

M-15"

- Capacity: 200 GPM (760 L/min.)
- Case made of aluminum with meter element components of various materials as required for Classes 1, 2, 3, 4, 14, 15 and 16 construction.
- Choice of 3" NPT and 3" BSPT connections. Also 3" aluminum or steel welded flanges.



M-25"

- Capacity: 300 GPM (1,135 L/min.)
- Case made of aluminum with meter element components of various materials as required for Class 1 & 2 construction for metering refined petroleum products including aviation fuels.
- Supplied in choice of 3" NPT and 3" BSPT companion flanges. Also 3" aluminum or steel welding flanges.

M-30"

- Capacity: 350 GPM (1,325 L/min.)
- Case made of aluminum with meter element components of various materials as required for Classes 1, 2, 3, 4, 14, 15 and 16 construction.
- Choice of companion flanges with 4" standard and 3" optional ...NPT or BSPT threads ... also aluminum or steel welding flanges.
- Case made of cast iron with meter element components of various materials as required for Classes 7, 27, 37 and 47 construction. Meter flanged 3" ANSI FF

M-40"

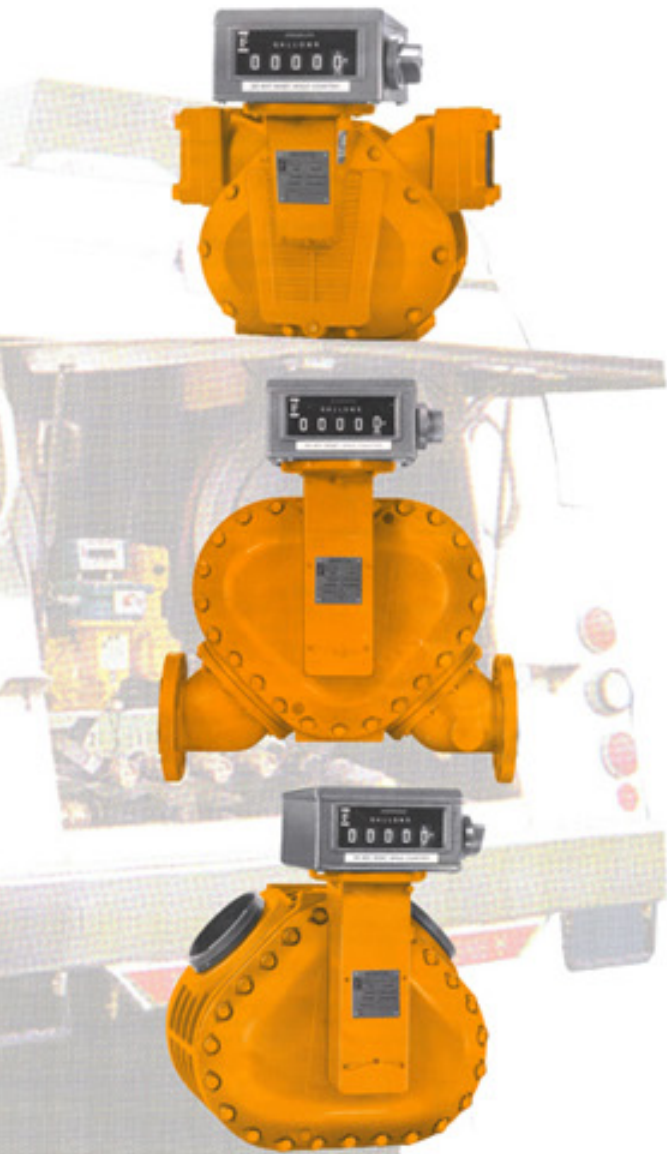
- Capacity: 450 GPM (1,700 L/min.)
- Case made of aluminum with meter element components of various materials as required for Classes 1 and 2 construction for metering refined petroleum products including aviation fuels.
- Choice of companion flanges with 4" NPT or 4" BSPT connection... also 4" aluminum or steel welding flanges.

M-60"

- Capacity: 600 GPM (2,271 L/min.)
- Case made of aluminum with meter element components of various materials as required for Classes 1, 2, 3, 14 and 15 construction.
- 4" square flanged spool and 4" companion flange connection standard ...NPT or BSPT threads. Choice of 4" and 6" ANSI FF flanged connections and 4" and 6" Victaulic spools. Also aluminum or steel welding flanges. 4" or 6" ANSI RF, aluminum, forged flanged connections optional.

M-80"

- Capacity: 800 GPM (3,000 L/min.)
- OVERLOAD OPERATION: Capable of momentary overload operation at 125% of maximum rated capacity in either direction without damage to mechanism (applies to Class 2 meters only, on Jet Fuel only). 125% overload operation (1,000 GPM) requires 6" ANSI or 6" Victaulic connections only.
- Case made of aluminum with meter element components of various materials as required for Class 2 construction for refined petroleum products including aviation fuels.
- Standard with 6" Victaulic (Right Angle Inlet to Outlet orientation). Optional choice of 4" and 6" ANSI FF flanged connections and 4" and 6" Victaulic spools. Also 4" square flanged spools and 4" companion flanges with NPT or BSPT threads or aluminum or steel welding flanges. 4" or 6" ANSI RF, aluminum, forged flanged connections optional.

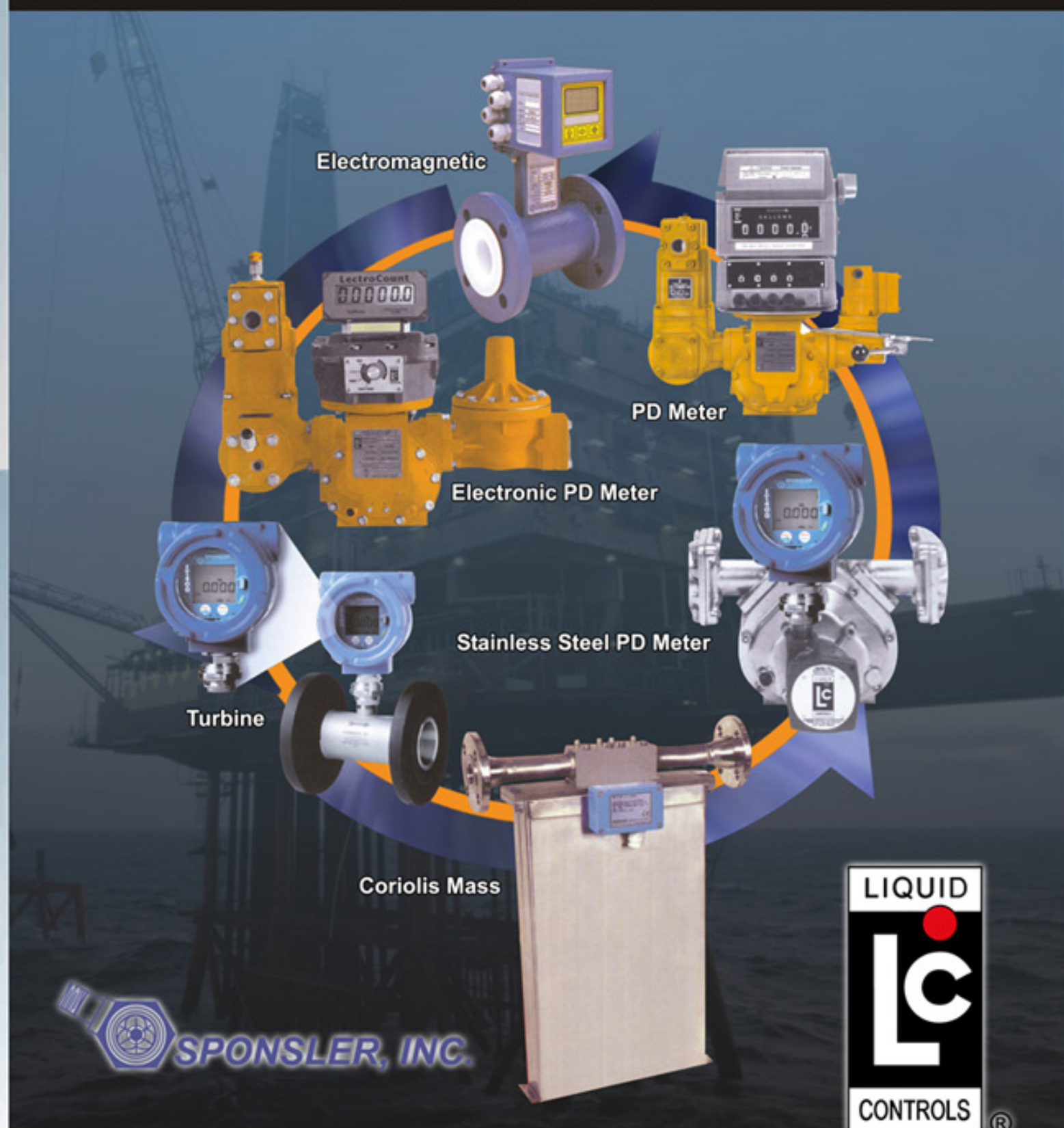


LIQUID CONTROLS.

CORKEN.



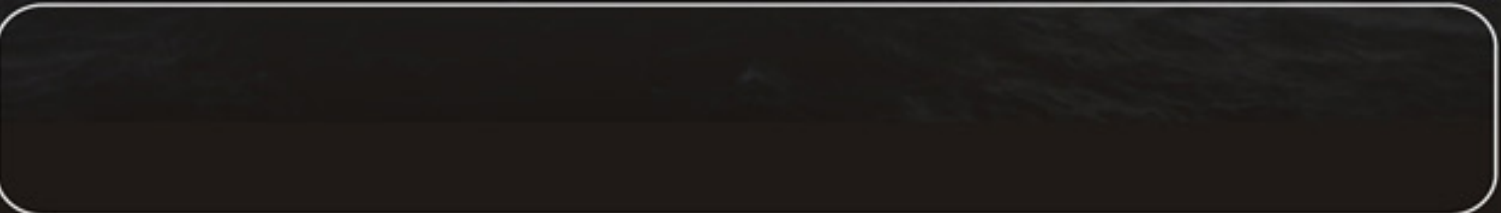
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Premier products, premier performance

Applications

Truck metering

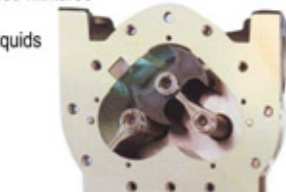
- Refined fuels
- LPG
- Aviation fuel
- Lube oils
- Agricultural chemicals

Industrial process metering

- Liquid sweeteners/corn syrup
- Paints and coatings
- Pulp and paper
- Pharmaceuticals
- Printing inks
- Cosmetics
- Concrete add mixtures
- Industrial liquids
- Others

Bulk plant/terminal metering

- Crude petroleum products
- Refined petroleum products and LPG
- Industrial chemicals/solvents
- Marine fuel/bunker oil
- Hot Asphalt/Asphalt Emulsions



LC's three - rotor positive displacement measuring chamber

Liquid Controls is a world renowned supplier of reliable, high-accuracy positive displacement (PD) metering systems. Whether your business requires flow measurement for custody transfer or process control, with an LC PD meter on your delivery vehicle, at your bulk shipping facility or at your plant, you'll get years of consistently accurate, trouble-free service. And because of the ease of installation, minimal maintenance and few replacement parts, you'll appreciate the low cost of owning and operating LC positive displacement meters.

Features and benefits

LC meters are exclusively engineered with **no metal-to-metal contact** within the measuring chamber, making use of a thin liquid capillary film between rotating and stationary components for hydraulic sealing. This unique design results in **minimal wear, sustained accuracy, and low operating costs**. When measuring the flow of a broad range of products, LC's innovative design results in **minimal resistance to flow** and the ability to **operate on pump pressure or gravity feed**. That means efficient performance and **low pressure drop** across the meter. LC's combination of low pressure drop with minimum seal or slippage area offers better accuracy over a wide range of flow than many other commercially produced PD meters.

The simplicity in design and high quality manufacturing make LC meters more reliable and less costly to operate than other meters. And, multiple installation configurations provide greater mounting versatility. In many cases, you can replace your existing meter with an LC meter with minimal disruption to system piping and components.

System accessories

Liquid Controls' innovation extends beyond meters to system components and accessories. Precision-engineered and manufactured LC strainers, air eliminators, and valves provide unsurpassed performance across a wide range of liquids and applications. LC meters are also available with your choice of **mechanical or electronic registers**. Our state-of-the-art family of LectroCount™ electronic registers provide your meter with automated control and data management capability to improve productivity, lower your costs and increase your profits.

At Liquid Controls' ISO-certified facility in Lake Bluff, Illinois, LC metering systems are manufactured to last. Meters crafted with quality decades ago are still in operation today. Our metering systems are sold and serviced by a worldwide network of qualified distributors and OEMs. And they're backed by our reputation for quality, accuracy and reliability. That's why Liquid Controls continues to lead the industry in Weights and Measures-approved custody transfer metering, and why you'll want your business to include Liquid Controls products.



The LC Metering Element

- Provides custody transfer accuracy
- Performs well with a wide range of liquids, from low viscosity to high viscosity
- Minimizes inaccuracies due to clearance changes and wear common to other meter designs
- Performs with equal accuracy when flow is in either direction (forward or reverse)
- Operates without axial thrust on rotor bearings for longer life
- Adapts to multiple installation positions
- Includes Weights and Measures approvals, worldwide

Mechanical registration

Mechanical registers have traditionally been used in a variety of mobile and fixed-site applications. Mechanical registers are ideal for applications without electrical power and can be installed on virtually all LC meters.



Mechanical counter with ticket printer

Large-numeral counter provides 5-digit resettable and 8-digit non resettable totalizers. Printer generates and imprinted record of the transaction, legal for use in resale applications.

Mechanical preset counter

Available for either single-stage or two stage valve closure. Sets a predetermined volume and controls a mechanically linked valve. Optional microswitches convert mechanical motion to an electronic signal for control of remotely located valve, pump and/or alarms.



Valves

Liquid Controls valves are designed for a wide range of applications, flow rates and minimum head loss. Careful engineering and construction ensure smooth, accurate and controlled operation. LC valves offer the important advantages of time-tested reliability and leak-tight shutoff.

Piston valves for refined petroleum products and industrial liquids

The mechanically actuated piston valves are available in 2" through 4" sizes, and are designed for mounting on the meter outlet to provide tight shutoff with smooth and easy operation regardless of system line pressure. Valves may be manually operated or connected via a mechanical linkage to a preset counter on the meter for single stage closure, or two-stage closure to eliminate hydraulic shock. Valves are indexible in 90° increments for up, down, or side facing outlet.

Differential valve for LPG and anhydrous ammonia

The differential valve - mounted on the meter outlet and connected at the valve bonnet to the vapor eliminator on the meter - functions to stop liquid flow whenever vapor is present in the system. The valve maintains sufficient pressure to ensure that high-vapor pressure products such as LPG or anhydrous ammonia (NH₃) always remain in the liquid state. The valve is spring loaded and designed to fail closed.

LC meter selection (by flow rate)

Maximum nominal GPM	Flow rate L/min	Flange size	Maximum non - shock working pressure *						Construction classes / typical application (see descriptions below)
			150 PSI 10.5 BAR	275 PSI 19 BAR	300 PSI 21 BAR	350 PSI 24 BAR	720 PSI 50 BAR	1,440 PSI 100 BAR	
30	113	1 1/2"				MA-4			10
60	227	1 1/2", 2" optional	M-5	M-5		MA-5			1, 2, 3, 4, 8, 10, 14, 16, 30
100	380	2", 1 1/2" optional	M-7	M-7		MA-7			1, 2, 3, 4, 7, 8, 10, 12, 14, 15, 16, 20, 27, 37
100	380	2", 1 1/2" optional	MS-7	MSAA-7	MSA-7		MSB-7	MSC-7	1, 2, 7, 10, 14, 16, 37
150	550	2"	M-10	M-10					1, 2
200	757	3"	M-15	M-15		MA-15			1, 2, 3, 4, 10, 14, 15, 16
200	757	3"	MS-15	MSA-15	MSA-15		MSB-15	MSC-15	1, 2, 8, 10, 14, 16
300	1,136	3"	M-25	M-25					1, 2
350	1,325	4", 3" optional	M-30						1, 2, 3, 4, 7, 14, 15, 16, 27, 37, 47
350	1,325	4", 3" optional	MS-30	MSAA-30	MSA-30		MSB-30	MSC-30	1, 2, 8, 10, 14, 16
450	1,700	4"	M-40						1, 2
450	1,700	4"	MS-40						1, 2
600	2,271	4", 6" optional	M-60	M-60					1, 2, 3, 14, 15
700	2,650	4"	MS-75	MSAA-75	MSA-75		MSB-75	MSC-75	1, 2, 10, 14
800	3,000	6", 4" optional	M-80	M-80					2
1,000	3,785	6" or 8"	MS-120	MSAA-120	MSA-120		MSB-120	MSC-120	1, 2, 8, 10, 14

Standard LC meters (with the exception of the M-10, M-25, M-40 and M-80) are suitable for operation on products with viscosities up to 1,000,000 SSU. * Working pressure ratings are based on products at temperatures below 160° F (71° C)

Construction / application classes

- | | | |
|--|---|--|
| <p>Class 1 Refined petroleum products</p> <p>Class 2 Aviation and jet fuel</p> <p>Class 3 Variety of products including: Liquid sugars, sweeteners, syrups, vegetable oils</p> <p>Class 4 Treated waters and solvents where no red metals are allowed</p> <p>Class 7 Chlorinated solvents</p> | <p>Class 8 Acid pH liquids including: nitric, phosphoric, glacial acetic acids, citric juices, vinegar</p> <p>Class 10 Liquid petroleum gas (LPG)</p> <p>Class 12 Anhydrous ammonia (NH₃)</p> <p>Class 14 Crude oil</p> <p>Class 15 Oil - or water - based latex products, polyester resins, adhesives, herbicides, nitrogen fertilizers</p> <p>Class 16 General solvents, 200 proof alcohol</p> | <p>Class 20 Batch process water meter service</p> <p>Class 27 Alkaline pH liquids: latex product, adhesives, liquid fertilizers</p> <p>Class 30 Herbicides</p> <p>Class 37 Sodium hydroxide solutions, high sulfur crude oil, alkaline pH liquids</p> <p>Class 47 Mildly abrasive liquids</p> |
|--|---|--|

Electronic registration

Liquid Controls' family of LectroCount™ electronic registers provide near-perfect metering accuracy over a full range of flow rates and deliver enhanced functions including: automated data collection (i.e., date, time, product, delivery quantity and more), on-site ticket generation, meter linearization, electronic temperature volume compensation, real-time communication capabilities (RF, GPS, CDDP), improved security and more.

LectroCount™ electronic register

Compatible with virtually all flow meters, the family of NEMA 4X LectroCount electronic registers is UL Class 1 listed and Weights and Measures approved. A simple "Run," "Stop," "Print" operator selector switch makes product delivery easy. The large 6-digit weatherproof LCD display provides readout of totalizer, preset quantity, flow rate, temperature, time, and more. Available with electronic temperature volume compensator to eliminate the effect of product temperature change on measured volume. Easy field calibration to Weights and Measures standards. No moving parts for long life and accurate performance.

Data entry

LectroCount is compatible with a variety of RS 232/485 data entry devices including LC Lap Pad, handheld computer or lap-top PC. Easy to set up and operate for calibration, presets, customized data fields, ticket formats and delivery data.

Printer

For all mobile and stationary applications from -40° F to 158° F (-40° C to 70° C). Printer generates an imprinted record of the transaction, legal for use in resale applications.

Valve

Diaphragm type, electrically (solenoid) actuated, aluminum body available with flanged or NPT connections. All valves provide downstream to upstream thermal relief and fail-safe closure.

Pulse output device

Weights and Measures approved, provides a high resolution, unscaled pulse stream. The meter rotor is magnetically coupled to an optical encoder that has a signal which is directly proportional to the liquid flow through the meter. No dynamic seals to fail or leak. Easily adapts to most remote totalizers, batch controllers, computers and other scalable pulse receiving devices.



Solenoid operated control valve for refined petroleum products and LPG

The refined fuels and LPG solenoid-operated control valves are installed at the meter outlet and are designed especially for use with Liquid Controls LectroCount™, LCR, and LCR-II electronic registers. These solenoid operated diaphragm valves can be applied for either single or two-stage closure. Valve is suitable for horizontal or vertical installation without modification.

Air activated differential check valves

The air-activated check valves are installed on the outlet side of the meter, and are designed to stop the flow of liquid whenever air is present to ensure accurate measurement of product. Used where air entrapment is of particular concern in the application, such as draining tanks.

Pilot-operated air check valve

Air check valve is for use with all MS, MSA and MSAA meters. The valve is offered in a steel body design with stainless steel tubing, pilot and fittings. The valve operates in conjunction with an LC air/vapor eliminator to stop flow whenever air or vapor is present in the liquid stream.

Digital control valve

The model DCV is a hydraulic, diaphragm-actuated, steel-body digital control valve. The valve provides precise batch quantity control using an electronic digital batch controller. Ideal for loading rack and bulk metering applications.



Specifications

LC meters meet NTEP (NIST Handbook 44) and International Weights and Measures accuracy requirements as well as U.S. Military specifications.

Accuracy / Performance*

Repeatability

Meters with Mech. registration: capable of 0.05% of reading over entire range
Meters with Elect. registration: capable of 0.03% of reading over entire range

Linearity

- Over 5:1 range
Mech. registration: capable of ±0.125% or better from max. nom. flow rate
Elect. registration: capable of ±0.10% or better from max. nom. flow rate
- Over 10:1 range
Mech. registration: capable of ±0.22% or better from max. nom. flow rate
Elect. registration: capable of ±0.10% or better from max. nom. flow rate
- Over 40:1 range
Mech. registration: capable of ±0.5% or better from max. nom. flow rate
Elect. registration: capable of ±0.15% or better from max. nom. flow rate

Mounting arrangements

LC meters may be mounted in a variety of configurations, as shown below. Do not position the meter on its side, i.e., with cover plate face down or up.



Note: regardless of meter mounting configurations, accessories such as the air/vapor eliminator must always be mounted in a vertical orientation to permit proper operation of the float-actuated apparatus.

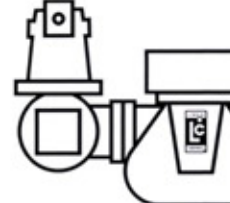
Standard accessory configurations

MMA-7-A
A=Meter with counter



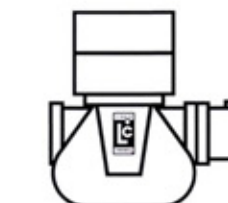
Optional Accessories :
Printer, Strainer

MMA-7-C
C=Meter with counter, strainer and air eliminator



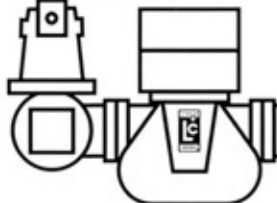
Optional Accessories : Printer

MMA-7-I
I=Meter with counter, preset counter and preset valve



Optional Accessories : Printer, Strainer

MMA-7-K
K=Meter with counter, preset counter, preset valve, strainer and air eliminator



Optional Accessories : Printer

M-5™

- Capacity: 60 GPM (227 L/min.)
- Case made of aluminum with metering chamber components of various materials as required for Classes 1, 2, 3, 4, 14, 16 and 30 construction.
- Choice of companion flanges with 1 1/2" standard and 2" optional ...NPT or BSPT threads. Also aluminum or steel welding flanges. ANSI and DIN adaptors available (consult factory).

M-7™

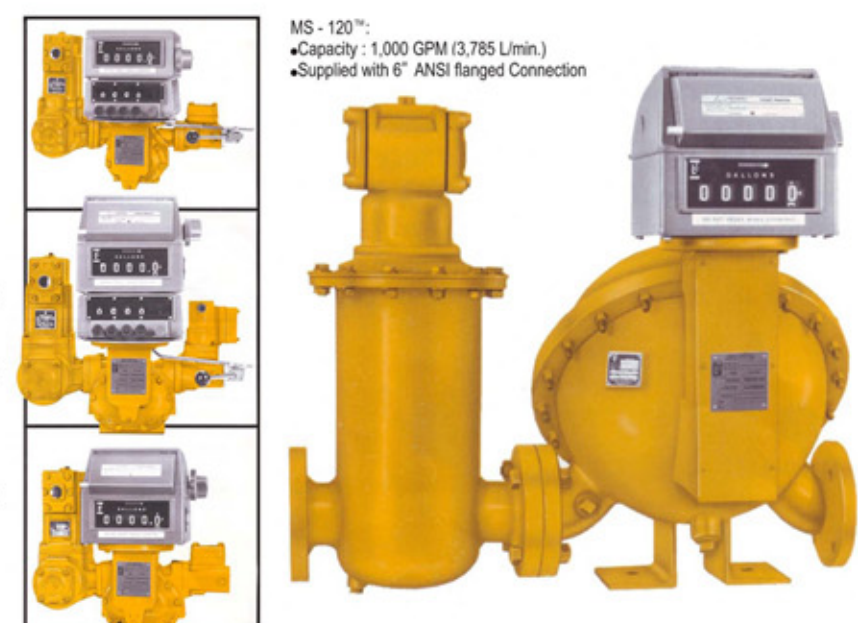
- Capacity: 100 GPM (380 L/min.)
- Case made of aluminum with meter element components of various materials as required for Classes 1, 2, 3, 4, 14, 15 and 16 construction.
- Choice of companion flanges with 2" standard and 1 1/2" optional ... NPT or BSPT threads ... also aluminum or steel welding flanges. ANSI and DIN adaptors available (consult factory).

M-10™

- Capacity: 150 GPM (550 L/min.)
- Case made of aluminum with meter element components of various materials as required for Class 1 or 2 construction (for metering refined petroleum products only, including aviation fuels).
- Choice of 2" NPT, BSPT or Slip Weld Companion Flanges. ANSI and DIN adaptors available (consult factory).

MS - 120™

- Capacity : 1,000 GPM (3,785 L/min.)
- Supplied with 6" ANSI flanged Connection



Temperature range

-40° F to 160° F (-40° C to 71° C)
For higher temperature applications, consult factory.

* Stated accuracy obtainable when all variables remain constant. Reading/measurements reflect a minimum of one minute of flow at selected rate(s). All accuracy statements based on metering safety solvent (aliphatic hydrocarbon), approximate viscosity 1 CPS. On higher viscosity products, the average deviation in accuracy will be less.

Construction

- **Meter housing**
M Series: aluminum, brass, cast-iron or stainless-steel
MS Series: steel or stainless steel
(Epoxy-coated steel available for aviation and other applications)

- **Meter element and rotors**
Cast aluminum (other metalurgies available including cast iron and stainless steel)

- **Internal components**
Aluminum, Ni-Resist, stainless steel, iron

- **Seal materials**
UL recognized component: Buna-N, Viton®, Teflon®

- **Bearings**
Carbon, Teflon®, Ni-Resist

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