



## Frequently Asked Questions for...

### MFT 4000

#### Multifunction Tester

#### Modular Calibrator • HART® Communicator • Documentor

Meriam Instrument is proud to present the **MFT 4000** to you through this FAQ document. If you have other questions, please contact Meriam Instrument, your local Meriam Representative or visit our website at [www.meriam.com](http://www.meriam.com).

#### **GENERAL**

##### **What does MFT 4000 mean?**

MFT is short for MultiFunction Tester. As you will soon discover, this is quite descriptive of the wide variety of tasks the MFT 4000 can perform.

##### **What is the MFT 4000?**

The MFT is a three-bay, modular calibrator for voltage and current, a wide variety of pressure ranges (vacuum, differential, gauge or absolute) and for RTD temperature measurement. Individual pressure or temperature sensors are mounted in self-contained modules to provide terrific flexibility to the user. The three (3) sensor module bays in the base unit will accommodate any Meriam sensor module offered. The base unit with module bays is common to the MFT 4000 (calibrator only), MFT 4005 (calibrator plus HART trims for pressure and temperature transmitters) and MFT 4010 (calibrator with HART communication capability).

##### **Why offer a modular calibrator (MFT 4000)?**

Versatility and flexibility are important to the instrument market! Modular sensors are interchangeable (restrictions apply to hazardous environment usage). They offer the user the flexibility of quickly reconfiguring to meet changing needs and they allow Meriam to offer a wide range of measurement sensors, not only for pressure, but also for temperature and any other physical measurement that the market needs.

##### **Why offer HART pressure and temperature transmitter trims in a hand-held calibrator (MFT 4005)?**

To calibrate a HART field device, a technician needs a reference standard (this is where the modular calibrator comes in) and a way to “trim” the zero and span of the field device. The MFT 4005 has knowledge of the HART trim commands needed to recalibrate a pressure or temperature transmitter using the appropriate MFT NIST traceable modules. With HART built into the calibrator, we make the technician’s workload easier with Quick Cal and Smart Trim features! And he doesn’t have to carry various calibrators and a separate HART communicator to affect HART pressure and temperature transmitter trims.

##### **Why offer HART communications in a hand-held calibrator (MFT 4010)?**

HART and similar protocols are in wide use! To calibrate a HART field device, a technician needs a reference standard (this is where the modular calibrator comes in) and a way to “trim” the zero and span of the field device. He may also need to reconfigure the field device for new operating conditions. With HART built into the calibrator, we make the technician’s workload easier with Quick Cal and Smart Trim features! The MFT 4010 means you don’t have to carry a calibrator and a separate HART communicator

for transmitter setup or reconfiguration; the 4010 talks with all analog, flow, level, pressure, temperature and valve type HART devices.

### **Why offer an integral Loop Supply module (VMA0055) with a hand-held calibrator?**

Technicians often need to supply power to a “dark” device before they can calibrate that device. The VMA0055’s loop supply solves this problem without the need for a separate piece of equipment. Once again, we have helped the Technician by decreasing the number of tools he needs to carry and made him more productive. And this module will also measure and source current, measure and source voltage, simulate a transmitter on a 2-wire loop.

## **THE MFT 4000 MODULAR CALIBRATOR**

### **What is the function of the MFT 4000 base unit?**

The base MFT unit provides the sensor module bays, electrical jacks and user interface required to configure the MFT for the desired application. The battery compartment on the rear holds six (6) AA alkaline batteries. A power jack is mounted for optional external power adapter. A DB-9 connector is also included to facilitate communication. A rubber boot provides shock protection for the base unit.

### **How does the user interface with the MFT?**

The user receives information from the MFT’s high-resolution display and uses four soft keys (keys whose functions are defined by changing labels) to navigate through a menu of choices. Eight dedicated keys are used to gain quick access to features such as HART, Units, Contrast, On/Off etc...

### **How are the module bays used?**

The MFT has three (3) module bays that are designed to securely dock Meriam sensor modules. The modules drop into the bays and secure with a spring-loaded button mounted in the module. Electrical contacts are made in the process and the base unit automatically runs diagnostics and identification checks. Depressing the spring-loaded button allows removal of the module. Modules are interchangeable in any bay location.

### **What if only two sensor modules are used?**

Meriam provides dummy modules to protect unused sensor bays from damage or debris.

**What are the electrical connections and what are they for?** Five (5) standard banana jacks are provided at the bottom of the base MFT unit. The top three are Volts, Common and mA for analog measuring needs of  $\pm 50$  Vdc or  $\pm 50$  mA. The bottom two are for HART loop connections (MFT 4005 or 4010).

### **What is the DB-9 connector for?**

The DB-9 provides RS-232 communications capability to facilitate download / upload operations. These operations are used for documenting operations or for future upgrades to firmware including HART capabilities.

### **How does the MFT “feel”?**

Ergonomics are more important everywhere you look. Meriam used a unique industrial design that is not only attractive but “feels” right. Your hand slips under a rear mounted hand strap and the MFT’s contour rests in your hand. To free up the Technician’s hands at a field calibration site, the hand strap detaches at one end and can be used as a hanger loop. When used on a bench top, the MFT will sit at a convenient viewing angle.

## **THE SENSOR MODULES**

### **What pressure modules are available?**

Differential pressure, vacuum and gauge pressure modules with ranges from 10” wc to 3000 PSIG are available. Absolute pressure ranges of 17.4 PSIA to 800 PSIA are available as well.

### **What pressure modules are available?**

The RIO4000 temperature measure and simulate module for RTD and temperature transmitter support are available along with complete accessory sets. The TIO0110 module for thermocouple measure and simulate needs is also available. The VMA0055 module provides measurement, sourcing and simulation for V DC and mA DC.

### **Do the Sensor Modules have to be returned to Meriam for re-calibration?**

No, all MFT versions have a standard field re-calibration feature! Sensor modules can be re-calibrated for changes in zero, span or linearity through the base unit using local reference standards. The user has less down time than ever before.

## **HART® TO ♥ DISCUSSIONS**

### **What will the MFT 4010 Calibrator / HART Communicator allow the user to do?**

The HART function on the MFT 4010 will allow the user to poll, configure and / or maintain a HART field device. The MFT 4010 uses a combination of Universal, Common Practice and Device Specific commands to facilitate communication with a field device. Combining HART ability with the modular calibrator means the Technician can use one device to effect device output trim adjustments (tweak 4 and 20 mA outputs), re-configure basic set up of the field device or poll a device for basic information.

### **What does a common HART transmitter calibration consist of?**

For a transmitter that provides a 4-20 mA analog signal for monitoring or control purposes, the output section will need to be checked. This is called a current loop trim or 4-20 mA trim. The MFT 4010 provides precise measurement of applied calibration pressure, reads the 4-20 mA output and can trim the 4-20 mA output using appropriate HART commands! For a transmitter that provides a digital signal for monitoring or control purposes, the input section needs to be checked. This is called input section trim or sensor trim. The MFT 4010 can also perform this task by measuring applied calibration pressure and reading the digital representation of the pressure found on the HART loop. Again, sensor trim is implemented through appropriate HART commands.

### **How do I connect the MFT 4010 to a HART device?**

The base MFT unit has two miniature banana jacks for the HART loop connection. Polarity is not a factor in the connections; simply connect into the 2-wire loop on either side of the HART device to establish communication. Please note that a 250-ohm shunt resistor will be needed to establish communication for low resistance loops made up of the HART device and a power supply only. A shunt resistor is included with the MFT 4010. Loops that include a receiving device will typically not need a shunt resistor for the MFT to read the HART signal.

### **How do I read the 4-20 mA or voltage output and HART signal from the same device?**

Simply connect to the HART jacks as described above and also connect to the Common and mA or Common and Volts jacks on the base MFT unit. Please note that a total of four (4) lead wires will be required.

### **There are over 400 HART devices available; which ones will the MFT 4010 service?**

Implementation of HART device language takes considerable effort. Meriam presently support 385 of the most popular HART field devices. Additional HART device support will be added on a regular basis. Upgrades to HART capability are available through internet download.

### **Are there any misconceptions about calibrating “smart” devices that I will run into?**

Yes! The most common one is that reconfiguring the range of a HART field device by using a communicator somehow calibrates the HART device. Wrong! Calibration requires a reference standard usually in the form of one or two calibration instruments to provide a precise input and to precisely

measure the device's output. A range change on a HART device does not reference any outside standard and, therefore, is not a calibration.

### **OTHER OPTIONS – Intrinsic Safety**

#### **When will the Intrinsic Safety option be available?**

Intrinsic Safety for Class I Division I hazardous atmospheres is available. Certification is through MET Laboratories (a NRTL company).

#### **What laboratory will be issuing the IS certification?**

Met Laboratories will be the certifying organization. Met Labs is a Nationally Recognized Testing Laboratory (NRTL) and offers testing to CSA and UL guidelines for Class I Division I hazardous environments.

#### **What MFT versions have the Intrinsic Safety option?**

Only the MFT 4000 Modular Calibrator, MFT 4005 HART Calibrator with Pressure and Temperature trim commands and the MFT 4010 Calibrator / HART Communicator are available with this option.

#### **Will there be any restrictions placed on the MFT when used in a hazardous area?**

Yes! Sensor modules will need to be installed, removed or swapped in a safe area. Batteries will need to be removed or installed in a safe area. The optional power adapter can only be used in a safe area. Consult the Intrinsic Safety Control Drawing for precise restrictions and approved batter list.

### **Documenting**

#### **What is Documenting?**

Calibration documenting is the ability to save As Found and As Left data from devices under test. This is standard on all MFT model variations. MFT 4005 and MFT 4010 combine knowledge of HART and the NIST traceable modules to provide new, time-saving features to our users such as Quick Cal and Smart Trim. These features allow users to trim HART transmitters without knowledge of HART menus or the need to carry HART menu trees to the field.

#### **How many Documenting sessions can the MFT support?**

MFT has dedicated memory for 200 complete documenting sessions consisting of 21 As Found data sets, 21 As Left data sets plus tag information and date stamping. Documenting results can be uploaded the compatible device management software systems like Meriam DMS.

#### **What documenting products will be compatible with the MFT?**

Meriam Device Management System (DMS) software, Emerson / Rosemount Asset Management System (AMS) software, other software packages utilizing the Field Calibrator Interface specification by ISA.

### **OTHER OPTIONS – Power**

#### **What other options are there for powering the MFT?**

Six (6) AA alkaline batteries normally provide the MFT power. For bench-top operations, Meriam offers a 100 – 240 Vac power adapter with US plug. A universal plug adapter kit is also available.