LIQUID CONTROLS

Simply the Best™

Turbine Meters for Custody Transfer Flow Measurement of Petroleum Products

Loading Terminal, Offshore, and Pipeline Applications

IDEX CORPORATION

Premier products, premier performance

Applications

Loading terminal, offshore, and pipeline metering

- **Crude petroleum products**
- **Refined petroleum products**
- **Industrial chemicals/solvents**
- **Custody transfer applications**

Liquid Controls is a world recognized supplier of reliable, high-accuracy, precision turbine metering systems*. Whether your application requires flow measurement for custody transfer, process control, or batching and blending, with an LC turbine meter at your facility, 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 your LC turbine meter.

*Turbine meters manufactured by Sponsler, Inc., A Unit of IDEX Corporation.

Features and benefits

The Liquid Controls Turbine Flowmeter measures volume by means of a precision-crafted, hydraulically balanced rotor mounted in the liquid flow stream. The meter's AC sine wave signal output is detected by a transducer and displayed by various electronic devices used for flow rate indication and totalization. LC Precision Turbine Flowmeters are engineered and manufactured to provide accurate flow measurement over a broad range of products, pressures, and flow rates. The compact, rugged design has established a new standard for flow measurement by exceeding the expectations of the industry for higher accuracy and reliability under varied operating conditions.

LC Precision Turbine Flowmeters are offered in 300 series stainless steel with other construction materials available upon request. The turbine rotor is hydraulically balanced and supported by precision bearings for long life and sustained high accuracy.

Liquid Controls engineers design flow systems to meet the needs of each customer's application. These processes can be automatic, semi-automatic, or manual. Standard or custom electronic instrumentation is available for a wide range of applications. At Liquid Controls, we believe that no matter what the application, our commitment to quality and service is second to none.

Weights & Measures Approvals

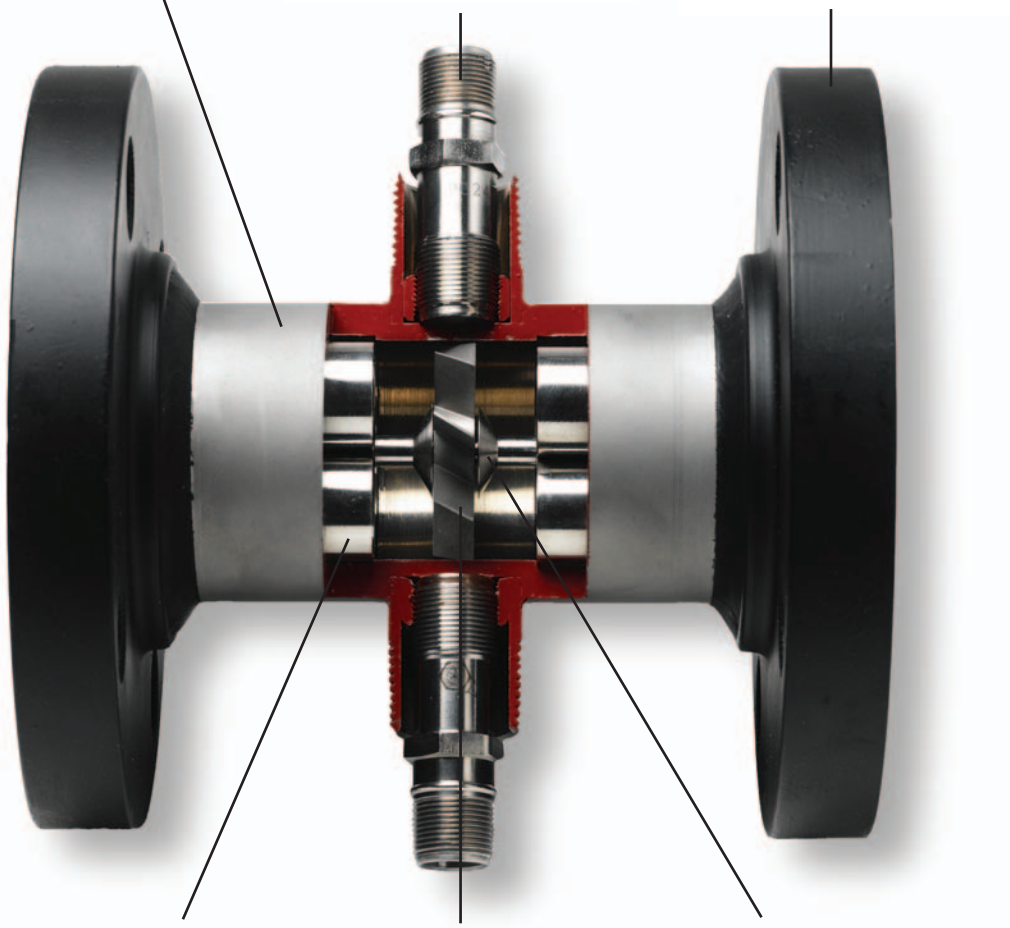
NIST and Measurement Canada approved models are available for Custody Transfer applications measuring low to moderate viscosity products including solvents, fuel oil, diesel, and gasoline.

Meter construction

Materials of Construction:
300 Series Stainless Steel
(Others available on request.)

Pickup Coils:
For hazardous areas, pickup coils supplied with explosion proof boss.
(Option suffix "x".)

End fittings:
ANSI Flanges: 150# to 600#
Carbon or Stainless Steel
(Other ratings available on request.)



Flow Straighteners:
Upstream and downstream flow profiling for accurate flow measurement.

Hydraulically Balanced Rotor:
17-4 PH Stainless Steel

Bearings:
CR = Ceramic Ball
CS = Carbide Sleeve
MB = Metal Ball

Model Selection Guide

SP (size) - bearing - rotor - end fitting - materials - options

Bearings:	Rotor:	End fittings:	Materials:	Options:
MB = Metal Ball CR = Ceramic Ball* CS = Carbide Sleeve	PHL = 17-4 PH SS*	C = 150# CS D = 150# SS E = 300# CS F = 300# SS J = 600# CS K = 600# SS H = High Pressure Others Available	4 = 304 SS 6 = 316 SS*	HT = High Temperature RF = Mod. Carrier X = Mounting Boss Blank = No Option XX = Dual Mounting Boss

*Recommended for petroleum applications.

Meter specifications

Accuracy/Performance

Repeatability: ±0.02%

Linearity: ±0.15%

Rangeability: 10:1

Temperature range: -40ºF to 450ºF (-40ºC to 232ºC) standard. For higher temperature applications, consult factory.

Flow ranges: Refer to the table below.

Materials: LC precision turbine flowmeters are constructed of 300 series stainless steel. Other materials are available to satisfy most applications.

Electrical Output: A minimum of 30 mV peak to peak at the minimum of repeatable flow.

Pressure drop: 4 psi at maximum flow (typical). Actual pressure drop depends on product viscosity and flow rate.

End fittings: ANSI flanges. Others available upon request.

Operating pressure: Dependent on end fittings.

Calibration: LC precision turbine flowmeters are furnished with standard water calibration. Special calibrations available.
NOTE: Meter must be calibrated in the field for the product being measured.

Flow ranges

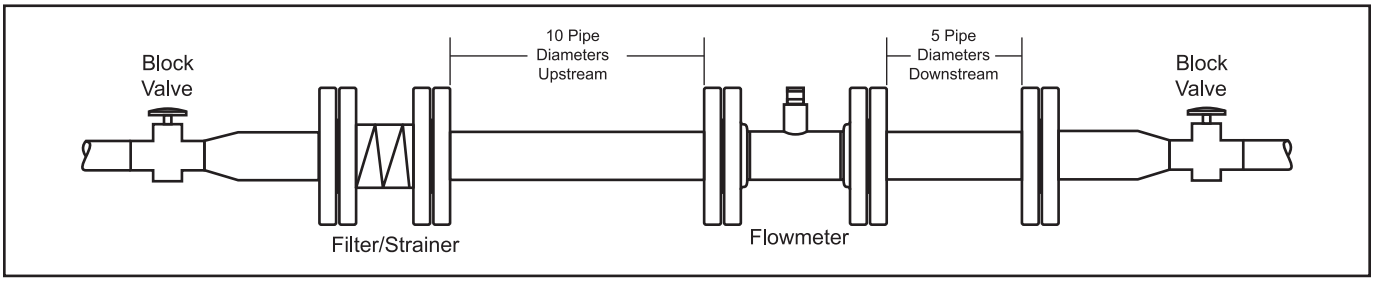
Size	Flow Range			Electrical Output Pulses/Gallon (avg. K factor)
	GPM	BBL/hr	m^3/hr	
1½"[a]	13 to 130	19 to 190	3 to 30	230
2"[a]	23 to 230	33 to 330	5 to 50	133
2½"[a, b]	40 to 400	57 to 570	19 to 190	75
3"[a, b]	65 to 650	93 to 930	15 to 150	46.1
4"[b]	125 to 1,250	179 to 1, 790	28 to 280	20.7
6"	290 to 2,900	414 to 4,140	66 to 660	5.6
8"	520 to 5,200	743 to 7,430	118 to 1,180	2.4
10"	800 to 8,000	1,143 to 11,430	182 to 1,820	2.1
12"	1,200 to 12,000	1,714 to 17,140	273 to 2,730	1.3

a. Available with Measurement Canada approvals for solvent and gasoline.
b. Available with US NIST approvals for solvent, gasoline, diesel fuel, and fuel oil.

Flow conditioning plates

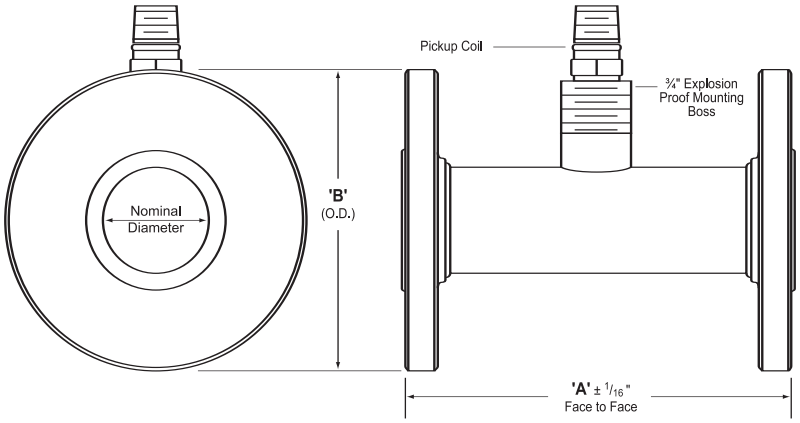
When the flowmeter installation provides ten pipe diameters of straight pipe upstream of the flowmeter and five pipe diameters of straight pipe downstream of the meter (as shown below), an external flow conditioning plate is generally not required nor recommended.

If elbows, valves, pipe bends, or other flow obstructions are located within the upstream to downstream straight pipe recommendations, Liquid Controls recommends the use of an upstream flow conditioning plate.



Meter dimensions

Line Size (N.D.)	150# ANSI		300# ANSI		400# ANSI		600# ANSI	
	A"	B"	A"	B"	A"	B"	A"	B"
1½"	6	5	6	6.125	6	6.125	6	6.125
2"	6.5	6	6.5	6.5	6.5	6.5	6.5	6.5
2½"	7	7	7	7.5	7	7.5	7	7.5
3"	10	7.5	10	8.25	10	8.25	10	8.25
4"	12	9	12	10	12	10	12	10.75
6"	14	11	14	12.5	14	12.5	14	14
8"	16	13.5	16	15	16	15	16	16.5
10"	20	16	20	17.5	20	17.5	20	20
12"	24	19	24	20.5	24	20.5	24	22



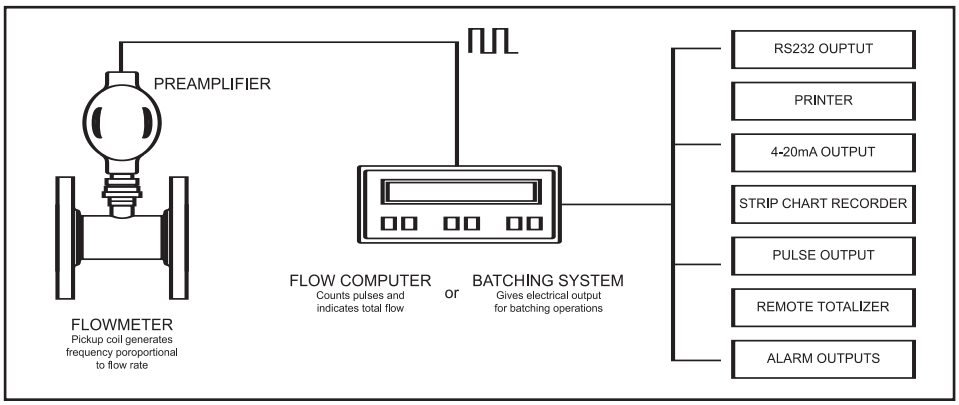
Meter registration equipment

Liquid Controls can package your meter with a selection of register and flow computer options manufactured by LC or others. Engineered packages are available for high-end, automated batching and blending systems, as well as for basic electronic preset registration systems. Contact Liquid Controls for additional information.

Sponsler Model IT-400 Rate/Totalizer

Sponsler amplifiers

LectroCount LCR Electronic Register (Class I, Div 1, Groups C & D)



Contrec Model 1010[1]

1. Photo courtesy of Contrec-USA, LLC

A tradition of excellence that benefits you

Almost fifty years ago, Liquid Controls set a new standard of excellence in engineering and building the finest flow meter products possible, starting with metering aviation fuel for the United States Air Force.

Since that time, the industry base we serve has grown, broadened. Our product line has expanded to include a wide variety of flow meters, accessories and related items distributed worldwide. But our commitment to excellence will never change. The professionals at Liquid Controls are driven to bring you products that perform efficiently and accurately, with minimum maintenance for years to come. Delivering everything you'd expect from the very best—that's our goal.

A good fit

In 2001, Liquid Controls joined the IDEX team of companies. IDEX is a leader in the manufacture of a broad range of pump products, dispensing equipment and other engineered technologies. Maintaining a theme of leadership, IDEX delivers **I**nnovation, **D**iversity and **EX**cellence to thousands of valued customers around the world.

LIQUID CONTROLS

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IDEX CORPORATION

ISO 9001 CERTIFICATED FIRM Certificate No. 08732
ISO 14001 CERTIFICATED FI Certificate No. 05049

Pub. 500336
Product Overview (3/06)

Printed on recycled paper using soy inks