

MDT

Pulse Metering Data Transceiver

Standard, MAX, and LoRaWAN Systems

Product Overview

The Tehama Pulse MDT records data from meters that generate a pulse output and transmits the totalizer count via radio towards the DCAP/Gateway. It is compatible with nearly all water, gas and electric utility meters that use a reed switch or a piezoelectric pulse generator.

Our Pulse MDT is available in three radio technologies, our original Standard Range, our MAX Range, and now LoRaWAN. Standard is our original system which we continue to fully support and maintain. MAX is based on LoRa technology but designed to use Repeaters. LoRaWAN uses the international standard for IoT type radios. All MDTs are powered by two inexpensive field-replaceable AA batteries.

The Pulse MDT is also available with either a single pulse input for single meter usage or dual pulse inputs for co-located hot and cold water meters or other two-meter combinations. A Top-of-the-hour synchronize Time of Use (ToU) model with 15-minute interval data is also available

Other variations and features are available such as:

- Submersible version for pit or outdoor installation (see Submersible Data sheet)
- Integrated Remote Display, California approved (See Display MDT Data sheet)

Specifications

Input	• Pulse signal from water, electric, gas, run-time, or BTU meters
MDT Data Storage	• -P/PP Pulse units: no local storage • -PT Time-of-Use units: Over 2300 data pts. (24+ days @ 15 Min interval)
Data Resolution	• -P/PP Pulse units: 1-hour interval • -PT Time-of-Use Units: 15-minute interval, Top of the Hour synchronized
Max Pulse Rate	20 pulses per second, 25mS minimum pulse width
Radio	902 – 928 MHz; FCC and IC Certified for all modes • Standard: Open field range of one mile • MAX/LoRaWAN: Open field range approaching 10 miles
LED	Indicates on/off and RF network connection status. From button press: • Solid Green: good Link Quality • Solid Amber: OK Link Quality • Red or Flashing: poor Link Quality or syncing to Network
Operating Environment	-20 to 145 degrees F, up to 90% RH, non-condensing.
Power	Two replaceable AA batteries, up to eight years life under normal conditions
Typical Battery Life	6-8 years @ 50 to 90 deg. F, reduced at temperature extremes
Dimensions	4.3" x 2.2" x 1.2"
Warranty	Five years. For more detailed information, please visit our warranty page . Note that the warranty does not cover batteries.

Continual product enhancements may cause specifications to change without notice.

*Actual range may vary depending on installation location and topography

Models

Standard System		
Single Pulse MDT	TW-160B-P	Single pulse input counter, one-hour interval data, no on-board memory
Dual Pulse MDT	TW-160B-PP	Dual pulse input counter, one-hour interval data, no on-board memory
Single Pulse MDT, Time-of-Use enabled	TW-160B-PT	Single Pulse input, 15-minute guaranteed ^(*) Time-of-Use interval data with on-board data memory. Readings are synchronized to the top of the hour for accurate billing.
MAX System		
Single Pulse MDT	TW-170B-P	Single pulse input counter, one-hour interval data, no on-board memory
Dual Pulse MDT	TW-170B-PP	Dual pulse input counter, one-hour interval data, no on-board memory
Single Pulse MDT, Time-of-Use enabled	TW-170B-PT	Single Pulse input, 15-minute guaranteed ^(*) Time-of-Use interval data with on-board data memory. Readings are synchronized to the top of the hour for accurate billing.
LoRaWAN System		
Single Pulse MDT	TW-180B-P	Single pulse input counter, one-hour interval data, no on-board memory
Dual Pulse MDT	TW-180B-PP	Dual pulse input counter, one-hour interval data, no on-board memory
Single Pulse MDT, Time-of-Use enabled	TW-180B-PT	Single Pulse input, 15-minute guaranteed ^(*/**) Time-of-Use interval data with on-board data memory. Readings are synchronized to the top of the hour for accurate billing.

* Adequate Repeater/Gateway coverage is required for guaranteed delivery.

** Extra cloud storage fees required

Other combinations and sensor inputs are available by special order. Please contact Tehama for details.

****Note**** Standard, MAX, and LoRaWAN products are NOT compatible with each other. MAX MDTs must be used with MAX Repeaters and DCAPs; likewise for Standard. LoRaWAN uses Gateways.

Refer to [AN-119](#) for more information. Also available in the Support/Documents section of our website.

MDT Configuration

All MDTs come with a pre-set configuration; there are no settings to change on the MDT itself. Settings such as count factor or Units are set in our software.

New MDTs are shipped from the factory in a powered-off state. They can be powered on using a hidden button under the Tehama Wireless logo. The LED lights up when the button is pressed for visible feedback.



Turn ON or Off:

- Press & hold button until LED blips off (roughly 3 seconds), then release.
- A pulse input will also turn on an MDT.

Power-up LED Flashing at a 1 second rate:

- Indicates MDT / Repeater is listening for a DCAP, Gateway, or Repeater.
- Once a beacon is heard, the flashing rate will double in speed.
- Once a Connection is established, the LED stays solid for 10 seconds.
- If the attempt to connect to all beacons fails, LED flashing stops after 60 seconds.

Check the status of an MDT or Repeater by tapping the button:

- Unit is OFF if you see 2 flashes after the button is released.
- Unit is Asleep (On but out of range) if you see 1 flash only. The button press will wake up the unit to try to re-connect to Network. Finding an MDT in the sleep state is usually an indication of poor placement or inadequate Repeater coverage.
- Unit is Connected and operating normally if the LED stays on for 10 seconds.
- Green indicates a robust radio link, Orange an OK link, and Red a poor link.

Reset Count:

- Press and hold button until power-up flashing sequence starts (12-15 seconds). The LED will blip off at the 3 second mark then go off for a few seconds at about 10 seconds.

MDT to Meter Wiring

Polarity Connection Concerns

Most Water & Gas Meters

The polarity does not matter for most Water and Gas meters which typically use a magnetic reed type switch.

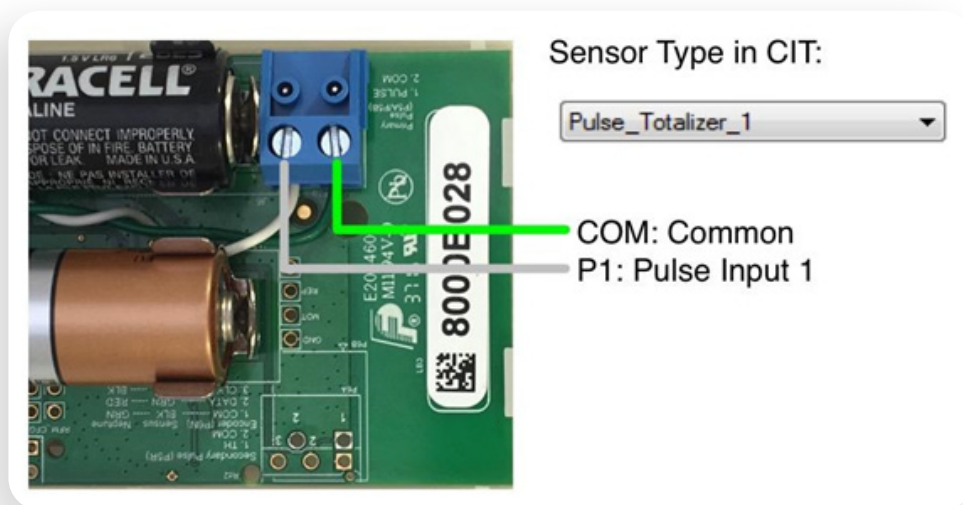
Electric Meters

The polarity is important for connecting to most Electric meters.

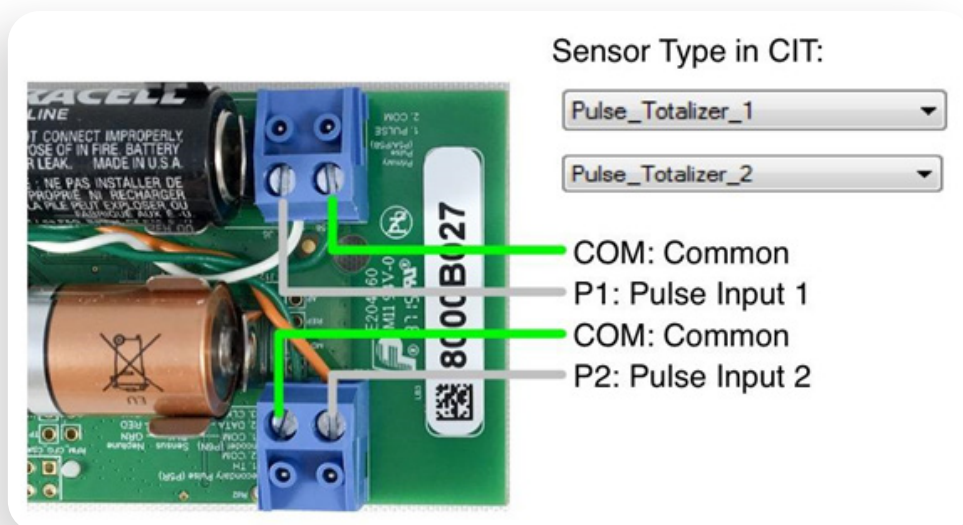
- The Pulse Input (P1 or P2) goes to the meter's pulse output terminal, labeled variously WH+, P1, "+", or ISOLATED OUTPUT 10/100/1000.
- The Common input goes to the common terminal, variously labeled ISOL COM, "-", or COM.

Wiring Guide

TW-160/170/180 B-P Single Pulse Input MDTs



TW-160/TW-170/180 B-PP Dual Pulse Input MDTs



Note that you can swap the Meter connectors between the two ports and the polarity remains correct.

Recommended System Installation Steps

First power up the DCAP or primary Gateway. Next power up Repeaters or other Gateways in appropriate locations around the property. For Repeaters, start with units closer to the DCAP and use the Repeater LED feedback indication to verify the range is acceptable. At first, just the minimum numbers of repeaters need be placed; however, it is necessary that they be within range (solid 10 second LED "flash" when button pushed) for the backbone to be reliable. Repeater to Repeater (or DCAP) range in open field scenarios is measured in miles for our MAX system, however building construction materials, terrain, and poor location choices can reduce this down to hundreds of feet. Gateways communicate directly with the Internet via Cellular but can use wired Ethernet if available across the property.

Once the initial Repeater placement is complete, the MDT placement phase begins. Again, the LED feedback can be used to verify that MDTs are communicating with the network. Additional Repeaters/Gateways can be placed in areas where MDTs are unable to connect to the backbone. MDT to Repeater (or DCAP) range in open field scenarios approaches 10 miles for MAX and LoRaWAN, and over a mile for Standard. Again building construction materials, terrain, and poor location choices can reduce this down to hundreds of feet or less.

The CIT software can also be used in the placement phase to provide more detailed information such as Link Quality and Signal Strength readings generated by MDT and Repeaters.

Warning: All radio devices should be placed at least 8 inches (20 cm) away from people in order to minimize RF exposure.

MDT Mounting Guidelines

Units should never be placed directly on a metal surface or within a metal enclosure. Mounting on a metal surface will significantly affect the radio performance of the device, be it an MDT or a Repeater.

Recommended placement

- Mount on nearby wall away from meter and copper /metal piping or conduit.
- RF performance is best when mounted on wallboard.
- Use keyhole shape to mount on screw in wall.
- Designed for #6 Drywall screw.
- Separate case to tighten screw if desired.
- Note Antenna Pattern shown on the right.
- Radio signal slightly attenuated along the long axis of the MDT case.

