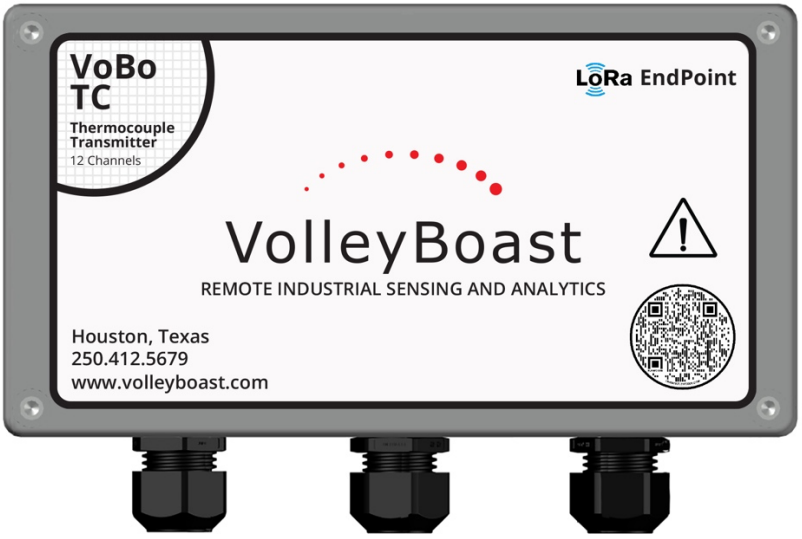
VolleyBoast

VoBo TC

INSTALLATION MANUAL



The VoBo TC is a LoRaWAN 12 channel thermocouple transmitter certified for use in hazardous areas.

DCM-TC03-A4

Contents

ENVIRONMENTAL RATINGS

E115256

Complies With UL 62368-1, CSA C22.2 No. 62368-1
UL 121201 and CAN/CSA C22.2 No.213
For use in the following areas:
Class I, Division 2, Groups B,C,D T4
Class II, Division 2, Groups F,G T135 °C
Class III, Division 1
Tamb:-40°C to +80°C, IP66/NEMA 4X

The VoBo TC is rated to operate in ambient temperatures between -40° C and + 80° C. Ingress is rated to IP66/NEMA 4X.

Storage Requirements

The VoBo TC should be stored in an environment where:

- Humidity is below 45 % & protected from precipitation.
- Temperature is between -35 °C and +30°C.

WARNINGS

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. All installation and maintenance of the VoBo TC device may only be performed by trained personnel authorized by the facility. Personnel must fully read and understand this document before carrying out the instructions. All warnings must be heeded.

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 8.0 to 9.5 in-lbs. Do not overtighten the screws. The entry point fittings (cord grips or conduit fittings) must be rated IP66 or better and installed in accordance with the manufacturer's instructions.

WARNING: The battery (cell) must only be removed or replaced in area known to be non-hazardous.

WARNING: Only cells listed below are permitted to be installed in the VoBo TC when used in a Hazardous Area.

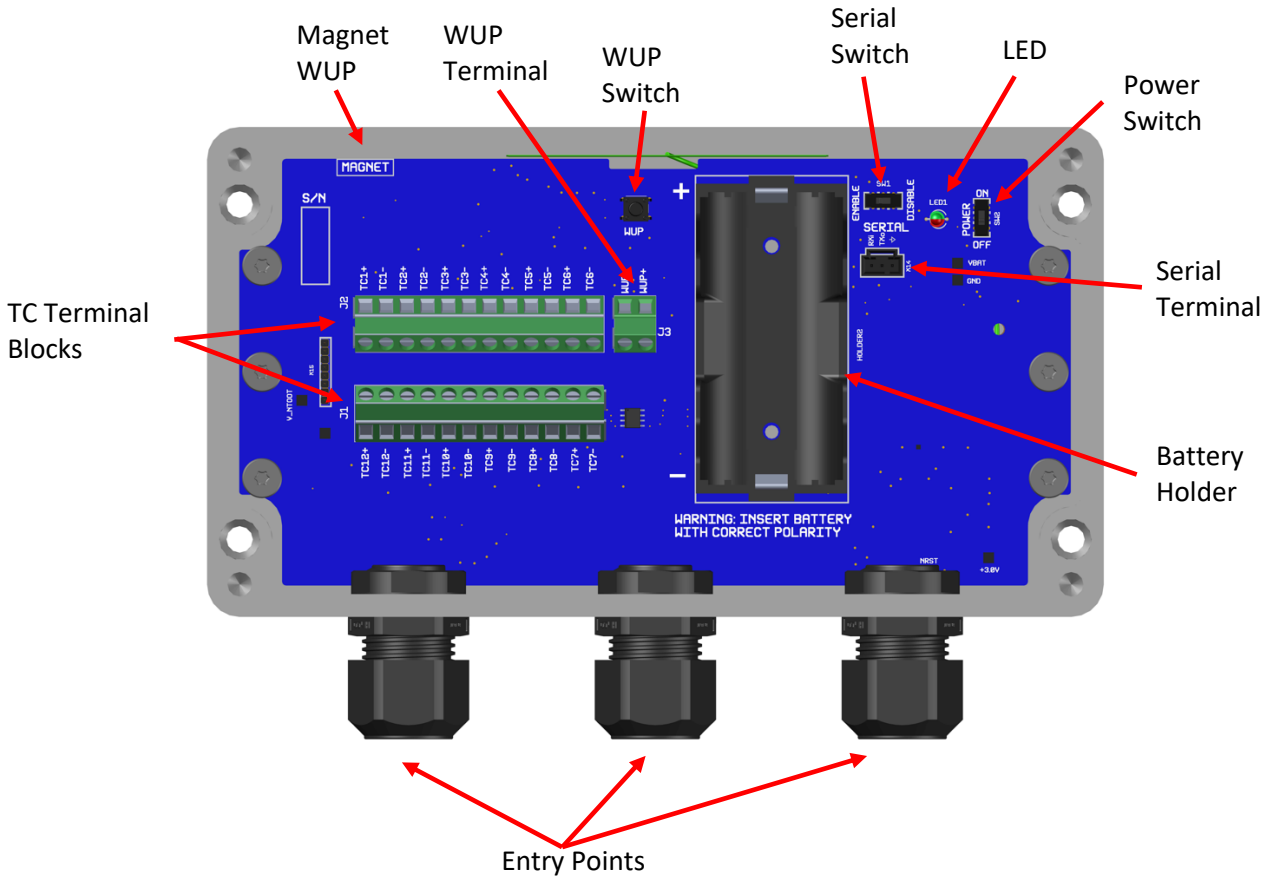
Saft LSH20
Saft LS 33600
TadiranTL-2300
Tadiran TL-5930

WARNING: Dispose of the battery properly according to local laws and regulations.

WARNING: Only devices which are classified as a Simple Apparatus may be connected to the VoBo TC. Thermocouples and dry contact switches are classified as Simple Apparatus.

A printed hard copy version of the VoBo TC Installation Manual is available upon request. Please email VolleyBoast at: info@volleyboast.com

VOBO TC COMPONENT OVERVIEW



Description of Components

Cover	The VoBo TC 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 VoBo TC has three (3) 7/8-inch diameter entry holes. Three cord grips (cable glands) are provided. The cord grips accept 0.095-inch to 0.290-inch diameter cable. For cable that is of a larger diameter, alternate cable glands may be installed by the user, providing that they are rated watertight and to a -40° C to 80° C temperature range and are installed in accordance with the manufacturer's specifications. Two (2) hole plugs are provided, to seal unused entry holes. This may be installed in place of the cable glands if fewer than three entry points are utilized. The user may also remove the provided cord grip(s)and install ½ inch fittings in accordance with the requirements of the National Electric Code (NFPA70) or the Canadian Electrical Code (CSA C22.1) and all local codes and regulations.
Battery & Battery Holder	A 13 Ahr Saft LSH20 D-size Underwriters Laboratories (UL) recognized lithium-thionyl chloride [Li-$SOCl_2$] primary cell is provided. The following cells are certified for use with the VoBo TC. Saft LSH20 Saft LS 33600 TadiranTL-2300 Tadiran TL-5930 The provided cell is user replaceable. Replacement cells **MUST BE** installed with the correct polarity. The polarity is marked adjacent to the battery holder. The Power Switch must first be switched to the "OFF" position while inserting or removing a battery. The battery should only be removed or replaced in an area which is known to be non-hazardous. A Velcro tie down strip is provided to ensure the battery remains in place during transportation.
Power Switch	The switch activates/deactivates the power supply (the battery). It should be in the "OFF" position when installing or removing the battery.
LED	The LED indicates successful completion of firmware initialization after power is turned on and successful connection to the network has been made.
WUP Switch	Press this button briefly to interrupt the preprogrammed sleep/wake cycle. This will immediately initiate the programmed reading of connected Thermocouples and transmission of payload. This is useful for checking readings while in the field or when calibrating sensors. ⚠ The WUP switch will not function if the WUP terminal circuit is closed
MAGNETIC WUP	There is a magnetic switch directly underneath this label. When the enclosure cover is on, a magnet can be used to activate this switch and interrupt the preprogrammed sleep/wake cycle. This will immediately initiate the programmed reading of connected

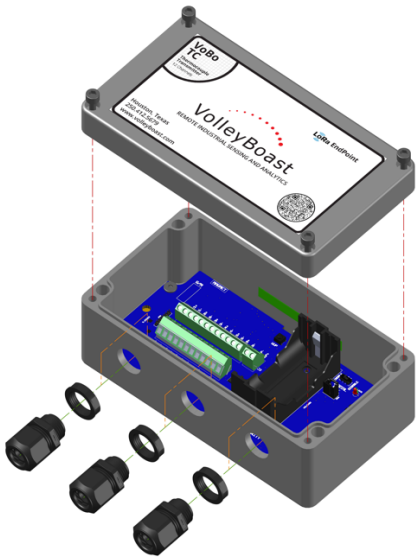
	sensors and transmission of payload. A red dot has been affixed to the exterior of enclosure marking the location of the magnet. ⚠ The Magnetic WUP switch will not function if the WUP terminal circuit is closed.
TC Terminal Blocks	Thermocouple terminal blocks. Generally, the red wire of the Thermocouple is inserted into the negative terminal and the other wire into the positive terminal. The terminal blocks accept 24-12 AWG stranded or solid wires. Wire strip length should be 0.27 in (7 mm).
WUP Terminal	Can be used to connect an external dry contact switch. When the switch position is changed (open/closed) the VoBo will wake up, run through its program, read any connected thermocouples, and transmit the data. The terminal blocks accept 24-12 AWG stranded or solid wires. Wire strip length should be 0.27 in (7 mm).
SERIAL	A RS232/UART terminal. Used for local configuration of the VoBo TC, viewing the output locally, and recovering 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 TC.
SERIAL Switch	The switch used to enable or disable communication with the processor through the Serial terminal.
X5	JTAG connection. Not for customer use.

⚠ The WUP button and Magnetic switch only function when the WUP I/O terminal is not in a closed position.

Field Installation

⚠ **Set the Power Switch to "Off" when inserting or removing Thermocouple or switches into the terminal blocks.**

⚠ **The VoBo TC must be installed a minimum of 20 cm away from personnel.**



Turn the POWER switch to the OFF position.

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 thermocouple 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 thermocouple wires into the terminal block in accordance with the wiring diagram for that specific type of Thermocouple (see Thermocouple data sheet). Generally red goes to the negative position and the other color goes to the positive position. Tighten the terminal screw to 4.4 in.lb.

The VoBo TC cord grip sealing nut should be tightened to a torque of 50-55 in.lbs. If different cord grips or conduit fittings are desired, the installed cord grips may be replaced by the user with alternate fittings. The alternate fittings must be rated to provide a watertight seal around the cable and the enclosure opening.

To maintain the VoBo TC hazardous location certification and IP66 protection, the entry points to the device must be sealed so they are watertight.

The VoBo TC should be mounted on a secure, rigid surface capable of supporting the VoBo and sensor cables. If 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. If 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. The enclosure requires 15 mm to clear the mounting hole. If mounting in a location that would subject the VoBo to corrosive elements, use stainless or galvanized fasteners.

Check LED for status. The LED will light green for 1 second following successful initialization of the VoBo. The LED will flash green twice for ¼ second each flash every time the VoBo attempts to join the network. The LED will light green for 1 second upon successfully joining the network. The LED will light red for 1 second if it fails to join the network after cycling through its configured FSB attempts and goes into its back off cycle. The LED will provide these indications only upon initialization of the VoBo (either through cycling power or resetting the microprocessor).

Press the WUP button to send another payload to confirm connectivity and transmission. Note the LED only functions upon powering up the VoBo. It will not light under normal operation.

The payload should be sent to your LoRaWAN network server where they can be viewed and confirmed that the VoBo TC is functioning properly.

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

Problems? Contact VolleyBoast at: *support@volleyboast.com*

Maintenance

User maintenance requirements of the VoBo TC is limited to replacing a depleted battery with a fresh battery. Please contact Volley Boast if any issues arise with respect to the performance of the VoBo TC.

REGULATORY INFORMATION

Hazard Class Information

ANSI/ISA 12.12.01 and CAN/CSA C22.2 No.213:
CLASS I, DIVISION 2, GROUPS C, D T4
Flammable gases including Ethylene, Propane, and Methane
CLASS II, DIVISION 2, GROUPS F, G T135 °C
Combustible dusts including metal dusts, carbonaceous dusts, flour, grain, wood, plastics, and chemicals
CLASS III, DIVISION 1
Combustible fibers and flyings
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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.

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.

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.

Industry Canada 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.*

Industry Canada

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 Number/No. de Certification	125A-0054
	Modular Approval/Approbation modulaire
Model/Modèle	MTDOT-915

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 10pecificati par le bureau de délivrance d'Industrie Canada et 10pecifica des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le 10pecifi 10pecificati est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux 10pecificat d'Industrie Canada. Le matériel à l'égard duquel le 10pecifi 10pecificati est délivré ne doit pas être fabriqué, importé, distribué, loué, mis en vente ou vendu à moins d'être conforme aux 10pecificat et aux 10pecifications techniques applicable publiées par Industrie Canada.

REVISION HISTORY

Revision Date	Section	Revision
2023.02.08		Removed description of optional antenna. Updated Table of Contents
2023.03.23		Updated VoBo TC image Added how to obtain printed version of the manual
2024.03.20		Added group B to Class 1, Division 2 ratings. Modified Description of Components – Entry Points.

CONTACT INFORMATION

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