

# TIP | TIM SERIES INSTRUCTION MANUAL



 **Corrosion-Free**  
Instrumentation Equipment



**Read the User's Manual Carefully.**  
**Manufacturer Reserves the Right to Implement Changes Without Prior Notice.**



## Safety Information

1. De-pressurize and Vent System Prior to Installation or Removal.
2. Confirm Chemical Compatibility Before Use.
3. DO NOT Exceed Maximum Temperature or Pressure Specifications.
4. ALWAYS Wear Safety Goggles or Face-Shield During Installation and/or Service.
5. DO NOT Alter Product Construction.



**Warning | Caution | Danger**

Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, injury, or death



**Hand Tighten Only**

Overtightening may permanently damage product threads and lead to failure of the retaining nut.



**Note | Technical Notes**

Highlights additional information or detailed procedure.

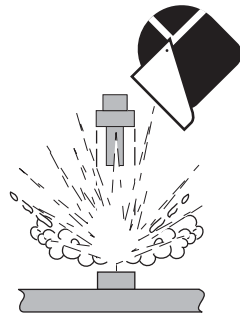


**Do Not Use Tools**

Use of tool(s) may damage product beyond repair and potentially void product warranty.



**WARNING!**



**Personal Protective Equipment (PPE)**

Always utilize the most appropriate PPE during installation and service of Truflo products.



**Pressurized System Warning**

Sensor may be under pressure, take caution to vent system prior to installation or removal. Failure to do so may result in equipment damage and/or serious injury.

## General Data

Specification	Description
Operating Voltage	10 - 30VDC
Current Consumption	60mA max.
Control Output	NPN   150mA max.
Transmitter	4-20mA
Communication	RS485*
Flow Rate GPM   LPM	0.0 - 999.9
Fluid	H <sub>2</sub> O   Liquid Chemicals
Accuracy	± 0.5% of F.S. @ 25°C
Response Frequency	5K Hz
Max Flow Rate	10m/s   33ft/s
Min Flow Rate	0.1m/s   0.3ft/s
Materials of Construction	Paddle   Tefzel® Rotor   Busings   Zirconium Ceramic Sensor Body   PVC   PP   PVDF
O-Ring Material	Viton (std)   EPDM*
Operating Temperature	PVC < 60°C   PP < 80°C   PF < 100°C
Protection Class	IP-65   General Purpose
Approval	CE   RoHS

\*Optional

## Installation



### Very Important

- Lubricate O-rings with a Viscous Lubricant Compatible with the Materials of Construction.
- Using an Alternating | Twisting Motion Carefully Lower the Sensor into the Fitting. | Do Not Force | Fig 5
- Ensure Tab | Notch are Parallel to Flow Direction | Fig-2



Hand Tighten the Sensor Cap. **DO NOT** use any tools on the sensor cap or the cap threads or fitting threads may be damaged. | Fig-5

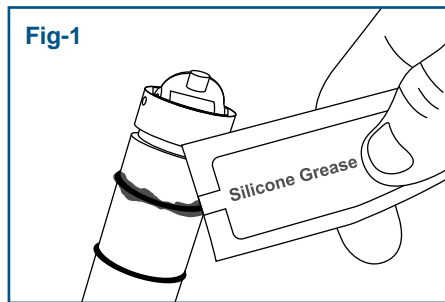


Fig-1

Ensure Amble Silicon Grease (Supplied) is Applied Prior to Insertion

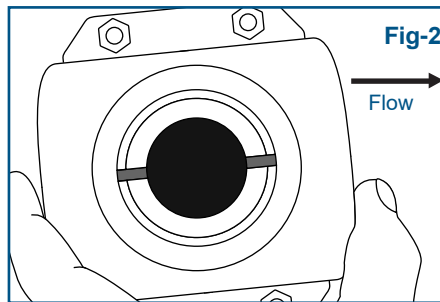


Fig-2

Ensure Location Tabs Are Parallel to Direction of Flow

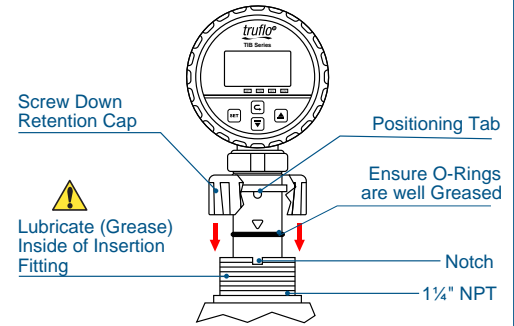
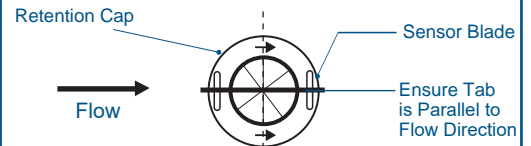


Fig-3



Process Pipe (Top View)

Fig-4

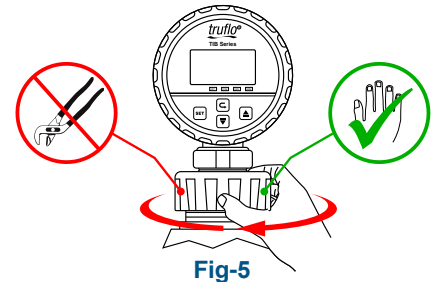
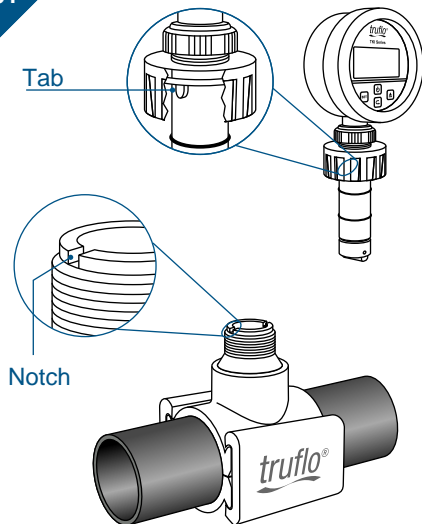


Fig-5

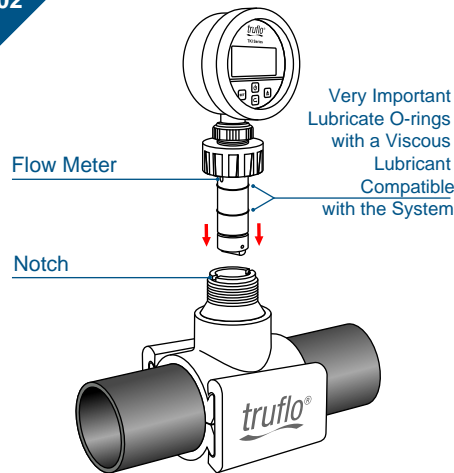
## Correct Sensor Installation

01



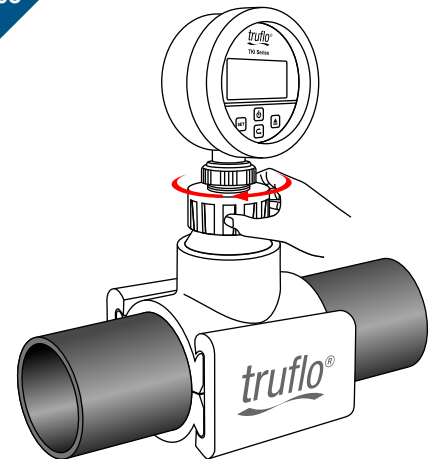
Flow Meter Positioning Tab and Clamp Saddle Notch

02



Engage one Thread of the Sensor Cap then turn the Sensor until the Alignment Tab is Seated in the Fitting Notch, Ensure Tab is Parallel to Flow Direction.

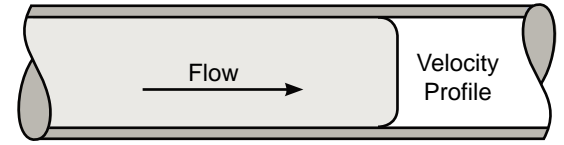
03



- Hand Tighten the Screw Cap.
- **DO NOT** use any Tools, Threads may be Damaged.
- Ensure Meter is Firmly in Place

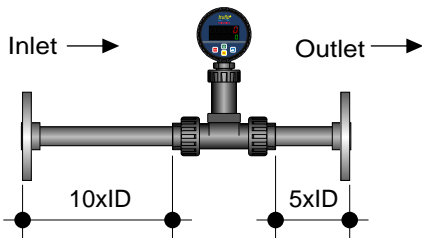
## Correct Sensor Positioning

TI Series Flow Meters measure liquids only. No air bubbles should be present and the pipe must always be full. The sensors are not effective in laminar or transitional flow applications. Minimum Reynolds number required is 4500. For accurate flow measurement there must be a developed turbulent velocity profile at the sensor location. This requires a straight run pipe with a minimum number of pipe diameters distance upstream and downstream of the flow sensor. These distances depend on the type of piping element (i.e. valves, elbows, reducers etc.) causing the disturbance. To ensure maximum accuracy, the following guidelines need to be observed when installing.

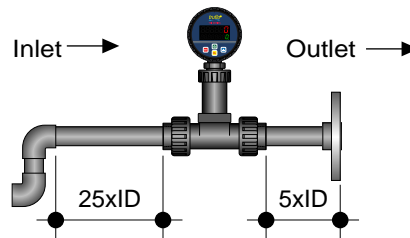


Developed Turbulent Flow

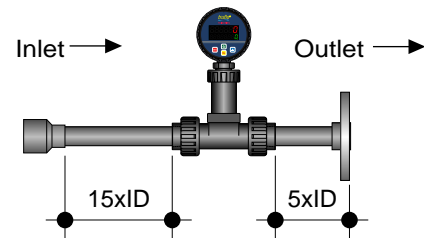
### Flange



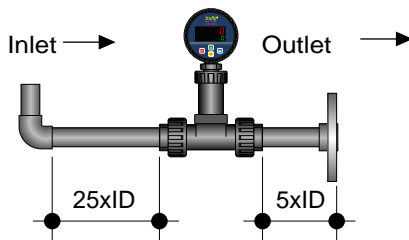
### 2 X 90° Elbow



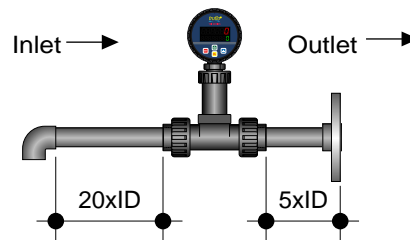
### Reducer



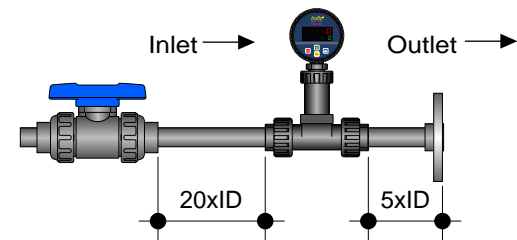
### 90° Elbow | Flow Downward



### 90° Elbow | Flow Upward

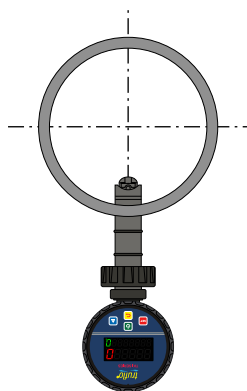


### Ball Valve



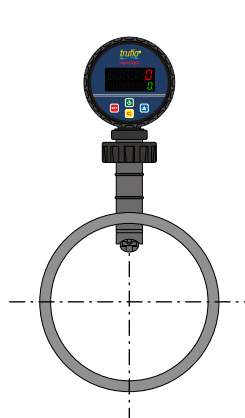
## Installation Positions

Figure 1



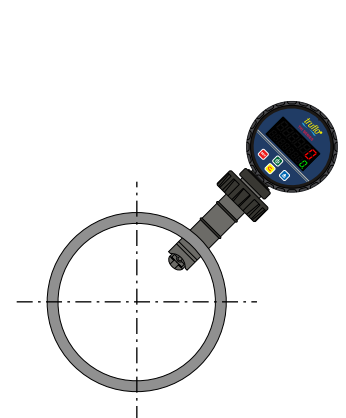
Good if NO Sediment Present

Figure 2



Good if NO Air Bubbles Present

Figure 3

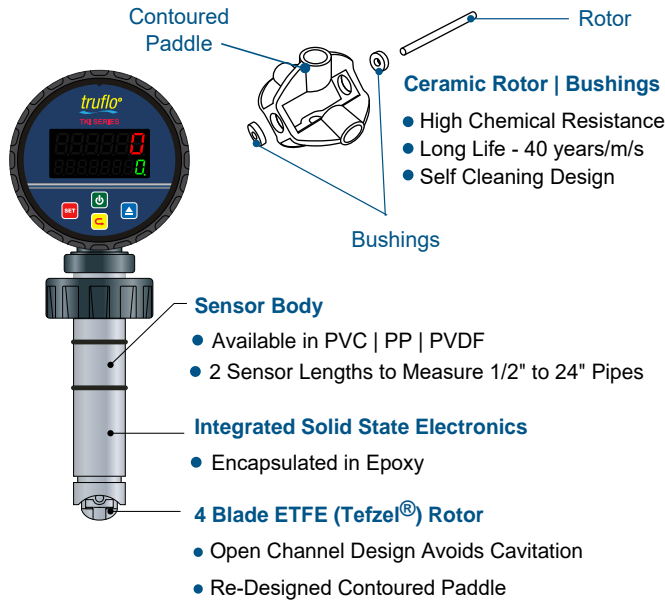


Preferred Installation if Sediment\* or Air Bubbles may be Present

\* Maximum % Solids: 10% with particle size not exceeding 0.5 mm cross section or length.

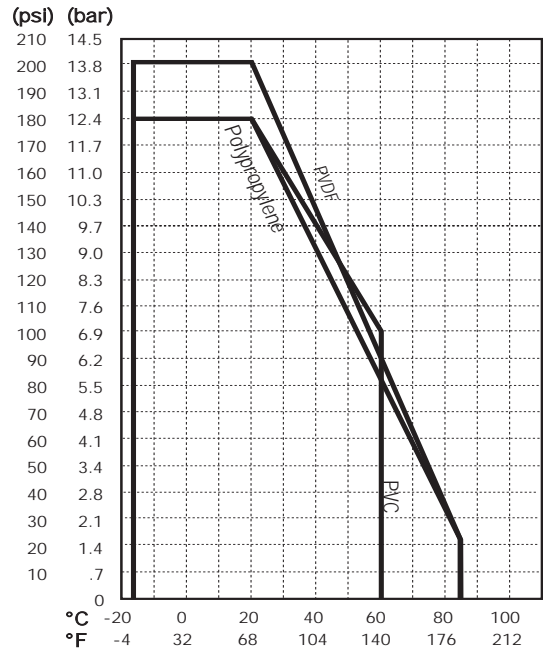
### Long Service Life

The TI Series is equipped with a Zirconium Ceramic Rotor Pin and 2 Bushings. The TI Series also incorporates a contoured, 'Low Drag' Paddle Wheel leading to reduced drag, longer wear and a higher accuracy.

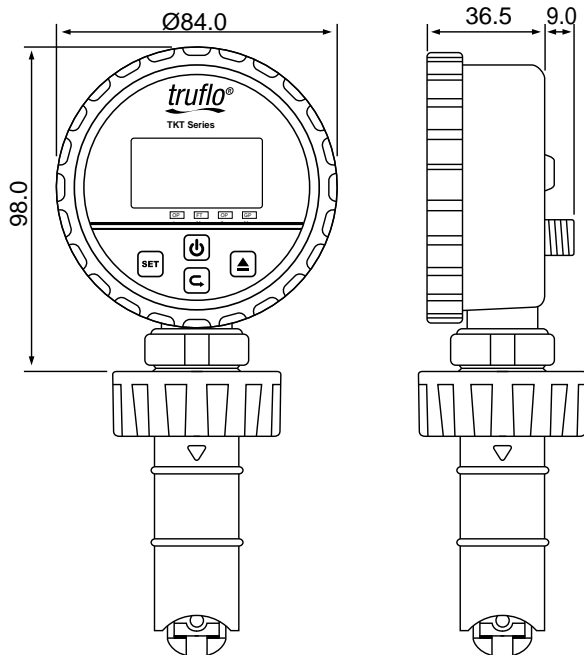


### Maximum Pressure | Temperature

**Note:** During system design the specifications of all components must be considered. | Non-Shock

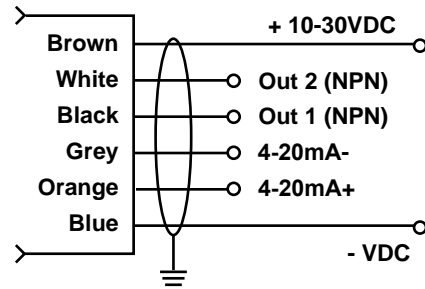


### Dimensions | Wiring

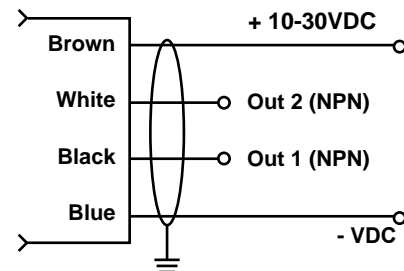


DC Power Only

#### TIM SERIES



#### TIP SERIES



Press to Increase Value

Press to Decrease Value

Press to Save Value

Press to Change Digit

## Programming

DC Power Only

STEPS	DISPLAY	OPERATION
<b>Step-1</b> Home Screen Press  +  3 Secs		Home Screen
<b>Step-2</b> Lock Out Feature Press		Factory Default: Lock = 10  **NOTE: If Lock # is Changed from the # 10 the Meter will be in Lockout Mode.
<b>Step-3</b> Units of Flow Press		Units of Flow Ut.0 = LPM Ut.1 = GPM   Default Ut.2 = KL
<b>Step-4</b> K Factor Press		Enter K Factor Value See Chart on Page 9
<b>Step-5</b> Transmitter Range Press		Programming 4-20mA Output for TIM (TIP with RS 485 Option Only)  4 mA = 0   Default 20 mA = 100   Default** **This can be Changed to Conform to Customers Application

## Programming NPN Pulse Relay Output

STEPS	DISPLAY	OPERATION
<b>Step-1</b> Home Screen		Home Screen
<b>Step-2</b> Programming Flow Rate Pulse Output Press		1000 Default One Pulse Per Gallon Default  <b>CV</b> Program Value of (Flow Rate) Pulse (NPN) Output Preset Value of Flow Rate Change to a Value that meets your Flow Rate Pulse Output  <b>SV</b> CV > SV → Flow Rate Pulse Output ON CV < SV → Flow Rate Pulse Output OFF
<b>Step-3</b> Programming Flow Total Pulse Output Press		2000 Factory Default One Pulse Per Gallon Default  <b>CV</b> Program Value of Flow Totalizer Pulse (NPN) Output SV : Preset value of Flow Total  <b>SV</b> CV > SV → Flow Rate output ON  2000 Default this can be Changed to Desired Value Refer to Next Page Programming OP2 Output for Options for Totalizer Flow Totalizer Pulse (Step #2-Next)

## Programming NPN Pulse Outputs

STEPS	DISPLAY	OPERATION
<b>Step-1</b> Home Screen Press  3 Secs		Home Screen
<b>Step-2</b> Programming OP2 Output Pulse Control (Frequency) Press		<b>Program (NPN) Pulse Output (OP2) Totalizer Range</b> E. F. n. r. c. Con = n : Manual Reset; Con = c : time (1=10 Secs) Auto Reset Using Timer time (Secs) Auto Reset Using Timer i.e 5 = Pulse On (5 Secs) Con = r : Auto Reset when Total Volume Value = Selct Value (SV) Con = E : Pulse Output of Unit volume (Default) = One Gal/Pulse Con = F → Paddle Pulse → Frequency Max 5 KHZ (For TVF) Con = E (Default)
<b>Step-3</b> Programming Pulse Relay Press		Refer to <b>Relay Mode</b> Below
<b>Step-4</b> Hysteresis Press       Press  To Change Value		<b>Enter Hysteresis Value</b> **Hysteresis is a buffer around the Programmed Set Point
<b>Step-5</b> Time Delay Press		<b>Program Time Delay for NPN Pulse</b> Delay Time (Secs)

OP1 } Pulse Frequency Output  
 OP2 } Pulse Relay Output

## Relay Mode

ALT NO.	DESCRIPTION
ALT = 0	CV > SV → ON: CV < SV - HyS → OFF      *Normally Closed Relay*
ALT = 1	CV < SV → ON: CV > SV + HyS → OFF      *Normally Open Relay*
ALT = 2	SV + HyS > CV > SV - HyS → ON: CV > SV + HyS or CV < SV - HyS → OFF
ALT = 3	SV + HyS > CV > SV - HyS → OFF: CV > SV + HyS or CV < SV - HyS → ON

Hys = Hysteresis ACTS Like a Buffer ± Around Pulse Output (Measured in GPM)

CV = Current Value = Flow Rate    SV = Selected Value = Programmed Value

### Important



Reset the Flow Totalizer to Zero Press



for (3 sec)  
**Important**



## Rotor Pin | Paddle Replacement Procedure

<p><b>01</b> Line up Pin with Rotor Hole</p> <p>Small Pin</p> <p>Rotor Hole</p>	<p><b>02</b> GENTLY tap pin with Mallet or Hammer</p>	<p><b>03</b> Tap until Rotor is 50% out</p>
<p><b>04</b> Pull out Rotor Pin</p>	<p><b>05</b></p> <p>Paddle</p> <p>Pull Out Rotor Pin entire way until Paddle Wheel is loose</p>	<p><b>06</b> Insert New Paddle in Flow Meter</p>
<p><b>07</b> Push in Rotor Pin approx. 50%</p>	<p><b>08</b> GENTLY tap Rotor Pin with Mallet or Hammer</p> <p>Ensure Holes are Aligned</p>	<p><b>09</b> Congratulations! Replacement Procedure Complete!</p>

### Min | Max | Flow Rates

Pipe Size (O.D.)	ANSI (ID) (Inches)		DIN (ID) (mm)	Flow Rate (LPM) / USGPM	
	Sch (40)	Sch (80)		0.3m/s min.	10m/s max.
1/2"   DN15	0.62	0.55	Ø20	3.5   1.0	120   32
3/4"   DN20	0.82	0.74	Ø25	5   1.5	170   45
1"   DN25	1.00	0.96	Ø32	9   2.5	300   79
1 1/2"   DN40	1.40	1.50	Ø50	25   6.5	850   225
2"   DN50	2.00	1.90	Ø63	40   10.5	1350   357
2 1/2"	2.50	2.30	Ø75	60   16	1850   357
3"   DN80	3.10	2.90	Ø78	90   24	2800   739
4"   DN100	4.00	3.80	Ø96.50	125   33	4350   1149
6"   DN150	6.06	5.70	Ø150	230   60	7590   1997
8"   DN200	7.94	7.56	Ø200	315   82	10395   2735

### K : UWcf' HUV' Yg

TEE FITTINGS					CLAMP-ON SADDLES					CPVC SOCKET WELD-ON ADAPTERS							
Tee Fitting (Unit:inch)			K-Factor		Sensor Length	Clamp Saddles			K-Factor		Sensor Length	Tee Fitting (Unit:inch)			K-Factor		Sensor Length
Size	DN	Id	CPVC   SCH80			Size	DN	Id	CPVC   SCH80			Size	DN	Id	CPVC   SCH80		
1/2"	15	0.55	<b>1013.04</b>		S	2"	50	1.9	<b>81.65</b>		S	2"	50	1.9	<b>81.65</b>		S
3/4"	20	0.74	<b>604.80</b>		S	3"	65	2.3	<b>34.96</b>		S	2-1/2"	65	2.3	<b>54.43</b>		S
1"	25	0.96	<b>408.24</b>		S	4"	80	2.9	<b>19.80</b>		S	3"	80	2.9	<b>34.96</b>		S
1-1/4"	32	1.30	<b>250.40</b>		S	6"	100	3.8	<b>9.18</b>		L	4"	100	3.8	<b>19.80</b>		S
1-1/2"	40	1.50	<b>139.86</b>		S	8"	150	5.7	<b>5.21</b>		L	6"	150	5.7	<b>9.18</b>		L
2"	50	1.90	<b>81.65</b>		S							8"	200	7.0	<b>5.21</b>		L
2-1/2"	65	2.30	<b>54.43</b>		S							10"	250	9.5	<b>3.43</b>		L
3"	80	2.90	<b>34.96</b>		S							12"	300	11.3	<b>2.45</b>		L
4"	100	3.83	<b>19.80</b>		S							14"	350	12.4	<b>1.77</b>		L
												16"	400	15.1	<b>1.36</b>		L
												20"	500	19.0	<b>0.86</b>		L
												24"	600	21.0	<b>0.60</b>		L

### Warranty Information

All warranty and non-warranty repairs being returned must include The RGA number and a fully completed Service Form and Flow Meter. must be returned to Icon Process Controls directly or to the authorized distributor. Product returned without a RGA number and Service Form will not be warranty replaced or repaired. Truflo Flow Meters are warranted out of box but not against any damage, due to Process or Misapplication Failures e.g. High Temperature, Chemical Attack or Physical Mishandling of Product.

# TI Series Products

- Industry's Highest Accuracy:  $\pm 0.50\%$
- PVC | PP | PVDF
- Retrofits into Signet® Fittings
- Size Range - 1/2" - 24"
- Low Pressure Drop
- Password Protected Security
- Lifetime Warranty on Paddle Wheel Assembly



**TIW**  
Flow Transmitter  
Frequency Pulse Output

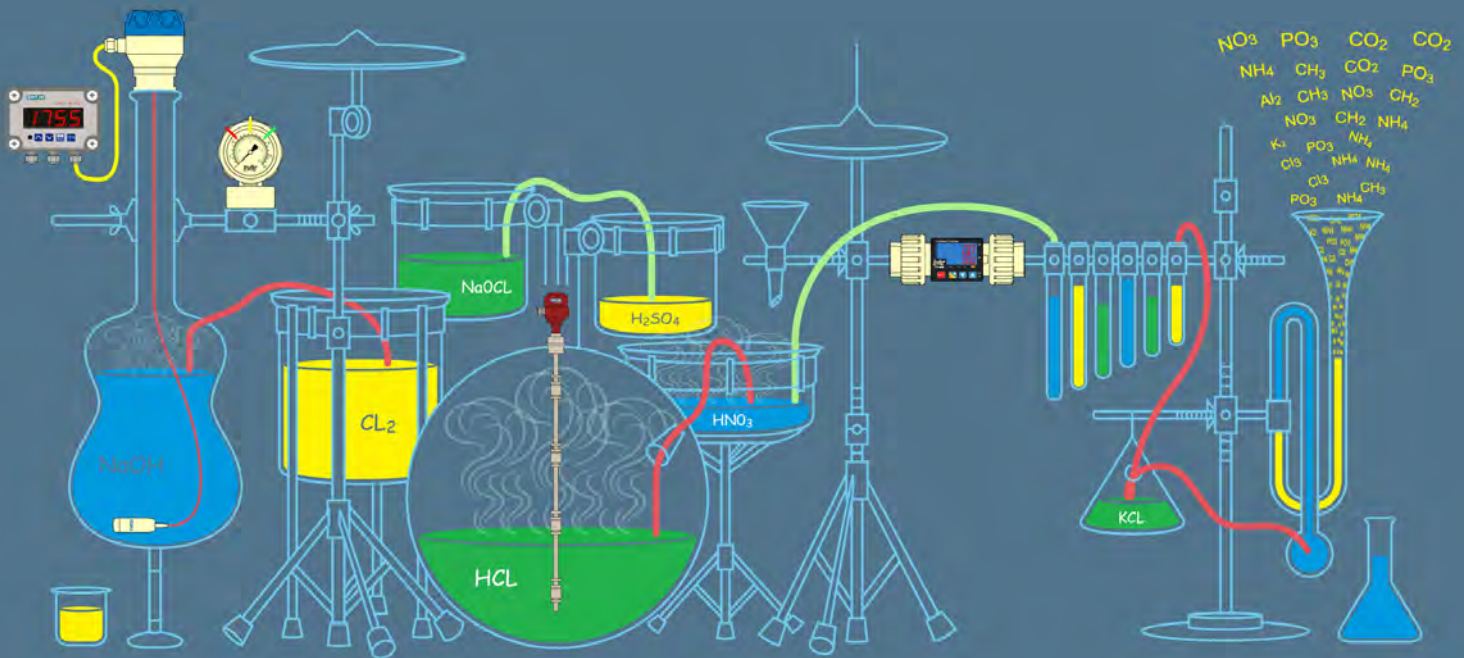


**TIR**  
Pulse + 4-20mA



**TIB**  
Battery Powered  
Flow Rate + Flow Total

Experience the ICON Difference  
North America's Largest Inventory  
Industry Leading Technology  
[www.iconprocon.com](http://www.iconprocon.com)



We Measure & Control  
All Kinds of Corrosive Liquid S#\*%

FLOW + PRESSURE + LEVEL + TEMP