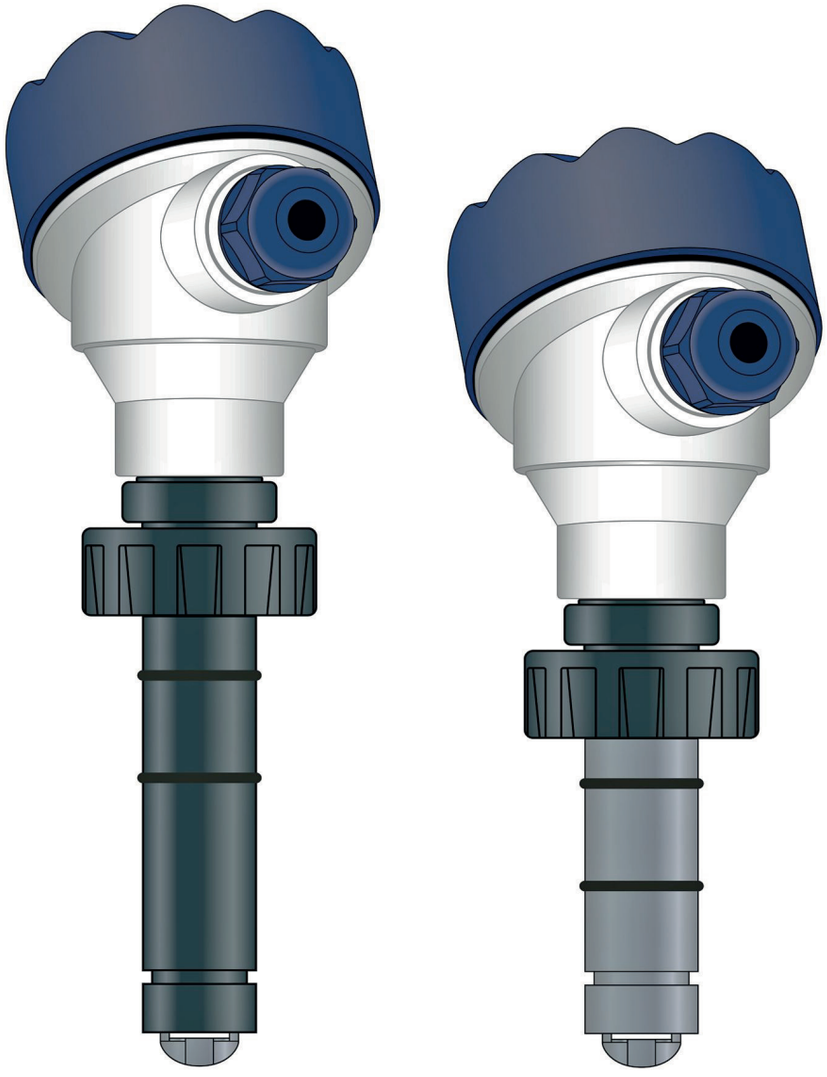
TIR SERIES

Multi-Function Paddle Wheel Flow Meter

truflo®

Quick Start

TIR Series Flow Meters



ICON™ PROCESS CONTROLS

Corrosion-Free Instrumentation Equipment

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.

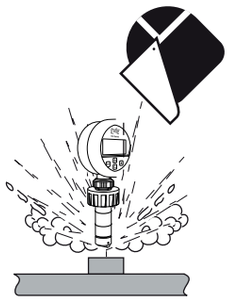
Warning | Caution | Danger
Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, injury, or death

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 Information

Specification	Description
Operating Voltage	10 - 30VDC
Current Consumption	60mA max.
Control Output	RS-485 Modbus
Transmitter	4-20mA
Relay Output	1A 30VDC | Normally Open | Normally Closed
Flow Rate GPM | LPM	0.0 - 999.9
Fluid	H_2O | Liquid Chemical Media
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	Rotor | ETFE Tefzel® || Rotor Pin | Zirconium Ceramic || Rotor Bushings | Ceramic Sensor Body | PVC | PP | PVDF | 316SS
O-Ring Material	FPM | EPDM Optional | FFKM Optional
Operating Temperature	PVC < 60°C | PP < 80°C | PF < 100°C
Protection Class	NEMA 4X | IP66 | General Purpose
Approval	CE | RoHS

*Optional

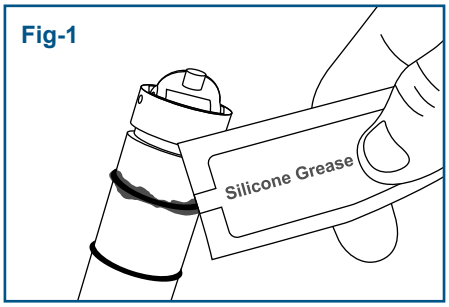
Installation

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**

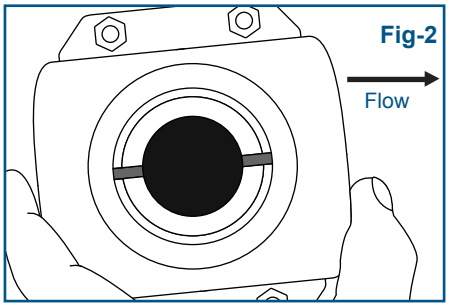
Hand Tighten the Sensor Cap. **DO NOT** use any tools on the sensor cap or the cap threads or fitting threads may be damaged. | Fig-5

Fig-1



Ensure the Silicon Grease Provided is Applied Prior to Insertion

Fig-2



Ensure Location Tabs Are Parallel to Direction of Flow

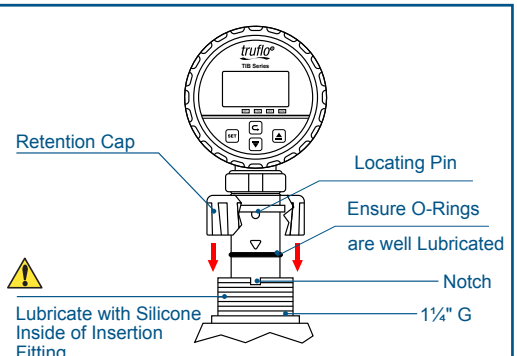


Fig-3

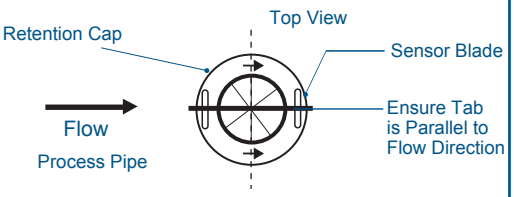


Fig-4

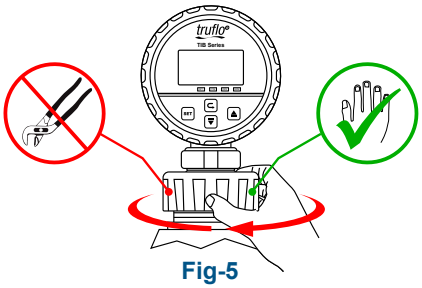
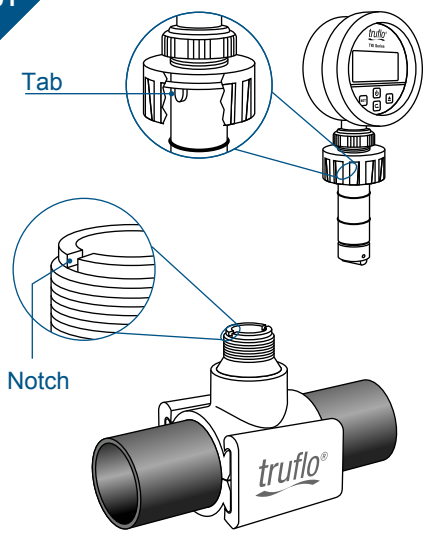


Fig-5

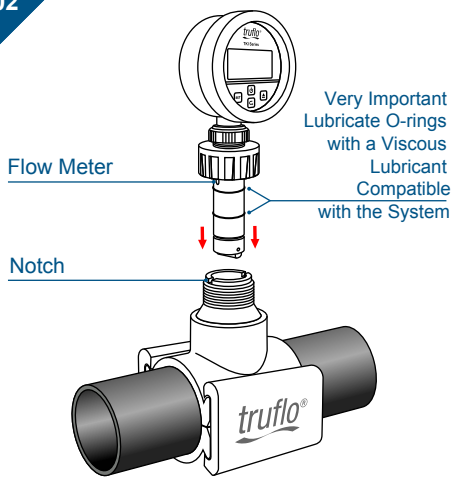
Correction Sensor Position

01



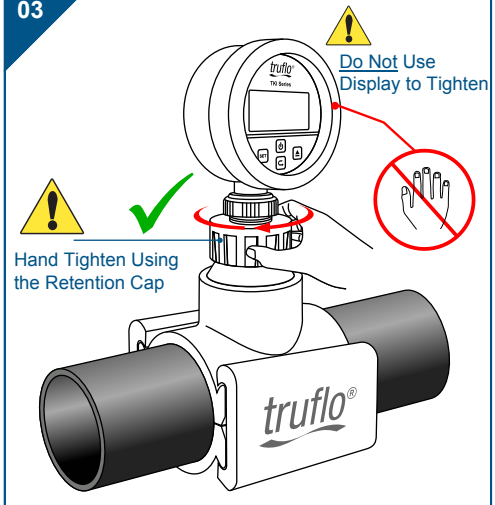
Flow Meter Positioning Tab and Clamp Saddle Notch

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

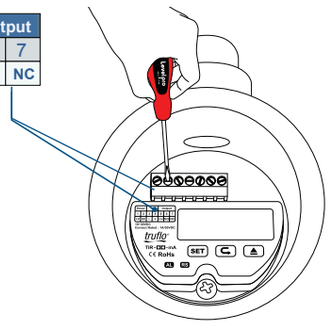
Terminal Connetions

- With Transmitter or RS-485

Power		Tr | RS		Output		
1	2	3	4	5	6	7
+V	0V	–	+	COM	NO	NC

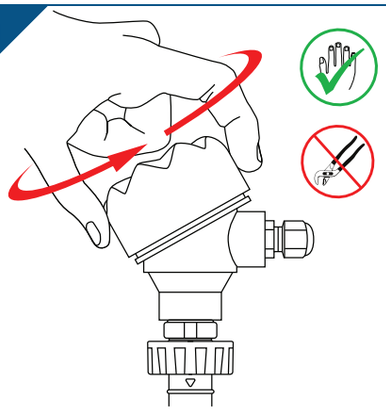
Power | 10-30VDC
Tr | 4-20mA
RS | RS-485 Modbus
Output | Relay 1A | 30VDC

Power		Tr	RS	Output		
1	2	3	4	5	6	7
+V	-V	–	+	COM	NO	NC

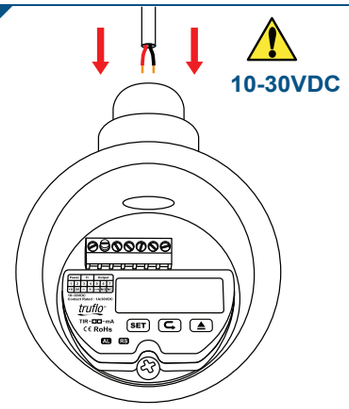


Wiring Procedure

01

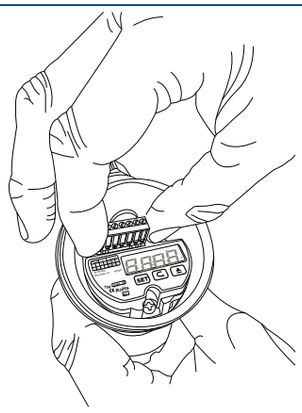


Open TIR Lid



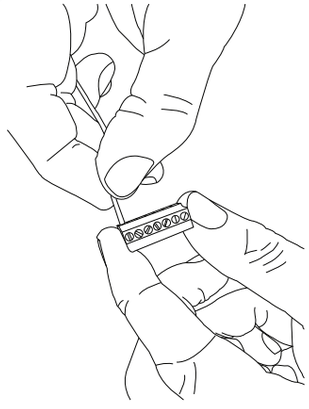
Open Screws from Terminals

03



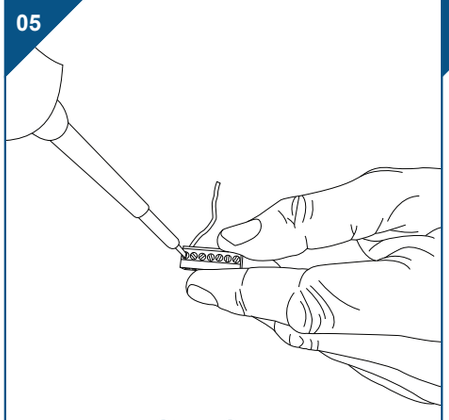
Remove Connection Wire

04



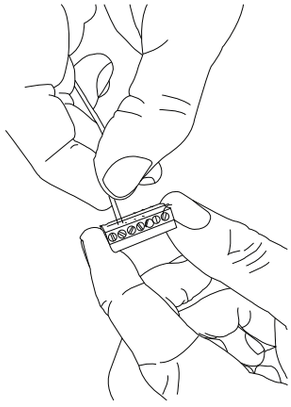
Insert Wire in Terminals

05



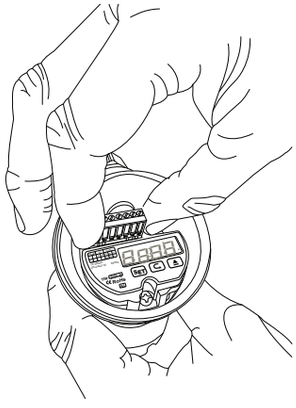
Close Screws

06



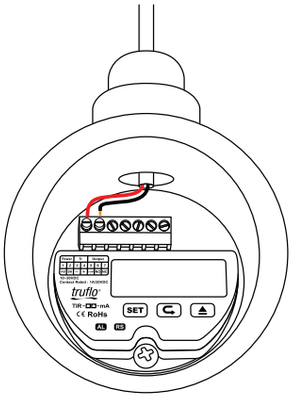
Connect All Wires

07



Re-Install Connector

08



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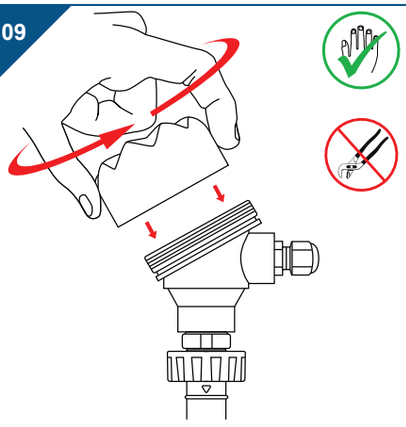
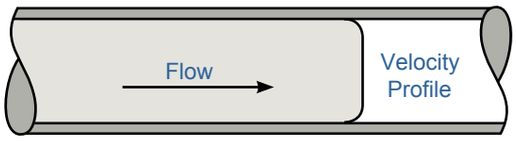


Hand Tighten Lid

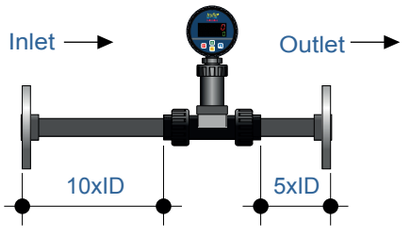
Correction Sensor Position

TI Series Flow Meters measure liquid media only. There should be no air bubbles and the pipe must always remain full. To ensure accurate flow measurement the placement of the flow meters needs to be adhered .This requires a straight run pipe with a minimum number of pipe diameters distance upstream and downstream of the flow sensor.

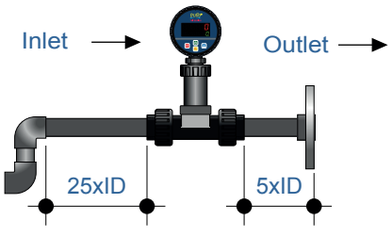


Developed Turbulent Flow

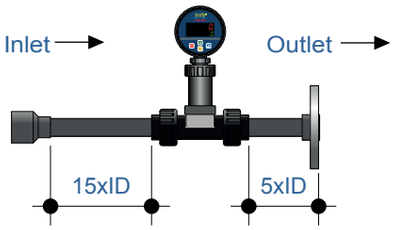
Flange



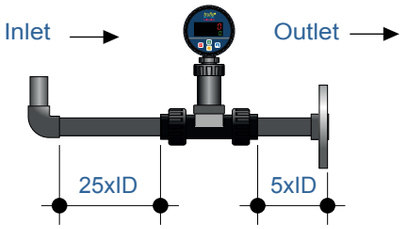
2x 90 Elbow



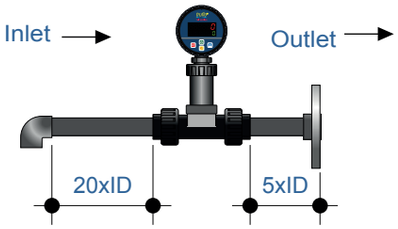
Reducer



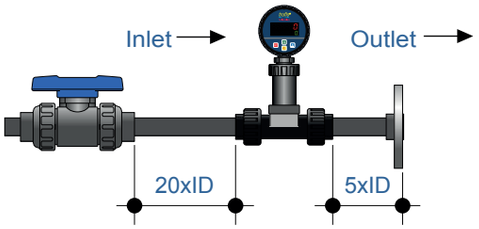
90 Elbow Downward flow



90 Elbow Downward flow Upward

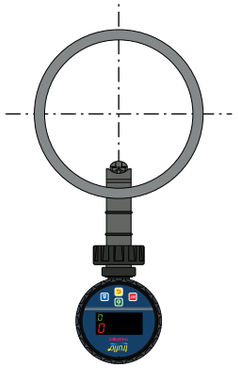


Ball Valve



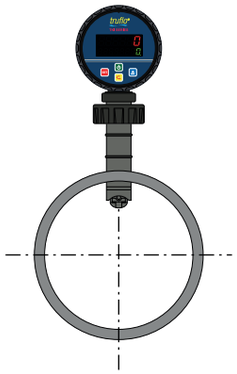
Installation Positions

Figure 1



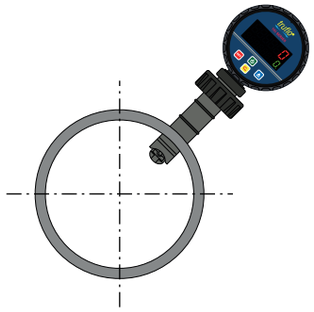
Good if NO
Sediment Present

Figure 2



Good if NO Air
Bubbles Present

Figure 3

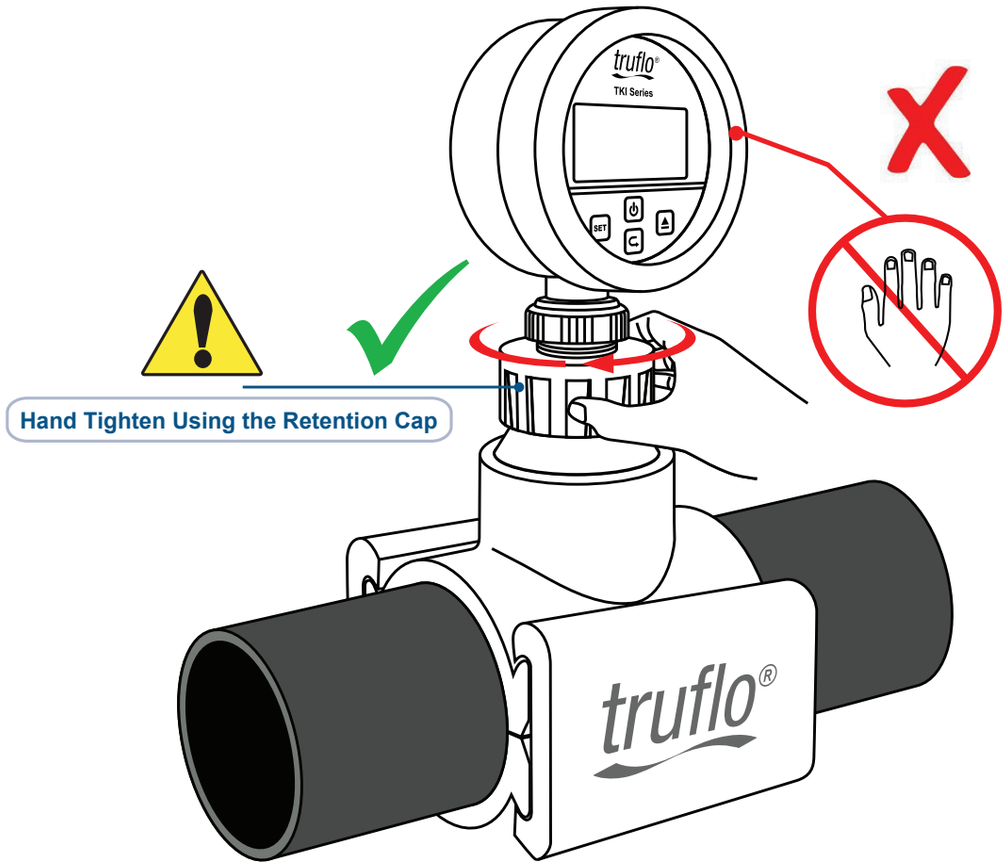


Preferred Installation if Sediment* or
Air Bubbles may be Present

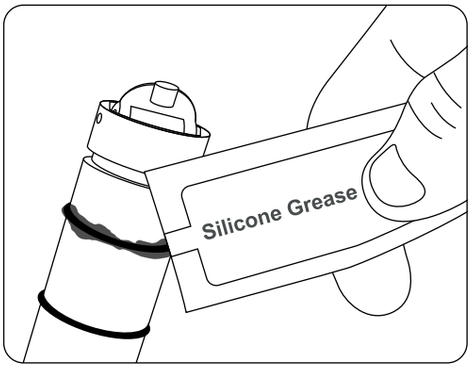
* Maximum % Solids: 10% with particle size not exceeding 0.5 mm cross section or length.

CORROSION

Do Not Use Display to Tighten



Hand Tighten Using the Retention Cap



Ensure Silicone Grease* is Applied to O-Rings Prior to Insertion into Fitting

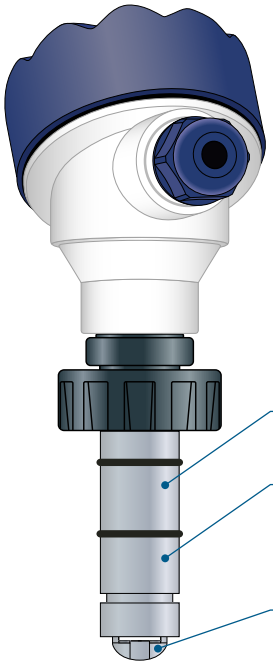
*Ensure Silicone Grease is Suitable for Application

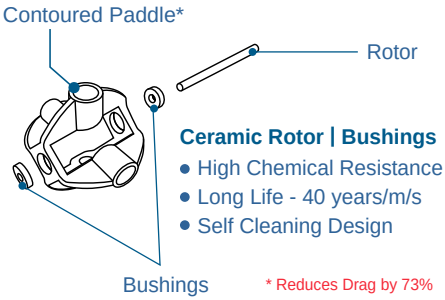
ICON™ PROCESS CONTROLS

Corrosion-Free Instrumentation Equipment

Long Service Life

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





Ceramic Rotor | Bushings
- High Chemical Resistance
- Long Life - 40 years/m/s
- Self Cleaning Design

* Reduces Drag by 73%

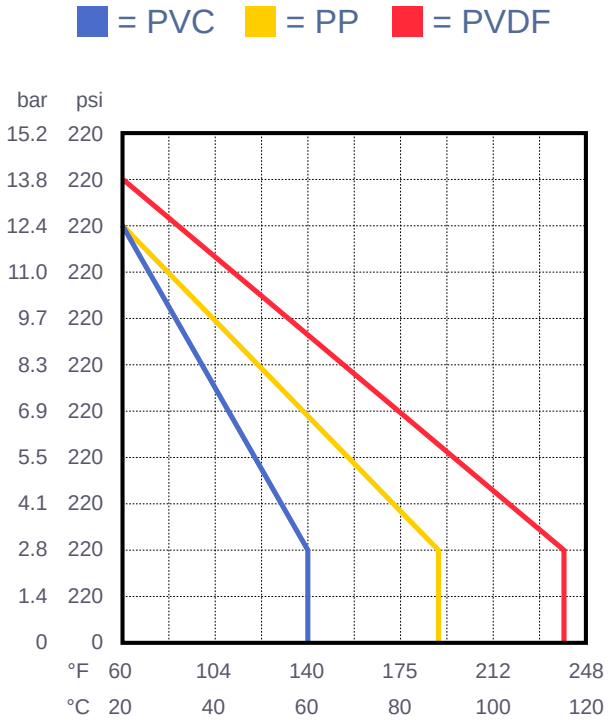
Epoxy Encapsulated Electronics

Sensor Body
- Available in PVC | PP | PVDF
- 2 Sensor Lengths to Measure 2" to 24" Pipes

4 Blade ETFE Tefzel® Rotor
- Open Chennel Design Avoids Cavitation
- New ShearPro® Contoured Designed Rotor

Pressure vs. Temperature

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



Min | Max Flow Rates

Pipe Size (O.D.)	LPM | GPM 0.3m/s min.	LPM | GPM 10m/s max.
2" | DN50	40.0 | 10.5	357.0 | 1350.0
2 ½" | DN60	60.0 | 16.0	1850 | 357
3" | DN80	90.0 | 24.0	2800 | 739
4" | DN100	125.0 | 33.0	4350 | 1149
6" | DN150	230.0 | 60.0	7590 | 1997
8" | DN200	315.0 | 80.0	10395 | 2735

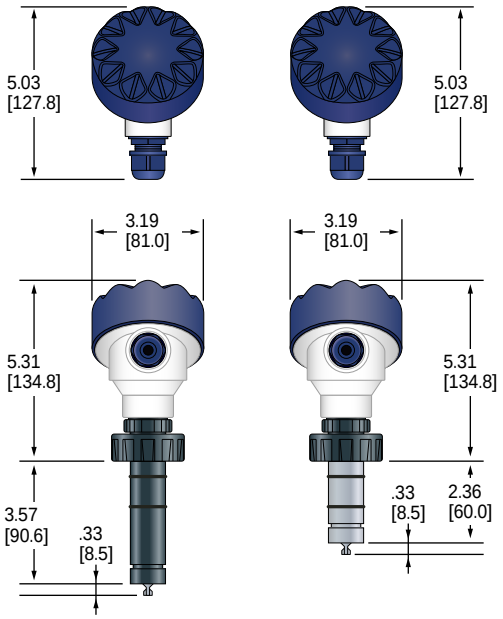
Wiring Diagram

With Transmitter or RS-485

Power		Tr | RS		Output		
1	2	3	4	5	6	7
+V	0V	–	+	COM	NO	NC

Power = 10~30VDC
Tr = 4 ~ 20mA
RS = RS-485 (Modbus)
Output = Relay (1A/30VDC)

Dimensions



Programming

	Display	Range	Description
Home Screen Press SET 3 Secs	0.0	0 - 999.9	Home Screen
K Factor Press SET	K		K Factor
K Factor Press SET	99.99	0.1 - 99.99	Enter K Factor Value Refer to Chart on Page 7
Transmitter Range Press SET	tr		4-20mA Output Range
Transmitter Range Press SET	100.0	0-999.9	4mA = 0 | Factory Default = No Flow 20mA = 100 | Default** **This can be Changed to Conform to Customers Application
Alarm Press SET	AL		Alarm Relay
Alarm Set Point Press SET	100.0	0-999.9	Alarm Set Point
Hysteresis Press SET	HYS		Alarm Hysteresis } Prevents Relay Chatter
Hysteresis Press SET	1.0	0-999.9	Enter Hysteresis Value

Programming Alarm

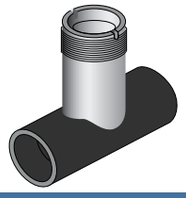
Status	Display	Range	Description
Home Screen Press SET + ⊂ 3 Secs	0.0	0 - 999.9	Home Screen
Lock Out Featue Press SET	LK. 10	1 - 10	Factory Default: Lock = 10 NOTE: If Lock # is Changed from the # 10 the Meter will enter the Lockout Mode.
Decimal Place Press SET	dP. 1	0 or 1	Change Decimal Place
Units of Flow Press SET	Ut. 6		Ut.6 = Gallons | Factory Default Ut.L = Liters | Ut.KL = Kiloliters
Programming Relay Press SET	ALt.0	0 - 4	Alt = 0 | Factory Default = No Relay Refer to **Relay Selection Mode** on Next Page
Relay Time Delay Press SET	t.00	0 - 99S	Start Up **Delay Time** in Seconds | **Prevents False Alarms during Start-Ups**

Alarm Settings

Mode	Description	
ALt.0	No Alarm	
ALt.1	R1 ON (AL1-H) AL1	R2 ON AL1 (AL1-H)
	CV > (AL1) ⟶ R1/AL1 ON ; C ⟶	CV > (AL2) ⟶ R2/AL2 ON ; CV > (AL2+H) ⟶ R2/AL2 OFF
ALt.2	R1 ON (AL1-H) AL1	R2 ON AL2 (AL2+H)
	CV < (AL1 - H) ⟶ AL1 ⟶ R1/AL1	CV > (AL2 + H) ⟶ R2/AL2 ON ; CV < AL2 ⟶ R2/AL2 OFF
ALt.3	R1 ON (AL1-H) AL1	R2 ON (AL2-H) AL2
	CV > AL1 ⟶ R1/AL1 OFF ; CV < (AL1 - ⟶	CV > AL2 ⟶ R2/AL2 OFF ; < (AL2 - H) ⟶ R
ALt.4	R1 ON (AL1-H) AL1	R2 ON (AL2-H) AL2
	CV > (AL1) ⟶ R1/AL1 ON ; C ⟶	CV > AL2 ⟶ R2/AL2 ON ; CV < (AL2 - H) ⟶ R2/AL2 OFF

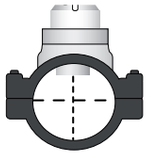
Fittings

TEE FITTINGS



Tee Fitting Size IN	DN	K-Factor LPM	K-Factor GPM	Sensor Length
½"	50	268.0	1013.0	S
¾"	50	160.0	604.0	S
1"	50	108.0	408.0	S
1-½"	50	37.0	140.0	S
2"	50	21.6	81.7	L
2-½"	65	14.4	54.4	L
3"	80	9.3	35.0	L
4"	100	5.2	19.8	L

CLAMP-ON SADDLES



Clamp Saddles Size IN	DN	K-Factor LPM	K-Factor GPM	Sensor Length
2"	50	21.6	81.7	S
3"	80	9.3	35.0	S
4"	100	5.2	19.8	S
6"	150	2.4	9.2	L
8"	200	1.4	5.2	L

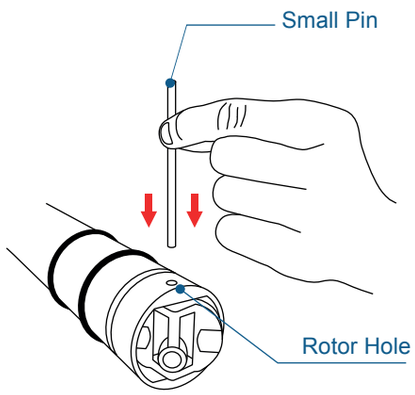
CPVC SOCKET WELD-ON ADAPTERS

Weld On Adapter Size IN	DN	K-Factor LPM	K-Factor GPM	Sensor Length
2"	50	14.4	54.4	S
2-½"	65	9.3	35.5	S
3"	80	9.3	35.0	S
4"	100	5.2	19.8	S
6"	150	2.4	9.2	L
8"	200	1.4	5.2	L
10"	250	0.91	3.4	L
12"	300	0.65	2.5	L
14"	50	0.5	1.8	L
16"	65	0.4	1.4	L
18"	80	0.3	1.1	L
20"	100	0.23	0.9	L
24"	150	0.16	0.6	L

Rotor Pin | Paddle Replacement

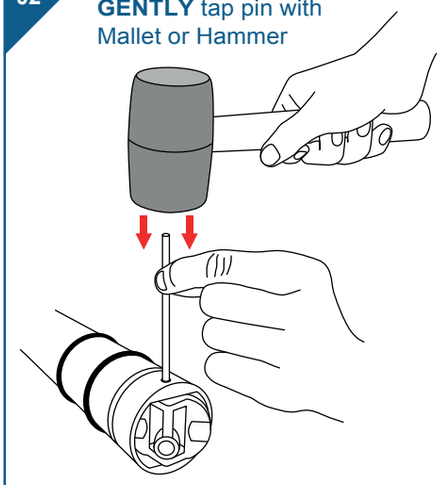
01

Line up Pin with Rotor Hole



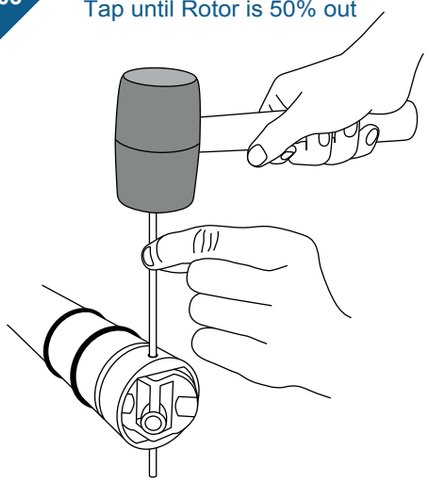
02

GENTLY tap pin with Mallet or Hammer



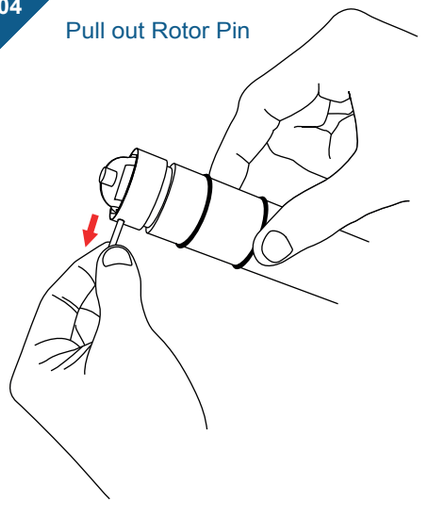
03

Tap until Rotor is 50% out

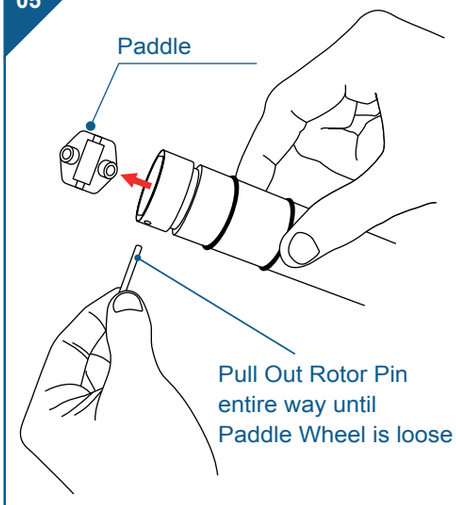


04

Pull out Rotor Pin

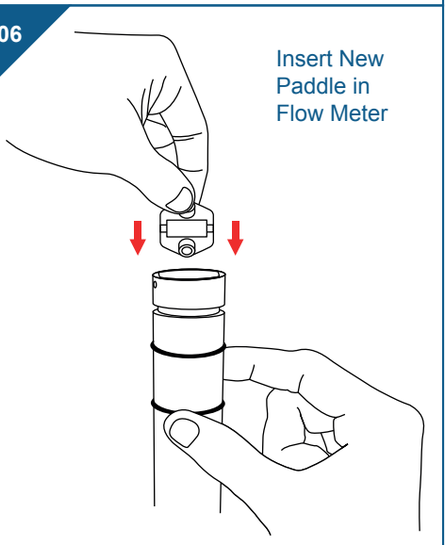


05



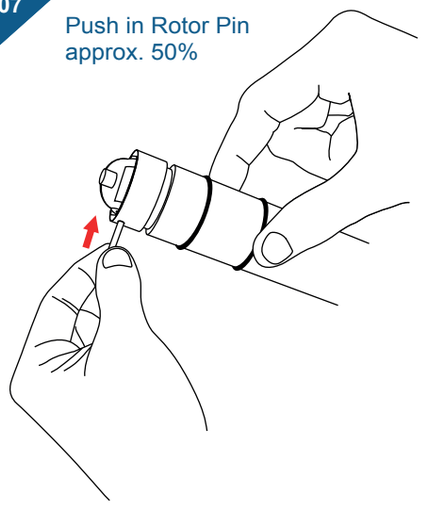
06

Insert New Paddle in Flow Meter



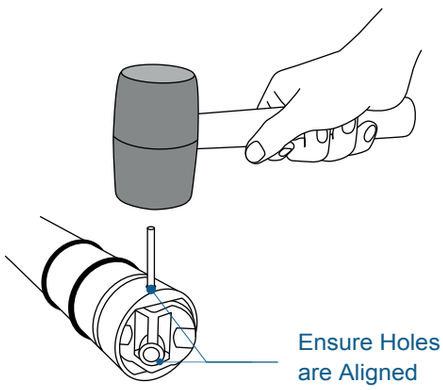
07

Push in Rotor Pin approx. 50%



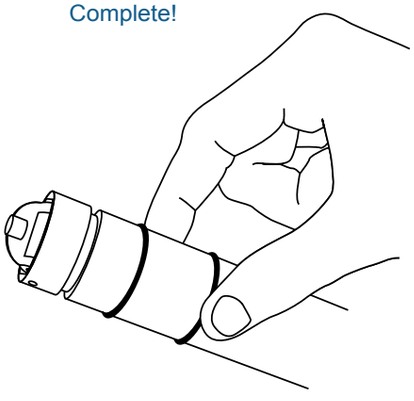
08

GENTLY tap Rotor Pin with Mallet or Hammer



09

Congratulations!
Replacement Procedure Complete!



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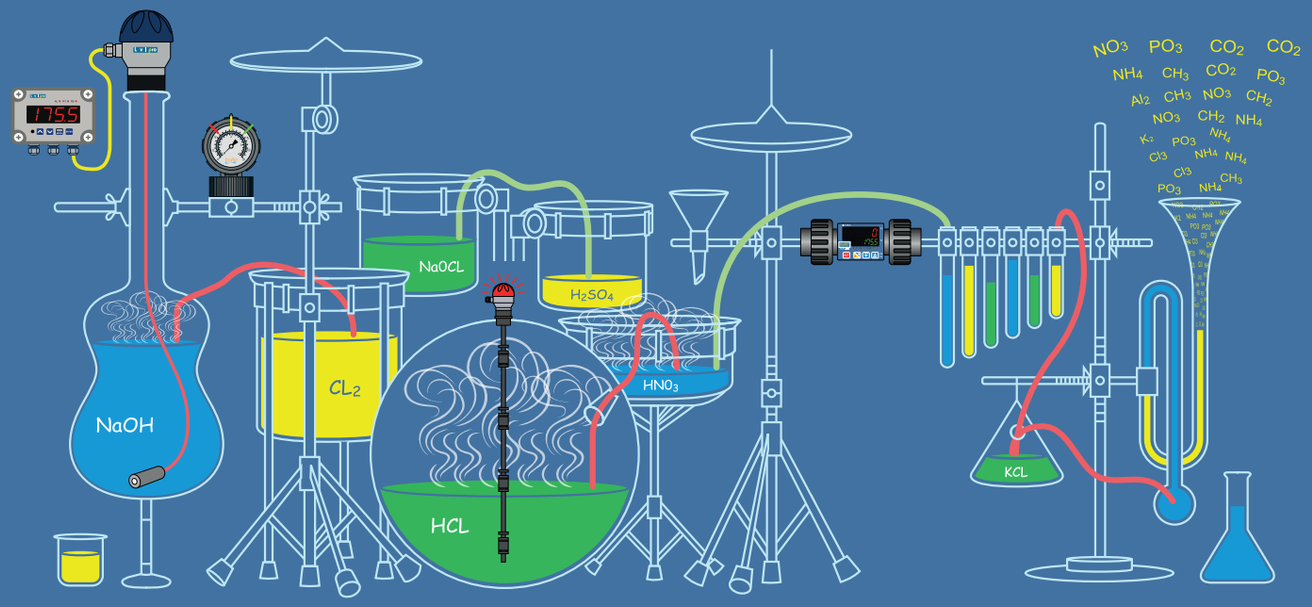
~~CORROSION~~



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