meriam
process technologies

M4 Series Handheld Pressure and Loop Calibrator

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Thank you for purchasing this product. Meriam has been providing innovative, reliable, cost effective measurement and calibration solutions for 100 years. The M400 Single Sensor or M402 Dual Sensor Handheld Pressure Transmitter Calibrator continues this legacy and is the first of its kind for the process measurement industry.

Certification/Safety/Warnings

⚠ DANGER Fire/Explosion Hazard. This instrument is not intrinsically safe. DO NOT use in areas that may contain flammable gas or vapors, combustible dusts or ignitable fibers where an unintended spark can cause a fire/explosion.

⚠ WARNING Do not exceed the Pressure Limits listed in the Specifications section of this manual. Failure to operate within the specified pressure limit could result in minor or moderate injury

⚠ CAUTION

- Substitution of components may impair operation and safety.
- Disconnect power before servicing.
- The product should not be powered with a combination of new and old batteries.
- The product should not be powered with a combination of batteries from different manufacturers.

NOTICE User must use a wrench on the pressure manifold when installing user's 1/8" NPT fitting. Do not tighten the fitting without using a wrench on the pressure manifold. Failure to use a wrench on the manifold will damage the plastic enclosure and void warranty No torque should be applied to the manifold with respect to plastic enclosure.

Safety Information

Failure to follow all instructions could result in injury. Read, understand and follow all safety warnings and instructions provided with this product. Also, meet or exceed your employer's safety practices.

In no event shall Meriam be liable for any indirect, special, incidental, consequential or punitive damages or for any lost profits arising out of or relating to any services provided by Meriam or its affiliates. It is not possible for Meriam to identify all foreseeable uses/misuses, therefore all persons involved in commissioning, using or maintaining this product must satisfy themselves that each intended application is acceptable.

Safety Warnings

The table below defines the safety symbols, signal words and corresponding safety messages used in the manual to identify potential hazards and are intended to warn persons about hazards that could result in personal injury or equipment damage.

	This is the Safety Alert symbol. This symbol indicates a WARNING. Warnings alert you to actions that can cause personal injury or pose a physical threat. Please read these carefully.
	This is the Safety Glasses symbol. This symbol indicates that you must wear approved safety glasses during the task.
	This is the Safety Gloves symbol. This symbol indicates that you must wear approved safety gloves during the task.
⚠ DANGER	Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates information essential for proper product installation, operation or maintenance.

Information in this document is subject to change without notice. Check the Meriam web site (www.meriam.com) for the latest manual revision.

Product Overview

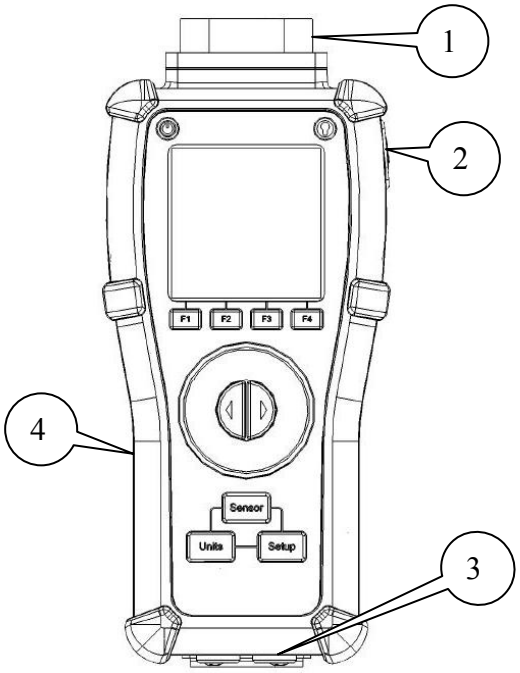


Figure 1: M4 Inputs and Outputs

Number	Name	Description
1	Pressure Manifold Connection	Connects the calibrator to a pressure source via 1/8” NPT Female. M400 = One Pressure Sensor M402 = Two Pressure Sensors
2	USB Connection	Connects the calibrator to a computer using a USB Mini Type B to USB Standard Type A cable.
3	Measure Volts/mA Source Volts/mA Terminals	Terminals for measuring or sourcing both Volts and mA DC. 50VDC and 100mA max.
4	Battery/SD Card Access	4x1.5V AA batteries and SD card for data logging

NOTES:
Batteries must be installed for Volts/mA measurement and simulation operation.

When the unit is attached to a high power USB port, everything except for the Volts/mA sensor runs from USB power.

Volts/mA measurement or simulation should not be used with USB attached unless the USB power source is isolated.

Keys and Functions

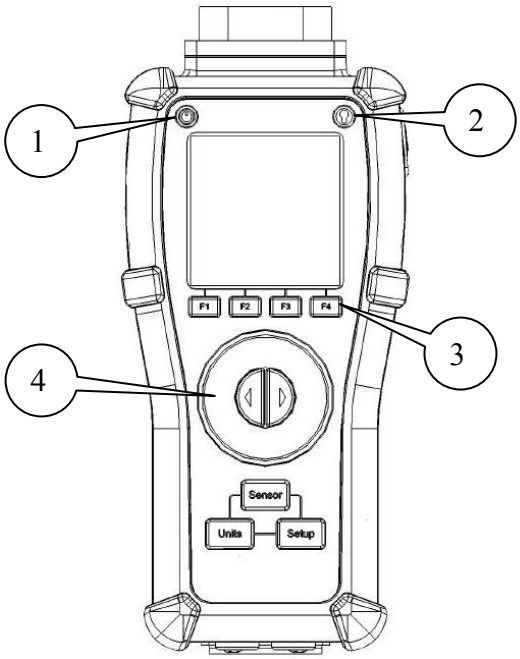


Figure 2: Keypad Functions

Number	Key	Description
1		Turns the power On and Off.
2		Turns green backlight On and Off.
3		Function Keys F1 – F4 Change depending on Operation Mode
4		Adaptive interface wheel scrolls up and down through menu options or increments or decrements a value.

Keys and Functions

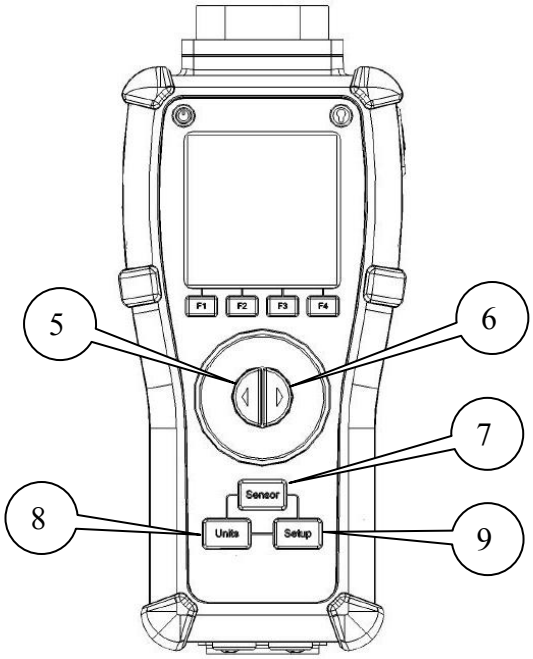
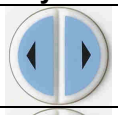
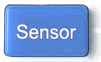


Figure 3: Keypad Functions

Number	Key	Description
5		Left Arrow – Navigates back out of menu or moves cursor
6		Right Arrow – Navigates further into menu structure, moves cursor, or selects value
7		Sensor – Highlights sensor of interest for configuring or viewing settings
8		Units – Changes engineering units of a pressure sensor that is highlighted. Units for the Volts/mA module are set automatically according to the measure/simulate mode.
9		Setup – Enters the setup menu for the unit or individual sensor that is selected or highlighted

Measure Mode

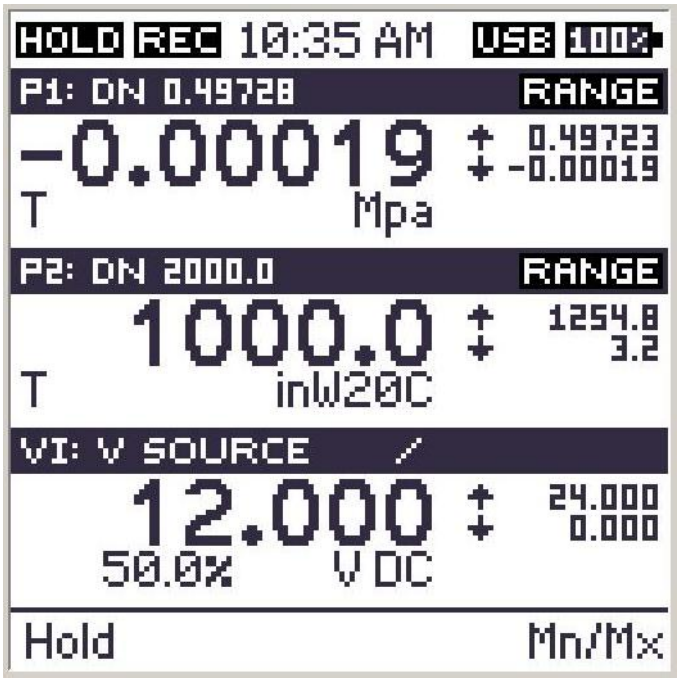


Figure 4: Measure Mode Display with All Indicators Shown

Icon or Reference	Function
HOLD	Values are held on display for reference.
REC	Data logging function is ON and calibrator is recording information.
USB	USB cable is connected to the calibrator.
100%	Battery life as a percentage value.
10:35 AM	Current time display.
P1: Type XXX	Pressure Sensor #1, Type, and Full Scale Range in units selected. See specifications for further details.
P2: Type XXX	Pressure Sensor #2, Type, and Full Scale Range in units selected. See specifications for further details. M400 units will have N/A displayed on the screen.
VI: Mode	Voltage/mA Sensor and current operation mode selected.
▲▼	Indicators for Maximum and Minimum measured or limit values.
T	Tare indicator.
50.0%	Simulation value as a percent of full scale
/	Indicator for auto simulation mode: ramp(shown), step or paused.
RANGE	Unit is operating with a soft or hard over range limit. See over and under range table.
Hold	Function Key to toggle the hold function of the displayed values.
Mn/Mx	Function Key to reset the displayed maximum and minimum values.

Main Unit Setup

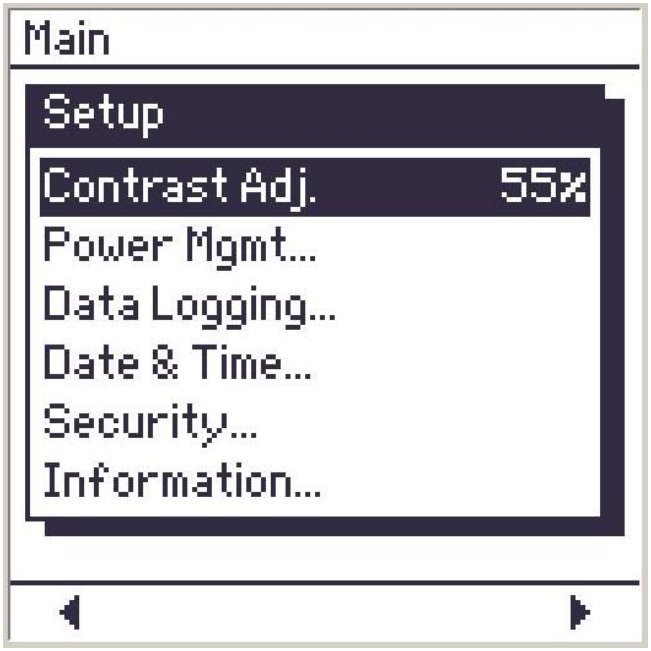


Figure 5: Main Unit Setup Display

Reference	Function
Contrast Adjust	Adjust contrast of display. Active setting shown on right.
Power Mgmt…	Adjust Auto Off Timer, Backlight Timer, or Backlight Intensity to improve battery life.
Data Logging…	Start, Stop, and setup parameters for a data log session.
Date & Time…	Adjust date and time.
Security…	Adjust security settings such as password, feature lockouts, etc…
Information…	Displays Product ID, Serial Number and Firmware Version.

Power Management Setup

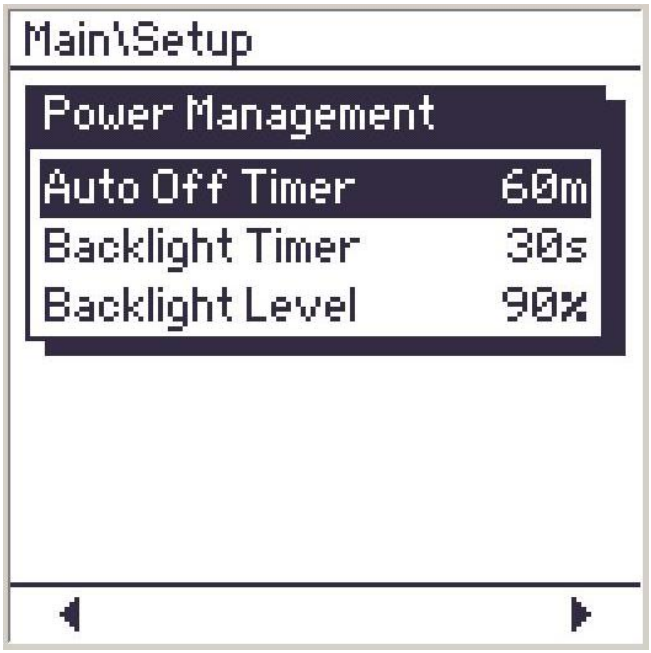


Figure 6: Power Management Setup Display

Reference	Function
Auto Off Timer	Automatic power off timer selection. Active setting shown on right.
Backlight Timer	Automatic backlight shut off timer selection. Active setting shown on right.
Backlight Level	Backlight brightness control. Active setting shown on right.

NOTE:
To maximize battery life, if the backlight is frequently used, reduce the backlight level. Also consider using the backlight timer to avoid the backlight being left on for long periods of time.

Data Logging Setup

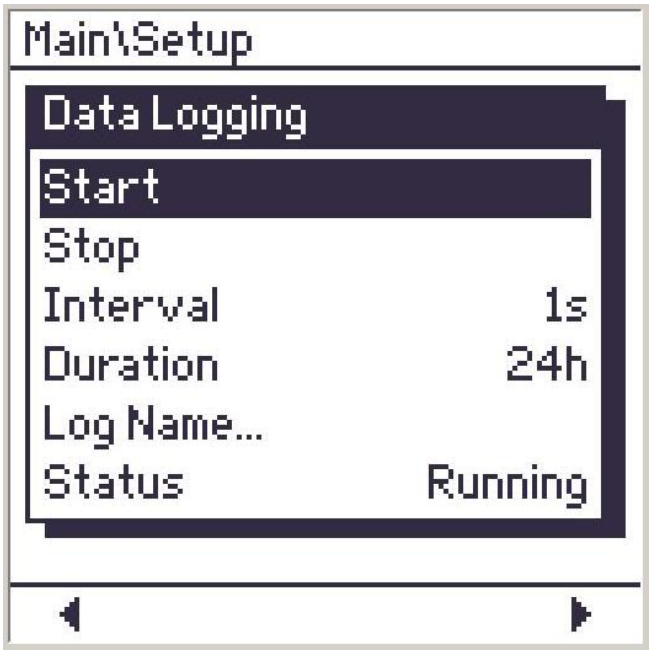


Figure 7: Data Logging Setup Display

Reference	Function
Start	Start the data log using the current settings.
Stop	Stop or cancel the running data log.
Interval	Adjust the data log interval time between 1 and 60 seconds. Active setting shown on right.
Duration	Adjust the data log duration time between 1 minute and 24 hours. Active setting shown on right.
Log Name…	Adjust the name of the data log. Press right arrow to bring up menu to enter name for data log session.
Status	Status of the data log session. Active status displayed on right. Press right arrow to bring up detailed information (shown in Fig. 8).

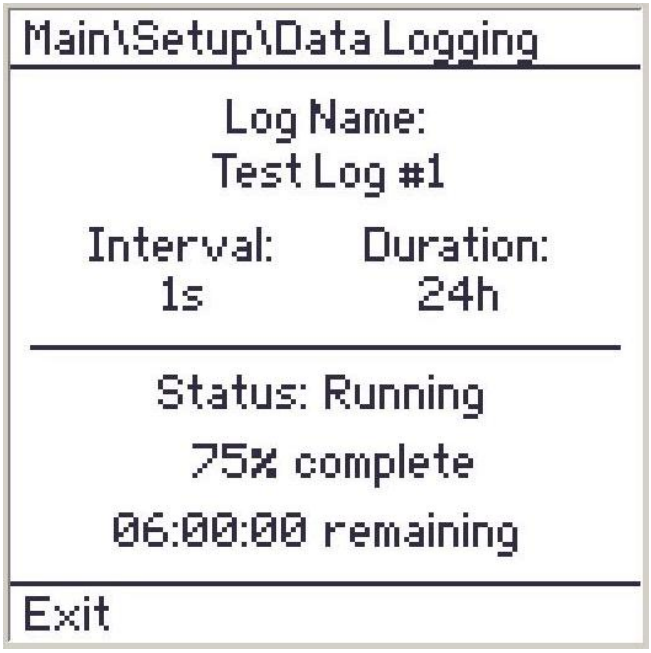


Figure 8: Data Logging Status Display

The data log status display shows the configured Log Name, Interval and Duration at the top.

At the bottom of the display, real-time data including Status, completion percentage and remaining time are shown.

Date & Time Setup

Figure 9: Date & Time Setup Display

Use the arrow keys to highlight the appropriate field. Set the correct value using the Adaptive Interface Wheel.

To save the new date & time press the Save key. All the fields will temporarily display dashes while the new values are stored. To cancel without saving, press the Exit key.

NOTE: The seconds field (ss) is not adjustable. The time can only be adjusted to the nearest minute. When the Save key is pressed the seconds are set to zero.

Security Setup

The Security feature allows you to protect sensitive functions of the device. At this time only the Field Recalibration functions can be protected. The lock indicator shown in Fig 10 above indicates whether Field Recalibration is locked or unlocked (as shown).

To change the security on Field Recalibration press the right arrow key when “Field Recalibration” highlighted. The lock indicator to the right will toggle between lock and unlock. If you have not entered the security password since the current power cycle you will first be prompted to enter it. Use the Adaptive Interface Wheel and arrow keys to enter the characters in the password prompt screen. Once you have entered the correct password you can modify the security function until the next time the unit is powered up.

NOTE:
The default password for factory new units is “PASSWORD”. It is strongly suggested that the password be changed when the unit is first received.

Figure 10: Security Setup Display

Reference	Function
Field recalibration	Set the lockout of the Field Recalibration function. Current lock setting shown on right.
Change Password…	Modify the existing password. Press right arrow to bring up password change screen (shown in Fig. 11).

The Change Password function allows you to set a new password. The screen shown in Fig. 11 shown below displays this function. Enter the current password on the first line. Use the Adaptive Interface Wheel and arrow keys to enter the characters. Using the Next key tab down to the New Password line to redefine the password and then down to the Confirm Password line to reenter the new setting. Press Enter to confirm the new password.

The password is 10 characters in length and is made up of any combination of upper case alpha and numeric characters.

Figure 11: Password Change Display

Pressure Sensor Setup

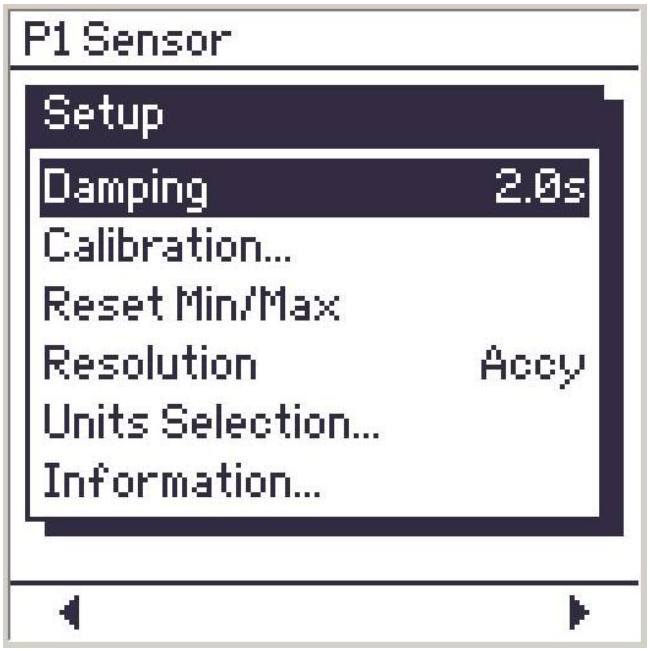


Figure 12: Pressure Sensor Setup Display

Reference	Function
Damping	Enable or disable damping and adjust value. Active setting shown to the right.
Calibration…	Zero, Field Calibrate, or Restore Factory Defaults
Reset Min/Max	Resets Min/Max values
Resolution	Choose Accuracy or Precision resolution on display for selected sensor. Active setting shown to the right.
Units Selection…	Engineering units selection list. Used to select which units are available when the Units key is pressed
Information…	Displays Sensor Type, Accuracy, Calibration Date, Serial #, and Range

NOTE: Pressure Sensor Setup applies to both P1 and P2 sensors.

Damping Setup

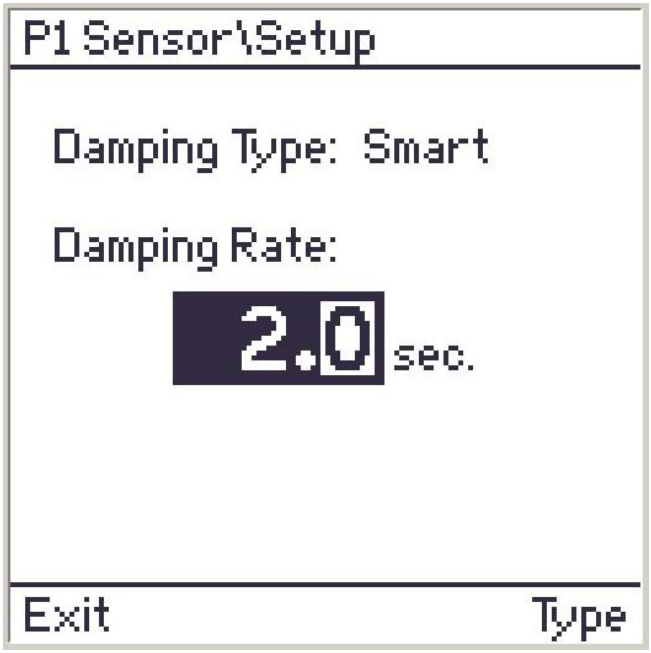


Figure 13: Damping Setup Display

Use the Type key to change the Damping Type. The options are a follows:

1) None. The measured value is not filtered or damped.
2) Exp(exponential), which uses a traditional damping algorithm with response delays associated with the Damping Rate.
3) Smart, which employs a smart damping algorithm to produce and instant response to a step change. After the step change it uses the Damping Rate to damp the measurement exactly as in exponential damping.

Use the arrow keys and the Adaptive Interface Wheel to set the Damping Rate in seconds. The value can be adjusted between 0 and 32 seconds.

Press the Exit key to return to the main Pressure Sensor Setup menu.

Calibration Setup

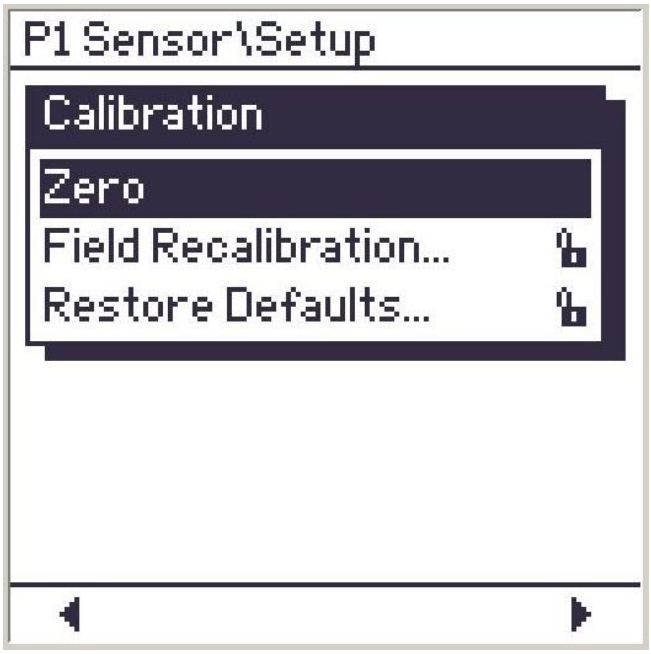


Figure 14: Pressure Sensor Calibration Setup Display

Reference	Function
Zero	Perform a zero adjustment of the pressure sensor at the applied input.
Field recalibration…	Enter field recalibration procedure. Functionality is described on the following page. Lock setting for operation displayed on right. See NOTE below.
Restore Defaults…	Perform a restore defaults function. Lock setting for operation displayed on right. See NOTE below.

NOTE:
If the Field Recalibration or Restore Defaults functions are locked you must first unlock them to enter the function. See the Security section for more details.

Field Recalibration

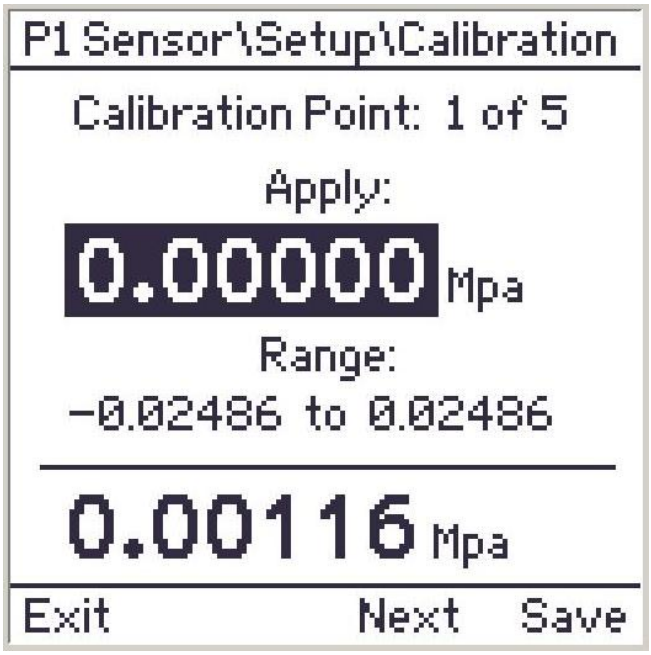


Figure 15: Field Recalibration Display

The Field Recalibration Display contains the following:

1. The current calibration point and number of points displayed at the top.
2. Under “Apply:” in the black highlighted area, the nominal calibration point in the current pressure units for the sensor is displayed.
3. Under “Range:” the tolerance band around the nominal value.
4. The live pressure measurement in the current pressure units is displayed at the bottom.

To run the field recalibration procedure:

1. Apply the pressure indicated in the “Apply:” field. The value must lie within the tolerance band indicated by “Range:”
2. Press the Save key when you are at the correct input to calibrate. The live display value will show dashes when the calibration point is being saved.
3. Press the Next key to advance to the next calibration point. Repeat steps 1&2 above.
4. Repeat steps 1-3 until you reach the last point.
5. At the last point the Next key is replaced with a Done key. When you have finished calibrating the last point press the Done key.
6. A Calibration complete screen appears with Exit and Save keys. Press Exit to discard the field recalibration. Press Save to store the field recalibration results.

Units Selection Setup

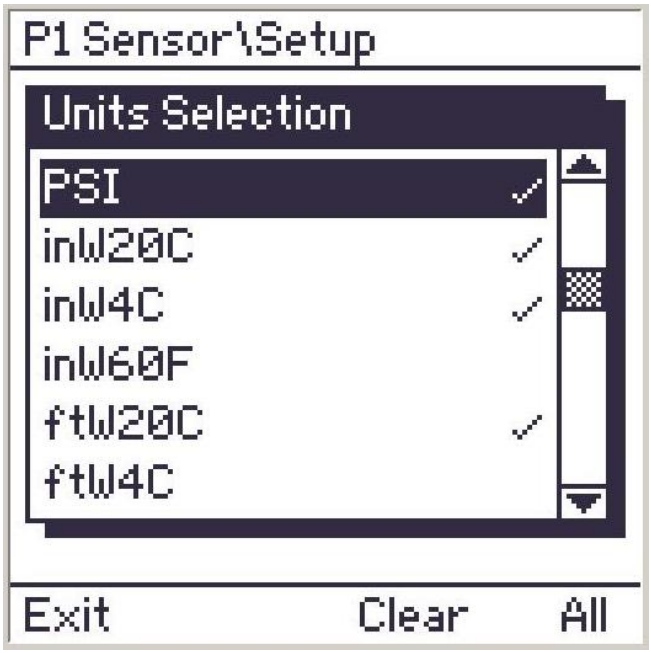


Figure 16: Pressure Units Selection Display

This selection list shows which pressure units are displayed when the Units key on the M4 is pressed. The units with the check mark to the right will be displayed. Those without the check mark will be skipped.

To enable or disable a pressure unit, use the Adaptive Interface Wheel to scroll to the desired unit. Press either arrow key to check or uncheck the unit. The arrow keys will toggle the unit between checked and unchecked.

To enable all 32 units press the All function key. To uncheck all the units press the Clear key.

Press Exit to return to the main Pressure Sensor Setup menu.

NOTE: At least one pressure unit must be selected before exiting.

Volts/mA Sensor Setup

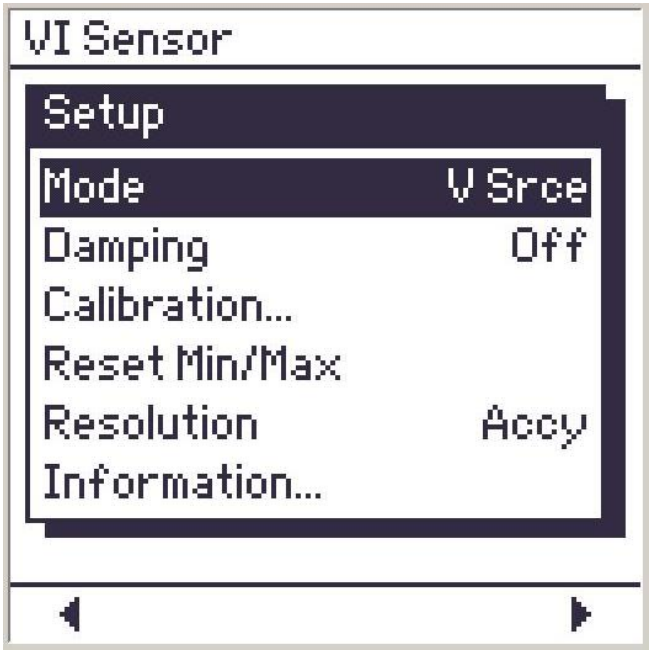


Figure 17: Volts/mA Sensor Setup Display

Reference	Function
Mode	Choose Volts Measure, mA Measure, 24V Source, Volts Source, mA Source, or mA Sink
Damping	Enable or disable damping and adjust value. Active setting shown to the right.
Calibration…	Perform a Zero, Field Calibration, or Restore Factory Defaults
Reset Min/Max	Resets Min/Max value
Resolution	Choose Accuracy or Precision resolution on display for selected sensor. Active setting shown to the right.
Information…	Displays Sensor Type, Accuracy, Calibration Date, Serial # and Range

NOTE:
Description of Mode setup is described in the following pages. Damping and Calibration are described in the preceding pages covering Pressure Sensor setup.

Volts/mA Mode Setup

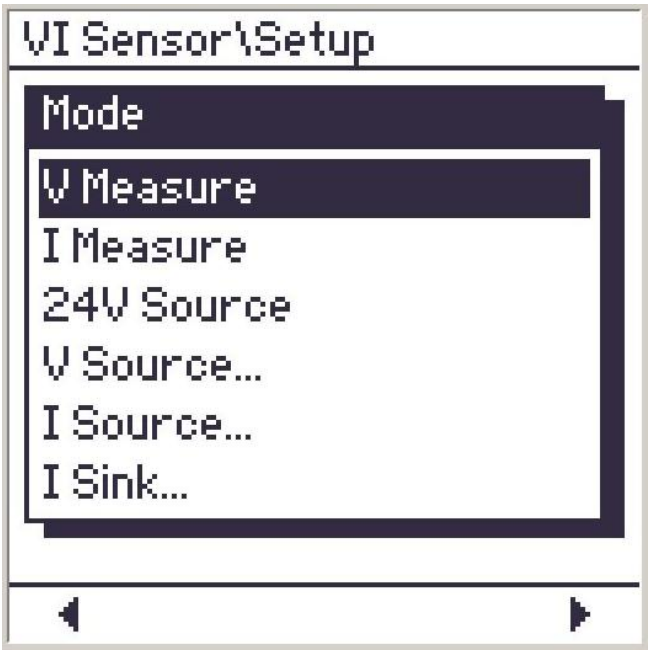


Figure 18: Volts/mA Mode Select Display

Reference	Function
V Measure	Selects the voltage measure mode.
I Measure	Selects the current measure mode.
24V Source	Selects the 24V loop source mode.
V Source…	Selects the voltage source mode. Brings up menu (described on following page) to select manual or automatic voltage simulation.
I Source…	Selects the current source mode. Brings up menu (described on following page) to select manual or automatic current simulation.
I Sink…	Selects the current sink mode. Brings up menu (described on following page) to select manual or automatic current sink. This is also known as transmitter simulation mode.

Volts/mA Source and Sink Setup

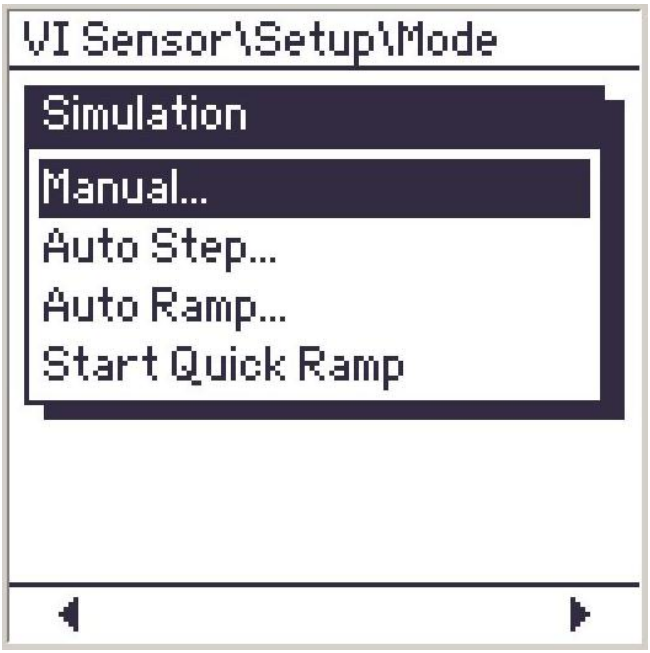


Figure 19: Volts/mA Source and Sink Setup Display

Reference	Function
Manual…	Selects manual simulation. Brings up a menu to set the initial simulation value and start simulating.
Auto Step…	Selects auto step simulation. Brings up a menu to configure the auto step procedure.
Auto Ramp…	Selects auto ramp simulation. Brings up a menu to configure the auto ramp procedure.
Start Quick Ramp	Starts a quick ramp simulation. The module will continuously ramp between zero and full scale in 15 seconds.

Volts/mA Auto Step Setup

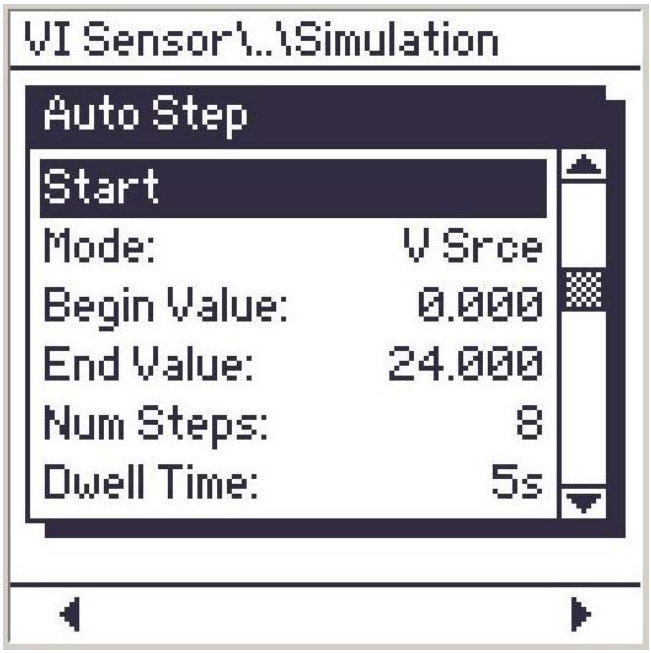


Figure 20: Volts/mA Auto Step Setup Display

Reference	Function
Start	Select to start the Auto Step simulation.
Mode:	Volts/mA mode for the simulation. For reference only, cannot be modified here.
Begin Value:	Starting simulation value. Brings up edit display to change the value.
End Value:	Ending simulation value. Brings up edit display to change the value.
Num Steps:	Number of steps in the procedure. Brings up edit display to adjust the value between 1 and 10.
Dwell Time:	Time to pause at each step before advancing to the next step. Brings up edit menu to select the value between Manual, 5 or 10 seconds.
Startup Delay: (not shown in Fig 20)	Delay after pressing Start key before simulation begins. Brings up edit menu to select the value between None, 30 or 60 seconds.

Volts/mA Auto Ramp Setup

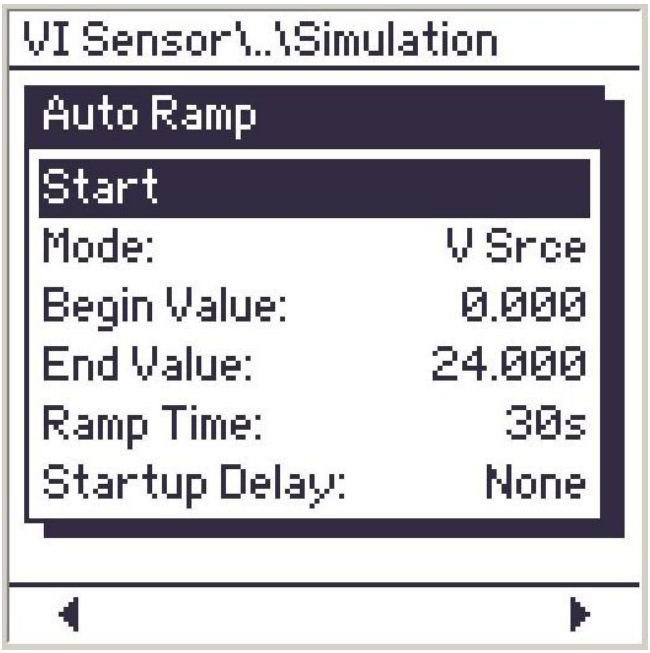


Figure 21: Volts/mA Auto Ramp Setup Display

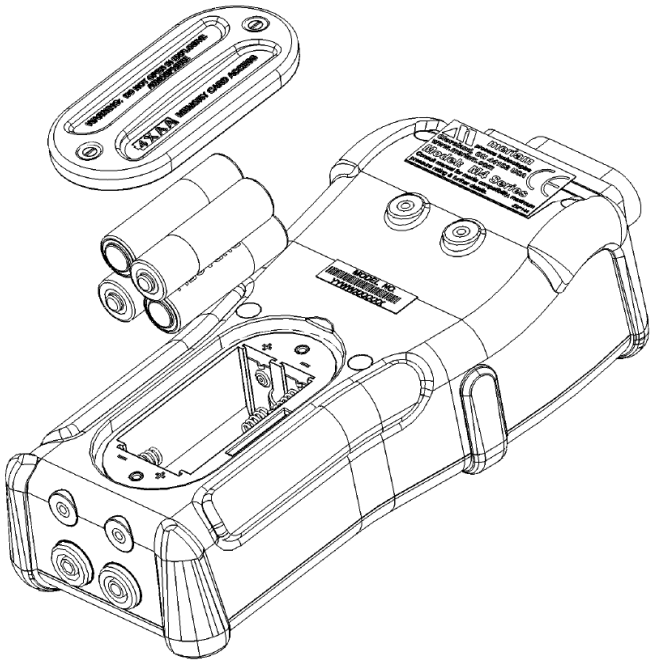
Reference	Function
Start	Select to start the Auto Ramp simulation.
Mode:	Volts/mA mode for the simulation. For reference only, cannot be modified here.
Begin Value:	Starting simulation value. Brings up edit display to change the value.
End Value:	Ending simulation value. Brings up edit display to change the value.
Ramp Time:	Time to ramp between the Begin and End values. Brings up edit display to adjust the value between 1 and 300 seconds.
Startup Delay:	Delay after pressing Start key before simulation begins. Brings up edit menu to select the value between None, 30 or 60 seconds.

Changing Batteries

Loosen the two screws in the battery cover and lift off cover. Remove the batteries by gently applying pressure to the positive side and pull upward. To install batteries (Four (4) AA 1.5 volt alkaline batteries) insert the negative side against the spring and gently apply pressure to lock in the positive side. The positive (+) and negative (-) battery polarity markings are located in the bottom of the case for the lower batteries and on the top of case for the upper batteries, as shown in the illustration. Once the batteries are secured in the battery compartment, replace battery cover and tighten the two flat head screws. The battery door is universal and can be installed in either direction.

Figure 22: Changing Batteries

Warning – To avoid erratic readings replace batteries when warning message appears.



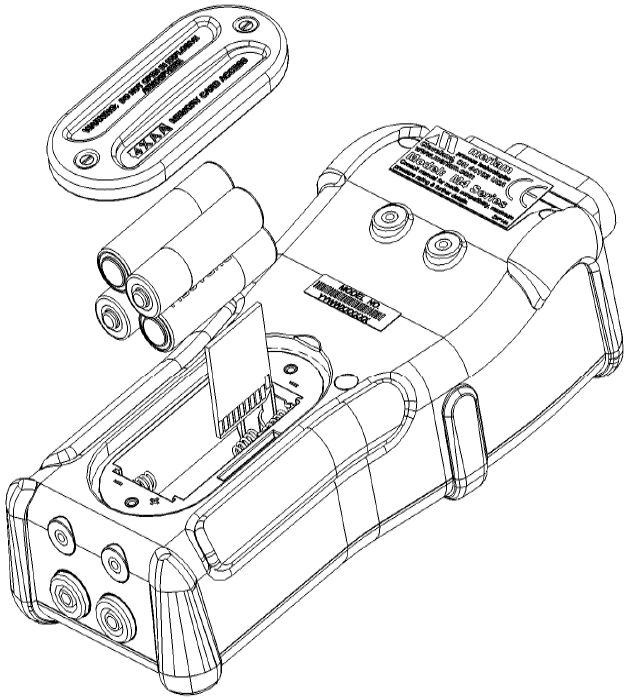
⚠ CAUTION

Accessing SD Card

To install the SD™ card simply insert the card in the slot and press down until you hear a click. The card has only one orientation for correct alignment. Please make sure you are inserting a SANDISK P/N SDSDB-2048-A11 or equivalent. Further details on the card are provided under the specification section.

NOTE:
There is a Lock located on the side of the SD™ card. When the Lock is pressed down information can only be read from the card. To write or save information to the card make sure it is Unlocked before installing.

Figure 23: Accessing SD Card

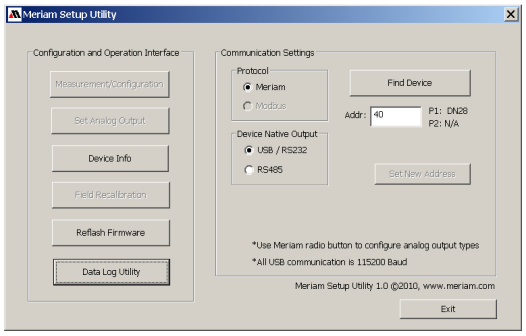


⚠ CAUTION

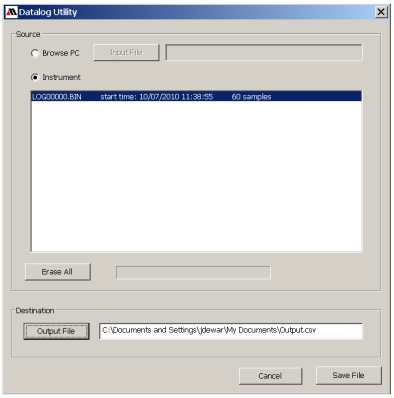
Downloading Data Using USB Interface

The M4 has the capability to download the information stored on the SD card to a computer via the USB cable provided with the unit or via an SD card reader. The Meriam Setup Utility which allows you to download the data is provided on the CD or available at www.meriam.com. Please install the USB drivers before installing the program. The USB Interface is for the exchange of data only. **See precaution in Product Overview section regarding measurements taken with USB connected.**

The data file is downloaded as a .bin file and converted over to a .csv file for direct use in Microsoft Excel™. Select Device Native Output (USB) and press the Find Device button to find the M4.



Once the device is found press the Data Log Utility button and follow screen instructions.

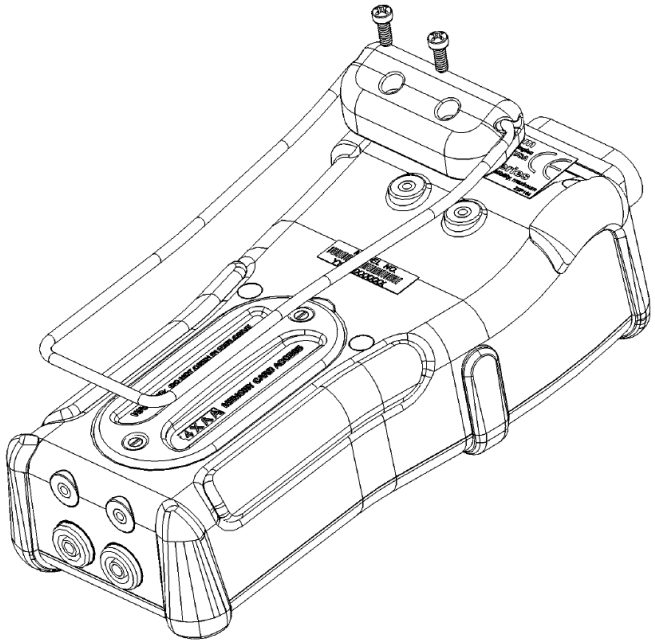


Installing Wire Stand

All ***M4*** units come standard with an installed rear hand strap and a separate wire stand. To install the wire stand first pull down on the loose end of the Velcro strap to separate it, then carefully pull the strap through the lower bracket. Next remove the two Phillips screws that secure the top metal bracket.

Locate the plastic bag that contains the wire stand, rubber mounting bracket, and two Phillips screws. Align the plastic mounting holes with the two brass inserts. Please make sure the straight edge is facing upward toward the pressure manifold as shown in the illustration. Secure the plastic mounting block to the enclosure by tightening the screws.

Figure 24: Installing Wire Stand



Specifications – Range

TYPE & RANGE	+/- 0.025% of Full Scale unless otherwise noted below. Accuracy statements include the combined affects of linearity, repeatability, hysteresis and temperature over the specified operating temperature range. Warm up time = 5 minutes. Unit should be zeroed at working ambient temperature before use
DN0010	0 TO 10 in H_2O Differential, Non-isolated. (±0.05%)
DN0028	0 TO 28 in H_2O Differential, Non-isolated.
DN0200	0 TO 200 in H_2O Differential, Non-isolated
DN0415	0 TO 415 in H_2O Differential, Non-isolated
DN2000	0 TO 2000 in H_2O Differential, Non-isolated
DI0001	0 TO 1 PSI Differential, Isolated
DI0005	0 TO 5 PSI Differential, Isolated
DI0015	0 TO 15 PSI Differential, Isolated
DI0030	0 TO 30 PSI Differential, Isolated
DI0100	0 TO 100 PSI Differential, Isolated
DI0300	0 TO 300 PSI Differential, Isolated
DI0500	0 TO 500 PSI Differential, Isolated
GI0015	0 TO 15 PSI Gauge, Isolated
GI0030	0 TO 30 PSI Gauge, Isolated
GI0050	0 TO 50 PSI Gauge, Isolated
GI0100	0 TO 100 PSI Gauge, Isolated
GI0300	0 TO 300 PSI Gauge, Isolated
GI0500	0 TO 500 PSI Gauge, Isolated
GI1000	0 TO 1000 PSI Gauge, Isolated
GI3000	0 TO 3000 PSI Gauge, Isolated
CI0015	-15 TO +15 PSI Compound, Isolated
CI0030	-15 TO +30 PSI Compound, Isolated
CI0050	-15 TO +50 PSI Compound, Isolated
CI0100	-15 TO +100 PSI Compound, Isolated
CI0300	-15 TO +300 PSI Compound, Isolated
CI0500	-15 TO +500 PSI Compound, Isolated
AI0017	0 TO 17 PSIA Absolute, Isolated (0-900 mm Hg)
AI0038	0 TO 38 PSIA Absolute, Isolated (0-2000 mm Hg)
AI0100	0 TO 100 PSIA Absolute, Isolated (0-5200 mm Hg)
AI1000	0 TO 1000 PSIA Absolute, Isolated (0-52000 mm Hg)

Specifications - Over and Under Range

Sensor Type	Hard Under Range	Soft Under Range	Certified Range (F.S.)	Soft Over Range	Hard Over Range
DN	Under -20% [1]	-20 to 0%	0 to 100%	100 to 120%	Over 120%
DI	Under -20% [2]	-20 to 0%	0 to 100%	100 to 120%	Over 120%
GI	Under -20% [3]	-20 [3] to 0%	0 to 100%	100 to 120%	Over 120%
CI	NA [4]	NA [4]	0 to 100%	100 to 120%	Over 120%
AI	NA [5]	NA [5]	0 to 100%	100 to 120%	Over 120%

Notes:

[1] DN units will measure to -20% (or -10 PSID, whichever is greater pressure relative to absolute zero) and +120% of full scale pressure. Calibration certification is for 0 – F.S. (Full Scale Only).

[2] DI units will measure to -20% (or -150 PSI, whichever is greater pressure relative to absolute zero) and +120% of full scale pressure. Calibration certification is for 0 – F.S. (Full Scale Only).

[3] GI units will measure to -20% (or -10 PSIG, whichever is greater pressure relative to absolute zero) and +120% of full scale pressure. Calibration certification is for 0 – F.S. (Full Scale Only).

[4] CI units will measure to negative barometric pressure (typically -14.7 PSIG) and to +120% of full scale pressure. Calibration certification is for -14.5 PSIG to F.S. (Full Scale Only).

[5] AI units will measure to +120% of full scale pressure. Calibration certification is for 0 PSIA to F.S. (Full Scale Only).

Soft Under & Over Range:
Indicates pressure is outside of the accuracy specification of the sensor. RANGE indicator will appear.

Hard Under & Over Range:
Indicates pressure is significantly outside of the measurement range of the sensor. RANGE indicator will appear. Display will read "-----". Red backlight will illuminate.

Certified Range:
Sensor is operating within the range of its accuracy specification.

NOTE:
The over/under range threshold is set in the sensor. The value, as shown above, is typically set to +/-20% of Full Scale.

Specifications

Pressure:
Accuracy: ±0.025% of Full Scale
Temperature Performance: Accuracy includes all affects of temperature from -20º to +50º C (-4º to +122º F)
Engineering Units: 32 user selectable pressure units

Pressure Limits:
DN sensors: 2x range when pressurized on P1 (HI) side only, 150 PSI when applied simultaneously to P1 (HI) and P2 (LO) sides.
DI sensors: 3x range when pressurized on P1 (HI) side only, 3x range or 150 PSI (whichever is less) on P2 (LO) side only 1000 PSI when applied simultaneously to P1 (HI) and P2 (LO) sides.
GI, CI, & AI sensors: 2x range

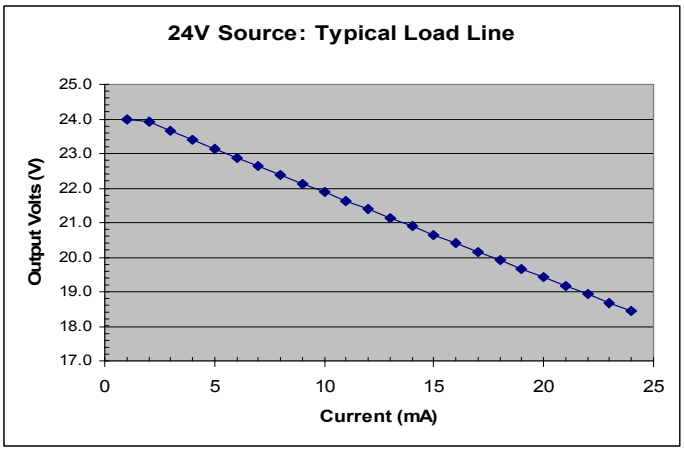
Media Compatibility:
DN sensors: Non-isolated for clean, dry, non-corrosive gases only (Brass, 316L SS, Silicon gel)
DI sensors: Isolated for fluids compatible with 316L SS and Viton
GI, CI, AI sensors: Isolated for fluids compatible with 316L SS

Connections:
Pressure: ⅛" NPT (female)
Electrical: Standard banana jacks on ¾" centers

Loop Power:
Accuracy: 24VDC (see load line below)

Voltage & Current Measurement:
DC Voltage Range: -50 to +50V auto-ranging
DC Current Range: -100 to +100 mA
Accuracy: (±0.015% of Reading ±0.002 units)
Accuracy of DC mA when 24V loop powered: (±0.02% of Reading ±0.002 units)
Resolution: 0.001 V, 0.001 mA, 0.0001 V, 0.0001 mA
Temperature Performance: Included in accuracy specification

Voltage & Current Source:
DC Voltage Range: 0 – 24 V
DC Current Range: 0 – 24 mA
Accuracy: (±0.015% of Reading ±0.002 units)
Resolution: 0.001 V, 0.001 mA
Temperature Performance: Included in accuracy specification



Power: Four (4) AA 1.5 volt alkaline batteries provide 30+ hours of continuous measurement service or 10 hours of service in 24V Source mode when powering a transmitter at 20 mA output. Meriam recommends the unit be powered up for a minimum of 5 minutes to operate at the full accuracy specification of the instrument.

Display: 128 x 128 pixel (2” x 2” viewable) monochrome display with backlight

Enclosure: 8.5” L x 3.75” W (max.) x 2.25” D (max.), polycarbonate case, Softflex® over-molded bumpers, IP40
M4 single sensor: 1.5 – 1.8 lbs, M4 dual sensor: 1.8 lbs

Specifications

Environmental Conditions:
Calibrated: -4 to 122°F (-20 to 50°C)
Storage: -40 to 140°F (-40 to 60°C)
Humidity: 5 – 95%, non-condensing
Altitude: Operating 2000 Meters, Storage 1000 Meters

Safety:
EMC: EN 61326-1, Class A
IEC 61010-1, CAT-1 Voltage Protection
Environmental: RoHS, WEEE, Pollution Degree 2
Shock: 1 Meter Drop Test per IEC 61010-1

This instrument is intended for a temporary connection to industrial low-voltage current loops and not intended for a permanent connection.

"This product complies with the essential requirements of the European Directives for Low Voltage, EMC, RoHS, & WEE and carries the CE marking accordingly".

Cleaning: Clean product with mild soap and damp rag. To avoid damaging the plastic lens and case do not use solvents or abrasive cleansers.

Product Features: sensor zero and tare, field recalibration with password protection, sensor damping (exponential & smart), running minimum/maximum, units select, flexible data logging, adjustable power off timer, adjustable backlight off timer, adjustable display contrast and backlight brightness, battery monitor, clock/calendar, field reprogrammable, keypad with adaptive interface wheel for alpha-numeric selection and menu navigation

Engineering Units: (32 selectable) PSI, inW20C, inW4C, inW60F, ftW20C, ftW4C, ftW60F, mmW20C, mmW4C, mmW60F, cmW20C, cmW4C, cmW60F, mW20C, mW4C, mW60F, inHg0C, mHg0C, cmHg0C, mmHg0C, torr, kg/cm2, kg/m2, Pa, hPa, kPa, MPa, Bar, mBar, ATM, oz/in2, lb/ft2

Zeroing and Field Recalibration

To maintain the accuracy of the M4 it is recommended that both the pressure and Volts/mA sensor be zeroed prior to use. Zero is located on the main measure screen once the sensor is selected or under the Sensor setup screen. Differential and Gauge sensors shall be vented to atmosphere before executing a zero. Absolute pressure sensors must be pulled down to a complete vacuum of 200 microns or less for optimum results.

To zero the Volts/mA sensor the shorting plug included with the unit must be installed across the banana jacks. Follow the instructions on the screen to perform the zero.

Periodic recalibration of M4 may be needed to maintain optimum performance. The calibration menu is located under each sensor in the setup menu. Simply follow the screen and apply the values requested.

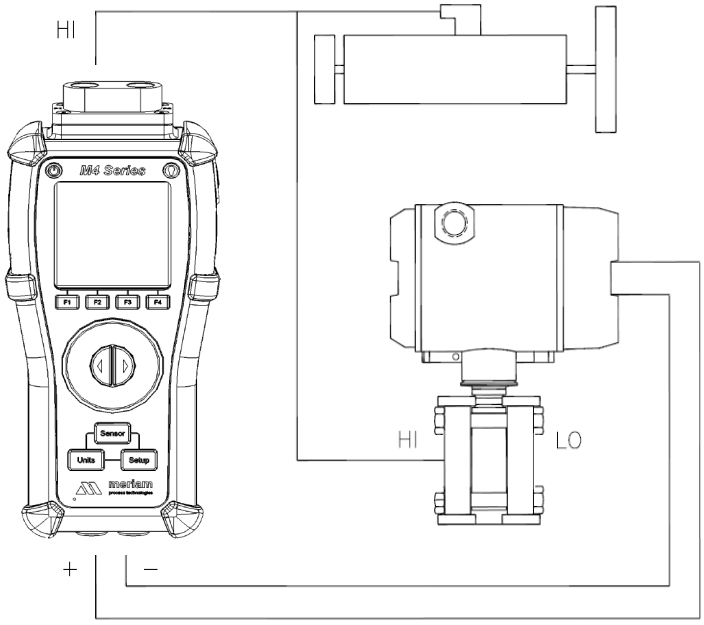
Field recalibration should only be executed by qualified personnel using suitable primary standards. These standards should meet the accuracy requirements of your company or industry. Meriam recommends using primary standards at least 4 times more accurate than the unit under test.

For pressure transmitters up to 200 PSI, Meriam recommends a deadweight tester of at least ±0.0015% of reading for field recalibration. For transmitter ranges of 200 PSI and above, a deadweight tester of at least ±0.0030% of reading. When calibrating using a dead weight tester referenced to inches of water, be sure the M4's inches of water reference temperature matches that of the dead weight tester.

If an error is made during field recalibration the restore factory defaults option is located under the sensor in the setup menu.

Applications

The M4 is designed to power up a transmitter to calibrate the pressure channel and channel and mA output. The unit under test should be isolated from the process and taken out of the loop before starting the calibration. Please make sure you have the proper sensor and range before starting the calibration. The Full Scale range of the sensor is displayed next to the sensor location in the current engineering units.

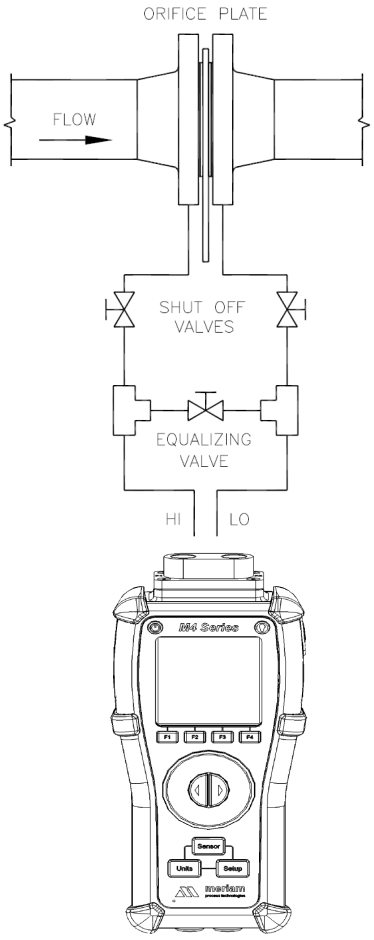


To calibrate the transmitter under test, insert test leads into the bottom of the M4. Observe loop polarity using the color coded standard banana jacks (Red +) and (Black -). If the loop requires power, the M4 will source 24V and measure the mA in the loop. The 24V source mode is located under the VMA setup menu. Field devices with compliance voltage about 19V may not be able to be calibrated. See the load line curve under specifications.

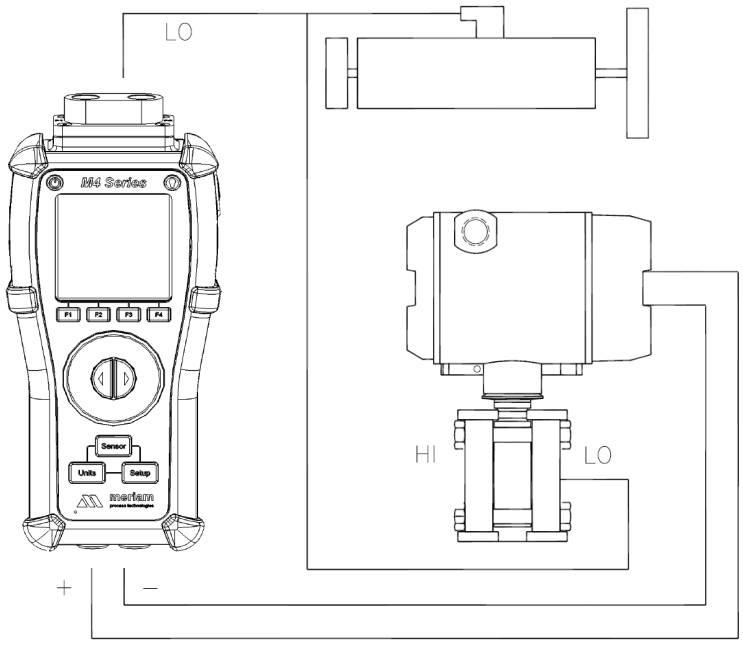
Applications (continued)

If you are using a DN or DI (Differential Pressure Sensor) the high pressure port (P1) is teed into the pressure source and transmitter high side (H) and low pressure port is vented to atmosphere. If you are using a GI or CI (Gauge Sensor) there is only one pressure connection.

In addition to reading gauge pressure the M4 can also be used to measure pressure drop across a pressurized system. Examples include orifice plates, pitot tubes, filters, or valves. A push to read, three valve, or five valve manifold is recommended to avoid damage to the sensor.



Applications (continued)



Vacuum calibration can be performed by venting the high pressure connection (P1) and applying vacuum to the lower pressure connection (P2). Atmospheric pressure is the reference for all vacuum measure elements.

Absolute pressure calibrations use an AI sensor which has an internal absolute zero reference. You will notice when powering up an M4 with an AI sensor, it will read the local barometric pressure. Simply connect the vacuum (or pressure) source to the single port of the manifold. To zero an absolute sensor a full vacuum of 200 micron or less must be applied.

Contact Meriam

In the event an M4 requires service or must be returned for repair, please contact Meriam at the numbers listed below.

DO NOT send any unit in for repair without first contacting Meriam for a Return Material Authorization (RMA) number. If this number has not been obtained and clearly marked on the return packaging, the unit will be returned at the shipper's expense. An RMA number will be provided by the Meriam Repair Department when you call, fax or e-mail your information. Certification for Non-Hazardous Materials will also be required. The RMA number must accompany all incoming packages to insure proper tracking, processing and repair work.

To assist us in processing your repair request, please have the Model & Serial Number of the unit available when you call. This information is located on the M4 label.

Information in this document is subject to change without notice. Check the Meriam web site (www.meriam.com) for the latest manual revision.

For customer assistance please call your local Meriam representative or Meriam directly.

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