Truflo®
tkp In Line Paddle Wheel Flow Meter Sensor

Truflo tkp In Line Paddle Wheel Flow Meter Sensor Instruction Manual

Contents

Truflo®

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Specifications

- **Operating Range:** 0.3 to 33 ft/s, 0.1 to 10 m/s
- **Pipe Size Range:** DN15 to DN100
- **Linearity:** Repeatability
- **Accuracy:** Flow Velocity
- **Max Flow Velocity:** 32.8 ft/s, 10 m/s
- **Min Flow Velocity:** 0.3 ft/s, 0.1 m/s

FAQs

Q: Can the TK Series flow meter be installed vertically?

A: Yes, the TK Series can be installed in either a horizontal or vertical direction. Ensure there is sufficient straight pipe length for accurate readings.

Q: What should I do if I encounter a pressurized system warning?

A: If you encounter a pressurized system warning, make sure tovent the system prior to installation or removal to prevent equipment damage or injury.

Q: How can I protect the paddle wheel from damage?

A: Install a Bag Filter or Y Strainer upstream to avoid damage from solids or fibers. Do not exceed the specified particle size limits to prevent warranty void.

Safety Information

- De-pressurize and vent system prior to 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 tool(s) 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 prior to installation or removal. Failure to do so may result in equipment damage and/or serious injury.

Please ensure that the Instruments are not to be subject to water hammer or pressure spikes! Always Pressure Test System with H2O Prior to Initial Start-Up Before Before installation be certain the appropriate instrument has been selected considering operating pressure, full-scale pressure, wetted material requirements, media compatibility, operating temperature, vibration, pulsation, desired accuracy, and any other instrument component related to the service application including the potential need for protective attachments and/or special installation requirements. Failure to do so could result in equipment damage, failure, and/or personal injury. Ensure only qualified personnel personnel are permitted to install and maintain this instrument. Pressurize System Warning The sensor may be under pressure, take caution to vent the system prior to installation or removal. Failure to do so may result in equipment damage and/or serious injury. Please Ensure Full PipeTK Series can be installed in a horizontal or vertical direction. Please ensure that the length of the straight pipe is enough to avoid intensified turbulent flow that can affect readings. Min 10x Pipe Diameters Upstream 3x Pipe Diameters Downstream A Bag Filter or Y Strainer Filtering Device upstream to Avoid the Paddle Wheel from being damaged by the solids or fibers – max 10% Particle Size – Not to Exceed .5mm Cross Section or Length. Please do not flush the pipe after the Flow Meter is installed with compressed air this may damage the ceramic shaft and will void the warranty.

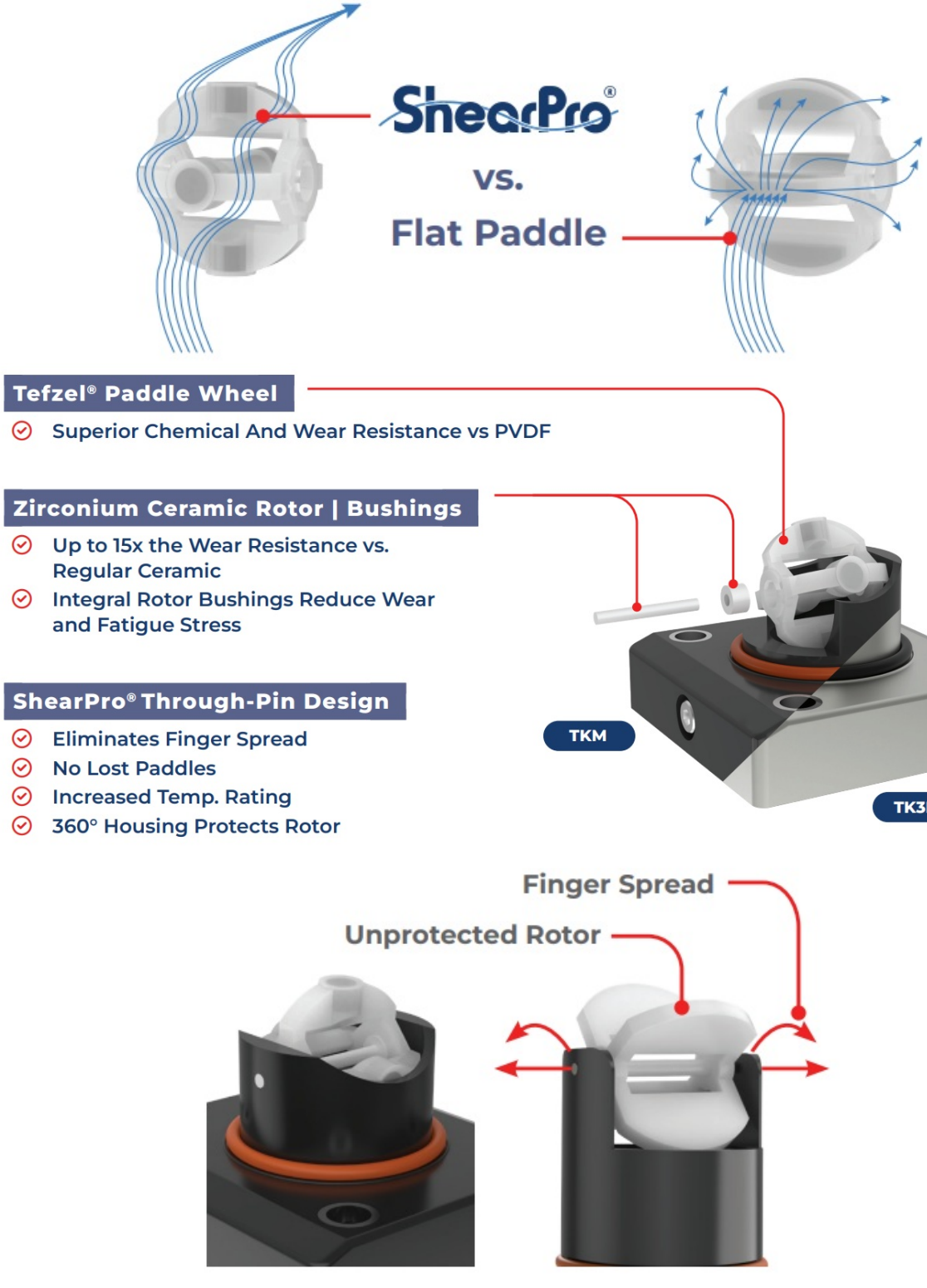
Industry’s Most Accurate & Reliable Paddle Wheel Flow Meters

The TK 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.

New ShearPro Design

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



Technical Specifications

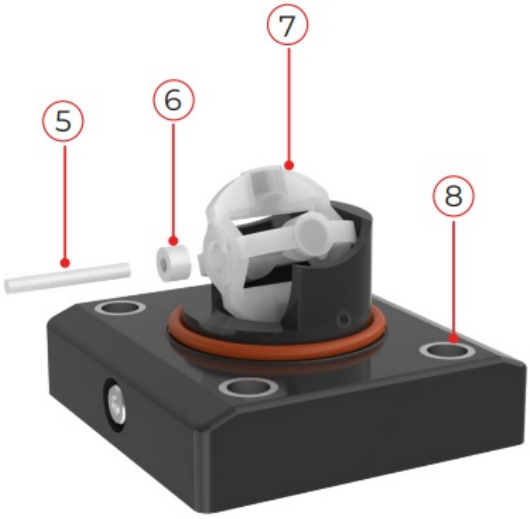
General		
Operating Range	0.3 to 33 ft/s	0.1 to 10 m/s
Pipe Size Range	½ to 4″	DN15 to DN100
Linearity	±0.5% of F.S @ 25°C | 77°F	
Repeatability	±0.5% of F.S @ 25°C | 77°F	
Accuracy	± 0.5% of F.S. @ 25°C	
Flow Velocity	32.8 ft/s max | 10 m/s max	
Low Cut	0.3 ft/s min | 0.1 m/s min	
Rangeability	100: 1	
Response Time	Real-Time	
Display Range	0~999999	
Units	Gallon (G) or Liter (L) or Kiloliter (KL)	
Fluid	Water or Chemical Liquid-Viscosity Range: 0.5-20 centistokes	
Wetted Materials		
Sensor Body	PVC (Dark) | PP (Pigmented) | PVDF (Natural) | 316SS	
O-Rings	FKM | EPDM* | FFKM*	
Rotor Pin | Bushings	Zirconium Ceramic | ZrO2	
Paddle | Rotor	ETFE Tefzel®	
Electrical		
Frequency	49 Hz per m/s Nominal	
Supply Voltage	5 ~ 24 VDC ± 10% Regulated	
Supply Current	<1.5mA @ 3.3 to 6 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°C
PP	180 psi @ 68°F | 40 psi @ 190°F	12.5 bar @ 20°C | 2.7 bar @ 88°C
PVDF	200 psi @ 68°F | 40 psi @ 240°F	14 bar @ 20°C | 2.7 bar @ 115°C
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
Outputs		
TKM Series	4-20mA | NPN Pulse | 0-5V*	
Standards and Approvals		
CE | FCC | RoHS Compliant		

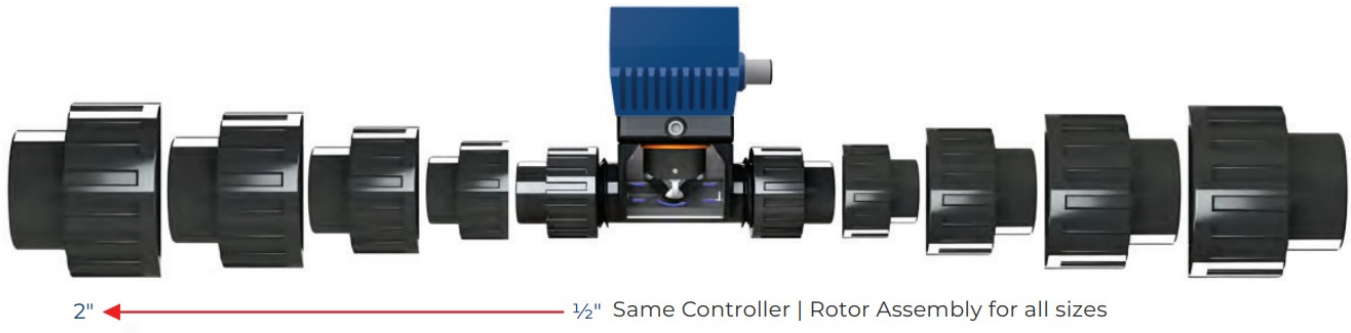
Optional

- See Temperature and Pressure Graphs for more information

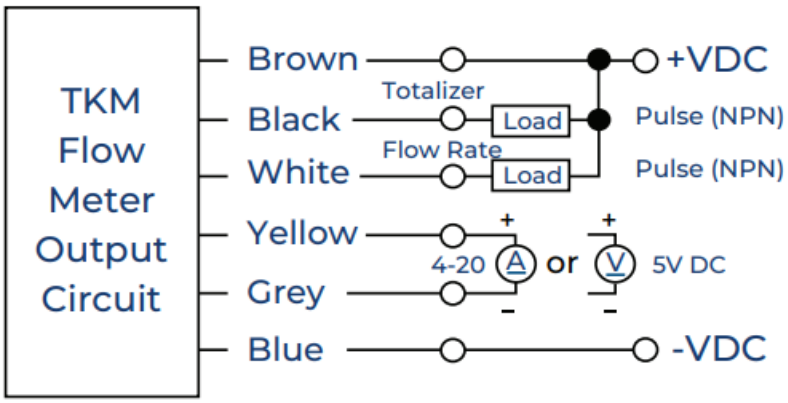
Exploded View



1	PC Cover
2	TKM Controller
3	Rotor Assembly
4	Body – PVC | PP | PVDF
5	Rotor Pin
6	Rotor Bushing
7	ShearPro® Paddle Wheel
8	Reinforced Inserts



Wiring Diagram



Wire Color	Description
Brown	+ 10~30VDC
Black	Totalizer Pulse Output (OP2)
White	Flow Rate Pulse Output (OP1)
Yellow	+ 4-20mA | 0-5V*
Grey	– 4-20mA | 0-5V*
Blue	-VDC

Programming

- SET Select/Save/Continue
- F Move Selection Left
- Change Digit Value

STEPS	DISPLAY	OPERATION
1 Home Screen SET + F 3 SEC		Home Screen
2 Password SET		Factory Default: Lk = 10 Otherwise meter will enter **Lockout Mode*** Press ▼ / ▲ to change Press SET to save
3 Units of Flow SET		Ut.0 = Liter | Ut.1 = Gallon (Factory Default) | Ut.2 = Kiloliters Press ▲ to change Press SET to save
4 K Factor SET		Enter K Factor Value Refer to Page 9 for K-Factor Values
5 Transmitter Range SET 3 SEC		Factory Default — 4mA = 0 | 20mA = 100** (Max. Flow Rate) **This can be changed to suit application
6 Transmitter Span SET		Range : 0.000 ~ 9.999 Factory Default: SPn = 1.000 (**Span** : Difference between Upper Range (UPV) & Lower Range (LRV))
7 Transmitter Offset SET		Range : 0.000 ~ 9.999 Factory Default: oSt = 0.000 (**Offset** : Actual Output - Expected Output)

Totalizer Reset

STEPS	DISPLAY	OPERATION
1 Home Screen SET + ▼ 3 SEC		Home Screen
2 Totalizer Reset		**Totalizer Value will Reset to Zero**

Setting Output Limits

STEPS	DISPLAY	OPERATION
1 Home Screen		Home Screen 
2 Flow Rate Pulse Output (OP1)		**Flow Rate Pulse Output (OP1) Limit** CV ≥ SV : Flow Rate Output (OP1) ON CV < SV : Flow Rate Output (OP1) OFF
3 Totalizer Pulse Output (OP2)		**Totalizer Pulse Output (OP2) Limit** CV ≥ SV : Totalizer Output (OP2) ON CV < SV : Totalizer Output (OP2) OFF Note: Refer **Totalizer Output (OP2) Control** Settings (Pg 8)

Pulse Control Programming

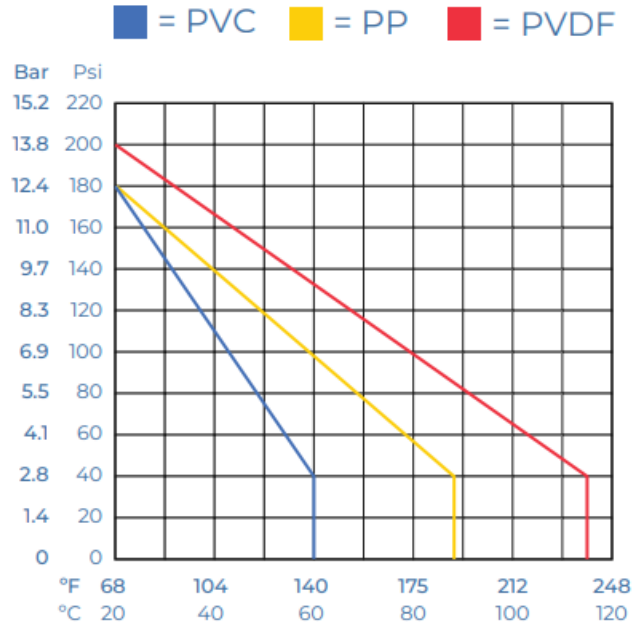
STEPS	DISPLAY	OPERATION
1 Home Screen SET 3 SEC		Home Screen
2 Totalizer Output (OP2) Control SET		Con = n : OP2 Manual Reset (When Totalizer = Set Value (SV)) Con = c | r : OP2 Auto Reset after **(t 1)** Secs Con = E : One Pulse/Gal (Default) Con = F : Paddle Pulse → Frequency Max 5 KHz (For TVF)
3 OP2 Auto Reset Time Delay SET		Range: 0 ~ 999.99 Secs (Displayed only when **Con r | Con c** is selected)
4 Relay Setting SET		Range: 0 ~ 3 Refer to **Relay Mode Selection**
5 Hysterisis SET		Range: 0.1 ~ 999.9 (Hysterisis is a buffer around the Programmed Set Point)
6 OP1 Power On Time Delay SET		Range: 0 ~ 9999 Secs t2 = 20 Sec (Default)

Relay 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	

Temperature | Pressure Graphs | Non-Shock

Note: The Pressure/Temperature graphs are specifically for the Truflo® Flow Meter Sensors. During system design the specifications of all components must be considered.



K-Factors for TK Series

Size	LPM	GPM
¼”	547	2079
⅜”	300	1140
½”	127.6	484.9
¾”	81.8	310.8
1”	55.1	209.4
1½”	18.8	71.4
2”	10.2	38.8
3”	4.7	18
4”	2.1	8
⚠ K-Factor is Pre-Programmed		

Min/Max Flow Rates

Pipe Size (O.D.)	LPM | GPM	LPM | GPM
	0.3m/s min.	**10m/s max.**
DN08 (¼”)	0.04 | 0.16	12 | 3
DN10 (⅜”)	1.0 | 3.8	50 | 13
DN15 (½”)	3.5 | 1.0	120 | 32
DN20 (¾”)	5.0 | 1.5	170 | 45
DN25 (1”)	9.0 | 2.5	300 | 79
DN40 (1½”)	25.0 | 6.5	850 | 225
DN50 (2”)	40.0 | 10.5	1350 | 357
DN65 (2½”)	60.0 | 16.0	1850 | 357
DN80 (3”)	90.0 | 24.0	2800 | 739
DN100 (4”)	125.0 | 33.0	4350 | 1149

Model Selection

PVC		
Size	**End Connections**	**Part Number**
½”	Sch 80 Soc	TKM-15-P
¾”	Sch 80 Soc	TKM-20-P
1”	Sch 80 Soc	TKM-25-P
1 ½”	Sch 80 Soc	TKM-40-P
2”	Sch 80 Soc	TKM-50-P
3”	Flanged	TKM-80-P
4”	Flanged	TKM-100-P

PVDF		
Size	**End Connections**	**Part Number**
½”	NPT	TKM-15-PF
¾”	NPT	TKM-20-PF
1”	NPT	TKM-25-PF
1 ½”	NPT	TKM-40-PF
2”	NPT	TKM-50-PF

PP		
Size	**End Connections**	**Part Number**
½”	NPT	TKM-15-PP
¾”	NPT	TKM-20-PP
1”	NPT	TKM-25-PP
1 ½”	NPT	TKM-40-PP
2”	NPT	TKM-50-PP
3”	Flanged	TKM-80-PP
4”	Flanged	TKM-100-PP

316 SS		
Size	**End Connections**	**Part Number**
¼”	NPT	TK3M-08-SS
⅜”	NPT	TK3M-10-SS
½”	NPT	TK3M-15-SS
¾”	NPT	TK3M-20-SS
1”	NPT	TK3M-25-SS
1 ½”	NPT	TK3M-40-SS
2”	NPT	TK3M-50-SS
3”	NPT	TK3M-80-SS
4”	NPT	TK3M-100-SS

Note:PVC Socket Ends (Std) PP/PVDF NPT Ends (Std)

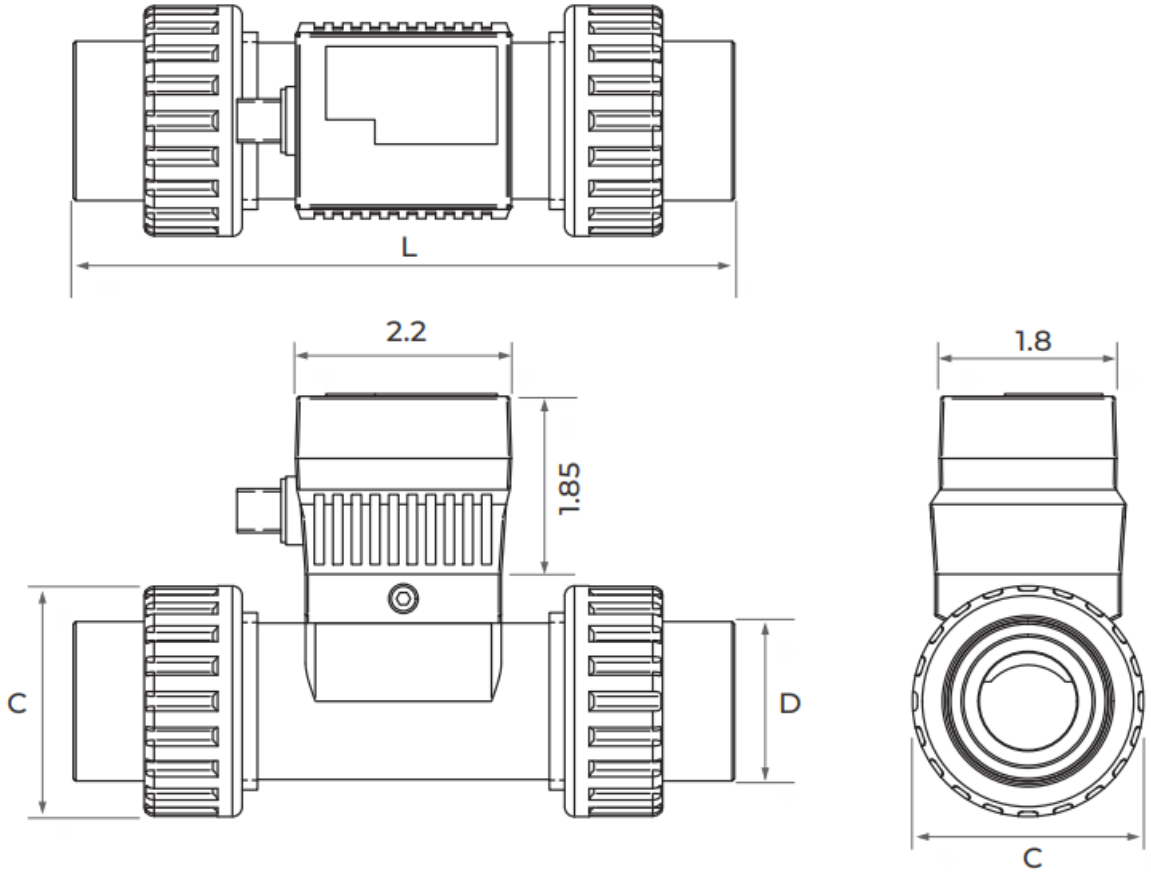
Add 2nd Suffix (seals): FKM (std, no suffix required)

- E ▶ EPDM Seals
- K ▶ FFKM | Kalrez® Seals

Add 1st Suffix (end connection):

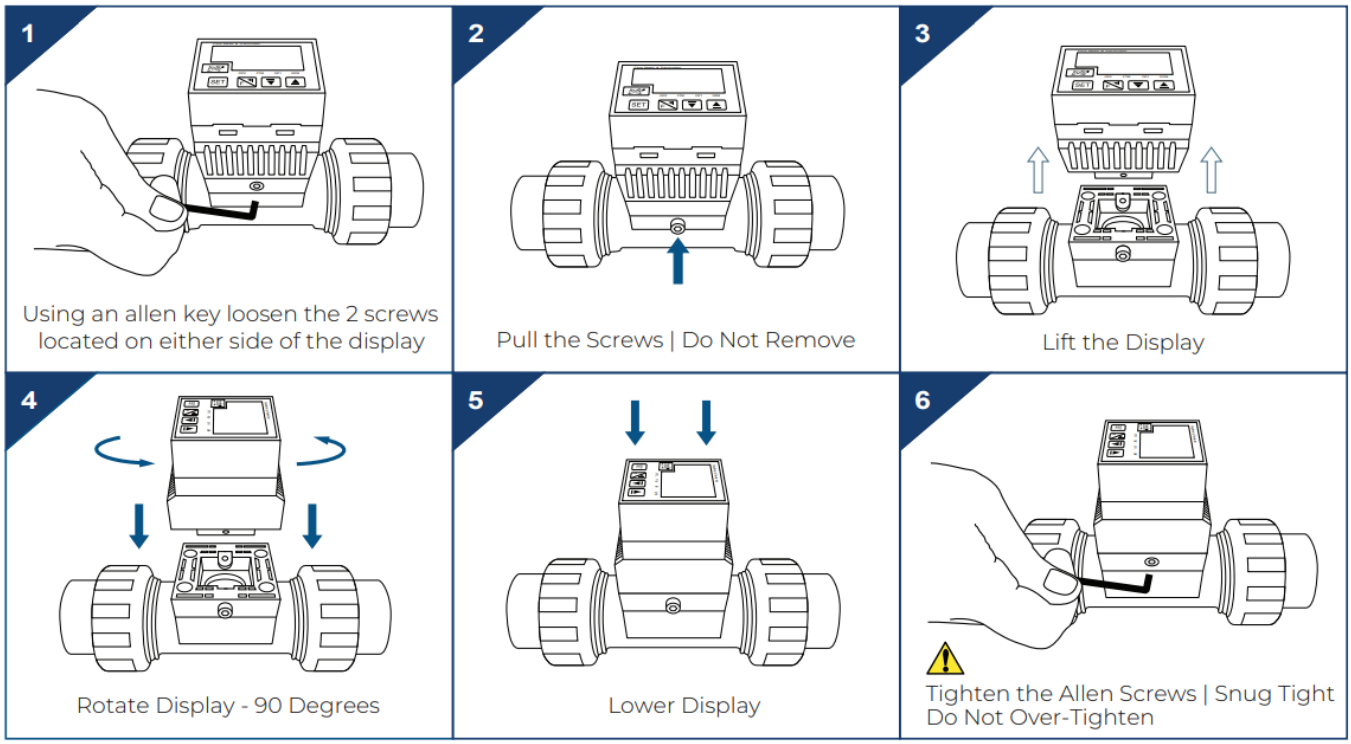
- T ▶ NPT End Connectors (on PVC)
- B ▶ Butt Fused End Connections for PP or PVDF
- F ▶ Flange ANSI 150lb – Consult Factory

Dimensions

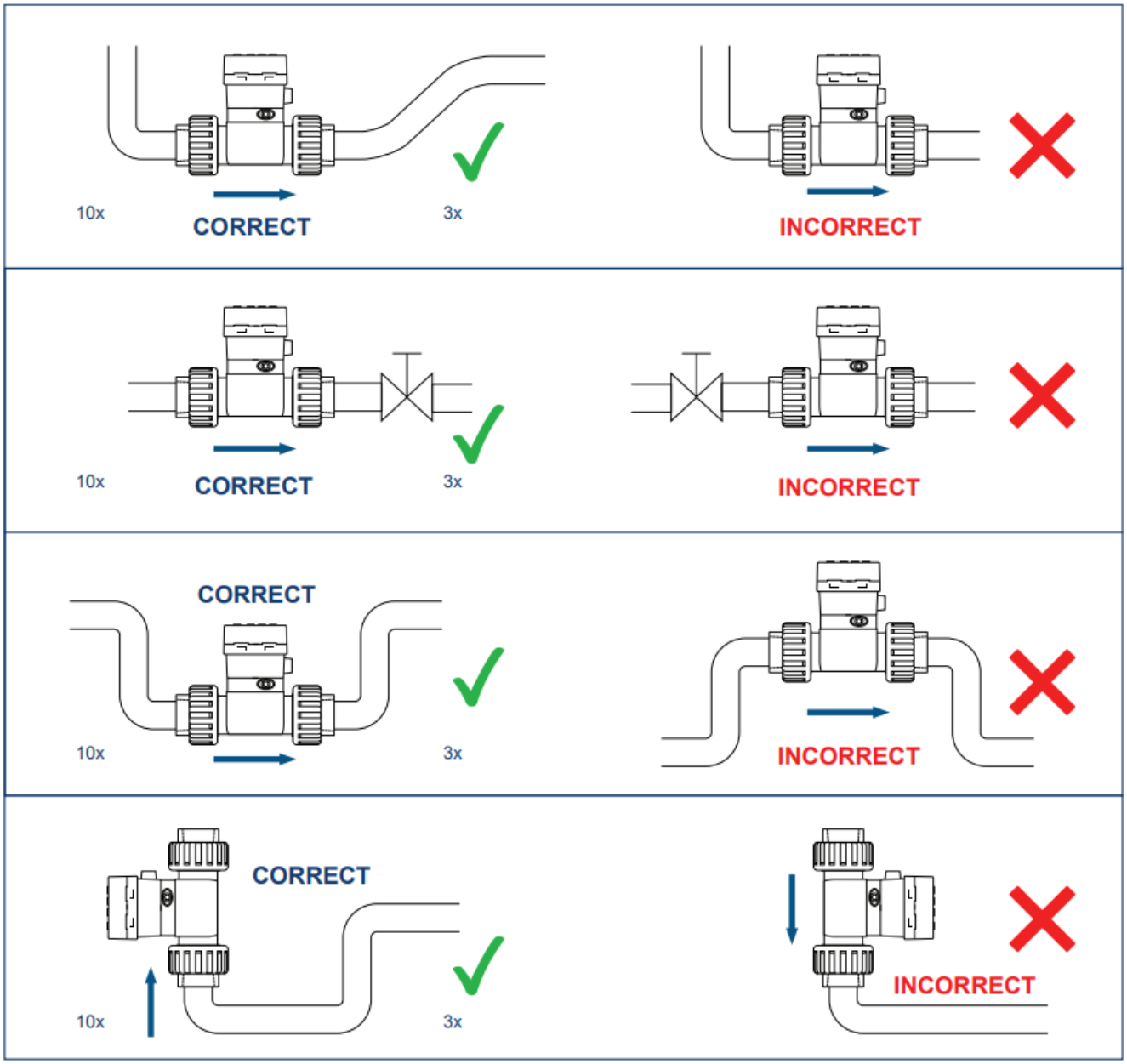


Pipe Size	L (inch)	D (inch)	C (inch)
½” DN (15)	5.48	1.07	1.61
¾” DN (20)	6.12	1.36	2.08
1″ DN (25)	6.76	1.68	2.36
1½” DN (40)	7.66	2.33	3.26
2″ DN (50)	8.40	2.86	4.33

Procedure to Rotate Display



Installation Position



- Please ensure full pipe.
- TK Series can be installed in a horizontal or vertical direction.
- Please ensure that the length of the straight pipe is enough to avoid turbulence that can affect readings.
- Note: Min 10x Pipe Diameters Upstream and 3x Pipe Diameters Downstream.
- A Plastic Basket Strainer, Bag Filter, or Y Strainer Filtering Device upstream to Avoid the Paddle Wheel from being damaged by the solids or fibers – max 10% Particle Size – Not to Exceed .5mm Cross Section or Length.
- Please do not flush the pipe after the Flow Meter is installed with Compressed Air this may damage the ceramic shaft and will Void the Warranty

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 in accordance with instructions furnished by

Icon Process Controls Ltd for a period of 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 pursuant to 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 that: 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 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 Ltd reserves the right to unilaterally waive this warranty and dispose of any product returned to Icon Process Controls Ltd where: 1) there is evidence of potentially hazardous material present with the product, or 2) 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 pursuant to 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** or **support@iconprocon.com** | Ph: 905.469.9283

Documents / Resources

	**Truflo tkp In Line Paddle Wheel Flow Meter Sensor** [pdf] Instruction Manual tkp, tkm, tkp In Line Paddle Wheel Flow Meter Sensor, tkp In, Line Paddle Wheel Flow Meter Sensor, Wheel Flow Meter Sensor, Flow Meter Sensor, Meter Sensor, Sensor

References

- **User Manual**