VOXiWatch 8W

MP884 8 Channel Wireless Controller

User's Guide



mPower Electronics
Making Powerful Senses

Rev. 1.0
October 2026

IMPORTANT!

The full VOXiWatch 8W User's Guide must be carefully read by all individuals who have the responsibility of using, maintaining, or servicing this product. The product will perform as designed only if it is used, maintained, and serviced in accordance with the manufacturer's instructions. The user should understand how to set the correct parameters and interpret the obtained results.

⚠ WARNINGS ⚠

The VOXiWatch 8WController (MP884) is NOT certified for use in hazardous gas locations. The VOXiLink Transmitters may be mounted in hazardous locations and wirelessly connected to the MP884 Controller outside the hazardous area.

Proper Product Disposal At End Of Life



The Waste Electrical and Electronic Equipment (WEEE) directive (2012/19/EU) is intended to promote recycling of electrical and electronic equipment and their components at end of life. This symbol (crossed-out wheeledbin)indicatesseparate collection of waste electrical and electronic equipment in the EU countries. This product may contain one or more Nickel-metalhydride (NiMH), Lithium-ion, or Alkaline batteries. Specific battery information is given in this user guide. Batteries must be recycled or disposed of properly.

At the end of its life, this product must undergo separate collection and recycling from general or household waste.Please use the return and collection system available in your country for the disposal of this product.

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1 Safety Precautions

IMPORTANT!

Read Before Installing This Installation Guide is for wiring, installation, and testing of the VOXiWatch 8W Controller system only. For safe configuration, it must be used in conjunction with the VOXiLink Transmitters User's Guide, depending on your system. Applicable User's Guides are available at www.mpowerinc.com.

Read Before Operating

⚠ WARNINGS ⚠

Hazardous area

This Manual must be carefully read by all individuals who have or will have the responsibility of using, maintaining, or servicing this product. The product will perform as designed only if it is used, maintained, and serviced in accordance with the manufacturer's instructions. The user should understand how to set the correct parameters and interpret the obtained results.

For safety reasons, this equipment must be operated and serviced by qualified personnel only. Read and understand the instruction manual completely before operating or servicing.

- The VOXiWatch 8W Controller (MP884) is NOT certified for use in hazardous gas locations. The VOXiLink Transmitters may be mounted in hazardous locations and wirelessly connected to the MP884 Controller outside the hazardous area.
- Use only mPower's sensors. Substitution of sensors may cause inaccurate readings.

CAUTION!

To reduce the risk of electric shock, turn the power off before performing service. Service this product only in an area known to be non-hazardous.

2 General Information

A VOXiWatch Wireless System consists of a VOXiWatch 8W Controller and the VOXiLink transmitter.

The VOXiWatch 8W Controller (MP884) is the central unit of a VOXi wireless gas alarm system, which connects up to 8 transmitters via LoRA wireless (2 Miles (3.2 km) LOS). The Controller shows real-time readings or statuses from connected gas transmitters, and automatically activates various alarms or devices when the monitored gases exceed the permitted health or safety levels. The Controller is housed in a NEMA 4X enclosure, and has a large, easy-to-read color display, common or individual channel relays, and optional horn and strobe assemblies.

2.1 Key Features, Functions, And Benefits: VOXiWatch 8W Controller

- Brackets to mount enclosure on solid surface
- Large graphic color LCD
- Push-button interface on controller display panel and transmitter
- One fault and one alarm LED
- Communication: LoRA wireless (2 Miles (3.2 km) LOS)
- EC sensors or Ultra-low power NDIR sensors
- 5 Programmable relays for LO, HI, HI HI, or Fault Alarms
- Up to 10 years of event and data logging

Refer to datasheets that apply to the monitors used in your VOXiWatch 8W Controller system.

Applications

- Oil and gas
- Petrochemical plants
- Utility facilities
- Energy storage
- Steel mills
- Water and air treatment
- Industrial safety
- Fence-line monitoring

3 Purpose Of This Guide

This guide is designed to provide information on installing and wiring the VOXiWatch 8W Controller Fixed Controller into a VOXiWatch 8W Controller Wireless System and configuring the controller to communicate with wireless transmitters.

4 Flexible Configurations

The VOXiWatch 8W Controller can be configured to support up to eight connected transmitters, depending on the facility or facilities being monitored. The VOXiWatch 8W Controller may be shipped as a pre-configured system that includes up to 8 transmitters.

5 VOXiWatch 8W Controller Installation

When mounting the VOXiWatch 8W Controller, ensure that it is in a safe place where it is unlikely to be damaged by machinery, maintenance activities, etc.

CAUTION!

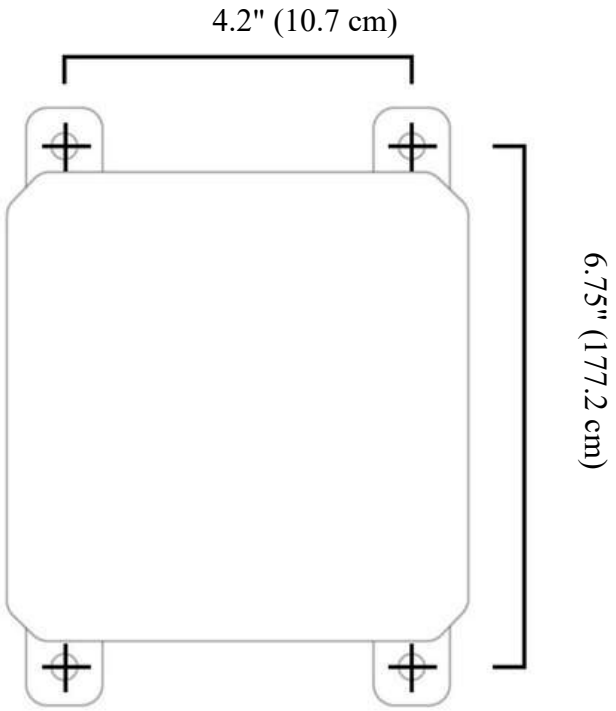
To reduce the risk of electric shock, turn the power off before opening this instrument or performing service. Never operate the instrument when the instrument is open. Service this product only in an area known to be non-hazardous.

- The VOXiWatch 8W Controller (MP884) is NOT certified for use in hazardous gas locations. The VOXiLink Transmitters may be mounted in hazardous locations and wirelessly connected to the MP884 Controller outside the hazardous area.

When locating the VOXiWatch 8W Controller for installation, make sure that there is approximately 12" (30 cm) of clearance on all sides of the VOXiWatch 8W Controller.

6 Mounting The VOXiWatch 8W Controller

The VOXiWatch 8W Controller should be mounted on a flat surface, making sure there is at least 12" (30 cm) of clearance around the unit. When mounting the VOXiWatch 8W Controller on a wall, use heavy-duty steel screws located as indicated below.



Follow these steps:

1. Locate the VOXiWatch 8W Controller on a wall or other flat surface. Make sure there is at least 12" (30 cm) of clearance around the unit. Mark the mounting holes' locations.
2. Remove the VOXiWatch 8W Controller.
3. Drill pilot holes in the wall or mounting surface.
4. Hold the VOXiWatch 8W Controller firmly against the wall or mounting surface and insert and tighten the screws.

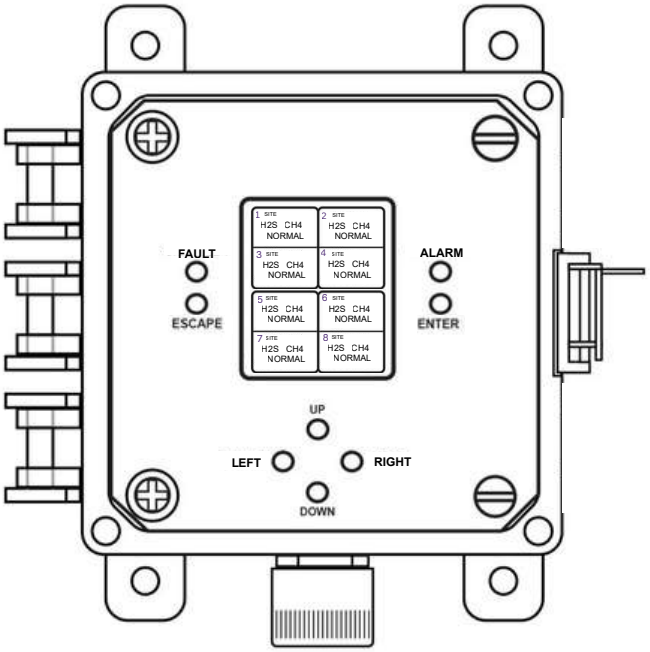
Note: Screw holes can accommodate screws with a diameter up to 0.3" (7.5mm).

The VOXiWatch 8W Controller is now ready for electrical wiring and testing.

7 VOXiWatch 8W Controller Wiring

Depending on the configuration ordered, the VOXiWatch 8W Controller may already have most wiring done. It may be necessary only to connect the power supply wires and ground connection (according to local requirements). Power and internal grounding wires must be fed through a connector or gland at the bottom or side of the unit or wired through conduit.

VOXiWatch 8W Controller



To power

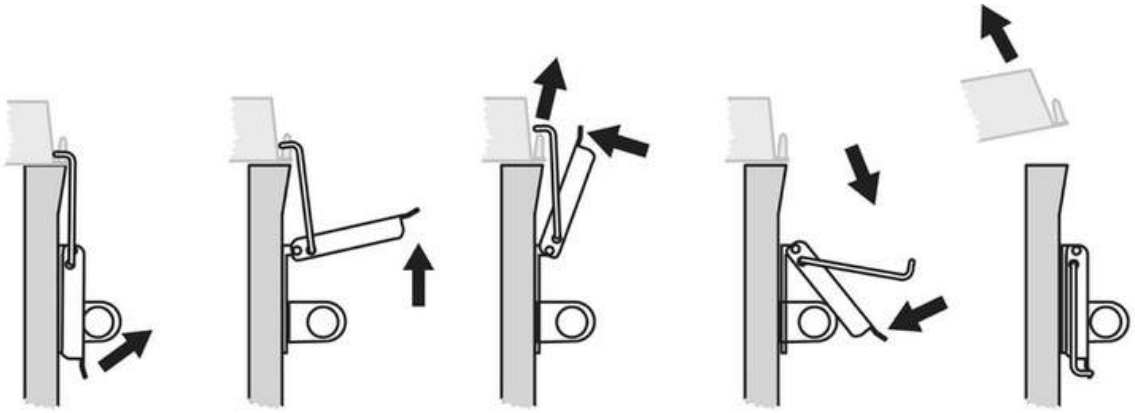
IMPORTANT!

Prior to factory shipment, the VOXiWatch 8W Controller is tested. However, the instrument should be tested after installation to ensure there was no damage in transport, to ensure proper wiring, and to check all functions before being used to monitor.

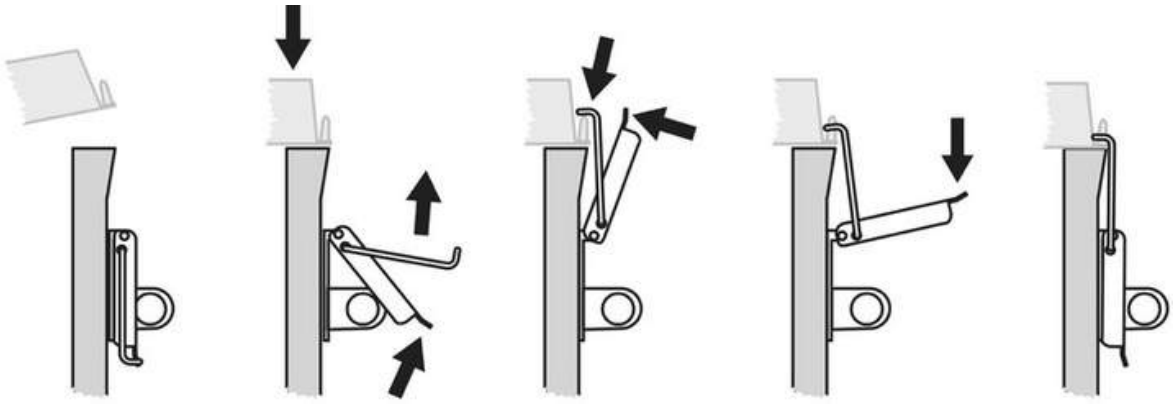
7.1 Opening & Closing The Enclosure

A latch is included to hold the hinged top of the enclosure snugly against the bottom portion of the enclosure. To open it:

1. Flip the tab up and lift it as shown in the following side views.
2. Move the latching bar away.
3. Flip the bar down and press the tab to lock it in place so that it does not get damaged.
4. Lift the hinged cover.

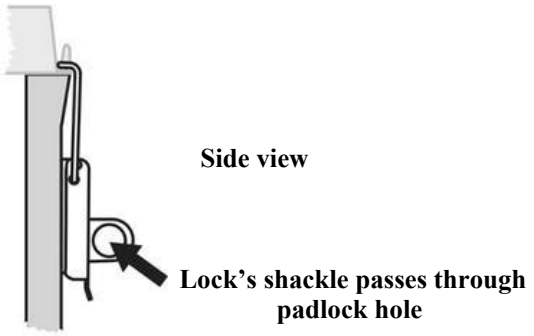


To latch the cover in place, reverse the procedure:

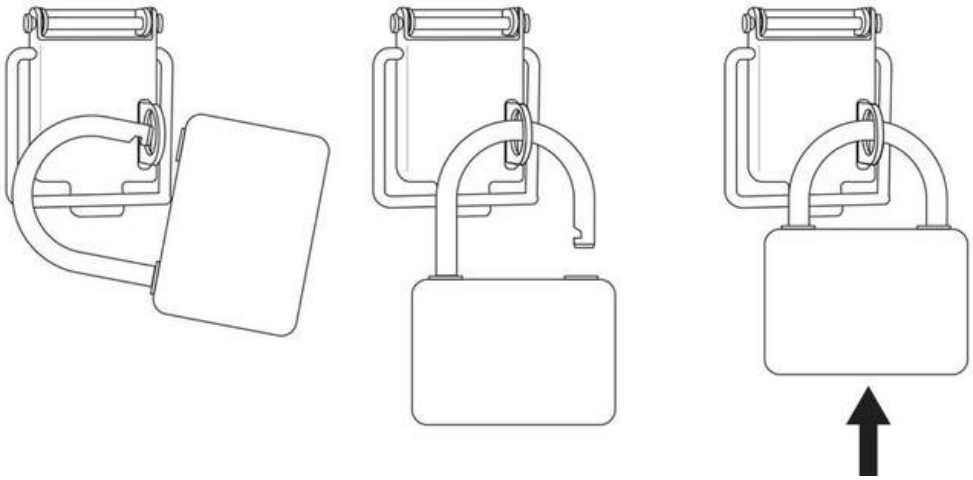


7.2 Locking The Enclosure

If extra security is required to ensure that the enclosure will not be opened, use a padlock (or combination lock).



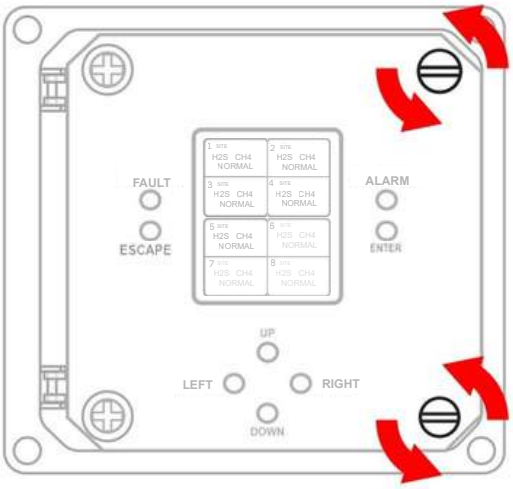
1. Make sure the VOXiWatch 8W Controller's lid is tightly closed and that the latch is secure.
2. Open the lock and pass the shackle throughthe padlock hole.
3. Press the lock's body up until the shackle clicks into its locked position.



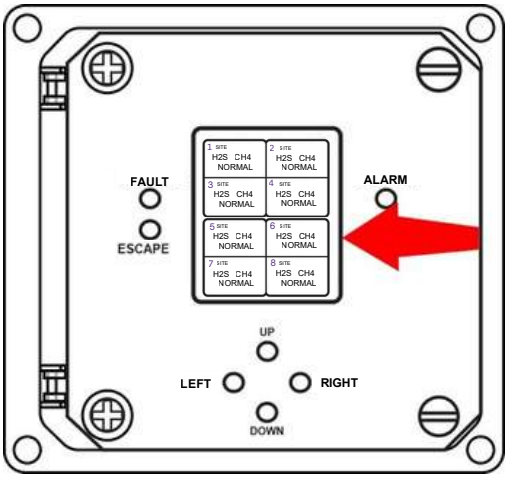
7.3 Accessing The Internal Connecting Points

All electrical connections and connections to external transmitters, horns, and strobe lights are made on the PC board, which is mounted to the back of the front panel. To access it, you must loosen the two capture screws and tilt it up on its hinges.

1. Loosen the two capture screws along the right side of the front panel:



2. Lift the front panel from the right edge. It has hinges onthe left side:

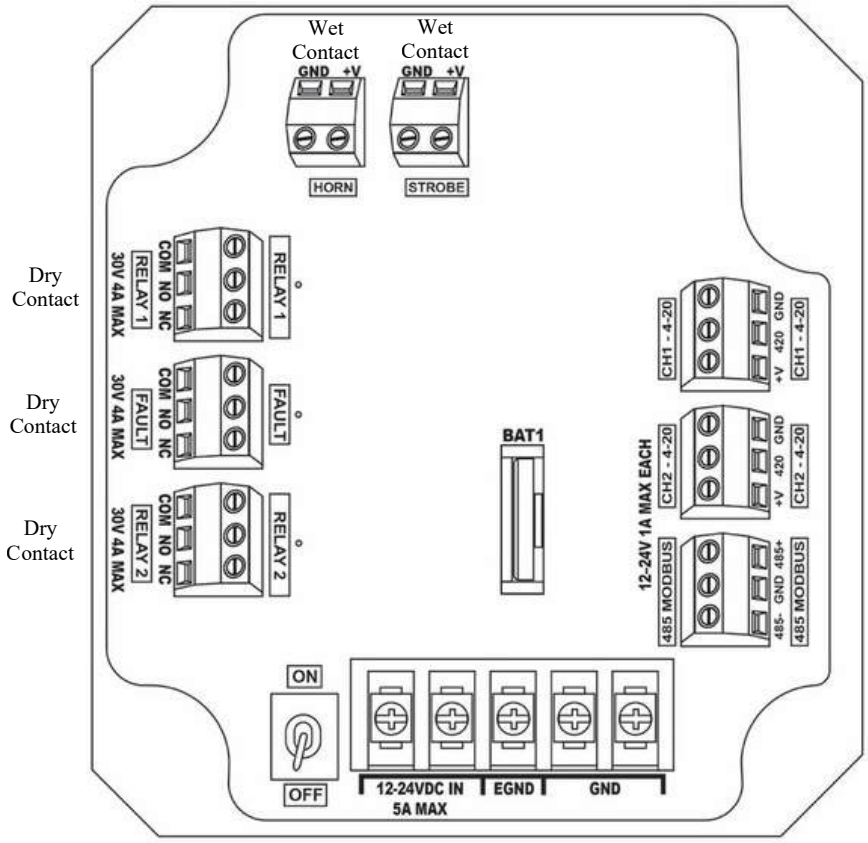


Lift here

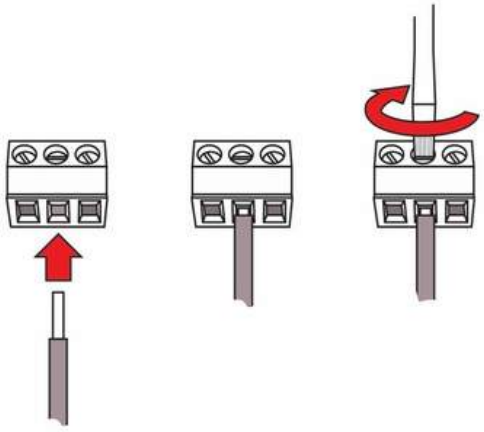
The PC board is now exposed and ready for wiring.

7.4 Wiring

The simplified drawing below shows the relay PC board of the VOXiWatch 8W Controller. The power and horn/strobe light connections are made here.



When connecting wires to the connection blocks, insert the wires inside the"square" opening and then tighten the screw to secure the wire.

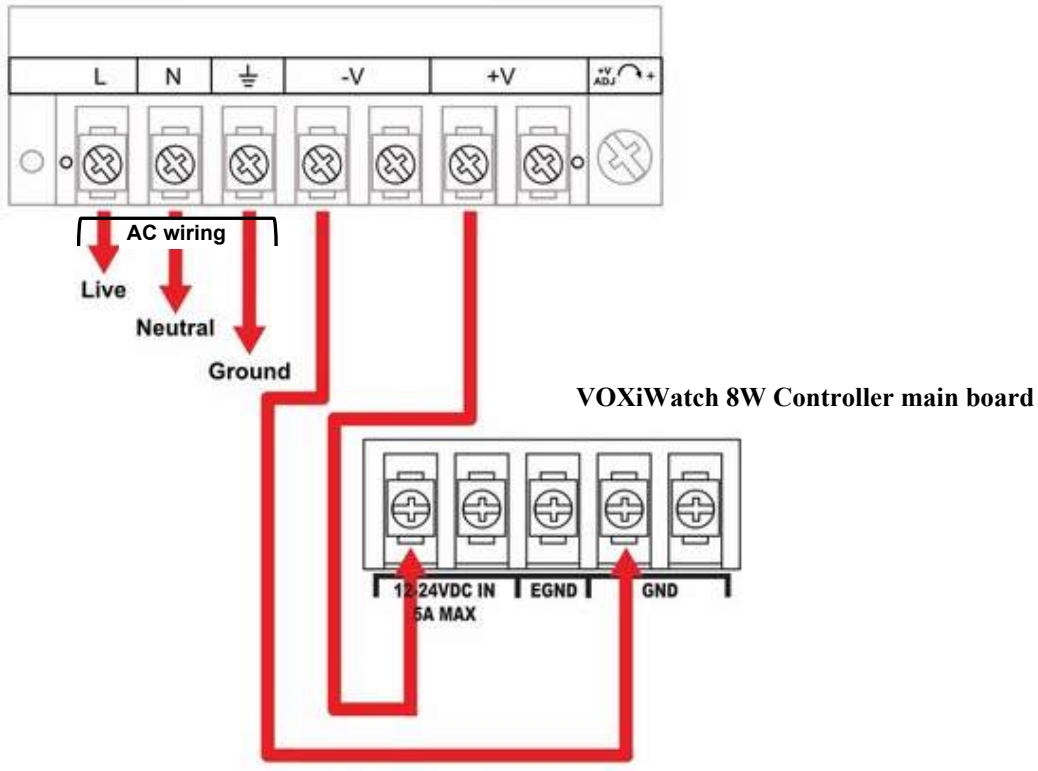


7.5 Power Connections

Note: If the VOXiWatch 8W Controller was delivered with a built-in power supply, electrical wiring for powering the internal circuit boards is already done.

If the VOXiWatch 8W Controller has a built-in power supply, then wiring to an AC source is required. AC power must be connected to the three points on the power supply: L, N, and ⏚ (Ground/Earth).

Built-in power supply



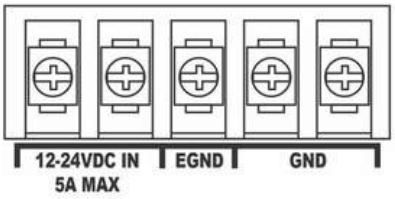
Depending on local ordinance, wires typically are colored as follows:

L ***(Line/Live) In the US, it is typically black or red, while in the UK and Europe, it is brown for single-phase circuits.***

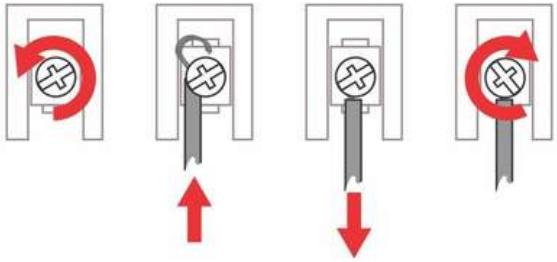
N (Neutral) ***Typically white or gray in the US, and blue in the UK and Europe.***

G (Ground) ***Green or bare copper wire.***

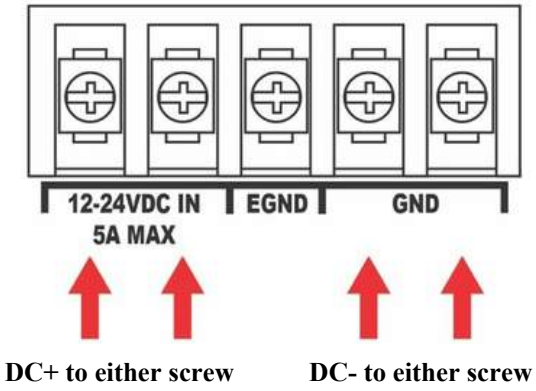
Electrical connections to provide DC power (12 to 24 volts) to the main board are made at its power block.



1. Loosen each screw that corresponds with a wire connection.
2. Loop the wire around screw.
3. Pull the wire to make sure the loop is completely under the screw.
4. Tighten the screw to secure the wire.



When wiring power connections to the block, connect the DC+ wire to the point labeled "12-24VDC IN" and DC- to the point labeled "GND." You can use either screw in these two sections.



The second screws for DC+ and DC- provide convenient connecting points for supplying power to the dry-contact relays.

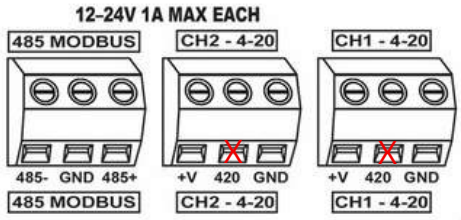
Note: A connection to earth ground (EGND) must be completed when the VOXiWatch 8W Controller is installed.

7.6 Earth Ground (EGND) Connection

A separate connection to earth ground is made by connecting a wire from the screw labeled "EGND" and an earth ground point (such as a cold water pipe or rod driven into the ground—check with local ordinance).

7.7 Modbus Connections

There are three connector blocks in this area of the relay board. Two are legacy wired connections for mPower transmitters using 4-20mA current operation and are labeled "CH1 – 4-20" and "CH2 – 4-20". These legacy connections will not be used due to the VOXiLink Transmitters connecting through the LoRa Wireless connection.

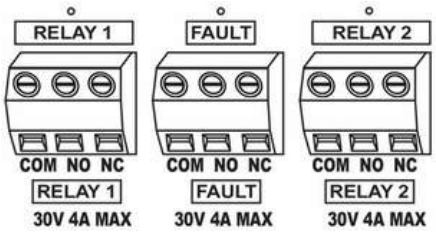


A third set of connectors is for RS-485 communication protocol interconnection. It is labeled "485 MODBUS." In a setting using RS-485 communication, three wires should be connected to the block's connections labeled "485-", "GND", and "485+".

Note: The maximum permissible length between an RS-485 driver and receiver is 4,000 feet (or 1,200 meters). However, both cable quality and data rates impact this distance. As data rates increase, the signal is increasingly attenuated by the parasitic RC filter created by the cable. Therefore, keep the wires as short as possible and only use shielded, high-quality wire. The shield must be connected to ground at one end to provide best isolation from external noise.

7.8 Alarm & Fault Connections

Connections to three dry-contact relays are included in this section. There are one for Relay 1 and one for Relay 2 connection, and one for Fault connection. Wire each relay so that the COM (common) connection is made for power, and then connect the other wire to either NO (Normally Open) or NC (Normally Closed). When a programmed threshold in the VOXiWatch 8W Controller is passed, the relay changes state. These relays can also be programmed for Lo, Hi, HiHi, and Fault alarms.



IMPORTANT!

All relays can be wired to provide both NO and NC operation (acting as two separate relays triggered at the same time).

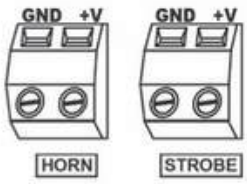
7.9 Horn And Strobe Connections

These connections are for driving a horn (sounder) and a strobe light. Note the polarity: Each block has two connection points. One is labeled "GND" for ground and the other is "+V" for positive voltage output.

The Horn and Strobe outputs deliver 12 to 24 volts DC (the same as the power coming into the controller). These outputs are designed to only power the provided horn and strobe or pre-approved alternatives. Ensure that any connected equipment is rated appropriately. These relays can also be programmed for Lo, Hi, HiHi, and Fault alarms.

IMPORTANT!

These connections cannot be used as relays or to power other devices.



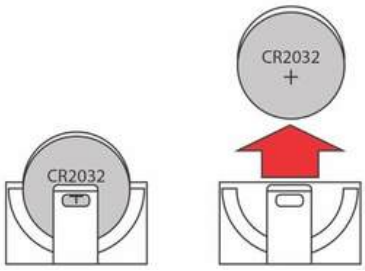
7.10 Battery Replacement

The battery provides power to back up the real-time clock when the VOXiWatch 8W Controller is turned off. Meanwhile, all operational data are stored on the SD card, and settings are stored in non-volatile memory.

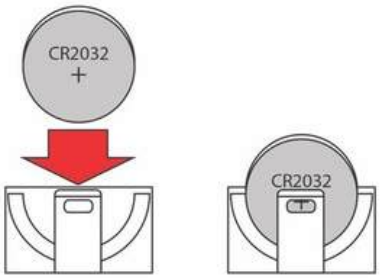
A battery should last several years. However, the battery should be replaced every year to ensure operation without disruption. If the battery goes dead, the real-time clock loses its correct time. Always use a high-quality CR2032 battery, and make sure itis clean and dry before inserting it into the socket, found on the relay PC board. It is labeled "BAT1."



Remove the old battery by pulling it straight upfrom the socket. It fits very snugly, so itmay require some effort. Do not twist the battery, and do not use tools such as a pliers.



Wipe the new battery with a clean, dry cloth. Pay attention to the orientation of the battery (the "+" side is labeled "CR2032"; there is usually a"+" symbol, as well). Orient the battery so that the labeled side is in contact with the socket's metal retainer/tensioner. Press the battery into the socket until it is firmly seated.



IMPORTANT!

In the U.S., it is federally mandated under 16 CFR part 1263 that you dispose of the old battery properly, in a place where it cannot be ingested. If a button of this type is swallowed, it can cause devastating injuries including internal burns, tissue damage and even death if not treated promptly. For further information, refer to ANSI/UL Standard for Safety of Products Incorporating Button Batteries or Coin Cell Batteries, UL 4200A.

Relevant Standards:

- ANSI/UL 4200A: This US standard outlines specific requirements for button battery safety including packaging, battery compartment design, and warning labels.
- IEC 62115: An international standard covering safety requirements for button and coin batteries.
- sAS/NZS/IEC 60065/60950/62368: Standards relevant to button battery safety in Australia and New Zealand.

7.11 Set The Clock

After the battery is replaced, set the clock for correct time and date. Refer to page 34 for the steps necessary for setting the clock's time and date.

8 SD Memory Card Replacement

The VOXiWatch 8W Controller accommodates an SD card for storing log data and events. It electronically stores system files and reports on a standard SD memory card, as well as system-specific data.

A user-provided 32GB SD card (P/N M490-0178-000) can optionally be used to log events such as power on/off, calibration, alarms, faults, and signal strength. If no SD card is present, the ALARM LED glows solid red after the power-on self-testing. Data can be downloaded on a PC using Excel, available at www.mpowerinc.com. This uploads the data directly to the computer as a CSV file. Once the software is installed, remove the SD card from the VOXiWatch 8W Controller and place it in the computer's SD card slot, or use an external reader. Follow the instructions in the software for downloading. It is a good idea to download the data on a regular basis because the process will be faster, plus it enhances security.

IMPORTANT!

SD Card capacity should not be greater than 32GB.

Once data has been downloaded to a computer running mPowerSuite, data can be exported in CSV (comma-separated value) format for use/storage in spreadsheets such as Microsoft Excel.

Note: The SD card can only be used **for** VOXiWatch 8W Controller recording. Do not save other files to the SD card.

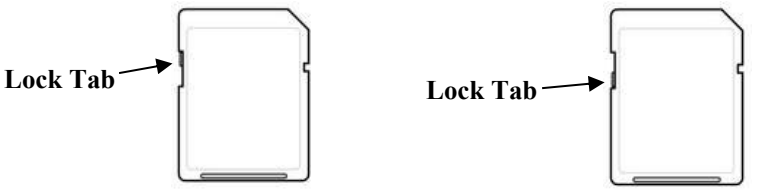
IMPORTANT!

The VOXiWatch 8W Controller does not store data without an SD card in its slot.

CAUTION!

Do not remove the SD card from its slot or insert an SD card into an empty slot while the VOXiWatch 8W Controller is running. This may damage the SD card or corrupt its data.

If the SD card is locked, the error message shown above is displayed. The VOXiWatch 8W Controller cannot write data to a locked SD card. Remove the SD card and unlock it by moving the lock tab upward; then reinsert the SD card.



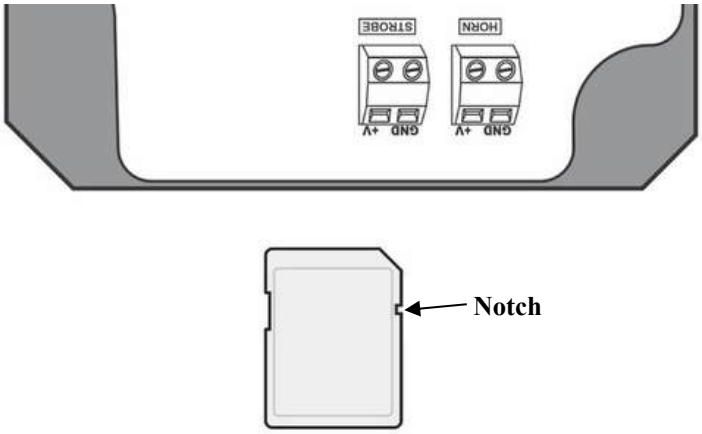
Unlocked SD Card **Locked SD Card**

Note: When the SD card is full, the VOXiWatch 8W Controller automatically writes new data over the oldest data in a "first in/first out" fashion.

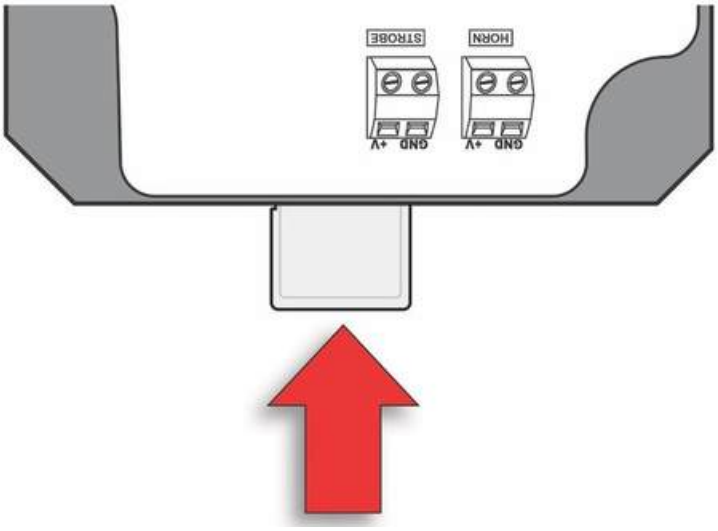
The SD Card Dockison the lower PC board, almost directly under the block for connecting a strobe.

Before inserting the SD card, turn off the power to the VOXiWatch 8W Controller.

Align the SD card as shown, with the notched corner to the right.



Press the SD card into its dock until it clicks. It should now be secure.



To remove the SD card:

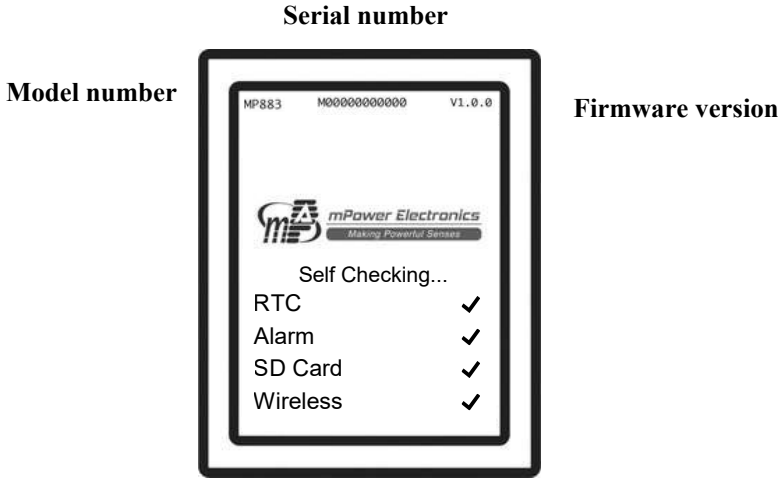
1. Turn off power to the VOXiWatch 8W Controller.
2. Press the SD card until it makes a click, unlatch, and push outward.
3. Grasp the SD card and remove it.

9 Start-Up

Once 12 to 24 volts DC power is connected and the internal power switch is set to "On," the VOXiWatch 8W Controller's display lights up and the system enters a 60-second warm-up.



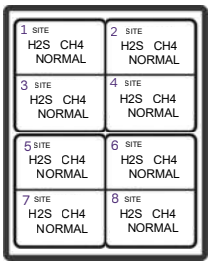
The controller will self check the RTC, alarms, SD card, wireless.



9.1 Successful Start-Up

The display changes to show the transmitter(s) and reading(s), as well as the measurement unit and type of sensor.

When all readings are within normal range, the background color is green.



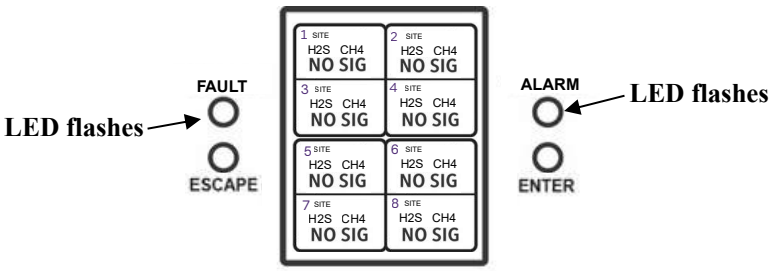
Depending on conditions that the VOXiWatch 8W Controller receives, the background changes and the LED glows different colors and it glows either continuously or it flashes. This chart shows conditions for the backlight color and LED color/state:

Condition	Backlight Color	LED
Normal	Green	Green Steady
Low Alarm	Orange	Yellow Flashing
High Alarm	Red	Red Flashing
High High Alarm	Red	Red Flashing
Transmitter Warm	Light Blue	Blue Steady
Up Cal in Progress	Light Blue	Blue Steady
No Signal	Dark Blue	Blue Flashing
Transmitter Fault	Dark Blue	Blue Flashing

9.2 Unsuccessful Start-Up

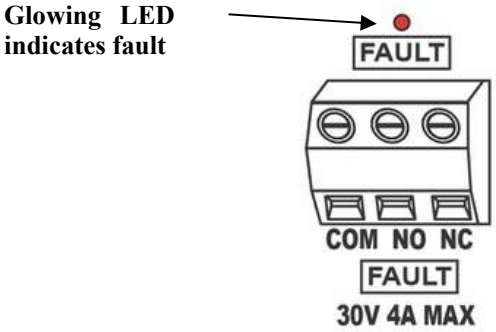
If the display does not light up, check power connections. Also check that the power source is delivering 12 to 24 volts DC.

If the display lights up but no signal is present, then the display alerts you and the Channel status will read No Signal.
The background on the portion of the display showing a problem is dark blue.



If no signal is received from the transmitter(s), check the connections inside the VOXiWatch 8W Controller, and then check the connections inside connected transmitters/sensors.

If there is a problem, the programmed fault relay LED on the main relay board inside the VOXiWatch 8W Controller glows continuously. At the same time, the relay is tripped to provide a
downline fault indication to any equipment connected to the Fault relay.



If everything appears in order in the VOXiWatch 8W Controller, check the connected transmitters/sensors.

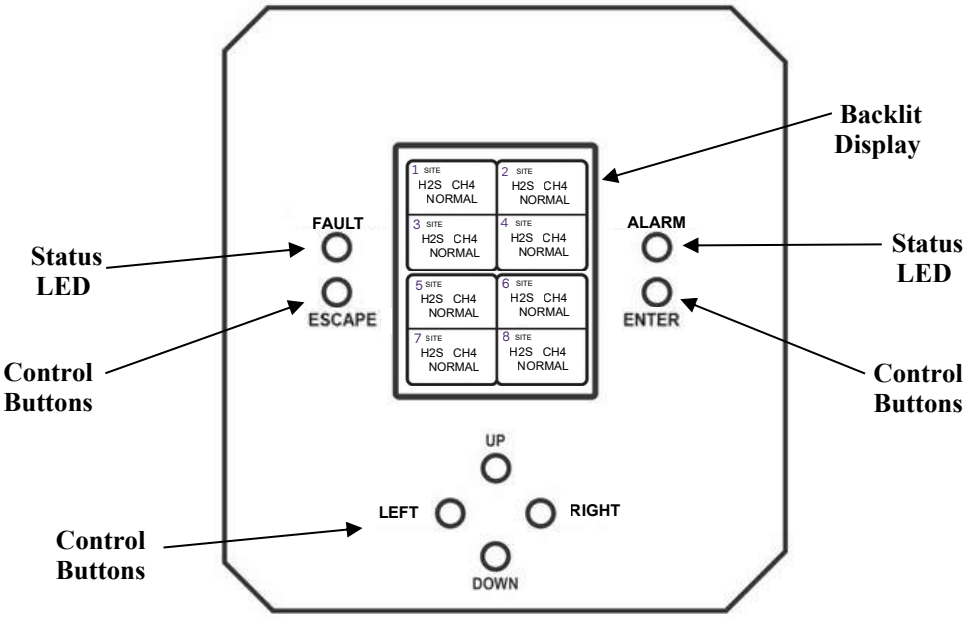
CAUTION!

Always turn off power to the system before opening any controller, especially if the controller is in a hazardous environment.

10 User Interface

The user interface consists of:

- Fault Status LED
- Escape Control Button
- Alarm Status LED
- Enter Control Button
- Backlit display
- Control buttons (Left, Right, Up, and Down)



11 Programming Mode

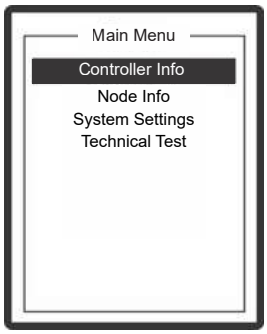
11.1 Navigation

Enter Programming Mode by pressing and holding Escape & Enter for 5 seconds.

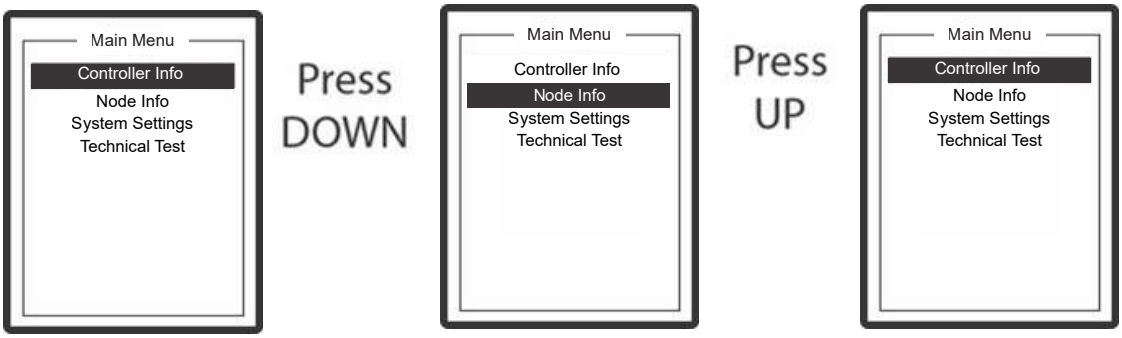
Note 1: When parameters are being edited/set, the VOXiWatch 8W Controller continues monitoring data from transmitter(s).

Note 2: Programmed parameters are stored and are retained when power is turned off.

In programming mode, there is a top-level menu:

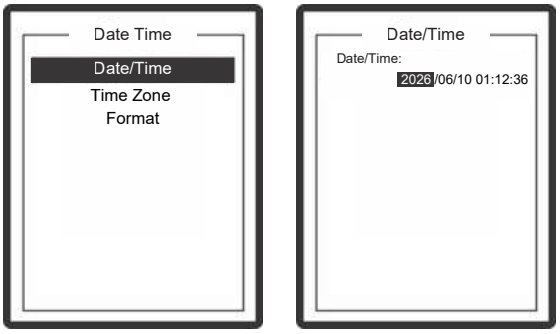


To scroll through the menu options, press the UP or DOWN button. The highlighting changes, showing you the current selection.

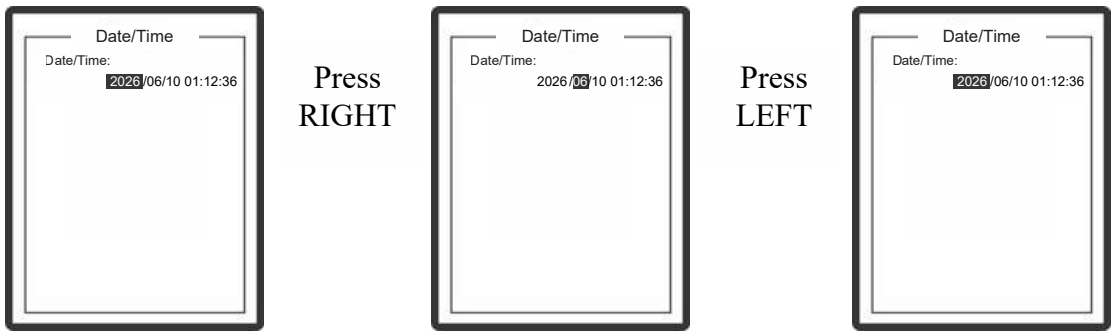


Once you have selected a menu, press ENTER. The menu item's submenu is shown. Press the UP and DOWN buttons to scroll up or down through the options.

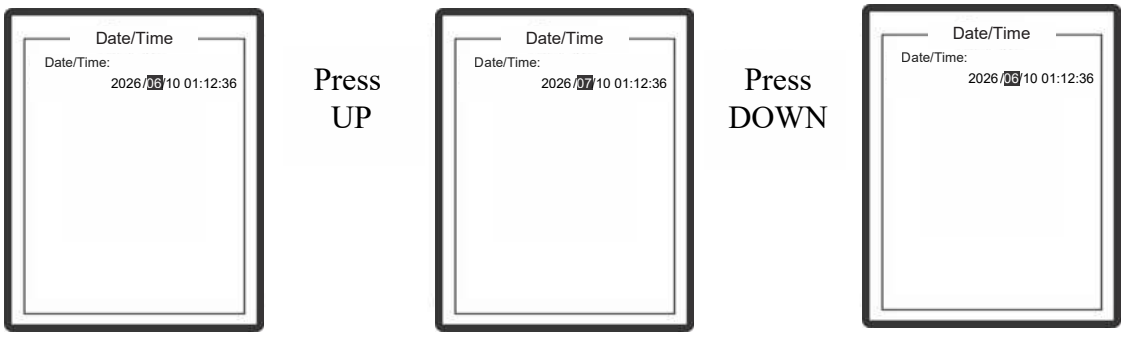
Press ENTER to enter the submenu item's parameters under this heading:



- Press UP, DOWN, LEFT, and RIGHT to scroll through the parameters.

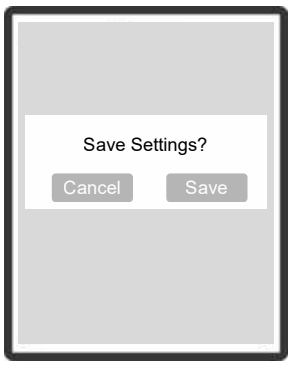


Once you have selected a parameter to edit, press ENTER to enable editing. The first editable item (character, state, or parameter) is indicated by a highlight. Press UP to increase the value or DOWN to decrease the value. This includes changing an alphabetic or numeric character or making a choice (such as between YES and NO or selecting an item in a list).



Advance the cursor from one character to the next character by pressing ENTER.

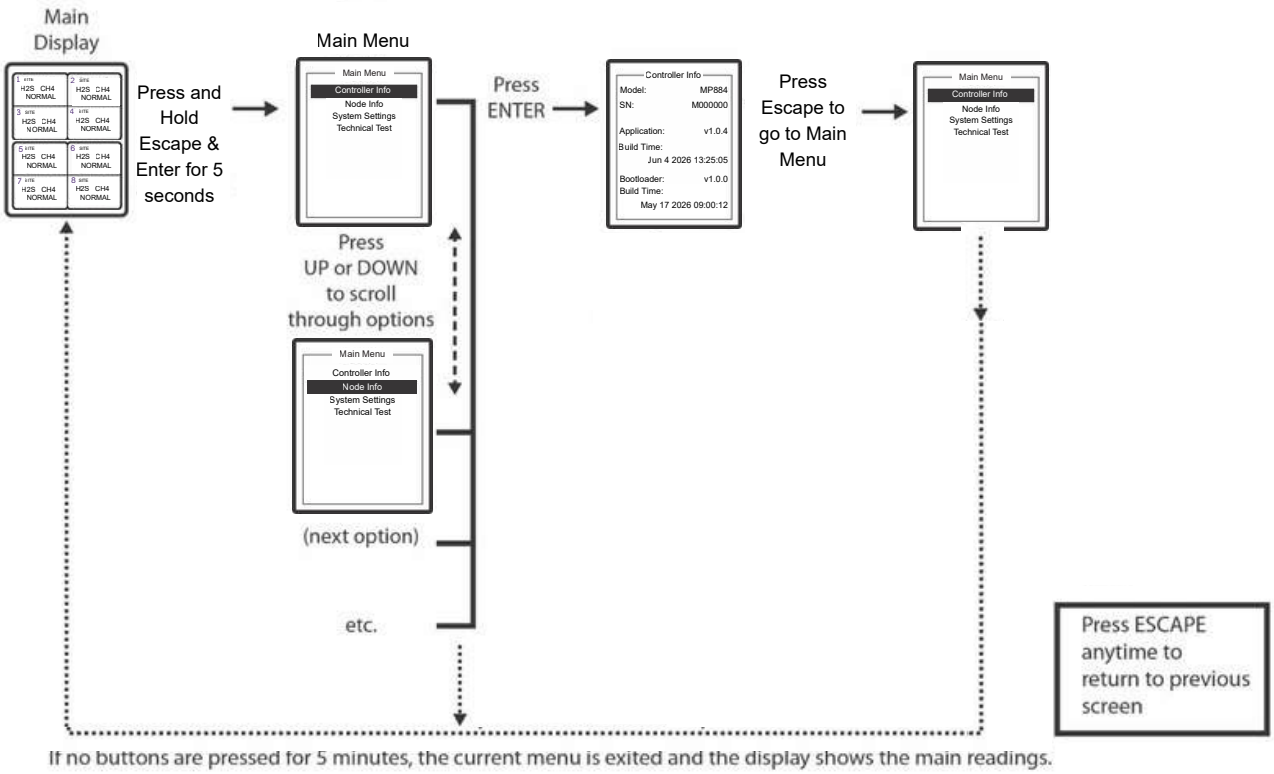
Perform any changes in this screen and then press ENTER to go to the save screen. Press ENTER for save or press ESCAPE for cancel and to return to the previous screen.

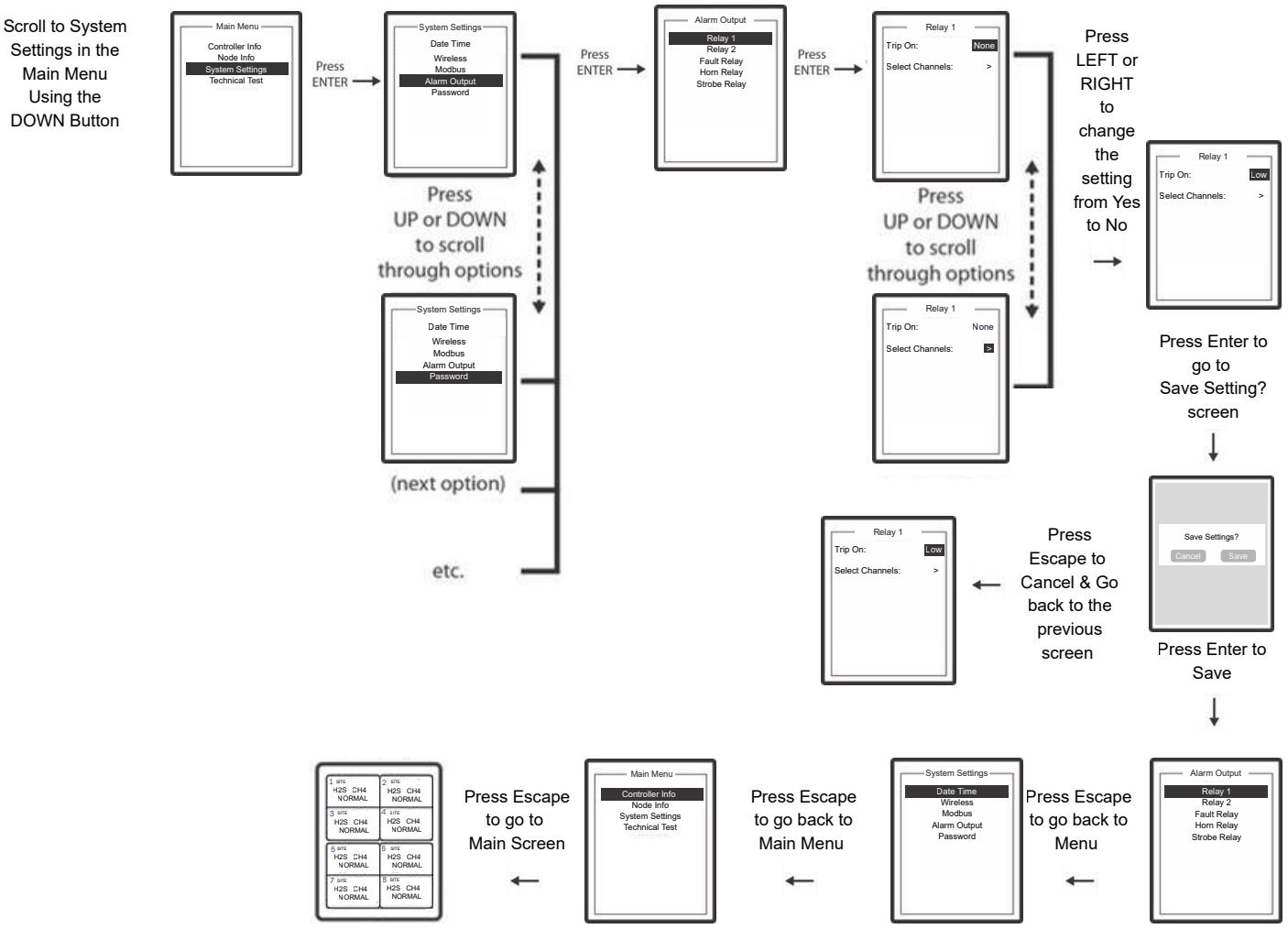


IMPORTANT!

Regardless of where you are in the menus and submenus, if you do not press a key for five minutes, the main display reverts to the main reading screen (without saving unsaved changes).

The following two flowcharts show how the navigation works in a consolidated view:



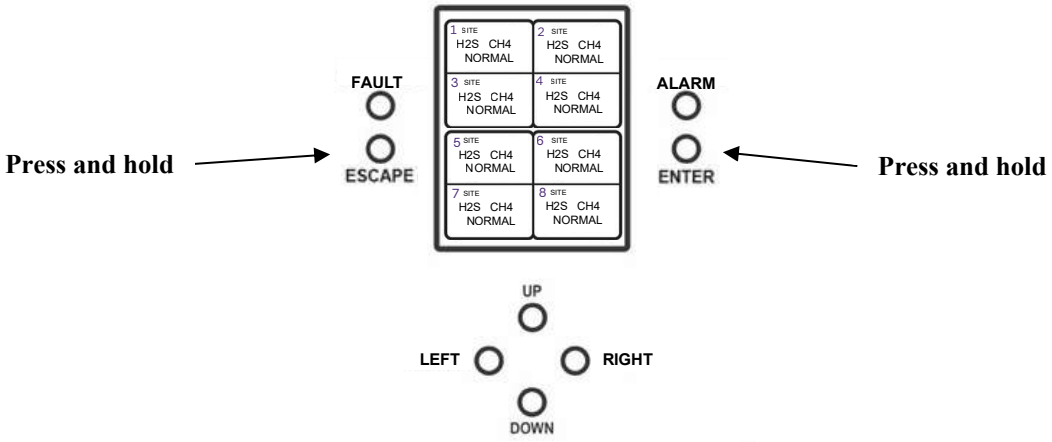

Scroll to System Settings in the Main Menu Using the DOWN Button
Main Menu
Controller Info
Node Info
System Settings
Technical Test
Press ENTER
System Settings
Date Time
Wireless
Modbus
Alarm Output
Password
Press UP or DOWN to scroll through options
(next option)
etc.
Press ENTER
Alarm Output
Relay 1
Relay 2
Fault Relay
Horn Relay
Strobe Relay
Press ENTER
Relay 1
Trip On: None
Select Channels: >
Press UP or DOWN to scroll through options
Press LEFT or RIGHT to change the setting from Yes to No
Relay 1
Trip On: Low
Select Channels: >
Press Enter to go to Save Setting? screen
Save Settings?
Cancel
Save
Press Enter to Save
Press Escape to Cancel & Go back to the previous screen
Press Escape to go back to Menu
Press Escape to go back to Main Menu
Press Escape to go to Main Screen
H2S CH4 NORMAL

12 Programming and Settings

The VOXiWatch 8W Controller is designed for programmability and allows customization of its responses and actions when monitoring connected sensors.
Note: Programmed parameters are stored and are retained when power is turned off.

12.1 Enter Main Menu

Press and hold the Escape & Enter buttons for 5 seconds.



If a password has been set, you will be prompted to supply it. The default password is 0000.

When the "Enter Password" screen is shown, the first digit is highlighted.

1. Press UP or DOWN to enter the correct number (0 through 9).
2. Press RIGHT to move the cursor to the second digit.
3. Repeat for all 4 digits and press ENTER.

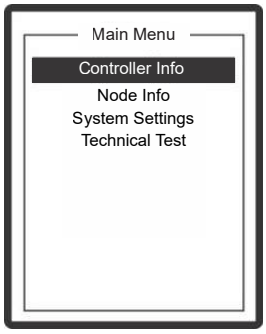
- If you input the correct four digits, then the Main Menu screen is shown.
- If you did not input the correct four digits, you are prevented from entering Setup and the main display is shown.

12.2 Main Menu

Parameters are set and adjusted through the Main Menu. There are four options, each with submenus:

- Controller Info
- Node Info
- System Settings
- Technical Test

When the Setup menu is displayed, the top item, Controller Info, is highlighted.

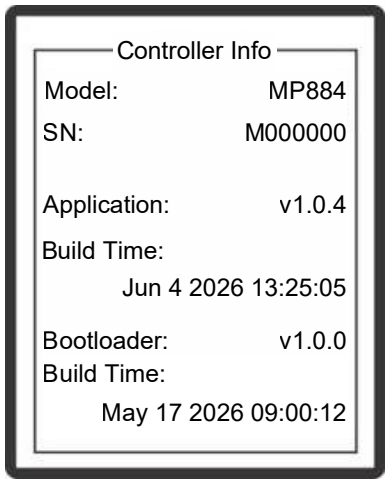


To select other options (Node Info, System Settings, Technical Test), press DOWN. Press ENTER to view the options in the selected menu item.

12.3 Controller Info

The Model, Serial Number, and other information can be viewed from the Controller Info section. To view this screen, navigate to Controller Info from the main menu and press ENTER.
Note: The information on this screen is not editable.

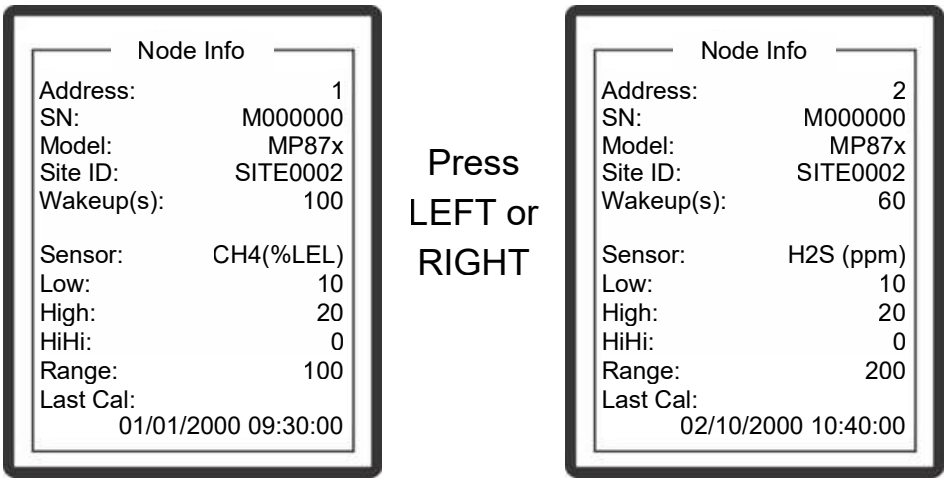
Example Screen:



12.4 Channels - Node Info

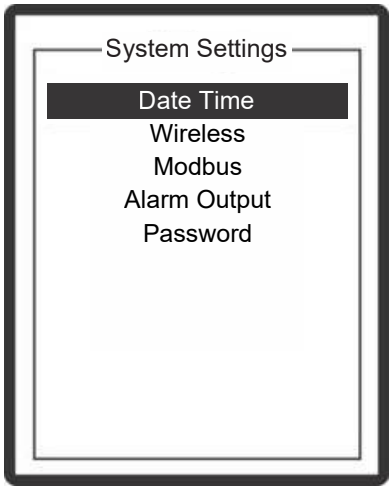
Channel settings are configured on transmitters. The sensor, alarms set points, and transmitter information can be viewed under Node Info from the main menu. To view this screen, navigate to Node Info from the main menu and press ENTER.
Note: The information on this screen is not editable.
Press LEFT or RIGHT to scroll to the next transmitter

Example Screens:



12.5 System Setting

There are four options in the System Settings submenu: Date Time, Wireless, Modbus, Alarm Outputs, and Password.



12.5.1 Set Date and Time

From the System Settings submenu, select Data Time by pressing enter, then select Date/Time by pressing enter.

On this screen, you can set the Date and Time by using the UP and DOWN buttons to change the highlighted numbers and using the LEFT and RIGHT buttons to move to the next selection.

Once you are satisfied with the setting, press ENTER to move to Save Settings? screen.

Press ENTER to save the change or press ESCAPE to return to the Date/Time settings without saving the changed value.

12.5.1.1 Set Time Zone

From the System Settings submenu, select Data Time by pressing ENTER. Use the DOWN button to scroll to Time Zone, then select by pressing ENTER.

On this screen, you can set the Time Zone by using the UP and DOWN buttons to change the highlighted numbers and using the LEFT and RIGHT buttons to move to the next selection.

Once you are satisfied with the setting, press ENTER to move to Save Settings? screen.

Press ENTER to save the change or press ESCAPE to return to the Time Zone settings without saving the changed value.

12.5.1.2 Set Date and Time Format

From the System Settings submenu, select Data Time by pressing ENTER. Use the DOWN button to scroll to Format, then select by pressing ENTER.

On this screen, set the Date and Time Format by using the UP and DOWN buttons to change the highlighted selections and using the LEFT and RIGHT buttons to move to the next selection.

Once you are satisfied with the setting, press ENTER to move to Save Settings? screen.

Press ENTER to save the change or press ESCAPE to return to the Time Zone settings without saving the changed value.

There are three options for Date Format: MM/DD/YYYY, DD/MM/YYYY, or YYYY/MM/DD

You can select 24H format or 12H format.

12.5.2 Wireless

To view Wireless settings, navigate to the System Settings submenu, and select Wireless by pressing enter.

From this submenu, you can select Channel ID or Network ID. To connect to the transmitters, make sure that the Channel ID and Network ID are the same on both the VOXiWatch 8W Controller and the VOXiLink Transmitters.
(See VOXiLink manual for more information on how to set the Channel ID and Network ID on the transmitter.)

12.5.2.1 Channel ID

To view or change Channel ID, select Channel ID from the Wireless submenu.

Set the Channel ID by using the UP and DOWN buttons to change the highlighted number and using the LEFT and RIGHT buttons to move to the next number.

Once you are satisfied with the setting, press ENTER to move to Save Settings? screen.

Press ENTER to save the change or press ESCAPE to return to the Channel ID settings without saving the changed value.

12.5.2.2 Network ID

To view or change Network ID, select Network ID from the Wireless submenu.

Set the Network ID by using the UP and DOWN buttons to change the highlighted number and using the LEFT and RIGHT buttons to move to the next number.

Once you are satisfied with the setting, press ENTER to move to Save Settings? screen.

Press ENTER to save the change or press ESCAPE to return to the Network ID settings without saving the changed value.

12.5.3 Modbus

Modbus (or MODBUS) is a client/server data communications protocol. It was originally designed for use with programmable logic controllers (PLCs), but it has become a de facto standard communication protocol for communication between industrial electronic devices in a wide range of networks.

The VOXiWatch 8W Controller can use Modbus for interconnection with other electronic equipment, particularly PLCs. See Section 13 for more details on Modbus framing.

The VOXiWatch 8W Controller provides two Modbus settings, Baud and Address.

12.5.3.1 Baud

The baud rate must match the baud rate of any other connected device. The default value is 115200, but other baud rates can be selected.

Available baud rates: 9600, 14400, 19200, 38400, 57600, 115200 (default)

12.5.3.2 Address

The address pertains to the controller. It should be set to 1-247. In Modbus terms, the controller is the slave. A master device (typically, a PLC) sends requests to the slave device asking for contents of some of the slave's holding registers.

Every slave device on the Modbus network needs its own address.

12.5.4 Alarms

There are four Alarm options: Low Alarm, High Alarm, HiHi Alarm, and Fault Alarm.
Note: Alarm Set Points and alarm settings are configured directly on the VOXiLink Transmitters. VOXiWatch 8W Controller Alarm Output settings enable and/or disable alarms, relays, horn, and strobe.
The Set Point is the threshold value set whether you want to trigger an alarm when a reading is above that point or below it.

Low Alarm:

The Low Alarm setting determines whether the alarm triggers above the Set Point or below the Set Point.
Examples: Low Alarm is most commonly set above a set point when monitoring a toxic or explosive gas such as H2S or LEL, when you want to be alerted to elevated concentrations. Low Alarm is typically set below a set point when you are monitoring a critical ambient gas such as oxygen and you want to be alerted when the level drops below a baseline value (for instance, 19.5%).

High Alarm:

A dangerous condition alarm level that is activated when gas concentration exceeds the High Alarm Set Point.

HiHi Alarm:

A critical alarm level that is activated when gas concentration exceeds the HiHi Alarm Set Points

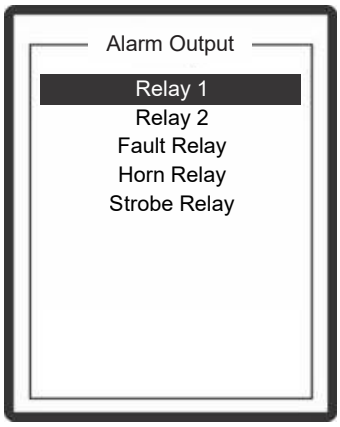
Fault Alarm:

An alarm level that is activated when the system has a technical error or other issue.

12.5.4.1 Navigating to Alarms Output Menu

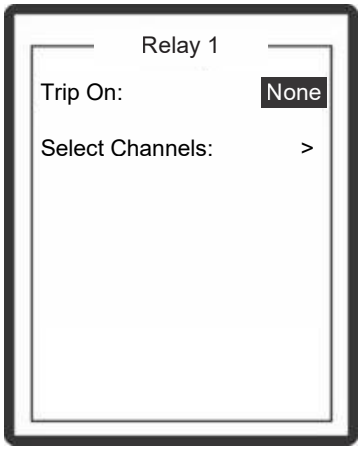
From the Main Menu, use the UP and DOWN buttons to navigate to System Settings. Press ENTER to open the submenu. Scroll to Alarm Outputs using the UP and DOWN buttons and press ENTER.

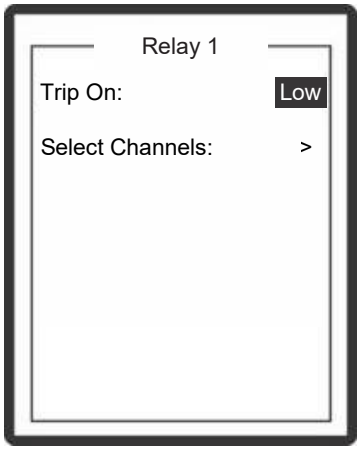
There are five Alarm Output menu options:

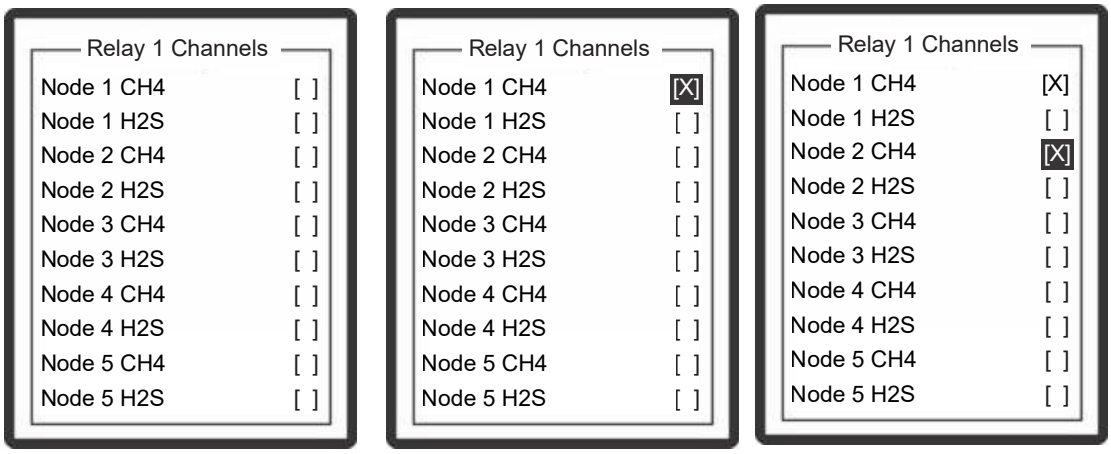


12.5.4.2 Dry Relay Settings: Relay 1, Relay 2, and Fault

Relay 1, Relay 2, and Fault settings are the same.
There are five options for the Trip On setting: None, Low, High, High-High, and Fault.
Press LEFT and RIGHT to scroll through the options.
Press the DOWN button to scroll to the Select Channels setting, and press ENTER. This will open the Relay Channels options. Use the UP and DOWN buttons to scroll through the options. Use the RIGHT button to select the nodes. If the brackets beside the node option is empty [ ] the node is not selected, if there is an x in the brackets [X] than the node is selected. Once you have selected the nodes, press ENTER to return to the Relay Settings page.
Press ENTER to save the change or press ESCAPE to return to the Alarm Output menu without saving the changed value.







The Relay 1 and Relay 2 settings determine whether the Relay is toggled when the Set Point has been crossed.

IMPORTANT!

Check the wiring for the relays to ensure that they are in the NO or NC configuration that you want for your application.

- If the physical relay is wired as NO (normally open), the relay toggles to its closed state when an alarm is present.
- If the physical relay is wired as NC (normally closed), it toggles to its open state when an alarm is present.

The relays can be wired to provide both NO and NC operation (acting as two separate relays triggered at the same time).

12.5.4.3 Horn Relay

The Horn setting determines whether a connected horn (sounder) is activated when the Set Point has been crossed.

- When Horn is set to NO, the horn is not activated in an alarm state.
- When Horn is set to PULSED, the repeating on/off pattern horn is activated with any other alarms.
- When Horn is set to STEADY, the continuous horn is activated with any other alarms.

Once you are satisfied with the setting, press ENTER to move to Save Setting? screen or use the UP or DOWN buttons to navigate to other menu items

Press ENTER to save the change or press ESCAPE to return to the Low Alarm settings without saving the Low Alarm changed value.

12.5.4.4 Strobe Relay

The Use Strobe setting determines whether a connected strobe (flasher) is activated when the Set Point has been crossed.

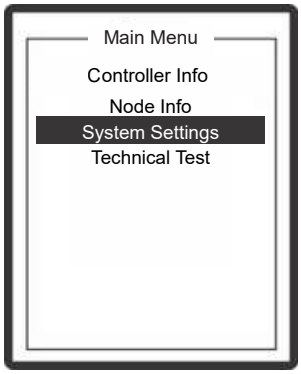
- When Strobe is set to NO, the strobe is not activated in an alarm state.
- When Strobe is set to YES, the strobe is activated with any other alarms.

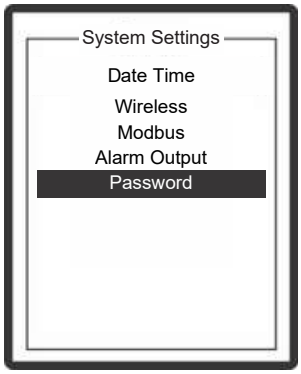
Once you are satisfied with the setting, press ENTER to move to Save Setting? screen or use the UP or DOWN buttons to navigate to other menu items

Press ENTER to save the change or press ESCAPE to return to the Low Alarm settings without saving the Low Alarm changed value.

12.5.5 Password

You can create a "gatekeeper" to prevent unauthorized changes to the VOXiWatch 8W Controller by setting a password. To set the password, select System Settings from the main menu, then select Password from the submenu.
Note: The default password in 0000





12.5.5.1 Set Password

This is where you set a 4-digit password.

IMPORTANT!

Write down or otherwise save a copy of the password in a secure location. If you lose the password or cannot remember it, you cannot reset it yourself. The VOXiWatch 8W Controller must be returned to mPower to have its password reset.

1. Press UP or DOWN to increase or decrease the value (0 through 9).
2. Press RIGHT to move the cursor to the second digit.
3. Repeat for all 4 digits.
4. Press Enter to go to the save screen.
5. Press ENTER to save the change or press ESCAPE to return to the Password settings without saving the changed value.

12.6 Testing

Once the VOXiWatch 8W Controller is operational, you can test the relays and connected horn and strobe light by selecting Technical Test from the main menu. Wireless Test, Relay Test, or Alarm Test can be selected from the submenu.

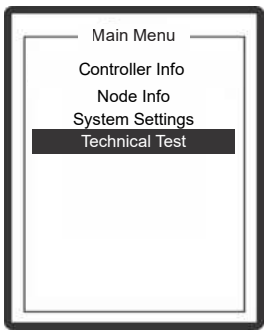
Use the UP and DOWN buttons to move the cursor to the test you would like to select and press ENTER. The relays associated with the selected channel should activate. At the same time, any connected horn should sound, and any connected strobe should light. The background on the main display associated with the channel under test should turn red, and the LED should flash red.

WARNING!

If a horn is connected, it can be very loud. Therefore, wear hearing protection or otherwise cover your ears during the test.

IMPORTANT!

If any of the tests fails, check the wiring. If after repeated attempts the test does not pass, disconnect power and contact mPower Customer Support.



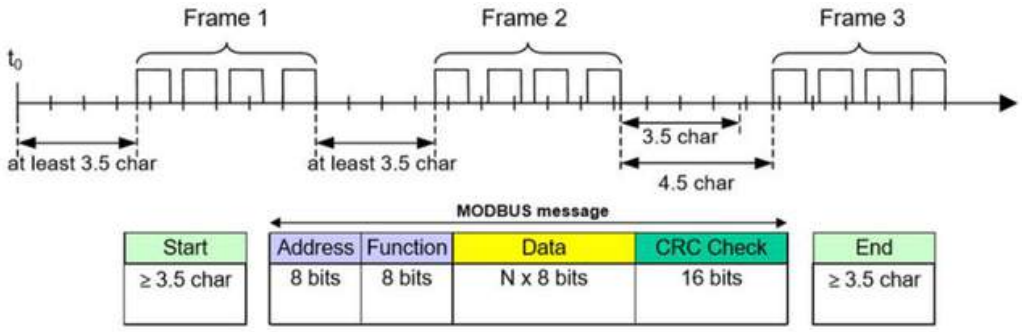


13 Modbus Message

13.1 Modbus RTU Framing

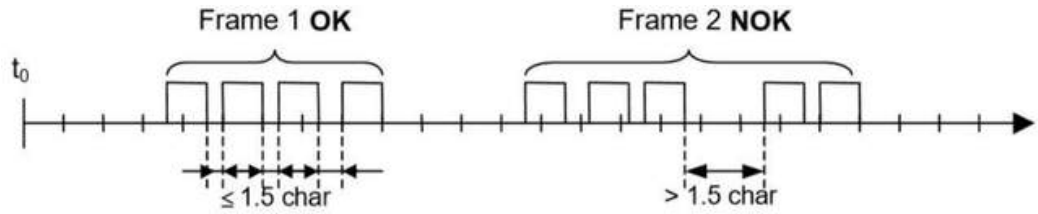
The VOXiWatch 8W Controller uses RTU framing for MODBUS messages. The following is an excerpt of the *MODBUS Over Serial Line Specification And Implementation Guide v1.02* (Dec.2006), with more information available at http://www.Modbus.org/ and http://www.Modbus.org/specs.php.

A MODBUS message is placed by the transmitting device into a frame that has a known beginning and ending point. This allows devices that receive a new frame to begin at the start of the message, and to know when the message is completed. Partial messages must be detected, and errors must be set as a result. In RTU mode, message frames are separated by a silent interval of at least 3.5 character times. In the following sections, this time interval is called t3.5.



13.2 RTU Message Frame

The entire message frame must be transmitted as a continuous stream of characters. If a silent interval of more than 1.5 character times (t1.5) occurs between two characters, the message frame is declared incomplete and should be discarded by the receiver.



Remark: The implementation of RTU reception driver may imply the managementof a lot of interruptions due to the t1.5 and t3.5 timers. With high communication baud rates, this leads to a heavy CPU load. Consequently, these two timers must be strictly respected when the baud rate is equal to or lower than 19200 Baud. For baud rates greater than 19200 Baud, fixed values for the two timers should be used: It is recommended to use a value of 750 µs for the inter-character time-out (t1.5) and a value of 1.750 ms for inter-frame delay (t3.5).

13.3 Modbus RTU (Remote Terminal Unit) Communication Settings

The VOXiWatch 8W Controller supports RS-485 communication as a Modbus RTU.

Mode: RTU
Baud rate: 15 = 4800, 16 = 9600, 18 = 19200
115200 (default)
Start bits: 1
Data bits: 8, LSB first
Parity bit: none
Stop bits: 1
Detector ID: 1 to 247
Default address: 136

13.3.1 Modbus RTU Functions

Detector supports function 0x03 (Read holding registers) only.

Request:

Device Address	Function Code	Register Address		Quantity of Registers		CRC	
		High Byte	Low Byte	High Byte	Low Byte	Low Byte	High Byte
Detector ID	3	Addr.H	Addr.L	Quantity.H	Quantity.L	CRC.L	CRC.H

Response:

Device Address	Function Code	Byte Count	Register Values	CRC	
Detector ID	3	N	N bytes data, Highest byte first	CRC.L	CRC.H

N = 2 x Quantity of Registers

13.3.2 Modbus RTU Register Address

Addr (hex)	Qty	Type	RW	Description	Options/Range
2000	2	uint32_t	R	product id	MP884: 0x00160021

2002	2	uint32_t	R	firmware version	struct {
					uint32_t tweak:8;
					uint32_t patch:8;
					uint32_t minor:8;
					uint32_t major:8;
					};

2004	6	char[12]	R	serial number	

200A	1	uint16_t	RW	modbus setting	struct {
					uint8_t address; /* 1~247, default 136*/
					uint8_t baudrate; /* 15:4800, 16:9600, 18:19200*/
					};

200B	2	uint32_t	RW	wireless setting	struct {
					uint8_t id; /* 1 – 254 */
					uint8_t channel; /* 1-16 */
					uint8_t mode; /* 0: Server, 1: Client */
					};

200D	1	uint16_t	R	wireless status	struct {
					uint16_t fault : 1; /* module init failed */
					uint16_t : 15;
					};

200E	1	uint16_t	R	node registered bitmap	struct {
					uint16_t node_0 : 1; /* 1: registered, 0: not */
					uint16_t node_1 : 1;
					uint16_t node_2 : 1;
					uint16_t node_3 : 1;
					uint16_t node_4 : 1;
					uint16_t node_5 : 1;
					uint16_t node_6 : 1;
					uint16_t node_7 : 1;
					uint16_t : 8; /* reserved as 0 */
					};
					"node_[0..7]" 0..7 means "node index" 0..7

200F	1	uint16_t	R	reserved	

2010	4	utc_time_t	RW	real time clock	typedef union {
					struct {
					uint32_t sec : 6; /* [0, 59] */
					uint32_t min : 6; /* [0, 59] */
					uint32_t hour : 5; /* [0, 23] */
					uint32_t mday : 5; /* [1, 31] */
					uint32_t month : 4; /* [1, 12] */
					uint32_t year : 6; /* 2000 + year, [0, 63] */
					};
					uint32_t value;
					} date_time_t;
					typedef union {
					struct {
					uint8_t tz_quarter : 2; /* min: [0, 1, 2, 3] x 15min */
					uint8_t tz_hour : 5; /* hour: [0, 23] */
					uint8_t tz_flag : 1; /* East(+)/West(-): 0: +, 1: - */
					};
					uint8_t value;
					} timezone_t;
					typedef struct {
					date_time_t time;
					timezone_t tz;
					} utc_time_t;

2014	12	uint16_t	R	reserved	

2020	4		RW	relay 1 output setting	typedefstruct {
					uint8_t trip_on; /* TRIP_ON_* bitmask */
					uint8_t reserved; /* padding/reserved */
					uint16_t reserved2; /* padding/reserved */
					uint32_t channel_mask; /* bit(node_idx*4 + sen_idx) selects a channel*/
					}relay_output_cfg_t; /* 8 bytes */
					
					enum {
					TRIP_ON_NONE = 0,
					TRIP_ON_LOW = 1 << 0,
					TRIP_ON_HIGH = 1 << 1,
					TRIP_ON_HIGH_HIGH = 1 << 2,
					TRIP_ON_FAULT = 1 << 3, /* gas fault | offline | battery low */
					};

2024	4	relay_output_cfg_t	RW	relay 2 output setting	
2028	4	relay_output_cfg_t	RW	relay FAULT output setting	

Addr (hex)	Qty	Type	RW	Description	Options/Range
202C	4	relay_output_cfg_t	RW	relay HORN output setting	
2030	4	relay_output_cfg_t	RW	relay STROBE output setting	
2034	1	uint16_t	RW	relay 1 output status	0: OFF 1: ON If the relay registers be wrote, the relay output status will be latched for 5 seconds, and then released automatic.
2035	1	uint16_t	RW	relay 2 output status	
2028	1	uint16_t	RW	relay FAULT output status	
202C	1	uint16_t	RW	relay HORN output status	
2030	1	uint16_t	RW	relay STROBE output status	

Node Register Base Address

Node registers base address assigned as follows, node index is the node registered bitmap bit number from lsb to msb:

Node Index	Register Base Address (hex)
0	2100
1	2200
2	2300
3	2400
4	2500
5	2600
6	2700
7	2800

Node register address = Base Address + Offset.

Unit ID	Unit Name	Remark	Unit ID	Unit Name	Remark
0x01	10^{-6}		0x06	μmol/mol	
0x02	pmm		0x07	ppb	
0x03	%		0x08	$\mu g/m^3$	
0x04	%LEL		0x09	%VOL	
0x05	mg/m^3				

14 Specifications

Size	7.1 x 8.4 x 5 in (191 x 220 x 127 mm)
Weight	4.4 lbs. (3 kg)
Sensors	All EC sensors, NDIR for LEL, CO2
Calibration	Two-point calibration
Wireless	LoRA
Wireless Certification	FCC
Communication Distance	2 miles or 3.2 km at a minimum Line of Sight, 70% success ratio
Temperature	-40° to +140°F (-40° to +60°C)
Humidity	0-95% (non-condensing)
Frequency Band	915MHz (902MHz-928MHz) 868MHz
Display	Dot Matrix
Configuration	Via remote infrared programmer
Outputs	LoRA wireless, to be programmed Power for radio 10mW, 200mW, 400mW.
Housing	Explosion-proof aluminum alloy
Safety Certifications	ATEX 94/9/EC Ex ib IIB T4 Gb -20°~55°C UL cUL CSA Class I Div. 1 Groups ABCD T4 AEx ib II B T4 Gb -40° to 60°C II 1G Ex ia op is IIC T4 Ga w/ NDIR sensors IECEx Ex ib II B T4 Gb -40°~60°C CE European Conformity
IP Rating	IP-67
Warranty	2 Years; Electrical warranty 4 years

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