

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.

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

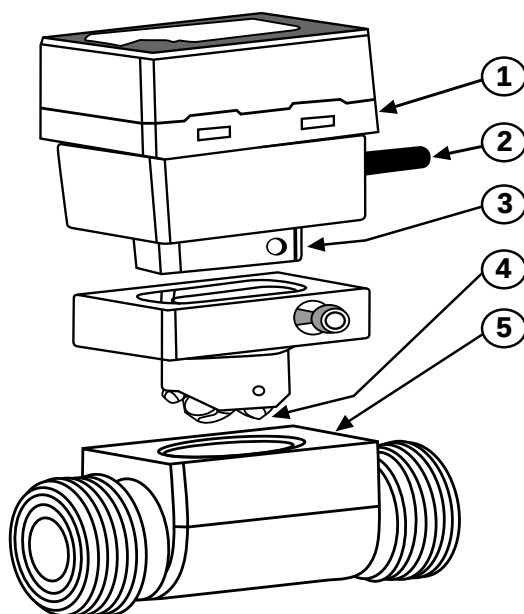
- PVC** = PVC
- PP** = Polypropylene
- ST** = 316 SST (Special Order)

CONNECTION METHOD

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

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	> $\pm 1.0\%$ of F.S. @ 20°C (68°F) - Repeatability $\pm .5\%$ 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

Programming TKP/TKM Model

Please Follow  Hand To Program

TKP/TKM Series Only

TKP/TKM Series Only

24V DC POWER ONLY

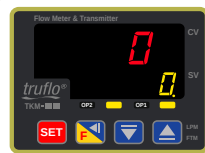
DISPLAY

DESCRIPTION

Step-1

Home Screen

Press **SET** + 
(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



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)

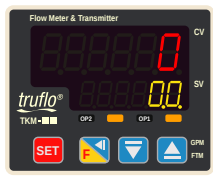
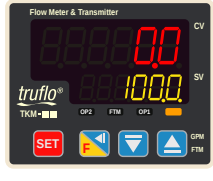
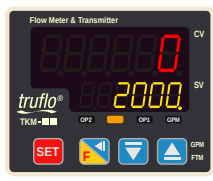
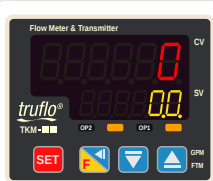
Please Follow  Hand To Program

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 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 $CV \geq SV \rightarrow$ Flow Rate Pulse Output ON $CV < SV \rightarrow$ 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 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 $CV \geq SV \rightarrow$ 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 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

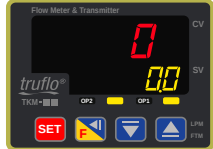
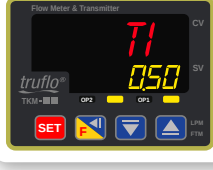
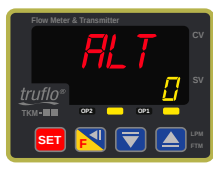
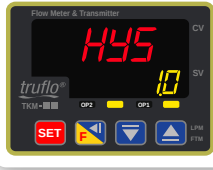
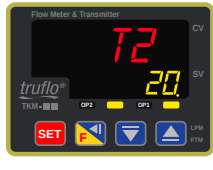
Programming NPN Pulse Control Function (TKP / TKM Model Only)

Please Follow  Hand To Program

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

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 Program (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
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

Mode of NPN Pulse Output TKP/TKM Models

ALT NO.	DESCRIPTION
ALt = 0	$CV > SV \rightarrow ON$; $CV < SV - HyS \rightarrow OFF$
ALt = 1	$CV < SV \rightarrow ON$; $CV > SV + HyS \rightarrow OFF$
ALt = 2	$SV + HyS > CV > SV - HyS \rightarrow ON$; $CV > SV + HyS$ or $CV < SV - HyS \rightarrow OFF$
ALt = 3	$SV + HyS > CV > SV - HyS \rightarrow OFF$; $CV > SV + HyS$ or $CV < SV - HyS \rightarrow ON$

Current Value = Flow Rate SV = Selected Value = Programmed Value (Customer)

Hys = Hysteresis ACTS Like Buffer $\pm$ 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.

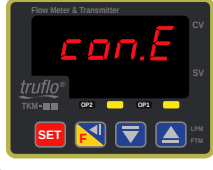
**K-Factor Pre Programmed by Factory - No Flow Meter
Programming of a K-Factor is required.**

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 Programming 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).

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 (Default) 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 (Default) 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 (Default) 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	$CV > SV \rightarrow \text{Relay ON} : CV < SV - d \rightarrow \text{Relay OFF}$
ALT = 1	$CV < SV \rightarrow \text{Relay ON} : CV > SV + d \rightarrow \text{Relay OFF}$
ALT = 2	$SV + d > CV > SV - d \rightarrow \text{Relay ON} : CV > SV + d \text{ or } CV < SV - d \rightarrow \text{Relay OFF}$
ALT = 3	$SV + d > CV > SV - d \rightarrow \text{Relay OFF} : CV > SV + d \text{ or } CV < SV - d \rightarrow \text{Relay ON}$
CV = Current Display Value = Flow Rate	
SV = Selected Value = Programmed Value	
d = (GPM) Hysteresis Measured around Relay Set Point (± Measured in Gallons)	

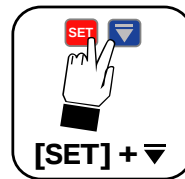
General Terms

- 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

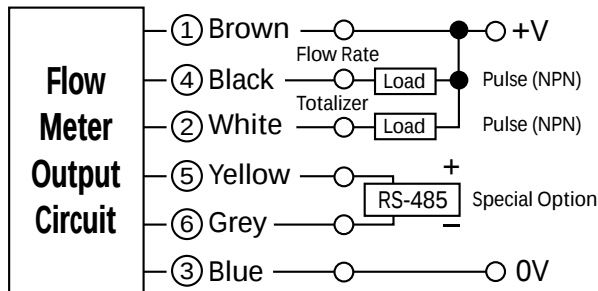


for  (3 sec)
Important

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

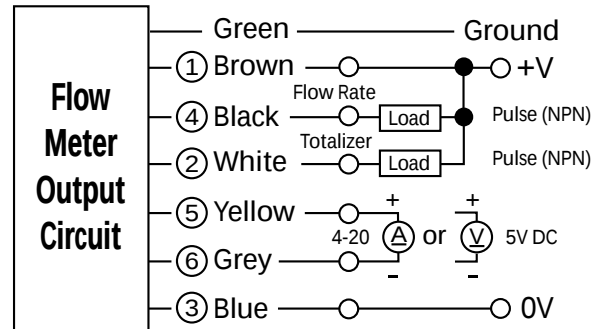
MODEL TKP
FLOW RATE + FLOW TOTALIZER + NPN PULSE



- **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)

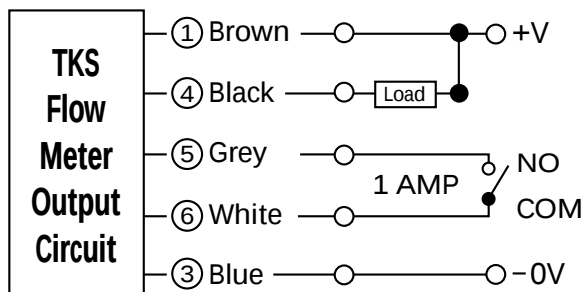
MODEL TKM(4-20mA Or 0-5V DC + NPN Pulse)
FLOW RATE + FLOW TOTALIZER + PULSE



- **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

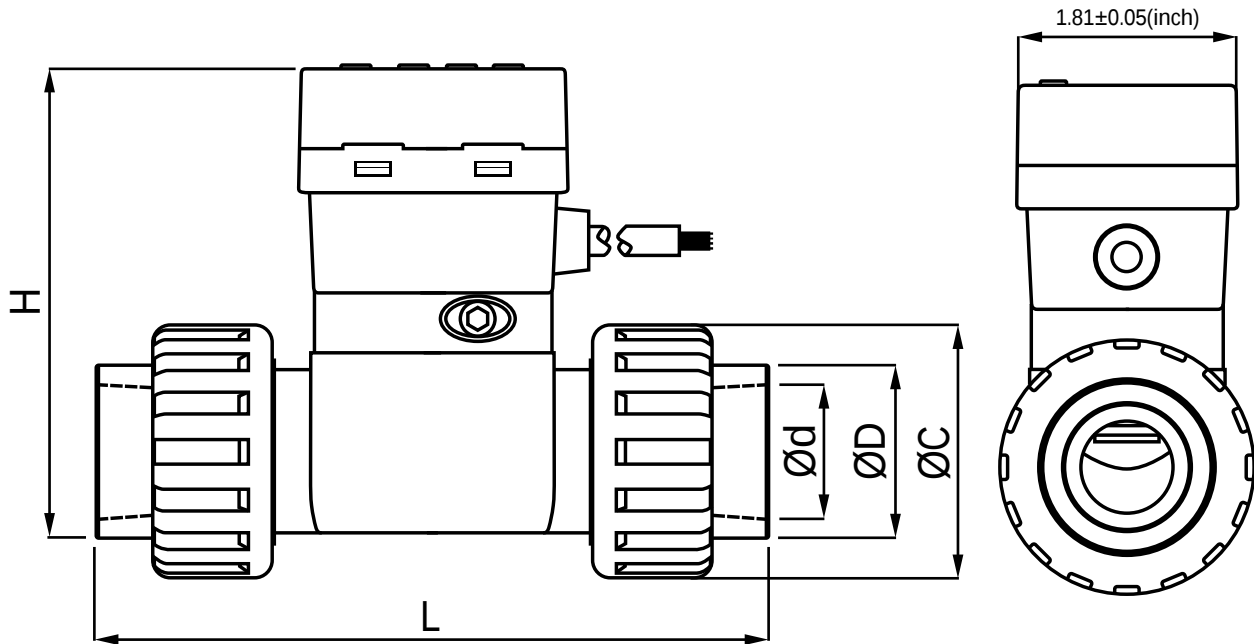
TKP - Yellow & Grey wires with RS - 485 Option Only

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

NOTE - DC Power Only

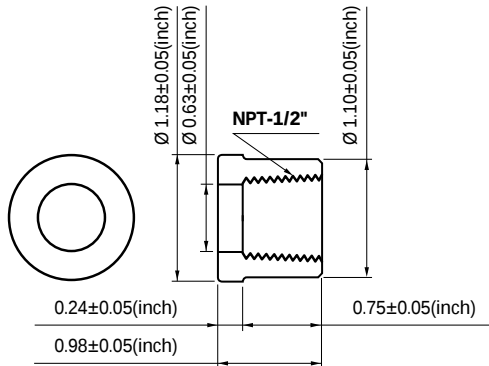
**TKM Series (0-5VDC) Optional
4-20mA is Standard**

Dimensions

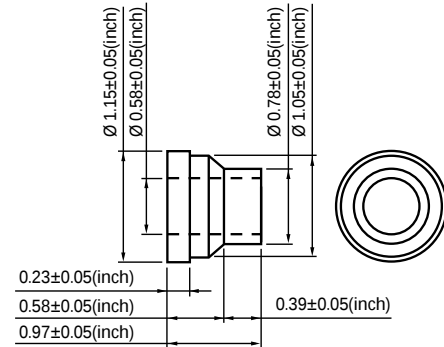


Pipe Size	H (inch)	L (inch)	$\varnothing d$ (inch)	$\varnothing D$ (inch)	$\varnothing C$ (inch)
(1/2") DN (15)	4.09 ± 0.05	5.48 ± 0.05	0.84 ± 0.05	1.07 ± 0.05	1.61 ± 0.05
(3/4") DN (20)	4.17 ± 0.05	6.12 ± 0.05	1.05 ± 0.05	1.36 ± 0.05	2.08 ± 0.05
(1") DN (25)	4.30 ± 0.05	6.76 ± 0.05	1.32 ± 0.05	1.68 ± 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

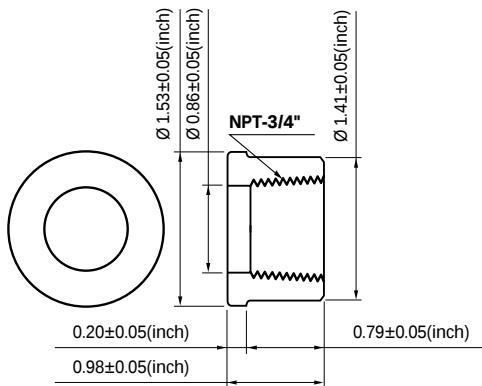
½" DN15-UNION-NPT-PP



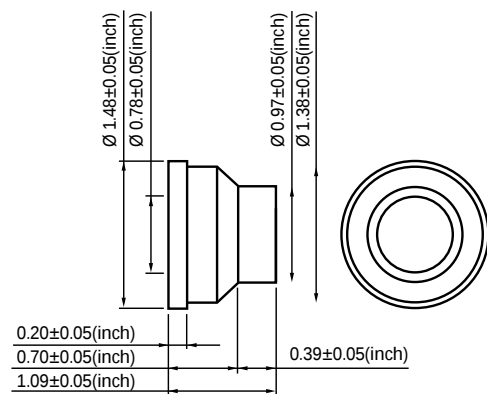
½" DN15-UNION-NPT-PP SDR 11 IR FUSION



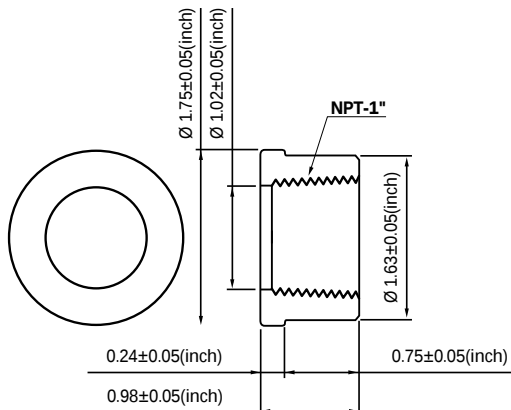
¾" DN20-UNION-NPT-PP



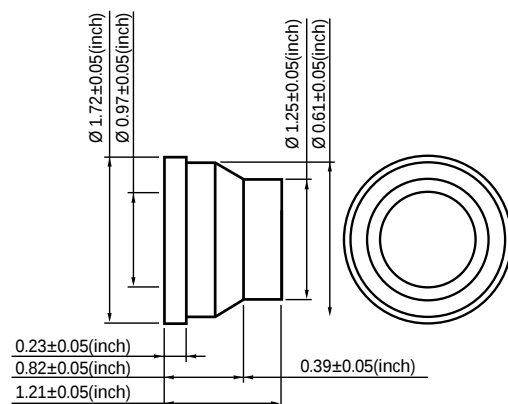
¾" DN20-UNION-NPT-PP SDR 11 IR FUSION



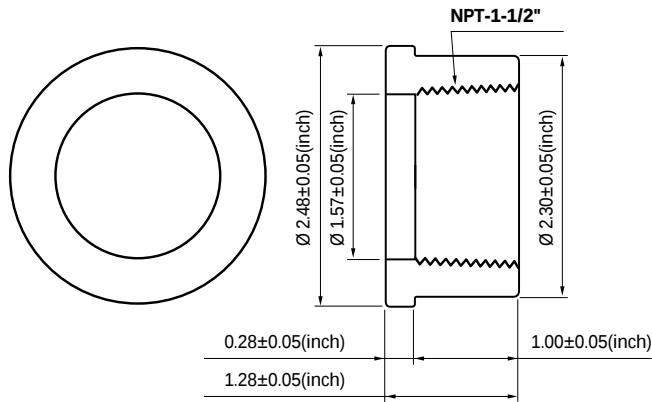
1" DN25-UNION-NPT-PP



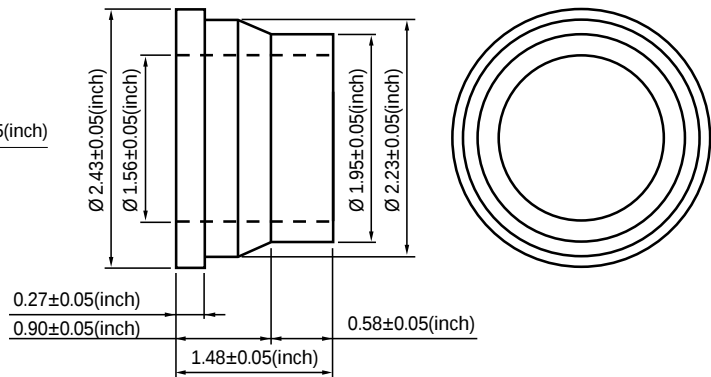
1" DN25-UNION-NPT-PP SDR 11 IR FUSION



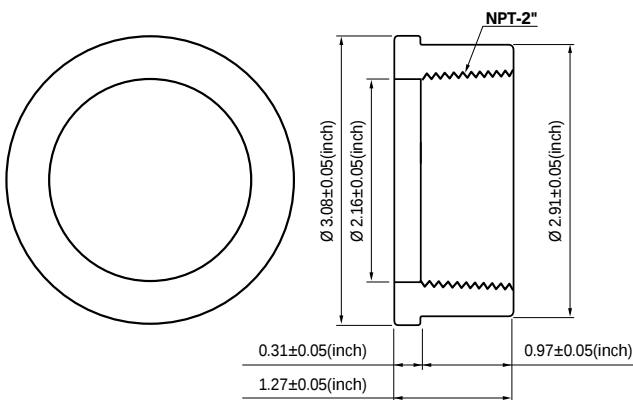
1½" DN40-UNION-NPT-PP



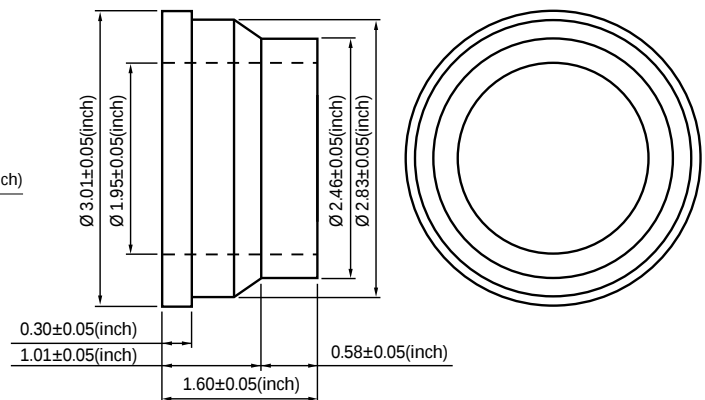
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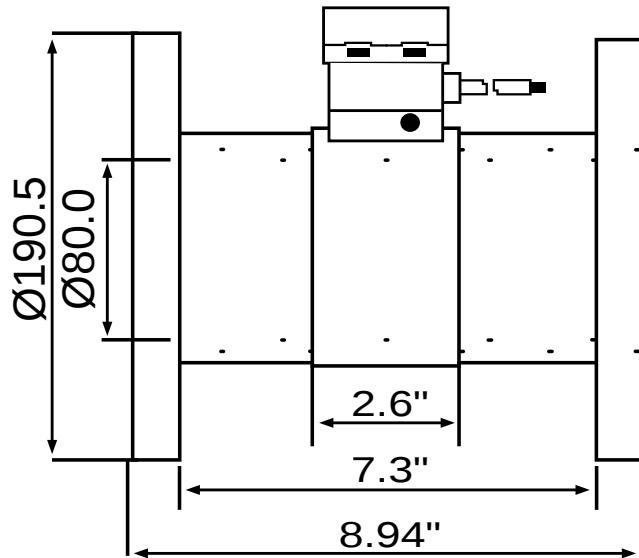
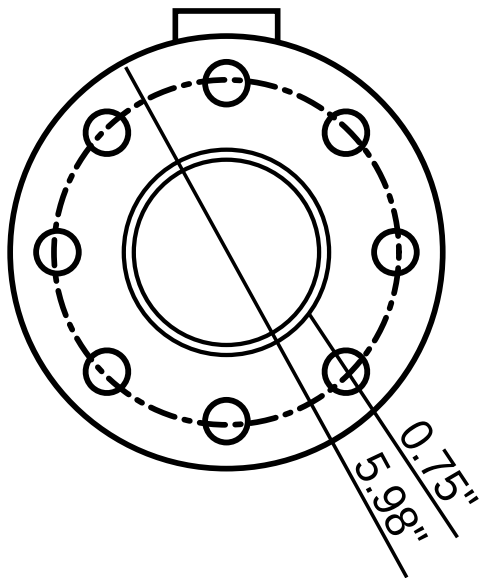
2" DN50-UNION-NPT-PP



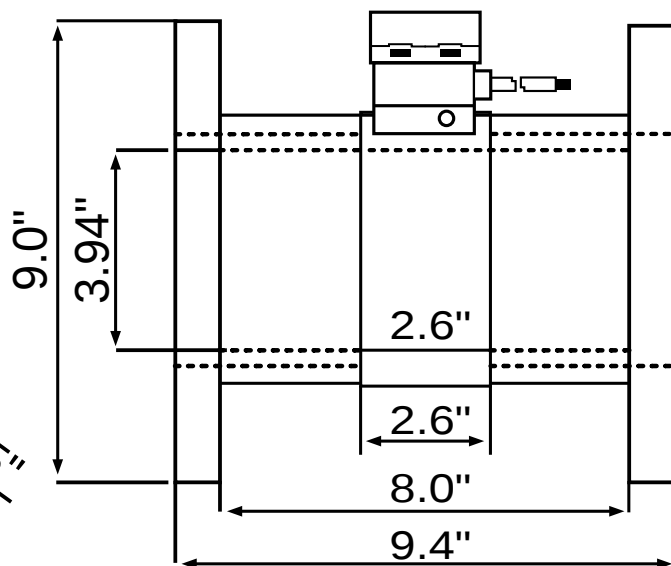
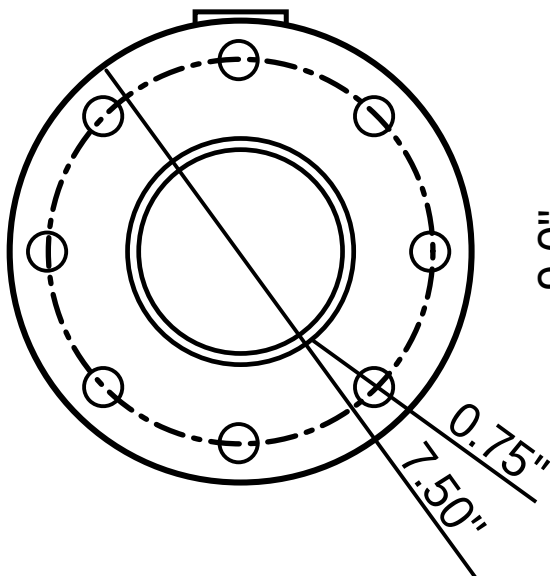
2" DN50-UNION-NPT-PP SDR 11 IR FUSION



3" ANSI JIS

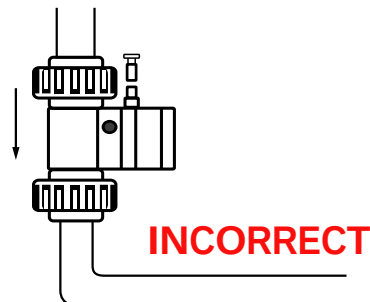
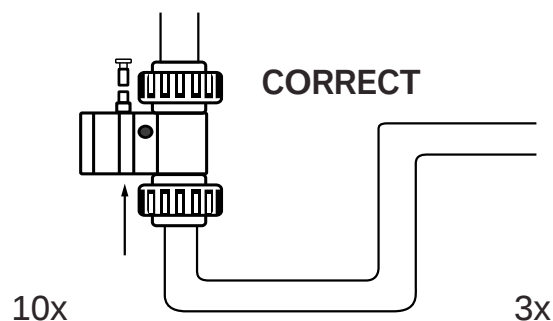
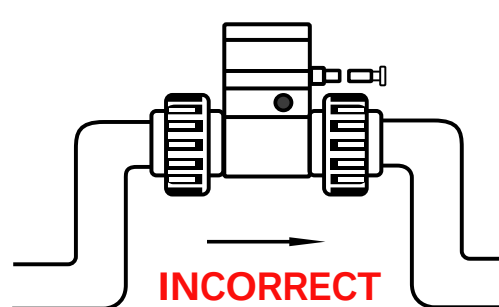
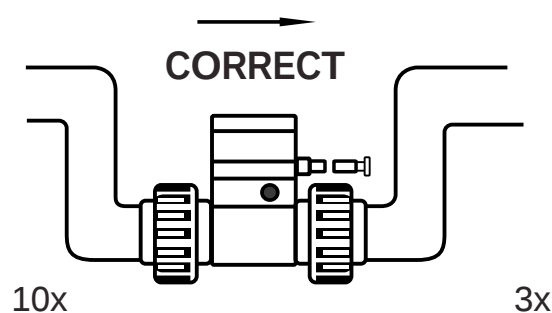
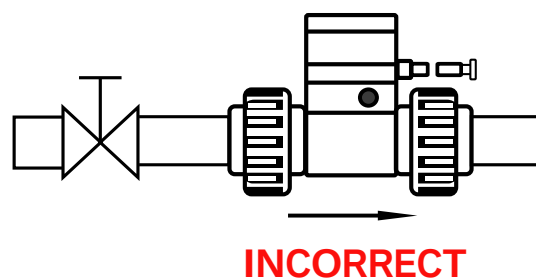
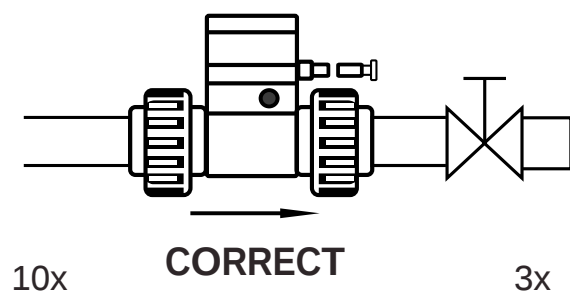
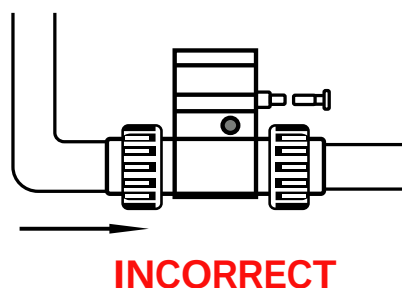
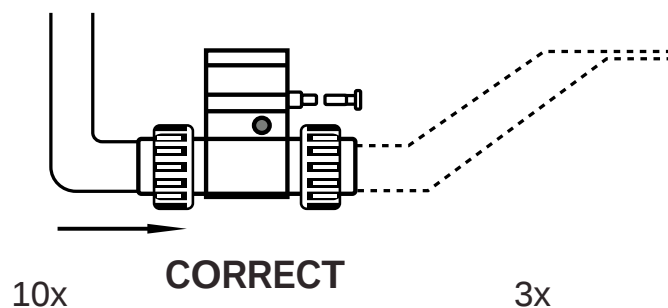


PVC 4" ANSI JIS



Remarks : Different Options Are Available

Installation Positions



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





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