

Quick Start Manual



truflo®



Read the user's manual carefully before starting to use the unit.
Producer reserves the right to implement changes without prior notice.

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.



Personal Protective Equipment (PPE)

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



Note | Technical Notes

Highlights additional information or detailed procedure.



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.



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 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 are permitted to install and maintain this instrument.



Pressurize 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.



Please Ensure Full Pipe

TK Series can be installed in a horizontal or vertical direction. Please ensure enough length of straight pipe to avoid turbulence that can effect readings.



Minimum 10 x Pipe Diameters Upstream, 3 x Pipe Diameters Downstream

A bag filter or Y-strainer should be installed upstream to prevent damage to the paddle wheel from solids or fibers. The maximum allowable particle size is 10%, not exceeding 0.5 mm in cross-section or length. Please do not flush the pipe with compressed air after the flow meter is installed, as this may damage the ceramic shaft and will void the warranty.



WARNING

Truflo® — TKW | TK3W Series (Blind) In-Line Paddle Wheel Flow Meter Sensor

ICON™ Corrosion-Free
PROCESS CONTROLS Instrumentation Equipment™

Product Description

The TK Series in-line 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 a 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*

*Ref: NASA "Shape Effects on Drag"

Tefzel® Paddle Wheel

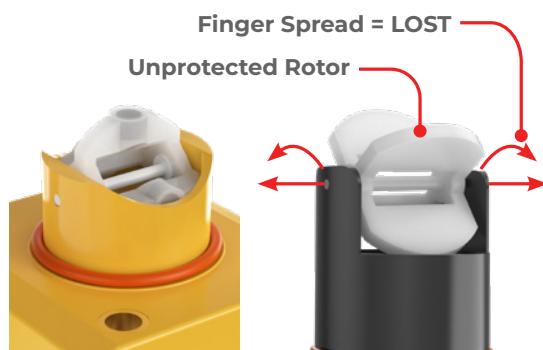
- ✓ Superior Chemical And Wear Resistance vs PVDF

Zirconium Ceramic Rotor | Bushings

- ✓ Up to 15x the Wear Resistance vs Regular Ceramic
- ✓ Integral Rotor Bushings Reduce Wear and Fatigue Stress

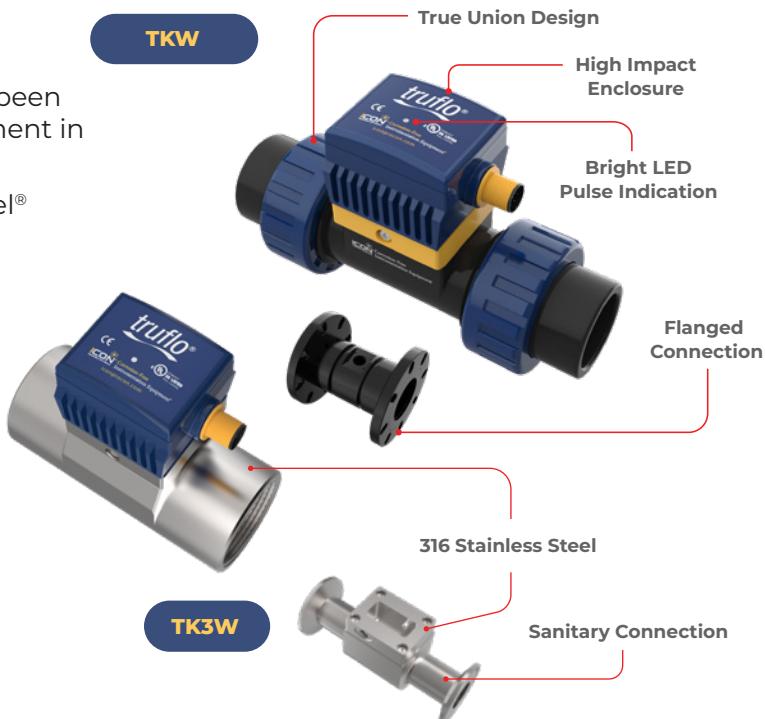
ShearPro® Through-Pin Design

- ✓ Eliminates Finger Spread
- ✓ No Lost Paddles
- ✓ Increased Temp. Rating
- ✓ 360° Housing Protects Rotor

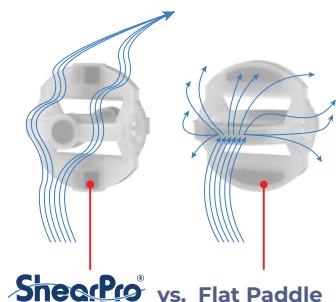


ShearPro® vs. Competitor 'A'

TKW



TK3W



ShearPro® vs. Flat Paddle

TKW
Thermal Plastic

TK3W
316 SS

Truflo® — TKW | TK3W Series (Blind) In-Line Paddle Wheel Flow Meter Sensor

ICONTM Corrosion-Free
PROCESS CONTROLS Instrumentation EquipmentTM

Technical Specifications

General

Operating Range	1 to 33 ft/s	0.3 to 10 m/s
Pipe Size Range	1/4 to 4" **	DN8 to DN100
Linearity	±0.5% of F.S. @ 25°C 77°F	
Repeatability	±0.5% of F.S. @ 25°C 77°F	
Fluid	Water or Chemical Liquid-Viscosity Range: .5-20 centistokes	
Flow Velocity	10 m/s max.	
Low Cut	0.3 m/s min.	
Operating Pressure	150 Psi (10 Bar) @ Ambient Temp Non-Shock	
Range Ability	10 : 1	
Response Time	Real Time	
Accuracy	± 0.5% of F.S. @ 25°C	

Wetted Materials

Sensor Body	PVC (Dark) PP (Pigmented) PVDF (Natural) 316 SS
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	9 to 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°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
316 SS	200 Psi @ 180°F 40 Psi @ 300°F	14 Bar @ 82°C 2.7 Bar @ 148°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
316 SS	-40°F to 300°F	-40°C to 148°C

Outputs

NPN Pulse Voltage 4-20mA

Display

Blind LED Indicator

Standards and Approvals

UL NSF CE RoHS Compliant

See Temperature and Pressure Graphs for more information

*Optional

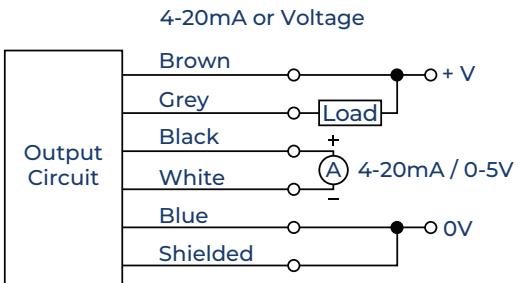
** 1/4" - 3/8" SS Only

Truflo® — TKW | TK3W Series (Blind) In-Line Paddle Wheel Flow Meter Sensor

Wiring Diagram

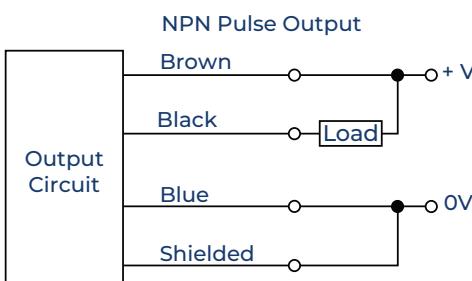
4-20mA or Voltage

Wire Color	Description
Brown	+VDC
Black	4-20mA+
White	4-20mA+
Blue	-VDC



NPN Pulse Output

Wire Color	Description
Brown	+VDC
Black	Pulse
Blue	-VDC



M12 Connection*



4 Pin M12 Male

4 Pin M12 Female

4-20mA + Pulse

Pin	Wire Color	Description
1	Brown	+VDC
2	Black	mA+
3	Blue	-VDC mA-
4	White	Pulse

*Only for units with M12 connection

Temperature | Pressure Graphs | Non-Shock

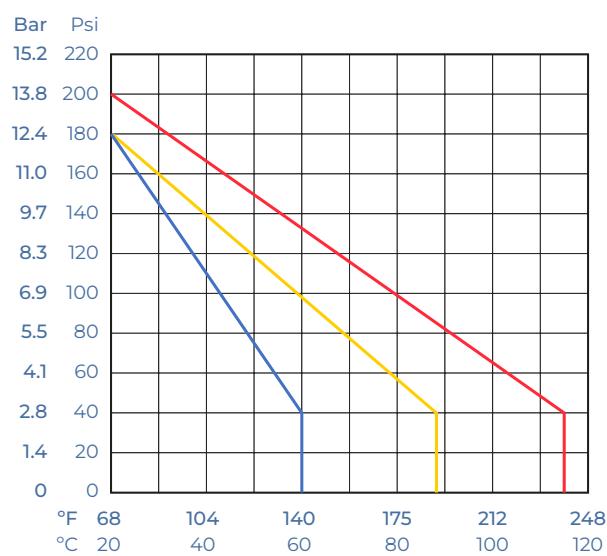
Note: The Pressure/Temperature graphs are specifically for the Truflo® Flow Meter Sensors.

During system design the specifications of all components must be considered.

Min/Max Flow Rates

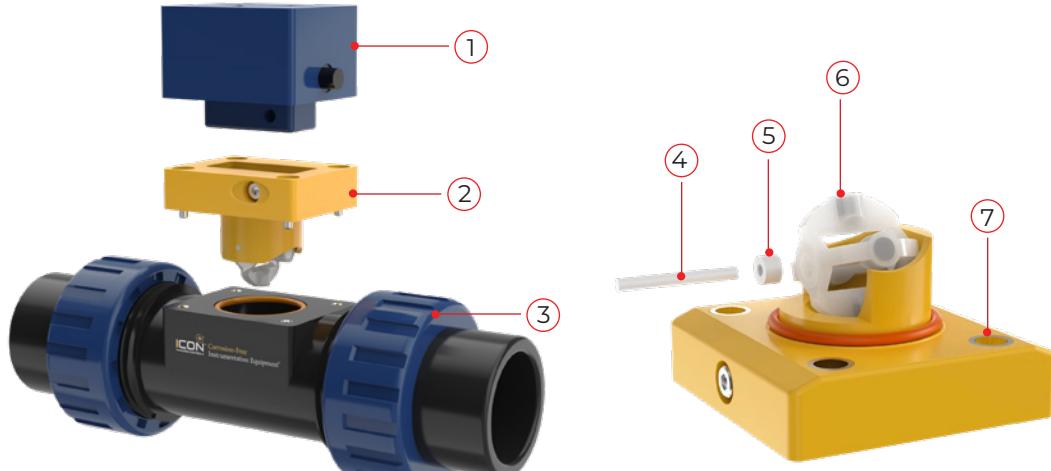
Pipe Size (O.D.)	LPM GPM		LPM GPM	
	0.3m/s min.	10m/s max.	0.3m/s min.	10m/s max.
DN08 (1/4")	0.6 0.16		12 3	
DN10 (3/8")	1.8 0.48		50 13	
DN15 (1/2")	3.5 1.0		120 32	
DN20 (3/4")	5.0 1.5		170 45	
DN25 (1")	9.0 2.5		300 79	
DN40 (1 1/2")	25.0 6.5		850 225	
DN50 (2")	40.0 10.5		1350 357	
DN65 (2 1/2")	60.0 16.0		1850 357	
DN80 (3")	90.0 24.0		2800 739	
DN100 (4")	125.0 33.0		4350 1149	

← SS Only
← SS Only

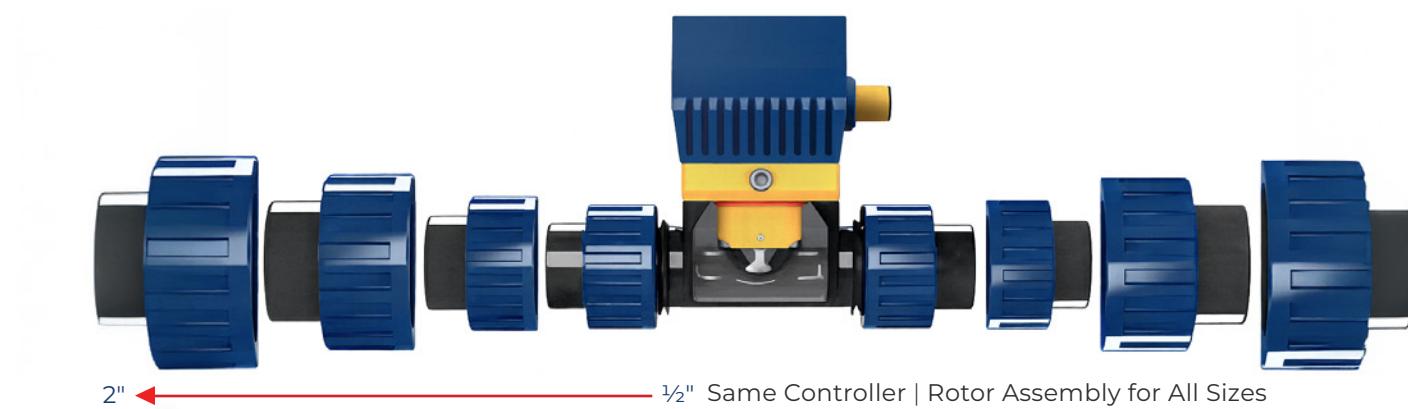


Truflo® — TKW | TK3W Series (Blind) In-Line Paddle Wheel Flow Meter Sensor

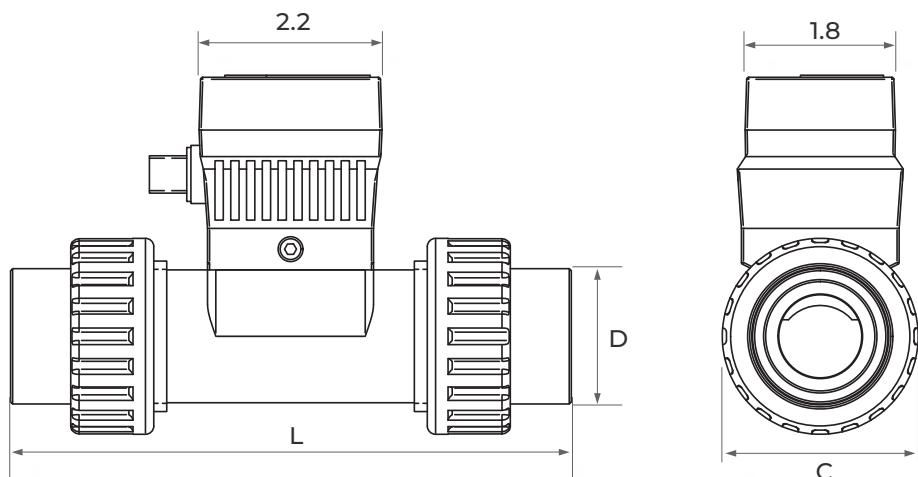
Exploded View



1	Flow Controller
2	Rotor Assembly
3	Body - PVC PP PVDF
4	Rotor Pin
5	Rotor Bushing
6	ShearPro® Paddle Wheel
7	Reinforced Inserts



Dimensions (mm)



Pipe Size	L (inch)	D (inch)	C (inch)
1/2" DN (15)	5.48	1.07	1.61
3/4" DN (20)	6.12	1.36	2.08
1" DN (25)	6.76	1.68	2.36
1 1/2" DN (40)	7.66	2.33	3.26
2" DN (50)	8.40	2.86	4.33

Truflo® — TKW | TK3W Series (Blind) In-Line Paddle Wheel Flow Meter Sensor

K-Factors for TK Series (V1)

Size	LPM	GPM
1/4"	547	2079
3/8"	300	1140
1/2"	124	471
3/4"	72	274
1"	54	171
1 1/2"	19	72
2"	10.3	39
3"	4.7	18
4"	2.1	8

⚠ K-Factor is Pre-Programmed

K-Factors for TK Series (V2)

Size	K-Factor
1/2"	127.6
3/4"	81.8
1"	55.1
1 1/2"	18.8
2"	10.2
2 1/2"	6.0

Range of Transmitter

Size	Range LPM GPM	
DN8* 1/4"	0-6 LPM	0-1.6 GPM
DN10* 3/8"	0-15 LPM	0-4 GPM
DN15 1/2"	0-30 LPM	0-8 GPM
DN20 3/4"	0-60 LPM	0-16 GPM
DN25 1"	0-90 LPM	0-24 GPM

Size	Range LPM GPM	
DN40 1 1/2"	0-200 LPM	0-53 GPM
DN50 2"	0-330 LPM	0-87 GPM
DN80 3"	0-750 LPM	0-198 GPM
DN100 4"	0-1300 LPM	0-344 GPM

* SS Only

Model Selection

PVC		
Size	End Connections	Part Number
1/2"	Sch 80 Soc	TKW-15-P
3/4"	Sch 80 Soc	TKW-20-P
1"	Sch 80 Soc	TKW-25-P
1 1/2"	Sch 80 Soc	TKW-40-P
2"	Sch 80 Soc	TKW-50-P
3"	Flanged	TKW-80-P
4"	Flanged	TKW-100-P

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

PP		
Size	End Connections	Part Number
1/2"	NPT	TKW-15-PP
3/4"	NPT	TKW-20-PP
1"	NPT	TKW-25-PP
1 1/2"	NPT	TKW-40-PP
2"	NPT	TKW-50-PP
3"	Flanged	TKW-80-PP
4"	Flanged	TKW-100-PP

Add 2nd Suffix (seals):

- FKM (std, no suffix required)
- E ▶ EPDM Seals
- K ▶ FFKM | Kalrez® Seals

Add 3rd Suffix (optional output):

- A ▶ 4-20mA Output
- V ▶ 0-5 V Output
- PA ▶ 4-20mA + Pulse Output

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

PVDF		
Size	End Connections	Part Number
1/2"	NPT	TKW-15-PF
3/4"	NPT	TKW-20-PF
1"	NPT	TKW-25-PF
1 1/2"	NPT	TKW-40-PF
2"	NPT	TKW-50-PF

316 SS		
Size	End Connections	Part Number
1/4"	NPT	TK3W-08-SS
3/8"	NPT	TK3W-10-SS
1/2"	NPT	TK3W-15-SS
3/4"	NPT	TK3W-20-SS
1"	NPT	TK3W-25-SS
1 1/2"	NPT	TK3W-40-SS
2"	NPT	TK3W-50-SS
3"	NPT	TK3W-80-SS
4"	NPT	TK3W-100-SS

Add 1st Suffix (end connection):

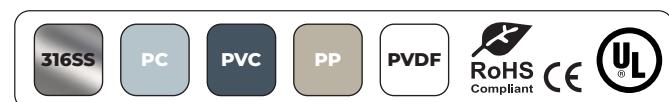
- T ▶ NPT End Connectors
- SE ▶ Sanitary - Consult Factory for Pricing
- F ▶ Flange ANSI 150lb - Consult Factory

Add 2nd Suffix (seals):

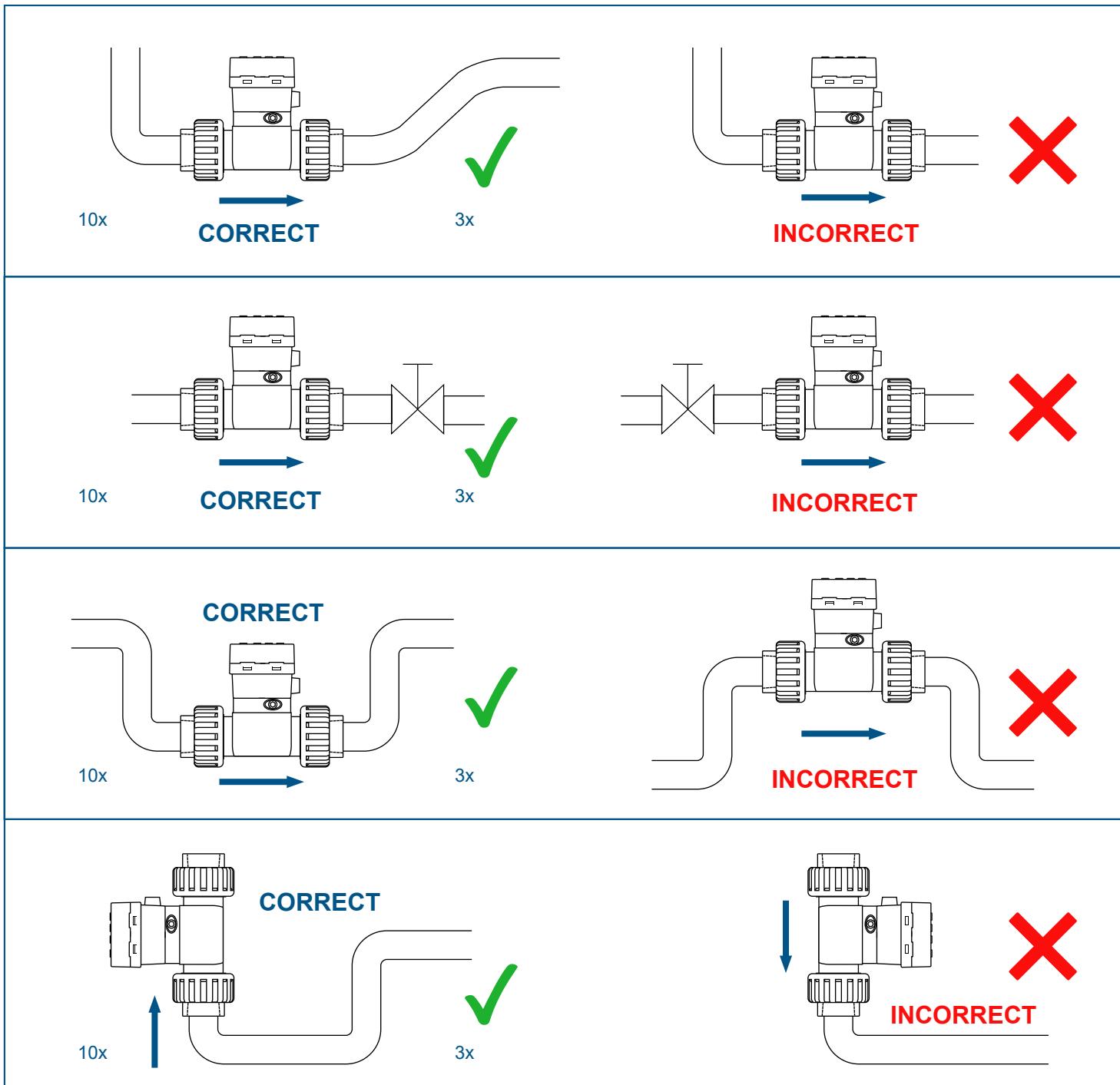
- FKM (std, no suffix required)
- E ▶ EPDM Seals
- K ▶ FFKM | Kalrez® Seals

Add 3rd Suffix (optional output):

- A ▶ 4-20mA Output
- V ▶ 0-5 V Output
- PA ▶ 4-20mA + Pulse Output



Installation Position



Please ensure the pipe remains full during operation.

TK Series can be installed in a horizontal or vertical direction.

Please ensure enough length of straight pipe to avoid turbulence that can effect readings.

Note: Min 10x Pipe Diameters Upstream | 3x Pipe Diameters Downstream.

To protect the paddle wheel from damage caused by solids or fibers, install a plastic basket strainer, bag filter, or Y-strainer upstream. Particulate content must not exceed 10%, with maximum particle dimensions no greater than 0.5 mm in cross-section or length. Do not flush the pipeline with compressed air after the flow meter is installed, as this may damage the ceramic shaft and 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 obligation under this warranty is solely and exclusively limited to the repair or replacement, at Icon Process Controls Ltd option, of the products or components, which 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 the 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, and 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 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

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 a potentially hazardous material present with the product;
2. 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 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



by



Corrosion-Free
Instrumentation Equipment

Phone: 905.469.9283 • **Sales:** sales@iconprocon.com • **Support:** support@iconprocon.com