



MDT



Submersible Data Transceiver

Standard, MAX, and LoRaWAN Systems

Product Overview

Our IP68 rated Submersible MDT combines our MDT with a specially designed enclosure, fully encased in epoxy, for a completely waterproof product. The sealed, waterproof battery enables the MDT to operate for well over 10 years in normal operation.

The submersible MDT comes in three versions, our Standard, MAX Range & LoRaWAN. The Standard Range is our original, first generation system, which we continue to fully support and maintain. All variations can be ordered with either one pulse meter input or one Encoder or GWF AllRead input. All now have an internal temperature sensor. Meters connect to the sealed MDT wires by using waterproof IDC Splice connectors (or similar) between MDT and the Meter. Like our other MDT models, an LED provides instant feedback of the state of the MDT. A magnet waved across the side of the case replicates the button on our regular MDTs and is used to generate an instant transmission (for field testing) and to query the device about its RF status. See Operation on page 3 for details.

For pit meters, the enclosure is designed to be mounting to the bottom of a plastic pit lit using screws through the two tabs, or with a waterproof adhesive. The radio range and performance of the MDT will be optimal if it is mounted to the plastic pit lid and being upside down will keep the radio within an air pocket, also beneficial for radio range.

Specifications

Inputs Options	<ul style="list-style-type: none">• S-P: Pulse input from water, electric, gas, run-time, or BTU meters• S-E: Sensus/Neptune encoded protocol• All variations now have internal Temperature sensor
Data Resolution	1-hour interval
Radio	902 – 928 MHz; FCC and IC Certified; Open field range nearly 2 miles (Compatible Models) * Open field range nearly 10 miles (LoRaWAN & MAX Range Models) *
LED	Indicates RF network connection status and on/off state
Operating Environment	-20° to 145° F IP68 rated, fully submersible
Power	Sealed primary lithium battery, 3.6V
Typical Battery Life	10+ years @ 50° to 90° F, reduced at extreme temperatures
Dimensions	6.2" x 2.4" x 1.5"
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		
Submersible MDT, Pulse, Standard Range	TW-167S-P	Single pulse input counter, one-hour interval data. Includes temperature reading.
Submersible MDT, Encoder, Standard Range	TW-167S-E	Single input for Neptune/Sensus Encoder registers (auto-detecting), one-hour interval. Includes temperature reading.
MAX System		
Submersible MDT, Pulse, MAX Range	TW-177S-P	Single pulse input counter, one-hour interval data. Only for MAX Range networks. Includes temperature reading.
Submersible MDT, Encoder, MAX Range	TW-177S-E	Single input for Neptune/Sensus Encoder registers (auto-detecting), one-hour interval. Only for MAX Range networks. Includes temperature reading.
LoRaWAN System		
Submersible MDT, Pulse, LoRaWAN	TW-187S-P	Single pulse input counter, one-hour interval data. Only for LoRaWAN networks. Includes Temperature reading
Submersible MDT, Encoder, LoRaWAN	TW-187S-E	Single input for Neptune/Sensus Encoder registers (auto-detecting), one-hour interval. Only for LoRaWAN networks. Includes temperature reading.

*: Adequate repeater coverage is required for guaranteed delivery.

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

****Note**** Standard, MAX Range & LoRaWAN systems are NOT compatible. 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.

Pulse Wiring

TW-167/177/187 S-P Submersible MDTs

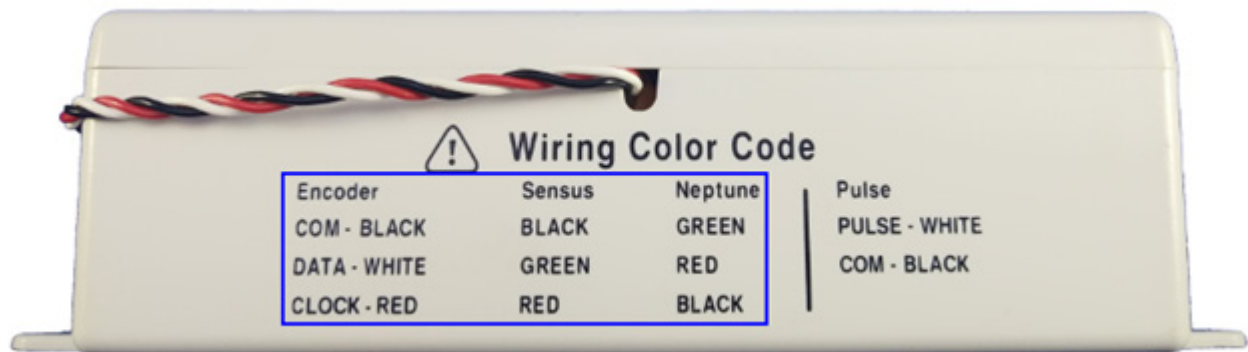
The TW-167/177/187 submersible pulse MDTs do not have any wiring connectors. The wires are already connected within the epoxy potted case. Meters interface to the sealed MDT wires by using waterproof IDC Splice connectors (or similar) between MDT and the Meter. The wiring information is printed on each MDT, as shown here. If these will be used in pits, it is recommended to further waterproof the connections by plunging the IDC connections into a grease-filled pod.



Encoder Wiring

TW-167/177/187 S-E Submersible MDT

The TW-167/177/187 submersible encoder MDTs do not have wiring connectors. The wires are already connected within the epoxy potted case. Meters interface to the sealed MDT wires by using waterproof IDC Splice connectors (or similar) between MDT and the Meter. The wiring information is printed on each MDT, as shown here. If these will be used in pits, it is recommended to further waterproof the connections by plunging the IDC connections into a grease-filled pod.



Operation

The Submersible MDT operates exactly like our regular MDT. A button press is created by swiping a magnet near the areas shown in green. Status and control are the same as our regular MDTs, including a "swipe" to initiate a read and transmit it to the DCAP/Gateway. The LED on the top provides the same feedback as on our regular MDTs.



Device Placement

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

With the DCAP/Gateway unit powered up, the repeater backbone should be placed next. Start with MDTs closer to the DCAP and use the Repeater LED feedback indication to verify the range is acceptable. At first just the minimum number of repeaters should be placed, however it is necessary that they are within range (solid 10 second LED "flash" when button pushed) for the backbone to be reliable. Range in open field scenarios are measured in miles for all systems, however building construction materials, terrain, and poor location choices can reduce this down to hundreds of feet or less.

Once the initial Repeater/Gateway 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 can be placed in areas where MDTs are unable to connect to the backbone.

The CIT software, web app and mobile app can be used in the placement phase to provide more detailed MDT and repeater/gateway information such as link quality & signal strength.

Placement and Wiring Instructions

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

- Ideal: Upside down, mounted to plastic pit lid. This keeps the radio as close to ground surface as possible. By mounting upside down, an air gap is formed to further protect the radio from water.
- The unit is fully submersible and can be placed anywhere. Note that RF performance is degraded if placed at the bottom of the pit or submersed in water.
- Use screw tabs to mount the MDT to lid.

Wiring

- Use waterproof connectors such as gel filled butt splices or waterproof wire nuts. To further waterproof the connection it is highly recommended to plunge the IDC connections into a grease-filled pod.

Antenna Pattern

