FLOW METER
Instruction Manual

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Quick Start Manual

(Industry's Toughest Built Paddle Wheel Flow Meter)

No Calibration Required

Plug & Play

No K-Factor Programming

TK SERIES

⚠ **Read the User's Manual Carefully before Starting to Use the Unit.**

All TK Series Flow Meters are Factory Calibrated and do not require K-flow Factor Programming.

Manufacturer reserves the right to implement changes without prior notice.

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Product Selection

EXAMPLE :

TKP —— 25 —— A —— PVC
(1) (2) (3) (4)

SERIES

TKM = Paddle Wheel Flow Meter with Transmitter
4 -20mA + (Flow Rate NPN Pulse + Totalizer NPN Pulse)
TKP = Paddle Wheel Flow Meter & Flow Totalizer
+ (Flow Rate NPN Pulse + Flow Totalizer NPN Pulse)
TKS = Paddle Wheel Flow Meter with Relay Output
+ (Flow Rate NPN Pulse)

PIPE SIZE

15 = (½") **20** = (¾")
25 = (1") **40** = (1 ½")
50 = (2") **80** = (3") **100** = (4")

COMMUNICATION OR TRANSMITTER

Non = Without Communication
RS = TKP Series with RS-485 MODBUS Selectable
A = TKM Series with Transmitter (4 -20mA) + NPN Pulse Output

BODY MATERIAL

PVC = PVC
PP = Polypropylene
ST = 316 SST (Special Order)

CONNECTION METHOD

STD = Wire Lead (3m) - Other Lengths Available
M12 CONNECTOR-

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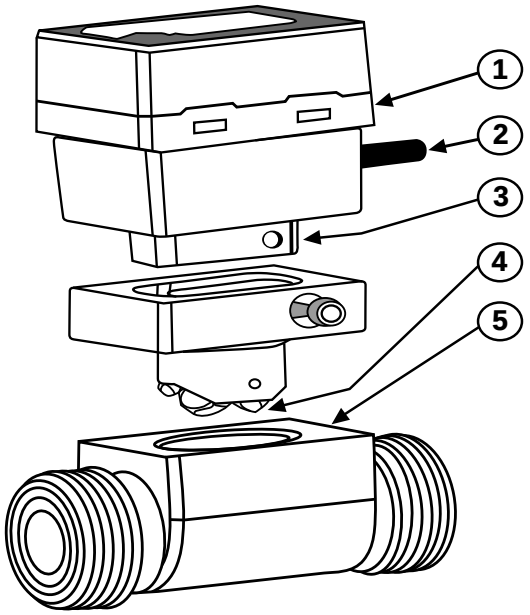
Parts TK Series

1. Flow Controller
2. Lead Wire
3. Hall Sensor
4. Paddle Wheel
5. Body (PVC, PP, 316 SST)



General Data

SPECIFICATION	DESCRIPTION
Fluid	Water or Liquid Chemicals - Viscosity Range: 5-20 centistokes
Accuracy	> ± 1.0% of F.S. @ 20°C (68°F) - Repeatability ± .5% of Full Scale
Max Flow Velocity	10 m/s max - (32.8 ft/s max) (8 ft/s is recommended max Velocity for Plastic Piping)
Min Flow	0.3 m/s min. - (.98 ft/s min)
Operating press	150 psi 10 BAR
Turndown	33:1
Response time	Real Time
Material of Construction	**Paddle :** Tefzel **Body :** PVC/PP/316 **Shaft :** Zirconium Ceramic **Seals :** EPDM/FPM
Operating Temperature	PVC < 60°C (140°F) PP < 80°C (176°F) 316 SST< 120°C (248°F)
Electronics	-13 - 122°F (-25 - 50°C)
Protection Class	IP66 NEMA 4X
Approval	CE Rohs
Operating Voltage	10 - 30VDC

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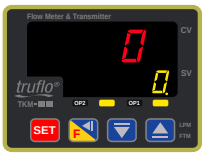
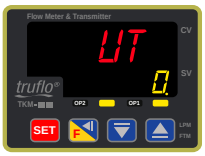
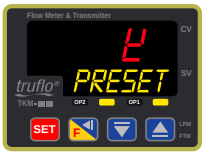
Programming TKP/TKM Model

Please Follow Hand To Program

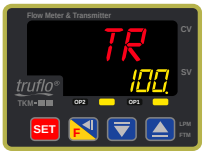
TKP/TKM Series Only

24V DC POWER ONLY	DISPLAY	DESCRIPTION
Step-1 **Home Screen** Press SET + F (Together) [SET] + F HOLD (3 sec)		**TKP/TKM Series Only** **Power On Flow Meter with DC Power** Display will Show **0 Totalizer (Top)** **0 Flow Rate (Bottom)**
Step-2 **Programming of Lock Out Feature** Press SET [SET]		**Programming Lock Out Feature** **TKP/TKM Series** **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 [SET]		**Programming Units of Flow** **TKP/TKM Series Only** Program Flow Units 0,1,2,3 Ut = 0 : (LPM) Ut = 1 : (GPM) Ut = 2 : {Kiloliter (KL)} **UT 1 (Default)**
No Programming Required **Step-4** **Coefficient of Flow Volume** Press SET [SET]		**TKP/TKM Series** 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

TKP/TKM Series Only

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 Series Only)** Press SET [SET]		**TKM + TKP (RS 485 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

Programming NPN Pulse Output (TKP / TKM Series)

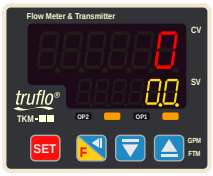
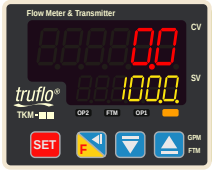
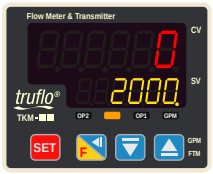
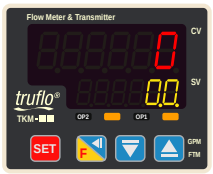
Please Follow Hand To Program

Important

Steps Only Necessary If NPN Pulse Output is Required

TKP/TKM Series Only

TKP/TKM Series Only

FUNCTION OF METER	DISPLAY	DESCRIPTION
Step-1 **Programming Flow Meter** Press Then Press SET SET Press then Press Set & Adjust		**TKP/TKM Series Only** **CV** Display Reads 0 **SV** Display Reads 0 **0** Totalizer Default **0.0** Flow Rate Default **CV = Current Value** **SV = Programmed Value**
Step-2 Op1 **Programming Flow Rate Pulse Output** Press To Change Value		**TKP/TKM Series Only (Pulse ON-OFF)** **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 **1000 Default** (One Pulse Per Gallon Default) (**Flow Rate) Pulse**
Press SET to Move to Save and Move to Next Screen		
Step-3 Op2 **Programming Flow total Pulse Output** Press Then Press SET SET		**TKP/TKM Series Only** **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 Page)**
Press SET Button to Move to Save Add Move to Next Screen		
Step-4 **Programming Flow total Pulse Output** Press		**TKP/TKM Series Only** **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 Relay Transistor**

(Max Fluid Velocity should NOT EXCEED 8 ft/sec)

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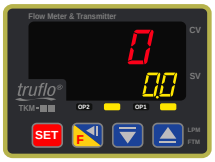
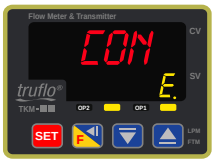
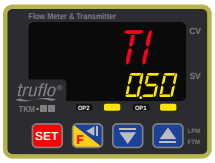
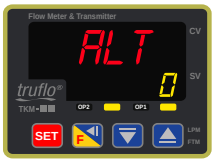
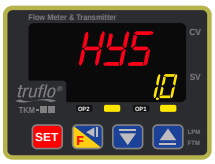
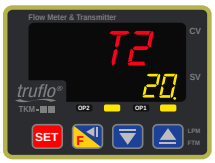
Programming NPN Pulse Control Function (TKP / TKM Model Only)

OP1 = NPN Pulse Output (Flow Rate)
OP2 = NPN Pulse Output (Flow Totalizer)

Please Follow Hand To Program

TKP/TKM Series Only

TKP/TKM Series Only

FUNCTION OF METER	DISPLAY	DESCRIPTION
Step-1 Home Screen (Flow Rate) Press SET [SET] HOLD (3 sec)		**Power On Flow Meter With 10-30 V DC** **0 Flow Totalizer** **0.0 Flow Rate**
Step-2 Programming Output Pulse Control (Totalizer) Press SET [SET]		**TKP/TKM Series Only** **Progam (NPN) Pulse Output 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 Programming Output Pulse Reset Time Press SET [SET]		**TKP/TKM Series Only (Length of Time Pulse relay remains On)** **Program Output NPN Pulse Reset Time For Totalizer** Range : 0 - 999.99 sec **T1 Only Applicable if Con r or Con C are Selected above if (Con = n or E ----> Timer Control ----> will not be an option)** **T1 0.50 Sec (Default)**
Step-4 OP1 Programming (OP1) Output Pulse Option (Flow Rate) Press SET [SET] HOLD (3 sec)		**TKP/TKM Series Only** 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 = Current Value** **SV = Programmed Value** **Hys = See below**
Step-5 OP1 Programming Hysteresis of Output Flow Rate Pulse Press SET [SET] HOLD (3 sec)		**TKP/TKM Series Only** 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-6 OP1 Programming OP1 Power on Delay Time For Initial Start UP (Sec) Press SET [SET]		**TKP/TKM Series Only - 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**

OP1 = NPN Pulse Output (Flow Rate)
OP2 = NPN Pulse Output (Flow Totalizer)

CV = Current Value SV = Programmed Value

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Mode of NPN Pulse Output TKP/TKM Models

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)	

K-Factors for TK Series Flow Meters (All Models)

Size	LPM	GPM
½"	124	471.2
¾"	72	273.6
1"	54	205.2
1 ½"	19	72.2
2"	10.3	39.2
3"	4.7	17.8
4"	2.1	7.9

⚠ **Required when programming remote display or controller.**

K-Factor Pre Programmed by Factory - No Flow Meter Programming of a K-Factor is required.

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Programming TKS Model Only

Please Follow Hand To Program

TKS Series Only

TKS Series Only

FUNCTION OF METER	DISPLAY	DESCRIPTION
Step-1 **Home Screen** Press SET + [SET] + F HOLD (3 sec)		**TKS Series Only** Power Up Flow Meter with DC Power **000.0**
Step-2 **Progamming Lock Output** Press SET [SET]		Programming Lock - Out Secure Feature Lk = 10 (Unlocked Status) - **(Default)** Changing Number will Lock Flow Meter **LK.10 (Default)** **10 = Unlocked** If any other Number is entered the Programming will be restricted
Step-3 **No Programming Required K Value** Press SET [SET]		K-Factor Range : 0.1-999.9 (Depends on Meter Size - Factory Pre-Programmed) Ut = 0 : (LPM) Ut = 1 : (GPM) Ut = 2 : {Kiloliter (KL)} **UT 1 (Default)** K Value Preset (Do Not Change)
Step-4 **Programming Communication Output Type** Press SET [SET]		Programming NPN Pulse Output con.E - Output = 1 Pulse / Gal con.F - Paddle Pulse Output 5KHZ MAX-Remote Display **con.E (Default)**
Step-5 **Programming of Relay Set Point** Press SET [SET]		Programming Relay Setpoint ON - OFF Options Select ALT.0 ALT.1 ALT.2 ALT.3 **ALT.0 (Default)** See Next Page for Relay Alarm Options
Step-6 **Programming Relay Time Delay** Press SET [SET]		Programming Initial Start-Up Relay Time Delay Range : 0-99 sec Delay Time to Power on Alarm Output Relay **T.20 (Default)** (20 Seconds) Initial Start up of Flow Meter or Process (Allows for System Steady State before Relay Switch becomes Active).

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Programming TKS Model Only

Program Relay Set Point And Relay Delay (Prevents Relay Chatter)

Please Follow Hand To Program

TKS Series Only

TKS Series Only

FUNCTION OF METER	DISPLAY	DESCRIPTION
Step-1 Home Screen Press SET [SET] HOLD (3 sec)		Power On Flow Meter - 24VDC **000.0 (Defaut) Home Screen**
Step-2 Programming Relay Set Point Press SET [SET]		Programming Relay Set Point. (When Relay Switches) Range : 0.1 - 999.9 GPM **100.0 GPM (Defaut)** Relay will Activate when this Set Point or (Flow Rate) is Reached
Step-3 Programming Relay Hysteresis Press SET [SET]		Program Relay Hysteresis - Prevents Relay Chatter -Due to Constant Flow Rate Change around Setpoint in Dynamic Flow Process (Cushion ±) (Prevents Relay **d = Delay 0.10 (Defaut) GPM**

- **In the Programming Stage, the Display will Flash**

Relay ON - OFF Options For TKS Series Only (Not for TKP/TKM Series)

TKS Series Only

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)

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General Terms

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

2) **tr** : TKM Range of Transmitter - Flow Rate 4-20 mA ⟶ 4mA = 0 20mA = Max Range
TKP - RS 485 Option

3) **NPN :** Transistor Relay - No Moving Parts

5) **Con :** Output Control of Flow Total OP2, Con = n ⟶ Manual Reset
Con = C - Time Reset (1=10 Secs) ⟶ Auto Reset, Con = r ⟶ Auto Reset,
Based on Volume (GPM) Con = E ⟶ Pulse Output of Unit Volume,
Con = F ⟶ Pulse Output of Paddle = 5 KHZ Max

Important

Totalizer Reset TKP/TKM
To Reset the Flow Totalizer to Zero Press

[SET] + ▼

for (3 sec)

Important

Standard Pipe Size

Pipe Size (O.D.)	ANSI (ID) (Inches)		DIN (ID) (mm)	Flow Rate (LPM) / USGPM	
	Sch (40)	Sch (80)		0.3m/s min.	10m/s max.
DN15 (1/2")	0.62	0.55	Ø20	3.5 / 1.0	120 / 32
DN20 (3/4")	0.82	0.74	Ø25	5.0 / 1.5	170 / 45
DN25 (1")	1.00	0.96	Ø32	9.0 / 2.5	300 / 79
DN40 (1 ½")	1.40	1.50	Ø50	25.0 / 6.5	850 / 225
DN50 (2")	2.00	1.90	Ø63	40.0 / 10.5	1350 / 357
2 ½	2.50	2.30	Ø75	60.0 / 16	1850 / 357
DN80 (3")	3.10	2.90	Ø78	90.0 / 24	2800 / 739
DN100 (4")	4.00	3.80	Ø96.50	125.0 / 33	4350 / 1149

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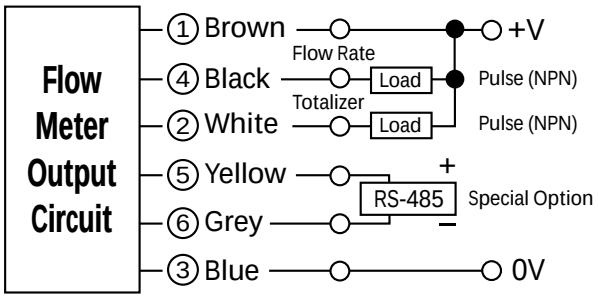
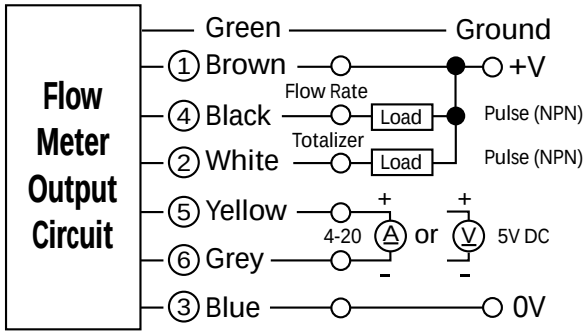
MODEL TKP
FLOW RATE + FLOW TOTALIZER + NPN PULSE



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

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)

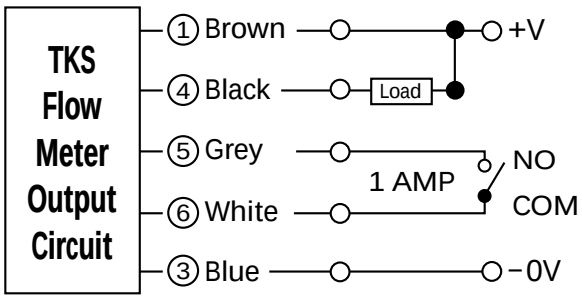
MODEL TKM(4-20mA Or 0-5V DC + NPN Pulse)
FLOW RATE + FLOW TOTALIZER + PULSE



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

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

MODEL TKS NPN
(FLOW RATE - RELAY + PULSE)



- **Black Wire is a Unit Volume NPN Pulse Output-1 pulse for every gallon**

Brown	10 - 30 VDC (+)	White	COM
Blue	0V (-)	Grey	NO
Black	Flow Rate Pulse Output (NPN)		1 Amp

NOTES

TKP - Yellow & Grey wires with RS - 485 Option Only

Current output (4 - 20mA) : 120 Ω max.
Voltage output (0 - 5V) : 10K Ω min.

NOTE - DC Power Only

TKM Series (0-5VDC) Optional 4-20mA is Standard

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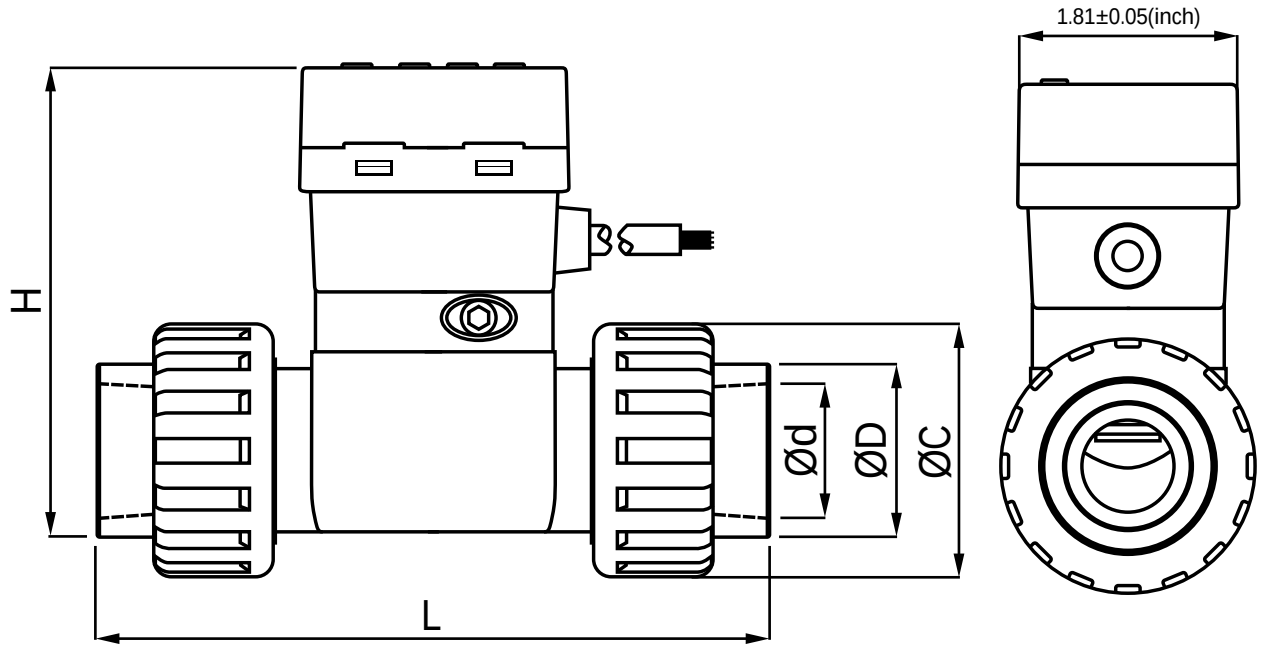
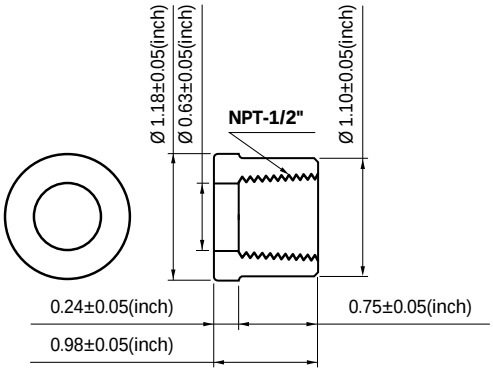
Dimensions

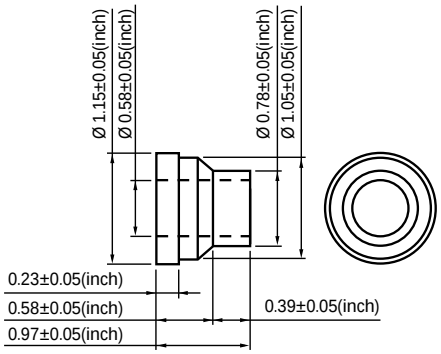


Pipe Size	H (inch)	L (inch)	Ød (inch)	ØD (inch)	ØC (inch)
(1/2") DN (15)	4.09±0.05	5.48±0.05	0.84±0.05	1.07±0.05	1.61±0.05
(3/4") DN (20)	4.17±0.05	6.12±0.05	1.05±0.05	1.36±0.05	2.08±0.05
(1") DN (25)	4.30±0.05	6.76±0.05	1.32±0.05	1.68±0.05	2.36±0.05
(1-1/2") DN (40)	5.02±0.05	7.66±0.05	1.91±0.05	2.33±0.05	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

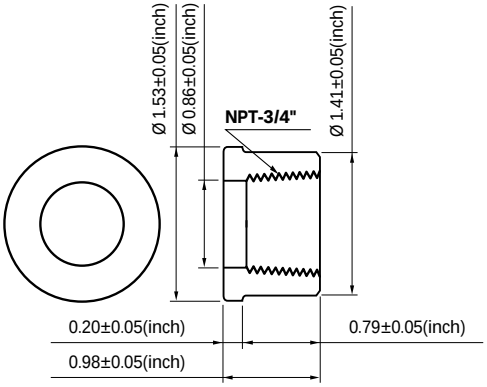
½" DN15-UNION-NPT-PP



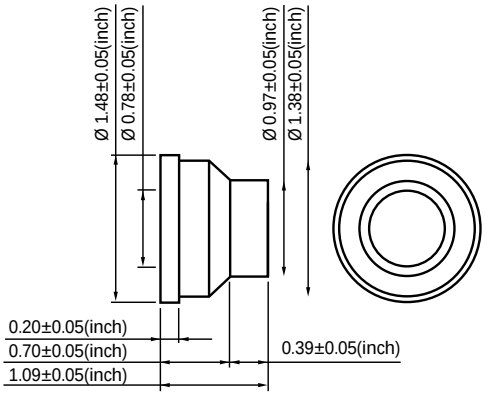
½" DN15-UNION-NPT-PP SDR 11 IR FUSION



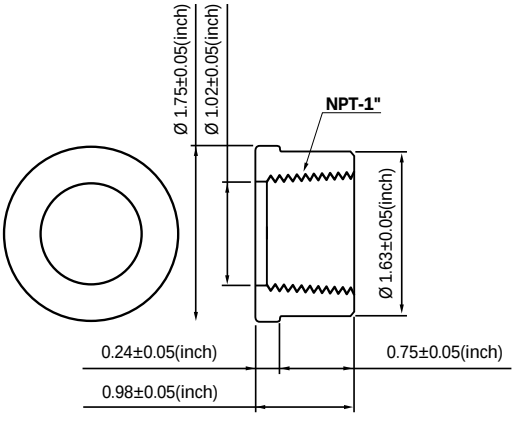
3/4" DN20-UNION-NPT-PP



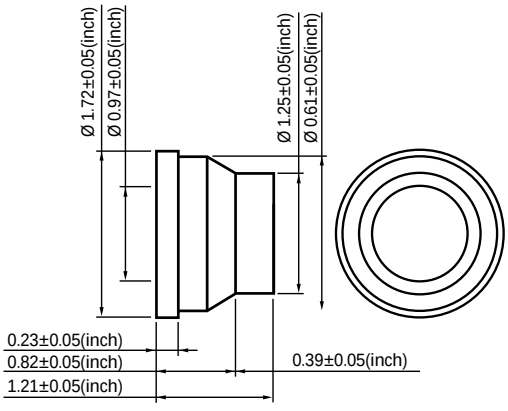
3/4" DN20-UNION-NPT-PP SDR 11 IR FUSION



1" DN25-UNION-NPT-PP

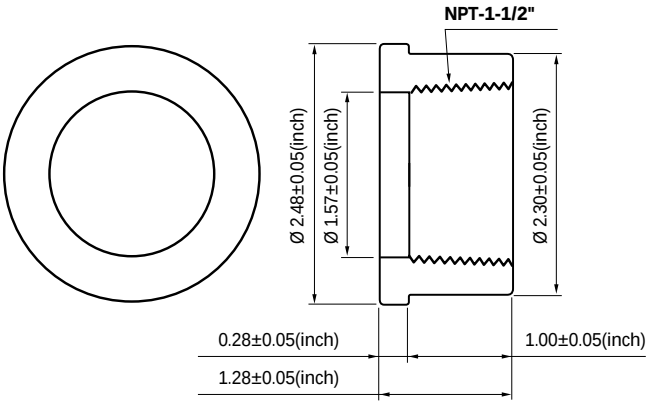


1" DN25-UNION-NPT-PP SDR 11 IR FUSION

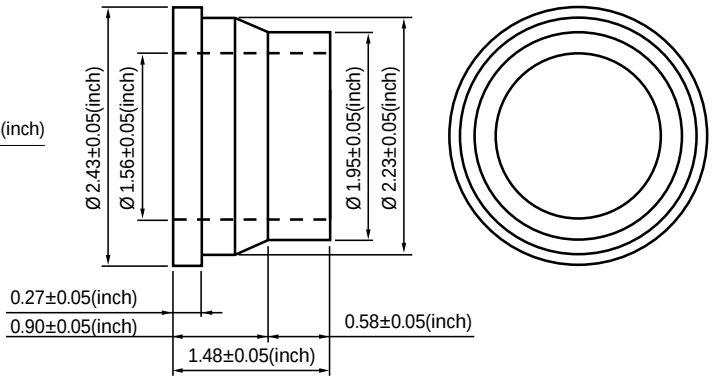


(Max Fluid Velocity should NOT EXCEED 8 ft/sec)

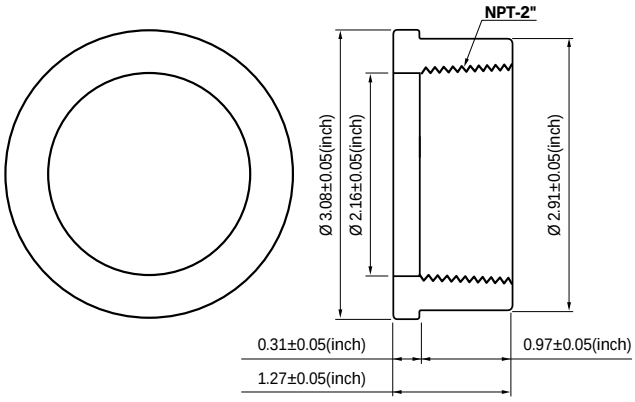
1½" DN40-UNION-NPT-PP



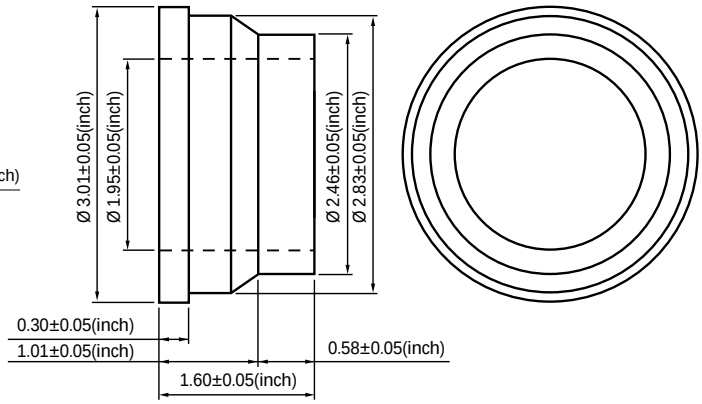
1½" DN40-UNION-NPT-PP SDR 11 IR FUSION



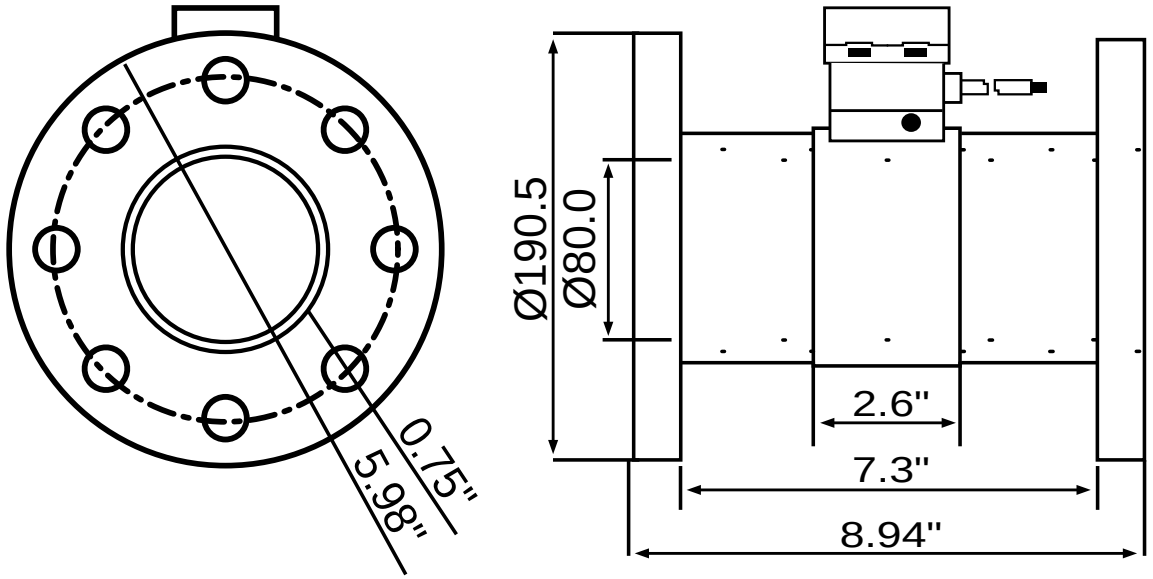
2" DN50-UNION-NPT-PP



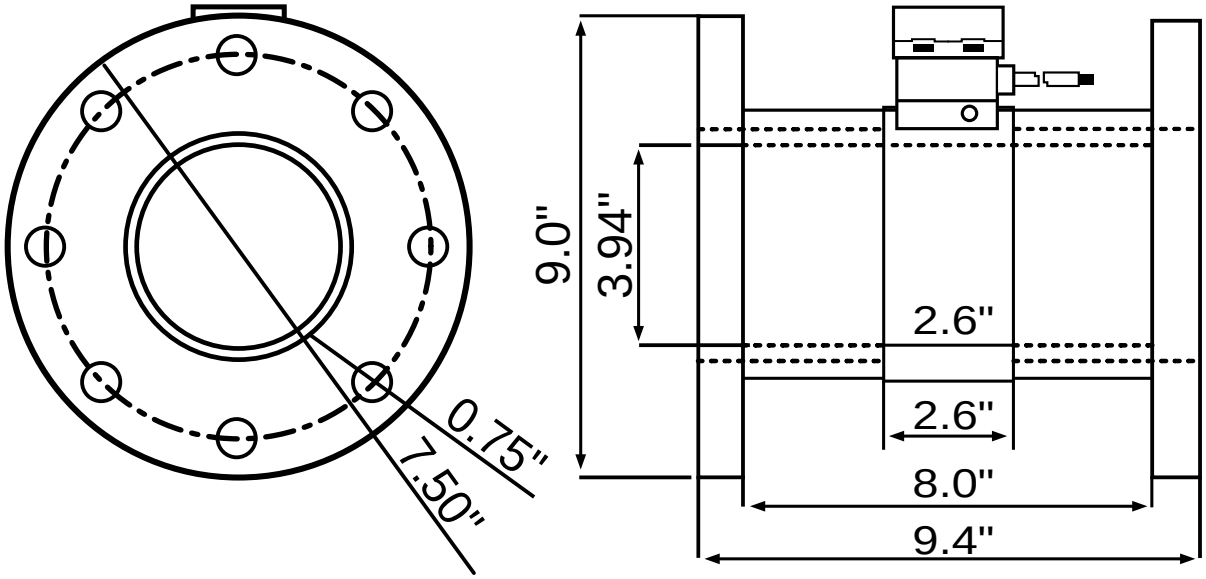
2" DN50-UNION-NPT-PP SDR 11 IR FUSION



3" ANSI JIS



PVC 4" ANSI JIS



Remarks : Different Options Are Available

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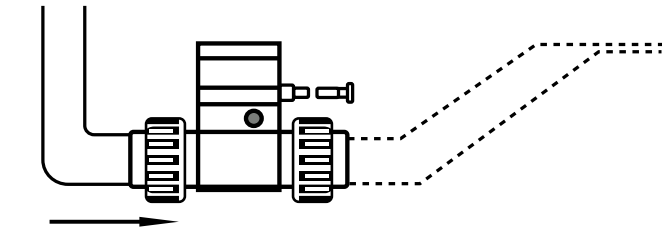
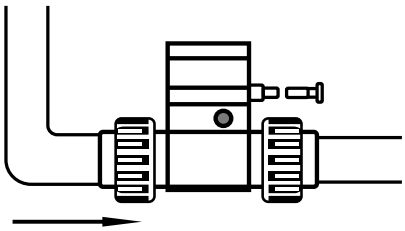
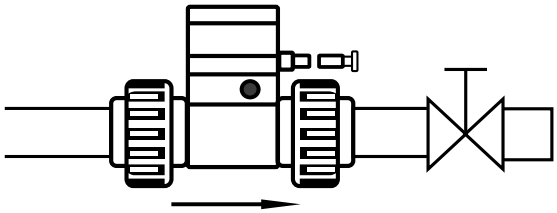
Installation Positions



10x CORRECT 3x



INCORRECT



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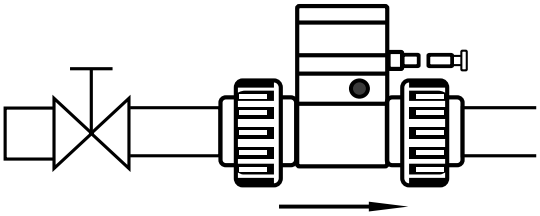
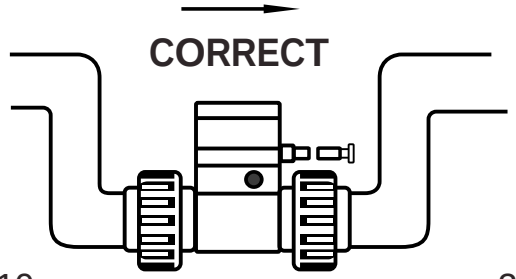
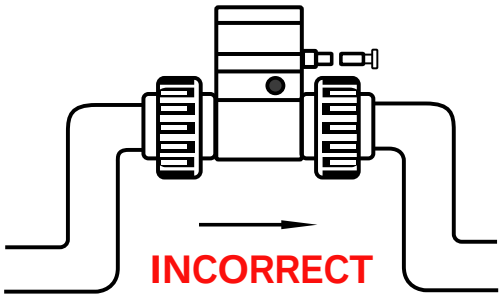


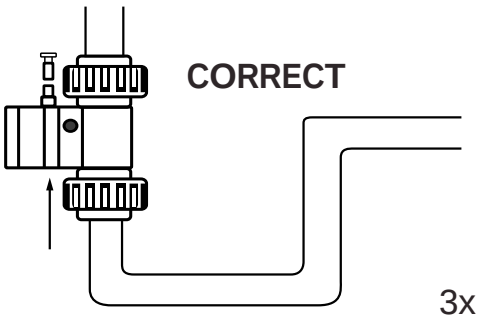
INCORRECT



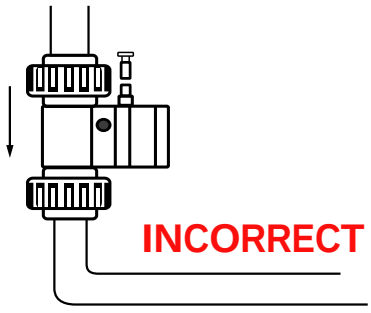
10x CORRECT 3x



INCORRECT



10x CORRECT 3x



INCORRECT

Installation Positions

Please make sure the pipe is filled with the fluid under normal 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.

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

FLOW METER
Instruction Manual

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Specifications may be modified without notice in advance.

For More Information Visit Truflosales.com