VaiNet
Modulation	Chirp spread spectrum modulation
Output power	≤ 13 dBm (≤ 20 mW)
Antenna	Internal
Typical range (indoors)	At least 100 m (approx. 330 ft)
Range with line-of-sight	Over 500 m (1640 ft)
Frequency bands	500 MHz, 868 MHz, 915 MHz, 920 MHz, and 922 MHz

Memory

Sample capacity	30 days (43200 samples per channel)
Memory type	Non-volatile EEPROM
Memory mode	Ring buffer (FIFO)
Sampling rate	One sample / channel / minute (non-changeable)

General

Compatible probes	GMP251, HMP110, HMP110T, HMP115, HMP115T, TMP115
Batteries	2 × AA sized, 1.5 V (LR6 or FR6)
Operation time on battery power at 20 °C (68 °F)	
RH and T measurement in any probe combination	18 months
CO ₂ measurement	Typically 12 hours with lithium batteries

Compatibility requirements

Item	Required minimum version(s)
viewLinc version	viewLinc Enterprise Server 5.0
Dual T probe support using Probe Splitter M8 accessory	<ul style="list-style-type: none"> RFL100 firmware 1.2.0 API0 firmware 3.0 viewLinc Enterprise Server 5.0.2
CO ₂ measurement using Probe Splitter M8/M12 accessory and external power	<ul style="list-style-type: none"> RFL100 firmware 1.4.0 RFL100 hardware manufactured after July 2021 API0 firmware 4.0 and hardware revision G viewLinc Enterprise Server 5.1

Operating environment

Storage temperature	-40 ... +60 °C (-40 ... +140 °F)
Operating humidity	0-100 %RH, non-condensing
IP rating	IP54
IP rating with external power supply	IP20
Operating temperature ¹⁾	
with alkaline batteries	+2 ... +60 °C (+35.6 ... +140 °F)
with lithium batteries	-20 ... +60 °C (-4 ... +140 °F)
with external power supply	+0 ... +60 °C (+32 ... +140 °F)

¹⁾ Verify operating temperature specification when using third party batteries and power supplies.

Compliance

Electromagnetic compatibility (EMC)	IEC/EN 61326-1, industrial environment
Electrical safety	IEC/EN 61010-1
500 MHz model	
Radio standards and approvals	China MIIT 工业和信息化部公告 2019 年第 52 号
Compliance marks	China RoHS
868 MHz model	
EU directives and regulations	RoHS Directive (2011/65/EU) amended by 2015/863 Radio Equipment Directive, RED (2014/53/EU)
Radio standards and approvals	ETSI EN 300 220-2 ETSI EN 301 489-1 ICASA No: TA 2020-7761 IMDA No: DB105576 TRA No: 67584/18 Serbia: M005 21
Compliance marks	AAA, CE, ICASA, UKCA
915 MHz model	
Radio standards and approvals	Anatel ID: 04761-19-12322 AS/NZS 4268 FCC ID: 2AO39-RFL100A IC ID: 23830-RFL100A NOM ID: 1901C00493
Compliance marks	ANATEL, NOM, NYCE, RCM
920 MHz model	
Radio standards and approvals	MIC ID: 012-200007
Compliance marks	GITEKI
922 MHz model	
Radio standards and approvals	NCC ID: CCAP21LP1240T3
Compliance marks	NCC

Mechanical specifications

Housing color	White
Mounting methods	Screws, cable ties, hook, or magnetic mounting bracket (optional accessory)

Probe interface	4-pin female M8 connector
Service port	USB 2.0 with micro-USB connector

Dimensions (H × W × D) with HMP115 probe	
Without mounting bracket	158 × 62 × 31 mm (6.22 × 2.4 × 1.22 in)
With mounting bracket	186 × 68 × 36.5 mm (7.32 × 2.68 × 1.44 in)

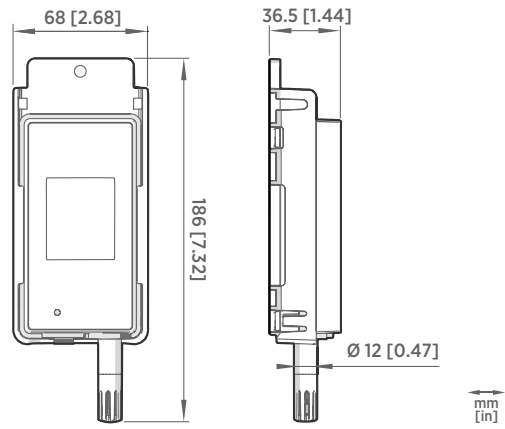
Weight	
With batteries (2 pcs alkaline) and HMP115 probe	190 g (6.7 oz)
With batteries (2 pcs alkaline), HMP115 probe, and magnetic mounting bracket	254 g (8.96 oz)

Materials	
Housing	PC/ABS blend
Display window	PMMA (acrylic)
Sealings	TPE

Requirements for external power supply

Output voltage	5 V DC
Output power	Min. 1 W
Output connector	Micro-USB

Certifications and approvals	<ul style="list-style-type: none"> • Certified to IEC 62368-1 • Approved for use in your country
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RFL100 dimensions with HMP115 probe



Features

- Humidity and temperature probe designed for use with RFL100 and CWL100 data loggers
- Measurement temperature range: -40 ... +60 °C (-40 ... +140 °F)
- Proven Vaisala HUMICAP® 180R sensor for excellent stability
- Fast thermal response time
- Low power consumption
- Temperature-only model HMP115T available
- Can be calibrated with Indigo80 handheld indicator, HM40 handheld meter, MI70 indicator, and Insight PC software
- Comes with calibration certificate: ±1.5 %RH measurement accuracy (0 ... 90 %RH)

Vaisala HUMICAP® Humidity and Temperature Probe HMP115 is a highly accurate and cost-effective humidity probe with plastic enclosure. It is designed for indoor measurements with RFL100 and CWL100 wireless data loggers.

Designed for RFL100 and CWL100 wireless data loggers

The probe body of HMP115 integrates easily with the data logger housing and provides an ideal solution for ambient measurement. It can also be connected using a cable for remote probe use.

High performance

HMP115 has a PC/ABS plastic enclosure and is suitable for non-condensing environments with fast temperature changes and a need for high-accuracy measurements with traceability. HMP115 also has excellent chemical tolerance thanks to the proven Vaisala HUMICAP® 180R sensor.

Plastic grid filter provides the fastest response time. For added protection, select the membrane filter or the PTFE filter.

Low power consumption

HMP115 is suitable for battery-powered applications due to its very low power consumption. It also has an extremely fast start-up time.

Variety of calibration options

A quick field calibration can easily be carried out using a handheld meter, for example, Vaisala Indigo80 Handheld Indicator or Vaisala Handheld Meter HM40. Alternatively, the probe can be

calibrated using a PC with Vaisala Insight PC software and a compatible USB connection cable, or sent to Vaisala for calibration. Vaisala Service Centers offer both ISO 9001 and ISO 17025 calibrations.

Technical data

Measurement performance

Relative humidity	
Measurement range	0-100 %RH
Accuracy ¹⁾	
at 0 ... +40 °C (+32 ... +104 °F)	±1.5 %RH (0-90 %RH) ±2.5 %RH (90-100 %RH)
at -40 ... 0 °C (-40 ... +32 °F) and +40 ... +60 °C (+104 ... +140 °F)	±3.0 %RH (0-90 %RH) ±4.0 %RH (90-100 %RH)
Typical factory calibration uncertainty	±0.8 %RH
Humidity sensor	HUMICAP® 180R
Stability	±2 %RH over 2 years
Temperature	
Measurement range	-40 ... +60 °C (-40 ... +140 °F)
Accuracy	
at 0 ... +40 °C (+32 ... +104 °F)	±0.2 °C (±0.36 °F)
at -40 ... 0 °C (-40 ... +32 °F) and +40 ... +60 °C (+104 ... +140 °F)	±0.4 °C (±0.72 °F)
Typical factory calibration uncertainty	±0.12 °C (±0.22 °F)
Temperature sensor	Pt1000 RTD Class F0.1 IEC 60751

¹⁾ Including non-linearity, hysteresis, and repeatability.

Operating environment

Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Operating humidity	0-100 %RH, non-condensing
IP rating ¹⁾	IP54

¹⁾ Not applicable with the plastic grid filter.

Compliance

Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
Compliance marks	CE, RCM

Inputs and outputs

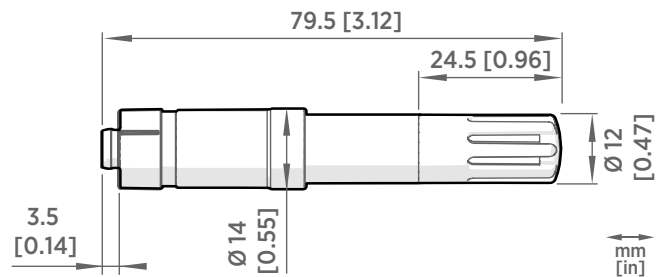
Power consumption	1 mA average, max. peak 5 mA
Operating voltage	5-28 V DC
Start-up time	1 s
Digital output	RS-485 2-wire half duplex, supports Modbus RTU

Output parameters

Output parameter	HMP115	HMP115T
Temperature (°C)	✓	✓
Relative humidity (%RH)	✓	

Mechanical specifications

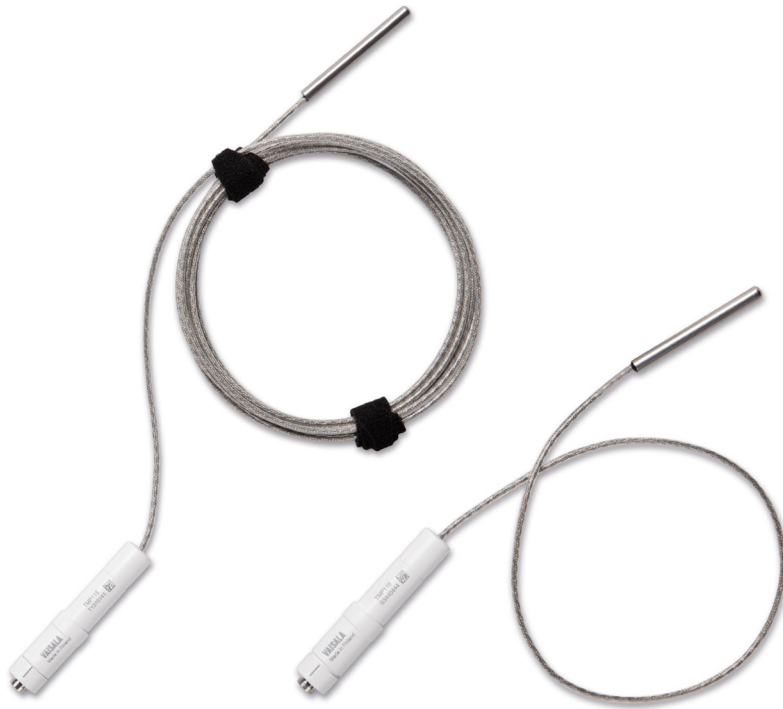
Cable connector	4-pin M8 (IEC 60947-5-2)
Weight	9 g (0.3 oz)
Materials	
Body	PC/ABS blend
Grid filter	PC (glass reinforced)



HMP115 dimensions

Accessories

Probe holder, 5 pcs	ASM213382SP
USB cable for PC connection	219690
Connection cable for Indigo80 handheld indicator	262195SP
Connection cable for MI70 indicator	219980SP



Features

- Temperature probe designed for use with RFL100 and CWL100 data loggers
- Measurement range
–196 ... +90 °C (–320 ... +194 °F)
- Platinum RTD temperature sensor for superior measurement stability
- Available as 0.5 m (1 ft 7.7 in) and 3 m (9.8 ft) long versions
- Can be calibrated with Indigo80 handheld indicator, HM40 handheld meter, MI70 indicator, and Insight PC software
- Traceable calibration certificate

Wide-Range Temperature Probe TMP115 is ideal for use in temperature-controlled chambers, cryogenic applications, incubators, LN₂ tanks, and blood/tissue banks. TMP115 uses a platinum RTD temperature sensor for superior measurement stability. TMP115 is designed for use with RFL100 and CWL100 wireless data loggers.

Designed for RFL100 and CWL100 wireless data loggers

The probe body of TMP115 integrates easily with the data logger housing. It can also be connected using a cable for remote probe use. The probe is available in two lengths: 0.5 m (1 ft 7.7 in) and 3 m (9.8 ft). The length includes probe body and sensor tip.

The operating temperature range of the probe body is –40 ... +60 °C (–40 ... +140 °F). It is usually best to leave the probe body outside the measured environment, and just insert the probe tip and some cable.

Low power consumption

TMP115 is suitable for battery-powered applications due to its very low power consumption. It also has an extremely fast start-up time.

Features for cold storage applications

Some cold storage applications may require slowing down the naturally fast response time of the probe. You can easily accomplish this by adding more thermal mass to the sensor tip. The thermal dampener block accessory (item code 236310SP) is designed for this purpose. The damping effect of the block is equivalent to that of 40 ml of glycol.

The 4.8 mm (0.19 in) diameter sensor tip withstands immersion in glycol and liquid nitrogen.

Flat cables are available as accessories for the compatible data loggers in case door seal insertion to chambers and freezers is required.

Variety of calibration options

A quick field calibration can easily be carried out using a handheld meter, for example, Vaisala Indigo80 Handheld Indicator or Vaisala Handheld Meter HM40. Alternatively, the probe can be calibrated using a PC with Vaisala Insight PC software and a compatible USB connection cable, or sent to Vaisala for calibration. Vaisala Service Centers offer both ISO 9001 and ISO 17025 calibrations.

Technical data

Measurement performance

Temperature	
Measurement range	-196 ... +90 °C (-320 ... +194 °F)
Accuracy over temperature range ¹⁾	
at -196 ... -90 °C (-320 ... -130 °F)	±2.5 °C (±4.5 °F)
at -90 ... -30 °C (-130 ... -22 °F)	±0.75 °C (±1.35 °F)
at -30 ... 0 °C (-22 ... +32 °F)	±0.5 °C (±0.9 °F)
at 0 ... +50 °C (+32 ... +122 °F)	±0.25 °C (±0.45 °F)
at +50 ... +90 °C (+122 ... +194 °F)	±0.75 °C (±1.35 °F)
Temperature sensor	Pt100 RTD Class A IEC 751
Typical factory calibration uncertainty	
at -90 °C (-130 °F)	±0.13 °C (±0.234 °F)
at -45 °C (-49 °F)	±0.07 °C (±0.149 °F)
at 0 °C (32 °F) and warmer	±0.06 °C (±0.128 °F)

¹⁾ Includes non-linearity, hysteresis, and repeatability.

Operating environment

Operating temperature of sensor tip	-196 ... +90 °C (-320 ... +194 °F)
Operating temperature of probe body	-40 ... +60 °C (-40 ... +140 °F)
IP rating of sensor tip	IP67
IP rating of probe body	IP65

Compliance

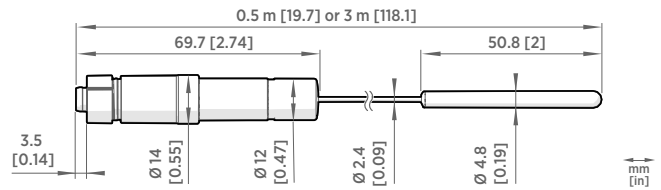
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
Compliance marks	CE, RCM

Inputs and outputs

Operating voltage	5-28 V DC
Start-up time	1 s
Digital output	RS-485 2-wire half duplex, supports Modbus RTU
Output parameters	Temperature (°C)

Mechanical specifications

Cable connector	4-pin male M8 (IEC 60947-5-2)
Materials	
Probe body	PC/ABS blend
Cable	FEP
Sensor tip	Stainless steel (AISI 316)
Dimensions	
Probe length including cable and sensor tip	0.5 m (1 ft 7.7 in) or 3 m (9 ft 10.1 in)
Probe body diameter	14 mm (0.55 in)
Sensor tip length	50.8 mm (2 in)
Sensor tip diameter	4.76 mm (0.19 in)



TMP115 dimensions

Accessories

Thermal dampener block for 3/16" probes (4.8 mm)	236310SP
Probe holder (5 pcs)	ASM213382SP
USB cable for PC connection	219690
Connection cable for Indigo80 handheld indicator	262195SP
Connection cable for MI70 indicator	219980SP



Features

- Miniature-size humidity transmitter
- Low power consumption and fast start-up for battery-powered applications
- Measurement range: 0–100 %RH; –40 ... +80 °C (–40 ... +176 °F)
- Cable detachable with standard M8 quick connector
- IP65 metal housing
- Compatible with Vaisala Insight PC software and Vaisala Indigo80 handheld indicator
- Optional RS-485 digital output supports Modbus® RTU
- ±1.5 %RH measurement accuracy (0–90 %RH)
- Temperature-only model HMP110T also available

Vaisala HUMICAP® Humidity and Temperature Probe HMP110 is a trouble-free and cost-effective humidity transmitter with high accuracy and good stability. It is suitable for volume applications or integration into other manufacturers' equipment. HMP110 is also suitable for glove boxes, greenhouses, fermentation and stability chambers, data loggers, and incubators.

Benefits

- Latest generation Vaisala HUMICAP® 180R sensor for best stability and high chemical tolerance
- HMP110R replacement probe service available for easy maintenance
- Comes with calibration certificate
- Optional dew point, wet bulb temperature, absolute humidity, mixing ratio, and enthalpy calculation

Easy installation

The probe cable has a screw-on quick connector for easy installation. Different cable lengths and accessories are available.

Low current consumption

HMP110 is suitable for battery-powered applications because of its very low current consumption. It also has a fast start-up time.

Several outputs

Temperature measurement is a standard feature in the HMP110, with dew point temperature, wet bulb temperature, absolute humidity, mixing ratio, and enthalpy as optional calculated parameters. Three standard voltage outputs are available. An optional RS-485 output with Modbus support is also available.

Flexible connectivity

In addition to analog and digital (Modbus) output options, the probe can also be used with the Vaisala Indigo80 handheld indicator. For easy-to-use

access to configuration and device analytics functionalities, the probe can be connected to Vaisala Insight software for Windows®. For more information, see www.vaisala.com/insight and www.vaisala.com/indigo80.

Robust design

The stainless steel body of HMP110 is classified as IP65, making it ideal for rough conditions. HMP110 has high chemical tolerance thanks to the HUMICAP® 180R sensor.

Easy maintenance

Maintaining measurement traceability is easy using the HMP110R replacement probe. We send you a replacement probe, you detach the old probe and send it back to us. This way the measurement is available at all times without interruptions.

Technical data

Models

Model	Output	Special features
HMP110	RH+T	-
HMP110T	T	-
HMP110R	RH+T	Replacement probe for HMP110
HMP110REF	-	Fixed output probe for validation of HMT120 and HMT130 transmitters

Measurement performance

Relative humidity	
Measurement range	0-100 %RH
Accuracy: ^{1) 2)}	
at 0 ... +40 °C (+32 ... +104 °F)	±1.5 %RH (0-90 %RH) ±2.5 %RH (90-100 %RH)
at -40 ... 0 °C (-40 ... +32 °F) and +40 ... +80 °C (+104 ... +176 °F)	±3.0 %RH (0-90 %RH) ±4.0 %RH (90-100 %RH)
Factory calibration uncertainty at +20 °C (+68 °F)	±1.1 %RH (0-90 %RH) ±1.8 %RH (90-100 %RH)
Humidity sensor types	HUMICAP® 180R HUMICAP® 180V
Stability	±2 %RH over 2 years
Temperature	
Measurement range	-40 ... +80 °C (-40 ... +176 °F)
Accuracy (probes with analog output):	
at 0 ... +40 °C (+32 ... +104 °F)	±0.2 °C (±0.36 °F)
at -40 ... 0 °C (-40 ... +32 °F) and +40 ... +80 °C (+104 ... +176 °F)	±0.4 °C (±0.72 °F)
Accuracy (probes with digital output):	
at +15 ... +25 °C (+59 ... +77 °F)	±0.1 °C (±0.18 °F)
at 0 ... +15 °C (+ 32 ... +59 °F) and +25 ... +40 °C (+77 ... +104 °F)	±0.15 °C (±0.27 °F)
at -40 ... 0 °C (-40 ... +32 °F) and +40 ... +80 °C (+104 ... +176 °F)	±0.4 °C (±0.72 °F)
Temperature sensor	Pt1000 RTD Class F0.1 IEC 60751
Analog outputs	
Accuracy at +20 °C (+68 °F)	±0.2 % of FS
Temperature dependence	±0.01 % of FS/°C (±0.006 % of FS/°F)

¹⁾ Including non-linearity, hysteresis, and repeatability.

²⁾ With HUMICAP® 180V sensor, accuracy is not specified below -20 °C (-4 °F) operating temperature.

Operating environment

Operating temperature	-40 ... +80 °C (-40 ... +176 °F)
IP rating ¹⁾	IP65

¹⁾ Not applicable with the plastic grid filter.

Compliance

EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
Compliance marks	CE, RCM, UKCA

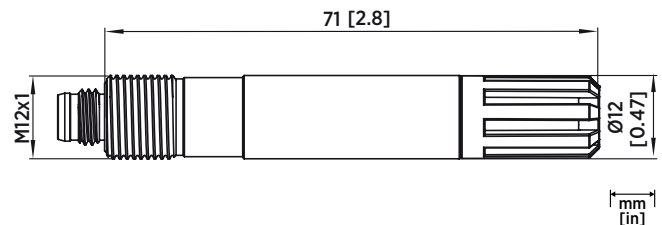
Inputs and outputs

Power consumption	1 mA average, max. peak 5 mA
Operating voltage ¹⁾	
With 1 V / 2.5 V output	5-28 V DC
With 5 V output	8-28 V DC
With loop power converter	8-28 V DC
With digital output	5-28 V DC
Start-up time	
HMP110 probes with analog output	4 s at operating voltage 13.5-16.5 V DC 2 s at other valid operating voltages
HMP110 probes with digital output	1 s
Outputs	
2 channels	0-1 V DC / 0-2.5 V DC / 0-5 V DC / 1-5 V DC
1-channel loop-power converter (separate module, compatible with humidity accuracy only)	4-20 mA
Digital output (HMP110 probes with digital output)	RS-485 2-wire half duplex, supports Modbus RTU
External loads	
0-1 V	R _L min. 10 kΩ
0-2.5 V / 0-5 V	R _L min. 50 kΩ
Output parameters	
Relative humidity, temperature, dew point temperature, wet bulb temperature, absolute humidity, mixing ratio, enthalpy	

¹⁾ Use lowest available operating voltage to minimize heating.

Mechanical specifications

Body thread	M12x1 / 10 mm (0.4 in)
Cable connector	M8 4-pin female (IEC 60947-5-2)
Materials	
Body	Stainless steel (AISI 316)
Grid filter	Chrome coated ABS plastic
Cable	Polyurethane or FEP
Weight	
Probe	17 g (0.6 oz)
Probe with 0.3 m (1 ft) cable	28 g (1 oz)



HMP110 and HMP110T probe dimensions

Spare parts and accessories

Sensors

Vaisala HUMICAP® 180R	HUMICAP180R
Vaisala HUMICAP® 180V	HUMICAP180V

Sensor protection

Plastic grid filter	DRW010522SP
Membrane filter	DRW010525SP
Stainless steel sintered filter	HM46670SP
PTFE membrane filter with stainless steel grid	ASM212652SP
PTFE sintered filter	DRW244938SP

Probe installation

Probe mounting clamp set, 10-pcs	226067
Probe mounting flange	226061
Probe holder, 5 pcs	ASM213382SP
Plastic M12 installation nuts, pair	18350SP
Flat extension cable 1 m (3 ft) ¹⁾	CBL210649SP

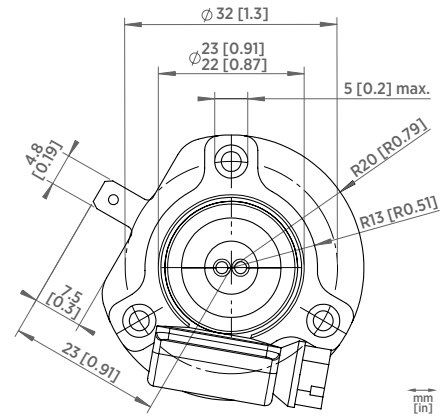
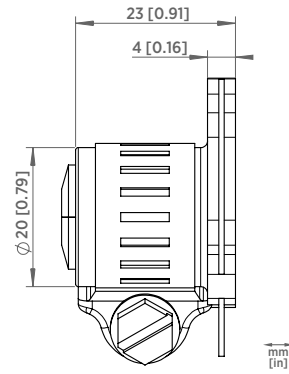
Connection adapters

4-20-mA loop power converter	UI-CONVERTER-ICB
Mounting bracket for converter	225979
USB cable for PC connection	219690
Connection cable for Indigo80 handheld indicator	262195SP
Connection cable for MI70 indicator	219980SP

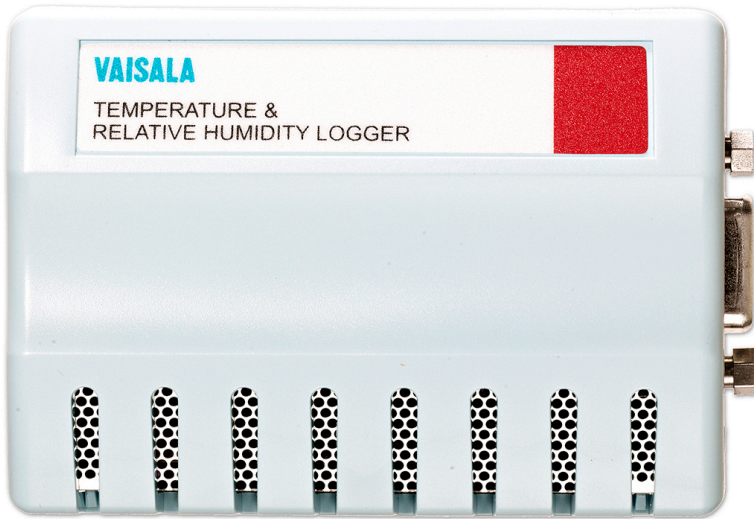
Connection cables with open wires

+60-°C 0.3-m (+140-°F 1-ft)	HMP50Z032SP
+60-°C 1.2-m (+140-°F 4-ft)	HMP50Z120
+60-°C 3-m (+140-°F 9.8-ft)	HMP50Z300SP
+80-°C 1.5-m (+176-°F 5-ft)	225777SP
+80-°C 3-m (+176-°F 10-ft)	225229SP
+180-°C 1.5-m (+356-°F 5-ft) FEP	238025
+180-°C 3-m (+356-°F 10-ft) FEP	226902SP

1) Connection cable 219980SP is also needed if this cable is used with MI70 indicator.



Probe mounting flange, side and front view



Features

- Industry-leading temperature and relative humidity measurement precision
- High accuracy, adjustable timebased digital recording
- Printed reports for any time period
- 10-year battery
- Ability to perform validation and continuous monitoring with the same model
- Traceable to SI units through national metrology institutes
- Superior alternative to chart recorders and hard-wired systems
- Integrated high-accuracy RH sensor

Vaisala's 2000 series of data loggers are designed to provide high accuracy measurements for temperature, relative humidity and an analog sensor of your choice.

The 2000 logger combines internal temperature and RH sensors with optional external channels for either current or voltage inputs for recording parameters such as differential pressure, CO₂, level, particles, or conductivity. The 2000 logger can also include a Boolean channel for door switches or alarm contacts. The 2000 logger includes calibrations traceable to SI units through national metrology institutes.¹⁾

Ideal for use in standalone or networked applications, the 2000 data logger connects directly to a PC with USB, or installs to an existing network via

Ethernet, Power over Ethernet, or WiFi. Each data logger contains a 10-year battery and onboard memory for recording at the point of measurement. With autonomous power and recording capacity, data is immune to network and power interruptions.

The DL2000 data loggers can be used with Vaisala software, either viewLinc or vLog, to download, display, and analyze environmental data. The viewLinc monitoring system provides 24/7

multi-stage alarm notification, remote, real-time monitoring and gap-free data. The vLog software is a simple solution for validation/ mapping applications. The measurement results are traceable to the international system of units (SI) through national metrology institutes (NIST USA, MIKES Finland, or equivalent) or ISO/IEC 17025 accredited calibration laboratories.

All reports are customizable and can be exported to spreadsheets and PDF to provide records that meet the requirements of 21 CFR Part 11 and Annex 11.

¹⁾ The measurement results are traceable to the international system of units (SI) through national metrology institutes (NIST USA, MIKES Finland, or equivalent) or ISO/IEC 17025 accredited calibration laboratories.

Technical Data

General

Size	85 × 59 × 26 mm (3.4 × 2.3 × 1 in)
Weight	76 g (2.7 oz.)
Interfaces	RS-232 serial, USB, WiFi, Ethernet and Power over Ethernet (vNet)
Mounting	3M Dual Lock™ fasteners
Power source	Internal 10-year lithium battery (Battery life specified at +23 °C with sample interval of 1 min or longer)
Internal clock	Accuracy ±1 min/month at -25 °C ... +70 °C (-13 ... +158 °F)
Electromagnetic compatibility	FCC Part 15 and CE EN 50581:2012 EN 55032:2012/AC:2013 Class B EN 61326-1:2013
RoHS compliance	2011/65/EU
PC Software	
Monitoring, alarming and reporting	viewLinc
Validation/mapping GxP environments	vLog VL for validated vLog SP for non validated
Adding loggers to an existing OPC-compatible monitoring system	OPC Server

Channel Configuration and Recording Span

Model	Channel Types			
	CH 1	CH 2	CH 3	CH 4
2000-20R	T	RH		
2000-3CR	T	RH	4 ... 20 mA	
2000-35R	T	RH	0 ... 5 VDC	
2000-3AR	T	RH	0 ... 10 VDC	
2000-4BR	T	RH	Boolean	Boolean
Number of Channels Enabled¹⁾				
Sample Interval	1	2	3	4
10 seconds	14.1 days	7.1 days	4.7 days	3.5 days
1 minute	2.8 months	1.4 months	23.8 days	21.2 days
5 minutes	1.2 years	7.1 months	4.7 months	3.5 months
15 minutes	3.5 years	1.7 years	1.2 years	10.6 months
1 hour	13.9 years	7.0 years	4.6 years	3.5 years

1) Temperature channel must be enabled when the RH channel is enabled.

Memory

Sample capacity	122 197 12-bit samples
Memory type	Non-volatile EEPROM
Memory modes	User-selectable wrap (FIFO) or stop when memory is full. User-selectable start and stop times.
Sampling rates	User-selectable from once every 10 seconds to once a day.

Current Loop and Voltage Inputs

Input Type	Current Loop	Analog Voltage
Available ranges	0 ... 22 mA	0 ... 5 VDC, 0 ... 10 VDC
Resolution	5.5 µA	0.025 % F.S.
Accuracy	±0.15 % F.S. at +25 °C (+77 °F)	±0.15 % F.S. at +25 °C (+77 °F)
Input impedances	75 Ω ¹⁾	>1 MΩ
Isolation	One common per logger	One common per logger
Overload protection	40 mA max. (reverse-polarity protected)	±24 VDC max. (reverse-polarity protected)

1) Termination resistance plus approximately 0.4 volt drop through a protection diode.

Internal Sensors

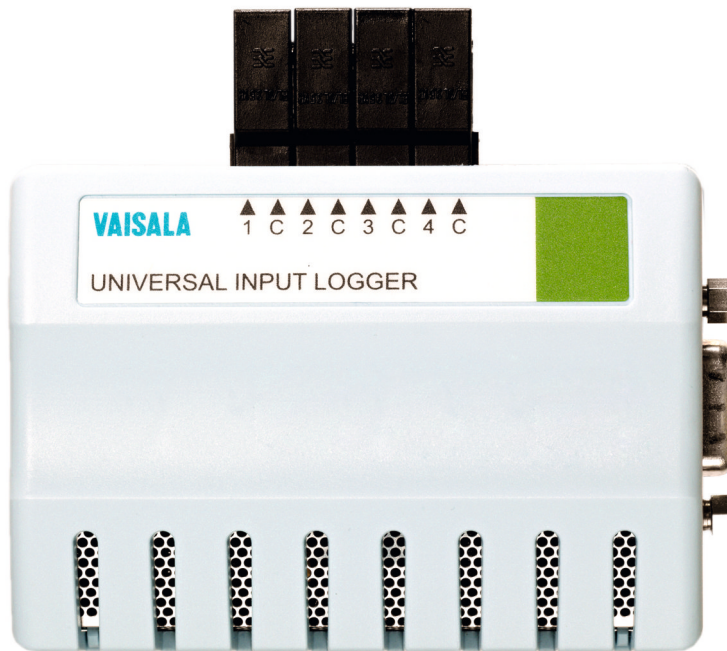
Internal Temperature Sensor	
Calibrated measurement range ¹⁾	-25 ... +70 °C (-13 ... +158 °F)
Operating range	-35 ... +85 °C (-31 ... +185 °F)
Initial accuracy ²⁾	± 0.10 °C over +20 °C ... +30 °C (± 0.18 °F over +68 °F ... +86 °F) ± 0.20 °C over -25 °C ... +70 °C (± 0.36 °F over -13 °F ... +158 °F)
One Year Accuracy ³⁾	± 0.15 °C over +20 °C ... +30 °C (± 0.27 °F over +68 °F ... +86 °F) ± 0.25 °C over -25 °C ... +70 °C (± 0.45 °F over -13 °F ... +158 °F)
Resolution	0.02 °C at +25 °C (0.04 °F at +77 °F)
Internal RH Sensor	
Calibrated measurement range ¹⁾	45 %RH at +10 °C (+50 °F) 10 ... 80 %RH at +25 °C (+77 °F) 45 %RH at +45 °C (+113 °F)
Operating range	0 ... 100 %RH (non-condensing)
Initial accuracy ²⁾	± 1 %RH over 10 ... 80 %RH at +20 ... +30 °C (+68 ... +86 °F) ± 1.5 %RH over 80 ... 90 %RH at +20 ... +30 °C (+68 ... +86 °F) ± 2 %RH over 10 ... 90 %RH at -20 ... +70 °C (-4 ... +158 °F)
One year accuracy ³⁾	± 2 %RH over 10 ... 90 %RH at +20 ... +30 °C (+68 ... +86 °F) ± 3 %RH over 10 ... 90 %RH at -20 ... +70 °C (-4 ... +158 °F)
Resolution	0.05 %RH

1) Custom calibration points available upon request including full ICH coverage.

2) Initial accuracy includes all known influence quantities present at the time of calibration including calibration uncertainty, mathematical fit, data logger resolution, hysteresis and reproducibility.

3) One Year Accuracy includes all known influence quantities present during the operation of a data logger over the course of one year including Initial Accuracy and Long Term Drift. Not included is any drift related to atypical contamination or misuse.





Features

- 10-year battery and large onboard memory
- Single and multi-channel models with up to four input channels
- Easily set scaling and measurement units for recording
- Time-based digital recording in a range of sample intervals
- Multiple connectivity options - USB, Ethernet, WiFi
- Optional vNet cradle for Ethernet or Power over Ethernet connectivity
- Traceable to SI units through national metrology institutes.
- Two year limited warranty

DL4000 series of data loggers are designed to interface with a wide range of transducers, transmitters, and sensors with a DC voltage or 0 - 20 mA current loop output.

DL4000 is a simple solution for recording and monitoring pressure, flow, fluid level, PH, electrical properties, moisture and gas concentrations.

Ideal for use in standalone or networked applications, the DL4000 Universal Input logger connects directly to a PC with USB or installs to an existing network via Ethernet, Power over Ethernet or WiFi. Each logger contains a 10-year battery and onboard memory for recording a wide range of variables at the point of measurement. With autonomous power and recording capacity, data is immune to network and power interruptions.

The DL4000 data loggers can be used with Vaisala software, either viewLinc or vLog, to download, display, and analyze environmental data. The viewLinc monitoring system provides 24/7 multi-stage alarm notification, remote, real-time monitoring and gap-free data. The vLog software is a simple solution for validation/mapping applications. The DL4000 data loggers include calibrations traceable to SI units through national metrology institutes.¹⁾

All reports are customizable and can be exported to spreadsheets and PDF to provide records that meet the requirements of 21 CFR Part 11 and Annex 11.

Choose the DL4000 VL series data logger for GxP-compliant environments and the DL4000 SP series for non-GxP applications.

¹⁾ Measurement results are traceable to the international system of units (SI) through national metrology institutes (NIST USA, MIKES Finland, or equivalent) or ISO/IEC 17025 accredited calibration laboratories.

Technical Data

General specifications

Operating range	-40 ... +85 °C (-40 ... +185 °F) and 0 ... 100 %RH (non-condensing)
Interfaces	RS-232 serial USB Wifi module Ethernet and Power over Ethernet (vNet)
Weight	76 g (2.7 oz)
Size	85 × 59 × 26 mm (3.4 × 2.3 × 1 in)
Mounting	3M Dual Lock™ fasteners
PC software	Graphing & Reporting Software vLog SP for SP-series vLog VL for VL-series viewLinc for continuous monitoring & alarming OPC Server to add on to existing OPC compatible monitoring systems
Internal clock	Accuracy ±1 min/month at -25 ... +70 °C (-13 ... +158 °F)
Electromagnetic compatibility	FCC Part 15 and CE EN 50581:2012 EN 55032:2012/AC:2013 Class B EN 61326-1:2013
RoHS compliance	2011/65/EU
Power source	Internal 10-year lithium battery (Battery life specified with sample interval of 1 min or longer)

Memory specifications

Memory type	Non-volatile EEPROM
Data sample capacity	120 000 12-bit samples
Memory modes	User-selectable wrap (FIFO) or stop when memory is full. User-selectable start and stop times.
Sampling rates	User-selectable from once every 10 seconds to once a day. (Battery life specified with sample interval of 1 min or longer)
Recording span	Recording span depends upon sample interval selected and number of channels enabled. Please see table above.

Recording span

	1	2	3	4
10 seconds	13.8 days	6.9 days	4.6 days	3.4 days
1 minute	2.7 months	1.3 months	27.7 days	20.8 days
5 minutes	1.1 years	6.9 months	4.6 months	3.4 months
15 minutes	3.4 years	1.7 years	1.1 years	10.4 months
1 hour	13.6 years	6.8 years	4.5 years	3.4 years

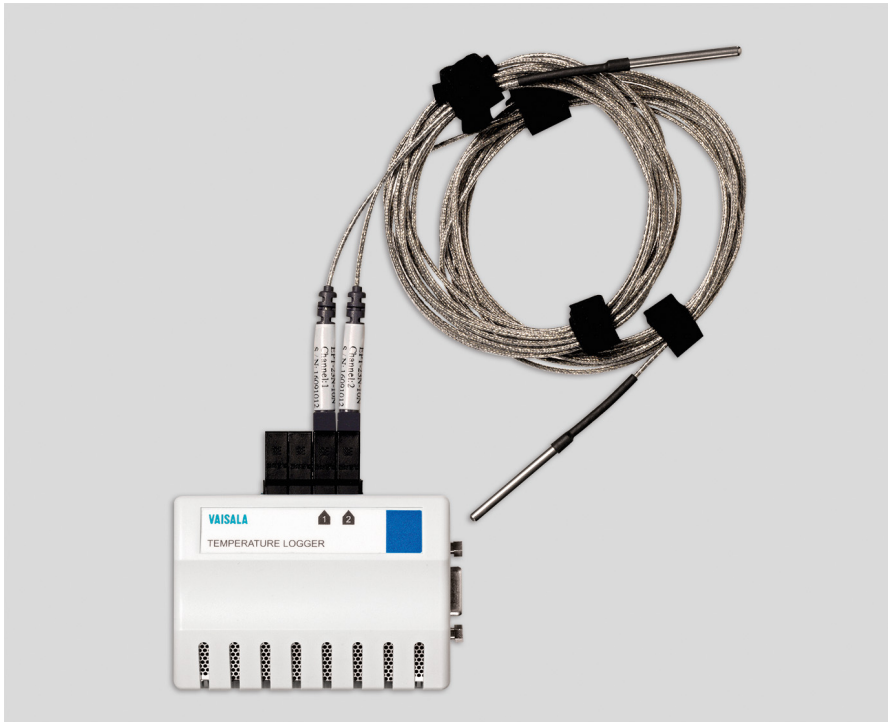
Current loop and voltage inputs

Available ranges	0 ... 20mA	0 ... 5 V DC, 0 ... 10 V DC
Resolution	5.5 µA	0.025 % F.S.
Accuracy	±0.15 % F.S. at +25 °C (+77 °F)	±0.15 % F.S. at +25 °C (+77 °F)
Input impedances	75 Ω	> 1 MΩ
Isolation	One common per logger	One common per logger
Overload protection	40 mA max. (reverse-polarity protected)	±24 V DC max. (reverse-polarity protected)

Channel configurations

4000-405	0 ... 5 V DC
4000-40A	0 ... 10 V DC
4000-40C	0 ... 20 mA





Features

- Industry-leading precision and accuracy
- Printed reports for any time period
- Internal battery with up to 10 years' lifetime
- Validation and continuous monitoring with the same model
- 2-year limited warranty
- Superior alternative to chart recorders and hard-wired systems
- Timebase calibrated over the operating temperature range
- Adjustable time-based recording
- Snap-in logger cradle for easy network connectivity
- Two probe options give high accuracy – from $-90\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$ ($-130\text{ }^{\circ}\text{F}$ to $+158\text{ }^{\circ}\text{F}$)
- Traceable to SI units through national metrology institutes

The DL1000-1400 temperature data loggers include the VL series for regulated environments and the SP series for non FDA/GxP regulated industries.

Suitable for validated and standard precision monitoring

Validatable data loggers, together with Vaisala software solutions, provide a superior, high accuracy solution for use in FDA/GxP regulated environments by ensuring tamperproof files and electronic records that meet 21 CFR Part 11 requirements.

The DL1000-1400 temperature data loggers include calibrations traceable to SI units through national metrology institutes.¹⁾

DL data loggers are compatible with the browser-based Vaisala viewLinc continuous monitoring software. viewLinc provides 24/7 multi-stage alarm notification and remote monitoring, and is suitable for regulated environments.

Additional software options include vLog VL for regulated environments and vLog SP for standard precision monitoring. vLog software solutions allow downloading, displaying, analyzing, and reporting of recorded environmental data.

Applications

The DL1000-1400 temperature data loggers are ideal for monitoring and validation of:

- Refrigerators and freezers (to $-90\text{ }^{\circ}\text{C}$ ($-130\text{ }^{\circ}\text{F}$))
- Incubators
- Stability chambers
- Warehouses
- Ambient conditions

Autonomous power and recording capacity

Each data logger contains a battery²⁾ and onboard memory for recording at the point of measurement. With autonomous power and recording capacity, data is immune to network and power interruptions.

1) Measurement results are traceable to the international system of units (SI) through national metrology institutes (NIST USA, MIKES Finland, or equivalent) or ISO/IEC 17025 accredited calibration laboratories.

2) Expected battery lifetime up to 10 years in typical use.

Technical data

General specifications

Interfaces	<ul style="list-style-type: none"> Internal: RS-232 serial With additional connectors/devices: USB, Ethernet, Wi-Fi, PoE
PC software	<ul style="list-style-type: none"> vLog software for graphing and reporting (vLog SP for SP series and vLog VL for VL series) viewLinc Enterprise Server software for continuous monitoring and alarming OPC DA Server to add Vaisala recorders to any OPC-compatible monitoring system
Internal clock	Accuracy ±1 min/month -25 °C ... +70 °C (-13 °F ... +158 °F)
Logger operating/Storage range	-40 °C ... +85 °C (-40 °F ... +185 °F) 0 ... 100 %RH non-condensing
Power source	Internal lithium battery with typical lifetime of 10 years ¹⁾

1) Typical battery lifetime specified with sample interval of 1 min or longer.

Mechanical specifications

Size	85 × 59 × 26 mm (3.4 × 2.3 × 1 in)
Weight	76 g (2.7 oz)
Mounting	3M Dual Lock™ fasteners Snap-in connector locks provide secure probe connections

Internal temperature sensor

1000-21x series	Precision-tolerance epoxy-encapsulated NTC thermistor
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Memory

1000-2XX series	48 100 12-bit samples
1400-44X series	85 300 12-bit samples
Memory type	Non-volatile EEPROM
Memory modes	User selectable: wrap (FIFO) or stop when memory is full. User selectable start time. User selectable stop time (VL series only).
Sampling rates	User-selectable (in 10-second intervals) from once every 10 seconds to once a day.

Compliance

EU directives and regulations	EMC Directive (2014/35/EU) RoHS Directive (2011/65/EU) amended by 2015/863
Electromagnetic compatibility (EMC)	IEC/EN 61326-1, industrial environment
EMC emissions	CISPR 32 / EN 55032, Class B FCC part 15 B, Class B
Compliance marks	CE, China RoHS, RCM

Recording span: 1000-2xx

Sample interval	Number of channels enabled	
	1	2
10 seconds	5.5 days	2.7 days
1 minute	1.1 months	16.7 days
5 minutes	5.5 months	2.7 months
15 minutes	1.3 years	8.3 months
1 hour	5.4 years	2.7 years



Data logger model VL-1000-21x



Data logger model VL-1000-22x

Technical data

Recording span: 1400-44x

Sample interval	Number of channels enabled			
	1	2	3	4
10 seconds	9.8 days	4.9 days	3.2 days	2.4 days
1 minute	1.9 months	29.6 days	19.7 days	14.8 days
5 minutes	9.8 months	4.9 months	3.2 months	2.4 months
15 minutes	2.4 years	1.2 years	9.8 months	7.4 months
1 hour	9.7 years	4.8 years	3.2 years	2.4 years



Data logger model VL-1400-44x

EPT series temperature probes

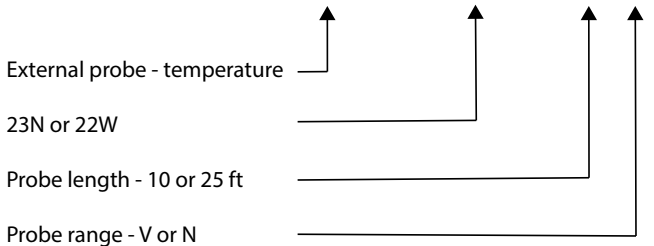
Sensor models	
"N" range external probes	EPT-23N-XXN and EPT-22W-XXN
Operating/storage range	-40 °C ... +95 °C (-40 ... +203 °F)
Connector color code	Black
"V" range external probes	EPT-23N-XXV and EPT-22W-XXV
Operating/storage range	-95 °C ... +95 °C (-139 ... +203 °F)
Connector color code	Blue
Sensor tips	
EPT-23N-XXX	Stainless steel Diameter 3.2 mm (0.13 in) Length 38 mm (1.5 in)
EPT-22W-XXX (liquid submersible)	Sealed Teflon® tip Diameter 3 mm (0.12 in) Length 28 mm (1.1 in)
Probe lengths	3 m (10 ft) and 7.6 m (25 ft)
Cable construction	2 mm (0.08 in) diameter Teflon® coated cable

Temperature probe accessories

Thermal dampening block, for use in refrigerators and freezers, simulates a glycol bottle to reduce viewLinc alarms generated by opening and closing a door.



EPT - XXX - XXX



Technical data

Temperature range and accuracy

Internal sensor

Calibrated measurement range	-25 ... +70 °C (-13 ... +158 °F)
Operating/storage range	-40 ... +85 °C (-40 ... +185 °F)
	0 ... 100 %RH non-condensing

Initial accuracy ¹⁾	±0.10 °C over +20 ... +30 °C (±0.18 °F over +68 ... +86 °F)
	±0.20 °C over -25 ... +70 °C (±0.36 °F over -13 ... +158 °F)

1-year accuracy ²⁾	±0.15 °C over +20 ... +30 °C (±0.27 °F over +68 ... +86 °F)
	±0.25 °C over -25 ... +70 °C (±0.45 °F over -13 ... +158 °F)

External probes - all models

"N" range external probe

Calibrated measurement range	-25 ... +70 °C (-13 ... +158 °F)
Operating/storage range	-40 ... +95 °C (-40 ... +203 °F)
Initial accuracy ^{1) 3)}	±0.10 °C over +20 ... +30 °C (±0.18 °F over +68 ... +86 °F)

	±0.20 °C over -25 ... +70 °C (±0.36 °F over -13 ... +158 °F)
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1-year accuracy ^{2) 3)}	±0.20 °C over +20 ... +30 °C (±0.36 °F over +68 ... +86 °F)
	±0.25 °C over -25 ... +70 °C (±0.45 °F over -13 ... +158 °F)

Resolution	0.02 °C at +25 °C (0.04 °F at +77 °F)
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"V" range external probe

Operating/storage range	-95 ... +95 °C (-139 ... +203 °F)
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Initial accuracy ^{1) 3)}	±0.20 °C over -90 ... -40 °C (±0.36 °F over -130 ... -40 °F)
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1-year accuracy ^{2) 3)}	±0.25 °C over -90 ... -40 °C (±0.45 °F over -130 ... -40 °F)
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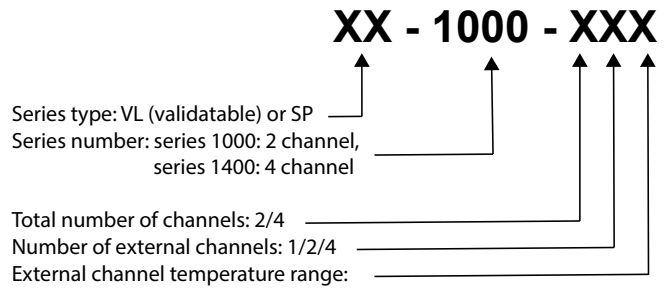
Resolution	0.02 °C at -80 °C (0.04 °F at -112 °F)
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Calibrated measurement range	-90 ... -40 °C (-130 ... -40 °F)
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- 1) Initial accuracy includes all known influence quantities present at the time of calibration including calibration uncertainty, mathematical fit, data logger resolution, hysteresis, and reproducibility.
- 2) 1-year accuracy includes all known influence quantities present during the operation of a data logger over the course of 1 year including initial accuracy and long term drift. Not included is any drift related to atypical contamination or misuse.
- 3) Specification for external channels is for a probe calibrated to the specific channel of the data logger and with the data logger at -25 °C ... +70 °C (-13 °F ... +158 °F).

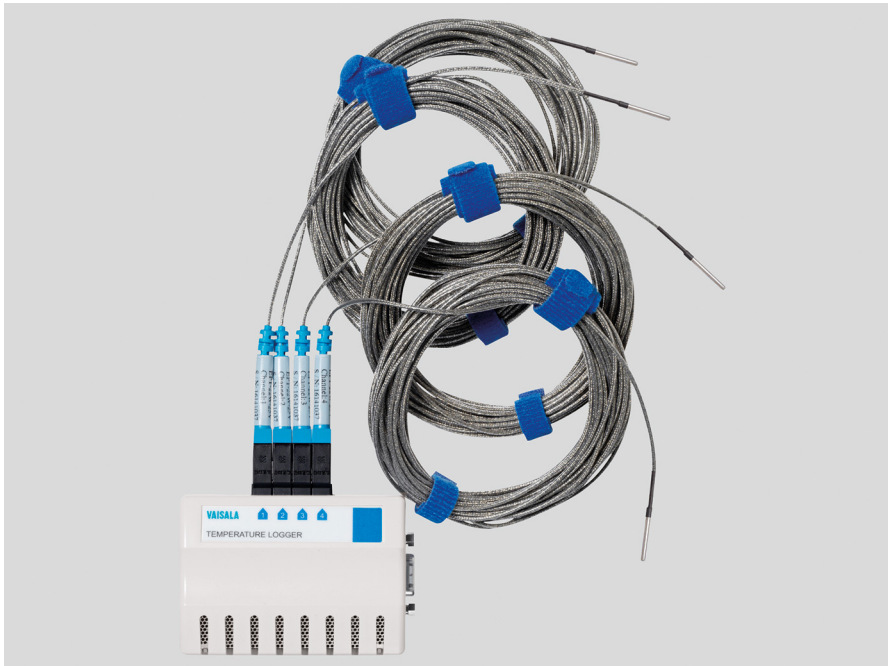
Product part number legend

Guide for reading the product tables and selecting the most appropriate model for your application.





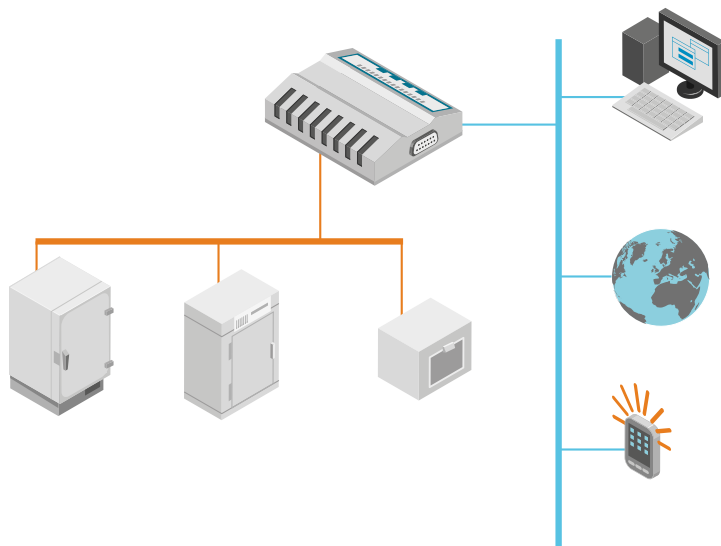
DL1016-1416 Multi-application Temperature Data Logger



Features

- Industry-leading precision and accuracy
- Real-time monitoring & alarming with viewLinc software
- Reliable validation/mapping with vLog software
- Easy connectivity to your existing network – wired or wireless
- Validation and continuous monitoring with the same data logger
- Superior alternative to chart recorders and hard-wired systems
- Traceable to SI units through national metrology institutes

Vaisala's multi-application temperature data loggers monitor temperatures in up to four applications with one logger – ultra-low temperature freezers, freezer/refrigerators and incubators.



DL1016-1416 data loggers include calibrations traceable to SI units through national metrology institutes.¹⁾

Choose the DL1016-1416 VL series data logger for GxP-compliant environments and the DL1016-1416 SP series for non-GxP applications.

Model numbers and channels

- VL-1016-22V: Two external channels for validatable applications
- VL-1416-44V: Four external channels for validatable applications
- SP-1016-22V: Two external channels
- SP-1416-44V: Four external channels

DL1016-1416 data loggers can be used with Vaisala software, either viewLinc or vLog, to download, display, and analyze environmental data.

The viewLinc monitoring system provides 24/7 multi-stage alarm notification, remote, real-time monitoring and gap-free data.

The vLog software is a simple solution for validation/mapping applications.

All reports are customizable and can be exported to spreadsheets and PDF to provide records that meet the requirements of 21 CFR Part 11 and Annex 11.

¹⁾ Measurement results are traceable to the international system of units (SI) through national metrology institutes (NIST USA, MIKES Finland, or equivalent) or ISO/IEC 17025 accredited calibration laboratories.

Technical data

General specifications

Interfaces	<ul style="list-style-type: none"> Internal: RS-232 serial With additional connectors/devices: USB, Ethernet, Wi-Fi, PoE
Software	<ul style="list-style-type: none"> vLog software for graphing and reporting viewLinc Enterprise Server software for continuous monitoring and alarming OPC Server to add Vaisala recorders to any OPC-compatible monitoring system
Internal clock accuracy	±1 min/month 0 ... +50 °C (+32 ... +122 °F)
Power source	Lithium battery with typical lifetime of 10 years ¹⁾

¹⁾ Typical battery life specified with sample interval of 1 min or longer.

Measurement performance

Sensor	"V" Range External Probe
Calibrated measurement range	-90 ... +50 °C (-130 ... +122 °F)
Operating range	-95 ... +70 °C (-139 ... +158 °F)
Initial accuracy ¹⁾	±0.25 °C over -90 ... +50 °C (±0.45 °F over -130 ... +122 °F)
One year accuracy ¹⁾	±0.35 °C over -90 ... +50 °C (±0.63 °F over -130 ... +122 °F)
Resolution	0.01 °C at +25 °C (0.02 °F at +77 °F)

¹⁾ 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 +77 °F).

Memory

1016 Series	68 600 16-bit samples
1416 Series	101 375 16-bit samples
Memory type	Non-volatile EEPROM
Memory modes and sampling rates	User-selectable rates from once every 10 seconds to once per day (with sample interval of ≥1 min)

Operating environment

Operating temperature	0 ... +50 °C (+32 ... +122 °F)
Operating humidity	0 ... 100 %RH non-condensing
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Storage humidity	0 ... 100 %RH non-condensing

Recording span: 1016-22V

Sample interval	Number of channels enabled	
	1	2
1 minute	1.5 months	23.8 days
5 minutes	7.6 months	3.8 months
15 minutes	1.9 years	11.5 months
1 hour	7.8 years	3.9 years

Recording span: 1416-44V

Sample interval	Number of channels enabled			
	1	2	3	4
1 minute	2.3 months	1.1 months	23.5 days	17.6 days
5 minutes	11.3 months	5.6 months	3.7 months	2.8 months
15 minutes	2.8 years	1.4 years	11.3 months	8.5 months
1 hour	11.5 years	5.7 years	3.8 years	2.8 years

Thermistor probes

Sensor	"V" range external probe
Operating temperature	-95 ... +70 °C (-139 ... +158 °F)
Connector color code	Blue
Probe length	3 m (10 ft) and 7.6 m (25 ft) lengths available
Cable construction	2 mm (0.07 in) diameter, Teflon coated cable

Stainless steel sensor tip

Diameter	3.2 mm (1/8 in)
Length	38 mm (1.5 in)

Sealed Teflon sensor tip

Diameter	3 mm (0.12 in)
Length	28 mm (1.1 in)

Mechanical specifications

Dimensions	85 × 59 × 26 mm (3.4 × 2.3 × 1 in)
Weight	76 g (2.7 oz)
Mounting	3M Dual Lock™ fasteners Snap-in connector locks provide secure probe connections

Compliance

EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
EMC emissions	EN 55032:2012/AC:2013 Class B
Compliance marks	CE, FCC Part 15

Spare parts and accessories

Immersion/Dry probes

Thermistor V range probe 25 ft	235139SP
Thermistor V range probe 10 ft	235218SP
Thermistor immersion V range probe 25 ft	235140SP
Thermistor immersion V range probe 10 ft	235217SP

Temperature probe accessories

Thermal dampening block, for use in refrigerators and freezers. The block simulates a glycol bottle to reduce alarms generated by opening and closing a door.	EPT-TDB-2
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Designed for Controlled Environments

- Extreme temperatures
- Liquid nitrogen (LN₂)
- Ovens
- Sterilization chambers

The Vaisala DL1700 series data loggers provide highly accurate temperature data acquisition and are ideal for demanding environments. The DL1700 data loggers can be used with Vaisala software, either viewLinc or vLog, to download, display, and analyze environmental data.

Applications

- Ideal for extreme temperatures from -240 °C to +1760 °C
- Accepts type J, K, T, E, R and S thermocouples
- No programming or complicated equations required
- Highly accurate replacement for bulky data acquisition systems
- Traceable to SI units through national metrology institutes

The viewLinc monitoring system provides 24/7 multi-stage alarm notification, remote, real-time monitoring and gap-free data. The vLog software is a simple solution for validation/ mapping applications. All reports are customizable and can be exported to spreadsheets and PDF to provide records that meet the requirements of 21 CFR Part 11 and Annex 11.

Easy to use with standard thermocouples, these compact data loggers can offer up to five channels of data in temperatures ranging from -240 °C to +1760 °C.

We offer models for both validated and non-validated applications. Choose the DL1700 VL series for GxP-compliant environments and the DL1700 SP series for non-validated applications.

DL1700 series data loggers include calibrations traceable to SI units through national metrology institutes. ¹⁾

¹⁾ Measurement results are traceable to the international system of units (SI) through national metrology institutes (NIST USA, MIKES Finland, or equivalent) or ISO/IEC 17025 accredited calibration laboratories.

Technical Data

General

Interfaces	RS-232 serial, USB, Ethernet, WiFi network interface available
Internal clock	Accuracy: ± 1 min./month at -25 ... +70 °C
Software	viewLinc for Monitoring, Alarming and Reporting vLogVL for Validation/ Mapping GxP environments vLogSP for graphing and reporting non-GxP environments OPC Server to add Vaisala loggers to any OPC- compatible monitoring system

Temperature Accuracy

	Temperature Measurement Range	Accuracy at Mid-range	Resolution at Mid-range
Type K	-220 ... +1370 °C (-364 ... +2498 °F)	± 1.3 °C (± 2.3 °F)	0.37 °C (0.67 °F)
Type J	-130 ... +900 °C (-202 ... +1652 °F)	± 1.0 °C (± 1.8 °F)	0.29 °C (0.52 °F)
Type T	-240 ... +350 °C (-400 ... +662 °F)	± 1.2 °C (± 2.2 °F)	0.34 °C (0.61 °F)
Type E	-110 ... +740 °C (-166 ... +1364 °F)	± 0.70 °C (± 1.3 °F)	0.20 °C (0.36 °F)
Type R	-50 ... +1760 °C (-58 ... +3200 °F)	± 4.4 °C (± 7.9 °F)	1.3 °C (2.3 °F)
Type S	-50 ... +1700 °C (-58 ... +3092 °F)	± 5.1 °C (± 9.2 °F)	1.5 °C (2.7 °F)

Operating Environment

Operating temperature	-40 ... +85 °C (-40 ... +185 °F)
Operating humidity	0 ... 100 %RH (non-condensing)
EMC compliance	FCC Part 15 and CE EN 50581:2012 EN 55032:2012/AC:2013 Class B EN 61326-1:2013
RoHS compliance	2011/65/EU

Mechanical Specifications

Dimensions	85 × 59 × 26 mm (3.4 × 2.1 × 1 in)
Weight	60 g (2.7 oz)
Mounting	3M Dual Lock™ fasteners
Power source	Internal 10-year lithium battery (Battery life specified with sample interval of 1 min. or longer)

Cold Junction Temperature Channel

Measurement range	-40 ... +85 °C (-40 ... +185 °F)
Accuracy	± 0.25 °C over +20 ... +30 °C (± 0.45 °F over +68 ... +86 °F) ± 0.35 °C over -25 ... +70 °C (± 0.63 °F over -13 ... +158 °F)

Data Logger Inputs

1700 Model	Number of Channels Enabled		
	Thermocouple	CJT	Total
170-54T	4	1	5

Note: One channel is designated for Cold Junction Temperature (CJT) reference using an on-board precision-tolerance thermistor.

Thermocouple Input Channels

Compatible Thermocouple Types: J, K, T, E, R, S	
Initial Accuracy	
Input range	-7.2 ... +55.4 mV
Resolution	0.016 mV
Initial Accuracy	± 0.042 mV at +25 °C (+77 °F)
Input Impedance: 10M Ω	
Input range	-7.2 ... +55.4 mV
Resolution	0.016 mV
1-Year Accuracy	± 0.055 mV at +25 °C (+77 °F)
Additional Error	
At 3 V/m RF field from 450 MHz ... 580 MHz	± 0.350 mV
At 3 V conducted RF from 3 MHz ... 80 MHz	± 1.0 mV

Memory

Memory type	Non-volatile EEPROM
Data sample capacity	135,165 12-bit samples
Memory modes	User-selectable wrap (FIFO) or stop when memory is full. User-selectable start time.
Sampling rates	User-selectable from once every 10 seconds to once a day. (Battery life specified with sample interval of 1 min. or longer)
Recording span	Recording span depends upon sample interval selected and number of channels enabled.

Spare Parts and Accessories

Thermocouple probe	EPT-22T-20T
Type	T
Conductors	Copper/Constantan
Operating range	-200 ... +200 °C (-328 ... +392 °F)
Length	6.096 m (20 ft)
Error	± 1 °C ... ± 1.5 %





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 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 to $+50$ °C (-67 to 122 °F).

The MR loggers include calibrations traceable to SI units through national metrology institutes to ensure cGMP, ISO 9000, and HACCP quality standards.¹⁾ Optional services are available, including extended warranties and onsite calibration.

Easy configuration

Additional connectivity devices enable data transfer with several options, including USB, wireless, and Power over Ethernet with the vNet PoE network interface. When MR loggers are used with the 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. For information on IQOQ documents, see www.vaisala.com/gamp-gxp-validation.

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

¹⁾ 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, Wi-Fi, vNet PoE network interface
Software	<ul style="list-style-type: none">vLog Validation/MappingviewLinc Continuous Monitoring & AlarmingOPC DA Server to add Vaisala loggers to any OPC compatible monitoring system
Internal clock accuracy	±1 min/month 0 to +50 °C (+32 to +122 °F)
Power source	Lithium battery with typical lifetime of 10 years ¹⁾

¹⁾ Typical 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 (Typical battery life specified with sample interval of 1 min or longer)
Data sample capacity	
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 Snap-in connector for secure probe connections

Temperature sensors

Internal sensor type	Precision-tolerance epoxy encapsulated NTC thermistor
Cable construction	2 mm (0.07 in) 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)

Compliance

EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
EMC emissions	EN 55032:2012/AC:2013 Class B
Compliance marks	CE, FCC Part 15

Technical data

DL1000MR internal temperature sensor

Range and accuracy

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

¹⁾ 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 at -25 ... +70 °C (-13 ... +122 °F) ¹⁾	±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"> • 45 %RH at +10 °C (+50 °F) • 10 %RH and 80 %RH at +25 °C (+77 °F) • 45 %RH at +25 °C (+77 °F) • 45 %RH at +45 °C (+113 °F)
Operating range	0 ... 100 %RH (non-condensing)
Temperature range +20 ... +30 °C (68 ... 86 °F)	10 ... 90 %RH ±2.0 %RH
Temperature range -20 ... +20 °C, +30 ... +70 °C (-4 ... 68 °F, 86 ... 158 °F)	10 ... 90 %RH ±3.0 %RH
Resolution	0.05 %RH
Humidity sensor	HUMICAP® 180R
Stability	±2 %RH over 2 years

¹⁾ 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 (0.02 °F at +77 °F)
Accuracy over temperature range at -55 ... +50 °C (-67 ... +122 °F) ¹⁾	±0.5 °C (±0.9 °F)

¹⁾ 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

Thermal dampening block, for use in refrigerators and freezers. The block simulates a glycol bottle to reduce alarms generated by opening and closing doors.	EPT-TDB
Cable with magnetic contact switch (7.6 m (25 in)) for use with MRB loggers	EPT-DS-25



Features

- Eliminates the cost of wiring AC power to each monitored point
- Data loggers can be installed wherever a LAN cable can be run
- Increased data communication protection from power outage because the server room's UPS can provide backup power
- Plug and Play connectivity when using viewLinc Aware function

Wherever reliable network communications and cost are important, more companies are using Power over Ethernet (PoE) devices. Vaisala vNet PoE network interface brings easy connectivity with Vaisala DL series data loggers at a lower cost than alternative networking devices.

The snap-in design streamlines data logger connectivity into a small footprint, eliminating wires between normally separate data loggers and PoE devices. When power and data are carried over the same cable, you can also eliminate the cost of installing an AC power source.

vNet PoE integrates VL and SP data loggers without compromising their high accuracy. It brings greater flexibility and simplicity to the deployment of Vaisala Continuous Monitoring system.

The viewLinc Aware function in viewLinc monitoring software allows you to quickly configure data loggers, alone or in batches. Simply place data loggers in a vNet cradle, connect to a Local Area Network, and viewLinc discovers and configures the data loggers.

vNet PoE interface comes in four models:

- CDL-VNET-P with a fan inside the cradle for data loggers with an internal temperature channel
- CDL-VNET-LP without a fan for data loggers without an internal temperature channel
- CDL-VNET-PC with 15 V output to power external sensors and transmitters; includes internal fan
- CDL-VNET-LPC with 15 V output to power external sensors and transmitters; without internal fan

There is also an option to power the interface with AC. Select the model that fits your application to monitor and record temperature, humidity, CO₂, differential pressure, door switches, and many other parameters.

Technical Data

Measurement performance

Heating effect on measurements

CDL-VNET-P and CDL-VNET-PC	Temperature rise from electronics (important only for data loggers with internal sensors): < 0.05 °C as seen by the data logger sensor
CDL-VNET-LP and CDL-VNET-LPC	Not to be used for data loggers with internal sensors

Operating environment

Operating temperature	-25 ... +70 °C (-13 ... +158 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Operating humidity	0 ... 90 %RH (non-condensing and not to exceed a mixing ratio of 38.5 g/kg)

Inputs and outputs

Ethernet connectivity	IEEE 802.3af (Class 1) ¹⁾ , bandwidth 10Base-T
Connectivity cable	Category 5/5e RJ-45 connector 1.83 m (6 ft)
Operating voltage ²⁾	12 ... 30 V DC Plugs into vNet jack labeled 12 V

Output voltage

CDL-VNET-P and CDL-VNET-LP	Not available
CDL-VNET-PC and CDL-VNET-LPC	Nominal: 15 V DC Maximum: 350 mW

Power consumption

CDL-VNET-P and CDL-VNET-LP	Typical: 625 mW Maximum: 700 mW
CDL-VNET-PC and CDL-VNET-LPC	Typical: 900 mW Maximum: 1.35 W

Power supply ³⁾

North America	12 V DC / 0.5 A max. out 120 V AC in
International	12 V DC / 1.66 A max. out 100 ... 240 V AC in

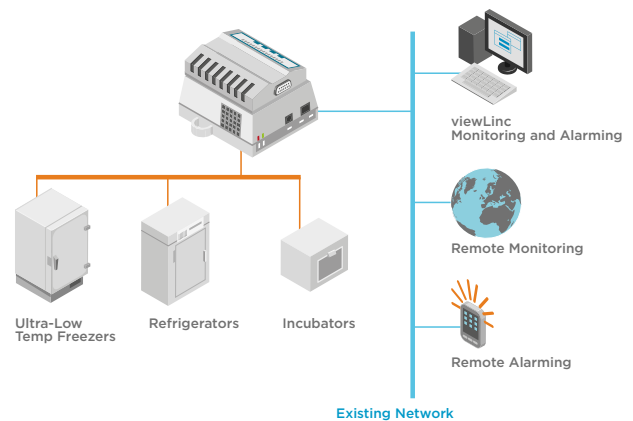
1) Max. PSE power reservation is 4.00 W.
2) Optional for use without PoE.
3) Included but not required when using PoE.

Mechanical specifications

Dimensions (H × W × L)	43 × 102 × 102 mm (1.7 × 4.0 × 4.0 in)
Weight	180 g (6.3 oz)

General specifications

Data logger compatibility	v6.00 hardware and higher Includes models VL and SP 1000, 1700, 1200, 1016, 1416, 1400, 2000, 4000
LED indicators	Link, activity, power, data logger communications
Device configuration	HTTP Web Interface PC-based configuration wizard
viewLinc Aware	Requires one vNet to be programmed with the viewLinc server IP address. Other vNets on the subnet will automatically self-configure.
Addressing	DHCP/RARP ARP-Ping Static IP for IP address assignment Net BIOS name
Firmware	Field upgradable firmware
Compliance	
Emissions/Immunity	FCC Part 15 and CE EN 50581:2012 EN 55032:2012/AC:2013 Class B EN 61326-1:2013
Conformity	RoHs, 2011/65/EU WEEE





Features

- Accurate and reliable measurement with Vaisala HUMICAP® humidity sensor technology
- Interchangeable probe (easy field calibration)
- Resistant to dust and most chemicals
- Enclosure IP65
- Traceable calibration certificate: 3 points for humidity, 1 point for temperature
- Temperature-only models TMT120 and TMT130 also available
- Suitable for cleanrooms and demanding HVAC and light industrial applications

Vaisala HUMICAP® Humidity and Temperature Transmitters HMT120 and HMT130 are designed for humidity and temperature monitoring in cleanrooms and are also suitable for demanding HVAC and light industrial applications.

Options

- Humidity parameter options: relative humidity, dew point/frost point, wet bulb temperature, enthalpy, absolute humidity, mixing ratio, vapor pressure, and saturation vapor pressure
- 2-wire loop-powered or 3-wire voltage output configurations
- Optional LCD display
- USB cable available for a PC connection for maintenance
- Wall-mounted or with a remote probe
- Constant output probe available
- Can be mounted outdoors using a Vaisala installation kit and Vaisala Radiation Shield DTR504A

Performance

The HMT120 and HMT130 transmitters incorporate Vaisala HUMICAP® humidity sensor technology that measures relative humidity accurately and reliably. Vaisala HUMICAP® sensors are resistant to dust and most chemicals.

The HMT120 and HMT130 transmitter enclosure is optimized for use in cleanrooms. The smooth surface of the enclosure makes it easy to clean and the enclosure material is chosen to tolerate purifying agents. Furthermore, cabling can be done through the back wall of the transmitter.

Interchangeable probe

The HMT120 and HMT130 transmitters use a fully interchangeable relative humidity probe. The probe can be easily removed and replaced with a new one

without having to adjust the transmitter, which allows for easy and quick recalibration of the transmitter. The probe can be adjusted using one of Vaisala's handheld meters as a reference. Also available is a constant output probe with fixed RH and T output for convenient inspection of the monitoring system and signal transfer line.

Available options

The HMT120 and HMT130 transmitters are available as wall mounted or with a remote probe. For high temperature applications or where space is limited, the remote probe is ideal.

The optional LCD display shows the measurement results of selected parameters in selected units. The parameters are displayed simultaneously on two separate rows on the display.

Technical data

Models

Model	Measured parameters	Output
HMT120	RH + T	2 analog outputs, 4 ... 20 mA (loop-powered)
HMT130	RH + T	2 analog outputs, 0 ... 1 V, 0 ... 5 V, 0 ... 10 V, or user-defined between 0 ... 10 V
TMT120	T	1 analog output, 4 ... 20 mA (loop-powered)
TMT130	T	1 analog output, 0 ... 1 V, 0 ... 5 V, 0 ... 10 V, or user-defined between 0 ... 10 V

Measurement performance

Relative humidity ¹⁾	
Measurement range	0 ... 100 %RH
Accuracy ^{2) 3)}	
At 0 ... +40 °C (+32 ... +104 °F)	±1.5 %RH (0 ... 90 %RH) ±2.5 %RH (90 ... 100 %RH)
With HMP110 probe: At -40 ... 0 °C and +40 ... +80 °C (-40 ... +32 °F and +104 ... +176 °F)	±3.0 %RH (0 ... 90 %RH) ±4.0 %RH (90 ... 100 %RH)
With HMP113 probe: At -40 ... 0 °C and +40 ... +60 °C (-40 ... +32 °F and +104 ... +140 °F)	
Factory calibration uncertainty at +20 °C (+68 °F)	±1.1 %RH (0 ... 90 %RH) ±1.8 %RH (90 ... 100 %RH)
Humidity sensor types	HUMICAP® 180R HUMICAP® 180V ⁴⁾
Stability	±2 %RH over 2 years
Stability in typical HVAC applications	±0.5 %RH per year
Temperature	
Measurement range	HMP110: -40 ... +80 °C (-40 ... +176 °F) HMP113: -40 ... +60 °C (-40 ... +140 °F)
Temperature sensor	Pt1000 RTD Class F0.1 IEC 60751
Accuracy over temperature range:	
HMP110:	
At +15 ... +25 °C (+59 ... +77 °F)	±0.1 °C (±0.18 °F)
At 0 ... +15 °C and +25 ... +40 °C (+32 ... +59 °F and +77 ... +104 °F)	±0.15 °C (±0.27 °F)
At -40 ... +0 °C and +40 ... +80 °C (-40 ... +32 °F and +104 ... +176 °F)	±0.4 °C (±0.72 °F)
HMP113:	
At 0... +40 °C (+32 ... +104 °F)	±0.2 °C (±0.36 °F)
At -40 ... 0 °C and +40 ... +60 °C (-40 ... +32 °F and +104 ... +140 °F)	±0.4 °C (±0.72 °F)
Other output parameters (optional)	
Dew point/frost point, wet bulb temperature, enthalpy, absolute humidity, mixing ratio, vapor pressure, saturation vapor pressure	

¹⁾ Relative humidity specifications excluding TMT120 and TMT130, which are temperature-only models.

²⁾ Including non-linearity, hysteresis, and repeatability.

³⁾ With HUMICAP® 180V sensor, accuracy is specified only in operating temperature -20 ... +80 °C (-4 ... +176 °F).

⁴⁾ Not available with HMP113.

Operating environment

IP rating (transmitter body)	IP65 ¹⁾
Operating temperature of transmitter body, no display	-40 ... +60 °C (-40 ... +140 °F)
Operating temperature of transmitter body with display	-20 ... +60 °C (-4 ... +140 °F)
Operating temperature, probe	HMP110: -40 ... +80 °C (-40 ... +176 °F) HMP113: -40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-50 ... +70 °C (-58 ... +158 °F)

¹⁾ IP65 for the HMP110 probe only when using stainless steel sintered filter (HM46670SP) or PTFE sintered filter (item code DRW244938SP).

Inputs and outputs

HMT120 and TMT120 2-wire transmitter (loop-powered)	
Current output signals	4 ... 20 mA
External loop voltage	10 ... 30 V DC (R _L = 0 Ω) 20 ... 30 V DC (R _L < 500 Ω)
HMT130 and TMT130 3-wire transmitter	
Voltage output signals	0 ... 1 V, 0 ... 5 V, 0 ... 10 V or user-defined between 0 ... 10 V
Min. output resistance	1 kΩ
Serial output	RS-485, non-isolated
Relay output	1 relay (max. 50 V DC, 200 mA)
Supply voltage	10 ... 35 V DC 15 ... 35 V DC (when output 0 ... 10 V) 24 V AC (±20 %)
Current consumption at 24 V DC	8 mA, if relay closed 15 mA
Max. additional error caused by the analog outputs after calibration at +20 °C (+68 °F) ambient temperature	±0.1 % of FS output signal
Temperature dependence of the analog outputs	±0.005 % of FS output signal

Mechanical specifications

Weight	270 g (9.5 oz)
Probe cable lengths	3 m, 5 m, 10 m - up to 50 m (9.8 ft, 16 ft, 33 ft - up to 164 ft)
Display (optional)	128 x 64 resolution full graphics B&W display without backlight
Material	
Transmitter housing	PBT plastic
Display window	PC plastic
Probe body	HMP110: Stainless steel (AISI 316) HMP113: PC/ABS blend
Probe grid filter	HMP110: Chrome coated ABS plastic HMP113: PC (glass reinforced)
Connections	
Inputs and outputs	Screw terminals 0.5 ... 1.5 mm ² (AWG 20 ... AWG 15)
Probe interface	4-pin M8 female panel connector

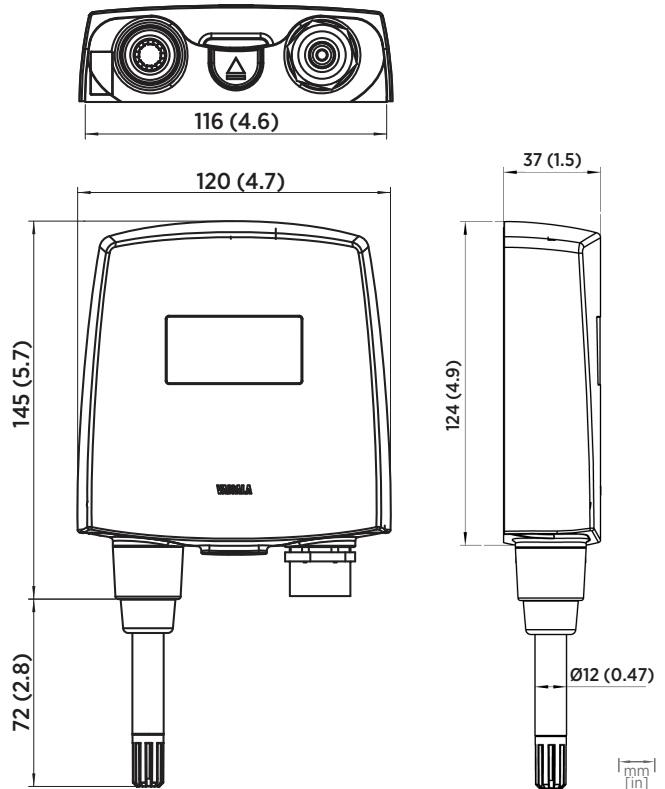
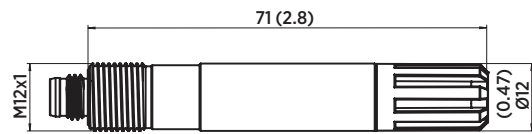
Compliance

EU directives and regulations	EMC, RoHS
Electromagnetic compatibility (EMC)	EN 61326-1, basic electromagnetic environment CISPR 32 / EN 55032, Class B
Compliance marks	CE, RCM

Spare parts and accessories

Probes ¹⁾	
Humidity and temperature probe	HMP110
Humidity and temperature replacement probe	HMP110R
Temperature-only probe	HMP110T
Constant output probe	HMP110REF
Humidity and temperature probe	HMP113
Sensors	
Standard humidity sensor	HUMICAP180R
Catalytic humidity sensor for H ₂ O ₂	HUMICAP180V ²⁾
Sensor protection	
HMP110 probes:	
Plastic grid filter	DRW010522SP
Plastic grid with membrane filter	DRW010525SP
Stainless steel sintered filter	HM46670SP
PTFE membrane filter with stainless steel grid	ASM212652SP
PTFE sintered filter	DRW244938SP
HMP113 probe:	
Plastic grid filter	DRW240185SP
Plastic grid with membrane filter	ASM210856SP
Stainless steel sintered filter	HM47280SP
Porous PTFE filter	219452SP
Probe installation	
Probe mounting clamp, 1 pc	225501
Probe mounting clamps, 10 pcs	226067
Probe mounting flange	226061
Probe holder, 5 pcs	ASM213382SP
Cables	
Probe cable 3 m (9.8 ft)	HMT120Z300
Probe cable 5 m (16 ft)	HMT120Z500
Probe cable 10 m (33 ft)	HMT120Z1000
Probe cable 20 m (66 ft)	HMT120Z2000
HM70 connection cable	211339
USB serial interface cable	219685
Transmitter protection and installation	
Radiation shield	DTR504A
Rain shield with installation kit	215109
Duct installation kit	215619

¹⁾ See the separate HMP110 and HMP113 order forms.
²⁾ Not available with HMP113.



Dimensions of HMP110 remote probe (top image) and HMT120, HMT130, TMT120, and TMT130 transmitters



CAB100 CMS Industrial Cabinet

For data collection in cleanrooms and industrial settings



Features

- Measurement options include differential pressure and analog inputs for a variety of parameters
- Analog inputs can be made intrinsically safe with a safety barrier or galvanic isolator
- Reporting via viewLinc is compliant with FDA, Annex 11, GxP, and GAMP
- Networking options include PoE and/or a multiport Ethernet adapter
- Large cabinets feature an integrated 24 V DC / 2.5 A power supply
- Small cabinets have the option of integrated power supply, or Power over Ethernet

Vaisala CMS Industrial Cabinet CAB100 integrates Vaisala's world-class instruments for monitoring differential pressure and other parameters into a simple, pre-configured instrument panel. In combination with the Vaisala viewLinc Enterprise Server Software, the cabinet provides pre-installed real-time monitoring of your critical environments.

Easy data collection with quality and compliance

Cabinets are configurable to your application requirements, with options for differential pressure transmitters, analog inputs for the connection of remote transmitters, and safety barriers or galvanic isolators for hazardous areas that require intrinsically safe devices. CAB100 enables you to combine differential pressure and other transmitters with data loggers in a single enclosure for centralized monitoring and reliable alarming.

Configured for your cleanroom

CAB100 is designed to ensure regulatory compliance in multiple cleanroom applications, including: pharmaceutical, healthcare, biotechnology, medical

device, aerospace, automotive, and semiconductor manufacturing. Select from two cabinet sizes: small and large. Small cabinets can contain up to four analog inputs which can also be intrinsically safe, or four differential pressure transmitters. Large cabinets can accommodate up to 12 differential pressure transmitters and up to 32 analog input channels with intrinsically safe options.

Communication is achieved over Ethernet to the viewLinc server database. CAB100 is an ideal solution for many monitoring applications, providing device protection, economy and serviceability.

The lockable metal enclosure protects the measurement instruments from tampering and accidental damage.

The benefits of centralization

It is often impossible or impractical to run power or network cables to each desired point of measurement. With CAB100 you can centralize and economize by running a single power and network cable to the cabinet to support numerous transmitters, while also reducing the number of network adapters needed.

Centralization of measurement devices also simplifies serviceability. With multiple transmitters and data loggers located together, regular maintenance activities like calibration are easy and efficient.

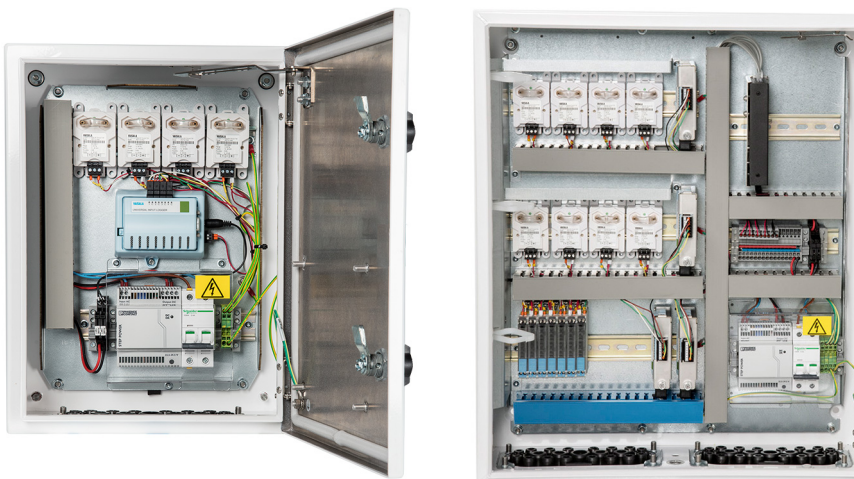
CAB100 configuration options

Cabinet size and material (H × W × L)	Small (model CAB100A)	200 × 300 × 400 mm (7.87 × 11.81 × 15.75 in) Aluminum, painted white
	Large (model CAB100B)	200 × 500 × 600 mm (7.87 × 19.69 × 23.62 in) Stainless steel AISI 316, painted white
Power	AC (mains) power	110 – 240 V AC, 50 – 60 Hz 0.5 A maximum (120 V AC)
	Power supply module within cabinet	24 V DC / 2.5 A / Fused 2 A
	Power over Ethernet ¹⁾	Power over Ethernet, with loop power, without fan
	Maximum power consumption	CAB100A: 20 W CAB100B: 40 W
Analog channels	4 ... 32 channels	4 ... 20 mA
Safety barrier	1 ... 16 pieces	1 barrier per channel
Galvanic isolator	1 ... 12 pieces	1 isolator per channel
Differential pressure	1 ... 12 pieces	±60 Pa or ±0.25 in H ₂ O
Ethernet communication	Large cabinet	Up to 2 serial-to-Ethernet devices via RJ45 (DIGI PortServer TS4)
	Small cabinet	Vaisala vNet Ethernet interface for DL series data loggers with PoE option via RJ45 connector
Ethernet	Ethernet switch	+4 PoE IEEE 802.3af/at
Compliance	EN/IEC 61326-1 (Basic electromagnetic environment)	EN 55032 Class B IEC/UL/EN 61010-1 ²⁾ IP66/NEMA 4 (large CAB100) / IP54 (small CAB100) SGS safety listed in USA and Canada ³⁾ CE compliant

1) Only with PDTs and small CAB100.

2) UL listing pending.

3) Applicable to CAB100B. Safety listing for CAB100A pending.



CAB100 supports internal differential pressure transmitters, analog inputs, and safety barriers or galvanic isolators.

For accuracy specifications, see devices on www.vaisala.com

- DL4000 data loggers for multiple parameters
- PDT101 differential pressure transmitter
- HMT370EX series transmitters for intrinsically safe temperature and humidity measurement
- HMT120 and HMT130 series transmitters for analog inputs



Our service offering

- Maintenance Agreement
- Installation & Configuration
- Validation
- Calibration Services
- Training
- Mapping/Validation
- Technical Support

Vaisala provides comprehensive customer care for the entire life cycle of the viewLinc Continuous Monitoring System (CMS). You can count on our experts to ensure carefree and reliable monitoring.

Worldwide experts at your service

Vaisala service and support teams provide you with an in-depth understanding of critical environments, network technologies, and measurement devices. We help ensure that your systems are efficiently and effectively deployed to meet or exceed the most stringent compliance requirements.



“The Vaisala team is well qualified, easy to work with, and became a part of our team. This relationship was a major reason that our original goal of project completion [for a 2000 point, 60 site system] within two years was met.”

Joe Cwiertniewicz,
McKesson Facilities Manager



MAINTENANCE
AGREEMENT



INSTALLATION &
CONFIGURATION



VALIDATION



CALIBRATION
SERVICES



TRAINING

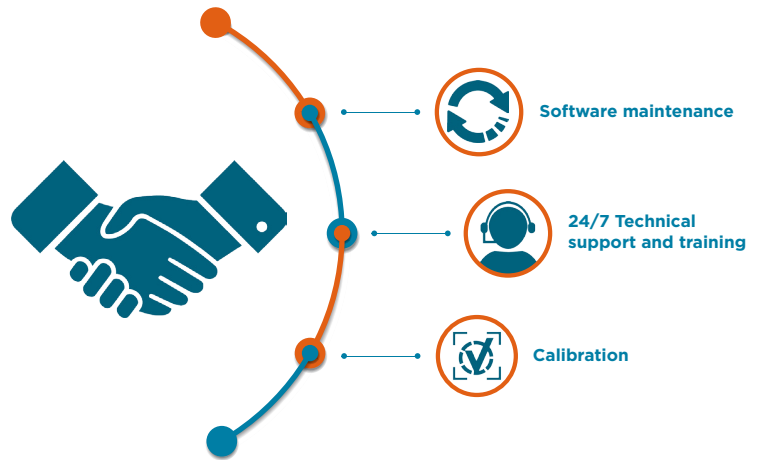


MAPPING/
VALIDATION



TECHNICAL
SUPPORT

viewLinc Life Cycle Maintenance Agreement



The **Life Cycle Maintenance Agreement (LCMA)** is a support plan designed to ensure that your viewLinc monitoring system is always up-to-date in terms of performance and regulation compatibility. The plan comprises a set of services that help ensure your operations comply with the latest regulations and provides prioritized support services. The plan includes the following options:

Regular software updates

Software updates ensure your monitoring system's compatibility with changing technologies and regulations. The LCMA includes updates to the latest viewLinc software and supporting validation documentation at no added cost.

Priority access to technical support

Priority technical support gives you 24/7/365 access to our experts in system-down situations. Your requests are prioritized, enabling the quickest possible response and remote help. Priority technical support also includes web-based live training for new system users, as well as access to all eLearning materials.

Calibration planning

Vaisala provides world-class calibration services throughout the life cycle of your continuous monitoring system. Choose calibration options according to your needs as a separate Calibration Care Agreement.



“Over the years, for complex system integrations, Vaisala’s field support has come out to assist, supporting all our needs effectively. Vaisala has enabled us to reduce the time it takes to create a fully GMP monitored environment. That provides us with a competitive edge.”

David Teer, Senior Engineering Manager for Viral-based Therapeutics at Lonza Houston

Installation

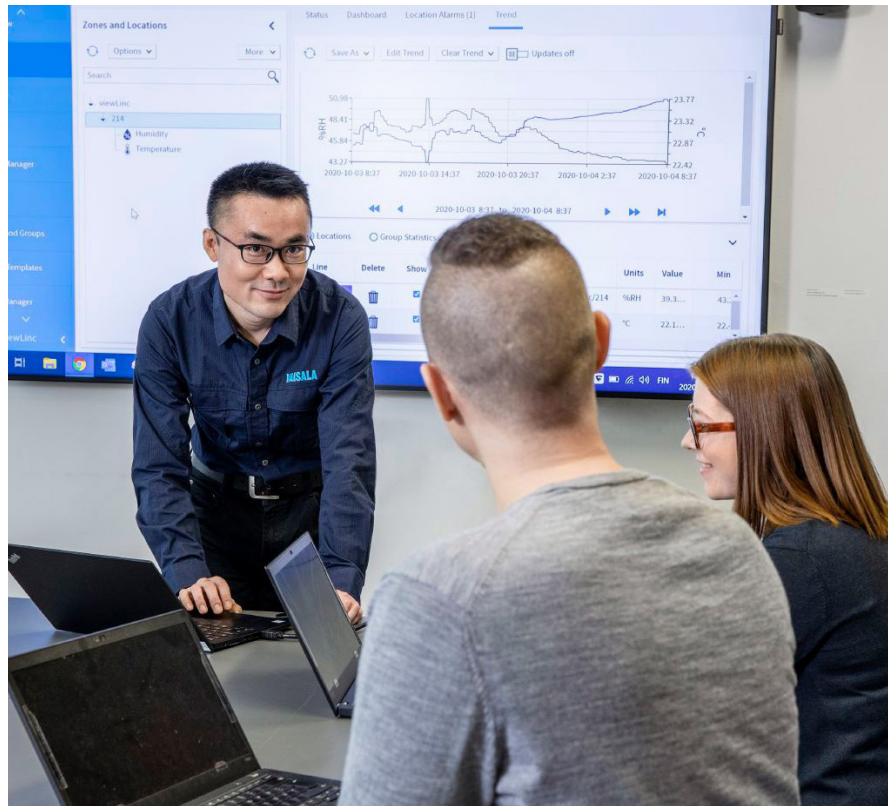
Vaisala's experienced technicians are available to manage and perform the installation and configuration of your viewLinc monitoring system. Installation service ensures flawless system deployment and efficient start-up, without burdening your resources. For existing viewLinc systems, we offer update and expansion services.

Installation service includes:

- Collaborative planning
- Installation of all sensing devices and network hardware
- Software installation and configuration
- User and administrator training
- System handover

Efficient and worry-free

With our comprehensive installation service you can be certain that system deployment meets all operational and regulatory requirements. Simply invite us to your site and let us install and configure the system to your specifications.



Comprehensive training available

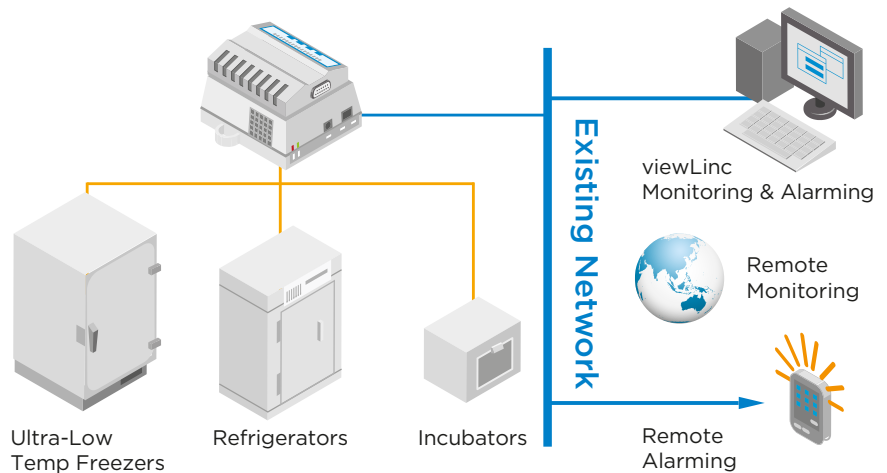
Our installation service includes hands-on user and administrator training. Training ensures that staff can effectively use the viewLinc software.

Skilled system experts

Vaisala's service technicians have expert knowledge of our hardware, software, and associated technologies. Our technicians are experienced in setting up systems in critical and GxP-regulated environments.

"The system was installed with the help of Vaisala Field Service. When a Joint Commission surveyor returned, we presented him with printouts of viewLinc records for the dates and times of his choosing... he was impressed..."

Frank Gee, Director of Facilities, Hazel Hawkins Memorial Hospital



Validation



Ensure a high quality validation of your monitoring system and reduce system implementation time by using our expertise and understanding of GxP quality systems.

Validation Services

Vaisala offers on-site Installation Qualification (IQ) and Operational Qualification (OQ) services. The IQ captures the baseline configuration of your system and provides evidence of control that aligns with GxP guidelines. The OQ provides evidence that your monitoring system is operating as designed, encompassing all GxP functions of the system, including audit trails, tamper-proof data, and the relevant requirements of 21 CFR Part 11, EU GMP Annex 11 and PSFB 040122.

Economical and efficient

Monitoring system validation by a skilled Vaisala technician is an economical choice, providing a significant savings in time and resources. Let us take care of the IQ/OQ system validation so that you can concentrate on your core business.

The quickest way to audit-ready monitoring

Our understanding of GxP regulations and quality system standards in life science industries allows us to validate the viewLinc continuous monitoring system expertly. The service ensures that your system is validated, documented, and ready for regulatory scrutiny.

Comprehensive validation documents

Validation service includes full documentation to demonstrate that the system operates correctly and meets quality standards and regulatory guidance.

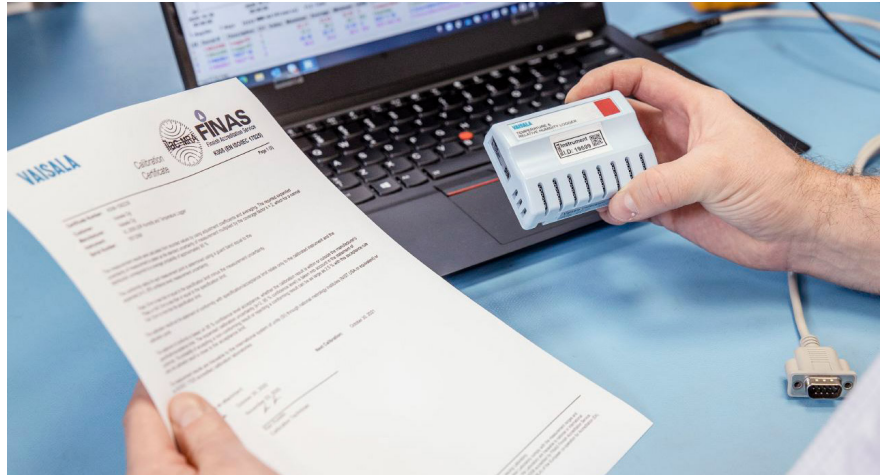
“The viewLinc system is not only easy to validate to GMP compliance, but it’s more efficient than all the hard wiring typically required by automation and control systems.”

David Teer, Senior Engineering Manager for Viral-based Therapeutics at Lonza Houston

Calibration

Vaisala offers several calibration options for continuous monitoring system data loggers and instruments to verify and ensure measurement accuracy.

Simply select Service Center Calibration, On-site Calibration or Probe Replacement Service and leave the rest to our experts. All calibration options include official calibration certificates. Certificates are ideal for both internal and external audit purposes.



Service Center Calibration

Traceable ISO 9001 or accredited ISO/IEC 17025 calibration performed at Vaisala's calibration laboratories

- Wide calibration ranges and options
- Adjustment included and repair services available as an option
- Includes calibration certificate with as-found and as-left results

On-site Calibration

Single or multi-point calibration performed at your site by Vaisala experts

- No system downtime or lost data
- Carefree and convenient – saves in-house resources
- Includes Calibration Certificate

Probe Replacement Service

New replacement probe with an as-found calibration certificate for the original probe

- Factory calibration accuracy with minimal downtime
- Quick and easy probe replacement takes less than a minute
- Currently available in the EU, USA, and Canada for RFL100 and HMT140 loggers with detachable probes (HMP110 or HMP115)

ISO 9001 and Accredited ISO/IEC 17025 calibrations available from Vaisala service centers

Boston, USA	Helsinki, Finland	Beijing, China	Tokyo, Japan
  <p>CALIBRATION LABORATORY CERTIFICATE # 2083.01</p>	  <p>Finnish Accreditation Service K008 (EN ISO/IEC 17025)</p>	  <p>中国认可 国际互认 校准 CALIBRATION CNAS L10243</p>	  <p>JCSS 0123</p>

ALL PARAMETERS CALIBRATED:
Relative Humidity, Temperature, Dew Point, Pressure, Carbon dioxide and Hydrogen peroxide

Please visit store.vaisala.com to browse services availability and terms in your area.

Training



Vaisala offers comprehensive training services for viewLinc customers. Ensure staff are trained on the system's functions and capabilities. Whether you are deploying a new monitoring system, expanding an existing one, or adapting to staff changes, comprehensive training ensures proper use of the system and compliance with regulations like the FDA's 21 CFR 211.25.

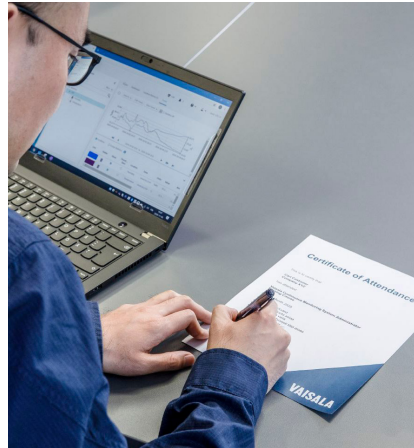
Options:

- On-site training - typically delivered with installation service
- Web-based training - perfect solution for distributed personnel
- 24/7 learning tools - access a library of instructions and videos

Mapping Service

Understanding the critical process parameters of a controlled environment is crucial to the safe and effective use of that space for manufacturing, storing, processing and distributing pharmaceuticals, biologicals, and medical devices. Vaisala mapping/validation service ensures that you fully understand the variability of conditions and qualify controlled environments.

Vaisala mapping service is currently available in Europe and Japan. However, we offer mapping software, equipment, and expertise also in other regions.



"As our research has evolved, viewLinc has met our needs. We are extremely pleased with the viewLinc system and the services Vaisala provides."

Dr. Leonardo Motta,
Medical Laboratory
Supervisor at Health
Research Institute at UCS,
University of Caxias do Sul

Mapping service includes:

- Thermal mapping and analysis of environments
- Mapping equipment used during the service
- Mapping study documents



Technical Support

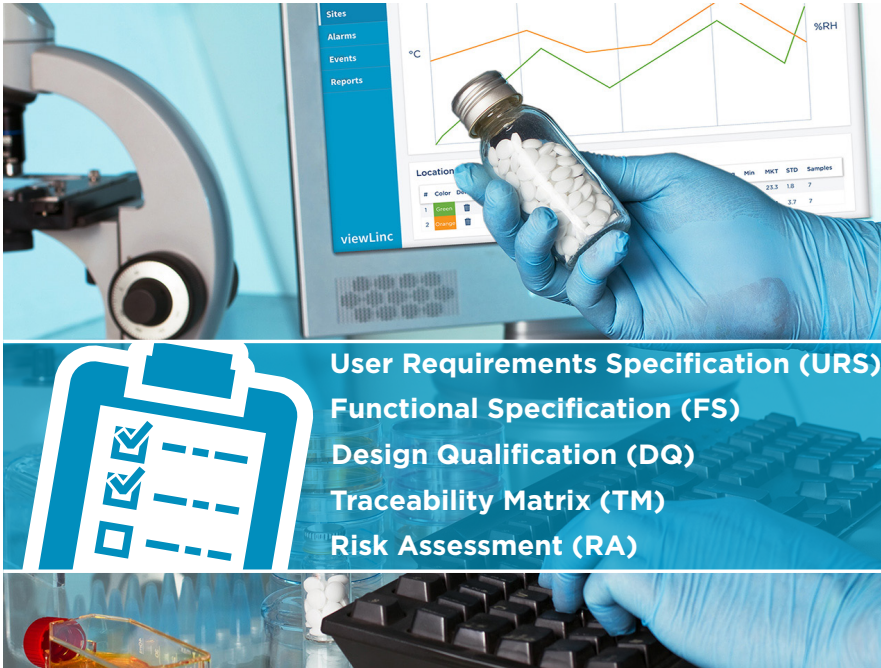
We deliver technical support to all our continuous monitoring system users globally.

- Professional response within one business day
- Convenient customer support channels and trained professionals
- On-site support on request

In addition to our regular technical support, we offer 24/7 emergency technical support as part of the Life Cycle Maintenance Agreement.



GxP Documentation Package for Vaisala viewLinc Continuous Monitoring System



Features

- System validation documentation package designed to provide ISPE Good Automated Manufacturing Practice (GAMP) methodology for viewLinc system validation.
- Available in English, Portuguese, Japanese, and Chinese.
- Specify the required attributes of your viewLinc system using the viewLinc-specific GxP documentation:
 - User Requirements Specification
 - Functional Specification
 - Design Qualification
 - Traceability Matrix
 - Risk Assessment

Vaisala viewLinc Continuous Monitoring System is ideal for GxP-regulated applications and environments that contain high-value products. If you are required to maintain compliant environmental monitoring methods and documentation, Vaisala can provide a GxP System Documentation package for the viewLinc monitoring system to help ensure your system implementation fulfills the recommendations of ISPE Good Automated Manufacturing Practice (GAMP).

Specify, then verify

The goal of the GAMP approach is to ensure, through specification and testing, that the monitoring system is fit for its intended use and implemented in a controlled manner. The required attributes of the system are described in specifications, and then verified in testing. The GxP Documentation Package provides the required specifications, which can then be verified using the Vaisala IQOQ (Installation Qualification/Operation Qualification) Documentation Package.

User Requirements Specification (URS)

The User Requirements Specification defines the capabilities you have deemed necessary for the Vaisala Continuous Monitoring System to fulfil its intended role in your process. This document provides a clear and concise list of requirements for a typical continuous monitoring application, while providing the option to add new requirements according to your unique business processes.

Functional Specification (FS)

The Functional Specification outlines all functions of the Vaisala Continuous Monitoring System. This document can be used by stakeholders to evaluate the CMS as a candidate system by comparison to a User Requirements Specification.

Design Qualification (DQ)

The Design Qualification ensures that the Vaisala Continuous Monitoring System is appropriately designed and capable of meeting the requirements of the system user. The DQ compares individual User Requirements in the URS against the system functions, and provides traceable verification that each User Requirement is fulfilled by a function listed in the FS.

Traceability Matrix (TM)

The Traceability Matrix ensures traceability of the requirements through the assessment and testing processes. The Traceability Matrix is used to verify that each requirement from the URS is fulfilled by a corresponding function in the CMS. It verifies that each requirement and corresponding function has been fully evaluated through Risk Assessment, IQ Testing, and OQ Testing.

Risk Assessment (RA)

The Risk Assessment outlines the CMS functions that are critical to preserving the safety and efficacy of GxP products. This Risk Assessment provides justification for the items in the Vaisala CMS that will be tested (or not tested). This analysis serves as a guide for your testing efforts.

A central tenet of GAMP philosophy is to leverage supplier involvement. Items identified as not requiring testing in the CMS IQOQ have either been tested thoroughly by Vaisala during system development, or are tested elsewhere during the implementation process.

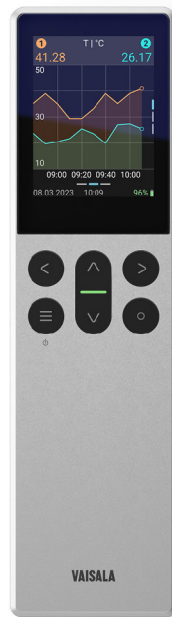
More information

For more information on the GxP Documentation Package for viewLinc, see www.vaisala.com/gamp-gxp-validation.



Indigo80 Handheld Indicator

For portable diagnostics



Features

- Flexible operation with Vaisala Indigo-compatible probes and transmitters, including HMP80 and DMP80 handheld probes
- Intuitive user interface available in 10 languages
- Rechargeable battery
- Robust design and modern appearance
- Logged measurement data can be transferred to PC via Vaisala Insight software

Vaisala Indigo80 Handheld Indicator is an industrial-grade portable diagnostics tool. Accommodating up to two Vaisala measurement probes, Indigo80 is ideal for spot-checking and process monitoring, as well as for configuring, troubleshooting, calibrating, and adjusting Vaisala Indigo-compatible probes and transmitters.

Variety of probe options

The Indigo80 indicator has two cable ports by which a combination of two probes or transmitters can be simultaneously connected to the indicator. Indigo80 can communicate with most current and future Vaisala probes and transmitters for measuring a wide range of parameters.

- Humidity and temperature
- Dew point
- Carbon dioxide
- Hydrogen peroxide vapor
- Moisture in oil

For the full set of probes and transmitters currently compatible with Indigo80, see the following page. For more information on the Indigo product family, see www.vaisala.com/indigo.

Robust and reliable

The sturdy aluminum body of Indigo80 is resistant to chemicals and dust.

Indigo80 is powered by a rechargeable lithium-ion battery with a typical operation time of 10 h. During long-term logging Indigo80 can be powered by using an AC adapter.

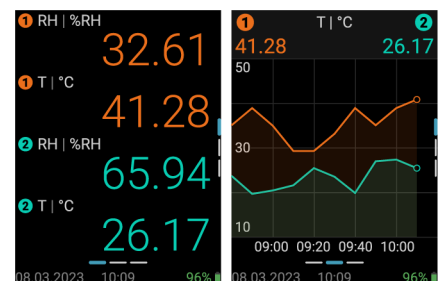
Easy to use

Indigo80 has an intuitive user interface that guides the user if needed. The indicator is designed to be easy to use in numerous use cases and measurement environments.

To access logged data and configuration functionality, Indigo80 can be connected to Vaisala Insight PC software for Windows®. For more information, see www.vaisala.com/insight.

Multilingual user interface

Indigo80 has a multilingual, menu-based user interface that shows live measurement data both numerically and graphically. The Indigo80 user interface is available in 10 languages.



View live measurement data as numbers or graphs

Vaisala devices compatible with Indigo80

Vaisala Indigo-compatible probes

HMP1, HMP3, HMP4, HMP5, HMP7, HMP8, HMP9, HMP80L, HMP80N	Humidity and temperature
TMP1	Temperature
DMP5, DMP6, DMP7, DMP8, DMP80A, DMP80B	Dew point
GMP251, GMP252	Carbon dioxide
HPP271, HPP272	Vaporized hydrogen peroxide
MMP8	Moisture in oil

Other Vaisala devices

HMP60, HMP63, HMP110, HMP113, HMP115, HMM170	Humidity and temperature
HMP110T, HMP115T, TMP115	Temperature
DMT143, DMT143L	Dew point

Vaisala Indigo transmitters (host devices)

Indigo300, Indigo510, Indigo520


Technical data

Operating environment

Operating temperature	-20 ... +50 °C (-4 ... +122 °F)
Storage temperature	-20 ... +60 °C (-4 ... +140 °F), recommended +20 °C (+68 °F)
Operating and storage humidity	20-85 %RH, when Ta ≤ +40 °C (+104 °F)
Charging temperature	0 ... +45 °C (+32 ... +113 °F) ¹⁾
IP rating	IP40
Use in wet location	No
Operating environment	Indoor use
Pollution degree	3
Maximum operating altitude	2000 m (approx. 6500 ft)

¹⁾ The battery will not charge at temperatures below 0 °C (+32 °F).

Inputs and outputs

Max. number of connected probes	2
Connector type	M12 5-pin female (2 pcs)
Battery ¹⁾	
Type	Rechargeable lithium-ion battery
Nominal voltage	7.2 V
Rated capacity	2900 mAh / 20.88 Wh
Charge limit voltage	8.4 V
AC adapter ²⁾	
Type	45 W USB-C AC adapter ³⁾
Connector type	USB-C
AC input	100-240 V AC, 1.2 A, 50-60 Hz
DC output	5.0 V/9.0 V/12.0 V/15.0 V DC, 3.0 A 20.0 V DC, 2.25 A 45 W
Insulation	Double or reinforced, indicated with the following symbol: 
PC interface	Vaisala Insight PC software with USB-C cable (Windows OS). ⁴⁾ Data can be logged and transferred also without Insight.

- ¹⁾ The battery is not user-replaceable. Contact Vaisala Service Center for any battery-related maintenance needs.
²⁾ The AC adapter is an optional accessory. If using an AC adapter not provided by Vaisala, make sure it fulfills the specifications given in this table and the safety requirements listed in Indigo80 Safety Guide (M212872EN), available at docs.vaisala.com.
³⁾ 45 W AC adapter recommended for optimal performance of Indigo80. An AC adapter with a lower power rating can also be used.
⁴⁾ Insight software is available for download at www.vaisala.com/insight.

Mechanical specifications

Weight	385 g (14 oz)
Dimensions (H × W × D)	213 × 58 × 27 mm (8.4 × 2.3 × 1.1 in)
Materials	
Main body and rear piece	Aluminum EN AW-6082 T6
Back cover	Rubber (TPE) and polycarbonate (PC), reinforced with fiberglass Flammability rating UL94 V-1
Display	Strengthened glass with anti-fingerprint (AF) and anti-reflection (AR) coatings

Data logging and user interface specifications

Data logging capacity	Up to 5.5 million real-time data values
Logging interval	1 s – 12 h
Logging duration	1 min – memory full ¹⁾
Alarm	Audible alarm function
Supported languages	English, Chinese, Finnish, French, German, Italian, Japanese, Portuguese, Spanish, Swedish
Display	2.7" sunlight readable transfective TFT LCD color display with backlight and automatic brightness control

¹⁾ For example, data logging duration for one measurement parameter with a logging interval of one second is over eight weeks. Use an AC adapter to power Indigo80 during long-term logging.

Battery operation time

Operation time (continuous use)	10 h at +20 °C (+68 °F) ¹⁾
Charging time	2 hours ¹⁾

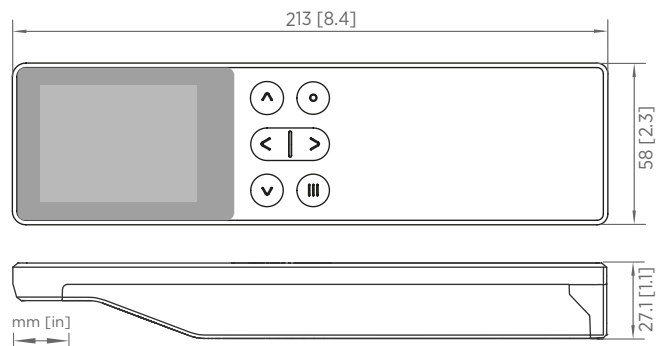
¹⁾ Typical value. Actual performance depends on, for example, the number and type of devices connected to Indigo80 and the data logging interval.

Compliance

EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
Electromagnetic compatibility (EMC)	IEC/EN 61326-1, industrial environment CISPR 32 / EN 55032, Class B FCC part 15 B, Class B ICES-3 / NMB-3 (Class B)
Compliance marks	CE, China RoHS, FCC, RCM, UKCA

Spare parts and accessories

Cables		
Cable for transmitters (M12-M8), 1.5 m (4 ft 11 in)		262195SP
Cable for probes (M12-M12), 1.5 m (4 ft 11 in)		272075SP
Flat cable for probes (M12-M12), 1 m (3 ft 3 in)		CBL210493SP
Probe connection cable (M12-M12), 10 m (32 ft 10 in)		INDIGOCABLE10M
Other		
Magnetic hanger for indicator		ASM214318SP
Weatherproof carrying case for Indigo80 and HMP80 and DMP80 series probes		ASM214759



Indigo80 dimensions (front and side view)



HMP80 Series Handheld Humidity and Temperature Probes

For spot-checking applications

Features

- Portable design optimized for industrial spot-checking and field calibration
- RH accuracy up to ± 0.8 %RH
- Temperature accuracy up to 0.1 °C (0.18 °F)
- Wide temperature measurement range
- Condensation-tolerant
- Sensor purge improves long-term stability and chemical resistance
- Compatible with Indigo80 handheld indicator and Insight PC software
- Calibration certificate included



Vaisala HUMICAP® Handheld Humidity and Temperature Probes HMP80 Series have been designed for portable use, especially with the Indigo80 handheld indicator. The combination of HMP80 probe and Indigo80 is ideal for spot-checking and field calibration of installed Vaisala humidity instruments.

Proven Vaisala HUMICAP performance

Vaisala is the original innovator of the thin-film capacitive humidity measurement technology, which has now become the industry standard in humidity measurement.

The HUMICAP technology results from Vaisala's 40-year experience in industrial humidity measurement, providing the best stability, fast response time, and low hysteresis in a wide range of applications.

HMP80 series probes are delivered with standard factory calibration certificates, with accredited calibration as an option. The probes can therefore be used as a working standard in field calibration.

Robust design for handheld measurements

The HMP80 series probes are available in two lengths offering similar measurement performance. The longer model (HMP80L) is designed for measurements in more extreme temperatures.

The design of the probe handle has been optimized for manual operation in versatile measurement environments. The IP66-classified probe handle offers excellent protection against moisture and dust with the probe connection cable attached. Also the cable connection is protected against mechanical stress by the robust design of the handle.

Flexible connectivity

HMP80 probes are optimized for portable spot-checking, field calibration, and data logging use with the Indigo80 handheld indicator. For easy-to-use access to device analytics and configuration, HMP80 probes can be connected to Vaisala Insight software for Windows®.

For more information, see www.vaisala.com/indigo and www.vaisala.com/insight.

Technical data

HMP80 series measurement performance

Relative humidity	
Measurement range	0-100 %RH
Accuracy at +23 °C (73.4 °F) ¹⁾	±0.8 %RH (0-90 %RH)
Factory calibration uncertainty ²⁾	±0.5 %RH (0-40 %RH) ±0.8 %RH (40-95 %RH)
T ₆₃ response time	15 s
Sensor	HUMICAP® R2C
Temperature	
Measurement range	HMP80N: -20 ... +60 °C (-4 ... +140 °F) HMP80L: -50 ... +120 °C (-58 ... +248 °F), short-time measurement range -50 ... +180 °C (-58 ... +356 °F)
Accuracy at +23 °C (+73.4 °F) ^{1) 3)}	±0.1 °C (±0.18 °F)
Factory calibration uncertainty ²⁾	±0.1 °C (±0.18 °F) at +23 °C (+73.4 °F)
Sensor	Pt100 RTD Class F0.1 IEC 60751

- 1) Defined against calibration reference. Including non-linearity, hysteresis, and repeatability.
 2) Defined as ±2 standard deviation limits. Small variations possible; see calibration certificate.
 3) Exposing temperature sensor to temperatures below -20 °C (-4 °F) may cause permanent additional deviation of ±0.1 °C (0.18 °F).

HMP80 series operating environment

Operating temperature of probe handle	-10 ... +60 °C (-14 ... +140 °F)
Operating temperature of probe head	HMP80N: -20 ... +60 °C (-4 ... +140 °F) HMP80L: -50 ... +120 °C (-58 ... +248 °F)
Storage temperature	-20 ... +60 °C (-4 ... +140 °F)
Measurement environment	For air, nitrogen, hydrogen, argon, helium, oxygen, and vacuum ¹⁾
IP rating of probe handle:	
with probe connection cable connected to the probe	IP66
without cable	IP55

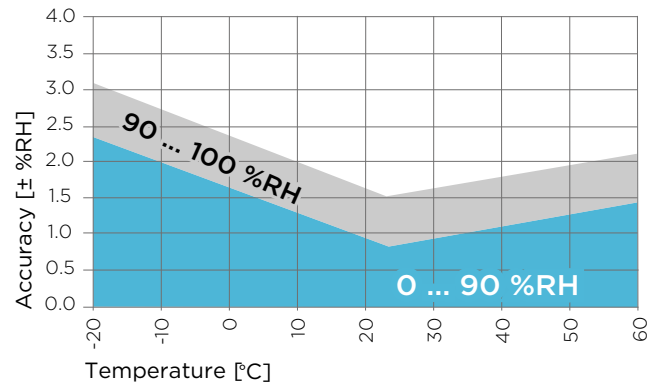
¹⁾ Consult Vaisala if other chemicals are present. Consider safety regulations with flammable gases.

HMP80 series inputs and outputs

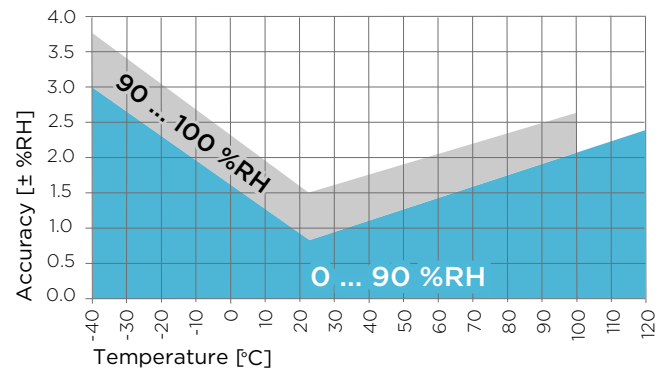
Operating voltage	15-30 V DC
Current consumption	10 mA typical, 500 mA max.
Digital output	RS-485, non-isolated

HMP80 series compliance

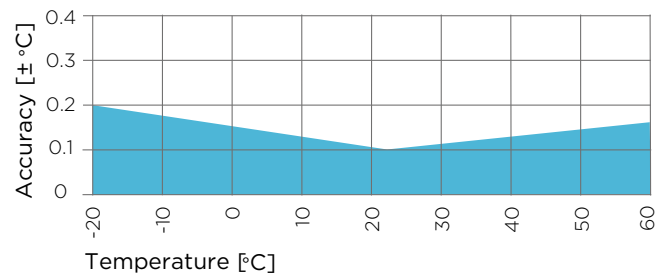
EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
Rough handling (excluding sensor inside probe head)	IEC 60068-2-31
Compliance marks	CE, China RoHS, RCM, UKCA



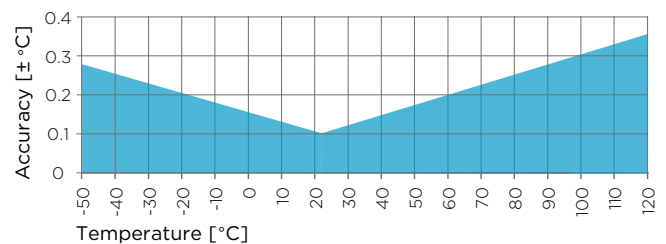
HMP80N humidity measurement accuracy as a function of temperature



HMP80L humidity measurement accuracy as a function of temperature



HMP80N temperature measurement accuracy over full range



HMP80L temperature measurement accuracy over full range

HMP80 series output parameters

Absolute humidity (g/m ³)	Relative humidity (%RH)
Absolute humidity at NTP (g/m ³)	Relative humidity (dew/frost) (%RH)
Dew point temperature (°C)	Temperature (°C)
Dew/frost point temperature (°C)	Water concentration (ppm _v)
Dew/frost point temperature at 1 atm (°C)	Water concentration (wet basis) (vol-%)
Dew point temperature at 1 atm (°C)	Water mass fraction (ppm _w)
Dew point temperature difference (°C)	Water vapor pressure (hPa)
Enthalpy (kJ/kg)	Water vapor saturation pressure (hPa)
Mixing ratio (g/kg)	Wet-bulb temperature (°C)

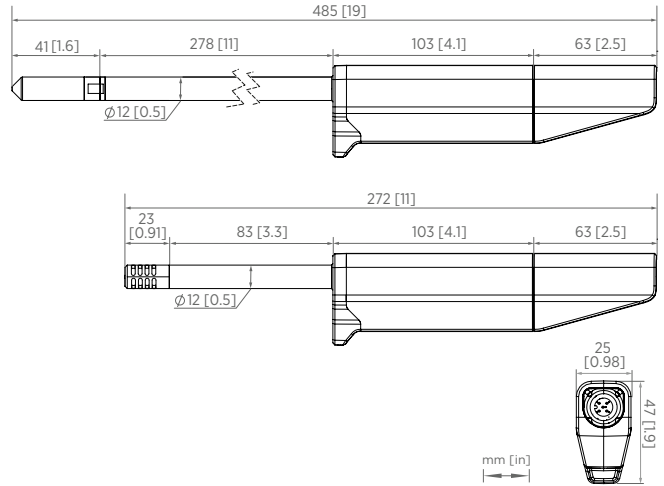
HMP80 series mechanical specifications

Connector type	M12 5-pin A-coded male
Weight	HMP80N: 200 g (7 oz) HMP80L: 300 g (10 oz)
Materials	
Probe handle	Polyamide (PA) and thermoplastic elastomer (TPE)
Probe shaft	Stainless steel (AISI 316L)
Filters	HMP80N: Stainless steel (AISI 316L) ¹⁾ HMP80L: Porous stainless steel (AISI 316L) ²⁾

1) With holes and without an additional filter membrane. Vaisala item code of filter: DRW255306SP.
2) Vaisala item code: HM47280SP

HMP80 series spare parts and accessories

Probe connection cable (M12-M12), 1.5 m (4.11 ft)	272075SP
Flat cable for probes (M12-M12), 1.0 m (3.4 ft)	CBL210493SP
Indigo USB adapter	USB2
Sintered stainless steel filter (HMP80N, HMP80L)	HM47280SP
Plastic PPS grid filter (HMP80N, HMP80L)	DRW010276SP
PPS grid with SS netting (HMP80N, HMP80L)	DRW010281SP
Slotted MIM filter (HMP80N)	DRW255306SP
Slotted MIM filter with membrane (HMP80N)	ASM214606SP



Dimensions of HMP80L (top) and HMP80N (bottom), side and bottom view



DMP80 Series Handheld Dew Point and Temperature Probes

For spot-checking applications



Features

- Portable design optimized for industrial spot-checking and field calibration
- Dew point measurement accuracy up to ± 2 °C (± 3.6 °F) $T_{d/f}$
- Wide dew point measurement range
- Sensor purge improves long-term stability and chemical resistance
- Condensation-tolerant
- Compatible with Indigo80 handheld indicator and Insight PC software
- Calibration certificate included

Vaisala DRYCAP® Handheld Dew Point and Temperature Probes DMP80 Series have been designed for portable use, especially with the Indigo80 handheld indicator. The combination of DMP80 probe and Indigo80 is ideal for spot-checking and field calibration of installed Vaisala humidity instruments.

Reliable measurements with the Vaisala DRYCAP sensor

Vaisala DRYCAP sensor is robust against particulate contamination, water condensation, oil vapor, and most chemicals. The sensor tolerates condensation and recovers perfectly if exposed to liquid water. The sensor's performance is excellent also in dynamic and low dew point applications, thanks to its fast reaction time and stability.

The probes can be inserted directly into pressurized processes, and respond rapidly from ambient to process conditions. The DMP80 probes are suitable for direct process dew point measurement in a wide temperature and pressure range.

DMP80 series probes are delivered with standard factory calibration certificates, with accredited calibration as an option. The probes can therefore be used as a working standard in field calibration.

Sensor purge minimizes effects of contaminants

In environments with high concentrations of chemicals and cleaning agents, the sensor purge option helps to maintain measurement accuracy between calibration intervals.

Sensor purge involves heating the sensor briefly to remove chemicals that could lower measurement performance and cause drifting.

Robust design for handheld measurements

The design of the probe handle has been optimized for manual operation in versatile measurement environments. The IP66-classified probe handle offers excellent protection against moisture and dust with the probe connection

cable attached. Also the cable connection is protected against mechanical stress by the robust design of the handle.

Flexible connectivity

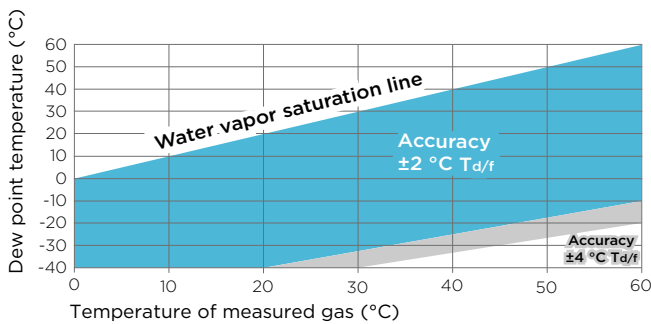
DMP80 probes are optimized for portable spot-checking, field calibration, and data logging use with the Indigo80 handheld indicator. For easy-to-use access to device analytics and configuration, DMP80 probes can be connected to Vaisala Insight software for Windows®.

For more information, see www.vaisala.com/indigo and www.vaisala.com/insight.

Technical data

DMP80A measurement performance

Dew point	
Sensor	DRYCAP® 180S
Measurement range	-40 ... +60 °C (-40 ... +140 °F) T _{d/f}
Accuracy	Up to ±2 °C (±3.6 °F) T _{d/f}
Response time 63 % [90 %]:	
From dry to wet	5 s [10 s]
From wet to dry	45 s [5 min]
Temperature	
Measurement range	0 ... +60 °C (+32 ... +140 °F)
Accuracy	±0.2 °C (±0.36 °F) at room temperature
Temperature sensor	Pt100 RTD Class F0.1 IEC 60751
Mixing ratio	
Measurement range (typical)	0-150 g/kg (0-1050 gr/lbs)
Accuracy (typical)	±12 % of reading
Absolute humidity	
Measurement range	0-130 g/m ³
Accuracy (typical)	±10 % of reading



Dew point accuracy vs. measurement conditions (DMP80A)

DMP80 series operating environment

Operating temperature range	-10 ... +60 °C (+14 ... +140 °F)
Storage temperature	-20 ... +60 °C (-4 ... +140 °F)
Operating pressure of probe head	0-20 bar (0-290 psi), absolute
Measurement environment	For air, nitrogen, hydrogen, argon, helium, and oxygen ¹⁾
IP rating of probe handle:	
With probe connection cable connected to the probe	IP66
Without cable	IP55

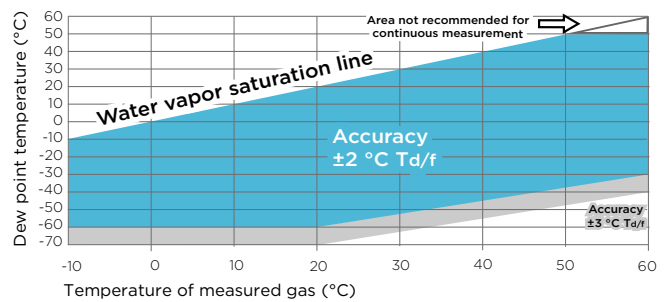
¹⁾ Consult Vaisala if other chemicals are present. Consider safety regulations with flammable gases.

DMP80 series inputs and outputs

Operating voltage	15-30 V DC
Current consumption	10 mA typical, 500 mA max.
Digital output	RS-485, non-isolated

DMP80B measurement performance

Dew point	
Sensor	DRYCAP® 180M
Measurement range	-70 ... +60 °C (-94 ... +140 °F) T _{d/f}
Accuracy	Up to ±2 °C (±3.6 °F) T _{d/f}
Response time 63 % [90 %]:	
From dry to wet	5 s [15 s]
From wet to dry	45 s [8 min]
Temperature	
Measurement range	0 ... +60 °C (+32 ... +140 °F)
Accuracy	±0.2 °C (±0.36 °F) at room temperature
Temperature sensor	Pt100 RTD Class F0.1 IEC 60751
Relative humidity	
Measurement range	0-70 %RH
Accuracy (RH <10 %RH, at +20 °C)	±0.004 %RH + 20 % of reading
Concentration by volume (ppm)	
Measurement range (typical)	10-2500 ppm
Accuracy (at +20 °C, 1 bar)	1 ppm + 20 % of reading



Dew point accuracy vs. measurement conditions (DMP80B)

DMP80 series mechanical specifications

Connector type	M12 5-pin A-coded male
Weight	250 g (9 oz)
Mechanical connection options	G1/2" ISO 228/1 NPT1/2"
Materials	
Probe handle	Polyamide (PA) and thermoplastic elastomer (TPE)
Probe shaft	Stainless steel (AISI 316L)
Filter	Porous stainless steel (AISI 316L) ¹⁾

¹⁾ Vaisala item code: HM47280SP

DMP80 series output parameters

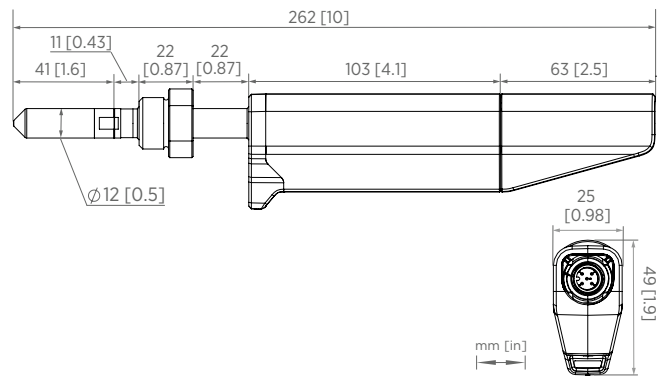
Absolute humidity (g/m ³)	Relative humidity (%RH)
Absolute humidity at NTP (g/m ³)	Relative humidity (dew/frost) (%RH)
Dew point temperature (°C)	Temperature (°C)
Dew/frost point temperature (°C)	Water concentration (ppm _w)
Dew/frost point temperature at 1 atm (°C)	Water concentration (wet basis) (vol-%)
Dew point temperature at 1 atm (°C)	Water mass fraction (ppm _w)
Dew point temperature difference (°C)	Water vapor pressure (hPa)
Enthalpy (kJ/kg)	Water vapor saturation pressure (hPa)
Mixing ratio (g/kg)	

DMP80 series compliance

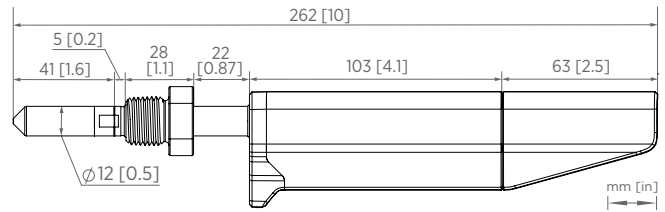
EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
Rough handling (excluding sensor inside probe head)	IEC 60068-2-31
Compliance marks	CE, China RoHS, RCM, UKCA

DMP80 series spare parts and accessories

Cables	
Probe connection cable (M12-M12), 1.5 m (4.11 ft)	272075SP
Flat cable for probes (M12-M12), 1.0 m (3.4 ft)	CBL210493SP
Accessories for ISO G1/2" thread option	
Sampling cell with quick connector and leak screw	DSC74
Sampling cell with female connectors, inlet G3/8", outlet G1/4" ISO	DMT242SC
Sampling cell with Swagelok connectors for 1/4" tubing	DMT242SC2
Two-pressure sampling cell	DSC74B
Two-pressure sampling cell with coil	DSC74C
Other items	
Indigo USB adapter	USB2
Sintered stainless steel filter	HM47280SP



Dimensions of DMP80 series probes with G1/2" thread, side and bottom view



Dimensions of DMP80 series probes with NPT1/2" thread



Features

- Humidity measurement range 0 ... 100 %RH
- Temperature measurement ranges -40 ... +100 °C (-40 ... +212 °F), depending on probe model. The HM46 model can measure up to +180 °C (+356 °F) for a short period of time.
- Incorporates proven Vaisala HUMICAP® sensor technology
- Calibration reminder function
- Probes can be user calibrated using an on-site reference
- Graphical display indicates when measurement has stabilized
- Hold-button to freeze the screen and save the reading
- Multilingual user interface available in 10 languages (EN, DE, FR, JA, ZH, PT, ES, RU, FI, SV)

The easy-to-use HM40 is a compact and portable humidity meter that provides reliable measurements in a wide range of applications. It is the ideal spot-checking tool for everything from structural moisture measurement and air conditioning systems to humidity measurement in industrial production processes and life science applications. There are four different models available: HM41, HM42, HM45, and HM46.

Benefits

- Compact, portable, and easy to use
- Versatile meter with wide measurement range and multiple calculated parameters
- Ideal for spot-checking in a wide variety of applications

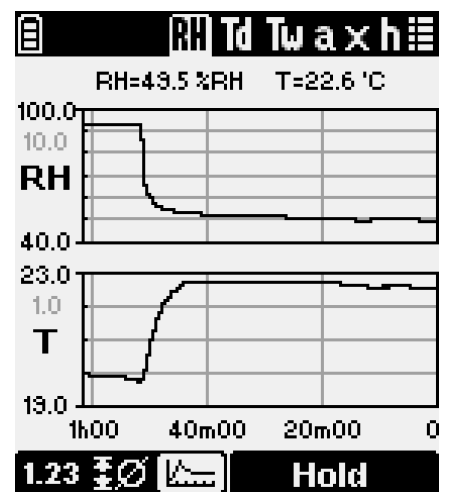
Simple and Easy to Use

HM40 has a large, user-friendly graphical display and easy-to-use push buttons. The user interface is simple and intuitive, and available in 10 languages. Also, many settings can be modified to meet users' individual needs. In addition to relative humidity and temperature, HM40 provides five calculated humidity

parameters, all of which are available in metric and non-metric units. HM40 is powered by 2 AA batteries. An external USB-charger and rechargeable AA sized NiMH batteries are available as an option. Each model also comes with a handy belt clip and case.

Easy Recalibration

Calibrating HM40 is easy. The meter or the probe can be sent to a Vaisala Service Center for recalibration. Alternatively, calibration can be completed on site by users with a humidity reference such as another hand-held meter or Vaisala Humidity Calibrator HMK15. The indicator includes a calibration reminder function that can be activated by the user.



The Graph Clearly Indicates When Readings Have Stabilized.

HM40 Handheld Humidity and Temperature Meter Series

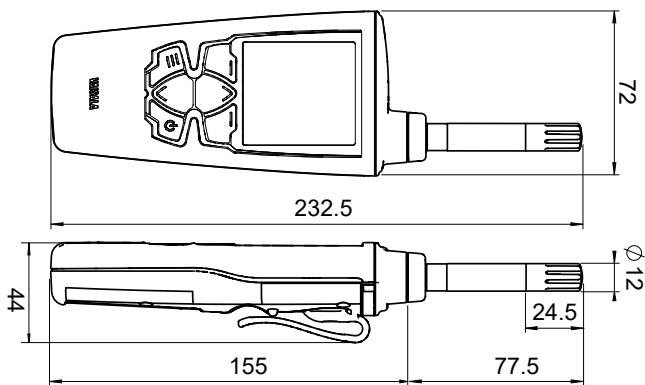


HM41 Technical Data

Humidity Measurement Accuracy (Including Non-linearity, Hysteresis, and Repeatability):

At 0 ... +40 °C	±1.5 %RH (0 ... 90 %RH)
	±2.5 %RH (90 ... 100 %RH)
At -10 ... 0 °C and +40 ... +60 °C	±3.0 %RH (0 ... 90 %RH)
	±4.0 %RH (90 ... 100 %RH)

Humidity sensor	HUMICAP® 180R
Temperature measurement range	-10 ... +60 °C (+14 ... +140 °F)
Temperature sensor	Pt1000 RTD Class F0.1 IEC 60751
Measurement probe	Interchangeable HMP113 probe
Probe material	PC/ABS plastic blend (white)
IP rating	IP54
Weight (with alkaline batteries)	230 g (8.1 oz)
Filter material	PC (glass-reinforced)



HM41 dimensions in mm



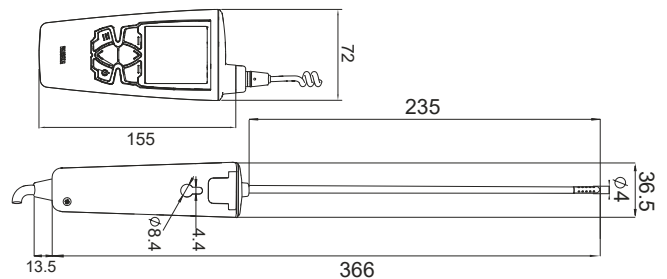
HM42 Technical Data

Humidity Measurement Accuracy (Including Non-linearity, Hysteresis, and Repeatability):

At 0 ... +40 °C	±1.5 %RH (0 ... 90 %RH)
	±2.5 %RH (90 ... 100 %RH)
At -40 ... 0 °C and +40 ... +80 °C	±3.0 %RH (0 ... 90 %RH)
	±4.0 %RH (90 ... 100 %RH)
At +80 ... +100 °C	±4.0 %RH ¹⁾

Humidity sensor	HUMICAP® 100R-Mini
Temperature measurement range	-40 ... +100 °C (-40 ... +212 °F)
Temperature sensor	Pt1000 RTD Class F0.3 IEC60751
Measurement probe	HM42PROBE
Probe head material	Stainless steel
IP rating	IP40 (probe), IP54 (indicator)
Weight (with alkaline batteries)	370 g (13.1 oz)
Filter material	Stainless steel and PTFE membrane
Probe cable length	1500 mm (59 in)

¹⁾ Not recommended for $T_d > 85$ °C



HM42 dimensions in mm

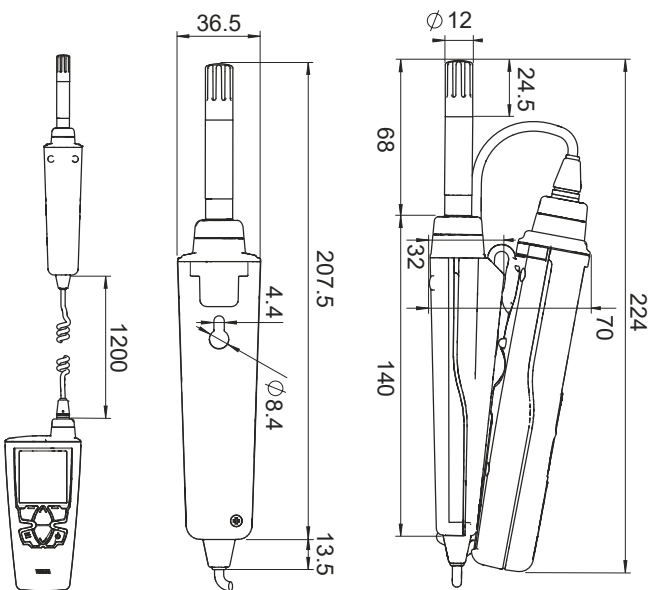


HM45 Technical Data

Humidity Measurement Accuracy (Including Non-linearity, Hysteresis, and Repeatability):

At 0 ... +40 °C	±1.5 %RH (0 ... 90 %RH)
	±2.5 %RH (90 ... 100 %RH)
At -40 ... 0 °C and +40 ... +60 °C	±3.0 %RH (0 ... 90 %RH)
	±4.0 %RH (90 ... 100 %RH)

Humidity sensor	HUMICAP® 180R
Temperature measurement range	-40 ... +60 °C (-40 ... +140 °F)
Temperature sensor	Pt1000 RTD Class F0.1 IEC 60751
Measurement probe	Interchangeable HMP113 with HM40HANDLE
Probe material	PC/ABS plastic blend (white)
IP rating	IP54
Weight (with alkaline batteries)	330 g (11.6 oz)
Filter material	PC (glass-reinforced)
Probe cable length	1200 mm (47 in)



HM45 dimensions in mm



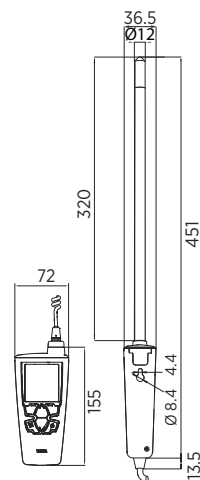
HM46 Technical Data

Humidity Measurement Accuracy (Including Non-linearity, Hysteresis, and Repeatability):

At 0 ... +40 °C	±1.5 %RH (0 ... 90 %RH)
	±2.5 %RH (90 ... 100 %RH)
At -40 ... 0 °C and +40 ... +80 °C	±3.0 %RH (0 ... 90 %RH)
	±4.0 %RH (90 ... 100 %RH)
At +80 ... +100 °C	±4.0 %RH ¹⁾

Humidity sensor	HUMICAP® 180R
Temperature measurement range	-40 ... +100 °C (-40 ... +212 °F), short-term up to +180 °C (+356 °F)
Temperature sensor	Pt1000 RTD Class F0.1 IEC 60751
Measurement probe	HM46PROBE
Probe head material	Stainless steel, brass filter
IP rating	IP40 (probe), IP54 (indicator)
Weight (with alkaline batteries)	490 g (17.3 oz)
Filter material	Sintered brass
Probe cable length	1500 mm (59 in)

¹⁾ Not recommended for $T_d > 85 °C$



HM46 dimensions in mm

HM40 Series Technical Data

Measurement Performance

Calculated parameters	Dew point, wet bulb temperature, absolute humidity, mixing ratio, enthalpy
Relative Humidity	
Measurement range	0 ... 100 %RH
Accuracy (including non-linearity, hysteresis, and repeatability) for different models at 0 ... +40 °C (+32 ... +104 °F)	±1.5 %RH (0 ... 90 %RH) ±2.5 %RH (90 ... 100 %RH)
Factory calibration uncertainty at +20 °C (+68 °F):	
HM42 and HM46	±1.5 %RH
HM41 and HM45	±1.1 %RH (0 ... 90 %RH) ±1.8 %RH (90 ... 100 %RH)
Stability	±2 %RH over 2 years
Humidity Measurement Response Time:	
(90 %) with plastic grid filter (HM41 and HM45)	17 s
(90 %) with membrane filter and steel grid (HM42)	26 s
(90 %) with brass sintered filter (HM46)	40 s
Temperature	
Accuracy over temperature range:	
At 0 ... +40 °C (+32 ... +104 °F)	±0.2 °C (0.36 °F)
At -40 ... 0 °C and +40 ... +100 °C (-40 ... +32 °F and +104 ... +212 °F)	±0.4 °C (0.72 °F)

Operating Environment

Operating temperature	
Indicator	-10 ... +60 °C (+14 ... +140 °F)
Probe handle	-40 ... +60 °C (-40 ... +140 °F)
Probe head	Range -40 ... +180 °C (-40 ... +356 °F) See probe specifications
Storage temperature	-30 ... +70 °C (-22 ... +158 °F)
EMC compliance	EN61326-1, Portable Equipment

Mechanical Specifications

Materials	
Indicator body	PC/ABS blend, acrylic display lens
Probe holder	PC/ABS blend (gray)
Probe handle	PC/ABS blend (white), PC/ABS blend (gray, HM45) or PBT (gray, HM42/46)
HMP113 probe or probe measurement head	PC/ABS blend (white, HM41/45) or stainless steel (HM42/46)
IP rating, HM40	IP54

Indicator

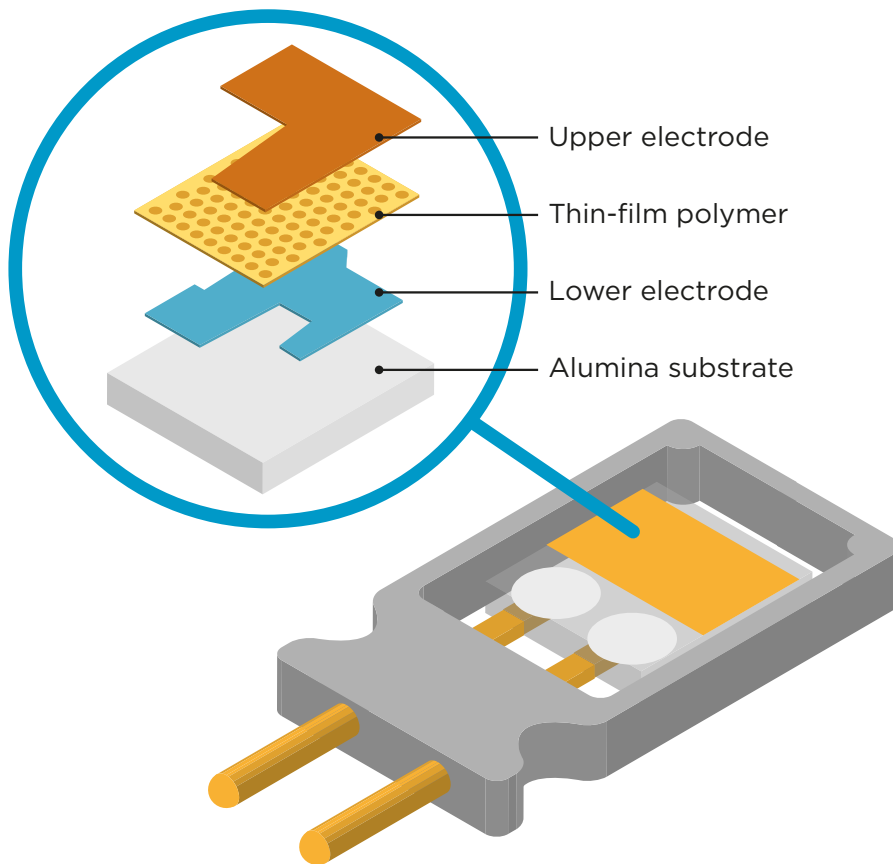
Display	LCD (140 x 160 pixels)
Power-up time	< 3 s
Batteries	2 × AA, 1.5 V
Operation time (typical)	100 hours (without backlight)
Menu languages	English, Chinese (simplified), Finnish, French, German, Japanese, Portuguese, Russian, Spanish, Swedish

Spare Parts and Accessories

Indicator	
Spare HM40 indicator	HM40INDI
Belt clip (3 pcs)	227710SP
Battery cover (3 pcs)	225688SP
NiMH rechargeable batteries (4 pcs)	229247SP
External battery recharger with USB connection and 4 batteries	229249SP
Case for short HM40 probes	235849SP
Case for long HM40 probes	DRW242351SP
Standard Probe (HM41)	
HMP113 probe for HM40	HMP113 (configuration: V00B2C1A0)
Plastic locking bushing (3 pcs) for attaching HMP113 probe to HM40 indicator	DRW238590SP
Plastic grid filter for HMP113 probe	DRW236214SP
Plastic grid with membrane filter for HMP113 probe	230727SP
HM42 Probe (HM42)	
Thin 4 mm diameter probe for HM40	HM42PROBE
Steel grid filter for HM42PROBE	19867HM
Membrane tube set (5 pcs) for HM42PROBE	19858HM
Rubber sleeve set (10 pcs) for HM42PROBE	19809HM
Calibration adapter for HM42PROBE	HM37067
Remote Probe (HM45)	
HMP113 probe for HM40	HMP113 (configuration: V00B2C1A0)
Plastic locking bushing (3 pcs) for attaching HMP113 probe to HM40 indicator	DRW238590SP
HM40 handle and cable	HM40HANDLE
Plastic grid filter for HMP113 probe	DRW236214SP
Plastic grid with membrane filter for HMP113 probe	230727SP
HM46 Probe (HM46)	
Stainless steel 12 mm diameter probe for HM40	HM46PROBE
Sintered filter for HM46PROBE	0195
Optional membrane filter for HM46PROBE (up to +80 °C)	10159HM
Plastic grid filter for HM46PROBE (up to +80 °C)	6221
Disposable sleeve, 50 pcs set	1558
Probe holder	HM36915



PEROXCAP® sensor for measuring vaporized hydrogen peroxide, relative saturation and relative humidity



PEROXCAP's unique benefits

- Repeatable measurement
- Excellent long-term stability
- In addition to H₂O₂ ppm measurement, the sensor also measures humidity and temperature when combined with an additional temperature sensor
- Unique Relative Saturation parameter indicates the combined humidity of both H₂O₂ vapor and water vapor
- Tolerates high humidity and measures accurately even in 100% relative saturation
- Accurate measurement with a traceable H₂O₂ factory calibration
- Long product lifetime and annual calibration interval
- Optional on-site calibration

Unique capacitive thin-film polymer sensor for repeatable measurement

PEROXCAP sensor technology works using measurements from two HUMICAP® sensors. Vaisala HUMICAP sensors guarantee quality and reliability, with their reputation for repeatability, accuracy, excellent long-term stability, and negligible hysteresis, even in the most demanding high-concentration H₂O₂ applications in atmospheric pressure.

HUMICAP is a thin-film polymer sensor consisting of an Alumina substrate on with a thin polymer film between two electrodes. The polymer film absorbs or

releases vapor according to humidity changes in the environment. As the humidity changes, the dielectric properties of the polymer film change, and so does the capacitance of the sensor. The instrument's electronics measure the capacitance of the sensor and convert it into a humidity reading.

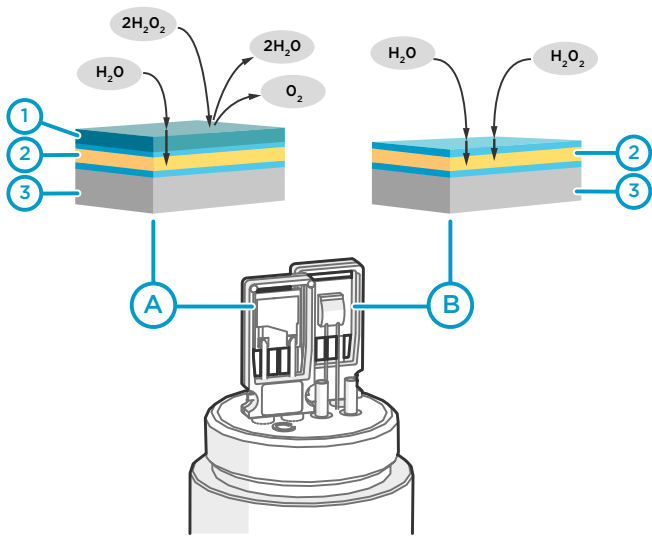
The upper electrode is made of corrosion resistant conductive material and functions as one of the two electrodes in the capacitor. It protects the active material of the sensor from dust, dirt and conductive particles.

The thin film polymer is sandwiched between the two electrodes. This conductive layer absorbs water and H₂O₂ vapor. The advanced upper electrode is one of the secrets behind a cutting-edge humidity sensor. The amount of vapor absorbed is proportional to the ambient relative humidity (sensor with catalytic layer) or relative saturation.

The thin film polymer layer amplifies the amount of water and H₂O₂ in the air. We synthesize our own polymers in order to optimize sensor performance.

The lower electrode is made of corrosion resistant conductive material and functions as one of the two electrodes in the capacitor.

Operating principle of PEROXCAP measurement



- A** HUMICAP sensor with a catalytic layer (under the probe filter). This sensor only senses water vapor.
- B** HUMICAP sensor without a catalytic layer (under the probe filter). This sensor senses the air mixture with both hydrogen peroxide vapor and water vapor.
- 1** Catalytic protection layer over the thin-film polymer. This layer catalyzes hydrogen peroxide into water and oxygen and prevents it from entering the sensing polymer.
- 2** Thin-film polymer between two electrodes.
- 3** Alumina substrate.

Intelligent PEROXCAP measurement technology

PEROXCAP measurement uses two HUMICAP sensors: one HUMICAP sensor with a catalytic layer and the other one without the catalytic layer. The catalytic layer catalyzes hydrogen peroxide from the vapor mixture. Therefore, the HUMICAP sensor with the catalytic layer only senses water vapor, providing a measurement of partial water pressure, i.e. relative humidity (RH). The other HUMICAP sensor without the catalytic layer senses the air mixture with both hydrogen peroxide vapor and water vapor. The difference between the readings from these two sensors indicates the vapor concentration of H₂O₂.

Repeatable measurement even in high humidity

The PEROXCAP sensor is warmed using a chemical purge function. This purging process involves rapid heating of the sensor to remove possible impurities and condensation. This allows the sensor to provide reliable measurement, even in environments where the humidity is near saturation because the heating prevents condensation on the sensor.

PEROXCAP's intelligent measurement technology, including the chemical purge function, helps maintain measurement accuracy between calibration intervals in challenging environments. The unique PEROXCAP technology was developed to provide stable and repeatable measurements.

Multi-parameter measurement

Combining the PEROXCAP sensor with an additional temperature sensor allows up to three measurement parameters: hydrogen peroxide vapor concentration, temperature, and humidity, referring to both relative humidity and relative saturation.

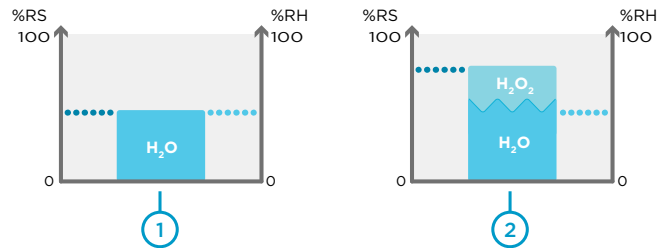
Water and hydrogen peroxide have a very similar molecular structure; both affect the humidity of the air in which they are present

- Relative saturation indicates the humidity of the air caused by both H₂O₂ vapor and water vapor. When relative saturation reaches 100 %RS, the vapor mixture starts to condense.
- Relative humidity is a parameter that indicates the humidity of the air caused only by water vapor.

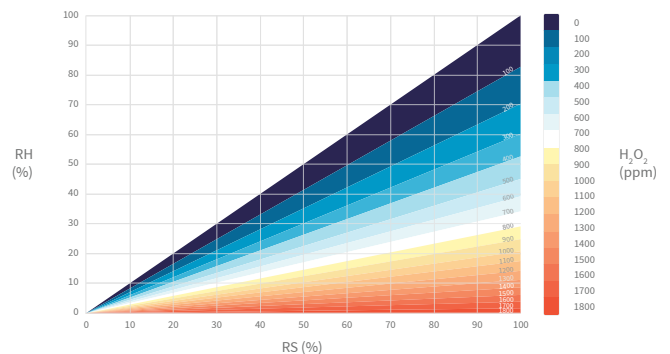
Traceable H₂O₂ factory calibration

Every PEROXCAP sensor is manufactured in Vaisala's own cleanroom and individually calibrated at the Vaisala factory. Both H₂O₂ and RH calibrations are traceable to international SI units, which ensures that the measured values represent the real environment.

The effect of H₂O and H₂O₂ on relative saturation (RS) and relative humidity (RH)



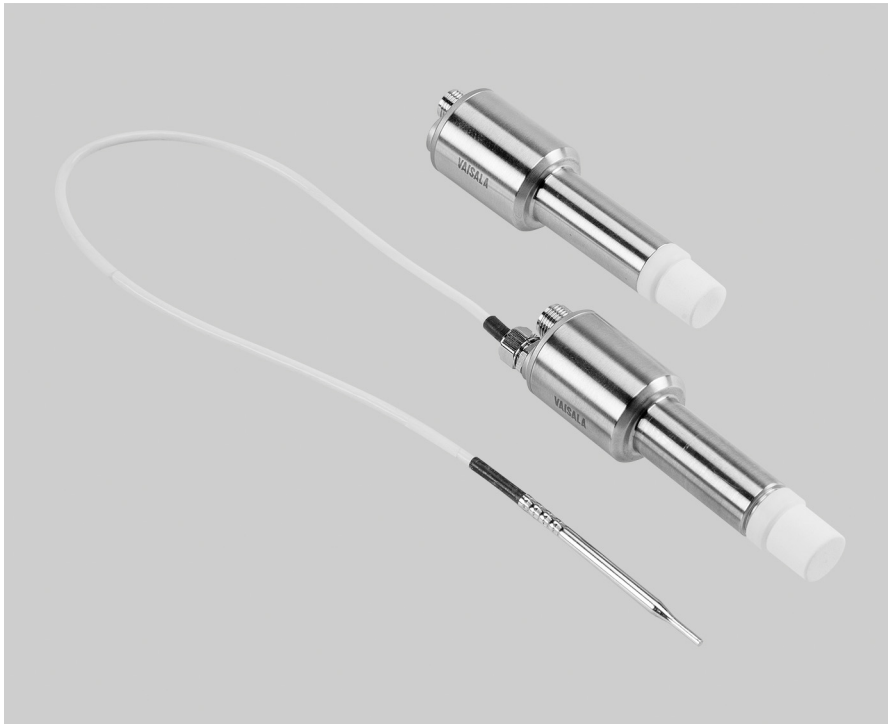
- 1** Space without H₂O₂ vapor. When H₂O₂ vapor is not present, relative saturation equals relative humidity.
- 2** Same space with H₂O₂ vapor introduced. Relative saturation is higher than relative humidity.



For example, at 20 °C and 500 ppm hydrogen peroxide, the humidity level 25 %RH is equivalent to 60 %RS. When this gas mixture starts to condense (relative saturation being 100 %), relative humidity is 45 %.

HPP270 Series Probes

For hydrogen peroxide, humidity, and temperature measurement



Features

- Basic probe option HPP271 for H₂O₂ vapor concentration measurement
- Advanced probe option HPP272: compact 3-in-1 probe with real-time measurement of H₂O₂ vapor concentration, humidity, and temperature
- Superior long-term stability and repeatability with proprietary PEROXCAP® technology
- Corrosion-resistant stainless steel housing (IP65)
- Traceable calibration certificate
- Standalone probe with digital Modbus RTU over RS-485 or 2 analog outputs
- Compatible with Vaisala Indigo products and Insight PC software

The Vaisala PEROXCAP® Hydrogen Peroxide, Humidity, and Temperature Probes HPP271 and HPP272 are designed for demanding hydrogen peroxide bio-decontamination where repeatable, stable, and accurate measurement is essential. The HPP270 series probes are suitable for a variety of applications such as isolator, material transfer hatch, and room bio-decontamination.

Up to three measurements in one compact unit

The advanced HPP272 probe option provides all the parameters you need to measure during bio-decontamination processes: hydrogen peroxide vapor, temperature, and humidity as relative saturation and relative humidity.

Relative saturation for comprehensive humidity monitoring

Similar to water, H₂O₂ vapor affects the humidity level of decontaminated air. The advanced HPP272 probe option enables the measurement of relative saturation, which indicates the total humidity level caused by water vapor and H₂O₂ vapor together. This tells you reliably when the bio-decontaminated air starts to condense.

Repeatable measurement for highly condensing environments

Intelligent measurement technology including the sensor purge function helps to maintain accuracy between calibrations in challenging H₂O₂ environments. The purging process involves rapid heating of the sensor to remove possible contamination.

The PEROXCAP® sensor used in the HPP270 series probes is warmed, which prevents condensation from forming on the sensor. This provides reliable measurement even in condensing conditions.

Indigo and Insight compatible

The probe can be connected to Vaisala Indigo transmitters and the Indigo80 handheld indicator to extend the selection of available features.

Indigo products provide a range of additional display, output, and relay options, as well as convenient interfaces for monitoring, configuration, and calibration and adjustment. For more information, see www.vaisala.com/indigo.

For easy-to-use access to configuration, calibration, and adjustment, the probe can be connected to Vaisala Insight PC software. See www.vaisala.com/insight.

Traceable calibration at Vaisala

Every probe and sensor is manufactured and individually calibrated at Vaisala world-class facilities. Available traceable calibration certificates: 2 points for H₂O₂, 3 points for humidity, 1 point for temperature.

HPP271 technical data

Measurement performance

Hydrogen peroxide	
Sensor	PEROXCAP®
Measurement range	0 ... 2000 ppm
Measurement temperature range	+5 ... +50 °C (+41 ... +122 °F)
Repeatability at +25 °C (+77 °F) up to 500 ppm H ₂ O ₂	±10 ppm
Accuracy at +10 ... +25 °C (+50 ... +77 °F), 10 ... 2000 ppm H ₂ O ₂ ¹⁾	±10 ppm or 5 % of reading (whichever is greater)
Factory calibration uncertainty at +25 °C (+77 °F), 500 ppm H ₂ O ₂ ²⁾	±10 ppm
Response time (T ₆₃)	70 s
Other parameters	
H ₂ O ppm by volume, dew point temperature	

1) Including non-linearity, hysteresis, and repeatability.

2) Defined as ±2 standard deviation limits. See also calibration certificate.

Inputs and outputs

Operating voltage	Digital output: 15 ... 30 V DC Analog output: 15 ... 25 V DC
Current consumption at +25 °C (+77 °F)	
In digital mode	Max. 10 mA
In analog mode	Max. 50 mA
During sensor purge	Max. 250 mA
Digital output	
Interface	RS-485, not isolated; do not use termination on the RS-485 line
Communication protocol	Modbus RTU v.1.02
Analog output	
Outputs	2 × 4 ... 20 mA 3-wire current outputs
Max. load	500 Ω
Accuracy (typical)	±0.1 % of full scale
Analog output temperature dependence	0.005 %/°C (0.003 %/°F) full scale

Operating environment

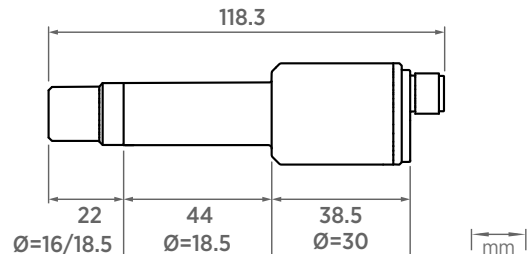
Operating temperature	+0 ... +70 °C (+32 ... +158 °F)
Storage temperature	-20 ... +70 °C (-4 ... +158 °F)
Ambient pressure	Normal atmospheric pressure
IP rating	IP65

Compliance

EU directives and regulations	EMC, RoHS
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
EMC emissions	CISPR 32 / EN 55032, Class B
Compliance marks	CE, China RoHS, RCM

Mechanical specifications

Connector	M12-5M
Materials	
Probe body	AISI316L stainless steel
Filter cap	Porous PTFE



HPP271 dimensions

Spare parts and accessories

Indigo USB adapter ¹⁾	USB2
Probe connection cable with open wires, 1.5 m (4.9 ft)	254294SP
Probe connection cable with open wires, 3 m (9.8 ft)	254295SP
Probe connection cable with open wires, 5 m (16 ft)	254296SP
Probe connection cable with open wires, 10 m (33 ft)	254297SP
Flat cable, M12-5F - M12-5M, 1 m (3.3 ft)	CBL210493SP
Filter	DRW246363SP
Gland set for through-wall installation, HPP271	HPP271MOUNTINGSET1
Flange for through-wall installation, HPP271	HPP271MOUNTINGSET2
Wall mount for HPP271 and HPP272	HPP272WALLMOUNT
Indigo transmitters	See www.vaisala.com/indigo
Indigo80 handheld indicator	See www.vaisala.com/indigo80

1) Vaisala Insight software for Windows available at www.vaisala.com/insight.

HPP272 technical data

Measurement performance

Hydrogen peroxide	
Sensor	PEROXCAP®
Measurement range	0 ... 2000 ppm
Measurement temperature range	+5 ... +50 °C (+41 ... +122 °F)
Repeatability at +25 °C (+77 °F) up to 500 ppm H ₂ O ₂	±10 ppm
Accuracy at +10 ... +25 °C (+50 ... +77 °F), 10 ... 2000 ppm H ₂ O ₂ ¹⁾	±10 ppm or 5 % of reading (whichever is greater)
Factory calibration uncertainty at +25 °C (+77 °F), 500 ppm H ₂ O ₂ ²⁾	±10 ppm
Response time (T ₆₃)	70 s
Relative saturation	
Measurement range	0 ... 100 %RS
Measurement temperature range	+5 ... +50 °C (+41 ... +122 °F)
Repeatability at +25 °C (+77 °F), 500 ppm H ₂ O ₂	±0.5 %RS
Accuracy at +25 °C (+77 °F) ¹⁾	±4 %RS
Factory calibration uncertainty at +25 °C (+77 °F), 500 ppm H ₂ O ₂ ²⁾	±2 %RS
Relative humidity	
Measurement range	0 ... 100 %RH
Measurement temperature range	+5 ... +70 °C (+41 ... +158 °F)
Accuracy: ¹⁾	
at +25 °C (77 °F), 0 ppm H ₂ O ₂ , 0 ... 90 %RH	±1 %RH
over full temperature measurement and H ₂ O ₂ range	±2 %RH
Response time (T ₆₃)	20 s
Factory calibration uncertainty at +25 °C (77 °F), 0 ppm H ₂ O ₂ , 0 ... 95 %RH ²⁾	±1 %RH
Temperature	
Sensor	Pt1000 RTD Class F0.1
Accuracy over temperature range	±0.2 °C (±0.36 °F)
Other parameters	
Absolute H ₂ O ₂ and H ₂ O, H ₂ O ppm by volume, water vapor saturation pressure (H ₂ O and H ₂ O+H ₂ O ₂), dew point temperature, vapor pressure (H ₂ O and H ₂ O ₂)	

¹⁾ Including non-linearity, hysteresis, and repeatability.
²⁾ Defined as ±2 standard deviation limits. See also calibration certificate.

Inputs and outputs

Operating voltage	Digital output: 15 ... 30 V DC Analog output: 15 ... 25 V DC
Current consumption at +25 °C (+77 °F)	
In digital mode	Max. 10 mA
In analog mode	Max. 50 mA
During sensor purge	Max. 250 mA
Digital output	
Interface	RS-485, not isolated; do not use termination on the RS-485 line
Communication protocol	Modbus RTU v1.02
Analog output	
Outputs	2 × 4 ... 20 mA 3-wire current outputs
Max. load	500 Ω
Accuracy (typical)	±0.1 % of full scale
Analog output temperature dependence	0.005 %/°C (0.003 %/°F) full scale dependence

Operating environment

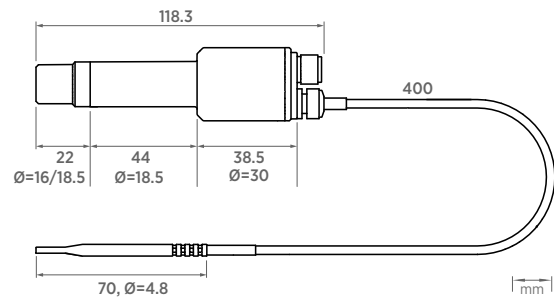
Operating temperature	+0 ... +70 °C (+32 ... +158 °F)
Storage temperature	-20 ... +70 °C (-4 ... +158 °F)
Ambient pressure	Normal atmospheric pressure
IP rating	IP65

Compliance

EU directives and regulations	EMC, RoHS
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
EMC emissions	CISPR 32 / EN 55032, Class B
Compliance marks	CE, China RoHS, RCM

Mechanical specifications

Connector	M12-5M
Materials	
Probe body	AISI316L stainless steel
Filter cap	Porous PTFE
Temperature probe	AISI316L stainless steel
Temperature probe cable	PTFE



HPP272 dimensions

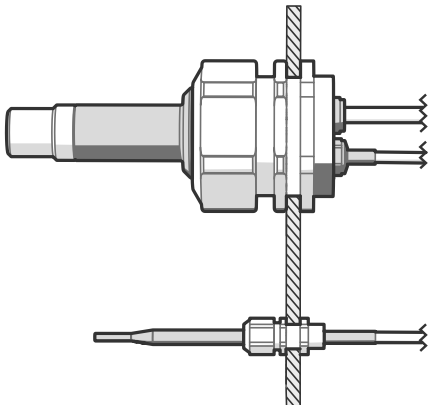
Spare parts and accessories

Indigo USB adapter ¹⁾	USB2
Probe connection cable with open wires, 1.5 m (4.9 ft)	254294SP
Probe connection cable with open wires, 3 m (9.8 ft)	254295SP
Probe connection cable with open wires, 5 m (16 ft)	254296SP
Probe connection cable with open wires, 10 m (33 ft)	254297SP
Flat cable, M12-5F - M12-5M, 1 m (3.3 ft)	CBL210493SP
Filter	DRW246363SP
Gland set for through-wall installation, HPP272	HPP272MOUNTINGSET1
Flange for through-wall installation, HPP272	HPP272MOUNTINGSET2
Wall mount for HPP271 and HPP272	HPP272WALLMOUNT
Indigo transmitters	See www.vaisala.com/indigo
Indigo80 handheld indicator	See www.vaisala.com/indigo80

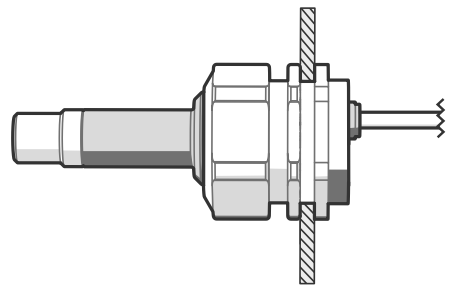
¹⁾ Vaisala Insight software for Windows available at www.vaisala.com/insight.

HPP271 and HPP272 installation accessories

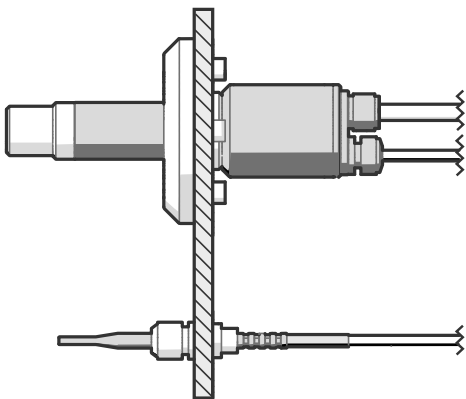
HPP272MOUNTINGSET1



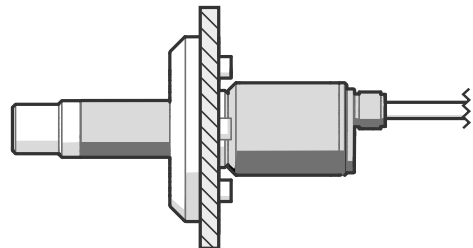
HPP271MOUNTINGSET1



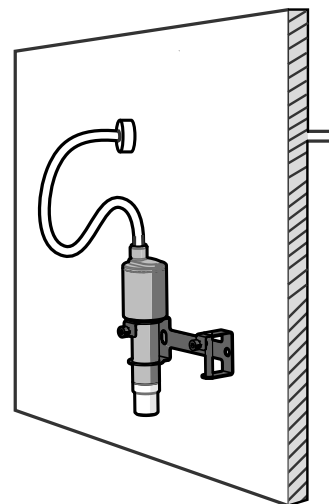
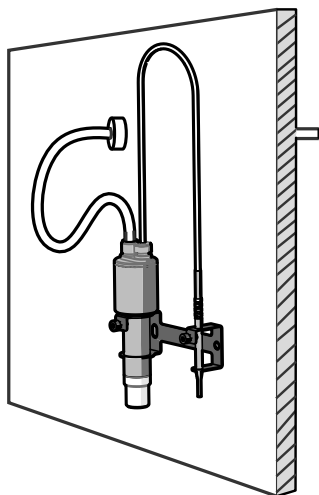
HPP272MOUNTINGSET2



HPP271MOUNTINGSET2



HPP272WALLMOUNT





Features

- Easy and reliable calibration of humidity probes and transmitters
- Based on saturated salt solutions
- Fast temperature equilibration
- No external power required
- Suitable for laboratory use and on-site checks
- Chambers and transit covers make HMK15 easy to transport
- Pre-measured certified salts available
- Vaisala Service Centers offer accredited calibrations for humidity, temperature, and barometric pressure

No measuring instrument stays accurate by itself. It is essential that the functioning of an instrument is periodically checked against a reference. Vaisala has developed Vaisala Humidity Calibrator HMK15 to make calibration and spot-checking of humidity probes and transmitters easy and reliable.

Benefits

- Easy to use
- Reliable calibration
- Certified and pre-measured salts available on order form of HMK15

Reliable calibration method

The operating principle of HMK15 is based on the fact that a saturated salt solution generates a certain relative humidity in the air above it. The reading of the humidity probe or transmitter can then be adjusted accordingly. Many calibration laboratories use this generally accepted and reliable method to

calibrate humidity instruments. Usually two or three different salt solutions are used. Salts are chosen according to the application. Available salts and their reference humidities:

- Lithium chloride LiCl (11 %RH)
- Magnesium chloride $MgCl_2$ (33 %RH)
- Sodium chloride NaCl (75 %RH)
- Potassium chloride KCl (85 %RH)
- Potassium sulphate K_2SO_4 (97 %RH)

Certified salts

HMK15 can be ordered with certified and pre-measured salts. A sample calibration is made from each salt batch in Vaisala's Measurement Standards Laboratory (MSL).

FINAS accredited measurement standards laboratory

Vaisala's Measurement Standards Laboratory is a FINAS accredited calibration laboratory. FINAS is a member of the EA (the European Cooperation for Accreditation).



Technical data

Operating environment

Operating temperature range	+0 ... +50 °C (+32 ... +122 °F)
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Mechanical specifications

Dimensions (H × W × L)	90 × 230 × 200 mm (3.54 × 9.06 × 7.87 in)
Weight	1 kg (2.20 lb) without salt solutions
Material (metal parts)	Anodized aluminum

Parts

Standard contents of HMK15 calibrator

Base plate
Two salt chambers with basic lids and transit covers
Thermometer
Measurement cup and mixing spoon
Calibration adapter (Ø13.5 mm) for Ø12 mm probes with long sensor legs
Calibration adapter (Ø13.5 mm) for Ø12 mm probes with short sensor legs

Optional items

See table *Spare parts and accessories*

Spare parts and accessories

Rubber plug set	19746HM
O-ring set	218096
Ion exchanged water	19767HM
Thermometer with red capillary liquid	25130HM
Transit bag	HM27032

Salt chambers and lids

HMK15 basic lid	271549
HMK15 universal lid	271550
HMK15 custom lid for 4 × HMP110 with filter on	253277SP
HMK15 custom lid for DMT132 and HMP60/HMP110 with filter on	230914
HMK15 salt chamber with basic lid and transit cover	DRW255417SP
HMK15 salt chamber with universal lid and transit cover	19766HM

Calibration adapters

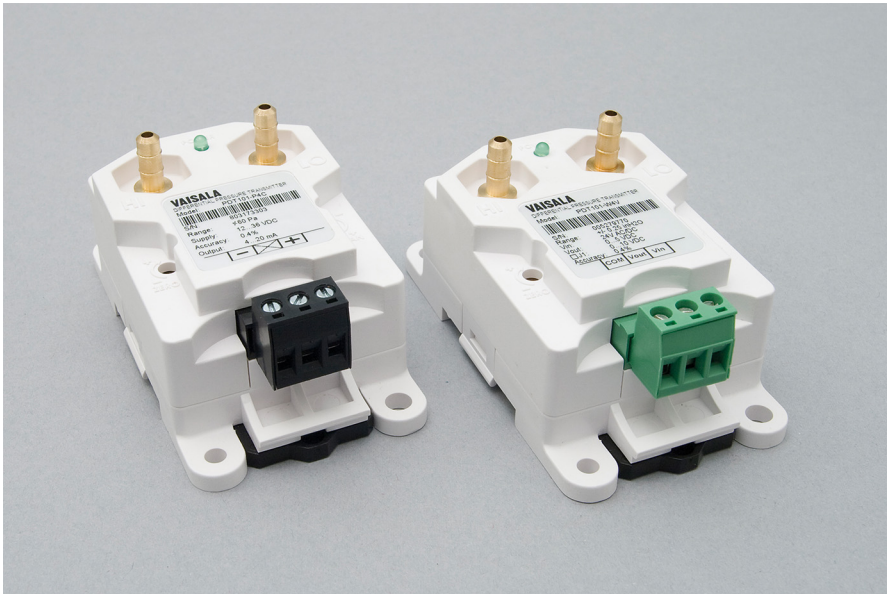
Calibration adapter for HMP9 probe	ASM213801
Calibration adapter (Ø13.5 mm) for Ø12 mm probes with long sensor legs	211302SP
Calibration adapter (Ø13.5 mm) for Ø12 mm probes with short sensor legs	218377SP
Calibration adapter for HMP42 probe	HM37067

Certified and ready-dosed salts ¹⁾

Ready-dosed LiCl salt package (LiCl salt 11 %RH, total uncertainty ±1.3 %RH) ²⁾	19729HM
Ready-dosed MgCl ₂ salt package (MgCl ₂ salt 33 %RH, total uncertainty ±1.2 %RH) ²⁾	19730HM
Ready-dosed NaCl salt package (NaCl salt 75 %RH, total uncertainty ±1.5 %RH) ²⁾	19731HM
Ready-dosed KCl salt package (KCl salt 85 %RH, total uncertainty ±2.0 %RH) ²⁾	251377HM
Ready-dosed K ₂ SO ₄ salt package (K ₂ SO ₄ salt 97 %RH, total uncertainty ±2.0 %RH) ²⁾	19732HM

¹⁾ Calibration certificate included with each salt package.

²⁾ Uncertainties given at +20 °C (+68 °F).



Features

- Easy mounting on wall, DIN rail, or panel
- 3 pressure ranges (Pa and inH₂O)
- Unidirectional and bidirectional models
- Accessible zero and span adjustment potentiometers
- ¼" brass tubing connections
- LED status indicator
- Dedicated models for critical and regulated environments and for air handling systems
- Euro style detachable connector
- Calibrations traceable to SI units through national metrology institutes or accredited calibration laboratories

Vaisala Differential Pressure Transmitter PDT101 offers precise measurement of differential air pressure. PDT101 offers dedicated models for critical and regulated environments with very low differential pressures and unidirectional models for air handling systems.

Operating environment

The highly accurate bidirectional models of PDT101 are designed especially for demanding life science and cleanroom applications, and are the perfect choice for any application requiring precise pressure differential measurement. The transmitter is ideal for incorporating into the Vaisala viewLinc Continuous Monitoring System to measure and monitor the critical environmental parameters as required in regulated environments.

The unidirectional models of PDT101 are optimal for air handling units to measure differential pressure over fans or filters, for example.

Zero and span adjustment screws are available on every PDT101 model. Both adjustments are accessible from the front of the unit.

Performance

PDT101 offers high accuracy, sensitivity, and stability, with models providing accuracies of either 0.40 or 1 % of span. The sensor uses a micro-machined, ultra-thin silicon diaphragm which provides inherent sensor repeatability and stability. The sensor enables precise measurement and control in high performance environments. The PDT101 transmitter is available with voltage output (3-wire) or current output (2-wire).

Applications

PDT101 is suitable for high performance environments in the life science, semiconductor, and electronics industries, as well as in building automation systems in data centers and other demanding buildings and environments.

When used in regulated environments as part of the viewLinc system, it is highly suitable for fulfilling the requirements of continuous, documented, and redundant data, to meet FDA, EMA and other international regulations.

The compact design is well suited for mounting in a cleanroom or in the adjacent corridor with LED indicator lights for quick and easy power status spot check.

Technical data

Models

Model	Measurement range	Output
PDT101-P4C	±60 Pa	4 ... 20 mA
PDT101-P4V	±60 Pa	0 ... 5 V
PDT101-P4C2	±125 Pa	4 ... 20 mA
PDT101-P4V2	±125 Pa	0 ... 5 V
PDT101-W4C	±0.25 inH ₂ O	4 ... 20 mA
PDT101-W4V	±0.25 inH ₂ O	0 ... 5 V
PDT101-W4C2	±0.5 inH ₂ O	4 ... 20 mA
PDT101-W4V2	±0.5 inH ₂ O	0 ... 5 V
PDT101-P10C	0 ... 500 Pa	4 ... 20 mA
PDT101-P10V	0 ... 500 Pa	0 ... 10 V
PDT101-W10C	0 ... 2 inH ₂ O	4 ... 20 mA
PDT101-W10V	0 ... 2 inH ₂ O	0 ... 10 V
PDT101-P10Cx ¹⁾	0 ... 500 Pa	4 ... 20 mA
PDT101-P10Vx ¹⁾	0 ... 500 Pa	0 ... 10 V
PDT101-W10Cx ¹⁾	0 ... 2 inH ₂ O	4 ... 20 mA
PDT101-W10Vx ¹⁾	0 ... 2 inH ₂ O	0 ... 10 V

¹⁾ The PDT101-P10Cx, PDT101-P10Vx, PDT101-W10Cx, and PDT101-W10Vx models do not include calibration certificate.

Measurement performance

Measurement ranges (bidirectional)	±60 Pa, ±125 Pa, ±0.25 inH ₂ O, or ±0.5 inH ₂ O
Measurement ranges (unidirectional)	0 ... 500 Pa, or 0 ... 2 inH ₂ O
Accuracy (incl. non-linearity, hysteresis, repeatability and zero/span calibration settings)	0.4 % of span (bidirectional models), 1% of span (unidirectional models)
Long-term stability	≤ 0.5 % span/year
Response time (10 ... 90 %)	250 ms
Warm-up time	15 s
Compensated temperature range	+2 ... +54 °C (+35.6 ... +129.2 °F)
Temperature dependence	±(0.065 Pa + 0.054 % of reading) / °C or ±(0.00015 inH ₂ O + 0.03 % of reading) / °F (reference 21 °C or 70 °F)
Pressure type	Differential, gauge, vacuum and compound
Overpressure	
Proof pressure	1.0 bar
Burst pressure	1.7 bar
Static pressure	1.7 bar
Mounting position	
Error (zero adjustable)	≤ 1%/g (calibration in vertical position is standard)
Adjustments (front accessible)	
Zero	±5 % span
Span	±3 % span

Mechanical specifications

Medium (measured gas)	Clean and dry air, non-conducting and non-corrosive gases
Mounting	Threaded fastener for wall mounting or DIN rail type EN 50022
IP rating	IP40
Weight	0.07 kg
Material	
Process connection	Brass
Sensor element	Silicon, aluminum, glass
Case	NEMA type 1 fire-retardant ABS 1 (meets UL94-5VA)

Inputs and outputs

Process connection	1/4" barbed fittings
Max. loop resistance for 4 ... 20 mA	≤ (Supply voltage - 12 V)/0.022 A
Supply current	Max. 20 mA for 4 ... 20 mA output signal
Optical process diagnostics	LED visual indicator
Electrical connection	Euro style pluggable terminal block accepts 12 ... 26 AWG wire (0.13 up to 3.31 mm ²)

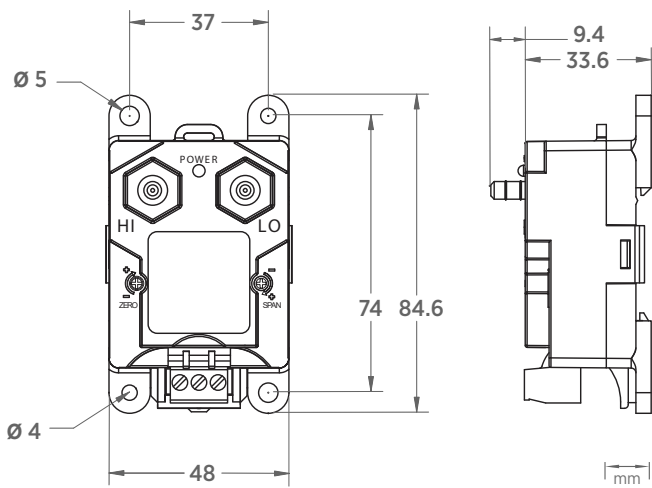
Output signal	
2-wire	4 ... 20 mA
3-wire	0 ... 5 or 0 ... 10 V DC (user selectable)
Operating voltage	
2-wire output 4 ... 20 mA	12 ... 36 V DC
3-wire output 0 ... 5 V DC	11.5 ... 36 V DC or 24 V AC
3-wire output 0 ... 10 V DC	14 ... 36 V DC or 24 V AC

Operating environment

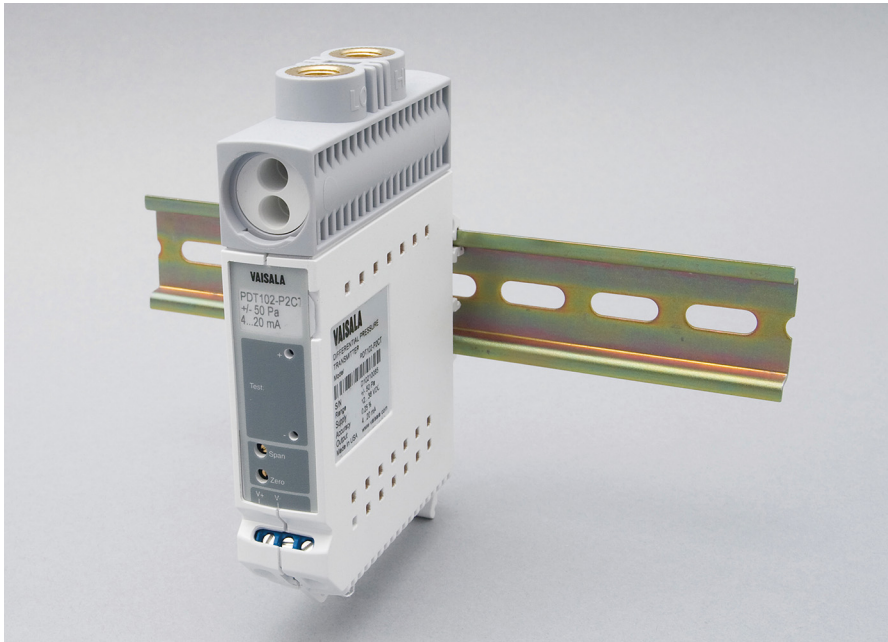
Operating temperature	-18 ... +70 °C (-0.4 ... +158 °F)
Storage temperature	-40 ... +82 °C (-40 ... +179.6 °F)
Note: If used in an electromagnetic field of 3 V/m, with narrow frequency area of 80 ... 120 MHz, it is possible that the current output of PDT101 can deviate max. 0.8 % (with accuracy specified 0.4 %)	

Compliance

EU directives and regulations	EMC
Electromagnetic compatibility (EMC)	EN 61326-1, basic immunity test requirements
Compliance marks	CE, RCM



PDT101 dimensions



Features

- In-place system calibration and online monitoring without disturbing process tubes with optional process valve actuator and test jacks
- Ultrathin profile ideally suited for DIN rail mount reduces installation and calibration costs
- High accuracy, two options; 0.25 % or 0.50 % of span
- Extremely robust MEMS silicon sensor technology provides very high accuracy, sensitivity, stability, and durability
- Calibrations traceable to SI units through national metrology institutes or accredited calibration laboratories
- Front side accessible zero and span adjustment potentiometers

Vaisala Differential Pressure Transmitter PDT102 offers ultra low pressure measurement for cleanroom control and monitoring applications.

Operating environment

Vaisala Differential Pressure Transmitter PDT102 is a high performance instrument designed primarily for life science and high technology cleanroom applications. The front panel includes zero and span adjustment potentiometers for convenient adjustment. The PDT102 transmitter is ideal for incorporating into the Vaisala viewLinc Continuous Monitoring System to measure and monitor the critical environmental parameters as required in regulated environments.

Performance

PDT102 offers very high accuracy, sensitivity and stability with two options for accuracy, 0.25% or 0.50% of span providing a highly reliable and

repeatable measurement. The sensor uses a micro-machined, ultra-thin silicon diaphragm which provides inherent sensor repeatability and stability. The sensor enables precise measurement and control in high performance cleanrooms. The PDT102 transmitter is available with voltage output (3-wire) or current output (2-wire).

Available options

Online monitoring of PDT102 is simple using the optional process valve actuator and the front access test jacks. The front access test jacks provide online process reference signal or calibration signal without disconnecting power supply wiring. Measurements can be made using a standard multimeter.

Applications

PDT102 is designed for use in critical monitoring of cleanrooms for pharmaceutical, biotechnology, medical device, and semiconductor controlled manufacturing environments.

Technical data

Measurement performance

Measurement ranges (bidirectional)	±50 Pa ±0.25 in H ₂ O
Accuracy ¹⁾	0.25 % span or 0.5 % span, depending on choice
Repeatability for 0.25 % span accuracy	0.03 %
Repeatability for 0.5 % span accuracy	0.05 %
Electrical resolution	1 x 10 ⁻⁴ span
Long-term stability	≤0.5 % span/year
Response time (10 ... 90 %)	250 ms
Warm-up time	15 s
Compensated temperature range	+2 ... +57 °C (+35.6 ... +134.6 °F)
Temperature dependence	±(0.036 Pa + 0.036 % of reading) / °C or ±(0.0001 in H ₂ O + 0.02 % of reading) / °F (reference 21 °C or 70 °F)
Pressure type	Differential, gauge, vacuum and compound
Overpressure	
Proof pressure	0.7 bar
Burst pressure	1.7 bar
Static pressure	1.7 bar
Mounting position	
Error (zero adjustable)	≤0.25 %
Adjustments (front accessible)	
Zero	±5 % span
Span	±3 % span

¹⁾ Incl. non-linearity, hysteresis, repeatability and zero/span calibration settings.

Inputs and outputs

Process connection	1/8 NPT female according to ANSI/ ASME B1.20.1
Operating voltage	12 ... 36 V DC
Max. loop resistance for 4 ... 20 mA	≤ (Supply voltage - 12V)/0.022 A
Electrical connection	Screw terminals, 12 ... 22 AWG (0.33 up to 3.31 mm ²)

Output signal	
2-wire	4 ... 20 mA
3-wire	0 ... 5 V
Supply current	
For 0 ... 5 V output	Max. 10 mA
For 4 ... 20 mA output	Max. 20 mA

Mechanical specifications

Medium (measured gas)	Clean and dry air, non-conducting and non-corrosive gases
Mounting	DIN rail types EN 50022, EN 50035 and EN 50045
Weight	0.16 kg
Material	
Process connection	Brass
Sensor element	Silicon, aluminum, glass
Case	Polycarbonate, glass filled (UL94-V-1)

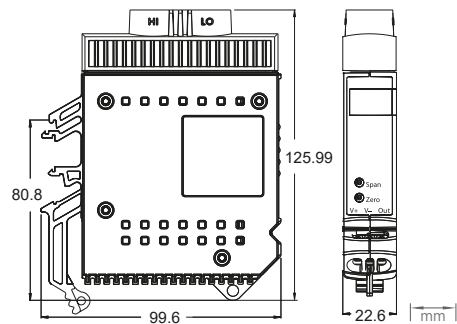
Operating environment

Operating temperature	-29 ... +70 °C (-20.2 ... +158 °F)
Storage temperature	-40 ... +82 °C (-40 ... +179.6 °F)
IP rating	IP30

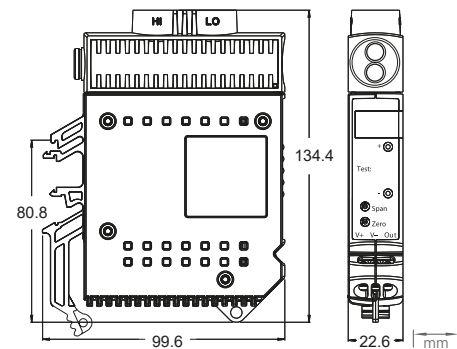
Note: If used in an electromagnetic field of 3 V/m, with narrow frequency area of 80 - 120 MHz, it is possible that the current output of PDT102 can deviate max. 0.3 % (with accuracy specified 0.25 %)

Compliance

EU directives and regulations	EMC
Electromagnetic compatibility (EMC)	EN 61326-1, basic immunity test requirements
Compliance marks	CE, RCM

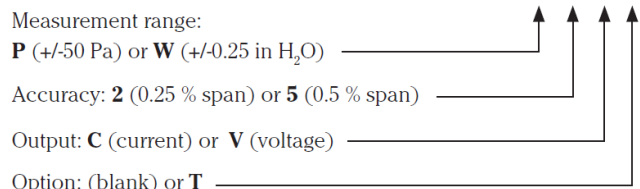


PDT102 transmitter dimensions



PDT102 dimensions with process valve actuator and test jacks

PDT102 - XXXT



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