

MAX LIQUID PRESSURE 300 PSI (20.69 BAR) LN SERIES
MAX LIQUID PRESSURE 500 PSI (34.5 BAR) LE SERIES

MAX FLOW SIZES FROM
80 TO 500 GPM (300 TO 1800 LPM)

Flow meters, Flow switches and Flow transmitters

A Large Vane Style
For Liquids



NIST Traceable Calibration
Certificate Available



DESCRIPTION

These variable-area flow meters have a spring-loaded swinging vane. Mounting is in-line and in any position. Straight pipe runs, before or after the meter, are not required. The all-mechanical sensing system directly drives the pointer, switches and transmitters. This swinging vane can be manually operated with a wrench (factory supplied) to verify or adjust switch points or to free the vane should it become lodged by debris in the fluid.

READOUTS

The flowmeter has outputs both visual and electronic. Visual displays are either pointer (with inscribed scale) or numeric (digital LCD). Electronic outputs can be mechanical switch closure, 4-20 mA analog, HART or some combination of switches with electronic outputs (for signal redundancy). The switches can be general purpose or rated for hazardous locations (all classes, groups and divisions).

CALIBRATION

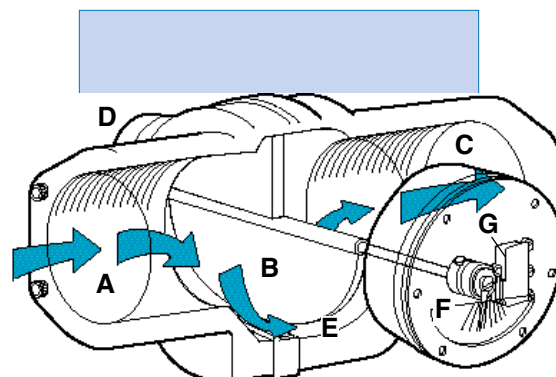
All flow meters are individually calibrated for fluids with the viscosity you specify (up to 3000 SSU/660 Centistokes). We also compensate for your fluid's specific gravity. For NIST Traceability please consult factory.

CONSTRUCTION MATERIALS

The meter body, internal moving parts, and seals are offered in a variety of materials to suit a wide range of applications: water, synthetic and petroleum based oils, paint, some corrosives, solvents, air and gases. See selections in the "How to Order" section.

LINE CONNECTION

Ports can be from 1-1/2 to 4 inches. All connections and types are specified in the "How to order" section.



Fluid enters at A, passes around the semi-circular vane B, exits at outlet C. The vane resists the flow because of the spring D. The further the vane is pushed the larger the passageway E becomes. This minimizes pressure drop. The vane shaft turns to operate the pointer F and remote signal devices such as the switch G.

HOW TO ORDER Select appropriate symbols and build a model code number, as in example shown:

EXAMPLE:

LN - F I F 200GM - 20 -

32V1.0 -

SERIES BY PRESSURE RATING

Normal pressure (300 PSI)	=	LN
High pressure (500 PSI)	=	LE

HOUSING MATERIAL

WHERE USED

Aluminum	Lube oil	=	D	LN
Brass	Water	=	F	LN
Carbon steel	Oil	=	M	LE or LN
Stainless steel (316)	Chemicals, corrosives	=	I	LE or LN

INTERNAL MOVING PARTS

Stainless steel (316 series)	Chemicals and corrosives	=	I
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SEAL MATERIAL

Buna N	Water, oil	=	B
Viton	Acids, some caustics	=	F
Kalrez (dynamic) and Viton (static)	Corrosives, solvents	=	K

MAX FLOW RATE LIQUIDS

GPM	80, 100, 150, 200, 300, 400*, 500*	=	GM
LPM	300, 400, 600, 800, 1200, 1500*, 1800*	=	LM
CMH	40, 50, 70, 90*, 120*	=	CMH
Dual viscosity scale		=	DGM
Dual gallons and liters per minute		=	GLM
Contact factory for other type scales			
*Requires special option DS (for flows greater than 400gpm).			
No dual scales on LCD displays			

PORT CONNECTION

		Threaded SAE-Style Flanges (NPT)	Socket-Weld SAE-Style Flanges (Pipe)	Max. Flow (GPM) (LPM)
Inches	MM			
1-1/2	38.10	= 12	= 12W	100 378
2	50.80	= 16	= 16W	150 567
2-1/2	63.50	= 20	= 20W	300 1134
3	76.20	= 24	= 24W	400 1512
4	101.6	= 32	= 32W	500 1890

Flanges are steel; stainless steel units have stainless steel flanges. ANSI flanges also available.

FLANGED

Ex: Ex: 24FTCS150RF = 3" Threaded, Carbon Steel Class 150 Raised Face Flange

Pipe Size In Inches	Attachment	Material	Class	Style
12 = 1 1/2"	FW=Welded FT=Threaded	CS=Carbon Steel	150	RF=Ansi raised face
16 = 2"		S=316 Stainless	300	
20 = 2 1/2"				
24 = 3"				
32 = 4"				

FLUID CHARACTERISTICS

Viscosity number followed by a 'V' (for SSU), 'C' (for centipoise), or 'CS' (for centistokes) followed by the specific gravity. Example: 32V1.0 would indicate a fluid with a viscosity of 32 SSU with a specific gravity of 1. For dual viscosities (where there is a start up viscosity or where there may be a range) put in both values with a slash. Example: 320/150V.9.

RX1

W

L -

ST -

3ØD

SERVICE

Weatherproof (Type 4) Available on all boxes = **W**
 Weatherproof, corrosion proof (Type 4X) Available on all boxes = **X**

FLOW DIRECTION

Left to right = **R**
 Right to left = **L**
 Up = **U**
 Down = **D**

SPECIAL OPTIONS

High-temp- 400°F std and 300°F for transmitter options = **HT**
 Stainless steel ID tag for customer supplied information = **ST**
 Safety Glass window ref. page 5 = **TG**
 Dual spring (required for flows 400gpm or greater) = **DS**

SWITCH SETTING

No symbol = Lowest possible setting
 Desired set point is assumed to be in flow units already selected (GPM). Give flow rate followed by a "D" for flow going down (flow failure) or a "U" for flow going up. **3ØD**
 Example, 3ØD indicates a setting of 30 GPM in declining flow. Consult factory for settings out of flow range.

CONTROL BOX & READOUT**T Box****"T" Box**

"T" box always has a transmitter (4-20 mA) and can be in combination with a mechanical switch for redundancy. It has two junction boxes to separate wiring for switches and transmitters. The display can be analog or digital LCD.

NOTE: The 4-20mA transmitter with or without the LCD and with NO switches is Intrinsically safe with approved barriers.



LCD readout, 4-20mA with 2 open collectors: No dual scales on LCD's

No switches **TXLØ**
 One SPDT (3 wire) **TXL1**
 One SPDT (4 wire) **TXL3**
 One SPDT (3 wire) high temperature **TXL61**

**Pointer, scale and 4-20 mA:**

No switches **TXØ**
 One SPDT (3 wire) **TX1**
 Two SPDT (3 wire) **TX2**
 One SPDT (4 wire) **TX3**
 Two SPDT (4 wire) **TX4**
 One SPDT (3 wire) high temperature **TX61**

Flow rate display, HART & 4-20mA output:

HART protocol is not intrinsically safe **THØ**
 HART & 4-20mA output only **TH1**
 One SPDT (3 wire) **TH2**
 Two SPDT (3 wire) **TH3**
 One SPDT (4 wire) **TH4**
 Two SPDT (4 wire)

"R" Box

"R" box is selected for greater visual resolution.

It holds switches (general purpose and hazardous location all classes, groups and divisions) and transmitters (HART or 4-20 mA). Switch (standard service) and transmitter are offered in this control box together when signal redundancy is desired.

**R Box****Flow rate display plus:**

Display only **RØ**
 One SPDT (3 wire) **R1**
 One high vibration SPDT (3 wire) **R1B**
 Two SPDT (3 wire) **R2**
 Two high vibration SPDT (3 wire) **R2B**
 One SPDT (4 wire) **R3**
 Two SPDT (4 wire) **R4**
 One SPDT (3 wire) high temperature **R61**
 Two SPDT (3 wire) high temperature **R62**
 One SPDT (3 wire) gold contact **R71**
 Two SPDT (3 wire) gold contact **R72**

Flow rate display, Hazardous location switches as follows:

One SPDT hazardous location **R7**
 One DPDT hazardous location **R17**
 Two SPDT hazardous location **R18**
 Two DPDT hazardous location **R19**

Flow rate display, 4-20 mA transmitter plus switch options as follows:

Display and transmitter only (Intrinsically safe with no switch options with approved barriers) **RXØ**

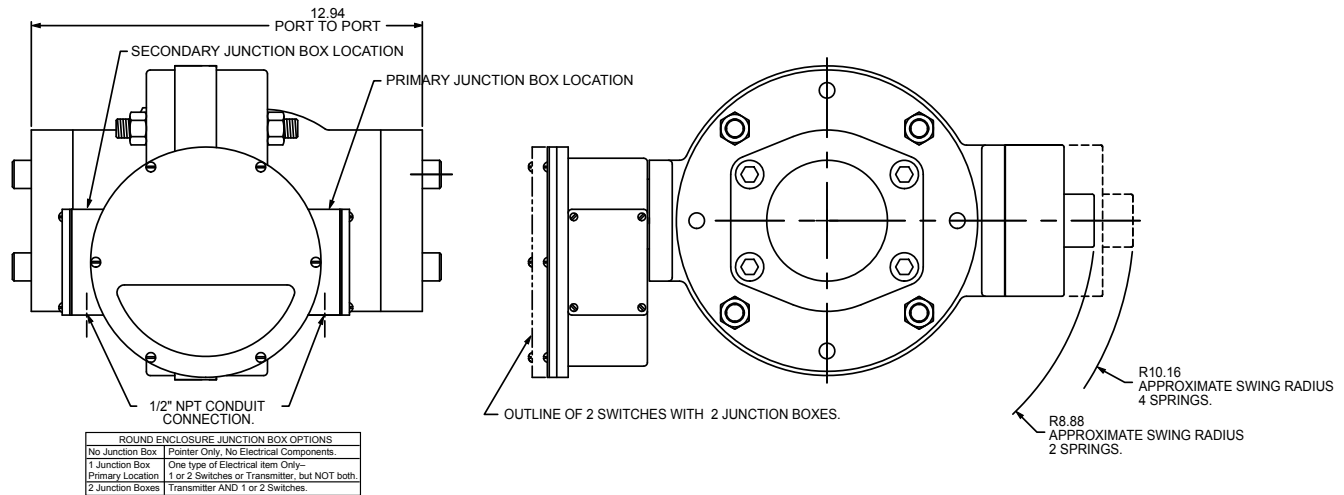
One SPDT (3 wire) **RX1**
 Two SPDT (3 wire) **RX2**
 One SPDT (4 wire) **RX3**
 Two SPDT (4 wire) **RX4**
 One SPDT (3 wire) high temperature **RX61**

Flow rate display, HART & 4-20mA output:

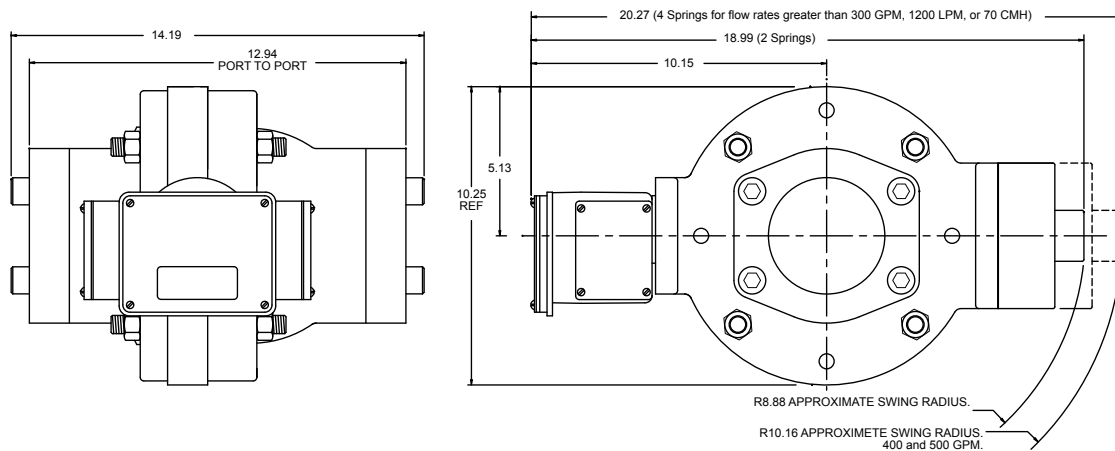
Hart protocol is not intrinsically safe **RHØ**
 HART & 4-20mA output only **RH1**
 One SPDT (3 wire) **RH2**
 Two SPDT (3 wire) **RH3**
 One SPDT (4 wire) **RH4**
 Two SPDT (4 wire)

CONTROL BOX SELECTION GUIDE

STANDARD OFFERING: Control Box “R”



SPECIAL OFFERING: Control Box “T”



SPECIAL OPTIONS

High temperature: (option HT) requires seals of Viton®, EPR, Kalrez™ or Teflon (compatible with fluid). A thermal barrier (heat-resistant cloth) is added between the housing and the control box, which must be used with service option "W" (weather-proof) or "X" (corrosion resistant). A metal scale is provided.

Safety Glass window: (option TG) replaces the standard window with "Laminated Safety Glass" ANSI Z97.1 and CPSC 1601 CFR 1201.

ENGINEERING DATA

Maximum fluid temperature:
200 °F (95 °C)

Optional max. fluid temperatures:
300 °F & 400 °F (150 °C & 205 °C)
(option HT)

Max. ambient temp: 150 °F (65 °C)

SERIES LN

Max. operating pressures
(3:1 safety factor):
300 PSI (20.69 BAR)

SERIES LE

Max. operating pressures
(2:1 safety factor):
500 PSI (34.5 BAR)

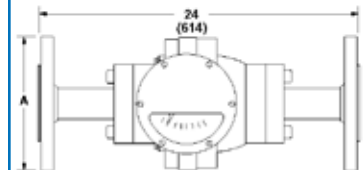
Readout accuracy, full scale: ±2 %

FLOW & PRESSURE DROP

Meters with maximum flows to 300 GPM (1200 LPM) impose a pressure drop that increases with flow from 1.9 to 3.8 PSI (avg. 2.2). Flows greater than 400 GPM have a maximum pressure drop of 5.5 PSI.

With 150 lb R.F. flanges
(for other flanges consult factory)

Port Size (inches)	A
1-1/2	5
2	6
2-1/2	7
3	7-1/2
4	9



"Flow up" or "flow down" dimensions are the same. Scale numbers are turned 90° to be right reading. For additional information on flanged connection see page 129.

DS-LN

