TKP | TKM SERIES QUICK START MANUAL

Paddle Wheel Flow Meter

truflo®

# Quick Start

## TKP | TKM | Series Flow Meters


ICON™ PROCESS CONTROLS

Corrosion-Free Instrumentation Equipment

# CORROSION

## Safety Information

**WARNING!**

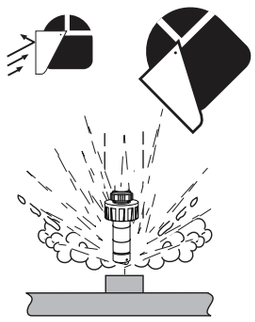
**Please ensure that the Instruments are not to be subject to water hammer or pressure spikes!**

**Always Pressure Test System with $H_2O$ Prior to Initial Start-Up**

Before 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.



**Personal Protective Equipment (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

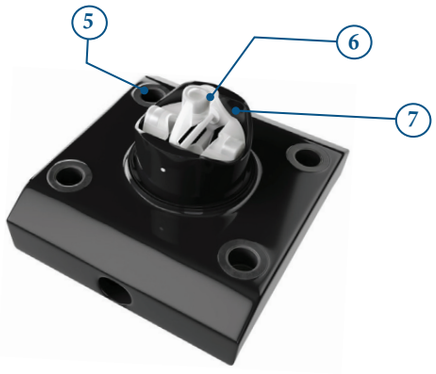
# TKP | TKM SERIES MANUAL

## Paddle Wheel Flow Meter

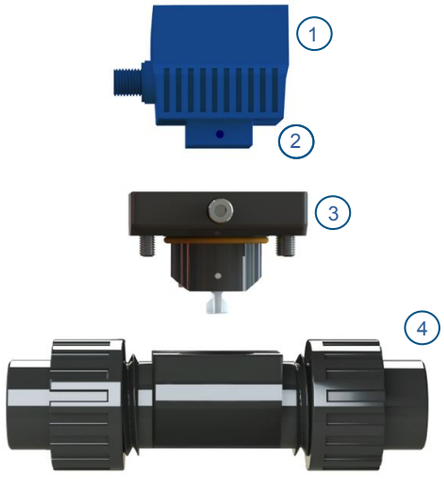
truflo®

## TK Series

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




## Exploded View




## Product Selection

**EXAMPLE**

**TKP ---- 25 ---- P ---- E ---- T ---- RS**
**(1) (2) (3) (4) (5) (6)**

**1. SERIES**

**TKP** : Flow Rate + Total || Pulse Output Flow Rate + Flow Total } RS485 Optional

**TKM** : Flow Rate + Total || 4-20mA + Pulse Output Flow Rate + Flow Total

**2. PIPE SIZE**

½" | DN15 | ¾" | DN20
1" | DN25 | 1 ½" | DN40
2" | DN50 | 3" | DN80 | 4" | DN100

**3. BODY MATERIAL**

**P** = PVC
**PP** = Polypropylene
**PF** = PVDF

* CPVC Socket Unions Available

**4. SEALS*** * **FPM** is Standard

**E** = EPDM | Opt
**F** = FFKM | Opt

**5. END CONNECTIONS**

**S** - Sch 80 Soc
**T** - NPT
**B** - SDR11 Butt
**D** - DIN Socket
**F** - Flange ANSI 150 lb

**6. RS =** TKP Series Only with RS-485 MODBUS Option

## Specifications

| | |
|---|---|
| **Fluid** | Liquid - Viscosity Range <.5-20 centistokes |
| **Accuracy** | > ± 0.5% 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 |
| **Material of Construction** | **Rotor :** Tefzel \| Zirconium Ceramic<br>**Body :** PVC \| PP \| PVDF<br>**Rotor Pin :** Zirconium Ceramic<br>**Seals :** FPM* \| EPDM |
| **Operating Temperature** | PVC < 140°F \| 60°C PP < 176°F \| 80°C<br>PVDF < 240°F \| 115°C<br>316 SS < 248°F \| 120°C |
| **Electronics** | 122°F °C |
| **Protection Class** | NEMA 4X \| IP66 |
| **Approval** | CE \| Rohs |
| **Current Draw** | 60mA Max |
| **Power Supply** | 10-30VDC |

## ProgrammingTerms

**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**

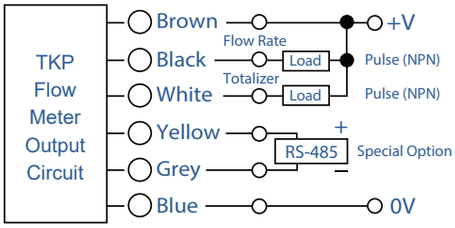
**Con = n :** Manual Reset;
**Con = c** : time (1=10 Secs) Auto Reset Using Timer
**Con = c** : time (secs) Auto Reset Using Timer i.e 5 =Pulse On (5 secs)
**Con = r** : Auto Reset when Total Volume Value = Selct Value (SV)
**Con = E** : Pulse Output of Unit volume (Default) = One Gal/Pulse
**Con = F** → Paddle Pulse → Frequency Max 5 KHZ
**Con = E (Default)**

**Totalizer Reset TKP | TKM Series**
**To Reset the Flow Totalizer to Zero Press** SET ▽ **Key Hold** 3 sec


**(PressTogether)**

## Wiring

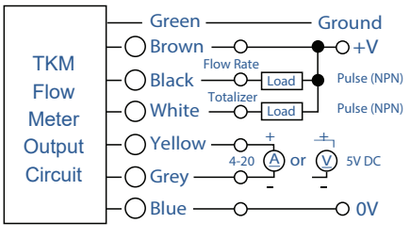
### 9.1 TKP - Flow Rate + Flow Totalizer + NPN Pulse Diagram




| | | | |
|---|---|---|---|
| **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**

### 9.2 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 : 120 Ω max.**
**Voltage output | 0 - 5V : 10K Ω min.**
**TKM Series | 4-20mA Std | 0-5VDC Optional**

# TKP | TKM SERIES MANUAL
## Paddle Wheel Flow Meter

truflo®

## Getting Started

**24VDC POWER ONLY**

| STEPS | DISPLAY | OPERATION |
|---|---|---|
| **Step-1** Home Screen<br>Press & Hold SET + F (HOLD) 3 |  | **Power On Flow Meter with DC Power**<br>Display will Show<br>**0 Totalizer Top RED**<br>**0 Flow Rate Bottom GREEN** |
| **Step-2** Programming of Lock Out Feature<br>Press SET |  | **Programming Lock Out Feature TKP \| TKM Series**<br>**Lck = 10** Unlocked : **Factory Default**. If **Lck** is Changed from the No.10 the Flow Meter Display go into Lockout Security Mode.<br>**LCK 10 \| Default** To Unlock ensure **Lck** No.is set to 10. |
| **Step-3** Programming Units of Flow<br>Press SET |  | **Programming Units of Flow TKP \| TKM Series Only** Program Flow Units 0 \| 1 \| 2<br>**Ut = 0** : **LPM** **Ut = 1 : GPM** I **Default** \| **Ut = 2 : KL \| Kiloliter** |
| No Programming Required<br>**Step-4** Coefficient of Flow Volume<br>Press SET |  | **TKP \| TKM Series Only**<br>**K-Factor** : 0.1 - 999.9 \| **K-Factor is Factory Preset**<br>**K-Factor Preset \| Do Not Change**<br>*Divide K Factor BY 3.8 TO CHANGE FROM GPM TO LPM |

**Step-5 For Programming 4-20mA Analog Output**
**TKP with RS 485 Option Only**

| | | |
|---|---|---|
| **Step-5** Program Range of Transmitter TKM Model Only<br>Press SET |  | **TKM \| 4-20mA and TKP with \| RS 485 Option Only**<br>Programming Analog Transmitter Range Output 4-20mA<br>Range : 0.1 - 999.9 4 mA = 0 20 mA = Entered Number.<br>**TR 100 \| Default** 4 mA = 0 GPM 20mA =100 GPM<br>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 |
|---|---|---|
| **Step-1** Home Screen<br>SET → SET |  | **Home Screen**<br>CV Display Reads 0<br>SV Display Reads 0<br>0 Totalizer Default<br>0.0 Flow Rate Default<br>CV = Current Value SV = Programmed Value |
| **Step-2** Programming Flow Rate Pulse Output<br>To Change Value |  | **1000 Default**<br>**One Pulse Per Gallon**<br>**Default**<br>**(Flow Rate) Pulse**<br>**CV** Program Value of (Flow Rate) Pulse (NPN) Output Preset Value of Flow Rate<br>Change to a Value that meets your Flow Rate Pulse Output<br>**SV** CV > SV ⟶ Flow Rate Pulse Output ON<br>CV < SV ⟶ Flow Rate Pulse Output OFF |

**Press SET to Save and Proceed to the Next Screen**

| | | |
|---|---|---|
| **Step-3** Programming Flow Total Pulse Output<br>SET → SET |  | **2000 Factory Default**<br>**One Pulse Per Gallon**<br>**Default**<br>**CV** Program Value of Flow Totalizer Pulse \| NPN Output SV : Preset value of Flow Total<br>**SV** CV > SV ⟶ Flow Rate Output ON<br>**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 Screen |  | **Return to Home Screen**<br>0 Totalizer Default<br>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**

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## Paddle Wheel Flow Meter

truflo®

## Pulse Output Selection

| ALT NO. | DESCRIPTION |
|---|---|
| ALt = 0 | CV > SV ⟶ ON: CV < SV - HyS ⟶ OFF |
| ALt = 1 | CV < SV ⟶ ON: CV > SV + HyS ⟶ OFF |
| ALt = 2 | SV + HyS > CV > SV - HyS ⟶ ON: CV > SV + HyS or CV < SV - HyS ⟶ OFF |
| ALt = 3 | SV + HyS > CV > SV - HyS ⟶ OFF: CV > SV + HyS or CV < SV - HyS ⟶ ON |
| Current Value = Flow Rate | SV = Selected Value = Programmed Value (Customer) |
| Hys = Hysteresis ACTS Lika Buffer ± Around Pulse Output (Measured in GPM) | |

## Pulse Control Function

| STEPS | DISPLAY | OPERATION |
|---|---|---|
| Step-1<br>Home Screen<br>Press & Hold SET (HOLD) 3 |  | **Power On Flow Meter With 10-30 V DC**<br>**0 Flow Totalizer**<br>**0.0 Flow Rate** |
| Step-2<br>Programming OP2 Output Pulse Control Totalizer<br>Press SET |  | **Program (NPN) Pulse Output (OP2) Totalizer**<br>Range E.n.r.c.<br>**Con = n :** Manual Reset;<br>**Con = c** : time (1=10 Secs) Auto Reset Using Timer<br>**Con = c** : time (secs) Auto Reset Using Timer i.e 5 =Pulse On (5 secs)<br>**Con = r** : Auto Reset when Total Volume Value = Selct Value (SV)<br>**Con = E** : Pulse Output of Unit volume (Default) = One Gal/Pulse<br>**Con = F** ⟶ Paddle Pulse ⟶ Frequency Max 5 KHZ<br>**Con = E (Default)** |
| Step-3<br>Programming OP1 Output Pulse Option (Flow Rate)<br>Press SET |  | **Program Flow Rate Pulse NPN Output \|**<br>**OP1 Range: 0 - 3**<br>CV > SV ⟶ Pulse (NPN) ON<br>**CV < SV** - HYS ⟶ Pu<br>CV > SV ⟶ Pulse (<br>CV > SV + HYS ⟶ Pu<br>**ALT 0 (Default) Most Common**<br>CV = C urrent Value<br>SV = P rogrammed Value<br>Hys = See below |
| Step-4<br>Programming Hysteresis of Output Flow Rate Pulse<br>Press SET |  | Program Hysteresis of NPN Output Pulse<br>Range 0.1-999.99 \|GAL Hysteresis<br>**HYS ± 1.0 GPM \| Default**<br>Hys - Hysteresis is a buffer around the Programmed Set Point |
| Step-5<br>Programming OP1 Power On Delay Time For Initial Start UP (Sec)<br>Press SET |  | **Flow Rate**<br>Program Time Delay for NPN Pulse \| OP1 on Initial Start Up<br>Range : 0-9999 Secs<br>Time Delay of Pulse Output \| Flow Rate<br>**T2 = 20 Secs \| Default Flow Rate** |

## K-Factors

| 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 |

## Flow Rates

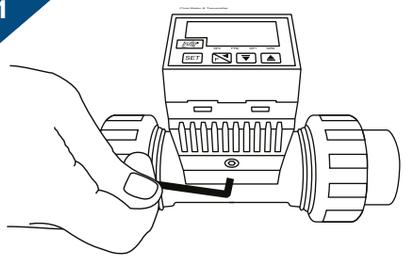
| Pipe Size O.D. | LPM \| GPM | LPM \| GPM |
|---|---|---|
| | 0.3m/s min. | 10m/s max. |
| ½" \| DN15 | 3.5 \| 1.0 | 120 \| 32 |
| ¾" \| DN20 | 5.0 \| 1.5 | 170 \| 45 |
| 1" \| DN25 | 9.0 \| 2.5 | 300 \| 79 |
| 1 ½" \| DN40 | 25.0 \| 6.5 | 850 \| 225 |
| 2" \| DN50 | 40.0 \| 10.5 | 1350 \| 357 |
| 2 ½ | 60.0 \| 16.0 | 1850 \| 357 |
| 3" \| DN80 | 90.0 \| 24.0 | 2800 \| 739 |
| 4" \| DN100 | 125.0 \| 33.0 | 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 | 175 | 150 | 150 | 30 | 150 | 110 | 85 | 55 | 175 | 150 | 150 | 110 | 85 |
| 2-½ | 65 | 150 | 120 | 150 | NA | 150 | 95 | 70 | 40 | 150 | 125 | 100 | 85 | 55 |
| 3 | 80 | 150 | 120 | 150 | NA | 150 | 95 | 70 | 40 | 150 | 125 | 100 | 85 | 60 |
| 4 | 100 | 150 | 120 | 150 | NA | 150 | 95 | 70 | 40 | 150 | 125 | 100 | 85 | 60 |

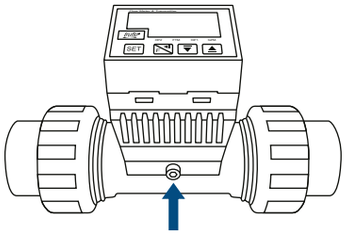
## Procedure to Rotate Display

1



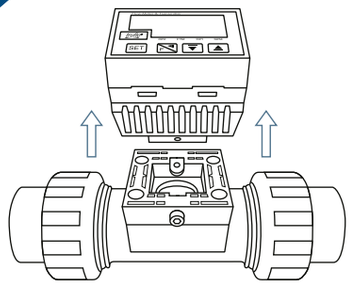
Using an Allen Key loosen the 2 screws located on either side of the display

2



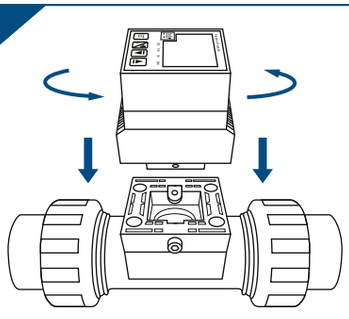
Pull the screws | Do Not Remove

3



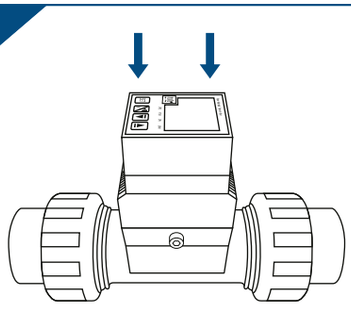
Lift the Display

4



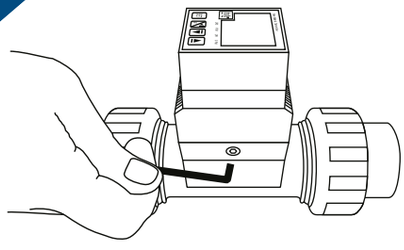
Rotate Display - 90 Degrees

5



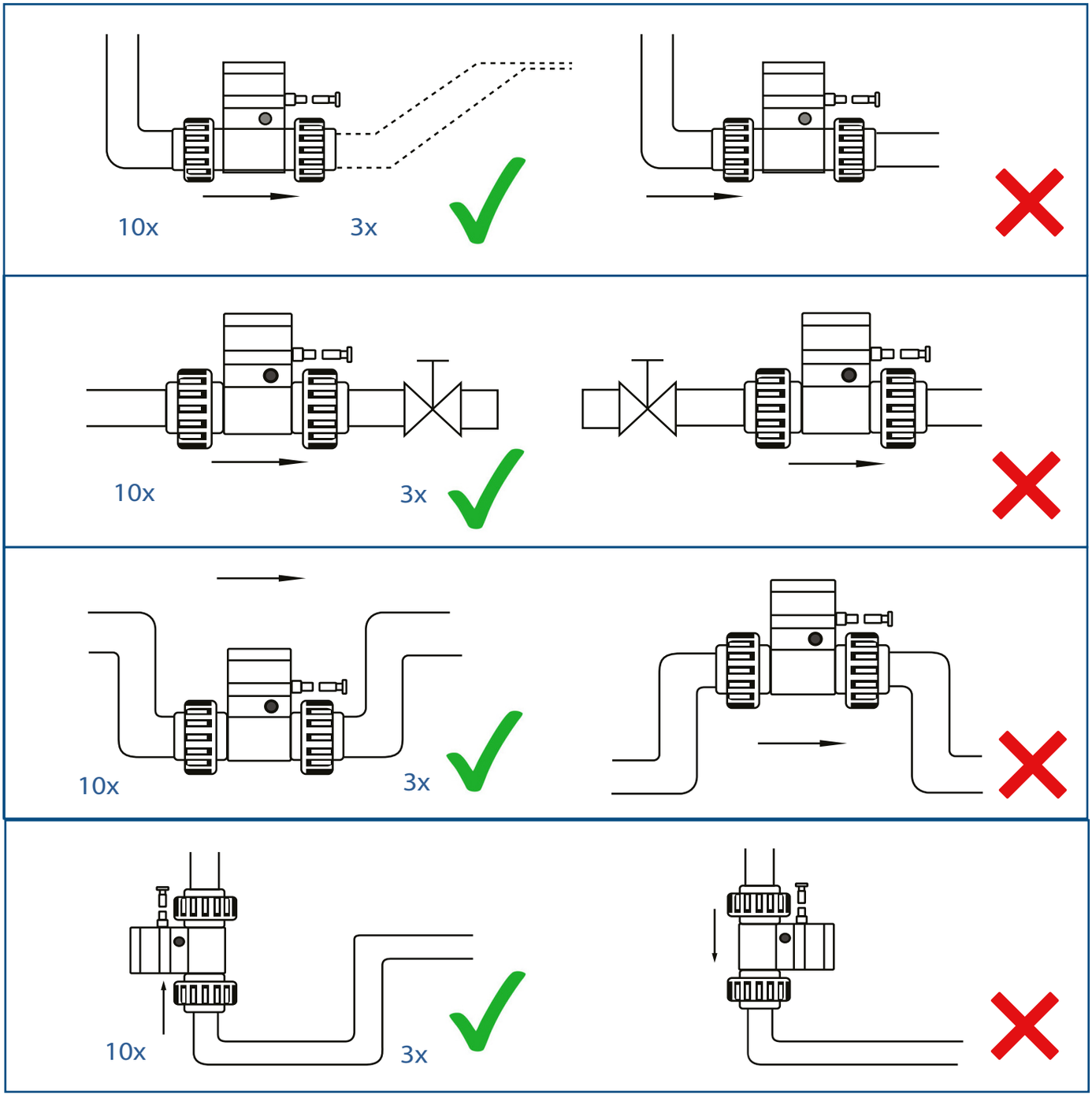
Lower Display

6



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

## Installation Positions

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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 **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.

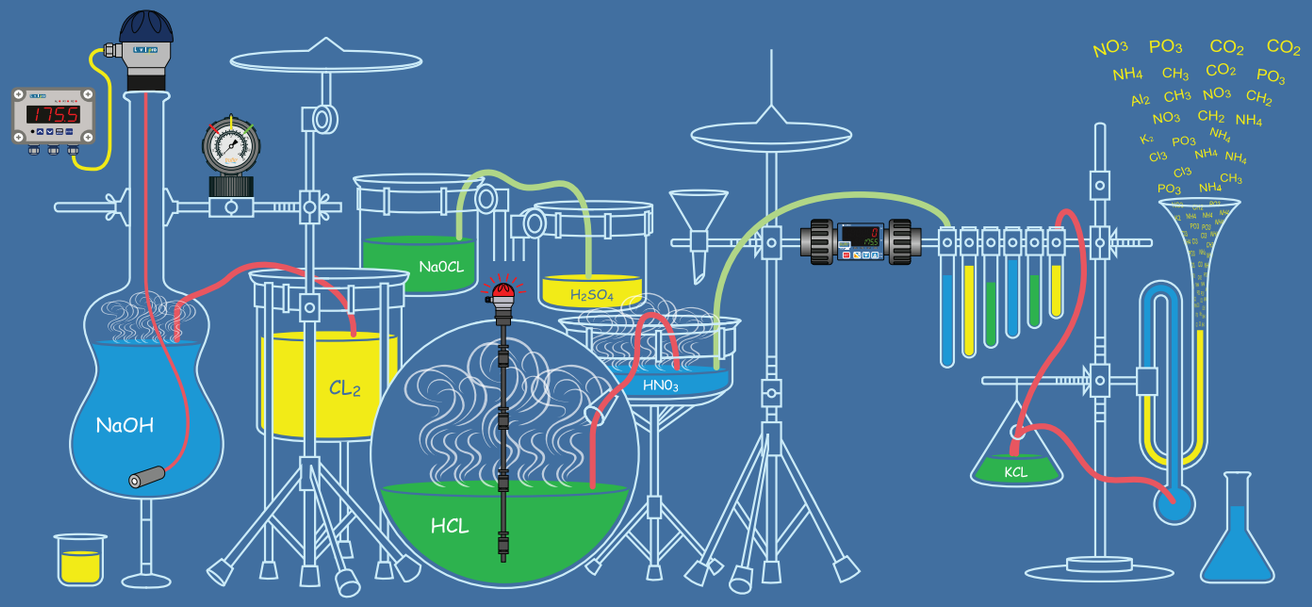
## Limitations

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** 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 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 support@iconprocon.com | Ph: 905.469.9283**

# ~~CORROSION~~

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