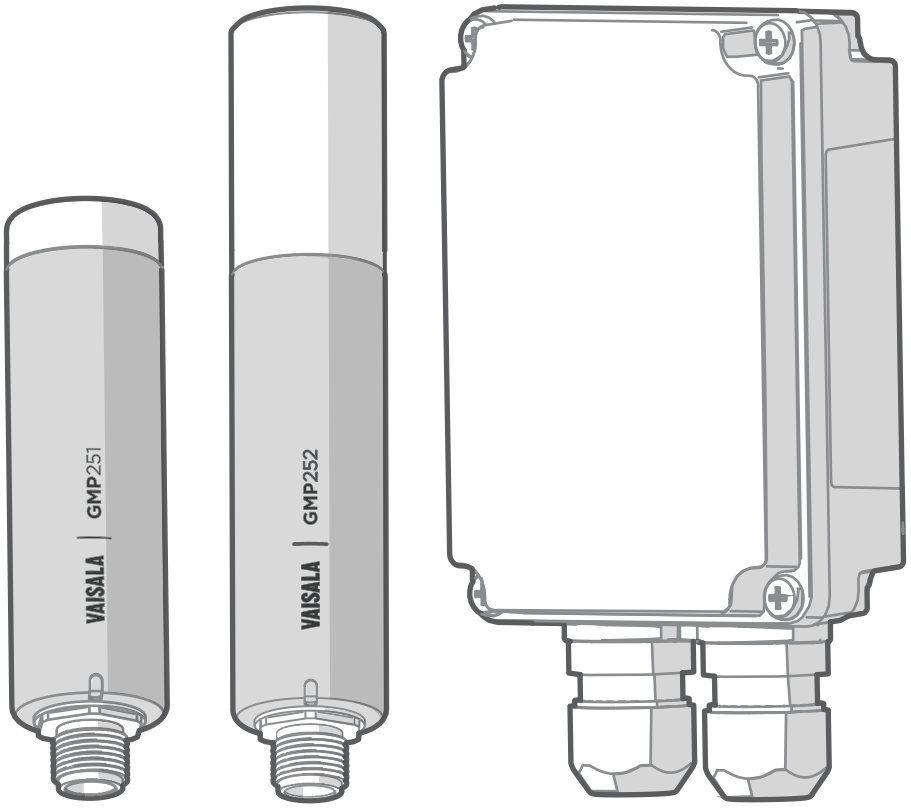
M211920EN-C

Quick Guide

GMP251 and GMP252

Relay Box for GMP250 Carbon Dioxide Probes



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1. Relay Box Quick Guide

1.1 Overview

The GMP250 relay box allows using the analog current (mA) output channel of Vaisala CARBOCAP® Carbon Dioxide Probes GMP251 and GMP252 for relay control.

The voltage (V) output channel is not used for relay control with the relay box: the voltage channel provides CO_2 measurement output (feedthrough via the relay box) in the same manner as when wired directly without the relay box.

The relay configuration (activation and release limits, error state output) is done using GMP251/252 serial line interface commands.

Table 1 GMP250 Relay Box Specifications

Property	Specification
Maximum switching voltage	50 VDC, 50 VAC
Maximum switching power	30 W, 30 VA
Number of relays	1
Probe output to relay	• Current output to relay control: ppm CO_2 • Voltage output through the relay box: ppm CO_2 or % CO_2
Probe power supply requirements	20 ... 30 VDC supplied through the relay box
Relay configuration interface	Serial line (Vaisala Industrial Protocol)

Using GMP251/252 for relay control requires using the Vaisala Industrial Protocol serial line interface to configure the probe to use relays, and wiring the probe to send output and receive power through the relay box.

- For instructions on carrying out the serial line configuration, see Serial Line Configuration (page 4).
- For wiring instructions, see Probe and Relay Box Wiring (page 10) .

This Quick Guide instructs how to carry out the serial line configuration and wiring related to using the current output for relay control. For more information on GMP251/252 serial line commands and other functionalities, see the user documentation of the probes:

- *GMP251 User Guide (M211799EN)*
- *GMP252 User Guide (M211897EN)*

1.2 Serial Line Configuration

To enable relay operation, you must use a terminal program (for example, PuTTy) to set the GMP251/252 serial mode to relay communication and configure the relay settings. Using serial line (Vaisala Industrial Protocol) to configure the probe requires the following:

- Vaisala USB service cable (order code 242659)
- Computer with:
  - Windows operating system
  - Terminal application (for example PuTTy, available from www.vaisala.com/software)
  - Free USB port
  - Driver for Vaisala USB service cable installed (available on the cable installation media and at www.vaisala.com/software)

The default serial interface settings are shown in the following table.

Table 2 Default Serial Interface Settings

Property	Description/Value
Bit rate	19200
Parity	None
Data bits	8
Stop bit	1
Flow control	None

For more detailed instructions on connecting to GMP251/GMP252 with a computer and using the serial line interface, see the User Guides of the probes.

1.3 Configuring Relays with Serial Line

To enable relay control with the current output channel and set the relay configuration, follow the instructions below for the relevant software version.

More Information

- Configuring Relays with GMP250 Software Version 1.3.1 or Later (page 5)
- Configuring Relays with GMP250 Software Version 1.2.9 (page 7)

1.3.1 Configuring Relays with GMP250 Software Version 1.3.1 or Later

Use the **rsel** command (not the **asel** command) to set the analog output channel to current (mA).

1. Connect GMP251/GMP252 to a computer with USB service cable 242659 and open a terminal connection (for example, PuTTy).
2. Enable advanced configuration commands with the **pass 1300** command.
3. Set the serial mode of the analog current output channel (2) to relay control with the following command: **smode relay2**

4. Configure the current output channel's relay settings with the **rsel** command:

```
rsel [channel parameter release_ppm set_ppm release_value set_value
startup_value error_value]
```

- **channel**= analog output channel: set to **2** (current)
- **parameter** = the parameter that controls the relay: set to **co2**
- **release_ppm** = CO_2 ppm level at which the relay is released
- **set_ppm** = CO_2 ppm level at which the relay is activated
- **release_value** = the current output (mA) when the relay is released
- **set_value** = the current output (mA) when the relay is activated: set to **12**
- **startup_value** = during probe start-up, if the CO_2 ppm level falls between the **release_ppm** and **set_ppm** values, **startup_value** shows the state of the relay (mA): the relay is either activated, released, or in error state.
- **error_value** = the current output when the probe is in error state

The relay mode of GMP251 and GMP252 probes has been designed to use 12 mA as the relay control current. Use only 12 mA for the **set_value** configuration when using the relay box with GMP251 and GMP252.

Example:
Set the analog output channel 2 (current) to control relay operation with the following settings:

- The relay is activated when the measurement is over 10100 ppm CO_2 and released when under 9900 ppm CO_2. Setting these relay activation limits means using a 1 % CO_2 (10 000 ppm CO_2) relay setpoint with a hysteresis of ±1 % (100 ppm CO_2).
- The output current is 0 mA when the relay is released.
- The output current is 12 mA when the relay is activated.
- The output current is 12 mA if during probe start-up CO_2 ppm level is between 9900 and 10100 ppm.
- The output current is 0 mA when the probe is in error state.

Enter the following commands:

```
pass 1300
smode relay2
rsel 2 co2 9900 10100 0 12 12 0
```

1.3.2 Configuring Relays with GMP250 Software Version 1.2.9

Use the **rsel** command (not the **asel** command) to set the analog output channel to current (mA).

1. Connect GMP251/GMP252 to a computer with USB service cable 242659 and open a terminal connection (for example, PuTTy).
2. Enable advanced configuration commands with the **pass 1300** command.
3. Set the serial mode of the analog current output channel (2) to relay control with the following command: **smode relay2**
4. Configure the current output channel's relay settings with the **rsel** command:

```
rsel [channel parameter release_ppm set_ppm set_value error_value]
```

- **channel**= analog output channel: set to **2** (current)
- **parameter** = the parameter that controls the relay: set to **co2**
- **release_ppm** = CO_2 ppm level at which the relay is released
- **set_ppm** = CO_2 ppm level at which the relay is activated
- **set_value** = the current output (mA) when the relay is activated: set to **12**
- **error_value** = the current output when the probe is in error state

The relay mode of GMP251 and GMP252 probes has been designed to use 12 mA as the relay control current. Use only 12 mA for the **set_value** configuration when using the relay box with GMP251 and GMP252.

Example:
Set the analog output channel 2 (current) to control relay operation with the following settings:

- The relay is activated when the measurement is over 10100 ppm CO_2 and released when under 9900 ppm CO_2. Setting these relay activation limits means using a 1 % CO_2 (10 000 ppm CO_2) relay setpoint with a hysteresis of ±1 % (100 ppm CO_2).
- The output current is 12 mA when the relay is activated.
- The output current is 0 mA when the probe is in error state.

Enter the following commands:

```
pass 1300
smode relay2
rsel 2 co2 9900 10100 12 0
```

1.3.3 Serial Line Mode Commands

Only serial mode commands related to relay operation are presented here. For other serial mode configuration options, see the User Guides of the GMP251/252 probes.

Table 3 Smode Command

Syntax	Description
smode<cr>	Shows the current start-up operating mode of the serial line.
smode [mode]<cr>	Set serial line start-up operating mode. The new mode is taken into use when the device is reset or powered up. Note: only use the **RELAY2** option. Available modes: RELAY1 = Voltage output channel: do not use for relay control with the GMP250 relay box. **RELAY2** = Set analog output channel 2 (current) to relay control: use only this option with the relay box.
Example (set serial mode to "RELAY2" (channel 2 current output)): **smode RELAY2** Serial mode : RELAY2	

1.3.4 Relay Configuration Commands

Table 4 Rsel Command for GMP250 Software Version 1.3.1 or Later

Syntax	Description
rsel [channel]<cr>	Show current relay settings. **channel** = Analog output channel

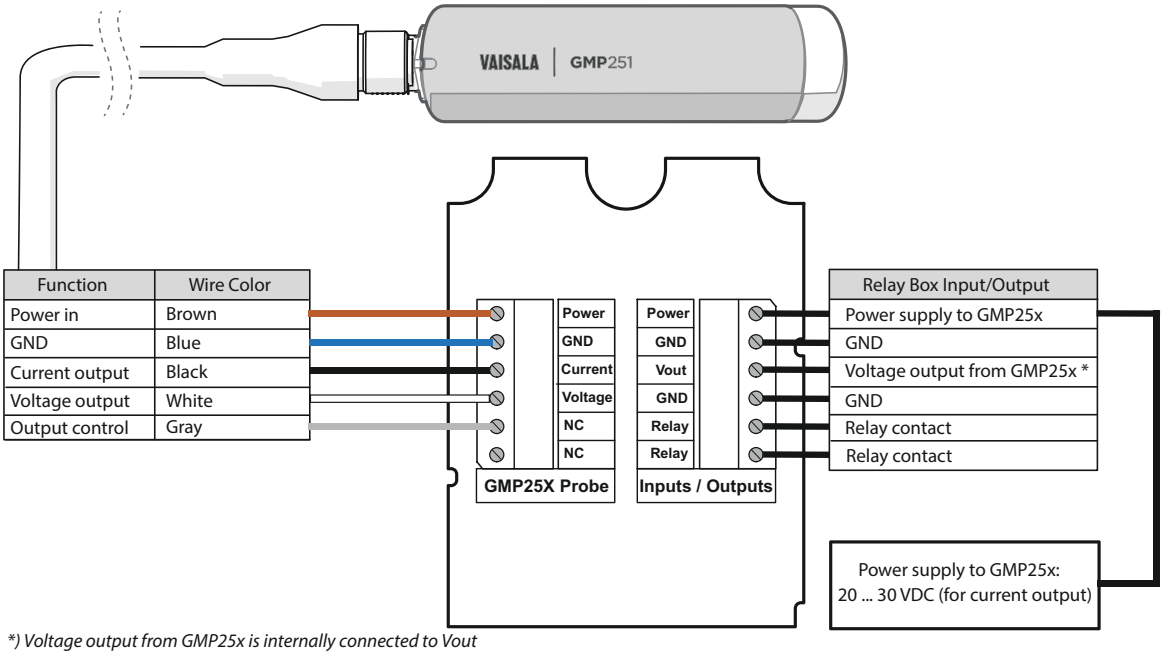
Syntax	Description
rsel [channel parameter release_ppm set_ppm release_value set_value startup_value error_value]<cr>	Configure relay operation of the channel. **channel** = Analog output channel • 1 = voltage output (V): not used with relay • **2** = current output (mA): only use this option with the relay box. **parameter** = The parameter that is output on analog channel. The only option is **CO2** (in ppm). **release_ppm** = CO_2 level at which the relay is released. **set_ppm** = CO_2 level at which the relay is activated. **release_value** = The current output (mA) when the relay is released. **set_value** = Current (mA) output when the relay is activated. Set to **12** when using the relay box with GMP251/252. **startup_value** = During probe start-up, if the CO_2 ppm level falls between the **release_ppm** and **set_ppm** values, **startup_value** shows the state of the relay (mA): the relay is either activated, released, or in error state. **error_value** = The current (mA) that is output when the probe is in an error state.

Table 5 Rsel Command for GMP250 Software Version 1.2.9

Syntax	Description
rsel [channel]<cr>	Show current relay settings. **channel** = Analog output channel
rsel [channel parameter release_ppm set_ppm set_value error_value]<cr>	Configure relay operation of the channel. **channel** = Analog output channel • 1 = voltage output (V): not used with relay • **2** = current output (mA): only use this option with the relay box. **parameter** = The parameter that is output on analog channel. The only option is **CO2** (in ppm). **release_ppm** = CO_2 level at which the relay is released. **set_ppm** = CO_2 level at which the relay is activated. **set_value** = Current (mA) output when the relay is activated. Set to **12** when using the relay box with GMP251/252. **error_value** = The current (mA) that is output when the probe is in an error state.

The relay mode of GMP251 and GMP252 probes has been designed to use 12 mA as the relay control current. Use only 12 mA for the **`set_value`** configuration when using the relay box with GMP251 and GMP252.

1.4 Probe and Relay Box Wiring



*) Voltage output from GMP25x is internally connected to Vout

Figure 1 Probe and Relay Box Wiring

1. Open the relay box screws and remove the cover.
2. Lead the GMP251/252 probe connection cable with open wires (223263SP/244669SP/216546SP) through the left cable gland and connect the open wires to the screw terminals as shown in Figure 1 (page 10).
3. Lead the relay box input/output cable through the right cable gland and connect the wiring as shown in Figure 1 (page 10).

CAUTION! Do not switch on the power supply before you have completed the wiring and reattached the relay box cover.

4. After the wiring is complete, reattach the relay box cover and switch on the 20 ... 30 VDC power supply.

1.5 Relay Box Dimensions

The relay box dimensions are given in millimeters (mm).

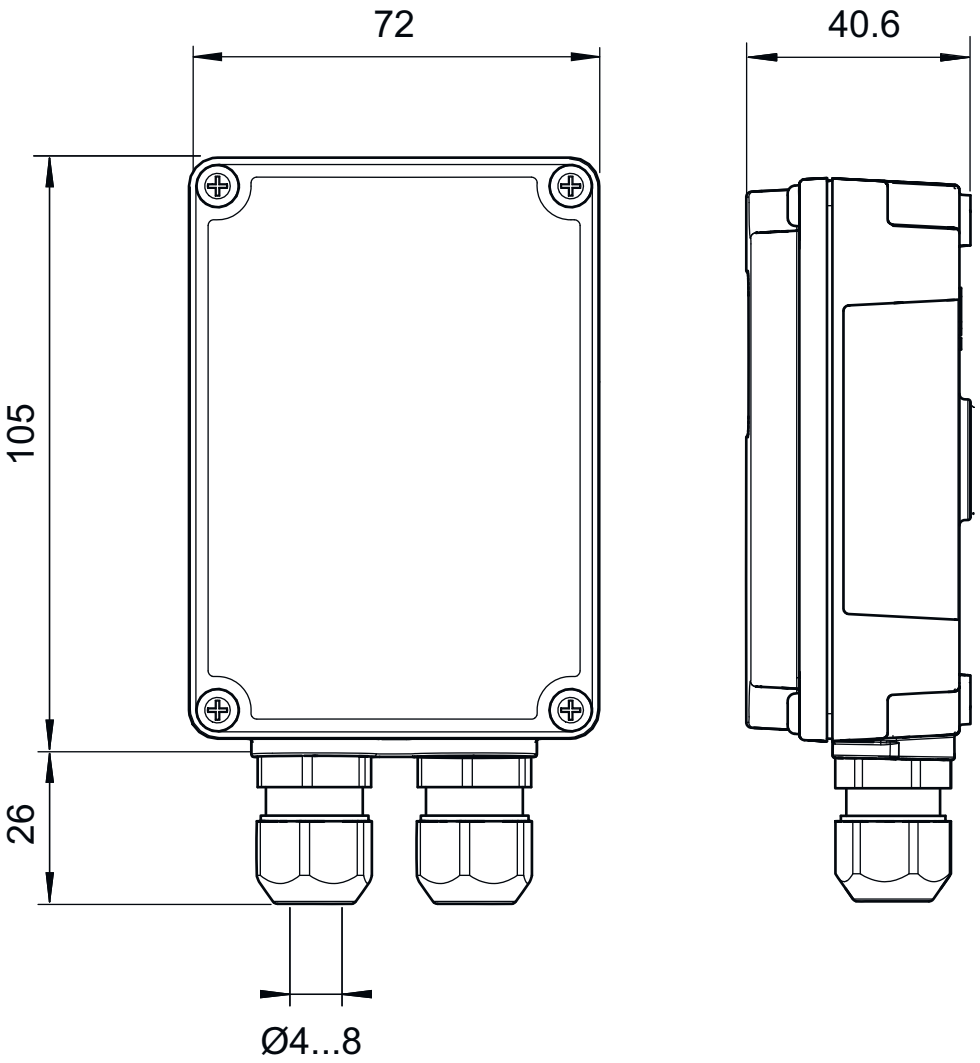


Figure 2 GMP250 Relay Box Dimensions

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