TKP | TKM SERIES

Paddle Wheel Flow Meter

Quick Start Operating Manual

ICON™ PROCESS CONTROLS

Corrosion-Free Instrumentation Equipment

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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.

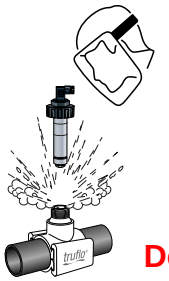
Warning | Caution | Danger
Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, injury, or death

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!



Failure to follow these instructions may result in the sensor being ejected from the pipe!

If leaking is observed from the retaining cap, it indicates defective or worn o-rings on the sensor. Do not attempt to correct by further tightening.

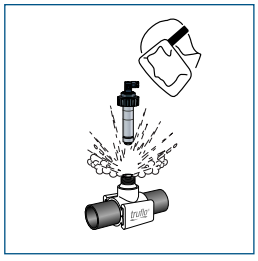
Do Not Remove Under Pressure

Please ensure that the Instruments are not to be subject to water hammer or pressure spikes! Always Pressure Test System with H_2O 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

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



Personal Protective Equipmet (PPE)

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

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.

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 Warranty

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			
Fluid	Liquid - Viscosity Range <.5-20 centistokes			
Accuracy	> ±5% of F.S. @ 68°F | 20°C | Repeatability 0.5 of Full Scale			
Max Flow Velocity	32.8 ft/s max | 10 m/s max			
Min Flow	0.8 ft/s min | 0.3 m/s min			
Operating Press	175 Psi | Non Shock | Ambient Temp			
Turndown	33:1			
Response Time	Real Time			
Electronics	122°F °C			
Current Draw	60mA Max			
Wetted Materials				
Sensor Body	PVC (Dark) | PP (Pigmented) | PVDF (Natural)			
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	5 to 24 VDC ±10% regulated		3 VDC	
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
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				
TKP Series	Frequency Pulse - Flow | Frequency Pulse - Total | RS-485 Option			
TKM Series	4-20mA + Frequency Pulse - Flow | Frequency Pulse - Total			
Standards and Approvals				
CE | FCC | RoHS Compliant				

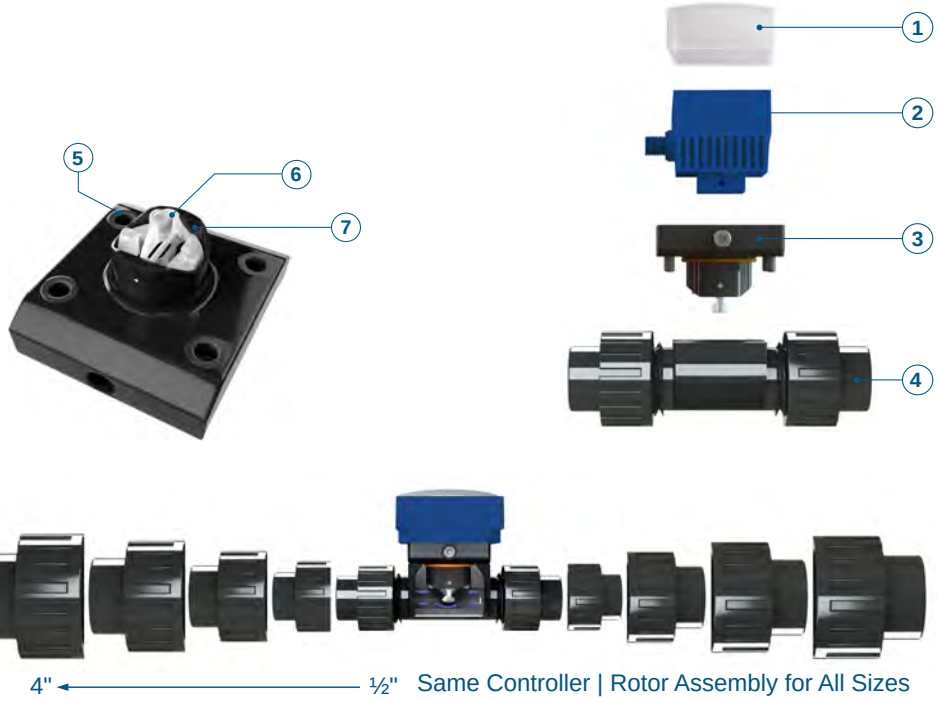
Optional*

TKP | TKM SERIES (Quick Start)
In-Line Paddle Wheel Flow Meter

truflo®

Exploded View

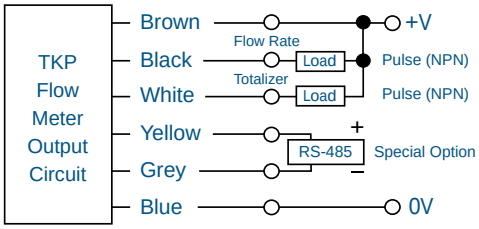
1. Polycarbonate Cover
2. Flow Controller
3. Hall Pickup Sensor
4. Redesigned Rotor Assembly
5. Body | PVC | PP | PVDF *
6. Re-inforced Inserts
7. Shearpro Contoured Rotor
8. Zirconium Rotor Pin & Bearings



4" ← ½" Same Controller | Rotor Assembly for All Sizes

Wiring Diagram

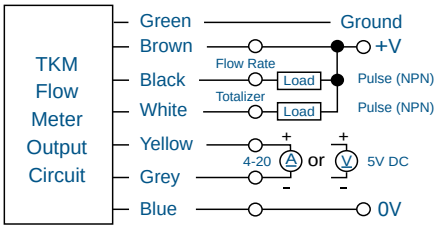
TKP - Flow Rate + Flow Totalizer + NPN Pulse Diagram



Brown	10 - 30 VDC (+)	**Yellow**	(+) RS-485 (OPT)
Blue	0V (-)	**Grey**	(-) RS-485 1 OPT RS485 is a Special Order Item
White	Totalizer Pulse Output NPN	**Black**	Flow Rate Pulse Output (NPN)

Yellow & Grey with RS485 (Only) Black Wire can be Changed for Flow Total Limit Output or Unit Volume Pulse Output

TKM - (4-20mA or 0-5V DC + NPN Pulse) Flow Rate + Flow Totalizer + Pulse Diagram



Brown	10 - 30 VDC (+)	**Yellow**	+ (4-20mA) or (0-5V)
Blue	0V (-)	**Grey**	Totalizer Output NPN (4-20mA or 0 - 5V DC) (4-20mA Default -0-5VDC Option-Special Order)
White	Totalizer Pulse Output NPN	**Black**	Flow Rate Pulse Output NPN

Black Wire can be Changed for Flow Total Limit Output or Unit Volume Pulse Output

TKP - Yellow & Grey Wires for RS - 485 Option Only
Current output | 4 - 20mA : 120Ω max.
Voltage output | 0 - 5V : 10KΩ min.
TKM Series | 4-20mA Std | 0-5VDC Optional

TKP | TKM SERIES (Quick Start)
In-Line Paddle Wheel Flow Meter

truflo®

Getting Started

STEPS	DISPLAY	OPERATION — 24V DC POWER ONLY
Step-1 Home Screen Press SET + F Key 3 sec (Together) (HOLD)		**Power On Flow Meter with DC Power** Display will Show **0 Totalizer (Top RED)** **0 Flow Rate (Bottom GREEN)**
Step-2 Programming of Lock Out Feature Press SET Key		**Programming Lock Out Feature** Lck = 10 (Unlocked) : Factory Default, IF **Lck** is Changed from the # 10 the Flow Meter will be in Lockout Mode. **LCK 10 (Default)** To Unlock ensure **Lck** # is set to 10.
Step-3 Programming Units of Flow Press SET Key		**Programming Units of Flow** Program Flow Units 0 | 1 | 2 **Ut** = 0 : (LPM) **Ut** = 1 : (GPM) **(Default)** **Ut** = 2 : {Kiloliter (KL)}
No Programming Required **Step-4** Coefficient of Flow Volume Press SET Key		K-Factor : 0.1 - 999.9 (K-Factor is Factory Preset) **K-Factor Preset (Do Not Change** *Divide K Factor BY 3.8 TO CHANGE FROM GPM TO LPM

Step-5 For Programming 4-20mA Analog Output
TKM (4-20mA) and TKP with (RS 485 Option) Only

Step-5 Program Range of Transmitter TKM Model Only Press SET Key		**TKM (4-20mA) and TKP with (RS 485 Option) Only** Programming Analog Transmitter Range Output 4-20mA Range : 0.1 - 999.9 4 mA = 0 20 mA = Entered Number. **TR 100 (Default)** 4 mA = 0 GPM 20mA =100 GPM This can be Change to Conform to Customers Application (Ex. Number Changed to 150)

NPN Pulse Output

Steps Only Necessary If NPN Pulse Output is Required

STEPS	DISPLAY	OPERATION — 24V DC POWER ONLY
Step-1 Home Screen Press → SET Key		**Home Screen** CV Display Reads 0 SV Display Reads 0 0 Totalizer Default 0.0 Flow Rate Default CV = Current Value SV = Programmed Value
Step-2 Programming Flow Rate Pulse Output Press ▲ Key To Change Value		**1000 Default** **One Pulse Per Gallon** **Default** **(Flow Rate) Pulse** **CV** Program Value of (Flow Rate) Pulse (NPN) Output Preset Value of Flow Rate Change to a Value that meets your Flow Rate Pulse Output **SV** CV > SV ⟶ Flow Rate Pulse Output ON CV < SV ⟶ Flow Rate Pulse Output OFF

Press SET to Save and Proceed to the Next Screen

Step-3 Programming Flow total Pulse Output Press → SET Key		**2000 Factory Default** **One Pulse Per Gallon** **Default** **CV** Program Value of Flow Totalizer Pulse (NPN) Output SV : Preset value of Flow Total **SV** 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**

Press SET Button to Save and Proceed to Next Screen

Step-4 Return to Home Sereen Press ▲ Key		**Return to Home Screen** 0 Totalizer Default 0.0 Flow Rate Default

- **Op1 & Op2 = 150mA Max Switching Currency Current + Consumption is 60mA Max.**
- **CV = Current Value = Current Flow Rate on Display**
- **SV = Selected Value (Programmed Value Customer Entered)**
- **NPN Pulse is a Transistor**

Pulse Control Function

OP1 } Flow Rate Pulse Output
OP2 } Flow Totalizer Pulse Output

STEPS	DISPLAY	OPERATION
Step-1 Home Screen Press SET Key 3 sec (HOLD)		**Power On Flow Meter With 10-30 V DC** **0 Flow Totalizer** **0.0 Flow Rate**
Step-2 OP2 Programming OP2 Output Pulse Control Totalizer Press SET Key 3 sec		**Program (NPN) Pulse Output (OP2) Totalizer** Range E.n.r.c. Con = n : Manual Reset; Con = c : time (1=10 Secs) Auto Reset Using Timer Con = c : 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 **Con = E (Default)**
Step-3 OP1 Programming OP1 Output Pulse Option (Flow Rate) Press SET Key 3 sec (HOLD)		**Program Flow Rate Pulse (NPN) Output (OP1)** **Range: 0 - 3** CV > SV ⟶ Pulse (NPN) ON CV < SV - HYS ⟶ Pulse (NPN) OFF CV > SV ⟶ Pulse (NPN) ON CV > SV + HYS ⟶ Pulse (NPN) OFF **ALT 0 (Default) Most Common** CV = C urrent Value SV = P rogrammed Value Hys = See below
Step-4 OP1 Programming Hysteresis of Output Flow Rate Pulse Press SET Key 3 sec (HOLD)		Program Hysteresis of NPN Output Pulse Range 0.1-999.99 (GAL) Hysteresis **HYS ± 1.0 GPM (Default)** Hys - Hysteresis is a buffer around the Programmed Set Point Example (Example) Liquid Caused by Pump Stopping or Valve Closing i.e.-sloshing
Step-5 OP1 Programming OP1 Power on Delay Time For Initial Start UP (Sec) Press SET Key		**Flow Rate** Program Time Delay for NPN Pulse (OP1) on Initial Start Up Range : 0-9999 (Secs) Time Delay of Pulse Output (Flow Rate) **T2 = 20 (Secs) (Default) Flow Rate**

Programming Terms

K : Coefficient of Flow Volume, **Note : Factory Set Do Not Change**

tr : TKM Range of Transmitter - Flow Rate 4-20 mA , 4mA = 0 | 20mA = Max Flow
TKP - RS 485 Option

Pulse Outputs Options

Con = n : Manual Reset;
Con = c : time (1=10 Secs) Auto Reset Using Timer
Con = c : 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
Con = E (Default)

Totalizer Reset TKP | TKM
To Reset the Flow Totalizer to Zero Press SET + Key Hold 3 sec
(PressTogether)

(PressTogether)

Relay Settings

ALT NO.	DESCRIPTION
ALt = 0	CV > SV → Relay ON : CV < SV - d → Relay OFF
ALt = 1	CV < SV → Relay ON : CV > SV + d → Relay OFF
ALt = 2	SV + d > CV > SV - d → Relay ON: CV > SV + d or CV < SV - d → Relay OFF
ALt = 3	SV + d > CV > SV - d → Relay OFF: CV > SV + d or CV < SV - d → Relay ON

CV = Current Display Value = Flow Rate | **SV** = Selected Value = Programmed Value

d = (GPM) Hysteresis Measured around Relay Set Point (± Measured in Gallons)

K-Factors for TK

Size	LPM	GPM
½"	124	471
¾"	72	274
1"	54	171
1 ½"	19	72
2"	10.3	39
3"	4.7	18
4"	2.1	8

⚠ **K-Factor is Pre-Programmed**

Flow Rates

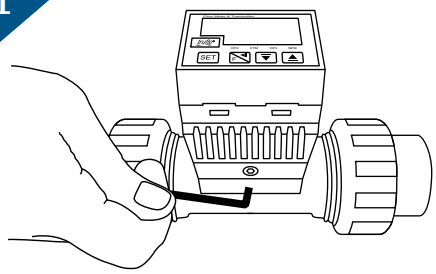
Pipe Size (O.D.)	LPM | GPM 0.3m/s min.	LPM | GPM 10m/s max.
DN15 (½")	3.5 | 1.0	120 | 32
DN20 (3/4")	5.0 | 1.5	170 | 45
DN25 (1")	9.0 | 2.5	300 | 79
DN40 (1 ½")	25.0 | 6.5	850 | 225
DN50 (2")	40.0 | 10.5	1350 | 357
2 ½	60.0 | 16	1850 | 357
DN80 (3")	90.0 | 24	2800 | 739
DN100 (4")	125.0 | 33	4350 | 1149

Pressure vs. Temperature Psi H_2O | Non-Shock

NOMINAL SIZE		PVC				PP				PVDF				
INCHES	mm	30° F 70° F	71° F 105° F	106° F 120° F	121° F 140° F	- 5° F 85° F	86° F 120° F	121° F 140° F	141° F 175° F	- 5° F 70° F	71° F 105° F	106° F 140° F	141° F 175° F	176° F 210° F
½-2	15-50	150	120	100	30	150	110	90	55	150	125	100	85	55
2-½	65	150	120	100	NA	150	95	70	40	150	125	100	85	55
3	80	150	120	100	NA	150	95	70	40	150	125	100	85	60
4	100	150	120	100	NA	150	95	70	40	150	125	100	85	60

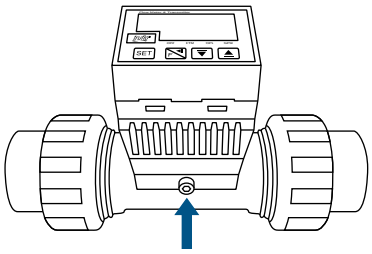
Procedure to Rotate Display

1



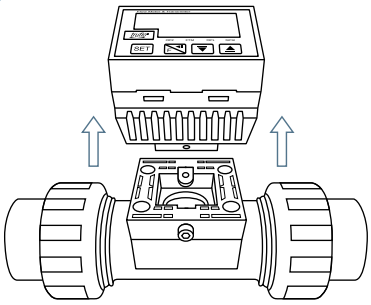
Using an allen key loosen the 2 screws located on either side of the display

2



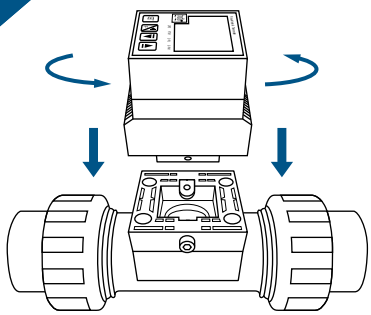
Pull the screws | Do Not Remove

3



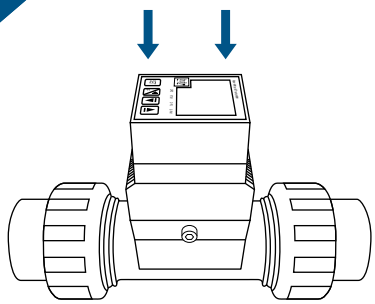
Lift the Display

4



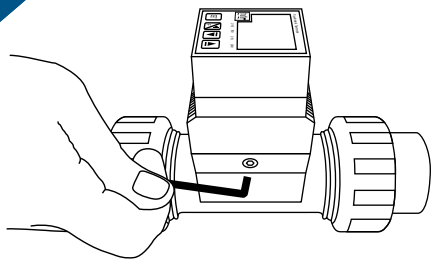
Rotate Display - 90 Degrees

5



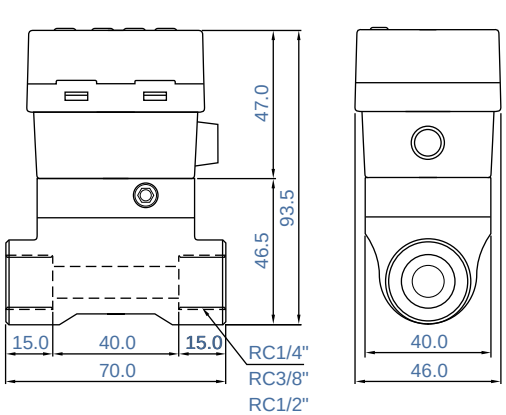
Lower Display

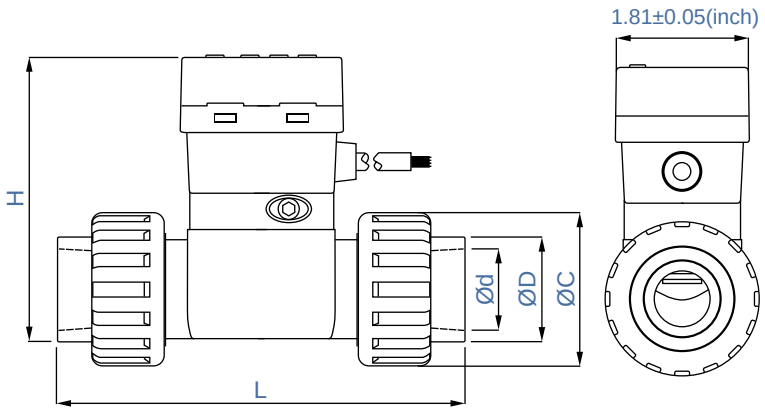
6



⚠ Tighten the Allen screws | Snug Tight
Do Not Over-Tighten

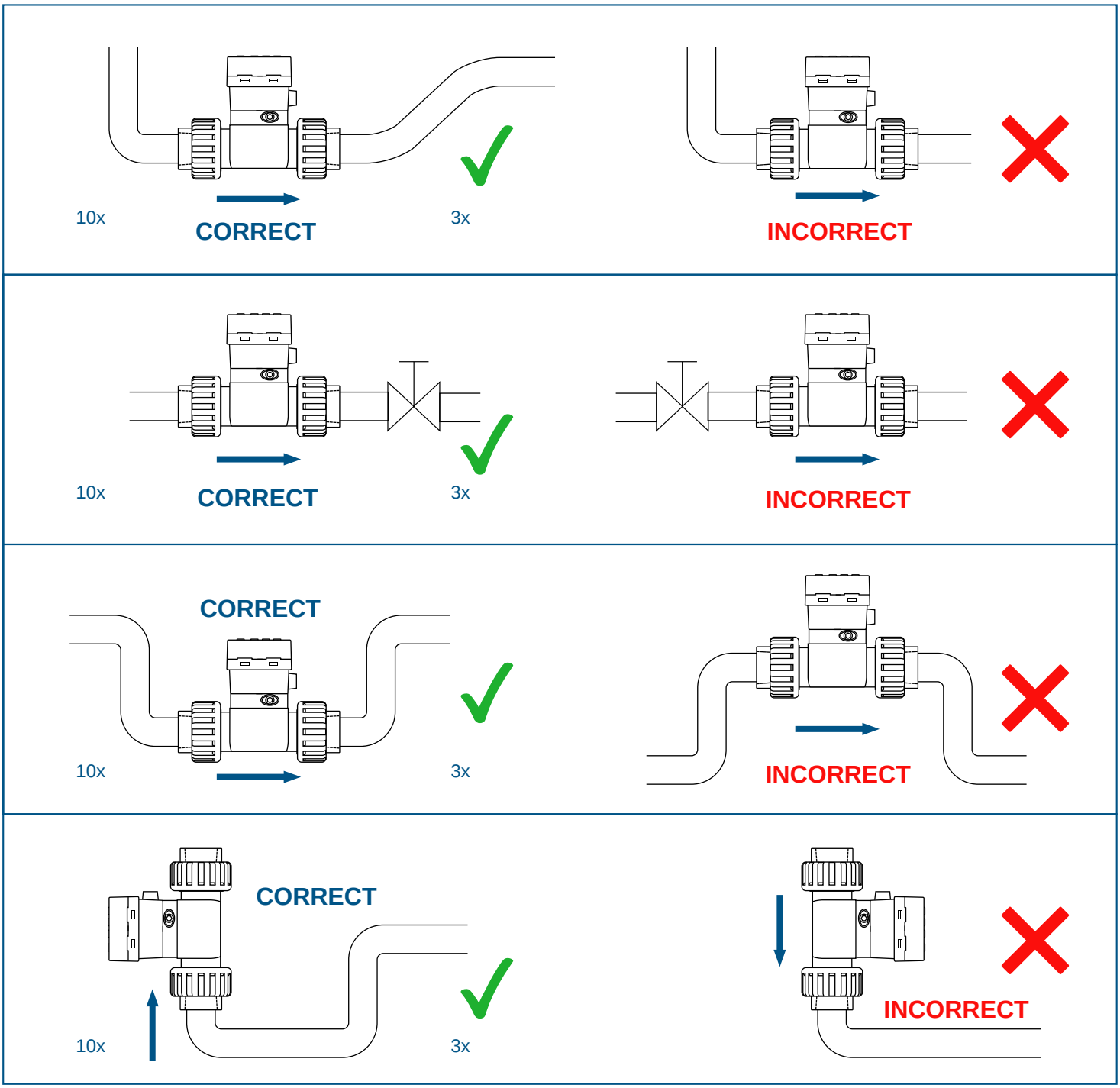
Dimensions





Pipe Size	H (inch)	L (inch)	Ød (inch)	ØD (inch)	ØC (inch)
(½") DN (15)	4.09±0.05	5.48±0.05	0.84±0.05	1.07±0.05	1.61±0.05
(¾") DN (20)	4.17±0.05	6.12±0.05	1.05±0.05	1.36±0.05	2.08±0.05
(1") DN (25)	4.30±0.05	6.76±0.05	1.32±0.05	1.68±0.05	2.36±0.05
(1-½") DN (40)	5.02±0.05	7.66±0.05	1.91±0.05	2.33±0.05	3.26±0.05
(2") DN (50)	5.56±0.05	8.39±0.05	2.38±0.05	2.86±0.05	4.33±0.05

Installation Positions



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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 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 years 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 I**con 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** 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; 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 I**MPLIED 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. I**N 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 support@iconprocon.com | Ph: 905.469.9283**

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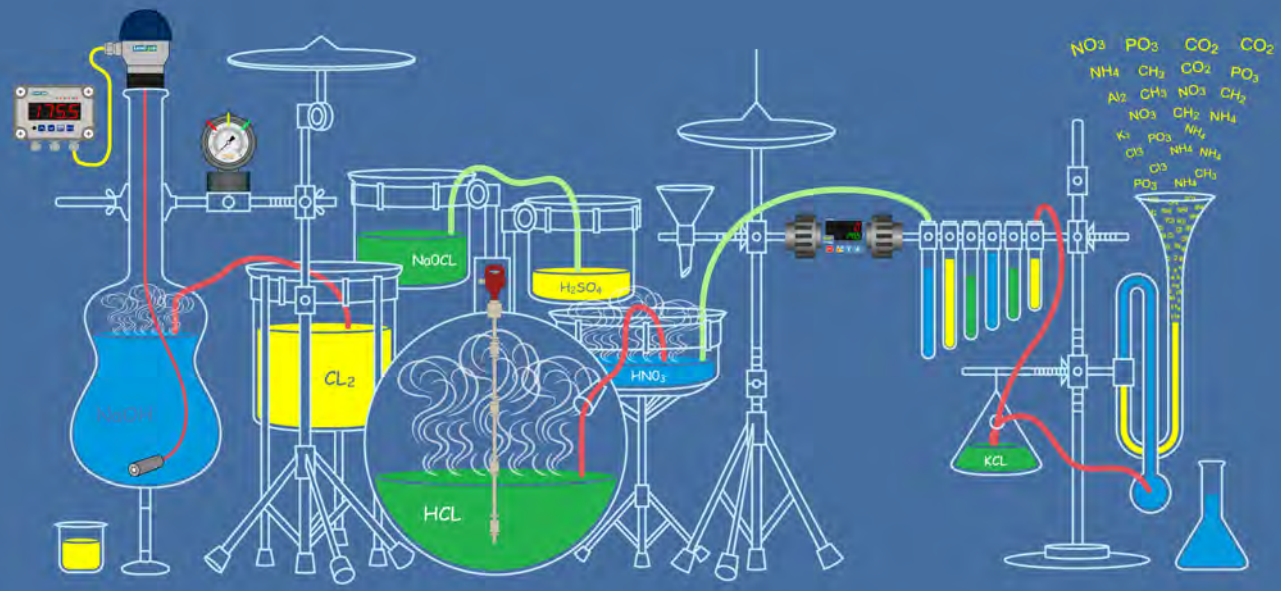
Instrumentation Equipment

~~CORROSION~~



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

'Industry's Most Extensive Line of Corrosion-Free Instrumentation' Equipment'

ICON™ PROCESS CONTROLS

Corrosion-Free Instrumentation Equipment