



TP-400V / TP-400R8 USER GUIDE



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EXTERNAL USE

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NOTICE

The information contained in this document is subject to change without notice and may not be suitable for all applications. While every precaution has been taken to ensure the accuracy and completeness of this document, Electronics4All assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

Technical Support Site

If you encounter any issues with this software requirements document, contact your sales representative for additional assistance.

1. REVISION HISTORY

Rev. #	Description	Date
00	Initial release	May 13, 2025
01	Updated battery pack section	July 23, 2025

2. ACRONYMS

BLE
LED
RTD
UL

Bluetooth Low Energy
Light Emitting Diode
Resistance temperature Detector
Underwriters Laboratories

3. ISED NON-INTERFERENCE DISCLAIMER

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

This device complies with the Canadian ICES-003 Class A specifications. CAN ICES-003(A) / NMB-003 (A).

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempt 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.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

4. FCC CLASS A COMPLIANCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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, and
2. this device must accept any interference received, including interference that may cause undesired operation. Please note that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Changes or modifications not expressly approved by Electronics4All Inc. could void the user's authority to operate the equipment.

5. RF EXPOSURE STATEMENT

This equipment complies with FCC and ISED RSS-102 radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. In order to avoid the possibility of exceeding the FCC and ISED RSS-102

radio frequency exposure limits, this equipment should be installed and operated with minimum distance 20 cm (7.8 inches) between the antenna and your body during normal operation. Users must follow the specific operating instructions for satisfying RF exposure compliance.

Cet équipement est conforme aux limites d'exposition aux rayonnements FCC et ISED CNR-102 établies pour un environnement non contrôlé. Cet émetteur ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou un autre émetteur. Afin d'éviter la possibilité de dépasser les limites d'exposition aux radiofréquences FCC et ISED, cet équipement doit être installé et utilisé avec une distance minimale de 20 cm (7.8 pouces) entre l'antenne et votre corps pendant le fonctionnement normal. Les utilisateurs doivent suivre les instructions spécifiques d'utilisation pour respecter la conformité à l'exposition aux RF.

6. SAFETY INFORMATION

1. Operate the device only with the specified battery packs and accessories.
2. The device is intended for use only in a clean and dry indoor environment.
3. Always wear personal protective equipment appropriate to the environment where the device is installed and operated.
4. The device contains no user serviceable parts. Do not attempt to repair the device. See the CONTACT INFORMATION section for support or repair.

7. INSTALLATION

7.1. INTENDED USE

The device is intended to be installed and operated in an indoor industrial environment. The wireless system is Class A equipment and may cause radio interference in residential areas.

8. PRODUCT DISPOSAL

The device may be recycled by Electronics4All Inc. See the Contact Information section to recycle the TP-400 or any supplied accessories.

9. MAINTENANCE AND CLEANING

Clean the enclosure using a clean dry cloth.

10. CONTACT INFORMATION

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250 Herzberg Road
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www.electronics4all.ca
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1-613-595-0303

11. SYMBOLS

The following symbols may be present on the device or within this document:



Certification mark indicating that the device has been evaluated against FCC part 15.



NRTL certification mark indicating that the device has been evaluated against IEC 61010-1.



Caution: A UL Certified battery pack or power source must be used with this product. See section 17.

12. INTRODUCTION



Figure 1: TP-400V



Figure 2: TP-400R8

The TP-400 is a wireless sensor platform designed to be deployed where environmental and operational monitoring of industrial equipment is necessary in order to maximize equipment uptime and to reduce maintenance costs due to unplanned outages.

The TP-400 contains a Bluetooth 5.0 transceiver that pairs with a companion Gateway. The Gateway can support hundreds of sensors.

The TP-400 operates on a single companion battery pack that is inserted into the top of the unit.

The TP-400 is available in two model variants: TP-400V and TP-400R8.

NOTE

TP-400 is used throughout this document when the description, instruction, or specification applies to both models. TP-400R8 or TP-400V is used when the description, instruction, or specification is unique to that model.

13. TP-400V

The TP-400V is a 3-axis vibration sensor designed for industrial vibration monitoring on rotating machinery and vibrating structures (e.g., generators, compressors, pumps, and pipes).

The TP-400V may be deployed to detect low frequency structural oscillations or excessive vibration at shaft rotation frequencies which may be generated by deteriorating bearings.

The TP-400V may also be used to detect the absence of vibration, indicating the failure of a drive motor, a disconnected coupling, or an inoperative valve.



The TP-400V contains a 3-axis accelerometer that has a configurable full-scale measurement range up to ± 64 g. Vibration data is converted to velocity and analyzed in the frequency domain via a custom Fast Fourier Transform algorithm.

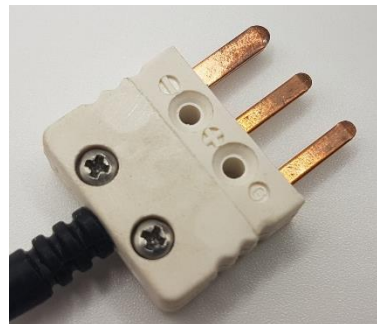
14. TP-400R8

The TP-400R8 is an eight (8) channel RTD designed to be installed in locations where the periodic temperature monitoring of industrial equipment such as industrial boilers, petrochemical and exhaust gas monitoring are essential. The device periodically samples the temperature of all 8 RTD probe and broadcasts the measurements back to a compatible wireless Gateway.

The TP-400R8 is equipped with 8 RTD ports, enabling the connection of up to 8 probes to a single device. It is compatible with both PT-100 and PT-1000 probes, allowing users to connect probes in any combination. The device automatically detects whether a PT-100 or PT-1000 probe is connected.



The TP-400R8 is designed to accept ANSI 3-wire male blade connectors (7.9 mm pitch).



The TP-400R8 may be supplied with RTD probes pre-calibrated to the sensor.

15. COMPATIBLE GATEWAYS

The TP-400 is compatible with the following Gateways manufactured by Electronics4All Inc.

Part Number	Description
GTW-BL100	Wireless Bluetooth 5.0 Receiver, LAN TCP/IP Communication, Integrated Ambient Temperature and Humidity Sensor
GTW-200	Wireless Bluetooth 5.0 Receiver, 900 MHz LoRa WAN Long Range Repeater Network, LAN TCP/IP Communication, Ambient Temperature and Humidity Sensor, PoE Compatible
P-GTW-BL300	Wireless Bluetooth 5.0 Portable Datalogger, Android X-Lab Database Application, Adjustable Sensor Reporting Interval

16. USER INTERFACES

The front face of the TP-400 contains five (5) color LEDs for status information and three (3) pushbuttons for simple deployment control.



16.1. PUSHBUTTONS

Pushbutton Label	Description
PB1	PB1 is used to pair and un-pair the sensor to a Gateway.
PB2	PB2 is used to trigger a single data report to the paired Gateway.
PB3	PB3 is used to enable or disable the serial terminal interface.

16.2. LEDS

Five LEDs are used to indicate the local host connection status, pairing operation, battery low status and fault.

LEDs	LED Pattern
STATUS LED	STATUS LED indicate status of local host connection.
COM LED1	COM LED1 and COM LED2 activated in particular sequence during successful BLE pairing processes. COM LED1 indicate status of BLE pairing when PB1 is pressed. COM LED2 indicate status of BLE pairing when PB1 is pressed.
COM LED2	
BAT LOW LED	BAT LOW LED activated as the indication of battery low status of battery pack.
FAULT LED	FAULT LED activated as the indication of any system fault.

16.3. SERIAL INTERFACE

The TP-400 contains a serial interface than can provide access to various sensor parameters via a serial terminal. When connected to a host computer via the USB-C port on the battery pack, the sensor will enumerate as a Virtual Communications Port (VCP) and can be controlled using a serial terminal program.



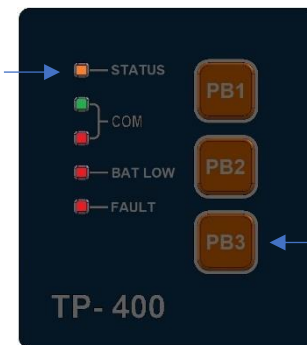
The TP-400 serial communication settings are provided in the table to the right:

Baud Rate:	115200
Data Bits:	8
Parity:	None
Stop Bits:	1
Flow Control:	None

To enable serial communication on the TP-400, momentarily press the **PB3** pushbutton after the USB-C cable has been connected between the installed battery pack and the host computer.

The **STATUS LED** will turn ON indicating the serial port is ready.

SERIAL
PORT
READY



MOMENTARY
PRESS

```
TP-400V>
TP-400V>HELP
----- command list -----
HELP      SINGLE_REPORT  STREAM_DATA  TP400_FW
RESET
ACK
TP-400V>
```

TP-400V Command Prompt

```
TP-400R8>
TP-400R8>HELP
----- command list -----
HELP      DETECT_RTD  SET_RTD_CH  GET_RTD_CH
SINGLE_REPORT  STREAM_DATA  CAL_DATE  TP400_FW
RESET
ACK
TP-400R8>
```

TP-400R8 Command Prompt

Press [ENTER] in the terminal window to display the command prompt. Typing HELP in the command prompt will display the available commands for either the TP-400V or TP-400R8. For assistance on utilizing the available commands.

17. BATTERY PACKS

The TP-400 operates on a single companion battery pack that is inserted into the top of the unit. Two battery pack chemistry options are supported: primary (non-rechargeable) and secondary (rechargeable).



Non-Rechargeable



Rechargeable



Caution: In order to operate the TP-400 in a manner compliant to UL/CAN/CSA-C22.2 No. 61010-1, the TP-400 must be operated with a UL (Underwriters Laboratories) certified battery pack. Please contact Electronics4All Inc. for more information on how to acquire a UL Certified battery pack.

17.1. BATTERY PACK INSTALLATION



- 1 Insert the battery pack into the TP-400 battery slot. The battery pack can only be inserted with the correct orientation.



- 2 Push down on the battery pack to seat it in the TP-400. An audible click will be heard.



- 3 Captive screws are installed on the rear of the unit to provide additional retention for the battery pack when the TP-400 is operated in a high vibration environment. First fully seat the battery pack, and then tighten the screws to a maximum of 5.0 in-lbs. The screws accept a 7/64" hex drive.

17.2. BATTERY PACK REMOVAL

Push in the retaining clips on each side of the battery pack and pull up to remove the battery pack.



NOTE

If difficulty is encountered when attempting to remove the battery pack, verify that the captive screws at the rear of the TP-400 are not tightened.

18. PAIRING

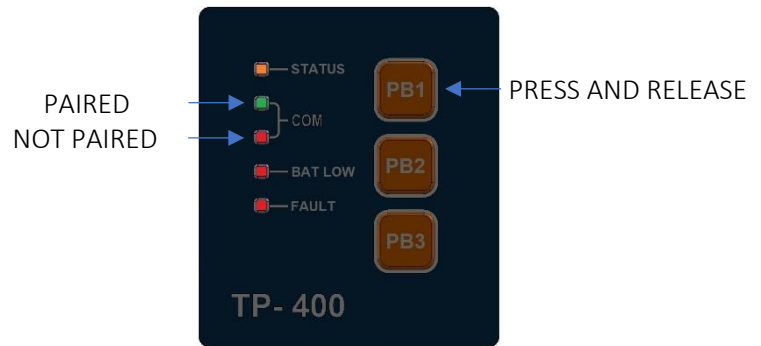
To enable sensor operation, the TP-400 must first be paired with a Gateway.

18.1. PARING STATUS

To determine if the TP-400 has been paired with a Gateway, press and release the **PB1** pushbutton.

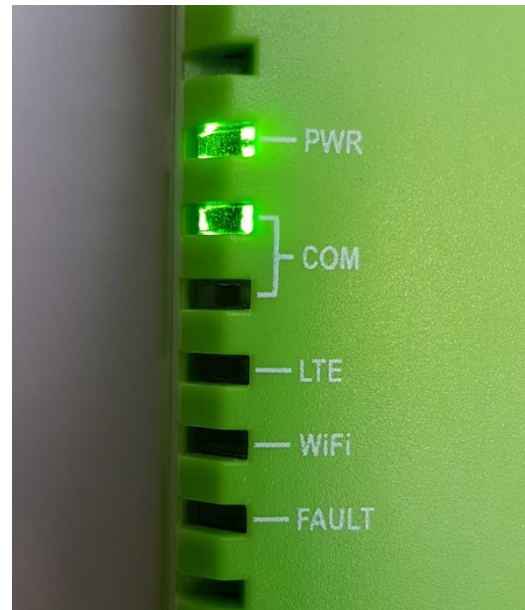
If the **GREEN COM LED** turns on for 1 second, the wireless sensor is paired with a Gateway.

If the **RED COM LED** turns on for 1 second, the wireless sensor is not paired with a Gateway.



18.2. PAIRING A DEVICE TO A GATEWAY

1. Place the target Gateway in Pairing Mode. The **GREEN COM LED** on the Gateway will turn ON. Note that the procedure for placing the unit in pairing mode differs depending on the Gateway, so refer to the User Manual for the specific model.



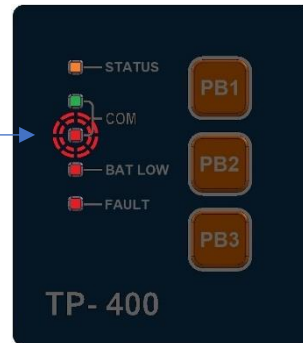
2. Press and hold the **PB1** button on the TP-400. The **RED COM LED** of the TP-400 will turn on for 1 second. Release the **PB1** button.
3. If pairing is successful, the **GREEN COM LED** on the TP-400 will then turn on for 1 second, and the **GREEN COM LED** on the Gateway will turn OFF.
4. If pairing was not successful, the **GREEN COM LED** on the TP-400 will not turn ON and the **GREEN COM LED** on the Gateway will remain ON. If this occurs, re-attempt step 3.

18.3. UNPAIRING A SENSOR FROM A GATEWAY

To unpair the TP-400 from the Gateway, press and hold the **PB1** pushbutton. After approximately 8 seconds, the **RED COM LED** will start to flash rapidly. The **PB1** pushbutton may then be released.

The TP-400 device is now no longer paired to the Gateway.

RAPID
FLASHING

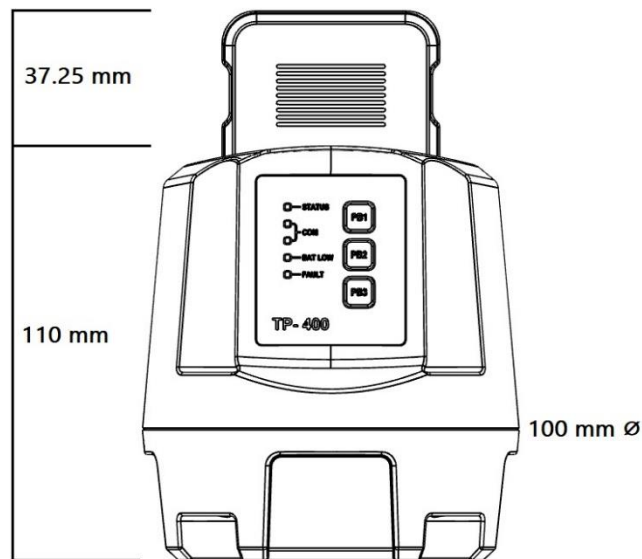


19. MOUNTING

The TP-400 contains a ¼-28 UNF thread on the underside of the unit. Maximum depth is 13.5 mm.



20. DIMENSIONS



TP-400 Dimensions

21. SPECIFICATIONS

21.1. Certifications

FCC ID	2AXVKTP400
Industry Canada Certification Number	26661-TP400
Safety	UL/CAN/CSA-C22.2 No. 61010-1 UL/CAN/CSA-C22.2 No. UL 61010-2-30

21.2. Bluetooth

Protocol	5.0 Low Energy
Frequency Range	2404 MHz to 2480 MHz
Channels	0 -39
Communication Range to Gateway	200 m Line of Sight

21.3. Power

Supported Battery Types	Primary Non-Rechargeable Secondary Rechargeable
Input Voltage Range	1.80 VDC to 5.00 VDC
Average Current Consumption	22 µA, 5 Minute Measurement + Reporting Interval

21.4. Mechanical

Dimensions (No Battery Pack)	110 mm (H) × 100 mm ø (W)
Dimensions (Battery Pack Installed)	147.5 mm (H) × 100 mm ø (W)
TP-400V Weight (No Battery Pack)	320 g
TP-400R8 Weight (No Battery Pack)	365 g
Weight (Battery Pack Installed)	+ 205 g
Mounting Thread	¼-28 UNF 13.5 mm Depth

21.5. Environmental

Ingress Protection Rating	IP30 (No Battery Pack), IP55 (Battery Pack Installed)
Pollution Degree	2
Operating Temperature	-20 °C to 60 °C
Storage Temperature	-40 °C to 85 °C
Permissible Humidity	20 % to 85 % RH (Operation and Storage)
Maximum Altitude	2000 m

21.6. TP-400V

Measurement Range Options	± 8 g, ± 16 g, ± 32 g, ± 64 g
Sensitivity	± 8 g: 4096 counts/g ± 16 g: 2048 counts/g ± 32 g: 1024 counts/g ± 64 g: 512 counts/g
Velocity Accuracy	± 5 mm/s

21.7. TP-400R8

Supported Probe Types	PT-100, PT-1000
Measurement Range	-50 °C to 250 °C
Accuracy after Factory Calibration	± 0.4 °C (Full Range)
RTD Probe Interface	3 Wire, ANSI Male Blade (7.9 mm Pitch)