Perfect Observe and Control Device

Build Smart Cities

TigerIoT

Exquisite Electric Ball Valve

Technical Data Sheet

Rev.1.0.7

Smart Actuator for ball valve

TW3NM/TW5NM/TW10NM Series
Torque: 3Nm / 5Nm / 10Nm

Product Features

- **Small Volume and High Precision**

  The actuator is designed with compact structure and small size, which is suitable for the air conditioning system with small space.

- **Multiple Signals Setting on Site**

  Multiple signals are available, such as 0(2)-10V, 0(4)-20mA, which can be shifted via DIP switches on site.

- **Manual Function**

  The actuator handle can open and close the valve manually.

- **Self-calibration**

  It can automatically test the valve stroke while power on.

- **Easy disassembly and assembly**

The connection between actuator and valve is realized by one screw. It is convenient and easy to pull and insert the actuator for disassembly and assembly.

- **Multi-function Window**

The actuator is equipped with an openable window. The signals can be shifted between 0~10V and 2~10V signals by DIP switches. You can observe the indicating lights through the window to know the operation status of the actuator.

- **Staying in Position at Signal Loss**

  Staying in position at signal loss: this is only applicable to input signal of 4~20mA and 2-10V, If other input control, this function will fail.

  Action at signal loss: The actuator at signal loss will run to the valve closed position by default.

- **Staying in Position at Power-off**

  When the actuator is powered off, the valve can be maintained in the current position.

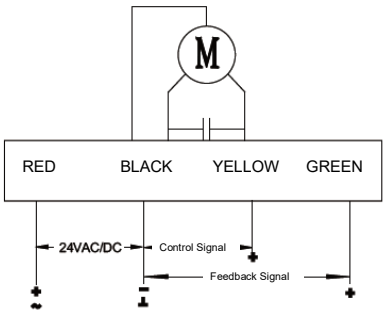
Type Overview

Actuator type						
Force	**Voltage**	**Type**	**Setting at signal loss**	**Control signal**	**Feedback signal**	**Velocity *1)**
3N.M	24V	TW3NM-X24	Action at signal loss	0(2)~10V,0(4)~20mA	0(2)~10V,0(4)~20mA	30s/90°
		TW3NM-XA24	Staying in position at signal loss	2-10V,4-20mA	2-10V,4-20mA	30s/90°
		TW3NM-D24	/	Floating	No signal	30s/90°
		TW3NM-D24-F2	/	Floating	SPDT	30s/90°
	220V	TW3NM-D220	/	Floating	No signal	30s/90°
5N.M	24V	TW5NM-X24	Action at signal loss	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°
		TW5NM-XA24	Staying in position at signal loss	2-10V,4-20mA	2-10V,4-20mA	30s/90°
		TW5NM-D24	/	Floating	No signal	30s/90°
		TW5NM-D24-F2	/	Floating	SPDT	30s/90°
	220V	TW5NM-D220	/	Floating	No signal	30s/90°
10N.M	24V	TW10NM-X24	Action at signal loss	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°
		TW10NM-XA24	Staying in position at signal loss	2-10V,4-20mA	2-10V,4-20mA	30s/90°
		TW10NM-D24	/	Floating	No signal	30s/90°
		TW10NM-D24-F2	/	Floating	SPDT	30s/90°
	220V	TW10NM-D220	/	Floating	No signal	30s/90°

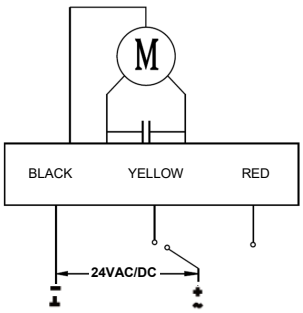
*1) If the speed is 15s/90°, the standard model suffix "K" is required, for example: TW3NM-X24K

Wiring Diagram

- **24V wiring diagram**

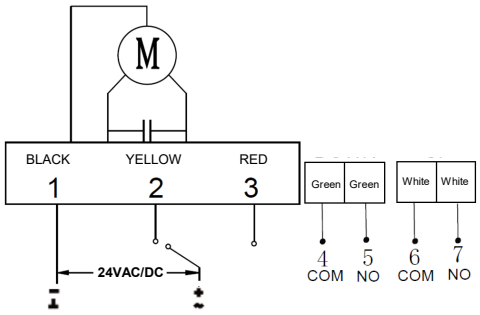


X24/XA24 Modulating



When the black or yellow power is on, the actuator runs from 1-0
When the black or red power is on, the actuator runs from 0-1

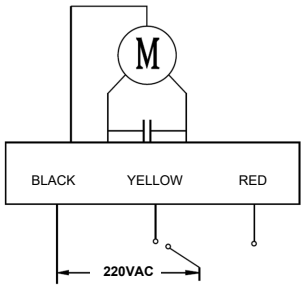
D24 Floating



When the black or yellow power is on, the actuator runs from 1-0, terminals 4 and 5 are connected and output SPDT
When the black or red power is on, the actuator runs from 0-1, terminals 6 and 7 are connected and output SPDT

D24-F2 Floating

- **220V wiring diagram**



When the black or yellow power is on, the actuator runs from 1-0
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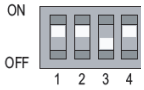
D220 Floating

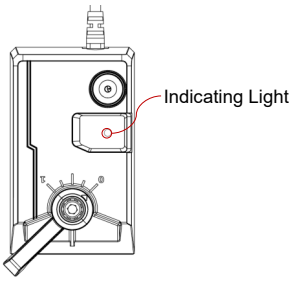
DIP Switch Setting Instruction (modulating)

Default Setting



DIP	Function	Description
S1-1	Control/valve position feedback signal	ON 4~20mA or 2~10VDC OFF 0~20mA or 0~10VDC
S1-2	Type of control signal	ON Current signal OFF Voltage signal
S1-3	Impedance match of control signal	ON Voltage signal OFF Current signal
S1-4	Type of feedback signal	ON Current signal OFF Voltage signal

Indicating Light Instruction



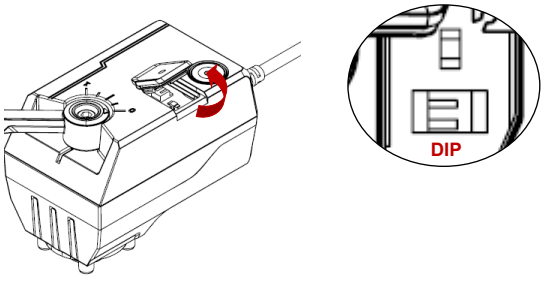
Indicating Light	Status	Description
Green	Always	Normal mode
Orange	Flashing	Stroke test
Red	Flashing	Alarming

Debugging Instruction

A. Connect the power supply and control signal cable.
B. Set the DIP switch to the needed position. When the DIP switch position is set, power on the actuator, and the setting function will take effect (the DIP switch can be set with power).

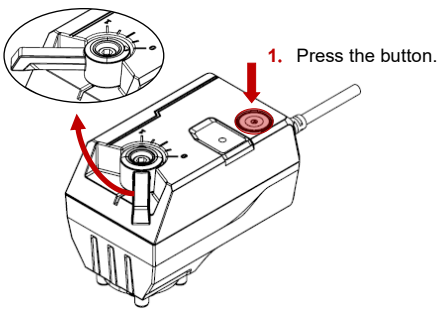
Operating Instruction

Opening Method of DIP cover



Manual function

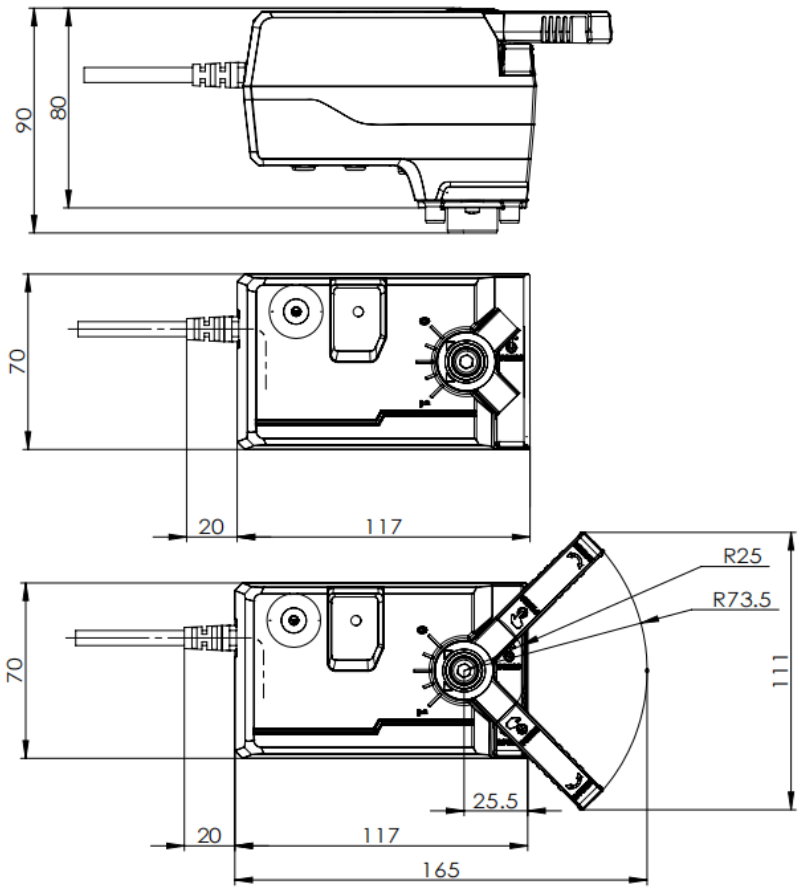
2. Turn the handle, the pointer points to "1", and the valve opens;
   Turn the handle, the pointer points to "0", and the valve closes;



Technical Parameters

• Functional data-Actuator		
Rated output power	3N.M / 5N.M / 10N.M	
Operating Voltage	24VAC/DC ± 15% 220VAC ± 15%	
Frequency	50Hz / 60Hz	
Control sensibility	Modulating: 1.0%	
Blind zone	3.0 %	
Velocity	30s / 90°	
Power	24VAC/220VAC: 25VA 24VDC: 10VA	Recommended transformer: 50VA DC switch power supply: 25VA
Impedance (only for modulating)		
Voltage input impedance	＞100K	
Current input impedance	＜0.2K	
Load requirements (only for modulating)		
Voltage output load requirement	＞2K	
Current output load requirement	＜0.4K	
Degree of protection	IP54	
Lifetime	100 thousand full open and close (The actuator runs from 0% to 100% to 0% as one time)	
Environmental condition for running	-25~+65℃, ≤95% RH non-condensing	
Environmental condition for storage	-40~+65℃, ≤95% RH non-condensing	

Dimension



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Environmental condition for running	-25~+65℃, ≤95% RH non-condensing	
Environmental condition for storage	-40~+65℃, ≤95% RH non-condensing	

Ball Valve TBL...stainless steel series

DN15~DN50 PN25

Product Features

- **Equal-percentage Flow Characteristics**

The valve from A to AB has a perfect equal-percentage control curve, and the rangeability is >100 : 1.

- **Zero Leakage Rate**

It is “0” leakage rate when the valve is closed.

- **Easy disassembly and assembly**

The connection between actuator and valve is realized by one screw. It is convenient and easy to pull and insert the actuator for disassembly and assembly.

- **Stainless Steel Full Core**

It adopts full core structure with dual seal and is made of stainless steel with strong corrosion resistance.

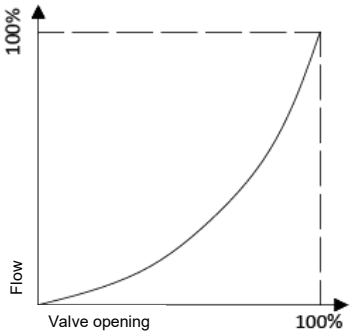
- **High Quality Materials**

The valve body is made of high-quality stainless steel with strong corrosion resistance.

Type Overview

Valve type -40~120℃ EPDM(O-ring)	Valve type -10~120℃ FKM(O-ring)	Valve type -40~80℃ HNBR(O-ring)	Size [in.]	Size [mm]	Size [in.]	Size [mm]	Connection	Kvs [m^3/h]	Actuator force
TBL15-2LBD-BX	TBL15-2VBD-BX	TBL15-2HBD-BX	1/2”	15	Thread		4	4	3NM
TBL20-2LBD-BX	TBL20-2VBD-BX	TBL20-2HBD-BX	3/4”	20	Thread		7.5	7.5	3NM
TBL25-2LBD-BX	TBL25-2VBD-BX	TBL25-2HBD-BX	1”	25	Thread		15	15	3NM
TBL32-2LBD-BX	TBL32-2VBD-BX	TBL32-2HBD-BX	11/4”	32	Thread		25	25	5NM
TBL40-2LBD-BX	TBL40-2VBD-BX	TBL40-2HBD-BX	11/2”	40	Thread		40	40	5NM
TBL50-2LBD-BX	TBL50-2VBD-BX	TBL50-2HBD-BX	2”	50	Thread		70	70	10NM

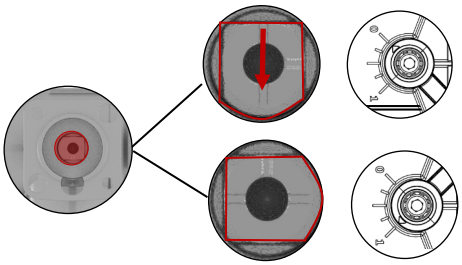
Flow Characteristics



A-AB equal percentage

Actuator And Valve Assembly

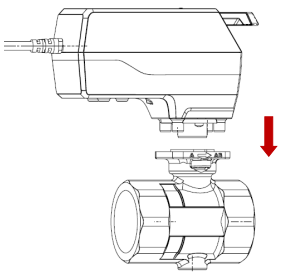
1. In order to better match the valve with the actuator, please ensure that the valve is closed and the actuator opening pointer is at "0" position before assembly!



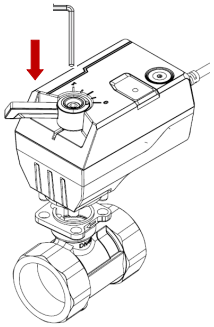
The valve shaft is at the position shown as on the left, the valve is closed, and the actuator pointer is at the "0" position.

The valve shaft is at the position shown as on the left, the valve is opened, and the actuator pointer is at the "1" position.

2. Align the locating hole and install the actuator vertically on the valve in the direction shown below.

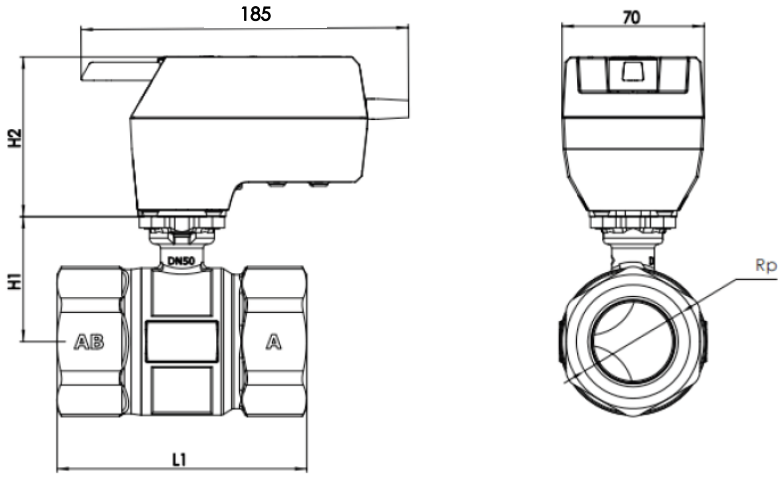


3. Insert a 5mm hex wrench into the pointer hole at the top and tighten it manually.



Dimension

DN15~DN50 with actuator



Size	Rp	L1 mm	H1 mm	H2 mm
DN15	1/2	64	37	89
DN20	3/4	71	42	89
DN25	1	87	48	89
DN32	1-1/4	100	50	89
DN40	1-1/2	110	56	89
DN50	2	123	62	89

Technical Parameters

• Functional data-Valve	
Nominal size	DN15~DN50
Nominal pressure	PN25
Flow characteristic	Equal percentage
Valve rangeability	>100 : 1
Leakage rate	Zero leakage
Permissible medium	Hot, chilled water
Medium temperature TBL**-2VBD TBL**-2LBD TBL**-2HBD	-10~+120℃ FKM O-ring -40~+120℃ EPDM O-ring -40~+80℃ HNBR O-ring
Connection standard	Thread ISO7-1 Rp
Valve body material	Stainless steel
Valve core material	Stainless steel
Valve stem	Stainless steel
Valve seat	PTFE
O-ring	FKM, EPDM and NBR are optional

TigerIoT

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Channels

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