

# User Guide

Digital output transmitter with Insight PC  
software USB-C interface  
**Indigo202**



**VAISALA**

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# 1. About this document

## 1.1 Version information

This document provides detailed instructions for using and maintaining the Vaisala Indigo202 digital output transmitter.

Table 1 Document versions (English)

| Document code | Date           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| M212843EN-C   | April 2024     | <p>This document. Added information on the IP rating limitation when cutting open the lead-through seal at the back of the transmitter. Added information on the diagnostics options in Insight PC software. Appearance and selection of transmitter display views updated. Added information on using the optional mains power supply accessory. Modbus register numbering convention changed.</p> <p>New sections:</p> <ul style="list-style-type: none"> <li>• <a href="#">Device status mode (page 13)</a></li> <li>• <a href="#">Before installation (page 16)</a></li> <li>• <a href="#">Terminal wiring (page 19)</a></li> <li>• <a href="#">Wiring with optional mains power supply INDIGOPOWER24VSP (page 21)</a></li> </ul> <p>Updated sections:</p> <ul style="list-style-type: none"> <li>• <a href="#">Display and LED indicator (page 12)</a></li> <li>• <a href="#">Graph mode (page 13)</a></li> <li>• <a href="#">Wiring options (page 20)</a></li> <li>• <a href="#">Specifications (page 51)</a></li> </ul> |
| M212843EN-B   | November 2022  | <p>Previous version. Added information on temporary use of Insight PC software connection and USB device driver installation. Updated power supply accessory options.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| M212843EN-A   | September 2022 | <p>First version of the manual.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## 1.2 Related manuals



For the latest versions of these documents, see [docs.vaisala.com](https://docs.vaisala.com).

| Document code | Name                                                      |
|---------------|-----------------------------------------------------------|
| M212816EN     | <a href="#">Indigo202 Digital Transmitter Quick Guide</a> |

| Document code | Name                                                                                                      |
|---------------|-----------------------------------------------------------------------------------------------------------|
| M212815EN     | <a href="#">Indigo201 Analog Output Transmitter Quick Guide</a>                                           |
| M212842EN     | <a href="#">Indigo201 Analog Output Transmitter User Guide</a>                                            |
| M211799EN     | <a href="#">Vaisala CARBOCAP® Carbon Dioxide Probe GMP251 User Guide</a>                                  |
| M211897EN     | <a href="#">Vaisala CARBOCAP® Carbon Dioxide Probe GMP252 User Guide</a>                                  |
| M211972EN     | <a href="#">Vaisala PEROXCAP® Hydrogen Peroxide, Humidity and Temperature Probe HPP272 User Guide</a>     |
| M212022EN     | <a href="#">Vaisala HUMICAP® HMP Series humidity and temperature probes with MMP8 and TMP1 User Guide</a> |

## 1.3 Documentation conventions



**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!** 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.



Note highlights important information on using the product.



Tip gives information for using the product more efficiently.

## 1.4 Trademarks

Vaisala® is a registered trademark of Vaisala Oyj.

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## 2. Product overview

### 2.1 Introduction to Indigo200 transmitters

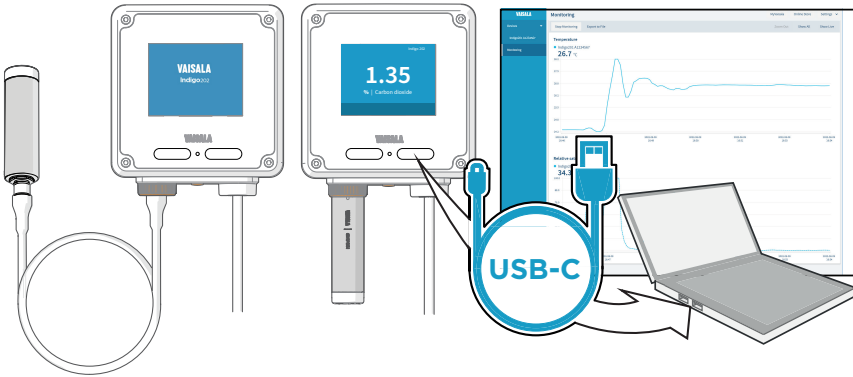


Figure 1 Probe connection options

Vaisala Indigo200 transmitters are a plug-and-play host device platform for Vaisala Indigo-compatible probes. Indigo transmitters extend the feature set of connected probes with a range of additional options for outputs, measurement viewing, status monitoring, and configuration interface access.

Depending on the Indigo200 transmitter model, a display is available as an optional selection or as a standard feature. In the non-display model, an LED indicator is used for notifications. Probes can be connected either directly on the transmitter from the probe's connector, or by using a cable between Indigo and the probe.

For easy access to configuration and additional monitoring options, the transmitter can be connected to Vaisala Insight PC software with a USB cable.

The Indigo202 transmitter is designed for digital output applications. The transmitter's output options include RS-485 Modbus RTU and 2 programmable relays.

For more information on Indigo transmitter models, see [vaisala.com/indigo](https://vaisala.com/indigo).

#### 2.1.1 Indigo202 basic features and options

- All Vaisala Indigo-compatible probes can be connected to all Indigo transmitter models
- The transmitter can be connected to Vaisala Insight PC software with a generic USB-C cable for easy access to configuration and monitoring options
- Digital output: RS-485 Modbus RTU
- 2 configurable relays
- 3.5" TFT LCD color display
- Power supply input 15–30 V DC (24 V AC  $\pm 10\%$  50/60Hz)

- 1-m, 3-m, 5-m, and 10-m probe connection cables available as accessories

## 2.2 Indigo200 transmitter parts

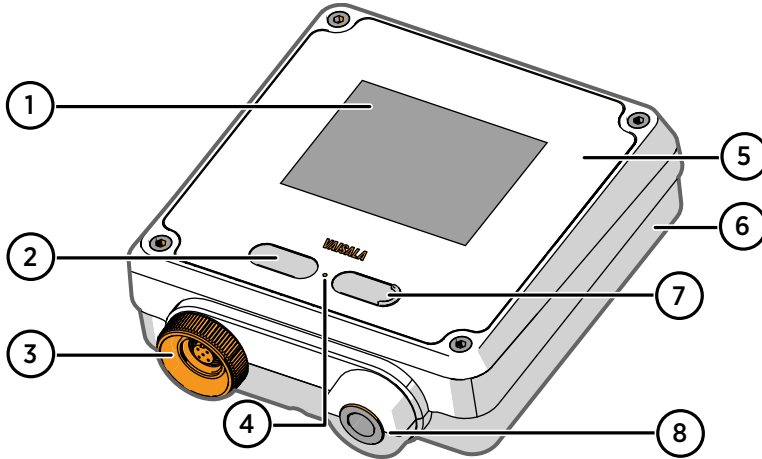


Figure 2 Indigo202 transmitter parts

- 1 Display
- 2 Push button for transmitter display quick actions (switch between display views, display off and on)
- 3 Probe and probe cable connector, locking wheel
- 4 LED status indicator
- 5 Top cover of the transmitter: display, circuit board and connector pins
- 6 Transmitter base: input and output wiring (screw terminals), mounting base
- 7 USB-C port for connecting the transmitter to Insight PC software
- 8 Rubber lead-through with strain relief for input/output cable. See [Wiring options \(page 20\)](#) for instructions and the location of the alternative wiring route on the back of the transmitter.



**CAUTION!** Only use Vaisala Indigo-compatible probes with the transmitter. Attempting to connect incompatible probes or probe cables can damage the equipment.

## 2.3 Display and LED indicator

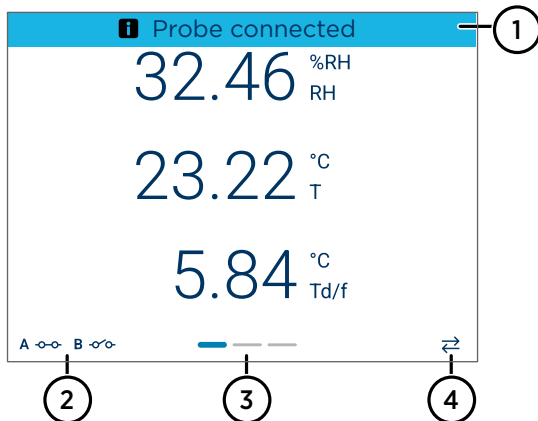


Figure 3 Indigo200 display with notification message, relay icons, 3 parameters, and USB connection icon

- 1 Message field for notifications, warnings, and errors
- 2 Relay A and relay B status
- 3 Display view navigation icons
- 4 Active USB connection notification icon

In transmitters with a display, you can configure the display to show 1 to 3 measurement parameters in numeric and graph format. Notifications, warnings, and errors are shown on a message row on the top part of the display.

Relay and USB connection status are also shown on the display as applicable.

The parameters shown, display brightness, and display mode (numeric or graph) can be configured with Insight PC software.

### Switching between display views and turning display off and on

To switch between different display views, push the left button on the front cover once.

To turn the display off and on, keep the left button pressed down for a few seconds. You can also turn the display off and on with Insight PC software.

### 2.3.1 Graph mode

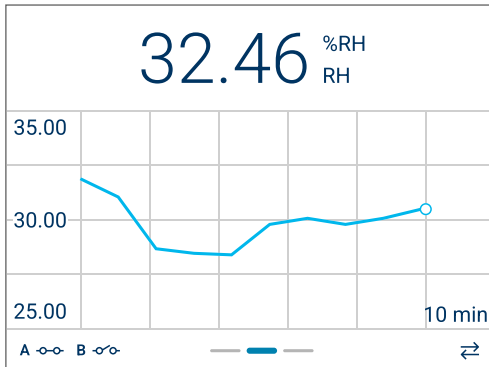


Figure 4 Transmitter display, graph mode

You can set the transmitter display to show the connected probe's measurement data as graphs.

The graph view shown on the display can be configured with Insight PC software.



You can switch between the different display views with the push button on the front of the transmitter.

### 2.3.2 Device status mode

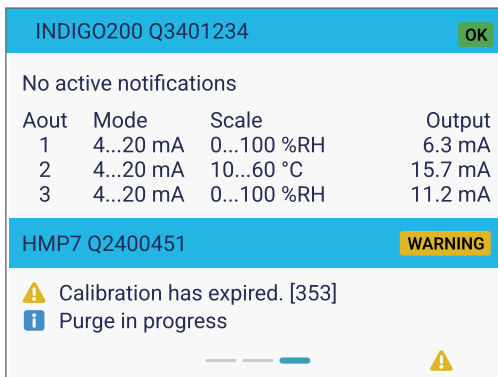


Figure 5 Example device status view on transmitter display

The rightmost display view shows the status of the transmitter and the connected probe. Any active notifications, for example, about the probe's calibration having expired, are shown. In addition, the view shows the mode, scaling, and output value of the transmitter's analog outputs.

To navigate to the device status view, press the push button on the front of the transmitter repeatedly. The view is shown for 1 minute, after which the display automatically reverts to the numeric view.

## 2.4 Configuration access with Insight PC software

Configure Device

In Advanced Mode

Indigo201 A1234567

Analog output 1

Analog output 2

Analog output 3

Relay output A

Relay output B

Compensation power-up defaults

Compensation setpoints

Measurement

Relay output on/off

Output parameter

Activate above

Activate below

Hysteresis

Error output state

CO<sub>2</sub>

500

100

20

Inactive

Save

Close

Figure 6 Insight PC software configuration example: relay output A options

Indigo200 transmitters and the probes connected to the transmitters can be configured, monitored, and calibrated by connecting the transmitter to a PC that has Vaisala Insight PC software installed. To access the configuration options in Insight PC software, you need to connect a computer with Insight PC software to the transmitter front cover USB port with a USB-C cable (type C to A). You can either use a generic USB-C cable, or the Vaisala accessory cable (item code: 273956). Using Indigo200 transmitters with Insight software requires the Vaisala USB Device driver.



Note that a USB-C cable is not included in Indigo200 transmitter deliveries by default.



The USB cable connection to Insight is only intended for temporary use during configuration, and must not be used for permanent installations. The IP rating and EMC properties of the transmitter can be affected when the USB port is open.

For an overview of using the Insight PC software, see [Insight PC software overview \(page 30\)](#).

## 2.5 Modbus communication

Indigo202 supports the Modbus RTU serial communication protocol (2-wire RS-485 interface).

For an overview of the Modbus implementation in Indigo202, see [Modbus overview \(page 34\)](#).

For information on the Modbus registers in Indigo202, see *Appendix A: Modbus reference*.

## 3. Installation

### 3.1 Before installation

When installing Indigo200 transmitters, note the following requirements and warnings:



**CAUTION!** The IP65 rating of the transmitter applies only when the wiring is done through the bottom lead-through and the seal at the back of the transmitter is left intact. See [Wiring options \(page 20\)](#) for an overview of the lead-through options.



The transmitter can be powered with the input/output cable, or a separate 24 V mains power supply accessory (Vaisala item code: INDIGOPOWER24VSP) can also be used. When planning the wiring in your installation, review the information related to lead-through options and IP rating restrictions in [Wiring options \(page 20\)](#).



**CAUTION!** When opening the transmitter cover, pull the transmitter cover off the base in a straight angle to avoid damaging the connector pins of the transmitter. Do not twist or bend. See [Opening and mounting \(page 17\)](#).

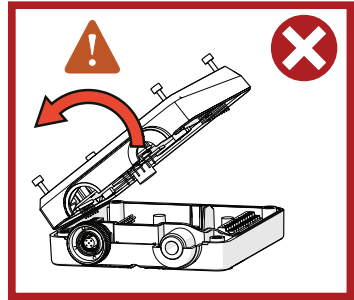
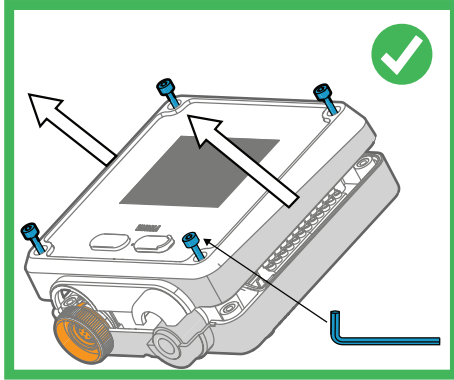


**CAUTION!** When connecting probes or cables to the transmitter, always use the locking wheel of the transmitter to lock the probe or cable in place. Never turn from the probe body.



**CAUTION!** Only connect compatible measurement devices to the transmitter. Attempting to connect incompatible devices or cables can damage the equipment. Refer to transmitter specifications for compatibility information.

## 3.2 Opening and mounting



**CAUTION!** To avoid damaging the connector pins of the transmitter, pull the transmitter cover off the base in a straight angle. Do not twist or bend.

- ▶ 1. Loosen the 4 screws on the transmitter cover.
2. Carefully open the transmitter cover part of the way from both sides so it is easier to pull the cover off the base.
3. Pull the transmitter cover off the base in a straight angle. Do not twist or bend.
4. Lead the input/output cable inside the transmitter (see [Wiring options \(page 20\)](#)). If you are wiring through the lead-through on the bottom of the transmitter, test that the strain relief works with your cable.
5. Place the transmitter base on the installation surface and mount it with 3 screws. See the screw positions in [Figure 7 \(page 18\)](#).
6. Connect the input/output cable's wiring to the screw terminals (see [Indigo200 transmitter base \(page 18\)](#)) and reattach the cover when done.

### 3.3 Indigo200 transmitter base

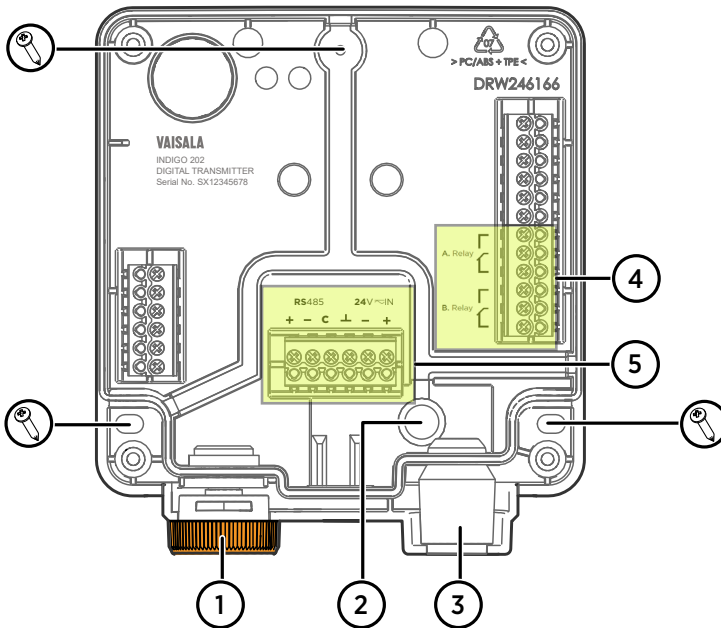


Figure 7 Indigo 202 transmitter base main parts and mounting screw positions

- 1 Probe and probe cable connector inside the locking wheel
- 2 Wiring from the back: cut open the seal. See [Wiring options \(page 20\)](#).
- 3 Rubber cable lead-through with strain relief. See [Wiring options \(page 20\)](#).
- 4 Screw terminals for relays A and B. See [Terminal wiring \(page 19\)](#).
- 5 Screw terminals for 24 V power supply input and RS-485 (Modbus) connection. See [Terminal wiring \(page 19\)](#).



**CAUTION!** Do not energize the power supply before the wiring has been connected.

### 3.3.1 Terminal wiring

Table 2 RS-485 terminals

| Terminal | Function      | Notes                                                                                  |
|----------|---------------|----------------------------------------------------------------------------------------|
| +        | RS-485 +      | Wire size: 0.2-1.5 mm <sup>2</sup> , (32-16 AWG), solid wires or ferrules recommended. |
| -        | RS-485 -      |                                                                                        |
| C        | RS-485 common |                                                                                        |

Table 3 Relay terminals

| Terminal                                                                              | Function                  | Notes                                                                                  |
|---------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------|
|  NO  | NO: relay normally open   | Wire size: 0.2-1.5 mm <sup>2</sup> , (32-16 AWG), solid wires or ferrules recommended. |
|  COM | COM: relay common         |                                                                                        |
|  NC  | NC: relay normally closed |                                                                                        |

Table 4 Power supply input terminals

| Terminal                                                                          | Function                | Notes                                           |
|-----------------------------------------------------------------------------------|-------------------------|-------------------------------------------------|
|  | Power supply ground     | Can also be used for grounding the transmitter. |
| 24 V -                                                                            | Negative supply voltage | 15-30 V DC or 24 V AC $\pm 10\%$ 50/60 Hz       |
| 24 V +                                                                            | Positive supply voltage |                                                 |

### 3.4 Wiring options

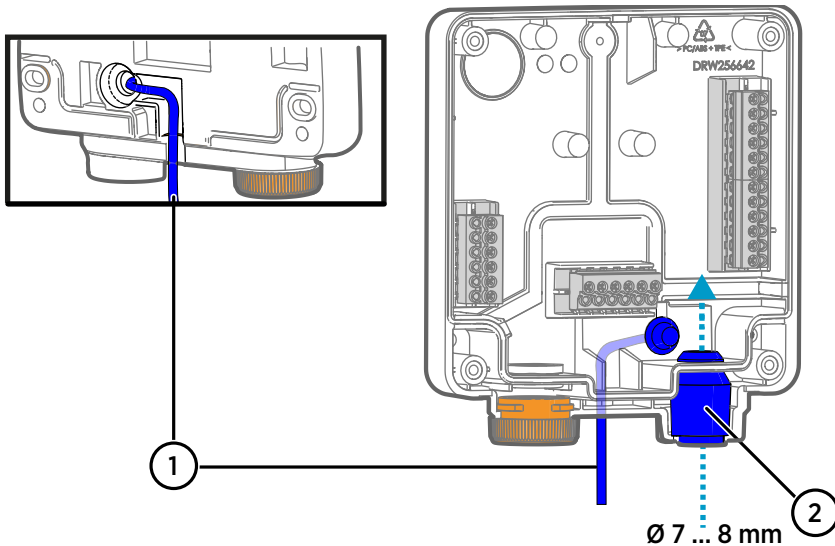


Figure 8 Indigo200 wiring options

- 1 Wiring from the back: cut the seal open and nest the cable in the groove on the back of the transmitter base
- 2 Wiring through the rubber lead-through on the bottom of the transmitter



**CAUTION!** The IP65 rating of the transmitter applies only when the wiring is done through the bottom lead-through (see option **2**), and the seal at the back of the transmitter (see option **1**) is left intact. Only cut open the seal at the back of the transmitter if you are installing the transmitter to a location where issues such as water or dust ingress through the opened seal can be ruled out.



Note that when the optional mains power supply INDIGOPOWER24VSP (wired through the back of the transmitter) is used, the IP65 rating does not apply.

- ▶ 1. To wire the input/output cable through the back of the transmitter:
  - a. Cut off as much of the seal on the transmitter base as is needed to fit your cable through the opening.
  - b. Lead the cable through the cut in the seal.
  - c. Nest the cable inside the groove on the back of the transmitter as shown in [Figure 8 \(page 20\)](#), and attach strain relief as needed.
  - d. If you wire only through the back, plug or seal the other lead-through on the bottom.



To protect the transmitter from water or dust ingress through the opened seal at the back, ensure that the back of the transmitter rests flat against the installation surface. Always nest the cable inside the groove on the back of the transmitter, so that the cable is not placed between the back of the transmitter and the installation surface.

- 2. To wire the input/output cable through the rubber lead-through on the bottom:
  - a. Push the input/output cable through the lead-through.
  - b. The lead-through provides strain relief and holds the cable in place. Tightening is not required.



The recommended cable diameter for wiring through the rubber lead-through is 7–8 mm. If you use a different cable size, test that the strain relief works as intended.

### 3.4.1 Wiring with optional mains power supply INDIGOPOWER24VSP

Indigo200 transmitters can be ordered as a package that includes the optional mains power supply. The mains power supply can also be ordered separately as an accessory (Vaisala item code INDIGOPOWER24VSP). Note that when the mains power supply is used to power Indigo200, the lead-through at the back of the transmitter is pierced, and the IP65 rating of the transmitter does not apply. See [Wiring options \(page 20\)](#) for more information on Indigo200 lead-through options and IP rating.



Note that the INDIGOPOWER24VSP power supply has a different operating environment specification than the Indigo200 transmitters. When installing Indigo200 with the INDIGOPOWER24VSP power supply, always follow the power supply operating environment specification.

Table 5 INDIGOPOWER24VSP power supply operating environment

| Property              | Description/Value                |
|-----------------------|----------------------------------|
| Storage temperature   | -40 ... +70 °C (-40 ... +158 °F) |
| Operating temperature | 0 ... +45 °C (+32 ... +113 °F)   |
| Operating humidity    | 10-95 %RH                        |

3.4.1.1 Connecting INDIGOPOWER24VSP wiring

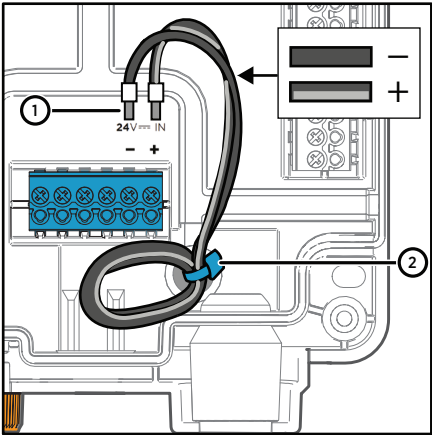


Figure 9 INDIGOPOWER24VSP mains power supply wiring inside the transmitter enclosure

- 1 Connect the wire with the gray stripe to the + screw terminal, and the unmarked black wire to the - screw terminal.
- 2 After connecting the + and - wires, adjust the length of the cable, make a loop on the cable next to the lead-through, and tie the loop with a cable tie to add strain relief.



**CAUTION!** Do not bend or twist the cover of the transmitter when opening. See the instructions in [Opening and mounting \(page 17\)](#).

- ▶ 1. Open the transmitter cover as instructed in [Opening and mounting \(page 17\)](#).
2. Make a small hole in the plastic membrane of the lead-through at the back of the transmitter. Only cut a hole big enough to lead the power supply wires through the rubber seal.
3. Pull the wires inside the transmitter and connect the + and - wires to the screw terminals as shown in [Figure 9 \(page 22\)](#).

4. After connecting the + and – wires, adjust the length of the cable, make a loop on the cable next to the lead-through, and tie the loop with a cable tie to add strain relief.
5. When you have completed the wiring, nest the power supply cable in the groove at the back of the transmitter (see [Figure 8 \(page 20\)](#)), so that the cable does not push the transmitter off the installation surface.
6. Mount the transmitter and reattach the cover.

## 3.5 Inputs and outputs

Table 6 Inputs and outputs

| Property                                               | Specification                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Insight PC software <sup>1)</sup> configuration access | USB-C port on transmitter (compatible with generic USB cables)                                                                                                                                                                                                                                              |
| Digital output                                         | RS-485 Modbus RTU                                                                                                                                                                                                                                                                                           |
| Relays                                                 | 2 configurable relays (V AC/V DC)                                                                                                                                                                                                                                                                           |
|                                                        | Device maximum specification (resistive load): <ul style="list-style-type: none"> <li>• Max. switching power 30 W / 37.5 VA</li> </ul>                                                                                                                                                                      |
|                                                        | UL-rated maximum specification (resistive load): <ul style="list-style-type: none"> <li>• AC: max. 28 V / 0.5 A</li> <li>• DC: max. 40 V / 0.24 A</li> <li>• Up to 30 V DC: <ul style="list-style-type: none"> <li>• max. switching current 1 A</li> <li>• max. switching power 30 W</li> </ul> </li> </ul> |
| Power supply input <sup>2)</sup>                       | 15 – 30 V DC (24 V AC $\pm 10\%$ 50/60 Hz)<br><sup>3)</sup>                                                                                                                                                                                                                                                 |
| Maximum current                                        | Transmitter and connected probe max. 1 A                                                                                                                                                                                                                                                                    |
| Power consumption                                      | Transmitter max. 3 W (+ connected probe, varies depending on probe type)                                                                                                                                                                                                                                    |
| Probe connector                                        | M12/5 connector for probe or probe cable connection (Vaisala Indigo-compatible probes)                                                                                                                                                                                                                      |
| Cable lead-throughs                                    | 2 options: rubber lead-through on the bottom of the transmitter, and opening with a seal at the back of the transmitter <sup>4)</sup>                                                                                                                                                                       |

| Property                 | Specification             |
|--------------------------|---------------------------|
| Screw terminal wire size | 0.2 – 1.5 mm <sup>2</sup> |

- 1) Vaisala Insight software for Windows® available at [www.vaisala.com/insight](http://www.vaisala.com/insight).
- 2) Using a power supply with overload protection is recommended for electrical safety.
- 3) When used with the HMP7 probe, the minimum required power supply input is 18 V DC.
- 4) Note that the IP65 rating only applies when the cable gland wiring option is used, and the lead-through with the pierceable seal at the back of the transmitter is left intact. See [Wiring options \(page 20\)](#) for more information.



**CAUTION!** Do not modify the unit or use it in ways not described in the documentation. Improper modification or use may lead to safety hazards, equipment damage, failure to perform according to specification, or decreased equipment lifetime.

### 3.6 Dimensions

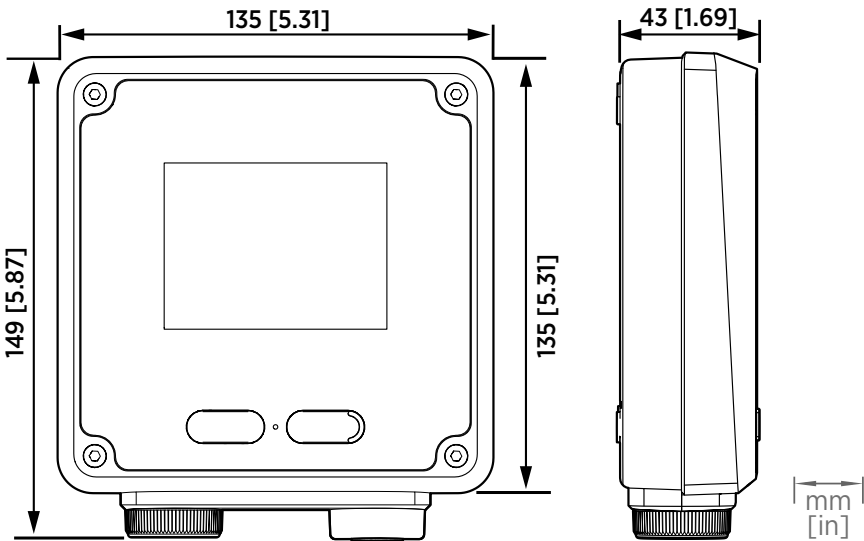


Figure 10 Indigo200 transmitter dimensions

## 3.7 Connecting probes



**CAUTION!** Only connect compatible measurement devices to the transmitter. Attempting to connect incompatible devices or cables can damage the equipment. Refer to transmitter specifications for compatibility information.



Figure 11 Connecting probes and cables to Indigo200

- 1 Probes are locked in place with the locking wheel. **Never turn from the probe body.**
  - 2 Probe connection cables are connected in the same way as probes: insert the cable in the connector and hold in place while turning the locking wheel.
  - 3 Probes are inserted into the probe connector with the orientation mark and/or the Vaisala logo facing out.
- 1. Insert the probe into the probe connector with the orientation mark and/or the Vaisala logo on the probe body facing out. Note the orientation of the cable connector pins when inserting.
2. Hold the probe in the probe connector and lock it in place by turning the locking wheel **counterclockwise**. Do not turn the probe body when connecting, only the locking wheel on the transmitter.
3. When the transmitter recognizes the connected probe, it shows a notification message on the display (for example, **Probe Connected: GMP251**).

## 4. Using Indigo202 with Insight PC software

### 4.1 Vaisala Insight PC software

Vaisala Insight PC software is a configuration software for Vaisala Indigo-compatible probes and transmitters. Insight is available for the Windows operating system (64-bit only). For a full list of supported operating system versions, see <http://www.vaisala.com/insight>.



To ensure support for your transmitter, download the latest version of Insight at [www.vaisala.com/insight](http://www.vaisala.com/insight).

With the Insight PC software, you can:

- See real-time measurements and device and status information
- Configure the transmitter settings (for example, display mode)
- Configure outputs and relays
- Configure serial communication (for example, Modbus) settings
- Calibrate and adjust the probe connected to the transmitter

Indigo200 transmitters can be connected to Insight PC software with a standard USB-C cable (type C to A or type C to C). For instructions on connecting the transmitter to Insight, see [Connecting to Insight PC software \(page 28\)](#).



The USB cable connection to Insight is only intended for temporary use during configuration, and must not be used for permanent installations. The IP rating and EMC properties of the transmitter can be affected when the USB port is open.



To connect the Indigo transmitter to the Vaisala Insight PC software, you must have the Vaisala USB Device driver installed on your computer.

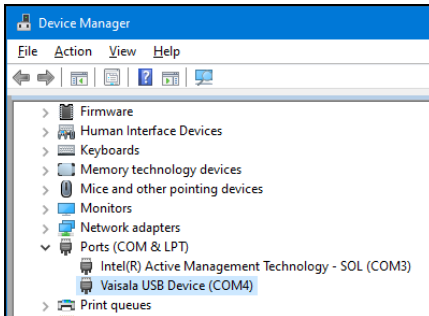
#### 4.1.1 Installing Vaisala USB Device driver



The Vaisala USB Device driver only supports Windows® operating systems.

- ▶ 1. Connect your USB-C cable to the Indigo transmitter USB port, and then connect the USB cable to a USB port on a PC that has Insight PC software installed. Windows® detects the new device and installs the appropriate driver.

2. Open **Device Manager** from the Windows® Start menu. Use search to find it if necessary (search for "device").



3. Locate the Vaisala USB device in the Device Manager list of devices :
  - If the device is listed as **Vaisala USB Device** with a COM port number in brackets, the driver is ready for use.
  - If the device is listed as **Vaisala USB Instrument Cable** without a COM port number listed, you must install the driver manually.
4. To install the driver manually:
  - a. Disconnect the USB cable from the computer.
  - b. Download the Vaisala USB device driver at <http://www.vaisala.com/software> (look for **USB Instrument Driver Setup** for cables).
  - c. Extract the driver zip file and run the USB driver installation program *Vaisala USB Device Driver Setup.exe*. Accept the installation defaults.
  - d. Go back to [step 1](#) and verify that the driver installation works as expected.

## 4.2 Connecting to Insight PC software

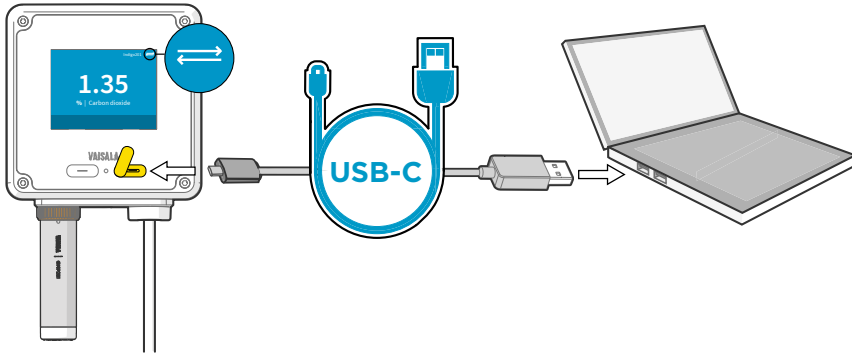


Figure 12 Connecting Indigo200 transmitter to Insight PC software with USB-C cable



### Required tools:

- Computer with a Microsoft Windows® operating system (64-bit version), Vaisala Insight PC software, and Vaisala USB Device driver installed
- USB cable with a USB-C (type C to A or type C to C) connector (available as an accessory, a generic cable can also be used)



The USB cable connection to Insight is only intended for temporary use during configuration, and must not be used for permanent installations. The IP rating and EMC properties of the transmitter can be affected when the USB port is open.

You can connect the Indigo200 transmitter to Vaisala Insight PC software with any generic USB cable that has a USB-C connector. The Insight software can be downloaded at [www.vaisala.com/insight](http://www.vaisala.com/insight). Using Indigo200 transmitters with Insight software requires the Vaisala USB Device driver.

For an overview of the Insight PC software configuration and monitoring options for Indigo200, see [Insight PC software overview \(page 30\)](#).

To connect the transmitter to Insight PC software:

- ▶ 1. Verify that you have the Vaisala USB Device driver installed on your computer. For instructions, see [Installing Vaisala USB Device driver \(page 26\)](#).
2. Open the Insight software on your PC.
3. Connect the USB cable to a free USB port on the PC.
4. Open the protective cover of the right-hand port on the front of the transmitter, and connect the USB cable to the USB-C connector.

5. In transmitter models with a display, the USB connection icon (see [Figure 12 \(page 28\)](#)) appears on the top right corner of the transmitter display when the USB cable connection is active.
6. Wait for Insight software to detect the device.



You can also temporarily power the transmitter through your computer with the USB cable when using Insight. Note that certain probe functionalities that increase the power supply requirements, such as purge or heating, may affect the Insight connection when powering the transmitter only through the USB connection. If the probe connected to the transmitter has a purge or heating feature, do not use the temporary USB powering option.

## 4.3 Insight PC software overview

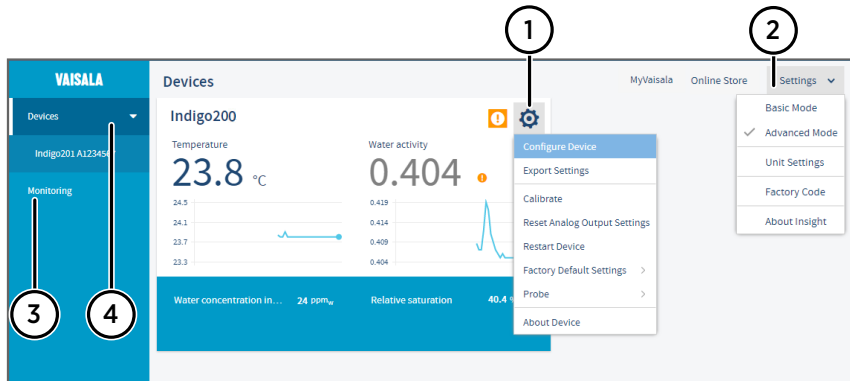


Figure 13 Insight software main menu view with transmitter and connected probe

- 1 Select  to access Insight main menu.
  - **Configure device:** display and graph options, output and relay settings (if applicable), parameter and unit selection, environmental compensation settings, filtering factor, probe options, and general settings.
  - **Export settings:** creates a text file export of the device settings.
  - **Calibrate:** options for calibrating and adjusting the measurement of the connected probe, adjusting outputs, viewing adjustment data, and restoring factory adjustments.
  - Various reset, factory default settings, and restart options for transmitter and probe.
  - **About device:** general device information such as serial number and software version.
- 2 Select **Settings** to switch between the **Basic mode** and **Advanced mode** user modes, change the units of parameters (metric/non-metric), enter a factory code to access restricted functionalities, or view information about the Insight software.
- 3 **Monitoring** provides options for monitoring and recording selected parameters, and exporting the monitoring data as a CSV (comma-separated values) file.
- 4 Device information menu with the following tabs:
  - **Measurements:** measurement graph view with parameter drop-down selection.
  - **Calibration information:** read-only information about the latest stored calibration.
  - **Diagnostics:** troubleshooting and administrative information about the device status. Also includes options for exporting the device error log and other diagnostics information as files (CSV/ZIP). When contacting Vaisala support, it is recommended to include an up-to-date export of the error log with the support request.

### 4.3.1 Unit settings

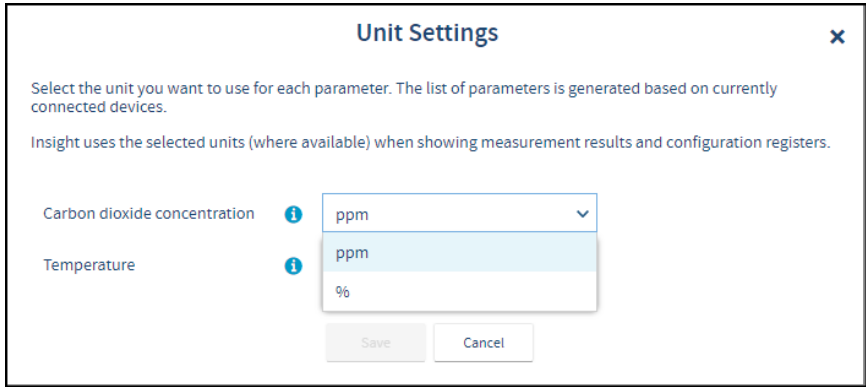


Figure 14 Unit selection example with CO<sub>2</sub> probe

You can change the units of the measurement parameters in the **Settings** menu accessible from the Insight PC software main view.



The unit selection has an effect on entering configuration values (for example, whether you must enter relay activation limits as ppm or % values).

## 4.4 Disabling and enabling USB functionality and RS-485 termination with DIP switch

If you install the transmitter to a location where it is necessary to limit access to configuration, you can disable the USB functionality with a DIP switch on the Indigo202 front cover component board. RS-485 termination can also be switched on or off with a DIP switch.

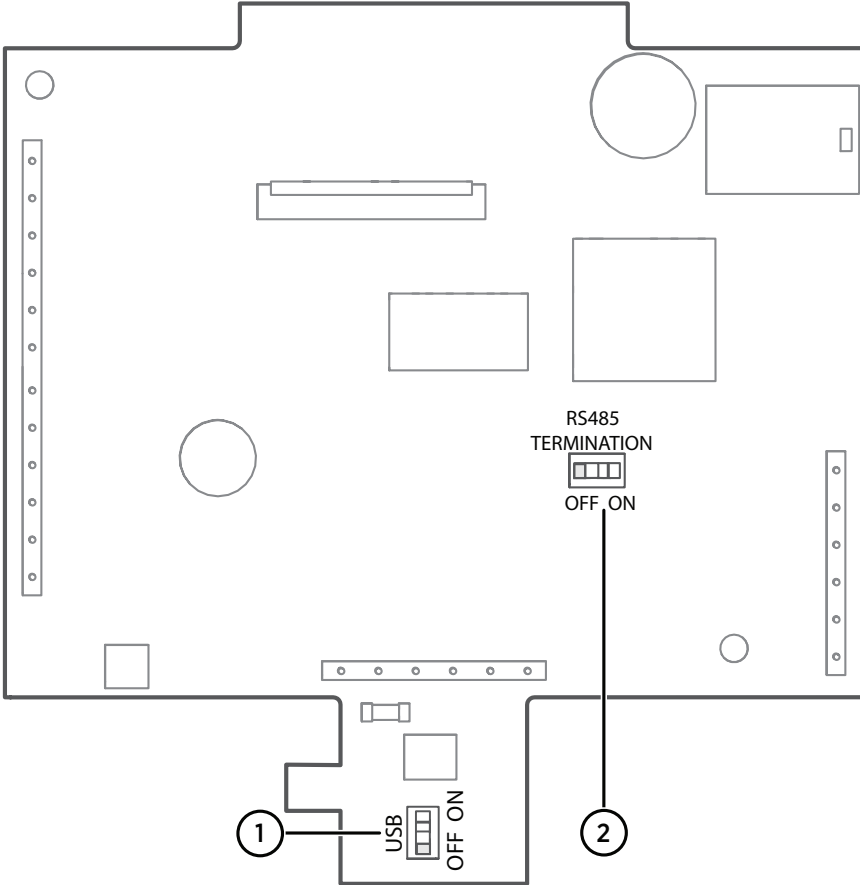


Figure 15 USB and RS-485 termination OFF/ON DIP switch locations

- 1 DIP switch for setting USB functionality OFF or ON

To switch USB communication or RS-485 termination OFF or ON with the DIP switches:

- ▶ 1. Power off the transmitter.
- 2. Open the transmitter cover. See [Opening and mounting \(page 17\)](#).



To avoid damaging the connector pins of the transmitter, pull the transmitter cover off the base in a straight angle. Do not twist or bend.

- 3. Use a small screwdriver or a similar tool to change the position of the DIP switch to OFF or ON.
- 4. When done, close the transmitter cover and power on Indigo. Note that when the USB DIP switch is in the OFF position, the transmitter USB port is inactive and it is not possible to connect Indigo202 to Insight PC software for configuration.

# 5. Modbus

## 5.1 Modbus overview

Indigo202 supports the Modbus RTU serial communication protocol (2-wire RS-485 interface).

There are 2 groups of Modbus register addresses in use in Indigo202: probe registers and Indigo registers. The probe registers are received from the connected probe, and are organized according to the probe's register map. Indigo registers include transmitter-specific information.

Table 7 Indigo202 Modbus registers

| Address                                                                                | Name                            | Data type |
|----------------------------------------------------------------------------------------|---------------------------------|-----------|
| <b>Probe registers (according to the connected probe's register map) <sup>1)</sup></b> |                                 |           |
| 0x0000                                                                                 | First measurement probe address |           |
| 0xDFFF                                                                                 | Last measurement probe address  |           |
| <b>Indigo registers</b>                                                                |                                 |           |
| 0xE000                                                                                 | Status                          | 16-bit    |
| 0xE001                                                                                 | Notification and error bits     | 16-bit    |
| 0xE002                                                                                 | Connected probe                 | text [30] |
| 0xE011                                                                                 | Relay A status                  | enum      |
| 0xE012                                                                                 | Relay B status                  | enum      |

1) See the connected probe's Modbus documentation for probe-specific register information

Received Modbus requests for register operations are handled in two different ways, depending on whether the register is a probe register or an Indigo transmitter register. Addresses above 0xDFFF (that is, Indigo registers) are handled as normal requests. Lower addresses (that is, probe registers 0x0000–0xDFFF) are passed to the measurement probe, and the response from the probe is again passed to the original Modbus client. Indigo can also have a cache for commonly requested registers (Measurement registers).

The maximum response delay is 2 seconds (when the data content needs to be fetched from the probe). The minimum delay between requests is 10 ms.

### 5.1.1 Default communication settings

Configure Device

Indigo202 A1234567

In Advanced Mode

Display

Displayed parameters

Relay output A

Relay output B

Communication

Address

Bit rate

Parity, data, stop bits

10

19200 b/s

N, 8, 2

Save

Close

Figure 16 Insight PC software Communication menu view

Modbus communication settings can be configured in the Insight PC software **Configure device > Communication** menu.

Table 8 Default Modbus serial communication settings

| Description           | Default value |
|-----------------------|---------------|
| Serial bit rate       | 19200         |
| Parity                | None          |
| Number of data bits   | 8             |
| Number of stop bits   | 2             |
| Modbus device address | 10            |

## 6. Configuring relays

### 6.1 Relay configuration overview

Indigo200 transmitters have 2 configurable relays (relay A and relay B). Both relays have configuration options for selecting the parameter that is used to control the relay, activation triggers, hysteresis, and error state behavior.

|                     |                                     |   |
|---------------------|-------------------------------------|---|
| Relay output on/off | <input checked="" type="checkbox"/> | 1 |
| Output parameter    | CO <sub>2</sub>                     | 2 |
| Activate above      | 500                                 | 3 |
| Activate below      | 100                                 | 4 |
| Hysteresis          | 20                                  | 5 |
| Error output state  | Inactive                            | 6 |

Figure 17 Relay configuration options (CO<sub>2</sub> probe example)

- 1 **Relay output on/off:** Set to **ON** to enable relay output.
- 2 **Output parameter:** The measurement that is used to control the relay. Options vary based on the type of the connected probe.
- 3 **Activate above:**  
When the measurement value exceeds the value set here, the relay activates.  
See the different relay activation options described in [Figure 20 \(page 39\)](#).
- 4 **Activate below:**  
When the measurement value falls below the value set here, the relay activates.  
See the different relay activation options described in [Figure 20 \(page 39\)](#).
- 5 **Hysteresis:** Define a buffer value for relay deactivation (set the value according to the parameter selected for the relay). With hysteresis, an activated relay switches off only when the measured value crosses the relay activation/deactivation limit and the additional buffer value.
- 6 **Error output state:** Select which state the relay is set to when an error occurs (on, off, or remains in its current state).

## Relay state information

When one or both relays are enabled, the relay state (active/not active) is shown on the transmitter display. You can also view the status of the relays with Insight PC software.

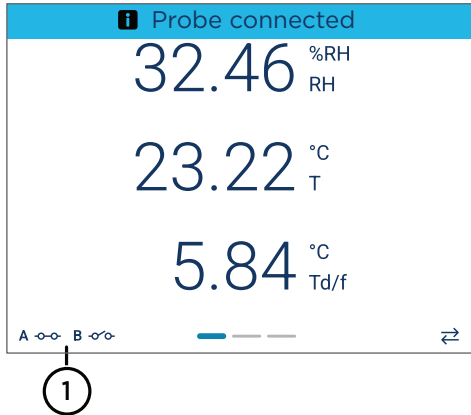


Figure 18 Relay icons on display (relay A active, relay B not active)

- 1 Relay A and relay B status shown on transmitter display

## 6.1.1 Relay activation options



Note that the values given must match the parameter and unit selections.

Relay activation and deactivation can be configured to happen either when the measurement passes a single setpoint, or also when the measurement is within or outside a set range. The following options are available:

- The relay activates when the measurement rises above or falls below a single setpoint, and deactivates when the measurement returns to the other side of the setpoint value.
- When you set a higher value for **Activate above** and a lower value for **Activate below**, the relay is **passive** when the measured value is in between the setpoints.
- When you set a lower value for **Activate above** than for **Activate below**, the relay is **active** when the measured value is in between the setpoints.

For examples of different relay activation options, see [Relay activation and hysteresis examples \(page 38\)](#).

Note that the hysteresis configuration has an effect on relay activation and deactivation. For more information on hysteresis, see [Relay hysteresis \(page 38\)](#). The effect of hysteresis is also described in the examples in [Relay activation and hysteresis examples \(page 38\)](#).

## 6.1.2 Relay hysteresis

If the measurement you are using to control the relay is likely to move back and forth close to the activation setpoint, you can set a hysteresis that prevents the relay switching on and off too frequently.

When hysteresis is used, the relay activates at the defined limit, but does not switch off immediately when the measurement moves back to the other side of the activation limit. Instead, with hysteresis, the relay remains active until the measurement crosses the relay activation/deactivation limit and the additional buffer value.

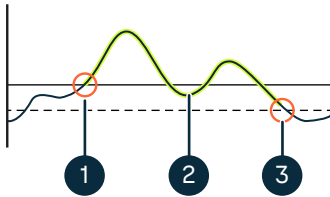


Figure 19 Behavior of relay that activates above limit, with hysteresis

- 1 Measurement goes above the relay activation limit (solid line —) and the relay activates.
- 2 Measurement falls below the activation limit, but stays above the hysteresis limit (dashed line - - -). The relay remains active.
- 3 Measurement falls below the hysteresis limit and the relay switches off.

## 6.1.3 Relay activation and hysteresis examples

Figure 20 (page 39) shows examples of different relay setpoint options, ranging from only one setpoint to different combinations of "above" and "below" setpoints. The effect of hysteresis is also described in the examples.

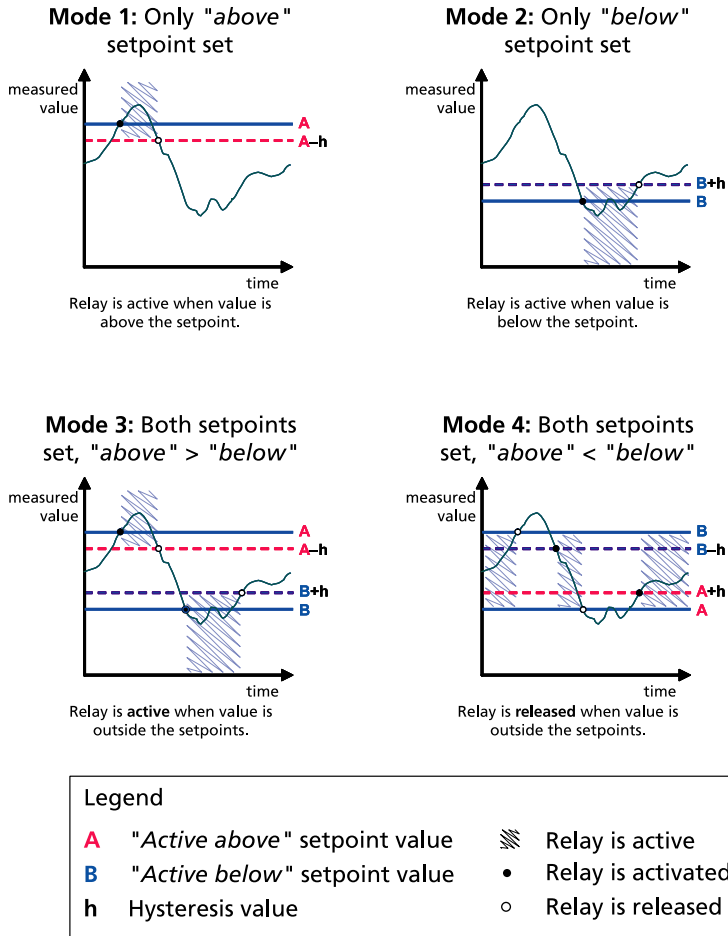


Figure 20 Relay activation and hysteresis examples

## 6.2 Setting relay activation limit without hysteresis

You can set the relay to activate when the probe measurement exceeds or falls below a set limit. When you configure a single setpoint for relay activation without hysteresis, the relay switches on or off immediately when the measurement moves over or below the setpoint.

|                     |                                                                                                                                                                              |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relay output on/off |                                                                                             |
| Output parameter    | CO <sub>2</sub>                                                                             |
| Activate above      |  500                                                                                        |
| Activate below      |  <input type="text"/>                                                                       |
| Hysteresis          |  0                                                                                          |
| Error output state  |  Inactive  |

Figure 21 Relay settings example: one setpoint without hysteresis

To define a single setpoint for relay activation when the measurement exceeds the defined activation limit (**Activate above**) without using hysteresis:

1. Select  to access Insight main menu.
2. In the **Configure Device** menu, select either relay A or relay B.
3. Enable the relay output by setting **Relay output on/off** to ON.
4. Select the measurement parameter that is used to control the relay with the **Output parameter** dropdown.

The parameter options depend on the connected probe. Note that the parameter units are defined in the **Settings** menu: see [Unit settings \(page 31\)](#).

5. Enter the activation limit value in the **Activate above** field.



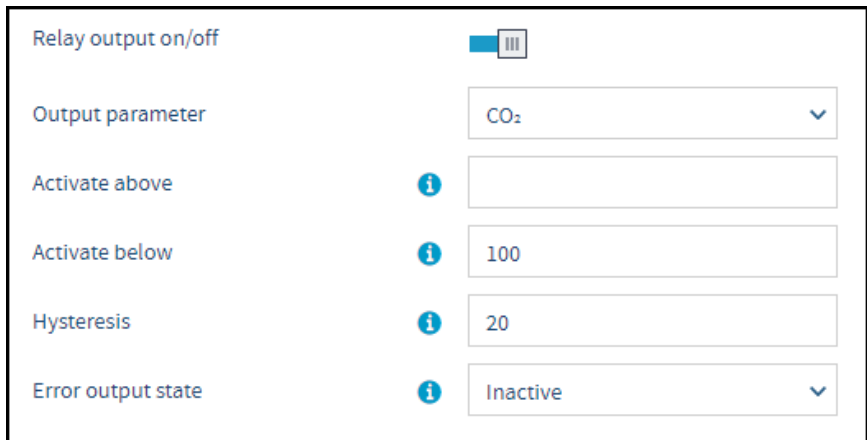
With this configuration, there is no hysteresis buffer. The relay activates or switches off immediately after passing this point.

6. Leave the **Activate below** field empty and set the **Hysteresis** field value as **0** (no hysteresis).
7. Select the **Error output state** for the relay.
8. Select **Save** to store the configuration.

## 6.3 Setting relay activation limit using hysteresis

If the measurement you are using to control the relay is likely to move back and forth close to the activation setpoint, you can set a hysteresis that prevents the relay switching on and off too frequently.

When hysteresis is used, the relay activates at the defined limit, but does not switch off immediately when the measurement moves back to the other side of the activation limit. Instead, with hysteresis, the relay remains active until the measurement reaches the defined tolerated variation limit.



The screenshot shows a configuration window for a relay. At the top, 'Relay output on/off' is set to 'ON' with a blue bar and a relay icon. Below this, 'Output parameter' is set to 'CO2' in a dropdown menu. 'Activate above' is an empty input field. 'Activate below' is set to '100'. 'Hysteresis' is set to '20'. 'Error output state' is set to 'Inactive' in a dropdown menu. Each input field has an information icon (i) to its left.

Figure 22 Relay settings example: one setpoint with hysteresis

To define a single setpoint for relay activation when the measurement falls below the defined activation limit (**Activate below**) using hysteresis:

- ▶ 1. Select  to access Insight main menu.
2. In the **Configure Device** menu, select either relay A or relay B.
3. Enable the relay output by setting **Relay output on/off** to ON.
4. Select the measurement parameter that is used to control the relay with the **Output parameter** dropdown.

The parameter options depend on the connected probe. Note that the parameter units are defined in the **Settings** menu: see [Unit settings \(page 31\)](#).

5. Enter the activation limit value in the **Activate below** field.
6. Leave the **Activate above** field empty.
7. Enter the hysteresis value in the **Hysteresis** field.

8. Select the **Error output state** for the relay.
9. Select **Save** to store the configuration.

With this configuration, the relay activates when measurement falls below the value entered in the **Activate below** field (100 ppm in this example). When the measurement returns above the **Activate below** limit, the relay does not switch off until it has reached the combined value of the activation limit and hysteresis buffer (120 ppm in this example). For further examples on the effect of hysteresis, see [Figure 20 \(page 39\)](#).

# 7. Calibration and adjustment

## 7.1 Calibration overview

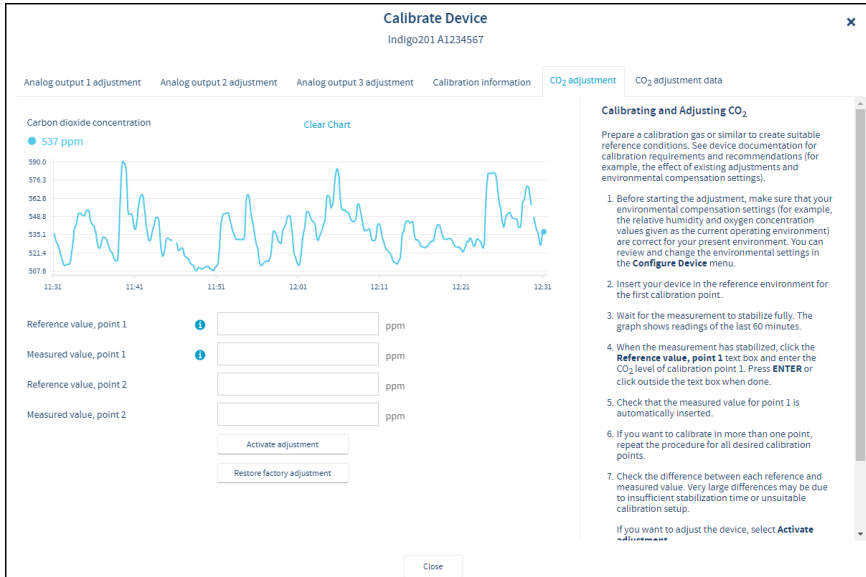


Figure 23 Insight calibration menu main view (CO<sub>2</sub> probe)

The calibration menu in the Insight PC software contains options for calibrating and adjusting the measurement of the probe you have connected to the transmitter. You can also view the current adjustment and restore the probe's factory adjustments.



The range of available options (for example, environmental compensations and the number of adjustment points) varies depending on the features of the connected probe.

The menu examples presented here are examples of calibration options that are available when a CO<sub>2</sub> probe is connected to the transmitter.



**CAUTION!** Before adjusting a probe's measurement, make sure that you have familiarized yourself with the probe-specific calibration requirements such as possible adjustment limits and environmental compensation interdependencies. See the user documentation of the probe for probe-specific information.

Starting calibration

To open the calibration menu, select  to access Insight main menu. In the main menu, select **Calibrate**.

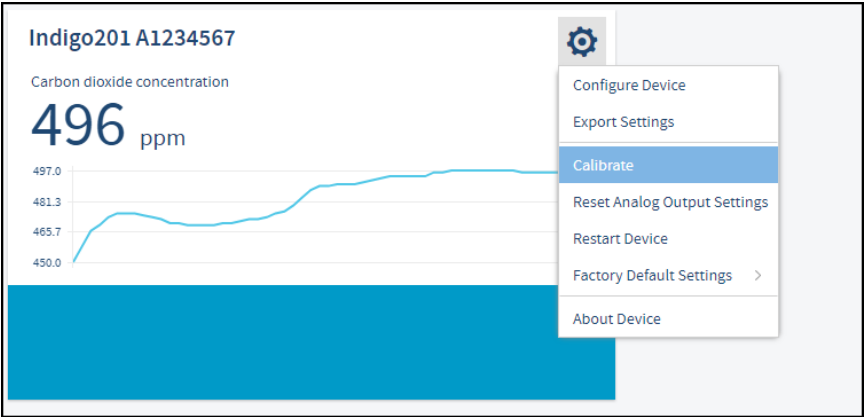


Figure 24 Insight **Calibrate** menu selection

Restoring factory adjustment

Before adjusting the probe measurement, you can remove any possible earlier adjustments with the **Restore factory adjustment** selection, if needed.

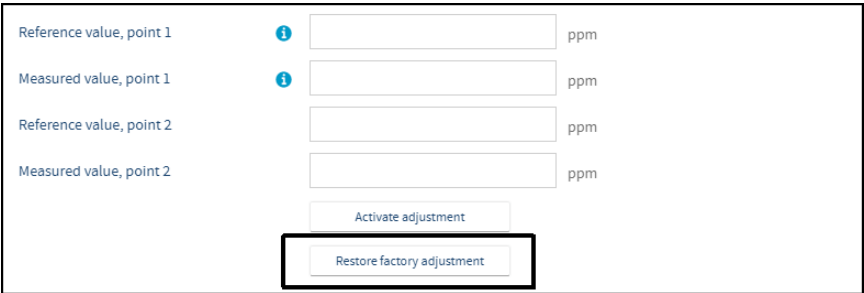
The screenshot shows a form for adjusting the device. It has four rows, each with a label, an information icon (i), an input field, and a unit 'ppm'. The labels are 'Reference value, point 1', 'Measured value, point 1', 'Reference value, point 2', and 'Measured value, point 2'. Below the input fields are two buttons: 'Activate adjustment' and 'Restore factory adjustment'. The 'Restore factory adjustment' button is highlighted with a black rectangular box.

Figure 25 Insight **Restore factory adjustment** selection

7.2 Environmental compensation

When making adjustments, you can enter information about the environment in which you perform the adjustment. This allows compensating for environmental factors that have an effect on the measurement (for example, temperature, pressure, or background gases).

The selection of environmental compensations available in the Indigo transmitter configuration menus depends on the features and configuration of the connected probe. If the probe you have connected to the transmitter supports environmental compensations, the configuration options are shown in the **Configure device** menu accessible from the Insight PC software main view. For information and instructions on the environmental compensation features of the probe, see the user documentation of the probe you are using.

**Configure Device**  
Indigo201 A1234567 In Advanced Mode

|                                |                               |                                     |
|--------------------------------|-------------------------------|-------------------------------------|
| Analog output 1                | Pressure compensation on/off  | <input checked="" type="checkbox"/> |
| Analog output 2                | Temperature compensation mode | Measured                            |
| Analog output 3                | Humidity compensation on/off  | <input checked="" type="checkbox"/> |
| Relay output A                 | Oxygen compensation on/off    | <input checked="" type="checkbox"/> |
| Relay output B                 | Filtering factor              | 100                                 |
| Compensation power-up defaults |                               |                                     |
| Compensation setpoints         |                               |                                     |
| Measurement                    |                               |                                     |

**Save** **Close**

Figure 26 Insight environmental compensation configuration example with CO<sub>2</sub> probe

## 7.3 CO<sub>2</sub> probe adjustment example

Prepare a calibration gas or similar to create suitable reference conditions. See device documentation for calibration requirements and recommendations (for example, the effect of existing adjustments and environmental compensation settings).

To adjust the CO<sub>2</sub> measurement of the probe that is connected to the transmitter:

- ▶ 1. Before starting the adjustment, make sure that your environmental compensation settings (for example, the relative humidity and oxygen concentration values given as the current operating environment) are correct for your present environment. You can review and change the environmental settings in the **Configure device** menu.
2. To open the Insight PC software calibration menu, select  to access Insight main menu. In the main menu, select **Calibrate**.
3. Select **CO<sub>2</sub> adjustment**.
4. Insert the probe in the reference environment for the first calibration point.
5. Wait for the measurement to stabilize fully. The graph shows readings of the last 60 minutes.

6. When the measurement has stabilized, click the **Reference value, point 1** text box and enter the CO<sub>2</sub> level of calibration point 1. Press **Enter** or click outside the text box when done.
7. Check that the measured value for point 1 is automatically inserted.
8. If you want to calibrate in more than one point, repeat the procedure for all desired calibration points.
9. Check the difference between each reference and measured value. Very large differences may be due to insufficient stabilization time or unsuitable calibration setup.

If you want to adjust the device, select **Activate adjustment**.

To exit without taking the adjustment in use, select **Close**.

10. After calibrating your device, update the information in the **Calibration information** tab.

## 8. Maintenance and troubleshooting

### 8.1 Cleaning

You can clean the Indigo transmitter body by wiping it with a moist cloth. Standard cleaning agents can be used.



Refer to the probe-specific cleaning instructions when cleaning the probe connected to transmitter. Do not spray anything directly on the probe, since that may deposit impurities on the sensor.

#### Chemical tolerance

The following chemicals can be used to clean the transmitter:

- $\text{H}_2\text{O}_2$  (6000 ppm), non-condensing
- Alcohol-based cleaning agents such as ethanol and IPA (70 % Isopropyl Alcohol, 30 % water)
- $\text{Ca}(\text{ClO})_2$  (calcium hypochlorite) max. 0.5 %
- QAC (quaternary ammonium cations) max. 0.5 %



Avoid exposing the transmitter to chemicals for unnecessarily long periods of time. Do not immerse it in a chemical, and wipe chemicals off the surfaces after cleaning.

### 8.2 Replacing probes



**CAUTION!** Only connect compatible measurement devices to the transmitter. Attempting to connect incompatible devices or cables can damage the equipment. Refer to transmitter specifications for compatibility information.

You can replace probes both when transmitter power is on and when it is off. There is no need to disconnect any wires from the transmitter; just detach the probe from the probe cable connector (5-pin M12).

When you replace a probe, measurement parameters and outputs will behave differently depending on whether the new probe's parameters are the same as the parameters of the old probe:

- If you replace a probe with a new one that has the same measurement parameters as the removed probe, the transmitter will continue to show those measurements once it detects the new probe.

### 8.3 Restoring factory default settings with Insight PC software

You can restore the transmitter back to its factory default settings using the Insight PC software.

- ▶
1.

Connect the transmitter to the Insight software.
2.

Select  > **Factory default settings** > **Restore settings**.

### 8.4 Troubleshooting

| Problem                                                     | Possible Cause                                                                                                     | Solution                                                                                                                                                                                                   |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USB connection to Insight PC software cannot be established | USB connection has been disabled with the DIP switch on the transmitter component board.                           | Enable the USB connection with the DIP switch.                                                                                                                                                             |
| Functionalities are not available in Insight PC software.   | Insight PC software is in <b>Basic mode</b> . Certain functionalities are only available in <b>Advanced mode</b> . | Change the user mode from <b>Basic mode</b> to <b>Advanced mode</b> in the <b>Settings</b> menu of Insight PC software.                                                                                    |
| Measurement performance affected after calibration.         | Probe has not been switched from calibration mode to normal operating mode in the Insight PC software.             | Open the <b>Calibrate</b> menu in Insight PC software. Exit the menu with the <b>Close</b> selection, and ensure that you confirm closing the calibration mode when exiting with the <b>Yes</b> selection. |

### 8.5 Display messages

The following table lists the display messages that the transmitter uses to inform you about its state.

In addition to the transmitter’s messages, the connected probes have probe-specific messages that are also shown on the transmitter display. Messages from the connected probe start with **Probe:**. For more information on the probe-specific messages, see the probe’s documentation.

Table 9 Indigo transmitter messages shown on display

| Display message | Description | Recommended action |
|-----------------|-------------|--------------------|
| <b>Errors</b>   |             |                    |

| Display message                   | Description                                                                                                                                                                                                                                          | Recommended action                                                                                                                      |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Supply voltage out of range.      | The supply voltage is below the minimum (range: 15–30 V DC or 24 V AC $\pm 10\%$ 50/60 Hz).                                                                                                                                                          | The error clears when the supply voltage returns to the specified range. Check your power supply and restart the transmitter if needed. |
| <b>Warnings</b>                   |                                                                                                                                                                                                                                                      |                                                                                                                                         |
| No probe connected.               | The measurement probe is not connected, or the probe is connected poorly and cannot be recognized by the transmitter.                                                                                                                                | Check that you have fastened the probe correctly with the locking wheel.                                                                |
| Unable to measure all parameters. | Some of the measurements you have configured to be displayed are currently not available. This can be caused, for example, by the probe heating feature: parameters that are affected by heating cannot be shown while the heating cycle is ongoing. | -                                                                                                                                       |
| <b>Notifications</b>              |                                                                                                                                                                                                                                                      |                                                                                                                                         |
| Probe connected:                  | The transmitter displays the name of the connected probe.                                                                                                                                                                                            | -                                                                                                                                       |
| Waiting for measurements.         | The connected probe is preparing measurements (for example, at start-up or after a probe restart).                                                                                                                                                   | -                                                                                                                                       |
| Date and time not set.            | The transmitter has lost its date and time settings. This can occur, for example, if the transmitter is powered off for a long time.                                                                                                                 | Connect the transmitter to the Insight PC software for automatic date and time setup.                                                   |

## 8.6 Writing a problem report

When troubleshooting the product, write a problem report including:

- What failed (what worked / did not work)?
- Where did it fail (location and environment)?
- When did it fail (date, immediately / after a while / periodically / randomly)?
- How many failed (only one defect / other same or similar defects / several failures in one unit)?
- What was done when the failure was noticed?
- What was connected to the product and to which connectors?

- Input power source type, voltage, and list of other items (such as lighting, heaters, and motors) that were connected to the same power output.
- Are all parts connected and grounded properly? Take a photo to help the troubleshooting.

This information is helpful if you need to contact Vaisala support.

## 9. Technical data

### 9.1 Specifications

Table 10 Indigo-compatible probes

| Measurement type            | Probe models                             |
|-----------------------------|------------------------------------------|
| Humidity and temperature    | HMP1, HMP3, HMP4, HMP5, HMP7, HMP8, HMP9 |
| Temperature                 | TMP1                                     |
| Dew point                   | DMP5, DMP6, DMP7, DMP8                   |
| Carbon dioxide              | GMP251, GMP252                           |
| Vaporized hydrogen peroxide | HPP271, HPP272                           |
| Moisture in oil             | MMP8                                     |

Table 11 Indigo202 inputs and outputs

| Property                                               | Description/value                                                                                   |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Insight PC software configuration access <sup>1)</sup> | USB-C port on transmitter (compatible with generic USB cables)                                      |
| Power supply input                                     | 15 ... 30 V DC <sup>2)</sup><br>24 V AC $\pm 10$ % 50/60 Hz                                         |
| Relay contacts x 2                                     | Max. switching power 30 W<br>Max. switching current 1 A<br>Max. switching voltage 40 V DC / 28 V AC |
| Digital communications                                 | RS-485, Modbus RTU                                                                                  |

1) Vaisala Insight software for Windows® available at [www.vaisala.com/insight](http://www.vaisala.com/insight)

2) When used with the HMP7 probe, the minimum required power supply input is 18 V DC.

Table 12 Indigo200 operating environment

| Property              | Specification                                                                                          |
|-----------------------|--------------------------------------------------------------------------------------------------------|
| Operating temperature | With display<br>–20 ... +60 °C (–4 ... +140 °F)<br>Without display<br>–40 ... +60 °C (–40 ... +140 °F) |
| Storage temperature   | –40 ... +70 °C (–40 ... +158 °F)                                                                       |

| Property           | Specification                                                                                                                                                                                                                          |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chemical tolerance | Temporary exposure during cleaning: <ul style="list-style-type: none"> <li>• H<sub>2</sub>O<sub>2</sub> (6000 ppm, non-condensing)</li> <li>• Alcohol-based cleaning agents such as ethanol and IPA (max. 70 % concentrate)</li> </ul> |
| IP rating          | IP65: Dust-tight. Protected from water jets from any direction. <sup>1)</sup>                                                                                                                                                          |
| Indoor/outdoor use | Indoor use                                                                                                                                                                                                                             |

1) *Note that the IP65 rating only applies when the cable gland wiring option is used, and the lead-through with the pierceable seal at the back of the transmitter is left intact. See user documentation for more information on Indigo200 wiring options.*

Table 13 Indigo200 compliance

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

Table 14 Indigo200 mechanical specifications

| Property                   | Specification                            |
|----------------------------|------------------------------------------|
| Housing material           | PC/ABS plastic                           |
| Display window material    | PMMA plastic                             |
| Connection screw terminals | 26–20 AWG                                |
| Weight                     | 402 g (14.2 oz)                          |
| Dimensions (H×W×D)         | 149 × 135 × 43 mm (5.87 × 5.31 × 1.7 in) |

## 9.2 Dimensions

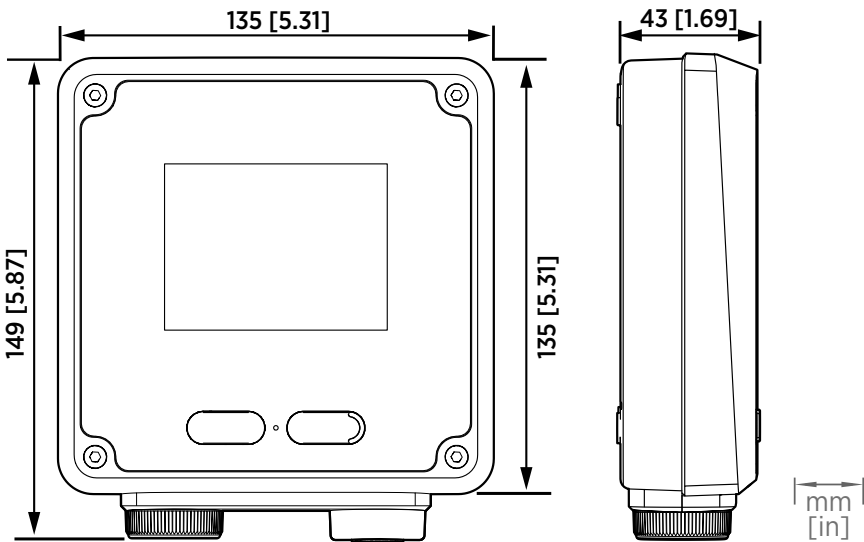


Figure 27 Indigo200 transmitter dimensions

## 9.3 Spare parts and accessories



Information on spare parts, accessories, and calibration products is available online at [vaisala.com](https://vaisala.com) and [store.vaisala.com](https://store.vaisala.com).

Table 15 Indigo200 spare parts and accessories

| Description                                                                             | Item code        |
|-----------------------------------------------------------------------------------------|------------------|
| USB-C connection cable (2 m, type C to A, for Insight PC software access) <sup>1)</sup> | 273956           |
| Probe connection cable, 1 m (3 ft 3 in)                                                 | INDIGOCABLE1M    |
| Probe connection cable, H <sub>2</sub> O <sub>2</sub> compatible, 1 m (3 ft 3 in)       | INDIGOCABLEHD1M5 |
| Probe connection cable, 3 m (9 ft 11 in)                                                | INDIGOCABLE3M    |
| Probe connection cable, H <sub>2</sub> O <sub>2</sub> compatible, 3 m (9 ft 11 in)      | INDIGOCABLEHD3M  |

| Description                                                                          | Item code        |
|--------------------------------------------------------------------------------------|------------------|
| Probe connection cable, 5 m (16 ft 5 in)                                             | INDIGOCABLE5M    |
| Probe connection cable, H <sub>2</sub> O <sub>2</sub> compatible, 5 m (16 ft 5 in)   | INDIGOCABLEHD5M  |
| Probe connection cable, 10 m (32 ft 10 in)                                           | INDIGOCABLE10M   |
| Probe connection cable, H <sub>2</sub> O <sub>2</sub> compatible, 10 m (32 ft 10 in) | INDIGOCABLEHD10M |
| Universal mains power supply with EU/US/UK/AUS plugs                                 | INDIGOPOWER24VSP |

- 1) *Note that a USB-C cable is not included in Indigo200 deliveries by default. A generic USB-C cable (type C to A) can also be used.*

## 9.4 Recycling



Disposal of Vaisala products is to be done according to local laws and regulations. We encourage end-users to segregate the products from other waste at end-of-life and use best available recycling practices to minimize related environmental impacts.

Almost all of the parts in our products can be recovered as material or energy. If applicable, Vaisala recommends removing the battery unit before recycling the rest of the device as typical electronic waste. The battery unit can be recycled separately in accordance with local waste management practices and regulations. Integrated small sized batteries are typically left in place and removed by professionals at the recycling facilities.

### Indigo200 series transmitter disposal

Do not disassemble Indigo200 series transmitters for recycling. Dispose of the entire transmitter as electrical and electronical waste.

# Appendix A. Modbus reference

## A.1 Function codes

Table 16 Supported function codes

| Function code (decimal) | Function code (hexadecimal) | Name                       |
|-------------------------|-----------------------------|----------------------------|
| 03                      | 0x03                        | Read Holding Registers     |
| 16                      | 0x10                        | Write Multiple Registers   |
| 43 / 14                 | 0x2B / 0x0E                 | Read Device Identification |

### A.1.1 Device identification objects

Table 17 Device identification objects

| Object ID | Object ID (hexadecimal) | Object name                   | Example contents                                                                         |
|-----------|-------------------------|-------------------------------|------------------------------------------------------------------------------------------|
| 0         | 0x00                    | VendorName                    | "Vaisala"                                                                                |
| 1         | 0x01                    | ProductCode                   | "Indigo202"                                                                              |
| 2         | 0x02                    | MajorMinorVersion             | "1.2.3"<br>Software version of the device.                                               |
| 3         | 0x03                    | VendorUrl                     | " <a href="http://www.vaisala.com/">http://www.vaisala.com/</a> "                        |
| 4         | 0x04                    | ProductName                   | "Indigo202 Digital Transmitter"                                                          |
| 128       | 0x80                    | SerialNumber <sup>1)</sup>    | "K0710040"                                                                               |
| 129       | 0x81                    | CalibrationDate <sup>1)</sup> | "2020-01-31"<br>Calibration date in YYYY-MM-DD format.<br>Empty string if not set/valid. |
| 130       | 0x82                    | CalibrationText <sup>1)</sup> | "Vaisala/HEL"<br>Calibration information text. Empty string if not set/valid.            |

1) Vaisala-specific device information.

## A.2 Indigo status registers

The following table describes the status information provided in Indigo status registers (transmitter, probe, and relay statuses). For more details on the high-level transmitter and probe statuses reported in register 0xE000, see [Notification and error bits \(page 56\)](#).

Table 18    Modbus status registers (read-only)

| Address<br>(hexadecimal) | Register description        | Data format | Notes                                                                                                                                                       |
|--------------------------|-----------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0xE000                   | Status                      | 16-bit      | 0 = Status OK<br>1 = Info<br>2 = Warning<br>3 = Error                                                                                                       |
| 0xE001                   | Notification and error bits | 16-bit      | Provides additional details on the high-level status reported in register E000 <sub>hex</sub> . See <a href="#">Notification and error bits (page 56)</a> . |
| 0xE011                   | Relay A status              | enum        | 0 = Relay is not active<br>1 = Relay is activated                                                                                                           |
| 0xE012                   | Relay B status              | enum        | 0 = Relay is not active<br>1 = Relay is activated                                                                                                           |

### A.2.1 Notification and error bits

The status register (0xE000) can report that one of the following notification types is present:

- 0    No issues
- 1    Info
- 2    Warning
- 3    Error

Additional details about the status reported in the register 0xE000 can be provided in the 16-bit register 0xE001, as described in the following table.

Table 19    Bits in register 0xE001

| Bit in E001 <sub>hex</sub> | Meaning     | Notes                                                                                                                   |
|----------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------|
| 0 (0x0000)                 | No errors   |                                                                                                                         |
| 2 (0x0002)                 | Probe error | Connect to Insight PC software and review the error information in the <b>Diagnostics</b> menu. Check display messages. |

| Bit in E001 <sub>hex</sub> | Meaning              | Notes                                                                                                                   |
|----------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------|
| 4 (0x0004)                 | Low supply voltage   | The supply voltage is not within the specified range (15–30 V DC (24 V AC $\pm$ 10 % 50/60 Hz)                          |
| 16 (0x0010)                | No measurement probe | Probe not connected or Indigo cannot detect the probe.                                                                  |
| 32 (0x0020)                | Probe warning        | Connect to Insight PC software and review the error information in the <b>Diagnostics</b> menu. Check display messages. |



## 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](https://vaisala.com/calibration).

- Vaisala Online Store at [store.vaisala.com](https://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](https://vaisala.com/contactus).

## Warranty

For standard warranty terms and conditions, see [vaisala.com/warranty](https://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.

## Technical support



Contact Vaisala technical support at [helpdesk@vaisala.com](mailto: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](https://vaisala.com/support).

## Recycling



Recycle all applicable material according to local regulations.





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