

## 2-way Tri-clamp Ball Valve

### Product Features

- O-type ball, bidirectional seal
- Equal-percentage flow characteristics
- Tri-clamp connection, quick assembly and disassembly
- Stainless steel valve body and valve core, applicable for several refrigerants medium

### Type Overview

Valve type -40~120°C EPDM(O-ring)	Valve type -10~120°C FKM(O-ring)	Valve type -40~80°C HNBR(O-ring)	Size [in.]	Size [mm]	Connection	Kvs [m³/h]	Actuator force
TBG15-2LBC-BX	TBG15-2VBC-BX	TBG15-2HBC-BX	1/2"	15	Tri-clamp	4	3NM
TBG20-2LBC-BX	TBG20-2VBC-BX	TBG20-2HBC-BX	3/4"	20	Tri-clamp	7.5	3NM
TBG25-2LBC-BX	TBG25-2VBC-BX	TBG25-2HBC-BX	1"	25	Tri-clamp	15	3NM
TBG32-2LBC-BX	TBG32-2VBC-BX	TBG32-2HBC-BX	1 1/4"	32	Tri-clamp	25	5NM
TBG40-2LBC-BX	TBG40-2VBC-BX	TBG40-2HBC-BX	1 1/2"	40	Tri-clamp	40	5NM
TBG50-2LBC-BX	TBG50-2VBC-BX	TBG50-2HBC-BX	2"	50	Tri-clamp	70	10NM
TBG65-2LBC-BX	TBG65-2VBC-BX	TBG65-2HBC-BX	2 1/2"	65	Tri-clamp	105	20NM
TBG80-2LBC-BX	TBG80-2VBC-BX	TBG80-2HBC-BX	3"	80	Tri-clamp	160	20NM
TBG100-2LBC-BX	TBG100-2VBC-BX	TBG100-2HBC-BX	4"	100	Tri-clamp	256	50NM

Note: If there are special material requirements for stainless steel, the corresponding grade should be added after the model, for example:  
TBG15-2LBC316-BX

# Sanitary Tri-clamp Ball Valve

## Features

- The flow passage inside the valve body is polished and meets the sanitary standard
- The sphere and its internal components transition smoothly, and there are no dead corners or residues of the medium
- Global ball core, bidirectional sealing
- Equal percentage flow curve
- The tri-clamp quick-connect interface makes disassembly and assembly convenient
- Stainless steel valve body/ball core, suitable for various cold media

## Application field

- Food processing: dairy products, fruit juice, beer, beverage production lines
- Pharmaceuticals and Biopharmaceuticals: Purified water, injection water, fermentation systems
- Cosmetics and daily chemical industry: Lotion, essence and fragrance delivery
- Semiconductor and ultrapure water systems: Oil-free and dust-free delivery control

## Type Overview

Valve type -40~120°C EPDM(O-ring)	Valve type -10~120°C FKM(O-ring)	Valve type -40~80°C HNBR(O-ring)	Size [in.]	Size [mm]	Connection	Kvs [m³/h]	Actuator force
TBGS15-2LBC-BX	TBGS15-2VBC-BX	TBGS15-2HBC-BX	1/2"	15	Tri-clamp	4	3NM
TBGS20-2LBC-BX	TBGS20-2VBC-BX	TBGS20-2HBC-BX	3/4"	20	Tri-clamp	7.5	3NM
TBGS25-2LBC-BX	TBGS25-2VBC-BX	TBGS25-2HBC-BX	1"	25	Tri-clamp	15	3NM
TBGS32-2LBC-BX	TBGS32-2VBC-BX	TBGS32-2HBC-BX	1 1/4"	32	Tri-clamp	25	5NM
TBGS40-2LBC-BX	TBGS40-2VBC-BX	TBGS40-2HBC-BX	1 1/2"	40	Tri-clamp	40	5NM
TBGS50-2LBC-BX	TBGS50-2VBC-BX	TBGS50-2HBC-BX	2"	50	Tri-clamp	70	10NM
TBGS65-2LBC-BX	TBGS65-2VBC-BX	TBGS65-2HBC-BX	2 1/2"	65	Tri-clamp	105	20NM
TBGS80-2LBC-BX	TBGS80-2VBC-BX	TBGS80-2HBC-BX	3"	80	Tri-clamp	160	20NM
TBGS100-2LBC-BX	TBGS100-2VBC-BX	TBGS100-2HBC-BX	4"	100	Tri-clamp	256	50NM

Note: If there are special material requirements for stainless steel, the corresponding grade should be added after the model, for example:  
TBGS15-2LBC316-BX

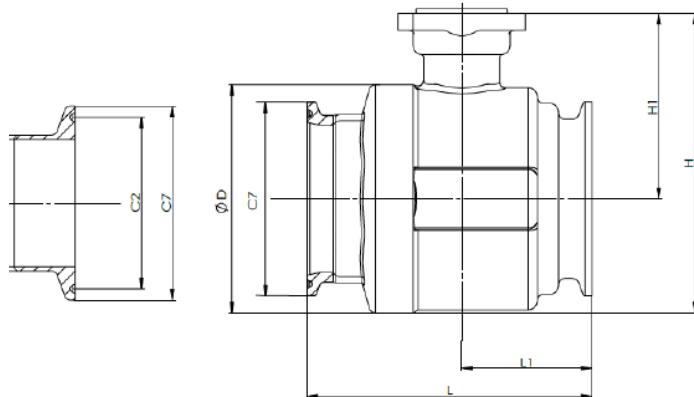
## Valve Flow Direction



## Technical Parameters

• Functional data	
Nominal size	DN15~DN100
Nominal pressure	PN16
Flow characteristic	Equal percentage
Valve rangeability	>100 : 1
Leakage rate	Bidirectional zero leakage
Medium temperature & O-ring material	-10~+120°C FKM O-ring
TBG**-2VBC	-40~+120°C EPDM O-ring
TBG**-2LBC	-40~+80°C HNBR O-ring
TBG**-2HBC	
Permissible medium	Hot, chilled water, ethylene glycol, deionized water, etc.
Connection standard	Tri-clamp ISO2852/DIN 32676
Valve body material	SS304, 316 / 316L / Seawater stainless steel can be customized
Valve core material	Stainless steel
Valve stem	Stainless steel

## Dimension



Size	C2 (mm)	C7 (mm)	D (mm)	L (mm)	L1 (mm)	H1 (mm)	H (mm)
DN15	27.5	34	30.5	68	31	34.5	50
DN20	27.5	34	34.5	68	31	35.5	53
DN25	43.5	50.5	48	73	32.5	44	68
DN32	43.5	50.5	52	76	33.5	47.5	74
DN40	43.5	50.5	66	90	40	57	90
DN50	56.5	64	75	94	43	61	99
DN65	70.5	77.5	92.5	130	62	88	135
DN80	83.5	91	110	152	75	95.5	150.5
DN100	110	119	144.4	195	93.5	113	196

The clamp interface part complies with the ISO2852/DIN 32676 standard.



## Smart Actuator

**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.

- **Detachable handle, suitable for extreme space applications**

The handle is detachable and can be stored on the side of the shell. When manual operation is required on site, the extension rod of the handle can be inserted for operation.

- **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.

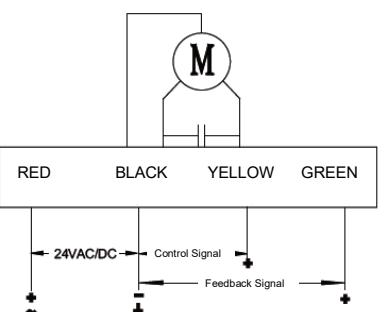
## Type Overview

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°	
5N.M	24V	220V	TW3NM-D220	/	Floating	No signal	30s/90°
		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°	
10N.M	24V	TW5NM-D24-F2	/	Floating	SPDT	30s/90°	
		220V	TW5NM-D220	/	Floating	No signal	30s/90°
		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°	
10N.M	220V	TW10NM-D24-F2	/	Floating	SPDT	30s/90°	
		220V	TW10NM-D220	/	Floating	No signal	30s/90°

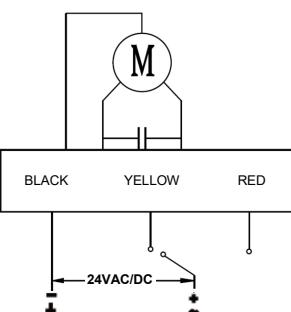
\*1) If the speed is 15s/90°, the standard model suffix "K" is required, for example: TW3NM-X24K

## Wiring Diagram

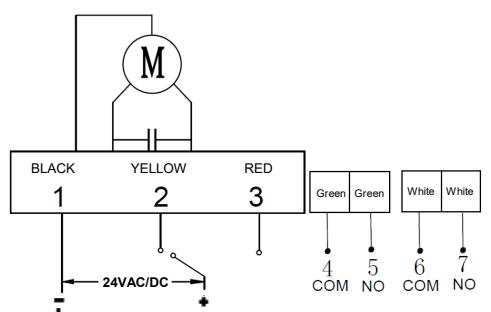
### • 24V wiring diagram



X24/XA24 Modulating



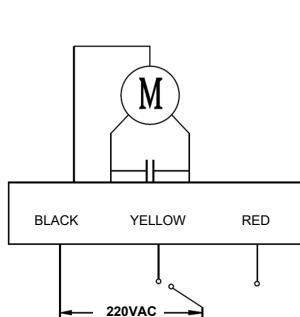
D24 Floating



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  
When the black or red power is on, terminals 4 and 5 are connected and output SPDT  
When the black or red power is on, terminals 6 and 7 are connected and output SPDT

D24-F2 Floating

### • 220V wiring diagram

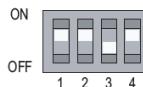


When the black or yellow power is on, the actuator runs from 1-0  
When the black or red power is on, the actuator runs from 0-1

D220 Floating

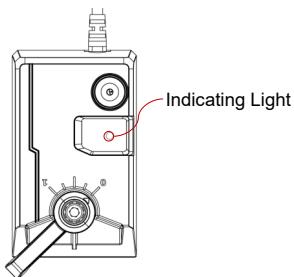
## DIP Switch Setting Instruction (modulating)

### 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

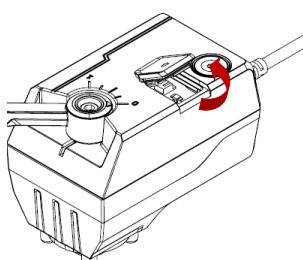
## Debugging Instruction

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).

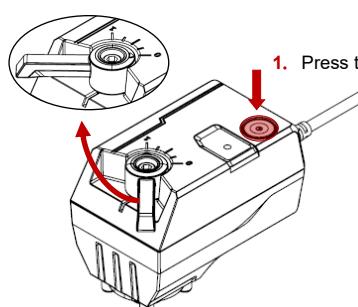
## Operating Instruction

### Opening Method of DIP cover



### Manual function

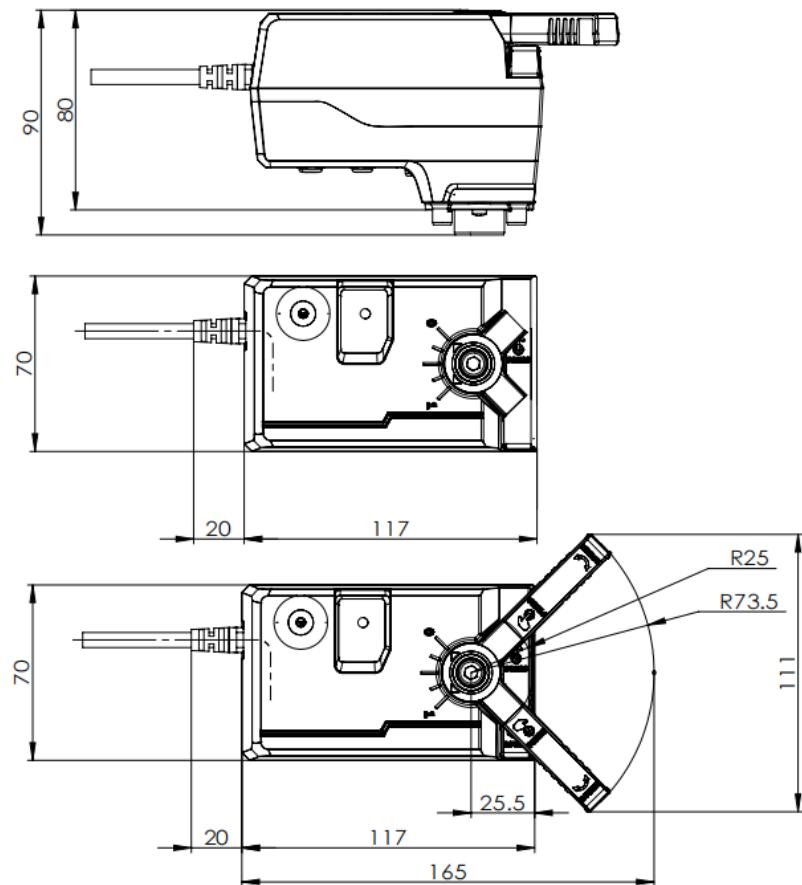
2. Turn the handle, the pointer points to "1", and the valve opens;  
Turn the handle, the pointer points to "0", and the valve closes;



## Technical Parameters

• Functional data-Actuator		
Rated output power	3N.M / 5N.M / 10N.M	
Operating Voltage	24VAC/DC $\pm$ 15% 220VAC $\pm$ 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 circles (The actuator runs from 0% to 100% to 0% as one time.)	
Environmental condition for running	-25~+65°C, $\leq$ 95% RH non-condensing	
Environmental condition for storage	-40~+65°C, $\leq$ 95% RH non-condensing	

## Dimension





## Actuator for Ball Valve TW20 series

Torque: 20Nm  
Power supply: 24V / 220V

### Product Features

- **Modulating & floating Control in Single Actuator, Expandable with RS485 Interface**

The control mode can be freely switched between modulating or floating type via the DIP switch. it supports multiple control/feedback signals, including 0(2)-10V and 0(4)-20mA.

- **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.

- **Local Control**

Local control and remote control can be shifted by DIP switch.

- **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. Users can observe the indicating lights through the window to know the operation status of the actuator.

- **Signal Loss**

Staying in position at signal loss and Action at signal loss can be shifted by DIP switch.

## Type Overview

Actuator type							
Force	voltage	Type	Control signal	Feedback signal	Velocity	Power	Recommended transformer
20N.M	24V	TW20NM-BX24	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°	24VAC:30VA	50VA
			Floating	No signal		24VDC:12VA	30VA
		TW20NM-BX24-485	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°	24VAC:30VA	50VA
	220V	TW20NM-BX24-F2	Floating	No signal		24VDC:12VA	30VA
			RS485	RS485		24VAC:30VA	50VA
		TW20NM-BX220	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°	40VA	/
		TW20NM-BX220-485	Floating	No signal		40VA	/
			RS485	RS485		40VA	/
		TW20NM-BX220-F2	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°	40VA	/
50N.M	24V	TW50NM-BX24	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°	24VAC:40VA	60VA
			Floating	No signal		24VDC:20VA	50VA
		TW50NM-BX24-485	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°	24VAC:40VA	60VA
	220V	TW50NM-BX24-F2	Floating	No signal		24VDC:20VA	50VA
			RS485	RS485		24VAC:40VA	60VA
		TW50NM-BX220	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°	50VA	/
		TW50NM-BX220-485	Floating	No signal		50VA	/
			RS485	RS485		50VA	/
		TW50NM-BX220-F2	0(2)~10VDC,0(4)~20mA	0(2)~10VDC,0(4)~20mA	30s/90°	50VA	/
		TW50NM-BX220-F2	Floating	SPDT		24VDC:20VA	50VA
			SPDT	SPDT		50VA	/

## Wiring Instruction

1. Please cut off power supply during wiring in order to ensure personal safety!

3. Open the cover when wiring, prohibit disassembling other spare parts!

2. Carefully check the power voltage when wiring, wire according to the product parameter, if not, it may cause fire and endanger personal safety in severe case!

4. After wiring, please install the cover to the original position to avoid electric shock!

## DIP Switch Instruction

DIP	Function	Description
S1-1	Starting of control/ 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
S1-5	Operating mode	ON when the control signal increases, actuator runs to "1", when the control signal decreases, actuator runs to "0". OFF when the control signal increases, actuator runs to "0", when the control signal decreases, actuator runs to "1".
S1-6	Losing control signal mode	ON When lose control signal (voltage type or current type), actuator will provide a min. control signal internally. OFF 1)When lose control signal (voltage type),actuator will provide a max. control signal internally. 2)When lose control signal (current type),actuator will provide a min. control signal internally.
S1-7	Self-stroking mode	ON Power on each time, self-stroking starts automatically. OFF Self-stroking starts only when press the self-stroking button manually.
S1-8	Control type (when S1-9 is OFF)	ON 3-position type OFF Proportional type
S1-9	Control mode	ON RS485 OFF Proportional type and 3-position type
S1-10	Losing signal position locked*	ON When the control signal is disconnected, the actuator remains at the current position (only applicable to input signals 4-20mA). OFF The actuator operates according to S1-6 settings.

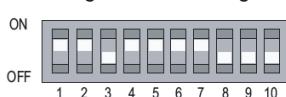
\*Note: 1) S1-10 is only applicable when S1-2 is in the ON state.

2) S1-10 takes priority over S1-6.

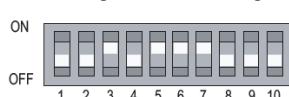
## DIP Switch Setting Instruction

### • Proportional

Control signal/feedback signal: 4~20mA



Control signal/feedback signal: 0~10VDC



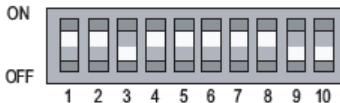
When S1-8 is set to OFF, the actuator is proportional type. Actuator can be controlled by control signal via connecting terminals:  
When the control signal increases, actuator runs to "1", the valve tends to open.

When the control signal decreases, actuator runs to "0", the valve tends to close.

When the control signal has no changing, actuator shaft and valve stem stay in present position.

When voltage (or current) signal is disconnected, this is equivalent to input a min. control signal, actuator runs to "0", valve will close.

- 3-position



When S1-8 is set to ON, the actuator is 3-position type. control the actuator by the switch. Terminal O, E and Y don't work by this time!

**24V 3-position:**

O, OPEN connected: actuator runs to "1", valve tends to open

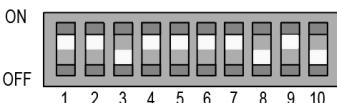
O, CLOSE connected: actuator runs to "0", valve tends to close

**220V 3-position:**

1 and 2 connected to power: actuator runs to "0"

1 and 3 connected to power: actuator runs to "1"

- RS485 Bus Communication

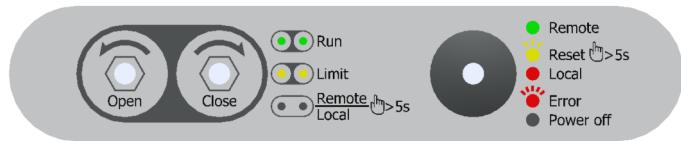


When the actuator is controlled by RS485 bus communication. It is remotely controlled by 8 and 9.

Actuator can be controlled remotely by RS485 bus communication, actuator supports ModBus protocol.

Notes: Terminal O, E, Y, CLOSE, and OPEN don't work!

## Indicating Light Instruction



Reset	Status	Description
Green	Always	Normal mode
Red	Always	Local mode
Orange	Flashing(1Hz)	Self-stroke
Red	Quick flashing(2Hz)	Alarming

UP	Status	Description
Green	Always	Normal mode
Red	Always	Local mode
Orange	Always	Reach upper limit position
Red	Flashing(1Hz)	Alarming

DOWN	Status	Description
Green	Always	Normal mode
Red	Always	Local mode
Orange	Always	Reach lower limit position
Red	Flashing(1Hz)	Alarming

## Debugging Instruction

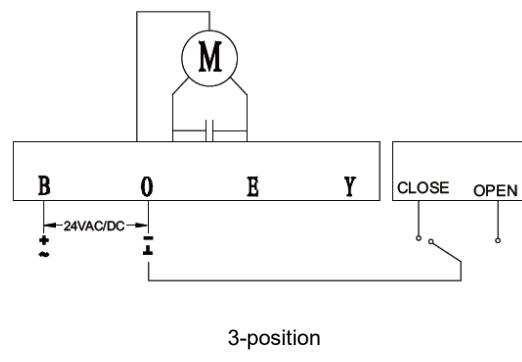
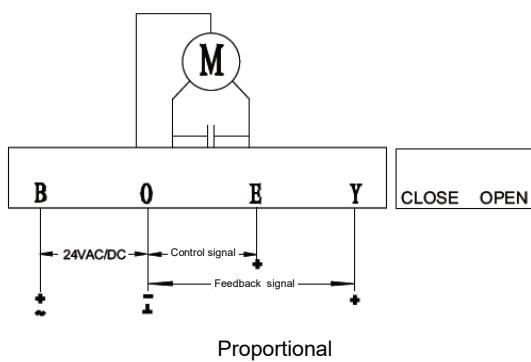
- Connect actuator and valve body.
- Connect the power supply and the control signal line.
- Set DIP Switch to needed position. After setting, turn on actuator power, pre-setting function will come into effect (DIP Switch can be set with power).
- Power on the actuator.
- Actuator self-stroking: the purpose of this step is to match the actuator with the valve body:
  - The Reset yellow indicating light will keep flashing(1Hz), actuator shaft extends to "0" firstly, and then, it retracts to "1", actuator will not be controlled by signal by this time.
  - After 2 mins, Reset yellow light stops flashing, self-stroking stops and the matching of the valve and actuator is finished. By then, actuator running direction can be controlled by control signal.
  - If the Reset red light is quick flashing (2Hz) during the self-stroking, it means the self-stroking status is not correct and the actuator starts alarming. The actuator can't match with the max. stroke of valve.

Remarks: If self-stroking is needed in a power-on state, press down the Reset button over 5s, and then the actuator will start self-stroking. Self-stroking phenomenon is the same as step 1), 2).

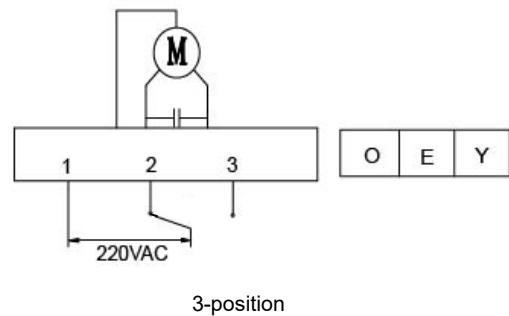
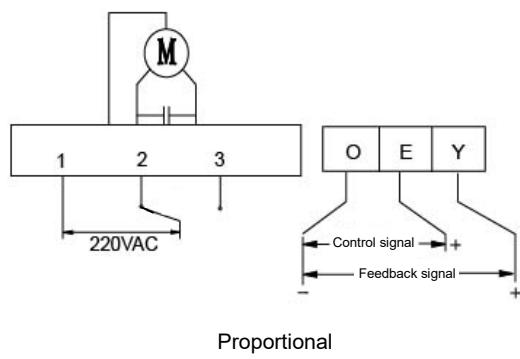
- The factory default setting is automatic self-stroking, it means the actuator will repeat automatic self-stroking when power on each time!**
- If you don't need automatic self-stroking function, you can set the 7th switch to OFF, it will change into manual self-stroking (Phenomenon is the same as step 1), 2).**

## Wiring Diagram

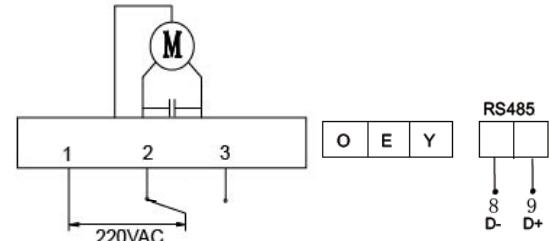
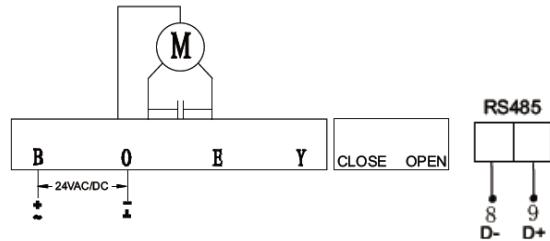
- **TW20/50NM-BX24**



- **TW20/50NM-BX220**



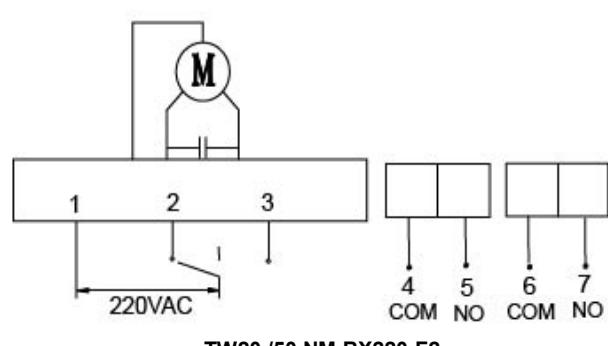
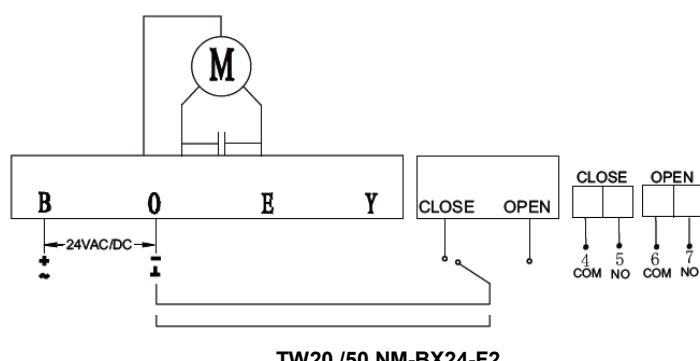
- **TW20/50NM-BX24 (220)-485**



Notes:

- 1) When wiring BX24 actuator with RS485 communication function, only B, 0 and RS485 communication terminal need to be connected.
- 2) When wiring BX220 actuator with RS485 communication function, only 1, 2 and RS485 communication terminal need to be connected.

- **TW20/50NM-BX24/220-F2**



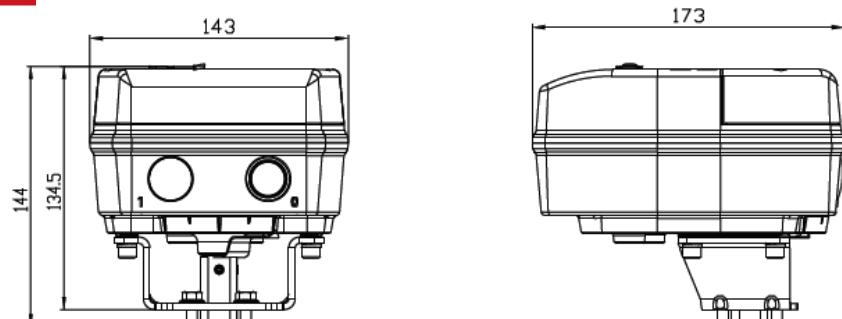
## Technical Parameters

• Functional data-Actuator	
Rate torque	20N.M / 50N.M
Operating voltage TW...-BX24... TW...-BX220...	24VAC± 15%, 24VDC+15% 220VAC ± 15%
Frequency	50Hz or 60Hz
Sensitivity	Proportional: 1.0% (factory setting) RS485: 0.5% (factory setting)
Blind zone	3.0 % (default setting)
Impedance (only for proportional type)	
Voltage Input Impedance	> 100K
Current Output Load Requirement	< 0.2K
Parallel Operation	< 10 actuators (depends on controller output impedance)
Load Requirements (only for proportional type)	
Voltage Output Load Requirement	> 2K
Current Output Load Requirement	< 0.5K
Degree of Protection	IP65
Lifetime	100 thousand full open and close

• Actuator spare parts materials	
Cover	PC
Seat	Die casting aluminum

• Environmental data	
Running	
Ambient temperature	-25~+65°C
Ambient humidity	≤95% RH non condensation
Storage	
Ambient temperature	-40~+65°C
Ambient humidity	≤95% RH condensation

## Dimension





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