CLA-VAL **MD35**

Autonomous Modulation Electronic Controller

User Manual

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1 INTRODUCTION

1.1 PRECAUTIONS BEFORE STARTING

⚠ Installation and electrical connection should be carried out in accordance with local regulations and only by qualified technicians!

⚠ The protection level is guaranteed only if product has been installed by technicians instructed by CLA-VAL personnel and thereafter correctly maintained. During installation and maintenance, the inside of product must remain completely dry. Humidity may drastically shorten the life of the battery and electronics.

1.2 BATTERY

⚠ Do not connect or disconnect the battery of the product in hazardous locations such as a damp room.

⚠ 35 Series products are designed to operate only with the original CLA-VAL battery supplied by CLA-VAL, using any other battery, even with the same technical characteristics, may prevent the product from operating correctly and is not permitted.

⚠ Using batteries other than those supplied by CLA-VAL may lead to a risk of explosion and void the product warranty.

The battery provided with the product is not rechargeable and must be disposed properly at end of life.

1.3 GENERAL DISCLAIMER

In accordance with our policy of continuous development and improvement, CLA-VAL reserves the right to modify or improve these products at any time without prior notice. CLA-VAL assumes no liability or responsibility for any errors or omissions in the content of this document.

1.4 ENVIRONMENTAL PROTECTION

The product is delivered with batteries marked with this symbol .

Help to preserve and protect the environment. Recycle used batteries and accessories; this means that according to local laws and regulations, they should be disposed of separately from household waste.

1.5 TYPOGRAPHY

Throughout this manual, the following typographical conventions and symbols have been adopted to help readability:

a. "**Bold**": Menu, command, tab and button

b. ***BOLD ITALIC***: Important information

c. (**1**) or (**A**): Circled numbers and letters in the text refer to the parts described in Figure 1 and 2 respectively (example: Figure 1 - page 5)

d. **Note:** Indicates useful information and advice

e. ⚠**: Indicates safety advice that must be strictly followed**

1.6 ACRONYMS

LED: Light Emitting Diode

NCR: Notification Claim Return

SMS: Short Messages Service

GPRS: General Packet Radio Service

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2 MD35 CHARACTERISTICS

(1) Body
(2) Head (main board + front panel)
(3) Antenna (optional)

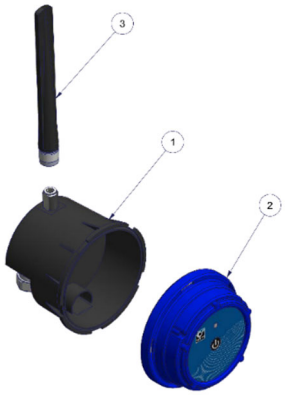

Figure 1 MD35 parts

(A) SIM Card connector
(B) SD Card connector
(C) Battery connector
(D) Micro USB Connector
(E) Tag connect (8 pin)
(F) Memory battery coin holder coin

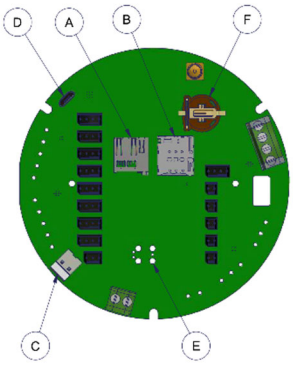

Figure 2 MD35 interfaces

3 WIRING CHARACTERISTICS

Refer to the *MD3500* wiring diagram for connection details.

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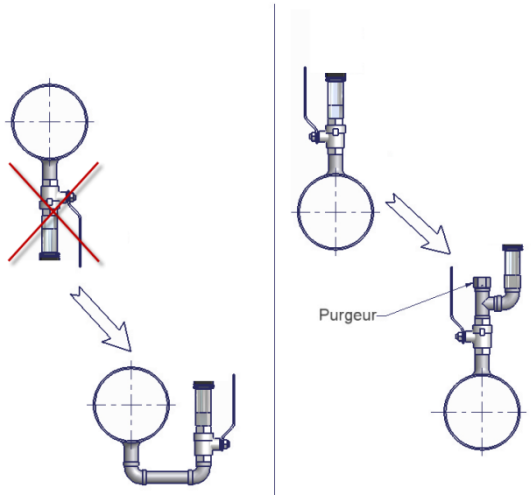
4 SENSOR MOUNTING

4.1 PRESSURE SENSORS

The pressure sensors can be mounted either vertically or horizontally.



4.2 METER WITH PULSE EMITTER

Any pulse emitter may be connected to the MD35 counter input if its electrical system has either a "Normally Open" or "Normally Closed" contact. For setting up the pulse emitter, refer to the meter manufacturer's instructions and the MD35 instructions located in the *MD3500* wiring diagram.

Note:

- Always connect meter last to avoid arbitrary pulse counts.
- In any case you can reset the counter in the user interface.

5 MD35 MOUNTING

When mounting a MD35 with sensors other than those provided by CLA-VAL, be careful not to damage or deform the housing in any way (warranty will become void).

5.1 CELLULAR NETWORK QUALITY

Check the cellular network quality at the installation location prior to installing the product.

Network strength indication from a cell phone gives initial information about signal reception quality on a site. For more accurate information, use the MD35 configuration mode to get the exact reception quality of the product. Refer to chapter 9.14 "Checking the quality of the network" for more details.

The MD35 configuration mode will indicate (amongst other things), the network reception quality as seen by the MD35 in dBm units. Installation is not recommended for signal quality under -95 dBm. As the cellular network quality may fluctuate strongly across the site, it is recommended to test at different locations.

If network quality at the installed location is not sufficient, it may be necessary to relocate the MD35 or extend its antenna with adequate CLA-VAL extension cables.

The minimum signal strength is - 80 dBm for optimum data communication at the valve level.

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5.1.1 NETWORK QUALITY BETWEEN -80 dBm and -95 dBm

If the signal quality at the valve level is between -80 dBm and -95 dBm, check if the MD35 can be installed closer to the well opening, while maintaining a maximum distance of 3 m to the pressure sensors. If this is not possible, an antenna extension with optional CLA-VAL antenna extension cables might be necessary.

5.1.2 NETWORK QUALITY LESS THAN -95 dBm

If the signal quality at the valve level is lower than -95 dBm, it is required to deport the antenna outside of the well.

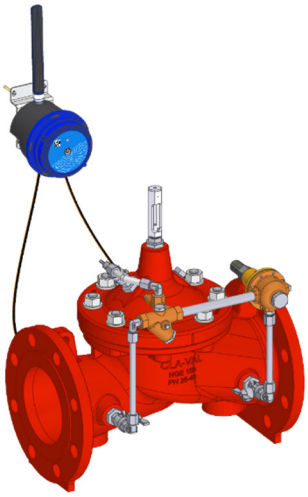
Please contact CLA-VAL for more information.

5.2 ORIENTATION IN SPACE

MD35 should be mounted in an upright position (antenna side up, cable gland down) to guarantee good cellular connectivity.

MD35 may have difficulties transmitting when submerged (e.g. in a manhole after rainfall). To guarantee reliable transmission it is recommended to install it as high as possible in the well.

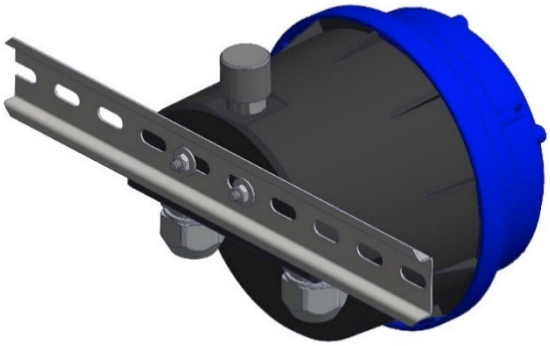
5.3 WALL MOUNTED INSTALLATION



MD35 can be fixed on walls using the wall mounted bracket.

Drill the holes at the correct distance (72 mm) or use the lower housing as a drilling gauge.

5.3.1 DIN RACK MOUNTED INSTALLATION



An alternative optional bracket is available for electrical box installation.

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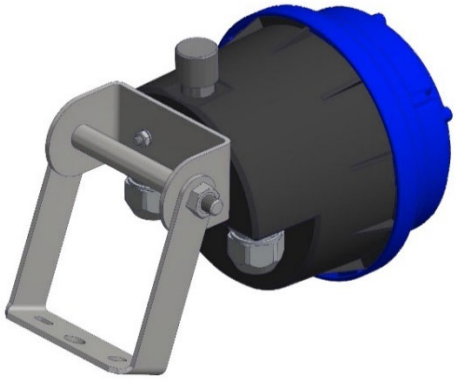
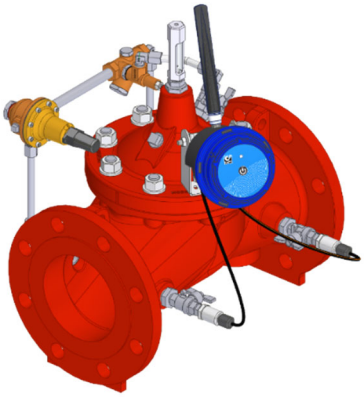
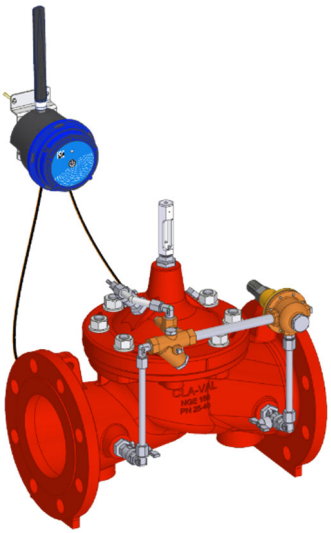
5.3.2 ORIENTABLE BRACKET INSTALLATION



An optional orientable wall-mounted or valve bracket for MD35 is also available.



5.3.3 STRANDARD INSTALLATION



The standard installation of the MD35 on the wall should be, as close as possible to the well opening, but not further than 3 m from the pressure sensor(s) connection(s) on the valve.

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6 CONNECTION

6.1 PULSE COUNTER

Note:

Refer to the meter manufacturer's product information for complete information about functionality and connectivity.

The counter contact ("Normally Open" or "Normally Closed") must be connected between Tx/Cnt and GND (refer to *MD3500* wiring diagram).

7 SIM CARD

7.1 PREPARING THE SIM CARD

A 3FF/Micro-SIM format is necessary for data communication compatible with LTE cat-M1, NB-IoT, or GPRS. CLA-VAL can optionally provide a SIM card. If another SIM card than the one supplied by CLA-VAL is used refer to chapter 9.13 "Custom SIM Card" for configuration.

7.2 INSERTING THE SIM CARD

Insert the SIM card with the golden contacts facing downwards into the card holder. Refer to Figure 2 - Chapter 2 «MD35 Characteristics» and the symbol printed on the MD35 for correct SIM card orientation. The SIM card must be completely inserted into the card holder. If the card is overlapping the card holder after insertion, remove it and check the card's orientation.

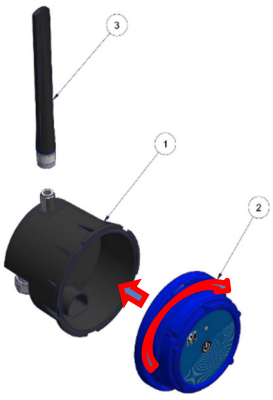
Avoid touching the metal contacts to prevent grease buildup. If touched, clean them with a dry cloth or a cotton swab lightly moistened with isopropyl alcohol, then allow to dry before insertion.

8 STARTING OPERATION

8.1 MD35 ASSEMBLY

If the product has been opened before closing, ensure the inside of the housing and seal are clean and dry. The presence of dust or humidity when installing may damage the product.

1. Connect the antenna (**3**) to the product (if present) (**1**).
2. Insert the SIM card in the base (if present) (**B**).
3. Connect the external battery connector.
4. Close the body (**1**) by rotating the head (**2**), see Figure 3 below. **Do not force closure!** If the two parts of the housing cannot be fit together properly, make sure there is no pinched cable or dust.



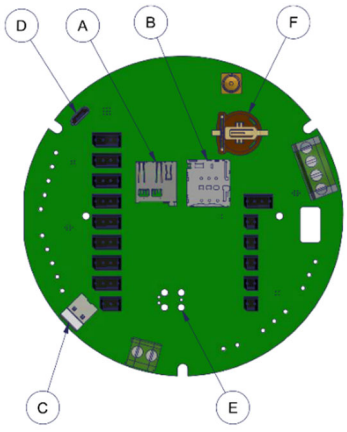


Figure 3 Body (1) and head (2) assembly

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8.2 OPERATING MODE

The MD35 has 3 modes of operation:

- "**Standby**" mode
- "**Acquisition**" mode
- "**Configuration**" mode

In "**Standby**" mode you can remove the SIM card or SD card, as well as connect or disconnect physical inputs.

The "**Acquisition**" mode is the operating mode of the MD35. In this mode, the device acquires the signals from the connected sensors and saves them to the internal memory. If the data communication option is enabled, the recorded data is sent across the cellular network at the set interval time.

The "**Configuration**" mode is used to activate the WiFi local network generated by the device, to configure the MD35.

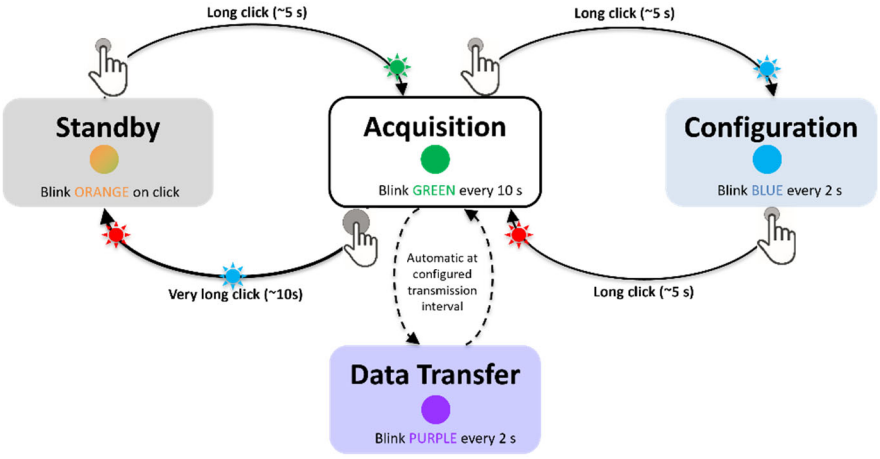

Figure 4 Logical diagram of switching from one mode of operation to another

8.3 ACTIVATING MD35

Once the following actions are performed

- ☐ Connected the battery & installed the sensor.
- ☐ Inserted the SIM card (if not using the default CLA-VAL SIM card).
- ☐ Closed the housing.

Switch to "**Acquisition**" mode on your MD35 as indicated in Figure 4 (from "**Standby**" mode, press the button for 5 seconds).

8.4 INSTALLATION VALIDATION

The simplest and fastest way to verify the successful start of the product is to use the MD35 LED. The LED flashes green every 10 seconds when in "**Acquisition**" mode.

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9 TOOL & CONFIGURATION

9.1 INSTALLATION CHECKUP

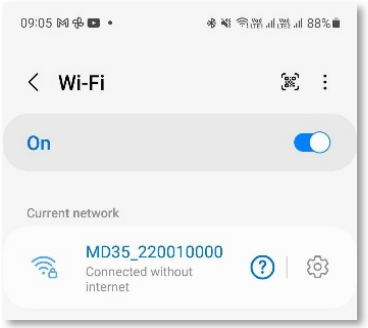
The MD35's user interface provides complete product parameters information such as sensor readings and cellular reception quality:

1. Activate "**Configuration**" mode on your MD35 as indicated in the previous section (from "**Acquisition**" mode, press the button for 5 seconds).
2. Connect your smartphone, tablet, or computer to the WiFi network generated by the MD35.

   The network has the **default name**: *MD35-< serial number>*

   The default **password** is: *MD35_< last 4 digits of the series serial number >*

   We strongly recommend changing the default password at first installation.



Note: The network generated by the MD35 has no Internet access. Any error messages about this can be ignored.

3. Enter the address http://192.168.4.1 in your usual internet browser, or scan the following QR code using a QR code reading application:

4. After a few seconds, the configuration interface of your MD35 will be displayed on the default browser.
5. The home page displays the measured values in real time. It also contains the web browsing menu as well as other useful information of your MD35.

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9.2 NAVIGATION MENUS

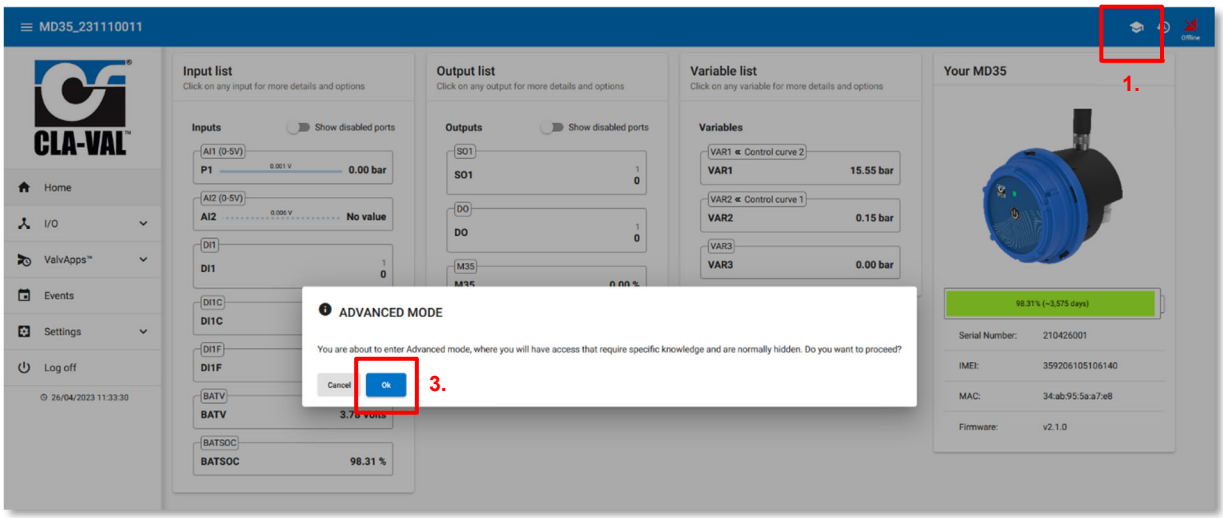
The user interface has dropdown menus to facilitate the readability of the interface.
To access sub-menus, click on the icon ⌄ to the right of the menu if available.
Menu without icon ⌄ don't have sub-menus.
When you click on the icon ⌄, the other menus close.
To hide sub-menus, click on the icon ⌃ to the right of the menu if available.

9.3 SIMPLIFIED / ADVANCED MODE

The advanced mode allows accessing configuration parameters requiring specific knowledge.

⚠ **Do not access the advanced mode without prior training or assistance from CLA-VAL personnel.**

1. To access the "**ADVANCED MODE**", click on the icon 🎓 at the top right of the interface.



2. A pop-up will open to confirm your choice.
3. Click on the "**OK**" button. You now have access to the advanced settings.
4. Click the icon 🎓 again to exit the advanced mode.

At the end of your session, the advanced mode will automatically be deactivated.

Note: Some parameters require switching to "**ADVANCED MODE**". These settings are indicated in the manual by the following icon: 🎓.

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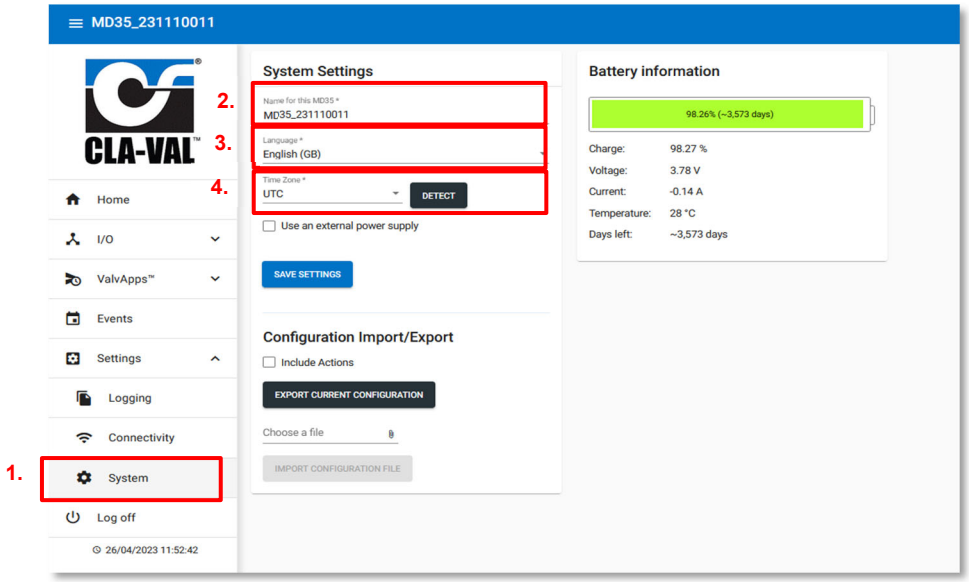
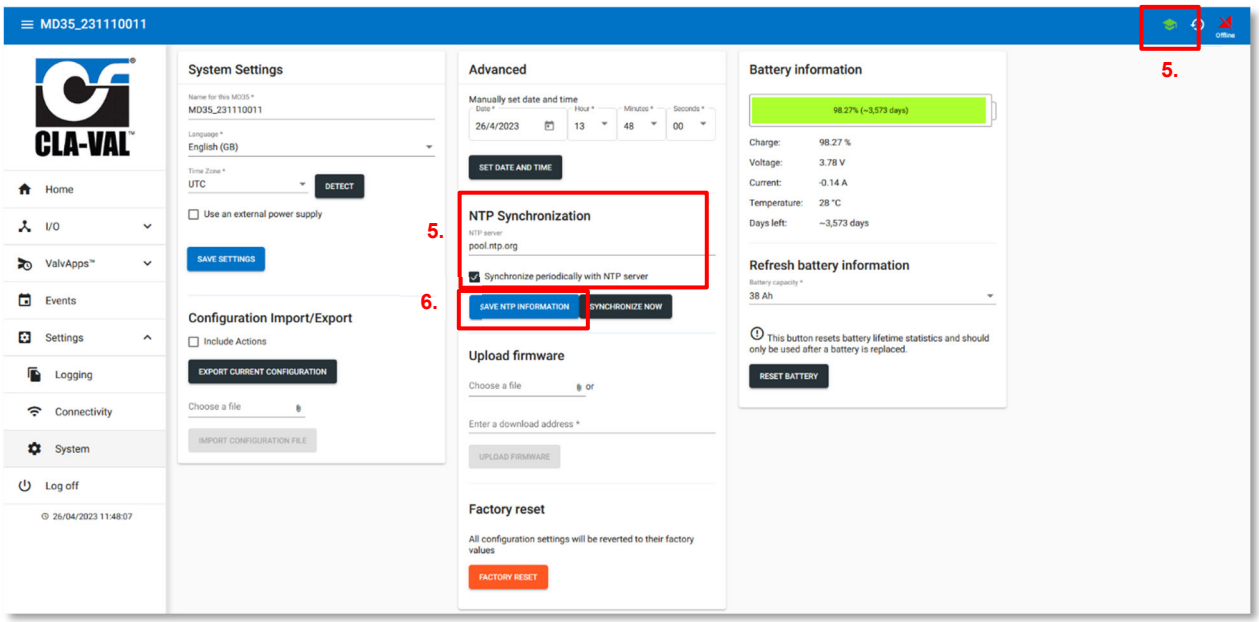
9.4 BASIC SYSTEM SETTINGS

1. Click on the "**System**" menu.
2. Give your MD35 a name.
3. Select the language of the interface.
4. Select your time zone using the "**DETECT**" button. If the time zone is not detected automatically, you can choose it manually with the "**Time Zone**" drop-down menu.



5. Optional: Set the automatic synchronization of the unit's internal clock.
   a. Choose a time synchronization server (NTP server). The address pool.ntp.org, corresponding to a publicly accessible server, can be used if you do not know an alternative.
   b. Periodic synchronization is recommended.

   This operation can only be performed if the MD35 is connected to the cellular network (option). If not, go directly to step 8.
6. Click on "**SAVE NTP INFORMATION**" to apply the changes.



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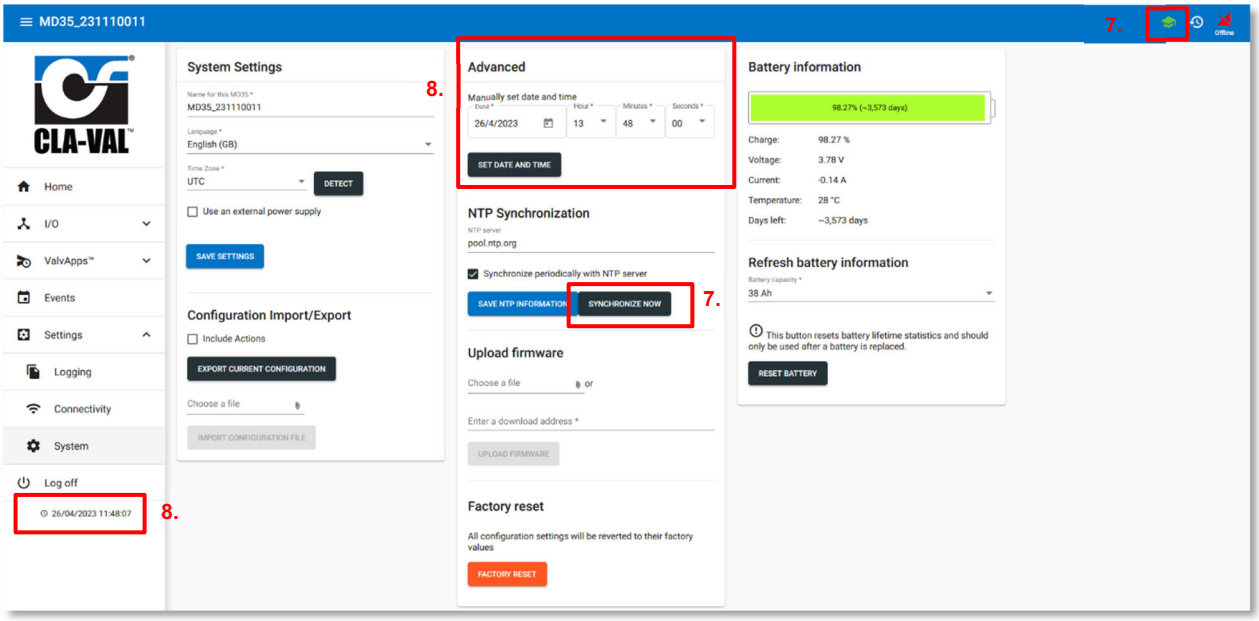
7. Click on "**SYNCHRONIZE NOW**" to update your unit's clock immediately.

⚠ This operation can only be performed if the MD35 is connected to the cellular network (option). If not, go directly to step 8.

8. Check that the time displayed on the clock under the navigation menu is correct. If not, you can manually set the time in "**Manually set date and time**". Click on "**SET DATE AND TIME**" to have the change applied.

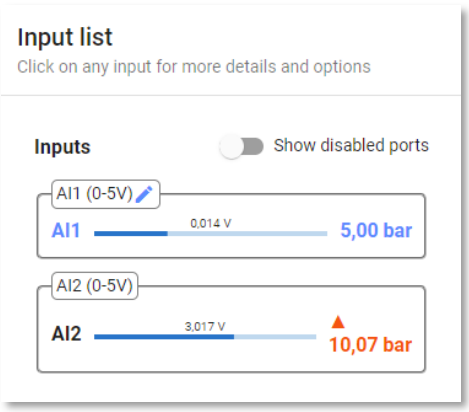


9.5 INPUT/OUTPUT: COLOR CODING

A color code is used to indicate whether an input has reached its alert threshold or if the input or output has been forced to a predefined value by the user.

When an input reaches its alert threshold, its value appears in red.

When the input or output is forced, the value appears in dark blue.



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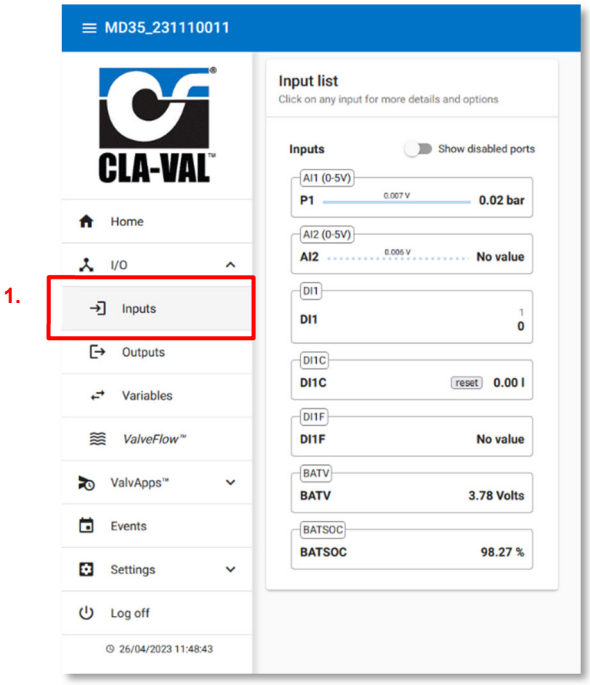
9.6 ANALOGUE INPUT SETTINGS

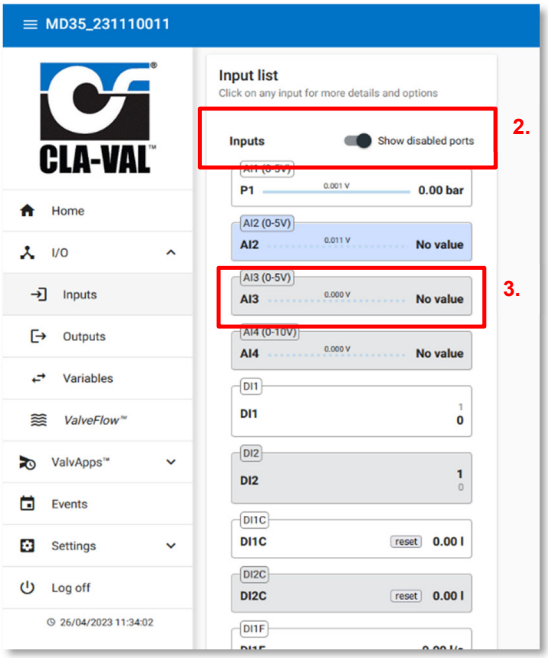
9.6.1 CONFIGURATION

The inputs identified by ***AI1***, ***AI2***, ***AI3*** and ***AI4*** are analogue inputs.

1. Click on "**Inputs**" to display the input configuration page.



2. To activate an input that is not displayed on the list, select "**Show disabled ports**". The list will show disabled inputs with a *gray* background.
3. Click on an input to reach its configuration page.



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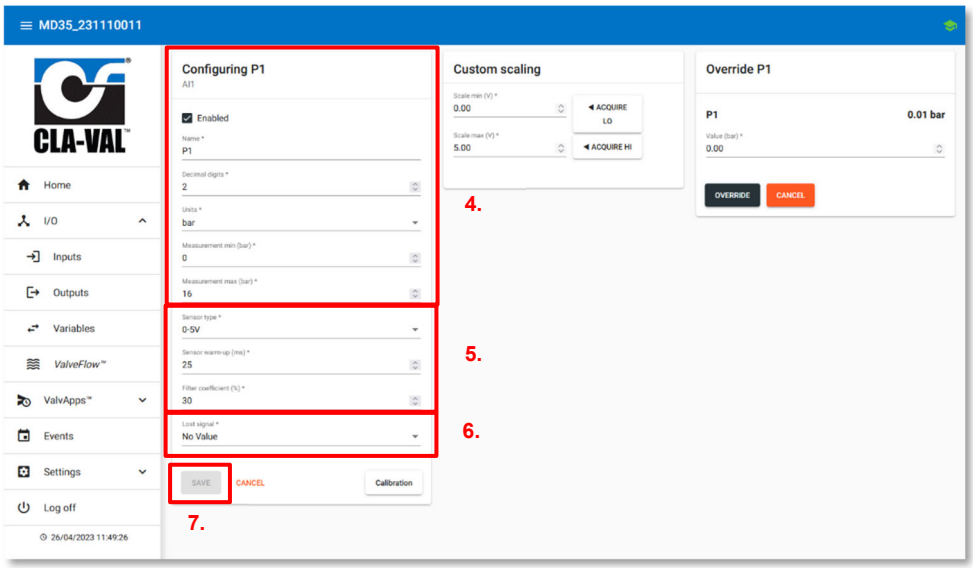
4. On the configuration page of the desired input, you have the possibility to change the name, and then configure the basic settings of the connected sensor.
5. , additional sensor settings are available in "**advanced mode**".
6. , "**Lost Signal**" drop-down menu allows configuring an action when the sensor signal is lost. For example, when the ratiometric sensor voltage is less than 0.5 V.

   You have the choice between:

   a. No Value
   b. A default Value
   c. The last Value
7. When done, click "**SAVE**" to apply your changes.

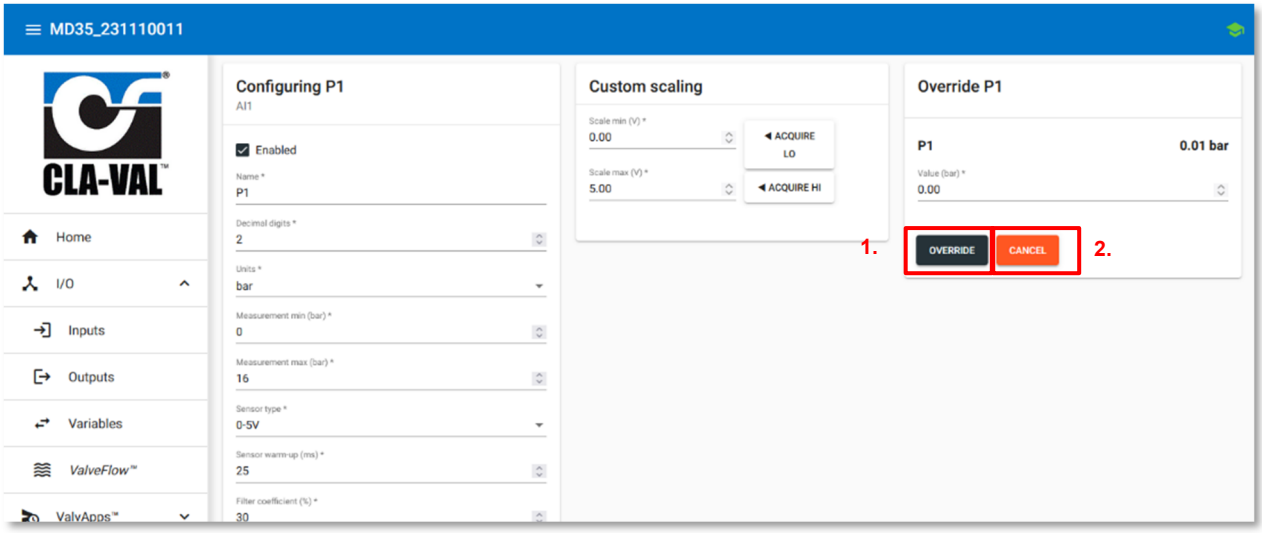


9.6.2 INPUT TEST

To test the proper functioning of an input, you can override its value:

1. After defining a desired value, click on "**OVERRIDE**", the forced value takes priority over the output.
2. To cancel the input override, click on "**CANCEL**".

When you exit the "**Configuration**" mode, all overridden inputs are automatically released.



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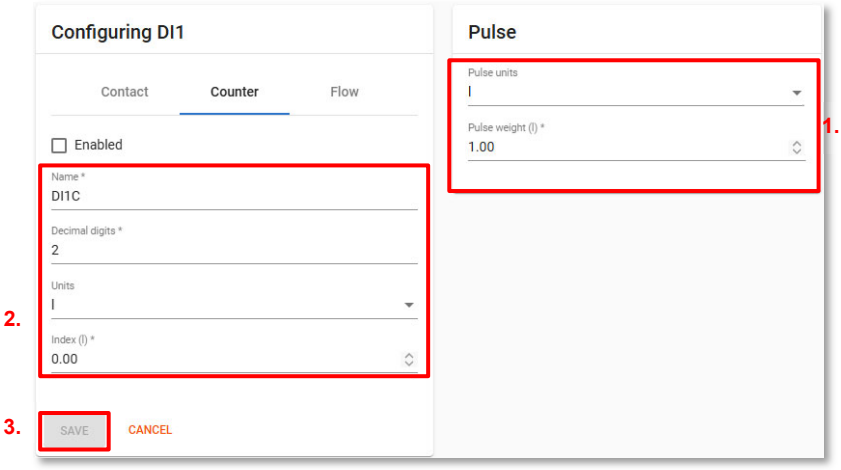
9.7 CONNECTING A FLOWMETER

Pulse meters must be connected to digital inputs (***DI1*** or ***DI2***). The configuration of these inputs ***DIx*** is broken down into two sub-inputs: DIxC, which provides volume information (C=COUNTER), and DIxF, which is flow rate information.

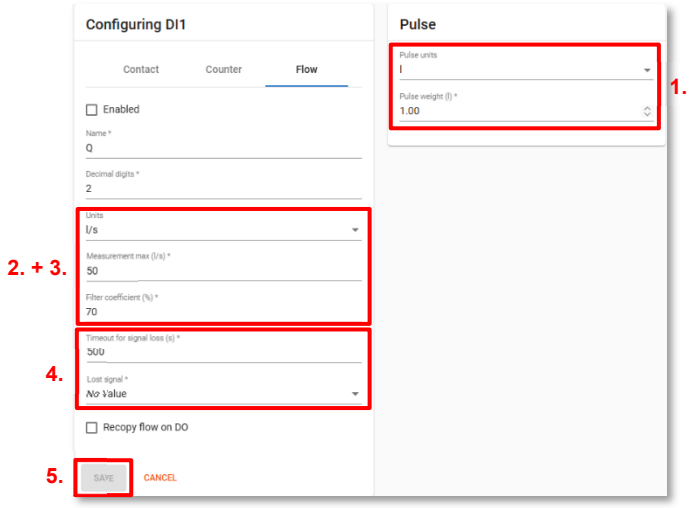
The input ***DIxC*** controls the display of the volume measurement.

1. Select the "**pulse weight**" for the flow meter and its units.
2. Set the initial value of the counter.
3. Click "**SAVE**" to apply the changes.



The input ***DIxF*** controls the flow rate display.

1. Choose the pulse weight and its units. These options must match the connected flowmeter.
2. Choose the units in which the flow rate is displayed.
3. Set the maximum measurement value of the input.
4.
   - You can set the timeout before signal loss.
   - The "**Signal Lost**" dropdown menu allows you to configure an action when the sensor signal is lost. For example, when the voltage of the ratiometric sensor is less than 0.5 V. You have the choice to apply:
     a. No value
     b. A default value.
     c. The last value.
5. Click "**SAVE**" to apply changes.



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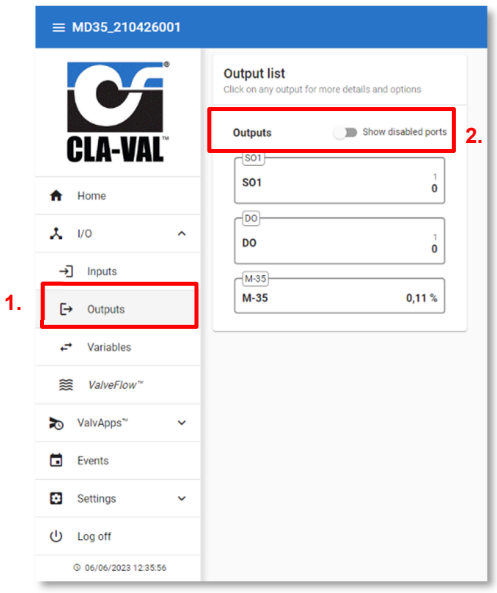
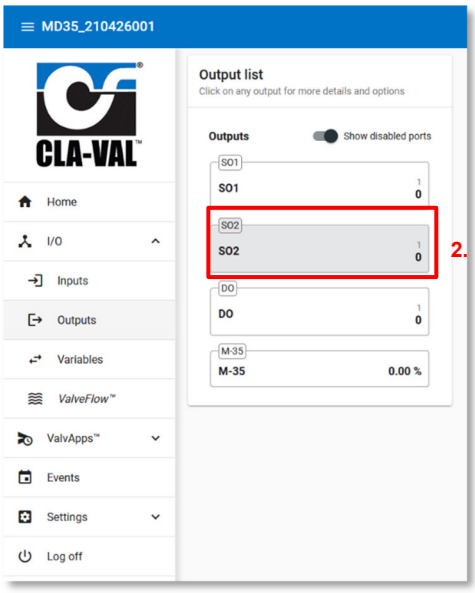
9.8 SETTING THE PARAMETERS OF A SOLENOID

The outputs identified by ***SO1*** and **SO2** are solenoid outputs.

1. Click on the "**Outputs**" menu to display the output configuration page.
2. To activate an output that is not displayed in the list, click on "**Show disabled ports**". The list will show the deactivated outputs with a *grey* background.





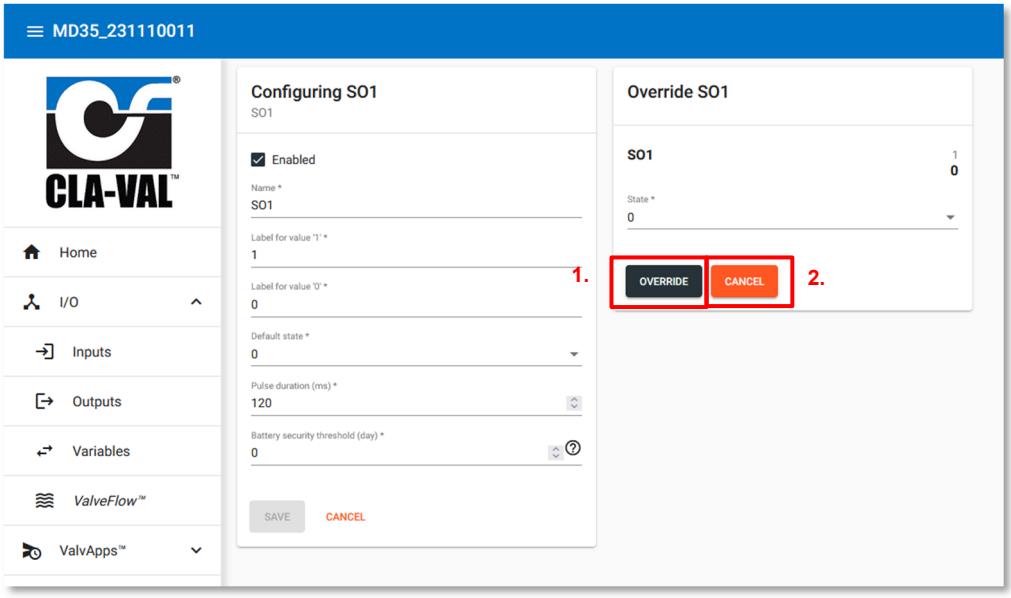
3. Click on an output to access its configuration page.
4. On the configuration page of the desired output, you have the possibility to change the name, the activation label, the deactivation label, and the default value.

9.8.1 OUTPUT TEST

To test the correct usage of a solenoid, you can force its state:

1. After selecting the desired state, click on "**OVERRIDE**", the forced state has priority over the output control.
2. To cancel the forcing of an output, click on "**CANCEL**".

When you exit the "**Configuration**" mode all outputs that have been forced are automatically released.



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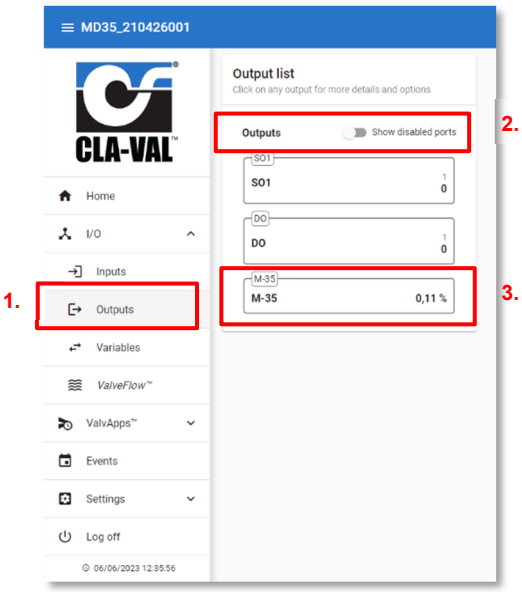
9.9 SETTING THE PARAMETERS OF A M-35

The output identified by ***M-35*** is the dedicated output for the CLA-VAL motor.

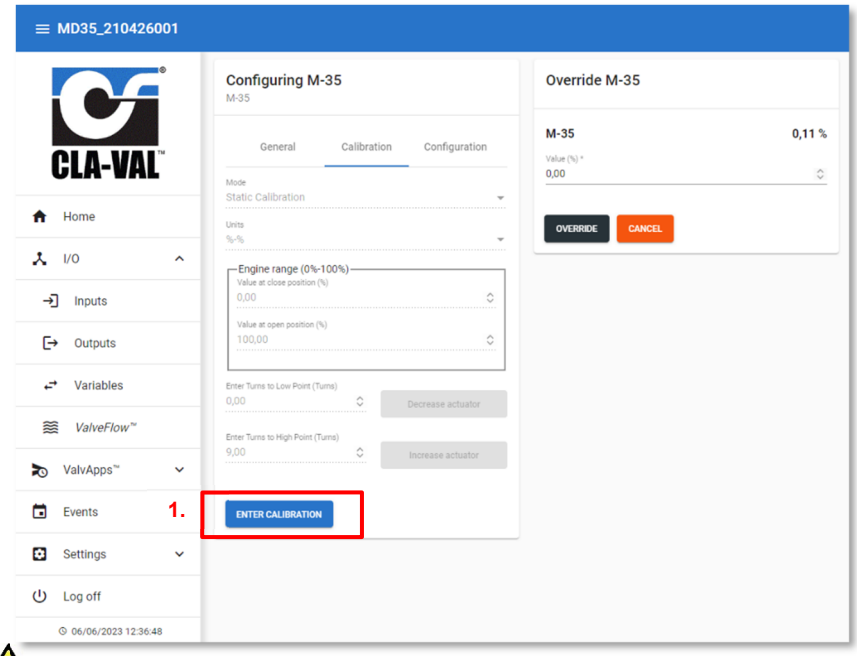
The M-35 motor is a type of electric motor used to modulate a CLA-VAL automatic control valve.

1. Click on the "**Outputs**" menu to display the output configuration page.
2. To activate an output that is not displayed on the list, click on "**Show disabled ports**". The list will display the disabled outputs with a gray background.
3. Choose M-35.



9.9.1 CALIBRATION

1. To enter calibration mode, click on the "**ENTER CALIBRATION**" button. Only available in advanced mode .



In this mode, it is no longer possible to manually adjust the motor position.

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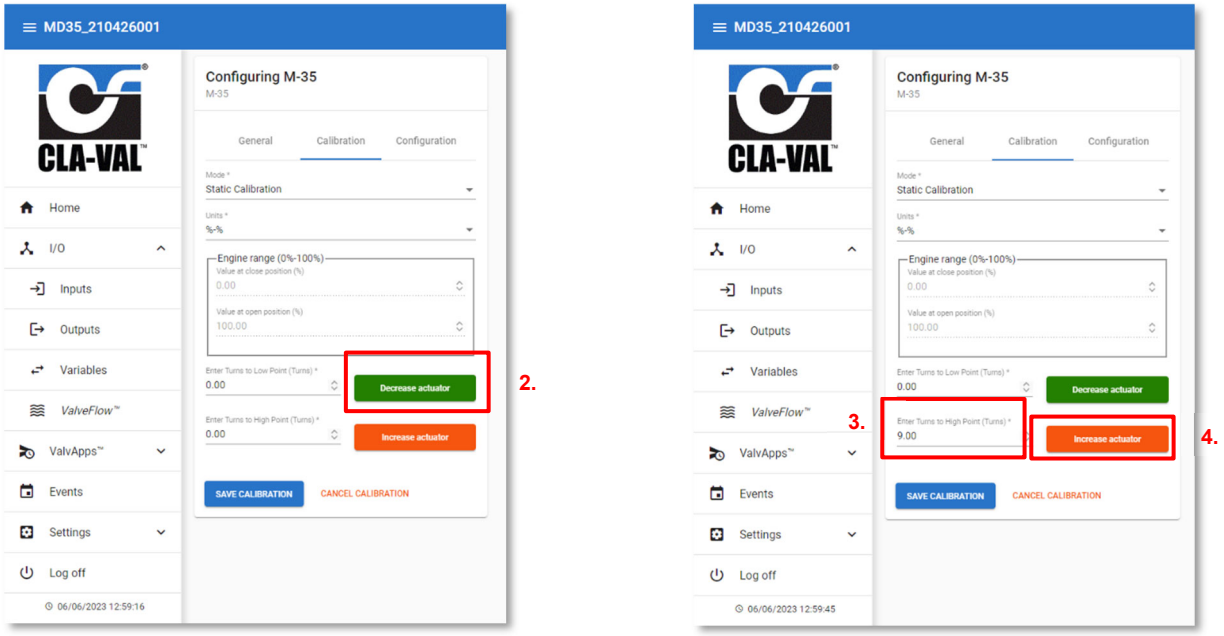
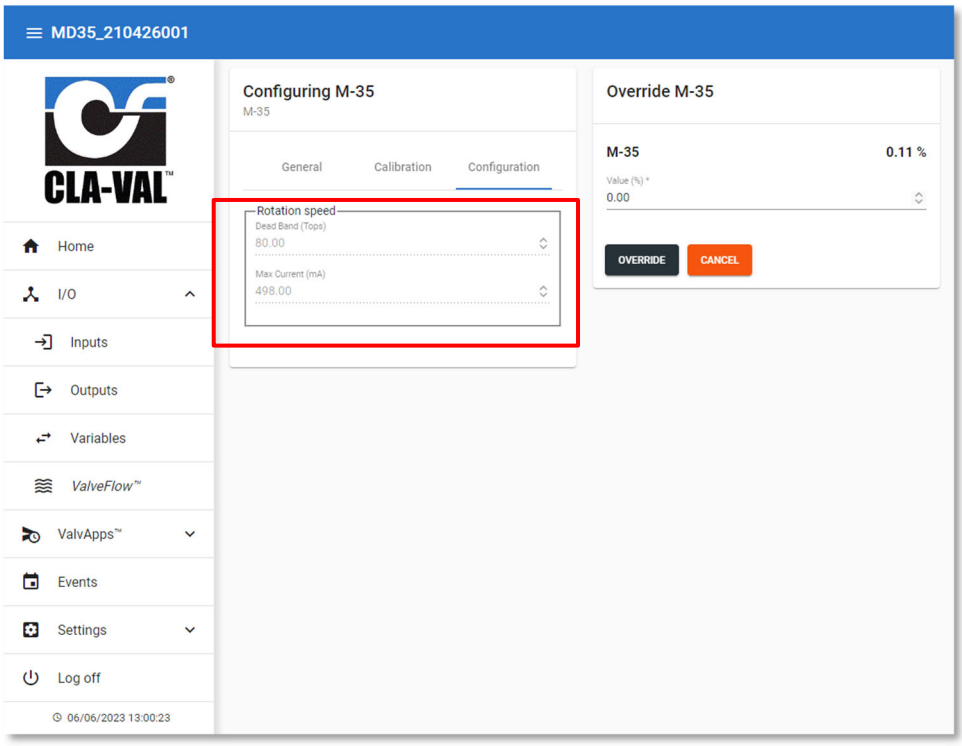
2. To fully close the pilot, click on the "**Decrease actuator**" button.
3. Once the pilot is fully closed, you can indicate the number of turns required to fully open the pilot.
4. You can also calibrate the motor directly from the open position by clicking on the "**Increase actuator**" button and wait for the pilot to fully open.



9.9.2 CONFIGURATION

The configuration page allows you accessing additional important information in read-only mode:

- The dead band of the motor in Tops.
- The maximum current in mA that the engine can consume before stopping.



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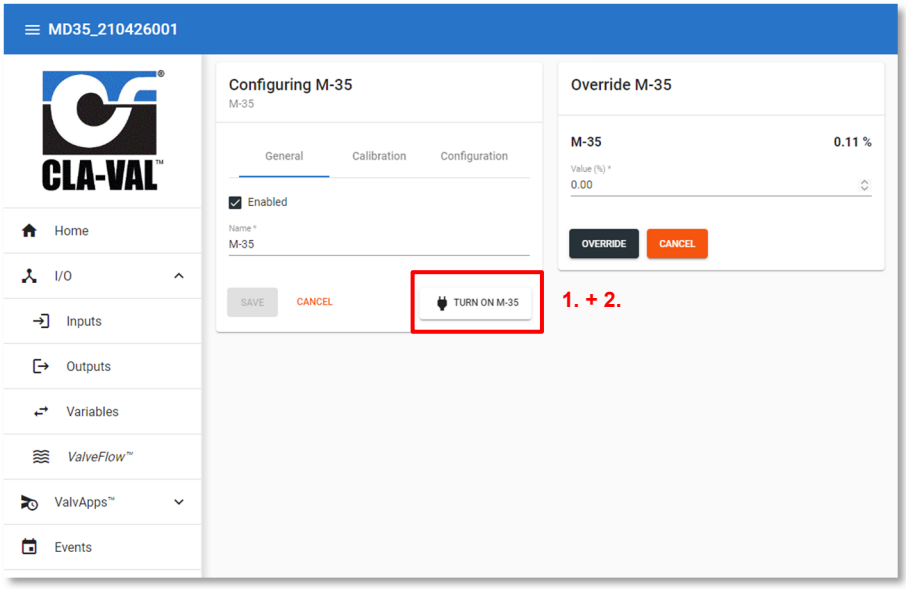
9.9.3 UPDATE M-35 FIRMWARE

To update the M-35 motor firmware, it is necessary to use the product computer software CV33. Refer to the M-35 documentation for more details on how to use the CV33 computer software.

To power the engine and connect it to the CV33 software application:

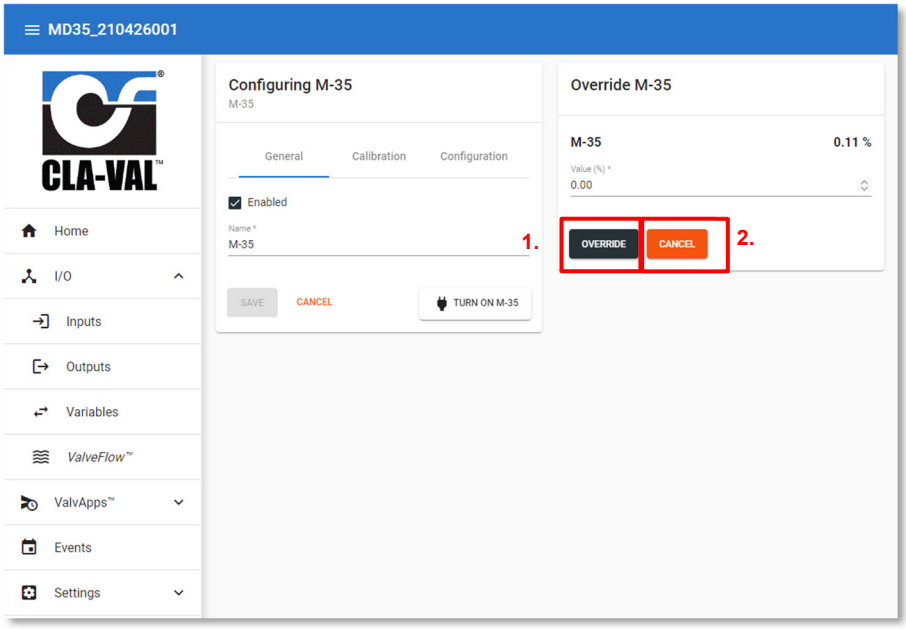
1. Click on the "**TURN ON M-35**" button. By activating this mode, you will no longer be able to access the output tests and calibration.
2. When you are done with the CV33 software modification, you can click "**TURN OFF M-35**" to stop the motor. Additionally, the motor automatically turns off when you exit the Wi-Fi mode.



9.9.4 OUTPUT TEST

To test the proper functioning of a motor M-35, you can manually force its position by following these steps:

1. Enter the desired position, then click on "**OVERRIDE**".
2. The forced position will have priority over the motor output. To cancel the override of an output, click "**CANCEL**".



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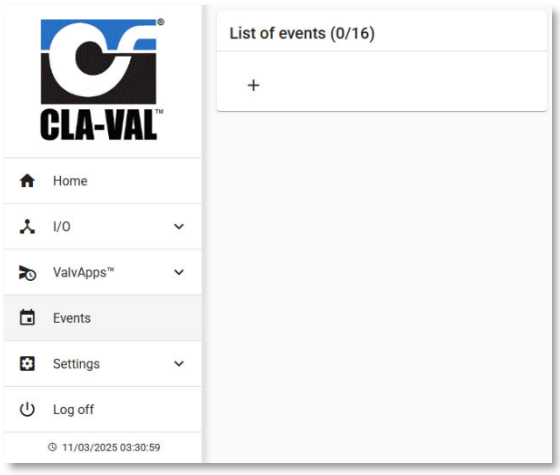
9.10 EVENT SETTING

Events allow you to trigger actions or alerts based on the status of an input (sensor, measurement, etc.). You can create up to 16 independent events.

To access the events menu:

- In the configuration interface, click on the "Events" menu.
- A list of events (initially empty) appears.

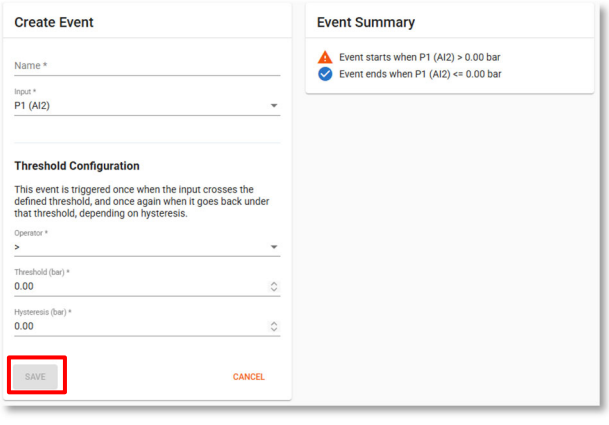


To create a new event:

- Click on the add icon.
- Enter a name for your event (for example, "High Pressure Alert").
- Select the input on which you want to base the event.

Depending on the chosen input, you can configure three types of events:

- Threshold event
  - Required parameters: a threshold and a hysteresis (return-to-normal or dead zone value).
  - Triggers an alert if the value goes above (or below) a defined threshold.
- Counter event
  - Required parameter: a setpoint describing the range of values that trigger successive alerts.
- State change event
  - No additional parameters: the event is triggered as soon as there is a change in the input's status (on/off, open/closed, etc.).
- When all parameters are filled in, click on "**SAVE**".



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To modify an existing event:

- In the list of events, click on the event you want to modify.
- Update the necessary fields (type, threshold, setpoint, etc.).
- Click on "**SAVE**" to confirm your changes.

Event and alert status:

- Threshold events use a color code:
  - Green: event enabled
  - Red: event disabled

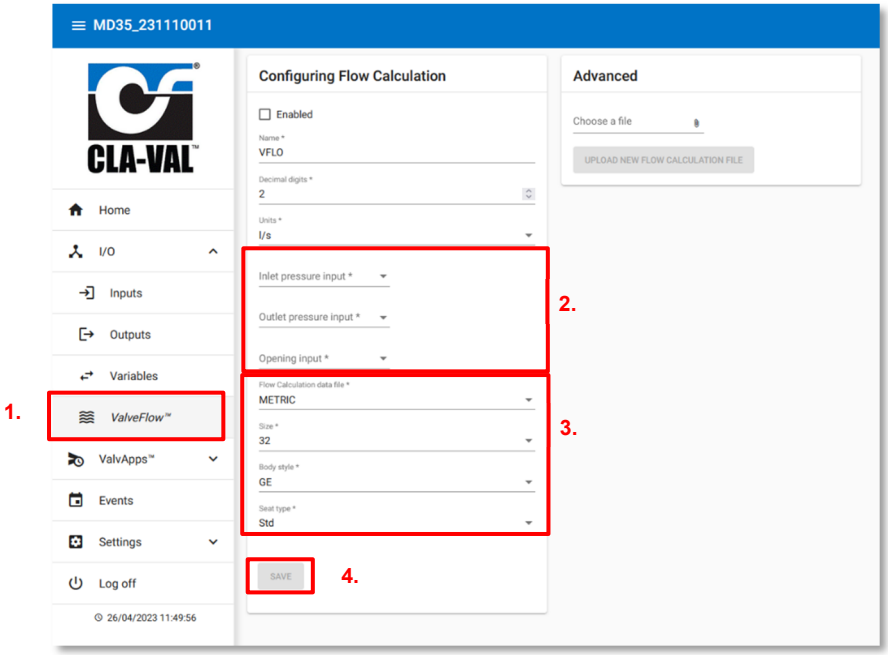
If an event is triggered (while the device is being configured), a small bell icon appears next to its name. It disappears when the event is acknowledged (at the next Wi-Fi disconnection).

Outside of configuration mode, when the bell appears, the information is automatically sent via the configured transfer methods.

9.11 VALVEFLOW™ SETTING (OPTION)

The *ValveFlow™* allows calculating the flow through a CLA-VAL valve, thanks to inlet pressure, outlet pressure, and valve opening.

1. Configure the ValveFlow by clicking on "***ValveFlow™***".
2. Select the inputs corresponding to the inlet/outlet pressure, as well as the opening.
3. Select the type of valve installed.
4. Click "**SAVE**" to apply the changes.



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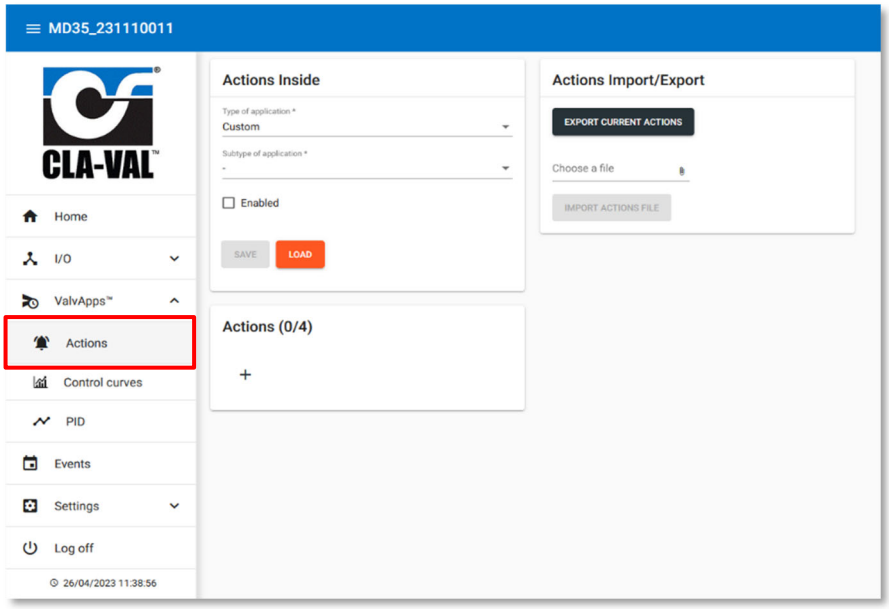
9.12 VALVAPPS™

9.12.1 ACTIONS

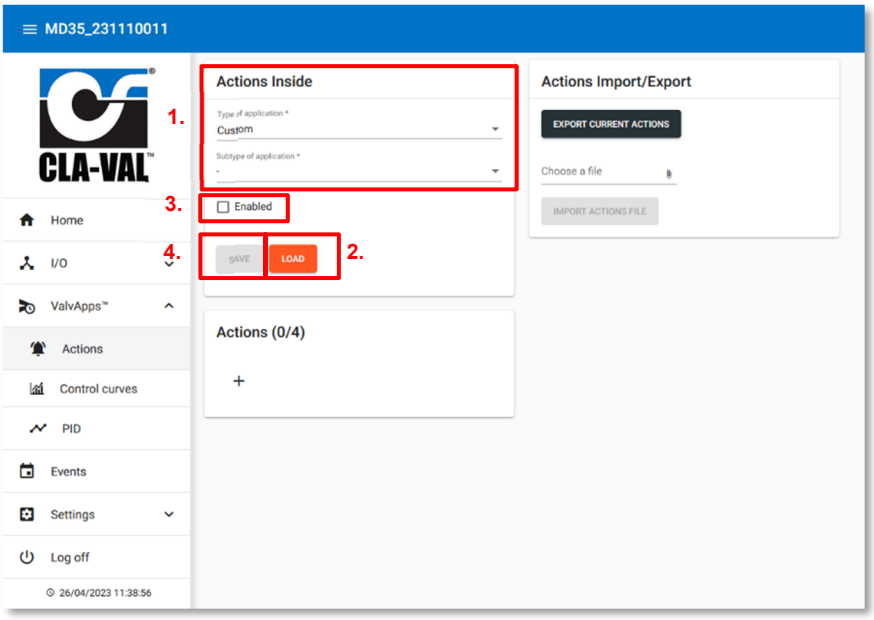
"Action" allows you to activate or deactivate a solenoid valve according to its configuration and conditions. You can create up to 4 actions.



9.12.1.1 Actions Inside

"**Actions Inside**" provides a catalogue of predefined hydraulic applications.

1. Select the "**Type of application***" and the "**Subtype of application***" according to your application needs.
2. Once selected, click on "**LOAD**". Now you can customize the predefined settings.
3. To activate the operation of the Actions, select the "**Enabled**" box.
4. Click on "**SAVE**".



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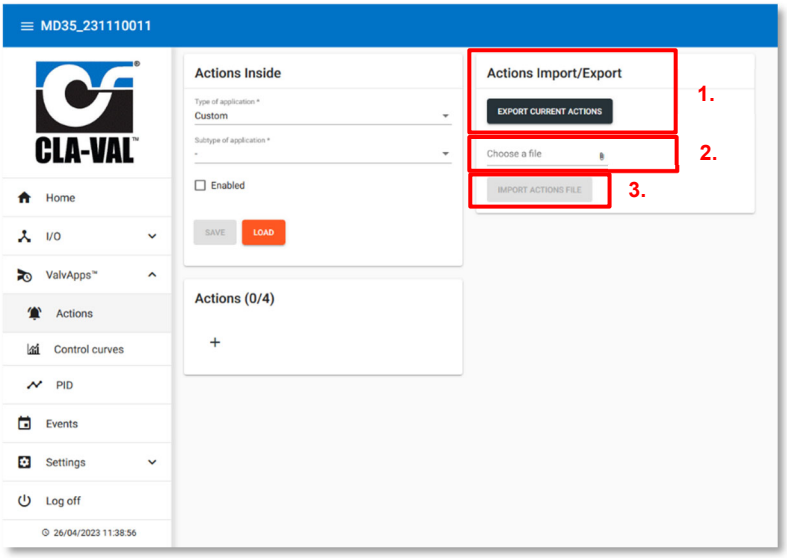
9.12.1.2 Import/Export

Exportation/Importation allows you to export the list of actions that you have configured, as well as the different inputs/outputs impacted by these actions.

1. To export actions, click on "**EXPORT CURENT ACTIONS**".

Importation allows you to load the actions that you previously exported.

2. Select the JSON file (.json) on your computer or mobile device.
3. Click on "**IMPORT ACTIONS FILE**".



9.12.1.3 Action Configuration

- **Name:** The action name.
- **Output:** The solenoid output which is controlled by this action.
- **Activation state:** The state of the solenoid when the action is active.
- **Activation delay [s]:** The activation delay allows adding a delay before the action is activated when these different conditions are met. Only available in advanced mode .
- **Deactivation delay [s]:** The deactivation delay allows adding a delay before the action is deactivated even if its conditions are no longer met. Only available in advanced mode .
- **Max. duration of an activation [s]:** The maximum time during which the action can be active, if it exceeds this time the solenoid valve will deactivate and can reactivate only when the action deactivates and reactivates again. A value of 0 disables this option. Only available in advanced mode .
- **Priority (1 : High):** When several actions control the same output, the priority defines which action will have control over the output. The action with the value closest to 1 has priority, in case of a tie the order of the actions prevails.

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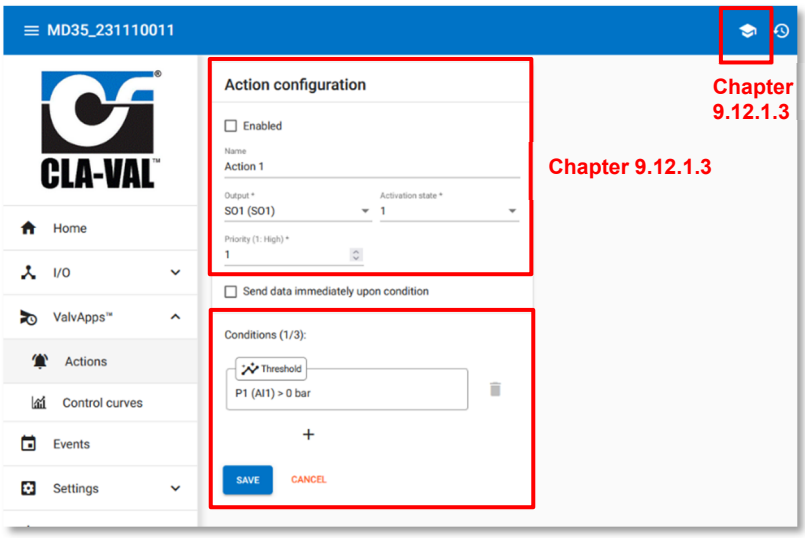
9.12.1.4 Conditions

Conditions determine when an action is active or inactive. You can set up to a maximum of three conditions per action.
You can choose to join the conditions with "or logic" or "and logic".
The conditions available are:

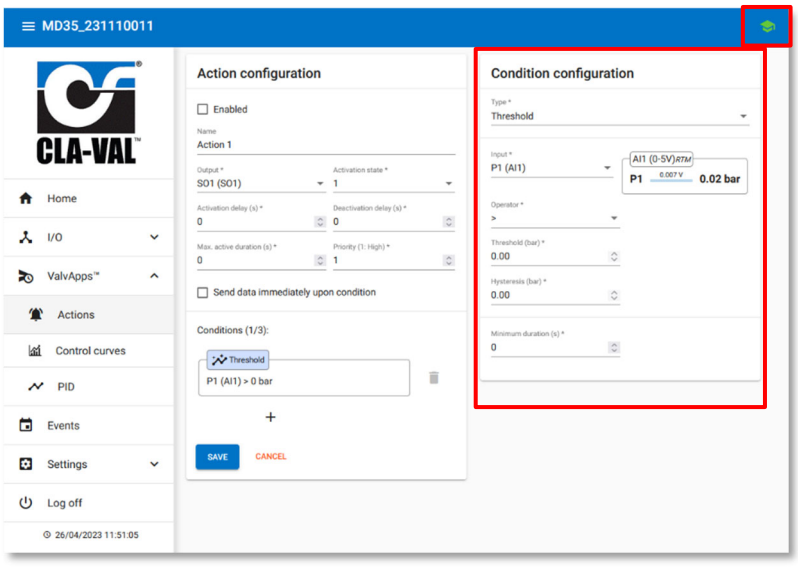
- Threshold
- Calendar
- Volume + Calendar



9.12.1.4.1 Threshold

A condition that will be triggered by a condition applied to an analogue or digital input.

- **Input:** The value of the input used in the comparison.
- **Operator:** The operator used for comparison (larger, smaller, equal).
- **Threshold [bar]:** The constant used for comparison.
- **Hysteresis [bar]:** Allows defining a dead band.
- **Minimum duration [s]:** The maximum time the condition can be true. Set the value to 0 to disable this feature. Only available in advanced mode .



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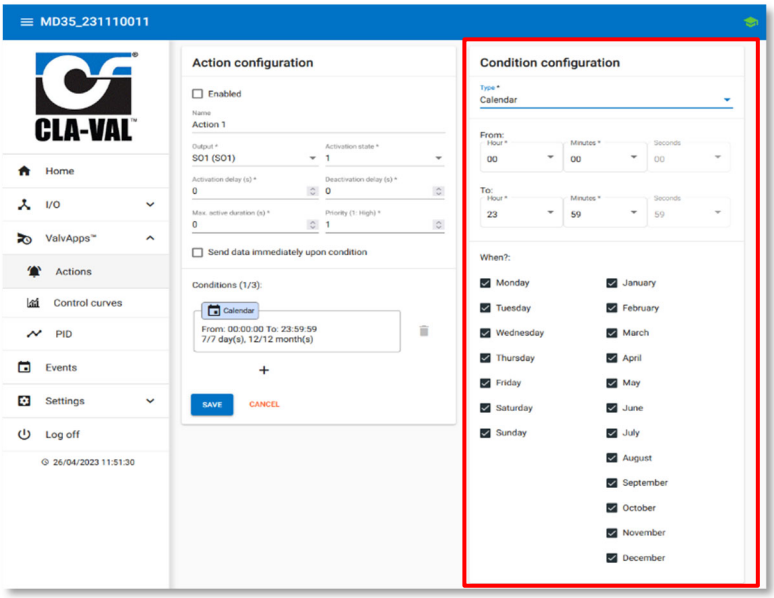
9.12.1.4.2 Calendar

Condition that will trigger between a start time and an end time. Depending on the days of the week, and months.

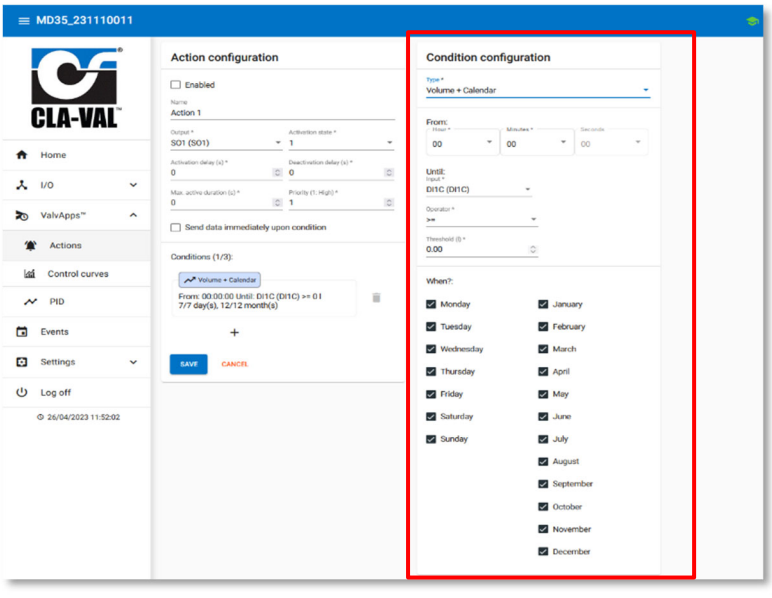
- **From:** The time when the condition starts.
- **To:** The time when the condition ends.
- **When?:** The list of days and months where the condition is valid.



9.12.1.4.3 Volume + Calendar

Condition that will be triggered according to a time of day and a month. And stop when a certain volume of water is reached.

- **From:** The time when the condition starts.
- **Until:** The volume of water after which the condition ends.
- **Input:** Selection of the counter input.
- **Operator:** The operator used for comparison (greater, greater, or equal).
- **Threshold:** The constant used for comparison.
- **When?:** The list of days and months when the condition is valid.



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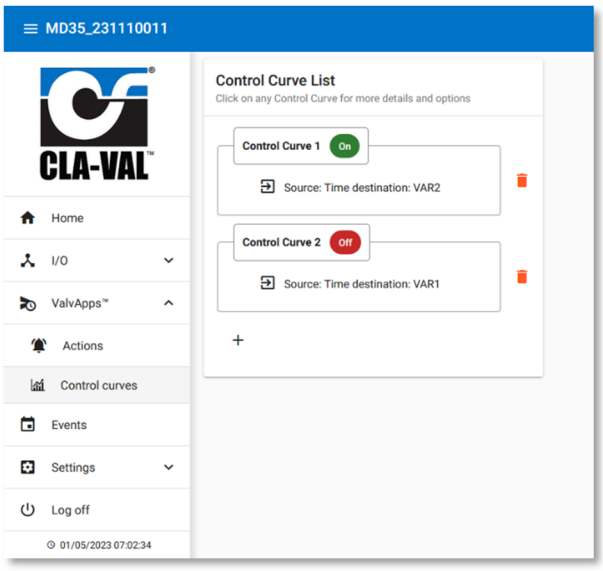
9.12.2 CONTROL CURVE

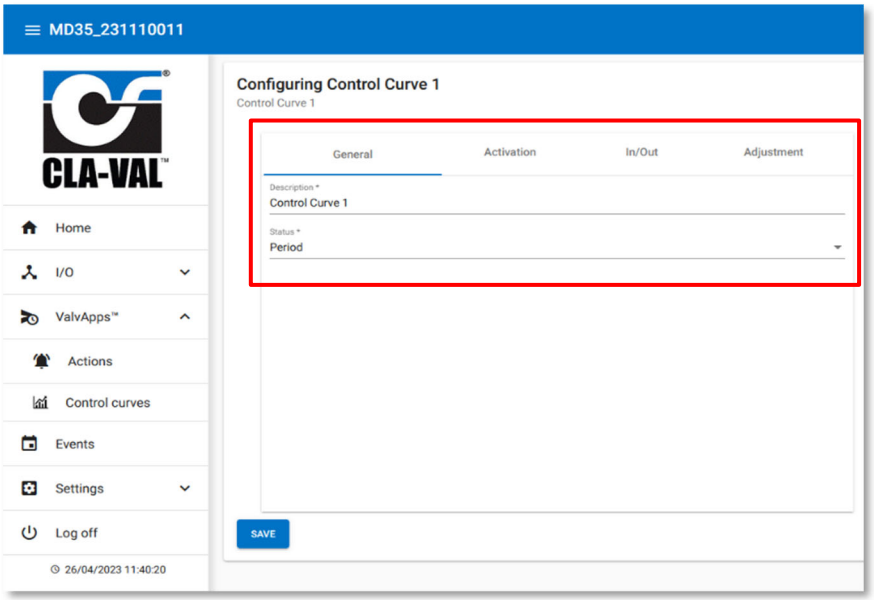
The menu "**Control Curve**" provides a simple method to establish a relationship between two variables in the system. The user can create this relationship graphically by linking pressure, flow, level, and/or time directly on the web interface using graphical functions. It is possible to create up to four (4) "**Control Curves**" to adapt the system specifically, such as for seasonal adjustment.



9.12.2.1 "**General**" Tab

Description of input fields:

- "**Description**": refers to a name for the control curve.
- "**Status**": indicates if the control curve is active.
  - "**On**": The control curve is active.
  - "**Off**": The control curve is inactive.
  - "**Conditional**": Condition based on an input or a variable.
  - "**Calendar**": The control curve is activated according to calendar rules, which are defined in the "**Activation**" tab.
  - "**Period**": The control curve is activated according to days of the week and a period, which are defined in the "**Activation**" tab.



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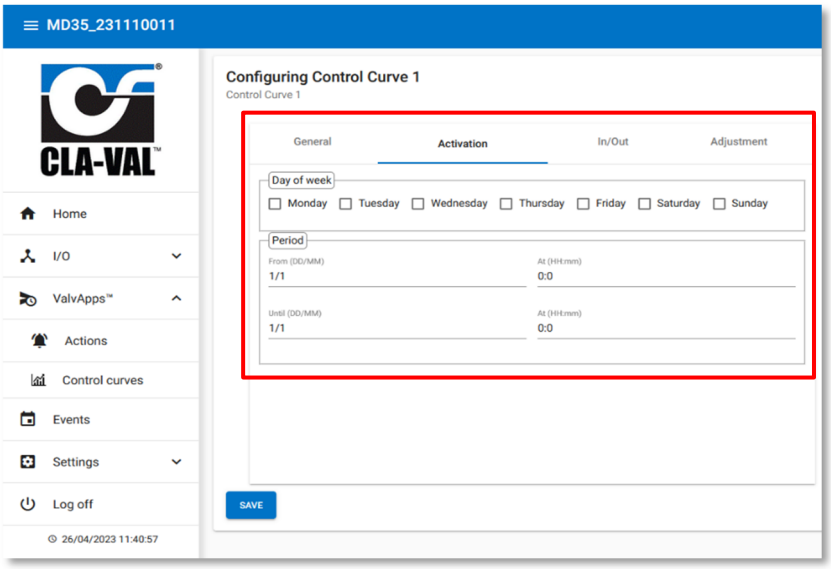
9.12.2.2 "**Activation**" Tab

Description of input fields:

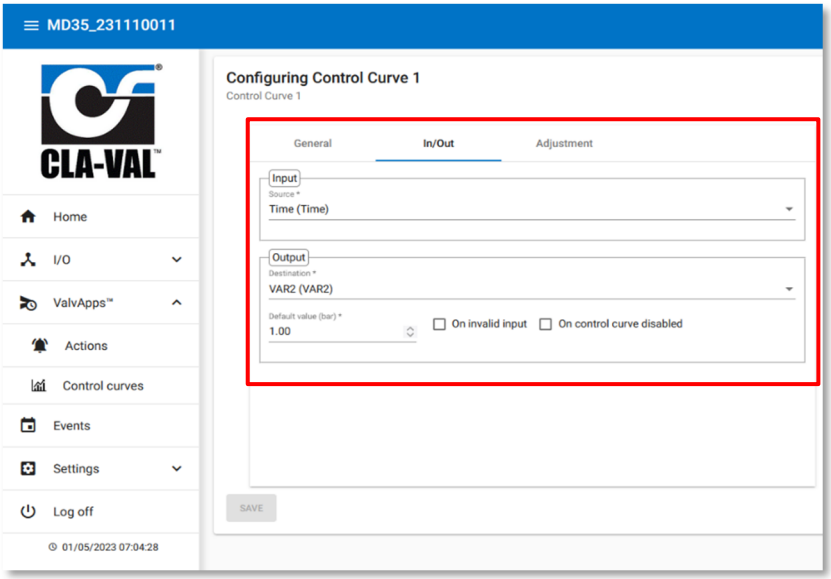
- "**Day of the week**": indicates which day(s) of the week the control curve is active.
- "**Month of the year**": indicates the months during which the selected days are active.
- "**Period**" section:
  - "**From**": Date and time when the period begins.
  - "**Until**": Date and time when the period ends.



9.12.2.3 "**In/Out**" Tab

Description of input fields:

- "**Input**" section:
  - "**Source**": indicates the location of the input.
- "**Output**" section:
  - "**Destination**": indicates the location of the output.
  - "**Default value**": the default value of the output in case of invalid input or disabled control curve.



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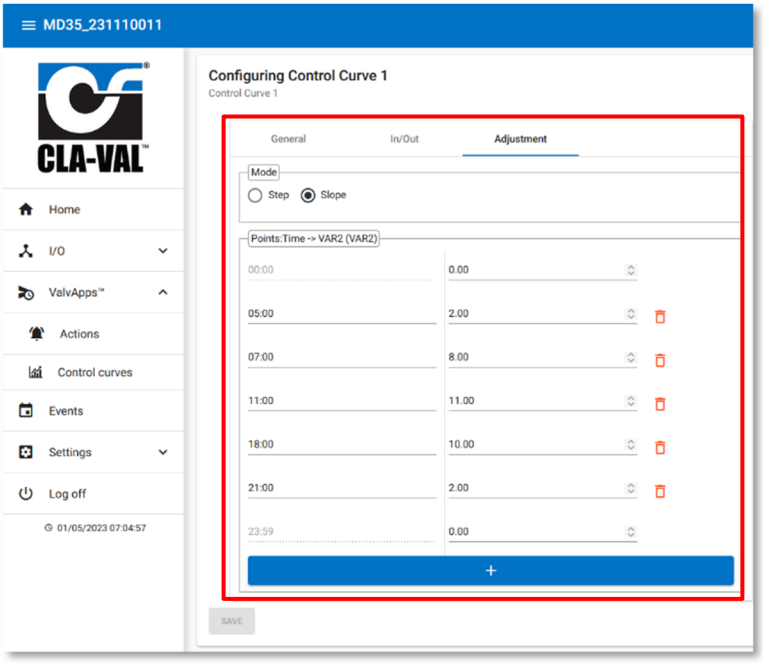
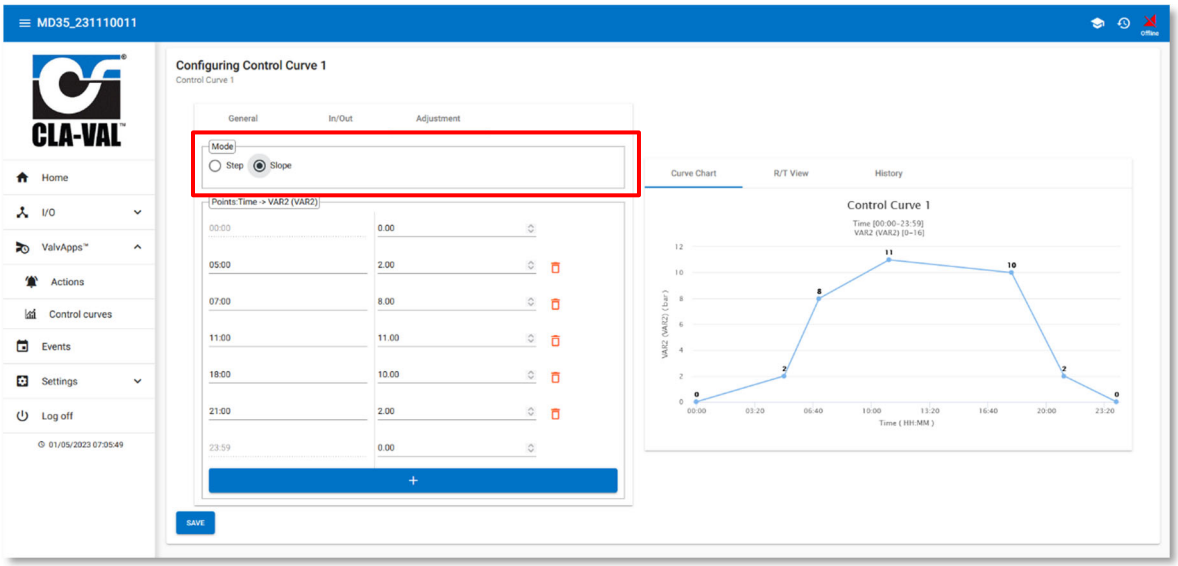
9.12.2.4 "**Adjustment**" Tab



The control curve can be fully customized by entering the required values in the table in the "**Adjustment**" tab.

- "**Add a point**": Click on the "+" button to add a point on the control curve, then edit it.
- "**Delete a point**": Click on the " " button next to a point to delete it.
- "**Edit a point**": To modify the input or output of a control curve point, click directly on the value you want to edit.
- "**Slope Mode**": A straight line is created between each point, as shown below:



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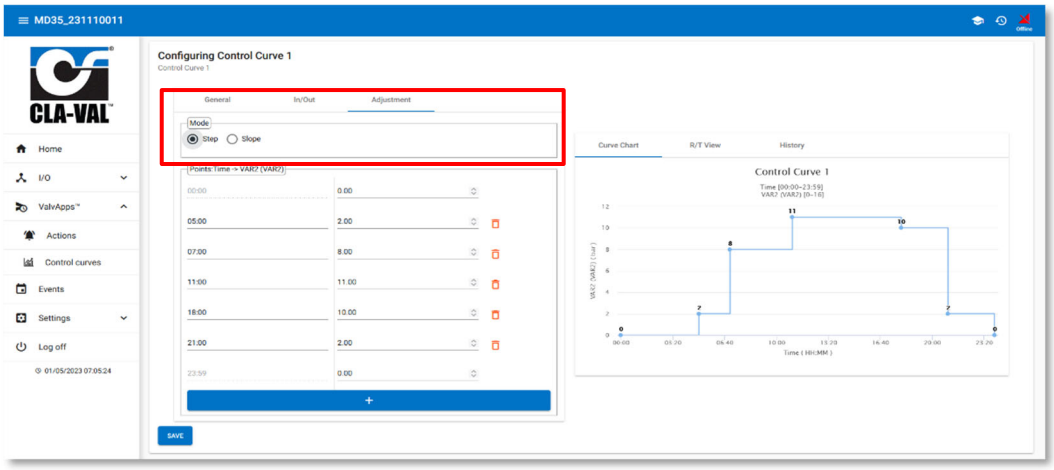
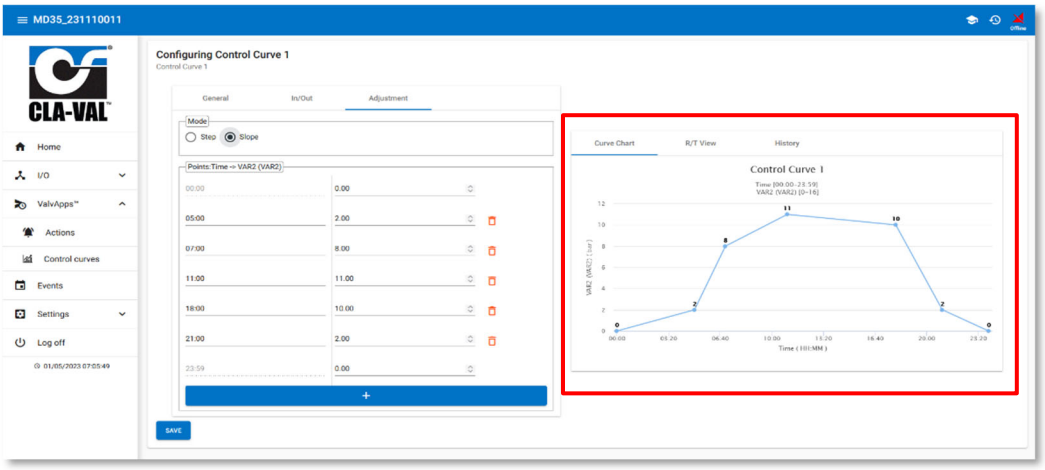
- "**Step Mode**": A stepped line is created between each point, as shown below:



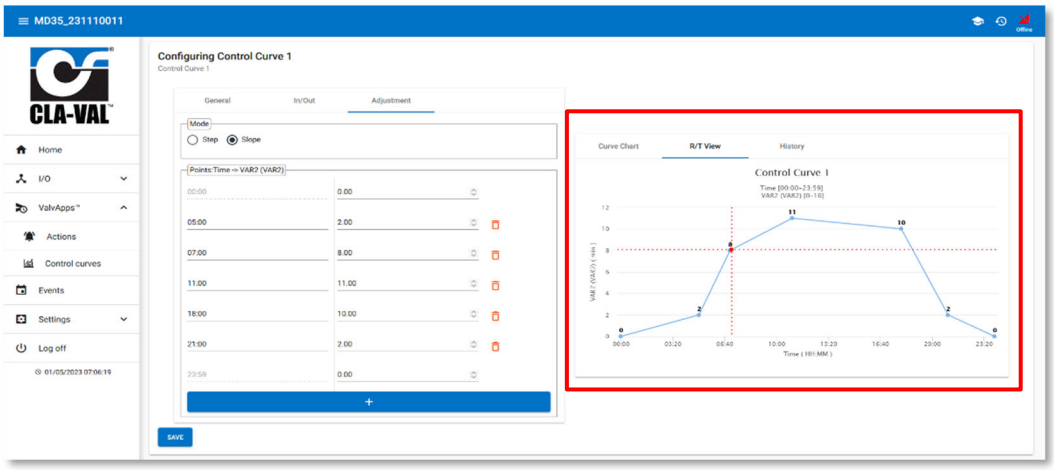
9.12.2.5 "**Curve Chart**" Tab

This tab allows to graphically visualize the control curve created from the points you have entered in the "**Adjustment**" tab.



9.12.2.6 "**R/T View**" Tab

This tab displays in real-time the current position of the system output based on the input it is provided. This means that when the input changes, the graph updates the corresponding output position to reflect the latest information from the system.



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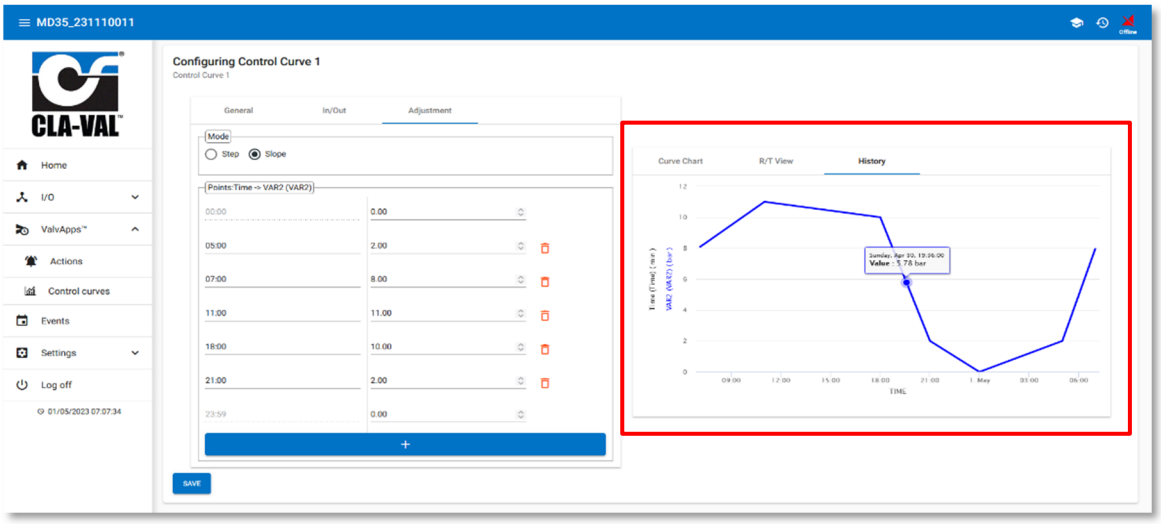
9.12.2.7 "**History**" Tab

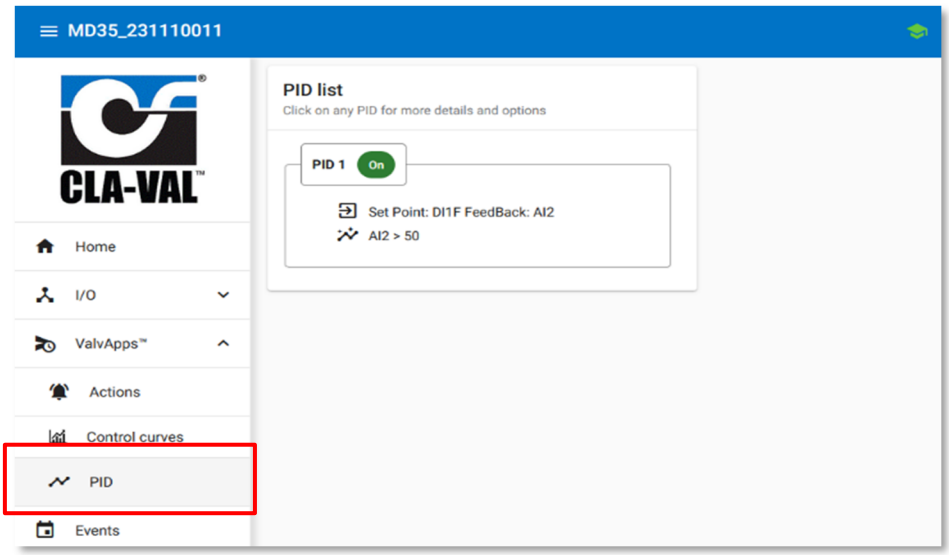
This tab allows displaying the history of output values over time.



9.12.3 PID (PROPORTIONAL-INTEGRAL-DERIVATIVE)

The PID menu is only available in advanced mode. .

The " PID" control system allows regulating the valve at a predefined set point. Up to four PIDS can be programmed, each offering the possibility of locally adjusting the set point. The M-35 provides real-time response and fine tuning based on variations in pressure and flow.



9.12.3.1 "**General**" Tab

Description of input fields:

1. "**Description**": Use this field to choose a unique name for each PID loop.
2. "**PID Type**": Designate the type of hydraulic value:
   a. "**Flow**": filters the setpoint and feedback using flow.
   b. "**Pressure**": filters the setpoint and feedback control using pressure.
   c. "**Level**": filters the setpoint and feedback using level.
   d. "**%**": filters the setpoint and feedback using the valve position in percentage.
   e. "**Analog**": filters the setpoint and feedback using flow.

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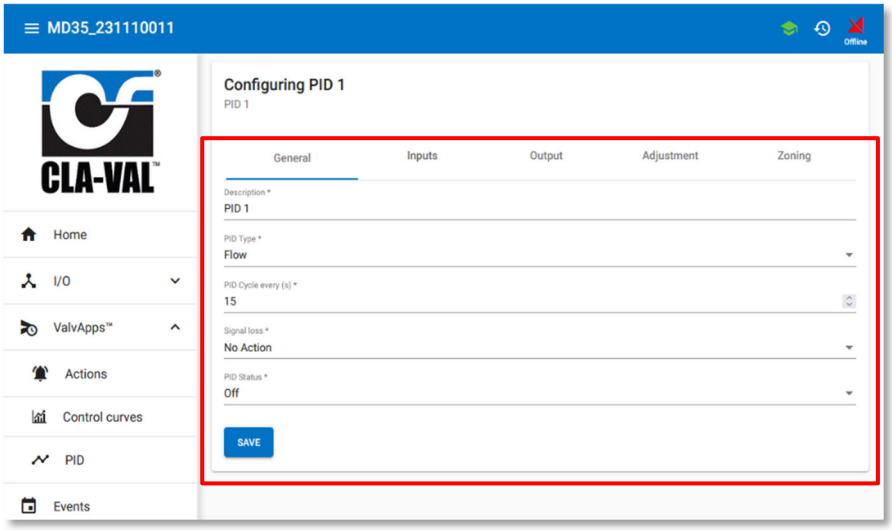
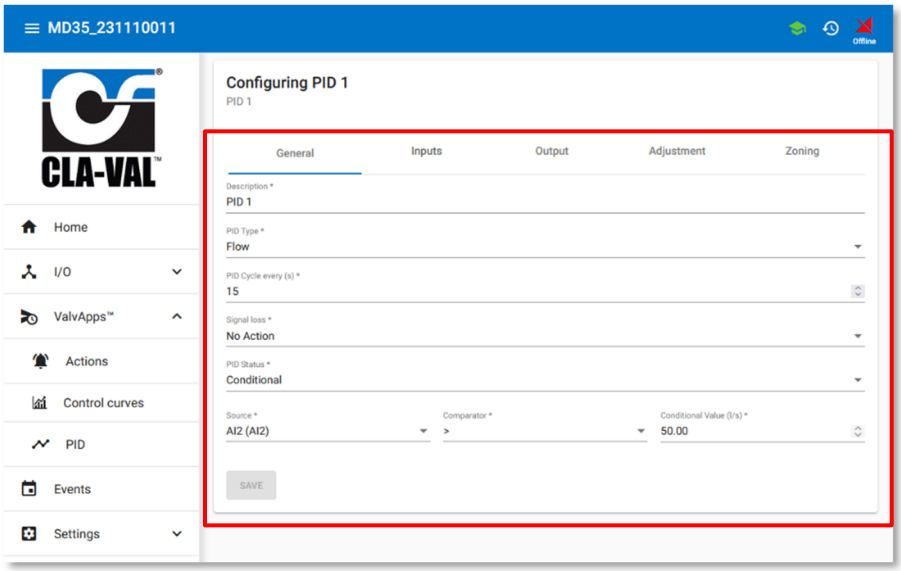
3. "**Cycle PID every (s)**": This field indicates how often the calculation will be performed to determine the appropriate output command; the minimum value is 1 second.
4. "**Signal loss**": This field indicates the action that the M-35 will take in case of signal loss on the setpoint. The options are:
   a. "**No action**".
   b. "**Open 100%**": open the valve 100%.
   c. "**Close 100%**": close the valve 100%.
5. "**PID status**": The user can configure a PID loop but not activate it until the appropriate time. The choices are:
   a. "**Enabled**".
   b. "**Disabled**".
   c. "**Conditional**": When "Conditional" is selected, an additional field appears and prompts the user to specify when the PID should be active. The following field is displayed:



The PID loop can be configured when any of the inputs meet certain conditions. In this case, use the dropdown menu to select the appropriate input, then use the dropdown menu on the right to select an operator, such as the "Greater than" sign (>), then specify a value.

Example: The following PID loop has been configured to be conditionally enabled only when feedback [AI2] is greater than 50.00 l/s.



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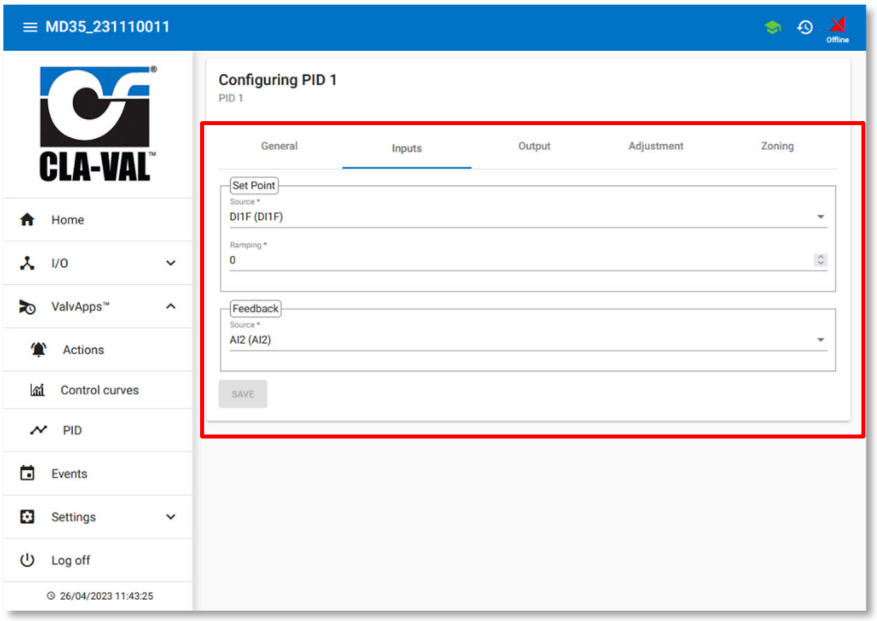
9.12.3.2 "**Inputs**" Tab

Description of input fields:

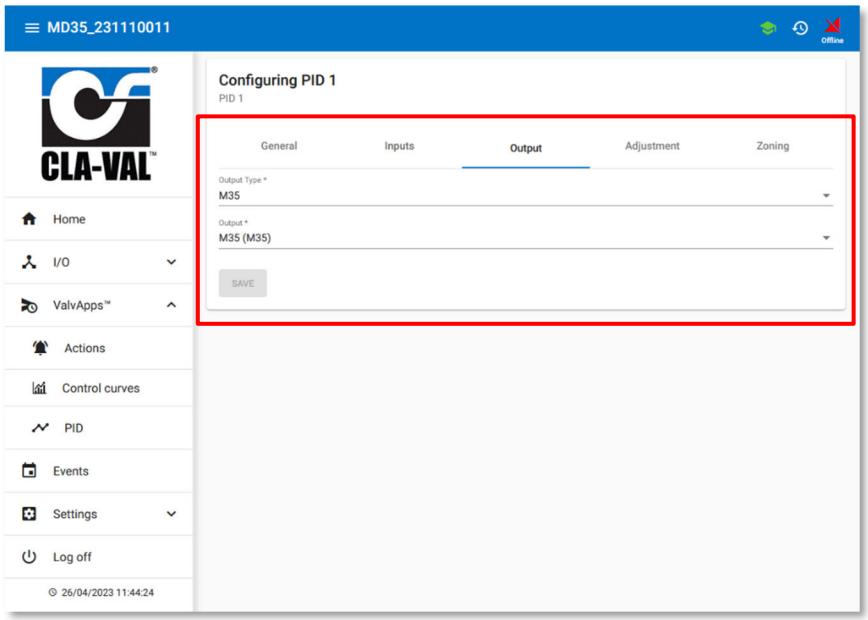
- Setpoint section:
  - "**Source**": Indicates which input or compatible variable should be used as the setpoint for the PID loop.
  - "**Ramp**": Increases or decreases the setpoint over a period x when a new setpoint is entered to avoid overshooting or undershooting the target value.
- Feedback section:
  - "**Source**": Indicates which input should be used as feedback for the PID loop.



9.12.3.3 "**Output**" Tab

Description of input fields:

- "**Output Type**": specifies the type of output used.
- "**Output**": designates the port used.



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9.12.3.4 "**Adjustment**" Tab

Description of input fields:

- "**Zone number**": designates which PID control zone is being adjusted.
- "**Closing speed (%)**": refers to the rate at which the valve can close. 1% is the slowest possible speed and 99% is the fastest possible speed.

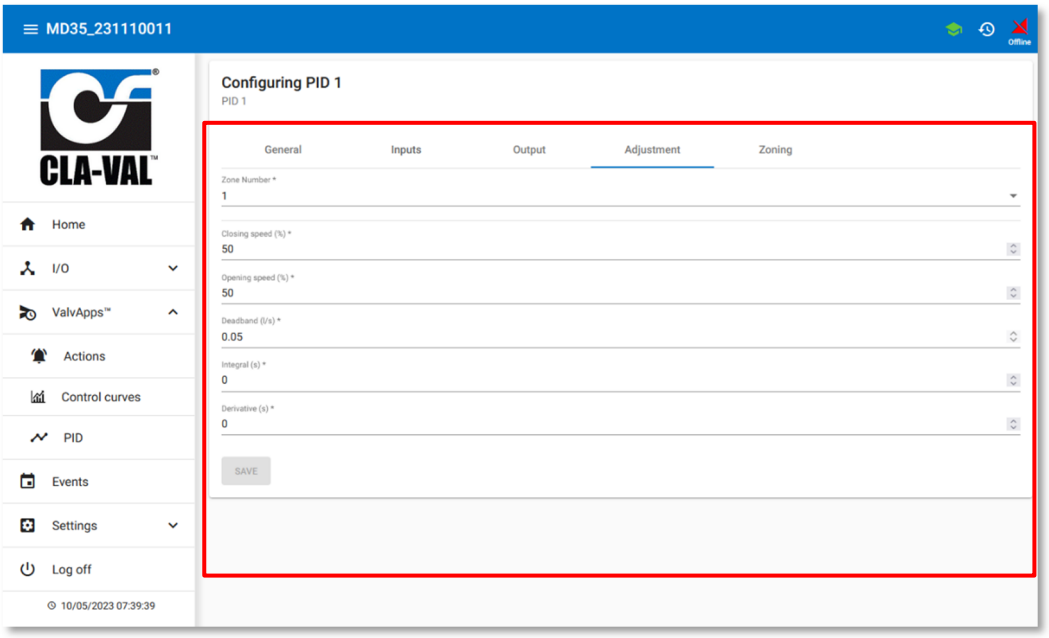
  Note: actual closing time will depend on hydraulic conditions.
- "**Opening speed (%)**": refers to the rate at which the valve can open. 1% is the slowest possible speed and 99% is the fastest possible speed.

  Note: actual opening time will depend on hydraulic conditions.
- "**Deadband (l/s)**": refers to the range of values around the setpoint where the M-35 will take no action.

  Example: If the setpoint is 50 l/s and the deadband is set to 2 l/s, the controller will take no action for feedback values between 48 l/s and 52 l/s.
- "**Integral (s)**": this value is used for fine-tuning very sensitive systems.

  It is not recommended to use it without contacting CLA-VAL technical support!
- "**Derivative (s)**": this value is used for fine-tuning very sensitive systems.

  It is not recommended to use it without contacting CLA-VAL technical support!



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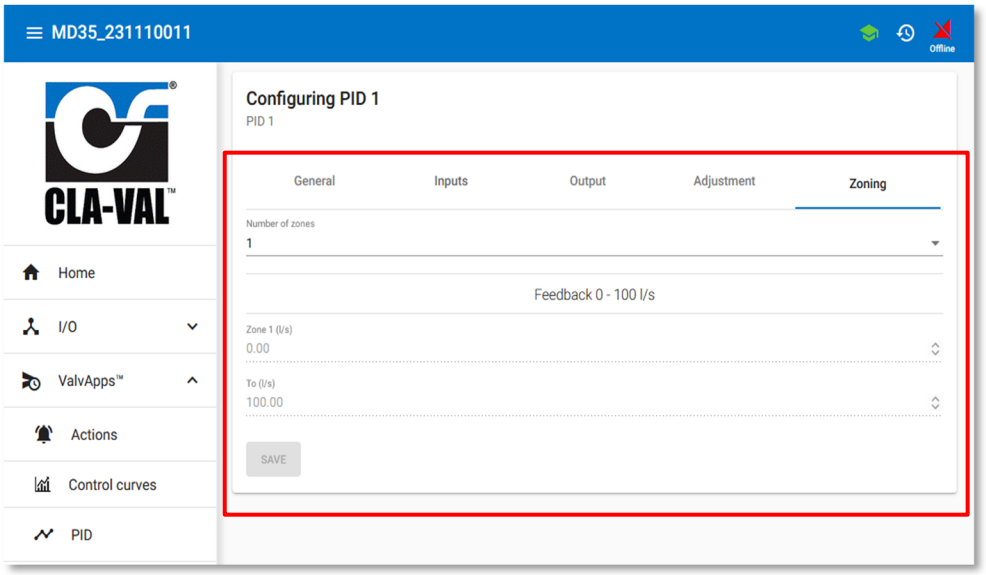
9.12.3.5 "**Zoning**" Tab

Description of input fields:

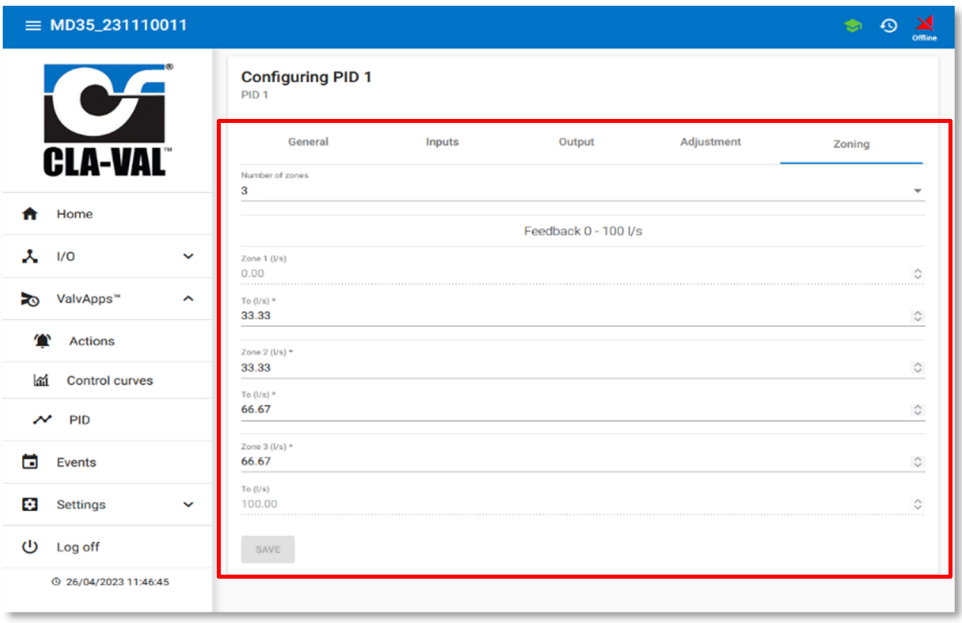
- "**Number of zones**": indicates the number of PID control zones to create.

Note: when multiple PID control zones are created, the active range of each loop is designated by an equal division of the total feedback range, as illustrated below:



The active range for zones 1, 2, and 3 each represent one-third of the total feedback range. These values can be specified by modifying the values of each zone, according to the user's needs.

- "**Zone 1 (l/s)**": designates the top of the range for zone 1 (the lower range is limited by the minimum of the feedback scale).
- "**Zone 2 (l/s)**": designates the lower and upper range of zone 2.
- "**Zone 3 (l/s)**": designates the lower range of zone 3 (the top of the range is limited by the maximum of the feedback scale).



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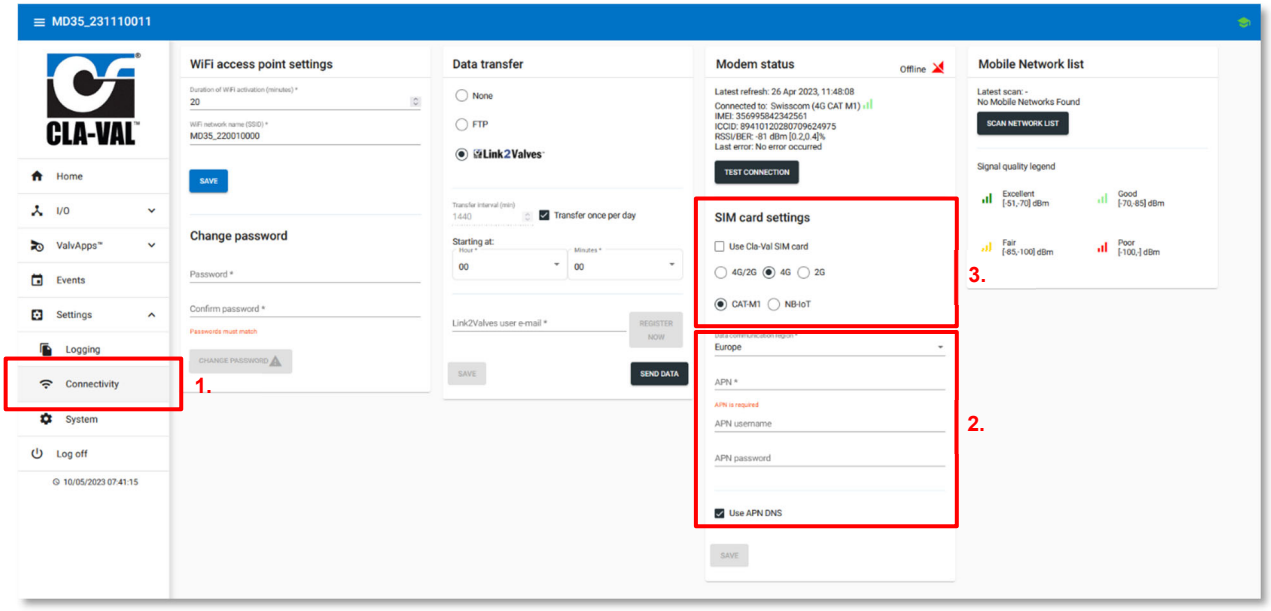
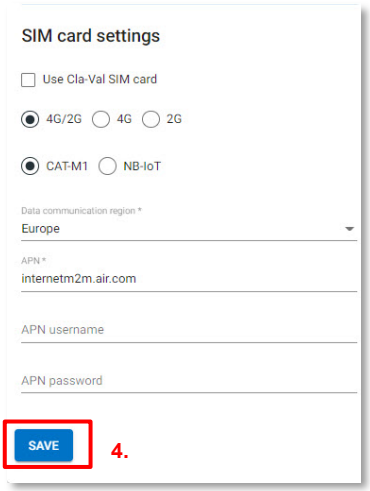
9.13 CUSTOM SIM CARD (COMMUNICATION OPTION)

1. Click on "**Connectivity**" menu.
2. Enter the APN information of your SIM card (provided by your network operator).
3. Choose whether you want to communicate in 4G / 2G (Fallback in 2G in case of unavailability of 4G), 4G only, or 2G only and the 4G technology (CAT-M1 or NB-IoT).



4. Click the "**SAVE**" button in the "**SIM card settings**" section to apply the configuration.



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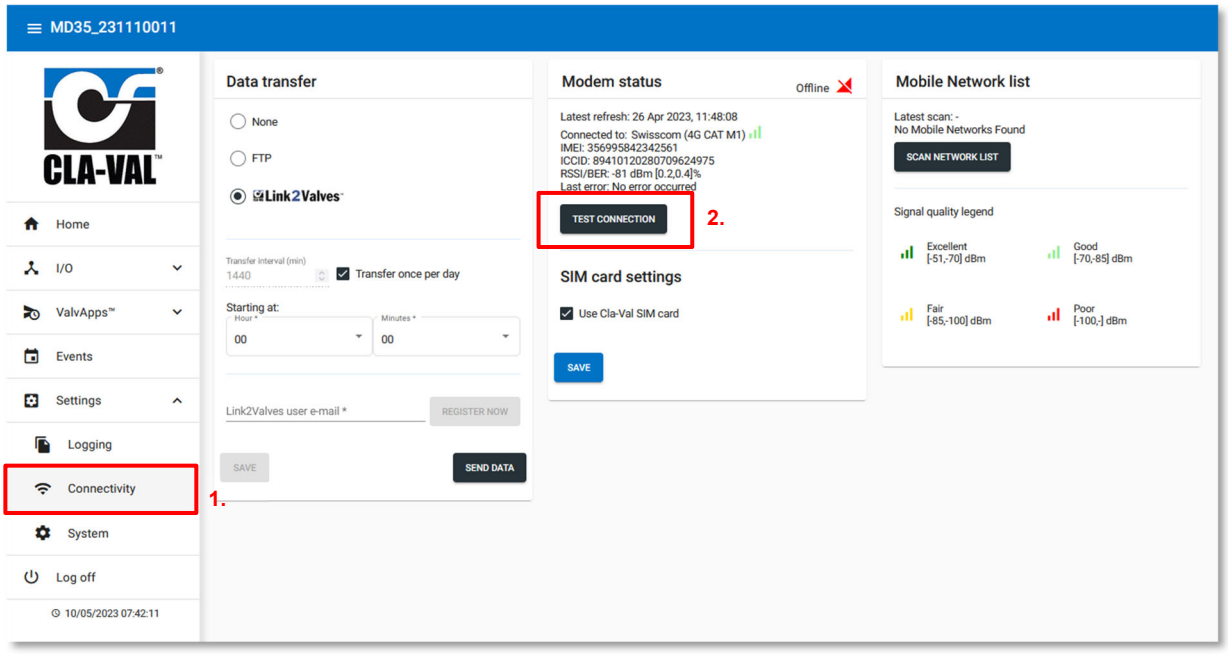
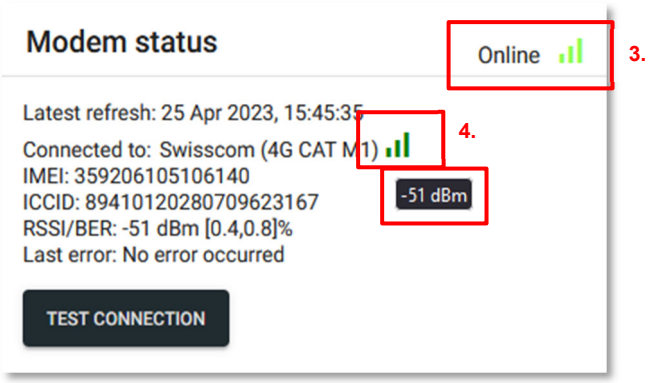
9.14 CHECKING THE QUALITY OF THE NETWORK (COMMUNICATION OPTION)

1. Click on "**Connectivity**" menu.
2. Click on the button "**TEST CONNECTION**".



3. Wait until the mode is online and refresh the page (F5).
4. Check the dBm value by hovering over the network quality icon.



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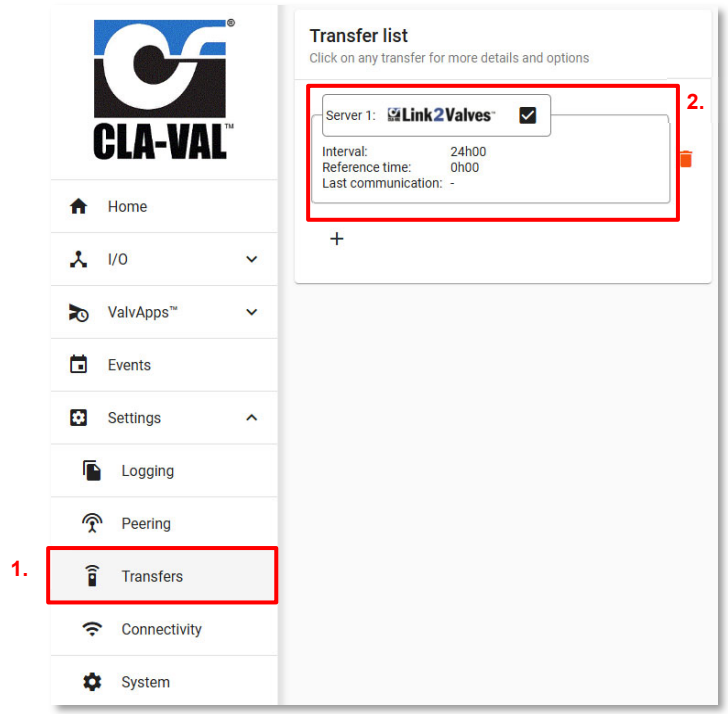
9.15 REGISTER ON LINK2VALVES (COMMUNICATION OPTION)

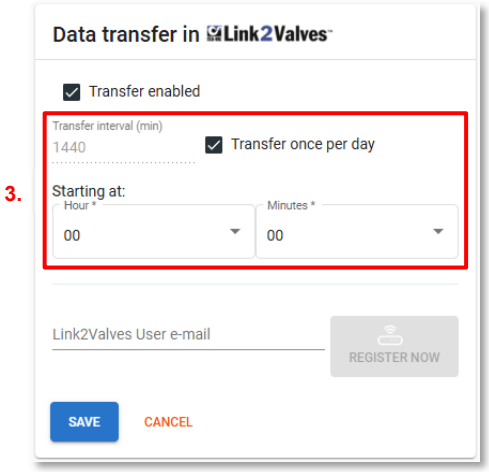
Link2Valves™ is the CLA-VAL web platform (https://cla-val.ch) that allows the remote access to your MD35.

A Link2Valves account is necessary. Please contact CLA-VAL to get one for free if you don't have it yet.

1. Click on " **Transfers**" menu.
2. Under "**Transfer List**", click "**Link2Valves**".



3. Choose the transfer interval and the time when the transfer will start. This interval will determine the frequency of communications of the MD35 and Link2Valves. Please note that a faster interval will have a negative impact on the battery life and generate potential additional data communication costs.



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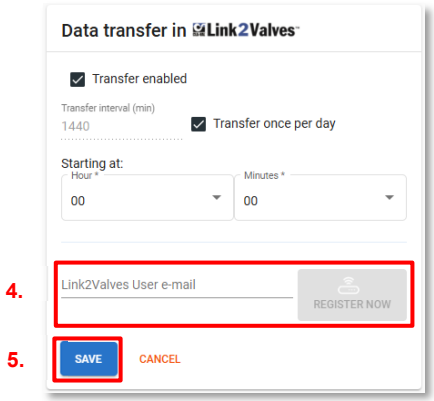
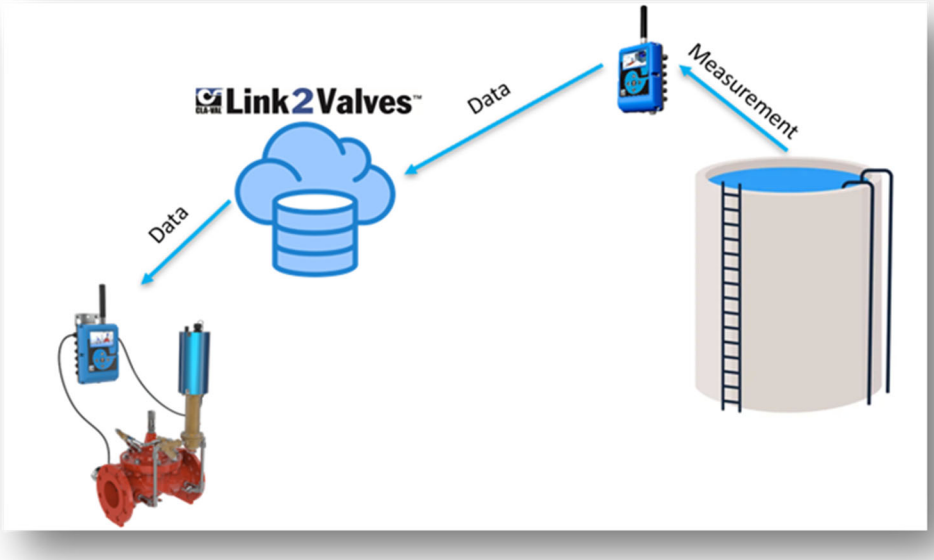
4. Associate the MD35 unit with your Link2Valves user account. First, enter the email address of your Link2Valves account. If you do not have one, please contact CLA-VAL to get one for free. Then click on "**REGISTER NOW**" and wait for the message "**Success!** ".



⚠ Don't forget to click "**SAVE**" for your changes to take effect.

9.16 PEERING LINK2VALVES

The HTTPS Peering functionality enables two or more MD35 devices to connect, communicate, and exchange information with each other. This feature is especially useful in scenarios where measurements are taken far from the valve, such as when the reservoir is located remotely. In such cases, the MD35 positioned near the reservoir measures the level and sends this value to the MD35 controlling the valve. Based on these values, the controller activates the actuator to reach the desired setpoint.



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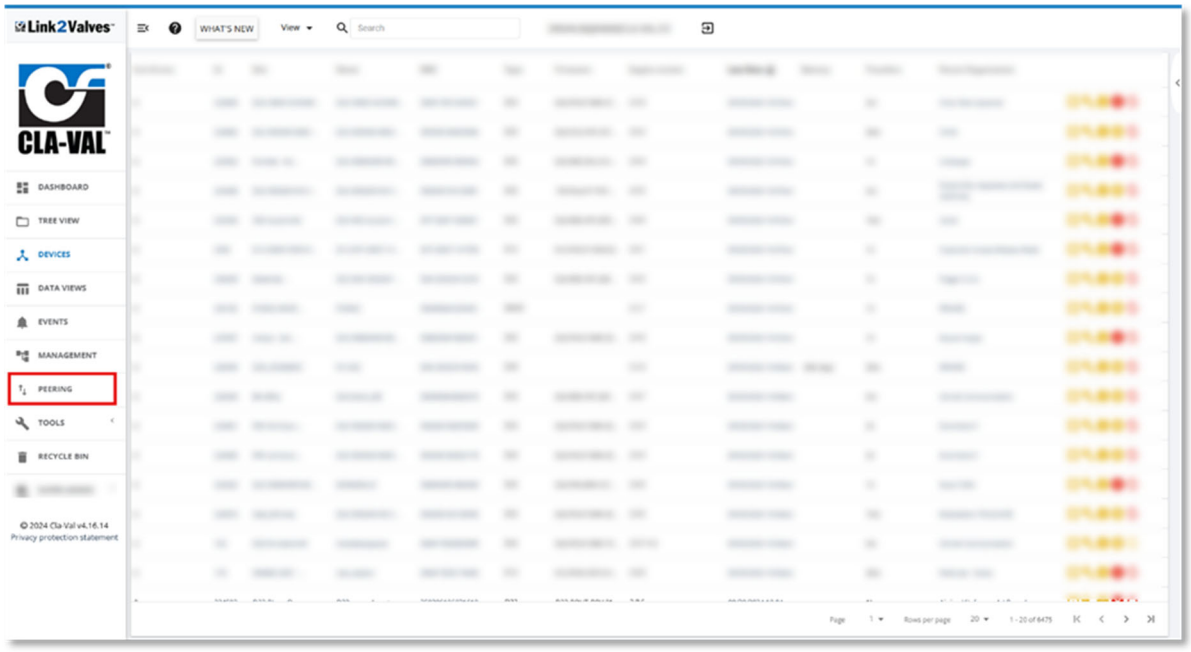
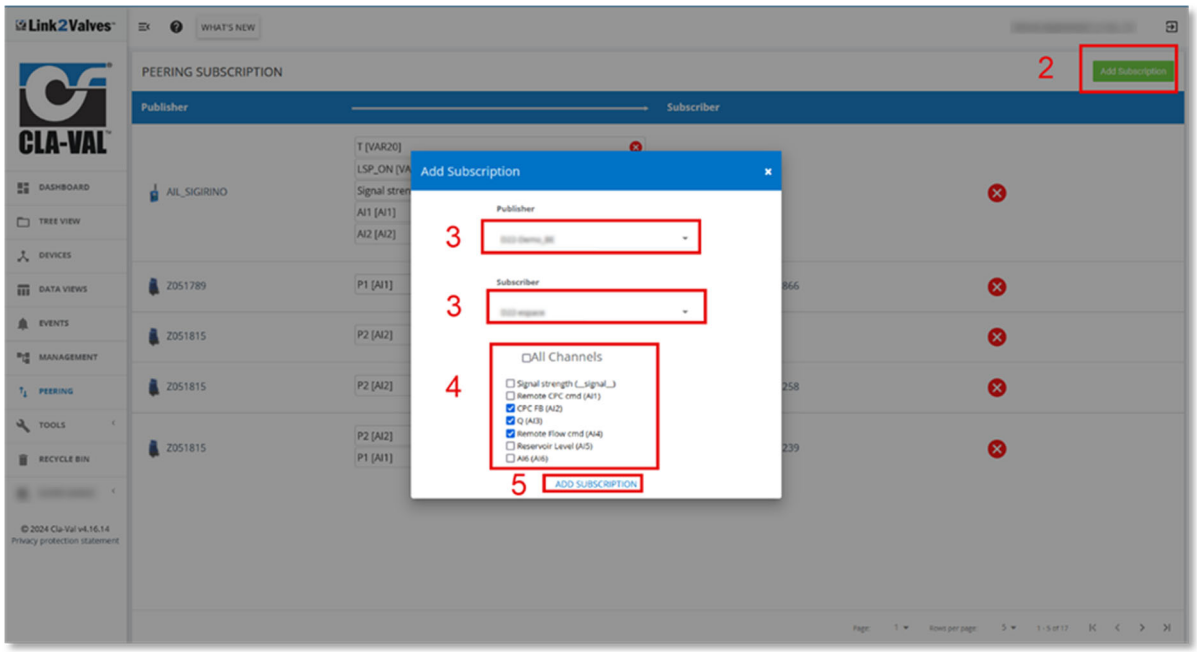
To use this feature, the devices intended to communicate must be connected via Link2Valves.

The first step is to configure the Peering functionality on L2V. To do so:

1. From the main Link2Valves page, click on the Peering option.



2. Click on "**Add Subscription**" to create a new communication between the two devices.
3. Select the device that will publish the data and the device that will receive the data.
4. Choose the inputs to be transmitted to the other device. For the publishing device, it is also possible to publish its outputs.
5. Finally, click the "**Add Subscription**" button.



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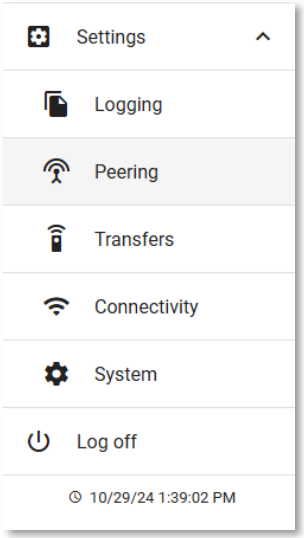
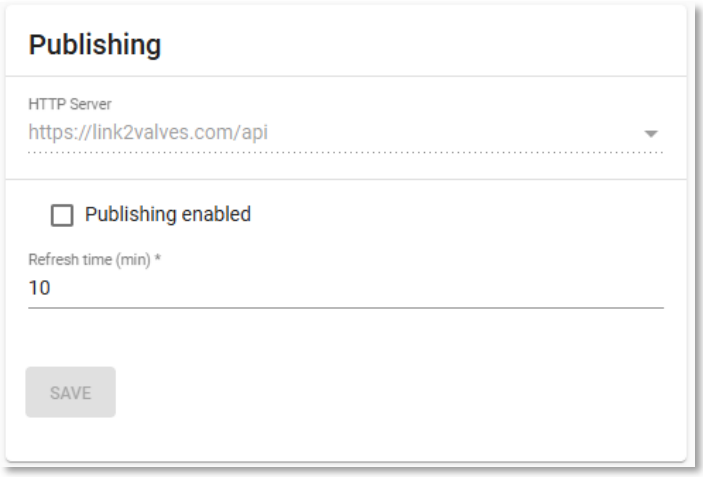
After configuring HTTPS Peering on Link2Valves, the next step is to set up the MD35 devices so they can communicate with each other.

To configure Peering on the MD35, follow these steps:

1. Access the Peering submenu from the Settings menu.



2. In the **Publication** section, configure the device that will publish its data. Enable publishing and select the publishing interval.



⚠ Reminder: A higher publishing frequency may lead to increased network data usage and battery consumption.

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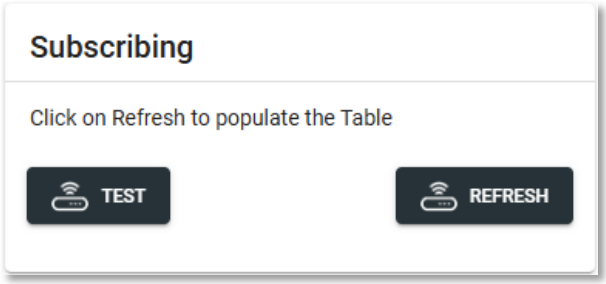
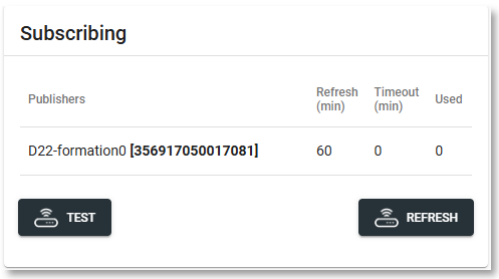
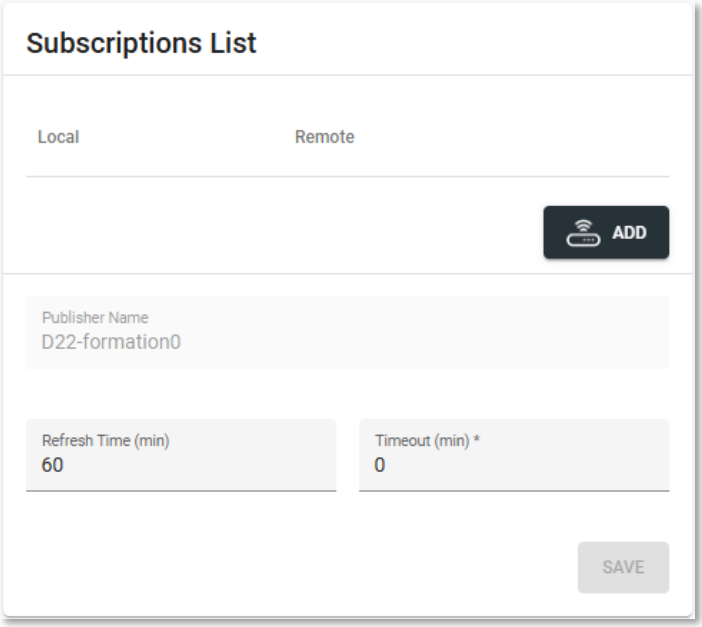
3. In the Subscription menu, configure the device that will receive the data.
   a. Click the Refresh button to search for publishing devices, then click to enter the menu of the publisher from which the data will be collected.

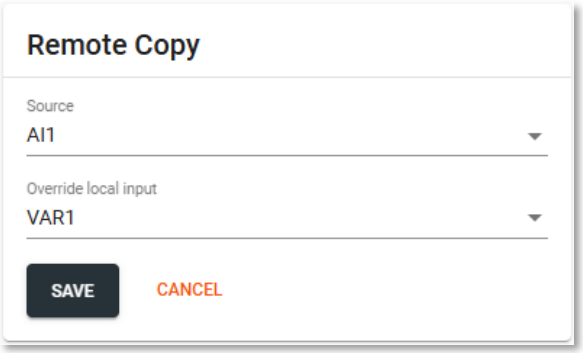




   b. After selecting the publisher, choose the data refresh interval and set the timeout duration in case no data is available.



   c. Click "**Add**" and then click the button to add the channels you wish to subscribe to.



By completing these steps, the MD35 devices will be able to communicate effectively via HTTPS Peering.

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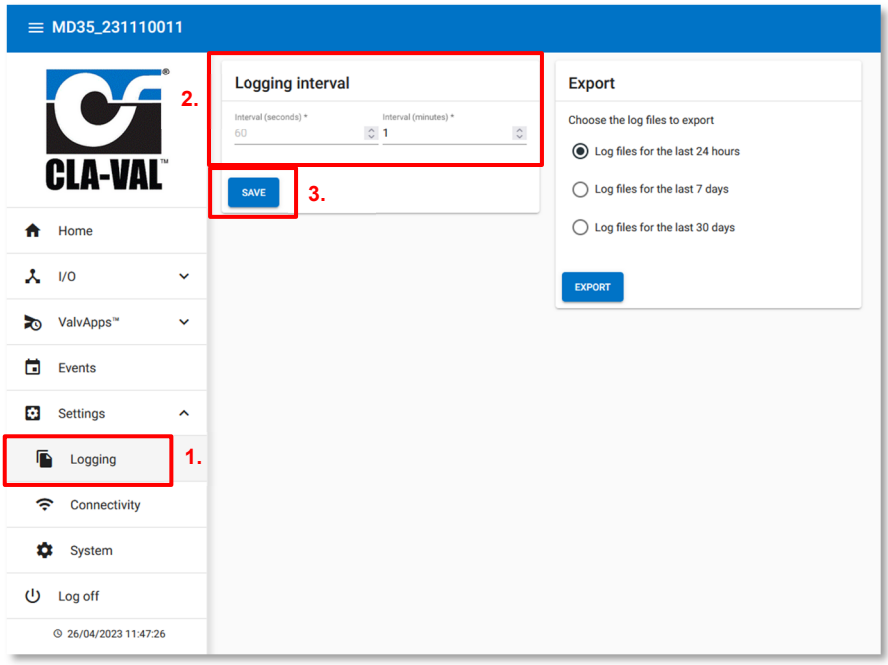
9.17 LOGGING SETTING

1. Click on "**Logging**" menu to access the corresponding configuration page.
2. Choose a recording interval. This interval manages the periodic recording of all activated inputs.
3. Click "**SAVE**" to apply the changes.



9.18 PRIORITY ON OUTPUTS

The MD35 product provides multiple outputs, including the M-35, a digital output, and two solenoid outputs. These outputs can be controlled by various regulation blocs such as control curves 1 to 4, PID 1 to 4, actions, and ValvApps™. When two blocks are simultaneously controlling the same output, a priority list determines which one takes precedence over the other.

Here is the list of priorities, ranked from least to most prioritized:

1. Control Curve 1
2. Control Curve 2
3. Control Curve 3
4. Control Curve 4
5. PID 1
6. PID 2
7. PID 3
8. PID 4
9. Actions
10. ValvApps™

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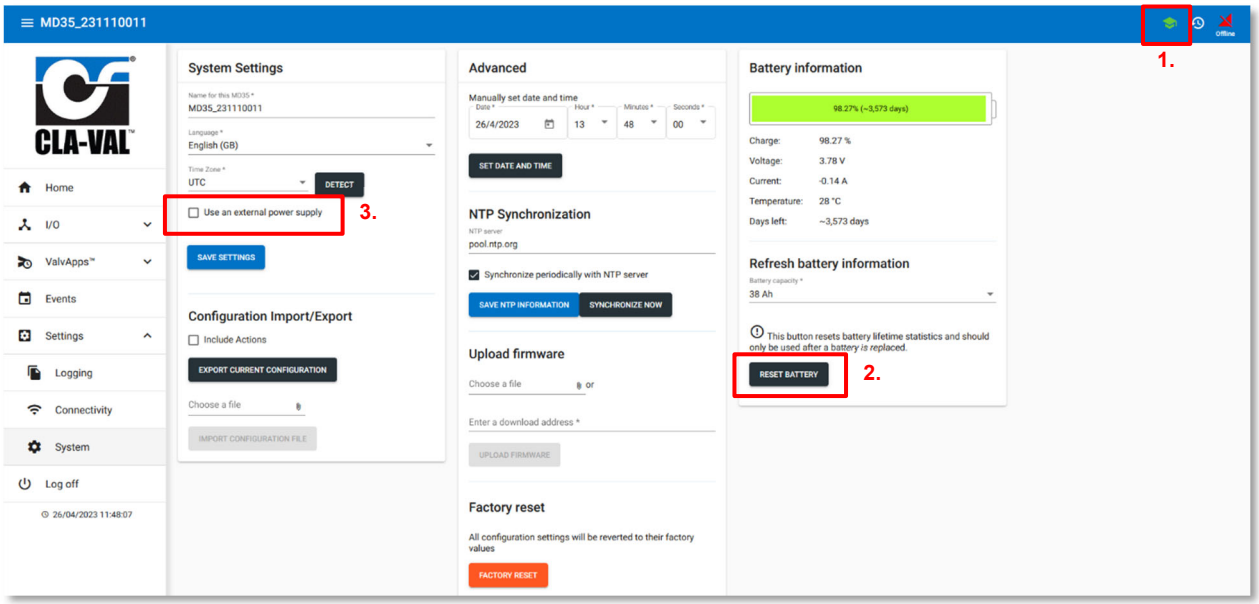
9.19 BATTERY CONTROL

The battery display estimates the remaining time of the battery.

1. During battery replacement.
2. Click on the "**RESET BATTERY**" button to reset the battery display.

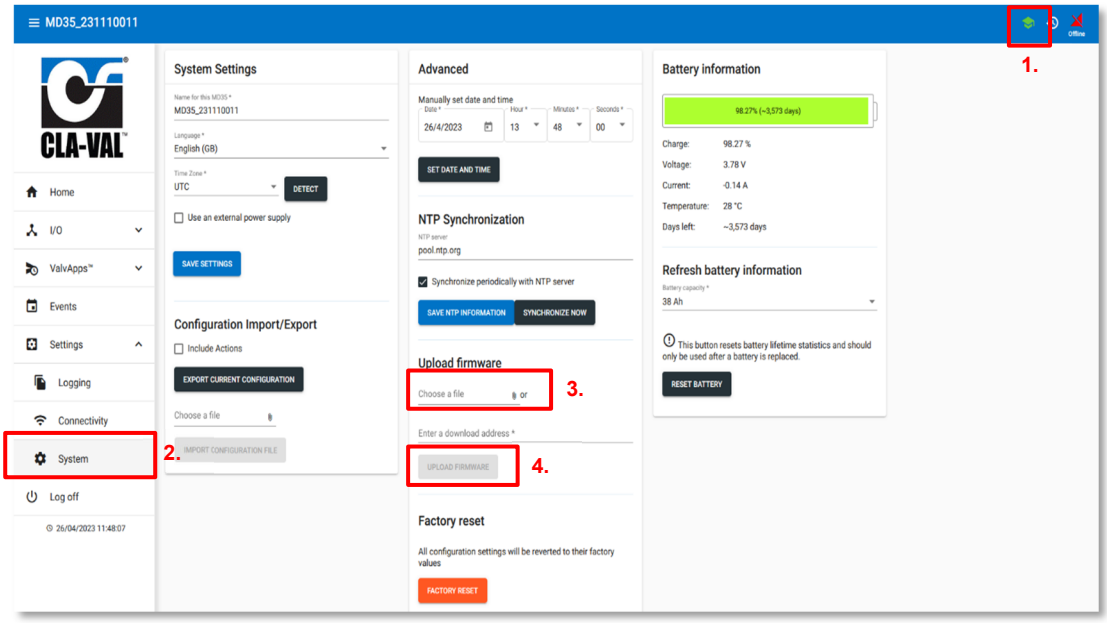
This button resets the battery life statistics and should only be used after a battery has been replaced.

3. If you are not using a battery, you can disable the battery display by clicking on the "**Use an external power supply**" button.



9.20 FIRMWARE UPDATE

1. Click on to enter to the advanced mode.
2. Click on the "**System**" menu.



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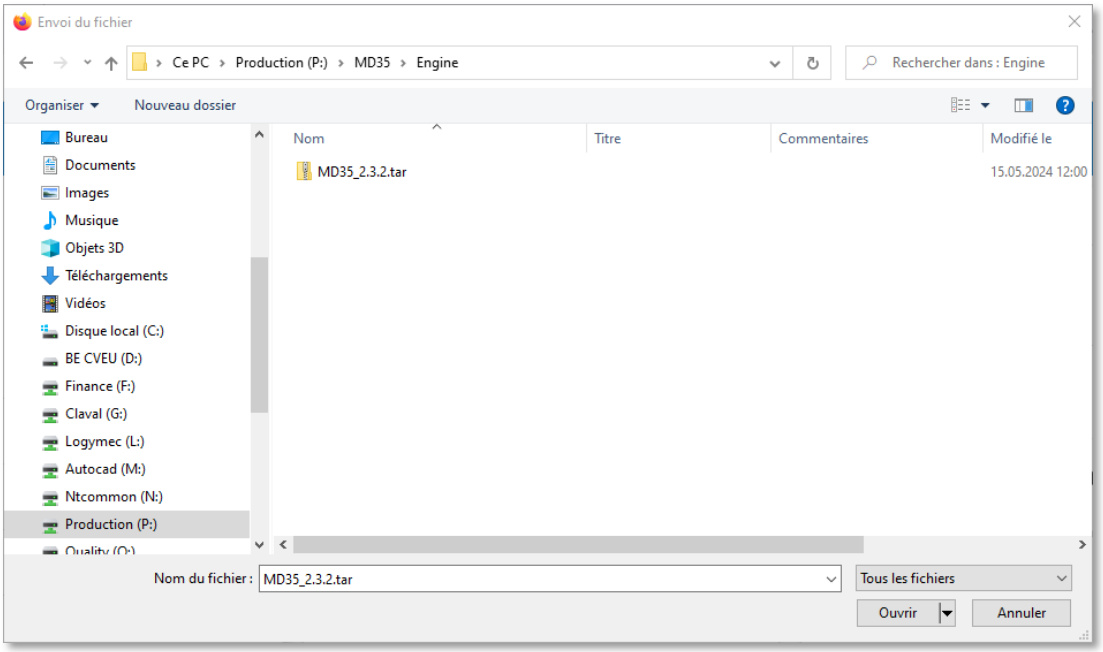
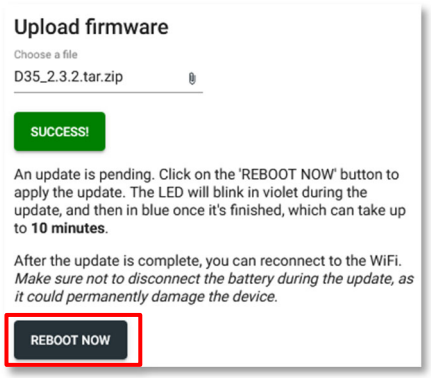
3. Click on the "**Upload firmware - Choose a file**" submenu, then choose ZIP file for example "MD35_2.3.2.tar".



4. Click on the "**UPLOAD FIRMWARE**" button and wait a minute.

5. When the loading of the firmware is ok. Click on the "**REBOOT NOW**" button and wait a few minutes. ⚠ During the update, The LED will blink purple. Do not disconnect the power during this time!



6. When the update is complete, the MD35 will return in "**Configuration**" mode and the LED will blink blue.

⚠ After some minutes of inactivity, the MD35 will exit "**Configuration**" mode and enter "**Acquisition**" mode.

Note:

On the CLA-VAL website (https://cla-val.ch). It is possible to download the latest version of the software & firmware.

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10 SUPPORT

10.1 MAINTENANCE AND RETROFIT

The MD35 is maintenance-free over the entire battery lifetime, which depends on the measurement and transmission frequencies settings (remotely configurable). However, environmental conditions may shorten battery lifetime and the presence of humidity inside the housing lead to corrosion. Prevent these situations with clean and robust installations.

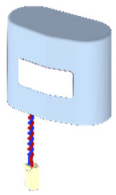
When the battery reaches its end-of-life, ask CLA-VAL, or an authorized reseller for maintenance assistance to change the battery, update the device to the most current Firmware, and test the system.

10.2 NON-CONFORMITY RETURN (NCR)

Only return MD35 under warranty after attribution of an Equipment Return Authorization provided by CLA-VAL. The returned MD35 must be clearly marked with the Non-Conformity (NCR) number.

11 ACCESSORIES

⚠ Warranty may be void if accessories other than those recommended by CLA-VAL are used.

Parts	Order Code	Description
	MEXE-B11-02	Internal battery replacement
	MEXE-B11-01	External High-Capacity battery replacement
	*CKCLM35-01	Pack of 5 replacement head gaskets CV-Log-35 / D35 / X35 The seal must be greased before installation. ⚠ The seal must be replaced after each opening.

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