



# POSITIVE DISPLACEMENT **FLOW METERS INSTRUMENTATION**

# JV-BB Positive Displacement Gear Flow Meter

## Common Uses

We improved on our industry-leading JV-KG series of meters with 0.5% accuracy over the full range of the meter, higher resolution, and higher pressure ratings with the release of our JV-BB series. These PD meters were designed for measuring lubricating and non-abrasive fluids with low or medium viscosity. Applications include:

- · Chemical injection & dosing systems
- · Fuel measurement
- · Test stands
- · Hydraulic positioning systems



# **Technical Specifications**

6 Flow Ranges	0.005 to 120 gpm (across all meter sizes)
Measuring Accuracy	±0.5% over full range with 30cP fluid, ±0.25% optional with select sensors
Repeatability	± 0.1%
Max. Operating Pressure	up to 6,000 psi
Ports	60BB and smaller: NPT standard, BSPP & bottom manifold mount optional
	80BB & 90BB: 1-1/4" SAE code 62 flange pattern standard; NPT, JIC & SAE flanges available upon request.
Turndown	up to 150:1
Calibration	7-point logarithmic calibration

# Materials of Construction

Body	JVA = 7075 Aluminum, JVM = 303 Stainless Steel, or JVS = 316L Stainless Steel
Gears & Bearings	Stainless Steel (DIN 1.4122)
O-Ring	FKM, FFKM, or PTFE
Shaft	402 C Stainless Steel
Bolts	Zinc Flake Coated Carbon Steel (Inconel 718 optional)

# **Output Options**

Choose from a wide variety of pickups, sensors, monitors, and controllers to pair with your gear meter:

- Frequency
- · Analog (voltage or 4-20mA)
- · Battery, loop, or DC powered displays



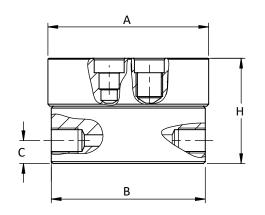
# JV-BB Positive Displacement Gear Flow Meter

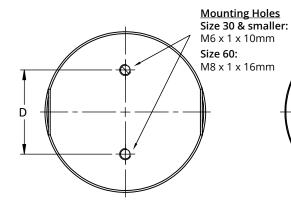
#### Meter Data

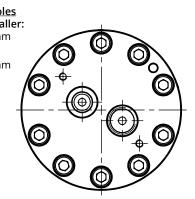
Meter Size	Flow Range		Resolution*		Ports	Filtration	Pressure	
	(GPM)	(LPM)	(Gal/Day)	(Impulses/Gal)	(Impulses/CC)		(microns)	(psi/bar)
JV#-12BB	0.005-0.8	0.02-3.0	7.2-1152	106,000	28.0	1/4" NPT	30	6,000/420
JV#-20BB	0.02-2.0	0.1-7.6	28.8-2880	31,800	8.4	1/4" NPT	30	6,000/420
JV#-30BB	0.1-7.0	0.5-26.5	144-10,080	13,200	3.5	1/2" NPT	30	6,000/420
JV#-60BB	0.1-20.0	0.5-75.7	144-28,800	3,600	0.95	3/4" NPT	30	6,000/420
JV#-80BB	0.5-60.0	1.9-227	720-86,400	1,600	0.42	1-1/4" SAE Code 62	200	5,000/345
JV#-90BB	1.0-120.0	3.8-454	1440-172,800	800	0.21	1-1/4" SAE Code 62	200	5,000/345

<sup># -</sup> Complete part # by selecting body material as follows: M=303 Stainless Steel, S=316 Stainless Steel, A= Aluminum. \* Figures shown represent resolution when using dual pickup sensor for 12BB to 60BB and x4 sensors for 80BB & 90BB.

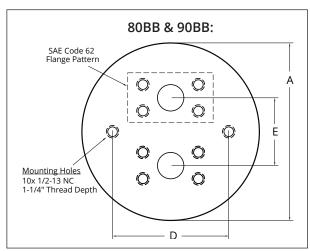
### **Meter Dimensions**







Meter Size			Dime	Weights (Lbs)					
	A	В	С	D	E	н	JVS	JVM	JVA
JV#-12BB	3.0"	2.9"	0.47"	1.7"		2.2"	3.6	3.6	1.8
JV#-20BB	3.3"	3.2"	0.47"	1.7"		2.2"	4.9	4.9	2.7
JV#-30BB	3.3"	3.2"	0.51"	1.7"		2.7"	6.4	6.4	2.9
JV#-60BB	5.0"	4.9"	0.75"	2.4"		4.3"	18.8	18.8	9.1
JV#-80BB	8.4"	8.4"		5.5"	3.2"	5.5"	78.0	78.0	31.0
JV#-90BB	8.4"	8.4"		5.5"	3.2"	7.0"	97.0	97.0	66.0



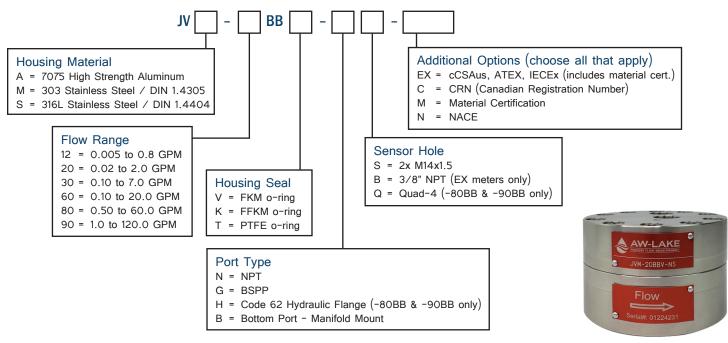
3D STEP Models are available upon request of factory.

Products may be subject to change without notice. Contact factory for the most up-to-date product information.



# JV-BB Positive Displacement Gear Flow Meter

## Part Number Guide



# **Electronics Options**

AW-Lake offers a wide selection of Sensors/Pickups and Monitors/Controllers to optimize flow measurement and deliver your flow data where you need it and in the format you need it:

- Analog (Voltage & 4-20mA available)
- Frequency
- · Modbus®
- · HART®
- · Bluetooth®
- Electronic Displays (Local & Remote Mount)
- · Certified Units (UL, cCSAus, ATEX, IECEx)
- Wireless Monitoring (Radio Frequency)

Refer to website for more information.













# JV-TC Positive Displacement Gear Flow Meter

#### Common Uses

JV-TC positive displacement flow meters build upon our 40+ years of excellence in measuring non-lubricating and filled fluids by improving gear/shaft design, increasing pressure ratings, and improving flushability. These improvements, along with the standard 7-point calibration and new EDGE sensor give you a 0.5% accurate meter across the full flow range. Practical applications include:

- Filling and dosing systems
- · Paint shops and delivery systems
- Polyurethane systems
- Multiple-component mixing systems
- · Adhesive dispensing systems
- Hydraulic systems



# **Technical Specifications**

5 Flow Ranges	0.001 to 20 gpm (across all meter sizes)
Measuring Accuracy	±0.5% over full range with 30cP fluid, ±0.25% optional with select sensors
Repeatability	± 0.1%
Max. Operating Pressure	up to 6,000 psi
Ports	NPT standard, BSPP & bottom manifold mount optional
Turndown	up to 400:1
Calibration	7-point logarithmic calibration

# Materials of Construction

Body	JVM = 303 Stainless Steel or JVS = 316L Stainless Steel
Gears	Stainless Steel (DIN 1.4122)
O-Ring	FKM, FFKM, or PTFE
Bearings & Shafts	Tungsten Carbide
Bolts	Zinc Flake Coated Carbon Steel (Inconel 718 optional)

# **Output Options**

Choose from a wide variety of pickups, sensors, monitors, and controllers to pair with your gear meter:

- · Frequency
- Analog (voltage or 4-20mA)
- · Battery, loop, or DC powered displays



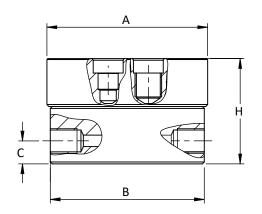
# JV-TC Positive Displacement Gear Flow Meter

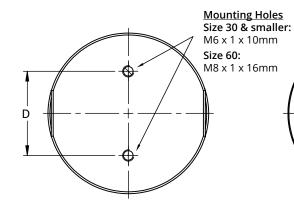
#### Meter Data

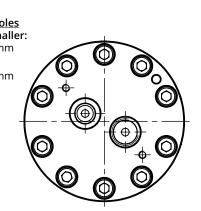
Meter Size	Flow Range			Resolu	ıtion*	Ports	Filtration	Pressure
	(GPM)	(LPM)	(Gal/Day)	(Impulses/Gal)	(Impulses/CC)		(microns)	(psi/bar)
JV#-10TC	0.001-0.5	0.004-1.9	1.4-720	200,600	53.0	1/4" NPT	120	6,000/420
JV#-12TC	0.005-0.8	0.02-3.0	7.2-1152	106,000	28.0	1/4" NPT	120	6,000/420
JV#-20TC	0.02-2.0	0.08-7.6	28.8-2880	31,800	8.4	1/4" NPT	120	6,000/420
JV#-30TC	0.1-7.0	0.38-26.5	144-10,080	13,200	3.5	1/2" NPT	120	6,000/420
JV#-60TC	0.1-20.0	0.38-75.7	144-28,800	3,600	0.95	3/4" NPT	200	6,000/420

<sup># -</sup> Complete part # by selecting body material as follows: M=303 Stainless Steel, S=316 Stainless Steel, A= Aluminum. \* Figures shown represent resolution when using dual pickup sensor.

## **Meter Dimensions**







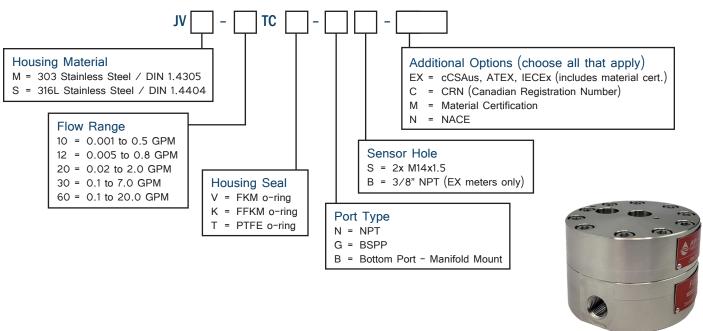
Meter Size		D	Weights				
	A	В	С	D	н	(Lbs)	(Kg)
JV#-10TC	3.0"	2.9"	0.47"	1.7"	2.2"	2.9	1.3
JV#-12TC	3.0"	2.9"	0.47"	1.7"	2.2"	3.6	1.6
JV#-20TC	3.3"	3.2"	0.47"	1.7"	2.2"	4.9	2.2
JV#-30TC	3.3"	3.2"	0.51"	1.7"	2.7"	6.4	2.9
JV#-60TC	5.0"	4.8"	0.75"	2.4"	4.3"	18.8	8.5

3D STEP Models are available upon request of factory.



# JV-TC Positive Displacement Gear Flow Meter

## Part Number Guide



# **Electronics Options**

AW-Lake offers a wide selection of Sensors/Pickups and Monitors/Controllers to optimize flow measurement and deliver your flow data where you need it and in the format you need it:

- Analog (Voltage & 4-20mA available)
- Frequency
- · Modbus®
- · HART®
- · Bluetooth®
- Electronic Displays (Local & Remote Mount)
- Certified Units (UL, cCSAus, ATEX, IECEx)
- Wireless Monitoring (Radio Frequency)

Refer to website for more information.













# JV-UF Positive Displacement Gear Flow Meter

## Common Uses

A completely new Series for AW-Lake, the JV-UF is designed for low viscosity fluids (solvents, scale inhibitor, methanol, DEF) in Stainless Steel bodies (303 and 316SS). We reduced the clearances around the gears to prevent fluid from slipping past and now measure flows as low as 0.0005 gpm with a 5cP fluid (we can measure fluids below 1.0 cP) and as high as 20 gpm. The JV-UF meters pair with our existing sensors to provide you with the data you need. Common applications include:

- · Chemical, methanol, and fuel injection & dosing systems
- · Test stands
- Hydraulic positioning systems
- · Coolant & lubrication monitoring



# **Technical Specifications**

5 Flow Ranges	0.0005 to 20 gpm (across all meter sizes)
Measuring Accuracy	$\pm 1.5\%$ over full range (viscosity $\geq$ 5cP), $\pm 0.5\%$ optional with select sensors; $\pm 2.5\%$ over full range (viscosity $\geq$ 5cP) for JV-01UF
Repeatability	± 0.05%
Max. Operating Pressure	up to 6,000 psi
Ports	NPT standard, BSPP optional
Turndown	up to 500:1
Calibration	7-point logarithmic calibration

### Materials of Construction

Body	JVM = 303 Stainless Steel or JVS = 316L Stainless Steel
Gears & Bearings	Stainless Steel (DIN 1.4122)
O-Ring	FKM, FFKM, or PTFE
Shaft	402 C Stainless Steel
Bolts	Zinc Flake Coated Carbon Steel (Inconel 718 optional)

#### **Output Options**

Choose from a wide variety of pickups, sensors, monitors, and controllers to pair with your gear meter:

- Frequency
- · Analog (voltage or 4-20mA)
- · Battery, loop, or DC powered displays



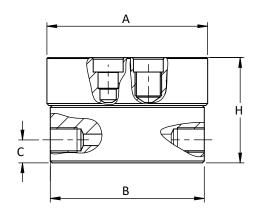
# JV-UF Positive Displacement Gear Flow Meter

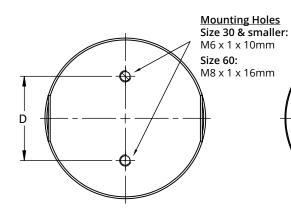
#### Meter Data

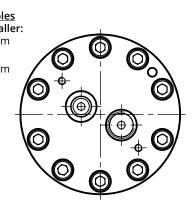
Meter Size	Flow Range			Resolu	ıtion*	Ports	Filtration	Pressure
	(GPM)	(LPM)	(Gal/Day)	(Impulses/Gal)	(Impulses/CC)		(microns)	(psi/bar)
JV#-01UF	.000525	0.002-1.0	0.72-360	302,600	80.0	1/4" NPT	15	5,000/345
JV#-12UF	0.005-0.8	0.02-3.0	7.2-1152	106,000	28.0	1/4" NPT	30	6,000/420
JV#-20UF	0.02-2.0	0.1-7.0	29-2880	31,800	8.4	1/4" NPT	30	6,000/420
JV#-30UF	0.1-7.0	0.5-25.0	144-10,080	13,200	3.5	1/2" NPT	30	6,000/420
JV#-60UF	0.1-20.0	0.5-75.0	144-28,800	3,600	0.95	3/4" NPT	30	6,000/420

<sup># -</sup> Complete part # by selecting body material as follows: M=303 Stainless Steel, S=316 Stainless Steel. \* Figures shown represent resolution when using dual pickup sensor.

## **Meter Dimensions**







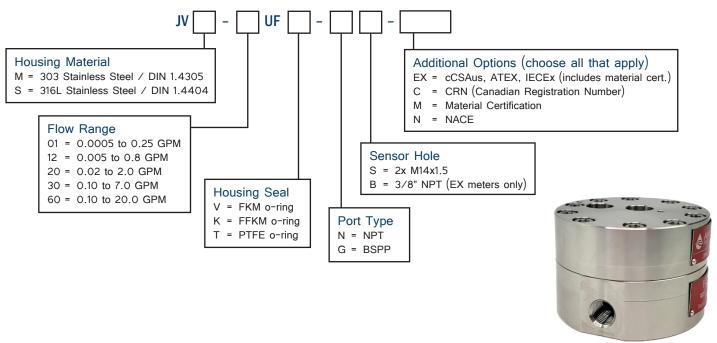
Meter Size		D	imension	Weights (Lbs)				
	A	В	С	D	Н	JVS	JVM	JVA
JV#-01UF	3.3"	3.2"	0.47"	1.7"	2.2"	3.6	3.6	1.8
JV#-12UF	3.0"	2.8"	0.47"	1.7"	2.2"	4.9	4.9	2.7
JV#-20UF	3.3"	3.2"	0.47"	1.7"	2.2"	6.4	6.4	2.9
JV#-30UF	3.3"	3.2"	0.51"	1.7"	2.6"	18.8	18.8	9.1
JV#-60UF	4.9"	4.7"	0.75"	2.4"	4.2"	78.0	78.0	32.0

3D STEP Models are available upon request of factory.



# JV-UF Positive Displacement Gear Flow Meter

## Part Number Guide



# **Electronics Options**

AW-Lake offers a wide selection of Sensors/Pickups and Monitors/Controllers to optimize flow measurement and deliver your flow data where you need it and in the format you need it:

- · Analog (Voltage & 4-20mA available)
- Frequency
- · Modbus®
- · HART®
- · Bluetooth®
- · Electronic Displays (Local & Remote Mount)
- Certified Units (UL, cCSAus, ATEX, IECEx)
- Wireless Monitoring (Radio Frequency)

Refer to website for more information.













# JVH High Pressure Positive Displacement Flow Meter

## Common Uses

Designed for use in systems rated up to 15,000 psi (1035 bar), the JVH meters are well suited for oils, fuels, additives, and chemicals in hazardous areas. JVH meters come standard with inconel bolts for added strength and better corrosion resistance. The internal design has reduced space between the gears and measuring chamber to reduce slippage and improve the low flow performance of the meter. Practical applications include:

- · Offshore production platforms, i.e. chemical injection
- Hydraulic power units
- · Gas dehydration systems
- · Chemical processing plants



# **Technical Specifications**

5 Flow Ranges	0.001 to 20 gpm (across all meter sizes)
Measuring Accuracy	±0.5% over full range with 30cP fluid, ±0.25% optional with select sensors
Repeatability	±0.1%
Max. Operating Pressure	up to 15,000 psi   1035 bar
Ports	Autoclave, Medium Pressure
Turndown	up to 400:1
Calibration	7-point logarithmic calibration

## Materials of Construction

Body	316L Stainless Steel
Gears	Stainless Steel (DIN 1.4122)
Bearings	Stainless Steel Ball Bearings or Tungsten Carbide Sleeve Bushing
O-Ring	FKM or FFKM
Shafts	402 C Stainless Steel or Tungsten Carbide
Bolts	Inconel 718

# **Output Options**

Choose from a wide variety of pickups, sensors, monitors, and controllers to pair with your gear meter:

- Frequency
- · Analog (voltage or 4-20mA)
- · Battery, loop, or DC powered displays



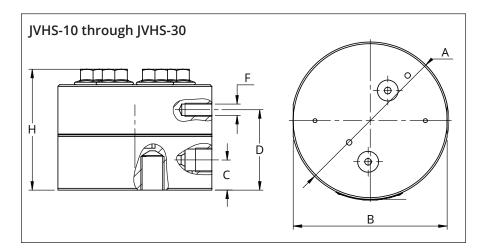
# JVH High Pressure Positive Displacement Flow Meter

## Meter Data

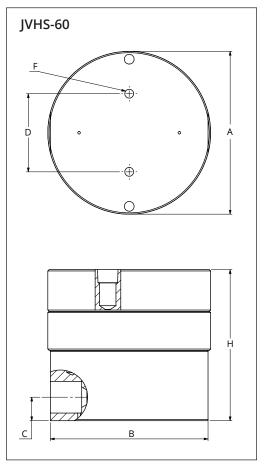
Meter Size		Flow Range	:	Resolu	Resolution* Ports		Filtration (microns)		Pressure	
	(GPM)	(LPM)	(Gal/Day)	(Impulses/Gal)	(Impulses/CC)	(Med Pres Autoclave)	вв тс		(psi/bar)	
JVHS-10	0.001-0.5	0.005-2.0	1.4-720	200,600	53.0	3/8"	30	120	15,000/1035	
JVHS-12	0.005-0.8	0.02-3.0	7.2-1152	106,000	28.0	3/8"	30	120	15,000/1035	
JVHS-20	0.02-2.0	0.1-7.0	28.8-2880	31,800	8.4	3/8"	30	120	15,000/1035	
JVHS-30	0.1-7.0	0.5-25.0	144-10,080	13,200	3.5	3/8"	30	120	15,000/1035	
JVHS-60	0.1-20.0	0.5-75.0	144-28,800	3,600	0.95	3/4"	30	200	7,500/520	

<sup>\*</sup> Figures shown represent resolution when using dual pickup sensor.

## Meter Dimensions



Meter Size		Dimensions								
	Α	В	С	D	<b>F</b> (mounting hole)	Н	(Lbs)	(Kg)		
JVHS-10	3.7"	3.6"	0.71"	1.9"	M6x1x10mm	2.8"	7.5	3.4		
JVHS-12	3.7"	3.6"	0.71"	1.9"	M6x1x10mm	2.8"	7.5	3.4		
JVHS-20	3.7"	3.6"	0.71"	1.9"	M6x1x10mm	2.8"	7.5	3.4		
JVHS-30	3.7"	3.6"	0.71"	2.4"	M6x1x10mm	3.3"	8.6	3.9		
JVHS-60	5.0"	4.8"	0.71"	2.4"	M8x1x16mm	4.6"	24.5	11.1		



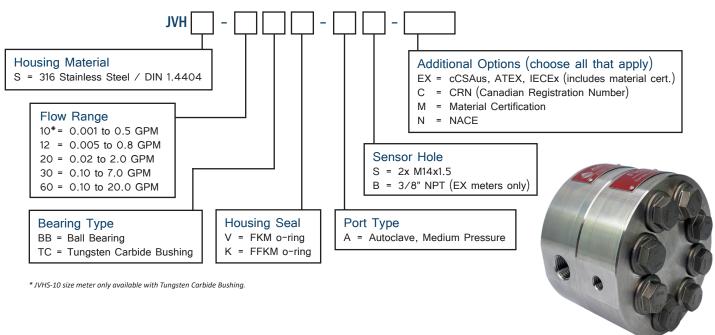
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# JVH High Pressure Positive Displacement Flow Meter

## Part Number Guide



# **Electronics Options**

AW-Lake offers a wide selection of Sensors/Pickups and Monitors/Controllers to optimize flow measurement and deliver your flow data where you need it and in the format you need it:

- · Analog (Voltage & 4-20mA available)
- Frequency
- · Modbus®
- · HART®
- · Bluetooth®
- Electronic Displays (Local & Remote Mount)
- · Certified Units (UL, cCSAus, ATEX, IECEx)
- Wireless Monitoring (Radio Frequency)

Refer to website for more information.













# NJECT - CHEMICAL INJECTION FLOW METER

Specifically Designed for Chemical Injection Applications in Onshore Oil Fields.



#### **TECHNICAL SPECIFICATIONS**

## Measuring Accuracy

± 0.5%

#### Repeatability

± 0.1%

#### **Duty Cycle**

Works with standard injection pumps from 50 to 200 gallons/day

# Maximum Operating Pressure

Up to 2,500 psi (172 bar)\*

\*Consult factory for other pressures.

#### Fluid Temperature Range

-40 to 175°F

#### Resolution

100,000 pulses/gal

#### Ports

1/4" female NPT

#### Weight

3.9 lbs

#### Filtration

120 microns, 120 mesh

# **BENEFITS**

#### Assured Accuracy

Each flow meter is individually calibrated and shipped with a calibration certificate.

### Sealed Electronics

Completely sealed integral sensor keeps electronics safe from environmental forces.

#### **Economic Low Flow Meter**

The meter produces good resolution and high accuracy at low flow rates, offering an affordable option for onshore chemical injection applications.

#### **Rugged Construction**

The sturdy 316 stainless steel construction of this gear meter provides superior corrosion resistance and a longer service life.

#### Fast Response Time

This meter can handle short pump shot times (<1 sec) and remain accurate.

#### MATERIALS OF CONSTRUCTION

Body	316L Stainless Steel
Gears	Stainless Steel
Bearing & Shaft	Tungsten Carbide
O-Ring	PTFE
Bolts	316 Stainless Steel
Cable Gland	Stainless Steel

#### INTEGRAL SENSOR

Supply Voltage

8 to 30 V DC, regulated

Frequency Range

2 to 1,000 Hz

**Electrical Connection** 

Sheilded 10-foot PVC cable with flying leads for easy hookup

**Protection Class** 

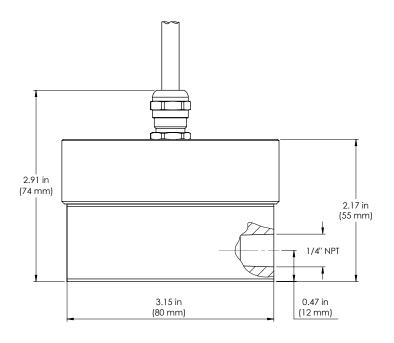
IP 67



# **NJECT – CHEMICAL INJECTION FLOW METER**

Specifically Designed for Chemical Injection Applications in Onshore Oil Fields.

#### **METER DIMENSIONS**



## **DUTY CYCLE LOOKUP CHART SAMPLE**

Minimum Instantaneous Flow Rate: 5 gal/day Pump Speed: 100 gal/day

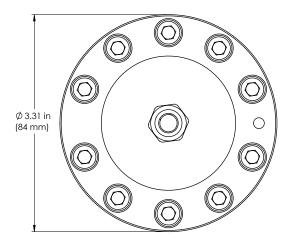
Dosing Rate (gal/day)	Duty Cycle	Run Time (seconds/min)
0.1	0%	0.06
0.5	1%	0.3
1	1%	0.6
2	2%	1.2
3	3%	1.8

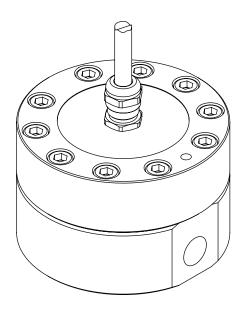
4%

5%

2.4

3.0







# SLG POSITIVE DISPLACEMENT SPUR GEAR METER

Ideal for measuring paints & coatings, especially where robotics are utilized or when space is limited.



#### **APPLICATIONS**

In production environments like the automotive industry, a lot of pressure is on line components. While performing under a variety of harsh, fast-paced conditions, flow meters in particular have to be rugged, accurate, and easy to install.

AW-Lake exceeds these demands with its SLG Series Positive Displacement Flow Meters. These

stainless steel meters feature small, light bodies, perfect for installation on robotic arms and in other tight areas. Flow meter construction incorporates virtually no "dead space," which allows for extremely efficient flush cycles and worry-free color changes.

#### TECHNICAL SPECIFICATIONS

#### Measuring Accuracy

± 0.5% over 10:1 turndown with 30cP fluid

#### Repeatability

± 0.1%

#### Flow Measuring Range

0.003 to 0.5 gpm 0.01 to 1.0 gpm 0.02 to 2.0 gpm

# Maximum Operating Pressure up to 2,000 psi

# Maximum Fluid Temperature 350°F (180°C)

#### **Ports**

Bottom ported through hole or 1/8" BSPP - specify upon ordering

#### **BENEFITS**

#### Strong, Compact Design

The SLG's solid stainless steel construction and compact size make this meter ideal for robotic applications where there is limited space, weight restrictions and vibration from movement.

#### Simple to Install & Use

These meters are easy to use and install, since there is no need for straight run piping upstream or downstream of the flow meter.

#### Accurate and Reliable

This meter has the ability to maintain consistent accuracy despite changing viscosity conditions, with accuracy of +0.5% of reading.

#### Flexible

Meter may be used in applications requiring bidirectional flow, and is offered in three different flow ranges (0.003 to 2.0 GPM).

## **MATERIALS OF CONSTRUCTION**

Body	JVS: 316 stainless steel (2,000 psi max)
Gears	Stainless Steel, DIN 1.4122
Seals	JVS: PTFE O-ring
Bearings & Shaft	Tungsten Carbide

## **RECOMMENDED SENSORS**

Sensor Type	Model	Sensor Features
Single sensor	CAPM-3o	Intrinsically safe, frequency output (when used with a barrier)
Fiber Optic System (includes the following:)	FOP 30/S	
Fiber optic sensor	FOP-30	Fully isolated optical signal, intrinsic safe
Light-to-frequency converter	OPTV-20	Converts optical output to frequency output
Standard heavy-duty fiber optic cable	Fiber optic cable	Available in 30, 40, 60 & 100 foot lengths



# SLG POSITIVE DISPLACEMENT SPUR GEAR METER Ideal for measuring paints & coatings, especially where robotics are utilized or when space is limited.

#### **METER DATA**

Meter Size	Flow Range (GPM)	Impulses/ Gallon	Impulses/ cc	Weight (Lbs / Kg)	Ports	Filtration (microns)	Pressure Rating
JVS-10SLGS	0.003-0.5	100,300	26.5	2.75 / 1.25	1/8" BSPP	120	2,000 psi
JVS-10SLGFS	0.003-0.5	100,300	26.5	2.75 / 1.25	6 mm (not threaded)	120	2,000 psi
JVS-15SLGS	0.01-1.0	31,000	8.2	2.75 / 1.25	1/8" BSPP	120	2,000 psi
JVS-15SLGFS	0.01-1.0	31,000	8.2	2.75 / 1.25	6 mm (not threaded)	120	2,000 psi
JVS-20SLGS	0.02-2.0	15,900	4.2	3.0 / 1.36	1/8" BSPP	120	2,000 psi
JVS-20SLGFS	0.02-2.0	15,900	4.2	3.0 / 1.36	6 mm (not threaded)	120	2,000 psi



A COMMON APPLICATION FOR THE SLG GEAR METER IS IN ROBOTIC PAINT LINES IN THE AUTOMOTIVE INDUSTRY.



# SRZ HELICAL GEAR FLOW METER

Ideal for highly filled and abrasive fluids, such as polyurethanes and polymers, glues and sealing materials, as well as heavy fuel oils.



#### **APPLICATIONS**

This series of flow meters from AW Gear Meters is a high-resolution answer to your metering needs. Made of stainless steel, the meters in the SRZ series offer wide measuring ranges and low pressure loss.

A helical-gear design gives these meters lower pressure drop compared to other meters and ideal for metering high viscosity polyurethanes, polymers, glues, sealants, and heavy fuel oils.

AW Gear Meters offers these specialized helical gear flow meters suitable for a variety of industrial applications, including:

- · Sealant / Adhesive Dispensing Applications Single and
- Multi-Component
- · Paint Reclaim and Environmental Tracking
- · Paint Circulation / Supply
- · Paint Spray Operations-High Solids / Filled Materials
- · Material Manufacturing Monitoring / Batching
- · Full body resin applications

#### TECHNICAL SPECIFICATIONS

## **BENEFITS**

#### Affordable and Accurate

This meter has the ability to maintain consistent accuracy despite changing viscosity conditions, with accuracy of  $\pm 0.5\%$  of reading.

#### Rugged Construction

The SRZ's solid meter construction is made of 303 stainless steel with tungsten carbide bearings for corrosion resistance and durability. Optional hard-coat gear offerings available.

#### Flexible

May be used with a wide range of materials and viscosities with a low pressure drop than conventional meters and wide flow range/size selection. Models offered with either BSPP or NPT threaded ports.

#### Proven Reliability & Performance

With a proven industry record for reliable meter life and electronics, these meters are ready to be installed into your process today.

#### Measuring Accuracy

 $\pm$  0.5% of reading with fluid viscosities >30 cP

#### Repeatability

 $\pm$  0.1%

#### Flow Measuring Range

0.1 to 11 gpm 0.25 to 26 gpm 1 to 105 gpm

#### Maximum Operating Pressure

up to 6,000 psi

# Maximum Fluid Temperature

Depends on sensor used, refer to sensor technical guide

#### Ports

NPT and BSPP available

#### Turn Down Ratio

Over 1:100

# Line Sizes

from 3/4" to 11/2"

#### MATERIALS OF CONSTRUCTION

Body	303 Stainless Steel
Bearings	Tungsten Carbide
Gear	303 Stainless Steel (QPQ1 coating) Note: Other coatings available
Seals	PTFE Standard (FKM & EPDM also available)



# SRZ HELICAL GEAR FLOW METER

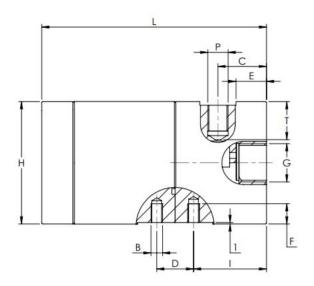
Ideal for highly filled and abrasive fluids, such as polyurethanes and polymers, glues and sealing materials, as well as heavy fuel oils.

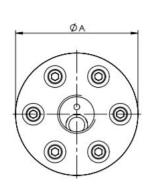
## **METER DATA**

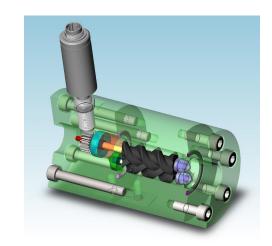
Meter Size	Flow Range (Gpm)	Nominal K-Factor* (pulses/cc) (pulses/gal)		Port Size (Thread Size)	Filtration (Microns)	Weight (Llbs)	Pressure Rating	
SRZ-40-xx	0.1 - 11.0	3.51	13,300	3/4"	200	14.0	6,000 psi	
SRZ-100-xx	0.25 - 26.0	0.85	3,230	1"	300	32.0	6,000 psi	
SRZ-400-xx	1.0 - 105	0.21	810	1-1/2"	300	70.0	6,000 psi	

xx= B1 for NPT port thread, B2 for BSPP port thread

<sup>\*</sup>A calibration sheet accompanies every meter sold with specific k-factor.







#### **METER DIMENSIONS**

SRZ Type	A	В	С	D	E	F	G	н	1	L	Р	т
SRZ-40-xx	3.35" (85mm)	M8	1.32" (33.5mm)	0.98" (25mm)	0.75" (19mm)	0.51" (13mm)	G 3/4" M22x1.5 3/4" NPT	3.19" (81mm)	2.00" (50mm)	6.10" (155mm)	M14x1.5	1.02" (26mm)
SRZ-100-xx	4.29" (109mm)	M10	2.09" (53mm)	1.73" (44mm)	0.91" (23mm)	0.71" (18mm)	G1" 1" NPT	4.17" (106mm)	2.56" (65mm)	8.70" (221mm)	M14x1.5	1.18" (30mm)
SRZ-400-xx	5.28" (134mm)	M12	2.36" (60mm)	-	1.18" (30mm)	-	G1-1/2"	5.20" (132mm)	-	12.52" (318mm)	M14x1.5	1.30" (33mm)

## **RECOMMENDED SENSORS**

Sensor Type	Model	Sensor Features
Frequency Output; 5-pin screw-on connector	VTER/P	Works with SRZ-40
Frequency Output; 5-pin screw-on connector	VTEK/P	Works with SRZ-100, SRZ-400

EX Versions available, consult factory.



# SRZ HR ULTRA HIGH RESOLUTION HELICAL GEAR FLOW METER WITH INTEGRAL PICKUP

Ideal for highly filled and abrasive fluids, such as polyurethanes and polymers, glues and sealing materials, as well as heavy fuel oils.



#### **APPLICATIONS**

AW-Lake offers these specialized helical gear flow meters suitable for a variety of industrial applications, including:

- · Sealant / Adhesive Dispensing Applications Single and Multi-Component
- · Paint Reclaim and Environmental Tracking
- · Paint Circulation / Supply
- · Paint Spray Operations-High Solids / Filled Materials
- · Material Manufacturing Monitoring / Batching
- · Full body resin applications

#### **TECHNICAL SPECIFICATIONS**

#### Measuring Accuracy

±0.5% of reading with fluid viscosities >30cP

## Linear Range

0.01 to 2.0 gpm\*

# Maximum Operating Pressure

up to 6,000 psi

Maximum Fluid Temperature

160° F

Low Pressure Loss

Ultra High Resolution

# **BENEFITS**

#### Affordable and Accurate

This meter has the ability to maintain consistent accuracy despite changing viscosity conditions, with accuracy of  $\pm 0.5\%$  of reading.

#### Rugged Construction/High Pressure

The SRZ's solid meter construction is made of 303 stainless steel with tungsten carbide bearings for corrosion resistance and durability. Optional hard-coat gear offerings available.

#### Flexible

May be used with a wide range of materials and viscosities with a low pressure drop than conventional meters and wide flow range/size selection. Models now offered in both NPT and BSPP threaded ports.

#### Proven Reliability & Performance

With a proven industry record for reliable meter life and electronics, these meters now offered in a low profile design with integrated sensor technology.

#### MATERIALS OF CONSTRUCTION

Body	303 Stainless Steel
Bearings	Tungsten Carbide
Gear	303 Stainless Steel (QPQ1 coating) Note: Other coatings available
Seals	PTFE Standard (FKM & EPDM also available)

#### **METER DATA**

Meter Size	Flow Range* (GPM)	Nominal K-Factor* (pulses/gal)	Port Size (Thread Size)		Frequency Range (Hz)	Pressure Rating
SRZ-40ST.HR.T-xx	0.01 - 2	124,900 pulses/gal 33 pulses/cc	3/4"	200	20 - 4,200	6,000 psi

xx= B1 for NPT port thread, B2 for BSPP port thread

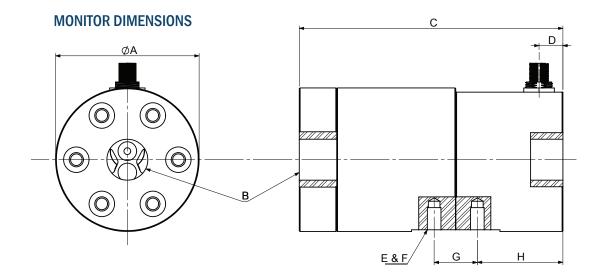


Operation down to 0.01 gpm with reduced accuracy.

<sup>\*\*</sup> A calibration sheet accompanies every meter sold with specific K-factor.

# SRZ HR ULTRA HIGH RESOLUTION HELICAL GEAR FLOW METER WITH INTEGRAL PICKUP

Ideal for highly filled and abrasive fluids, such as polyurethanes and polymers, glues and sealing materials, as well as heavy fuel oils.



Meter Size	А	B (port size)	С	D	E (thread type)	F (thread depth)	G	Н
SRZ-40ST. HR.T-xx	3.35"	3/4"	6.10"	0.55"	M8	0.51"	1.0"	1.98"

xx= B1 for NPT port thread, B2 for BSPP port thread

# **ELECTRICAL DATA**

Supply

Voltage: 12 up to 30 VDC

Frequency

Output: Active push pull, square wave signal

out max. 20 mA

Duty cycle 50% nominal

Electrical Connection:

Micro (M12)

1 = +Supply (12 up to 30 VDC)

2 = Output signal A

3 = 0V

4 = Output signal B

5 = n.c.

- All output signals are available simultaneously

– Signals 2 and 4 are  $90^{\circ}$  phase–shifted.

Ingress

Protection: IP 67 when used with IP67 rated

mating connector

Connector Pin-Out:

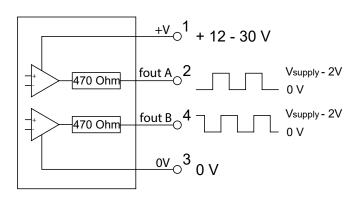


Note: Not for use with materials containing any ferromagnetic fillers or particles due to internal multi-pole magnet.

**EX Versions available, consult factory.** Products may be subject to change without notice - Contact factory for the most up-to-date product information







# SRZ STAT HIGH RESOLUTION HELICAL GEAR FLOW METER WITH INTEGRAL PICKUP

Ideal for highly filled and abrasive fluids, such as polyurethanes and polymers, glues and sealing materials, as well as heavy fuel oils.



#### **APPLICATIONS**

AW-Lake offers these specialized helical gear flow meters suitable for a variety of industrial applications, including:

- · Sealant / Adhesive Dispensing Applications Single and Multi-Component
- · Paint Reclaim and Environmental Tracking
- · Paint Circulation / Supply
- · Paint Spray Operations-High Solids / Filled Materials
- · Material Manufacturing Monitoring / Batching
- · Full body resin applications

#### TECHNICAL SPECIFICATIONS

#### Measuring Accuracy

± 0.5% of reading with fluid viscosities >30cP

#### Flow Measuring Range

0.1 to 11 gpm 0.25 to 26 gpm 1 to 105 gpm

#### Maximum Operating Pressure

up to 6,000 psi

Maximum Fluid Temperature 160° F

Sizes from 3/4" to 11/2"

Low pressure loss

# **BENEFITS**

#### Affordable and Accurate

This meter has the ability to maintain consistent accuracy despite changing viscosity conditions, with accuracy of  $\pm 0.5\%$  of reading.

#### **Rugged Construction**

The SRZ's solid meter construction is made of 303 stainless steel with tungsten carbide bearings for corrosion resistance and durability. Optional hard-coat gear offerings available.

#### Flexible

May be used with a wide range of materials and viscosities with a low pressure drop than conventional meters and wide flow range/size selection. Models offered with either BSPP or NPT threaded ports.

#### Proven Reliability & Performance

With a proven industry record for reliable meter life and electronics, these meters are now offered in a low profile design with integrated sensor technology.

## **MATERIALS OF CONSTRUCTION**

Body	303 Stainless Steel
Bearings	Tungsten Carbide
Gear	303 Stainless Steel (QPQ1 coating) Note: Other coatings available
Seals	PTFE Standard (FKM & EPDM also available)

#### **METER DATA**

Meter Size	Flow Range (GPM)	Nominal K-Factor* (pulses/gal)	Port Size (Thread Size)	Filtration (Micron)	Frequency Range (Hz)	Pressure Rating
SRZ-40-STAT-xx	0.1 - 11	26,500	3/4"	200	45 - 4,600	6,000 psi
SRZ-100-STAT-xx	.25 - 26	6,400	1"	300	28 - 2,800	6,000 psi
SRZ-400-STAT-xx	1.0 - 105	1,600	1-1/2"	300	28 - 2,850	6,000 psi

xx= B1 for NPT port thread, B2 for BSPP port thread

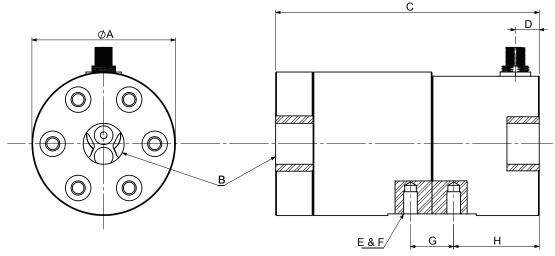


<sup>\*</sup> A calibration sheet accompanies every meter sold with specific K-factor. K-factors shown are double frequency output value.

# SRZ STAT HIGH RESOLUTION HELICAL GEAR FLOW METER WITH INTEGRAL PICKUP

Ideal for highly filled and abrasive fluids, such as polyurethanes and polymers, glues and sealing materials, as well as heavy fuel oils.

#### **MONITOR DIMENSIONS**



Meter Size	A	B (port size)	С	D	E (thread type)	F (thread depth)	G	Н
SRZ-40-STAT-xx	3.35"	3/4"	6.10"	0.55"	M8	0.51"	1.0"	1.98"
SRZ-100-STAT-xx	4.33"	1"	8.70"	0.91"	M10	0.71"	1.73"	1.61"
SRZ-400-STAT-xx	5.28"	1-1/2"	12.52"	1.64"	n/a	n/a	n/a	n/a

xx= B1 for NPT port thread, B2 for BSPP port thread

# **ELECTRICAL DATA**

Supply

Voltage: 12 up to 30 VDC

Frequency

Output: Active push pull, square wave signal

lout max. 20 mA

Duty cycle 50% nominal

Electrical

Connection: Micro (M12)

1 = +Supply (12 up to 30 VDC)

2 = Output signal A

3 = OA

4 = Output signal B

5 = n.c.

- All output signals are available simultaneously.

- Signals 2 and 4 are 90° phase-shifted.

Ingress

Protection: IP 67 when used with IP67 rated mating connector

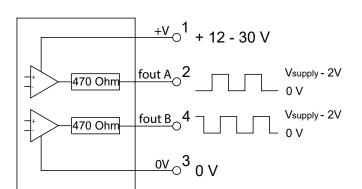
Connector Pin-Out:



Note: Not for use with materials containing any ferromagnetic fillers or particles due to internal multi-pole magnet.

EX Versions available, consult factory. Products may be subject to change without notice - Contact factory for the most up-to-date product information.









TURBINE FLOW METERS
INSTRUMENTATION

# TRG SERIES - STANDARD TURBINE FLOW METER

Ideal turbine flow meter for monitoring solvents and other lower viscosity fluids, such as antifreeze and fuel measurement.



#### **TECHNICAL SPECIFICATIONS**

Measuring Accuracy

± 1.0% of reading or better

Repeatability

± 0.1%

Flow Measuring Range
.08 to 200 GPM (gal/min)

Turn Down Ratio

Maximum Operating Pressure\* Working pressure up to 5,000 psi

Maximum Operating Temperature

Fluid temperature of -150° to 450°F

Standard Calibration Media Tap water @ 70°F Temperature

End Connections

#### **BENEFITS**

#### Rugged & Cost-Effective

The sturdy construction of this turbine flow meter means high performance and longer service life at an affordable price.

#### **Industry Standard**

The TRG Series flow meter comes with a standard NPT end connection for universal applications.

#### Versatile

This meter is capable of measuring flow in line sizes from 1/2" to 2".

# Electronic Integration

This meter can provide displayed flow rate, totalization, current or voltage outputs through a variety of compatible electronics.

#### Simplified Maintenance

The TRG Series was designed with only one moving part for easy cleaning and maintenance.

Explosion Proof (EX) Options Available

#### **MATERIALS OF CONSTRUCTION**

Rotor Support	303 Stainless Steel
Body	316L Stainless Steel
Rotor Shaft	Tungsten Carbide
Impeller	420 Stainless Steel

#### **RECOMMENDED SENSORS**

Model	Sensor Type	Temp (°F)
MAG-PB	Pulse Sensor - No Amplifier Required	-40 to 185
FIP-4HS	4-20 mA Output Sensor	-40 to 185
Meter Mounted Disp	olays:	
	Non EX Meters	
RT-10A	Battery-Powered monitor	0 to 140
RT-30 SD	24 VDC Powered monitor	0 to 140
	EX Meters	
HUB-40EX	Hazardous area rated sensor	-40 to 140
RT-30EX	Hazardous area rated local flow rate transmitter	-6 to 140

<sup>\*</sup> For additional sensors available, contact factory. Other outputs available upon request.



<sup>\*</sup> Electronic sensor dependent.

# TRG SERIES - STANDARD TURBINE FLOW METER

Ideal turbine flow meter for monitoring solvents and other lower viscosity fluids, such as antifreeze and fuel measurement.

## **METER SPECIFICATIONS**

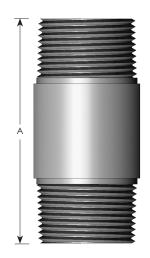
Part Number	Flow Range (gal/min)	K-Factor* (pulses/gal)	Porting	Filtration (micron)	Pressure Rating (psi)	Weight (lbs)
TRG-11.250-5 (EX2) <sup>1</sup>	0.08 to 0.4	125,000	1/2" Male NPT	100	5,000	0.75
TRG-11.300-5 (EX2) <sup>1</sup>	0.13 to 1.06	91,500	1/2" Male NPT	100	5,000	0.75
TRG-11.375-5 (EX2) <sup>1</sup>	0.3 to 3	48,000	1/2" Male NPT	100	5,000	0.75
TRG-11.500-5 (EX2) <sup>1</sup>	0.9 to 9	15,000	1/2" Male NPT	100	5,000	0.75
TRG-11.750-5 (EX2) <sup>1</sup>	1.6 to 16	10,500	1/2" Male NPT	300	5,000	0.75
TRG-11.750 (EX2) <sup>1</sup>	1.6 to 16	10,500	1" Male NPT	300	5,000	1.25
TRG-11.880** (EX2)1	3.2 to 32	2,900	1" Male NPT	300	5,000	1.50
TRG-1110 (EX2)1	5.3 to 53	800	1-1/2" Male NPT	300	5,000	2.50
TRG-1120L (EX2) <sup>1</sup>	13 to 200	400	2" Male NPT	300	5,000	3.25

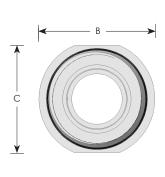
<sup>\*</sup>K-Factors given are averaged. A calibration sheet accompanies every meter sold. \*\*This is a direct replacement for the TRG-11.875 and has a doubled K-Factor. ¹EX2 versions available.

## **METER DIMENSIONS**

Part Number	Α	В	С
TRG-11.250-5 (EX2) <sup>1</sup>	3.00"	1.35"	1.20"
TRG-11.300-5 (EX2) <sup>1</sup>	3.00"	1.35"	1.20"
TRG-11.375-5 (EX2) <sup>1</sup>	3.00"	1.35"	1.20"
TRG-11.500-5 (EX2) <sup>1</sup>	3.00"	1.35"	1.20"
TRG-11.750-5 (EX2) <sup>1</sup>	3.00"	1.35"	1.20"
TRG-11.750 (EX2) <sup>1</sup>	3.00"	1.55"	1.40"
TRG-11.880 (EX2) <sup>1</sup>	3.00"	1.55"	1.40
TRG-1110 (EX2) <sup>1</sup>	3.00"	2.15"	1.95"
TRG-1120L (EX2)1	4.00"	2.70"	2.55"









# **HM-AC SERIES - HIGH PRESSURE TURBINE FLOW METER**

Ideal when measuring the flow of fluids under high pressures, such as in hydraulic testing. It is also ideal for chemical injection systems.



#### **APPLICATIONS:**

- Dosing
- Mixing
- · Process Monitoring
- Inhibitors
- Emulsions
- Water
- Methanol

#### **TECHNICAL SPECIFICATIONS**

## **Measuring Accuracy**

± 1.0% of reading or better

#### Repeatability

± 0.05%

# Flow Measuring Range

.08 to 32 GPM (gal/min)

#### Turn Down Ratio

10:1 (Extended on request)

#### Maximum Operating Pressure

Working pressure up to 20,000 psi

#### Maximum Operating Temperature

Depends on sensor used

#### Calibration

Default is water (1cst), custom calibrations available for added cost

# Filtration Requirement 300 microns

#### **Process Connections**

Medium pressure AutoClave

# **BENEFITS**

#### **Industry Standard**

Standard end connections are AutoClave®, (also available in Grayloc® and Techlok®.)

#### High Pressure Suitable

The HM Series of turbine flow meters can handle low viscosity fluids flowing under extremely high pressures, such as hydraulic and fuel systems and offshore chemical injection systems.

#### Hazardous Area Approved Sensors

A complete line of hazardous area approved sensors and displays are available for the HM Series meters.

#### Durable & Cost-Effective

This meter's rugged stainless steel construction provides a durable and economic flow metering solution to sanitary environments.

Explosion Proof (EX) Options Available

#### MATERIALS OF CONSTRUCTION

Body	1.3980 Stainless Steel
Rotor Support	316 Ti Stainless Steel
Rotor	329 Stainless Steel
Bearings/Shaft	Tungsten Carbide



# HM-AC SERIES - HIGH PRESSURE TURBINE FLOW METER

Ideal when measuring the flow of fluids under high pressures, such as in hydraulic testing. It is also ideal for chemical injection systems.

#### **METER SPECIFICATIONS**

Part Number	Range (gal/min)	Medium Pressure AutoClave	K-Factor (Pulses/ gal)	Max. Frequency (0-max. Hz)	Pressure Rating (psi)	Weight (lbs)
HM 003/AC	0.08 to 0.4	9/16"	123,000	1,100	20,000*	4.2
HM 004/AC	0.13 to 1.05	9/16"	94,600	1,700	20,000*	4.4
HM 005/AC	0.2 to 1.6	3/4"	67,400	1,750	20,000*	4.8
HM 006/AC	0.3 to 2.6	3/4"	45,400	2,100	20,000*	4.8
HM 007/AC	0.5 to 5	1"	19,000	1,650	20,000*	5.1
HM 009/AC	0.9 to 9	1"	19,000	2,750	20,000*	5.3
HM 011/AC	1.6 to 16	1"	5,000	1,350	20,000*	5.3
HM 013/AC	2.25 to 22.5	1-1/2"	3,500	1,300	15,000	12.1
HM 017/AC	3.2 to 32	1-1/2"	1,440	840	15,000	12.1

<sup>\*</sup>Pressure rating drops to 15,000 psi if used with RT-30EX or HUB-40EX sensors.

#### **RECOMMENDED SENSORS\***

Model	Sensor Type	Temp (°F)				
EX Meters						
RT-30EX	Hazardous area rated local flow rate transmitter	-6 to 140				
HUB-40EX	Hazardous area rated sensor	-40 to 140				
Non EX Meters						
RT-30SD	Local flow rate transmitter	-40 to 140				
VTE 02	Pulse output sensor	-40 to 248				
VTE 02-EX	Intrinsic safe pulse output sensor	-40 to 185				

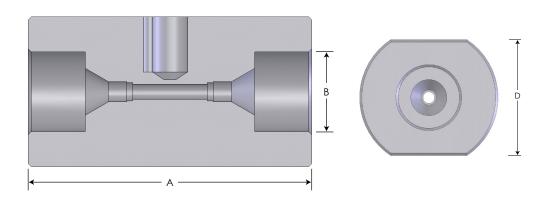
<sup>\*</sup>For additional sensors such as extended temperature range, contact factory.

# **METER DIMENSIONS**

Part Number	А	В	D
HM 003/AC	3.54"	13/16"	1.97"
HM 004/AC	3.54"	13/16"	1.97"
HM 005/AC	4.13"	3/4"	1.97"
HM 006/AC	4.13"	3/4"	1.97"
HM 007/AC	5.31"	1-3/8"	1.97"
HM 009/AC	5.31"	1-3/8"	1.97"
HM 011/AC	5.51"	1-3/8"	1.97"
HM 013/AC	6.89"	1-7/8"	2.76"
HM 017/AC	7.01"	1-7/8"	2.76"

#### **ORDERING**

Cotact factory for Part Number Configuration





# TA3 SERIES - SANITARY TURBINE FLOW METER

Ideal for use in industries including dairy, brewing, wine production, food processing and pharmaceuticals.



#### **TECHNICAL SPECIFICATIONS**

#### Measuring Accuracy

± 1.0% of reading or better

(±1% of reading over the upper 70% of the measuring range for 3/8, 1/2 and 3/4 in. meters)

#### Repeatability

± 0.1%

Flow Measuring Range

0.6 to 400 GPM (gal/min)

Turn Down Ratio

Maximum Operating Pressure\*

Working pressure up to 1,000 psi

Temperature Range\*\*

Fluid temperature up to 300°F

**Electrical Connection** 

NEMA 6 Connector

**Port Connection** 

Tri-clamp

#### **BENEFITS**

#### **Durable & Cost Effective**

This meter's rugged 316 stainless steel construction provides a durable and economic flow metering solution to sanitary environments.

#### **Excellent Accuracy**

The TA3 sanitary turbine flow meter can achieve a flow accuracy up to 1.0% of reading and is repeatable up to 0.1%.

#### Federal Compliance

The most up-to-date polishing technology is utilized during manufacturing on all internal components. and all TA3 models are 3A authorized.

#### Flexible

This meter is available in nine different flow ranges, covering flows from 0.6 GPM up to 400 GPM.

#### Versatile

This flow meter provides local flow rate and volume totalization and will interface with most displays, controllers and computers.

#### **MATERIALS OF CONSTRUCTION**

Body & Rotor Support	316L Stainless Steel
Rotor	Nickel Plated Stainless Steel
Bearings	Nickel Bindery Tungsten Carbide

#### **ELECTRONICS\***

Model	Sensor Type	Temp (°F)
RT-10R	Battery-Powered Monitor	0 to 140
RT-30SD	15-24 VDC Powered Monitor	0 to 140
MAG-INVA	Amplified Pulse Output	0 to 140
MG-300	Non-Amplified (external amplifer needed)	0 to 300
MG-450	Non-Amplified (external amplifer needed)	0 to 450

<sup>\*</sup>Contact factory for additional sensor options.



<sup>\*</sup> Depends on connection size & clamp. Note: .COP (Clean-Out-of-Place) \*\*Sensor & seal dependent.

# TA3 SERIES - SANITARY TURBINE FLOW METER Ideal for use in industries including dairy, brewing, wine production, food processing and pharmaceuticals.

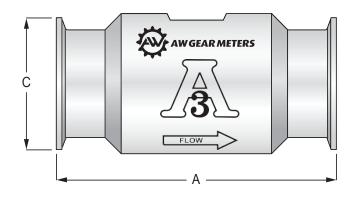
#### **METER SPECIFICATIONS**

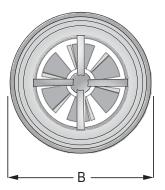
Part Number	Range (gal/min)	K-Factor * (Pulses/ gal)	Meter Size	Clamp Size	Weight (lbs)
TA3-75-375-1	0.6 to 3	20,000	3/8"	3/4"	1
TA3-75-500-1	0.75 to 7.5	13,000	1/2"	3/4"	1
TA3-75-750-1	2 to 15	2,750	1/2"	3/4"	1
TA3-150-500-1	0.75 to 7.5	13,000	1/2"	1-1/2"	3
TA3-150-750-1	2 to 15	2,750	1/2"	1-1/2"	3
TA3-150-875-1	3 to 30	2,600	7/8"	1-1/2"	3
TA3-150-100-1	5 to 50	870	1"	1-1/2"	3
TA3-150-150-1	15 to 180	330	1-1/2"	1-1/2"	5.5
TA3-250-200-1	40 to 400	50	2"	2-1/2"	8.5

 $<sup>\</sup>hbox{\it *K-Factors given are averaged. A calibration sheet accompanies every meter sold.}$ 

#### **METER DIMENSIONS**

Part Number	А	В	С
TA3-75-375-1	3"	1.5"	1"
TA3-75-500-1	3"	1.5"	1"
TA3-75-750-1	3"	1.5"	1"
TA3-150-500-1	4"	2.0"	2"
TA3-150-750-1	4"	2.0"	2"
TA3-150-875-1	4"	2.0"	2"
TA3-150-100-1	4"	2.0"	2"
TA3-150-150-1	6.25"	2.3"	2"
TA3-250-200-1	6.5"	2.3"	3"







TW SERIES - OIL & GAS TURBINE FLOW METER

Ideal to withstand the demands of the most rigorous flow measurement applications and is an ideal meter for liquid flow measurement on or off the oilfield.



## **TECHNICAL SPECIFICATIONS**

Flow Ranges

0.6 - 5000 GPM (gal/min)

Pressure

Working pressure up to 5,000 psi

Accuracy

±1% of reading or better

the upper 70% of the measuring (±1% of reading over the upper 70% of range for 3/8, 1/2 and 3/4 in. meters)

Repeatability

±0.1%

Temperature

Fluid temperature of -150° to 300°F

Turndown Ratio

10:1

Water (NIST traceable calibration)

**End Connections** 

NPT and Victaulic®

#### **BENEFITS**

#### Accurate & Reliable

The TW Series turbine meter is accurate to ±1% of reading with repeatability of better than ±0.1%.

#### Rugged & Cost-Effective

All stainless steel construction and tight machining tolerances make for excellent durability/long life.

#### **Port Connections**

This flow meter comes with standard NPT or Victaulic® end connections for universal applications.

#### Versatile

The meter or just the meter internals are perfect drop-in replacements for Kimray NuFlo/Haliburton/Cameron and Blancett turbine flow meters.

### Electronic Integration

This meter can accept a variety of existing electronics, such as the SignalFire Flow Totalizer.

# Simplified Maintenance

Maintenance is easy with the rotor replacement kit. Rotor can be replaced in just 2-3 minutes.

#### **MATERIALS OF CONSTRUCTION**

Body	316 Stainless Steel
Rotor	CD4MCU Stainless Steel
Rotor Shaft	Tungsten Carbide
Rotor Support	316 Stainless Steel

### **ELECTRONICS**

Included Sensor:	Sensor Type:	Output:
MG-300	Magnetic Pick-up	Pulse
Optional Local Display:	Description:	
SFTotalizer-1BIS	Intrinsically Safe Wireless Flow Totalizer	with LCD Display

<sup>\*</sup>Contact factory for additional sensor options.



# TW SERIES - OIL & GAS TURBINE FLOW METER

Ideal to withstand the demands of the most rigorous flow measurement applications and is an ideal meter for liquid flow measurement on or off the oilfield.

#### **METER PART NUMBERS**

Part Number	Range (gal/min)	Range (barrels/day)	K-Factor* (pulses/gal)	Porting	Strainer (mesh)	Pressure Rating (psi)	Meter Weight (lb)	Sensor Collar Size	Repair Kit Part Number**
TW-50M-100	0.6-3	20-100	18000	1/2" Male NPT	60	5000	1	1/2" HUB Connection	KIT-50M-100
TW-50M-250	0.75-7.5	25-250	13000	1/2" Male NPT	60	5000	1	1/2" HUB Connection	KIT-50M-250
TW-50M-515	2-15	68-515	3300	1/2" Male NPT	60	5000	1	1/2" HUB Connection	KIT-50M-515
TW-100M-100	0.6-3	20-100	18000	1" Male NPT	60	5000	2	1" HUB Connection	KIT-100M-100
TW-100M-250	0.75-7.5	25-250	13000	1" Male NPT	60	5000	2	1" HUB Connection	KIT-100M-250
TW-100M-515	2-15	68-515	3300	1" Male NPT	60	5000	2	1" HUB Connection	KIT-100M-515
TW-100M-1K	3-30	100-1,000	3100	1" Male NPT	60	5000	2	1" HUB Connection	KIT-100M-1K
TW-100M-2K	5-50	170-2,000	870	1" Male NPT	40	5000	2	1" HUB Connection	KIT-100M-2K
TW-150M-6K	15-180	515-6,000	330	1 1/2" Male NPT	20	5000	5	1" HUB Connection	KIT-150M-6K
TW-200M-6K	15-180	515-6,000	330	2" Male NPT	20	5000	6	1" HUB Connection	KIT-200M-6K
TW-200V-6K	15-180	515-6,000	330	2" Victaulic®	20	800	6	1" HUB Connection	KIT-200V-6K
TW-200F-13K	40-400	1,300-13,000	52	2" Female NPT	20	5000	14	1" HUB Connection	KIT-200F-13K
TW-300M-21K	60-600	2,100-21,000	57	3" Male NPT	10	800	15	1" HUB Connection	KIT-300M-21K
TW-300V-21K	60-600	2,100-21,000	57	3" Victaulic®	10	800	15	1" HUB Connection	KIT-300V-21K
TW-400M-41K	100-1200	3,400-41,000	29	4" Male NPT	10	800	20	1" Hub Connection	KIT-400M-41K
TW-400V-41K	100-1200	3,400-41,000	29	4" Victaulic®	10	800	20	1" Hub Connection	KIT-400V-41K
TW-600M-86K	200-2500	6,800-86,000	7	6" Male NPT	4	800	46	1" Hub Connection	KIT-600M-86K
TW-600V-86K	200-2500	6,800-86,000	7	6" Victaulic®	4	800	46	1" Hub Connection	KIT-600V-86K
TW-800V-120K	350-3500	12,000- 120,000	3	8" Victaulic®	4	800	56	1" Hub Connection	KIT-800V-120K
TW-1000V-171K	500-5000	17,000- 171,000	1.6	10" Victaulic®	4	800	80	1" Hub Connection	KIT-1000V-171K

<sup>\*</sup>K-Factors given are averaged. A calibration sheet accompanies every meter sold. \*\*Repair Kits include retaining rings, flow straightener and rotor assembly.



# **HM-F SERIES - FLANGED TURBINE FLOW METER**

Ideal for low viscosity fluids flowing under extremely high pressure, such as hydraulic and fuel systems and offshore chemical injection systems.



#### **TECHNICAL SPECIFICATIONS**

Measuring Accuracy

± 1.0% of reading or better

Repeatability

± 0.05%

Flow Measuring Range .008 to 12,000 GPM (gal/min)

Turn Down Ratio 10:1 Maximum Operating Pressure

Working pressure is flange dependent

Maximum Operating Temperature Fluid temperature of -384° to 662°F

Filtration Requirement 300 microns

**End Connections** 

Equipped with flanges as per DIN or ANSI

# MATERIALS OF CONSTRUCTION

Body	316 Stainless Steel Ti / 316L
Rotor Support	316 Stainless Steel Ti
Rotor	429 Stainless Steel / 329
Bearings	Tungsten Carbide with Nickel binder

#### **SENSOR OPTIONS**

Model	Sensor Type	Temp (°F)
VTEK/P	Pulse output sensor	-150 to 325
VTEK/P -EX	Pulse output sensor	-40 to 185
RT-30SD	Local flow rate transmitter	-40 to 140
RT-30EX	Hazardous area rated local flow rate transmitter	

<sup>\*</sup> For additional sensors available, contact factory.

# **BENEFITS**

#### Fast Response Time & High Resolution

The Turbine wheel's low moment of inertia allows a fast acceleration from standstill up to full number of revolutions within 5 to 50 sec. For that reason, dynamic measurements can be made. The resolution can amount to as much as 35,000 pulses per liter.

#### Wide Temperature Range

Standard turbine: -4 up to 248°F Special models for cryogenic liquids: -459°F Special models w/ hi-temp pickups: up to 662°F.

#### Low Contamination Risk

The spacing of the turbine wheel and bearing mount is wide enough to protect against particles in fluid jamming the turbine wheel. And the Twist of flow in this area has a self-cleaning effect for the bearing.



# **HM-F SERIES - FLANGED TURBINE FLOW METER**

Ideal for low viscosity fluids flowing under extremely high pressure, such as hydraulic and fuel systems and offshore chemical injection systems.

#### **METER SPECIFICATIONS**

Part Number	Range (gal/min)	K-Factor (Pulses/ Gal)	Frequency (0-max. Hz)
HM 9 EP	0.008 to 0.2	36,723	1970
HM 3/1.5	0.08 to 0.4	8,454	1,000 1,000
HM 3/4	0.13 to 1.06	6,340	1,250 1,250
HM 5/6	0.2 to 1.6	4,703	1,740 1,780
HM 5/10	0.3 to 2.6	2,906	1,750 1,750
HM 7	0.5 to 5	1,374	1,800 1,800
HM 9	0.9 to 9	502	1,080 2,200
HM 11	1.6 to 16	343	1,350 2,700
HM 13	2.2 to 22	238	1,300 2,600
HM 17	3.2 to 32	100	800 1,650
HM 19	4 to 40	82	925 1,600
HM 22	5.3 to 53	57	800 1,600
HM 24	6.6 to 66	45	800 2,000
HM 28	7.9 to 95	41	960 2,000
HM 30	9.2 to 106	34	860 1,850
HM 36	10.6 to 132	16	600 1,200
HM 40	13.2 to 198	28	1,320 1,400
HM 50	18.5 to 317	17	1,400
HM 65	26.4 to 528	6	850
HM 80	42.8 to 845	3	615
HM 100	66 to 1320	2	560

Pulses/ m3				
Part Number	Range (gal/min)	K-Factor (Pulses/Gal)	Frequency (0-max. Hz)	
HM 125	79 to 1744	1189	495	
HM 150	94 to 2642	898	420	
HM 200	114 to 3540	9	134	
HM 250	219 to 6604	70	150	
HM 300	423 to 12,680	36	110	

#### **VISCOSITY GROUPS**

Turbine size	Viscosity	Viscosity Group #	Turbine size	Viscosity	Viscosity Group #
HM 003	1 - 9 cST	15	HM 019	20 - 29 cST	75
HM 003	10 - 30 cST	57	HM 019	30 cST >	80
HM 004	1 - 19 cST	27	HM 022	1 - 7 cST	10
HM 004	20 - 30 cST	77	HM 022	8 - 9 cST	35
HM 005	1 - 9 cST	15	HM 022	10 - 29 cST	55
HM 005	10 - 30 cST	57	HM 022	30 cST >	80
HM 006	1 - 19 cST	27	HM 024	1 - 7 cST	10
HM 006	20 - 30 cST	77	HM 024	8 - 9 cST	35
HM 007	1 - 19 cST	27	HM 024	10 - 29 cST	55
HM 007	20 - 30 cST	77	HM 024	30 cST	80
HM 009	1 - 9 cST	15	HM 028	1 - 7 cST	10
HM 009	10 - 19 cST	52	HM 028	8 - 29 cST	45
HM 009	20 - 30 cST	77	HM 028	30 cST >	80
HM 011	1 - 9 cST	15	HM 030	1 - 7 cST	10
HM 011	10 - 19 cST	52	HM 030	8 - 29 cST	45
HM 011	20 - 30 cST	77	HM 030	30 cST >	80
HM 011	30 cST >	80	HM 036	1 - 7 cST	10
HM 013	1 - 7 cST	10	HM 036	8 - 29 cST	45
HM 013	8 - 14 cST	40	HM 036	30 cST	80
HM 013	15 - 19 cST	65	HM 040	1 - 9 cST	15
HM 013	19 - 29 cST	75	HM 040	15 - 29 cSt	75
HM 013	30 cST >	80	HM 040	30 cST >	80
HM 017	1 - 7 cST	10	HM 050	1 - 9 cST	15
HM 017	8 - 9 cST	35	HM 050	15 - 19 cSt	65
HM 017	10 - 29 cST	55	HM 050	20 - 29 cSt	75
HM 017	30 cST >	80	HM 050	30 cST >	80
HM 019	1 - 7 cST	10	HM 065	1 - 7 cST	10
HM 019	8 - 9 cST	35	HM 065	8 - 14 cST	40
HM 019	10 - 14 cST	50	HM 065	15 - 29 cST	70
HM 019	15 - 19 cST	65	HM 065	30 cST >	80



# SUBSEA TURBINE FLOW METER

Ideal for Subsea Applications such as Valve Actuation & Testing on Subsea Equipment and ROVs.



#### **TECHNICAL SPECIFICATIONS**

**Measuring Accuracy** 

± 1.0% of reading or better

Flow Measuring Range

Up to 16 GPM (gal/min)

**External Pressure** 

Up to 7,200 psi

Maximum Operating Pressure

Up to 20,000 psi

\*Contact factory for addional options.

**Process Connection** 

Autoclave\*

Temperature Range

-40° to 250°F (-40° to 121°C)

**Electrical Connections** 

6-pin receptacle (or customer specified for custom meters).

Output

Amplified pulse or 4-20mA output.

## **BENEFITS**

#### Made for Subsea Environment

Designed to withstand the harsh subsea environment, there is no need for a pressurized container.

#### Sealed Electronic

Completely sealed electronics, there is no need for subsea electronics module canister space.

#### Versatile

Available in multiple flow ranges.

#### Customizable

Our engineers will work with you on customized materials or port configurations to meet your specific application requirements.

#### Rugged Construction

The sturdy construction of this turbine flow meter means high performance and longer service life.

### **MATERIALS OF CONSTRUCTION**

Body & Rotor Support	316 Ti
Rotor	329 Stainless Steel
Bearings	Tungsten Carbide

#### **TRANSMITTER**

Supply voltage	+7 up to 29 VDC
Quiescent Current	< 5 mA
Frequency Range	2 up to 2,000 Hz
Ambient Temperature	-40 to 250°F (-40 to 121°C)
Housing	316 Ti
<b>Electrical Connection</b>	6-pin receptacle no. 1370046-101*

<sup>\*</sup>Other options available upon request.

#### **METER SPECIFICATIONS**

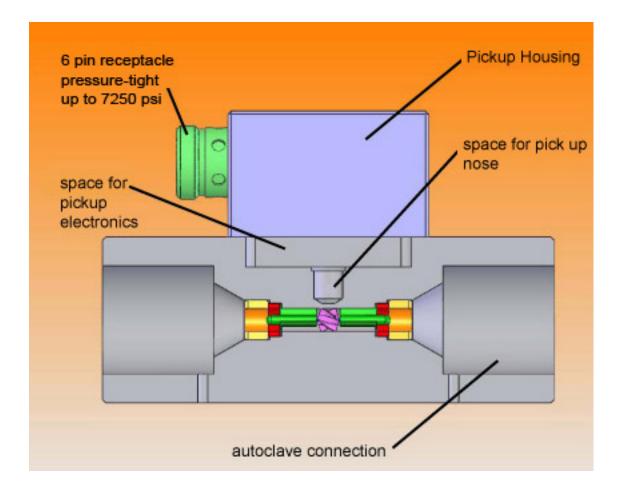
Part Number	Range (gal/min)	Connections	Operating Pressure	Overall Length	Meter Dimensions
HM-003/AC-71-9/16"-C1-TC01-S01	0.08 to 0.4	9/16" Autoclave	20,000 PSI	3.5 Inch	2 in X 3.50 in
HM-009/AC-71-1"-C1-TC01-S01	0.87 to 8.72	1" Autoclave	20,000 PSI	5.3 Inch	2 in X 3.50 in
HM-011/AC-71-1"-C1-TC01-S01	1.5 to 15.8	1" Autoclave	10,000 PSI	5.5 Inch	2 in X 3.50 in



# SUBSEA TURBINE FLOW METER

Ideal for Subsea Applications such as Valve Actuation & Testing on Subsea Equipment and ROVs

# **METER / SENSOR DETAILS**





# TR-QS SERIES - TURBINE FLOW METER

Ideal for high performance flow measurement in aggressive environments, where space is limited and installation needs vary.



#### TECHNICAL SPECIFICATIONS

#### Measuring Accuracy

± 1.0% of reading or better

#### Repeatability

± 0.1%

#### Flow Measuring Range

5 to 5,000 GPM (gal/min) (per flange rating of install kit)

# Maximum Operating Pressure Refer to ASME/ANSI B16.5-1996

# Maximum Operating Temperature

Fluid temperature of -150° to 300°F

#### **End Connections**

Wafer-style ASME/ANSI B16.5-1996
• Threaded, Flange, Graloc & Victaulic

# MATERIALS OF CONSTRUCTION

Body & Rotor Support	316 Stainless Steel
Bearings	Tungsten Carbide
Rotor	Stainless Steel
Rotor Shaft	Tungsten Carbide

## **BENEFITS**

#### Accurate & Reaptable

The TR Series turbine meter is accurate to  $\pm 1\%$  of reading with repeatability of better than  $\pm 0.1\%$ .

#### Smart & Simple Design

Unique design eliminates the need for mating flanges, resulting in lower costs and simplifying installation.

#### Space-Saver

Wafer-style mounting configurations for limited space requirements.

#### High Performance

This flow meter is made from superior materials of construction for high performance in aggressive environments.

#### Improved Accuracy

The modiffied upstream and downstream flow straighteners allow for a higher accuracy and greater fluid dynamics.

## **INSTALLATION KITS**

Each kit includes studs, nuts, gaskets and spacer rings.

Size	150#	300#	600#	900#	1500#
1"	TR-1110QS-150	TR-1110QS-300	TR-1110QS-600	TR-1110QS-900	TR-1110QS-1500
2"	TR-1120QS-150	TR-1120QS-300	TR-1120QS-600	TR-1120QS-900	TR-1120QS-1500
3"	TR-1130QS-150	TR-1130QS-300	TR-1130QS-600	TR-1130QS-900	TR-1130QS-1500
4"	TR-1140QS-150	TR-1140QS-300	TR-1140QS-600	TR-1140QS-900	TR-1140QS-1500
6"	TR-1160QS-150	TR-1160QS-300	TR-1160QS-600	TR-1160QS-900	TR-1160QS-1500
8"	TR-1180QS-150	TR-1180QS-300	TR-1180QS-600	TR-1180QS-900	TR-1180QS-1500
10"	TR-1190QS-150	TR-1190QS-300	TR-1190QS-600	TR-1190QS-900	TR-1190QS-1500



<sup>\*</sup>Actual pressure rating depends on installtion connection.

# TR-QS SERIES - TURBINE FLOW METER

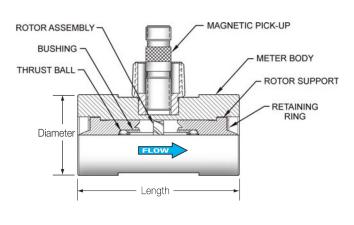
Ideal for high performance flow measurement in aggressive environments, where space is limited and installation needs vary.

## **METER SPECIFICATIONS**

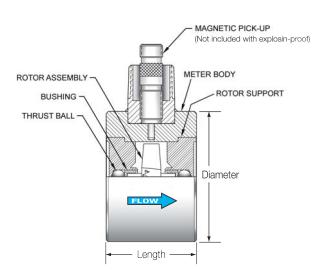
Part Number	Flow Range (Gal/min)	K-Factor * (Pulses/gal)	Bore Size x Line Size	Filtration (micron)	Dimensions (Diam x Lngth)	Repair Kit Part Number
TR-1110QS	5 - 50	870	1" x 1"	250	2" x 4"	TR-112QS
TR-1115QS	5 - 50	870	1" x 2"	250	2" x 4"	consult factory
TR-1118QS	15 - 180	330	1½" x 2"	840	3.62" x 2.5"	consult factory
TR-1120QS	40 - 400	52	2" x 2"	840	3.62" x 2.5"	TR-220QS
TR-1130QS	60 - 600	57	3" x 3"	2000	5" x 4.25"	TR-330QS
TR-1140QS	100 - 1200	29	4" x 4"	2000	6.18" x 5"	TR-440QS
TR-1160QS	200 - 2500	7	6" x 6"	4500	8.5" x 5.75"	TR-660QS
TR-1180QS	350 - 3500	3	8" x 8"	4500	10.62" x 6.25"	TR-880QS
TR-1190QS	500 - 5000	1.6	10" x 10"	4500	12.75" x 6.75"	TR-990QS

<sup>\*</sup>K-Factors given are averaged. A calibration sheet accompanies every meter sold.

# Model TR1110QS only



# Model TR1120QS through TR1190QS









VARIABLE AREA & PADDLE WHEEL FLOW METERS

# BASIC INLINE LIQUID VARIABLE AREA FLOW METER

Ideal for monitoring pump performance as well as measuring fluids in hydraulic circuits and cooling systems.



#### **TECHNICAL SPECIFICATIONS**

#### Measuring Accuracy

±2.0% of full scale

#### Repeatability

±1% of full scale

# Flow Measuring Range

0.1-150 GPM (0.5-550 LPM)

## Maximum Operating Pressure

Aluminum and brass meters: 3500 PSIG (240 Bar)

Stainless steel meters: 6000 PSIG (410 Bar)

#### Maximum Operating Temperature

240°F (116°C) Note: for operation to 600°F (316°C), see our High Temperature Data sheet.

DTE 25 is a registered trademark of Exxon Mobil.

Standard Calibration Fluids

Oil meters: DTE 25® @ 110°F (43°C),

0.873 sg

Water meters: tap water @ 70°F (21°C), 1.0 sg

## Filtration Requirements

74 micron filter or 200 mesh screen minimum

#### Viscosity

Standard viscosities up to 110 cSt. For viscosities between 110 to 430 cSt contact factory.

# BENEFITS

#### Choice of Materials

Select from aluminum, brass or stainless steel to meet system and liquid requirements.

# **Unrestricted Mounting**

Allows for horizontal, vertical or inverted installation and does not require straight plumbing on inlet or outlet.

#### Superior Exterior Design

Weather-tight for use outdoors and/or on systems where wash downs are required.

#### Rugged and Reliable

These meters are constructed with all metal pressure vessels that allow safe and permanent installation.

#### High Pressure Operation

The magnetically coupled follower design allows operation to 6000 PSIG.

#### Multiple Ports Available

Standard selection of NPT, SAE and BSPP ports reduces the amount of adapters required for installation.

# MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	Aluminum	Brass	Stainless Steel
Window Tube	Polycarbonate	Polycarbonate	Polycarbonate
Window Seals	Buna-N® (STD), PTFE	Buna-N® (STD), PTFE	Buna-N® (STD), PTFE

## MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

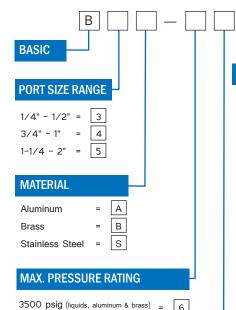
	Aluminum	Brass	Stainless Steel
Casing & End Ports	Anodized Aluminum	Brass	Stainless Steel
Seals	Buna-N® (STD), EPR, FKM or FFKM	Buna-N <sup>®</sup> (STD), EPR, FKM or FFKM	FKM with PTFE backup (STD), Buna-N®, EPR or FFKM
Transfer Magnet	PTFE coated Alnico	PTFE coated Alnico	PTFE coated Alnico
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

Buna-N is a registered trademark of Chemische Werke Huls.



# BASIC INLINE LIQUID VARIABLE AREA FLOW METER Ideal for monitoring pump performance as well as measuring fluids in hydraulic circuits and cooling systems.

# **PART NUMBER GUIDE**



# **FLUID MEDIA**

Oil @ 0.873 specific gravity	=	Н
Water @ 1.0 specific gravity	=	W

Note: For special scales consult factory.

6000 psig (liquids, stainless steel)

# **PORTING/THREAD TYPE**

1/4" NPTF, dry seal       3 only       = S         3/8" NPTF, dry seal       3 only       = B         1/2" NPTF, dry seal       4 only       = C         3/4" NPTF, dry seal       4 only       = D         #6 SAE, O-ring seal       4 only       = E         #8 SAE, O-ring seal       3 only       = F         #10 SAE, O-ring seal       4 only       = H         #12 SAE, O-ring seal       4 only       = J         #16 SAE, O-ring seal       5 only       = K         1-1/4" NPTF, dry seal       5 only       = K         1-1/2" NPTF, dry seal       5 only       = M         #20 SAE, O-ring seal       5 only       = N         #24 SAE, O-ring seal       5 only       = P         #32 SAE, O-ring seal       5 only       = Q         3/8" BSPP       3 only       = T         1/2" BSPP       3 only       = T         3/4" BSPP       4 only       = V         1-1/4" BSPP       5 only       = W         1-1/2" BSPP       5 only       = X	(all female)	Size	
1/2" NPTF, dry seal       3 only       =       B         3/4" NPTF, dry seal       4 only       =       C         1" NPTF, dry seal       4 only       =       D         #6 SAE, O-ring seal       3 only       =       E         #8 SAE, O-ring seal       3 only       =       F         #10 SAE, O-ring seal       4 only       =       H         #12 SAE, O-ring seal       4 only       =       H         #16 SAE, O-ring seal       4 only       =       J         1-1/4" NPTF, dry seal       5 only       =       K         1-1/2" NPTF, dry seal       5 only       =       M         #20 SAE, O-ring seal       5 only       =       N         #24 SAE, O-ring seal       5 only       =       P         #32 SAE, O-ring seal       5 only       =       Q         3/8" BSPP       3 only       =       R         1/2" BSPP       3 only       =       T         3/4" BSPP       4 only       =       V         1-1/4" BSPP       5 only       =       W         1-1/2" BSPP       5 only       =       Y	1/4" NPTF, dry seal	3 only	= S
3/4" NPTF, dry seal 4 only = C  1" NPTF, dry seal 4 only = D  #6 SAE, O-ring seal 3 only = E  #10 SAE, O-ring seal 4 only = J  #16 SAE, O-ring seal 4 only = H  #16 SAE, O-ring seal 4 only = J	3/8" NPTF, dry seal	3 only	= A
1" NPTF, dry seal	1/2" NPTF, dry seal	3 only	= B
#6 SAE, O-ring seal 3 only = E  #8 SAE, O-ring seal 3 only = F  #10 SAE, O-ring seal 3 only = G  #12 SAE, O-ring seal 4 only = H  #16 SAE, O-ring seal 4 only = J	3/4" NPTF, dry seal	4 only	= C
#8 SAE, O-ring seal 3 only = F  #10 SAE, O-ring seal 3 only = G  #12 SAE, O-ring seal 4 only = H  #16 SAE, O-ring seal 4 only = J  1-1/4" NPTF, dry seal 5 only = K  1-1/2" NPTF, dry seal 5 only = L  2" NPTF, dry seal 5 only = M  #20 SAE, O-ring seal 5 only = N  #24 SAE, O-ring seal 5 only = P  #32 SAE, O-ring seal 5 only = Q  3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	1" NPTF, dry seal	4 only	= D
#10 SAE, O-ring seal 3 only = G  #12 SAE, O-ring seal 4 only = H  #16 SAE, O-ring seal 4 only = J  1-1/4" NPTF, dry seal 5 only = K  1-1/2" NPTF, dry seal 5 only = M  #20 SAE, O-ring seal 5 only = N  #24 SAE, O-ring seal 5 only = P  #32 SAE, O-ring seal 5 only = Q  3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	#6 SAE, O-ring seal	3 only	= E
#12 SAE, O-ring seal 4 only = H  #16 SAE, O-ring seal 4 only = J  1-1/4" NPTF, dry seal 5 only = K  1-1/2" NPTF, dry seal 5 only = L  2" NPTF, dry seal 5 only = M  #20 SAE, O-ring seal 5 only = N  #24 SAE, O-ring seal 5 only = P  #32 SAE, O-ring seal 5 only = Q  3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	#8 SAE, O-ring seal	3 only	= F
#16 SAE, O-ring seal 4 only = J  1-1/4" NPTF, dry seal 5 only = K  1-1/2" NPTF, dry seal 5 only = L  2" NPTF, dry seal 5 only = M  #20 SAE, O-ring seal 5 only = N  #24 SAE, O-ring seal 5 only = P  #32 SAE, O-ring seal 5 only = Q  3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	#10 SAE, O-ring seal	3 only	= G
#10 SAL, O fing seal  1-1/4" NPTF, dry seal  5 only = K  1-1/2" NPTF, dry seal  5 only = M  #20 SAE, O-ring seal  #24 SAE, O-ring seal  5 only = P  #32 SAE, O-ring seal  5 only = Q  3/8" BSPP  3 only = R  1/2" BSPP  3 only = T  3/4" BSPP  4 only = U  1-1/4" BSPP  5 only = W  1-1/2" BSPP  5 only = Y	#12 SAE, O-ring seal	4 only	= H
1-1/2" NPTF, dry seal 5 only = L 2" NPTF, dry seal 5 only = M #20 SAE, O-ring seal 5 only = N #24 SAE, O-ring seal 5 only = P #32 SAE, O-ring seal 5 only = Q 3/8" BSPP 3 only = R 1/2" BSPP 3 only = T 3/4" BSPP 4 only = U 1-1/4" BSPP 5 only = W 1-1/2" BSPP 5 only = Y	#16 SAE, O-ring seal	4 only	= J
2" NPTF, dry seal 5 only = M  #20 SAE, O-ring seal 5 only = N  #24 SAE, O-ring seal 5 only = P  #32 SAE, O-ring seal 5 only = Q  3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1" BSPP 4 only = V  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	1-1/4" NPTF, dry seal	5 only	= K
#20 SAE, O-ring seal 5 only = N  #24 SAE, O-ring seal 5 only = P  #32 SAE, O-ring seal 5 only = Q  3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1" BSPP 4 only = V  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	1-1/2" NPTF, dry seal	5 only	= L
#24 SAE, O-ring seal 5 only = P  #32 SAE, O-ring seal 5 only = Q  3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1" BSPP 4 only = V  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	2" NPTF, dry seal	5 only	= M
#32 SAE, O-ring seal 5 only = Q  3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1" BSPP 4 only = V  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	#20 SAE, O-ring seal	5 only	= N
3/8" BSPP 3 only = R  1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1" BSPP 4 only = V  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	#24 SAE, O-ring seal	5 only	= P
1/2" BSPP 3 only = T  3/4" BSPP 4 only = U  1" BSPP 4 only = V  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	#32 SAE, O-ring seal	5 only	= Q
3/4" BSPP 4 only = U  1" BSPP 4 only = V  1-1/4" BSPP 5 only = W  1-1/2" BSPP 5 only = Y	3/8" BSPP	3 only	= R
1" BSPP 4 only = V 1-1/4" BSPP 5 only = W 1-1/2" BSPP 5 only = Y	1/2" BSPP	3 only	= T
1-1/4" BSPP 5 only = $\boxed{W}$ 1-1/2" BSPP 5 only = $\boxed{Y}$	3/4" BSPP	4 only	= U
1-1/2" BSPP 5 only = Y	1" BSPP	4 only	= V
	1-1/4" BSPP	5 only	= W
2" BSPP 5 only = X	1-1/2" BSPP	5 only	= Y
	2" BSPP	5 only	= X

Note: SAE porting not available in Brass. Consult factory for SAE brass meter requirements.

# SPECIAL SCALE/CUSTOM PRODUCT

#### **OPTIONAL FLOW DIRECTIONS**

Standard Flow, Uni-Directional

ability and delivery time.)

Reverse Flow	=	RIF
Bi-Directional Flow (For bi-direction	onal flov	v refer to
bi-directional data sheet. Please cons	sult facti	ory for avail

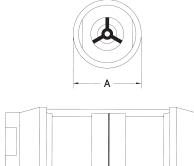
# **FLOW RANGES**

Liquid		Size			
0.1-1.0 GPM	0.5-4 LPM	3 only	=	0	1
0.2-2.0 GPM	1-8 LPM	3 & 4	=	0	2
0.5-5.0 GPM	2-19 LPM	3 & 4	=	0	5
1-10 GPM	5-37.5 LPM	3 & 4	=	1	0
1-15 GPM	5-55 LPM	3 & 4	=	1	5
2-20 GPM	10-75 LPM	4 only	=	2	0
2-25 GPM	10-95 LPM	4 & 5	=	2	5
4-30 GPM	15-115 LPM	4 only	=	3	0
4-40 GPM	20-150 LPM	4 only	=	4	0
6-50 GPM	20-190 LPM	4 & 5	=	5	0
6-75 GPM	30-280 LPM	5 only	=	7	5
10-100 GPM	50-375 LPM	5 only	=	8	8
25-150 GPM	100-550 LPM	5 only	=	9	9

## **MECHANICAL - SIZE CODE**

DIM	Series 3	Series 4	Series 5	Series 5 (2" port only)
Α	1-7/8" (48mm)	2-3/8" (60 mm)	3-1/2" (90mm)	3-1/2" (90mm)
В	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)

Products may be subject to change without notice - Contact factory for the most up-to-date product information.





В

# **BI-DIRECTIONAL VARIABLE AREA FLOW METER**

Ideal for monitoring pump performance as well as measuring fluids in hydraulic circuits and cooling systems where flow is measured in both directions.



#### **TECHNICAL SPECIFICATIONS**

#### Measuring Accuracy

±4.0% of full scale

#### Repeatability

±1% of full scale

# Flow Measuring Range

0.5-100 GPM (2-350 LPM)

#### Maximum Operating Pressure

Aluminum and brass meters: 3500 PSIG (240 Bar)

Stainless steel meters: 6000 PSIG (410 Bar)

#### Maximum Operating Temperature

240°F (116°C) Note: for operation to 600°F (316°C), see our High Temperature Data sheet.

DTE 25 is a registered trademark of Exxon Mobil.

## Standard Calibration Fluids

Oil meters: DTE 25® @ 110°F (43°C),

0.873 sg

Water meters: tap water @ 70°F

(21°C), 1.0 sg

#### Filtration Requirements

74 micron filter or 200 mesh screen minimum

#### Viscosity

Viscosities up to 110 cSt

## **BENEFITS**

# Choice of Materials

Select from aluminum, brass or stainless steel to meet system and liquid requirements.

#### **Unrestricted Mounting**

Allows for horizontal, vertical or inverted installation and does not require straight plumbing on inlet or outlet.

#### Bi-Directional

Measures bi-directional flow measurement for liquids.

#### Rugged and Reliable

These meters are constructed with all metal pressure vessels that allow safe & permanent installation.

#### High Pressure Operation

The magnetically coupled follower design allows operation to 6000 PSIG.

#### Multiple Ports Available

Standard selection of NPT, SAE and BSPP ports reduces the amount of adapters required for Installation.

# MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	Aluminum	Brass	Stainless Steel
Window Tube	Polycarbonate	Polycarbonate	Polycarbonate
Window Seals	Buna-N® (STD), PTFE	Buna-N® (STD), PTFE	Buna-N® (STD), PTFE

# MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	Aluminum	Brass	Stainless Steel
Casing & End Ports	Anodized Aluminum	Brass	Stainless Steel
Seals	Buna-N® (STD), EPR, FKM or FFKM	Buna-N <sup>®</sup> (STD), EPR, FKM or FFKM	FKM with PTFE backup (STD), Buna-N®, EPR or FFKM
Transfer Magnet	PTFE coated Alnico	PTFE coated Alnico	PTFE coated Alnico
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

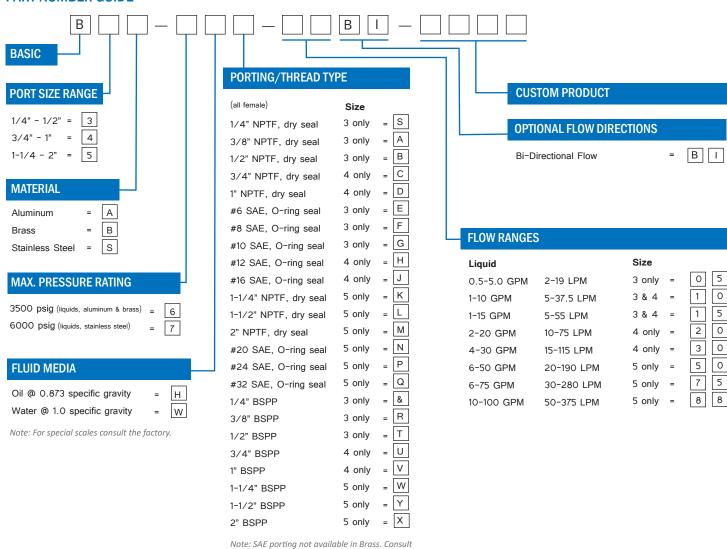
Buna-N is a registered trademark of Chemische Werke Huls.



# **BI-DIRECTIONAL VARIABLE AREA FLOW METER**

Ideal for monitoring pump performance as well as measuring fluids in hydraulic circuits and cooling systems where flow is measured in both directions.





# **MECHANICAL - SIZE CODE**

DIM	Series 3	Series 4	Series 5	Series 5 (2" port only)
Α	1-7/8" (48mm)	2-3/8" (60 mm)	3-1/2" (90mm)	3-1/2" (90mm)
В	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)

factory for SAE brass meter requirements.

A --



# HIGH TEMPERATURE FLOW METER

High Temperature Flow Meter enables flow monitoring of barrel heating fluids, thermal transfer fluids such as Syltherm® coolant flows, hydraulic circuits and sub-circuits.



#### **TECHNICAL SPECIFICATIONS**

# Measuring Accuracy

±2.0% of full scale

#### Repeatability

±1% of full scale

#### Flow Measuring Range

0.1-150 GPM (0.4-560 LPM)

## Maximum Operating Pressure<sup>1</sup>

#### Liquids

Aluminum and brass meters: 3500 PSIG

(240 Bar)

Stainless steel meters: 6000 PSIG (410

Bar)

#### Air/Gas

Aluminum and brass meters: 600 PSIG

(40 Bar)

Stainless steel meters: 1000 PSIG (69 Bar)

# Maximum Operating Temperature

H-Series 400°F (204°C) J-Series 600°F (315°C)

# Standard Calibration Fluids

Oil meters: DTE 25® @ 110°F (43°C),

0.873 sg

Water meters: water @ 70°F (21°C),

1.0 sg

Air meters: air @ 70°F (21°C), 1.0 sg

& 100 PSIG (6.8 bar)

#### Filtration Requirements

74 micron filter or 200 mesh screen minimum

# Viscosity

Standard viscosities up to 110 cSt. For viscosities between 110 to 430 cSt

contact factory.

## MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	Aluminum	Brass	Stainless Steel
Window Tube	Pyrex®	Pyrex®	Pyrex®
Window Seals	PTFE	PTFE	PTFE

Pyrex is a registered trademark of Corning Incorporated.

# BENEFITS

#### Choice of Materials

Select from aluminum, brass or stainless steel to meet system and media compatibility requirements.

#### **Unrestricted Mounting**

Allows for horizontal, vertical or inverted installation and does not require straight plumbing on inlet or outlet.

# Multiple Ports Available

Standard selection of NPT, SAE and BSPP ports reduces the amount of adapters required for installation.

# Bi-Directional and Reverse Flow Option Offered

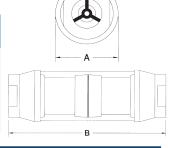
High temperature monitors are also available in bidirectional and reverse flow versions. Contact the factory for more information.

# MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	Aluminum	Brass	Stainless Steel
Casing and End Ports	Anodized Aluminum	Brass	Stainless Steel
Seals H-Series (400°F) J-Series (600°F)	FKM w/ PTFE backup FFKM w/ PTFE backup	FKM w/ PTFE backup FFKM w/ PTFE backup	FKM w/ PTFE backup FFKM w/ PTFE backup
Transfer Magnet	PTFE coated Alnico	PTFE coated Alnico	PTFE coated Alnico
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

# **MECHANICAL - SIZE CODE**

DIM	Series 3	Series 4	Series 5	Series 5 (2" port only)
Α	1-7/8"	2-3/8"	3-1/2"	3-1/2"
	(48mm)	(60mm)	(90mm)	(90mm)
В	6-9/16"	7-5/32"	10-1/8"	12-5/8"
	(167 mm)	(182mm)	(258mm)	(322mm)





<sup>&</sup>lt;sup>1</sup>Note: See Temperature/Pressure De-rating Chart on back. DTE 25 is a registered trademark of Exxon Mobil.

# HIGH TEMPERATURE FLOW METERS

High Temperature Flow Meter enables flow monitoring of barrel heating fluids, thermal transfer fluids such as Syltherm® coolant flows, hydraulic circuits and sub-circuits.

#### PART NUMBER GUIDE **METER STYLE PORTING/THREAD TYPE** 400°F In-line = H SPECIAL SCALE/CUSTOM PRODUCT (all female) Size 600°F In-line = J 3 only = S 1/4" NPTF, dry seal Α 3/8" NPTF, dry seal OPTIONAL FLOW DIRECTIONS 3 only **PORT SIZE RANGE** В 1/2" NPTF, dry seal 3 only Standard Flow, Uni-Directional С 4 only 3/4" NPTF, dry seal 1/4" - 1/2" R F Reverse Flow 4 only D 1" NPTF, dry seal 3/4" - 1" 4 Bi-Directional Flow В I Ε #6 SAE, O-ring seal 3 only 5 1-1/4 - 2" Note: See bi-directional datasheet for available F #8 SAE, O-ring seal 3 only bi-directional ranges. G #10 SAE, O-ring seal 3 only **MATERIAL** Н #12 SAE, O-ring seal 4 only **FLOW RANGES** Α Aluminum 4 only #16 SAE, O-ring seal Size Liquid Air В **Brass** Κ 1-1/4" NPTF, dry seal 5 only 0 0.1-1.0 GPM 2-12 SCFM 3 only S Stainless Steel = 5 only 1-1/2" NPTF, dry seal 0 2 0.2-2.0 GPM 4-23 SCFM 3 & 4 M 5 only 2" NPTF, dry seal 0 5 5-50 SCFM 0.5-5.0 GPM 3 & 4 MAX. PRESSURE RATING 5 only Ν #20 SAE, O-ring seal 0 1-10 GPM 10-100 SCFM 3 & 4 Р #24 SAE, O-ring seal 5 only 1 5 1-15 GPM 25-150 SCFM 3 & 4 600 psig (air/gas, aluminum & brass) 4 5 only Q #32 SAE, O-ring seal 2 0 2-20 GPM 20-215 SCFM 4 only 5 1000 psig (air/gas, stainless steel) & 3 only 1/4" BSPP 5 2-25 GPM 20-250 SCFM 2 3500 psig (liquids, aluminum & brass) 6 4 & 5 R 3 only 3/8" BSPP 3-30 GPM 30-330 SCFM 3 0 4 only $6000 \ psig \ (liquids, \ stainless \ steel)$ 7 Т 1/2" BSPP 3 only 0 4 4-40 GPM 30-400 SCFM 4 only U 3/4" BSPP 4 only 5 0 5-50 GPM 40-500 SCFM 4 only V 1" BSPP 4 only = **FLUID MEDIA** 5 0 30-470 SCFM 5-50 GPM 5 only W 1-1/4" BSPP 5 only 7 5 Air & Gases Α 8-75 GPM 30-750 SCFM 5 only

5 only

5 only

Note: SAE porting not available in Brass. Consult

factory for SAE brass monitor requirements.

Χ

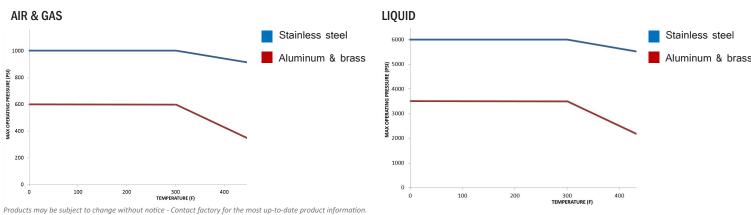
# TEMPERATURE DE-RATING FOR ALUMINUM & BRASS METERS

Н

W

1-1/2" BSPP

2" BSPP





Oil & 0.873 specific gravity

Water & 1.0 specific gravity

Note: For special scales consult the factory

10-100 GPM

20-150 GPM

150-900 SCFM

150-1300 SCFM

8 8

9 9

5 only

5 only

# **CLEARVIEW VALUE FLOW METER**

ClearView Flow Meter is an economical way to monitor water flows, observe case drain flows and verify pump outputs.



# **BENEFITS**

#### Visual Inspection of Fluid

The transparent body allows for visual inspection of fluid conditions. Diagnose problems at a glance.

#### **Unrestricted Mounting**

Allows for horizontal, vertical or inverted installation and does not require straight plumbing on inlet or outlet.

# Compact Design

Measures less than 8" long and 2-7/16" diameter with a rigid tube and union nut design.

#### Multiple Materials and Calibrations Available

With a variety of wetted materials of construction and media calibrations, the meter will be well suited to your process.

#### Sensing Method Assures Accuracy

The proven variable area piston metering assembly provides accurate, dependable flow rate indication.

#### **TECHNICAL SPECIFICATIONS**

# Measuring Accuracy

±2% of full scale

#### Repeatability

±1% of full scale

# Flow Measuring Range

1-30 GPM (5-110 LPM)

# Maximum Operating Pressure

325 PSIG (22.4 Bar)

#### Maximum Operating Temperature

ClearView H2O 200°F (93°C) (water only) ClearView+ 250°F (121°C)

#### Standard Calibration Fluids

Oil monitors: DTE  $25^{\circ}$  @110°F (43°C),

0.873 sg

Water monitors: tap water @70°F (21°C),

1.0 sg

#### Filtration Requirements

74 micron filter or 200 mesh screen minimum

# MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

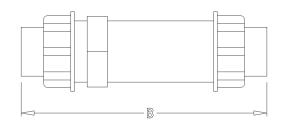
	ClearView H2O	ClearView +
End Ports	Brass, Ryton®	Brass, Ryton®
Seals	Viton	Viton
Spring	Stainless Steel	Stainless Steel
Body	Polycarbonate	Polysulfone
Indicator	Polysulfone	Polysulfone

Ryton is a registered trademark of the Chevron Phillips Chemical Company LLC. Buna-N is a registered trademark of Chemische Werke Huls. DTE is a registered trademark of Exxon Mobil.

## **MECHANICAL - SIZE CODE**

DIM	1/2" Female	3/4" Female	1" Female
Α	2-7/16" (62 mm)	2-7/16" (62 mm)	2-7/16" (62 mm)
B - Brass	7-5/32" (182 mm)	7-9/16" (192 mm)	7-9/16" (192 mm)
B - Ryton	7-9/16" (192 mm)	7-9/16" (192 mm)	7-9/16" (192 mm)
Port Type	NPTF, BSPP	NPTF, BSPP	NPTF, BSPP
DIM	1/2" Male	3/4" Male	1" Male
B - Brass	7-21/32" (194 mm)	8-1/64" (204 mm)	8-3/16" (208 mm)
Port Type	NPTF	NPTF	NPTF



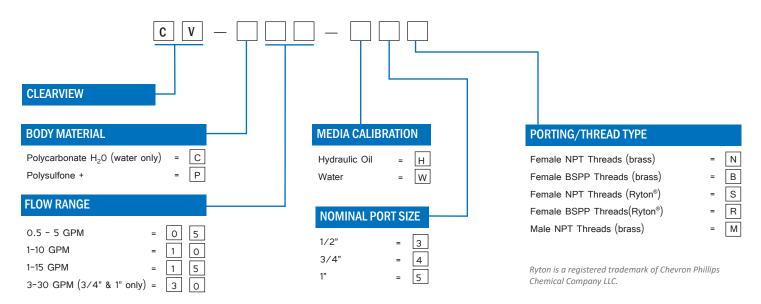




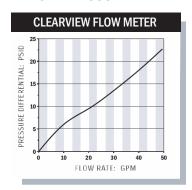
# **CLEARVIEW VALUE FLOW METER**

ClearView Flow Meter is an economical way to monitor water flows, observe case drain flows and verify pump outputs.

## **PART NUMBER GUIDE**



## TYPICAL PRESSURE DIFFERENTIALS





# PHOSPHATE ESTER FLOW METERS

Phosphate Ester Flow Meter is compatible with aviation lubricants such as Skydrol®, and fire-retardant fluids such as Pydraul®, Fyrquil® and Houghton 900 series. Meters are density corrected to 1.145 sg.



## **TECHNICAL SPECIFICATIONS**

#### Measuring Accuracy

±2.0% of full scale

#### Repeatability

±1% of full scale

#### Flow Measuring Range

0.1-130 GPM (0.5 - 500 LPM)

## Maximum Operating Pressure

Aluminum and brass meters: 3500

PSIG (240 Bar)

Stainless steel meters: 6000 PSIG

(410 Bar)

# Maximum Operating Temperature 240°F (116°C)

#### Standard Calibration Fluids

Tap water @ 70°F (21°C) 1.0 s.g. Meters are density corrected to 1.145 sg

#### Filtration Requirements

74 micron filter or 200 mesh screen minimum

# **BENEFITS**

## Choice of Materials

Select from aluminum, brass or stainless steel to meet system and liquid requirements.

#### **Unrestricted Mounting**

Allows for horizontal, vertical or inverted installation and does not require straight plumbing on inlet or outlet.

#### Multi-Use

Factory calibrated for phosphate esters, these versatile meters can be used to verify hydraulic power unit outputs, as well as test machinery and tools for proper fluid flow rates.

#### Rugged and Reliable

These meters are constructed with all metal pressure vessels that allow safe & permanent installation.

#### High Pressure Operation

The magnetically coupled follower design allows operation to 6000 PSIG and use with liquids.

#### Multiple Ports Available

Standard selection of NPT, SAE and BSPP ports reduces the amount of adapters required for installation.

# MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	Aluminum	Brass	Stainless Steel
Window Tube	Pyrex®	Pyrex®	Pyrex®
Window Seals	PTFE	PTFE	PTFE

Pyrex is a registered trademark of Corning Incorporated.

# MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

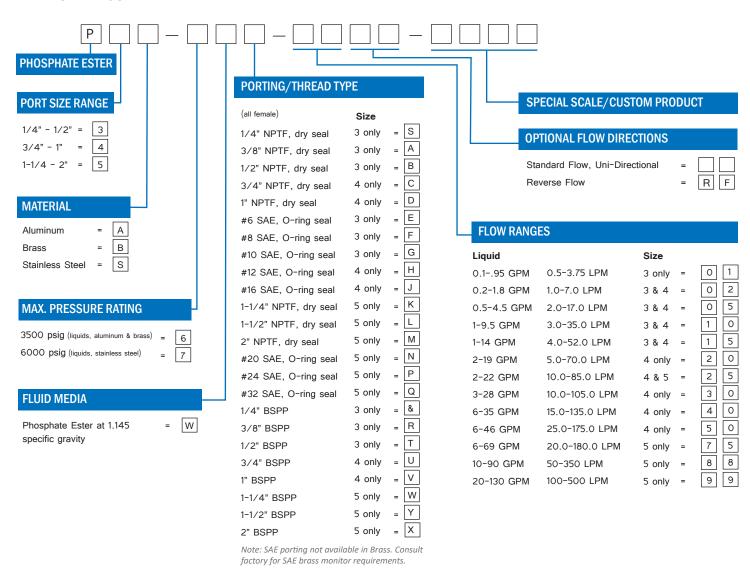
	Aluminum	Brass	Stainless Steel
Casing & End Ports	Anodized Aluminum	Brass	Stainless Steel
Seals	ERP with PTFE backup FKM or FFKM optional		nal
Transfer Magnet	PTFE coated Alnico	PTFE coated Alnico	PTFE coated Alnico
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel



# PHOSPHATE ESTER FLOW METERS

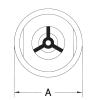
Phosphate Ester Flow Meter is compatible with aviation lubricants such as Skydrol®, and fire-retardant fluids such as Pydraul®, Fyrquil® and Houghton 900 series. Meters are density corrected to 1.145 sg.

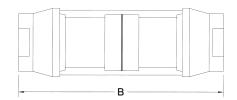
#### PART NUMBER GUIDE



# **MECHANICAL - SIZE CODE**

DIM	Series 3	Series 4	Series 5	Series 5 (2" port only)
А	1-7/8"	2-3/8"	3-1/2"	3-1/2"
	(48mm)	(60 mm)	(90mm)	(90mm)
В	6-9/16"	7-5/32"	10-1/8"	12-5/8"
	(167mm)	(182mm)	(258mm)	(322mm)







# **CASE DRAIN FLOW METER**

Case Drain Flow Meter is a low cost alternative for monitoring pump performance and identifying required maintenance.



#### **TECHNICAL SPECIFICATIONS**

# Measuring Accuracy

±5% of full scale

#### Repeatability

±1% of full scale

# Flow Measuring Range

0.1-30 GPM (0.5-115 LPM)

# Maximum Operating Pressure

1000 PSIG (69 Bar)

# Maximum Operating Temperature

240°F (116°C)

DTE 25 is a registered trademark of Exxon Mobil.

# Standard Calibration Fluids

Oil meters: DTE 25 $^{\circ}$  @ 110 $^{\circ}$ F (43 $^{\circ}$ C), 0.873 sg

Water meters: tap water @ 70°F (21°C), 1.0 sg

# Filtration Requirements

74 micron filter or 200 mesh screen minimum

# Viscosity

Standard viscosities up to 110 cSt. For viscosities between 110 to 430 cSt contact factory.

# BENEFITS

#### **Unrestricted Mounting**

Allows for horizontal, vertical or inverted installation and does not require straight plumbing on inlet or outlet.

# Superior Exterior Design

Weather-tight for use outdoors and/or on systems where wash-downs are required.

#### Rugged and Reliable

These meters are constructed with all metal pressure vessels that allow safe and permanent installation.

#### Multiple Ports Available

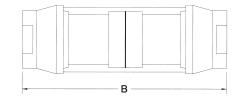
Standard selection of NPT, SAE and BSPP ports reduces the amount of adapters required for installation.

# **MATERIALS OF CONSTRUCTION**

Wetted Components	
Component	Materials
Casing	Anodized Aluminum
Ports	Non-anodized Aluminum
Seals	Buna-N®
Transfer Magnet	PTFE coated Alnico
All other internal parts	Stainless Steel

Non-Wetted Components		
Component	Materials	
Window Tube	Polycarbonate	
Window Seals	Buna-N®	





# **MECHANICAL - SIZE CODE**

DIM	Series 3	Series 4
А	1-7/8" (48mm)	2-3/8" (60 mm)
В	6-9/16" (167mm)	7-5/32" (182mm)

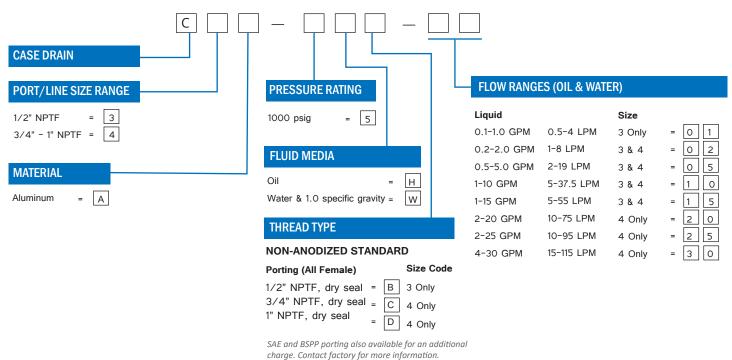
SAE and BSPP porting also available. Contact factory for more information.



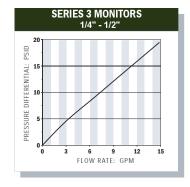
# **CASE DRAIN FLOW METER**

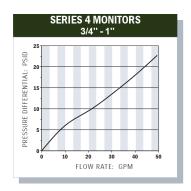
Case Drain Flow Meter is a low cost alternative for monitoring pump performance and identifying required maintenance.





## TYPICAL PRESSURE DIFFERENTIALS







# PNEUMATIC FLOW METERS

Pneumatic Flow Meters are ideal for monitoring air compressor efficiencies, pneumatic tool air consumption and industrial gas flows.



#### **TECHNICAL SPECIFICATIONS**

#### Measuring Accuracy

±2.5% of full scale in the center third of the measuring range; ±4% in upper and lower thirds

#### Repeatability

±1% of full scale

# Flow Measuring Range

2-1300 SCFM @ 100 PSIG (1-600 SLPS)

# Maximum Operating Pressure

Aluminum and brass meters: 600 PSIG (40 Bar)

Stainless steel meters: 1000 PSIG (69 Bar)

application conditions & media.

PSIG (6.8 Bar)

# Filtration Requirements

74 micron filter or 200 mesh screen minimum

Maximum Operating Temperature

240°F (116°C) Note: For operation

to 600°F (316°C), see our High

Standard Calibration Fluids

Air @ 70°F (21°C), 1.0 sg and 100

Consult factory for scale correction for

Temperature data sheet.

# MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	Aluminum	Brass	Stainless Steel
Window Tube	Polycarbonate	Polycarbonate	Polycarbonate
Window Seals	Buna-N®	Buna-N®	Buna-N®

# **BENEFITS**

#### Choice of Materials

Select from aluminum, brass or stainless steel to meet system and media compatibility requirements.

#### **Unrestricted Mounting**

Allows for horizontal, vertical or inverted installation.

#### Superior Exterior Design

Weather-tight for use outdoors and/or on systems where wash downs are required.

#### Rugged and Reliable

These monitors are constructed with all metal pressure vessels, allowing safe, permanent installation in industrial systems.

#### Multiple Ports Available

Standard selection of NPT, SAE and BSPP ports reduces the amount of adapters required for installation.

# MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	Aluminum	Brass	Stainless Steel
Casing & End Ports	Anodized Aluminum	Brass	Stainless Steel
Seals	Buna-N® (STD), EPR, FKM or FFKM	Buna-N® (STD), EPR, FKM or FFKM	FKM with PTFE backup (STD), Buna-N®, EPR or FFKM
Transfer Magnet	PTFE coated Alnico	PTFE coated Alnico	PTFE coated Alnico
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

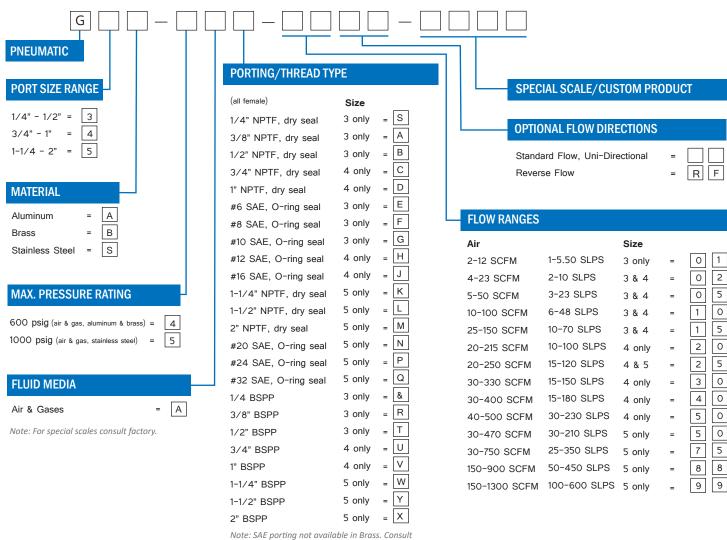
Buna-N is a registered trademark of Chemische Werke Huls.



# PNEUMATIC FLOW METERS

Pneumatic Flow Meters are ideal for monitoring air compressor efficencies, pneumatic tool air consumption and industrial gas flows.

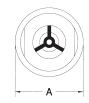
# PART NUMBER GUIDE

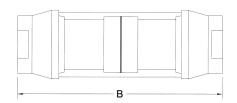


factory for SAE brass monitor requirements.

## **MECHANICAL - SIZE CODE**

DIM	Series 3	Series 4	Series 5	Series 5 (2" port only)
Α	1-7/8" (48mm)	2-3/8" (60 mm)	3-1/2" (90mm)	3-1/2" (90mm)
В	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)







# **FLOW RATE ALARMS**

Flow Rate Alarm ensures sufficient flows of coolants and lubricants in mobile hydraulic equipment and industrial process control. Field adjustable alarm setting available in single or duel switch.



#### TECHNICAL SPECIFICATIONS

#### Measuring Accuracy

±2.0% of full scale

#### Repeatability

±1% of full scale

#### Flow Measuring Range

0.1-150 GPM (0.5-550 LPM) 2.0-1300, SCFM (1-600 SLPS)

#### Maximum Operating Pressure

#### Liquids

Aluminum and brass monitors: 3500 PSIG (240 Bar)

Stainless steel: 6000 PSIG (410 Bar)

#### Air/Gas

Aluminum and brass: 600 PSIG (40

Bar)

Stainless steel: 1000 PSIG (69 Bar)

# Maximum Operating Temperature

Media: 185°F (85°C) Ambient: 185°F (85°C)

DTE 25 is a registered trademark of Exxon Mobil.

#### Standard Calibration Fluids

Oil meters: DTE 25® @ 110°F (43°C),

0.873 sg

Water meters: tap water @ 70°F (21°C),

1.0 sg

Air meters: air @ 70°F (21°C), 1.0 sg and 100 PSIG (6.8 Bar)

#### Alarm Switch Dead-band

4% of full scale

#### Alarm Switch Contacts

SPDT (dry contact). 10 amps and 1/4 hp, 125 or 250 VAC. 1/2 amp, 125 VDC (regulated); 1/4 amp, 250 VDC (regulated); 3 amps, 125 VAC "L" (lamp load)

#### Filtration Requirements

74 micron filter or 200 mesh screen minimum

#### Viscosity

Standard viscosities up to 110 cSt. For viscosities between 110 to 430 cSt contact factory.

# **BENEFITS**

#### Field Adjustable Alarm Setting

Only an allen wrench is required to change the flow alarm setting.

# Weather-Tight Construction

Rugged cast aluminum NEMA type 4X enclosure allows installation outdoors and in environments where liquid tight seals are required.

## Simple On/Off Logic

Positive alarm points using dry-contact, SPDT switches, reduce the complexity found in standard rotameter OFF/ON/OFF circuits.

## Pre-Wired with Cable Disconnect

The standard Hirschmann interconnection provides easy installation and maintenance of the Flow Alarm and the system it is a part of.

#### **Economical Protection**

This monitor rapidly pays for itself as it "sounds the alarm" on incorrect pneumatic, lubrication or cooling volumes, protecting expensive equipment and reducing downtime.

**ENCLOSURE MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)** 

Enclosure & Cover	Painted Aluminum	Painted Aluminum	Painted Aluminum
Seals	Buna-N®	Buna-N®	Buna-N®
Window	Pyrex®	Pyrex®	Pyrex®
Din Connector	Polyamide	Polyamide	Polyamide

Buna-N is a registered trademark of Chemische Werke Huls. Pyrex® is a registered trademark of Corning Incorporated.

# FLOW METER MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

Casing & End Ports	Anodized Aluminum	Brass	Stainless Steel 303
Seals	Buna-N (STD), EPR, FKM or Kalrez®	Buna-N (STD), EPR, FKM or Kalrez®	FKM with PTFE backup (STD), Buna-N, EPR or Kalrez®
Transfer Magnet	PTFE coated Alnico	PTFE coated Alnico	PTFE coated Alnico
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

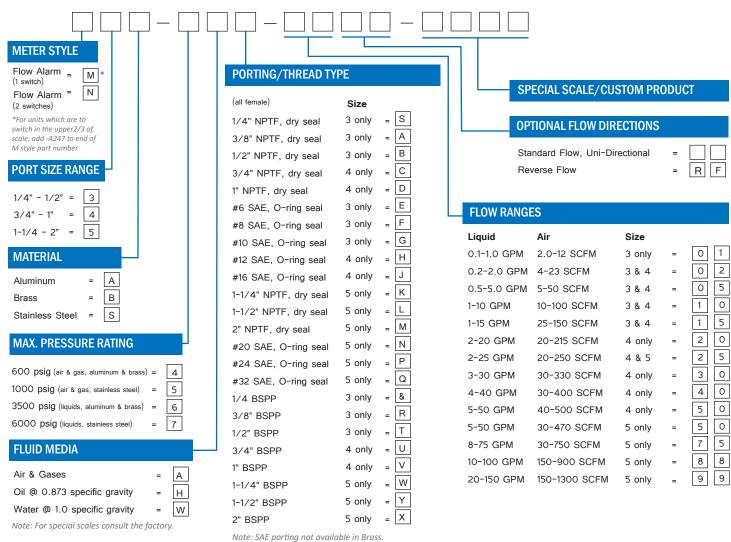
Kalrez is a registered trademark of DuPont Incorporated.



# **FLOW RATE ALARMS**

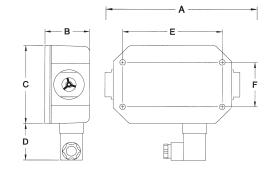
Flow Rate Alarm ensures sufficient flows of coolants and lubricants in mobile hydraulic equipment and industrial process control. Field adjustable alarm setting available in single or duel switch.





#### **MECHANICAL - SIZE CODE**

DIM	Series 3	Series 4	Series 5	Series 5 (2" port only)
Α	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)
В	2-3/16" (56mm)	2-15/16" (75mm)	3-13/16" (97mm)	3-13/16" (97mm)
С	4" (101mm)	4-1/2" (114mm)	5-5/16" (135 mm)	5-5/16" (135mm)
D	1-7/8" (47mm)	1-7/8" (47mm)	1-7/8" (47mm)	1-7/8" (47mm)
Е	4-7/8" (128mm)	5" (127mm)	6-3/4" (172mm)	6-3/4" (172mm)
F	2-1/4" (57mm)	2-7/8" (73mm)	3-3/4" (95mm)	3-3/4" (95mm)





# **FLOW RATE TRANSMITTERS**

Flow Rate Transmitter is ideal for batching, industrial process control, mobile hydraulic equipment and computer / PLC controlled hydraulic system monitoring application. Available in analog or pulse outputs.



#### **TECHNICAL SPECIFICATIONS**

# Measuring Accuracy

±2.0% of full scale

#### Repeatability

±1% of full scale

# Flow Measuring Range

0.1-150 GPM (0.5-550 LPM) 2-1300 SCFM (1-600 SLPS)

#### Standard Calibration Fluids

Oil monitors: DTE 25® @ 110°F (43°C), 0.873 sg

Water monitors: tap water @ 70°F

(21°C), 1.0 sg

Air monitors: air @ 70°F (21°C), 1.0 sg and 100 PSIG (6.8 Bar)

# Maximum Operating Pressure

DTE 25 is a registered trademark of Exxon Mobil.

Liquids

Aluminum and brass monitors:

3500 PSIG (240 Bar)

Stainless steel: 6000 PSIG (410 Bar)

#### Air/Gas

Aluminum and brass: 600 PSIG (40 Bar) Stainless steel: 1000 PSIG (69 Bar)

# Maximum Operating Temperature

Media: 185°F (85°C) Ambient: 185°F (85°C)

#### Filtration Requirements

74 micron filter or 200 mesh screen minimum

#### Viscosity

Standard viscosities up to 110 cSt. For viscosities between 110 to 430 cSt contact factory.

#### **BENEFITS**

#### Simple to Install

All transmitters are factory calibrated and ship fully assembled. Simply install the transmitter into your system and apply power. No straight plumbing required at inlet or outlet.

## **Industry Standard Outputs**

Transmitters provide proportional analog or pulse outputs that will drive popular data acquisition devices, meters and analog input cards.

#### **Direct Reading**

All transmitters provide a visual indication of flow rate that matches the transmitted output.

#### Weather-Tight Construction

The rugged cast aluminum enclosure is built to NEMA 4X standard and allows installation outdoors and in environments where liquid tight seals are required.

#### Rugged and Reliable

Without delicate internal components to break, abrade or corrode, the flow transmitter will provide many years of low-maintenance service.

# **ELECTRONIC TRANSMITTER PERFORMANCE**

#### Power Requirements

12-24 VDC, Regulated

#### Load Driving capacity

4-20mA: Load resistance is dependent on power supply voltage.

Use the following equation to calculate maximum load resistance: Max Loop Load  $(\Omega)$  = 50 (Power supply volts - 12).

0-5 VDC (regulated): Minimum load resistance 1000  $\Omega$ .

1-5 VDC\* (regulated): Minimum load resistance 25 K  $\Omega$ 

Square Wave Pulse: Minimum load resistance 1000  $\Omega$ 

## Transmission Distance

4-20mA and 1-5 VDC (regulated) are limited only by wire resistance and power supply voltage.

<200 feet recommended for 0-5 VDC (regulated) and square wave pulse.

#### **Over-Current Protection**

Self limiting at 35mA

# Resolution

10-bit (0.1%)

#### Response Time

<100 milliseconds



<sup>\*</sup>The 1-5 VDC output requires an external 249 ohm resistor (not included with transmitter) to be wired at the receiving device.

# **FLOW RATE TRANSMITTERS**

Flow Rate Transmitter is ideal for batching, industrial process control, mobile hydraulic equipment and computer / PLC controlled hydraulic system monitoring application. Available in analog or pulse outputs.

# **ENCLOSURE MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)**

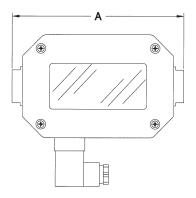
Enclosure & Cover	Painted Aluminum	Painted Aluminum	Painted Aluminum
Seals	Buna-N®	Buna-N®	Buna-N®
Window	Pyrex®	Pyrex®	Pyrex®
Din Connector	Polyamide	Polyamide	Polyamide

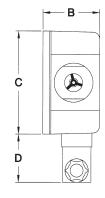
 $\textit{Buna-N} \ \textit{is a registered trademark of Chemische Werke Huls. Pyrex} \\ \textit{§ is a registered trademark of Corning Incorporated}.$ 

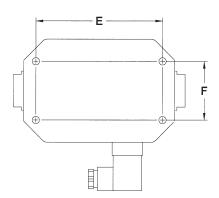
# FLOW METER MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

Casing & End Ports	Anodized Aluminum	Brass	Stainless Steel 303
Seals	Buna-N (STD), EPR, FKM or Kalrez®	Buna-N (STD), EPR, FKM or Kalrez®	FKM with PTFE backup (STD), Buna-N, EPR or Kalrez®
Transfer Magnet	PTFE coated Alnico	PTFE coated Alnico	PTFE coated Alnico
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

Kalrez is a registered trademark of DuPont Incorporated.







# **MECHANICAL - SIZE CODE**

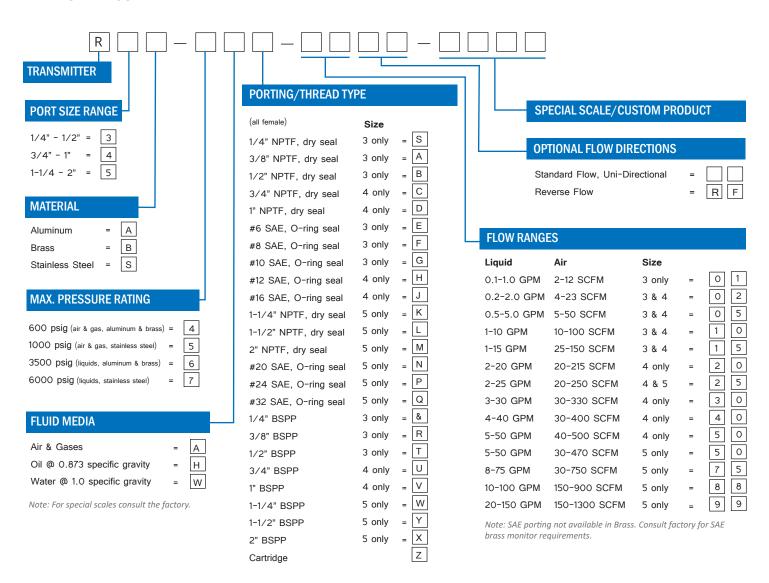
DIM	Series 3	Series 4	Series 5	Series 5 (2" port only)
Α	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)
В	2-3/16" (56mm)	2-15/16" (75mm)	3-13/16" (97mm)	3-13/16" (97mm)
С	4" (101mm)	4-1/2" (114mm)	5-5/16" (135 mm)	5-5/16" (135mm)
D	1-7/8" (47mm)	1-7/8" (47mm)	1-7/8" (47mm)	1-7/8" (47mm)
Е	4-7/8" (128mm)	5" (127mm)	6-3/4" (172mm)	6-3/4" (172mm)
F	2-1/4" (57mm)	2-7/8" (73mm)	3-3/4" (95mm)	3-3/4" (95mm)



# FLOW RATE TRANSMITTERS

Flow Rate Transmitter is ideal for batching, industrial process control, mobile hydraulic equipment and computer / PLC controlled hydraulic system monitoring application. Available in analog or pulse outputs.

#### PART NUMBER GUIDE





# HYDRAULIC SYSTEM TEST ANALYZER

Hydraulic Test Analyzer is used to diagnose faults in hydraulic circuits, determine horsepower and test for component wear and cylinder leakages. Two options are available: K Series (flow & pressure) and T Series (flow, pressure & temperature).



## **TECHNICAL SPECIFICATIONS**

#### Measuring Accuracy

Flow: ±2% of full scale
Pressure: ±2.5% of full scale
Temperature: ±2.5% of full scale

#### Repeatability

±1% of full scale - all measurements

#### Flow Measuring Range

Flow: 0.1-150 GPM (0.5-550 LPM) Temperature: 0-250°F (-20-120°C)

#### Maximum Operating Pressure

Aluminum meters: 3000 PSIG (200 Bar) Stainless steel meters: 5000 PSIG

(340 Bar)

DTE 25 is a registered trademark of Exxon Mobil.

# Maximum Operating Temperature 240°F (116°C)

#### Standard Calibration Fluid

Oil meters: DTE 25® @ 110°F (43°C),

0.873 sg

#### Filtration Requirements

74 micron filter or 200 mesh screen minimum

#### Viscosity

Standard viscosities up to 110 cSt.

# MATERIALS OF CONSTRUCTION

Wetted Components	
Component	Materials
Needle Valve	Carbon Steel
Casing and End ports	Anodized Aluminum (3000 PSIG) Stainless Steel (5000 PSIG)
Seals	Buna-N® (STD), FKM, EPR, Neoprene optional
Transfer Magnet	PTFE coated Alnico
All other internal parts	Stainless Steel

Buna-N is a registered trademark of Chemische Werke Huls.

Non-Wetted Components		
Component	Materials	
Window Tube	Polycarbonate	
Window Tube Seals	Buna-N®	
Gauge	Brass and Stainless Steel	
Gauge Window	Acrylic	

# **BENEFITS**

# A Complete Troubleshooting System

Style K consists of the flow meter, precision needle-type load valve and Glyerin filled pressure gauge. Style T adds a Thermowell protected temperature gauge.

#### Planned Component Repairs

This system analyzer can be part of a predictive maintenance program, allowing strategized pump, valve, motor and cylinder rebuilding.

#### Compact and Rugged

The complete hydraulic system test analyzer is small enough to fit in a tool box and built to withstand rigorous industrial use.

#### Non-Electrical

Without batteries to fail or other electrical power connections to make, this system will provide a lifetime of simple and reliable operation.

# Metric and US/Standard Measuring Ranges

These multi-measurement analyzers simultaneously measure flow in GPM and LPM, pressure in PSIG and Bar, and temperature in degrees F and C.

#### **Unrestricted Mounting**

Accurate measurements can be taken in any mounting orientation, without the straigh plumbing required with other analyzer systems.

# Reverse Flow Option Available

Optional built-in reverse bypass mechanism prevents potential damage from mis-installation or backflow.



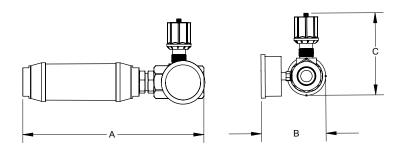
# **HYDRAULIC SYSTEM TEST ANALYZER**

Hydraulic Test Analyzer is used to diagnose faults in hydraulic circuits, determine horsepower and test for component wear and cylinder leakages. Two options are available: K Series (flow & pressure) and T Series (flow, pressure & temperature).

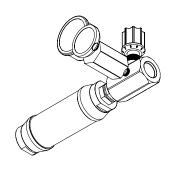
## HYDRAULICS DIAGNOSTICS TOOL KIT APPLICATIONS

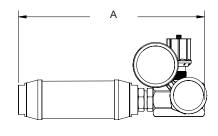
# Test hydraulic pump horsepower developed // control valve leakage // Verify relief valve settings // Test cylinder leakage rates

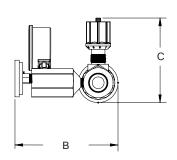
## **K-STYLE**



#### **T-STYLE**







# **GENERAL DIMENSIONS**

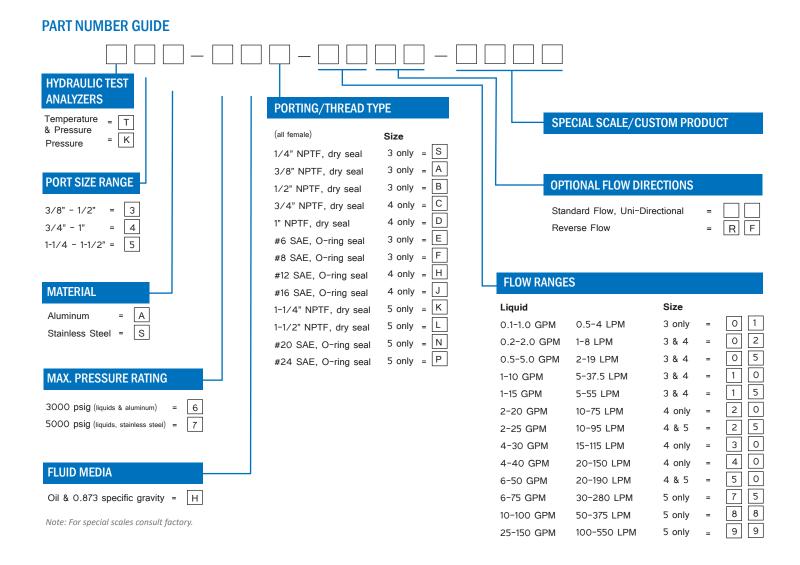
(Measurements may vary from meter to meter)

DIM	Series 3	Series 3	Series 4	Series 4	Series 5	Series 5
Port Sizes	3/8" + #6 SAE	1/2" + #8 SAE	3/4" + #12 SAE	1" + #16 SAE	1-1/4" + #20 SAE	1-1/2" + 24 SAE
Α	9.75" (248mm)	10.15" (258mm)	11.14" (283mm)	12.7" (323mm)	15.85" (403mm)	15.85" (403mm)
B (K-Style)	3.44" (87mm)	3.54" (90mm)	3.98" (101mm)	4.08" (104mm)	4.84" (123mm)	5.04" (128mm)
B (T-Style)	5.64" (143mm)	5.74" (146mm)	6.18" (157mm)	6.28" (160mm)	7.04" (179mm)	7.24" (184mm)
С	4.11" (104mm)	4.53" (115mm)	5.07" (129mm)	5.88" (149mm)	6.64" (169mm)	6.84" (174mm)



# **HYDRAULIC SYSTEM TEST ANALYZER**

Hydraulic Test Analyzer is used to diagnose faults in hydraulic circuits, determine horsepower and test for component wear and cylinder leakages. Two options are available: K Series (flow & pressure) and T Series (flow, pressure & temperature).





# FLOWSTAT ES TURBINE FLOW SENSOR

Ideal for monitoring various fluids in applications such as chillers/cooling circuits, HVAC, batching and industrial process control applications.



#### **TECHNICAL SPECIFICATIONS**

# Measuring Accuracy

2% of full-scale

# Repeatability

±0.5% of full-scale

# Flow Measuring Range

0.5-15 GPM (2-60 LPM) With optional low-flow adapter: .25-4.5 GPM (1-17 LPM)

#### Turn Down Ratio

10:1

# Maximum Operating Pressure 150 PSIG

# Maximum Operating Temperature 20-150°F

#### Standard Calibration Fluid

Tap water @ 70°F Temperature (21°C), 1.0 sg

#### Filtration Requirement

150 Micron Filter recommended

# BENEFITS

#### Value Pricing

Low cost operation combined with low cost maintenance, equals better bottom line savings for your operation.

#### **Encapsulated Circuitry**

Withstands the harshest environments.

#### Several Outputs Available

The standard interface is a 2-wire, 4-20mA current loop. Sensor signal may be transmitted on a low cost wire without degradation. Pulse, relay and 0-5 VDC (regulated) are also available.

# Connects Directly to your Flow Monitoring Instruments

Can be connected directly to analog acquisition cards, chart recorders or other monitoring instruments, without external signal conditioning.

#### Simply Plumb and Apply Power

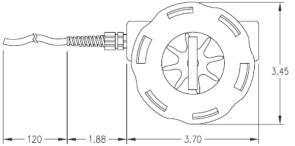
Comes factory calibrated to your flow range specifications.

# MATERIALS OF CONSTRUCTION

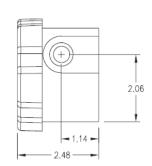
Wetted Components		
Component	Materials	
Casing	Glass-Filled Polypropylene	
Cover	Clear Polycarbonate	
Seal	Buna-N® (Other options available)	
Impeller	Acetal Copolymer	
Bearing	PEEK (Polyetheretherketone)	
Shaft	Stainless Steel	

Non-Wetted Components				
Component	Materials			
Encapsulant	Ероху			
Strain Relief	Nylon			
Lock Ring	Glass-Filled Polypropylene			
Wire Insulation	High-Temperature PVC			

Buna-N is a registered trademark of Chemische Werke Huls.





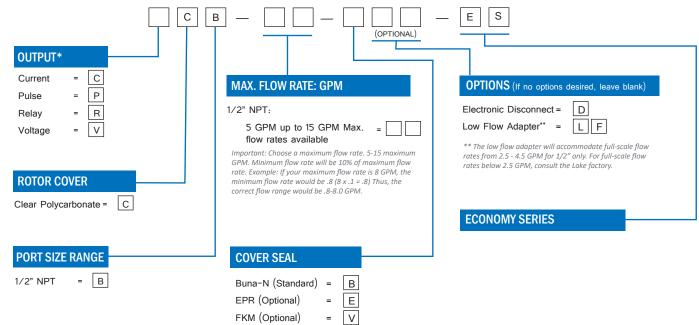




# FLOWSTAT ES TURBINE FLOW SENSOR

Ideal for monitoring various fluids in applications such as chillers/cooling circuits, HVAC, batching and industrial process control applications.

# **PART NUMBER GUIDE**



## **ELECTRONIC SPECIFICATIONS**

4-20 mA version			
Power Requirements	12-24 VDC, Regulated, Loop powered		
Load driving capacity	Use the following equation to calculate maximum load resistance: Max Loop Load $(\Omega)$ = 50 (Power supply volts - 12).		
Maximum Transmission Distance	Limited only by wire resistance & supply voltage		
Response time	2 seconds to 90% (step change)		
Resolution	Infinite		
Over-current limit	Self limiting at 35 mA		
Other protection	Reverse polarity		

Relay Output			
Power Requirements	12-24 VDC, Regulated		
Maximum Transmission Distance	200 feet recommended		
Switch Contact	Form C, 5A max 120 or 240 VAC		
Set Point Repeatability	1% of full scale		

0-5 VDC (regulated) version			
Power Requirements	12-24 VDC, Regulated		
Maximum Current	25 mA DC, Regulated		
Minimum Load resistance	1000 Ohms		
Maximum Transmission Distance	200 feet recommended		
Resolution	Infinite		
Response time	< 5 seconds to 90% (step change)		

Pulse Output Version			
Power Requirements	12-24 VDC, Regulated		
Response Time	<100 mS		
Maximum Current	25 mA DC, Regulated		
Maximum Transmission Distance	200 feet recommended		
Minimum Load Resistance	1000 Ohms		
Protection	Short circuit & reverse polarity		



# FLOWSTAT TURBINE FLOW SENSOR

Ideal for monitoring various fluids in applications such as chillers/cooling circuits, HVAC, medical equipment, batching and industrial process control applications.



#### **TECHNICAL SPECIFICATIONS**

#### Measuring Accuracy

±2% of full scale

#### Repeatability

±0.5% of full scale

#### Flow Measuring Range

1/2" porting: 0.5-15 GPM (2-60 LPM) 1/2 " porting low flow option: 0.25-4.5 (1-17 LPM)

3/4" - 1" porting: 1.5-50 GPM

(60-200 LPM)

#### Turn Down Ratio

10:1

# Fluid Temperature Range

20-225°F (-7° to 107°)

#### Maximum Operating Pressure

Stainless steel cover: 500 PSIG (34 Bar) Clear polycarbonate cover: 200 PSIG (14

Bar)

#### Filtration Requirements

150 Micron filter recommended

#### Standard Calibration Fluid

Water @ 70°F Temperature (21°C), 1.0 sg

#### MATERIALS OF CONSTRUCTION

# BENEFITS

#### Choice of Three Port Sizes

Select from 1/2", 3/4" or 1" NPT porting to meet system requirements.

NOTE: Using reduced ID fittings will affect calibrated range.

#### **Encapsulated Circuitry**

Withstands the harshest environments.

#### Several Outputs Available

The standard interface is a 2-wire, 4-20mA current loop. Sensor signal may be transmitted on a low cost wire without degradation. Pulse, relay and 0-5 VDC (regulated) are also available.

# Connects Directly to your Flow Monitoring Instruments

Can be connected directly to analog acquisition cards, chart recorders or other monitoring instruments, without external signal conditioning.

#### Simply Plumb and Apply Power

Comes factory calibrated to your flow range specifications.

Wetted Components			
Component	Materials		
Casing	Stainless Steel 316		
Cover	Clear polycarbonate (Optional Stainless Steel 316)		
Seal	Buna-N® (other options available)		
Impeller	Acetal Copolymer		
Bearing	PEEK (Polyetheretherketone)		
Shaft	316 Stainless Steel		

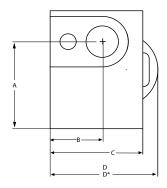
Non-Wetted Components		
Component	Materials	
Encapsulant	Ероху	
Strain Relief	Nylon	
Lock Ring	Stainless Steel	
Wire Insulation	High-Temperature PVC	

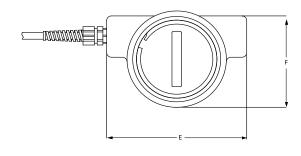
Buna-N is a registered trademark of Chemische Werke Huls.



FLOWSTAT TURBINE FLOW SENSOR

Ideal for monitoring various fluids in applications such as chillers/cooling circuits, HVAC, medical equipment, batching and industrial process control applications.





# **MECHANICAL DIMENSIONS**

DIM	1/2" NPTF	3/4" NPTF - 1" NPTF
A	1.94" (49mm)	3.06" (78mm)
В	1.13" (29mm)	1.33" (34mm)
С	2.00" (51mm)	2.46" (62mm)
D	2.45" (62mm)	2.78" (71mm)
D*	2.45" (62mm)	2.88" (73mm)
Е	3.70" (94mm)	5.25" (133mm)
F	2.63" (67mm)	3.80" (97mm)

<sup>\*</sup>Dimensions with clear polycarbonate cover installed.

# **ELECTRONIC SPECIFICATIONS**

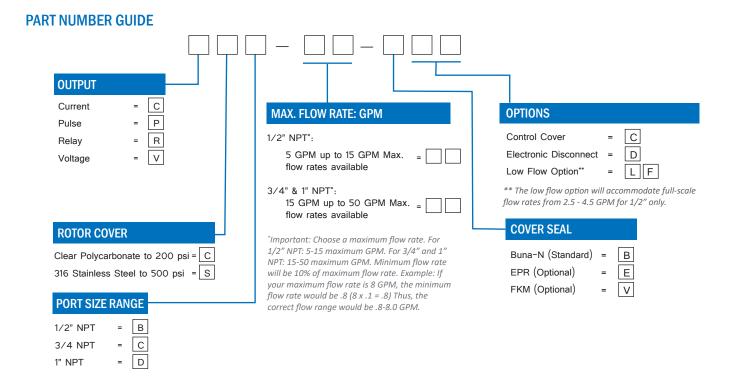
4-20 mA version		0-5 VDC (regulated) version	
Power Requirements	12-24 VDC, Regulated, Loop powered	Power Requirements	12-24 VDC, Regulated
Load driving capacity	Use the following equation to calculate maximum load resistance: Max Loop Load ( $\Omega$ ) = 50 (Power supply volts – 12).	Maximum Current	25 mA DC, Regulated
		Minimum Load resistance	1000 Ohms
Maximum Transmission Distance	Limited only by wire resistance & supply voltage	Maximum Transmission Distance	200 feet recommended
Response time	2 seconds to 90% (step change)		
Resolution Infinite		Resolution	Infinite
Over-current limit	Self limiting at 35 mA	Response time	< 5 seconds to 90% (step change)
Other protection	Reverse polarity		

Relay Output		Pulse Output Version	
Power Requirements	12-24 VDC, Regulated	Power Requirements	12-24 VDC, Regulated
		Response Time	<100 mS
Maximum Transmission Distance	200 feet recommended	Maximum Current	25 mA DC, Regulated
		Maximum Transmission Distance	200 feet recommended
Switch Contact	Form C, 5A max 120 or 240 VAC	Minimum Load Resistance	1000 Ohms
Switch contact	10111 C, 37 1110X 120 01 240 VAC	Protection	Short circuit & reverse polarity
Set Point Repeatability	1% of full scale	K-Factor	1/2" port ≈ 200 pulses/gallons 3/4" & 1" ports ≈ 60 pulses/gallons

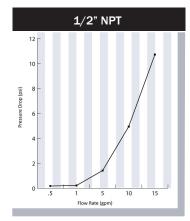


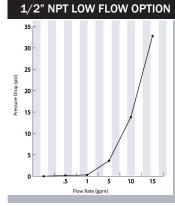
# FLOWSTAT TURBINE FLOW SENSOR

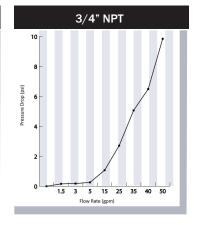
Ideal for monitoring various fluids in applications such as chillers/cooling circuits, HVAC, medical equipment, batching and industrial process control applications.

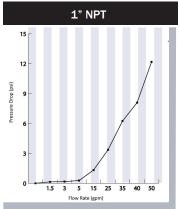


#### TYPICAL PRESSURE DIFFERENTIALS











# WTA SERIES HYDRAULIC ANALYZER

Simple compact design allows for simultaneous measurement of flow, pressure and temperature on Mobile Industrial & Agricultural industries.



# **BENEFITS**

## Reversible Flow Indicator

The WTA will allow full flow to pass through in the reverse direction at low pressure but will not measure the reverse flow. This can be useful in situations when the flow and direction are uncertain or a cycle requires reversing, via the raising and lowering of a cylinder.

#### Easy Connection & No Power Required

The WTA can be connected "In Line" between the pump and valve for convenient machine testing.

# Rugged and Reliable

Manufactured in a painted high quality steel case with removable lid. The WTA can withstand the most rigorous of use out in the field.

# Loading Valve

A loading valve allows you to simulate pressure on the hydraulic system without the need to operate all the machine functions in the workshop. The multistage valve design assures low handle effort and smooth operation over the entire flow and pressure range.

#### Built-in Thermometer

Heat stressed hydraulic fluids can be a major factor in component failure. The thermometer, calibrated for both °F and °C is a carefully designed and integrated part of a high quality unit, not a bolted-on afterthought.

## **FUNCTIONAL SPECIFICATIONS**

#### Measuring Accuracy

Flow: ± 4% of full scale Pressure: ± 1.6% of full scale Temperature: ±5°F (± 2.5°C)

## Flow Measuring Range

2-32 GPM (10-120 lpm) 2-54 GPM (10-200 lpm)

# Maximum Operating Pressure

6000 PSIG (420 Bar)

# Standard Calibration Fluids

28cSt Oil

#### **Ambient Temperature**

-10 to 50 °C (14 - 122 °F)

#### Fluid Temperature

68 - 176°F (20 to 80°C) continuous use. Intermittently (< 10 minutes) up to 230°F (110°C).

#### Fluid Type

Hydraulic oils

#### **Dimensions**

310 x 105 x 120 mm (12-1/4" x 4-1/8" x 4-7/8")

#### Weight

14.5 lbs (6.6kg)

#### Accessories

A range of burst discs are available – please consult factory.

#### **TECHNICAL SPECIFICATIONS**

Model Number	Flow Range		Inlet Fitting	Outlet Fitting
	lpm	gpm	iniet ritting	Outlet Fitting
WTA32	10-120	2-32	1-5/16" - 12UN JIC Male	1-5/16" - 12UN JIC Male
WTA50	10-200	2-54	1-5/16" - 12UN JIC Male	1-5/16" - 12UN JIC Male

## MATERIALS OF CONSTRUCTION

Case	Painted steel - removable lid	
RFI body	Aluminum 2011T6	
Load valve body	Aluminum 2011T6	
Internal components	Stainless Steel, Brass	
Seals	Viton	

NOTE: This unit is not designed for permanent installation.





# VARIABLE AREA & PADDLE WHEEL FLOW METERS

# ABOUT AW-LAKE VARIABLE AREA METERS:

AW-Lake's line of variable area and paddle wheel flow meters have been used in industrial applications around the world. This includes lubrication and cooling systems, as well as pneumatic and hydraulic systems, process control systems, and even gas and chemical applications.

#### **State-of-the-Art Production**

Variable Area flow meters from Lake Monitors have recently undergone a production re-design. Utilizing automated calibration software and a high-res vision system, our new proprietary calibration and scaling process records the unique flow profile of each meter during calibration. The integrated laser engraving system marks precise scale increments for a more accurate, custom-scaled meter.

#### **Excellent Customer Service**

AW-Lake products are built to order in our Oak Creek facility, and typically ship within 5 days from order placement. We also offer expedited service with 24-hour turn-around. We understand our customers often face tight installation deadlines so we do everything we can to take care of your needs. From fast turnaround to technical support, we have your back.

#### **Meet or Beat Competitor Pricing**

AW-Lake prides itself on remaining competitively priced, and will do what is necessary to make sure our customers get the very best price in the market. When we realize cost savings, we pass it along to you!

## **Global Support**

With offices in the US, Europe, China and Singapore, we are strategically positioned to support our customers around the globe.



# VARIABLE AREA FLOW METERS



#### BASIC VARIABLE AREA FLOW METER

Basic Variable Area Flow Meter is ideal for monitoring pump performance as well as measuring fluids in hydraulic circuits and cooling systems.

Measuring Accuracy: ±2.0% of full scale over 10:1 turndown

Repeatability: ±1% of full scale

Flow Ranges: 0.1-150 GPM (0.5-550 LPM)

Pressure Rating: Aluminum & brass: 3500 PSIG (240 Bar)

Stainless steel: 6000 PSIG (410 Bar)

**Temperature Rating:** 240°F (116°C)



# BI-DIRECTIONAL FLOW METER

Bi-Directional Flow Meter is ideal for monitoring pump performance as well as measuring fluids in hydraulic circuits and cooling systems where flow is measured in both directions.

Measuring Accuracy: ±4.0% of full scale over 10:1 turndown

Repeatability: ±1% of full scale

Flow Ranges: 0.5-100 GPM (2-350 LPM)

Pressure Rating: Aluminum & brass: 3500 PSIG (240 Bar)

Stainless steel: 6000 PSIG (410 Bar)

**Temperature Rating:** 240°F (116°C)



#### CASE DRAIN FLOW METER

Case Drain Flow Meter is a low cost alternative for monitoring pump performance and identifying required maintenance.



Measuring Accuracy: ±5.0% of full scale over 10:1 turndown

Repeatability: ±1% of full scale

Flow Range: 0.1-30 GPM (0.5-115 LPM)
Pressure Rating: 1000 PSIG (69 Bar)
Temperature Rating: 240°F (116°C)



## **CLEARVIEW FLOW METER**

ClearView Flow Meter is an economical way to monitor water flows, observe case drain flows and verify pump outputs.

Measuring Accuracy: ±2.0% of full scale over 10:1 turndown

Repeatability: ±1% of full scale

Flow Range: 0.1-30 GPM (5-110 LPM)
Pressure Rating: 325 PSIG (22.4 Bar)

**Temperature Rating:** ClearView H<sub>3</sub>O: 200°F (93°C) (water only)

ClearView+: 250°F (121°C)



#### FLOW RATE ALARM

Flow Rate Alarm ensures sufficient flows of coolants and lubricants in mobile hydraulic equipment and industrial process control. Field adjustable alarm setting available in single or duel switch. Measuring Accuracy: ±2.0% of full scale over 10:1 turndown

Repeatability: ±1% of full scale

Flow Range: 0.1-150 GPM (0.5-550 LPM) 2.0-1300 SCFM (1-600 SLPS)

**Pressure Ratings:** 

Liquids - Aluminum & brass monitors: 3500 PSIG (240 Bar)

Stainless steel: 6000 PSIG (410 Bar)

Air/Gas - Aluminum & brass: 600 PSIG (40 Bar)

Stainless steel: 1000 PSIG (69 Bar)

**Temperature Rating:** 185°F (85°C)



# FLOW RATE TRANSMITTER

Flow Rate Transmitter is ideal for batching, industrial process control, mobile hydraulic equipment and computer / PLC controlled hydraulic system monitoring application.

Available in analog or pulse outputs.

Measuring Accuracy: ±2.0% of full scale over 10:1 turndown

**Repeatability:** ±1% of full scale

Flow Ranges: 0.1-150 GPM (0.5-550 LPM) 2-1300 SCFM (1-600 SLPS)

**Pressure Ratings:** 

Liquids - Aluminum & brass: 3500 PSIG (240 Bar)
Stainless steel: 6000 PSIG (410 Bar)
Air/Gas - Aluminum & brass: 600 PSIG (40 Bar)

Stainless steel: 1000 PSIG (69 Bar)

**Temperature Rating:** 185°F (85°C)



#### PHOSPHATE ESTER FLOW METER

Phosphate Ester Flow Meter is compatible with aviation lubricants such as Skydrol®, and fire-retardant fluids such as Pydraul®, Fyrquil® and Houghton 900 series. Meters are density corrected to 1.145 sg.

Measuring Accuracy: ±2% of full scale over 10:1 turndown

Repeatability: ±1% of full scale

Flow Range: 0.1-130 GPM (0.5-500 LPM)

Pressure Ratings: Aluminum & brass: 3500 PSIG (240 Bar)

Stainless steel: 6000 PSIG (410 Bar)

**Temperature Rating:** 240°F (116°C)



#### HIGH TEMPERATURE FLOW METER

High Temperature Flow Meter enables flow monitoring of barrel heating fluids, thermal transfer fluids such as Syltherm® coolant flows, hydraulic circuits and sub-circuits.

Measuring Accuracy: ±2% of full scale over 10:1 turndown

Repeatability: ±1% of full scale

Flow Range: 0.1-150 GPM (0.4-560 LPM)

**Pressure Rating:** 

Liquids - Aluminum & brass meters: 3500 PSIG (240 Bar)

Stainless steel meters: 6000 PSIG (410 Bar)

Air/Gas - Aluminum and brass meters: 600 PSIG (40 Bar)

Stainless steel meters: 1000 PSIG (69 Bar)

Temperature Rating: H-Series 400°F (204°C), J-Series 600°F (315°C)



#### PNEUMATIC FLOW METER

Pneumatic Flow Meters are ideal for monitoring air compressor efficencies, pneumatic tool air consumption and industrial gas flows. Measuring Accuracy: ±2.5% of full scale in the center third of the measuring range; ±4% in upper and lower thirds

Flow Range: 2.0-1300 SCFM @ 100 PSIG (1-600 SLPS)

Pressure Ratings: Aluminum & brass: 600 PSIG (40 Bar)

Stainless steel: 1000 PSIG (69 Bar)

**Temperature Rating:** 240°F (116°C)



#### HYDRAULIC TEST ANALYZER FLOW METER

Hydraulic Test Analyzer is used to diagnose faults in hydraulic circuits, determine horsepower and test for component wear and cylinder leakages. Two options are available: T Series (flow and pressure) and T Series (flow, pressure and temperature).

Measuring Accuracy: Flow: ±2% of full scale over 10:1 turndown

Pressure: ±2.5% of full scale Temperature: ±2.5% of full scale

**Repeatability:** ±1% of full scale – all measurements

Flow Measuring Range: Flow: 0.1–150 GPM (0.5-550 LPM)

Temperature: 0°F to 250°F (-20°C to 120°C)

Pressure Ratings: Aluminum: 3000 PSIG (200 Bar)

Stainless steel: 5000 PSIG (340 Bar)

**Temperature Rating:** 240°F (116°C)



#### WTA — HYDRAULIC ANALYZER

WTA Series Hydraulic Analyzer is a simple, compact design that allows for simultaneous measurement of flow, pressure and temperature on mobile industrial and agricultural equipment.



Pressure: ±1.6% of full scale Temperature: ±5°F (±2.5°C)

Flow Ranges: 2-32 GPM (10-120 lpm)

2-54 GPM (10-200 lpm)

Pressure Rating: 6000 PSIG (420 Bar)

Ambient Temperature Rating: 14 to 122°F (-10 to 50°C) Fluid Temperatures: 68°F to 176°F (20°C to 80°C) continuous use. Intermittently (< 10 minutes) up to 230°F (110°C).



#### FLOWSTAT — PADDLE WHEEL FLOW METER

Lake FlowStat Paddle Wheel Flow Meter is a perfect monitoring solution for chillers/cooling circuits, HVAC, medical equipment, batching and industrial process control applications. Measuring Accuracy: ±2% of full scale over 10:1 turndown

Repeatability: ±0.5% of full scale Flow Ranges: 0.5–15 GPM (2-60 LPM) 0.25-4.5 GPM (1-17 LPM) 1.5–50 GPM (60-200 LPM)

Pressure Rating: Stainless steel cover: 500 PSIG (34 Bar)

Clear polycarbonate cover: 200 PSIG (14 Bar)

**Temperature Rating:** 20°F to 225°F (-6°C to 107°C)

**Body Material:** Stainless steel



#### FLOWSTAT ES — PADDLE WHEEL FLOW METER

FlowStat ES is an economical monitoring solution for chillers/cooling circuits, HVAC, batching and industrial process control applications.

Measuring Accuracy: ±2% over a 10:1 turndown

Repeatability: ±0.5% of full scale Flow Range: 0.5 to 15 GPM (2-60 LPM)

Optional low-flow adapter 0.25-4.5 GPM

Pressure Rating: up to 150 PSIG (10 Bar)

**Temperature Rating:** 20°F to 150°F (-6°C to 65°C)

**Body Material:** Plastic



#### MX-9000 — PANEL METER

MX 9000 Panel Meter is ideal for any industrial flow measurement application where a simple, compact & easy-to-use remote panel meter is required. Flow Display Options: Rate, total, limit, batch and ratio

Channels: Single or dual channel

**Batch Controller:** Stores up to 20 batch recipes

Output Options: Programmable Form C relay and 4-20 mA

**Data Logging Available** 

#### **AW-Lake Company**

2440 W. Corporate Preserve Dr. #600 Oak Creek, WI 53134 414.574.4300 www.aw-lake.com

#### **KEM Küppers Elektromechanik**

GmbH Liebigstraße 5 85757 Karlsfeld, Germany +49 (0)8131 59391-0 www.kem-kueppers.com

#### **TASI Flow China**

Rm. 2429 Jin Yuan Office Building, No. 36 CN - BeiYuan Road, Beijing 100012 +86 10 520 037 38





## **POSITIVE DISPLACEMENT** FLOW METERS & ELECTRONICS

#### POSITIVE DISPLACEMENT FLOW METERS FROM AW-LAKE:

The AW-Lake line of Positive Displacement flow meters have been the industry-standard flow meters for low flow applications, for example chemical injection, paint & adhesives, hydraulics, cylinder positioning, and hot melt, among others. The reasons companies standardize on our meters are simple:

**Exceptional Quality:** Our manufacturing facilities maintain the highest quality standards and superior machining technology. Our meters are calibrated to the highest specifications of NIST or ISO 17025.

**Ability to Customize:** Are you measuring a very specialized fluid that requires special materials of construction? Do you need to fit meters into tight spaces? Is there a need for specialized electronics? Our engineers are here to design a custom flow measurement system for you.

**Industry Experience:** We have been in the trenches with our customers... we understand their unique environments, challenges, and requirements. A purchase from AW-Lake comes with flow measurement expertise and industry experience to make the process as smooth as possible.

**Global Support:** With offices in the US, Europe, China and Singapore, we are strategically positioned to support our customers around the globe.



#### POSITIVE DISPLACEMENT FLOW METERS



#### JV-CG — SPUR GEAR FLOW METER

JV-CG Positive Displacement Meter is ideal for highly accurate, yet cost-effective metering of paints and industrial fluids.

Measuring Accuracy: ±0.5% over 10:1 turndown w/ 30cP fluid

Six Flow Ranges: 0.001 to 20.0 GPM Pressure Rating: up to 5,000 psi

Temperature Rating: Depends on sensor used, refer

to sensor technical guide.

**Body Materials:** 303 or 316 stainless steel **EX Version:** Explosion-Proof version available



#### JV-KG — SPUR GEAR FLOW METER

JV-KG Positive Displacement Meter is ideal for measuring oil, fuel, polyurethane, brake fluid, Skydrol® and other non-abrasive, low- to midviscosity lubricating fluids.

Measuring Accuracy: ±0.5% over 10:1 turndown w/ 30cP fluid

**Six Flow Ranges:** 0.003 - 120 gpm (4.32-172,800 gpd)

Pressure Rating: up to 5,000 psi

Temperature Rating: Depends on sensor used, refer

to sensor technical guide.

Body Materials: 303 aluminum and 316 stainless steel

**EX Version:** Explosion-Proof version available

#### SPECIALITY POSITIVE DISPLACEMENT FLOW METERS



#### SUBSEA SPUR GEAR FLOW METER

Our Subsea Positive Displacement Meters are available in a wide variety of flow ranges and electrical outputs, as well as a variety of exotic materials for highest corrosion resistance and material compatibility. Electronics are bolted on and sealed to withstand external pressures and temperatures.

Measuring Accuracy: ±0.5% over 10:1 turn down
Working Pressure: Internal up to 15,000 psi

External up to 8,700 psi

Flow Ranges: 0.001 GPM to 70 GPM @1 cP

Water Temperature: As low as -40°F

**Temperature Rating:** Depends on sensor used, refer

to sensor technical guide.

Turn down: 400:1 with linearization

Analog Sensor: 4-20 mA, pulse, HART®, Modbus,

**Foundation Fieldbus** 



#### JVHS — HIGH PRESSURE SPUR GEAR FLOW METER

JVHS High Pressure Positive
Displacement Meter works extremely
well under high pressure. Ideal for
measuring oil, fuel, additives &
chemicals in hazardous area rated and
non-hazardous environments, such
as oil production platforms, landbased oil recovery sites, & chemical
processing plants.

Measuring Accuracy: ±0.5% over 10:1 turn down ≥ 30cP

Three Flow Ranges: 0.003 to 7 GPM Pressure Rating: up to 15,000 psi

Temperature Rating: Depends on sensor used, refer to sensor

technical guide.

Body Material: 316 stainless steel

**EX Version:** Explosion-Proof version available



#### MICROFLOW — LOW FLOW SPUR GEAR FLOW METER

MicroFlow Positive Displacement Meter is ideal for flow measurement of low and medium viscosity fluids (solvents, polyurethanes, oils and other non-abrasive fluids) at very low flow rates, as in chemical injection. Measuring Accuracy: ±0.5% over 10:1 turn down ≥ 3cP

Flow Range: 0.0005 to 0.25 GPM Pressure Rating: up to 5,000 psi

Temperature Rating: Depends on sensor used, refer to

sensor technical guide.

Body Material: 316 stainless steel

**EX Version:** Explosion-Proof version available



#### SLG — COMPACT SPUR GEAR FLOW METER

SLG Compact Positive Displacement Meter is ideal for measuring paints & coatings, especially where robotics are utilized or when space is limited. Measuring Accuracy: ±0.5% over 10:1 turn down ≥ 30cP

**Three Flow Ranges:** 0.003 to 2 GPM **Pressure Rating:** up to 2,000 psi

Temperature Rating: Depends on sensor used, refer to

sensor technical guide.

Body Material: JVS: 316 stainless steel (2,000 psi max)

**Intrinsically Safe Sensors Available** 

#### POSITIVE DISPLACEMENT FLOW METERS



#### JVK — PLASTIC SPUR GEAR FLOW METER

JVK Plastic Positive Displacement Meter is ideal for measuring chemicals, including the strongest of chemicals such as acid, caustic-based fluids and corrosives.

Measuring Accuracy: ±1% over a 10:1 turn down ≥ 30cP

Flow Range: 0.1 to 7 GPM

Pressure Rating: up to 500 psi

Temperature Rating: Up to 110°F

**Body Materials:** Kynar® body with ceramic bearings



#### ZHM — SPUR GEAR FLOW METER

ZHM Positive Displacement Meter is are ideal for measuring the flow rates multi-viscosity fluids, as well as abrasive fluids and fluids under high pressure, such as paints, coatings, waxes, epoxies, sealants and oils.

Measuring Accuracy: ±0.5% over 10:1 turn down ≥ 30cP

**Ten Flow Ranges:** 0.001 to 265 GPM **Pressure Rating:** up to 6,000 psi

**Temperature Rating:** Depends on sensor used, refer to

sensor technical guide.

Body Material: 303 stainless steel (standard)

\*Contact factory for other materials available

**EX Version:** Explosion-Proof version available

#### **HELICAL GEAR METERS -**



#### SRZ — ULTRA/HIGH RESOLUTION HELICAL GEAR FLOW METER

SRZ STAT-HR High Res Helical Gear Meter ideal for highly filled and abrasive fluids, such as polyurethanes and polymers, glues and sealing materials, as well as heavy fuel oils.

Measuring Accuracy: ±0.5% over of reading ≥ 30cP Flow Ranges: 0.1 to 105 GPM (STAT model)

0.1 to 2.0 GPM (HR model)

Pressure Rating: up to 6,000 psi

**Temperature Rating:** Up to 160°F **Two Models:** STAT – High Resolution

HR – Ultra High Resolution

Body Material: 303 stainless steel



#### SRZ — HELICAL GEAR FLOW METER

SRZ Helical Gear Meter is ideal for highly filled and abrasive fluids, such as polyurethanes and polymers, glues and sealing materials, as well as heavy fuel oils. Measuring Accuracy: ±0.5% over of reading ≥ 30cP

Three Flow Ranges: 0.1 to 105.0 GPM Pressure Rating: up to 6,000 psi

Temperature Rating: Depends on sensor used,

refer to sensor technical guide. **Body Material:** 303 stainless steel

#### INDUSTRIAL PROCESS DATA MANAGEMENT

Today's industrial environments are under increasing pressure to accurately measure and report usage, waste, status, and condition of their process materials and capital equipment. At AW-Lake, we understand this pressure and the importance of getting your data where you need it and in the format you need it in so you can record, report, analyze and make adjustments and decisions based on it. We continually strive to develop tools to help make this process easier for you. As technology changes, so do the data requirements. We provide sensors with the output you want – frequency, analog, voltage, Modbus or HART. Setup and trouble-shooting is made easier through the use of our PC and mobile apps. Our transmitters, displays and controllers include hazardous area rated, batch control and ratio monitoring units.

#### **COMPATIBLE ELECTRONICS -**

We offer a complete line of compatible electronics, including local and remote displays, explosion-proof displays, closed loop controllers and batch controllers.





**Industrial Enclosure System** 

#### ► MX 9000 — Panel Meter

- Rate, total & limit
- Batch control (up to 20 batches) or ratio monitor
- · Built in 30-point linearizer
- Single or dual channel
- USB port for remote programming & data logging
- Two programmable Form C Relay outputs
- Assignable 4-20 mA output
- Industrial enclosure available with numerous options



## RT-50 Battery-Powered Flow Rate Transmitter

- Bluetooth connectivity for easy setup and monitoring from a mobile device
- Resettable Total and Grand Total
- Quick menu navigation
- Flow filtering
- · Real-time clock
- Contract time
- 10-point linearization



#### FlowPod — Local Display

- 2 or 4 wire
- 2 sensing options
- Tool-free assembly
- Rotatable through 360° display
- Low Maintenance
- Explosion-Proof version available (CSA, ATE,IECEx)



## RT-30 SD & EX Transmitters with Local Display

- CSA explosion-proof rating available
- 15-24 VDC supply
- Built in 30 point linearizer
- HART® communication protocol
- 4-20 mA rate and scaled pulse outputs
- Programmable outputs

#### **FLOW SENSORS & SIGNAL CONDITIONERS**





#### **Outputs:**

- Pulse Output (sinking & sourcing)
- Analog Outputs (0-5 VDC, 0-10 VDC, and 4-20 mA)

#### **Sensor Types:**

- Analog
- Hall-Effect
- Carrier Frequency
- Inductive
- Fiber Optic

#### **Options Include:**

- Bluetooth
- Modbus
- Quadrature
- Current or Voltage
- CSA, ATEX or IECEx
- High Temperature Version up to 600°F (stainless steel meters only)
- Frequency-to-Analog Conversion
- Pulse Amplification

#### AW-Lake

2440 W. Corporate Preserve Dr. #600 Oak Creek, WI 53134 414.574.4300 www.aw-lake.com

#### **KEM Küppers Elektromechanik**

GmbH Liebigstraße 5 85757 Karlsfeld, Germany +49 (0)8131 59391-0 www.kem-kueppers.com

#### **TASI Flow China**

Rm. 2429 Jin Yuan Office Building, No. 36 CN - BeiYuan Road, Beijing 100012 +86 10 520 037 38





## TRICOR CORIOLIS MASS FLOW METERS | CLASSIC SERIES



TRICOR

customized solutions to your real-world needs – from custom connections to pre-programmed transmitter parameters and reporting preferences. The TRICOR family offers a broad portfolio with pricing options that scale to performance.

#### **FEATURES**

- > Multi-variable instrument: direct independent measurement of mass flow, density and temperature with calculated volumetric flow
- > API gravity output reading
- Frequency output up to 10,000 Hz resolution
- > Easily accessible, integrated meter diagnostics to verify meter health & performance
- > Hazardous area certifications: ATEX, IECEx, CSA, TR (EAC)

#### **ADDITIONAL OPTIONS**

- Net oil software
- High pressure designs available up to 15,200 psi, 1050 bar
- Integrated pressure compensation
- Customizable installation length and process connections
- Extended warranty and startup program
- Calibration maintenance services

## TRICOR FLOW SENSORS | CLASSIC SERIES

TRICOR's Diamond Shape Coriolis Mass Flow Meters range in flow rate from 325 to 3100 kg/hr (12-114 lb/min) and withstand pressures up to 2900 psi (200 bar). The diamond shape (D-shape) tube design has the best overall performance of any Coriolis tube shape. The mechanical advantages of this design include the best signal-to-noise ratio and reduced effects of external vibrations, thus improving zero stability. Each meter is mechanically balanced to ensure the best in class density measurement and overall performance.



TRICOR's U-Shape Coriolis Mass Flow Meters range in flow rate from 5500 to 230,000 kg/hr (202-8450 lb/min) and withstand pressures up to 1450 psi (100 bar). The TCM 5500 is rated at a maximum pressure of 5,000 psi (345 bar). These meters have good overall accuracy, zero stability, and pressure drop. The simple self-draining U-shape tube design provides for easy cleaning/flushing.



#### TCM 0325

Mass Flow Rate (max): 12 lb/min, 325 kg/h Volumetric Flow Rate (max): 1.43 gpm, 325 l/h, 49 bbl/d Standard Pressure Rating: up to 2900 psi, 200 bar Nominal Meter Size: 1/8", DN4

#### TCM 5500

Mass Flow Rate (max): 202 lb/min, 5500 kg/h Volumetric Flow Rate (max): 24.22 gpm, 5500 l/h, 830 bbl/d Standard Pressure Rating: up to 5000 psi, 345 bar Nominal Meter Size: 1/2", DN15

#### TCM 0650

Mass Flow Rate (max): 24 lb/min, 650 kg/h Volumetric Flow Rate (max): 2.86 gpm, 650 l/h, 98 bbl/d Standard Pressure Rating: up to 2900 psi, 200 bar Nominal Meter Size: 1/8", DN4

#### TCM 7900

Mass Flow Rate (max): 290 lb/min, 7900 kg/h Volumetric Flow Rate (max): 34.78 gpm, 7900l/h, 1193 bbl/d Standard Pressure Rating: up to 1450 psi, 100 bar Nominal Meter Size: 1/2", DN15

#### TCM 1550

Mass Flow Rate (max): 57 lb/min, 1550 kg/h Volumetric Flow Rate (max): 6.82 gpm, 1550 l/h, 234 bbl/d Standard Pressure Rating: up to 2900 psi, 200 bar Nominal Meter Size: 1/4", DN6

#### TCM 028K

Mass Flow Rate (max): 1029 lb/min, 28,000 kg/h Volumetric Flow Rate (max): 123.3 gpm, 28,000 l/h, 4227 bbl/d Standard Pressure Rating: up to 1450 psi, 100 bar Nominal Meter Size: 1", DN25

#### TCM 3100

Mass Flow Rate (max): 114 lb/min, 3100 kg/h Volumetric Flow Rate (max): 13.65 gpm, 3100 l/h, 468 bbl/d Standard Pressure Rating: up to 2900 psi, 200 bar

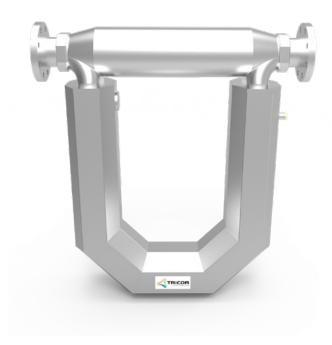
Nominal Meter Size: 1/4", DN6

### TCM 065K

Mass Flow Rate (max): 2388 lb/min, 65,000 kg/h Volumetric Flow Rate (max): 286.2 gpm, 65,000 l/h, 9812 bbl/d Standard Pressure Rating: up to 1450 psi, 100 bar Nominal Meter Size: 2", DN50



## TRICOR FLOW SENSORS | CLASSIC SERIES



#### TCM 230K

Mass Flow Rate (max): 8450 lb/min, 230,000 kg/h

Volumetric Flow Rate (max): 1012 gpm, 230,000 l/h, 34700 bbl/d

Standard Pressure Rating: up to 1450 psi, 100 bar

Nominal Meter Size: 3", DN80

## TRICOR FLOW SENSORS | SPECIALITY SERIES



#### TCMH 0450

The TCMH 0450 is TRICOR's High Pressure Coriolis Mass Flow Meter, offered in three pressure ratings: 6,000 psi, 10,000 psi or 15,200 psi. The material choices for the U-shape tubes are either 316 stainless steel for chemical injection applications or Sandvik® Alloy HP 160, chosen to eliminate hydrogen embrittlement, such as in Hydrogen fueling stations.

#### **Technical Specifications for Liquids:**

Nom. Flow Rates: (@850 kg/m³, Pressure Drop Max. 29 psi):

- 6.6 lb/min @ 1 cSt, 180 kg/h @ 1 cSt
- 5.5 lb/min @ 10cSt, 150 kg/h @ 10 cSt
- 2.4 lb/min @30 cSt, 65 kg/h @ 30 cSt

#### **Standard Pressure Rating:**

- TCMH 0450-HC-SPOS: 15,200 psi, 1050 bar
- TCMH 0450-HC-SROS: 10,000 psi, 690 bar
- TCMH 0450-HC-SSOS: 6,000 psi, 414 bar

Connection: 3/8" Autoclave (MP)

#### **Technical Specifications for Gases:**

Nom. Flow Rates: (@ 20°C air, pressure drop 145 psi):

- 14.5 lb/min @ 15,200 psi, 394 kg/h @ 1050 bar
- 13.3 lb/min @ 10,000 psi, 362 kg/h @ 690 bar
- 11.6 lb/min @ 6,000 psi, 316 kg/h @ 414 bar

#### Nom. Flow Rates: (@ 20°C H<sub>2</sub>, pressure drop 725 psi):

- 9.30 lb/min @ 15,200 psi, 254 kg/h @ 1050 bar
- 8.80 lb/min @ 12,690 psi, 240 kg/h @ 875 bar
- 8.15 lb/min @ 10,000 psi, 222 kg/h @690 bar
- 6.75 lb/min @ 6,000 psi, 184 kg/h @ 414 bar

Standard Pressure Rating: up to 15,200 psi, 1050 bar

Connection: 3/8" Autoclave (MP), other connections available



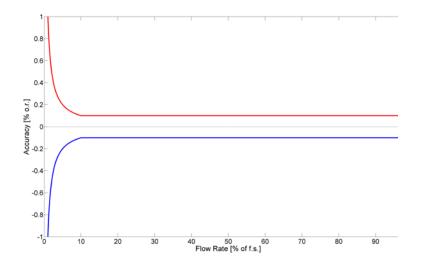
## ► TECHNICAL DATA FOR LIQUIDS

## FLOW RATE FOR LIQUIDS

Model Number	Max. Flow (lbs/min)	Rate (water) (kg/hr)	Basic Mass Flow Accuracy (% of flow rate)	Zero Stability (% of full scale)	Repeatability (% of flow rate)
TCM 0325	12	325			
TCM 0650	24	650			±0.05
TCM 1550	57	1550		±0.01	
TCM 3100	114	3100	±0.3 (option: up to ±0.1)		
TCM 5500	202	5500			
TCM 7900	290	7900			
TCM 028K	1029	28,000			
TCM 065K	2388	65,000			
TCM 230K	8450	230,000			
TCMH 0450**	6.6	180	±0.2	0.34 kg/h	±0.1

Density Measuring Range	Density Accuracy	Density Repeatability	
0 - 2500 kg/m <sup>3</sup> , 2.5 g/cm <sup>3</sup>	m <sup>3</sup> ±5.0 kg/m <sup>3</sup> , ±0.005 g/cm <sup>3</sup> ±0.5 kg/m <sup>3</sup> , ±0.0005 g/cm <sup>3</sup>		
(higher ranges on request)	(special calibration on request)	±0.3 kg/III-, ±0.0003 g/CIII-	

## **▶** ACCURACY FOR LIQUIDS



Flow Rate of Full Scale	Accuracy
>10%	± Base Accuracy
<10%	± Zero Point Measured Value * 100

Notes: Calibration for Liquids and Gases:

The TRICOR flowmeters are always factory calibrated with water.

Calibration Conditions: Water: 68°F ... 77°F (20°C ... 25°C), ambient temperature: 68°F ... 77°F (20°C ... 25°C)

All specifications are based on above mentioned calibration reference conditions, a flow calibration protocol is attached to each instrument.

Stated accuracy combines the effects of repeatability, linearity and hysteresis.

Typical flow dynamics based on max. flow rate is 100:1.
\*\* @ 1 cSt



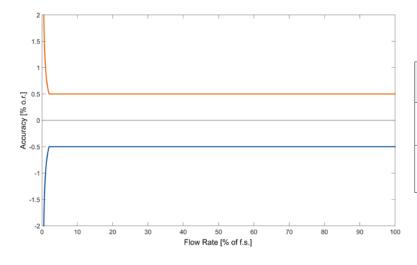
#### **▶ TECHNICAL DATA FOR GASES**

#### **FLOW RATE FOR GASES**

Model		Normal Fl	ow Rate		Zero Stability in	Basic Accuracy	Repeatability
Number	(lbs/min) <sup>1,3</sup>	(kg/h) <sup>1,3</sup>	(SCFM) <sup>1,2</sup>	(nm <sup>3</sup> /h) <sup>1,2</sup>	lb/min (kg/h)	(% of flow rate)	(% of flow rate)
TCM 0325	3	78	109	64	0.0012 (0.0325)		
TCM 0650	7	177	247	146	0.0024 (0.065)		
TCM 1550	12	333	464	273	0.0057 (0.155)		
TCM 3100	27	740	1031	607	0.0114 (0.31)	110/	
TCM 5500	34	910	1268	747	0.020 (0.55)	±1.0 (option up to ±0.5)	±0.25
TCM 7900	53	1430	1993	1173	0.029 (0.79)	10 ±0.5)	
TCM 028K	188	5100	7109	4184	0.103 (2.8)		
TCM 065K	575	15,650	21,813	12,838	0.029 (6.5)		
TCM 230K	1797	48,900	68,157	40,115	0.845 (23)		
TCMH 0450	14.5	394	549	320	0.0165 (0.45)	±1.0	±0.5

Density Measuring Range	Density Accuracy Density Repeatability	
See comment <sup>3)</sup>	±1.0 kg/m³, ±0.001 g/cm³	±0.5 kg/m³, ±0.0005 g/cm³

### **ACCURACY FOR GASES**



Flow Rate of Full Scale	Accuracy
>10%	± Base Accuracy
<10%	± Zero Point Measured Value * 100

Notes: Max. allowed flow velocity (Ma 0.5)

For gas applications, flow rate and pressure drop for individual sensor sizes are dependent on operating temperature, pressure and fluid composition. Therefore, when selecting a sensor for any particular gas application, please use the TSP (TRICOR Sizing Program) or contact us.

<sup>1)</sup> Nominal flow rates that produce approximately 3 bar (43 psi) pressure drop for natural gas at 50 bar (725 psi) operational pressure.

<sup>&</sup>lt;sup>2)</sup> Normal reference conditions (Nm3/h) are 1.013 bar and 0°C. Standard (SCFM) reference conditions are 14.7 psi and 60°F.

<sup>&</sup>lt;sup>3)</sup> Flow rate and density range depend on the gas density and the pressure range.



## **▶ TECHNICAL SPECIFICATIONS**

### **GENERAL**

Model Number	Nominal Mete (in)	r Size (DN)	Internal Tube I (in)	Diameter (mm)	Tube Arrangement
TCM 0325	1/8"	DN4	0.157"	4 mm*	2 serial
TCM 0650	1/8"	DN4	0.157"	4 mm	2 parallel
TCM 1550	1/4"	DN6	0.315"	8 mm*	2 serial
TCM 3100	1/4"	DN6	0.315"	8 mm	2 parallel
TCM 5500	1/2"	DN15	0.276"	7 mm	2 parallel
TCM 7900	1/2"	DN15	0.354"	9 mm	2 parallel
TCM 028K	1"	DN25	0.630"	16 mm	2 parallel
TCM 065K	2"	DN50	1.1"	28 mm	2 parallel
TCM 230K	3"	DN80	1.693"	43 mm	2 parallel
TCMH 0450	3/8"	DN10	0.095"	2.40 mm	2 parallel

<sup>\*</sup>Double loop design.

### **TEMPERATURE**

Temperature Repeatability	±0.36°F (±0.2°C)
Temperature Accuracy	±1.8°F ±0.5 % of reading (±1°C ±0.5 % of reading)
	-40°F +212°F (-40°C +100°C) (standard)
Process Temperature (Non Ex)	-40°F +302°F (-40°C +150°C) (optional)
	-76°F +392°F (-60°C +200°C) (optional)
	direct meter mount: -40°F +158°F (-40°C +70°C ) (T4) (n/a for the TCM 230K)
Process Temperature (Ex)	remote mount: -40°F +158°F (-40°C +70°C ) (T4)
Process remperature (EX)	-40°F +275°F (-40°C +135°C) (T3)
	-76°F +392°F (-60°C +200°C) (T2)
Ambient Temperature	-40°F +158°F (-40°C +70°C)
Storage Temperature	-40°F +212°F (-40°C +100°C)



### **▶ TECHNICAL SPECIFICATIONS**

#### **PROCESS CONNECTIONS**

Model Number	Process Connections	Max. Pressure Standard	Pressure Drop at Max. Flow
TCM 0325			
TCM 0650	female thread 1/2" adaptors for		
TCM 1550	flanges, dairy and tri-clamp	2900 psi, 200 bar	
TCM 3100			
TCM 5500		5000 psi, 345 bar	For detailed information
TCM 7900			please contact us.
TCM 028K	flanges EN1092, ANSI B16.5, DIN2512, tri-clamp	14F0 pgi 100 bar	
TCM 065K		1450 psi, 100 bar	
TCM 230K			
TCMH 0450	3/8" Autoclave (MP), other connections available	15,200 psi, 1050 bar	

Remote Electrical Connections	Screw type and spring type terminals
Direct Meter Mount Electrical Connections	None (internally connected to the electronics)
Ingress Protection	IP65 (IP66/IP67 on request)

### ► HAZARDOUS AREA CLASSIFICATIONS

#### ATEX

Zone 1: Group IIC or IIB, T2-T4 Zone 2: II 3G Ex nA IIC T2-T4 Gc

**IECE**x

Zone 1: Group IIC or IIB, T2-T4

cCSAus

Class 1, Division 1: Group A, B, C, D or C, D, T2-T4 **ATEX + IECEx + cCSAus = Triple Approval** 

Zone 1: Group IIC or IIB, T2-T4 and

Class 1, Division 1: Group A, B, C, D or C, D, T2-T4

EAC (TR-CU)

Group IIC or IIB, T2-T4











## TRICOR FLOW ELECTRONICS | CLASSIC SERIES

#### TCE 8000 ELECTRONICS

The multi-variable TCE 8000 Series of Mass Flow Transmitters from TRICOR outputs flow rate, flow total, density or temperature data. The TCE 8000 transmitters are also offered in a variety of mounting styles, including direct meter mount, panel mount, and wall mount; as well as multiple outputs and interfaces to choose from. These transmitters are certified for use in hazardous areas: cCSAus, ATEX, IECEx, and EAC (TR-CU). Optional features include net oil calculations and integrated pressure compensation.

#### **Outputs available:**

- Analog (up to 2)
- Pulse/Frequency (0.5 -10,000 Hz)
- Status

#### **Programmable control inputs**

Interfaces available: RS485 (MODBUS-RTU), HART®,

Foundation Fieldbus

**LCD Display** 

Hazardous area approvals: ATEX, IECEx, cCSAus



TCE 8000 Direct Meter Mount



**TCE 8000 Wall Mount** 



**TCE 8000 Panel Mount** 



#### TCE 6000

The TCE 6000 Mass Flow Transmitter is ready for ESTA applications. Outputs available include Analog current output, pulse/ frequency output (0.5 to 10,000 Hz), and status output. Choose from either RS485 or HART® interfaces. It works with the TRD 8001 Remote Display.

#### **Outputs available:**

- Analog current output
- Pulse/frequency output (0.5-10000 Hz)
- Status output

Programmable control inputs

Interfaces available: RS485, HART®



#### TRD 8001

The TRD 8001 Coriolis Flow Remote Display was designed for applications where a display is needed further away from the meter than is possible with the TCE 8000 electronics, which only go up to 3280 feet (1000 meters). It features a flame retardant plastic housing with a back-lit LCD screen and front programming buttons.

Display: Back-lit LCD screen, 132x132 dot

Supply Voltage: Via interface

Interface to TCE: RS485

Electrical Connections: Connectors M12, B coded

#### **AW-Lake**

2440 W. Corporate Preserve Dr. #600 Oak Creek, WI 53134 USA 414.574.4300 www.aw-lake.com

#### **KEM Küppers Elektromechanik**

GmbH Liebigstraße 5 85757 Karlsfeld, Germany +49 (0)8131 59391-0 www.kem-kueppers.com

#### **TASI Flow China**

Rm. 2429 Jin Yuan Office Building, No. 36 CN - BeiYuan Road, Beijing 100012 +86 10 520 037 38





## TRICOR CORIOLIS MASS FLOW METERS | PRO SERIES



Calibration maintenance services

## TRICOR FLOW SENSORS | PRO SERIES

TRICOR's Diamond Shape Coriolis Mass Flow Meters range in flow rate from 325 to 3100 kg/hr (12-114 lb/min) and withstand pressures up to 2900 psi (200 bar). The mechanical advantages of this diamond shape (D-shape) tube design include the best signal-to-noise ratio and reduced effects of external vibrations, thus improving zero stability.

TRICOR's U-Shape Coriolis Mass Flow Meters range in flow rate from 5500 to 65,000 kg/hr (202-8450 lb/min) and withstand pressures up to 1450 psi (100 bar) with the exception of the TCM 5500, which is rated up to 5,000 psi (345 bar). These meters have good overall accuracy, zero stability, and pressure drop. The simple self-draining U-shape tube design provides for easy cleaning/flushing.



#### **TCMP 0325**

Mass Flow Rate (max): 12 lb/min, 325 kg/h

Volumetric Flow Rate (max): 1.43 gpm, 325 l/h, 49 bbl/d

Standard Pressure Rating: up to 2900 psi, 200 bar

Nominal Meter Size: 1/8", DN4

#### **TCMP 0650**

Mass Flow Rate (max): 24 lb/min, 650 kg/h

Volumetric Flow Rate (max): 2.86 gpm, 650 l/h, 98 bbl/d

Standard Pressure Rating: up to 2900 psi, 200 bar

Nominal Meter Size: 1/8", DN4

#### TCMP 1550

Mass Flow Rate (max): 57 lb/min, 1550 kg/h

Volumetric Flow Rate (max): 6.82 gpm, 1550 l/h, 234 bbl/d

Standard Pressure Rating: up to 2900 psi, 200 bar

Nominal Meter Size: 1/4", DN6

#### TCMP 3100

Mass Flow Rate (max): 114 lb/min, 3100 kg/h

Volumetric Flow Rate (max): 13.65 gpm, 3100 l/h, 468 bbl/d

Standard Pressure Rating: up to 2900 psi, 200 bar

Nominal Meter Size: 1/4", DN6

### TCMP 5500

Mass Flow Rate (max): 202 lb/min, 5500 kg/h

Volumetric Flow Rate (max): 24.22 gpm, 5500 l/h, 830 bbl/d

Maximum Pressure Rating: up to 5000 psi, 345 bar

Nominal Meter Size: 1/2", DN15

#### **TCMP 7900**

Mass Flow Rate (max): 290 lb/min, 7900 kg/h

Volumetric Flow Rate (max): 34.78 gpm, 7900l/h, 1193 bbl/d

**Standard Pressure Rating:** up to 1450 psi, 100 bar

Nominal Meter Size: 1/2", DN15

#### **TCMP 028K**

Mass Flow Rate (max): 1029 lb/min, 28,000 kg/h

Volumetric Flow Rate (max): 123.3 gpm, 28,000 l/h, 4227 bbl/d

Standard Pressure Rating: up to 1450 psi, 100 bar

Nominal Meter Size: 1", DN25

#### TCMP 065K

Mass Flow Rate (max): 2388 lb/min, 65,000 kg/h

Volumetric Flow Rate (max): 286.2 gpm, 65,000 l/h, 9812 bbl/d

Standard Pressure Rating: up to 1450 psi, 100 bar

Nominal Meter Size: 2", DN50

#### TCMP 230K

Mass Flow Rate (max): 8450 lb/min, 230,000 kg/h

Volumetric Flow Rate (max): 1012 gpm, 230,000 l/h, 34,700 bbl/d

Standard Pressure Rating: up to 1450 psi, 100 bar

Nominal Meter Size: 3", DN80



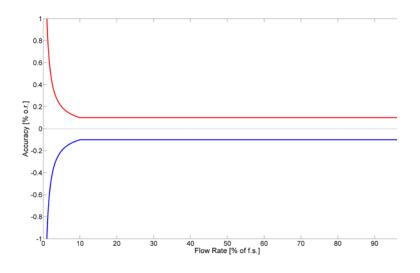
## ► TECHNICAL DATA FOR LIQUIDS

## FLOW RATE FOR LIQUIDS

Model Number	Max. Flow (Lbs/Min)	Rate (water) (Kg/Hr)	Basic Mass Flow Accuracy (% of flow rate)	Zero Stability (% of full scale)	Repeatability (% of flow rate)
TCM 0325	12	325			
TCM 0650	24	650			
TCM 1550	57	1550			
TCM 3100	114	3100			
TCM 5500	202	5500	±0.1	±0.01	±0.05
TCM 7900	290	7900			
TCM 028K	1029	28,000			
TCM 065K	2388	65,000			
TCM 230K	8450	230,000			

Density Measuring Range	Density Accuracy	Density Repeatability	
0 - 2500 kg/m <sup>3</sup> , 2.5 g/cm <sup>3</sup>	±1.0 kg/m <sup>3</sup> , ±0.001 g/cm <sup>3</sup>	±0.5 kg/m³, ±0.0005 g/cm³	
(higher ranges on request)	(special calibration on request)	±0.5 kg/III-, ±0.0005 g/CIII-	

## **▶** ACCURACY FOR LIQUIDS



Flow Rate of Full Scale	Accuracy
>10%	± Base Accuracy
<10%	± Zero Point Measured Value * 100

Notes: Calibration for Liquids and Gases:

The TRICOR flowmeters are always factory calibrated with water.

Calibration Conditions: Water: 68°F ... 77°F (20°C ... 25°C), ambient temperature: 68°F ... 77°F (20°C ... 25°C)

All specifications are based on above mentioned calibration reference conditions, a flow calibration protocol is attached to each instrument.

Stated accuracy combines the effects of repeatability, linearity and hysteresis.

Typical flow dynamics based on max. flow rate is 100:1.
\*\* @ 1 cSt



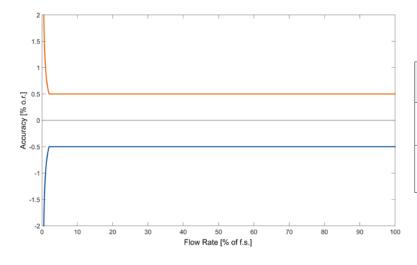
#### ► TECHNICAL DATA FOR GASES

#### **FLOW RATE FOR GASES**

Model		Normal Fl	ow Rate		Zero Stability in	Basic Accuracy	Repeatability
Number	(lbs/min) 1,3	(kg/h) <sup>1,3</sup>	(SCFM) <sup>1,2</sup>	$(nm^3/h)^{1,2}$	lb/min (kg/h)	(% of flow rate)	(% of flow rate)
TCM 0325	3	78	109	64	0.0012 (0.0325)		
TCM 0650	7	177	247	146	0.0024 (0.065)		
TCM 1550	12	333	464	273	0.0057 (0.155)		
TCM 3100	27	740	1031	607	0.0114 (0.31)		
TCM 5500	34	910	1268	747	0.020 (0.55)	±0.5	±0.25
TCM 7900	53	1430	1993	1173	0.029 (0.79)		
TCM 028K	188	5100	7109	4184	0.103 (2.8)		
TCM 065K	575	15,650	21,813	12,838	0.029 (6.5)		
TCM 230K	1797	48,900	68,157	40,115	0.845 (23)		

Density Measuring Range	Density Accuracy	Density Repeatability
See comment <sup>3)</sup>	±2.0 kg/m³, ±0.002 g/cm³	±1 kg/m <sup>3</sup> , ±0.001 g/cm <sup>3</sup>
	(special calibration on request)	

### **ACCURACY FOR GASES**



Flow Rate of Full Scale	Accuracy
>10%	± Base Accuracy
<10%	± Zero Point Measured Value * 100

Notes: Max. allowed flow velocity (Ma 0.5)

For gas applications, flow rate and pressure drop for individual sensor sizes are dependent on operating temperature, pressure and fluid composition. Therefore, when selecting a sensor for any particular gas application, please use the TSP (TRICOR Sizing Program) or contact us.

<sup>1)</sup> Nominal flow rates that produce approximately 3 bar (43 psi) pressure drop for natural gas at 50 bar (725 psi) operational pressure.

<sup>&</sup>lt;sup>2)</sup> Normal reference conditions (Nm3/h) are 1.013 bar and 0°C. Standard (SCFM) reference conditions are 14.7 psi and 60°F.

<sup>&</sup>lt;sup>3)</sup> Flow rate and density range depend on the gas density and the pressure range.



## **▶ TECHNICAL SPECIFICATIONS**

### **GENERAL**

Model Number	Nominal Mete (in)	r Size (DN)	Internal Tube I (in)	Diameter (mm)	Tube Arrangement
TCM 0325	1/8"	DN4	0.157"	4 mm*	2 serial
TCM 0650	1/8"	DN4	0.157"	4 mm	2 parallel
TCM 1550	1/4"	DN6	0.315"	8 mm*	2 serial
TCM 3100	1/4"	DN6	0.315"	8 mm	2 parallel
TCM 5500	1/2"	DN15	0.276"	7 mm	2 parallel
TCM 7900	1/2"	DN15	0.354"	9 mm	2 parallel
TCM 028K	1"	DN25	0.630"	16 mm	2 parallel
TCM 065K	2"	DN50	1.1"	28 mm	2 parallel
TCM 230K	3"	DN80	1.693"	43 mm	2 parallel

<sup>\*</sup>Double loop design.

### **TEMPERATURE**

Temperature Repeatability	±0.36°F (±0.2°C)	
Temperature Accuracy	±1.8°F ±0.5 % of reading (±1°C ±0.5 % of reading)	
	40°F +212°F (-40°C +100°C) (standard)	
Process Temperature (Non Ex)	-40°F +302°F (-40°C +150°C) (optional)	
	-76°F +392°F (-60°C +200°C) (optional)	
	meter mount -40°F +158°F (-40°C +70°C ) (T4) (n/a for the TCM 230K)	
Process Temperature (Ex)	remote version -40°F +158°F (-40°C +70°C ) (T4)	
Process remperature (LX)	-40°F +275°F (-40°C +135°C) (T3)	
	-76°F +392°F (-60°C +200°C) (T2)	
Ambient Temperature	-40°F +158°F (-40°C +70°C)	
Storage Temperature	-40°F +212°F (-40°C +100°C)	

## TRICOR FLOW ELECTRONICS | PRO SERIES



#### TCD 9100/9200 TRANSMITTER

The TCD 9000 Series Mass Flow Transmitters are equipped with Digital Signal Processing, allowing for fast response, resistance to process vibration/noise, and advanced diagnostics. These transmitters provide a modular Universal I/O configuration with up to 4 fully configurable channels as well as onboard SD card for logging, document storage and traceability functions. The modern, customizable display offers 6 views and trend curves for optimal process monitoring.

#### **Programmable Output Values:**

Mass flow, volume flow, total mass, total volume, corrected volume, density, temperature, fraction

**Supply Voltage:** 20...27 VDC, ±10% or 100...240 VDC, ±10% Interfaces & IO:

- Ch1: RS485 (MODBUS-RTU) is standard, or choice of HART®, Profibus PA, Profibus DP, and 4...20mA
- Ch2-Ch4: User-configurable, modular IO cards offer:
  - > Current output (0...20 mA or 4...20mA)
  - > Digital output (pulse, frequency, active)
  - > Digital input (15 ... 30 VDC, 2 ... 15mA)
- Relay: Voltage free contact, 30 VAC, 100mA
- Wireless Option: SignalFire wireless mesh network (external connection to Modbus or 4...20 mA)

**Protection Class: IP67/NEMA 4X Hazardous Area Approvals:** 

- cCSAus Class 1, Div. 1, Groups A, B, C, D or C, D, T2...T4
- ATEX Zone 1: Group IIC or IIB, T2...T6; Zone 2: II 3G Ex nA IIC T2...T4 Gc
- IECEx Zone 1: Group IIC or IIB, T2...T4

Graphic Display: 240x160px, 6 programmable views



#### TCD 9010 TRANSMITTER

The TCD 9010 electronic transmitter is a direct meter mount solution that is perfect for space constrained applications (such as Marine). This offering is a highly robust minimal footprint supporting Modbus only interface without display and without modular I/O options.

Supply Voltage: 12 ... 27 VDC Power Consumption: 1.1 W

Interface: Modbus RTU

Cable Gland: 1/2" NPT (M20 on request)

Housing Material: Aluminum **Hazardous Area Approvals:** 

- cCSAus Class 1, Div. 1, Groups A, B, C, D or C, D, T2...T4
- ATEX Zone 1: Group IIC or IIB, T2...T4; Zone 2: II 3G Ex nA IIC T2...T4 Gc
- IECEx Zone 1: Group IIC or IIB, T2...T4

#### **AW-Lake**

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TRICOR CORIOLIS MASS FLOW METERS | PRO PLUS SERIES



## TRICOR FLOW SENSORS | PRO PLUS SERIES

The PRO Plus Series of Coriolis Mass Flow Meters presents an accurate and highly repeatable meter with the smallest installation length on the market for installation into systems where space is limited. The TCD transmitter offers greater robustness, performance, diagnostics, and connectivity options. With a modern HMI interface and a strong logging functionality, the DSP transmitters provide users with an efficient configuration and analysis tool.

#### PRO Plus Series Features:

- High dosing accuracy due to short response time (max. 10 ms)
- Suitability for pump monitoring and fast control circuits due to 100 Hz refresh rate
- Extremely short installation length for easy fit in most system configurations
- High zero stability for drift-free accuracy and long-term stability
- Extensive diagnostics and self-monitoring, including empty pipe detection

#### TCMQ 6400

Mass Flow Rate (max): 235 lb/min, 6400 kg/h

Volumetric Flow Rate (max): 28 gpm, 6400 l/h, 970 bbl/d

Standard Pressure Rating: up to 1450 psi, 100 bar

Nominal Meter Size: 1/2", DN15



### TCMQ 018K

Mass Flow Rate (max): 650 lb/min, 17,700 kg/h

Volumetric Flow Rate (max): 78 gpm, 17,700 l/h, 2670 bbl/d

Standard Pressure Rating: up to 1450 psi, 100 bar

Nominal Meter Size: 1", DN25



#### TCMQ 070K

Mass Flow Rate (max): 2600 lb/min, 70,700 kg/h

Volumetric Flow Rate (max): 311 gpm, 70,700 l/h, 10,700 bbl/d

Standard Pressure Rating: up to 1450 psi, 100 bar

Nominal Meter Size: 2", DN50





### **▶ TECHNICAL SPECIFICATIONS**

## FLOW RATE FOR LIQUIDS

Model Number	Max. Flow R (Lbs/Min) (	ate (water) Kg/Hr)	Basic Mass Flow Accuracy (% of flow rate)	Zero Stability (% of full scale)	Repeatability (% of flow rate)
TCMQ 6400	235	6400		±0.003	
TCMQ 018K	650	17,700	±0.1	±0.01	±0.05
TCMQ 070K	2600	70,700		10.01	

Density Measuring Range	Density Accuracy	Density Repeatability	Brix Accuracy
0 - 5000 kg/m <sup>3</sup> , 5.0 g/cm <sup>3</sup>	±5.0 kg/m³ , ±0.005 g/cm³	±0.25 kg/m <sup>3</sup> , ±0.00025 g/cm <sup>3</sup>	0.1°Priv (1.000 kg/m³)
	(option: ±0.5 kg/m <sup>3</sup> , ±0.0005 g/cm <sup>3</sup> )	1 ±0.25 kg/III°, ±0.00025 g/CIII°	0.1 Brix (1,000 kg/iii°)

#### **TEMPERATURE**

Temperature Repeatability	±0.9°F ±0.25% of reading (±0.5°C ±0.25% of reading)	
Temperature Accuracy	±1.8°F ±0.5 % of reading (±1°C ±0.5 % of reading)	
Process Temperature (Non Ex)	-76°F +392°F (-60°C +200°C)	
Ambient Temperature	-40°F +140°F (-40°C +60°C)	
Storage Temperature	-40°F +158°F (-40°C +70°C)	

#### **GENERAL**

Model Number	Nominal Mete (in)	r Size (DN)	Internal Tube (in)	Diameter (mm)	Tube Arrangement
TCMQ 6400	1/2"	DN15	0.31"	8 mm	parallel
TCMQ 018K	1"	DN25	0.55"	14 mm	parallel
TCMQ 070K	2"	DN50	1.1"	28 mm	parallel

Notes: Calibration for Liquids:

The TRICOR flowmeters are always factory calibrated with water.

Calibration Conditions: Water:  $68^{\circ}F \dots 77^{\circ}F$  ( $20^{\circ}C \dots 25^{\circ}C$ ), ambient temperature:  $68^{\circ}F \dots 77^{\circ}F$  ( $20^{\circ}C \dots 25^{\circ}C$ )

All specifications are based on above mentioned calibration reference conditions, a flow calibration protocol is attached to each instrument.

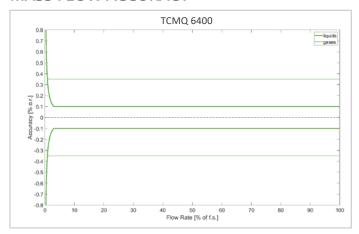
Stated accuracy combines the effects of repeatability, linearity and hysteresis.

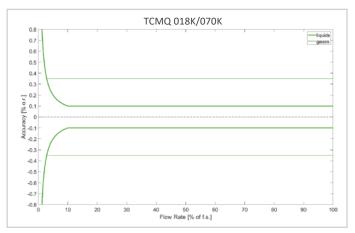
Typical flow dynamics based on max. flow rate is 100:1.
\*\*\* @ 1 cSt



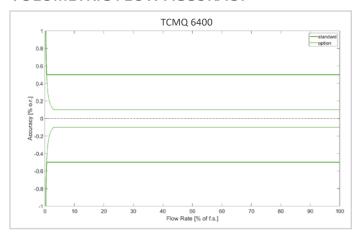
### ► TECHNICAL SPECIFICATIONS

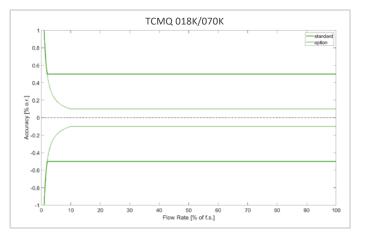
### MASS FLOW ACCURACY





### **VOLUMETRIC FLOW ACCURACY**





Flow Rate of Full Scale	Accuracy		
>10%	± Base Accuracy		
<10%	± Zero Point * 100  Measured Value		

#### **CERTIFICATIONS**

cCSAus*	Class 1, Division 1: Group A, B, C, D or C, D, T2T6	
ATEX*	Zone 1: Group IIC or IIB, T2T6   Zone 2: II 3G Ex nA IIC T2T6 Gc	
IECEx*	Zone 1: Group IIC or IIB, T2T6	
3-A Sanitary	Suitable for Food & Beverage Processing	

<sup>\*</sup> Release pending

## TRICOR FLOW ELECTRONICS | PRO SERIES



#### TCD 9100/9200 TRANSMITTER

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#### **Programmable Output Values:**

Mass flow, volume flow, total mass, total volume, corrected volume, density, temperature, fraction

**Supply Voltage:** 20...27 VDC, ±10% or 100...240 VAC, ±10% Interfaces & IO:

- Ch1: RS485 (MODBUS-RTU) is standard, or choice of HART®, Profibus PA, Profibus DP, and 4...20mA
- Ch2-Ch4: User-configurable, modular IO cards offer:
  - > Current output (0...20 mA or 4...20mA)
  - > Digital output (pulse, frequency, active)
  - > Digital input (15 ... 30 VDC, 2 ... 15mA)
- Relay: Voltage free contact, 30 VAC, 100mA
- Wireless Option: SignalFire wireless mesh network (external connection to Modbus or 4...20 mA)

**Protection Class: IP67/NEMA 4X Hazardous Area Approvals:** 

- cCSAus Class 1, Div. 1, Groups A, B, C, D or C, D, T2...T4
- ATEX Zone 1: Group IIC or IIB, T2...T6; Zone 2: II 3G Ex nA IIC T2...T4 Gc
- IECEx Zone 1: Group IIC or IIB, T2...T4

Graphic Display: 240x160px, 6 programmable views



#### TCD 9010 TRANSMITTER

The TCD 9010 electronic transmitter is a direct meter mount solution that is perfect for space constrained applications (such as Marine). This offering is a highly robust minimal footprint supporting Modbus only interface without display and without modular I/O options.

Supply Voltage: 12 ... 27 VDC Power Consumption: 1.1 W

Interface: Modbus RTU

Cable Gland: 1/2" NPT (M20 on request)

Housing Material: Aluminum **Hazardous Area Approvals:** 

- cCSAus Class 1, Div. 1, Groups A, B, C, D or C, D, T2...T4
- ATEX Zone 1: Group IIC or IIB, T2...T4; Zone 2: II 3G Ex nA IIC T2...T4 Gc
- IECEx Zone 1: Group IIC or IIB, T2...T4



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## **TURBINE** FLOW METERS & ELECTRONICS

#### ABOUT AW-LAKE TURBINE FLOW METERS:

At AW-Lake, our turbine flow meters are crafted on stateof the-art machining centers and wet tested on our flow calibrator to ensure accuracy and repeatability. Backed by more than 50 years of experience in turbine flow meters, AW-Lake continually serves global customers in oil & gas, petrochemical, semiconductor, food & beverage, pharmaceutical, and process control.





#### TRG — STANDARD TURBINE FLOW METER

The TRG series is the workhorse of turbine flow meters. Its rugged stainless steel body construction and vast range of sizes makes this turbine ideal for many applications and is suitable for water, solvents, and other lower viscosity fluids, such as antifreeze.

Flow Ranges: 0.08 - 200 GPM
Working Pressure: up to 5,000 PSI

Accuracy: ±1% of reading Repeatability: ±0.1% Connections: NPT

Body Material: 316L stainless steel



#### HM — HIGH PRESSURE TURBINE FLOW METER

Perfect for chemical injection systems, the HM flow meter withstands pressures up to 20,000 psi and is available in seven different flow ranges, from .08 GPM to 32 GPM. Flow Ranges: 0.08 - 32 GPM
Working Pressure: up to 20,000 PSI

Accuracy: ±1% of reading Repeatability: ±0.05%

Connections: Medium pressure AutoClave® (Optional Flanges: Grayloc® and Techlok®)

Body Material: 1.3980 Stainless Steel



#### HM...F — FLANGED TURBINE FLOW METER

The well respected HM series turbine flow meters are also available in flanged versions for those applications where ease of installation and removal are a priority. The HM...F meter is available in ANSI and DIN flange connections, depending on your preference or pressure requirements.

Flow Ranges: 0.08 - 12,000 GPM

Working Pressure: Dependent on flange

Accuracy: ±1% of reading Repeatability: ±0.05%

Connections: ANSI & DIN flanges

Body Material: 316 Ti stainless steel/ 316L



#### TW — TURBINE FLOW METER

The TW turbine is ideal to withstand the demands of the most rigorous flow measurement applications such as liquid flow measurement on or off the oilfield.

Flow Ranges: 0.06 - 5,000 GPM
Working Pressure: up to 5,000 PSI

**Accuracy:** ±1% of reading

(±1% of reading over the upper 70% of the measuring

range for 3/8, 1/2 and 3/4 in. meters)

Repeatability: ±0.1%

Connections: NPT and Victaulic® Body Material: 316 Stainless steel



#### SUBSEA TURBINE FLOW METER

The sturdy construction of the subsea turbine flow meter means high performance and longer service life. With completely sealed off electronics and subsea connector there is no need for electronics module canister space.

Flow Ranges: 0.08 to 15.8 GPM

Working Pressure (External): Up to 7,200 PSI Working Pressure (Internal): Up to 20,000 PSI

Temperature: -40 to 250°F

Frequency Range: 2 up to 2,000 Hz

Connections: AutoClave®

Body Material: 316 Ti stainless steel



#### TR-QS — WAFER-STYLE TURBINE FLOW METER

The modified upstream and downstream flow straighteners of the TR-QS wafer-style turbine flow meter allow for a higher accuracy and greater fluid dynamics.

**Flow Ranges:** 0.5 - 5,000 GPM

Working Pressure: Refer to ASME/ANSI B16.5-1996

Accuracy: ±1% of reading (Liquid)

Repeatability: ±0.1%

Connections: Wafer-style ASME/ANSI B16.5-1996

Threaded, Flange, Grayloc®, Victaulic

Body Materials: 316 & 316L stainless steel



#### TA3 — SANITARY TURBINE FLOW METER

Food and beverage processing plants require specialized standards different than many other industries. The TA3 series sanitary turbine meter meets the challenge. Used in plants around the world, the TA3 turbine has proved itself in industries including dairy, brewing, wine production and pharmaceuticals.

Flow Ranges: 0.6 - 400 GPM
Working Pressure: up to 1,000 PSI

Accuracy: ±1% of reading Repeatability: ±0.1%

**Connections:** Tri-clamp sanitary process connection

Body Material: 316L stainless steel

3-A Sanitary Certificated

#### **COMPATIBLE ELECTRONICS**

We offer a complete line of compatible electronics, including local meter-mounted and remote displays, explosion-proof displays, closed loop controllers and batch controllers.



## RT-50 Battery-Powered Flow Rate Transmitter

- Bluetooth connectivity for easy setup and monitoring from a mobile device
- Resettable Total and Grand Total
- Quick menu navigation
- Flow filtering
- Real-time clock & Contract time
- 10-point linearization

# RT-30 SD & EX Transmitters with Local Display

- CSA explosion-proof rating available
- 15-24 VDC supply
- Built in 30 point linearizer
- HART® communication protocol
- 4-20 mA rate and scaled pulse outputs
- Programmable outputs

#### FLOW SENSORS & SIGNAL CONDITIONERS

We provide sensors with the output you want – frequency, analog, voltage, Modbus or HART. Setup and trouble-shooting is made easier through the use of our PC and mobile apps.



#### **Sensor Types:**

- Analog
- Hall-Effect
- Carrier Frequency
- Inductive
- Fiber Optic

#### **Options Include:**

- Bluetooth
- Quadrature
- Current or Voltage
- CSA, ATEX or IECEx
- High Temperature Version up to 600°F
- Frequency-to-Analog Conversion
- Pulse Amplification

#### **AW-Lake Company**

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