truflo TI3P Series Insertion Paddle Wheel Flow Meter Sensor Owner's Manual

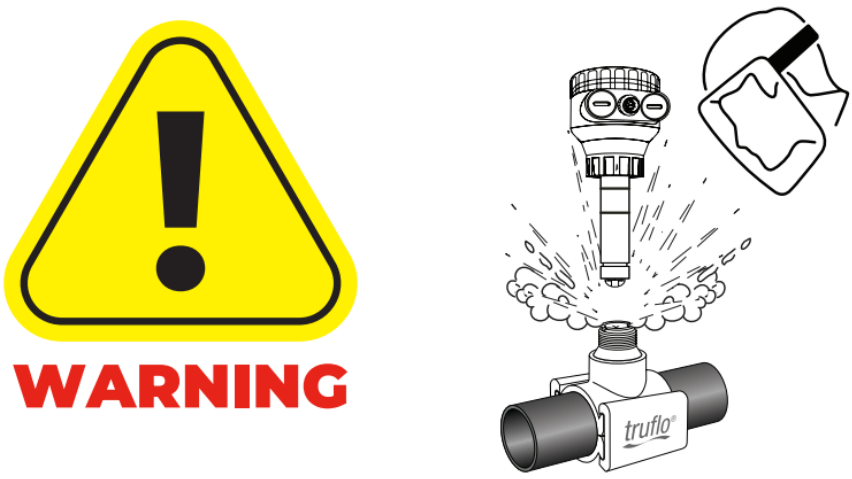
Contents

truffle TI3P Series Insertion Paddle Wheel Flow Meter Sensor

Specifications

- **Operating Range:** 0.1 to 10 m/s
- **Pipe Size Range:** DN15 to DN600
- **Linearity: High-precision**
- **Repeatability:** Accurate and reliable
- **Wetted Materials:** PVC, PP, PVDF, 316SS, FKM, EPDM, FFKM
- **Electrical Frequency:** 49 Hz per m/s nominal, 15 Hz per ft/s nominal
- **Supply Voltage:** Standard voltage
- **Supply Current:** Low power consumption

Safety Information



- De-pressurize and vent the system before installation or removal
- Confirm chemical compatibility before use

- DO NOT exceed maximum temperature or pressure specifications
- ALWAYS wear safety goggles or face-shield during installation and/or service
- 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.

Note | Technical Notes
Highlights additional information or detailed procedure.

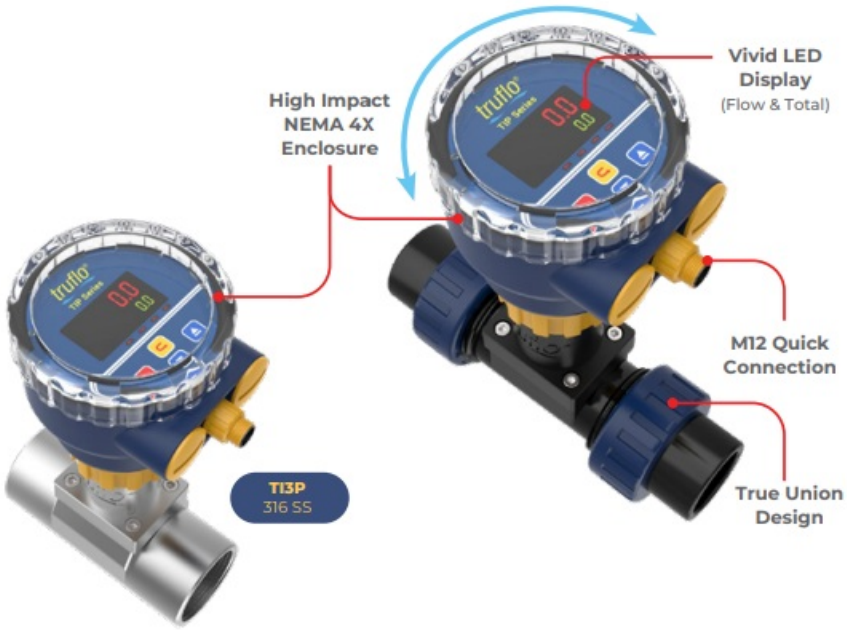
Hand Tighten Only
Over-tightening may permanently damage product threads and lead to the failure of the retaining nut.

Do Not Use Tools
Use of tools) may damage produced beyond repair and potentially void product warranty.

Personal Protective Equipment (PPE)
Always utilize the most appropriate PPE during the installation and service of Truflo® products.

Pressurized System Warning The sensor may be under pressure. Take caution to vent the system before installation or removal. Failure to do so may result in equipment damage and/or serious injury.

Product Description

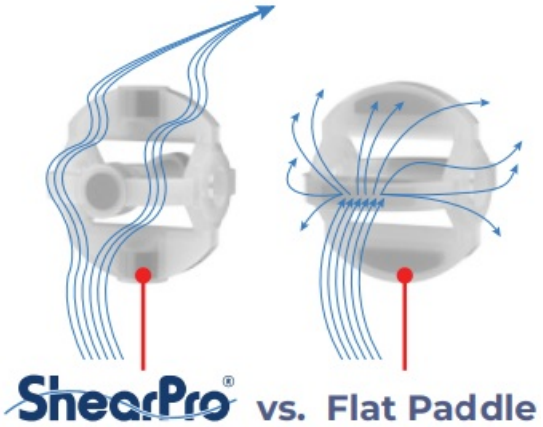


The TI Series insertion plastic paddle wheel flow meter has been engineered to provide long-term accurate flow measurement in tough industrial applications. The paddle wheel assembly consists of an engineered Tefzel® paddle and micro-polished zirconium ceramic rotor pin and bushings. High-performance Tefzel® and Zirconium materials have been selected due to their excellent chemical and wear-resistant properties.

Features

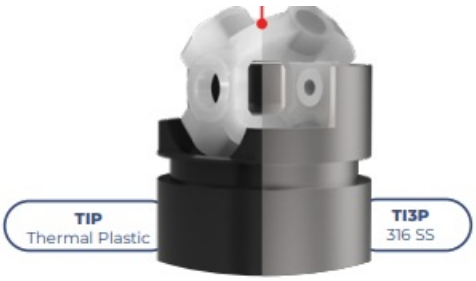
- ½” – 24″ Line Sizes
- Flow Rate | Total
- Pulse | RS485 Outputs (Optional)

New ShearPro® Design



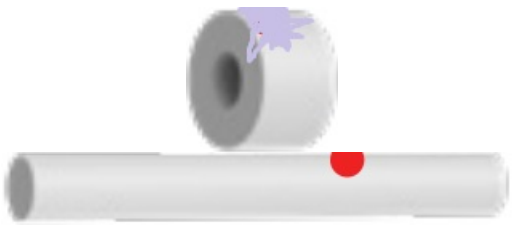
- Contoured Flow Profile
- Reduced Turbulence = Increased Longevity
- 78% Less Drag than Old Flat Paddle Design

Tefzel® Paddle Wheel



- Superior Chemical And Wear Resistance vs PVDF

Zirconium Ceramic Rotor | Bushings



- Up to 15x the Wear Resistance
- Integral Rotor Bushings Reduce Wear and Fatigue Stress

360° Shielded Rotor Design

- Eliminates Finger Spread
- No Lost Paddles

Technical Specifications

General		
Operating Range	0.3 to 33 ft/s	0.1 to 10 m/s
Pipe Size Range	½ to 24"	DN15 to DN600
Linearity	±0.5% of F.S @ 25°C | 77°F	
Repeatability	±0.5% of F.S @ 25°C | 77°F	
Wetted Materials		
Sensor Body	PVC (Dark) | PP (Pigmented) | PVDF (Natural) | 316SS	
O-Rings	FKM | EPDM* | FFKM*	
Rotor Pin | Bushings	Zirconium Ceramic | ZrO_2	
Paddle | Rotor	ETFE Tefzel®	
Electrical		
Frequency	49 Hz per m/s nominal	15 Hz per ft/s nominal
Supply Voltage	10-30 VDC ±10% regulated	
Supply Current	<1.5 mA @ 3.3 to 6 VDC	<20 mA @ 6 to 24 VDC
Max. Temperature/Pressure Rating – Standard and Integral Sensor | Non-Shock		
PVC	180 Psi @ 68°F | 40 Psi @ 140°F	12.5 Bar @ 20°C | 2.7 Bar @ 60°F
PP	180 Psi @ 68°F | 40 Psi @ 190°F	12.5 Bar @ 20°C | 2.7 Bar @ 88°F
PVDF	200 Psi @ 68°F | 40 Psi @ 240°F	14 Bar @ 20°C | 2.7 Bar @ 115°F
316SS	Consult Factory	
Operating Temperature		
PVC	32°F to 140°F	0°C to 60°C
PP	-4°F to 190°F	-20°C to 88°C
PVDF	-40°F to 240°F	-40°C to 115°C
316SS	-40°F to 300°F	-40°C to 148°C
Output		
Pulse | RS485*		
Display		
LED | Flow Rate + Flow Totalizer		
Standards and Approvals		
CE | FCC | RoHS Compliant		

See Temperature and Pressure Graphs for more information

Model Selection

PVC | PP | PVDF		
Size	Part Number	Material
½" - 4"	TIP-P-S	PVC
6" - 24"	TIP-P-L	PVC
1" - 4"	TIP-PP-S	PP
6" - 24"	TIP-PP-L	PP
1" - 4"	TIP-PF-S	PVDF
6" - 24"	TIP-PF-L	PVDF

Add Suffix

- 'E' – EPDM Seals
- 'R' – RS485 Communication Output – $100

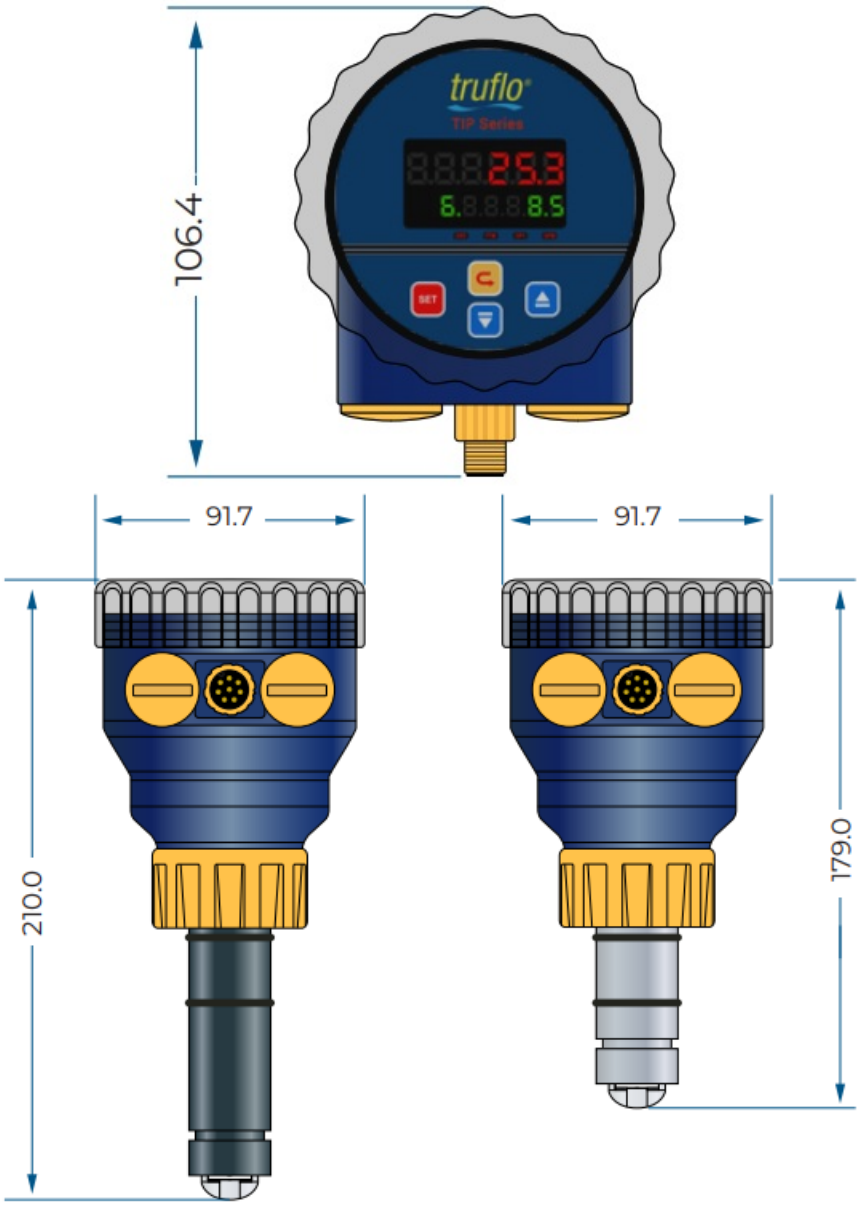
316 SS		
Size	Part Number	Material
½" - 4"	TI3P-SS-S	316 SS
6" - 24"	TI3P-SS-L	316 SS

Add Suffix

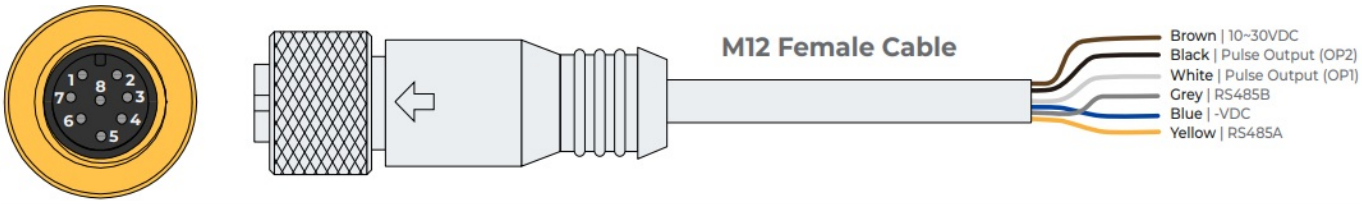
- 'E' – EPDM Seals
- 'R' – RS485 Communication Output – $100

Display Characteristics

Dimensions (mm)



Wiring Diagram



Terminal	Description	Color
1	10~30 VDC	Brown
2	Pulse Output	White
3	- VDC	Blue
4	Pulse Output	Black
5	RS485A	Yellow
6	RS485B	Grey

Wiring – SSR* (Totalizer)

Wire Color	Description
Brown	+ 10~30VDC
White	Pulse Output
Blue	-VDC

Set “Con n” in Pulse Output Control (Refer Pulse Control Programming, Page 11)

Wiring – One Pulse/Gal | Con E

Wire Color	Description
Brown	+ 10~30VDC
White	Pulse Output
Blue	-VDC

Set “Con E” in Pulse Output Control (Refer Pulse Control PProgramming Page 11)

Wiring – SSR* (Flow Rate)

Wire Color	Description
Brown	+ 10~30VDC
Black	Pulse Output
Blue	-VDC

Set any “Con” in Pulse Output Control (Refer Pulse Control PrProgrammingPage 11)

Wiring – To Flow Display | Con F

Wire Color	Description
Brown	+ 10~30VDC
White	Paddle Pulse
Blue	-VDC

Set “Con F” in Pulse Output Control (Refer to Pulse Control ProProgrammingage 11)

Installation

Fig - 1

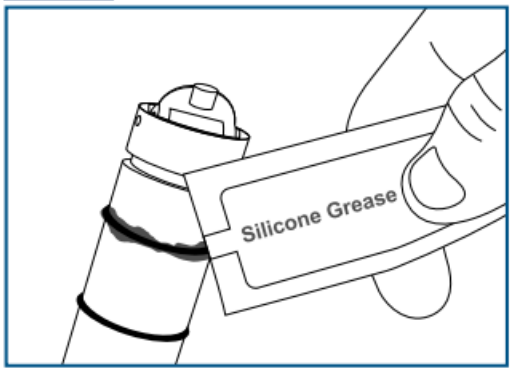
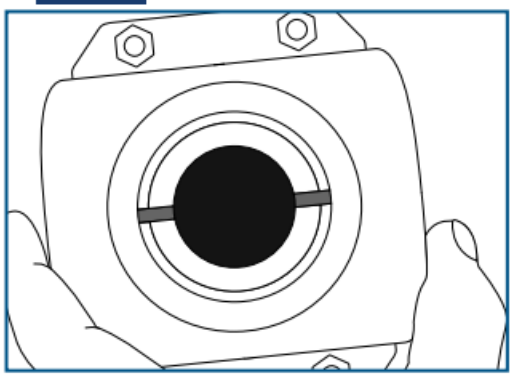


Fig - 2



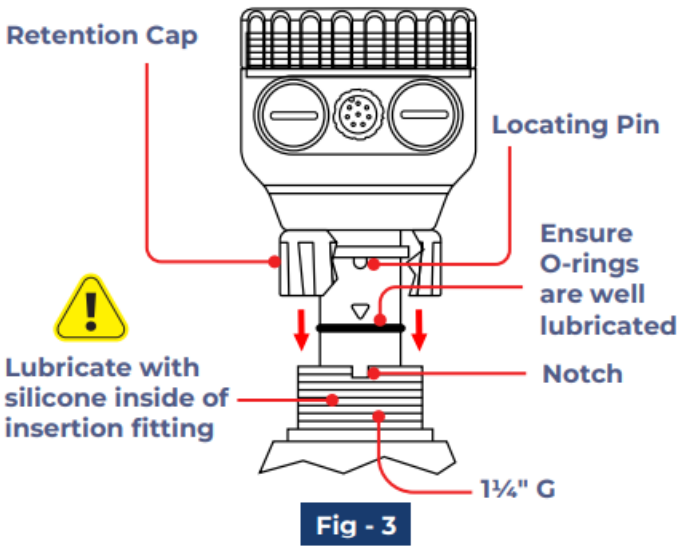


Fig - 3

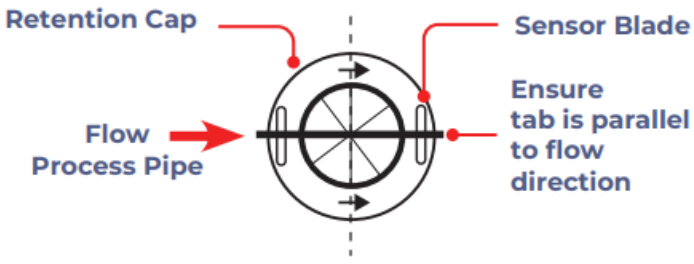


Fig - 4

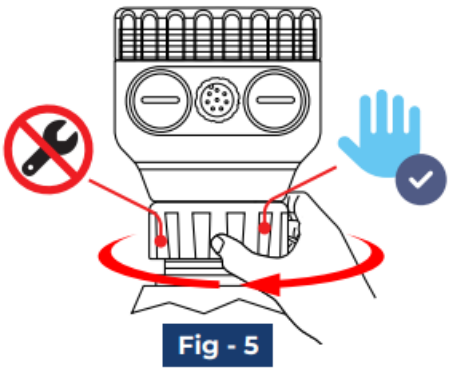


Fig - 5

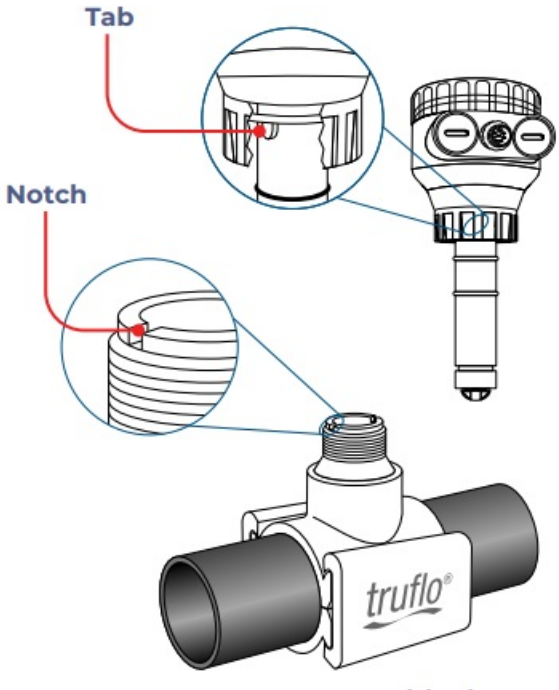
Very Important

- 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-3
- Ensure tab | notch is called to flow direction | Fig-4

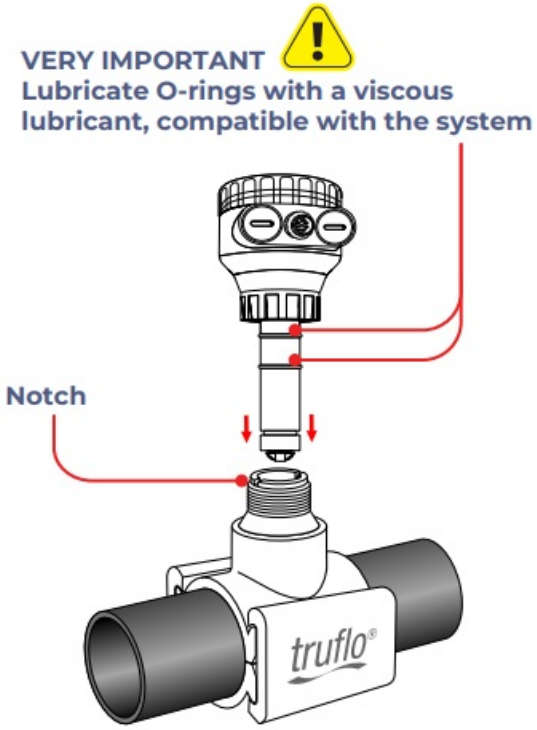
Hand HaHand-tighten sensor. DO NOT use any tools on the sensor cap or the cap threads or fitting threads may be damaged. | Fig-5

Correct Sensor Position

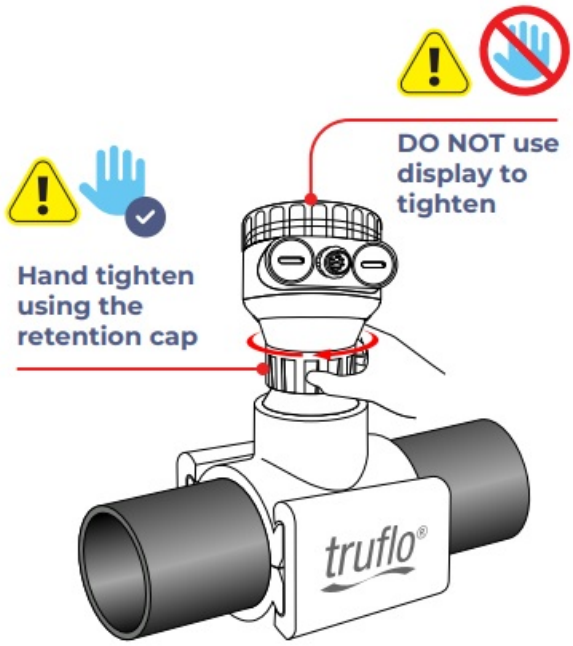
1. Locate the flow meter positioning tab and clamp the saddle notch.



2. Engage one thread of the sensor cap, then turn the sensor until the alignment tab is seated in the fitting notch. Ensure the tab is parallel to the flow direction.

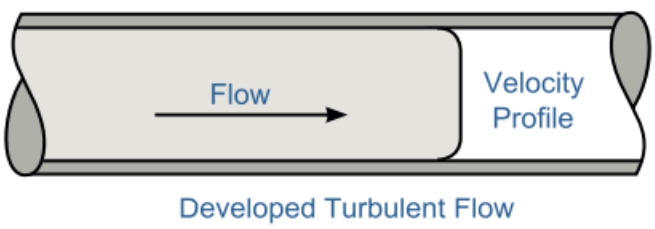


3. Hand tighten using the retention cap



- Hand-tighten the screw cap
- DO NOT use any tools — threads may be damaged
- Ensure the meter is firmly in place

Correct Sensor Position Setup

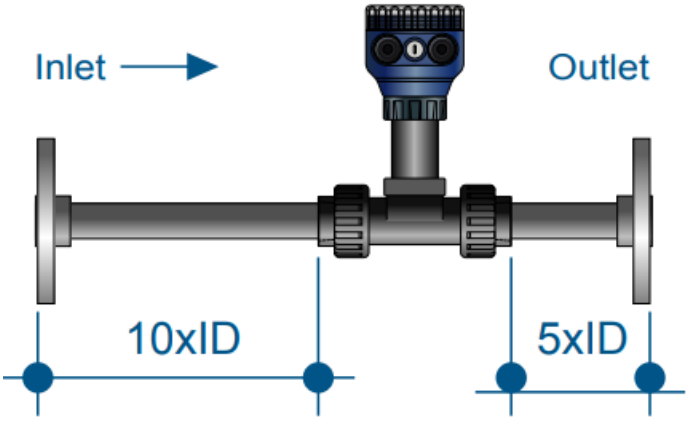


Developed Turbulent Flow

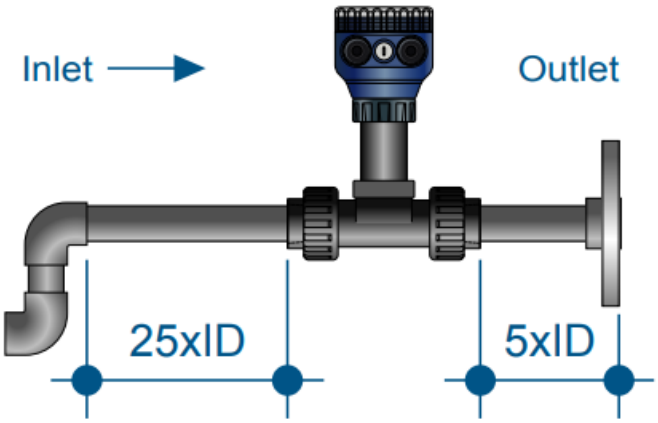
TI Series flow meters measure liquid media only. There should be no air bubbles and the pipe must always remain full. To ensure accurate flow measurement, the placement of the flow meters needs to adhere to specific parameters. This requires a straight run pipe with a minimum number of pipe diameters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

downstream of the flow sensor.

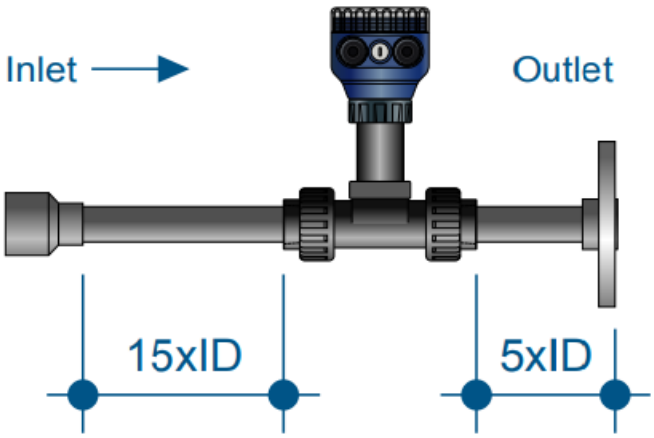
Flange



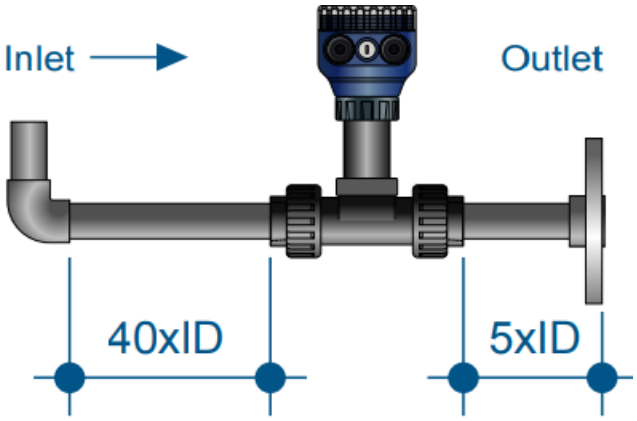
2x 90° Elbow



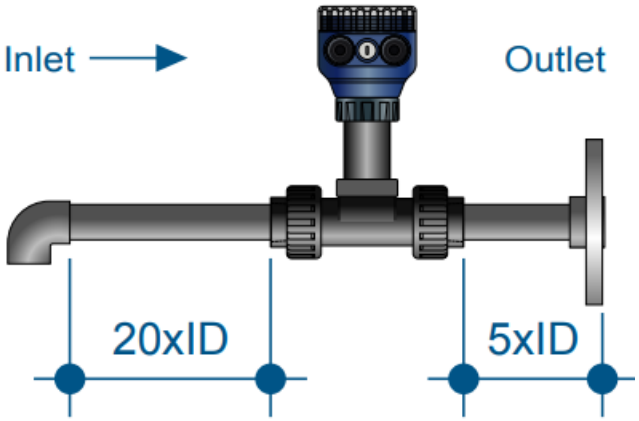
Reducer



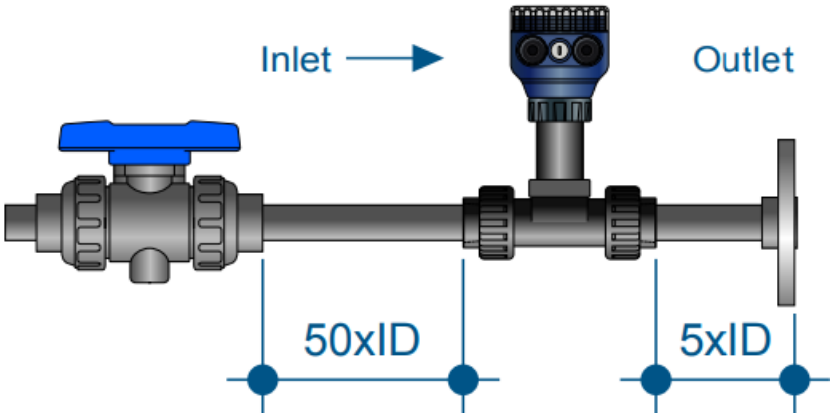
90° Downward Flow



90° Elbow Downward Flow Upward

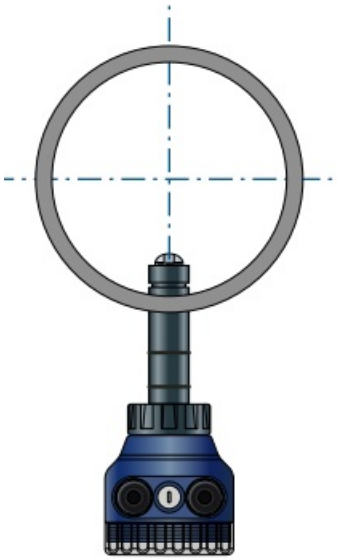


Ball Valve



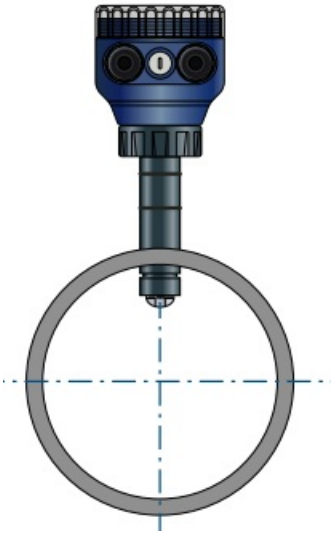
Installation Positions

Figure - 1



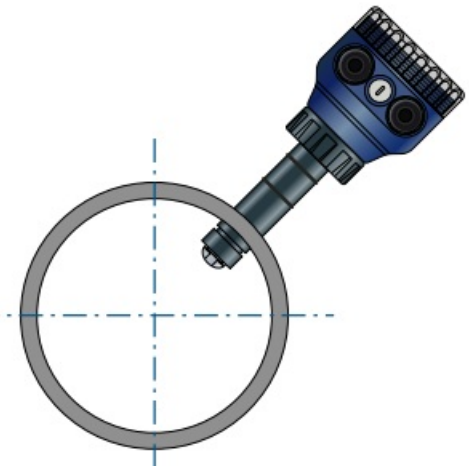
1. Good if NO SEDIMENT present

Figure - 2



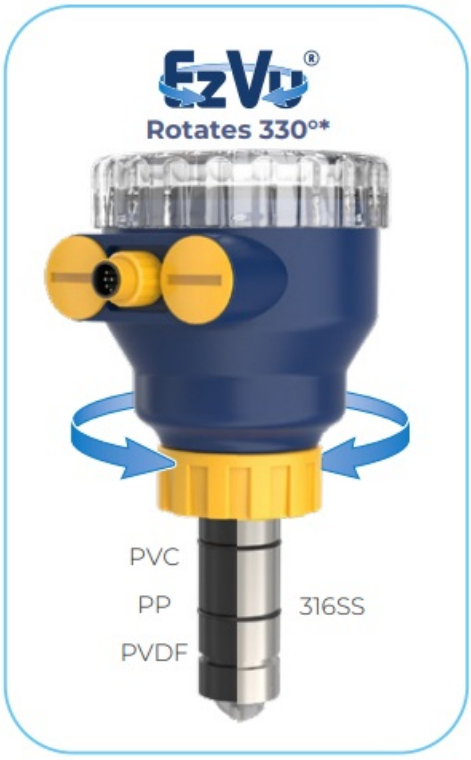
2. Good if NO AIR BUBBLES present

Figure - 3



3. Preferred installation if SEDIMENT* or AIR BUBBLES may be present

Fittings and K-Factor



TEE FITTINGS

Tee Fitting		K-Factor		Sensor Length
IN	DN	LPM	GPM	
½" (V1)	15	156.1	593.0	S
½" (V2)	15	267.6	1013.0	S
¾"	20	160.0	604.0	S
1"	25	108.0	408.0	S
1½"	40	37.0	140.0	S
2"	50	21.6	81.7	L
2½"	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		K-Factor		Sensor Length
IN	DN	LPM	GPM	
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

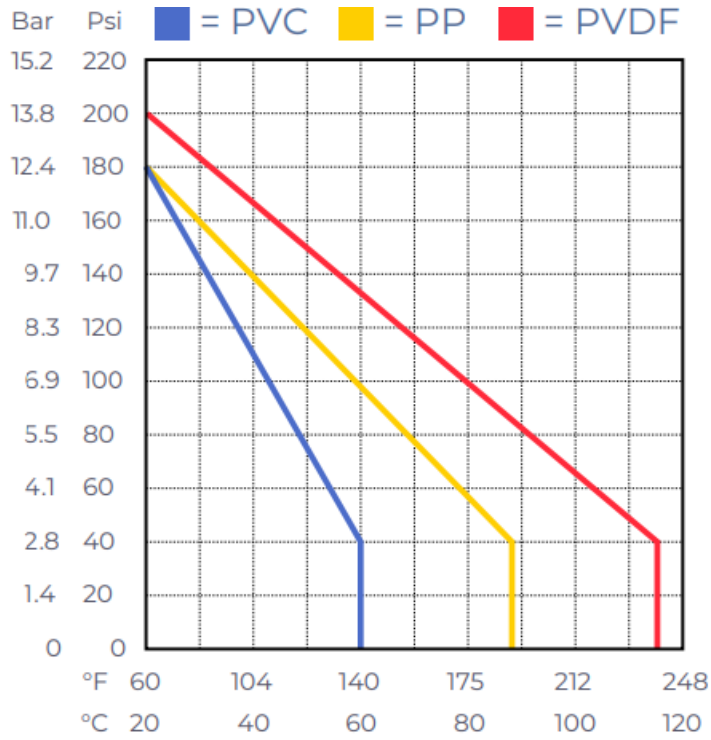
CPVC SOCKET WELD-ON ADAPTERS

Weld On Adapter		K-Factor		Sensor Length
IN	DN	LPM	GPM	
2"	50	14.4	54.4	S
2½"	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"	400	0.5	1.8	L
16"	500	0.4	1.4	L
18"	600	0.3	1.1	L
20"	800	0.23	0.9	L
24"	1000	0.16	0.6	L

TEE FITTINGS (V2)

Size	K-Factor
½"	282.0
¾"	196.0
1"	136.0
1½"	43.2
2"	23.2

Pressure vs. Temperature

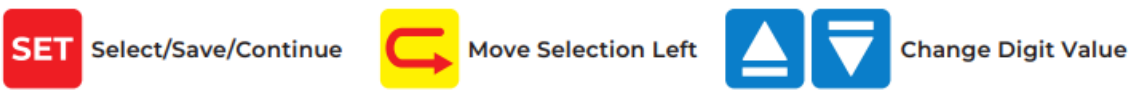


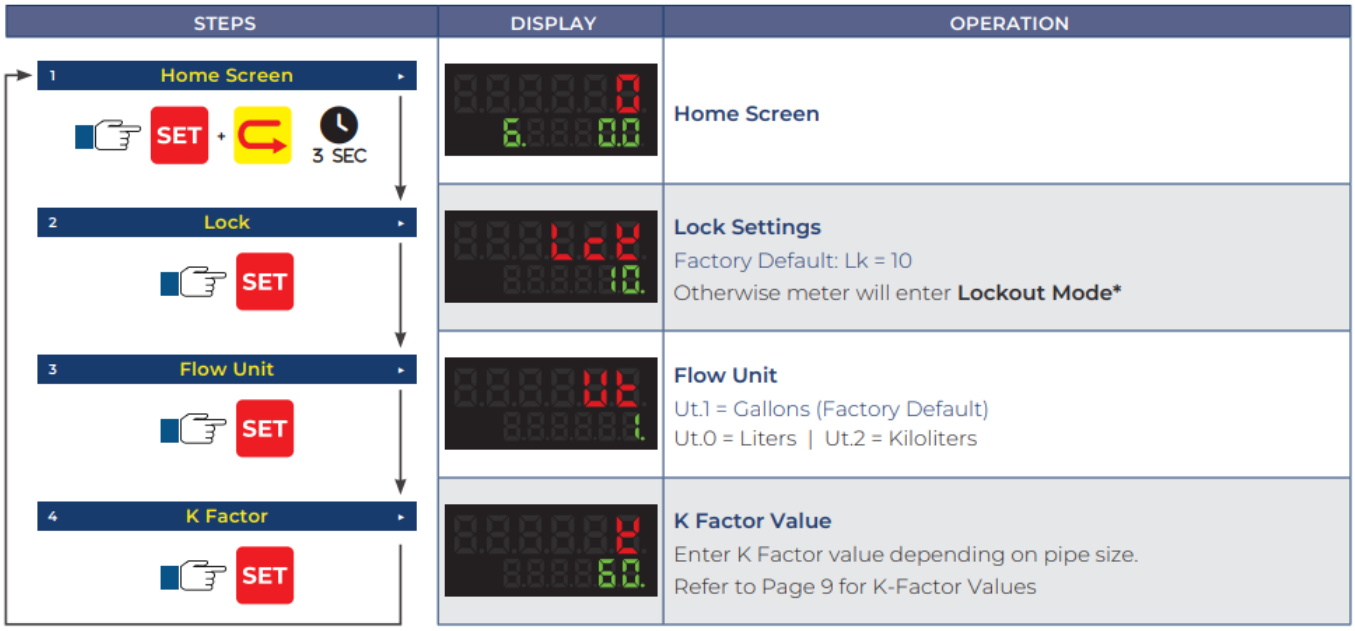
Note: During system design the specifications of all components must be considered. I Non-Shock

Min/Max Flow Rates

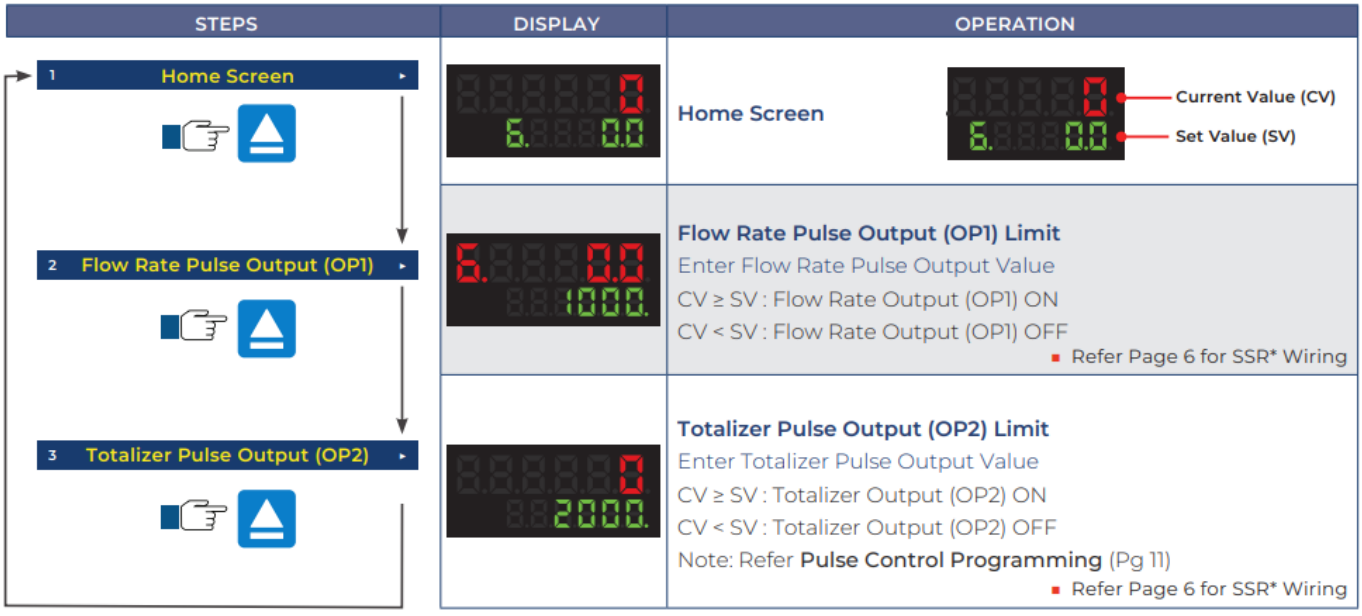
Pipe Size (O.D.)	LPM | GPM 0.3m/s min.	LPM | GPM 10m/s max
½" | DN15	3.5 | 1.0	120.0 | 32.0
¾" | DN20	5.0 | 1.5	170.0 | 45.0
1" | DN25	9.0 | 2.5	300.0 | 79.0
1 ½" | DN40	25.0 | 6.5	850.0 | 225.0
2" | DN50	40.0 | 10.5	1350.0 | 357.0
2 ½" | DN60	60.0 | 16.0	1850.0 | 357.0
3" | DN80	90.0 | 24.0	2800.0 | 739.0
4" | DN100	125.0 | 33.0	4350.0 | 1149.0
6" | DN150	230.0 | 60.0	7590.0 | 1997.0
8" | DN200	315.0 | 82.0	10395.0 | 2735.0

Programming





Setting Output Limits (SSR*)



Pulse Control Programming

STEPS	DISPLAY	OPERATION
1 Home Screen ▸ 		**Home Screen**
2 Pulse Output Control ▸ 		**Pulse Output Control** Con = n : OP2 Manual Reset (When Totalizer = Set Value (SV)) Con = c | r : OP2 Auto Reset after **(t 1)** Secs Con = E : One Pulse/Gal (Default) Con = F : Paddle Pulse → Frequency Max 5 KHz (For TVF)
3 OP2 Auto Reset Time Delay ▸ 		**OP2 Auto Reset Time Delay** Factory Default: t 1 = 0.50 | Range: 0 ~ 999.99 Secs (Displayed only when **Con r | Con c** is selected) Note: OP2 = Totalizer Output
4 Alarm Mode Setting ▸ 		**Alarm Mode Setting** Factory Default: ALT = 0 | Range: 0 ~ 3 Refer to **Alarm Mode Selection**
5 Hysterisis ▸ 		**Hysterisis** Factory Default: HYS = 1.0 | Range: 0 ~ 999.9 (Hysterisis is a buffer around the Programmed Set Point)
6 OP1 Power On Time Delay ▸ 		**OP1 Power On Time Delay** Factory Default: t2 = 20 | Range: 0 ~ 9999 Secs Note: OP1 = Flow Rate Output

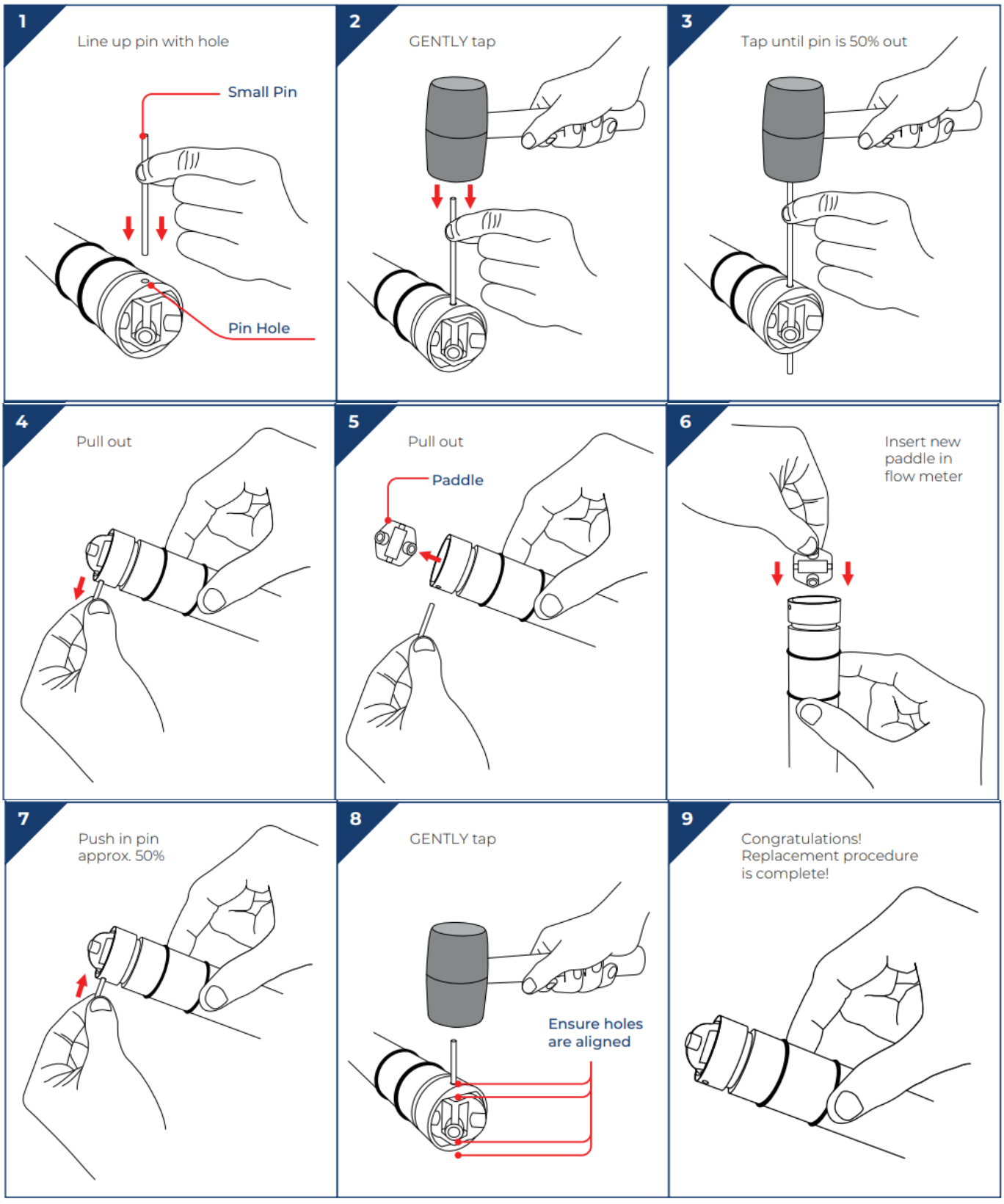
Alarm Mode Selection

ALt No.	Description
ALt = 0	CV ≥ SV → Relay ON | CV < [SV - Hys] → Relay OFF
ALt = 1	CV ≤ SV → Relay ON | CV > [SV + Hys] → Relay OFF
ALt = 2	[SV + Hys] ≥ CV ≥ [SV - Hys] → Relay ON : CV > [SV + Hys] or CV < [SV - HyS] → Relay OFF
ALt = 3	[SV + Hys] ≥ CV ≥ [SV - Hys] → Relay OFF: CV > [SV + Hys] or CV < [SV - HyS] → Relay ON
Hys = Hysteresis — Acts like a buffer ± around (OP1) pulse output	
CV: Current Value (Flow Rate) | SV = Set Value	

Totalizer Reset

STEPS	DISPLAY	OPERATION
1 Home Screen ▸ 		**Home Screen**
2 Totalizer Reset ▸		Totalizer Value will Reset to Zero

Rotor Pin | Paddle Replacement



Installation Fittings

SA Clamp-On Saddle Fittings

-

PVC Material

- Viton® O-Rings
- Available in Metric DIN
- Will Accept Signet® Type Flow Meter

PVC	
Size	**Part Number**
2"	SA020
3"	SA030
4"	SA040
6"	SA060
8"	SA080

PT | PPT | PFT Installation Fittings

PVC | PP | PVDF

- Socket End Connections
- Will Accept Signet® Type Flow Meter
- True-Union Design

	PVDF	PVC	PP
Size	Part Number	Part Number	Part Number
½”	PFT005	PT005	PPT005
¾”	PFT007	PT007	PPT007
1”	PFT010	PT010	PPT010
1½”	PFT015	PT015	PPT015
2”	PFT020	PT020	PPT020

Add Suffix

- ‘E’ – EPDM Seals
- T’ – NPT End Connectors
- ‘B’ – Butt Fused End Connections for PP or PVDF

SAR Clamp-On Saddle Fittings (SDR Pipe)

- PVC Material
- Viton® O-Rings
- Available in Metric DIN
- Will Accept Signet® Type Flow Meter

PVC	
Size	Part Number
2"	SAR020
3"	SAR030
4"	SAR040
6"	SAR060
8"	SAR080
10"	SAR100
12"	SAR120
14"	SAR140
16"	SAR160

CT CPVC Tee Installation Fitting

- 1″-4″ Pipe Sizes
- Easy to Install
- Will Accept Signet® Flow Meter

CPVC	
Size	Part Number
1"	CT010
1 ½"	CT015
2"	CT020
3"	CT030
4"	CT040

Add Suffix

- ‘E’ – EPDM Seals

- ‘T’ – NPT End Connectors
- ‘B’ – Butt Fused End Connections for PP or PVDF

PG Glue-On Adapter

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  2″-24″ Pipe Sizes
- Easy to Install
- Will Accept Signet® Flow Meter

Glue-On Adapter – CPVC	
Size	Part Number
2”- 4”	PG4
6”- 24”	PG24

SWOL Weld-On Adapter

- 

  2″-12″ Pipe Sizes

- 316SS Weld-o-let with PVDF insert
- Easy to Install
- Will Accept Signet® Flow Meter

Weld-On Adapter - 316 SS		
Size	Part Number	List Price
3”	SWOL3	$ 299.00
4”	SWOL4	$ 329.00
6”	SWOL6	$ 349.00
8”	SWOL8	$ 369.00
10”	SWOL10	$ 389.00
12”	SWOL12	$ 419.00

SST 316SS TI3 Series NPT Tee Fittings

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Will Accept Signet® Type Flow Meter

Threaded Tee Fitting - 316 SS		
Size	Part Number	List Price
½"	SST005	$ 399.00
¾"	SST007	$ 419.00
1"	SST010	$ 499.00
1 ½"	SST015	$ 529.00
2"	SST020	$ 629.00
3"	SST030	$ 899.00
4"	SST040	$ 999.00

SSS 316SS TI3 Series Sanitary Tee Fittings

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Will Accept Signet® Type Flow Meter

Sanitary Tee Fitting - 316 SS		
Size	Part Number	List Price
½"	SSS005	$ 630.00
¾"	SSS007	$ 630.00
1"	SSS010	$ 636.00
1 ½"	SSS015	$ 658.00
2"	SSS020	$ 696.00
3"	SSS030	$ 1,098.00
4"	SSS040	$ 1,599.00

SSF 316SS TI3 Series Flanged Tee Fittings

- 

Will Accept Signet® Type Flow Meter

Flanged Tee Fitting - 316 SS		
Size	Part Number	List Price
½"	SSF005	$ 630.00
¾"	SSF007	$ 630.00
1"	SSF010	$ 636.00
1 ½"	SSF015	$ 658.00
2"	SSF020	$ 696.00
3"	SSF030	$ 1,098.00
4"	SSF040	$ 1,599.00

Warranty, Returns, and Limitations

Warranty

Icon Process Controls Ltd warrants to the original purchaser of its products that such products will be free from defects in material and workmanship under normal use and service under instructions furnished by Icon Process Controls Ltd for one year from the date of sale of such products. Icon Process Controls Ltd's obligation under this warranty is solely and exclusively limited to the repair or replacement, at Icon Process Controls Ltd's option, of the products or components, that Icon Process Controls Ltd examination determines to its satisfaction to be defective in material or workmanship within the warranty period. Icon Process Controls Ltd must be notified under the instructions below of any claim under this warranty within thirty (30) days of any claimed lack of conformity of the product. Any product repaired under this warranty will be warranted only for the remainder of the original warranty period. Any product provided as a replacement under this warranty will be warranted for one year from the date of replacement.

Returns

Products cannot be returned to Icon Process Controls Ltd without prior authorization. To return a product that is thought to be defective, go to **www.iconprocon.com**, submit a customer return (MRA) request form, and follow the instructions therein. All warranty and non-warranty product returns to Icon Process Controls Ltd must be shipped prepaid and insured. Icon Process Controls Ltd will not be responsible for any products lost or damaged in shipment.

Limitations

This warranty does not apply to products which:

1. are beyond the warranty period or are products for which the original purchaser does not follow the warranty procedures outlined above;
2. have been subjected to electrical, mechanical,l or chemical damage due to improper, accidental, or negligent use;
3. have been modified or altered;
4. anyone other than service personnel authorized by Icon Process Controls Ltd have attempted to repair;
5. have been involved in accidents or natural disasters; or
6. are damaged during return shipment to Icon Process Controls Lt

Icon Process Controls Ltd reserves the right to unilaterally waive this warranty and dispose of any product returned to Icon Process Controls Ltd where: T there is evidence of a potentially hazardous material present with the product;

1. Or the product has remained unclaimed at Icon Process Controls Ltd for more than 30 days after Icon Process

Controls Ltd has dutifully requested disposition.

This warranty contains the sole express warranty made by Icon Process Controls Ltd in connection with its products. ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED. The remedies of repair or replacement as stated above are the exclusive remedies for the breach of this warranty. IN NO EVENT SHALL Icon Process Controls Ltd BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING PERSONAL OR REAL PROPERTY OR FOR INJURY TO ANY PERSON THIS WARRANTY CONSTITUTES THE FINAL, COMPLETE, AND EXCLUSIVE STATEMENT OF WARRANTY TERMS AND NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES OR REPRESENTATIONS ON BEHALF OF Icon Process Controls Ltd. This warranty will be interpreted under the laws of the province of Ontario, Canada. If any portion of this warranty is held to be invalid or unenforceable for any reason, such finding will not invalidate any other provision of this warranty.

For additional product documentation and technical support visit:
www.iconprocon.com
e-mail: **sales@iconprocon.com**
support@iconprocon.com
Ph: 905.469.9283

FAQs

Q: How do I confirm chemical compatibility before use?
A: Check the user manual or contact the manufacturer for a list of compatible chemicals with the materials used in the sensor.

Q: What should I do if I exceed the maximum temperature or pressure specifications?
A: Stop using the sensor immediately and consult with a professional for inspection and potential adjustments to avoid equipment damage.

Q: Can I use this sensor with different pipe sizes?
A: The sensor is compatible with a range of pipe sizes from DN15 to DN600 within the specified operating range.

Documents / Resources

	truflo TI3P Series Insertion Paddle Wheel Flow Meter Sensor [pdf] Owner's Manual TI3P Series Insertion Paddle Wheel Flow Meter Sensor, TI3P Series, Insertion Paddle Wheel Flow Meter Sensor, Paddle Wheel Flow Meter Sensor, Wheel Flow Meter Sensor, Meter Sensor
	truflo TI3P Series Insertion Paddle Wheel Flow Meter Sensor [pdf] Owner's Manual TI3P 316 SS, TI3P Series Insertion Paddle Wheel Flow Meter Sensor, TI3P Series, Insertion Paddle Wheel Flow Meter Sensor, Paddle Wheel Flow Meter Sensor, Wheel Flow Meter Sensor, Flow Meter Sensor, Meter Sensor

References

- User Manual