

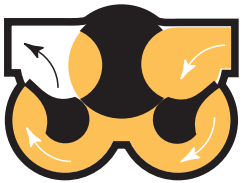
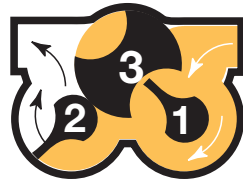
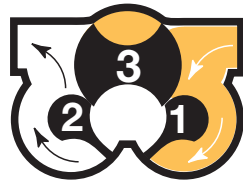
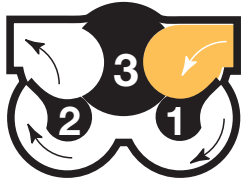
# POSITIVE DISPLACEMENT METERS

FOR CUSTODY TRANSFER OF VALUABLE LIQUIDS AND FUELS



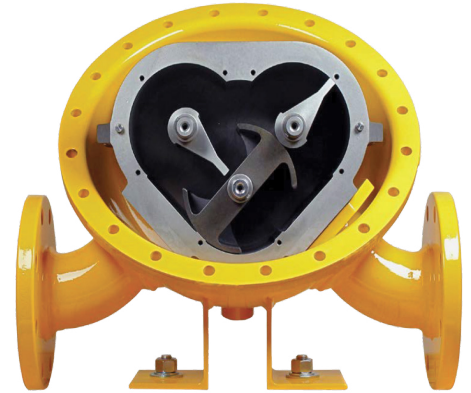
# THE ORIGINAL TRI-ROTOR METER

PROVEN MOST TRUSTED AND RELIABLE SINCE 1956



The original Liquid Controls tri-rotor meter design consists of a housing in which three rotors turn and measure fuel in synchronized relationship with no metal-to-metal contact.

The bladed displacement rotors (1 & 2), alternately rotate through the half-cylinder bores of the meter element, while the single blocking rotor (3) rotates within its bore to produce a continuous capillary seal between the unmetered product and the metered product.



Because the force exerted by the fluid flowing through the meter is at right angles to the faces of the displacement rotors, and the rotor shafts are always in a horizontal plane, there is no axial thrust, thereby eliminating wear between the rotors and the bearing plates and ultimately providing a lifetime of measurement accuracy.

## NO METAL-TO-METAL CONTACT RESULTS IN...

- Sustained accuracy over time
- Minimum maintenance
- Maximum service life

**LOW PRESSURE  
DROP**  
~2.3 PSI

\*avg. based on flowrate

**WIDE RANGE  
TEMP**  
-40° TO 160°

(-40° to 71°C)

**FULL FLOW  
RANGE**  
6 -1000 GPM

(20 to 3780 LPM)

## SUSTAINED ACCURACY!

Zero wear and no metal-to-metal contact inside the measuring chamber results in maximum accuracy retention over time, fewer re-calibrations, and longer service life.

# RANGE & SPECIFICATIONS

LC METERS MEET NTEP (NIST HANDBOOK 44) AND MANY INTERNATIONAL WEIGHTS AND MEASURES ACCURACY REQUIREMENTS, AS WELL AS U.S. MILITARY SPECIFICATIONS.

M-Series	Size	Flange Size	Nominal Flow Rate Range		Maximum Pressure		
		Inches	GPM	LPM	PSI	BAR	kPa
	M-5 <sup>®</sup>	1.5	6-60	22-227	150	10.3	1034
M-7 <sup>®</sup>	2	10-100	20-378	150	10.3	1034	
M-10 <sup>®</sup>	2	15-150	56-567	150	10.3	1034	
M-15 <sup>®</sup>	3	20-200	75-756	150	10.3	1034	
M-25 <sup>®</sup>	3	30-300	110-1134	150	10.3	1034	
M-30 <sup>®</sup>	4	35-350	132-1323	150	10.3	1034	
M-40 <sup>®</sup>	4	45-450	170-1701	150	10.3	1034	
M-40 <sup>®</sup> AVI*	4	45-600	170-2268	150	10.3	1034	
M-60 <sup>®</sup>	4	60-600	225-2268	150	10.3	1034	
M-80 <sup>®</sup>	6	80-1000	300-3024	150	10.3	1034	

MA <sup>®</sup> Series	Size	Flange Size	Nominal Flow Rate Range		Maximum Pressure		
		Inches	GPM	LPM	PSI	BAR	kPa
	MA-4 <sup>®</sup>	1.5	6-60	22-227	150	10.3	1034
MA-5 <sup>®</sup>	2	10-100	20-378	150	10.3	1034	
MA-7 <sup>®</sup>	2	10-100	20-378	150	10.3	1034	
MA-15 <sup>®</sup>	3	20-200	75-756	150	10.3	1034	

MSA-Series	Size	Flange Size	Nominal Flow Rate Range		Maximum Pressure		
		Inches	GPM	LPM	PSI	BAR	kPa
	MSA-30	3	35-350	132-1325	300	20.7	2068
MSA-75	4	70-700	265-2650	300	20.7	2068	

MSAA- Series	Size	Flange Size	Nominal Flow Rate Range		Maximum Pressure		
		Inches	GPM	LPM	PSI	BAR	kPa
	MSAA-30	3	35-350	132-1325	285	19.7	1965
MSAA-40	3	45-450	170-1703	285	19.7	1965	
MSAA-75	4	70-700	265-2650	285	19.7	1965	
MSAA-120	6	100-1000	378-3785	285	19.7	1965	

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.

\*M-40 AVI is for aviation applications only, model name is M-40-2AVI.

# REFINED FUELS

## TRUCK MOUNTED FUEL DELIVERY SYSTEMS

- Liquid Controls M-Series™ meters provide the industry's most time-proven record of superior accuracy and performance.
- M-7® meters are ideal for applications with high accuracy and low-flow requirements
- When coupled with the new LCR.iQ® electronic registers, the LC meter system is the most advanced, easy to use, and best overall value in the industry.

### M-7®

#### REFINED FUELS TRUCK METERS



M-7® for refined fuels with LCR.iQ®, E-7 valve, optical air eliminator and high-capacity strainer.



## REGISTRATION



# LCR.iQ®



LCR.iQ® is the industry's newest and most advanced electronic register, designed to simplify fueling operations with process configurability, intuitive operation, and real-time fueling diagnostics and data connectivity to maximize up-time and daily throughput.



# LPG

## BOBTAIL MOUNTED LPG DELIVERY SYSTEMS

- Liquid Controls metering solutions are ideal for use on LPG Bobtails.
- The MA® Series meters have provided safe and accurate measurement for custody transfer for LPG fuels for over 50 years.
- Common applications include delivery of LPG for home heating, farms and automotive fleets



## MA-7®

### LPG TRUCK METERS



MA-7® for LPG applications with LCR.iQ® register, strainer and air eliminator.

In addition to the LCR.iQ®, the LCR 600 and LCR-II electronic registers have proven to be the industry's work-horses in the area of fueling transaction management.

The LCR family of registers accurately deliver and report millions of daily fuel transactions throughout the world.



LCR® 600



LCR®-II

# BULK PLANT & LOADING

## BULK PLANT AND LOADING TERMINAL METERS

- The larger M, MSA & MSAA series meters are ideal for bulk measurement during loading and unloading of tanks, railcars, ships, and barges.
- MSA & MSAA series meters have a spherical steel case for higher system pressure applications up to 1,440 PSI to handle nearly any bulk metering requirement.
- Meter accessories include bulk air/vapor eliminators, strainers, valves, and mechanical or electronic registers.
- MSA & MSAA series meters feature the same high-quality meter elements and accuracy that are the hallmark of all LC PD meters and have flow rates up to 1,000 gpm.

## ***M, MSA, and MSAA Series Meters***

### BULK FUEL METERING



M-30<sup>®</sup> with LCR.iQ<sup>®</sup> electronic register



Toptech<sup>®</sup> MultiLoad<sup>®</sup> II and SMP preset controllers for terminal applications.



MSAA-75 with mechanical register.

# AVIATION FUELING

TRUCK MOUNTED REFUELERS AND HYDRANT DELIVERY SYSTEMS

- Liquid Controls M-Series meters for Class 2 Aviation fueling applications began in 1956 with the US Air Force and continues today to be the preferred meter for aviation fueling.
- Meter sizes from M-25<sup>®</sup>, M-30<sup>®</sup>, M-40<sup>®</sup>, M-60<sup>®</sup>, M-80<sup>®</sup> cover the full range of aviation fueling applications from 40 gpm to 1000 gpm.
- LCR.iQ<sup>®</sup> provides an easy to use, intuitive operator interface and ties together critical sensing devices in aviation fueling systems, reducing complexity, improving efficiency and maintains all fueling system data.

## M-25<sup>®</sup>, M-30<sup>®</sup>, M-40<sup>®</sup>, M-60<sup>®</sup>, M-80<sup>®</sup>

AVIATION FUEL METERS

### LC ACCESSORIES FOR AVIATION FUELING



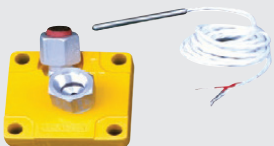
Slipstream<sup>®</sup>  
Densitometers

Real-time fuel density input into the LCR.iQ<sup>™</sup> provides highest level of accuracy for volume to weight (mass) conversion and reporting.



Differential Pressure  
Transducers

Real-time differential pressure input allows active monitoring of critical dP changes during fueling for improved safety and reporting.



Temperature-Volume  
Compensation

Real-time fuel temperature compensation provides a higher level of volume accuracy than stand-alone volume measurement.



M-60<sup>®</sup> meter with LCR.iQ<sup>®</sup> register.



At the center of the new **CENTRILOGiQ®** platform is the **LCR.iQ®**, built from the ground up by Liquid Controls' Research & Development team with close collaboration with customers who benefit from it!

**HIGH-RES. DISPLAY WITH DAY/NIGHT MODES**  
7" ultra bright video display designed for extreme climates and rigorous fueling environments.

**LARGE SCALABLE DIGITS FOR EASY VIEWING**  
Large digits provide easy viewing, day or night, up to 100 feet (30 m) away.

**CONFIGURABLE FUELING DATA**  
The LCR.iQ® allows users complete control over the fueling data fields displayed on the detailed delivery screen.

**SMART KEYS FOR GUIDED OPERATION**  
Smart keys guide the operator through the next available steps in the operation to minimize risk of error.

**LARGE KEYS FOR EASY OPERATION**  
Large, petroleum and UV resistant elastomeric keys provide confident feel and consistent operation.

**METER MOUNT BASE**  
Liquid Controls standard meter-mount base with integrated pulser allows easy mount-and-connect retrofit.



## LCR.iQ® User Configurable Features

### User Configuration Features

- Configurable idle screen - Design the fueling screen the way you want it.
- Configurable fuel delivery process - Step by step on-screen instructions guide the operator through the fueling process you specify.
- Configurable date, time, and units of measure formats - Set local units of measure and date/time formats to eliminate unit conversions
- Configurable product types - Configure product types and terms based on local terminology
- Configurable flow rate min/max thresholds - Set alerts to notify user if flow rates exceed thresholds
- Configurable I/O settings - Define what each input and output is assigned to and how they are utilized
- Configurable tickets and printer settings - Easily tailor ticket header text, fields, and printer type
- Configurable product pricing and taxes - Either fixed or user definable pricing and taxes at the delivery level
- Configurable data logging and retention period - Define how long to retain fueling transactional data on-board the LCR.iQ®
- Configurable electronic temperature volume compensation - Available with optional temperature probe and thermowell kit

### Setup, Calibration and Security

- iQ settings and preferences transferable to multiple registers - Set up once, then backup and install configuration across multiple units
- Intuitive Calibration - Easy to follow meter calibration and linearization process.
- Security - Set security access for operators and supervisors