VolleyBoast

VoBo XP

Installation Manual

VoBo XP Overview

Externally Powered LoRaWAN® Endpoint for Continuous Monitoring

The VoBo XP™ is an externally powered, industrial grade, 7 input, 4 output, LoRaWAN® bridge certified for safe and hazardous areas. It can operate as a LoRaWAN® Class A (sleep/wake monitoring) or Class C (continuous monitoring) device with the ability to perform control functions through its relay drivers. The relay drivers can be activated by downlink command or on-board analytics as part of a programmed process Control features can also be locked out if required. The VoBo XP can operate on solar power where an external power source is a challenge. The analog, digital, and serial channels support a wide range of sensors and simplify data collection from your own trusted and qualified sensors.

Configuration can be done locally through a serial connection or over the air with downlinks. The rugged enclosure and internal antenna permit it to be installed almost anywhere. The LoRa® radio technology provides robust wireless communication and the LoRaWAN® protocol enables economical scaling.

With the addition of proprietary VoBoSync technology (patent pending), data collection across any number of enabled devices, can be synchronized for true system analysis.

The VoBo XP is available for safe and hazardous areas

Highlights/Features

- Externally Powered
- Solar Power Ready
- LoRaWAN® Class A or C
- 3 Analog Inputs
- 2 Digital Inputs
- Pulse Counting on Digital Inputs
- Wake Up Digital Input
- RS485 / RS232 Serial Interface
- Modbus RTU
- Optional Multiple Modbus devices
- 4 Relay Drivers
- Data Logging
- Power Failure Detection
- Analytics Plug-In Capable
- Optional VoBoSync
- Hazardous Area Rated
- IP66 / NEMA 4X

Applications

- Continuous or high-rate monitoring
- Monitoring with remote and/or condition-based control
- Sensors with power requirements higher than those supported by battery powered endpoints

Important

 For installation assistance, enter a support ticket through the VoBo Help Desk on the Volley Boast Customer Portal: portal.volleyboast.com

The VoBo XP datasheet with full specifications can be found at:

https://volleyboast.com/products/latest/voboxp/datasheet

The VoBo XP users manual with instructions on how to configure and use the VoBo can be found at:

https://portal.volleyboast.com/ProductsDocumentation

The Volley Boast Terms and Conditions of Sale can be found at:

https://volleyboast.com/documentation/latest/termsandconditions-sale

The warranty covers Volley Boast supplied hardware and software.

1 CONTENTS

2 REVISION HISTORY

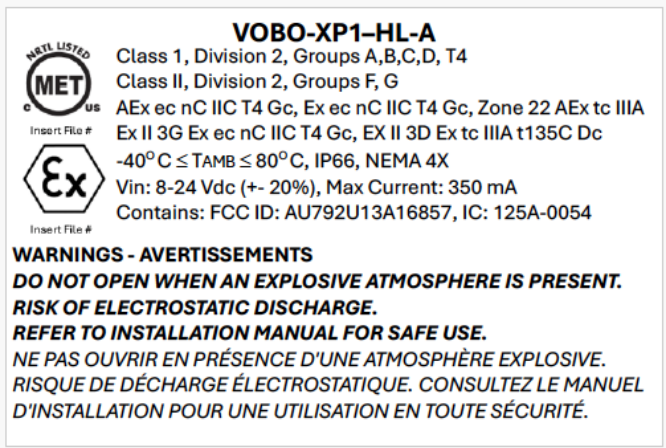
Revision Date	Version ID	Section	Revision
March 19, 2025	A1	All sections	Original Issue of DCM-XP01 Rev A1
June 10, 2025	A2	3.1, 5.2.5, 6.1, 6.2, 6.4	Clarified Name Plates, applied standards, and device mounting instructions.
		Overview, 5.2.9, 7	Added links to VoBo Help Desk at Customer Portal

3 MODELS AND NAME PLATES

3.1 US 915 Channel Plan

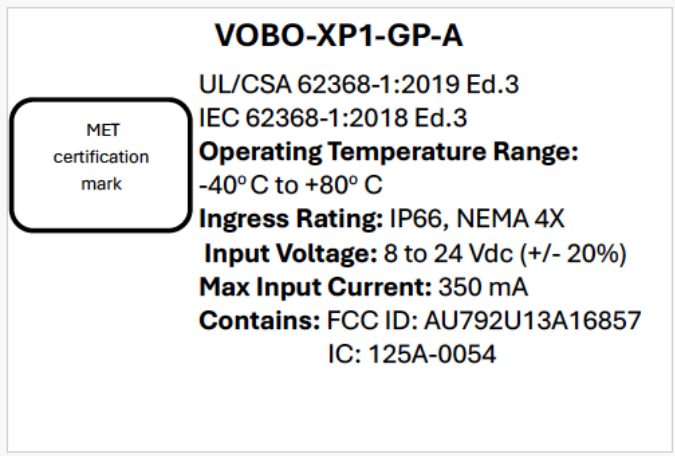
3.1.1 US 915 Channel Plan Hazardous Area Model Name Plate

Model Number: VOBO-XP1-HL-A



3.1.2 US915 Channel Plan Non-Hazardous Area Model Name Plate

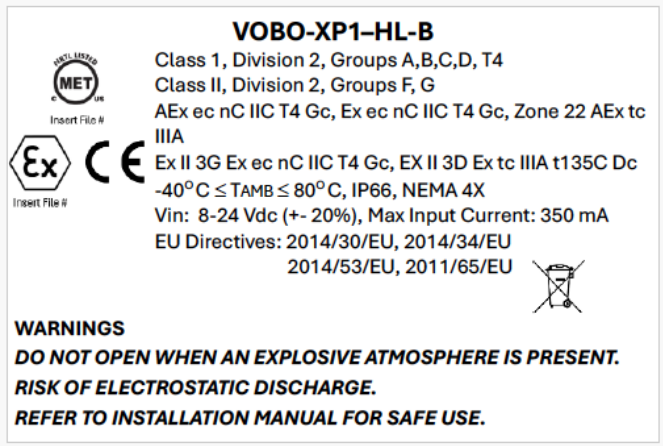
Model Number: VOBO-XP1-GP-A



3.2 EU868 Channel Plan

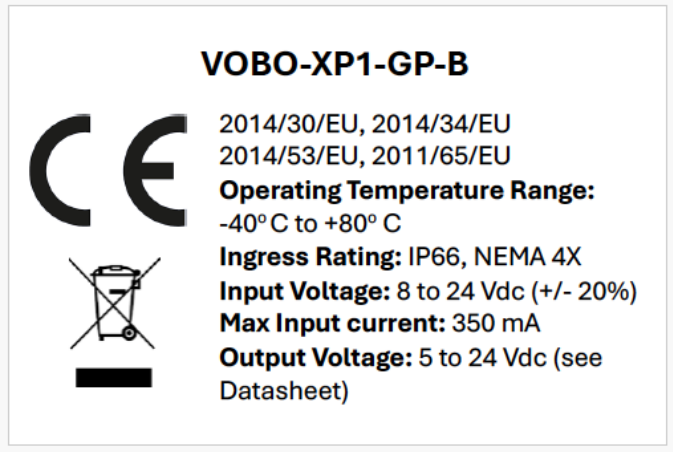
3.2.1 EU868 Channel Plan Hazardous Area Model Name Plate

Model Number: VOBO-XP1-HL-B



3.2.2 EU868 Channel Plan Non-Hazardous Area Model Name Plate

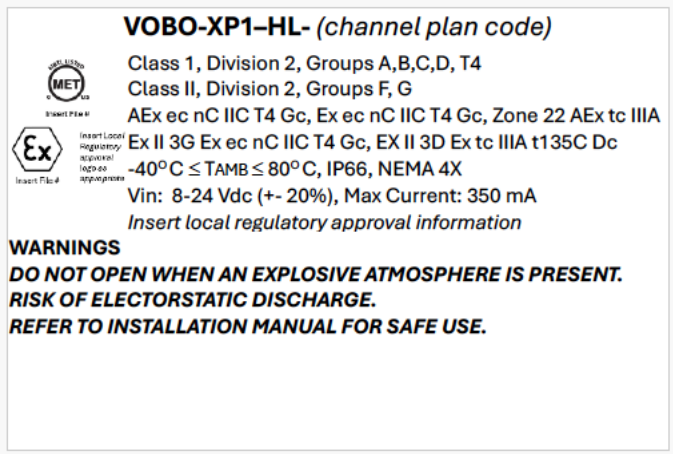
Model Number: VOBO-XP1-GP-B



3.3 Other Channel Plans

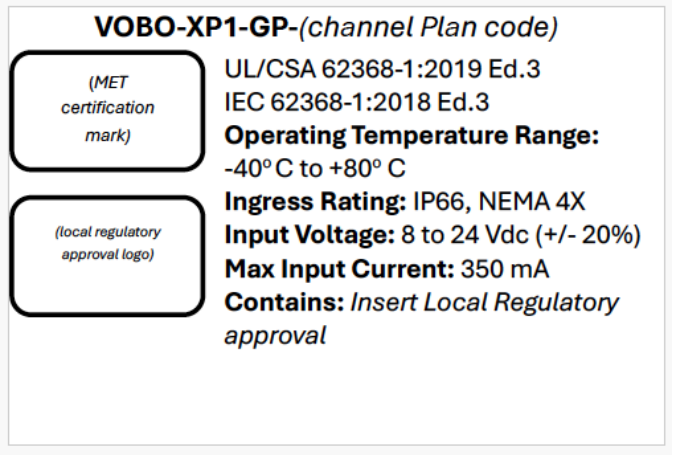
3.3.1 Other Channel Plan Hazardous Area Name Plate

Model Number: VOBO-XP1-HL-*(Channel Plan Code)*



3.3.2 Other Channel Plan Non-Hazardous Area Name Plate

Model Number: VOBO-XP1-GP-*(Channel Plan Code)*



4 HAZARDOUS AREA WARNINGS

WARNING: Read all instructions prior to installing, operating, and servicing the product.

WARNING: EXPLOSION HAZARD. DO NOT CONNECT OR DISCONNECT THE POWER SUPPLY OR ANY OF THE INPUTS OR OUTPUTS WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS FREE OF IGNITABLE CONCENTRATIONS OF GASES.

WARNING: *ALL LOCAL WIRING AND INSTALLATION REQUIREMENTS PER THE APPLICABLE ELECTRICAL CODES MUST BE FOLLOWED.* For the United States the National Electrical Code applies and for Canada the Canadian Electrical Code applies.

WARNING: Do not install the device in hazardous locations exceeding the rated hazard classifications, as shown in the Regulatory Information section of this document.

WARNING: Before opening the enclosure, take the appropriate antistatic precautions, such as discharging your electrostatic potential by touching a known grounded object, or using an antistatic wrist strap.

WARNING: Explosion Hazard when equipment is not handled properly or not installed correctly. Installation and maintenance of the product may only be performed by trained personnel authorized by the facility. Personnel must fully read and understand this document before carrying out the instructions.

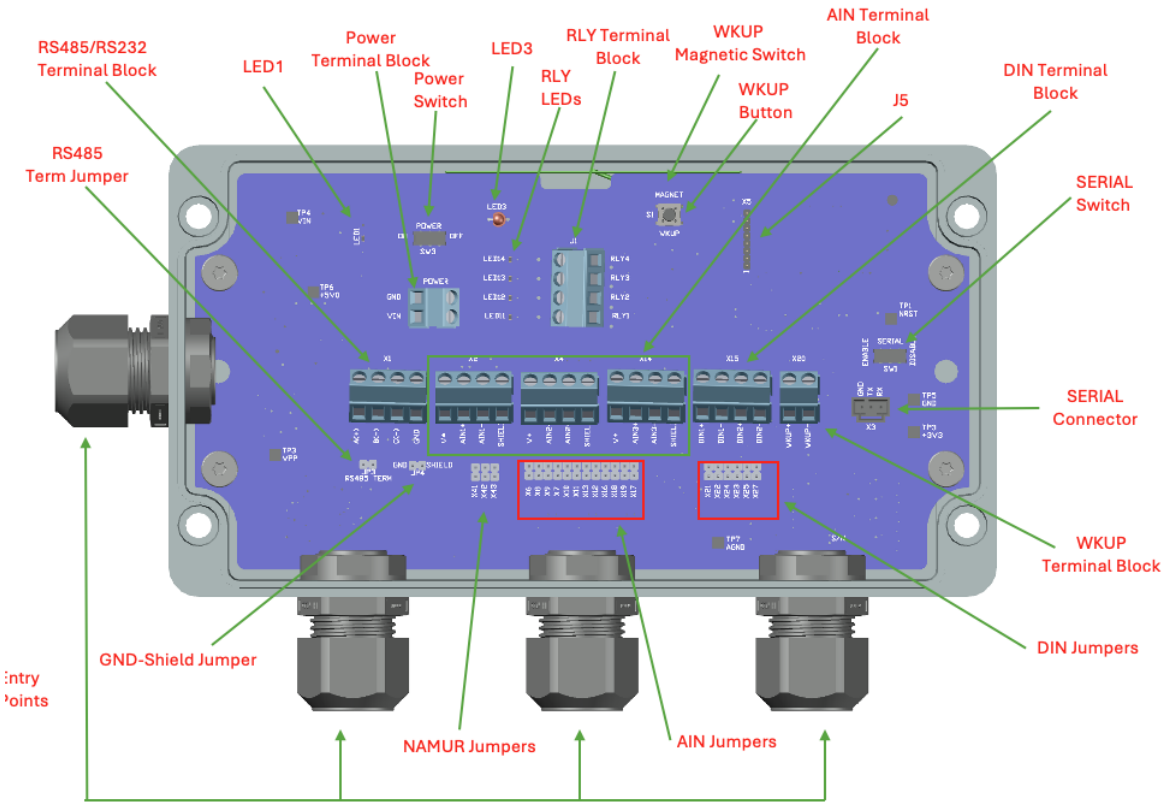
WARNING: Do not clean the device with a dry cloth, at risk of electrostatic discharge.

WARNING: To maintain the IP66 rating the enclosure cover screws must be tightened to between 8.0 and 9.5 in-lbs. Do not overtighten the screws.

WARNING: Alternate entry point fittings (cord grips or conduit fittings) must be rated IP66/NEMA 4X or better and installed in accordance with the manufacturer's instructions and in compliance with local electrical codes.

WARNING: Do not change the position of any switches when an explosive atmosphere is present.

5 COMPONENT OVERVIEW



5.1 Description of Components

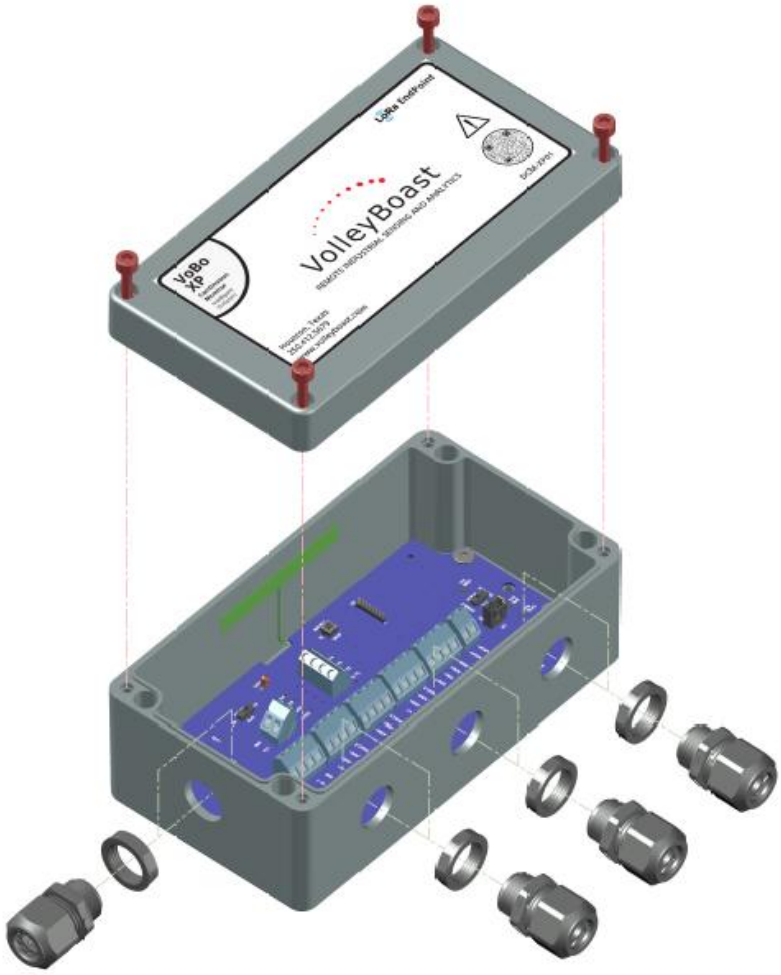
Cover **(Not Shown)**	The VoBo XP is rated IP66, NEMA 4X. These standards require that the gasket be properly positioned, and the cover screws tightened to between 8.0 and 9.5 in-lbs. Do not over tighten the screws.
Entry Points	The enclosure has four 7/8-inch diameter entry holes. The provided cord grips accept 0.095-inch to 0.290-inch diameter cable. Two (2) hole plugs are provided. These may be installed in place of the cable glands if fewer than four entry points are utilized. The user may remove the provided cord grip(s)and install alternate fittings in accordance with the local applicable electrical codes.

Power Switch	The switch activates/deactivates the power supply to the VoBo XP.
LED1	LED1 indicates when the VoBo is powered on (i.e. when voltage is applied to VIN and the power switch is in the on position)
LED3	LED3 indicates power-up and Network Join status. LED3 only functions upon first powering up the VoBo. LED3 only functions during the initial power-up and join attempts. Once the VoBo has joined the network successfully, LED3 will not flash during normal operation. The VoBo indicates: • Successful completion of firmware power-on initialization by flashing LED3 with the sequence: *Red for 1 second, Off for 1 second, and Green for 1 second*. • A new Network Join attempt by flashing LED3 with the sequence: *Green for ¼ second, Off for ¼ second, and Green for ¼ second*. • The Network Join attempt succeeded by flashing LED3 with the sequence: *Green for 1 second*. • The Network Join attempt failed by flashing LED3 with the sequence: *Red for 1 second*.
RLY LEDs	The RLY LEDs indicate the state of the relay drivers. • If the relay driver is open (not connected to ground), the associated LED will be *Off*. • If the relay driver is closed (connected to ground), the associated LED will be *Yellow*.
WKUP Button	Pressing the WKUP button temporarily interrupts the configured CycleTime and triggers the VoBo to take a set of readings and to transmit the configured payload(s). ⚠ The WKUP button will not function if the WUP terminal block has a dry contact switch connected to it that is closed.
WKUP Magnetic Switch	There is a WKUP magnetic switch directly underneath this label. When the enclosure cover is on, a magnet can be used to activate this switch. Activating the magnetic switch temporarily interrupts the configured CycleTime and triggers the VoBo to take a set of readings and to transmit the configured payload(s). A red dot has been affixed to the exterior of enclosure marks the location of the magnet. ⚠ The WKUP magnetic switch will not function if the WUP terminal block has a switch connected that is closed.

WKUP Terminal Block	Terminal block for connecting a dry contact switch and triggering a wake-up. Changing the dry contact switch position (opened -> closed or closed to opened) temporarily interrupts the configured CycleTime and triggers the VoBo to take a set of readings and to transmit the configured payload(s). The terminal block accept 12-24 AWG stranded or solid wires. Wire strip length should be 0.27 in (7 mm).
AIN Terminal Blocks	Terminal blocks for connecting and monitoring 3 Analog Inputs. The Analog Inputs can be configured for reading 4-20mA, 0-5V, 0-10V or NAMUR sensors through jumper settings. The wiring information for the various configuration is provided in ***Section 5.2.6.2.*** The terminal block accept 12-24 AWG stranded or solid wires. Wire strip length should be 0.27 in (7 mm).
DIN Terminal Block	Terminal block for connecting and monitoring 2 Digital Inputs. The Digital Inputs can be configured for reading the state of dry contact switches or discrete voltage inputs through jumper settings. The wiring information for various configuration is provided in ***Sections 5.2.6.3*** The terminal block accept 12-24 AWG stranded or solid wires. Wire strip length should be 0.27 in (7 mm).
RLY Terminal Block	Terminal block for connecting to the 4 low-side relay drivers. The terminal block accept 12-24 AWG stranded or solid wires. Wire strip length should be 0.27 in (7 mm).
RS485 / RS232 Terminal Block	Terminal block for connecting to Modbus RTU Slave device over RS485 half-duplex or over RS232. The terminal block also supports connecting to an RS232 display for streaming the sensor data readings. The terminal block accept 12-24 AWG stranded or solid wires. Wire strip length should be 0.27 in (7 mm).
Power Terminal Block	Terminal for connecting the power supply. The Input Voltage (VIN) may be 8 to 24 Vdc. The terminal block accept 12-24 AWG stranded or solid wires. Wire strip length should be 0.27 in (7 mm).
SERIAL Connector	Connector for connecting the VoBo Config Cable to a Host for bidirectional communication to configure the device, monitor the serial log output, and to recover logged data. The area must be free of hazardous gases or materials prior to connecting any device that is not certified for operation in the hazardous area to the VoBo.
SERIAL Switch	The switch used to enable or disable the serial menu access (for configuring the device and for recovering logged data).
AIN Jumpers	Jumpers that can be open or closed to configure the AIN terminal blocks to read different types of analog transmitters. The AIN jumper settings can be found *in* ***Section 5.2.3.1***

NAMUR Jumpers	Jumpers that can be open or closed to configure the AIN terminal blocks to read NAMUR sensors. The jumper settings can be found *in* ***Section 5.2.3.1***
DIN Jumpers	Jumpers that can be open or closed to configure the DIN terminal blocks to read different types of digital transmitters. The DIN settings can be found *in* ***Section 5.2.3.2.***
RS485 Term Jumper	Closing the RS485 Termination Jumper (JP3) connects a 143 Ohm termination resistor between the A and B terminals for RS485 communication. The JP3 jumper settings can be found in ***Section 5.2.3.3***.
GND-SHIELD Jumper	Closing the GND-SHIELD jumper (JP4) connects the SHIELD terminal of all the AIN terminal blocks to the board ground plane. The SHIELD wire should only be connected on one end of the cable (either at the VoBo or at the transmitter). The JP4 jumper settings can be found in ***Section 5.2.3.4***.
Serial Number	Volley Boast's unique serial number for the device.
X5	For Volley Boast usage only. Not for customer use.

5.2 Field Installation



5.2.1 Configuring the VoBo

It is recommended that the VoBo XP be configured for its intended use prior to installation in the field. Any adjustments required to the configuration after installation can be made using downlinks. See the VoBo XP User Manual (*insert link)* for instructions on configuring the VoBo XP.

5.2.2 Checking Network Connectivity

It is recommended that the connectivity of the VoBo to the network be tested prior to installation of the VoBo in the field. If possible, it is also recommended to examine either the VoBo payloads or the serial output of the VoBo prior to field installation to ensure the VoBo is configured properly to read the instrumentation to be connected in the field.

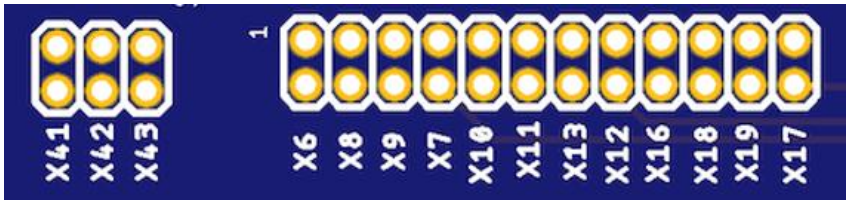
5.2.3 Setting the Jumpers

It is advised to set the jumpers on the VoBo prior to installing the VoBo in the field. Set the jumpers according to the type of transmitters being connected. Jumpers must be set for each AIN input, each DIN input, for RS485 termination, and for SHIELD connectivity.

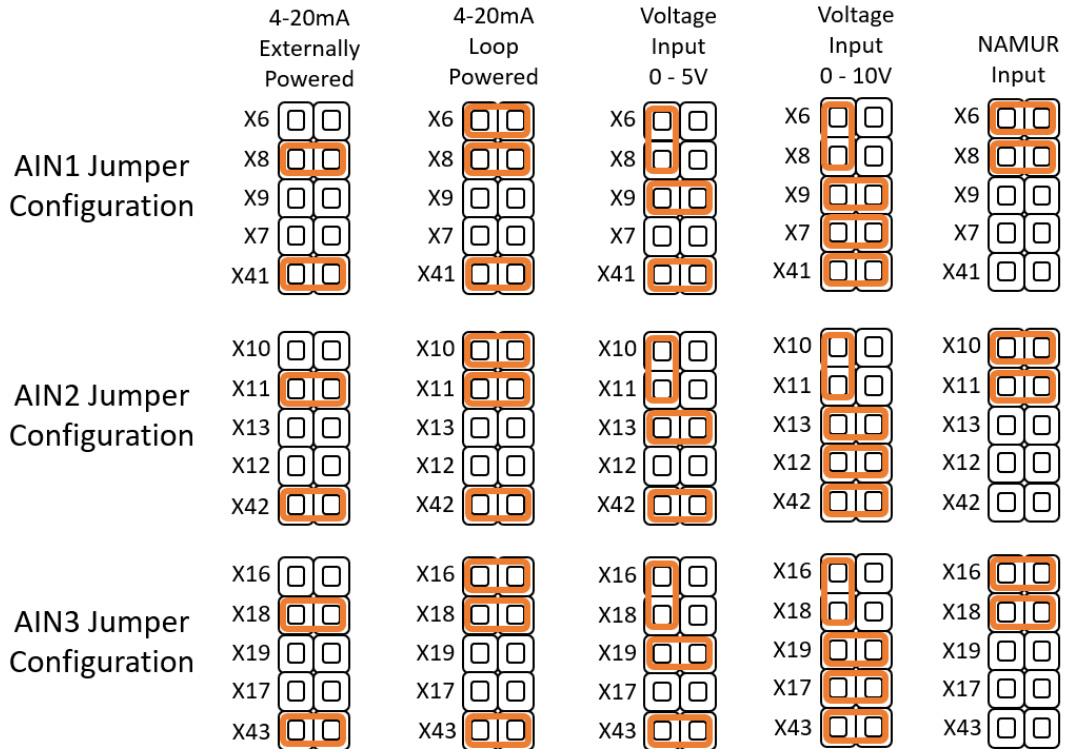
5.2.3.1 AIN Jumpers

Each of the three AIN inputs can be configured to be connected to either a 4-20mA, 0-5V, 0-10V, or NAMUR transmitter. The X6, X8, X9, X7, and X41 jumpers configure the AIN1 input, the X10, X11, X13, X16, and X42 jumpers configure the AIN2 input, and the X16, X18, X19, X17, and X43 jumpers configure the AIN3 input.

The below diagram shows the positions of the AIN jumpers on the PCB. Note that the jumpers are not in numerical order.



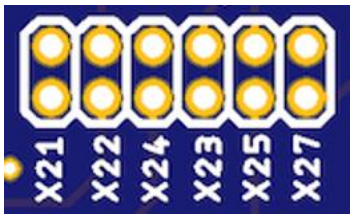
The jumpers for each of the AIN inputs should be set for the desired transmitter types based on the following diagram (with orange showing the jumper closed). Note that the jumpers are not in numerical order and that jumpers X41, X42, and X43 are not immediately next to the other jumpers on the PCB.



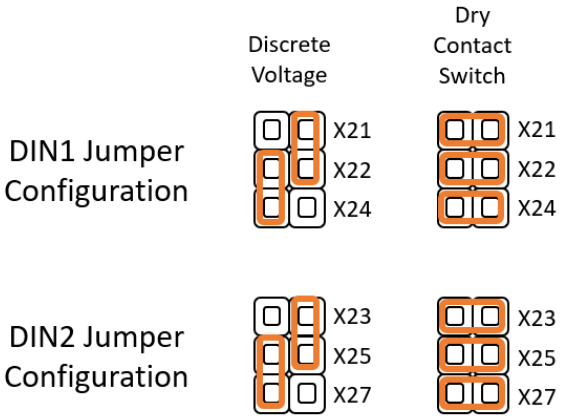
5.2.3.2 DIN Jumpers

The X21, X22, and X24 jumpers configure the DIN1 input for either a discrete voltage input or a dry contact switch. The X23, X25, and X27 jumpers configure the DIN1 input for either a discrete voltage input or a dry contact switch.

The below diagram shows the positions of the DIN jumpers on the PCB. Note that the jumpers are not in numerical order.



The jumpers should be set based on the following diagram (with orange showing the jumpers closed).



5.2.3.3 RS485 Termination Jumper (JP3)

When connecting RS485 serial device(s) and using long cable lengths, high data rates, or any situation where signal reflections could become problematic, ensure there is the VoBo's 145 ohm termination resistor is installed by closing JP3. Termination resistors at each end of the bus help absorb reflections and ensure signal integrity. For short cable lengths and when connecting to a single slave, the termination resistor is not needed and JP3 can remain open.

The termination resistor is not used when connecting an RS232 device, so JP3 should remain open.

5.2.3.4 SHIELD to GND Jumper (JP4)

The SHIELD terminal is used to connect the sensor/transmitter ground to the VoBo XP board ground or allow a wire wrapped around the signals wires to serve as a noise shield.

If JP4 is closed, the SHIELD terminals on the analog terminal blocks are connected to the VoBo XP ground. If JP4 is open, the SHIELD terminals on the analog terminal blocks are open circuits (i.e. not connected to the VoBo XP ground).

In most applications the JP4 may be left open, but in some cases the JP4 may need to be closed (such as if the transmitter is not grounded) to equalize the grounds between the sensor/transmitter and the VoBo XP in order to get accurate readings.

5.2.4 Positioning the VoBo

WARNING: The VoBo XP must be installed a minimum of 20 cm away from personnel.

The LoRaWAN radio technology is robust and can surmount a significant amount of interference. Nonetheless, the less interference the better the communication.

The VoBo XP is equipped with an internal omnidirectional antenna. It's signal strength is greatest along the longer length of the enclosure. In general, orient the VoBo with the label facing the closest gateway and, in a position, where the fewest obstacles are in its direct path. If the best location of the VoBo is questionable, the signal strength and signal to noise ratio can be examined at the network server.

5.2.5 Mounting the VoBo

The VoBo XP should be mounted on a secure, rigid surface capable of supporting the VoBo and sensor cables. The fasteners must be appropriate for the environment. The VoBo XP has a mounting hole in each corner of the enclosure. Note the lid must be removed to access the mounting holes. When mounting on a wood surface, use 4 - #10 pan head wood screws. The minimum depth of penetration of the screw into wood is 1/2 inch. The minimum length of the screw is 1 ¼ inch. When mounting the VoBo TC on a metal surface, use 4 – M6 (1/4 inch) Socket Head Cap Screws and M6 Nuts with a locking washer.

See ***Appendix A*** for the VoBo XP Mechanical Specifications.

Contact Volley Boast at info@volleyboast.com for information regarding where pole mounts or mounting feet are available for purchase.

5.2.6 Cabling/Wiring

WARNING: Ensure the area is free of hazardous concentrations of gas prior to connecting or removing wires from the terminals.

WARNING: Set the Power Switch to "Off" when connecting or disconnecting wires from terminal blocks.

WARNING: All entry points must be sealed to IP 66 or NEMA 4X standards or better.

The VoBo XP cord grips may be removed and alternate fittings inserted in accordance with local applicable electrical standards. The alternate fittings must be rated to IP 66 or NEMA 4X standards or better to provide a watertight seal around the cable and the enclosure opening.

Remove any unnecessary cord grips. Install the provided hole plug into the unused hole by inserting the plug into the cord grip nut and tighten it to a torque of 40-45 in-lbs.

Ensure the power switch is in the off position and ensure the Jumpers are configured for the appropriate transmitter types.

5.2.6.1 Power Supply Wiring

Ensure the power supply wires are stripped to 0.27 in (7 mm). Insert the power supply cable into the cord grip. The cord grips accept cable diameters of between 0.095 inch and 0.290 inch. Insert the power supply wires into the terminal block in accordance with the wiring diagram for that specific type of sensor. Tighten the terminal screw to 4.4 in-lb.

Connect the positive line of the power supply to the VIN terminal position and the negative line to the GND terminal position.

5.2.6.2 Analog Transmitter Wiring

Four different types of analog transmitters can be connected to an AIN input: 4-20mA, 0-5V, 0-10V, or NAMUR.

For all types of analog transmitters, ensure the sensor wires are stripped to 0.27 in (7 mm). Insert the sensor cable into the cord grip. The cord grips accept cable diameters of between 0.095 inch and 0.290 inch. Insert the sensor wires into the terminal block in accordance with the wiring diagram for that specific type of sensor. Tighten the terminal screw to 4.4 in-lb.

See the VoBo XP Data Sheet (https://volleyboast.com/products/latest/voboxp/datasheet) for the maximum current the VoBo can supply.

5.2.6.2.1 Analog 4-20mA Transmitter Wiring

Analog 4-20mA Transmitters can be wired in 3 different configurations as described below:

- Two-wire current sensor/transmitter, powered by the VoBo:
  - Connect the VDC supply wire (typically red) to AIN+
  - Connect the signal wire (typically black) to AIN-
  - Jumper JP4 can be left open
- Two-wire current sensor/transmitter, powered externally:
  - Connect the signal wire to AIN-
  - Connect the common (or supply -) to the SHIELD.
  - Close jumper JP4
- Three-wire current sensor/transmitter, powered by the VoBo:
  - Connect the VDC supply wire to AIN+
  - Connect the signal wire to AIN-
  - Connect the common wire to SHIELD
  - Close jumper JP4

5.2.6.2.2 Analog 0-5V Transmitter Wiring

Analog 0-5V Transmitters can be wired in 3 different configurations as described below:

- Three-wire 0-5V voltage sensor/transmitter, powered by the VoBo:
  - Connect the VDC supply wire to V+
  - Connect the signal wire to AI+
  - Connect the common wire to AI-
  - Jumper JP4 can be left open
- Three-wire 0-5V voltage sensor/transmitter, externally powered:
  - Connect the signal wire to AIN+

    - Connect the common wire to AIN-
    - Connect the shield wire or ground wire to SHIELD
    - Close jumper JP4
- Four-wire 0-5V voltage sensor/transmitter, powered by the VoBo:
    - Connect the VDC supply wire to V+
    - Connect the signal wire to AIN+
    - Connect the common wire to AIN-
    - Connect the shield wire or ground wire to SHIELD
    - Close jumper JP4

5.2.6.2.3 Analog 0-10V Transmitter Wiring

Analog 0-10V Transmitters can be wired in 3 different configurations as described below:

- Three-wire 0-10V voltage sensor/transmitter, powered by the VoBo:
    - Connect the VDC supply wire to V+
    - Connect the signal wire to AI+
    - Connect the common wire to AI-
    - Jumper JP4 can be left open
- Three-wire 0-10V voltage sensor/transmitter, externally powered:
    - Connect the signal wire to AI+
    - Connect the common wire to AI-
    - Connect the shield wire or ground wire to SHIELD
    - Close jumper JP4
- Four-wire 0-10V voltage sensor/transmitter, powered by the VoBo:
    - Connect the VDC supply wire to V+
    - Connect the signal wire to AI+
    - Connect the common wire to AI-
    - Connect the shield wire or ground wire to SHIELD
    - Close jumper JP4

5.2.6.2.4 Analog NAMUR Transmitter Wiring

Analog NAMUR Transmitters can be wired in 3 different configurations as described below:

- Two-wire NAMUR transmitter, powered by the VoBo:
    - Connect the VDC supply wire (typically red) to AIN+
    - Connect the signal wire (typically black) to AIN-
    - Jumper JP4 can be left open
    - NOTE, the ***AnalogVoltage*** configuration parameter should also be programmed to 8.2V
- Two-wire NAMUR transmitter, powered externally:
    - Connect the signal wire to AIN-
    - Connect the common (or supply -) to the SHIELD.
    - Close jumper JP4
- Three-wire NAMUR transmitter, powered by the VoBo:
    - Connect the VDC supply wire to AIN+
    - Connect the signal wire to AIN-
    - Connect the common wire to SHIELD

- Close jumper JP4
- NOTE, the ***AnalogVoltage*** configuration parameter should also be programmed to 8.2V

5.2.6.3 Digital (Discrete) Wiring

Four different types of digital transmitters can be connected to a DIN input: dry contact switch, voltage output, NPN, and PNP.

For all types of digital transmitters, ensure the sensor wires are stripped to 0.27 in (7 mm). Insert the sensor cable into the cord grip. The cord grips accept cable diameters of between 0.095 inch and 0.290 inch. Insert the sensor wires into the terminal block in accordance with the wiring diagram for that specific type of sensor. Tighten the terminal screw to 4.4 in-lb.

5.2.6.3.1 Digital Dry Contact Switch Wiring

A dry contact switch should be connected to the DIN terminal block to either the DIN1 or DIN2 terminal positions as follows:

- Connect the first wire to the DIN+
- Connect the second wire to the DIN-

5.2.6.3.2 Digital Voltage Output Transmitter Wiring

A digital voltage output transmitter should be connected to the DIN terminal block to either the DIN1 or DIN2 terminal positions as follows:

- Connect the positive wire to the DIN+
- Connect the negative wire to the DIN-

5.2.6.3.3 Digital NPN Transmitter Wiring

A digital NPN type output transmitter should be connected to the DIN terminal block to either the DIN1 or DIN2 terminal positions as follows:

- Connect transmitter Positive (Brown) wire to the V+ terminal
- Connect transmitter Output (Black) wire to DINx- terminal
- Connect transmitter Ground (Blue) wire to GND terminal
- Connect a wire from DINx+ terminal to V+ terminal

5.2.6.3.4 Digital PNP Transmitter Wiring

A digital PNP type output transmitter should be connected to the DIN terminal block to either the DIN1 or DIN2 terminal positions as follows:

- Connect transmitter Positive (Brown) wire to the V+ terminal
- Connect transmitter Output (Black) wire to the DINx+ terminal
- Connect transmitter Negative (Blue) wire to the DINx- terminal
- Connect a wire from DINx- terminal to GND terminal

5.2.6.4 RS485 / RS232 Serial Device Wiring

The RS485 / RS232 Terminal Block can be connected either to one or more RS485 device or to one RS232 device. Both types of devices cannot be connected simultaneously.

For either type of serial device, ensure the sensor wires are stripped to 0.27 in (7 mm). Insert the sensor cable into the cord grip. The cord grips accept cable diameters of between 0.095 inch and 0.290 inch. Insert the sensor wires into the terminal block in accordance with the wiring diagram for that specific type of sensor. Tighten the terminal screw to 4.4 in-lb.

5.2.6.4.1 RS485 Slave Device(s) Wiring

Connect the twisted pair cable from the RS485 slave A(+) to the VoBo A(+) terminal position, and from the RS485 slave B(-) to the VoBo B(-) terminal position. Connect the RS485 slave GND to the VoBo GND. If multiple RS485 slave devices are being connected, they should be daisy chained (i.e. VoBo connected to slave device 1, slave device 1 connected to slave device 2, etc) such that the A terminals of all devices and the B terminals of all devices are connected in a line.

The VoBo can be used to supply between 5 and 24 Vdc to the Modbus slave by connecting the V+ of the slave to the V+ terminal position of an AIN terminal block. See the VoBo XP Data Sheet (https://volleyboast.com/products/latest/voboxp/datasheet) for the maximum current the VoBo can supply.

5.2.6.4.2 RS232 Device Wiring

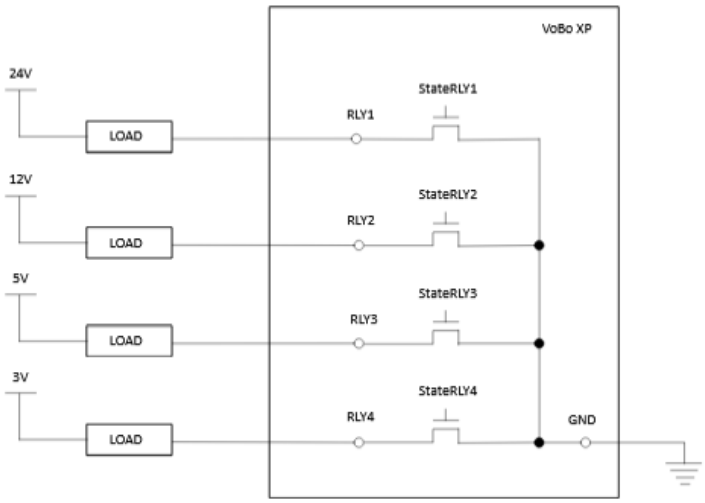
Connect the twisted pair cable from the RS232 device RX signal to the VoBo A(+) terminal position, and from the RS232 device TX signal to the VoBo C(-) terminal position. Connect the RS232 device GND to the VoBo GND. RS232 is a point-to-point connection so the VoBo should only be connected to one other device.

The VoBo can be used to supply between 5 and 24 Vdc to the RS232 device by connecting the V+ of the slave to the V+ terminal position of an AIN terminal block. See the VoBo XP Data Sheet (https://volleyboast.com/products/latest/voboxp/datasheet) for the maximum current the VoBo can supply.

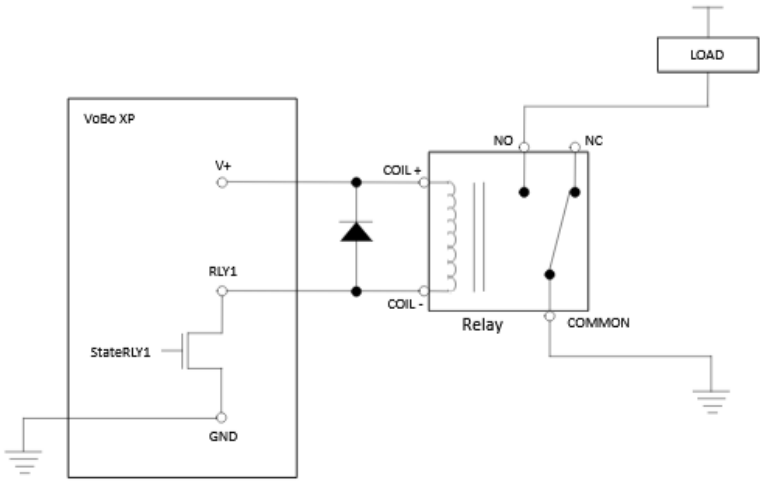
5.2.6.4.3 Relay Wiring

The VoBo controls low-side drivers which can be connected to relays or to resistive, inductive, or capacitive loads to serve as a power switch. The relay coil or load should be connected to a power source (either the VoBo's V+ or to an external power source) and will make its ground connection through on of the low-side drivers inside the VoBo.

The following diagram shows an example of the VoBo's low-side relay drivers being used to switch the power for an external load. In this case the power to the load is coming from external power supplies at 4 different voltages and making their ground connection through the low-side relay drivers, based on the ***StateRLYx*** configuration parameters.



When connecting a relay to the VoBo's low-side drivers, connect the minus (-) side (if polarity is marked) or one side (if polarity is not marked) of the relay coil to one of the RLY terminal positions on the Relay Driver terminal block. The following diagram shows an example of a VoBo relay driver controlling the coil of a relay that is then switching the power for a load. The V+ terminal of the VoBo is being used to supply power to the relay coil.



The VoBo can be used to supply 5 to 24 Vdc power to the relay or load by connecting the plus (+) side (if polarity is marked) or one side (if the polarity is not marked) of the relay coil or load to the V+ terminal position of an AIN terminal block. See the VoBo XP Data Sheet (https://volleyboast.com/products/latest/voboxp/datasheet) for the maximum current the VoBo can supply.

5.2.7 Checking LoRaWAN Network Connectivity

Ensure the SERIAL switch is in the DISABLED position. Turn the POWER switch to the ON position.

Check LED3 for successful power-up and LoRaWAN Join status. The LED will flash GREEN for 1 second, OFF for 1 second, and RED for 1 second following successful boot-up and initialization of the VoBo. The

LED will flash GREEN twice for ¼ second when the VoBo attempts to join the network. The LED3 will either flash GREEN for 1 second upon successfully joining the network or the LED3 will flash RED for 1 second if it fails to join the network and goes into its back off cycle. Note, LED3 only functions during the initial power-up and join attempts. Once the VoBo has joined the network successfully, LED3 will not flash during normal operation.

If the VoBo successfully joined the network, press the WKUP button to trigger payloads to be sent to confirm connectivity and transmission. The payloads should be sent to your LoRaWAN network server where they can be viewed and confirmed that the VoBo XP and transmitters are functioning properly.

5.2.8 Closing the Cover

Attach the VoBo cover with the provided screws. The screws should be tightened to 8 to 9.5 in-lbs.

5.2.9 Troubleshooting

Problems? Enter a support ticket through the VoBo Help Desk on the Volley Boast Customer Portal: portal.volleyboast.com

5.3 Maintenance

No maintenance is required.

6 REGULATORY INFORMATION

6.1 Hazard Class Information

Class 1, Division 2, Groups A,B,C,D, T4
Class II, Division 2, Groups F, G
AEx ec nC IIC T4 Gc
Ex ec nC IIC T4 Gc
Zone 22 AEx tc IIIA

Ex II 3G Ex ec nC IIC T4 Gc
EX II 3D Ex tc IIIA t135C Dc

6.2 Safety Standards (as applicable to product model)

UL 60079-0
UL 60079-7
UL-60079-15
UL-60079-31

CSA C22.2 60079-0
CSA C22.2 60079-7
CSA C22.2 60079-15
CSA C22.2 60079-31

IEC/EN 60079-0
IEC/EN 60079-7
IEC/EN 60079-15
IEC/EN 60079-31

ATEX Directive 2024/34/EU

UL/CSA 62368-1:2019 Ed.3

IEC 62368-1:2018 Ed.3

6.3 CE Marking (European Union)

CE When affixed to this product, the CE mark confirms compliance with all relevant requirements of the following EU directives and regulations:

- Radio Equipment Directive (RED) 2014/53/EU
- Electromagnetic Compatibility Directive (EMC) 2014/30/EU
- ATEX Directive 2024/34/EU (if applicable)
- Low Voltage Directive (LVD) 2015/35/EU

- ROHS Directive 2011/65/EU

The declaration of conformity may be requested by emailing info@volleyboast.com.

6.4 Environmental Standards

6.4.1 Temperature and Ingress Ratings

Operating Temperature Range: -40°C - +80°C
Ingress Ratings: IP66, NEMA 4X

6.4.2 RoHS Compliance (Directive 2011/65/EU)

Based on supplier declarations and internal review procedures, to the best of our knowledge this product conforms to the requirements of Directive 2011/65/EU on the restriction of hazardous substances in electrical and electronic equipment, as amended by Directive 2015/863. A formal statement of compliance is available upon request by emailing info@volleyboast.com.

6.4.3 REACH Compliance (EC 1907/2006)

Based on supplier declarations and internal review procedures, to the best of our knowledge this product does not contain any Substances of Very High Concern (SVHC) listed on the ECHA Candidate List above the permitted concentrations. A formal statement of compliance is available upon request by emailing info@volleyboast.com.

6.4.4 Waste Electrical and Electronic Equipment (WEEE) (Directive 2012/19/EU) and End-of-Life Disposal

The WEEE Directive places an obligation on EU-based manufacturers, distributors, retailers, and importers to take-back electronics products at the end of their useful life. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

When the symbol shown below is on the product or on its packaging, this indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste

equipment for recycling, please contact your local city office, your waste disposal service or where you purchased the product.

6.5 FCC

6.5.1 47 CFR Part 15 Regulation Class B Devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

6.5.2 FCC Interference Notice

Per FCC 15.19(a)(3) and (a)(4) This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

6.5.3 FCC Grant

FCC Part 15	
FCC Identifier:	AU792U13A16857

Equipment Class:	Digital Transmission System
Notes:	MTDOT-915
FCC Rule Parts:	15C
Approval:	Single Modular
Frequency Range:	902.3-914.9
Output Watts:	0.0772

Output power is conducted. This transmitter is a hybrid per FCC 15.247(f) and FCC KDB 453039. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter within a host device, except in accordance with FCC multi-transmitter product procedures.

6.6 Industry Canada

6.6.1 Industry Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

This device complies with Industry Canada license-exempt RSS standard(s). The operation is permitted for the following two conditions:

1. The device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. *L'appareil ne doit pas produire de brouillage*
2. *L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.*

6.6.2 Industry Canada Certification

Certification Number/No. de Certification				125A-0054		
				Modular Approval/Approbation modulaire		
Model/Modèle				MTDOT-915		
Specification/ Cahier des Charges	Issue/ Édition	From Frequency/ De Fréquences	To Frequency/ Á Fréquences	Emmission Designation/ Designation D'émission	Minimum Power	Maximum Power
RSS247	1.0	902.3 MHz	914.9 MHz	GXDXX	77.2 mW	77.2 mW

Certification of equipment means only that the equipment has met the requirements of the above noted specification. License applications, where applicable to use certified equipment, are acted on accordingly by the Industry Canada issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements and procedures issued by Industry Canada. The equipment for which this certificate is issued shall not be manufactured, imported distributed, leased, offered for sale or sold unless the equipment complies with the applicable technical specifications and procedures issued by Industry Canada.

La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci- dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en consequence par le bureau de délivrance d'Industrie Canada et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'Industrie Canada. Le matériel à l'égard duquel leprésent certificat est délivré ne doit pas être fabriqué, importé, distribué, loué, mis en vente ou vendu à moins d'être conforme aux procédures et aux spécificationstechniques applicable publiées par Industrie Canada.

7 CONTACT

For installation assistance, enter a support ticket through the VoBo Help Desk on the Volley Boast Customer Portal: portal.volleyboast.com

(+1) 250-412-5679

info@volleyboast.com

www.volleyboast.com

2000 North Loop West, Suite 120

Houston, TX 77018

8 APPENDIX A – MECHANICAL SPECIFICATIONS

8.1 Weight

The VoBo XP weight is 2.75 lbs.

8.2 Enclosure Material

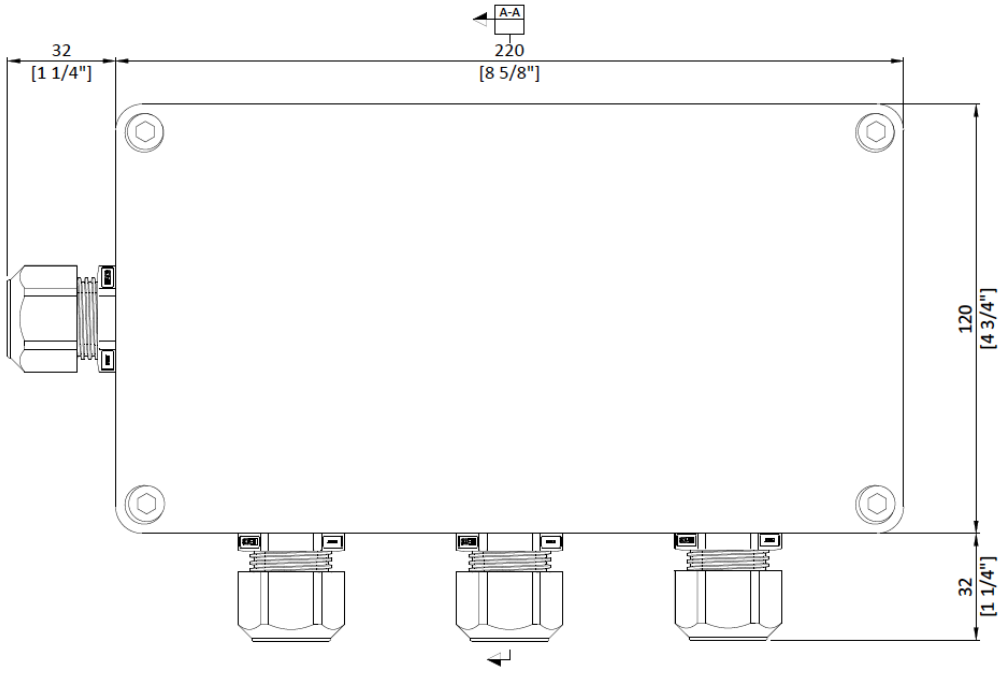
The VoBo XP enclosure is molded from a grey glass reinforced polyester

8.3 Cover Fasteners

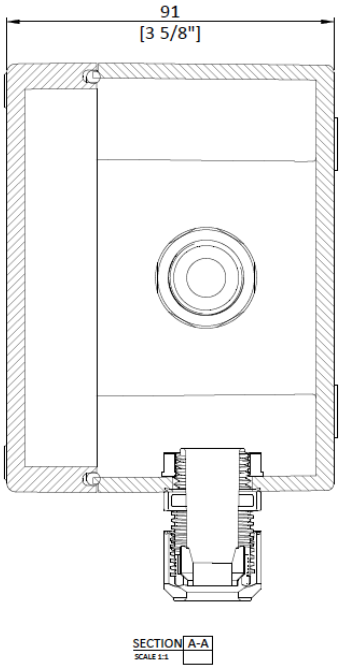
The cover fasteners are 316 stainless and are captive.

8.4 Exterior Dimensions

8.4.1 Front View with Dimensions

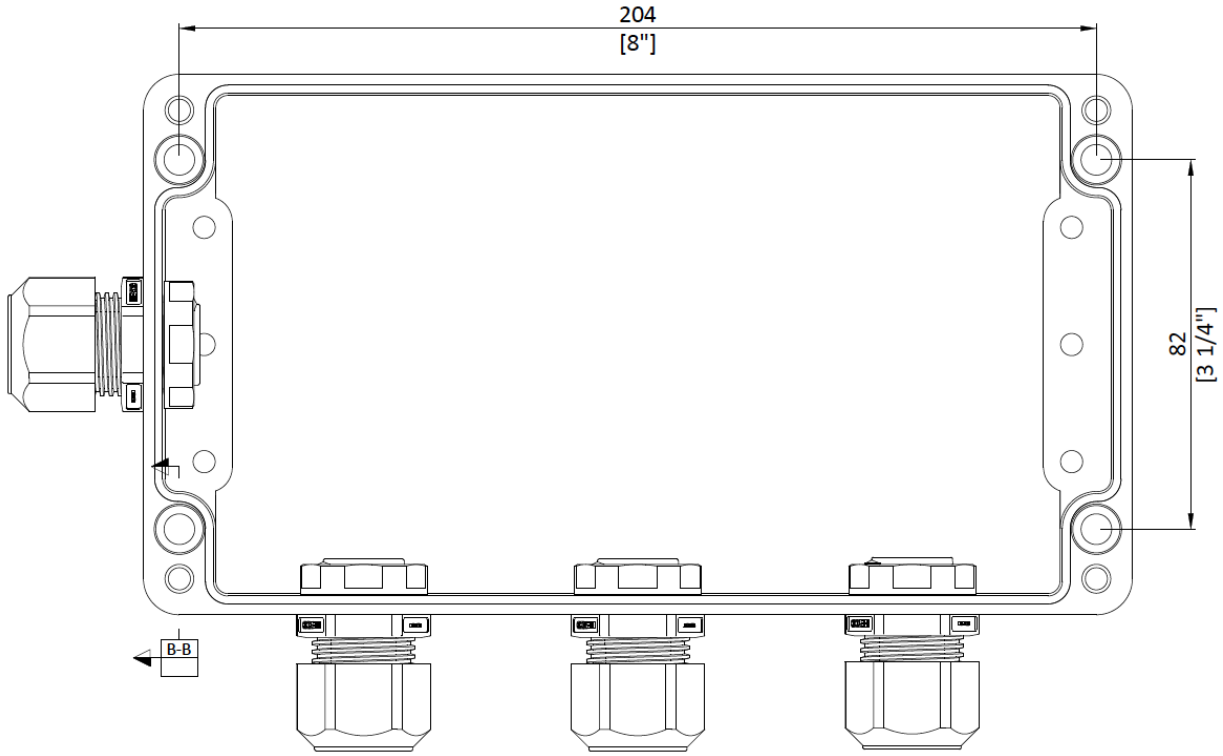


8.4.2 Left Side View with Dimensions

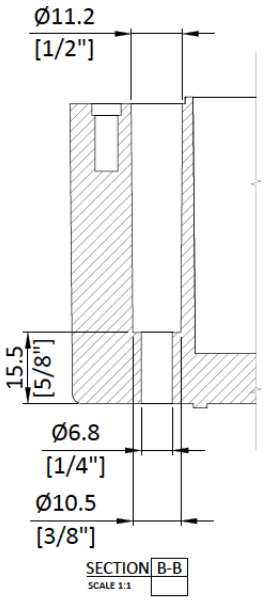


8.5 Mounting Holes

8.5.1 Mounting Hole Locations (Front View without Cover)

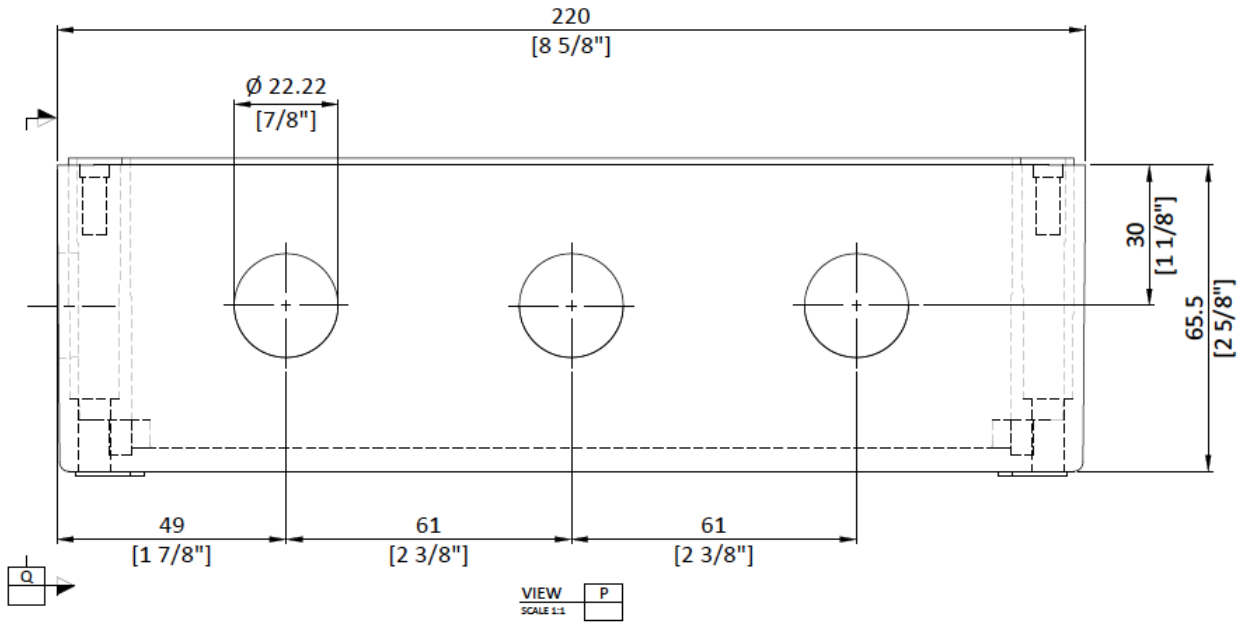


8.5.2 Mounting Hole Cross Section



8.6 Entry Points

8.6.1 Bottom Entry Point Dimensions and Locations



8.6.2 Left Side Entry Point Dimension and Location