3-way Grooved Ball Valve *Nominal size: DN40~DN125*

Product Features

- **Equal-percentage flow characteristics**

The valve from A-AB has a perfect control curve. The rangeability of valve is 100:1. The valve core is made of stainless steel with a better corrosion resistance and a longer service life.

- **High close-off Differential Pressure**

Due to O-shaped sealing ring and compensation structure, the differential pressure is higher, and which allows a better sealing performance.

- **Zero Leakage Rate**

While the valve is fully closed from A to AB, there is zero leakage.

- **Easy disassembly and assembly With The Pipeline**

The valve and pipe are connected by standard clamp, which is easy to install and disassemble. Clamp connectors are standard and can be purchased directly from the market.

- **Manual Function**

It has the mechanical manual function with automatic power off.

- **2SPDT feedback**

The floating control type has 2SPDT function. The contact capacity is less than 30VDC.

Type Overview

Nominal size	Valve type T-type core I type	Valve type T-type core II type	Nominal size [in.]	Connec-tion	AB-A Kvs [m3/h]	AB-B Kvs [m3/h]	Actuator torque [N.M]	△Ps [MPa]
DN40	TBG40-3LBC-AX	TBG40-3LBC-BX	1 1/2”	Grooved	47	16	20	0.7
DN50	TBG50-3LBC-AX	TBG50-3LBC-BX	2”	Grooved	59	27	20	0.7
DN65	TBG65-3LBC-AX	TBG65-3LBC-BX	2 1/2”	Grooved	149	90	50	0.7
DN80	TBG80-3LBC-AX	TBG80-3LBC-BX	3”	Grooved	201	95	50	0.7
DN100	TBG100-3LBC-AX	TBG100-3LBC-BX	4”	Grooved	265	130	50	0.7
DN125	TBG125-3LBC-AX	TBG125-3LBC-BX	5”	Grooved	395	190	50	0.7

Nominal size	Valve type L-type core	Nominal size [in.]	Connec-tion	A-B Kvs [m3/h]	AB-B Kvs [m3/h]	Actuator torque [N.M]	△Ps [MPa]
DN40	TBG40-3LBC-AL	1 1/2”	Grooved	16	16	20	0.7
DN50	TBG50-3LBC-AL	2”	Grooved	27	27	20	0.7
DN65	TBG65-3LBC-AL	2 1/2”	Grooved	90	90	50	0.7
DN80	TBG80-3LBC-AL	3”	Grooved	95	95	50	0.7
DN100	TBG100-3LBC-AL	4”	Grooved	130	130	50	0.7
DN125	TBG125-3LBC-AL	5”	Grooved	190	190	50	0.7

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

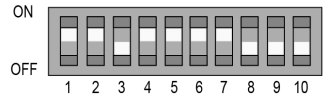
DIP Switch Instruction

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.

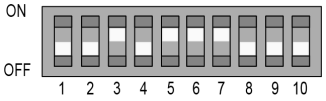
DIP Switch Setting Instruction

- **Modulating**

Control / feedback signal: 4~20mA



Control / feedback signal: 0~10VDC



When S1-8 is set to OFF, the actuator is modulating control. Terminal 1 and 2 are power input, control signal comes into from Terminal O and E for control.

- Ⅰ type

When the control signal increases, actuator runs to “1”, the valve tends to fully open from AB-A.
When the control signal decreases, actuator runs to “0”, the valve tends to fully open from AB-B.
When the control signal has no changing, actuator shaft and valve stem stay in current position.
When voltage (or current) signal is disconnected, this is equivalent to input a min. control signal, actuator runs to "0", valve will close from AB-A.

- Ⅱ type

When the control signal increases, actuator runs to “1”, the valve tends to fully open from AB-B.
When the control signal decreases, actuator runs to “0”, the valve tends to fully open from AB-A.
When the control signal has no changing, actuator shaft and valve stem stay in current position.
When voltage (or current) signal is disconnected, this is equivalent to input a min. control signal, actuator runs to "0", valve will close from AB-B.

- **Floating**

When S1-8 is set to ON, the actuator is floating control. Terminal 1 is power input, control is achieved by on and off of Terminal 2 and 3, at this time, Terminal O, E and Y will not work.

- Ⅰ type

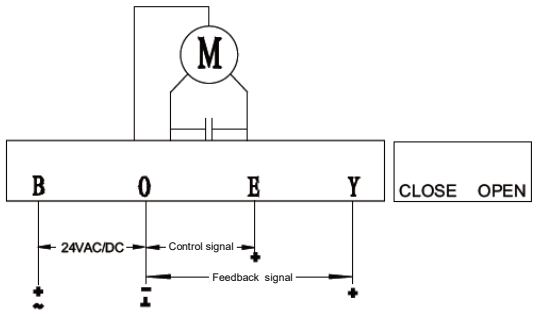
While Terminal 1 and 2 are powered on, actuator runs to “0”, the valve tends to fully open from AB-B.
While Terminal 1 and 3 are powered on, actuator runs to “1”, the valve tends to fully open from AB-A.

- Ⅱ type

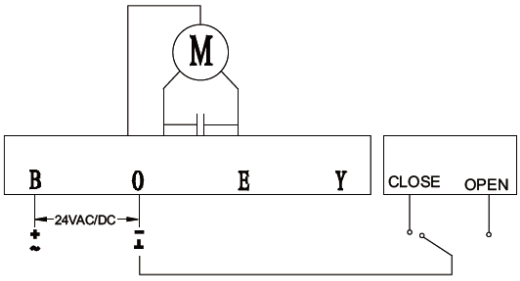
While Terminal 1 and 2 are powered on, actuator runs to “0”, the valve tends to fully open from AB-A.
While Terminal 1 and 3 are powered on, actuator runs to “1”, the valve tends to fully open from AB-B.

Wiring Diagram

- **TW20（50）NM-BX24**

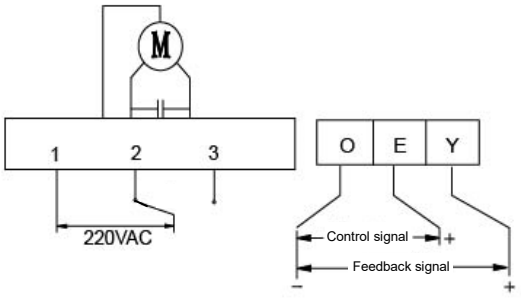


Modulating

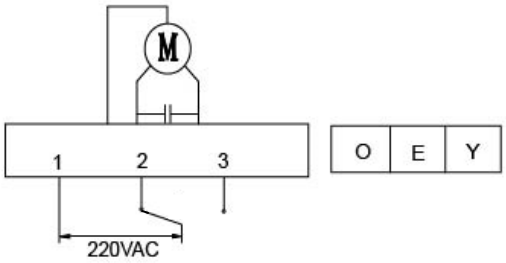


Floating

- **TW20（50）NM-BX220**

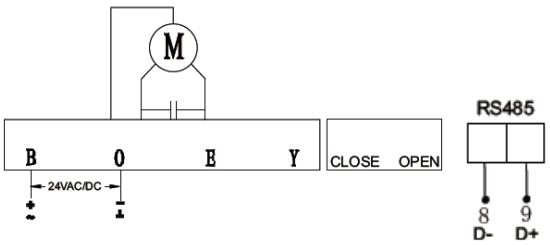


Modulating

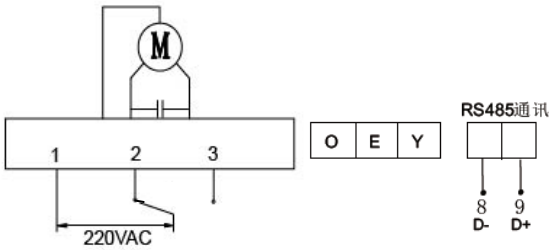


Floating

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



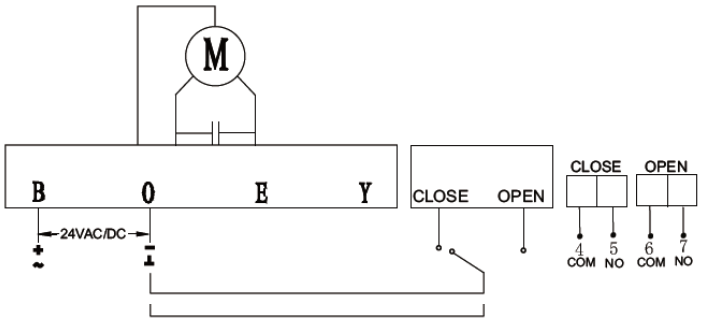
TW20 (50) NM-BX24-485



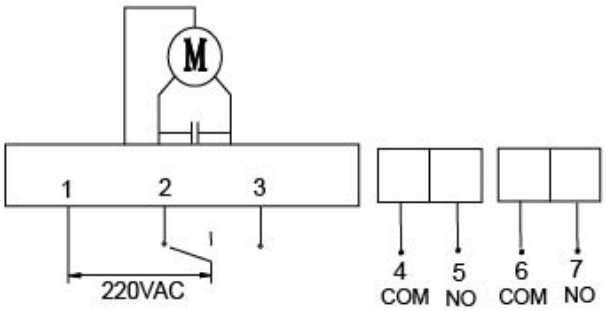
TW20 (50) NM-BX220-485

Notes:
1) When wiring BX24 actuator with RS485 communication function, only B, O 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 (50) NM-BX24(220)-F2**

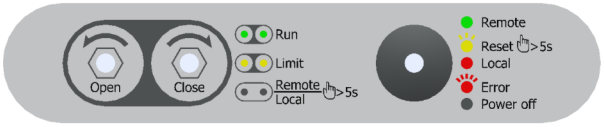


TW20 (50) NM-BX24-F2



TW20 (50) NM-BX220-F2

Indicating Light Instruction



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

Reset	Status	Description
Green	Always	Normal mode
Red	Always	Local mode
Orange	Flashing(1Hz)	Stroke testing
Red	Quick flashing(2Hz)	Alarming

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

Debugging Instruction

A. Connect actuator and valve body.
B. Connect the power supply and the control signal line.
C. 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).
D. Power on the actuator.
E. Actuator self-stroking: the purpose of this step is to match the actuator with the valve body:

1) 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.
2) 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.
3) 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).

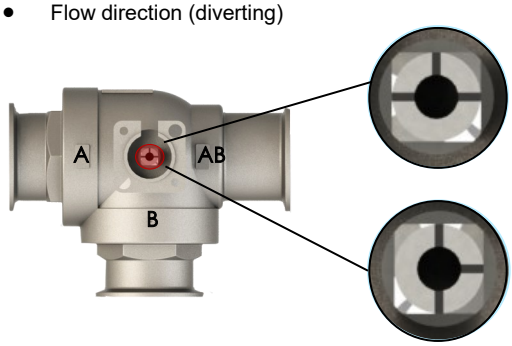
1. The factory default setting is automatic self-stroking, it means the actuator will repeat automatic self-stroking when power on each time!

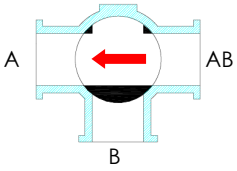
2. If you don't need automatic self-stroking function, you can set the 7th switch to OFF, it will change into manual self-stroking (Phenomenon is the same as step 1), 2).

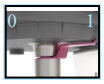
Flow Direction Instruction

T-type core—— I type

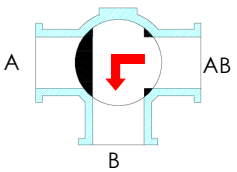
- Flow direction (diverting)

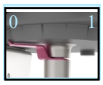






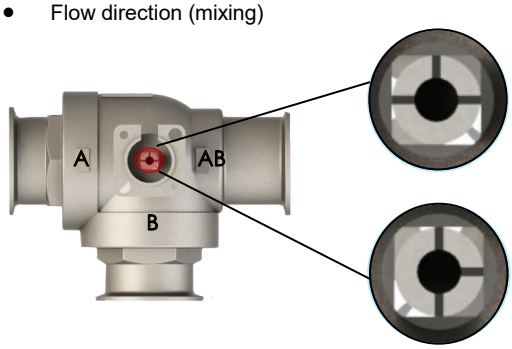
When actuator pointer tends to "1", the flow increases from AB to A and decreases to B.

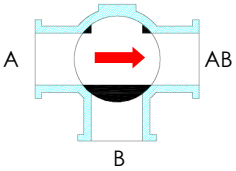


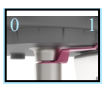


When actuator pointer tends to "0", the flow increases from AB to B and decreases to A.

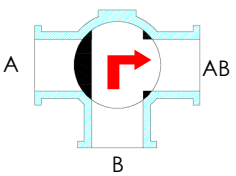
- Flow direction (mixing)

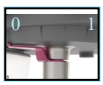






When actuator pointer tends to "1", the flow increases from A to AB and decreases to B.

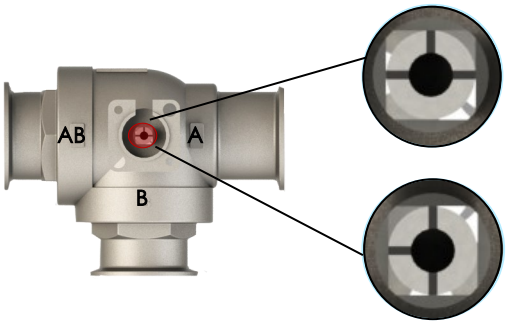


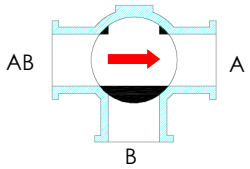


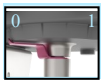
When actuator pointer tends to "0", the flow increases from B to AB and decreases to A.

T-type core—— II type

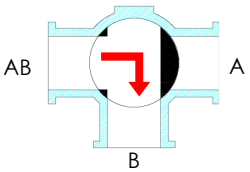
- Flow direction (diverting)

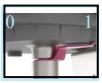






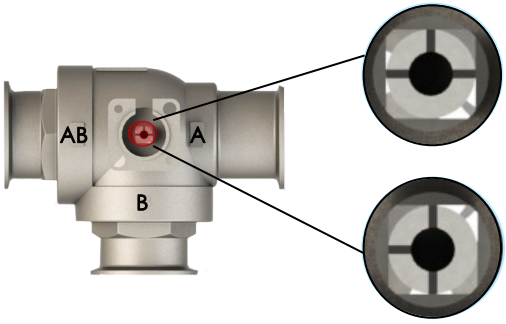
When actuator pointer tends to “0”, the flow increases from AB to A and decreases to B.

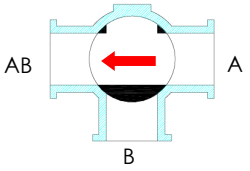


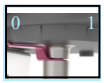


When actuator pointer tends to “1”, the flow increases from AB to B and decreases to A.

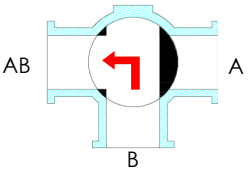
- Flow direction (mixing)

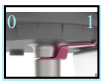






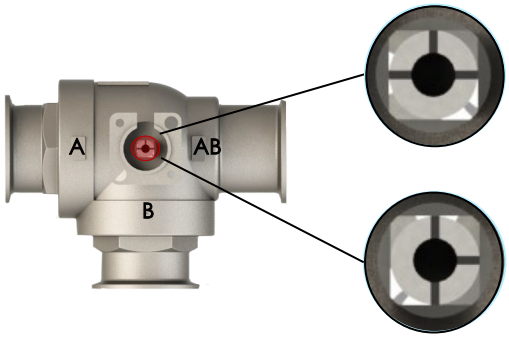
When actuator pointer tends to “0”, the flow increases from A to AB and decreases to A.

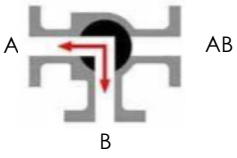


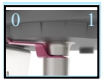


When actuator pointer tends to “1”, the flow increases from B to AB and decreases to A.

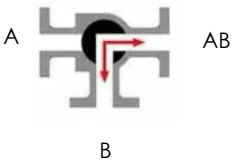
L-type core

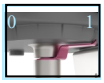






When actuator pointer tends to “0”, the flow increases at A and B and decreases at AB.

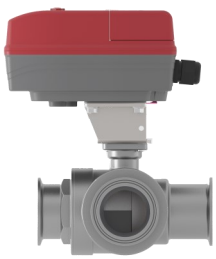


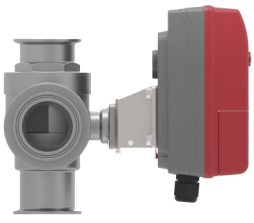


When actuator pointer tends to “1”, the flow increases at AB and B and decreases at A.

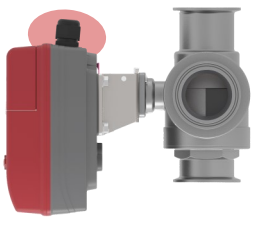
Installation Instruction

Pay attention to correct mounting direction!



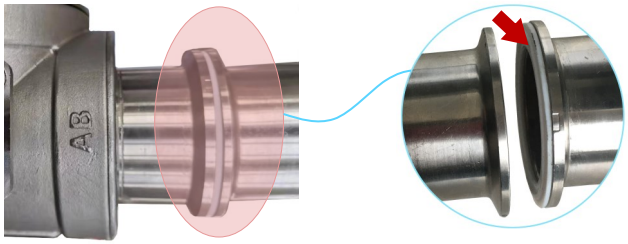


Do not install the waterproof connector upward!



The actuator is not recommended to be installed downward!

Note: When connecting the valve and the pipe, use the clamp connector, and there are sealing rings between the valve and the pipe!

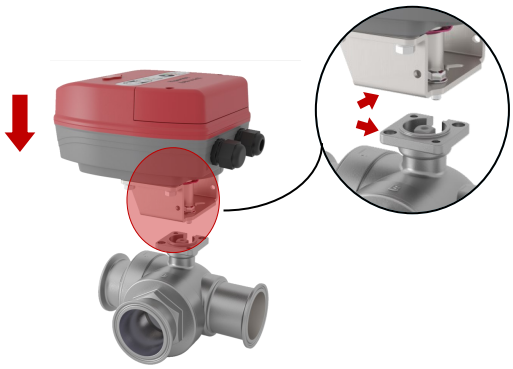


Note: Reserve removable distance when installing in pipe!

Actuator And Valve Assembly

1. In order to make the valve and the actuator better match, please pay attention to the valve opening and the actuator position! See flow direction for details.

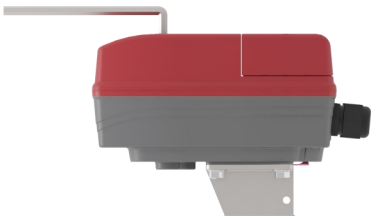
2. Align the locating hole and install the actuator vertically on the valve in the direction shown below.



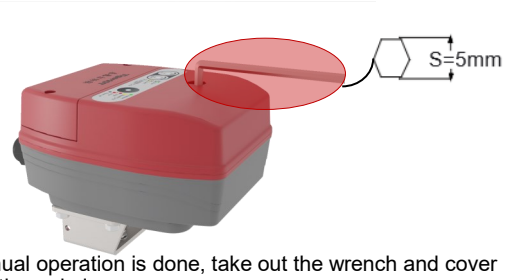
3. Insert a 5mm Allen wrench into the pointer hole at the top and tighten it manually.

Manual Function

1. Disconnect the power supply and remove the Allen wrench at the bottom of the actuator, ready for manual operation.

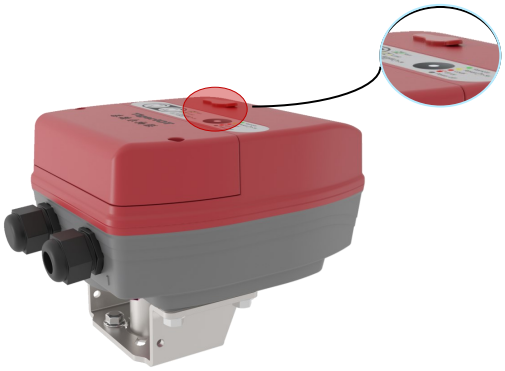


2. Insert the Allen wrench into the manual hole on the top of the cover.



3. Turn the Allen wrench counterclockwise, the valve is closed from AB to A and opened from AB to B.
Turn the Allen wrench clockwise, the valve is opened from AB to A and closed from AB to B.

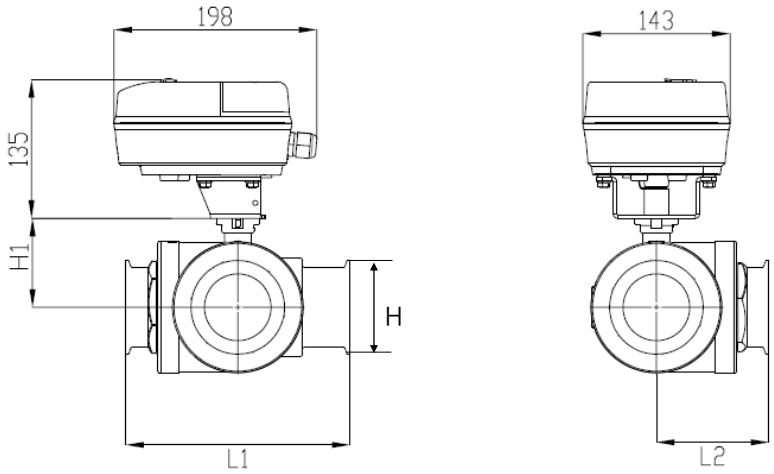
4. Manual operation is done, take out the wrench and cover tightly the red plug.



Note: In the case of power off, the actuator needs stoke testing again after the manual operation is completed.

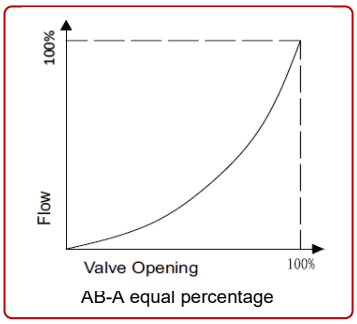
Manual stroke testing method: press the Reset button on the actuator cover over 5s, actuator will test stoke automatically!

Dimension

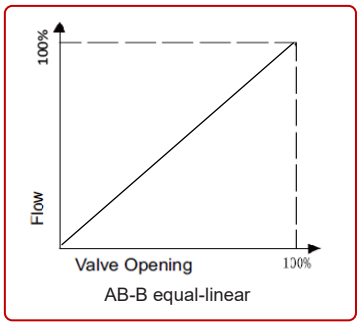


Nominal size	H1 (mm)	L1 (mm)	L2 (mm)	H (mm)
DN40	57	154	77	50.5
DN50	64	164	84	64
DN65	73	190	95	77.5
DN80	86	218	109	91
DN100	100	225	122	106
DN125	116	255	140	130

Flow Characteristics



AB-A equal percentage



AB-B equal-linear

Technical Parameters

• Functional data-Valve	
Nominal size	DN40~DN125
Nominal pressure	PN16
Flow characteristic	AB-A: equal percentage AB-B: equal linear
Valve rangeability	>100 : 1
Leakage rate	AB-A: zero leakage AB-B: ⩽0.5%Kvs
Medium temperature	-40~+120℃
Connection standard	Grooved ISO2852
Life time	200000 full open and close

• 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	Modulating: 1.0% (factory setting) RS485: 0.5% (factory setting)
Blind zone	3.0 % (default setting)
Impedance (only for modulating control)	
Voltage Input Impedance	＞100K
Current Output Load Requirement	＜0.2K
Parallel Operation	＜10 actuators (depends on controller output impedance)
Load Requirements (only for modulating control)	
Voltage Output Load Requirement	＞2K
Current Output Load Requirement	＜0.5K
Degree of Protection	IP65

• Valve spare parts materials	
Valve body	Stainless steel
Valve core	Stainless steel
Valve stem	Stainless steel
O-ring	FKM

• Environmental condition	
Running	
Ambient temperature	-25~+65℃
Ambient humidity	≤95% RH, non-condensation
Storage	
Ambient temperature	-40~+65℃
Ambient humidity	≤95% RH, non-condensation

• Certificates	
CE Certificate	
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
OHSAS	GB/T45001-2020 / ISO45001:2018

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