MDT

Submersible Data Transceiver

Standard and MAX Range Systems

Product Overview

Our IP68 rated Submersible MDT combines our MAX Range 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 two comes in two versions, our Standard and MAX Range. The Standard Range is our original, first generation system, which we continue to fully support and maintain. Both 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 interface 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 replaces 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 next page 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	• S-PI: Pulse input from water, electric, gas, run-time, or BTU meters • S-EI: 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 (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	Four years, 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-PI	Single pulse input counter, one-hour interval data. Temperature
Submersible MDT, Encoder, Standard Range	TW-167S-EI	Single input for Neptune/Sensus Encoder registers (auto-detecting), one-hour interval. Temperature
MAX System		
Submersible MDT, Pulse, MAX Range	TW-177S-PI	Single pulse input counter, one-hour interval data. Only for MAX Range networks. Temperature
Submersible MDT, Encoder, MAX Range	TW-177S-EI	Single input for Neptune/Sensus Encoder registers (auto-detecting), one-hour interval. Only for MAX Range networks. Temperature

*: 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 and MAX Range systems are NOT compatible: only Max Range MDTs must be used with a Max Range Repeater (and Max Range DCAP) and vice versa for Standard.

Refer to [AN-119](#) in the documents section of our website for more information.

Pulse Wiring

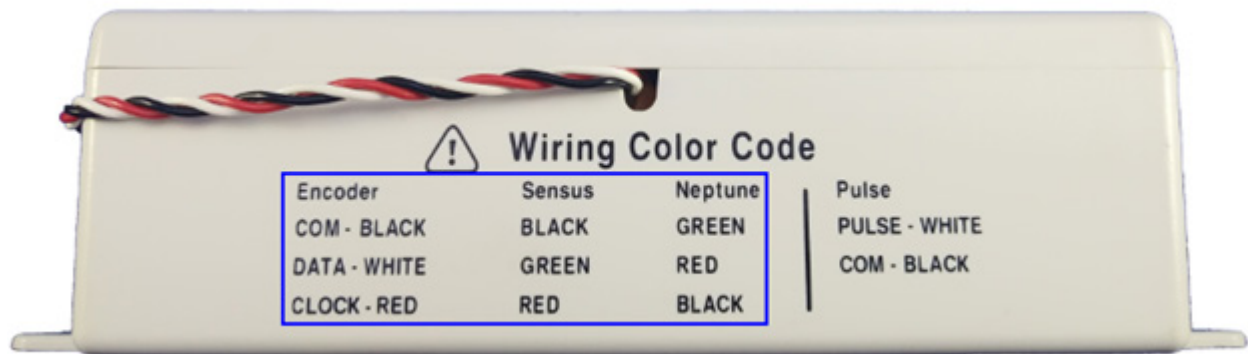### TW-167/177 S-P Submersible MDTs

The TW-167/177 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 S-E Submersible MDT

The TW-167/177 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.

⚠ Wiring Color Code				Pulse	
Encoder	Sensus	Neptune			
COM - BLACK	BLACK	GREEN		PULSE - WHITE	
DATA - WHITE	GREEN	RED		COM - BLACK	
CLOCK - RED	RED	BLACK			

Operation

The Submersible MDT operates exactly like our regular MDT. A button press is created by waving a magnet near the areas shown. Status and control are the same as our regular MDTs, including a "press" to initiate a read and transmit it to the DCAP. 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 Unit powered up, the repeater backbone should next be placed. 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 can 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 or less.

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 can be placed in areas where MDTs are unable to connect to the backbone. MDT to Repeater (or DCAP) range in open field scenarios is in excess of a mile for MAX, or roughly 2000 feet for Standard. Again building construction materials, terrain, and poor location choices can reduce this down to a hundred 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.

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

- 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.