POSITIVE DISPLACEMENT METERS

FOR ACCURATE MEASUREMENT OF VALUABLE FUELS AND LIQUIDS









LIQUID CONTROLS®

When Accuracy Counts®

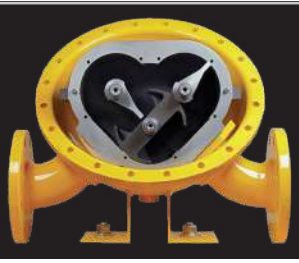
THE ORIGINAL TRI-ROTOR METER

PROVEN THE MOST TRUSTED AND RELIABLE METER 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 alternately rotate through the half-cylinder bores of the meter element, while the single blocking rotor 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 measurment accuracy!



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)

INDUSTRIAL APPLICATIONS

SUGARS, SYRUPS, WATERS, SOLVENTS, ACIDS, AND HIGH VISCOSITY OILS

WORLD DATA POWER ENERGY

CLASS 3

Liquid Sweeteners and Syrups, Dextrose, Fructose, Sucrose, Maltose, Lactose. Corn Oil, Soy Bean, Cotton Seed and Coconut Oils, Shortenings



M-7 class 3 meter with mechanical register

CLASS 4

Potted, treated, deionized, and demineralized Water, Windshield Washer Fluid and Solvents where no red metals are allowed



M-5 class 4 meter with register and printer

CLASS 8

Acidic pH Liquids, Nitric, Phosphoric and Glacial Acetic Acids, Fruit Juices and Vinegar, Distilled Water



M-7 class 8 stainless steel meter with register

CLASS 14

Crude Oil, LACT, NOD, Heated and/or Viscous Liquids Including: Animal Fats, Resins, #6 Oil, Non-Abrasive Asphalt Emulsions



M-30 class 14 meter with POD for LCR.iQ



MSAA-75 class 14 meter with mechanical register

MOST SUSTAINABLE ACCURACY! (COMPARED TO CONVENTIONAL METERS)

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

RANGE & SPECIFICATIONS

LC METERS MEET NTEP (NIST HANDBOOK 44), MEASUREMENT CANADA, OIML, AND MILITARY WEIGHTS AND MEASURES SPECIFICATIONS.

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

	Size	Flange Size	Nominal Flow Rate Range		Maximum Pressure		
		Inches	GPM	LPM	PSI	BAR	kPa
MA® Series	MA-4®	1	5-30	19-114	350	24	2414
	MA-5®	1.5	12-60	45-227	350	24	2414
	MA-7®	2	20-100	76-378	350	24	2414
	MA-15®	3	40-200	151-756	350	24	2414

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

	Size	Flange Size	Nominal Flow Rate Range		Maximum Pressure		
		Inches	GPM	LPM	PSI	BAR	kPa
MSAA- Series	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 M-40-2AVI.*

INDORAYA POWER ENERGI

REFINED and ALTERNATIVE FUELS

TRUCK MOUNTED FUEL DELIVERY SYSTEMS

- Liquid Controls M-Series™ class 1 and class 16 meters provide the industry's most time-proven record of superior accuracy, performance, and long-term durability in custody transfer of refined and alternative fuels.
- M-5®, M-7®, and M-10® meters are ideal for applications with high accuracy, wide flow range, or low-flow requirements.
- Examples include truck based applications that deliver gasoline and diesel fuels or retail On-Demand Fueling applications.

M-5®,M-7®, M-10®

REFINED FUELS TRUCK METERS





INDORAYA POWER ENERGI

M-7® class 1 meter system for refined fuels with LCR.iQ®, E-7 valve, optical air eliminator and high-capacity strainer.

Model Shown: M7K1-LCR.iQ-I#3

CLASS 1	CLASS 16
Refined Petroleum Products, Leaded and Unleaded Gasoline, Fuel Oils, Diesel Fuel, Kerosene, Ethylene Glycol, Propylene Glycol at rated capacity. Also used on Motor Oils, Crop Oils and Rotogravure Ink at reduced flow rates.	General Solvent, Methanol, Xylene, Naptha, Acetone, MEK, MIBK, and Alcohols (including 200 proof ethanol)

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 and NH_3

BOBTAIL MOUNTED DELIVERY SYSTEMS

- The MA® and MSA series class 10 meters are the industry standard for safe and accurate transfer of LPG fuels
- MA® series class 12 meters are the industry standard for safe and accurate delivery of anhydrous ammonia (NH_3).



MA-7®

LPG BOBTAIL METER SYSTEMS



INDORAYA POWER ENERGI

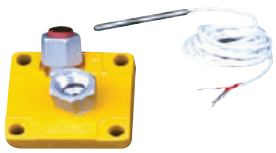
CLASS 10	CLASS 12
Liquified Petroleum Gas [LPG], Including: Butane, Isobutane, Pentane, Ethane, Freons, and Propane	Anhydrous Ammonia (NH3)

MA-7® class 10 system for LPG applications including LCR.iQ® register, strainer, optical air eliminator and 2-Stage preset valve.

Model Shown: MA7KY10-LCR.IQ-I#1



LCR-II is the industry's work-horse in fueling registration.



ETVC - Tempurature Volume Compensation provides accurate net-volume deliveries.



The Corken® Z3200 3" for LPG Bobtail Applications

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 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



M-30® with LCR.iQ® electronic register



Toptech® MultiLoad II and SMP preset controllers for terminals



INDORAYA POWER ENERGI

CLASS 1	CLASS 2	CLASS 14	CLASS 16
Refined Petroleum Products, Leaded and Unleaded Gasoline, Fuel Oils, Diesel Fuel, Kerosene, Ethylene Glycol, Propylene Glycol at rated capacity. Also used on Motor Oils, Crop Oils and Rotogravure Ink at reduced flow rates	Aviation Fuels including Jet-A, Jet-A1, JP-8, Avgas fuels **CLASS 10** Liquified Petroleum Gas [LPG], Including: Butane, Isobutane, Pentane, Ethane, Freons, and Propane	Crude Oil, LACT, NOD, Heated and/or Viscous Liquids Including: Animal Fats, Resins, #6 Oil, Non-Abrasive Asphalt Emulsions	General Solvent, Methanol, Xylene, Naptha, Acetone, MEK, MIBK, and Alcohols (including 200 proof ethanol)

AVIATION FUELING

TRUCK MOUNTED REFUELERS AND HYDRANT DELIVERY SYSTEMS

CLASS 2

Aviation Fuels including Jet A, Jet A-1, JP-8, and Avgas

- 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-5®, M-7®, M-10®, M-25®, M-30®, M-40®, M-60®, M-80® cover the full range of aviation fueling applications up to 1000 gpm flow rate.
- LCR.iQ® 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 and MSAA Series

Slipstream® Densitometers



New

Real-time fuel density provides the most precise fuel deliveries preset and reported by weight

** preset by weight patent pending*

Water Detection



New

Real-time fuel monitoring utilizing approved water detection devices per JIG, A4A, IATA, and EI1598

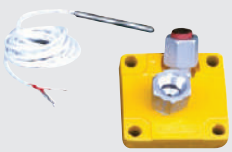


Differential Pressure (dP) Transducers



Real-time dP input allows active monitoring of dP changes during fueling for improved safety

Temperature-Volume Compensation



Real-time fuel temperature compensation provides net-volume deliveries

LCR.iQ®

- Easy configurability
- Hi-Resolution display
- Wireless control capability

ATEX Div. 2, Zone 2 rated



MASTERLOADx.iQ™

- All features of LCR.iQ
- *Plus:* expanded I/O
- *Plus:* Zone 1 enclosure

ATEX Zone 1 rated



New

INDORAYA POWER ENERGI

LCR.iQ®

PART OF
CENTRILOGiQ®

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 consitent operation.

METER MOUNT BASE
Liquid Controls standard meter-mount base with integrated pulser allows easy mount-and-connect retrofit. (panel mount option also available)



LCR.iQ® User Configurable Features

User Configuration Features
Configurable idle screen - Display exactly the data on 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
Data Management, Setup, Calibration and Security
Wireless data and remote controls - Bluetooth / Wi-Fi accessibility for data transfer and remote control applications designed for use with LCR.iQ
Ethernet connectivity - Data transfer via ethernet connection to systems configured with FTP support or LCP communication protocol
Wi-Fi access point connectivity - Connect to local SSID Wi-Fi access point to push fueling data to a remote network
LCR.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

To learn more about Liquid Controls visit:
LCMeter.com

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