DELTA

Installation and Operation Guide

BERMAD™

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1. SAFETY

This chapter reviews the DELTA safety concerns and includes:

- Safety Conventions
- Safety Instructions
- Certificates
- DELTA Controller Nameplate

Safety Conventions

WARNING: Indicates a potentially hazardous situation, which, if not avoided, could result in injury or death.

CAUTION: Indicates that the equipment or environment can be damaged, or data can be corrupted.

NOTE: Indicates additional information to help the user obtain optimum performance. Notes are not safety-related to the equipment or personnel.

Tip: Indicates useful information to simplify steps or procedures.

Safety Instructions

Prior to performing any work on the DELTA controller, become familiar with the following safety concerns:

General Safety Instructions

- Read this installation and operation guide prior to installing and servicing the system.
- Pay careful attention to all cautions and warnings in this guide.
- Installation must comply with all local electrical and plumbing codes.
- It is recommended that a licensed electrician performs all electrical connections. Improper installation could result in shock or fire hazard.
- DELTA is not intended for use by children.

WARNING: Contact with electrical connections can cause electric shock if the power supply is turned on.

Battery Safety Instructions

- BERMAD is not responsible for battery failures due to mishandling.
- Do not crush, break, or disassemble the batteries.
- Do not damage the battery label, which acts as an electrical insulation for the battery can.
- Do not install the batteries backwards, put in fire, submerge in fluids, or mix with other battery types.
- Do not weld or solder the batteries onto the battery compartment.
- Dispose of batteries in accordance with local regulations.
- Internal batteries are intended for offline mode operation.
- Contact BERMAD for battery replacement when depleted or damaged.

External Power Source Safety Instructions

- Before connecting to an external power source, ensure the external power polarity matches the one marked on the DELTA connector board.
- The power supply cables must first be connected to the DELTA power connectors before plugging into an external power source.
- The DELTA controller must first be unplugged from the external power source before disconnecting the power supply cables from the power connectors.

Certificates

DELTA Controller Nameplate

This DELTA controller nameplate is located on the back of the controller. It contains the following information:

2. INTRODUCTION

This chapter reviews the DELTA controller and includes:

- Overview
- Typical System Layout
- DELTA Controller
- Cloud Management System
- Technician App
- Installation Kit
- Cables Index
- Modes of Operation

Overview

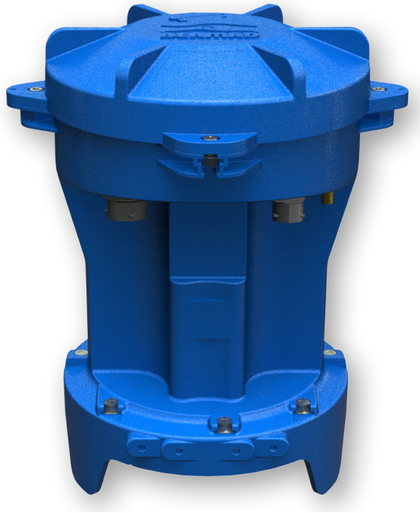
The DELTA is a stand-out pressure management controller that optimizes system performance. It ensures a stable network, enhances efficiency and minimizes leakage and bursts. As a result, it delivers a reliable water supply and improved client service.

Controller Features

- Up to 16 flow or time windows
- Highly accurate and stable regulation
- Latch override to fully open the valve at insufficient pressure supply, or fully close in event of pipe burst
- 5 years internal battery operated or external power
- Large capacity data logging
- Full communication via cloud for monitoring and remote setting
- Intuitive and user friendly platform
- Advanced mordern graphs and reports
- Alert and notifications via E-mail

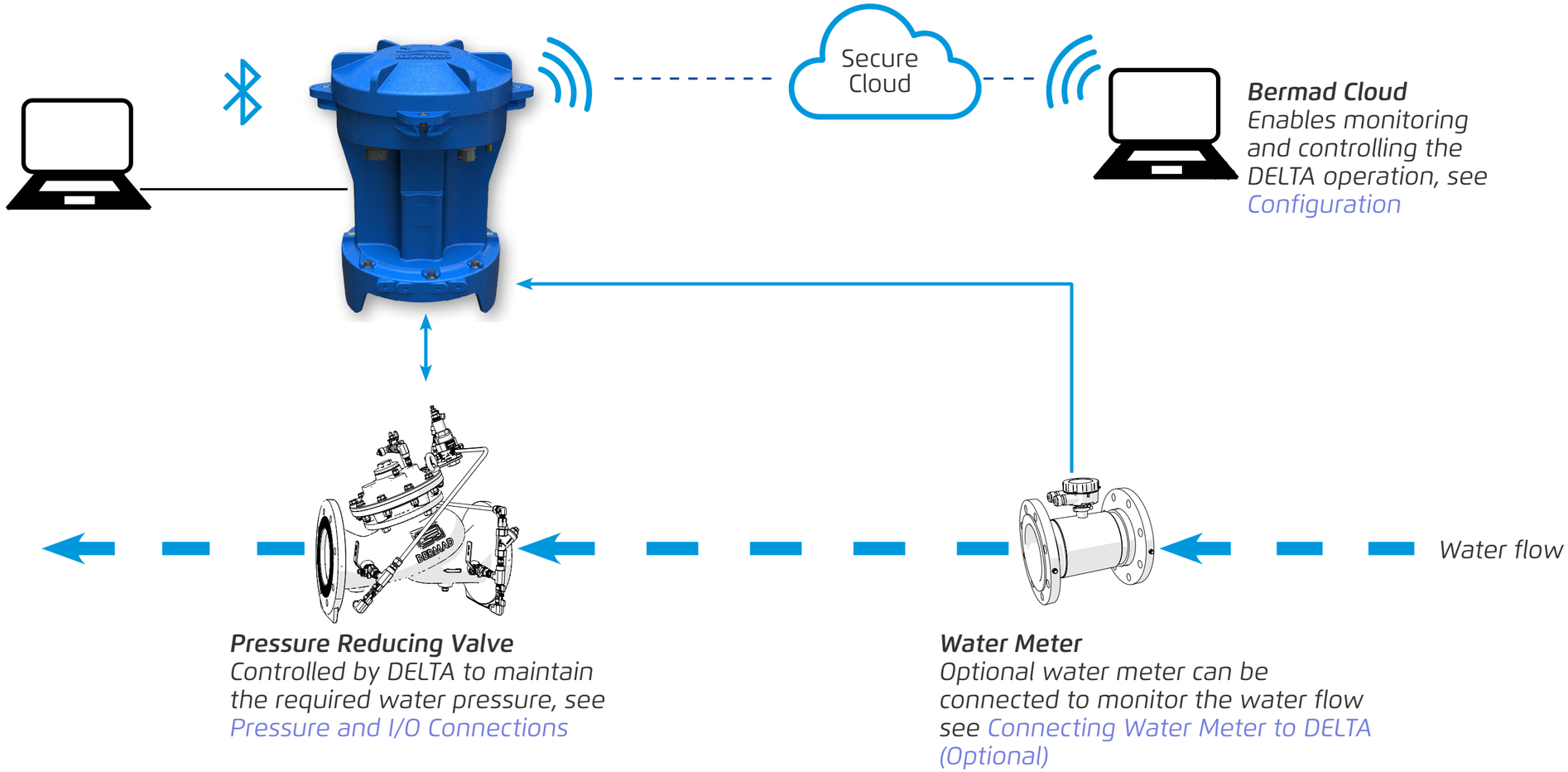
Application Features

- Full modulation pressure reducing with the DELTA internal solenoids and a bias chamber according to flow rate or time windows
- Two pressure regimes by switching between "Low" and "High" setpoints according to flow rate or time window (Day/Night)



Typical System Layout

The chart below illustrates a typical system layout:



Technician Software App
Connects to DELTA via a cable or bluetooth for initial calibration, see Connecting Technician Software to DELTA

Bermad Cloud
Enables monitoring and controlling the DELTA operation, see Configuration

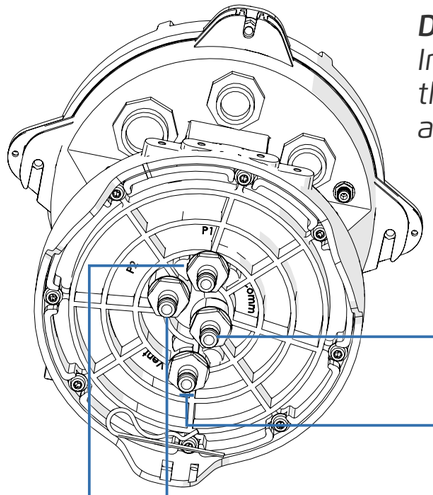
Pressure Reducing Valve
Controlled by DELTA to maintain the required water pressure, see Pressure and I/O Connections

Water Meter
Optional water meter can be connected to monitor the water flow see Connecting Water Meter to DELTA (Optional)

Water flow

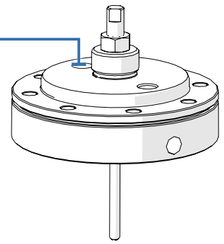
DELTA Controller

The DELTA controller includes the following:



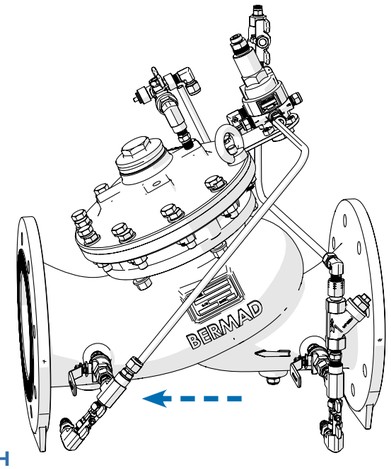
DELTA Controller
Includes analog sensors that measure the upstream and downstream pressures

Comm
Enables connection of the command tube to the PCBU



PCBU
The PCBU is installed on the pilot. Allows the DELTA to control the pressure see *Installing the Bias Chamber*

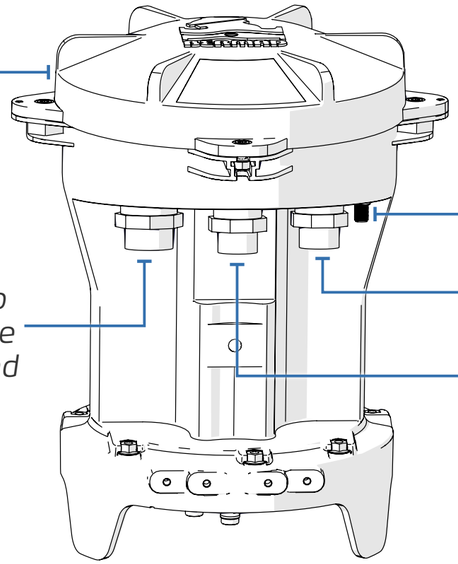
Vent Outlet
Drains the water from the PCBU



P2
Enables connection of the downstream water tube and pushes the water out in pulses via the internal solenoid

P1
Enables connection of the upstream water tube and pushes the water in pulses via the internal solenoid

Lid
Removable lid

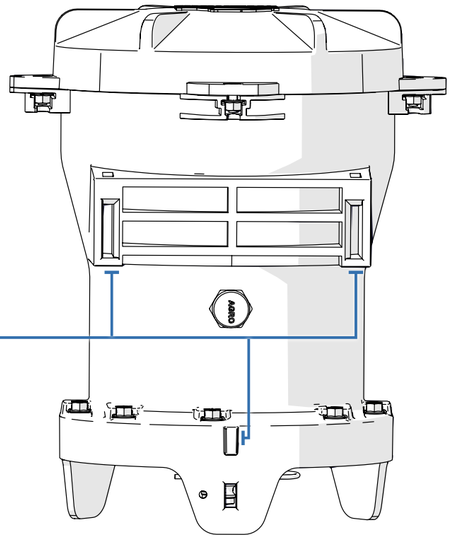


SMA
SMA connector for the antenna

USB Connection Port
Enables connecting a laptop with the technician software app for initial installation and connecting to an external power source

I/O connector

Water Meter Connector

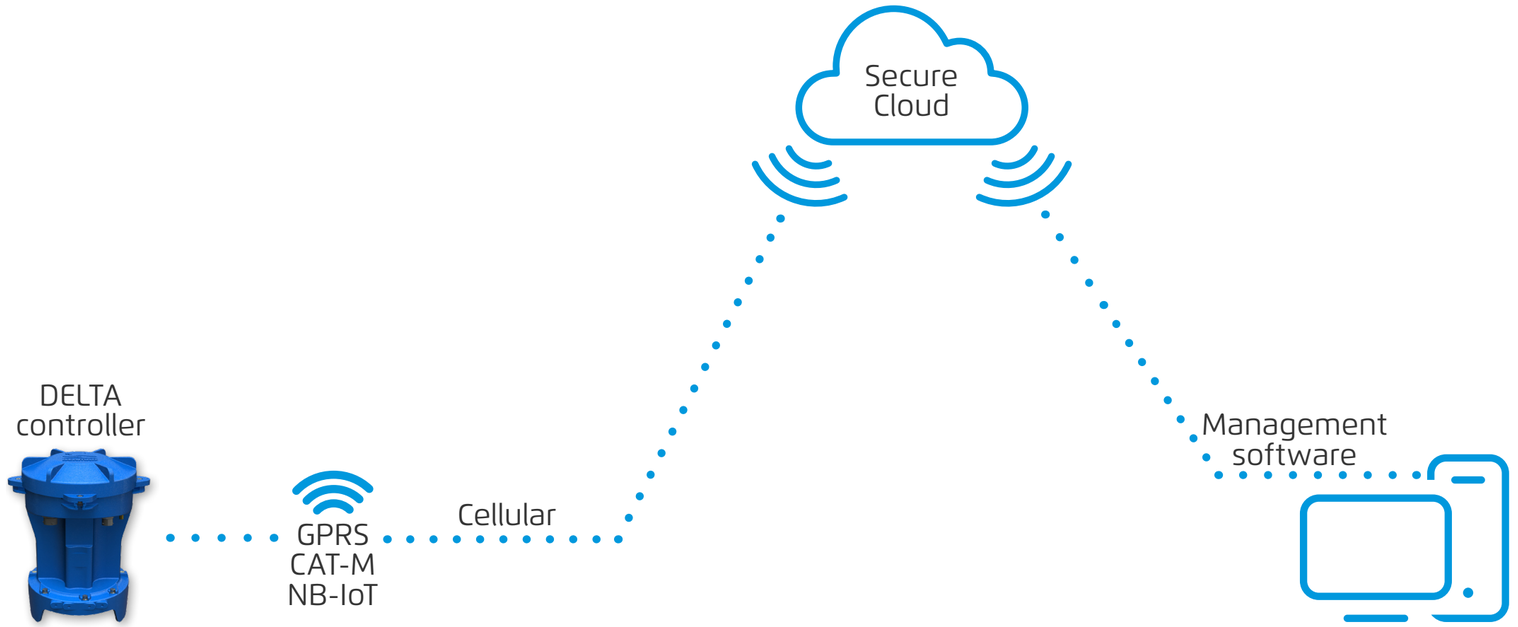


Mounting Grooves
Enables mounting on a wall mount bracket

Cloud Management System

BERMAD Cloud offers web-based internet access to the DELTA controller and includes the following features:

- Global management of all your DELTA controllers
- User friendly and intuitive control features
- Real time status and monitoring

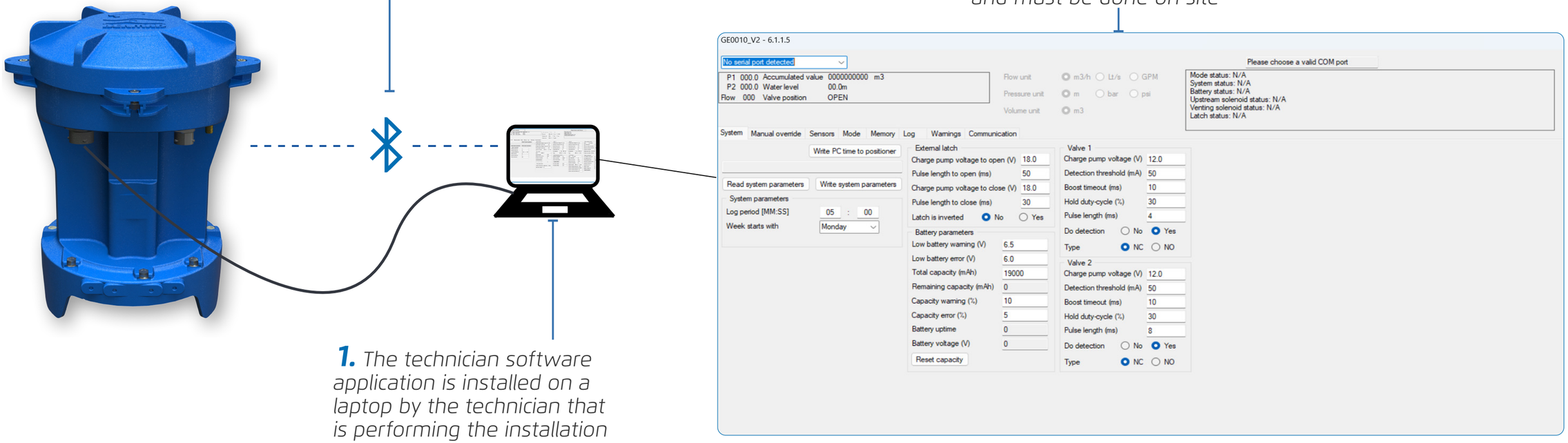


Technician Software Overview

The technician software app enables defining the controllers initial parameters.

2. *The laptop communicates with the DELTA via a cable or bluetooth*

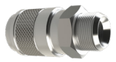
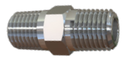
3. *The technician software application enables initial setup and calibration of the system and must be done on site*



1. *The technician software application is installed on a laptop by the technician that is performing the installation*

Installation Kit

This section reviews the installation kit.

Serial Number	Component	Description	QTY	Comments
06600N361		Nickel Plated Brass Quick Coupling DN5(F)X6mm Tube	4	
06600N360		Nickel Plated Brass Quick Coupling DN5(M)X6mm Tube	2	
060400N908		Nickel Plated Brass Quick Coupling DN5(F)X1/4''BSP(M)	2	
9901260055		1/4" S.S 316 2W 1PC BALL VALVE, H10 NPT 800PSI T HANDLE FEMALE-FEMALE (FP) type S20	2	
060404C122		S.S 316 HEX NIPPLE 1/4NPT(M) x 1/4NPT(M) - 122B	2	

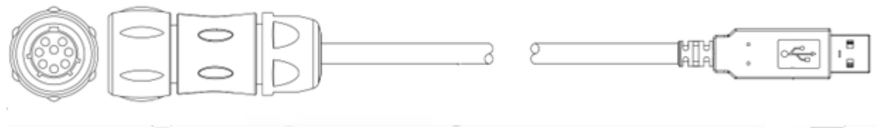
Serial Number	Component	Description	QTY	Comments
060404C116		S.S 316 STREET ELBOW 1/4NPT(M) x 1/4NPT(F) - 116B	2	
500401CU90		BRASS PCBU 2X1 ASSY.	1	 The PCBU as standard assembled with this angle fitting: 066008N934 - NICKEL PLATED BRASS PUSH IN FITTING ELBOW 6mmX1/8"BSPT(M)
070400P010		LLDPE John Guest tube, 6mm, BLACK - 10 meter	10m	

NOTE: 2 Wires flow meter cable, USB Technician cable and 5 or 14 wires I/O, external power cable are NOT part of the kit and need to be ordered separately.
Bracket for mounting the DELTA on 700 SIGMA actuator can be ordered separately, code: 25300SD320_U

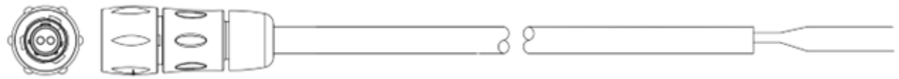
Cables Index

This section reviews the various cables.

BDD0000038 - DELTA 3 Wire Cable with SOURIAU Connector UTS6JC12E8S and USB, L=2.5M for Technician Software		
Label	**Function**	**Color**
-	USB Plug	**Black**



BDD0000034 - DELTA 2 Wire cable With SOURIAU Connector UTS6JC8E2S L=2.5M for Flow Meter		
Label	**Function**	**Color**
A	Digital Input 1	**Red**
B	Digital Input 1 - COM	**Black**



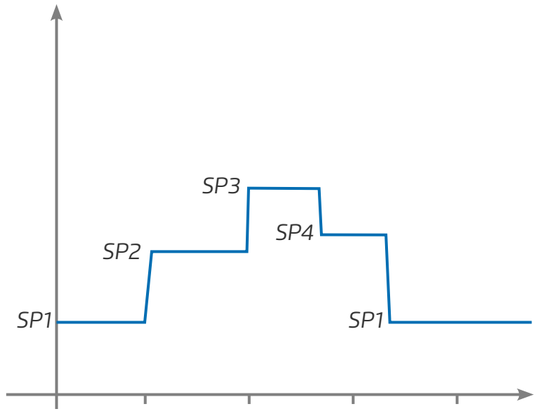
BDD0000037 - DELTA 5 Wire Cable with SOURIAU Connector UTS6JC12E8S L=2.5M for External Power & MODBUS		
Label	**Function**	**Color**
D	COM	Gray
E	RS485 -	Orange
F	RS485 +	Green
G	External Power (-)	**Black**
H	External Power (+)	**Red**

BDE0000010 - DELTA & EPSILON 14 Wire Cable with SOURIAU Connector UTS6JC12E14S L=2.5M for External Latch, Digital & Analog Inputs		
Label	**Function**	**Color**
A	Latch Solenoid Output (+)	**Black**
B	Latch Solenoid Output (-)	**Red**
C	Digital Input 1	Orange
D	Digital Input 1 - COM	**Green**
E	Digital Input 2	**Blue**
F	Digital Input 2 - COM	Gray
R	Digital Input 3	White
H	Digital Input 3 - COM	**Brown**
J	Analog Input 1	**Purple**
K	Analog Input 1 - COM	Light Purple
L	Analog Input 1 Power	**Navy Blue**
M	Analog Input 2	**Light Green**
N	Analog Input 2 - COM	Yellow
P	Analog Input 2 Power	**Pink**

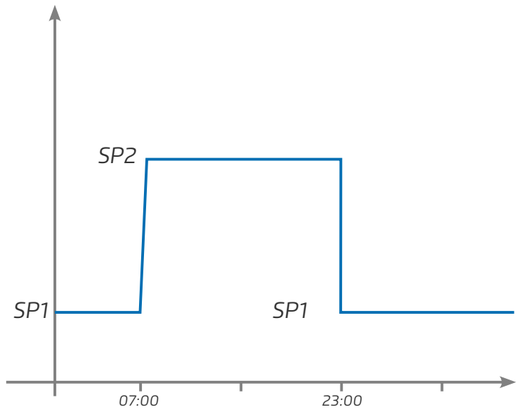
Modes of Operation

The DELTA consists of two modes of operation:

Full Modulation Mode
Enables setting multiple water pressure set points. (see Full Modulation by Time and Full Modulation by Flow)



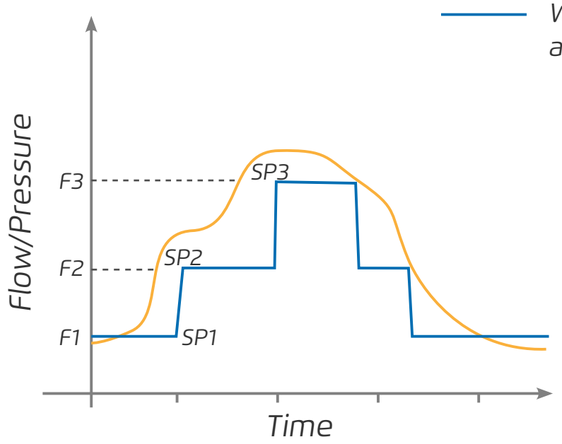
Two Pressures Settings
Enables setting two water pressure set points (see Two Pressures (High / Low))

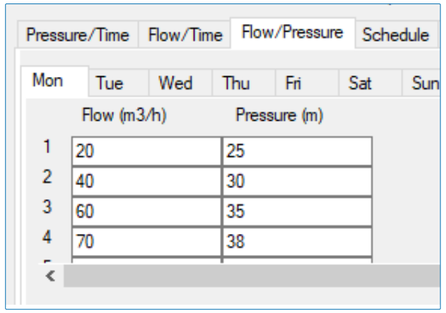


Modes of Pressure Control

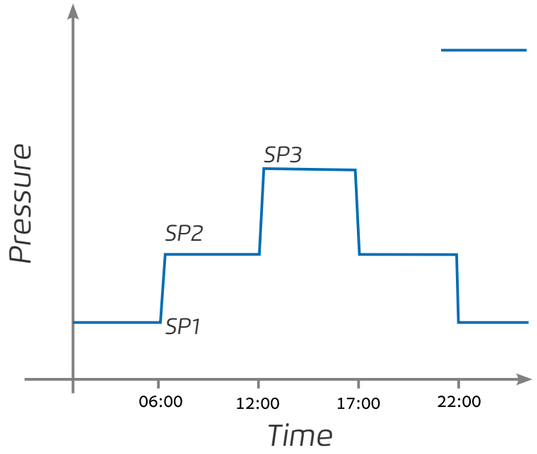
The pressure can be controlled by two modes:

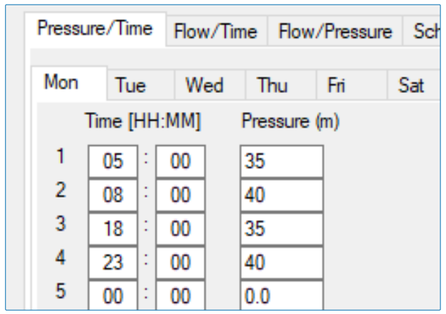
Controlled by FLOW
The water pressure is adjusted according to the water demand (see Full Modulation by Flow)





Controlled by TIME
The water pressure is adjusted according to a predefined schedule (see Full Modulation by Time)





3. INSTALLATION

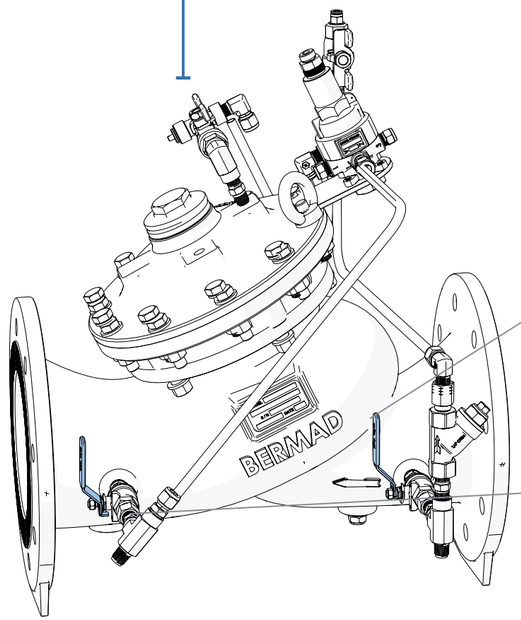
This chapter reviews DELTA installation and includes:

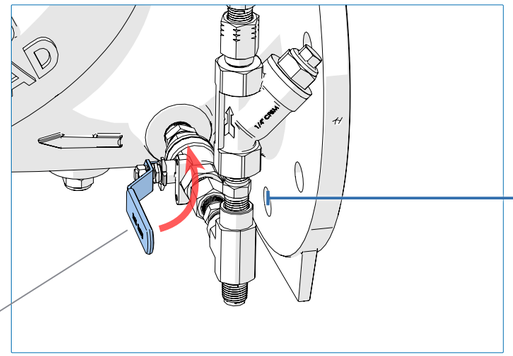
- Adding Fittings to Valve
- Mounting DELTA to Bracket
- Connecting Technician Software to DELTA
- Pressure and I/O Connections
- Installing the Bias Chamber
- Setup and Calibration

Adding Fittings to Valve

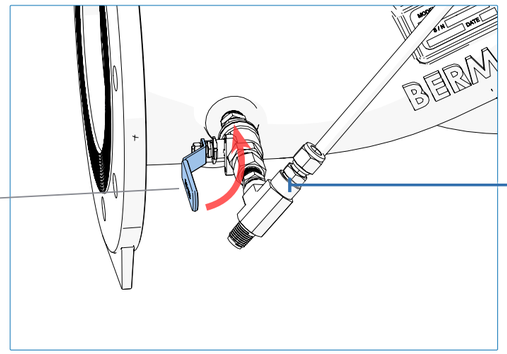
Perform the following steps to install fittings to the pressure reducing valve:

1. *Shut off the control cock valve to maintain the pressure in the mainline*



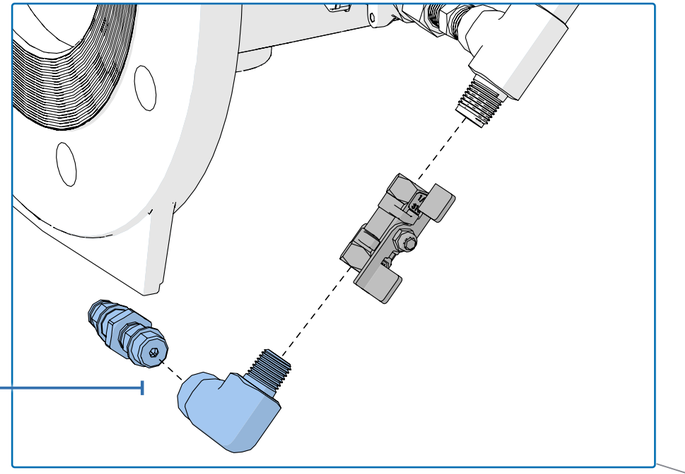


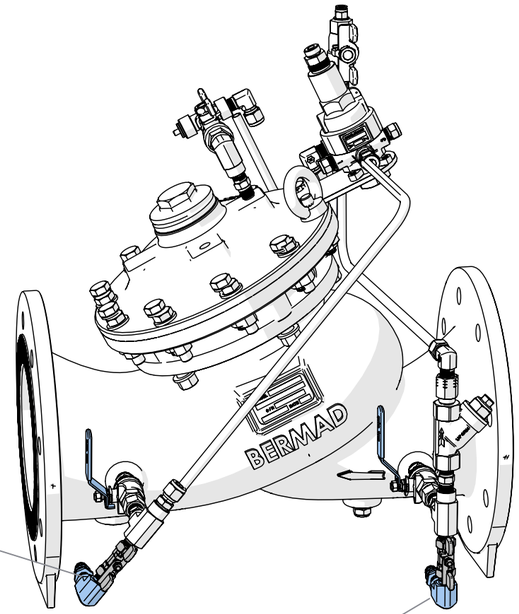
2. *Shut off the Upstream cock valve*



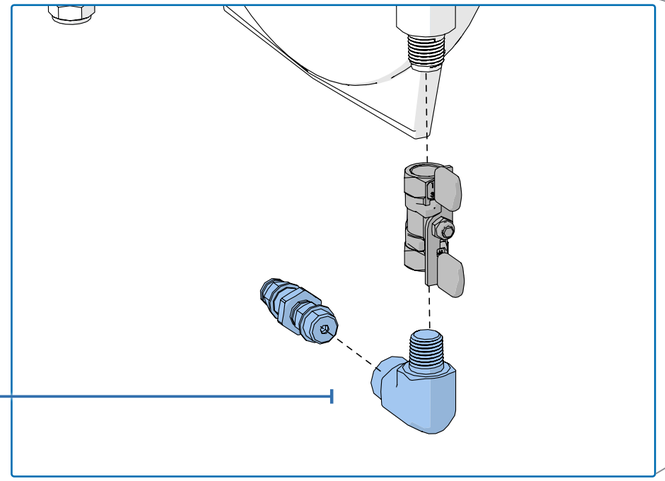
3. *Shut off the Downstream cock valve*

4. *Connect fittings to the downstream outlet*





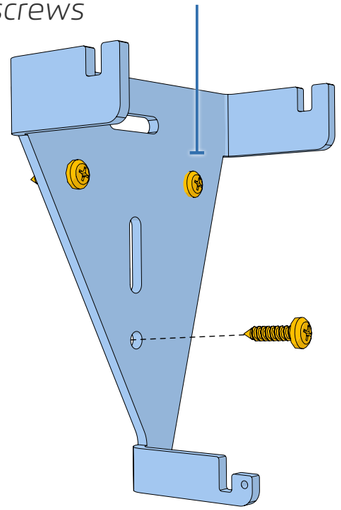
5. *Connect fittings to the upstream outlet*



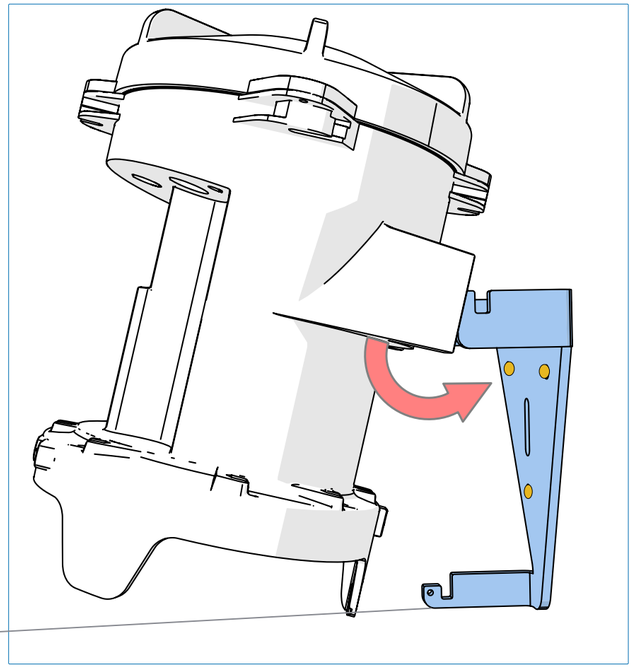
Mounting DELTA to Bracket

Perform the following steps to mount the DELTA controller to a wall or a valve chuck:

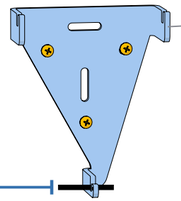
1. *Attach the mounting bracket to the wall using three screws*



2. *Connect the DELTA Controller to the mounting bracket by snapping it into place using the three grooves and pushing it down*



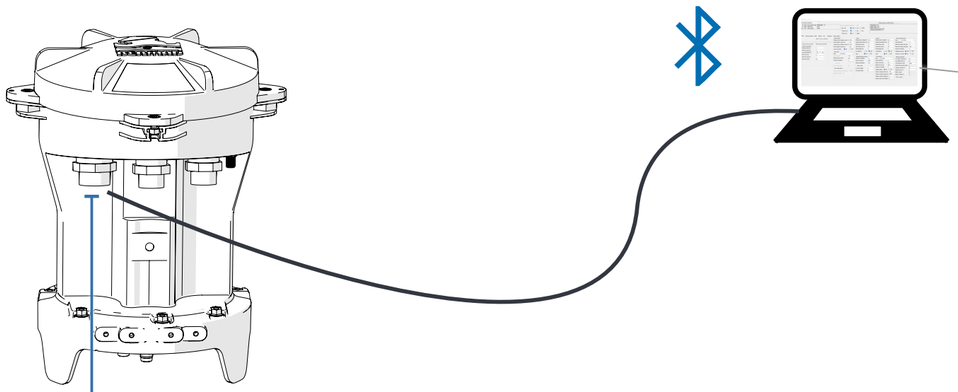
3. *Insert the securing pin to secure the DELTA in place*



Connecting Technician Software to DELTA

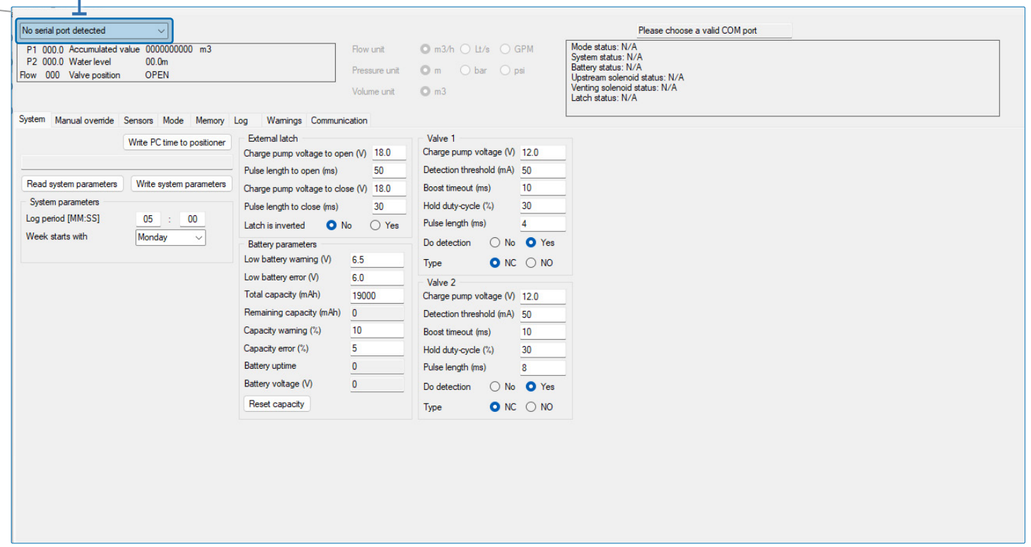
Perform the following steps to connect the technician software to the DELTA controller:

1. *The technician software is sent by the clients contact person from BERMAD*



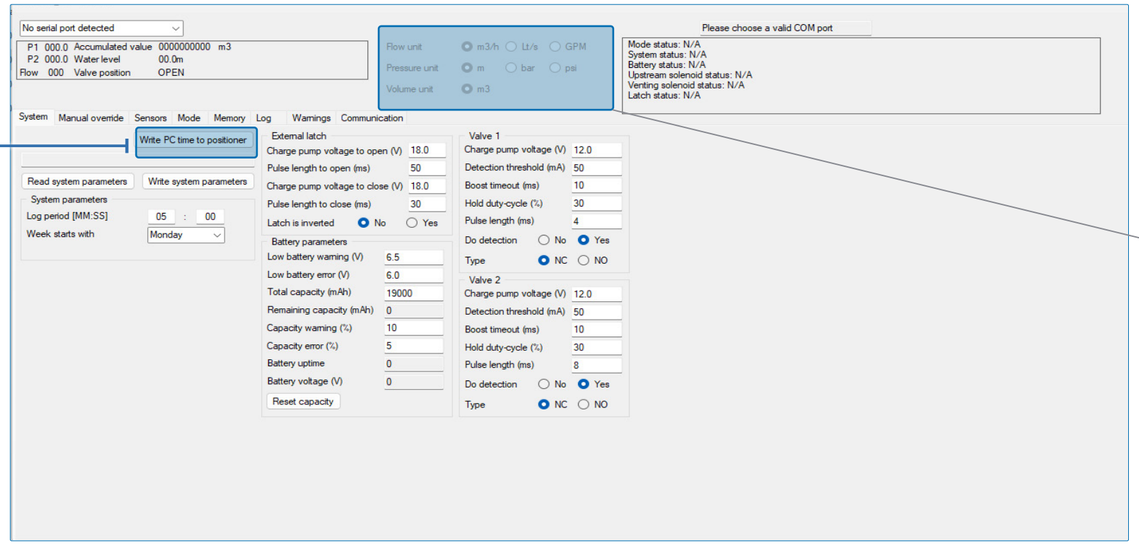
2. *Pair the laptop to the DELTA via bluetooth or a cable to the USB connection port*

3. *Select the laptop COM port*

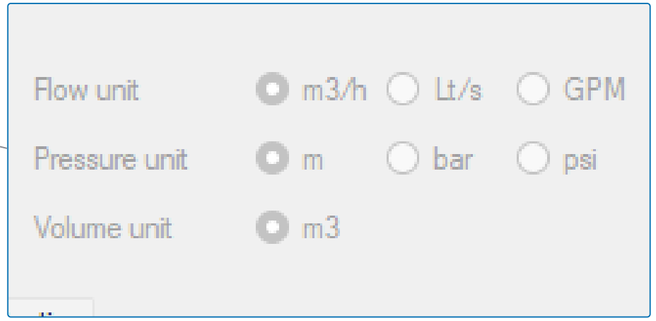


NOTE: Click 'Write System Parameters' to download the software to the controller.

4. *Displays the time the controller is set to. Click 'Write PC time to Positioner' so the DELTA will have the correct time zone.*



5. *Select the measurement units for the Flow, Pressure and Volume values*



Pressure and I/O Connections

This section reviews connecting tubes and cables to the DELTA controller and includes:

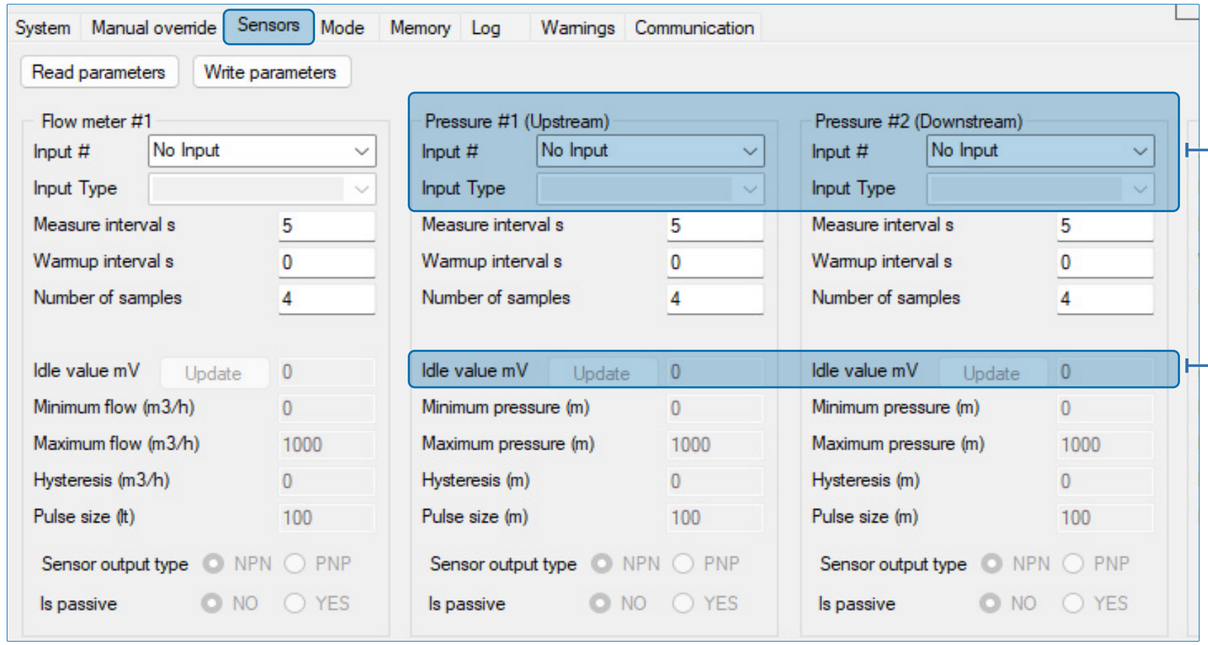
- Internal Pressure Sensors Reset
- Connecting to Upsteam Outlet
- Connecting to Downstream Outlet
- Connecting Command Tube
- Connecting Water Meter to DELTA (Optional)

Internal Pressure Sensors Reset

Perform the following steps to update the internal pressure sensors:

NOTE: Click 'Write Parameters' to save any changes that are made at each screen.

1. *From the app, Select the* ***Sensors*** *tab*

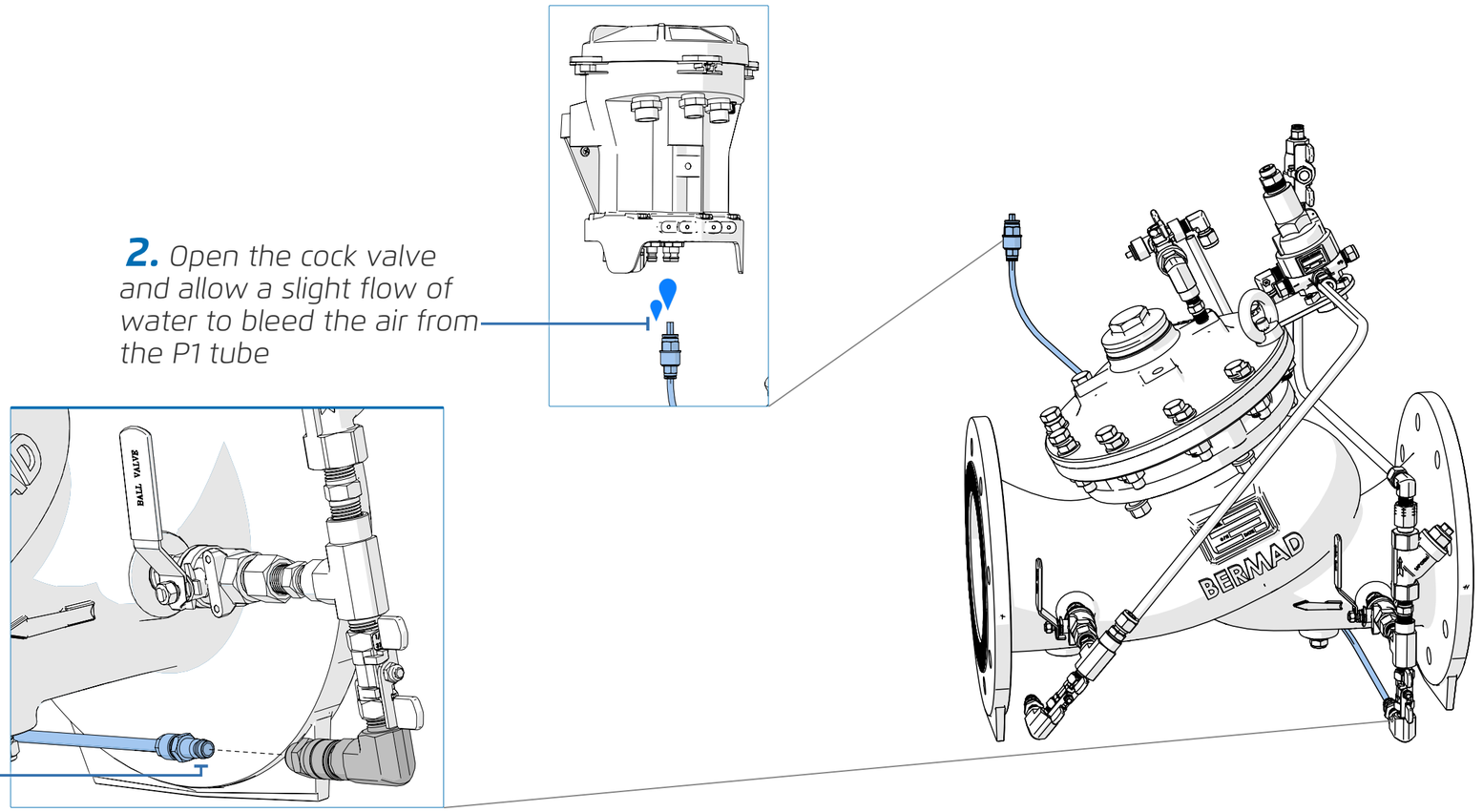


2. *Select the type of input and the channel to which the pressure sensors are connected*

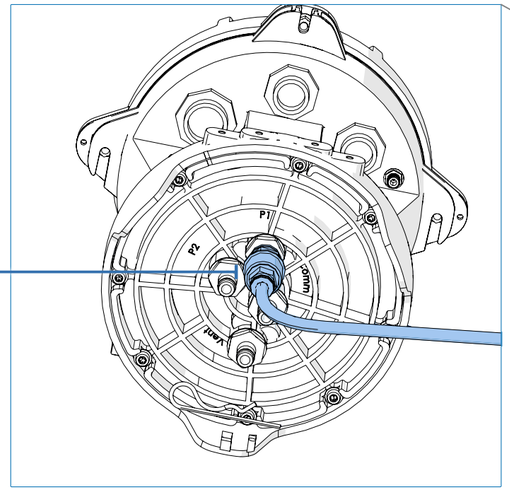
3. *Click* ***Update*** *to update sensors*

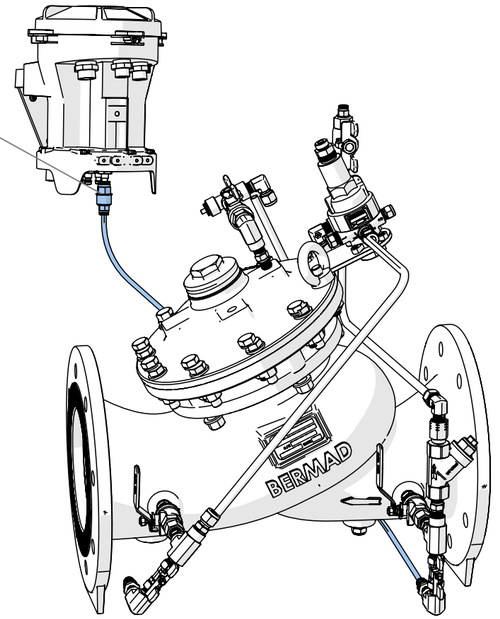
Connecting to Upsteam Outlet

Perform the following steps to connect the DELTA to the upstream outlet:



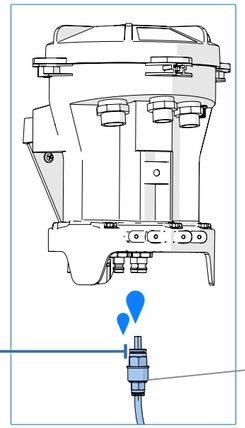
3. *Connect the other end of the P1 tube to the P1 port on the controller*



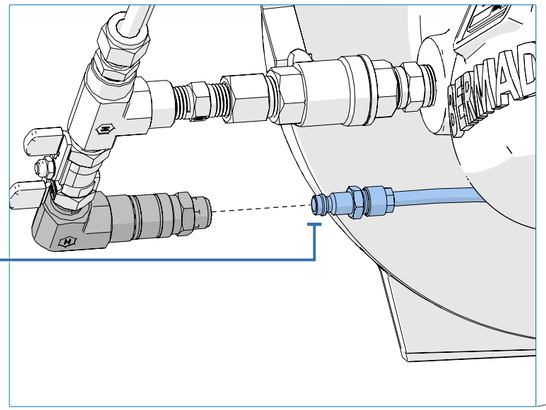


Connecting to Downstream Outlet

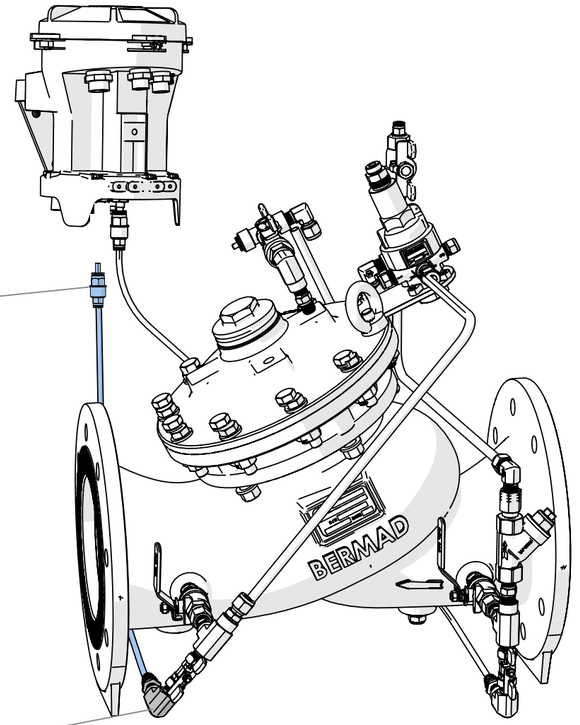
Perform the following steps to connect DELTA to the downstream outlet:



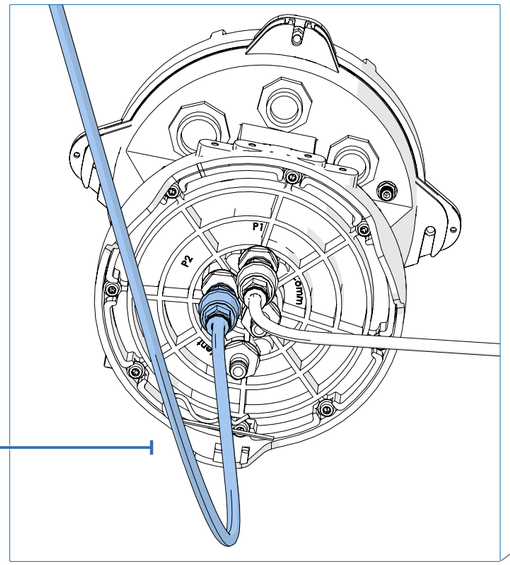
2. *Open the cock valve and allow a slight flow of water to bleed the air from the P2 tube*

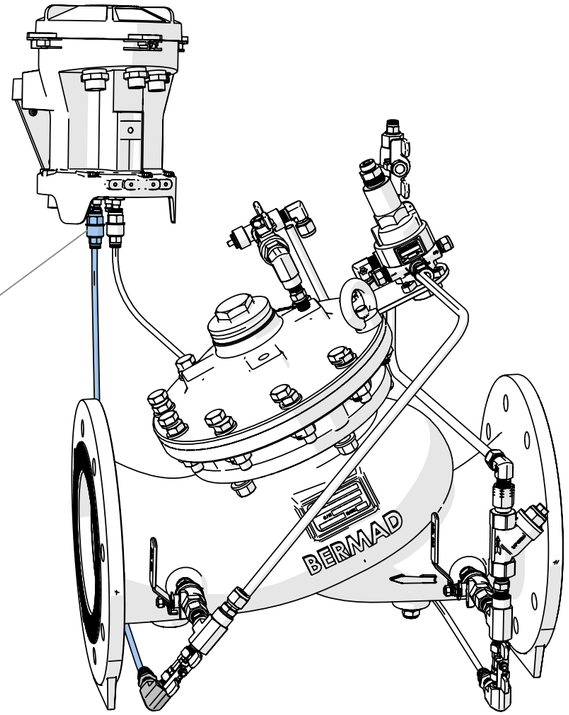


1. *Connect the P2 tube to the P2 fitting on the downstream outlet*



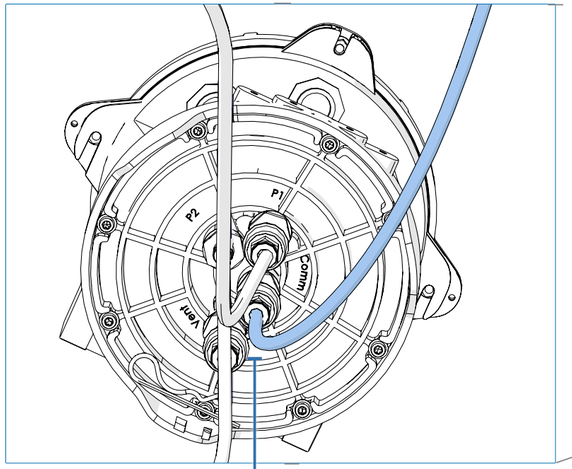
3. *Connect the other end of the P2 tube to the P2 port on the controller*

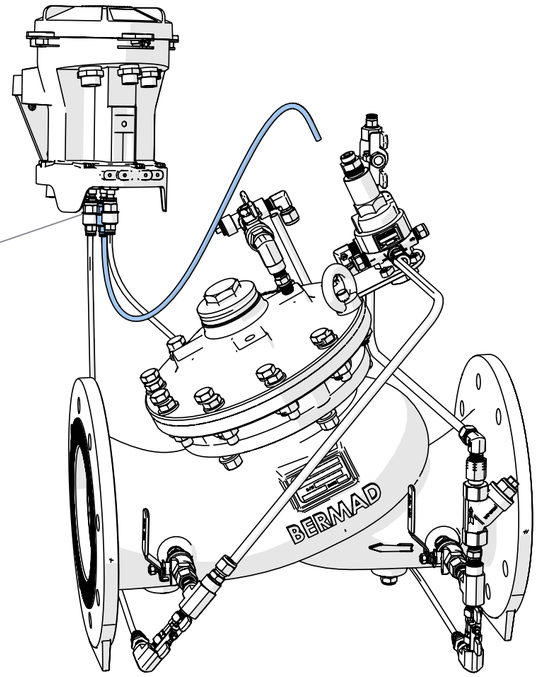




Connecting Command Tube

Perform the following to connect the command tube:





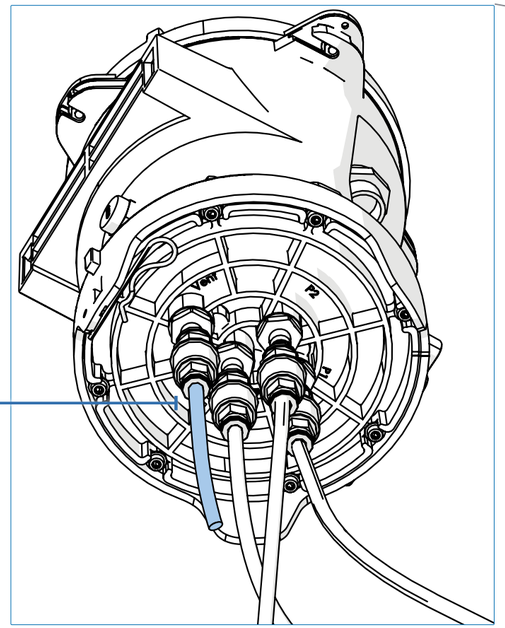
1. *Connect the command tube to the Comm port on the controller*

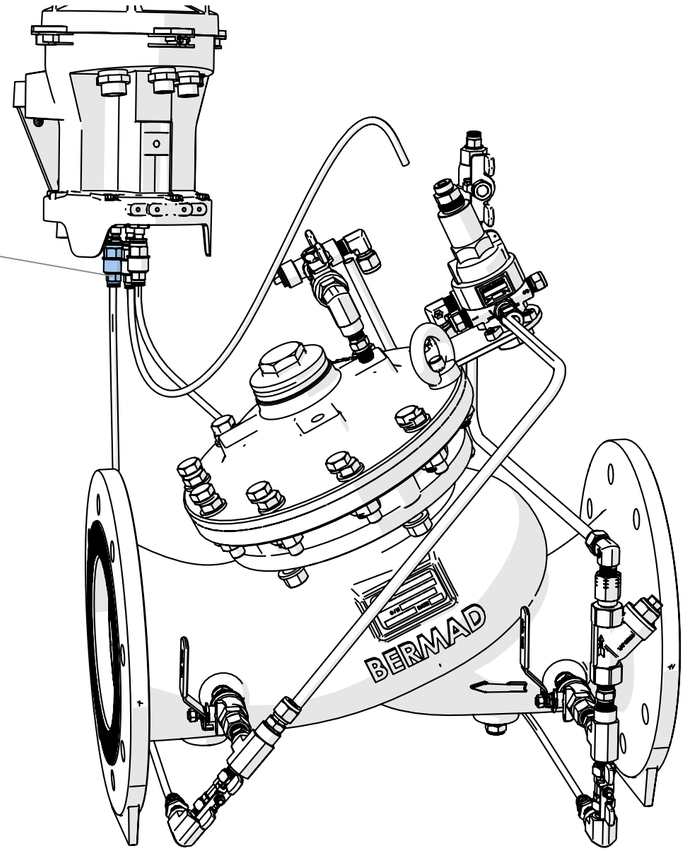
NOTE: Connect the other end of the command tube to the PCBU after bleeding the excess air see Bleeding Air from the PCBU.

Connecting Vent Tube

Perform the following to connect the vent tube:

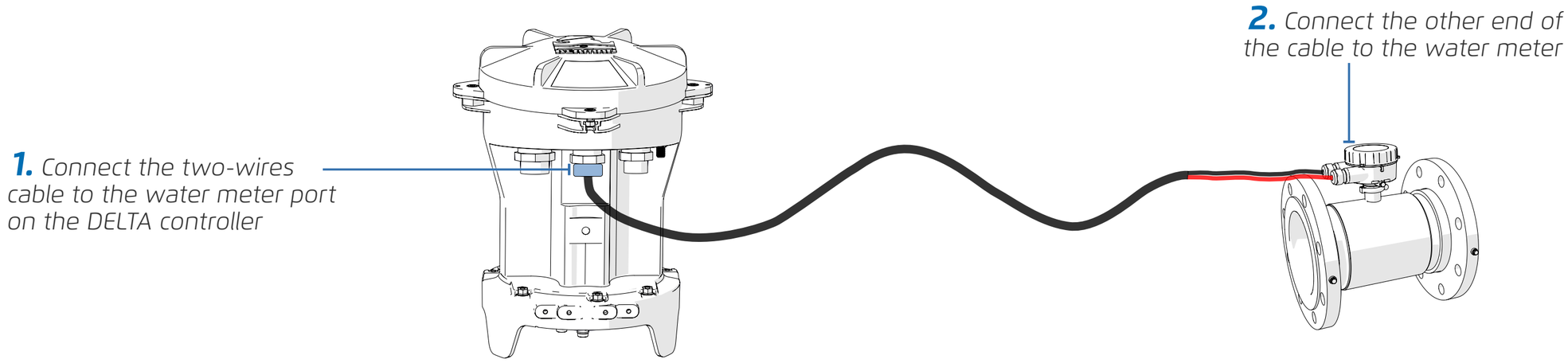
1. *Connect the vent tube for directing the dripping water downwards*





Connecting Water Meter to DELTA (Optional)

Perform the following steps to connect a water meter to DELTA:



Installing the Bias Chamber

This section reviews installing the bias chamber and includes:

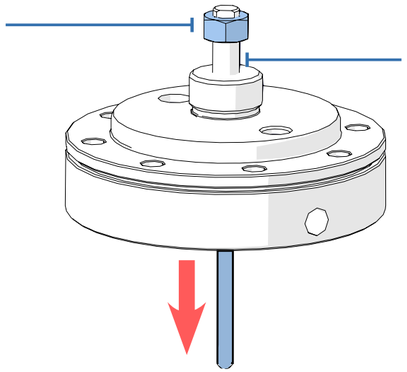
- Preparation of the PCBU
- Preparation of the Pilot Valve
- Connecting the PCBU to Pilot
- Air Release From the Control Tube
- Bleeding Air from the PCBU
- Increasing the Pressure to Maximum Level
- Decreasing the Pressure to Minimum Level

Preparation of the PCBU

Perform the following steps to prepare the PCBU:

1. *Remove the cover*

2. *Release the lock nut of the top screw*



3. *Tighten the top screw of the PCBU all the way down, to its maximum depth*

Preparation of the Pilot Valve

Perform the following steps to prepare the pilot valve:

1. *Remove the cover*

2. *Release the secure nut*

3. *Remove the adjustment screw from the pilot valve*

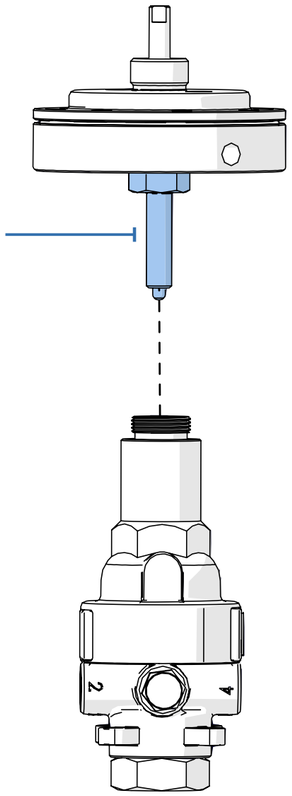
Connecting the PCBU to Pilot

Perform the following steps to connect the PCBU to the pilot valve:

Setting the Maximum Pressure

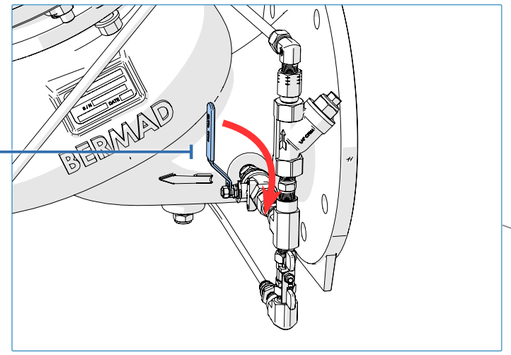
Perform the following steps to set the PCBU to the maximum level:

1. *Very slowly tighten the PCBU onto the pilot valve and stop when the spring tension of the pilot is felt*

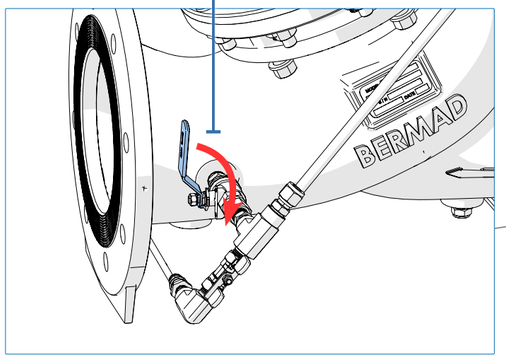


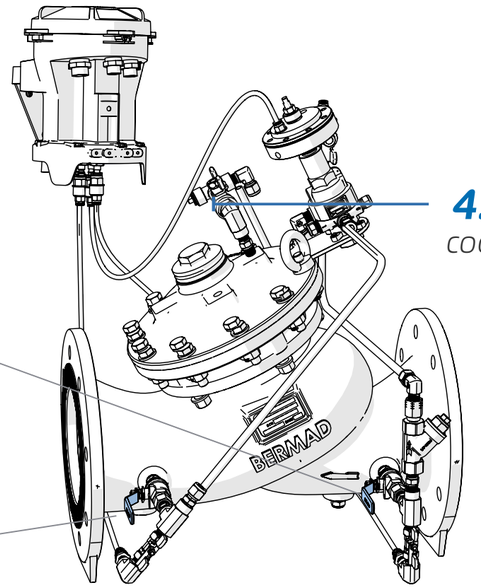
WARNING: Increase the pressure gradually. Tighten the PCBU onto the pilot valve very slowly.

2. *Open the Upstream cock valve*



3. *Open the Downstream cock valve*

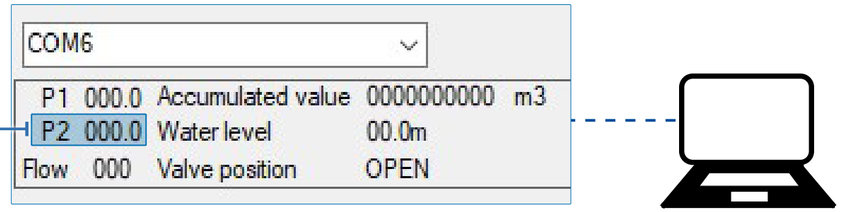




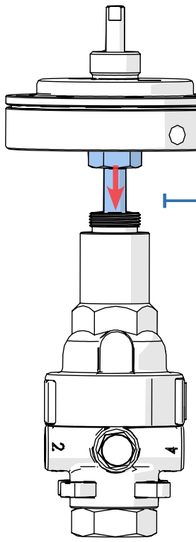
4. *Open the control cock valve*

WARNING: Increase the pressure gradually. Tighten the PCBU onto the pilot valve very slowly.

5. *The pressure reading in the P2 will rise as the PCBU is tightened. The pressure is displayed in the technician software*



6. *Stop tightening when the maximum pressure is 4-5 metres <u>above</u> the highest setpoint that will be defined*



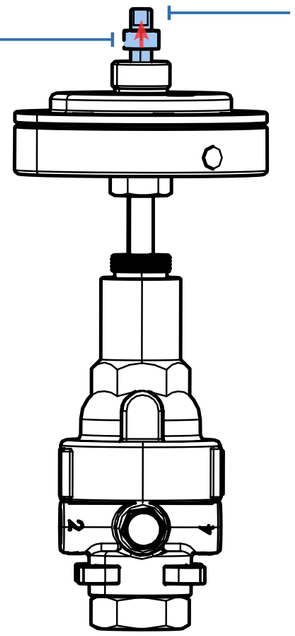
7. *Lock the lower nut until it reaches the top of the pilot valve*

Setting the Minimum Pressure

Perform the following steps to set the PCBU to the minimum pressure:

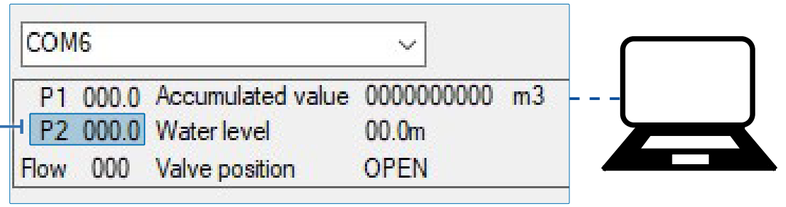
WARNING: Reduce the pressure gradually. Loosen the PCBU screw very slowly.

1. *Loosen the upper lock nut*

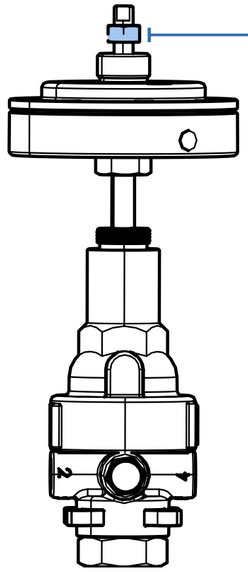


2. *Very slowly loosen the upper screw of the PCBU*

3. *The pressure reading in the P2 will decrease as the upper screw is loosened. The pressure is displayed in the technician software*



4. *Stop loosening when the minimum pressure is 4-5 metres lower than the minimal setpoint that will be defined*

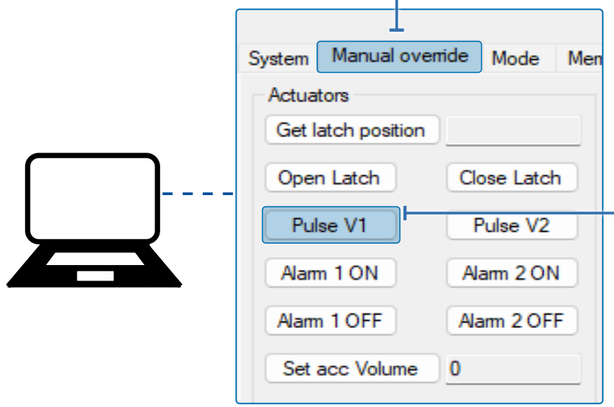


5. *Tighten the upper lock nut*

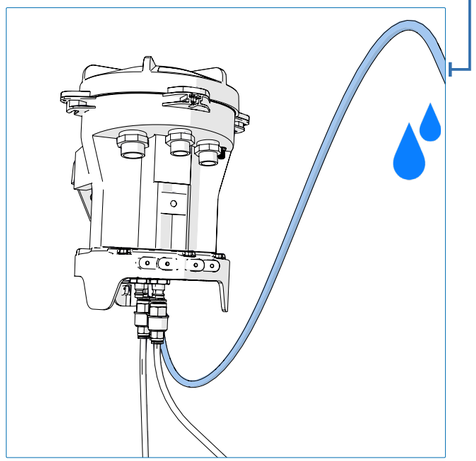
Air Release From the Control Tube

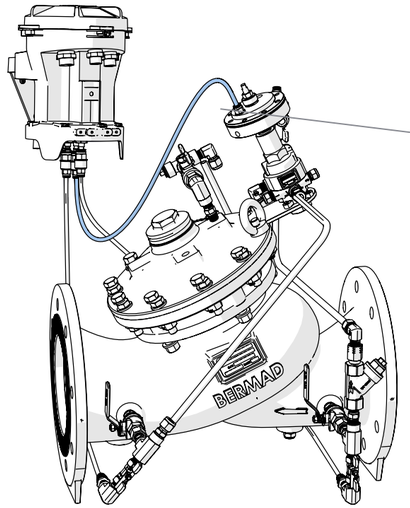
Perform the following steps to release the air from the control tube:

1. *Select the* ***Manual Override*** *tab in the technician software*

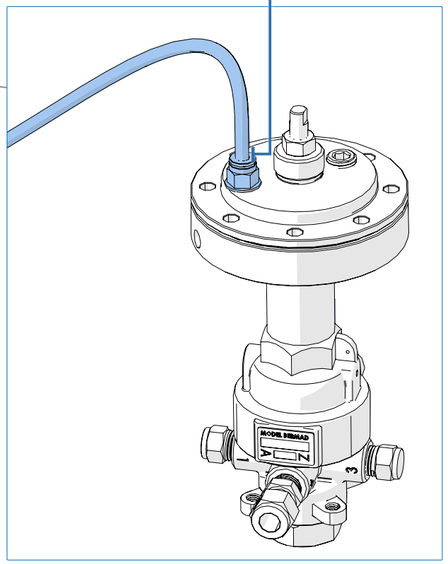


2. *Click* ***Pulse V1*** *repeatedly until water is released from the command tube and the tube is completely filled with water*





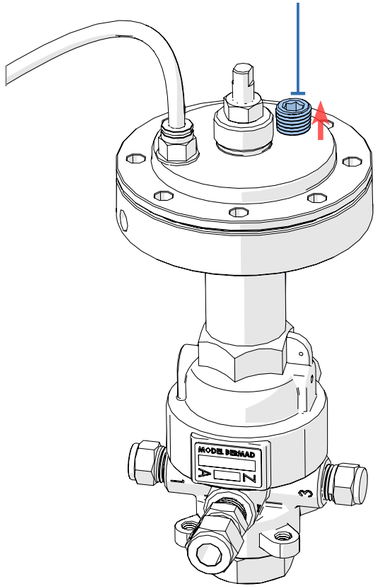
3. *Connect the other end of the command tube to the PCBU*



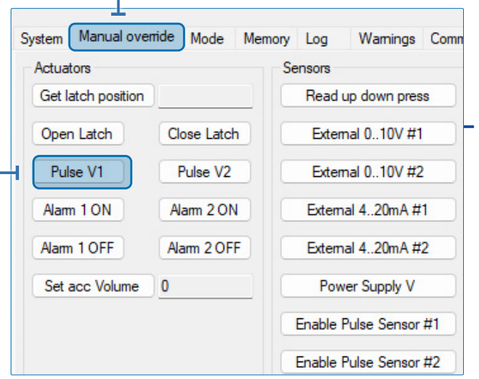
Bleeding Air from the PCBU

Perform the following steps to bleed the air from the PCBU:

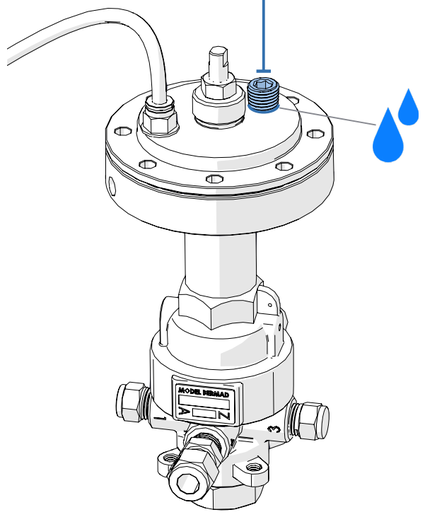
1. *Loosen the air release screw*

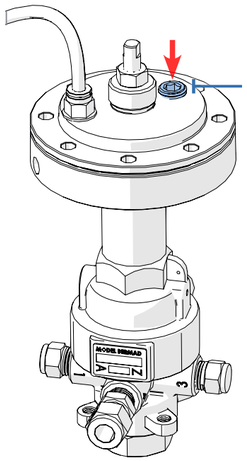


2. *Select the* ***Manual Override*** *tab*



3. *Click* ***Pulse V1*** *repeatedly to bleed the air from the PCBU until water is released.*



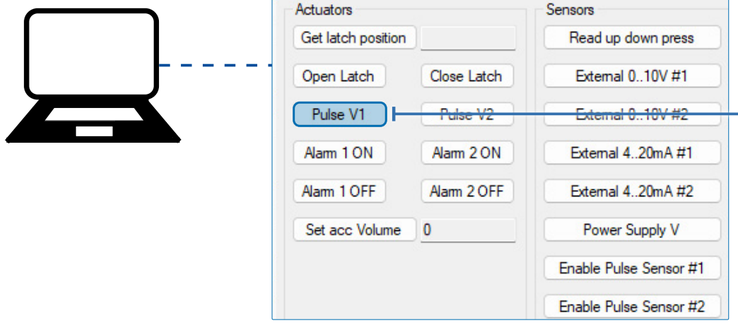


4. *Tighten the air release screw once all excess air has been released.*

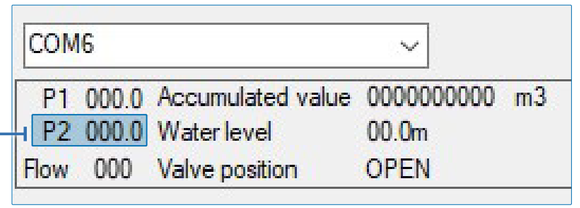
Increasing the Pressure to Maximum Level

Perform the following steps to increase the pressure to the maximum level to verify calibration:

1. *Select the* ***Manual Override*** *tab*



2. *Click* ***Pulse V1*** *repeatedly to increase the pressure until the mechanical limitation is reached and the P2 stops rising*



CAUTION: This process should be carried out very slowly in order to avoid water shock and burst in the pipeline.

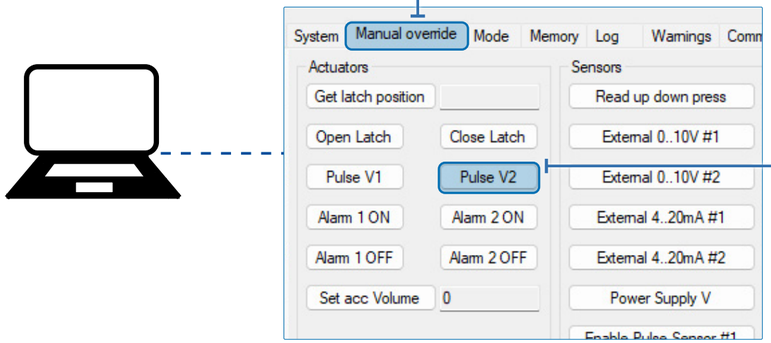
3. *Click* ***Pulse V1*** *and verify that the P2 reading does not exceed the maximum pressure limit*

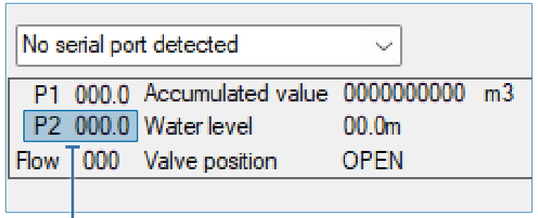
NOTE: If the pressure exceeds the defined limit, restart the calibration process see Connecting the PCBU to Pilot.

Decreasing the Pressure to Minimum Level

Perform the following steps to decrease the pressure to the minimum level to verify calibration:

1. *Select the **Manual Override** tab*



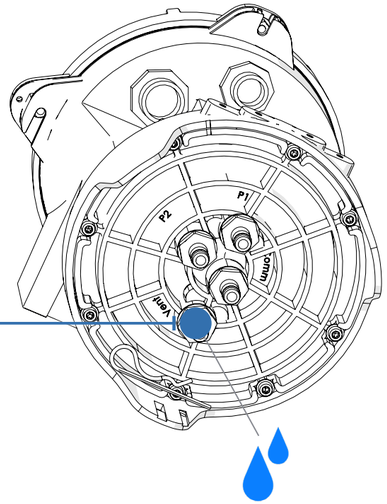


2. *Click **Pulse V2** repeatedly to decrease the pressure until the mechanical limitation is reached and the P2 value stops dropping*

CAUTION: This process should be carried out very slowly in order to avoid water shock and burst in the pipeline.

3. *Click **Pulse V2** and verify that the P2 reading does not drop below the minimum pressure limit*

4. *The water from the PCBU is released from the vent output on the DELTA controller*



NOTE: If the pressure drops below the defined limit, restart the calibration process see Connecting the PCBU to Pilot.

Setup and Calibration

This section reviews setup and calibration and includes:

- Setting Pressure Management Parameters
- Setting Operational Mode Parameters
- Verifying DELTA Reaches the Setpoint Automatically
- Verifying DELTA Connects to Bermad Cloud

Setting Pressure Management Parameters

Perform the following to define the pressure management parameters:

System Parameters

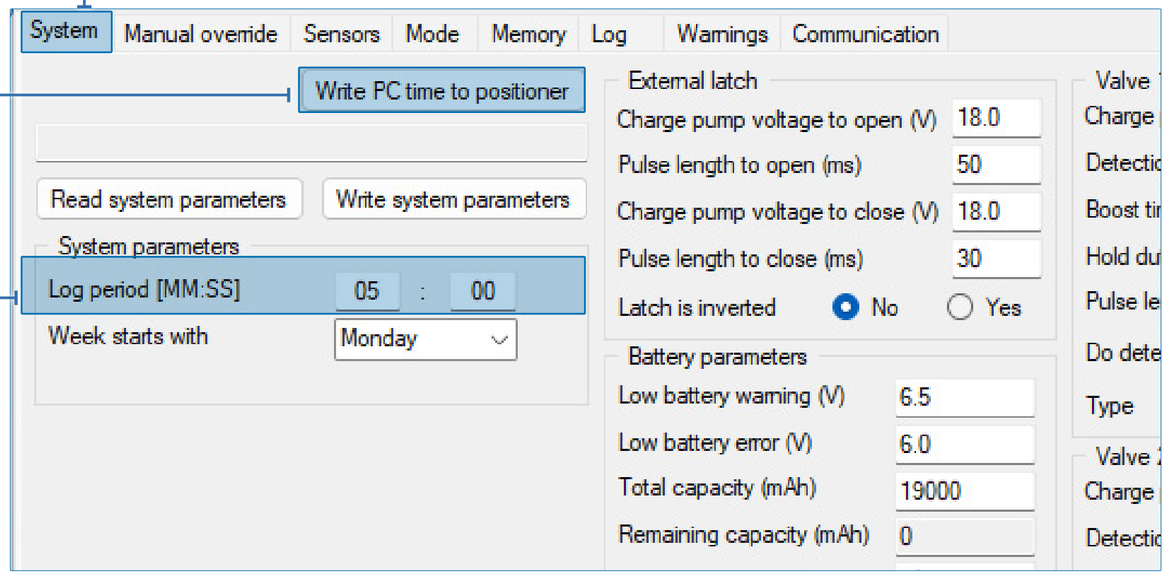
Define the following parameters in the system tab:

NOTE: Click 'Write Parameters' to save any changes that are made at each screen.

1. *From the app, select* ***System***

2. *Click* ***Write PC time to positioner*** *to set the local time*

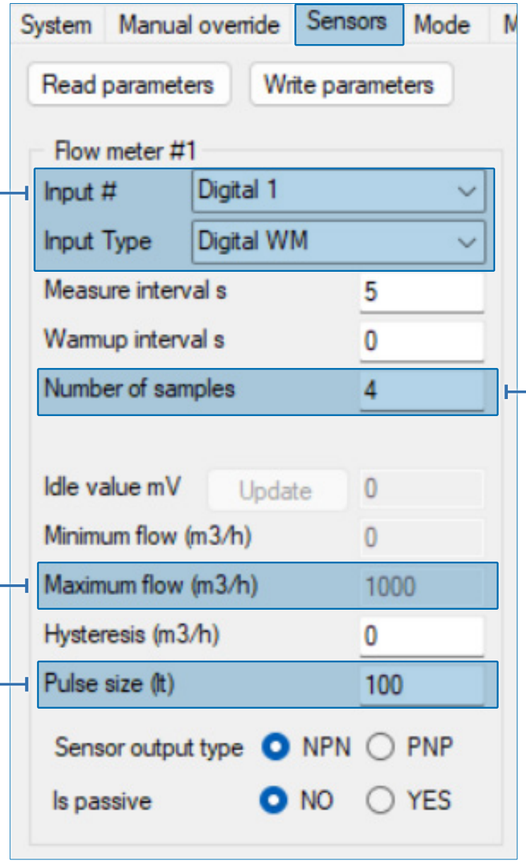
3. *Define how often to log the measure into the controller chart*



Defining Sensors Parameters

Perform the following to set the flow meter parameters:

1. *Select the **Sensors** tab*



2. *Select the type of flow meter input (analog or digital) and the channel to which the flow meter is connected*

3. *Define the amount of pulses used to calculate the average flow.*

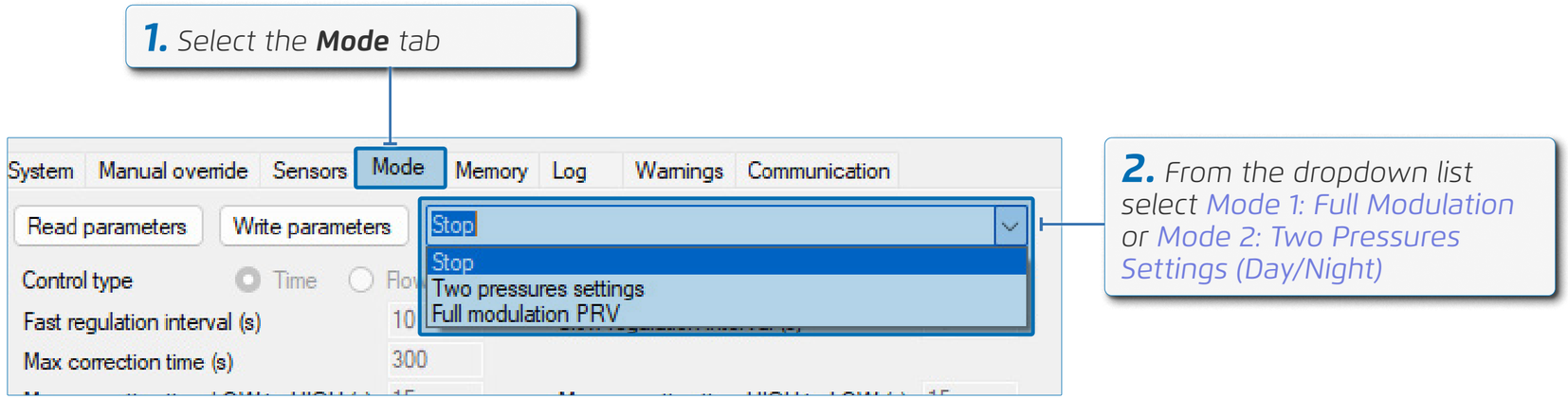
4. *Define the maximum water flow (m3/h) (This option is relevant for analog input only)*

5. *Define the pulse size in liters (This option is relevant for digital input only)*

NOTE: Click 'Write Parameters' to save any changes that are made at each screen.

Setting Operational Mode Parameters

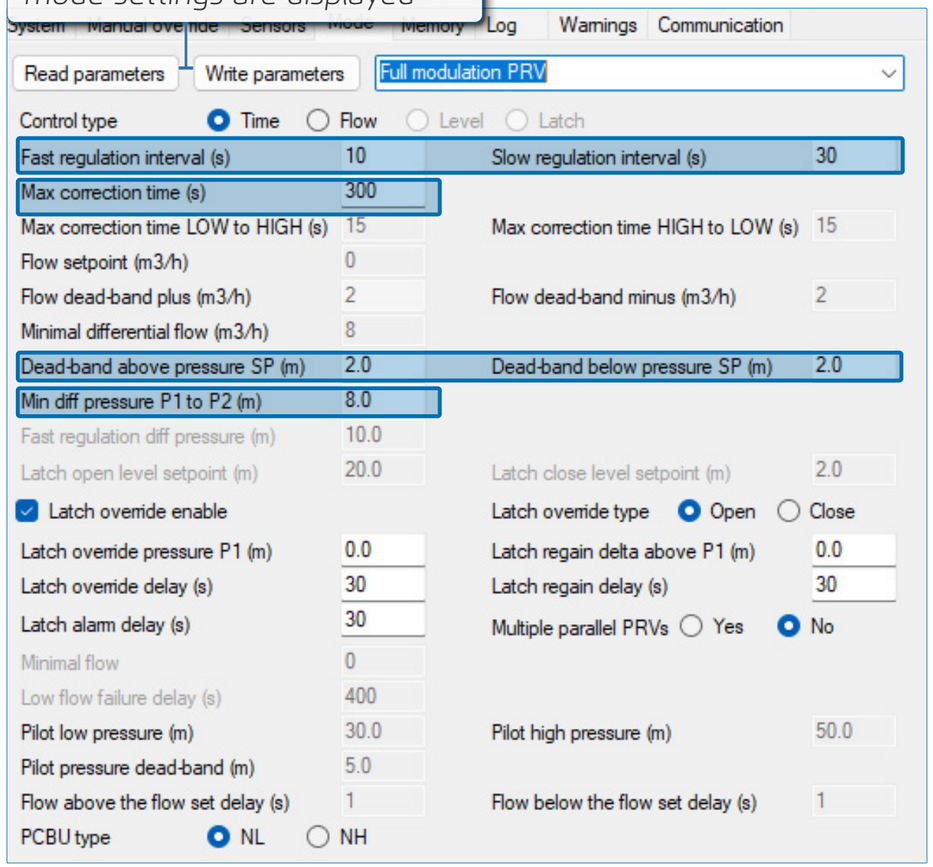
Select the desired operation mode and define it's parameters:



Mode 1: Full Modulation

Define the following parameters in the mode tab:

1. *After selecting* ***Full Modulation PRV****, the controller's mode settings are displayed*

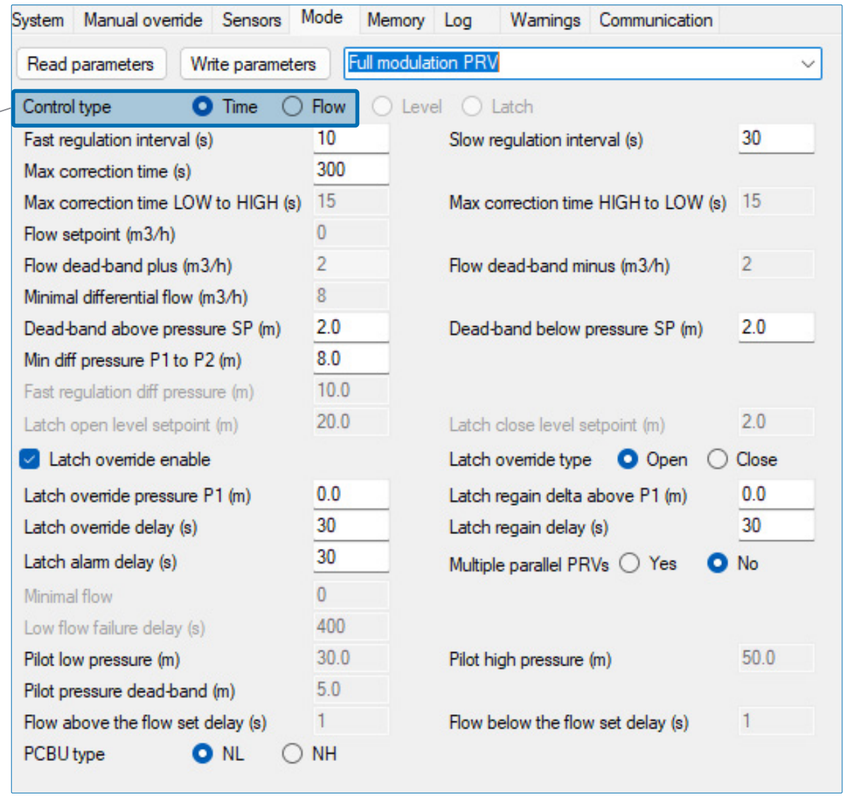


2. *Define the following parameters:*

Fast regulation interval (s)	The time between each internal solenoid pulse when the pressure setpoint is changed. This interval is used only while the pressure setpoint has changed and until the pressure reached the new setpoint.
Slow regulation interval (s)	The time between internal solenoid pulses that is used during normal operation while the system maintains the pressure around the defined setpoint.
Max correction time (s)	Enables sending an alert after the defined amount of time if the setpoint did not change, and suspends further attempts to reach the set point until the next time/flow window.
Dead-band above pressure SP (m)	Enables setting a deadband value above the setpoint due to the operation of the hydraulic pilot installed on the valve control loop.
Dead-band below pressure SP (m)	Enables setting a deadband value below the setpoint due to the operation of the hydraulic pilot installed on the valve control loop.
Min diff pressure P1 to P2 (m)	If the pressure differential (upstream-downstream) drops to below this value, the system suspends its pressure regulation and sends an alert.

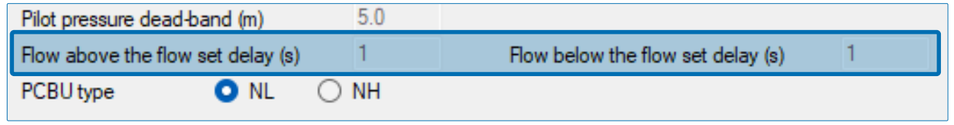
NOTE: Click 'Write Parameters' to save any changes that are made at each screen.

3. *Select the Control type (Control type: Time/Control type: Flow)*



Control type	Enables selecting the mode of operation: **Flow** - pressure is defined according to water demand (rate of flow) **Time** - pressure is defined according to time

Control type: Flow



1. *Define the flow set delay parameters*

Flow above the flow set delay (s)	Defines the delay time when the flow is above the flow setpoint and before the controller willl switch to the next setpoint.
Flow below the flow set delay (s)	Defines the delay time when the flow is below the flow setpoint and before the controller willl switch to the next setpoint.

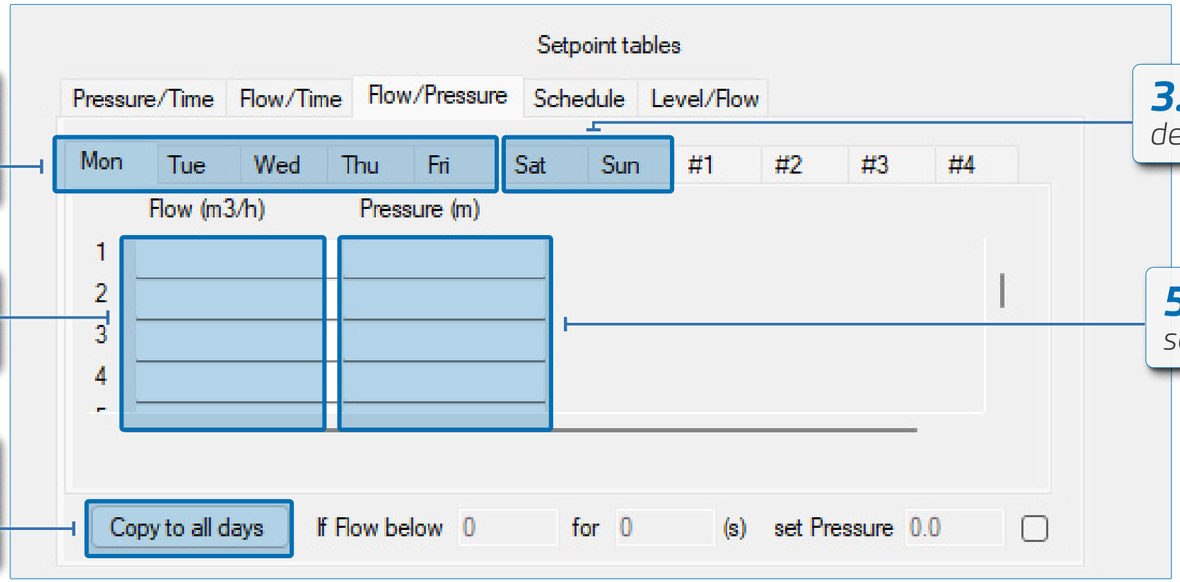
2. *Select each day of the week to define the flow setpoints or select a sequence of days by numbers*

3. *Change the flow and pressure (SP) definition of the weekend - optional*

4. *Define the flow in the selected days when the pressure will change*

5. *Define the pressure setpoints*

6. *Click* ***Copy to all days*** *to set the same parameters for every day of the week*

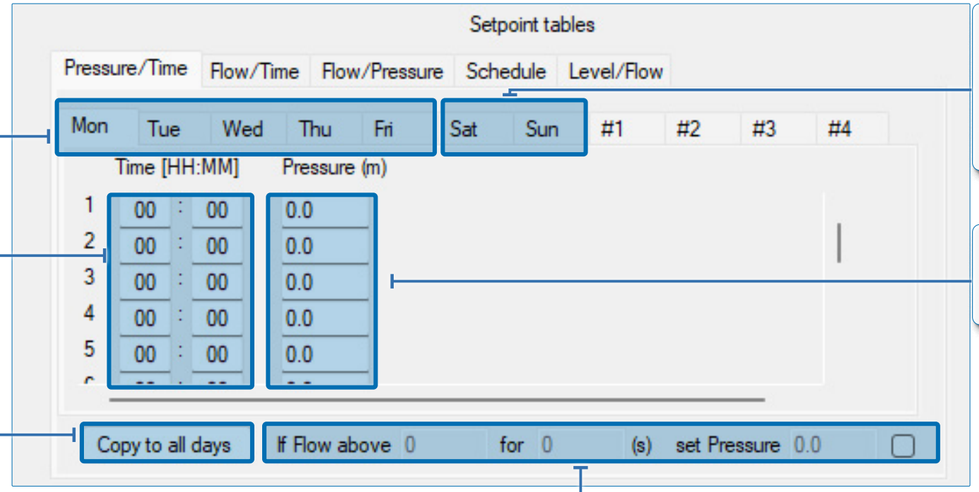


Control type: Time

1. *Select each day of the week to define the setpoints by time or select a sequence of days by numbers*

3. *Define the times in the selected days when the` pressure will change*

5. *Click* ***Copy to all days*** *to set the same parameters for every day of the week*



2. *Change the definition of the time windows and the pressures set point for the weekend - optional*

4. *Define the pressure setpoints*

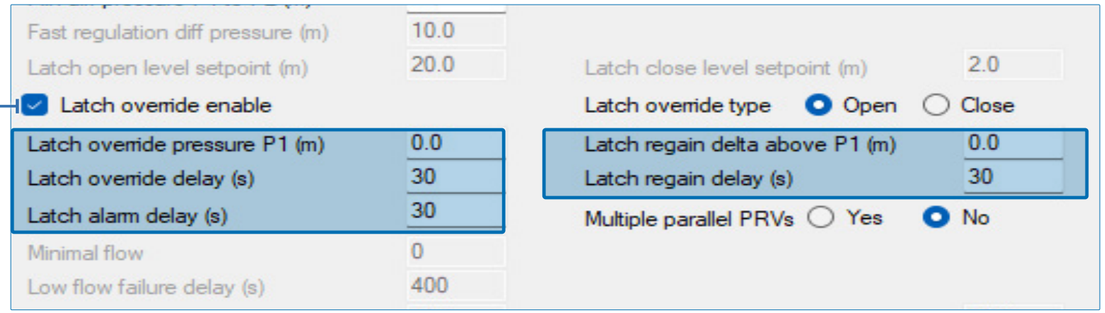
6. *An option to increase the system pressure, if the flow exceeds the defined maximum value for the defined duration. For example, in the event of fire.*

Latch Settings (Optional)

Fully open the valve during insufficient inlet pressure and define the following optional parameters in the latch settings:

NOTE: Select when using the latch override system.

1. After defining the Time/ Flow setpoints, define the latch parameters



NOTE: This function is only relevant if a latch solenoid is mounted on the valve control loop in the right location for venting the valve control chamber.

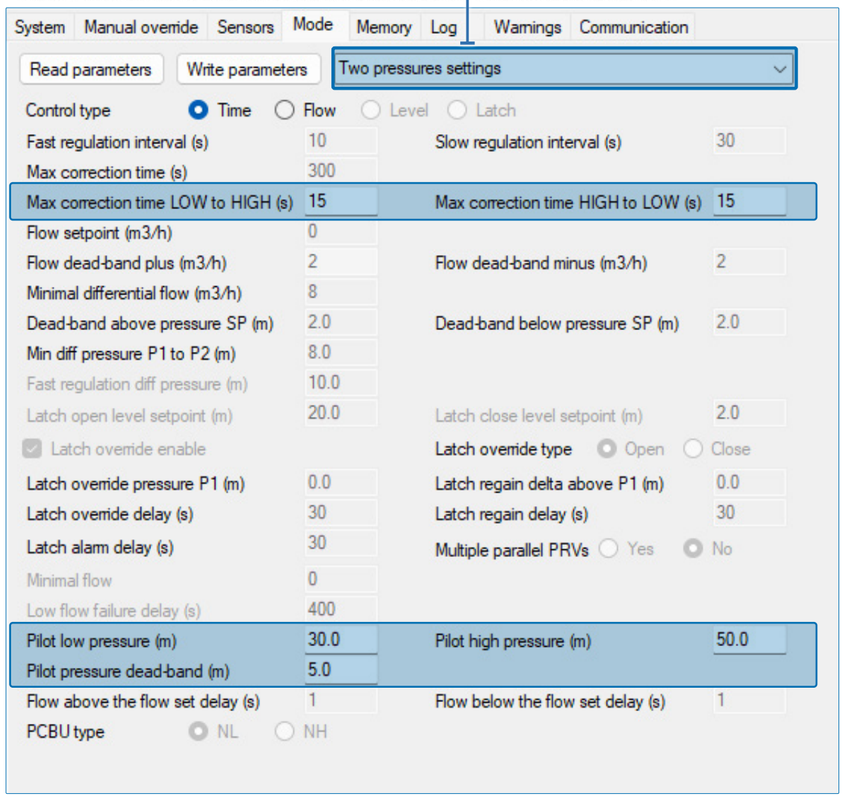
Latch override pressure P1 (m)	Define the pressure at which the latch will open.
Latch override delay (s)	Define the time if a pressure is equal to or lower than the selected pressure, until the latch opens.
Latch alarm delay	Define the time before sending an alert.
Latch regain delta above P1 (m)	Define the pressure at which the latch will close and the valve returns to pressure reducing
Latch regain delay (s)	Define the time if the pressure is above the selected pressure, until the latch closes.

NOTE: Click 'Write Parameters' to save any changes that are made at each screen.

Mode 2: Two Pressures Settings (Day/Night)

Define the following parameters when using the two pressures settings option:

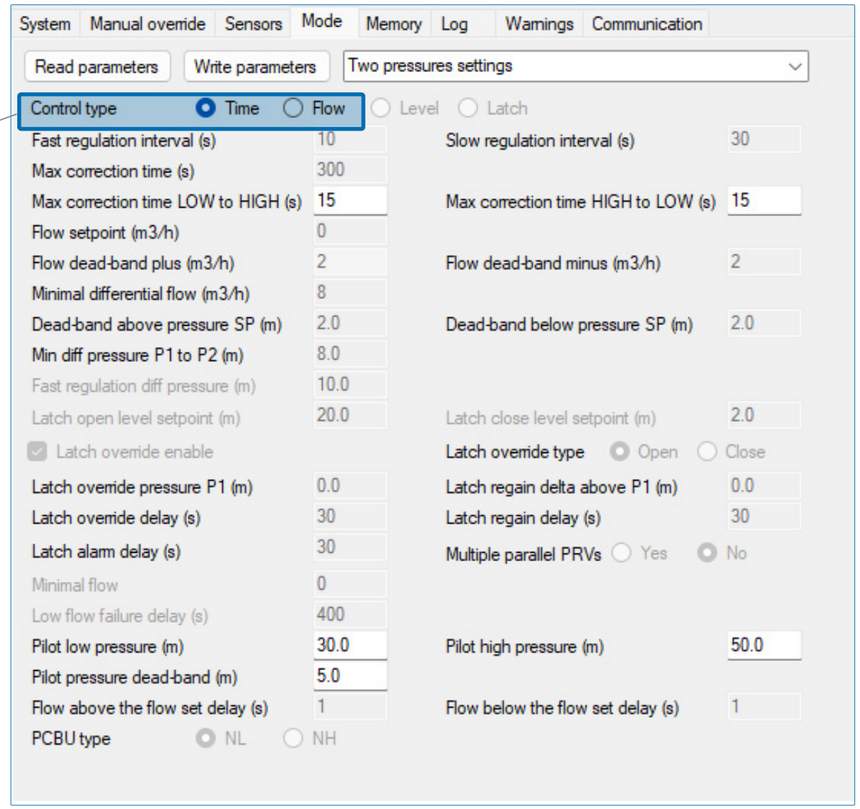
1. *After selecting* ***Two Pressures Settings****, the controller's mode settings are displayed*



2. *Define the following parameters:*

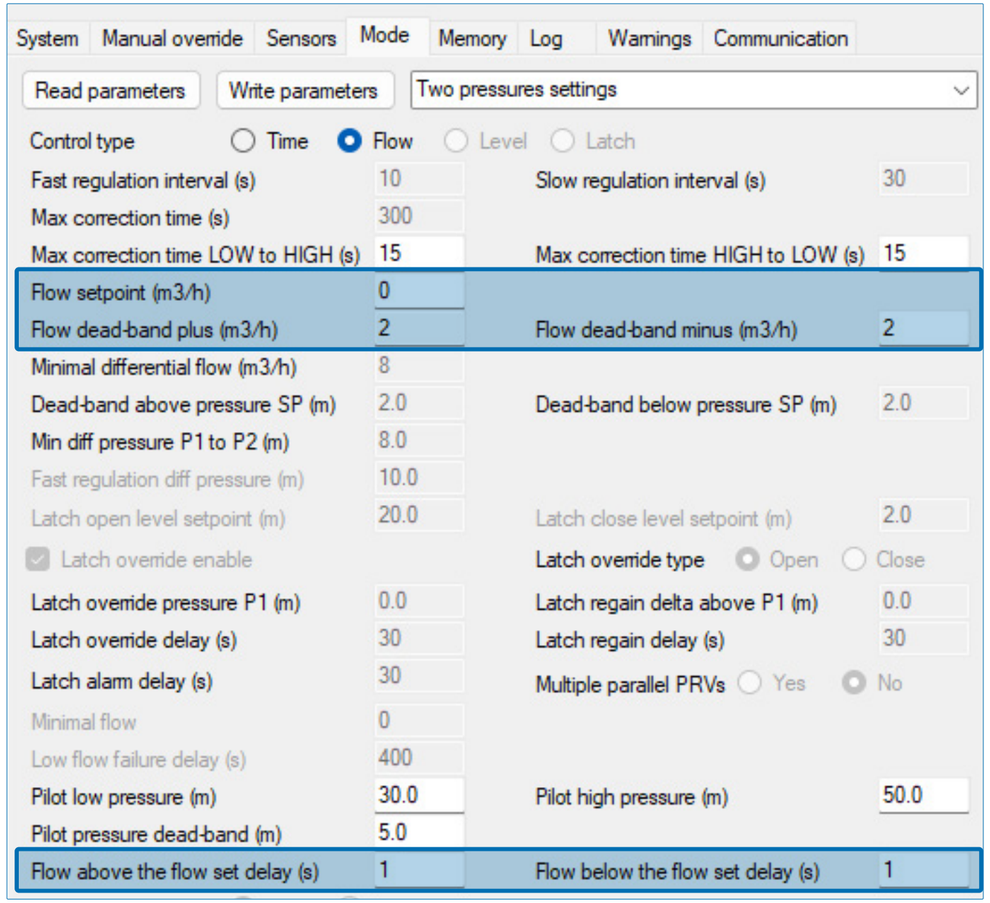
MAX correction time LOW to HIGH	Enables sending an alert after the defined amount of time if the setpoint did not change from low to high.
MAX correction time HIGH to LOW	Enables sending an alert after the defined amount of time if the setpoint did not change from high to low.
Pilot low pressure	Enter the low pilot pressure value from the manual calibration. For controller to sending alert in case the valve can't reach the low pressure setting.
Pilot high pressure	Enter the high pilot pressure value from the manual calibration.
Pilot pressure dead-band	Defines a dead-band above and below the pressure set point before the controller takes action.

3. *Select the Control type (Control type: Time/Control type: Flow)*



Control type	Enables selecting the mode of operation: **Flow** - pressure is defined according to water demand (rate of flow) **Time** - pressure is defined according to time

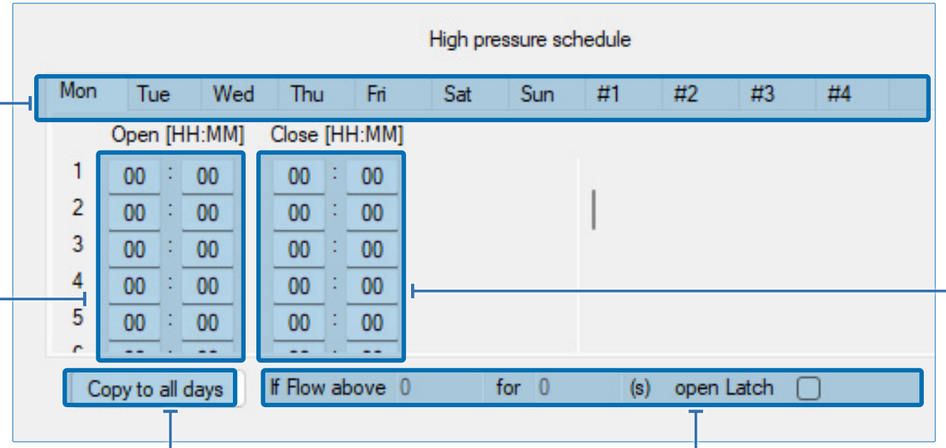
Control type: Flow



1. *Define the following parameters:*

Flow setpoint (m3/h)	Defines the flow rate point where the pressure set point switches from Low to High and from High to Low.
Flow dead-band plus (m3/h)	Defines a dead-band above the flow setpoint before the controller takes action.
Flow dead-band minus (m3/h)	Defines a dead-band below the flow setpoint before the controller takes action.
Flow above the flow set delay (s)	Defines the delay time after the flow rate exceeds the setpoint before the controller takes action.
Flow below the flow set delay (s)	Defines the delay time after the flow rate drops below the setpoint before the controller takes action.

Control type: Time



1. *Select each day of the week to define the setpoints by time or select a sequence of days by numbers*

2. *Define the times in the selected days when the high pressure will open*

3. *Define the times when the high pressure will close*

4. *Click* ***Copy to all days*** *to set the same parameters for every day of the week*

5. *An option to move to a high pressure window, if the flow exceeds the defined maximum value for a defined duration. For example, in the event of fire.*

NOTE: Click 'Write Parameters' to save any changes that are made at each screen.

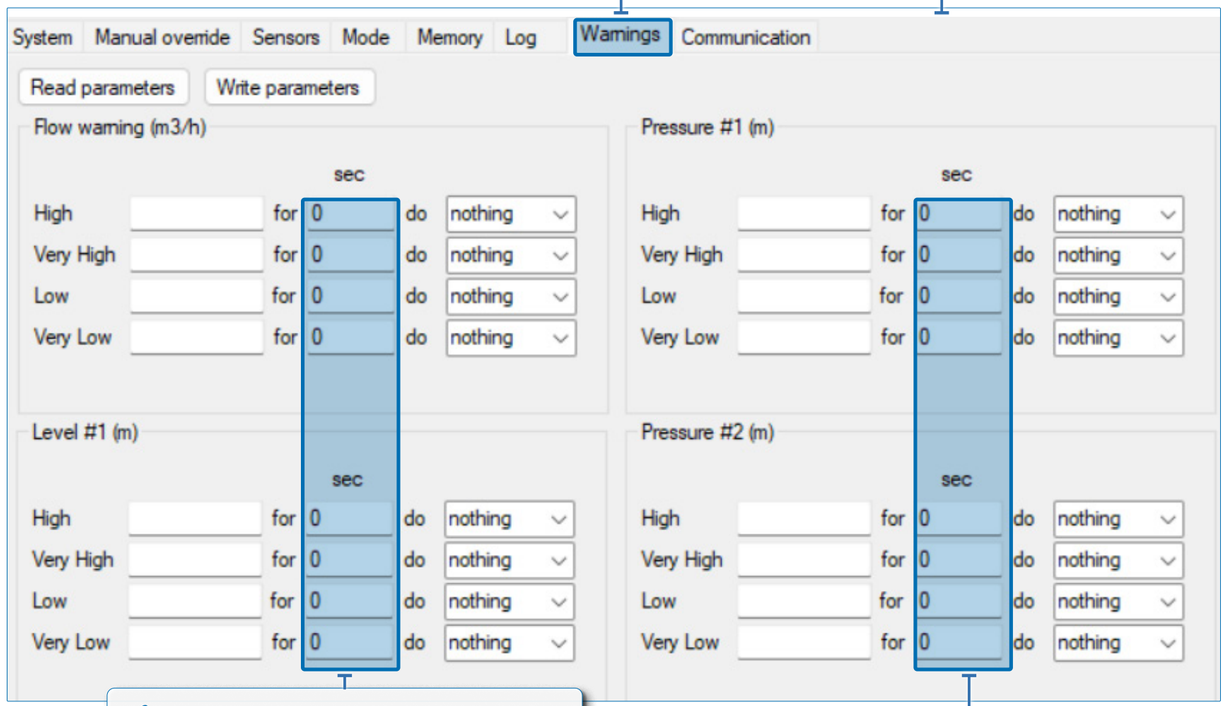
Warning Parameters

Define the following parameters in the warnings tab:

1. *From the app, select* ***Warnings***

2. *The controller's warning settings are displayed*

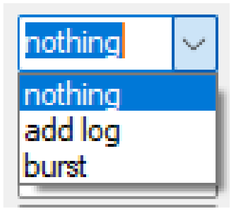
3. *Define the following parameters:*



4. *Define the delay time for when the flow/pressure exceeds or drops below the defined value*

Flow warning	Define the threshold value for exceeding or dropping below the defined flow.
Pressure #1 (upstream pressure)	Define the threshold value for exceeding or dropping below the defined upstream pressure.
Pressure #2 (downstream pressure)	Define the threshold value for exceeding or dropping below the defined downstream pressure.

5. *Select the delay reaction: Nothing, Add to the Log or Burst (sends an alert)*



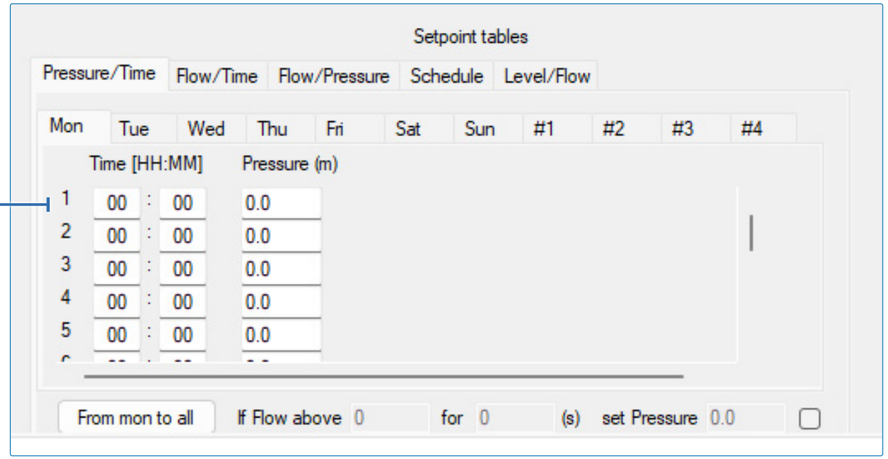
NOTE: Click 'Write Parameters' to save any changes that are made at each screen.

Verifying DELTA Reaches the Setpoint Automatically

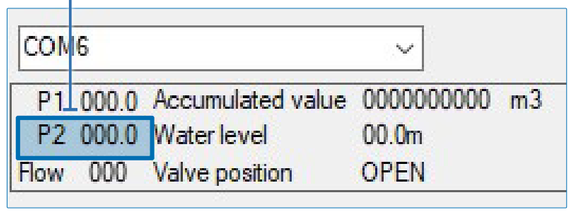
Perform the following step to verify the DELTA controller reaches the setpoint automatically:

NOTE: This procedure is relevant when operating based on a time schedule.
When operating based on flow windows, verify the pressure set point aligns with the current flow rate in the designated flow table.

1. *Define time and pressures that will require the system to start with a minimum pressure, after a few minutes to change to maximum pressure, and after a few additional minutes to return back to minimum pressure*



2. *Verify the downstream pressure is stabilized on correct pressure setpoint*



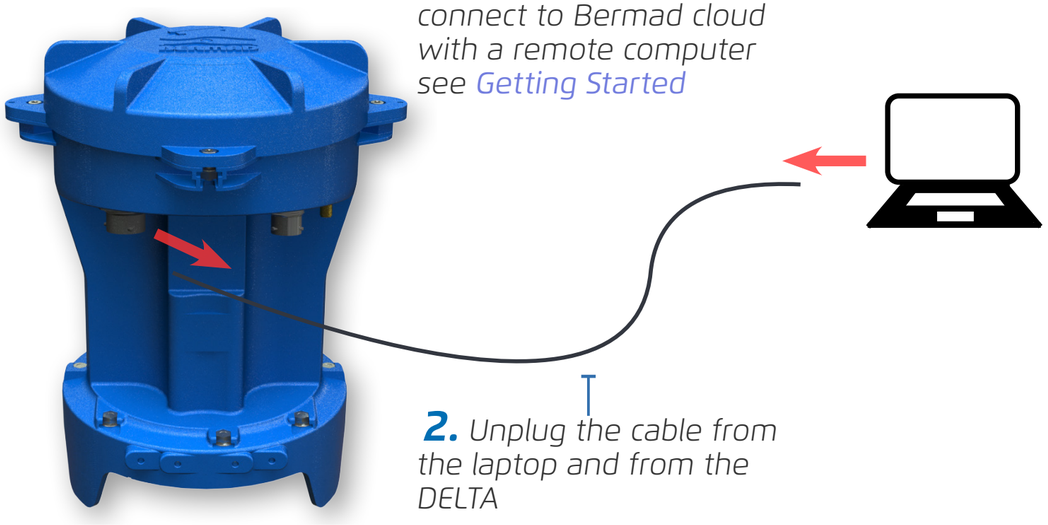
3. *When the setpoint changes verify it takes no more than the predefined time for the system to stabilize on the correct pressure setpoint*

4. *Define a real program that is based on time control see Full Modulation PRV Mode Settings*

Verifying DELTA Connects to Bermad Cloud

Perform the following steps to verify the DELTA controller is connected to Bermad cloud:

Tip: This process may take up to 2 hours. It is recommended to perform this process before installing the controller.

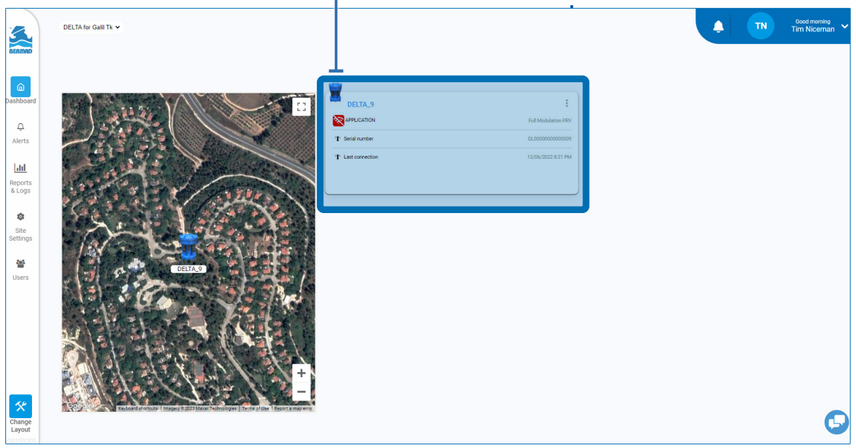


1. *Register, log in and connect to Bermad cloud with a remote computer see Getting Started*

2. *Unplug the cable from the laptop and from the DELTA*

3. *The DELTA will connect to the cloud*

4. *The DELTA controller is displayed in the cloud*



4. CONFIGURATION

This chapter reviews configuring the DELTA controller using BERMAD Cloud and includes:

- Getting Started
- Managing Sites and Controllers
- Controller Settings
- Managing Users

Getting Started

This section reviews setup and calibration and includes:

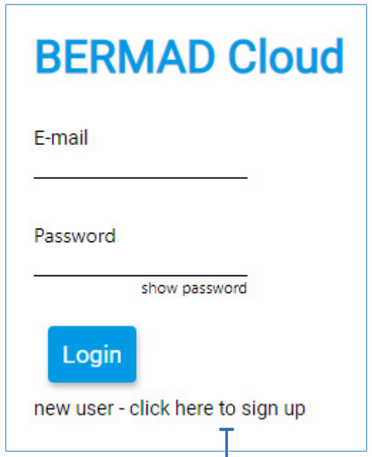
- Registering
- Logging In
- Site Dashboard Overview
- Controller Display
- Main Toolbar
- Changing Layout

Registering

Perform the following steps to register as a new user:

NOTE: The registration process can also be completed in the BERMAD Cloud application.

1. *Type **cloud.bermad.io** in the Internet browser address bar. The BERMAD Cloud login window is displayed*



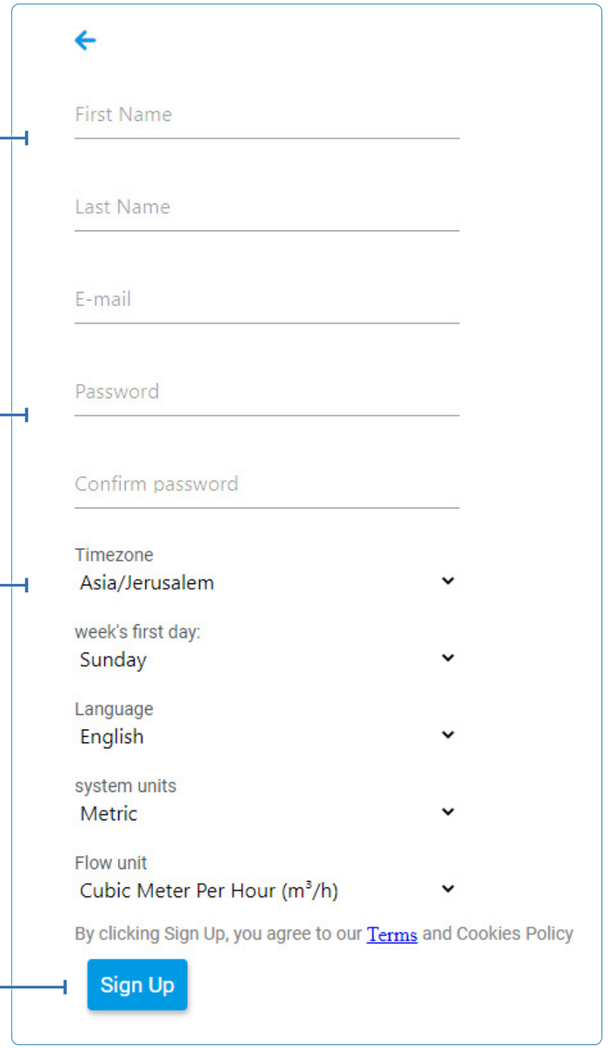
2. *Click **sign up**. The registration window opens*

3. *Type first name, last name, and e-mail address*

4. *Type a password, then type it again to confirm*

5. *Select the relevant options*

6. *Click **Sign Up***



Logging In

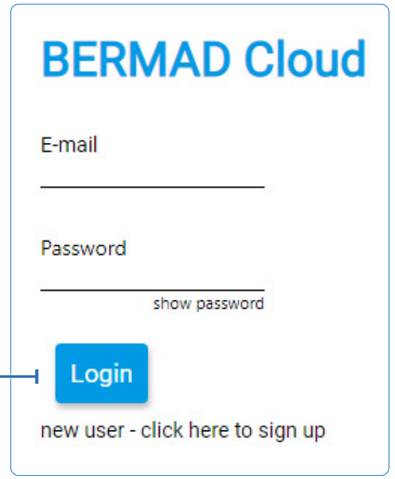
Perform the following steps to log in to BERMAD Cloud:

1. *Type **cloud.bermad.io** in the Internet browser address bar*

The BERMAD Cloud login window is displayed

2. *Type the user credentials (e-mail address and password)*

3. *Click **Login**. The site dashboard window opens*



NOTE: A user must first register before being able to log in see Registering.

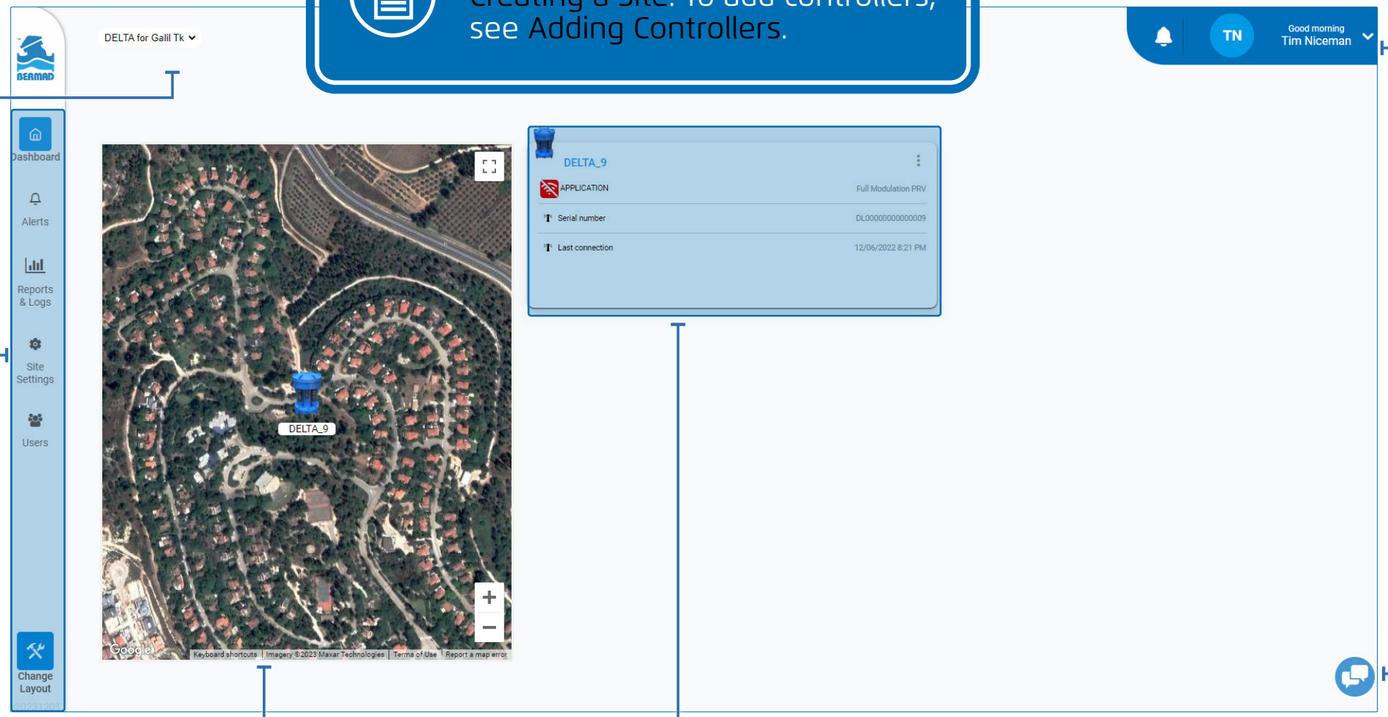
Site Dashboard Overview

The site dashboard opens, displaying the following:

NOTE: To create a site, see Creating a Site. To add controllers, see Adding Controllers.

Site management *– enables selecting and managing the sites*

Main Toolbar (Sites) *– displays the main navigation options for the site see Main Toolbar*



User info *– displays and enables managing user information*

Cloud Assistant *– digital assistant that guides a user through the setup and configuration processes*

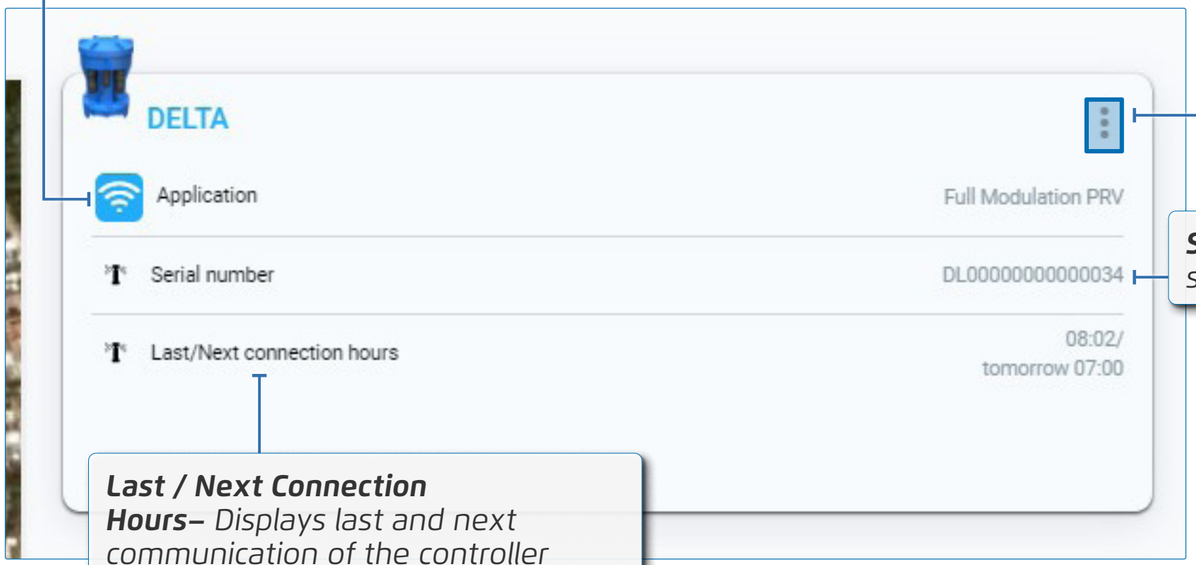
Live map *– displays the site controllers on a live map*

Controllers Display *– displays the selected site's controllers see Selecting a Controller*

Controller Display

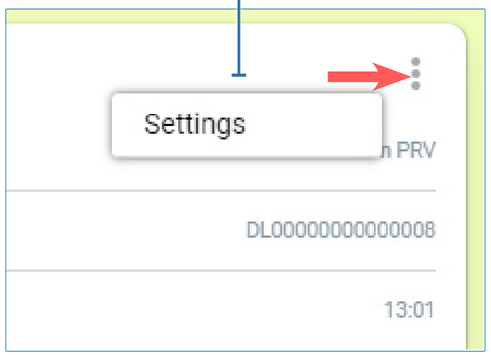
The controller displays the following:

Status Icon– *icon with the communication status:*
- *Green - Online mode (successfully connected)*
- *Blue - Successfully connected in the last 24 hrs*
- *Red - Failed to connect in the last 24 hrs*



Serial Number– *Displays the serial number of the controller*

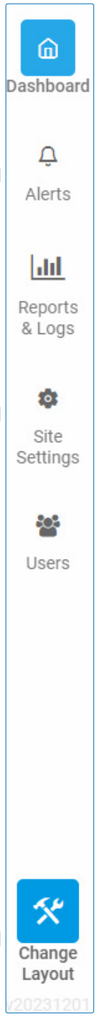
Settings– *In the menu bar, click the three dots and then click Settings to go to the controller settings*



Last / Next Connection Hours– *Displays last and next communication of the controller*

Main Toolbar

The main toolbar displays the following:



Alerts – *displays the alerts see Alerts*

Dashboard – *displays the site dashboard see Site Dashboard Overview*

Reports and Logs – *displays the reports and logs*

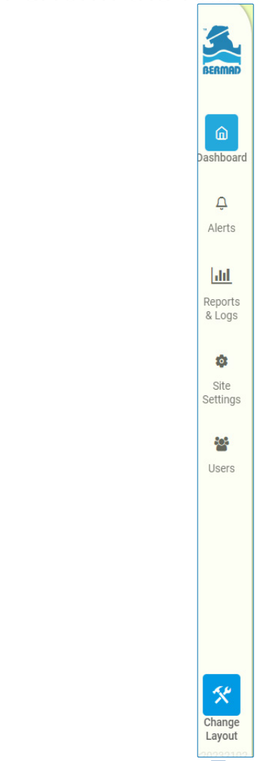
Site Settings – *displays the settings see Creating a Site*

Users– *displays users see Managing Users*

Change Layout – *Enables changing the layout of the site dashboard see Changing Layout*

Changing Layout

Perform the following steps to change the layout of the site dashboard:



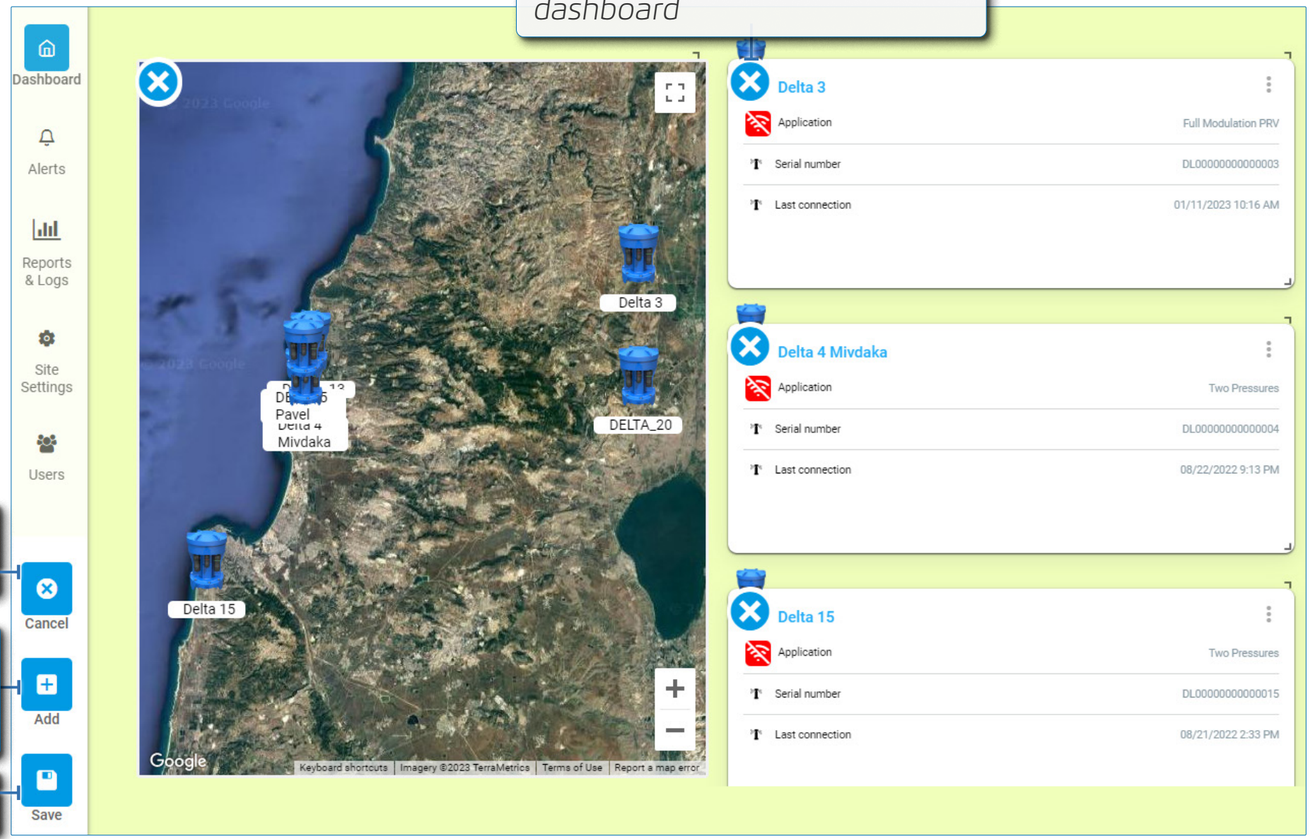
1. *Click **Change Layout** on the main tool bar*

*Click **Cancel** to cancel any changes*

2. *Click **Add** to add a new window display to the dashboard*

4. *Click **Save***

3. *Click the **X** icon to remove a window display from the dashboard*

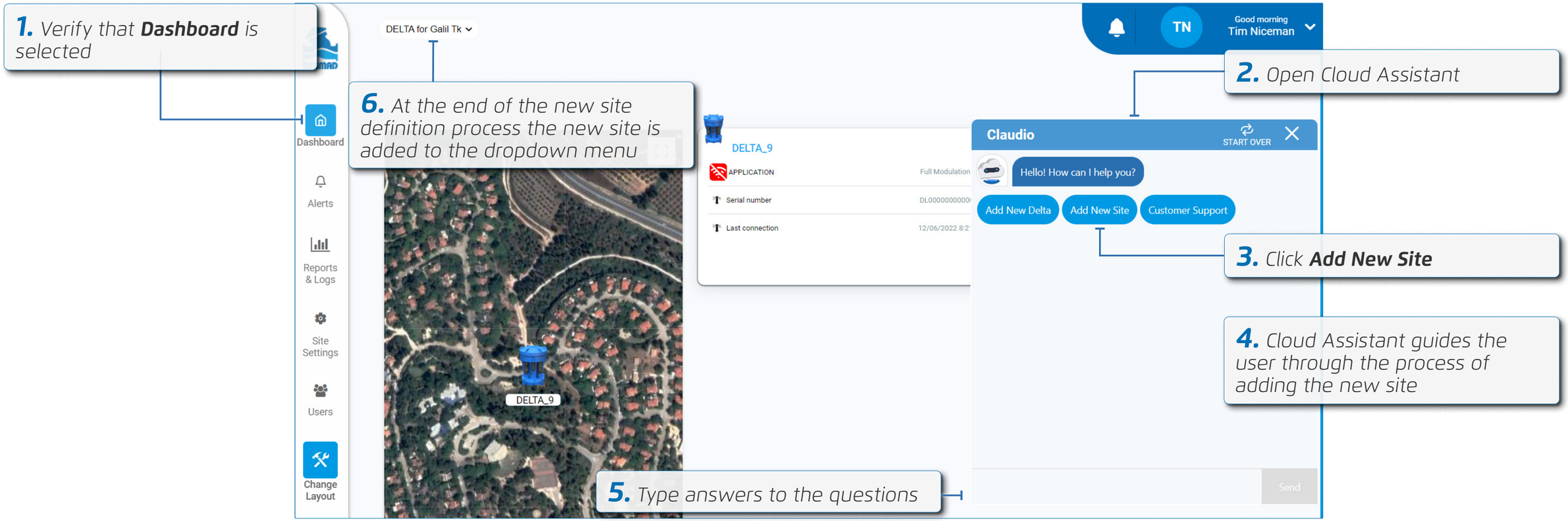


Managing Sites and Controllers

This section reviews managing sites and includes:

Creating a Site

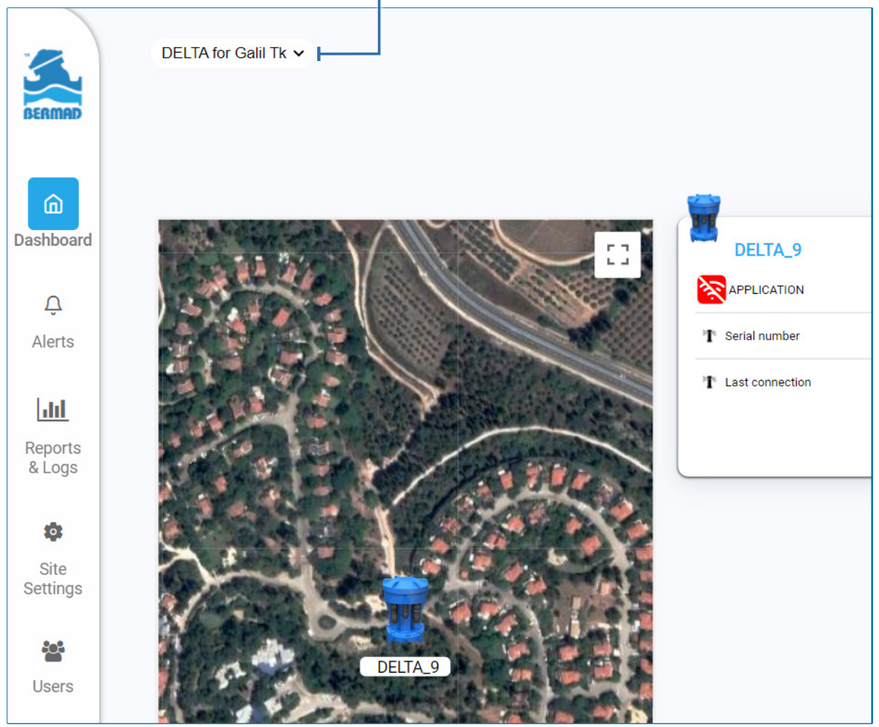
Perform the following steps to create a site:



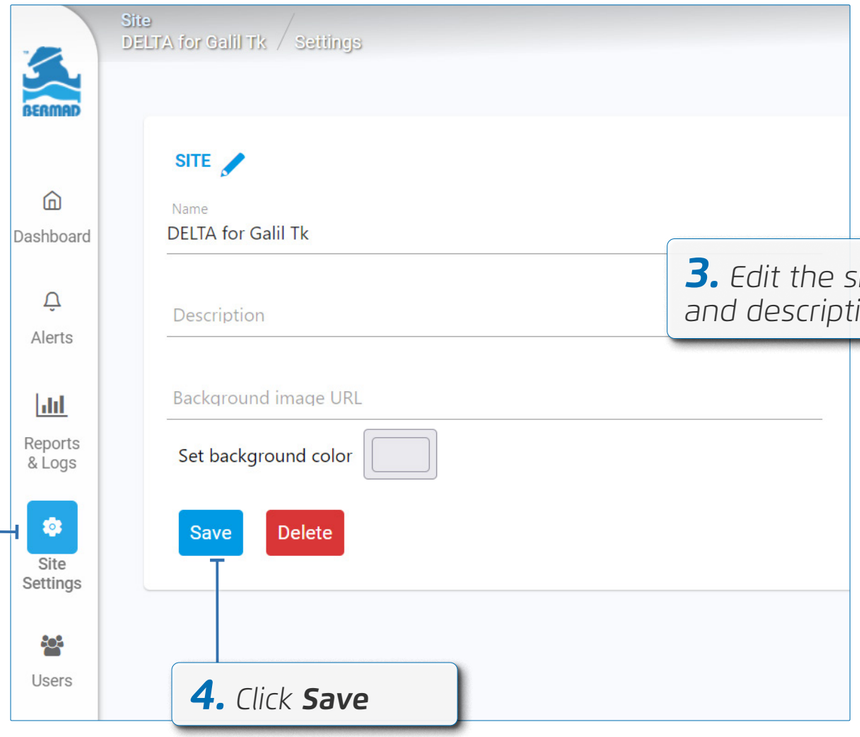
Editing a Site

Perform the following steps to edit an existing site's name and description:

1. *Click the dropdown menu and select the site to be edited*



2. *Click the **Site Settings** icon*

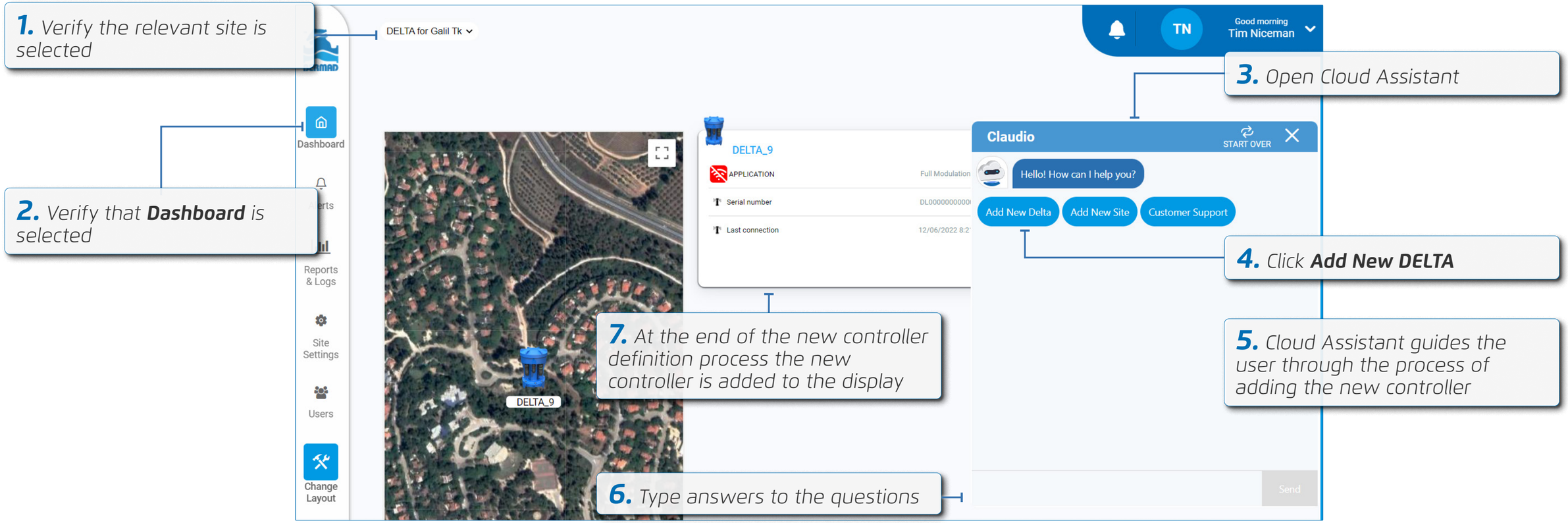


3. *Edit the site's name and description*

4. *Click **Save***

Adding Controllers

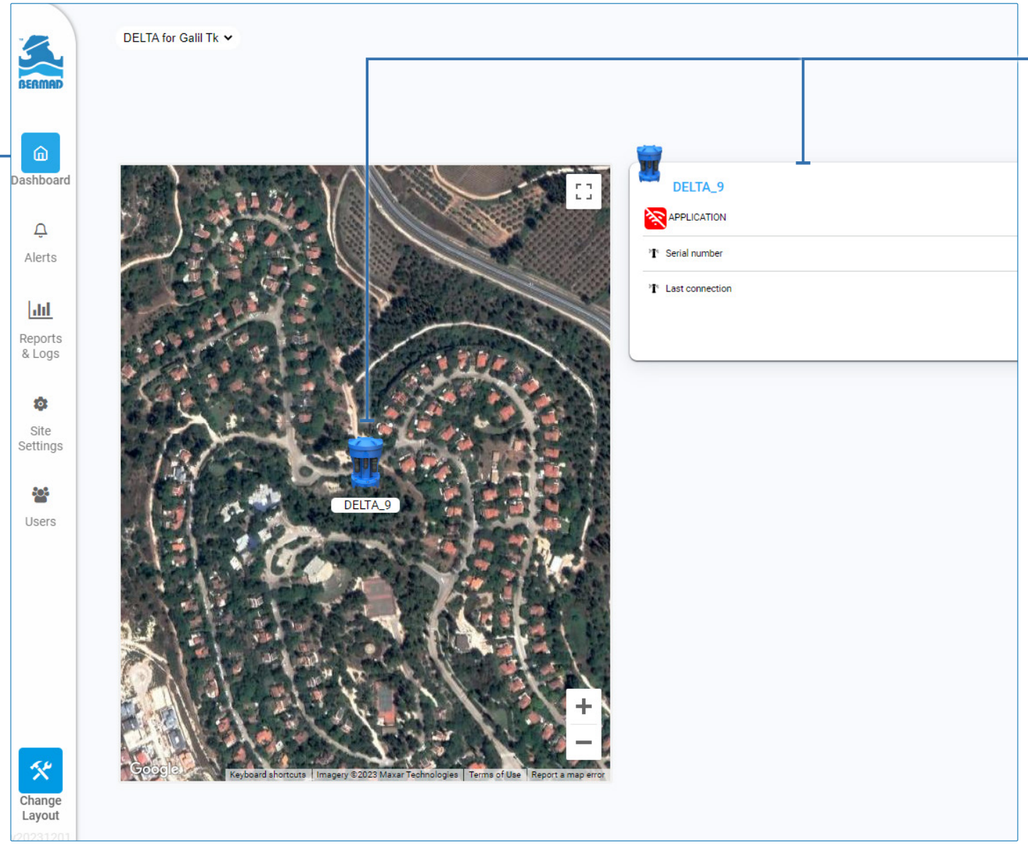
Perform the following steps to add a new controller to the selected site



Selecting a Controller

Perform the following steps to view information about a specific controller:

1. *Verify that **Dashboard** is selected*



2. *Click on the relevant controller from the controller dashboard or from the live map*

3. *The controller dashboard is displayed (see Controller Dashboard Overview)*

Controller Dashboard Overview

When selecting a controller, the following information is displayed:

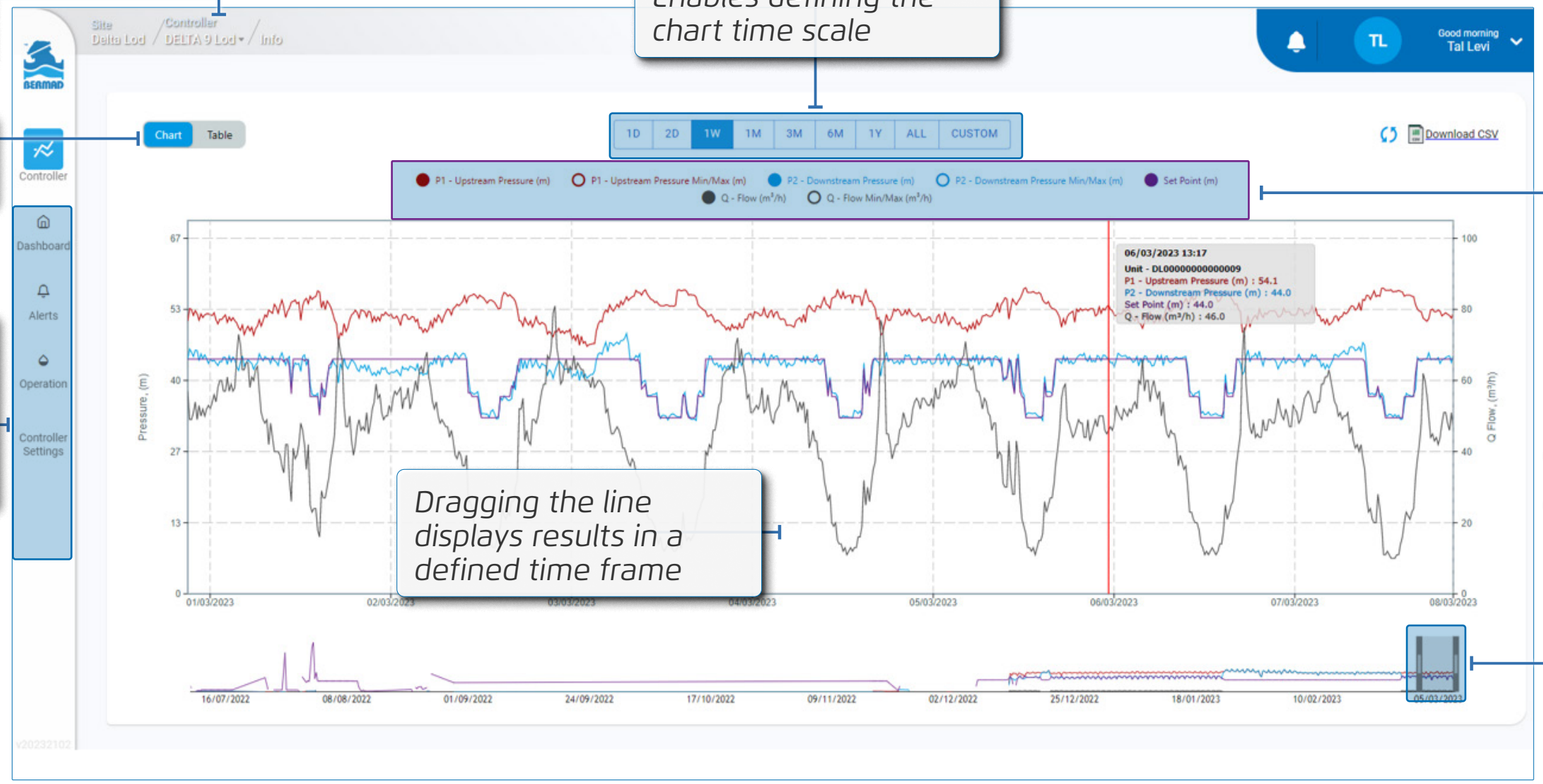
Chart Display

Selected controller identification

Option to view data in a chart or table format

Controller Main Toolbar - displays the navigation options for the controller see Controller Main Toolbar

Enables defining the chart time scale



Dragging the line displays results in a defined time frame

Download options

Chart Displays:

- P1 Upstream pressure
- P2 Downstream pressure
- Q Flow rate
- Set Points

Displays the curve

Does not display the curve

Moving the brackets displays results in a defined time frame

NOTE: The units of measurement displayed are based on the user selection after signing in. The units can be changed iin the account settings.

Table Display

Selected controller identification

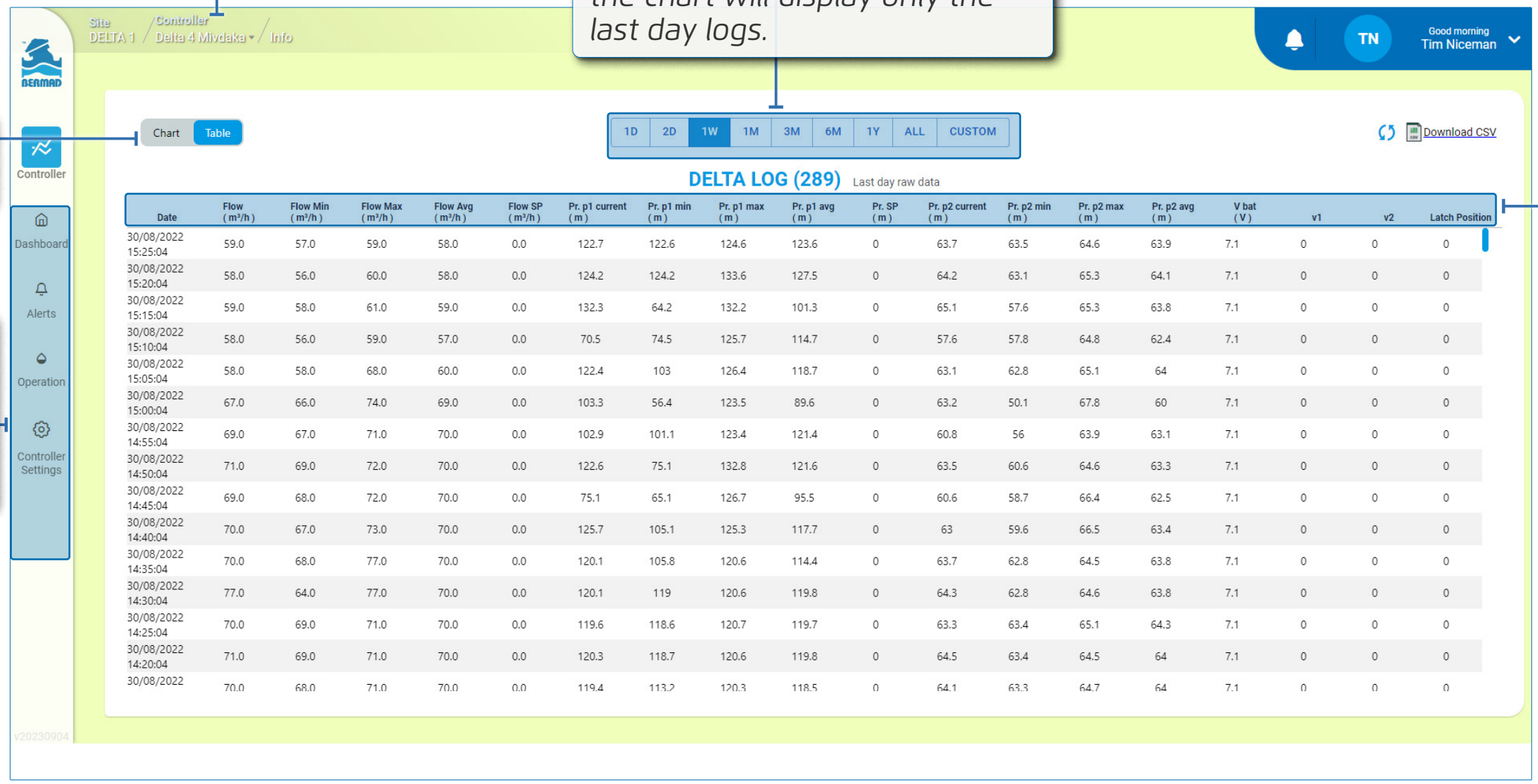
Option to view data in a chart or table format

Controller Main Toolbar - displays the navigation options for the controller see Controller Main Toolbar

*Enables defining the chart scale *The time scale refers to the CSV file export. In the web page the chart will display only the last day logs.*

Download options

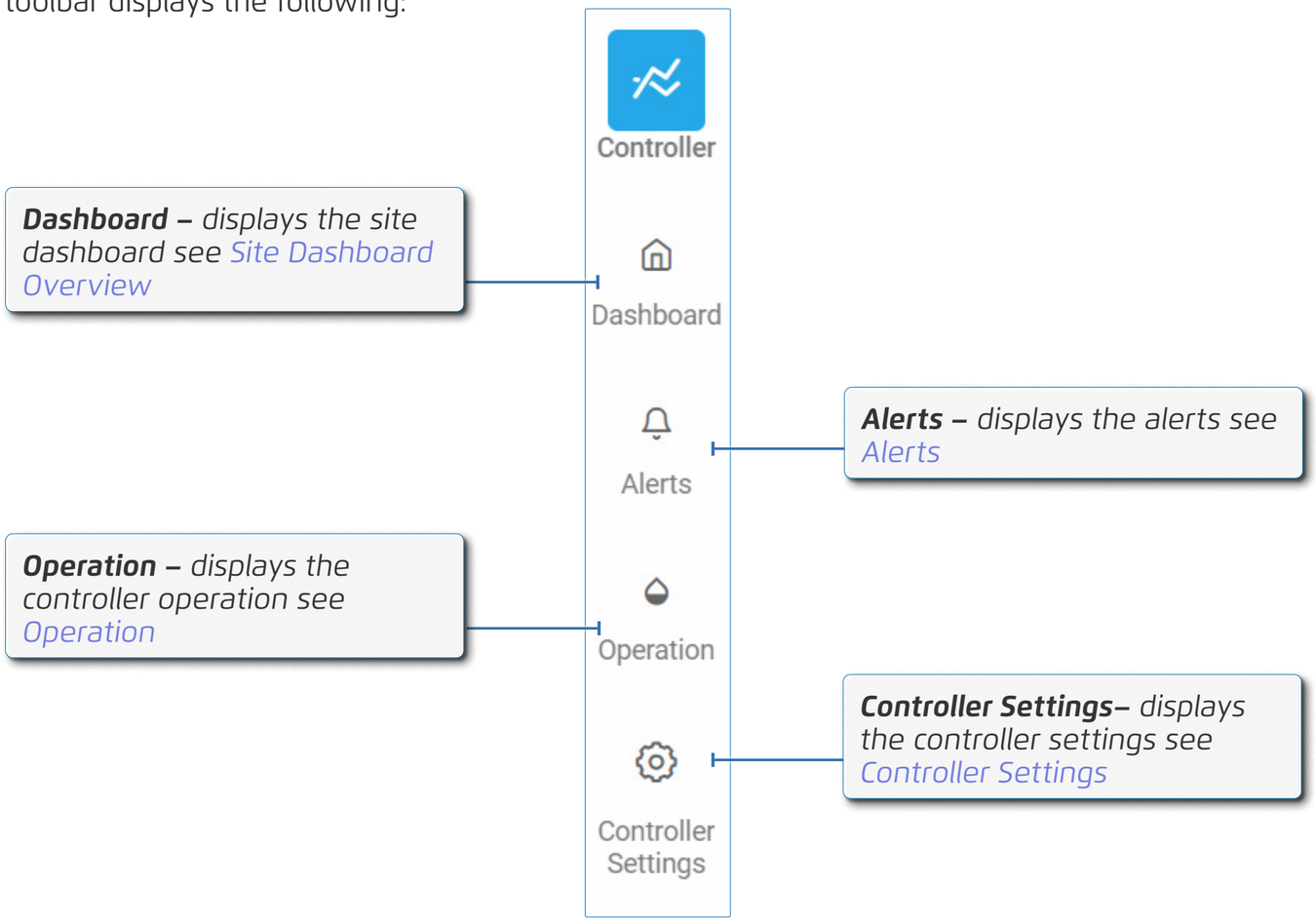
Log Parameters



Date	Flow (m³/h)	Flow Min (m³/h)	Flow Max (m³/h)	Flow Avg (m³/h)	Flow SP (m³/h)	Pr. p1 current (m)	Pr. p1 min (m)	Pr. p1 max (m)	Pr. p1 avg (m)	Pr. SP (m)	Pr. p2 current (m)	Pr. p2 min (m)	Pr. p2 max (m)	Pr. p2 avg (m)	V bat (V)	v1	v2	Latch Position
30/08/2022 15:25:04	59.0	57.0	59.0	58.0	0.0	122.7	122.6	124.6	123.6	0	63.7	63.5	64.6	63.9	7.1	0	0	0
30/08/2022 15:20:04	58.0	56.0	60.0	58.0	0.0	124.2	124.2	133.6	127.5	0	64.2	63.1	65.3	64.1	7.1	0	0	0
30/08/2022 15:15:04	59.0	58.0	61.0	59.0	0.0	132.3	64.2	132.2	101.3	0	65.1	57.6	65.3	63.8	7.1	0	0	0
30/08/2022 15:10:04	58.0	56.0	59.0	57.0	0.0	70.5	74.5	125.7	114.7	0	57.6	57.8	64.8	62.4	7.1	0	0	0
30/08/2022 15:05:04	58.0	58.0	68.0	60.0	0.0	122.4	103	126.4	118.7	0	63.1	62.8	65.1	64	7.1	0	0	0
30/08/2022 15:00:04	67.0	66.0	74.0	69.0	0.0	103.3	56.4	123.5	89.6	0	63.2	50.1	67.8	60	7.1	0	0	0
30/08/2022 14:55:04	69.0	67.0	71.0	70.0	0.0	102.9	101.1	123.4	121.4	0	60.8	56	63.9	63.1	7.1	0	0	0
30/08/2022 14:50:04	71.0	69.0	72.0	70.0	0.0	122.6	75.1	132.8	121.6	0	63.5	60.6	64.6	63.3	7.1	0	0	0
30/08/2022 14:45:04	69.0	68.0	72.0	70.0	0.0	75.1	65.1	126.7	95.5	0	60.6	58.7	66.4	62.5	7.1	0	0	0
30/08/2022 14:40:04	70.0	67.0	73.0	70.0	0.0	125.7	105.1	125.3	117.7	0	63	59.6	66.5	63.4	7.1	0	0	0
30/08/2022 14:35:04	70.0	68.0	77.0	70.0	0.0	120.1	105.8	120.6	114.4	0	63.7	62.8	64.5	63.8	7.1	0	0	0
30/08/2022 14:30:04	77.0	64.0	77.0	70.0	0.0	120.1	119	120.6	119.8	0	64.3	62.8	64.6	63.8	7.1	0	0	0
30/08/2022 14:25:04	70.0	69.0	71.0	70.0	0.0	119.6	118.6	120.7	119.7	0	63.3	63.4	65.1	64.3	7.1	0	0	0
30/08/2022 14:20:04	71.0	69.0	71.0	70.0	0.0	120.3	118.7	120.6	119.8	0	64.5	63.4	64.5	64	7.1	0	0	0
30/08/2022	70.0	68.0	71.0	70.0	0.0	119.4	113.2	120.3	118.5	0	64.1	63.3	64.7	64	7.1	0	0	0

Controller Main Toolbar

The controller main toolbar displays the following:



Controller Settings

This section reviews basic device settings and includes:

- General Settings
- Internal Solenoid Settings
- Flow Meter Settings
- Full Modulation PRV Mode Settings
- Two Pressures Mode Settings
- Pressure Sensor Threshold Settings
- External Latch Settings
- Communication Settings

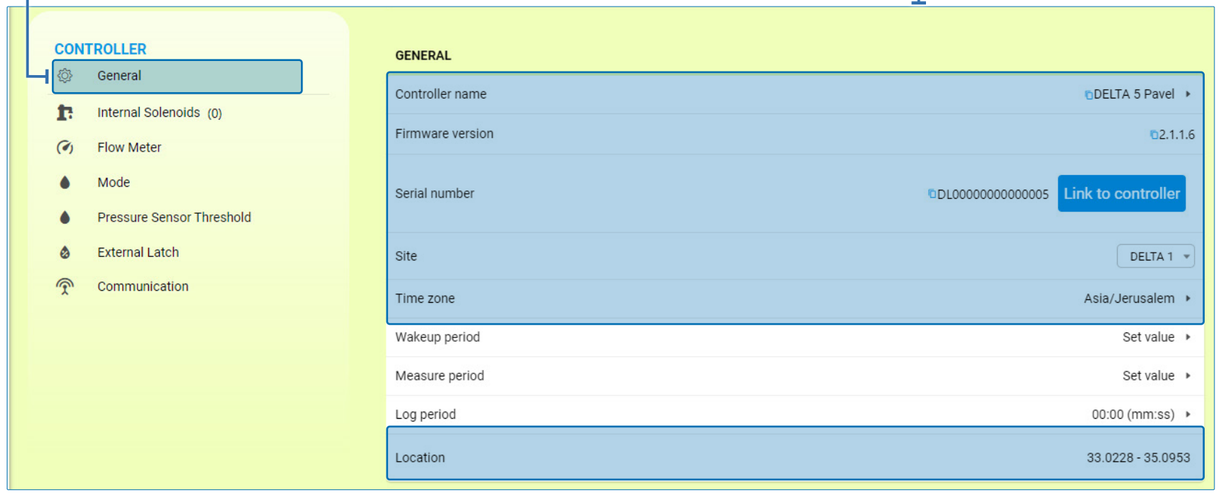
General Settings

Perform the following steps to view or edit a controller's general settings:

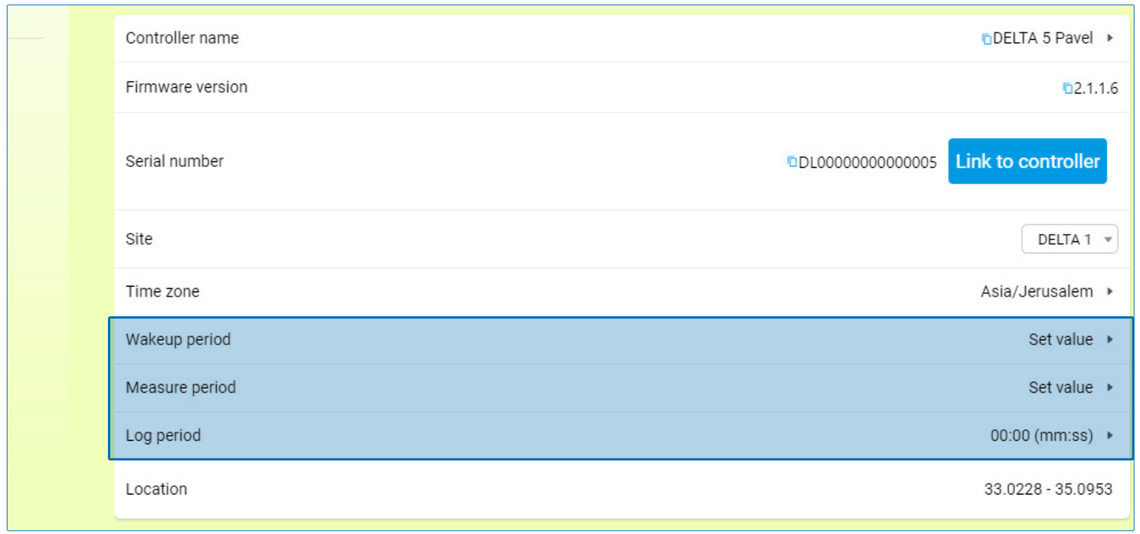
1. *From the controller settings, select* ***General***

2. *The general settings of the controller are displayed*

3. *Define the following parameters*



Controller name	Enables naming of the controller.
Firmware version	Displays the firmware version currently installed on the controller.
Serial number	Displays the serial number of the controller.
Site	The site to which the controller belongs. The drop-down list enables moving the controller to another site.
Time zone	Defines the time zone in which the controller is located.
Location	Displays the coordinates of the controller's location. Clicking on the line opens a map which enables moving the controller to a new location.



4. *The following parameters define the log and processor parameters*

Wakeup period	Defines how often the processor wakes up.
Measure period	Defines the frequency of sensor measurements.
Log period	Defines how often to log the measure into the controller memory.

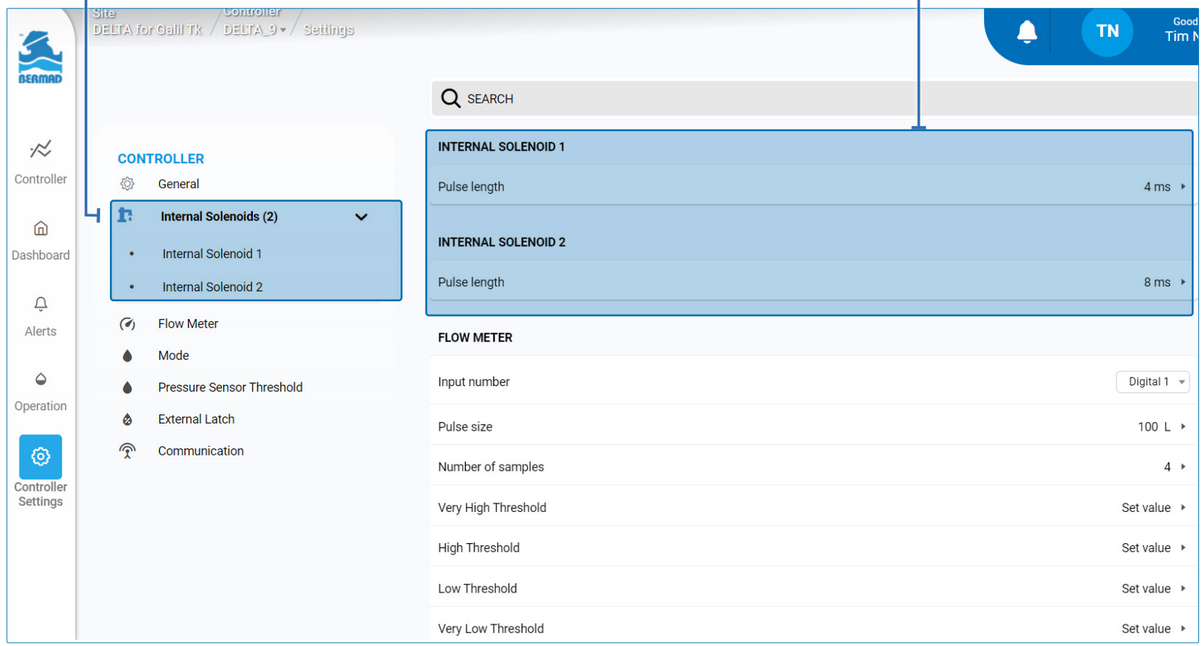
Internal Solenoid Settings

Perform the following steps to view and adjust the internal solenoid settings:

1. *From the controller settings, select the relevant solenoid*

2. *The internal solenoid settings are displayed*

3. *Define the following parameters*



Internal Solenoid 1	Defines the solenoid pulse duration to increase the water pressure.
Internal Solenoid 2	Defines the solenoid pulse duration to decrease the water pressure.

NOTE: These settings are for advanced users only.

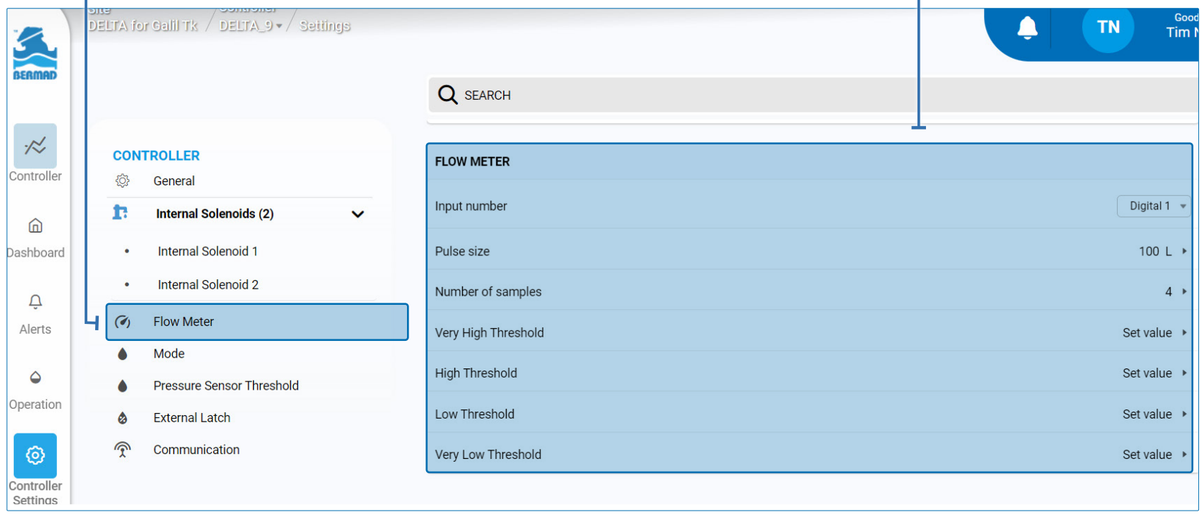
Flow Meter Settings

Perform the following steps to navigate to the flow meter settings:

1. *From the controller settings, select* ***Flow Meter***

2. *The flow meter settings of the controller are displayed*

3. *Define the following parameters*



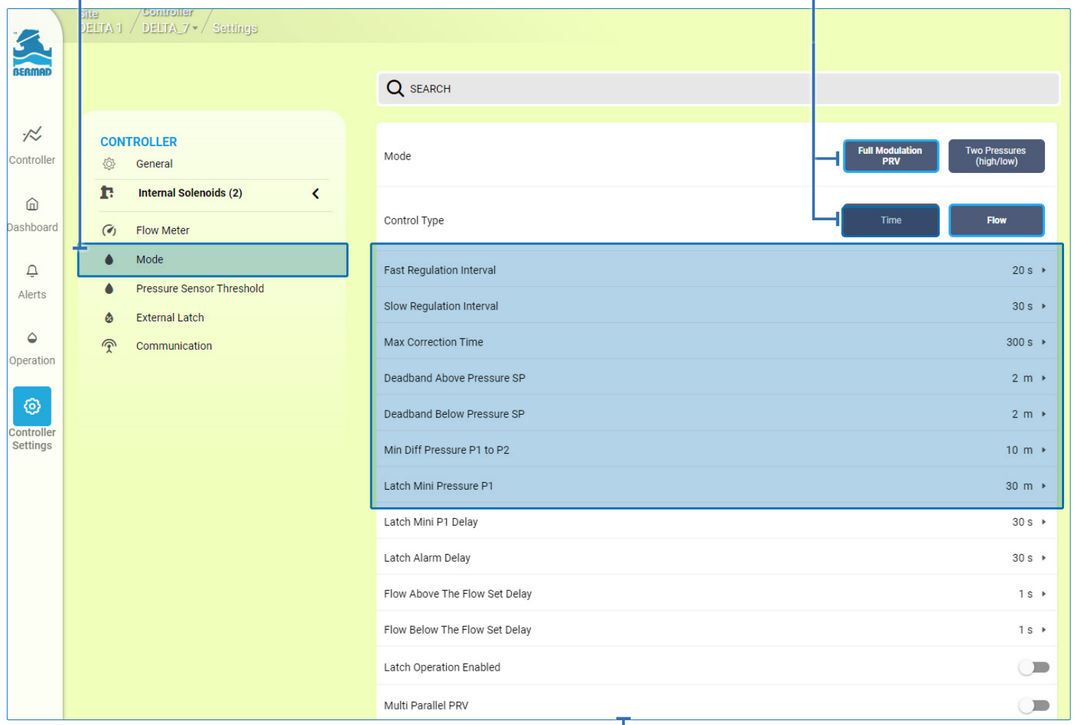
Input number	Select from the drop down list to define the type of flow meter input (analog or digital) and the channel to which the flow meter is connected.
Pulse size	Define the pulse volume. This option is relevant for digital input only.
Number of samples	Define the amount of pulses used to calculate the average flow.
Very high threshold	Enables setting an alert for when the measurement exceeds a defined value.
High threshold	Enables setting an alert for when the measurement exceeds a defined value.
Low threshold	Enables setting an alert for when the measurement drops below a defined value.
Very low threshold	Enables setting an alert for when the measurement drops below a defined value.

Full Modulation PRV Mode Settings

Perform the following steps to navigate to the full modulation PRV mode settings by **Flow**:

1. *From the controller settings, select* ***Mode***

2. *Select* ***Full Modulation PRV****, and* ***Flow***



3. *The Mode settings of the controller are displayed*

4. *Define the following parameters*

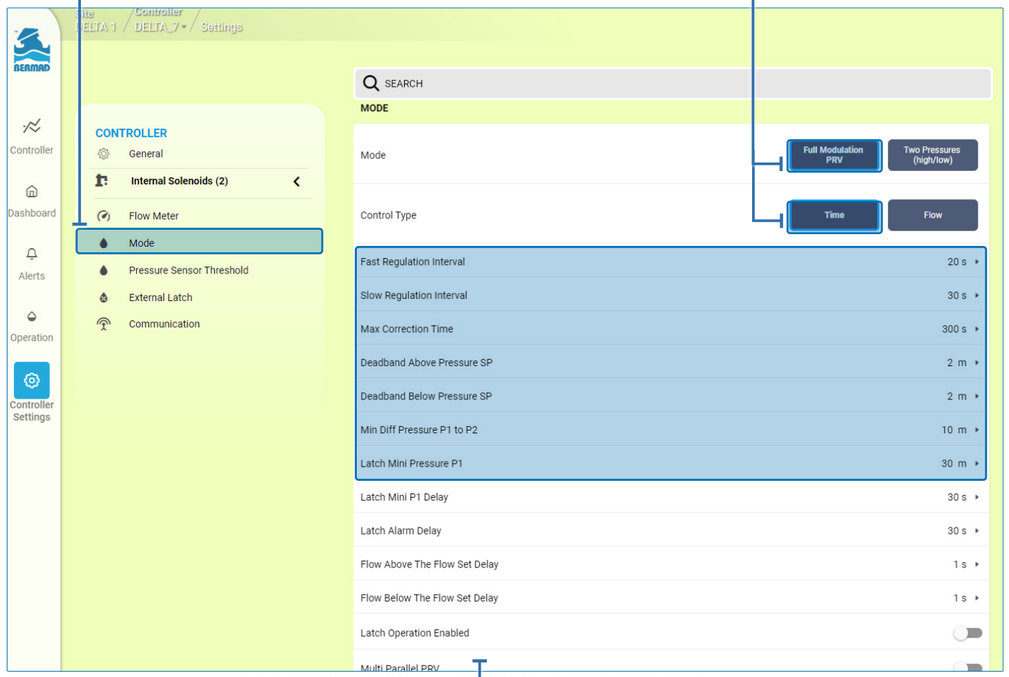
Fast Regulation Interval	The time between each pulse while the pressure setpoint is changed. This interval is used only while the pressure setpoint has changed and until the pressure reached the new setpoint.
Slow Regulation Interval	The time between internal solenoid pulses that is used during normal operation while the system maintains the pressure around the defined setpoint.
Max Correction Time	Enables sending an alert after the defined amount of time if the setpoint did not change, and suspends further attempts to reach the set point until the next time/flow window.
Deadband Above Pressure SP	Enables setting a deadband value above the setpoint due to the operation of the hydraulic pilot installed on the valve control loop
Deadband Below Pressure SP	Enables setting a deadband value below the setpoint due to the operation of the hydraulic pilot installed on the valve control loop.
Min Diff Pressure P1 to P2	If the pressure differential (upstream-downstream) drops to below this value, the system suspends its pressure regulation and sends an alert.

Full Modulation PRV Mode Settings

Perform the following steps to navigate to the full modulation PRV mode settings by **Time**:

1. *From the controller settings, select* ***Mode***

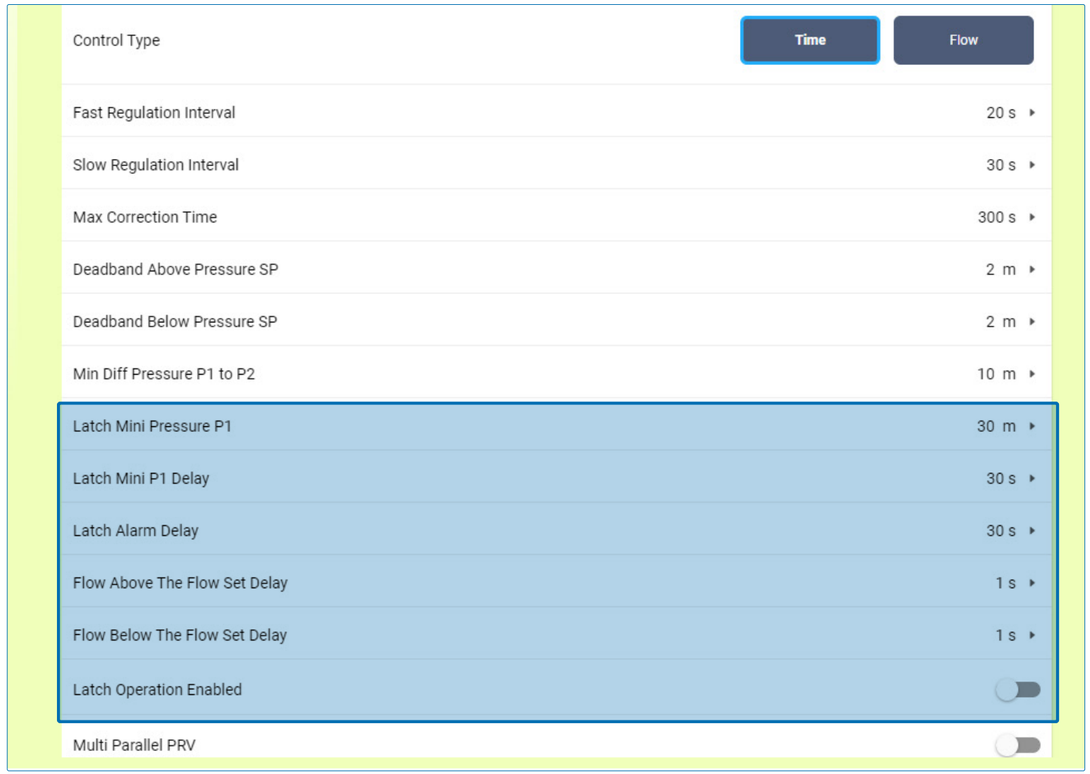
2. *Select* ***Full Modulation PRV****, and* ***Time***



3. *The mode settings of the controller are displayed*

4. *Define the following parameters*

Fast Regulation Interval	The time between each internal solenoid pulse while the pressure setpoint is changed. This interval is used only while the pressure setpoint has changed and until the pressure reached the new setpoint.
Slow Regulation Interval	The time between internal solenoid pulses that is used during normal operation while the system maintains the pressure around the defined setpoint.
Max Correction Time	Enables sending an alert after the defined amount of time if the setpoint did not change, and suspends further attempts to reach the set point until the next time/flow window.
Deadband Above Pressure SP	Enables setting a deadband value above the setpoint due to the operation of the hydraulic pilot installed on the valve control loop
Deadband Below Pressure SP	Enables setting a deadband value below the setpoint due to the operation of the hydraulic pilot installed on the valve control loop
Min Diff Pressure P1 to P2	If the pressure differential (upstream-downstream) drops to below this value, the system suspends its pressure regulation and sends an alert.



4. *Define the following parameters*

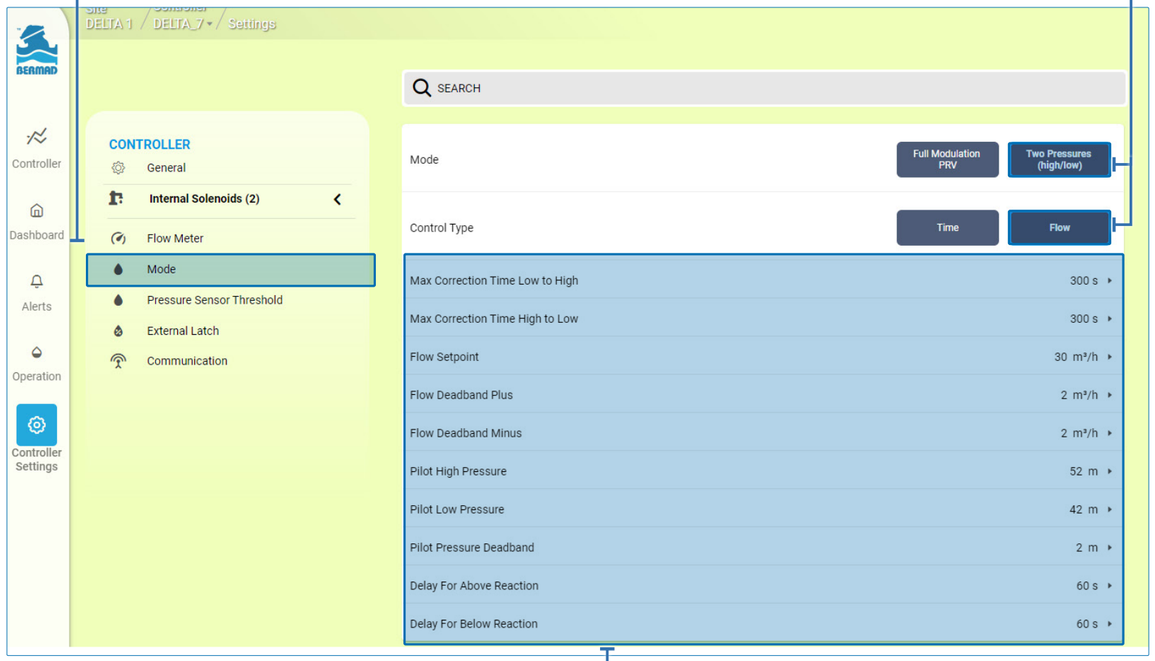
Latch Mini Pressure P1	This parameter is relevant when using a PRV that can be controlled by an Override latch. The latch will fully open the valve while the upstream pressure drops below this value.
Latch Mini P1 Delay	Defines the delay time before the Override latch is activated and the valve fully opens.
Latch Alarm Delay	Defines how long to delay sending the alarm after the override latch is activated, if the pressure did not change as a result of opening or closing the override.
Flow Above the Flow Set Delay	Defines the delay time when the flow is above the flow setpoint and before the controller will switch to the next setpoint.
Flow Below The Flow Set Delay	Defines the delay time when the flow is below the flow setpoint and before the controller will switch to the next setpoint.
Latch Operation Enabled	Enabled using the latch override system.

Two Pressures Mode Settings

Perform the following steps to navigate to the two pressures mode settings by **Flow**:

1. *From the controller settings, select* ***Mode***

2. *Select* ***Two Pressures****, and* ***Flow***



3. *The mode settings of the controller are displayed*

4. *Define the following parameters*

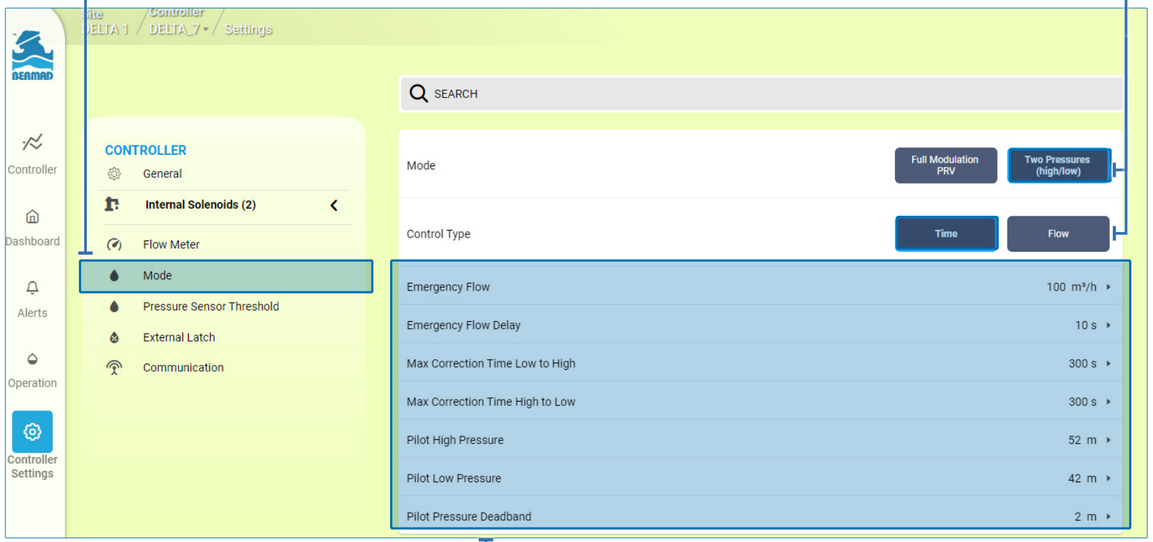
Max Correction Time Low to High	Enables sending an alert after the defined amount of time if the setpoint did not change from low to high.
Max Correction Time High to Low	Enables sending an alert after the defined amount of time if the setpoint did not change from high to low.
Flow Setpoint	Defines the desired flow rate of water through the system.
Flow Deadband Plus	Defines a deadband above the flow setpoint before the controller takes action.
Flow Deadband Minus	Defines a deadband below the flow setpoint before the controller takes action.
Pilot High Pressure	Enter the high pilot pressure value from the manual calibration.
Pilot Low Pressure	Enter the low pilot pressure value from the manual calibration.
Pilot Pressure Deadband	Enables sending an alert after the defined deadband if the pressure was not reached.
Delay for Above Reaction	Defines the delay time after the flow rate exceeds the setpoint before the controller takes action.
Delay for Below Reaction	Defines the delay time after the flow rate drops below the setpoint before the controller takes action.

Two Pressures Mode Settings

Perform the following steps to navigate to the two pressures mode settings by **Time**:

1. *From the controller settings, select* ***Mode***

2. *Select* ***Two Pressures****, and* ***Time***



3. *The mode settings of the controller are displayed*

4. *Define the following parameters*

Emergency Flow	If the flow is above the defined amount it will move to the high setpoint until regular flow resumes.
Emergency Flow Delay	If the flow is above the defined emergency flow and after the defined delay time, it will move to the high setpoint until regular flow resumes.
Max Correction Time Low to High	Enables sending an alert after the defined amount of time if the setpoint did not change from low to high.
Max Correction Time High to Low	Enables sending an alert after the defined amount of time if the setpoint did not change from high to low.
Pilot High Pressure	Enter the high pilot pressure value from the manual calibration. The controller will send an alert if the valve can't reach the high pressure setting.
Pilot Low Pressure	Enter the low pilot pressure value from the manual calibration, the controller will send an alert if th valve can't reach the low pressure setting.
Pilot Pressure Deadband	Enables sending an alert after the defined deadband if the pressure was not reached.

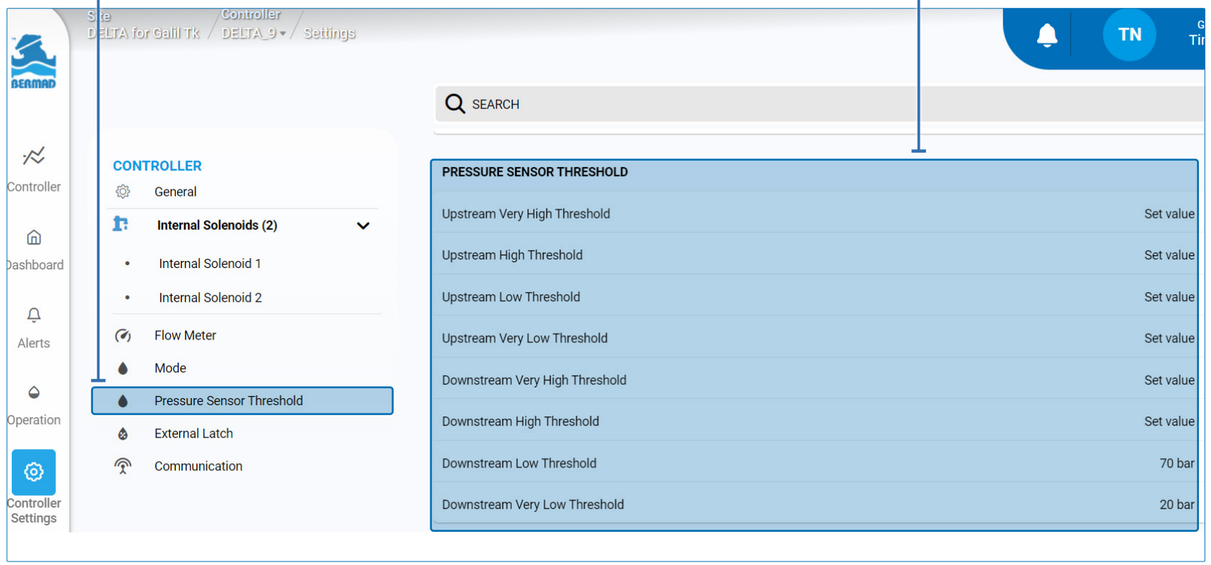
Pressure Sensor Threshold Settings

Perform the following steps to navigate to the pressure sensor threshold settings:

1. *From the controller settings, select* ***Pressure Sensor Threshold***

2. *The pressure sensor threshold settings of the controller are displayed*

3. *Define the following parameters*



Upstream very high threshold	Enables sending an alert when the upstream measurement exceeds a defined value.
Upstream high threshold	Enables sending an alert when the upstream measurement exceeds a defined value.
Upstream low threshold	Enables sending an alert when the upstream measurement drops below a defined value.
Upstream very low threshold	Enables sending an alert when the upstream measurement drops below a defined value.
Downstream very high threshold	Enables sending an alert when the downstream measurement drops below a defined value.
Downstream high threshold	Enables sending an alert when the downstream measurement drops below a defined value.
Downstream low threshold	Enables sending an alert when the downstream measurement drops below a defined value.
Downstream very low threshold	Enables sending an alert when the downstream measurement drops below a defined value.

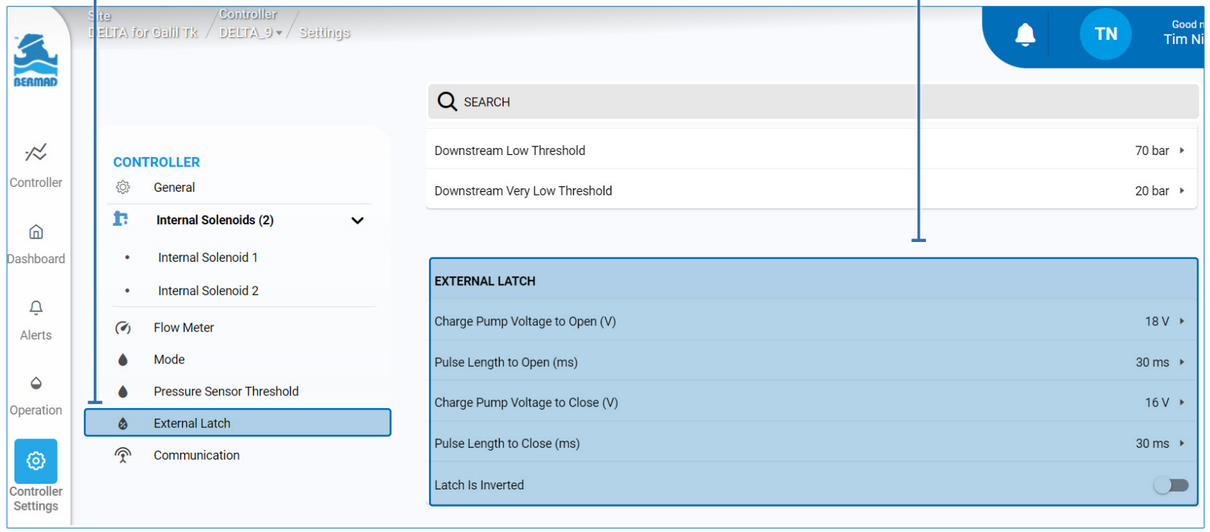
External Latch Settings

Perform the following steps to navigate to the external latch settings:

1. *From the controller settings, select* ***External Latch***

2. *The external latch settings of the controller are displayed*

3. *Define the following parameters*



Charge pump voltage to open (V)	Defines the voltage required to activate the latch solenoid.
Pulse length to open (ms)	Defines the pulse length to open.
Charge pump voltage to close (V)	Defines the voltage required to close the latch solenoid.
Pulse length to close (ms)	Defines the pulse length to close.
Latch is inverted	Defines if the latch is inverted or not.

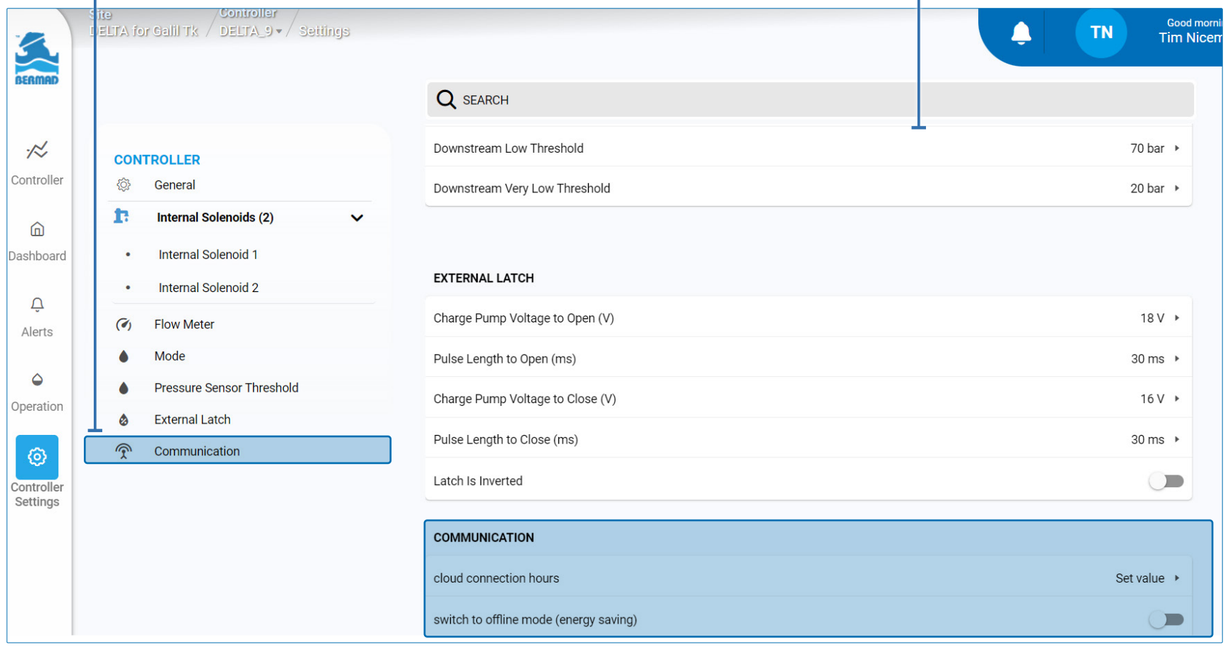
Communication Settings

Perform the following steps to navigate to the communication settings:

1. *From the controller settings, select* ***Communication***

2. *The communication settings of the controller are displayed*

3. *Define the following parameters*



Cloud connection hours	Defines the hours the controller goes online and connects to the cloud.
Switch to offline mode (energy saving)	Enables using the offline mode.

5. OPERATION

This chapter reviews operating DELTA and includes:

- Full Modulation by Time
- Full Modulation by Flow
- Two Pressures (High / Low)
- Alerts
- Managing Users

Full Modulation by Time

Perform the following steps to operate in full modulation mode by time:

1. *Verify the relevant controllor is selected*

3. *Set the time when the pressure setpoint should be changed*

6. *Click* ***Set to All Week Days*** *to set the defined setpoints to all the days of the week*

2. *Click the* ***Operation*** *button*

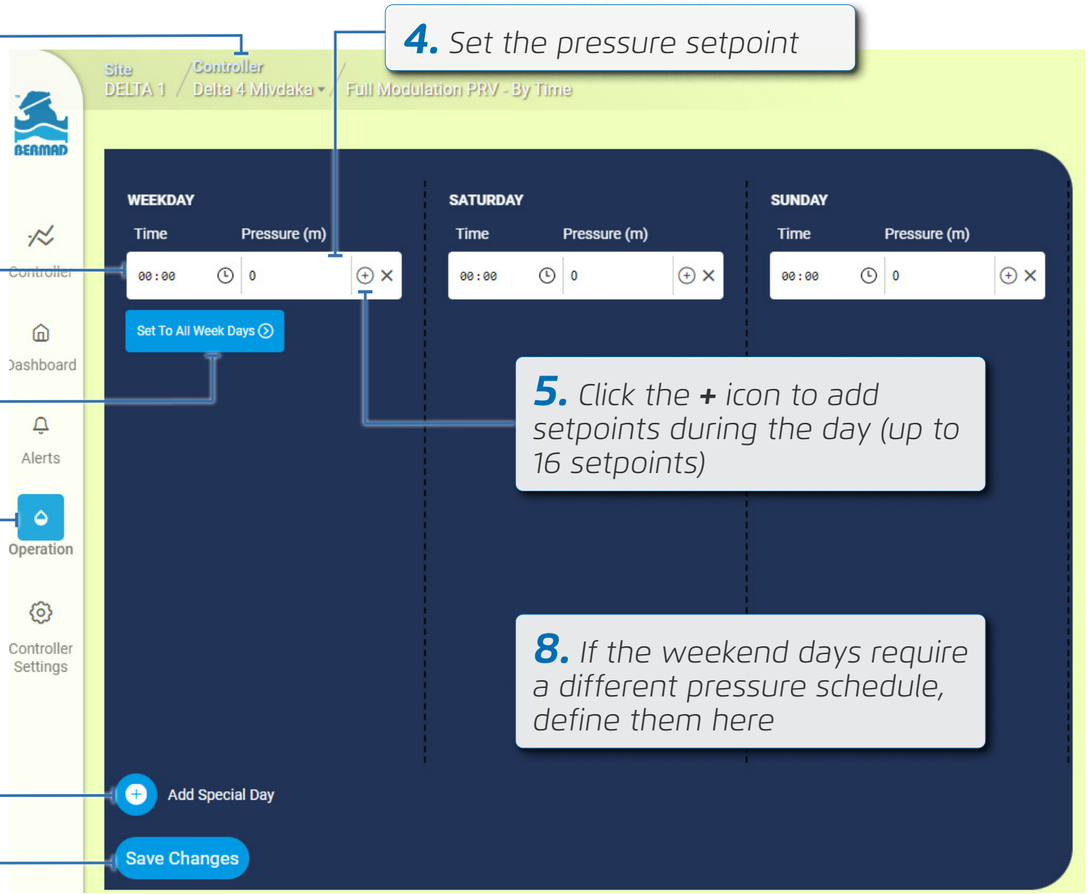
7. *If needed, click* ***Add Special Day*** *to define a day of the week when the setpoints are different*

9. *Click* ***Save Changes***

4. *Set the pressure setpoint*

5. *Click the* ***+*** *icon to add setpoints during the day (up to 16 setpoints)*

8. *If the weekend days require a different pressure schedule, define them here*



Tip: Click the **x** icon to remove a setpoint.

Full Modulation by Flow

Perform the following steps to operate in full modulation mode by flow:

1. *Verify the relevant controllor is selected*

4. *Set the pressure setpoint*

3. *Define the water flow required by pressure*

6. *Click **Set to All Week Days** to set the defined setpoints to all the days of the week*

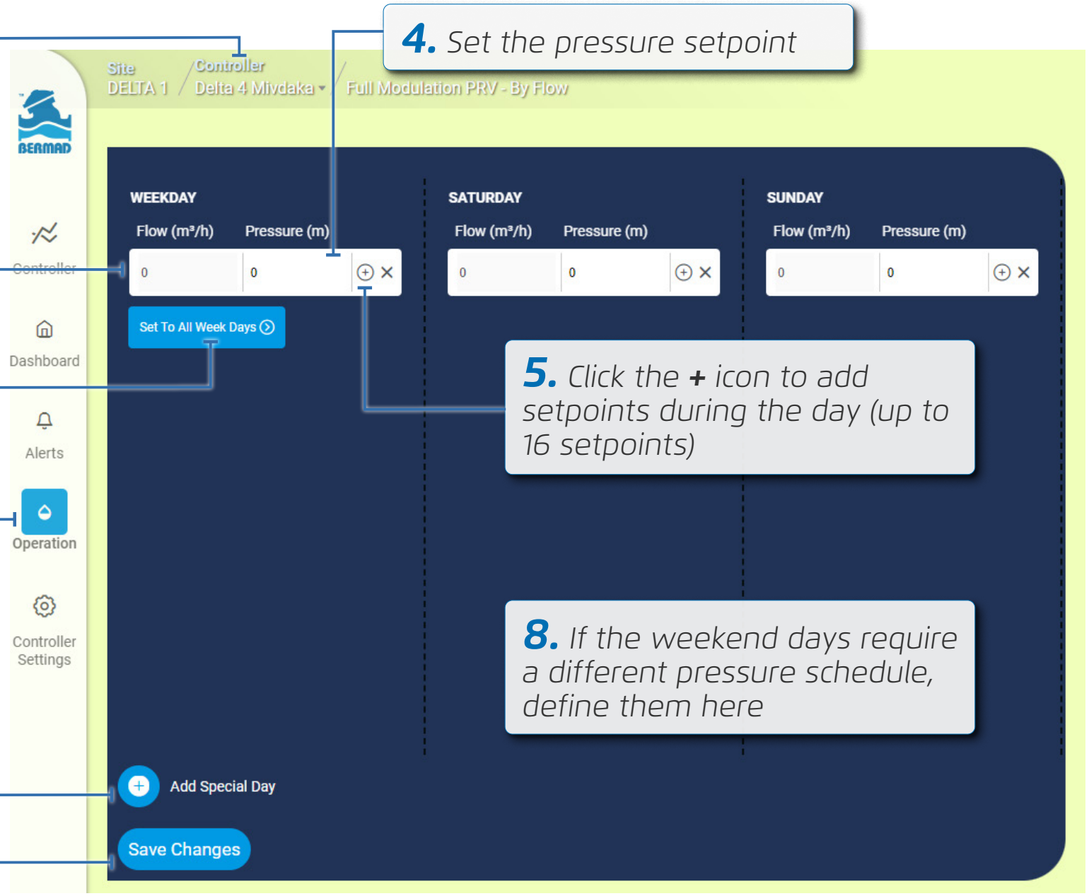
2. *Click the **Operation** button*

5. *Click the **+** icon to add setpoints during the day (up to 16 setpoints)*

8. *If the weekend days require a different pressure schedule, define them here*

7. *If needed, click **Add Special Day** to define a day of the week when the setpoints are different*

9. *Click **Save Changes***



Tip: Click the **x** icon to remove a setpoint.

Two Pressures (High / Low)

To operate in two pressures mode perform the following steps:

1. *Verify the relevant controllor is selected*

2. *Click the* ***Operation*** *button*

3. *Enter the start times of the high pressure setpoint*

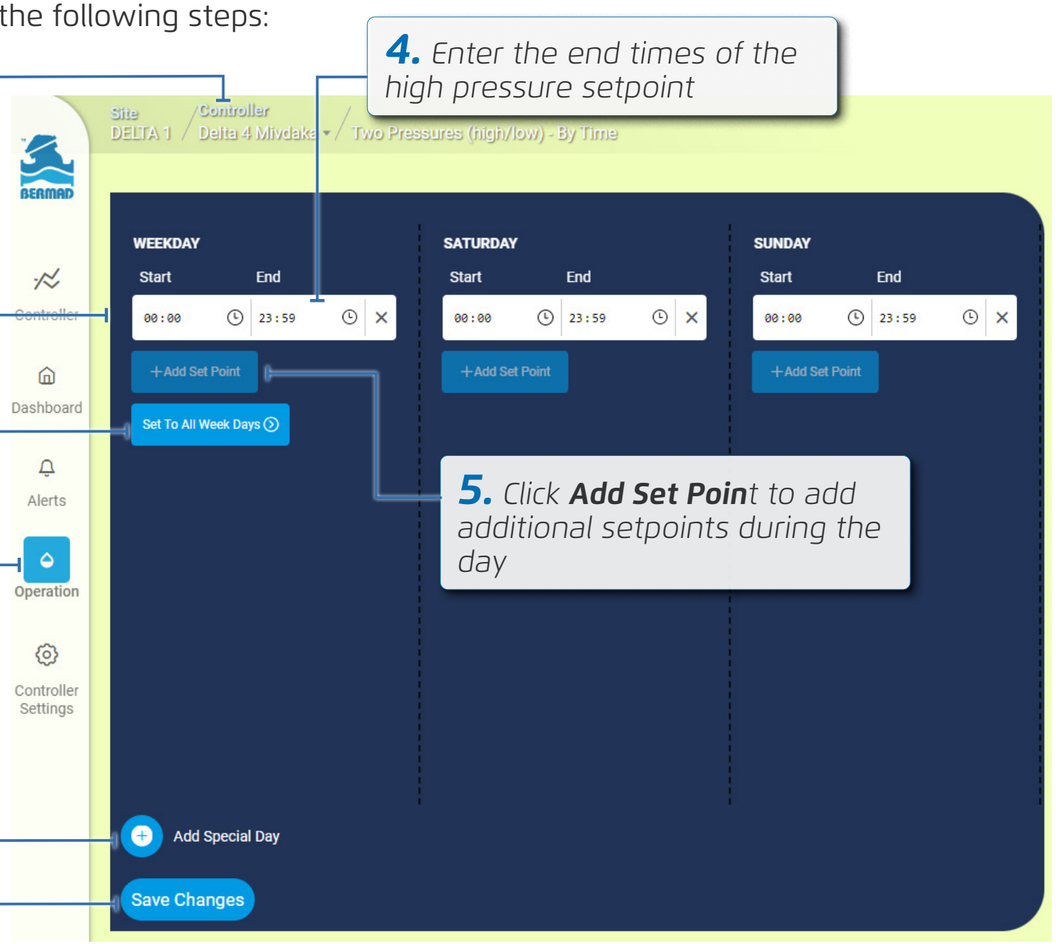
4. *Enter the end times of the high pressure setpoint*

5. *Click* ***Add Set Point*** *to add additional setpoints during the day*

6. *Click* ***Set to All Week Days*** *to set the defined setpoints to all the days of the week*

7. *If needed, click* ***Add Special Day*** *to define a day of the week when the setpoints are different*

9. *Click* ***Save Changes***



Tip: Click the **x** icon to remove a setpoint.

Alerts

To view alerts, perform the following steps:

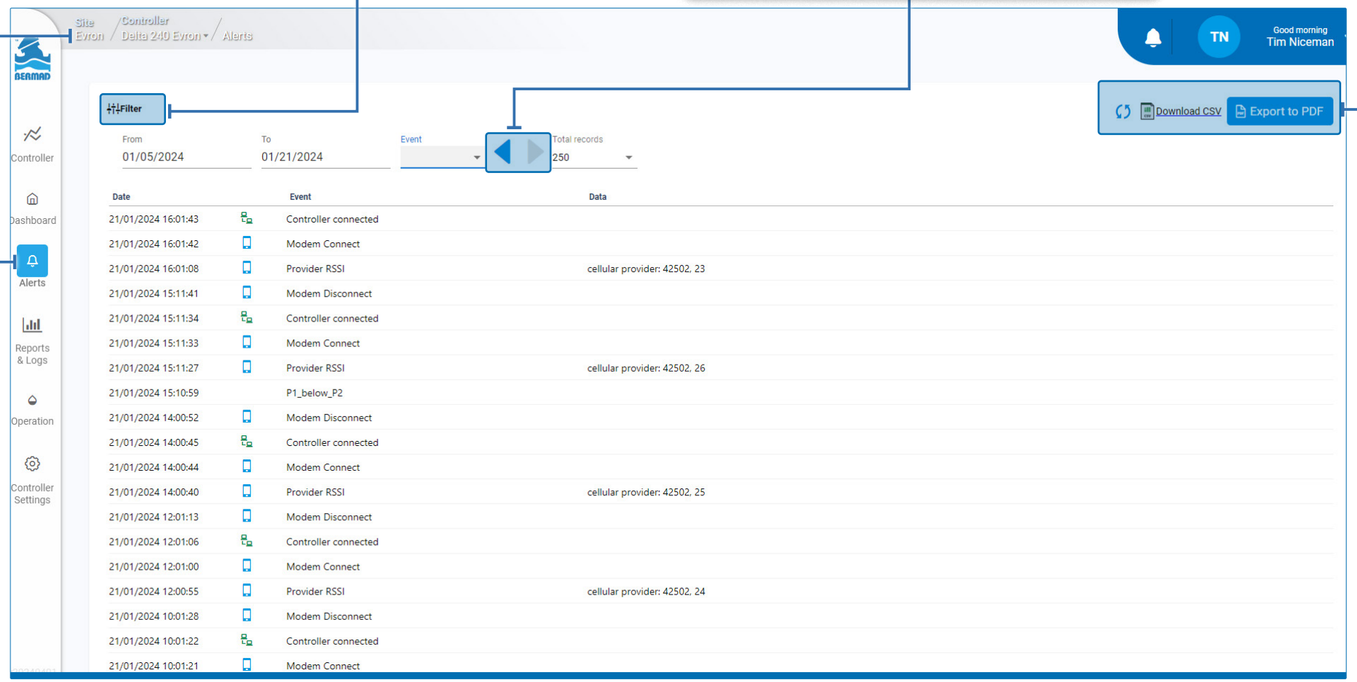
1. *Verify that the relevant site is selected*

2. *Click the **Alerts** icon*

3. *Click **Filter** to enable filtering the alerts by date and by unit*

4. *Click the arrows to enable displaying the alerts by different dates*

5. *Click to refresh, download or export to PDF*



Managing Users

This section reviews managing users and includes:

- Inviting a User
- Defining User Alerts
- Removing a User

Inviting a User

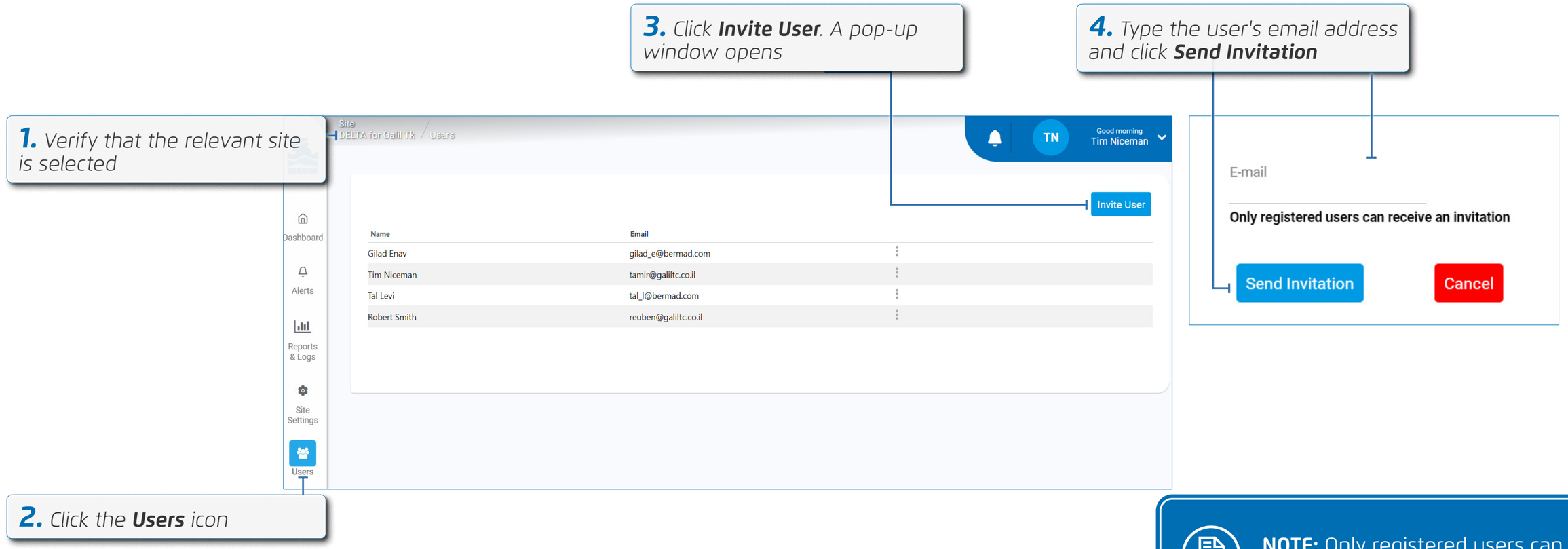
To invite someone to be part of a site, perform the following steps:

1. *Verify that the relevant site is selected*

2. *Click the **Users** icon*

3. *Click **Invite User**. A pop-up window opens*

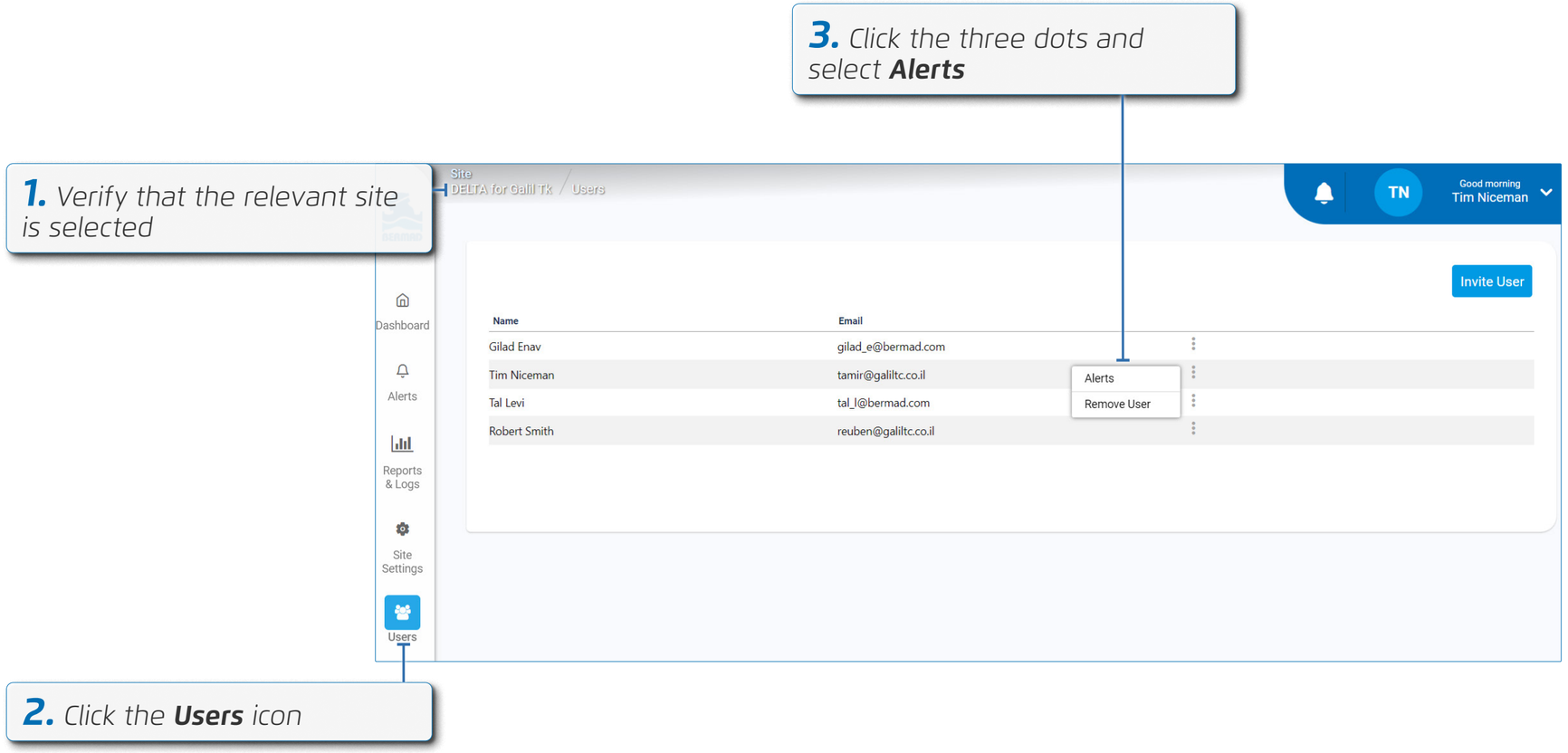
4. *Type the user's email address and click **Send Invitation***



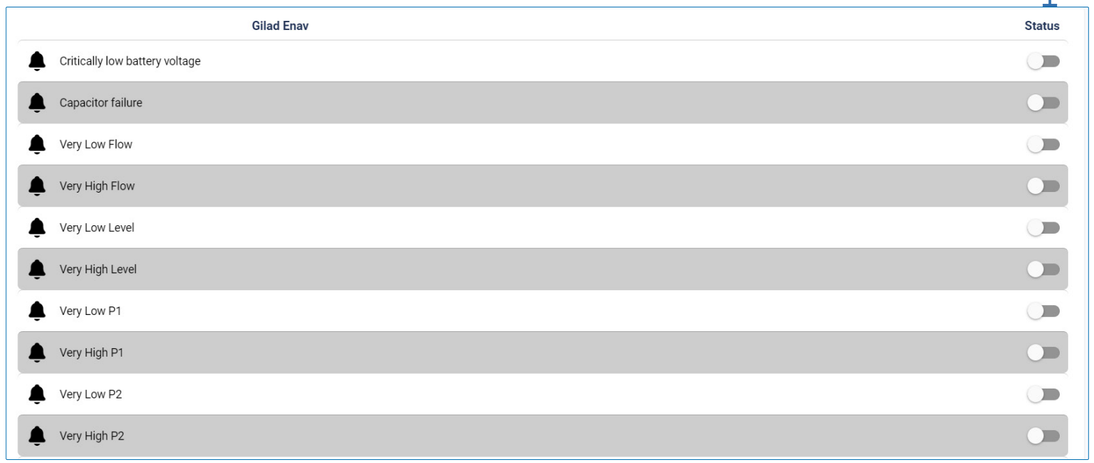
NOTE: Only registered users can be invited see Registering.

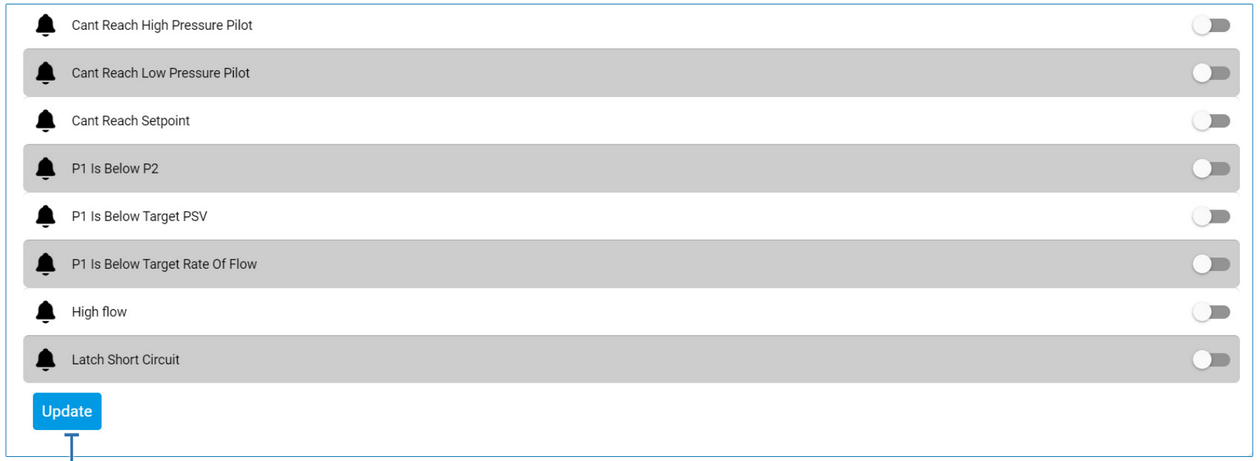
Defining User Alerts

To define which alerts a user recieves, perform the following steps:



4. *Select the relevant alerts*

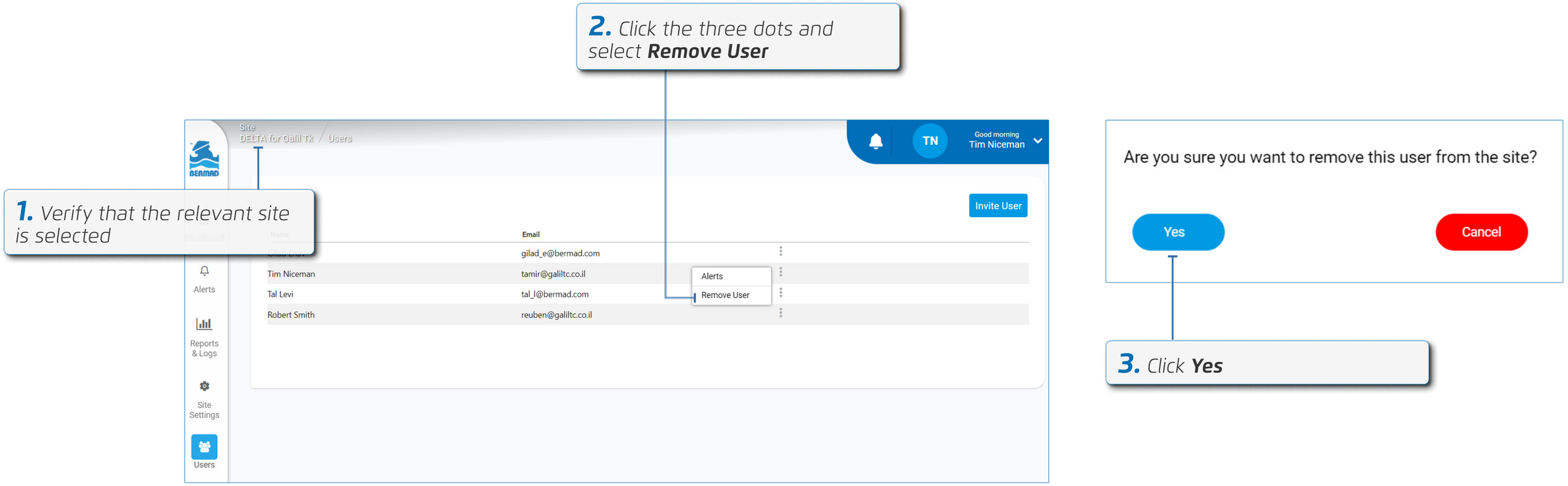




5. *Click* ***Update***

Removing a User

To remove a user, perform the following steps:



6. SPECIFICATIONS

Main Features

- Valve is “Normally Low” in event of mechanical failure
- Manual override to open and close the valve
- For optimal operation allow to set
  - Fast & slow regulation intervals
  - Dead-band from set-point
- Sensors calibration for all physical units
- Internals
  - 2 clog free high speed internal solenoids for the Bias chamber
  - chamber operation
  - 2 0-20 bar internal pressure sensors +/- 0.5%
- Local I/O:
  - 1 Latch outputs (16V DC; 100 mS pulse) for Day/Night control or venting the valve chamber
  - 3 digital inputs for metering and discrete sensors
  - 2 analogue inputs for 4-20mA or 0-10VDC sensors. for pressure, level. and

Connectivity

- Built in 4G Modem with 2G fallback
  - Global data sim card for worldwide plug-and-play internet connectivity
  - Supports NB-IoT, CAT-M & GPRS communication protocols
- Bluetooth communication or USB cable for technician local operation

Operation modes:

- Online mode: 24/7 connection between controller and
- cloud (require external power source)
- Offline mode:
  - Autonomous control operation, predefined cloud communication and real time alerts
  - Designed for power saving when using internal batteries

Power source:

- 2 Lithium batteries for operation in offline mode
- 9-24VDC external power input for online mode operation (solar panel, grid power, etc.)

- **Integral data logger -** with more than 150K records, enables comprehensive log registry that can cover long periods of offline operation
- **Periodic over the air firmware upgrades (FOTA)**
- **Outdoor installation -** IP68 rated with UV protection
- **Standard compliance -** CE, FCC (Pending)
- **Industrial grade electronic components -** –35°C to 75°C
- **Push type connectors -** for quick and easy wiring without need for special tools

7. WARRANTY

BERMAD Standard International Limited Warranty

Product Details: DELTA irrigation controller (the "**Product**")

BERMAD CS LTD. ("**BERMAD**") warrants that, for a period of 24 months from the retail purchase date of the original (first) purchaser (the "**Warranty Period**"), each component of the Product shall be free from defects in material or workmanship and the Product shall meet in all material respects its specification as detailed in BERMAD documentations.

General Conditions

This warranty shall be valid only if the Product is installed, handled and maintained in accordance with BERMAD's written manual provided together with the Products or publish on BERMAD website.

This Warranty does not cover defects or damages resulting from accident, inappropriate physical or operational environment, failure of electrical power, 'acts of nature' (which includes but is not limited to, hail, lightning storm, blizzard, flood and fire effects), improper installation, maintenance, service, repair, transportation, storage, modification, operation, use, damage by animals, negligence or fault by any party other than BERMAD.

This Warranty shall run solely to and in favor of the customer that purchased the defective Product directly from BERMAD (or any of its authorized dealers), and it does not extend to any other purchaser or user of the Product.

Claims, Notifications and Compensation

Every warranty claim must be notified in writing to BERMAD (or to the relevant authorized dealer from which the Product was purchased) as soon as reasonably possible after the discovery of the defective Product, enclosing the original sales receipt and this Warranty.

The claimant must allow BERMAD to inspect the Product involved and the installation site itself while the Product is still in its original position and has not been removed or altered in any way and/or return the Product to BERMAD for testing. BERMAD reserves the right to investigate independently the cause of any failure.

If a claim under this Warranty is properly notified within the Warranty Period and found to be justified by BERMAD, then BERMAD, at its sole option, shall: (i) replace such Product; or (ii) repair such Product.

In any way, BERMAD's liability shall not exceed the amounts actually paid by the customer to BERMAD (or to any of its authorized dealers) for the defective Products.

Limitations

This Warranty is the sole warranty in respect to the Products.

Under no circumstances shall BERMAD be liable for any indirect, special or consequential damages, including, without limitation, for any loss of profit, loss in connection with business interruption, loss of use, loss of revenues or damage to business or reputation.

This warranty does not cover any costs and expenses of removal and installation of the Product or shipping cost or taxes or any other direct or indirect loss(es) which may result from the Product failure and BERMAD shall not be liable for such costs and expenses.

OTHER THAN HAS BEEN SPECIFICALLY STATED IN THIS WARRANTY, ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED SO FAR AS THE LAW PERMITS.

8. APPENDIX

Technician App

This section reviews the technician app.

DELTA

www.bermad.com