Perfect Observe and Control Device

Build Smart Cities

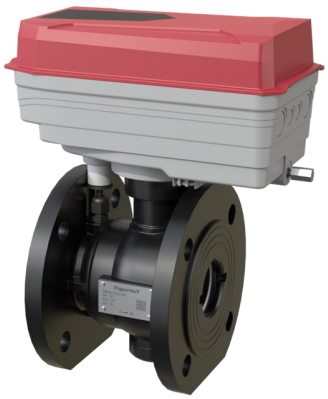
TigerIoT

泰德尔物联

Unit IoT Temp. Balancing Valve

Technical Data Sheet

Rev.1.2.0



U2 series Unit IoT Temp. Balancing Valve

Units Regulation — Precision Flow Control for Buildings/units

Cloud Management — Cloud Platform Big Data AI Analysis

Intelligent Temp. Control — High Precision Sensors, Intelligent Temp. Regulation

Dual Temp. and Pressure — Collect Data on Supply/Return Pipelines via Sensors

Product Features

IP68

IP68, It can operate steadily at a depth of 1.5 meters underwater without any protection;

Integrated Design

No exposed connecting bolts, need special key to open it;

Visual Window

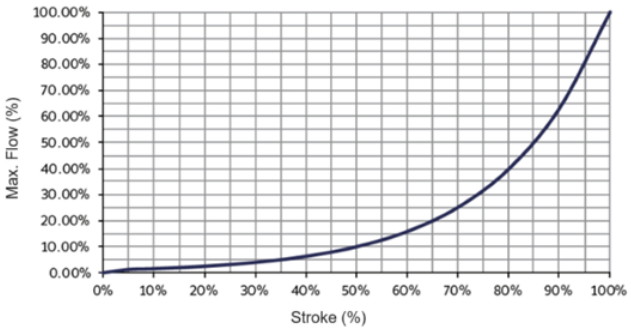
The actuator running status could be observed through the window;

Sensor Concealed Design

Adopt high precision sensor, stronger to avoid interference;

Temp. sensor precision: ±0.3℃

Pressure sensor precision: ±0.5%



Equal Percentage Flow Characteristic

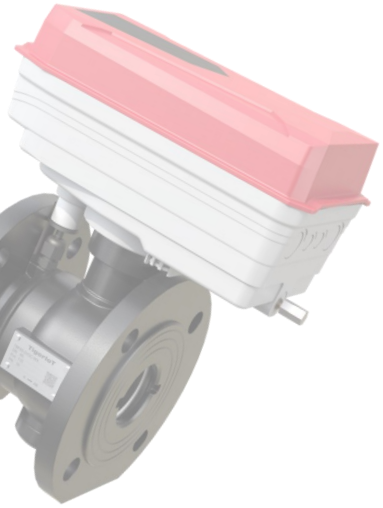
Valve has a perfect flow curve, rangeability is over 100:1;

High Regulation Precision of 0.3%

Achieve a precision flow regulation;

Zero Leakage in Both Direction

The valve could realize zero leakage in both direction once it is fully closed;



Power Supply

RS485 communication

NB communication

LoRa communication

Battery Supply

NB communication

LoRa communication

Type Overview

Power Supply - RS485 Communication

Single Temp. Sensor	Dual Temp. Sensor	Dual Temp. & Pressure Sensor	Caliber [in.]	DN [mm]	Connec-tion	Kvs [m3/h]	AC Power	Recom-mended AC Trans-former	DC Pow-er	Recom-mended DC Power Supply	Actuator Power Sup-ply
TBF040W-80RS485-P	TBF040W-80RS485-PD	TBF040W-80RS485-PF	1 1/2	40	Flange	40	12VA	30VA	6VA	15VA	24VAC/DC
TBF050W-80RS485-P	TBF050W-80RS485-PD	TBF050W-80RS485-PF	2	50	Flange	78	12VA	30VA	6VA	15VA	24VAC/DC
TBF065W-80RS485-P	TBF065W-80RS485-PD	TBF065W-80RS485-PF	2 1/2”	65	Flange	120	12VA	30VA	6VA	15VA	24VAC/DC
TBF080W-80RS485-P	TBF080W-80RS485-PD	TBF080W-80RS485-PF	3”	80	Flange	160	12VA	30VA	6VA	15VA	24VAC/DC
TBF100W-80RS485-P	TBF100W-80RS485-PD	TBF100W-80RS485-PF	4”	100	Flange	275	12VA	30VA	6VA	15VA	24VAC/DC
TBF125W-80RS485-P	TBF125W-80RS485-PD	TBF125W-80RS485-PF	5”	125	Flange	396	12VA	30VA	6VA	15VA	24VAC/DC
TBF150W-80RS485-P	TBF150W-80RS485-PD	TBF150W-80RS485-PF	6”	150	Flange	544	12VA	30VA	6VA	15VA	24VAC/DC
TBF200W-80RS485-P	TBF200W-80RS485-PD	TBF200W-80RS485-PF	8”	200	Flange	600	12VA	30VA	6VA	15VA	24VAC/DC
TBF250W-80RS485-P	TBF250W-80RS485-PD	TBF250W-80RS485-PF	10”	250	Flange	884	12VA	30VA	6VA	15VA	24VAC/DC

Power Supply - NB Communication

Single Temp. Sensor	Dual Temp. Sensor	Dual Temp. & Pressure Sensor	Caliber [in.]	DN [mm]	Connec-tion	Kvs [m3/h]	AC Power	Recom-mended AC Trans-former	DC Pow-er	Recom-mended DC Power Supply	Actuator Power Sup-ply
TBF040W-80NB-P	TBF040W-80NB-PD	TBF040W-80NB-PF	1 1/2	40	Flange	40	12VA	30VA	6VA	15VA	24VAC/DC
TBF050W-80NB-P	TBF050W-80NB-PD	TBF050W-80NB-PF	2	50	Flange	78	12VA	30VA	6VA	15VA	24VAC/DC
TBF065W-80NB-P	TBF065W-80NB-PD	TBF065W-80NB-PF	2 1/2”	65	Flange	120	12VA	30VA	6VA	15VA	24VAC/DC
TBF080W-80NB-P	TBF080W-80NB-PD	TBF080W-80NB-PF	3”	80	Flange	160	12VA	30VA	6VA	15VA	24VAC/DC
TBF100W-80NB-P	TBF100W-80NB-PD	TBF100W-80NB-PF	4”	100	Flange	275	12VA	30VA	6VA	15VA	24VAC/DC
TBF125W-80NB-P	TBF125W-80NB-PD	TBF125W-80NB-PF	5”	125	Flange	396	12VA	30VA	6VA	15VA	24VAC/DC
TBF150W-80NB-P	TBF150W-80NB-PD	TBF150W-80NB-PF	6”	150	Flange	544	12VA	30VA	6VA	15VA	24VAC/DC
TBF200W-80NB-P	TBF200W-80NB-PD	TBF200W-80NB-PF	8”	200	Flange	600	12VA	30VA	6VA	15VA	24VAC/DC
TBF250W-80NB-P	TBF250W-80NB-PD	TBF250W-80NB-PF	10”	250	Flange	884	12VA	30VA	6VA	15VA	24VAC/DC

Power Supply - LoRa Communication

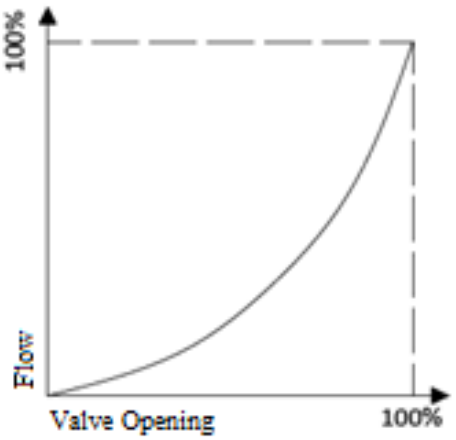
Single Temp. Sensor	Dual Temp. Sensor	Dual Temp. & Pressure Sensor	Caliber [in.]	DN [mm]	Connec-tion	Kvs [m3/h]	AC Power	Recom-mended AC Trans-former	DC Pow-er	Recom-mended DC Power Supply	Actuator Power Sup-ply
TBF040W-80Lora-P	TBF040W-80Lora-PD	TBF040W-80Lora-PF	1 1/2	40	Flange	40	12VA	30VA	6VA	15VA	24VAC/DC
TBF050W-80Lora-P	TBF050W-80Lora-PD	TBF050W-80Lora-PF	2	50	Flange	78	12VA	30VA	6VA	15VA	24VAC/DC
TBF065W-80Lora-P	TBF065W-80Lora-PD	TBF065W-80Lora-PF	2 1/2”	65	Flange	120	12VA	30VA	6VA	15VA	24VAC/DC
TBF080W-80Lora-P	TBF080W-80Lora-PD	TBF080W-80Lora-PF	3”	80	Flange	160	12VA	30VA	6VA	15VA	24VAC/DC
TBF100W-80Lora-P	TBF100W-80Lora-PD	TBF100W-80Lora-PF	4”	100	Flange	275	12VA	30VA	6VA	15VA	24VAC/DC
TBF125W-80Lora-P	TBF125W-80Lora-PD	TBF125W-80Lora-PF	5”	125	Flange	396	12VA	30VA	6VA	15VA	24VAC/DC
TBF150W-80Lora-P	TBF150W-80Lora-PD	TBF150W-80Lora-PF	6”	150	Flange	544	12VA	30VA	6VA	15VA	24VAC/DC
TBF200W-80Lora-P	TBF200W-80Lora-PD	TBF200W-80Lora-PF	8”	200	Flange	600	12VA	30VA	6VA	15VA	24VAC/DC
TBF250W-80Lora-P	TBF250W-80Lora-PD	TBF250W-80Lora-PF	10”	250	Flange	884	12VA	30VA	6VA	15VA	24VAC/DC

Type Overview

Battery Supply - NB Communication							
Single Temp. Sensor	Dual Temp. Sensor	Dual Temp. & Pressure Sensor	Caliber [in.]	DN [mm]	Connec-tion	Kvs [m3/h]	Battery Lifetime
TBF040W-80NB-B	TBF040W-80NB-BD	TBF040W-80NB-BF	1 1/2	40	Flange	40	5 Years
TBF050W-80NB-B	TBF050W-80NB-BD	TBF050W-80NB-BF	2	50	Flange	78	5 Years
TBF065W-80NB-B	TBF065W-80NB-BD	TBF065W-80NB-BF	2 1/2"	65	Flange	120	5 Years
TBF080W-80NB-B	TBF080W-80NB-BD	TBF080W-80NB-BF	3"	80	Flange	160	5 Years
TBF100W-80NB-B	TBF100W-80NB-BD	TBF100W-80NB-BF	4"	100	Flange	275	5 Years
TBF125W-80NB-B	TBF125W-80NB-BD	TBF125W-80NB-BF	5"	125	Flange	396	5 Years
TBF150W-80NB-B	TBF150W-80NB-BD	TBF150W-80NB-BF	6"	150	Flange	544	5 Years
TBF200W-80NB-B	TBF200W-80NB-BD	TBF200W-80NB-BF	8"	200	Flange	600	5 Years
TBF250W-80NB-B	TBF250W-80NB-BD	TBF250W-80NB-BF	10"	250	Flange	884	5 Years

Battery Supply - LoRa Communication							
Single Temp. Sensor	Dual Temp. Sensor	Dual Temp. & Pressure Sensor	Caliber [in.]	DN [mm]	Connec-tion	Kvs [m3/h]	Battery Lifetime
TBF040W-80Lora-B	TBF040W-80Lora-BD	TBF040W-80Lora-BF	1 1/2	40	Flange	40	5 Years
TBF050W-80Lora-B	TBF050W-80Lora-BD	TBF050W-80Lora-BF	2	50	Flange	78	5 Years
TBF065W-80Lora-B	TBF065W-80Lora-BD	TBF065W-80Lora-BF	2 1/2"	65	Flange	120	5 Years
TBF080W-80Lora-B	TBF080W-80Lora-BD	TBF080W-80Lora-BF	3"	80	Flange	160	5 Years
TBF100W-80Lora-B	TBF100W-80Lora-BD	TBF100W-80Lora-BF	4"	100	Flange	275	5 Years
TBF125W-80Lora-B	TBF125W-80Lora-BD	TBF125W-80Lora-BF	5"	125	Flange	396	5 Years
TBF150W-80Lora-B	TBF150W-80Lora-BD	TBF150W-80Lora-BF	6"	150	Flange	544	5 Years
TBF200W-80Lora-B	TBF200W-80Lora-BD	TBF200W-80Lora-BF	8"	200	Flange	600	5 Years
TBF250W-80Lora-B	TBF250W-80Lora-BD	TBF250W-80Lora-BF	10"	250	Flange	884	5 Years

Flow Characteristic



Equal Percentage Flow Characteristic

Determination of Kvs

$$Kvs = \frac{V}{\sqrt{\frac{\triangle P}{100}}}$$

△P: Differential pressure when valve is full open (KPa)

V: Rating flow at the △P (unit: m3/h)

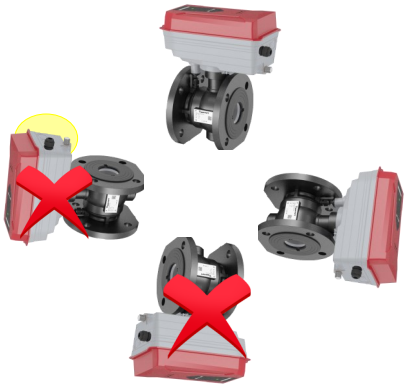
Kvs: Nominal flow coefficient, which refers to the flow when medium (density = 1g/cm3) goes through the full open control valve, whose ⍰P is 100KPa.

Installation Instructions

- Note: Power Supply Type - Installation Orientation

  Don't install the waterproof connector upward!

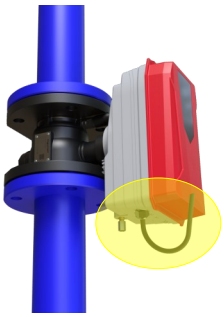
  Don't install the actuator downward!



- Note: Battery Supply Type - Installation Orientation

  Don't install the actuator downward!

- When installing the valve on the vertical pipe, ensure that the waterproof joint is installed facing downwards, and that the incoming wire is routed with a reserved 'U' shaped loop to prevent water ingress!

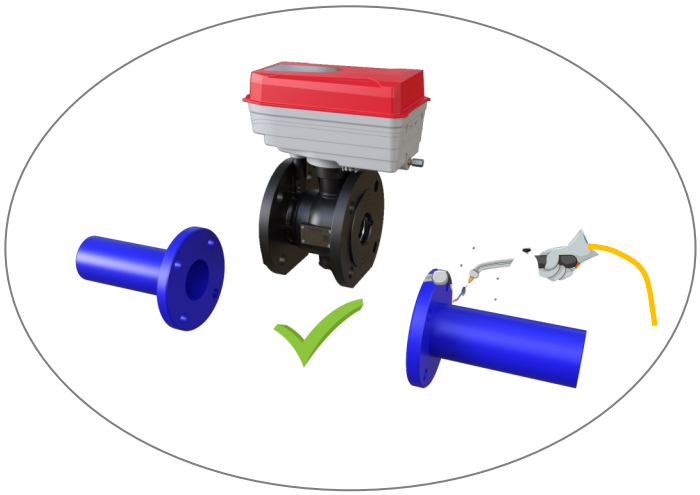


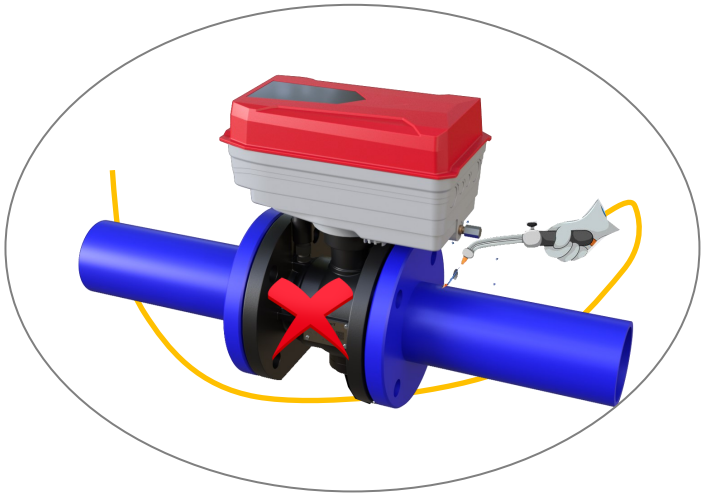
- When installing on a pipeline, reserve a detachable distance.

- When IoT Temp. Balancing valve is in installed on the pipeline, the outer flange should be welded to the pipeline first, and then the valve should be stuck to the outer flange;

If the outer flange is first stuck with the valve and then welded on the pipeline, the temp. will be too high during the welding process, which will cause the valve and actuator to be heated and damage to the battery, circuit and sensor;

If the null line of the welding is placed on the left side of the valve, but the welding point is on the right side of the valve, the current will be very high from the valve during the welding, which will also damage the battery, circuit and sensor.

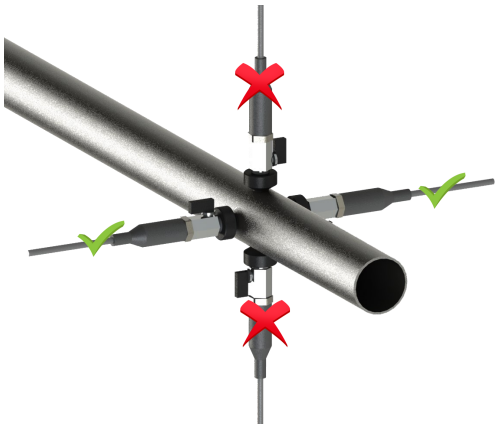




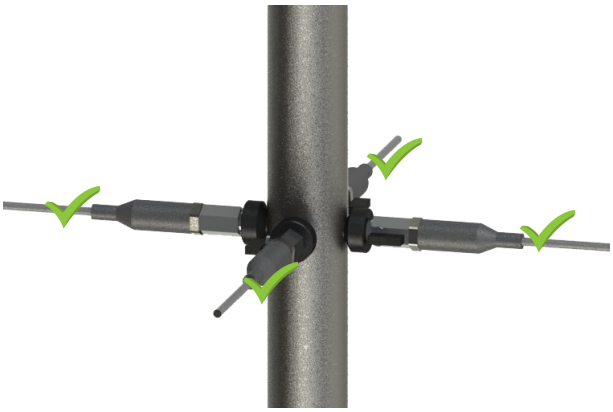
Installation Instructions

- Dual pressure sensors installation position: for vertical pipe, there is no requirement for the installation direction; for horizontal pipe, it could only be installed parallel to the floor!

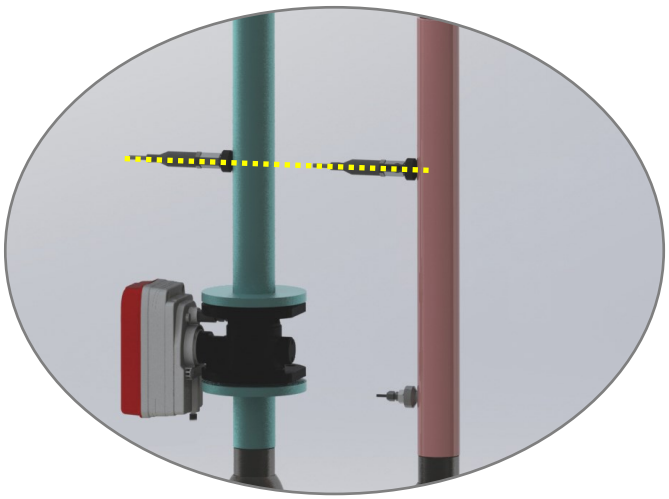
Horizontal pipe installation position:



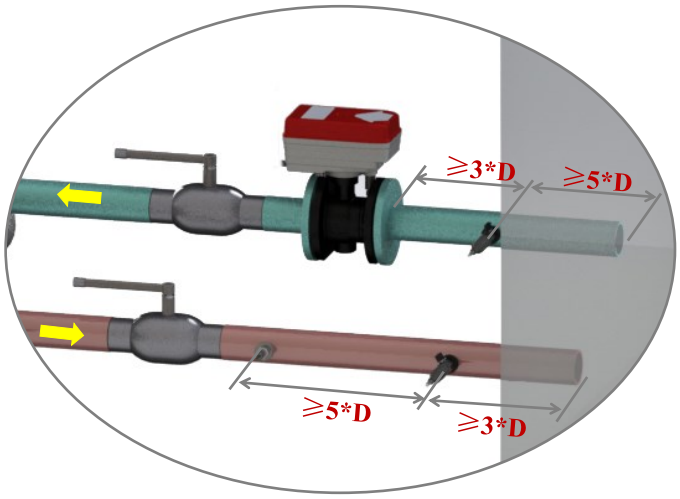
Vertical pipe installation position:



- **When installing those dual pressure sensors, the supply water pressure sensor and return water pressure sensor should be at the same height.**

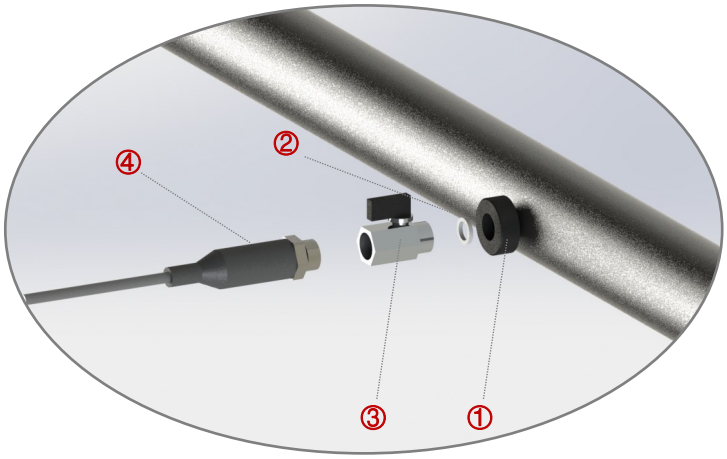


- **When installing the pressure sensor, ensure that there are straight pipe sections of 5D length upstream and 3D length downstream, where D represents the pipe diameter.**



- **Pressure Sensor Installation Methods:**

1. Weld the welding joint to the pipe
2. Install gasket, ball valve, pressure sensor in turn



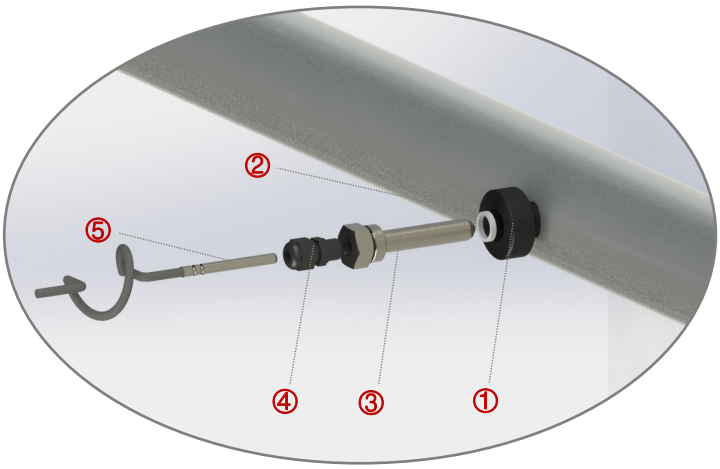
Pressure Sensor			
No.	Name	Thread	Model
①	Welding Joint	G1/2	TPTG(H)-RS485-3HJ
②	Gasket	/	
③	Ball Valve	G1/2	
④	Pressure Sensor	G1/2	

Note: Adopt special communication protocol, so special accessories provided by the manufacturer must be used;

Installation Instructions

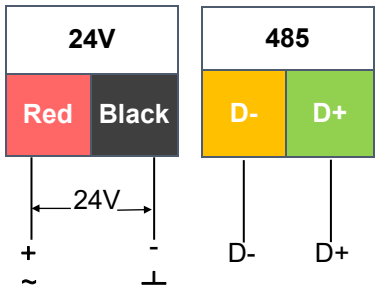
- **Temperature Sensor Installation Methods:**

1. Weld the welding joint to the pipe
2. Install gasket, pipe sleeve, waterproof joint, temperature sensor in turn



Temperature Sensor			
No.	Name	Thread	Model
①	Weld Tube	G1/2	TSW-PT1000-3HJ
②	Gasket	/	
③	Pipe Sleeve	M12*1.5	
④	Waterproof	G1/2	
⑤	Temperature	M12*1.5	

Wiring Diagram - Power Supply



Warning:

1. Please disconnect the power supply before connecting (disconnecting) the cables. Contact with components carrying dangerous voltages can result in electric shock, causing severe personal injury or even death!

2. Please verify the power voltage carefully before wiring and ensure it is done strictly according to the product parameter requirements. Failure to do so may cause a fire hazard, posing a serious threat to personal safety!

Note: TigerIoT doesn't assume any responsibility for casualties and propert y losses caused by irregular or wrong connection (disconnection)!

Indicating Light

Green light is flickering slowly

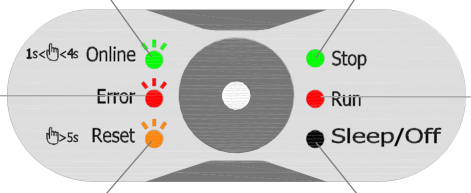
Connecting to the network, network connection is successful, or in a wake-up state.

Red light is flickering slowly

Network connection failed

Orange light is flickering slowly

Actuator stroke self-calibrating



Green light steady

Actuator stopped

Red light steady

Actuator operating

Light off

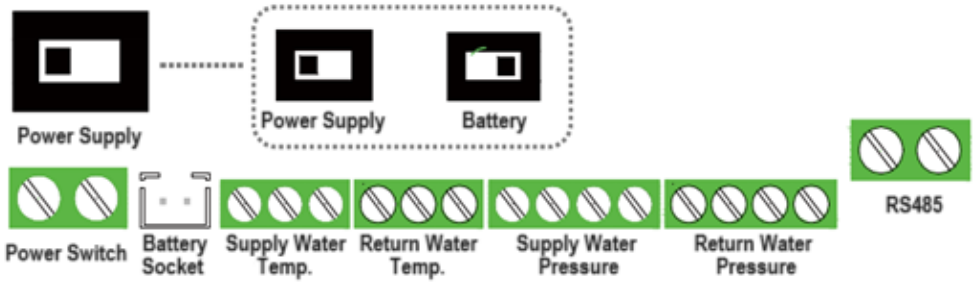
Actuator in low-power standby/powered off

- Button Operation Instructions

>5s	Power on	Upon leaving the factory, the actuator is in the powered-off state. Holding the button >5s activates it.
>5s	Self-calibrating	While the actuator is awake, holding button >5s initiates actuator's stroke self-calibrating
1s<<4s	Wake-up	While the actuator is standby or sleep, holding button 1-4s to wake actuator for 60s. During this wake-up period, read and write operations can be performed via the mobile app.
1s<<4s	Communicating	For an NB-IoT communication power supply type actuator, holding button 1-4s to initiate a communication session.

Terminals

- Power Switch & Terminals



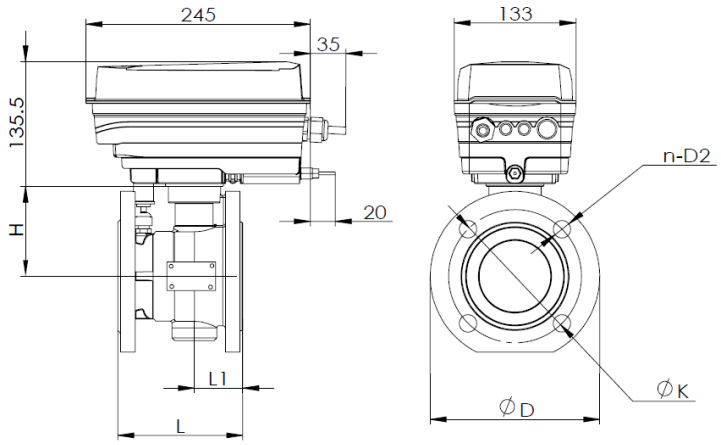
Warning:

1. After manual control, if switching back to remote control, the valve needs to be self-calibrated again. Hold the button for over 5 seconds to initiate the self-calibration process.
2. Every time an NFC read/write operation is performed, the actuator must be woken up through the button first.

Accessories

The special key in the toolkit is required to open the cover of the Unit IoT Temperature Balancing Valve. On-site debugging and maintenance managers can purchase the "toolkit" from the manufacturer!

Dimension



DN	D	n-D2	K	L1	L	H
DN40	150	4-19	110	53	137	82
DN50	165	4-19	125	53	137	91
DN65	185	4-19	145	53	137	98
DN80	200	8-19	160	67	168	105
DN100	220	8-19	180	90	211	117
DN125	250	8-19	210	109	263	138
DN150	285	8-23	240	135	315	152
DN200	340	12-23	295	135	315	210
DN250	405	12-28	355	161	365	243

Note: reserve the space for the antenna or waterproof joint to be extended out according to the dimension drawing to avoid interference with other manual valves or walls.

Hazardous Substances

Hazardous Substances						
Parts	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Metal	×	○	○	○	○	○
Rubber	○	○	○	○	○	○
PCB	○	○	○	○	○	○
Package	○	○	○	○	○	○

This form is created in accordance with the SJ/T11364 standard.

o :Indicates that the concentration of the hazardous substance contained in all the homogeneous materials of this part is below the limit requirement of the GB/T 26572.

x :Indicates that the concentration of the hazardous substance contained in all the homogeneous materials of this

Technical Parameters

• Operating Parameters—Valve Body	
Caliber	DN40~DN250
Permissible Pressure	PN16
Flow Characteristic	Equal-percentage
Rangeability	>100 ： 1
Leakage Rate	Zero Leakage
Connection Standard	Flange ISO 7005-2

• Operating Parameters—Actuator	
Rated Torque	80N.M
Operating Voltage	24V±15%
Frequency	50Hz or 60Hz
Power Consumption	24VAC:12VA Recommended AC Transformer: 30VA 24VDC:6VA Recommended DC Transformer: 15VA
Running Speed	240s/90°
Control Mode	
U2/U2-D/U2–Pro	RS485/NB/LoRa
U2-B/U2-BD/U2–BPro	NB/LoRa
Sensitivity	0.3%
Dead Zone	0.5%
Protection Grade	IP68
LifeCycle	100 thousand cycles

Technical Parameters

• Sensor	
PT1000 Temperature Sensor	
Measure Range	0~150℃
Measure Precision	±0.3℃
RS485 Pressure Sensor	
Measure Range	0-1600kPa
Measure Precision	±0.5%

• Material	
Valve Body	Ductile Iron
Valve Core	Stainless Steel
Valve Stem	Stainless Steel
Sealing Ring	FKM
Cover	Metal or PC
Base	Aluminum die casting

• Environment Parameter	
Operation	
Ambient Temperature	-25~+65℃
Ambient Humidity	≤95% RH
Storage	
Ambient Temperature	-40~+65℃
Ambient Humidity	≤95% RH

• Certificates	
CE Conformity	
EMC Directive	2014/30/EU
Low-voltage Directive	2014/35/EU
Machinery Directive	2006/42/EC
System Certification	
QMS	GB/T19001-2016 / ISO9001:2015
EMS	GB/T24001-2016 / ISO14001:2015
QHSAS	GB/T45001-2020 / ISO 45001:2018

Packing List

Single Temperature Scheme

Picture	Product	Qty
	IoT Electric Actuator	1
	IoT Temp. Balancing Valve: Built-in temperature sensor with high precision	1

Dual Temperature Scheme

Picture	Product	Qty
	IoT Electric Actuator	1
	IoT Temp. Balancing Valve: Built-in temperature sensor with high precision	1
	Temperature Sensor (Manufacturer-Specific part) Installed on the supply water pipe (with 3-meter cable) Included welding joint, pipe sleeve, waterproof joint, gasket	1
	Cable Protector (Optional) The 3-meter cable exposed externally from the pressure and temperature sensors is encased in a cable protector, which measures 3 meters in length.	1

Dual Temperature & Pressure Scheme

Picture	Product	Qty
	IoT Electric Actuator	1
	IoT Temp. Balancing Valve: Built-in temperature sensor with high precision	1
	Temperature Sensor (Manufacturer-Specific part) Installed on the supply water pipe (with 3-meter cable) Included welding joint, pipe sleeve, waterproof joint, gasket	1
	Pressure Sensor (Manufacturer-Specific part) Installed one on the supply water pipe, another one on return water pipe (with 3-meter cable) Included welding joint, G1/2 manual ball valve, gasket	2
	Cable Protector (Optional) The 3-meter cable exposed externally from the pressure and temperature sensors is encased in a cable protector, which measures 3 meters in length.	3

Packing List

Other Optional Accessories

Picture	Product Type	Product Name	Product Usage
	TTOOL-U2	Toolkit	It can be used in one-to-many mode, and the selection is based on the number of purchased valves, but at least one set of tool kit must be selected for each batch of goods.
	TMBH-U2	U2 Metal Cover	For the application of valve in severe conditions such as outdoor exposure to the sun, a metal protective cover can be selected.
	TXPTX-3.0A (NB/LoRa communication as standard)	External Antenna (3m)	When the on-site signal is poor, an external antenna can be selected separately. Note: If a metal protective cover is chosen, an external antenna must be used.
	TXPTX-1.5B	External High Gain Antenna (1.5m)	The signal strength is increased, which is better than that of ordinary external antennas.
	TXPC-8A TXPC-28A	External Antenna Extension Cable (8m or 28m)	If the standard 3 meter length of the external antenna does not meet the installation requirements, an antenna extension cable can be selected additionally.

TigerIoT

WeChat Official Account

Channels

Website: www.tigeriot.com Welcome to follow the "Tige IoT" related platform for more information