

UNIVERSAL® Flow Meters

An Extra-Large Vane Style For Liquids



NIST Traceable Calibration
Certificate Available



XHF meter
with R Box

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 are not required on the 4-inch meter. The meters require 2 pipe diameters straight run before and after the meter. The all-mechanical sensing system directly drives the pointer and remote signaling devices. They handle shocks or flow surges beyond their rated capacities.

The swinging vane can be manually operated with a factory supplied wrench 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).

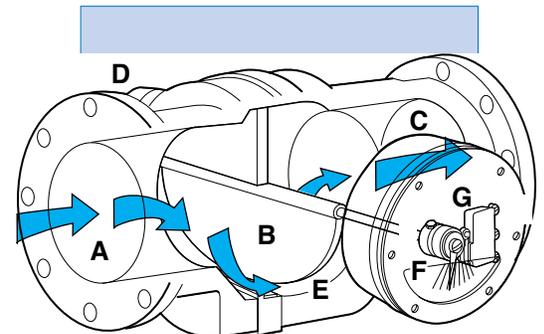
The switches can be general purpose or rated for hazardous locations (all classes, groups and divisions).

CALIBRATION

All flow meters are individually calibrated on fluids suitable to maintain the stated accuracy for viscosities up to 3000 SSU (650 Centipoise). We also compensate for specific gravity. For NIST Traceability please consult factory.

CONSTRUCTION MATERIALS

The meter body, 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, and air and gases. The flowmeter body is made up of the "center section" which is where the moving parts are. Sometimes it is cost effective to match this to other materials for the in and outflow sections of the meter body and flanges. See selections 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: XHF -

Q I B 800GM - 32V1.0 -

SERIES BY PRESSURE RATING

Extra high vane style = **XHF**

Material of meter body, center section and flanges

In and outflow body portions	Center section	Flange		
Aluminum	Aluminum	Aluminum	Oil	D
Carbon steel	Carbon steel	Carbon steel	Oil	M
Carbon steel (nickel plated)	Carbon steel (nickel plated)	Carbon steel (nickel plated)	Water	J
Aluminum (hard coat)	Aluminum (hard coat)	Aluminum (hard coat)	Oil with corrosive environment	E
Stainless steel (316)	Stainless steel (316)	Stainless steel (316)	Chemicals, corrosives, water	I
Aluminum	Brass	Aluminum	Water	Q
Carbon steel	Stainless steel (316)	Carbon steel	Water, oil	X

INTERNAL MOVING PARTS

Stainless steel (316 series) = **I**

SEAL MATERIAL

Buna N	Water, oil	B
EPR	Water, hot water, some caustics	E
Viton®	Acids, some caustics	F
Kalrez™ (dynamic) and Teflon (static)	Corrosives, solvents	T
Kalrez (dynamic) and Buna N (static)	Specialty	A
Kalrez (dynamic) and EPR (static)	Specialty	H
Kalrez (dynamic) and Viton (static)	Specialty	K

MAX FLOW RATE LIQUIDS

GPM	500, 600, 800 , 1000, 1500	=	GM
LPM	2000, 2500, 3000, 3500, 5600	=	LM
CMH	120, 140, 180, 220, 340	=	CMH

PORT CONNECTION

150-lb ANSI Weld-Neck Flanges				
Size		Max. Flow		Symbol
Inches	MM	(GPM)	(LPM)	
4	101.6	600	2271	32W
6	152.4	1000	3785	48W
8	203.2	1500	5677	64W

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.

Consult factory for compatibility of construction materials with the fluid involved.

Viton® and Kalrez™ are registered trademarks for DuPont Performance Elastomers.

RX1

W

L -

ST -

75D

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, 300°F for transmitter options = **HT**
Stainless steel ID tag for customer supplied information = **ST**
Safety Glass window ref. page 5 = **TG**

SWITCH SETTING

No symbol = Lowest possible setting (usually 10% of maximum flow)
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.
Example, 75D indicates a setting of 75 GPM in declining flow.

75D

CONTROL BOX & READOUT

T Box

"T" Box

"T" box always has a transmitter (4-20 mA or HART) 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.



Pointer, scale and 4-20 mA plus option:

No switches (Intrinsically safe with approved barriers) **TX0**
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**

HART, pointer, scale plus option:

Two programmable HART switches **TH0**
One SPDT (3 wire) **TH1**
Two SPDT (3 wire) **TH2**
One SPDT (4 wire) **TH3**
Two SPDT (4 wire) **TH4**
One SPDT (3 wire) high temperature **TH61**

LCD readout, 4-20mA plus option:

No switches (Intrinsically safe with approved barriers) **TXL0**
One SPDT (3 wire) **TXL1**
One SPDT (4 wire) **TXL3**
One SPDT (3 wire) high temperature **TXL61**

"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 **R0**
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:

For > 5 amp circuits

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

For < 1 amp circuits

One SPDT hazardous location **R20**
One DPDT hazardous location **R21**
Two SPDT hazardous location **R22**
Two DPDT hazardous location **R23**
One SPST hazardous location proximity **R30**
Two SPST hazardous location proximity **R31**

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

Display and transmitter only
(Intrinsically safe with approved barriers) **RX0**
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 output plus options as follows:

HART output only **RH0**
One SPDT (3 wire) **RH1**
Two SPDT (3 wire) **RH2**
One SPDT (4 wire) **RH3**
Two SPDT (4 wire) **RH4**

CONTROL BOX SELECTION GUIDE

STANDARD OFFERING: Control Box "R"



"R" box is selected for greater resolution (more increments on the inscribed scale).

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

You get this control box when you order any CONTROL BOX & READOUT starting with an "R" (see "How to Order" page). Examples: R1WR is a one switch, weatherproof box with flow from left to right.

This control box is made from epoxy coated aluminum.

SPECIAL OFFERING: Control Box "T"



"T" box is selected for availability of two isolated junction boxes with terminal strips. This means that no direct wiring to switches or transmitters is required.

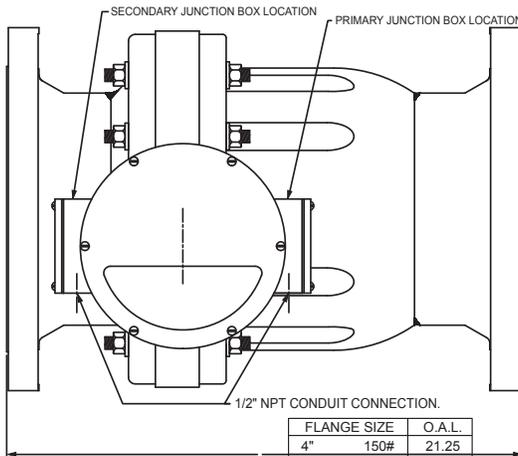
Digital LCD display of flow is optional ("TXL").

It holds switches (general purpose) and 4-20mA transmitter. Switch (standard service) and transmitter are offered in this control box together when signal redundancy is desired. These are wired to separate junction boxes for signal isolation.

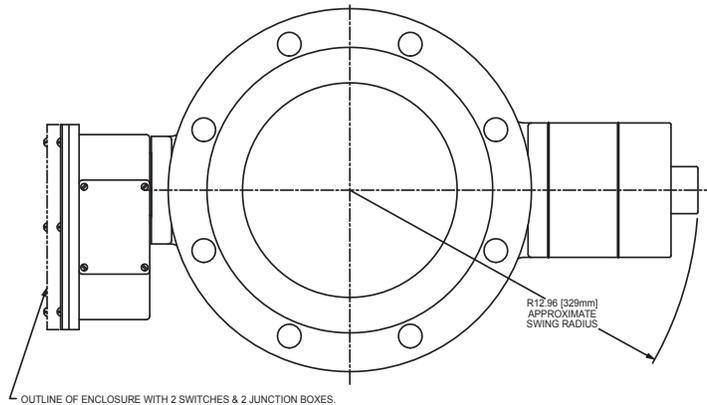
You get this control box when you order any CONTROL BOX & READOUT starting with a "T" (see "How to Order" page). Examples: TX1WR is a one switch with 4-20mA transmitter, weatherproof box with flow from left to right.

This control box is made from epoxy coated aluminum.

Outline drawing for all control box options



ROUND ENCLOSURE JUNCTION BOX OPTIONS	
No Junction Box	Pointer Only, No Electrical Components.
1 Junction Box	One type of Electrical Item Only—Primary Location
1 Junction Box	1 or 2 Switches or Transmitter, but NOT both.
2 Junction Boxes	Transmitter AND 1 or 2 Switches.



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.

Identification tag: (option **ST**) customer-supplied information is stamped on a stainless steel tag that is attached to the nameplate.

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 temperature:
400°F (205°C)

Maximum ambient temperature:
150°F (65°C)
CSA listed only to 105°F (40°C)

Maximum operating pressure
(3:1 safety factor):
300 PSI (20.69 BAR)

Readout accuracy, full scale:
±2%

FLOW & PRESSURE DROP

Units with max flow of 800 GPM or less have a max pressure drop of 3.8 PSI. All others have maximum pressure drop of 5.5 PSI.



Universal Flow Monitors, Inc.

1755 E. Nine Mile Road ▪ P.O. Box 249 ▪ Hazel Park, MI 48030
Tel: 248-542-9635 ▪ Fax: 248-398-4274
www.flowmeters.com ▪ E-mail: ufm@flowmeters.com