



meriam
process technologies

a Scott Fetzer company

Calibration &
Configuration



Pressure
& Level



Flow



Service &
Custom Applications



your
**Complete
Solution**

Precision Measurement Since 1911



Who We Are

MERIAM

For nearly a century, we have been dedicated to providing products and services of exceptional value and reliability to the process industry. Our success depends on continuing that tradition, growing and enhancing our services, and exceeding the requirements of a changing industry. We measure our success by the value we provide to our customers, our company and our fellow employees.

PROCESS

The decisions we make everyday define our company and ourselves. Outstanding decisions can only come from complete information available to everyone. To achieve outstanding results as a team, it must be recognized that each employee has unique, valuable skills and experience, and must be provided with proper training, tools, and resources to successfully contribute to the effort. Open, honest, communication is crucial between all employees. All aspects of our work must be guided by integrity and respect for our customers, our company, our co-workers, our community, and ourselves.

TECHNOLOGIES

We will deliver innovative, reliable, cost effective hardware and software solutions. Success depends on aligning our goals with the needs and expectations of the process industry: superior products, timely response to issues, and anticipation of the requirements of our customers, as their businesses evolve.

meriam
process technologies

Our Name Says It all

Introduction

Meriam Process Technologies, founded in 1911, is the authority in reliable, accurate industrial instruments for the precise measurement of pressure, flow and level.

In addition to our products, Meriam offers in-field technical support, plant-based customer service, published primers, selector guides, how-to manuals and application notes. Meriam's applications engineering capabilities, combined with personal attention to customers needs is what makes Meriam unique in our field. Meriam also has a full service ISO/IEC 17025 accredited Calibration Flow Lab with fast turnaround to further serve our customers.

Today, in addition to our mechanical indicators and primary elements, Meriam offers microprocessor controlled pressure calibrators, HART communicators, Device Management database software, process indicators with digital and analog outputs, and complete flow systems.

Meriam continuously develops new products to meet the changing needs of the process industries. Our latest developments include the DMS 4200 Device Management System database software and the MFC 4100 HART Communicator. These products join the MFT 4000, the most versatile multifunctional calibrator / HART communicator on the market, to provide the only fully integrated configuration / calibration device management system on the market.

MERIAM PRODUCT GROUPS

HART COMMUNICATORS & CALIBRATORS

MFT 4010 Calibrator, MFC 4100 HART Communicator

MERIAM'S DEVICE MANAGEMENT SYSTEM

Complete Calibration and Configuration Management software

CALIBRATORS

MFT 4000, Meri-Cal, Portable Digital Smart Gauge, Smart Manometers, M-CAL Series Single Function & Multi-function Calibrators, Aviation Test Equipment

PRESSURE & LEVEL MEASUREMENT

Glass Manometers, Manometer Accessories, Bellows Gauge, 2110P Smart Pressure Gauge, 1500 Series Smart Transmitter, Merigauge, Minigauge

FLOW MEASUREMENT & SYSTEMS

Accutubes, 2110F Smart Flow Gauge, Orifice Plates & Flanges, Laminar Flow Elements, LFS-1, LFS-3, 1900 Series Flow Computer, Smart Multivariable Transmitter

SERVICES

Calibration Instrument Repair, Applications Engineering, Custom Solutions

HART® Communicators & Calibrators

MFT 4010 Multi-Function Tester Calibrator / Communicator

MFT 4010 is a combination calibrator / HART communicator that reduces the time spent on field calibrations. The MFT 4010 delivers the versatility of a modular calibrator and the convenience of HART communications in one hand-held unit. Users can view up to four measurements simultaneously on the high resolution LCD or compare HART Primary Variable and Analog Output values to corresponding measurements by the NIST traceable MFT modules. A voltage and current meter is integral to the base unit. All HART field devices can be configured, polled, and trimmed using HART communications.

Documenting versions for complete calibration procedure prompting in the field and full documentation of As Found and As Left results are available for standard and 21CFR part II needs.



Modules Available for the MFT 4000 Series

Pressure Sensor Modules

- Differential ranges from 10" H₂O to 2000" H₂O FS
- Gauge ranges from 20 PSIG to 3000 PSIG FS
- Vacuum ranges from full vacuum to 100 PSIG
- Absolute ranges from 900 mm Hg to 100 PSIA FS

T/C Measure and Simulate Module

- 12 T/C types; B, C, D, E, J, K, M, N, P, R, S, T
- °C, °F, mV units

RTD Measure and Simulate Module

- Pulsed and continuous temperature transmitters
- 2, 3, or 4-wire RTD's (measure); 2-Wire (simulate)
- 22 RTD types / alpha combinations

Volt and mA Measure and Simulate Module

- 24 vdc loop power supply
- Measure or simulate V or mA using auto step procedures



MFC 4100 Series HART® Communicator

The MFC is a full function HART Communicator supporting Universal, Common Practice and Device Specific commands for commissioning, configuration and maintenance operations. The MFC 4100 is designed for optimum convenience and usability. Standard Send / Save commands are always available. Complete configuration management is optimized when the MFC is used with Meriam's Device Management System software.

The MFC's operating system and HART device drivers are field updateable via the internet.



Device Management Software

Device Management System (DMS) Software

This fully featured calibration and HART configuration management software is designed to support both field devices and calibration equipment. Initial database population can be accomplished through .csv template import, HART configuration upload from MFT, MFC or HART modem, or through template guided data entry. Calibration output may be automatically or manually registered with DMS. Authorized users can schedule next calibration date, develop and assign calibration procedures and assign work through downloadable action lists to compatible documenting process calibrators. HART configuration changes or configuration copies can be downloaded through action lists to Meriam's MFC 4100 or MFT 4010. Calibration and configuration results can be uploaded from these handhelds to DMS for permanent addition to the field device's history file.

Calibration Management Features

- Create calibration procedures and associate with HART and conventional field transmitters (devices)
- Calibration cycle based scheduling / notices
- Calibration equipment & standards tracking
- Action Lists for task assignments
- Preventative maintenance trending
- Device History (Audit Trail)
- 21 CFR Part 11 Electronic Signature and change control
- 3rd Party Software Integration
- Documenting Process Calibrator Interface (FCINTF)

Configuration Management Features

- HART and conventional configuration storage
- Manage configuration changes & assign work
- Comparison of stored configurations for differences
- Interfaces with Meriam MFC 4100 & MFT 4010
- Optional HART modem interface

DMS Software Platform

- Stand alone (non-networked) or networked client/server installations with scalable simultaneous Client Licenses
- MS SQL Desktop Engine (MSDE) and MS SQL compatible
- Import/Export Utilities
- Backup/Restore Utilities

Support and Services

Customer location and factory training, as well as on site system setup and installation, are available.



Calibrators

MFT 4000 Calibrator



The MFT 4000 is a modular, multi-function tester designed with NIST traceable accuracy for one-tool convenience in the field. A voltage and current meter is integral to the base unit. Three module bays accept a wide variety of pressure measurement modules plus temperature and electrical measure and simulate modules

available from Meriam (see list under MFT 4010 section on previous page). Users can view up to four measurements simultaneously on the high resolution LDC or configure the display for only one or two lines of information. Measurement averaging and display hold are selectable for ease of reading. Simulations are programmed and initiated from a convenient Setup menu. Documenting versions provide calibration procedure prompting on the display and memory storage of As Found and As Left calibration results.

CE mark is standard. Intrinsically safe versions are available.

Meri-Cal Digital Manometer / Calibrator

The Meri-Cal is a portable digital manometer / calibrator for pressure and differential pressure measurement. It features high accuracy and rugged design that brings laboratory test and calibration capability to the field. Meri-Cal's display simultaneously indicates pressure, or differential pressure, and electronic transducer / transmitter output in any of eight selectable engineering units. Meri-Cal is available with CSA certification for intrinsic safety.

Available Ranges:

- LP200I 0-200" H₂O
- DP200I 0-200" H₂O
- LP2000I 0-2000" H₂O
- DP2000I 0-2000" H₂O



35EF Portable Digital Manometer

This unit features pressure, vacuum, or differential measurement for use with clean dry, gases. The unit is powered by a 9-volt battery.

Available Units:

Inches of water, PSIG, PSIA, mbar, bar, mm Hg A, & inches Hg A

Accuracy:

±0.25% of reading

± 5 digits @ 22°C (includes the combined effects of linearity, repeatability and hysteresis)



350 Series Smart Manometer

The 350 Series Smart Manometers are micro-processor-based pressure sensing devices that can measure gauge, differential, absolute or vacuum pressure with an accuracy of ±0.025% of FS. The display can read out in any of eleven engineering units and can also be scaled to special user units for pressure. A MIN/MAX key captures the extremes of pulsating pressure signals and a HOLD key freezes the display at any point of interest.



Available Ranges;

- 0-20", 0-200", 0-2000" H₂O Differential
- 0-20 PSI, 0-200 PSI, 0-2000 PSI Gauge
- 0-2000 mm Hg Absolute

355 Precision Absolute Manometer

The model 355 Precision Absolute Manometer places calibration bench accuracy in a portable, handheld unit. This combination of accuracy and fluid compatibility makes the 355 ideal for test or process applications.

The model 355 has a programmable altitude function that allows the user to enter the site altitude above sea level in feet or meters. This allows the user to chose between displaying local barometric pressure or pressure corrected to sea level. The altitude function used with the Min/Max and Tare makes the model 355 useful as a surveyor's tool by accurately measuring changes in altitude.

Available Ranges:

- 0-900 mm Hg Abs
- 0-2000 mm Hg Abs



M-CAL Calibrators

Meriam's line of single function mA, Tc and Rtd calibrators provides accuracy to 0.03% to simulate and measure thermocouples, RTDs, current, voltage and resistance. For all this capability in one multifunction unit, check out the high accuracy MULTI-Cal calibrator.

M-CAL mA

Accurate, Hand-held, Single Function Calibrator for Milliamp Simulation and Measurement

- mA and % of scale unit selection
- High accuracy ($\pm 0.05\%$ of reading)
- Range:
 - 0.00 to 22.00 mA (0.01 mA resolution)
 - 4.00 to 20.00 mA (0.01 mA resolution)
- Measurement and simulation on passive or active external loops
- Average, scale factor, square root, and technical unit conversion algorithms
- Single-line LCD display
- Menu-driven procedures
- Internal 24 VDC loop power supply
- Memory for 3 output values with manual recall and programmable step function



M-CAL Rtd

Accurate, Hand-held, Single Function Calibrator for RTD Simulation and Measurement

- Measure and simulate 14 RTD types: Pt 100, Pt 200, Pt 1000, Cu 10, Cu 100, Ni 100, Ni 120
- Measure and simulate Ohms (to 4000 Ohms)
- High accuracy ($\pm 0.04\%$ of reading)
- Single-line LCD display
- Single value, multi-step or continuous ramp/soak simulation
- Selectable temperature scales (IPTS68 and ITS90)
- Compatible with pulsed and continuous excitation transmitters
- 2- or 3- wire RTD measurement; 2-wire simulation



M-CAL Tc

Accurate, Hand-held, Single Function Calibrator for Thermocouple Simulation and Measurement.

- High accuracy ($\pm 0.04\%$ of reading)
- 0.1° F/C resolution
- Source or Measure 12 Thermocouples: J, K, T, R, S, B, C, L, U, N, E and F
- Fast internal or external cold junction compensation
- Selectable temperature scale (IPTS68 and ITS90)
- Single-line LCD display
- Digital, menu-driven procedures
- Single value, multi-step or continuous ramp/soak simulation



MULTI-Cal

Accurate, Hand-held Multifunction Calibrator

An accurate, versatile, and portable calibration tool to test, measure, and calibrate field instruments. One compact, hand-held instrument design meets the needs and requirements of instrumentation engineers and field technicians.

- High accuracy ($\pm 0.03\%$ of reading typical)
- Dual-line LCD display for output and input indication
- Menu-driven procedures
- Ideal tool for measuring and simulating:
 - mV (0 to 1000 mV)
 - V (0 - 10 V Simulate, 0 - 30 V Measure)
 - mA (0 to 22 mA, active and passive loop)
 - Ohms (0 to 400 Ω ohms)
- Compatible with Thermocouple types: J, K, T, R, S, B, C, L, U, N, and E
- Resistance thermometers (Pt 100, Ni 100)



Pressure & Level Measurement Instrumentation

Aviation Test Equipment

Model 353 Precision Altimeter Tester

The Model 353 Precision Altimeter Tester performs altitude, rate of climb (R of C), and leak testing at the stroke of a key. Accuracy is ± 7 feet at sea level, ± 38 feet at 36000 feet and ± 70 feet at 60000 feet. Altitude can be displayed in feet or meters and R of C in feet or meters per minute (FPM or MPM). Other display options include user selectable pressure units in inches of mercury, mm of mercury or millibars absolute. A leak test feature is included in the 353 to allow leak testing of aircraft static systems. Toggling the LEAK key initiates a program sequence and user prompt that follows industry guidelines.

Model 354 Precision Airspeed Tester

The Model 354 provides accurate airspeed indication and pitot system leak testing at the stroke of a key. Airspeed can be displayed in knots, miles per hour (mph), or kilometers per hour (km/h). Other display options include user selectable pressure units in inches of water, inches of mercury, PSI or millibars. A leak test feature is included in the 354 to allow leak testing of aircraft pitot systems. Toggling the LEAK key initiates a program sequence and user prompts that follow established guidelines. A ZERO key is standard for convenient re-zeroing of the unit.



Model 370PSK Pitot / Static Test Kit

The model 370PSK Pitot / Static Test Kit is a microprocessor based digital test kit that successfully combines the functionality of the 353 Precision Altimeter Tester and the 354 Precision Airspeed Tester with the necessary hand pumps, plenum chambers and control valves to provide a portable kit. The rugged carrying case houses all components needed to perform pitot / static tests on aircraft altimeters, rate of climb indicators and airspeed indicators. Program options are available at the stroke of a key to automatically time and display static system and pitot system leak rates per established guidelines.

Manometers

Manometers have many advantages in this age of technology because of their inherent accuracy and simplicity. Manometers are unique in being both pressure measurement instruments and standards for calibrating other instruments. The manometer is commonly used in production applications to measure pressures ranging from as high as 100 inches of mercury to the lowest vacuums achievable.

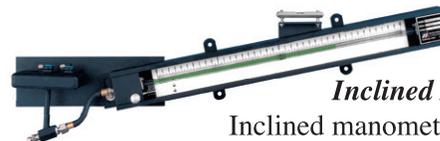


U-Tube Manometer

The U-tube manometer is a primary standard and the most widely used style of manometer. The U-tube manometer is a versatile, economical instrument for the measurement of pressures, vacuums or differential pressures. Meriam's U-tube manometers are constructed of a ridged cast aluminum frame, aluminum indicating scale and hand bent glass U-tube. Mounting holes are provided in the frame for mounting to a wall, pipe or other suitable structure.

Well Type Manometer

Well type manometers are a direct reading pressure indicator designed for process monitoring, general purpose production testing or laboratory measurement. Well manometers are constructed of aluminum channel, stainless steel end blocks and stainless steel manometer well. The 7/16" diameter glass tubing is yoke packed with viton gaskets at each end block and is supported at spaced intervals to prevent distortion. In most cases, the uncertainty of a manometer reading is $\pm 1/2$ of the smallest scale graduation. This is due to the human eye's inability to interpolate between graduations.



Inclined Manometer

Inclined manometers provide greater readability by stretching a vertical differential along an inclined indicating column, giving more graduations per unit of vertical height. Scales are typically graduated to the hundredth of an inch. The Model 40HEX Inclined Manometer is individually calibrated and the angle of inclination is set relative to the instrument level mounted above the channel. Additional inclined manometers are available depending on your requirements.

Manometer Accessories

Pressure / Vacuum Variator can produce -10 PSIG to 30 PSIG (-.69 to 2.0 Bar) or 12 to 20" Hg (300 to 500mm Hg) vacuum. Max. Pressure is 20 PSIG (1.3 Bar) when used with other pressure sources.

Hand Pumps are available in 2 models, Pressure or Vacuum. The pressure pump generates a positive pressure up to 145 PSIG, while the vacuum pump generates a vacuum of 650mm Hg. Both units feature a needle bleed valve and a multi-turn vernier, which provides precise adjustment.

Line Traps are an inexpensive means to keep manometers and indicating fluids clean and are recommended for all installations.

Sight Feed Bubblers provide a visual indication of flow by showing air or gas bubbles discharging from a dip tube immersed in a liquid in a transparent bowl. The bubble rate is controlled by a stainless steel needle valve in the head casting.

Float Check Valves prevent manometer fluid from leaving the manometer in the event of over pressure. This is a valuable and dependable accessory small enough to be installed on each tube of a multiple tube manometer.

Return Wells are stainless steel and are used on manometers with operating pressures up to 500 PSIG. The indicating fluid is trapped during manometer over pressure. Fluid will drain back into the manometer when normal pressure is returned.

Seal Pots are used to provide a constant liquid head on each side of a flow meter used in steam or other condensable vapor applications. They can also be used to isolate the instrument from the process with a sealing liquid.



Bellows D/P Units

The Bellows D/P line of instruments serves as a compliment to manometers by offering a choice when pressure rating, size, process compatibility and other specifications are a factor. The Bellows D/P assemblies are used by many instrument manufacturers as the basic differential pressure sensing devices for indicators, recorders, transmitters or controllers.

Series 1120 D/P Indicators

The series 1120 gauges are designed to measure differential pressures, for pressure, flow or liquid level applications. They are widely used in industrial process plants, power plants, pollution control facilities, liquid cryogenic tank farms, and many other applications. Models 1123, 1124 and 1126 have 3", 4-1/2" and 6" dials respectively.

Series 1220 Indicating Switches

The Series 1220 Differential Pressure Indicating Switches are used for on-off control or alarm. They also indicate flow, liquid level or other process variables. These units are furnished with one or two SPDT type switches with actuation set points adjustable over most of the range of the instrument. The Series 1220 Switches are commonly used in power plants, compressor stations, cryogenic applications, and many others.

Series 1226X Explosion-Proof Switches

Meriam's 1226X Explosion-Proof housing is CSA and UL listed, meeting NEC requirements for Class I, Division I, Group C or Group D hazardous environments.



2110P Smart Pressure Gauge

The 2110P Smart Gauge is a microprocessor based, programmable, pressure sensing device. The various ranges available allow for measurement of pressure, differential pressure, vacuum and absolute pressure. The AC powered and 4 - 20 mA units can be configured through the keypad, or the RS-232C serial communications port.

SPDT relays on AC powered units and the 4 - 20 mA output on the transmitter models make the 2110P an ideal choice for many control and recording functions. Typical applications include use as test bench gauges, tank level measurement, gas flow measurement and leak testing.



Model 1500 Smart Digital Transmitter

The 1500 Smart Digital Transmitter is for high accuracy applications for OEM's, manufactured skids, process control systems and plant instrumentation. RS-485 communications allows for easy configuration using a PC or laptop computer. The RS-485 addressable interface allows up to 32 devices to be networked together. Optional 1-5 Volt or 4 - 20 mA outputs are also configured from a PC or laptop.



Merigauge 3900/3910 Digital Pressure Gauge

Pressure ranges are available to 6,000 PSIG at standard accuracy of $\pm 0.25\%$ of FS and optional accuracy of $\pm 0.10\%$ of FS. A combination gauge that can be used for positive pressure measurements and vacuum measurements is also available. The standard gauge is powered by two 9-volt alkaline or lithium batteries. Externally powered units are available. The pressure display is a 4 1/2" digit LCD with 0.6" high numerals. Each gauge includes 12 field selectable engineering units. In addition to numeric pressure indication, visual indication of the pressure is represented by an adjustable vertical bar graph on the left side of the display. Other standard features include MIN/MAX query, ZERO, selectable DAMP, selectable program Lock-out, adjustable display shutoff and field recalibration and adjustable display shutoff (for battery powered models). The housing is 304 stainless steel and NEMA 4 rated. Wetted components are 316 stainless steel for compatibility with many process fluids.



Minigauge 3800 Digital Pressure Gauge

The Minigauge provides digital pressure measurement. Pressure ranges are available from vacuum to 10,000 PSIG at an accuracy of $\pm 1\%$ of FS. One 9-volt alkaline or lithium battery powers the transducer and the LCD display. Field calibration is easy to accomplish by adjusting zero and span potentiometers located under the back cover plate.

- Accuracy: $\pm 1\%$ of FS at calibrated temperature
- Temperature effect: $\pm 0.1\%$ per °F.
- Certifications: NIST Certificate optional. CE standard and Intrinsically Safe optional
- Engineering Units: Available in either PSIG, Bar or kg/cm².



Flow Measurement & Systems

Accutube® Flow Sensors

The Accutube averaging pitot tube is a head type device, that generates a differential pressure signal in response to flow rate. Accutubes generate considerable cost savings with their simple installation, wear-free, and energy-efficient design. They are a viable alternative to traditional flow measurement devices.

The Accutube is an annular averaging pitot device, that is simply inserted into a pipe or duct through a weld coupling and packing. Based on pipe or duct size, the Accutube is constructed so that strategically located sensing ports continually sample the impact and static pressures produced by the Accutube's obstruction of the flow stream profile. Within the probe, the impact pressures sensed by the upstream ports are continually averaged in a dedicated plenum chamber. Similarly, the static pressures sensed by the downstream ports are averaged in a second dedicated plenum. A readout device is then used to indicate the differential between the two-plenum chambers.

For further assistance on Accutube sizing and selection, please contact Meriam.

Mounting Options

Compression fitting, flange or wet tap retractable mounting is available. Meriam's Accutube averaging pitot tube is a round tube design allowing for greater flexibility in length, size, delivery time and cost. Inline styles for pipe sizes 1/2" through 3", threaded insertion styles for 1" through 72" pipes, and flange insertion sizes for 2" through 72" are available. Larger pipe sizes of up to 20 feet are available for special applications. In addition to varied sizes, Meriam offers a wide range of metals for flange mounted units, including exotics such as Monel®, Hastelloy®, and Inconel®. Meriam offers a complete line of readout devices to complement the Accutube flow sensor line including Digital Flow Computers, indicating gauges and switches, manometers and multivariable transmitters to fit any flow application.



Model 2110F for Flow Indication of DP Primary Elements

The model 2110F Smart Gauge is a microprocessor based, programmable, differential pressure sensing device designed to display flow rate when used with a head type flow element such as Accutube® averaging pitot tubes, orifice plates or Meriam's LFEs. The unit calculates flow rate by measuring the DP and using it in algorithms with flow coefficients entered into the unit by the user. All units can be configured through the front keypad. The AC powered and 4 - 20 mA units can also be configured through the RS-232C serial communications port. SPDT relays on AC powered units and the 4 - 20 mA output on the transmitter models make the 2110F an ideal choice for many control and recording functions.

Typical applications include use as a flow test bench gauge, air compressor usage monitor, leak tester and LFE flow indicator.

Sensor types include Differential, Non-Isolated, Gauge Isolated and Absolute Isolated.



Orifice Plates - Model 951

Meriam provides orifice plates designed and manufactured to AGA, ISA, ASME and ISO-5167 standards. Tolerances and specifications are tightly controlled for greatest precision and reliability. Materials available include 304SS, 316SS, Monel®, Hastelloy® and Inconel®. Plates can be designed for all ANSI flange ratings and standard pressure tap locations. Calculations as well as flow versus differential pressure and temperature and pressure correction curves are available.



Orifice Flanges - Model 952

Raised face orifice flange unions are designed to provide a convenient, accurate method for installing orifice plates. They incorporate accurately positioned pressure taps for connecting the flow measuring instruments. This eliminates the requirement of locating pressure taps in the field. These built-in taps reduce field installation labor necessary for welding, drilling and/or tapping pressure taps on the flow line itself. Meriam orifice flanges are provided complete with nuts, bolts, gaskets, and plugs for installation with no other parts required.

Laminar Flow Elements (LFE)

LFEs are gas volume rate of flow differential producers operating on capillary flow principles. They are available in a wide range of types and sizes and are ideally suited to many flow measurement and calibration applications. Some typical applications of LFEs include: combustion airflow to internal combustion engines, fan and blower calibration, leak testing, testing of automobile components and critical air flow control. LFEs are used to calibrate other flow metering devices such as variable area meters, thermal flowmeters, orifices, nozzles, and others.

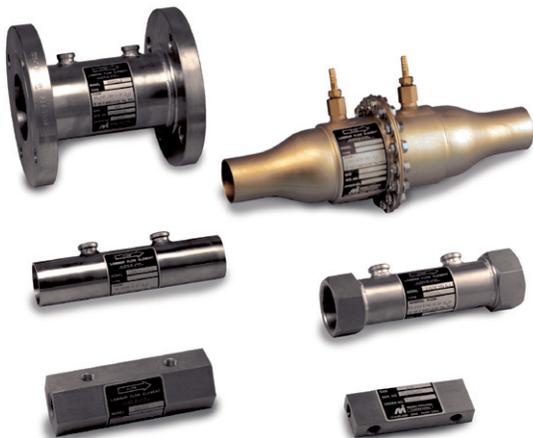
Meriam maintains an ISO/IEC 17025 certified laboratory. Each completed element is calibrated and correlated to Meriam flow standards, which are traceable to the National Institute of Standards and Technology (NIST). The Meriam LFE is supplied with a reproducible flow curve in terms of SCFM versus differential pressure in inches of water. Correction factors are included to cover an inlet pressure range from 26 to 36 inches of mercury absolute and an inlet temperature from 50 °F to 150 °F. For special applications, we request you contact Meriam for complete flow information. The rated accuracy of all Meriam LFEs is of actual reading, not the much wider percent of FS tolerance of other devices.

Accuracy Levels:

Commercial Calibration	+0.72% of Actual Reading*
Master Calibration	+0.64% of Actual Reading**
Independent Lab Calibration	+0.50% of Actual Reading

* ±0.86% Reading for full scale flow of 1000 SCFM or higher

** ±0.70% Reading for full scale flow of 1000 SCFM or higher



Flow Measurement Systems

Meriam's Flow Measurement Systems are used in conjunction with differential pressure producing primary flow elements (such as LFEs, Accutubes, orifice plates and venturis) to quickly and automatically determine volumetric flow rate, mass flow rate and total flow. Meriam offers several options to suit your application requirements. The systems are ordered with all transducers necessary to measure the critical parameters of the application. Flow can be calculated using our state of the art flow computers or in some cases by using the power of your own PC. Any head type (square root) primary element can be modeled as well as LFEs.

LFS-1 Flow Measurement System



The LFS-1 Flow Measurement System for Meriam's LFEs take advantage of the wide flow turndown and the percent of Reading precision of the LFE to provide a superior gas flow measurement solution. The broad range of flows that LFE measurement systems offer make them an excellent choice for measurements of engine intake air flow, electronics cooling, leak detection and quantification, production line quality control, component design and product certification applications. The integral flow computer makes real time corrections for changes in static pressure, temperature and relative humidity to provide the most accurate results possible. Calibration coefficients for up to five (5) LFEs can be stored in memory and called up for use later with a push of a button. All measured or calculated volumes can be output via RS485 to a PC for processing or recording.

The LFS provides standard system accuracy of ± 1.0% of reading over a 10:1 flow turndown and ± 1.1% over 20:1 turndown. The calibration of the LFE and LFS together makes this possible. By using better calibration standards, Meriam can offer LFS accuracy as low as 0.60% of Reading over a 10:1 flow turndown. All LFS packages include complete system calibration and NIST traceable documentation. LFEs and systems cover gas flow ranges from a few cm/mm to over 2250 SCFM.

LFS-3 FLOPAC Flow Measurement System

The Meriam LFS-3 Flow Measurement System is designed to allow Laminar Flow Element users to accurately measure gas flow using state-of-the-art electronic instrumentation and software. Real time data measured by the system instrumentation is transmitted via RS-485 to a personal computer. Meriam SOFTFLOW software enables the PC to automatically calculate flow rate and compensate for changes in line pressure, temperature, and relative humidity. System accuracy is $\pm 1.0\%$ at full scale of the LFE and $\pm 2.0\%$ at 10:1 turndown. The user selects units for flow rate, temperature, and pressure using the system software. Configurations for multiple flow elements can be saved and then recalled for later use. Results of flow tests can be saved to a file for post test processing or archiving purposes. Meriam model 1500 Smart Transmitters with RS-485 output are used to measure the differential and inlet pressure. A dual temperature / humidity sensor provides analog signals for these variables. A/D converters in the LFS-3 enclosure convert this data to an RS-485 format as well. All measured parameters are transmitted to the user's PC on a single RS-485 cable. Since most PCs are equipped to handle RS-232, the LFS-3 system includes an RS-485 to RS-232 converter (and power supply, cables) to allow all PCs to receive the differential pressure, pressure, temperature, and relative humidity measurements. With this data the PC can calculate the corrected flow rate using the SOFTFLOW software. The user can select display options of actual volume, standard volume or mass flow.



Series 1900 Flow Computer

The Series 1900 Flow Computer satisfies the computation requirements for a variety of flowmeter types in liquid, gas, steam and heat flow applications. Multiple flow equations are available in a single instrument with many advanced features.



The Series 1900 Flow Computer is compatible with Meriam LFEs, orifice plates, and venturis.

The versatility of the Series 1900 Flow Computer permits a wide measure of versatility within the instrument package. The various hardware inputs and outputs can be user, assigned to meet a variety of common application needs.

The user assigns the usage of each input/output while configuring the instrument.

The isolated analog output can be assigned to output volume flow, corrected volume flow, mass flow, temperature, pressure, or density by means of a menu selection. Most hardware features are user-assignable.

The standard RS-232 Serial Port can be used for external data logging, transaction printing, or for connection to a modem for remote meter reading.

Smart Multivariable Transmitter Flow Systems for Accutubes, Orifice Plates

Smart Multivariable Transmitters (SMVs) are excellent for users who want to reduce the price of traditional head type flow meter installations. Head or differential pressure type primary elements produce differential pressures (DPs) that are proportional to actual flow volume. This is fine for most liquid flow measurement but the measurement of gas or vapor flow becomes more involved if standard volume flow or mass flow is required. Inlet pressure and temperature need to be measured in addition to the DP. Traditional electronic flow meters for gas or vapor require a DP transmitter, a Pressure transmitter, RTD or thermocouple, and flow computer. Purchase price for all these components is relatively high since four secondary devices must be purchased in addition to the primary element. Installation costs are high as well since the transmitters, temperature device and flow computer need to be mounted, piped to the primary element and wired together. SMVs measure both the DP and the inlet pressure with one device, accept RTD input and calculate correct flowrate in one device.



Meriam's Services

ISO/IEC 17025 Accredited Laboratory

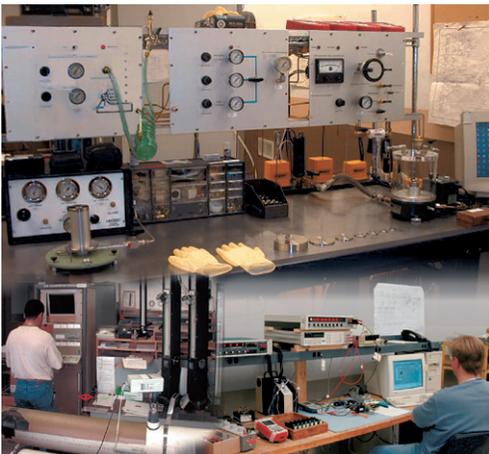
Meriam Process Technologies has expanded to a full service Primary Calibration Laboratory. Our service and calibration department provides the highest quality repair, remanufacturing, and accredited calibration of instruments, at competitive prices with quick, reliable turnaround times.

These services are rooted in the company's 90+ year history as a manufacturer of instruments for the precise measurement of pressure, flow and level. Our products' precision is the result of continued investment in laboratory calibration equipment and expertise. Our expansive on-site laboratory offers a broad selection of standards for use in calibrating pressure, flow, temperature, current, voltage and resistance.

Calibration of our own products, as well as products from other manufacturers, is done with strict adherence to Meriam's quality registrations and our laboratory accreditation includes and ISO/IEC 17025.

Capabilities

- Calibration to many different standards
- Calibration of many different manufacturer's instruments
- All Standards are traceable to NIST
- Computerized calibration systems
- Before & After calibration data sets
- Computer generated calibration results
- Equipment history
- Date recertification labels



Applications Engineering

Since 1911 Meriam has been providing applications engineering services.

The mission of Meriam's Applications Engineering Group is to offer engineered solutions. If a customer calls with an application question in our fields of expertise, we will advise them how to do it. If a customer needs a standard equipment solution within Meriam's product portfolio, we will offer it. However, if they just need advice, a custom product, or a software solution, our Application's Engineering Group's flexible structure will allow us to immediately create results, with the customer's needs driving the process.

For partial listing of typical applications see tables on the following pages.

Custom Solutions

- **Calibration and Configuration Management**
Meriam is the only single source manufacturer of a calibrator, communicator and software solution that uses the same base technology.
- **Complete Flow Solution™**
Engineered and assembled by Meriam, the Accutube™ averaging pitot tube and smart multi-variable transmitter produces a mass flow rate that is fully compensated for static pressure and temperature eliminating the need for DCS calculation.
- **FLOPAC**
Flow measurement system is designed to allow users to accurately measure gas flow rate using state of the art electronic instruments, electronics and software.
- **Roots® Meter Tester**
Designed for measurement of differential pressure across Roots® Meters.

Partial Listing of Typical Applications

Measurement/Application	Industry	Meriam Products
Aeration pond flow balancing	Water treatment	20T Accutube, liquid manometer, 2110P
Air flow balancing	HVAC	20T Accutube, 35EF, 350
Aircraft instrument calibration	Aviation	350 (modified), 353, 354, 370PSK
Aircraft pressurized cabin leakage	Aviation	LFE, 2110P
Automotive air conditioning design	Automotive	LFE, LFS, 2110P
Automotive fittings and parts flow	Automotive	LFE, LFS, 2110P
Barometric Pressure Measurement	Airfields, mfg. R&D, Process	Mercury manometers, 350, 2110P
Blower performance qualification	Blower Mfg.	LFE, LFS, liquid & digital manometers, 2110
Building material permeability	Bldg. Materials & fixtures mfg.	LFE & LFS
Calibration of pressure transmitter (bench)	General Process	Meri-Cal, MFT-4000, MFT Modules, 350, 2110P
Calibration of pressure transmitter (field)	Process Industries	MFT, MFT pressure modules, Meri-Cal
Calibration of respiratory equipment	Medical Services	35EF, 350, Meri-Cal
Calibration of Temperature transmitter (bench) measure and simulate	General Process	MFT-4000, t/c and RTD modules
Calibration of temperature transmitter (field) Measure and Simulate	Process Industries	MFT, t/c and RTD modules
Calibration using portable loop power for field devices	Process Industries	MFT with VMA0055 module
Chiller efficiency	HVAC, Process plants	1120, 1220, liquid manometer
Clean room pressure monitoring	Electronics, pharmaceutical	Inclined manometer, 2110P
Continuous emissions monitoring	Power plants, Steel, Chemical	Accutube, transmitter
Cryogenic gas flow measurement	Gas Separation	LFE, Accutube, Orifice
Cryogenic gas level measurement	Gas separation	1120, 1220 Bellows, 2110 Smart Gauges
Documenting field transmitter calibrations	Process Industries	MFT, DMS database software
Documenting HART transmitter configuration	Process Industries	MFT4010, MFC4100, DMS database software
Documenting Process Calibrations	Process Industries	MFT, Modules, and DMS database software
Engine flow testing	Automotive	LFE & LFS
Evacuating air conditioner for refrigerant fill	HVAC	11AA10, 35EF, 350, 2110P
Filter condition indication	General	Manometer, 1120, 1220, 2110P Gauges
Filter flow design & performance testing	Filter Mfg.	LFE, LFS, 2110P
Flow and leak testing transmission shift assemblies	Automotive	LFE, LFS
Flow meter calibration	Flow meter mfg., Calibration labs	LFE, LFS
Fuel injector dry flow testing	Automotive	LFE, LFS
Gas pipeline pressure	Natural Gas Transmission	3900, 350, MFT 4000
HART communications	Process Industries	MFT4010, MFC4100, DMS database software with HART modem
HART device configuration/troubleshooting	General process, power	MFT-4000, MFC4100

Measurement/Application	Industry	Meriam Products
Heat exchanger blockage detection	HVAC, Process	1120, 1220 Bellows, liquid manometers
Heat treating environment gas flows	Heat treating	LFE, Accutube
High accuracy, low pressure measurement	Calibration Laboratory	34FB2 TM micro manometer
High pressure gas flow measurement	General	Accutube, orifice, 1120, 1220, transmitter
High viscosity flow	Chemical, petrochemical	Radius edge orifice
Intrinsically Safe calibration of pressure transmitters (field)	Process Industries with hazardous environments	MFT, MFT pressure modules, MeriCal
Intrinsically Safe calibration of temperature transmitter (field), Measure and Simulate	Process Industries with hazardous environments	MFT, t/c and RTD modules
Intrinsically Safe HART communications	Process Industries	MFT4010, MFC4100, DMS database software with HART modem
Lake and stream level monitoring	US Geological Survey	Liquid manometers, 1120, 1220, 931 bubblers
Leak testing of discrete components	General	LFE, LFS, liquid manometers, 2110P
Liquid level measurement	Chemical, petrochemical	Manometer, 1120, 1220, 2110L Gauges
Liquid Process Flows	Chemical, petroleum	Accutube, Orifice, 1120, 1220, Transmitters
Manage calibration schedules of calibration reference standards	Process Industries	DMS database software
Manage calibration schedules of field devices	Process Industries	DMS database software
Maximizing burner efficiency by balancing air/gas flow	General process plants	Accutube, 2110P
Measuring flow in an underground pipe	Chemical, power, process Indus.	Accutube, Transmitters, 1120, 1220, 2110P
Measuring flow in large duct using multiple accutubes	HVAC, heat treating	Accutube, 2110P, complete flow solution, Manometers, 350
Pneumatic transmitter calibration	Process, general	MFT 3-bay multifunction calibrator
Positive displacement (Roots®) meter test	Natural Gas Distribution	350, 350R
Pressure drop across valves	Valve Mfg. R&D, general process	350, Meri-Cal, 1120, 1220, 2110P
Pressure measurement of corrosive, extreme conditions process with diaphragm seals	Chemical, petrochemical, tank level	1120, 1220, 2110P
Pressure sourcing for bench calibrations	Process Industries	971 pressure vacuum variator
Pressure sourcing for field calibrations	Process Industries	961P and 961V hand pumps with vernier
Pressure vessel leak detection	General	LFE, LFS, liquid manometer, 2110P
Process pressure testing	General	350, 3900
Process system calibration	General	MFT-4000, pressure, temperature, electric
Propane regulator flow testing	Commercial grills	LFE, LFS
Removing fluid samples from a pipe	Process Industries	Accutube
Seawater flow measurement	Fire systems, desalinization	Monel Accutubes, 1120, 1220, transmitters
Simulating transmitters or transducers in control loops	Process Industries	MFT with VMA0055
Soil remediation flow measurement	Environmental	Accutube, 2110F
Steam Flow Measurement	Process and power plants	Accutube, Orifice, 1120, 1220, Transmitters, 1900 Flow computer
Vacuum measurement chemical drying	Pharmaceutical	350, 2110P
Valve leak and flow rate test	Valve mfg.	LFE & LFS
Window and Door leak testing	Window and Door mfg	LFE, 40HEX35, 30EBX25

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