M212938EN-A

User Guide

Data Logger for continuous monitoring systems

VDL200

VAISALA

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1. About this document

1.1 Version information

This document provides instructions for installing, using, and maintaining the VDL200 Data Logger.

Table 1 Document versions (English)

Document code	Date	Description
M212938EN-A	November 2024	First version.

1.2 Related manuals

For the latest versions of these documents, see docs.vaisala.com.

Table 2 Related manuals

Document code	Name
M211060EN	Vaisala HMP60 and HMP110 Series Humidity and Temperature Probes User Guide
M211799EN	Vaisala GMP251 and GMP80P Carbon Dioxide Probe User Guide
M211897EN	Vaisala GMP252 Carbon Dioxide Probe User Guide
M212933EN	Vaisala viewLinc Enterprise Server 5.2 User Guide

1.3 Documentation conventions

WARNING! Warning alerts you to a serious hazard. If you do not read and follow instructions carefully at this point, there is a risk of injury or even death.

CAUTION! Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.

Highlights important information on using the product.

Gives information for using the product more efficiently.

Lists tools needed to perform the task.

Indicates that you need to take some notes during the task.

1.4 Trademarks

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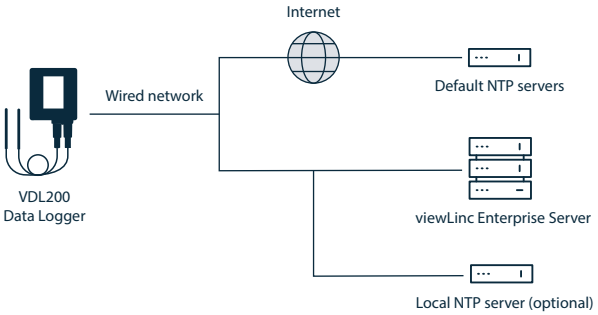
2. Product overview

2.1 Introduction to VDL200 data logger

VDL200 is an Ethernet-connected data logger for continuous monitoring systems. It provides high-accuracy measurements from up to 2 detachable humidity, temperature, and carbon dioxide probes. Suitable applications include real-time measurements in environments where wired connections are preferred. VDL200 is compatible with the Vaisala viewLinc Enterprise Server software.



VDL200 is powered from the Ethernet connector using Power over Ethernet (PoE). If the network does not provide PoE, a separate PoE power supply must be used. Single-use 1.5 V AA size batteries are used as a temporary backup power source when PoE power is not available.

VDL200 maintains accurate time by synchronizing with a Network Time Protocol (NTP) server. VDL200 must be able to synchronize with an NTP server, otherwise it cannot store and send measurement data.

The following ports are used in the communication between VDL200 and the servers:

- TCP port 8883 (viewLinc Enterprise Server)
- UDP port 123 (NTP servers)

More information

- VDL200 technical specification (page 43)

2.2 Probe options

Probe	Description [1)]	Installation notes
HMP110 and HMP110T 	**Humidity and temperature** probe for measurement in demanding conditions. Robust stainless steel construction. Temperature-only version HMP110T available. Plastic grid filter provides the fastest response time. For added protection, select the membrane filter, the PTFE filter, or the stainless steel sintered filter. Measurement temperature range −40 ... +80 °C (−40 ... +176 °F).	Suitable for measurement inside chambers, incubators, fridges, and freezers. Versatile mounting options using accessories. Must be connected to VDL200 using an M8/M8 probe cable (for example, CBL211293-3MSP).
HMP115 and HMP115T 	**Humidity and temperature** probe for general purpose measurement. Temperature-only version HMP115T available. Plastic grid filter provides the fastest response time. For added protection, select the membrane filter or the PTFE filter. Measurement temperature range −40 ... +60 °C (−40 ... +140 °F).	Ideal choice for ambient measurement. Can be connected to VDL200 directly or using an M8/M8 probe cable (for example, CBL211293-3MSP).
TMP115 	**Temperature** probe for measurement in a wide range of conditions. 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. Measurement temperature range −196 ... +150 °C (−320 ... +302 °F). Operating temperature range of the probe body is −40 ... +60 °C (−40 ... +140 °F).	Suitable for measurement inside chambers, fridges, and freezers. Sensor tip withstands immersion in glycol and liquid nitrogen. Can be connected to VDL200 directly or using an M8/M8 probe cable (for example, CBL211293-3MSP). Use the thermal dampener block accessory (item code 236310SP) to add thermal mass to the sensor tip.

Probe	Description [1]	Installation notes
GMP251 and GMP252 	**Carbon dioxide** probes for %-level measurements (GMP251) and ppm-level measurements (GMP252). Designed for use in demanding applications such as life science incubators. Measurement temperature range −40 ... +60 °C (−40 ... +140 °F). When ordered with the VDL200 data logger, the probe is delivered with an M8-M12 adapter cable (item code CBL211291SP) and the CO_2 probe mounting kit (item code ASM214253SP). The kit includes a probe holder that has attachments for the CO_2 probe, a Ø 12 mm probe (for example, HMP110) and the sensor tip of the TMP115 probe.	Must be connected to VDL200 using the M8/M12 flat cable (item code CBL211291SP).

1) See probe datasheets in docs.vaisala.com for detailed probe specifications.

More information

- Accessories and spare parts (page 46)

2.3 Parts

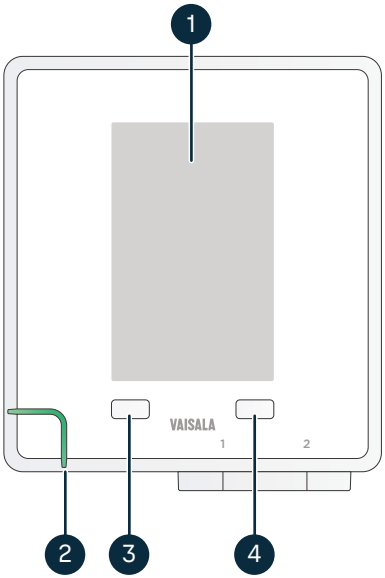


Figure 1 Front parts

1 Display
2 Status LED
3 Left button
4 Right button

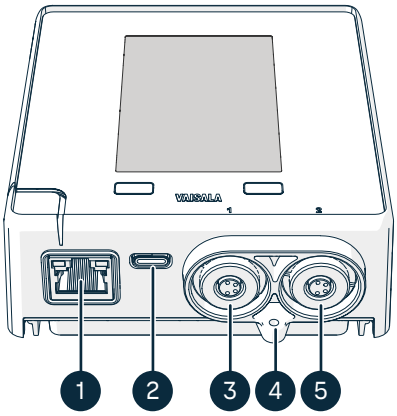


Figure 2 Connectors

1 Ethernet port (RJ-45)
2 Service port (USB-C)
3 Probe port 1 (4-pin M8 female)
4 Place for locking screw (3×8 mm screw recommended)
5 Probe port 2 (4-pin M8 female)

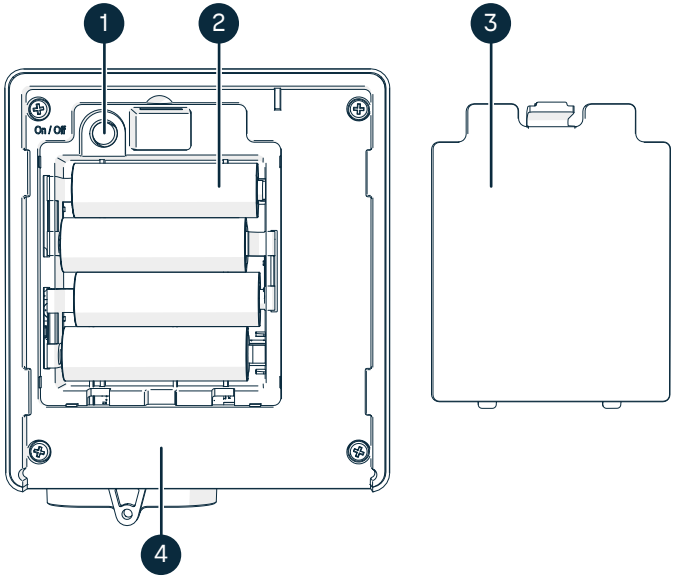


Figure 3 Rear parts

1 Power button
2 Backup batteries (4 pcs 1.5 V alkaline (LR6) or lithium (FR6))
3 Battery cover
4 Type label area

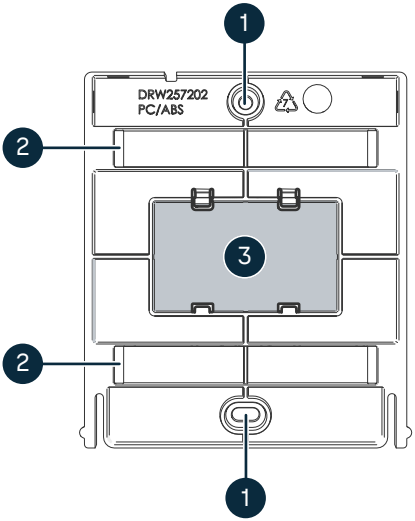


Figure 4 Mounting bracket parts

1 Screw mounting holes
2 Cable tie mounting holes
3 Mounting magnet

CAUTION! Strong magnet
Keep the magnet away from devices that are sensitive to magnetic fields, for example, pacemakers, magnetic cards, and mechanical watches. Do not separate the magnet from the mounting bracket.

2.4 Display

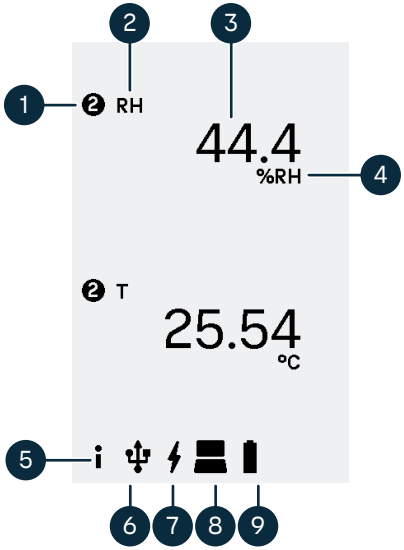


Figure 5 Display layout

1 Number of the probe port that is the source of this measurement
2 Abbreviation of measurement parameter
3 Latest measured value
4 Unit of measurement
5 Information icon. Touching the left button (below the icon) opens the device information page.
6 Service port connection status
7 PoE power supply status
8 Host system connection status
9 Battery level

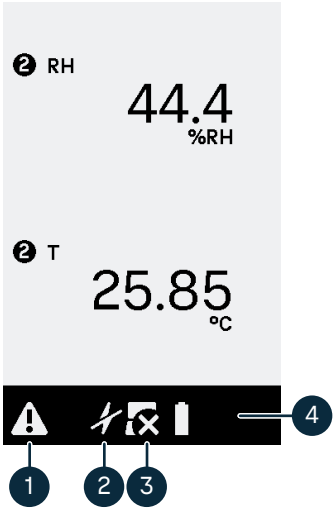


Figure 6 Display when errors are active

1 Error icon. When the error icon is shown, touching the left button opens the error page.
2 PoE power supply status. In this example PoE is not connected.
3 Host system connection status. In this example the Ethernet connection is not available as PoE is not connected.
4 The color of the icon row is inverted when there are active errors.

2.5 Status icons

Table 3 Status icons on VDL200 display

Icon(s)	Icon name	Meaning
	Information	Access the device information page by touching the button below this icon.
	Error	A device error is active. Touch the button below this icon to access the error page and the device information page.
	Service port active	Service port is in use.
	PoE available	Device is currently powered by Power over Ethernet (PoE).
	PoE not available	PoE is not available and the device is operating on backup battery power. This state is considered an error state. Ethernet connection is disabled to reduce power consumption, which prevents communication with the monitoring system and the time servers.
	Connection OK	Monitoring system address is configured and the system is reachable.
	Connection unavailable	Ethernet connection is not available.

Icon(s)	Icon name	Meaning
	Check connection	Connection to monitoring system not available.
	Battery charge	Approximate charge remaining in the backup batteries.
	Batteries empty	Backup batteries do not have sufficient charge to power the device.
	Batteries missing	Backup batteries are missing or inserted incorrectly.

More information

- Basic troubleshooting (page 40)

2.6 Backup batteries

VDL200 uses 4 AA size primary (non-rechargeable) batteries with 1.5 V nominal voltage as its backup batteries. Battery power is used whenever Power over Ethernet (PoE) is not available and the device is not temporarily powered through the service port. The real-time clock of the VDL200 also relies on the batteries to retain accurate time when the device is turned off. There is a capacitor that powers the clock circuit for up to 30 minutes when the batteries are disconnected.

Compatible battery types

- 1.5 V alkaline batteries, designation IEC-LR6, ANSI 15A. Standard choice for most humidity and temperature measurement applications.
- 1.5 V lithium batteries, designation IEC-FR14505 (FR6), ANSI 15-LF. Typically higher capacity and better in cold temperatures. Must be used when the temperature of the data logger's installation location is below 0 °C (+32 °F). Lithium batteries are also required when CO_2 measurement is used due to the higher power consumption.

Do not use batteries with a nominal voltage higher than 1.5 V.

Use of rechargeable batteries is not recommended. VDL200 will not charge the batteries, and they are typically unsuitable due to different nominal voltage, capacity, and/or discharge curve.

Battery type setting

VDL200 has a configurable battery type setting that optimizes the operation of the battery charge indicator. This setting should be set according to the battery type (alkaline or lithium) when the device is taken into use, and changed if the battery type is changed.

More information

- Replacing batteries (page 32)
- Configuring settings using Insight software (page 27)

2.7 Service port

The service port of the data logger provides a local interface for performing local configuration and service actions using a computer connection. The service port connector is a standard female USB-C connector. Standard USB cables with a USB-C connector can be used to connect the data logger to a computer.

- Any computer that supports Media Transfer Protocol (MTP) can view the files available in the file system of the data logger. Firmware updates can also be performed using this connection.
- Computers with a compatible Windows® operating system can use Insight PC software to configure the settings of the data logger and perform firmware updates.

The service port can be used to supply temporary operating power to the data logger. Do not attempt to use the service port to permanently power the data logger.

2.7.1 Files and folders in the USB file system

The following files and folders are present in the USB file system of the VDL200 Data Logger. Most of the accessible files are in JSON format, and they are intended for use by Vaisala support as necessary.

Except for the `\Device\Update\` folder that is used to load the firmware update file, the file system is read-only.

Table 4 Files and folders in the USB file system

Path and file	Content
`\Device\`	Files for the data logger.
`\Device\Logs\All data\`	Measurement data files created by the data logger in JSON format.
`\Device\Diagnostics\`	Diagnostic files for the data logger.
`\Device\Configuration\`	Configuration settings of the data logger.

Path and file	Content
\Device\Update\	Folder for firmware update. Copy the firmware update file here to start the update. See Updating firmware using USB file transfer (page 36).
\Probe1\	Identification and measurement files for probe in port 1.
\Probe2\	Identification and measurement files for probe in port 2.

2.8 ESD protection

Electrostatic discharge (ESD) can cause immediate or latent damage to electronic circuits. Vaisala products are adequately protected against ESD for their intended use. However, it is possible to damage the product by delivering an electrostatic discharge when touching, removing or inserting any objects inside the equipment housing.

Avoid touching component contacts or connectors when working with the device.

2.9 Safety

WARNING! Read the product documentation carefully before installing or operating the product. If you encounter the following marking during installation or operation, consult product documentation to find out the nature of the potential hazards and any actions which have to be taken to avoid them:

CAUTION! The magnetic mounting bracket of the VDL200 has a strong magnet. Handle it with care and keep it away from devices that are sensitive to magnetic fields (for example, pacemakers, magnetic cards, and mechanical watches.)

3. Installation

3.1 Installing VDL200

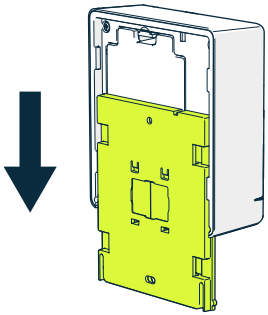
To install VDL200, you need the following tools and equipment:

- Content of the VDL200 product package:
  - VDL200 device with mounting bracket
  - According to order: measurement probes, probe cables, probe holders, and batteries
- If not included in the order: 4 pcs AA size 1.5 V batteries, type LR6 (alkaline) or FR6 (lithium)
- Cable ties or screws and wall plugs for mounting
- Cable tie cutter or screwdriver, depending on mounting method
- Ethernet cable
- Power over Ethernet (PoE) power source

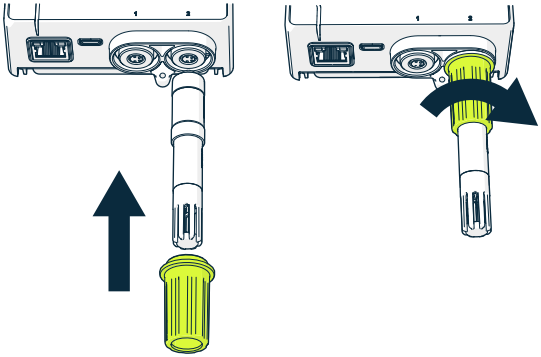
For configuring the settings of VDL200:

- Computer with Microsoft Windows® operating system (64-bit version) and Insight PC software (version 1.3.0 or later) installed, and a free USB port
- USB-C cable for connecting VDL200 to computer

1. Slide the mounting bracket out of the data logger.



2. Connect the measurement probes to the probe ports of the data logger:
   - Directly attached probes: Verify the orientation of the connector pins and push the probe to the connector. Secure the probe using a probe nut.
   - Cable-attached probes: Connect the cable to the probe port, and secure it using the M8 nut on the cable. Then connect the probe to the cable.



3. Open the battery cover.
4. If the batteries have been inserted at the factory, verify their type (alkaline or lithium) and remove the battery isolation tab if it is present. The tab prevents the batteries from draining during storage.
5. If the battery compartment is empty, insert 4 AA size 1.5 V batteries of the appropriate type. Follow the markings on the battery compartment to insert the batteries in the right orientation.

> Use batteries that have a full charge and are not past their expiration date. Lithium batteries must be used with CO_2 measurement, and when the ambient temperature of the data logger's installation location is below 0 °C (+32 °F).

6. Press the power button for approximately 1 s to turn on the data logger. The data logger plays a short sound effect when turning on and off.

   The data logger starts up on battery power and detects the connected probes. The measurements from the probes are automatically assigned for display and recording.

> Batteries are intended for backup use only. Proceed to connect Power over Ethernet (PoE) as soon as possible. **The Ethernet connection is disabled until PoE is available.**

7. Replace the battery cover.

8. Connect the Ethernet cable.
9. If the network does not provide PoE, connect a PoE power source between the network and the data logger.
10. Connect the VDL200 to your laptop using a USB-C cable and configure its settings. See Configuring settings using Insight software (page 27).
11. Attach the mounting bracket to the installation location with screws, cable ties, or the magnet.

    Note the orientation – when the data logger is installed, the probe ports should point down.
12. Slide the data logger into the mounting bracket.
13. Optional: Insert a 3×8 mm screw into the locking screw hole to prevent the data logger from being easily removed.
14. Use the included accessories to attach cabled probes to their final locations and secure the cables. See Mounting probes (page 21).
15. Log in to your viewLinc Enterprise Server as an administrator and accept the data logger as a new device. See Managing devices using viewLinc Enterprise Server (page 28).

    Remote management provides additional configuration options that may be relevant for you. For example, the temperature unit displayed by the data logger can be changed remotely. The default temperature unit is degrees Celsius.
16. Check the display of the VDL200 to verify there are no active errors.

More information

- Error messages (page 38)

3.2 Mounting probes

For more information on probe mounting and available accessories, refer to the user guides of the probes:

- HMP60 and HMP110 Series User Guide (M211060EN)
- GMP251 and GMP80P User Guide (M211799EN)
- GMP252 User Guide (M211897EN)

3.2.1 Probe holder

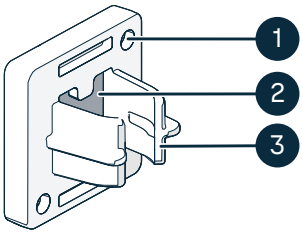


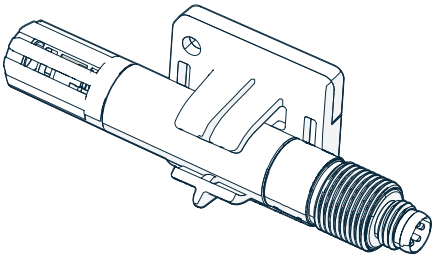
Figure 7 Probe holder ASM213382

1 Holes for attaching the holder with screws (screws not included)
2 Magnet
3 Probe attachment

The probe holder is a versatile mounting accessory for securing Ø 12 mm diameter cable mounted probes.

To attach the probe, simply press the body of the probe into the probe attachment. HMP115 and TMP115 probes have a groove that locks the probe in the holder when it is centered in the probe attachment.

Figure 8 HMP110 probe in the probe holder



3.2.2 CO_2 probe mounting kit

When the data logger is purchased with a CO_2 measurement probe, a CO_2 probe mounting kit (Vaisala item ASM214253SP) is included. The kit includes a versatile probe support accessory that has attachments for a Ø 25 mm probe (for example, GMP251), a Ø 12 mm probe (for example, HMP110), and the sensor tip of the TMP115 probe. It also provides sufficient separation between the probes to prevent the mild heating effect of the CO_2 probe from affecting the measurement of the other probe. For this reason, it is best not to attach the CO_2 probe to another probe using a cable tie, for example.

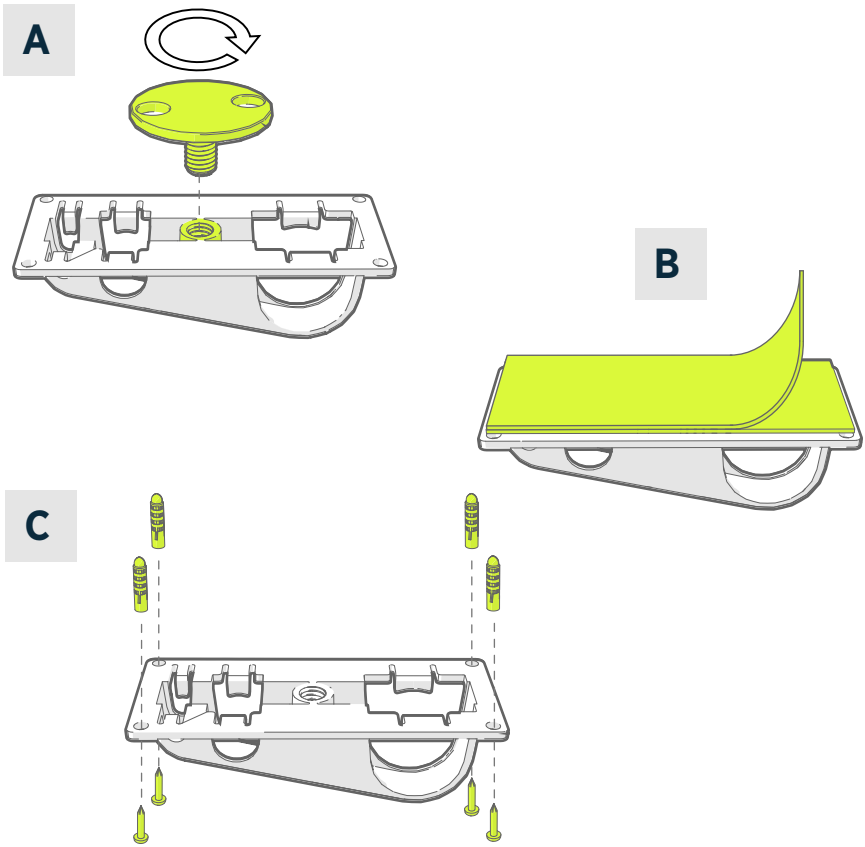


Figure 9 Probe support accessory mounting options

A Mounting through a hole using the screw-on attachment part.
B Mounting using a reusable fastener strip. Clean the attachment surfaces using the included cleaning pad before applying the strip.
C Mounting with screws and wall plugs.

3.2.3 Mounting HMP110 probes

HMP110 is a robust stainless steel probe for humidity and temperature measurement in demanding conditions. Suitable for measurement inside chambers, fridges, and freezers in temperature range -40 ... +80 °C (-40 ... +176 °F). Must be connected to the data logger using a cable. Probe diameter 12 mm (0.47 in).

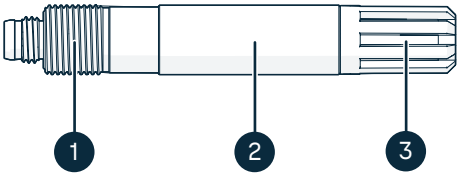


Figure 10 HMP110 probe

1 M12×1 thread for through-wall installation using mounting nuts.
2 Attach from this area using probe holder ASM213382 or cable tie.
3 Sensor protection filter. Do not attach from this area.

3.2.4 Mounting HMP115 probes

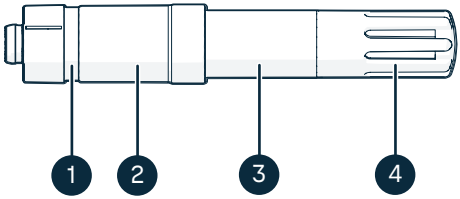


Figure 11 HMP115 probe

1 If using a probe holder, align it to this groove.
2 Plastic sleeve that locks the probe in place when connected to a mechanically compatible host device (for example, RFL100 data logger). Diameter 14 mm (0.55 in) at this point.
3 Attach from this area if using a cable tie. Diameter 12 mm (0.47 in) at this point.
4 Sensor protection filter. Do not attach from this area.

3.2.5 Mounting TMP115 probes

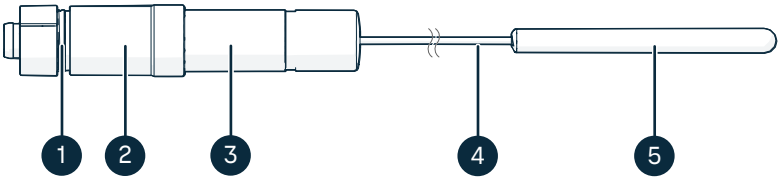


Figure 12 TMP115 probe

1 If using a probe holder, align it to this groove.
2 Plastic sleeve that locks the probe body in place when connected to a mechanically compatible host device (for example, RFL100 data logger). Diameter 14 mm (0.55 in) at this point.
3 Probe body with measurement electronics. Attach from this area if using a cable tie. Diameter 12 mm (0.47 in) at this point. Operating temperature range −40 … +60 °C (−40 … +140 °F).
4 Sensor cable. Do not cut or bend into a tight loop.
5 Sensor tip, diameter 4.8 mm (0.19 in). Secure using a cable tie or insert into thermal dampener block for added thermal mass. Insert into the probe support accessory when using together with a CO_2 probe. Operating temperature range −196 … +150 °C (−320.8 … +302 °F).

CAUTION! The operating temperature range of the sensor tip is much wider than that of the probe body. Leave the probe body outside the measured environment if possible, and avoid inserting it in environments that are outside its operating range.

When working with equipment in extremely cold temperatures, use appropriate personal protective equipment such as thermally insulated gloves and clothing. Wear protective eyewear if working with coolants such as liquid nitrogen, and observe safe handling and storage precautions.

3.2.6 Mounting GMP251 and GMP252 probes

GMP251 and GMP252 are robust carbon dioxide (CO_2) measurement probes for use in demanding applications such as life science incubators. Operating temperature range −40 ... +60 °C (−40 ... +140 °F). The CO_2 probe mounting kit (Vaisala item ASM214253SP) is recommended for mounting, but the probes can also be attached from the probe body by other methods.

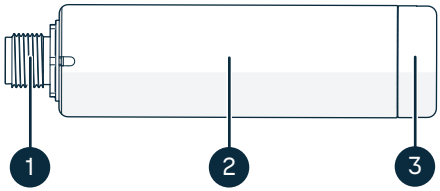


Figure 13 GMP251 probe

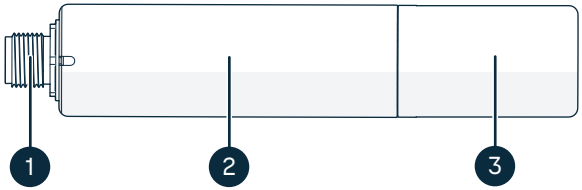


Figure 14 GMP252 probe

1 M12 5-pin male connector. Connect to VDL200 using the included M8-M12 adapter cable (item code CBL211291SP).
2 Ø 25 mm probe body.
3 Sensor protection filter. Do not attach from this area.

4. Configuration

4.1 Configuring settings using Insight software

Required tools:
- Computer with Microsoft Windows® operating system (64-bit version) and Insight PC software (version 1.3.0 or later) installed, and a free USB port
- USB-C cable for connecting VDL200 to computer

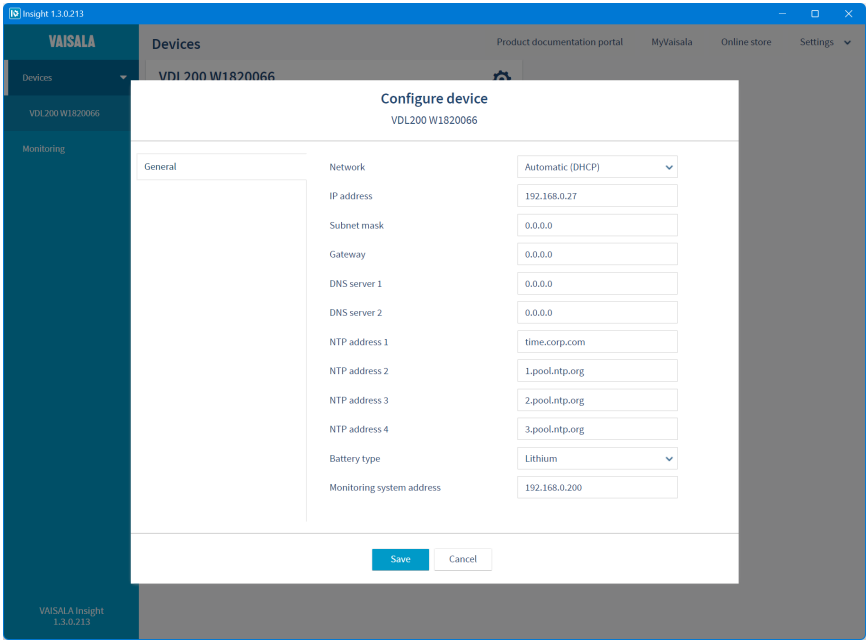


Figure 15 Configuring VDL200 settings with Insight

1. Turn on the VDL200 if it is off.
2. Open the Insight software on your computer.
3. Connect the USB cable between your computer and the service port of the VDL200.
4. Wait for the Insight software to detect the data logger.
5. Select **> Configure device**.

6. Configure the **Network** setting to select addressing type:
   - To use automatic IP address configuration using DHCP, select **Automatic (DHCP)**.
   - To configure a static IP address, select **Static IP**.

   Your network administrator may request the **MAC address** of the device to allow it to the network. It is marked on the device itself, and you can also press the left button on the device to view it on the device information screen.

7. If you selected Static IP configuration, fill the following fields as instructed by your network administrator:
   - **IP address**
   - **Subnet mask**
   - **Gateway**
   - **DNS server 1** and **DNS server 2**
8. If you have an NTP server (time server) in your local network, overwrite **NTP address 1** with its hostname, fully qualified domain name, or IP address.
9. Select the **Battery type** so that it matches the batteries currently inserted in the device.

   The battery type setting is important to optimize the accuracy of the battery indicator and to allow the monitoring system to reliably send the low battery warning.
10. Configure the hostname, fully qualified domain name, or IP address of your viewLinc Enterprise Server in the **Monitoring system address** field.

    VDL200 communicates with TCP port 8883 by default. You do not have to specify the default port in the address. However, if the port has been changed on the viewLinc side, you must add a colon ":" and the correct TCP port number to the address. For example: **viewlinc.examplecompany.com:1234**

11. Select **Save** when done.

More information

- Backup batteries (page 16)

4.2 Managing devices using viewLinc Enterprise Server

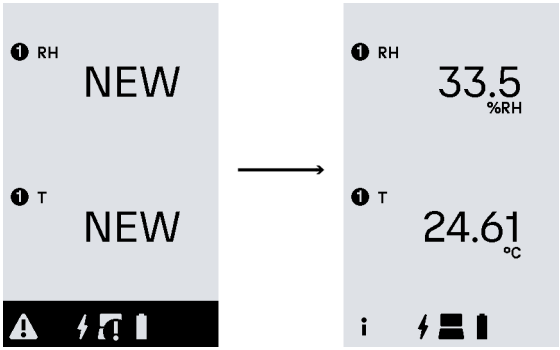
1. Open the viewLinc Enterprise Server user interface by double-clicking the desktop icon, or by entering the server's IP address and port in a web browser's address field.
2. Log in with a user account that has the right to manage devices.

3. When viewLinc detects new devices, **New Devices** text appears at the top of the screen. If there are any new devices:
   a. Click the **New Devices** text to open the **New Devices** window.
   b. Compare the list of new devices to your device installation plan to verify that all your devices have been found. In the **Accept** column, select each device you want to add.
   c. Select **Save** to register the selected devices with your viewLinc Enterprise Server.
4. To access management options for accepted devices:
   a. Select **Sites Manager > Hosts and Devices**.
   b. Locate the device you want to manage from the device tree, right-click the entry of the device, and select **Edit Properties**. The **Edit Device Properties** window opens.
   c. In this window you can set some information fields that viewLinc uses (for example, **Device alias**) and some actual settings that are sent to the device. Note the following settings for VDL200:
      - **Metric units enabled**: Change the setting to **No** to display degrees Fahrenheit for temperature on the device display.
      - **Device log level**: Do not adjust this setting unless instructed by Vaisala to do so. Changing the setting will increase the power consumption of the device, which will reduce the battery backup time.

5. Operation

5.1 Probe detection

Figure 16 Detection of a new RH + T probe in port 1



VDL200 detects and validates the connected probe(s) only at startup. It also selects the displayed and recorded measurement parameters automatically based on the type of probe. VDL200 can display and record up to 4 measurement parameters.

When the data logger is starting up, there may be error indications on the screen as the device is connecting to the network and synchronizing with a time server. The error indications will quickly disappear if everything is OK.

Table 5 Automatic selection of measurement parameters

Probe model	Selected measurement parameter(s)
HMP110, HMP115	RH + T
HMP110T, HMP115T, TMP115	T
GMP251, GMP252	CO_2

After the data logger completes the probe detection successfully it starts normal operation. The connected probe(s) must remain the same until the data logger is turned off again. If a probe is disconnected while the data logger remains powered on, the values of the measurement(s) will be replaced with dashes "---" until the probe is reconnected and can be successfully read again. You can successfully reconnect correctly detected probes to their original probe port without turning off the data logger.

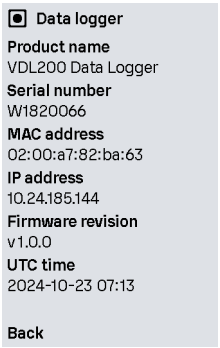
5.2 Measurement sampling rate

VDL200 uses a fixed 1 minute measurement interval. Every minute, the device performs these actions:

1. Reads measurements from the connected probe(s)
2. Stores the data into the local memory with a timestamp
3. Updates the measurement results on the display
4. If the monitoring system connection is configured and available, transmits the new measurement data (known as "real-time data") to the monitoring system

5.3 Viewing device information

1. With the data logger in the measurement view, touch the left button.
2. If there are active errors, the **Errors** page opens. Touch the right button to proceed to the **Data logger** page.
3. The **Data logger** page shows the following identifying and status information:



4. The data logger returns to the measurement view after 30 s.

6. Maintenance

6.1 Cleaning

- Instrument air
- Lint-free cloth
- Isopropyl alcohol (70 %)

Do not spray anything directly on the VDL200 or the measurement probes.
Do not use acetone as the cleaning agent as it may damage the plastic parts.
Do not use abrasive sponges or scrape the surface of the devices.
Do not immerse the devices in liquid.

1. Blow instrument air on the VDL200 to remove any dust and loose debris.

   Do not blow directly into the filters of the measurement probes as that may damage the filter or the sensors underneath.
2. Moisten some lint-free cloth with isopropyl alcohol (70 %).
3. Wipe the data logger housing.
4. Wipe the Ethernet cable and any probe connection cables.

   To avoid pulling on the cables, hold the cable while wiping along the length of it.
5. To clean the measurement probes:
   a. Wipe the probe body and the probe nut that is holding it (if not connected by a cable).
   b. If the probe has a detachable filter, check it for contamination, and replace if necessary.

      Do not wipe the filter as that may block its pores and/or deposit residue on the filter. Keeping the filter clean is especially important for accurate humidity measurement. If the filter becomes contaminated, it is very likely to retain some moisture.

6.2 Replacing batteries

- 4 pcs of new AA size 1.5 V batteries: alkaline (type LR6) or lithium (type FR6)

VDL200 has a configurable battery type setting that optimizes the operation of the battery charge indicator. This setting should be set according to the battery type (alkaline or lithium) when the device is taken into use, and changed if the battery type is changed.

Always insert batteries that have a full charge and are not past their expiration date. Using partially discharged or expired batteries may cause the battery level indication and alerting to work unreliably.

For more information on battery requirements of the VDL200, see Backup batteries (page 16).

1. Check the power status from the display of the data logger:
   - If PoE power is connected (icon is shown), you can replace the batteries without turning off the data logger.
   - If the data logger is operating on battery power (icon is shown), you must turn off the data logger from the power switch before replacing the batteries.
   - If the data logger is already turned off, you can replace the batteries at any time.
2. Remove the data logger from the mounting bracket.
3. Open the battery cover of the data logger.
4. If the data logger is operating on battery power, push the power button to turn it off.
5. Remove the old batteries from the data logger.
6. Check the battery orientation markings on the data logger and insert the new batteries in the correct orientation.
7. If the data logger is turned off, push the power button to turn it on.
8. At startup, the data logger may prompt you to confirm that you have replaced the batteries. Touch the **Yes** button to confirm.
9. Verify that the battery icon indicates full batteries .
10. Close the battery cover of the data logger.
11. Insert the data logger back in the mounting bracket.

More information

- Backup batteries (page 16)

6.3 Replacing and swapping probes

VDL200 detects and validates the connected probe(s) only at startup. Because of this, you must restart the data logger to take any probe changes into use. Probe cables can be disconnected and reconnected on the fly, as long as the probes and their connection ports remain the same.

If you change the probes in a way that changes the parameters recorded by the data logger, log in to your monitoring system and check if you need to make changes to way measurement data is linked to locations.

1. Remove the data logger from the mounting bracket.
2. Open the battery cover of the data logger.
3. Push the power button to turn off the data logger.

4. Disconnect and connect probes as needed.
5. Push the power button to turn on the data logger.
6. Close the battery cover of the data logger.
7. Check the display to verify that the connected probes are successfully detected.
8. Insert the data logger back in the mounting bracket.

6.4 Calibration and adjustment

Calibration means comparing the measurement output of the device to a known reference, such as a known environment in a calibration chamber or the output of a reference instrument. Correcting the reading of the device so that it measures accurately is referred to as **adjustment**.

Sensors and measurement electronics are fully contained in the replaceable probes. This allows the probes to be calibrated, adjusted, and replaced as needed. Probe serial number and calibration information (calibration date and information text string) are stored in the probe. If a probe is replaced or the calibration information in the probe is updated, VDL200 automatically sends the new information to the monitoring system.

The calibration frequency depends on the application and your compliance requirements. Vaisala recommends having the probes calibrated and adjusted once a year by Vaisala Calibration and Repair Services. See vaisala.com/calibration.

For detailed calibration and adjustment instructions, see the following documents:

- HMP60 and HMP110 Series User Guide (M211060EN)
- GMP251 and GMP80P User Guide (M211799EN)
- GMP252 User Guide (M211897EN)

6.5 VDL200 firmware update

You can update the firmware of the VDL200 data logger using file transfer or using the Insight PC software.

- Updating VDL200 firmware does not erase the recorded data on the device.
- Updating the firmware will not affect the data logger's status in the monitoring system. If the device was accepted in the system before the update, it will remain accepted.
- For information on firmware version changes and compatibility, see VDL200 Firmware Release Notes (M213146EN).

There is a short break in data logging and connectivity during the actual update. After a successful update the data logger will automatically resume data logging and communication with the monitoring system.

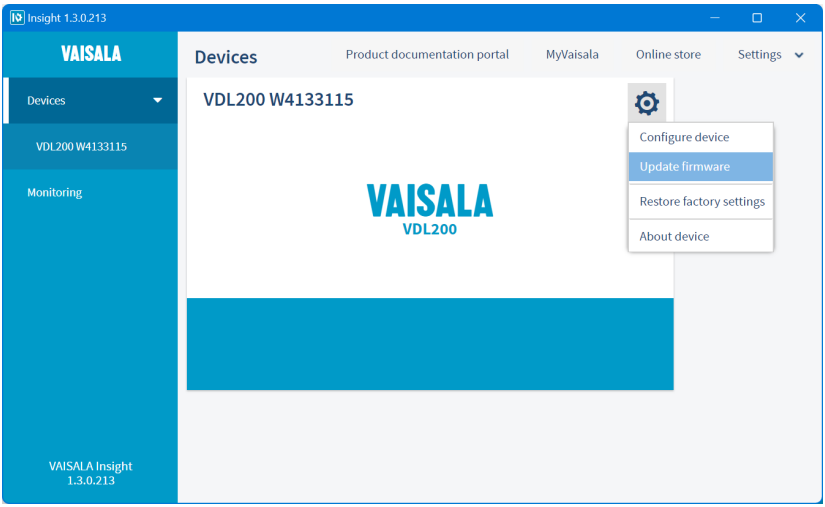
6.5.1 Updating firmware using Insight

Required:
- Computer with Microsoft Windows® operating system (64-bit version) and Insight PC software (version 1.3.0 or later) installed, and a free USB port
- USB-C cable for connecting VDL200 to computer
- Firmware update package (ZIP file) for VDL200

1. Check that the VDL200 to be updated is turned on and has backup batteries that are not empty.

   It is not necessary to connect a network cable or any probes to perform the firmware update.
2. Check the current firmware version of the VDL200. See Viewing device information (page 31).
3. Make sure you have the latest VDL200 firmware update package available on your computer.

   Do not unzip the package, as Insight will only accept the file in ZIP format.
4. Open the Insight software on your computer.
5. Connect the USB cable between your computer and the service port of the VDL200.
6. Wait for the Insight software to detect the data logger.
7. In the **Devices** menu of Insight, select the VDL200 settings icon and the **Update firmware** option.



8. Select **Browse...** to locate the ZIP file. Select the file and select **Open**.
9. Select **Update**.
10. Wait for the firmware transfer to complete and VDL200 to begin updating.

    If the file is valid, VDL200 begins the update automatically. Do not unplug the cable or turn off the VDL200 during the update.
    The update takes approximately 1 minute. During the update the status LED flashes green, and the display shows the text **Updating firmware, do not turn off power**.
11. When the update is done, VDL200 restarts and shows the result of the update with a message on the display:

    - **Firmware updated to version <new version>.**: The update was successful and the new firmware is in use.
    - **Firmware updated failed. Please try again.**: The update was unsuccessful for some reason.

VDL200 may incorrectly report a failed update in certain situations, for example when attempting to update with a package that has the same firmware version as the current one. Always check the current firmware version after performing the update. If the version has not been updated, repeating the update process may help.

6.5.2 Updating firmware using USB file transfer

Required:
- Computer with a free USB port and an operating system that supports the Media Transfer Protocol (MTP). For example, Windows® 7 and newer.
- USB-C cable for connecting VDL200 to computer
- Firmware update package (ZIP file) for VDL200

1. Check that the VDL200 to be updated is turned on and has backup batteries that are not empty.

   It is not necessary to connect a network cable or any probes to perform the firmware update.
2. Check the current firmware version of the VDL200. See Viewing device information (page 31).
3. Unzip the firmware update package it into a temporary directory on your computer.
4. Connect the USB-C connection cable between your computer and the data logger.

   After the computer detects the device and installs the appropriate driver, it is available for file transfer.

5. Copy the firmware update file into the `\Device\Update` folder on the VDL200. For example, if your computer has a Windows operating system, you can simply drag the file into the correct folder (drag and drop) or use the copy and paste functions.

   If the file is valid, VDL200 begins the update automatically. Do not unplug the cable or turn off the VDL200 during the update.
   The update takes approximately 1 minute. During the update the status LED flashes green, and the display shows the text **Updating firmware, do not turn off power**.

6. When the update is done, VDL200 restarts and shows the result of the update with a message on the display:

   - **Firmware updated to version <new version>.**: The update was successful and the new firmware is in use.
   - **Firmware updated failed. Please try again.**: The update was unsuccessful for some reason.

VDL200 may incorrectly report a failed update in certain situations, for example when attempting to update with a package that has the same firmware version as the current one. Always check the current firmware version after performing the update. If the version has not been updated, repeating the update process may help.

7. Troubleshooting

7.1 Error messages

When VDL200 has one or more error messages to show, it flashes the status LED with red, and displays the ⚠ icon over the left button. Touching the button opens the **Errors** screen where you can view the error messages.

Some errors are associated a status icon that is shown on the home screen.

Table 6 VDL200 error messages

Error message and icon	Description	Recommended action
No probes detected. Connect probes and restart.	No compatible measurement probes were detected when VDL200 was started up. This message is shown on the home screen instead of the **Errors** screen.	Connect measurement probes and restart the VDL200.
Power over Ethernet not available.	PoE power is not available. VDL200 is operating on battery power or power from the temporary service port connection. This error means VDL200 cannot operate its network connection, which causes additional errors to be active.	1. Verify that the Ethernet cable is connected. 2. Enable PoE from the network switch or connect a PoE power source between the network and the VDL200.
Network connection not available.	VDL200 does not have a network connection.	1. Verify that the Ethernet cable is connected. 2. Connect the VDL200 to Insight software and verify the network settings. 3. Depending on how the network is configured, you may need to supply your IT support with the **MAC address** of the VDL200 so that it can be allowed to the network.

Error message and icon	Description	Recommended action
Monitoring system connection problem. 	VDL200 has a network connection but it is not connected to a monitoring system.	1. Connect the VDL200 to Insight software and verify that the address of the monitoring system has been configured correctly. 2. There may be a connectivity problem between the monitoring system and the VDL200. Request help from your local IT support to resolve it.
Backup batteries empty. 	The battery level is insufficient to operate the VDL200.	Replace the batteries.
Backup battery level low. 	The battery level is low but currently sufficient to operate the VDL200.	
Backup batteries not installed. 	Backup batteries are not installed.	Insert new batteries.
	Backup batteries are installed in incorrect orientation.	Verify the correct orientation of the batteries from the markings on the battery compartment, and correct the orientation.
	The battery isolation tab that prevents battery drain during storage has not been removed.	Remove the battery isolation tab.
System time not available.	The real-time clock of the VDL200 does not have system time set. This error means the VDL200 cannot store and send measurement data.	Resolve the time synchronization error.

Error message and icon	Description	Recommended action
Time synchronization problem.	VDL200 is currently unable to synchronize its system time with any of the network time protocol (NTP) servers.	1. Verify that VDL200 has a network connection and PoE power connected. 2. Connect the VDL200 to Insight software and verify that the addresses of the NTP servers have been configured correctly. 3. A network firewall may be blocking UDP port 123 that is needed for the NTP protocol to function.

More information

- Basic troubleshooting (page 40)

7.2 Basic troubleshooting

If you have already installed the VDL200 but the data logger is flashing a red status LED and displaying error messages, or not connecting to the monitoring system as expected, perform this procedure to resolve the most common causes of problems.

If you need more help, contact Vaisala technical support at helpdesk@vaisala.com.

1. Check the battery icon on the home screen and take corrective action if necessary.
   - means the backup batteries have not been inserted, they are inserted incorrectly, or the battery isolation tab that prevents battery drain during storage has not been removed.
   - means the batteries are empty.
   - means the battery charge is low.
2. Verify that the VDL200 is connected to the network with a network cable, and that Power over Ethernet (PoE) is supplied by the connection.

   Check the power icon on the home screen:
   - means PoE is connected.
   - means PoE is not connected. This causes the VDL200 to disable network interface to conserve battery power. It also activates many separate error messages as VDL200 cannot communicate with the monitoring system or the time servers.
3. If necessary, enable PoE from the network switch or connect a PoE power source between the network and the data logger.

4. After you have verified that PoE power is connected, check that the device has an IP address.
   a. Touch the left button to open the device information screens.
   b. If there are active errors, the **Errors** screen opens first. In that case, touch the right button to switch to the **Data logger** screen.
   c. Locate the **IP address** and verify that it is valid for your network.

      If the VDL200 has been configured to acquire the IP address using DHCP and the IP address reads 0.0.0.0 on the **Data logger** screen, that means the VDL200 has not managed to join the network.
5. If necessary, contact your local IT support to resolve the connection issue.

   Depending on how the network is configured, you may need to supply your IT support with the **MAC address** of the VDL200 so that it can be allowed to the network. The MAC address is shown on the **Data logger** screen.
6. Check if there are still active errors, and continue to the next step if there are.
7. If the error **Monitoring system connection problem** is active:
   a. The address of the target monitoring system may be configured incorrect or not at all. Use the Insight software to check **Monitoring system address** configuration. See Configuring settings using Insight software (page 27).

      TCP port 8883 is the default port for this connection, and it does not have to be included in the address configuration. If the monitoring system has been configured to use a different port for connecting to VDL200 devices, add it to the **Monitoring system address** by adding a colon ":" and the port number.
   b. If address is correct, the cause of the error is likely there is a network routing problem or a firewall is blocking the network port for this connection. Contact your local IT support to resolve the issue.

8. If **System time not available** or **Time synchronization problem** errors are active:

   Similarly to the monitoring system, the VDL200 must be configured with the addresses of the time servers it uses. The default time servers are configured by default, but VDL200 must have access to the Internet to use those. You may have your own time server in the local network that must be used.

   a. Use Insight software to check the **NTP address** configuration. See Configuring settings using Insight software (page 27).

      By default, there are four numbered *pool.ntp.org* servers listed (for example, *0.pool.ntp.org*).
      If you have replaced a default server with a local time server, make sure its address is written correctly. If the address of the local time server is a hostname (for example, *myntpserver*), make sure it is registered with the DNS server the VDL200 is using. Instead of the hostname, you can also try to provide a fully qualified domain name (for example *myntpserver.corporate.net*) or the actual IP address of the server.

   b. If the time server configuration is correct, the cause of the error may be a network routing problem.

      The most typical case is an isolated network with no access to Internet, which means the default time servers are not reachable. In an isolated network, you **must** provide a local NTP server or VDL200 cannot be used.

   c. It is also possible that a firewall may be blocking UDP port 123 that is needed for the NTP protocol to function.

      Typically this happens on the edge of the network. Both inbound and outbound connections must be allowed. Contact your local IT support to resolve the issue.
      If you have set up a local NTP server, make sure the firewall on the server itself is not blocking the NTP connections.

   d. Depending on your geographical location, the default time servers may be unreachable even if the access point has Internet access and the firewalls of your local network are not blocking the NTP connections.

      In that case, you should reconfigure the time server list to use country-specific servers. For example, you could use *0.ch.pool.ntp.org* if the access point is installed in Switzerland. For lists of available server addresses, see www.ntppool.org.

More information

- Error messages (page 38)
- Status icons (page 15)

8. Technical data

8.1 VDL200 technical specification

Table 7 VDL200-compatible probes

Measurement	Compatible measurement probes
Humidity and temperature (RH+T)	HMP110, HMP115
Temperature (T)	HMP110T, HMP115T, TMP115
Carbon dioxide (CO_2)	GMP251, GMP252

Table 8 VDL200-compatible systems and software

System or software	Version	Connection
viewLinc Enterprise Server	Version 5.2.1 or above	TCP port 8883 (default)
Insight PC software	Version 1.3.0 or above	USB-C
Time server [1)]	Any	UDP port 123

1) Connection to Network Time Protocol (NTP) server is required for operation.

Table 9 VDL200 inputs and outputs

Property	Description/value
Ethernet connector	8P8C (RJ-45)
Probe connector (2 pcs)	4-pin female M8 connector
Service port	USB-C
Ethernet interface	
Supported standards	10BASE-T, 100BASE-TX
IPv4 address assignment	DHCP (automatic), static IP

Table 10 VDL200 operating environment

Property	Description/Value
Operating environment	Indoor use
Use in wet location	No
Storage temperature	−30 … +60 °C (−22 … +140 °F)

Property	Description/Value
Operating temperature	–20 … +60 °C (–4 … +140 °F)
Operating humidity	0–100 %RH, non-condensing
IP rating	IP30: Protected against solid foreign objects of 2.5 mm Ø and greater.
Do not place the VDL200 unit in an environment that can exceed this specification, for example inside a climate chamber. Insert only the measurement probe(s) in the chamber and leave the VDL200 unit outside it.	

Table 11 VDL200 powering

Property	Description/Value
Powering options	Power over Ethernet (PoE) Battery backup [1)] USB-C for temporary service use
PoE supply voltage	48 V DC
USB-C supply voltage	5 V DC
Power consumption	Max. 2 W
Battery type	AA size, 1.5 V, LR6 (alkaline) or FR6 (lithium)
Number of batteries	4
Typical operating time on battery power at 20 °C (68 °F)	
RH and T measurement combinations	2 weeks with alkaline batteries
CO_2 measurement	24 hours with lithium batteries

1) Network connection is not available when VDL200 is operating on battery power.

Table 12 VDL200 data logging and user interface specifications

Property	Specification
Number of samples [1)]	50 000
Sampling rate	1 min
Minimum recording span	30 days
Memory type	Flash
Memory mode	Ring buffer (FIFO)
Display	3.16″ reflective matrix display
Display languages	English

Property	Specification
Interaction	2 capacitive buttons

1) *1 sample can include up to 4 measurement values.*

Table 13 VDL200 compliance

Property	Description/Value
EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) as amended by 2015/863
Electromagnetic compatibility (EMC)	IEC/EN 61326-1, industrial environment EN 61000-6-2 EN 61000-6-4 FCC part 15 B, Class B ICES-3 / NMB-3 (Class B)
Compliance marks	CE, China RoHS, KC, RCM

Table 14 VDL200 mechanical specifications

Property	Specification
Housing color	RAL 9003 (white)
Mounting methods	Screws, cable ties, or magnet
Dimensions without probes (H × W × D)	120 × 100 × 38 mm (4.72 × 3.94 × 1.50 in)
Display size (H × W)	68 × 42 mm (2.68 × 1.65 in)
Weight without batteries and probes	260 g (9.17 oz)
Materials	
Housing	PBT plastic
Display window	PMMA (acrylic)
Mounting bracket	PC/ABS plastic blend

8.2 Accessories and spare parts

Table 15 VDL200 accessories

Name	Item code
Mounting kit with screws (4 pcs), wall plugs (4 pcs), and cable ties (2 pcs)	245679SP
USB-A – USB-C cable for service port connection, 2 m	273956
Probe cable for VDL200, M8-4M – M8-4F, 3 m	CBL211293-3MSP
Probe cable for VDL200, M8-4M – M8-4F, 10 m	CBL211293-10MSP
Flat probe cable for VDL200, M8-4M – M8-4F, 3 m	CBL211292SP
Flat probe cable for VDL200, M8-4M – M12-5F, 3 m	CBL211291SP
High-temperature cable, M12-5M – M12-5F, 1 m [1) 2)]	271038SP
High-temperature cable, M8-4M – M8-4F, 1 m [2)]	271039SP

1) *For CO_2 probe. Connect to VDL200 using M8-M12 adapter cable CBL211291SP.*
2) *High-temperature cables tolerate –20 ... +180 °C (–4 ... +356 °F) temperatures and can remain inside an incubator during a typical heat sterilization cycle. To minimize heat conduction, leave half of the cable in ambient temperature when installed.*

Table 16 Selected probe-specific accessories

Name [1)]	Compatible probes	Item code
Thermal dampener block for 3/16" probes (4.8 mm)	TMP115	236310SP
Probe holder (5 pcs) for Ø 12 mm probes	HMP110/T, HMP115/T, TMP115	ASM213382SP
CO_2 probe mounting kit	GMP251, GMP252	ASM214253SP
Sintered PTFE filter	HMP115/T	219452SP

1) *See probe datasheets in docs.vaisala.com for more accessories.*

Table 17 VDL200 spare parts

Spare part	Item code
VDL200 mounting bracket with magnet	DRW257202SP

Spare part	Item code
VDL200 probe nut (5 pcs)	DRW257207SP
VDL200 battery cover (5 pcs)	DRW257201SP
Probes	
HMP110 probe	HMP110 order form, code: Z00B0C1A0
HMP110T probe	HMP110 order form, code: Z0B01A0
HMP115 probe	HMP115 order form
HMP115T probe	HMP115T order form
TMP115 probe	TMP115 order form
GMP251 probe	GMP251 order form, code: B1B0C0N1
GMP252 probe	GMP252 order form, code: 51A0B0N1

8.3 Dimension drawings

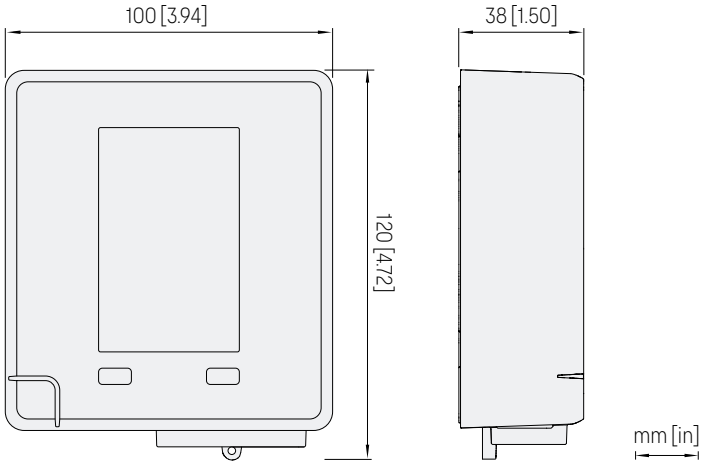


Figure 17 VDL200 dimensions

8.4 Maintenance and calibration services

Vaisala offers comprehensive customer care throughout the life cycle of our measurement instruments and systems. Our factory services are provided worldwide with fast deliveries. For more information, see vaisala.com/calibration.

- Vaisala Online Store at store.vaisala.com is available for most countries. You can browse the offering by product model and order the right accessories, spare parts, or maintenance and calibration services.
- To contact your local maintenance and calibration expert, see vaisala.com/contactus.

8.5 Warranty

For standard warranty terms and conditions, see vaisala.com/warranty.

Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or Conditions of Sale for details of the warranty for each product.

8.6 Technical support

Contact Vaisala technical support at helpdesk@vaisala.com. Provide at least the following supporting information as applicable:

- Product name, model, and serial number
- Software/Firmware version
- Name and location of the installation site
- Name and contact information of a technical person who can provide further information on the problem

For more information, see vaisala.com/support.

8.7 Product returns

If the product is faulty, these steps help to speed up the return process and avoid extra costs.

1. Read the warranty information.
2. Contact Vaisala technical support and request a Return Material Authorization (RMA) and shipping instructions.

Always request the RMA before returning any faulty material.
Provide the failure report as requested.

3. If you are returning the VDL200 data logger, remove the backup batteries from the device before shipping. This is especially important if lithium batteries are used.
4. Make sure any returned material is safe to handle and does not require special handling or cleaning precautions. Do not return any material that may be contaminated by substances or chemicals that are harmful to humans.

Appendix A. Recycling instructions

These recycling instructions guide you on the end-of-life treatment of this Vaisala product. As waste regulations and infrastructure vary in each country, these instructions only indicate the different components to be separated and common ways to handle them. Always follow local requirements when disposing of the product. Vaisala encourages to use the best available recycling practices to minimize related environmental impacts.

Vaisala is committed to meeting the requirements of the EU Waste Electrical and Electronic Equipment (WEEE) Directive. This directive aims to minimize the impact of electrical and electronic goods on the environment, by increasing reuse and recycling, and reducing the amount of WEEE going to landfill. This symbol indicates that the product should be collected separately from other waste streams and treated appropriately.

This product uses easily removable single-use batteries. Remove the batteries and recycle them separately in accordance with local waste management practices and regulations.

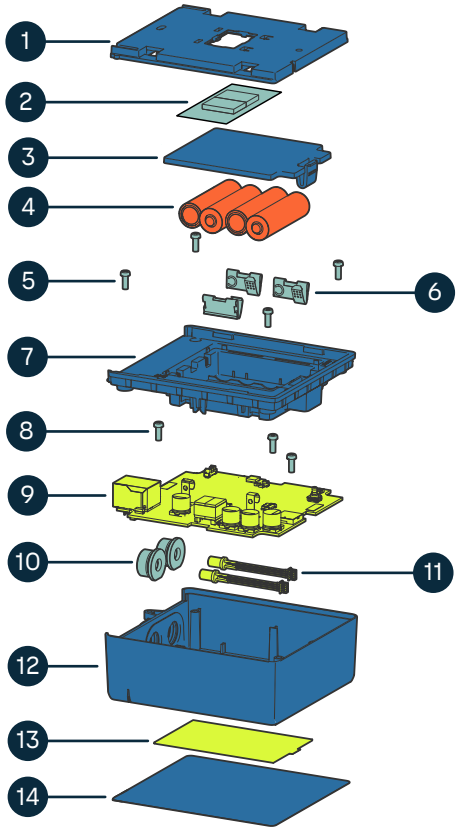


Figure 18 Materials for recycling

Recycling	Part	Material
Plastic waste	1	PC/ABS plastic blend
Metal waste	2	Neodymium and steel
Plastic waste	3, 7, 12	PBT plastic
Battery waste	4	Single-use alkaline or lithium batteries
Metal waste	5, 6, 8	Stainless steel
Electrical and electronic waste	9, 11, 13	Various materials

Recycling	Part	Material
Metal waste	10	Brass
Plastic waste	14	PMMA (acrylic)

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