

# UNIVERSAL<sup>®</sup>

Flow Monitors Inc.



Water • Oils • Coolants • Glycol  
Indicator • Switches • Transmitters

**Visit us online at**  
**[Flowmeters.com](http://Flowmeters.com)**

# WATER, GLYCOL OILS & COOLANTS

## Indicators • Switches • Transmitters

### TYPICAL APPLICATIONS

|                       |                         |
|-----------------------|-------------------------|
| Pump Seal Water       | Cooling & Process Water |
| Scrubber Water        | Condensate              |
| Bearing & Quench Oils | Gear Box Oil            |
| Propylene Glycol      | Ethylene Glycol         |
| Machine Tool Coolants | Grinder Coolants        |



### Features

- **Direct Flow Rate Indicators w/Optional field adjustable switch(es)**
- **Optional LCD Readout w/two Open Collector alarms and LED alarm indicators**
- **4-20 mA Output Transmitter**
- **Certified CSA, CE & CENELEC**
- **Rated for Hazardous Location all Classes, Divisions & Groups**
- **Mounts in any orientation**
- **No straight pipe runs required**
- **Easy to read with dark or opaque fluids**
- **Durable Simple Mechanical Design- no glass or plastic tubes**
- **Individually Calibrated**
- **NIST certificate of calibration- Optional**
- **Easy to install, operate and maintain**
- **Analog or Digital LCD Rate Readout**
- **Cost Effective**

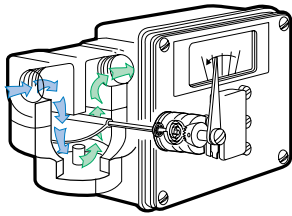
### General Description

The flow meters described here are used for water, coolant, lubricating oil or glycol. These are the fluids that keeps drills, mills, resistance welders, gears and bearings functional. Line sizes covered are 1/4 to 2 inch with flows as low as 5 GPH and as high as 160 GPM.

They work on the variable area principle wherein a greater cross-sectional area is provided as flow increases (See "How it Works"). There are no magnetic couplings to attract metal and clog up. There are no probes that can coat and change reading. There are no glass tubes to break. The basic design has been proven in the field for over 25 years.

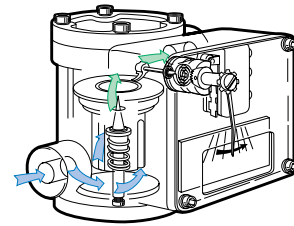
The most fundamental use of this product is for equipment protection when flow goes too low. The flow switch can trigger process shutdown to avoid equipment damage. Flow indication allows diagnosis of the problem and minimization of downtime. Switches are available for hazardous locations for all Classes, Divisions and Groups. For greater automation, flow transmitters allow remote reading of the flow, totalizing, batching, recording, and use with PLCs or in control systems. Our transmitter includes local digital readout and two open collector switches. Intrinsically safe transmitters are available.

The simple design has many advantages. It is robust. The response is immediate. It mounts in line. No straight pipe runs are needed. Mount it in any orientation. It is easy to install, troubleshoot, clean, repair and understand. It has CSA, CE and Cenelec ratings. Each meter is individually calibrated to customer provided fluid specifications for maintaining accuracy. NIST traceable calibration is available.



### HOW IT WORKS SN/MN VANE STYLE

Fluid is passed around a semicircular swinging vane that resists the flow because of a constant-torque spring. As increasing flow forces the vane further around, the passage becomes larger. This accommodates the larger flows without appreciably increasing the pressure drop, which averages 2.2 PSI. Attached to the vane shaft is a pointer that indicates the flow rate on a scale. The shaft can also turn switch cams and transducers to actuate any remote readout device present.



### HOW IT WORKS LL PISTON STYLE

A piston with a central circular opening is spring-loaded to seat on a precision-tapered shaft. Fluid flow causes the piston to move along the axis of the shaft, creating the variable orifice (between the hole and the shaft). The equilibrium position of a piston is mechanically linked to the readout pointer. Pressure drop increases over rated flow range, averaging 3 PSI.

## Mechanical Specifications

### General Mechanical Specifications

**Maximum Pressure** ..... 300 PSIG (20.69 BAR)  
**Maximum Temperature** ..... 200°F (96°C)  
 ..... Optional: 400°F (205°C) Consult Factory

### Mechanical Specs- Piston Style (LL)

**Maximum (Full Scale) Flow Rates** ..... from 5 GPH - 2 GPM  
**Readout Accuracy** ..... +/- 5% Full Scale (F.S.)  
**Pressure Drop** ..... Average is 2.5 / Maximum is 5 PSI @ F.S.  
**Process Connection Sizes NPTF** ..... 1/8", 1/4", 3/8", 1/2" & 3/4"

### Mechanical Specs- Small Vane (SN)

**Maximum (Full Scale) Flow Rates** ..... from 3 GPM - 20 GPM  
**Readout Accuracy** ..... +/- 5% Full Scale (F.S.)  
**Pressure Drop** .....  
 1/2 to 8 GPM                      9 to 12 GPM                      12 to 20 GPM  
 2.5 PSID max.                      4 PSID max.                      5.5 PSID max.

**Process Connection Sizes NPTF** ..... 1/8", 1/4", 3/8", 1/2" & 3/4"

### Mechanical Specs- Medium Vane (MN)

**Maximum (Full Scale) Flow Rates** ..... from 16 GPM - 160 GPM  
**Readout Accuracy** ..... +/- 2% Full Scale (F.S.)  
**Pressure Drop** .....  
 16 to 80 GPM    90 to 100 GPM    110 to 150 GPM    150 to 160 GPM  
 3.8 PSID max.    6.0 PSID max.    6.8 PSID max.    7.5 PSID max.

**Process Connection Sizes NPTF** ... 1/2", 3/4", 1", 1-1/4", 1-1/2" & 2"

\*Note: For other thread types & flanged connections, Consult Factory.

## Transmitter Specifications

Requires Box Symbol "G"

**Input Power** ..... 10 - 30 VDC @ 21 mA  
 ..... (24 VDC max. for intrinsically safe)  
**Output** ..... 4-20 mA DC Linear (2-wire transmitter)  
**Maximum Output Current** ..... 21 mA  
**Ambient Operation Temperature** ..... 0°F + 176°F (-18°C + 9°C)  
**Response Time** ..... 250 milliseconds  
**Calibrated Accuracy** ..... Same as primary device  
**Temperature Effect on Accuracy** ..... None on electrical  
**Output Noise** ..... 0.5% FS peak to peak, 0.25% FS RMS  
**Display Type** ..... 4-1/2 digit 7-segment LCD, 0.30" height  
**Alarm Outputs** ..... Two opto-isolated open-collector PNP  
 ..... transistor w/corresponding LEDs (for low & high flow rate)  
**Alarm Output Rating (Open Collector)** ..... 50 mA  
 ..... per output @ 30 VDC  
**Data Retention** ..... EEPROM (40 years)  
**Approvals/Certification-Pending** ..... CSA (NRTL/C),  
 Intrinsically safe for all classes and groups of hazardous locations  
 and CE  
**Board dimensions** ..... 1.15"W x 2.75"l x 0.50"H (w/LCD)  
**Enclosure** ..... Type 4 (Weatherproof)

## Switch Specifications

Non-Hazardous Location - Requires Box Symbol "A"

3-Wire SPDT Readout Options: 1, 2, 1B, 2B

Ratings:

5A-125, 250, or 480 VAC, 2A-600 VAC, 1/2A-125 VDC, 1/4A 250 VDC,  
 1/8 HP-125 VAC, 1/4 HP-250 VAC, 6A Resistive & 5A Inductive,  
 24 or 48 VDC

4-Wire SPDT Readout Options: 3, 4

Ratings:

15A-125, 250, or 480 VAC, 1A-125 VAC, 1/2A-250 VDC, 1/4A 125,  
 VDC, 1/2 HP-250 VAC, 3A Resistive & 2.5A Inductive-, 48 VDC,  
 24VDC=6A Res. & 5A Ind.

Switch Deadband All Styles not to exceed ≤ 7%

Hazardous Location- Requires Box Symbol "X"

3-Wire SPDT Readout Options: 7, 7C, 18 &

6-Wire DPDT Readout Options: 17, 17C, 19

Ratings:

11A, 1/4 hp, 125/250 VAC; 5A res., 28 VDC; 0.5 A res., 125 VDC

SPST Proximity Readout Option: 30, 31

Ratings:

0.5A, 20-250 VAC/VDC

Switch Deadband (not to exceed) Style LL= ≤ 30%, SN= ≤ 30%,

MN= ≤15%- Please Consult Factory



## Material of Construction

| Application                  | Style       | Wetted Materials   |
|------------------------------|-------------|--|
| Water/ Glycols/<br>Coolants  | LL Piston   | Brass Body & Piston<br>Stainless Steel Internals, Buna &<br>Teflon Seals         |
| Synthetic Oils               | LL Piston   | Brass Body & Piston<br>Stainless Steel Internals & Viton Seals                   |
| Petroleum Oils               | LL Piston   | Aluminum Body, Brass Piston<br>Stainless Steel Internals, Buna &<br>Teflon Seals |
| Water / Glycols/<br>Coolants | SN, MN Vane | Brass & Nylon Body<br>Stainless Steel Internals & Buna Seals                     |
| Synthetic Oils               | SN, MN Vane | Brass & Nylon Body<br>Stainless Steel Internals & Viton Seals                    |
| Petroleum Oils               | SN, MN Vane | Aluminum & Nylon Body<br>Stainless Steel Internals & Buna Seals                  |

# HOW TO ORDER WATER, GLYCOL,

Select the appropriate symbols to build a model code:

EXAMPLE: **S N - B S F** **6 G M** - **4** -

## APPLICATION

### WATER, WATER/GLYCOL, COOLANT

| Materials of Construction                           | Max. Flow Range                     | Prefix/Symbol | NOTE:  |
|---|-------------------------------------|---------------|--|
| Brass Body, Brass/SS Internals, Buna & Teflon Seals | 5 GPH to 2 GPM<br>(20 LPH to 8 LPM) | LL-BBPSB      | Consult factory for conversion of WB, WW, WP, WVS, WVM, WV L, O, OK and OO series. |
| Brass/Nylon Body, SS Internals, Buna Seals          | 3-20 GPM<br>(12-75 LPM)             | SN-BSB        |  |
| Brass/Nylon Body, SS Internals, Buna Seals          | 30-160 GPM<br>(120-600 LPM)         | MN-BSB        |  |

### SYNTHETIC BASED OILS

| Materials of Construction  | Max. Flow Range                     | Prefix/Symbol | NOTE:  |
|--|-------------------------------------|---------------|--|
| Brass/Polysulfone Body, Brass/SS Internals, Viton & Teflon Seals | 5 GPH to 2 GPM<br>(20 LPH to 8 LPM) | LL-BBPSF      | Consult factory for conversion of WB, WW, WP, WVS, WVM, WV L, O, OK and OO series. |
| Brass/Nylon Body, SS Internals, Viton Seals                      | 3-20 GPM<br>(12-75 LPM)             | SN-BSF        |  |
| Brass/Nylon Body, SS Internals, Viton Seals                      | 30-160 GPM<br>(120-600 LPM)         | MN-BSF        |  |

### PETROLEUM BASED OILS

| Materials of Construction  | Max. Flow Range                     | Prefix/Symbol | NOTE:  |
|--|-------------------------------------|---------------|--|
| Aluminum/Polysulfone Body, Brass/SS Internals, Buna & Teflon Seals | 5 GPH to 2 GPM<br>(20 LPH to 8 LPM) | LL-ABPSB      | Consult factory for conversion of WB, WW, WP, WVS, WVM, WV L, O, OK and OO series. |
| Aluminum/Nylon Body, SS Internals, Buna Seals                      | 3-20 GPM<br>(12-75 LPM)             | SN-ASB        |  |
| Aluminum/Nylon Body, SS Internals, Buna Seals                      | 30-160 GPM<br>(120-600 LPM)         | MN-ASB        |  |

## MAXIMUM FLOW RATES

### MAXIMUM FLOW - PISTON STYLE LL

| GPH  | GPM   | LPM |
|------|-------|-----|
| 5GH  | .5GM  | 2LM |
| 15GH | 1GM   | 4LM |
| 30GH | 1.5GM | 6LM |
| -    | 2GM   | 8LM |

### MAXIMUM FLOW - VANE STYLE SN

|   |      |      |
|---|------|------|
| - | 3GM  | 10LM |
| - | 4GM  | 15LM |
| - | 5GM  | 20LM |
| - | 6GM  | 25LM |
| - | 7GM  | 30LM |
| - | 8GM  | 40LM |
| - | 9GM  | 50LM |
| - | 10GM | 60LM |
| - | 12GM | -    |
| - | 15GM | -    |
| - | 16GM | 70LM |
| - | 20GM | 80LM |

### MAXIMUM FLOW - VANE STYLE MN

|   |       |       |
|---|-------|-------|
| - | 30GM  | 100LM |
| - | 40GM  | 120LM |
| - | 50GM  | 150LM |
| - | 60GM  | 200LM |
| - | 70GM  | 300LM |
| - | 80GM  | 400LM |
| - | 90GM  | -     |
| - | 100GM | -     |

Consult Factory for Flow Ranges to 160 GPM and other scale calibrations

## PROCESS CONNECTIONS

| Style Meter | Size in Inches | Max Flow Recommended |     | Symbol for NPT pipe connection |
|-------------|----------------|----------------------|-----|--------------------------------|
|             |                | GPM                  | LPM |                                |
| LL          | 1/8            | 2                    | 8   | 1U                             |
|             | 1/4            | 5                    | 20  | 2L                             |
|             | 3/8            | 10                   | 40  | 3L                             |
|             | 1/2            | 15                   | 60  | 4L                             |
| SN          | 3/4            | 20                   | 80  | 6L                             |
|             | 3/8            | 10                   | 40  | 3                              |
|             | 1/2            | 15                   | 60  | 4                              |
|             | 3/4            | 20                   | 80  | 6                              |
| MN          | 1/2            | 15                   | 60  | 4                              |
|             | 3/4            | 20                   | 80  | 6                              |
|             | 1              | 70                   | 265 | 8                              |
|             | 1 1/4          | 70                   | 265 | 10                             |
|             | 1 1/2          | 100                  | 380 | 12                             |
|             | 2              | 160                  | 600 | 16                             |

# OIL & COOLANT FLOW METERS

3 2 V 1.0 - A 1 N R - 2 D

## INITIAL SWITCH SETTING

No symbol = Lowest possible, or give setting(s) in GPM or LPM. Also a symbol to indicate the accuracy is desired during increasing flow (U) or decreasing flow (D). **2D** would mean that switch should actuate when flow rate decreases to 2 GPM. Settings are field adjustable.

## PIN CONNECTOR FOR TRANSMITTERS

**PC5M** = 5-pin male, options GTL0 & GP0  
**PC3M** = 3-pin male, options GTLZ0  
**CC** = 1/2" conduit connection

Pin connectors are also available for switches. Consult Factory.

## FLOW DIRECTION

**R** = Left to Right-Horizontal Mount  
**L** = Right to Left- Horizontal Mount  
**U** = Up-Vertical Mount  
**D** = Down-Vertical Mount

## ENCLOSURE TYPE

**N** = Oil & dust tight (Type 12 indicators w/switches only)  
**W** = Weatherproof (Type 4 indicators w/switches & transmitter)  
**X** = Weatherproof corr. (Type 4X indicators w/switches only)

## MECHANICAL INDICATION & SWITCHES TRANSMITTERS / LCD READOUT & O.C. ALARMS

### MECHANICAL INDICATION & SWITCHES (NON-HAZARDOUS)

#### A BOX OPTIONS

**A0** = Mechanical Indication only  
**A1** = Mechanical Indication with one 3-wire SPDT switch  
**A2** = Mechanical Indication with two 3-wire SPDT switches  
**A3** = Mechanical Indication with one 4-wire SPDT switch  
**A4** = Mechanical Indication with two 4-wire SPDT switches

### MECHANICAL INDICATION & SWITCHES (HAZARDOUS)

#### X BOX OPTIONS

**X7** = One SPDT Hazardous Location switch  
**X7C** = One SPDT Cenelec Approved switch  
**X17** = One DPDT Hazardous Location switch  
**X17C** = One DPDT Cenelec Approved switch  
**X18** = Two SPDT Hazardous Location switches- N/A SN Style  
**X19** = Two DPDT Hazardous Location switches- N/A SN Style  
**X30** = One SPST Hazardous Location Proximity switch  
**X31** = Two SPST Hazardous Location Proximity switches

### TRANSMITTERS / LCD READOUT & O.C. ALARMS

#### G BOX OPTIONS

**GTL0** = Integral 4-20mA transmitter, LCD readout, and 2 open collector alarms  
**GTLZ0** = Intrinsically safe 4-20mA transmitter, no open collector alarms  
**GP0** = G Box with potentiometer (requires remote LCD readout transmitter model: UT-PM-DTLCD).

Note: G Box requires "W" service option.

## FLUID CHARACTERISTICS

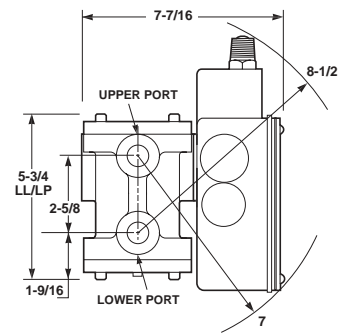
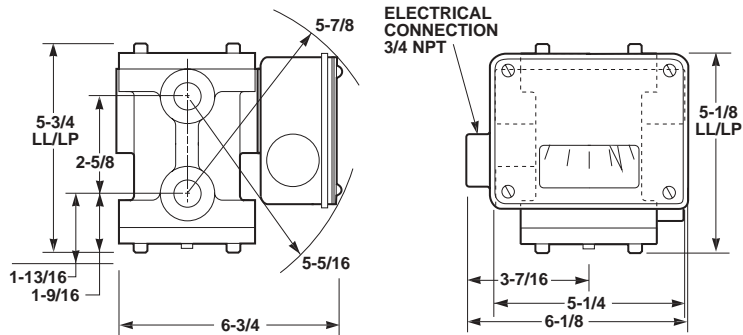
Viscosity number followed by a "V" (for SSU), "C" (for centipoise), or a "CS" (for centistokes), plus the fluid specific gravity. Leave blank for water. If unknown advise factory of the manufacturer of the fluid, the related product code, and the operating temperature- Consult Factory. Note: viscosity & specific gravity of water = **32V1.0**. This can also apply to most coolants and glycols.

# DIMENSIONAL DRAWINGS FOR WATER,

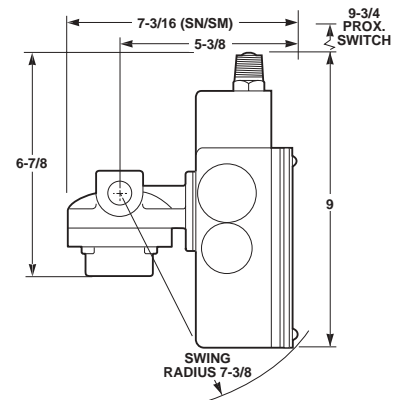
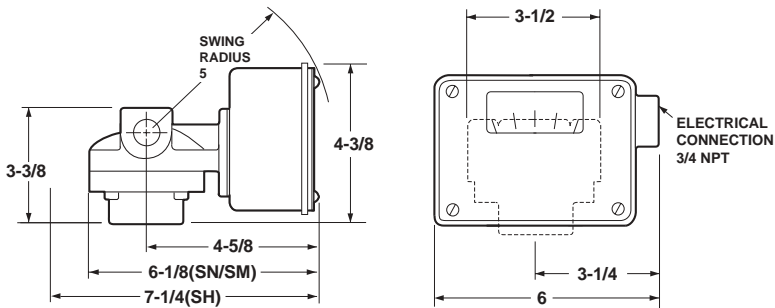
## A BOX (NON-HAZARDOUS LOCATIONS)

## X BOX (HAZARDOUS

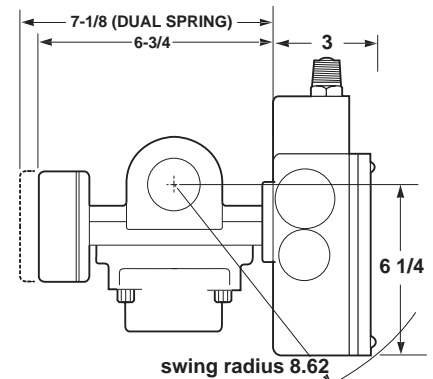
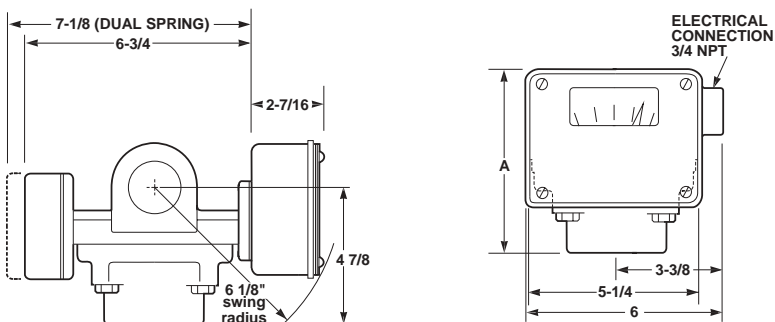
### PISTON STYLE (LL)



### SMALL VANE STYLE (SN)



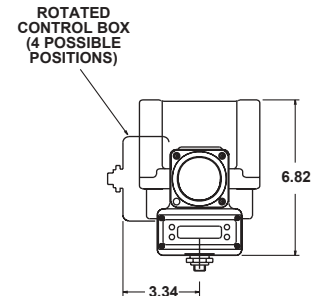
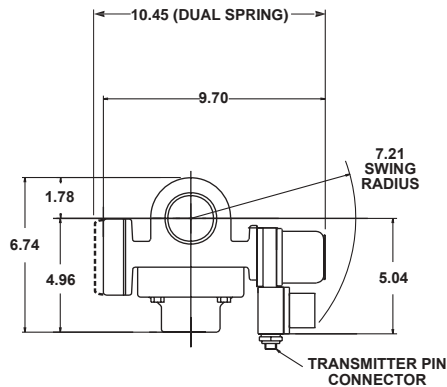
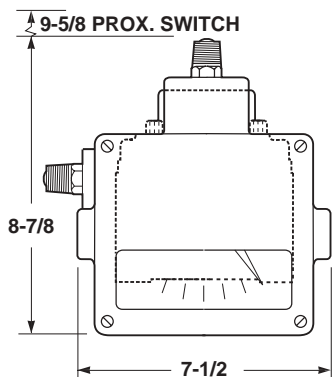
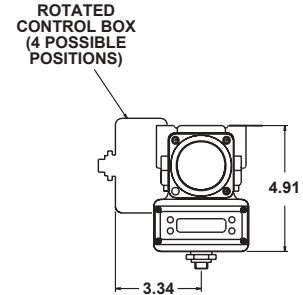
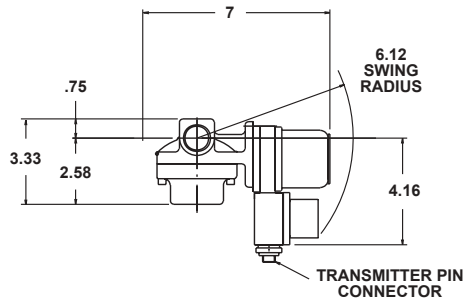
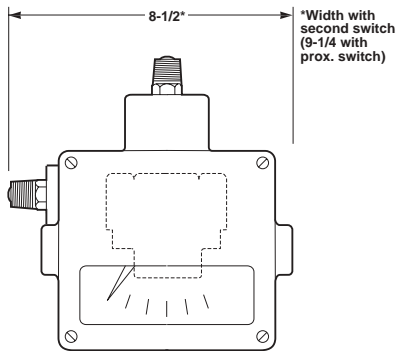
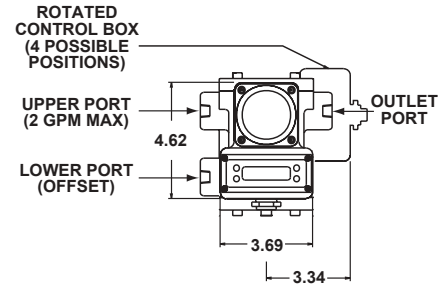
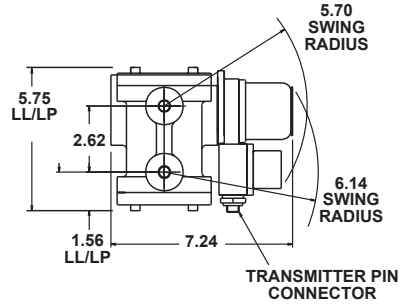
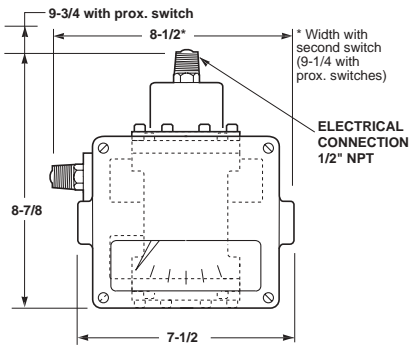
### MEDIUM VANE STYLE (MN)



# GLYCOL, OIL & COOLANT FLOW METERS

## LOCATIONS)

## G BOX TRANSMITTERS



# TYPICAL APPLICATIONS

## Water

Batching  
Make Up  
Chiller  
Polymer Feed  
Condensate  
Re-circulated Water  
Gas + Particulate Scrubber  
Pump Seal Water  
Heat Exchanger  
Turbine Cooling

Irrigation  
Centrifuge Water  
Plastic Injection Molds  
Compressor Cooling  
Quenching  
Dust Suppression  
Cooling  
Heating  
Transformer Cooling

Blending  
Motor Jacket Cooling  
Cold Rolls  
Process  
Cooling Water  
Resistance Welding  
Furnace Door and Panel  
Spray  
High Pressure Deburring

## Lubricants

Pinion Stand Bearings  
Ball Mill Bearing Lube  
Bearing Lube  
Thermal Transfer Fluids

Crusher Bearing Lube  
Mining Machinery Lubrication  
Hydraulic Power Units

Gear Boxes  
Quench Oils/Polymers  
Shipboard Lubricant

## Coolants/Glycols

Mixer Coolant  
Machine Tool Coolant

Ethylene Glycol Coolant  
Thermal Transfer Fluids

Propylene Glycol Chillers  
Grinder Coolant

SN Vane with X Box



Piston Style with G Box



SN Vane Style with A Box



MN Vane Style with A Box

# QUICK SIZING REFERENCE

## SUGGESTED MAXIMUM FLOW RATES FOR KNOWN PROCESS CONNECTION SIZES

| Connection Size | Maximum Flow Rate |         | Prefix | Abbrev. Prefix |     |
|-----------------|-------------------|---------|--------|----------------|-----|
| 1/8 Inch        | 30 GPH            | 120 LPH | LL     | OO             | WP  |
| 1/4 Inch        | 2 GPM             | 8 LPM   | LL     | OO             | WP  |
| 3/8 Inch        | 5 GPM             | 20 LPM  | SN     | O              | WVS |
| 1/2 Inch        | 10 GPM            | 40 LPM  | SN     | O              | WVS |
| 3/4 Inch        | 20 GPM            | 75 LPM  | SN     | O              | WVS |
| 1 Inch          | 30 GPM            | 120 LPM | MN     | O              | WVM |
| 1-1/4 Inch      | 40 GPM            | 160 LPM | MN     | O              | WVM |
| 1-1/2 Inch      | 50 GPM            | 200 LPM | MN     | O              | WVM |
| 2 Inch          | 100 GPM           | 600 LPM | MN     | O              | WVM |



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