ŌMEAX

V PORT BALL VALVES - TB100/200/201

SPECIFICATIONS

DN mm	DN15 - DN150
DN inch	1/2" - 6"
Temperature	-5°C to 120°C
Type of body	F / F, Flanges
Application	Cold/hot water, Glycol solution concentration < 50%
Connection	Threaded ISO 7-1 BSP, Flanged ISO 7005-2 PN16
Test	EN 12266-2 (Test body safety and tightness, Test seat tightness)
Options	Other specifications on request

ADVANTAGES

•RS485 Remote Control

The actuator is equipped with RS485 communication interface. The valve can be remotely controlled by ModBus protocol.

• NFC (Near Field Communication)

The actuator has NFC function which can not only control opening and closing of valve by mobile NFC client, but also set a number of parameters. NFC function can still read actuator parameter even if the actuator is powered off on site.

•V Shape Ball Core

Adopts "V shape ball core" design, with perfect regulation curve. Adjustable ratio >100. Ball core adopts stainless steel material,compared with brass ball core, it will be better corrosion resistance and longer lifetime.
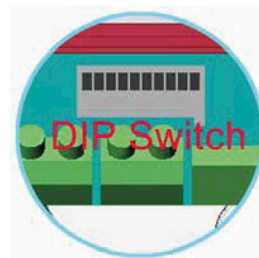
•Speed Adjustability

The high/low speed can be switched through DIP Switch.

•Manual Function

The actuator has the mechanical manual function and manual priority function, that is, when insert the Allen wrench, the actuator will be automatically powered off which is safe and convenient.

•Mistake-proofing Interface

The interface of valve body and actuator adopts mistake proofing design, which can avoid disassembling and adjusting repeatedly caused by installation error.

TYPE SUMMARY

Threaded Valve Type PN25	Caliber [in.]	[mm]	Kvs [m³/h]	Actuator Type	Actuator Power	Speed High Speed	Low Speed	Torque [N.M]	△Ps [MPa]
TBL15-2VTD-BX	1/2"	15	4	TW8NM-BX24	24VAC/DC	30S/90°	90S/90°	8	1.40
TBL20-2VTD-BX	3/4"	20	7.5	TW8NM-BX24	24VAC/DC	30S/90°	90S/90°	8	1.40
TBL25-2VTD-BX	1"	25	15	TW8NM-BX24	24VAC/DC	30S/90°	90S/90°	8	1.40
TBL32-2VTD-BX	1 1/4"	32	23	TW8NM-BX24	24VAC/DC	30S/90°	90S/90°	8	1.40
TBL40-2VTD-BX	1 1/2"	40	35	TW15NM-BX24	24VAC/DC	30S/90°	90S/90°	15	1.40
TBL50-2VTD-BX	2"	50	60	TW15NM-BX24	24VAC/DC	30S/90°	90S/90°	15	1.40

Flanged Valve Type PN16	Flanged Valve Type PN25	Caliber [in.]	[mm]	Kvs [m³/h]	Actuator Type	Actuator Power	Speed High Speed	Low Speed	Torque [N.M]	△Ps [MPa]
TBF40-2VGC-BX	TBF40-2VGD-BX	1 1/2"	40	38	TW20NM-BX24 / TW20NM-BX220	24VAC/DC / 110~230VAC	30S/90°	60S/90°	20	1.40
TBF50-2VGC-BX	TBF50-2VGD-BX	2"	50	73	TW20NM-BX24 / TW20NM-BX220	24VAC/DC / 110~230VAC	30S/90°	60S/90°	20	1.40
TBF65-2VGC-BX	TBF65-2VGD-BX	2 1/2"	65	110	TW20NM-BX24 / TW20NM-BX220	24VAC/DC / 110~230VAC	30S/90°	60S/90°	20	0.80
TBF80-2VGC-BX	TBF80-2VGD-BX	3"	80	160	TW20NM-BX24 / TW20NM-BX220	24VAC/DC / 110~230VAC	30S/90°	60S/90°	20	0.80
TBF100-2VGC-BX	TBF100-2VGD-BX	4"	100	220	TW50NM-BX24 / TW50NM-BX220	24VAC/DC / 110~230VAC	40S/90°	60S/90°	50	0.70
TBF125-2VGC-BX	TBF125-2VGD-BX	5"	125	330	TW50NM-BX24 / TW50NM-BX220	24VAC/DC / 110~230VAC	40S/90°	60S/90°	50	0.70
TBF150-2VGC-BX	TBF150-2VGD-BX	6"	150	418	TW50NM-BX24 / TW50NM-BX220	24VAC/DC / 110~230VAC	40S/90°	60S/90°	50	0.70

RELATIONSHIP BETWEEN DIFFERENTIAL PRESSURE AND FLOW

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

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

V: Rating flow at the △P (unit: m³/h)

Kvs: Norminal flow coefficient, which refer to the flow when medium (Density=1g/cm³) go through the full open control valve，whose △P is 100KPa.

DIP SWITCH INSTRUCTION

Switch	Function		Description
S1-1	Starting of control/ feedback signal	ON	20%:the starting of control/feedback signal is 20%(namely 4~20mA or 2~10VDC)
		OFF	0:the starting of control/feedback signal is 0(namely 0~20mA or 0~10VDC)
S1-2	Type of control signal	ON	II:current signal
		OFF	UI:voltage signal
S1-3	Impedence match of control signal	ON	UI:voltage signal
		OFF	II:current signal
S1-4	Type of feedback signal	ON	IO:current signal
		OFF	UO:voltage signal
S1-5	Operating mode	ON	DA:when the control signal increases, actuator runs to"1"; when the control signal decreases, actuator runs to "0"
		OFF	RA:when the control signal increases, actuator runs to"1"; when the control signal decreases, actuator runs to "0"
S1-6	Losing control signal mode	ON	DW: when lose control signal (voltage type), actuator will provide a min. control signal internally. when lose control signal (current type), actuator will provide a min. control signal internally.
		OFF	UP: 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	DF:Power on each time, self-stroking starts automatically.
		OFF	RF:Self-stroking starts only when press the self-stroking button manually.
S1-8	Control mode (when S1-9 is OFF)	ON	3-position type
		OFF	Proportional type
S1-9	Control type	ON	RS485 interface control(Modbus protocol)
		OFF	Proportional type and 3-position type
S1-10	Speed	ON	TW20/50NM: Low speed TW8/15NM: High speed
		OFF	TW20/50NM: High speed TW8/15NM: Low speed

FUNCTION INTRODUCTION

Proportional Type
Control signal/feedback signal: 0~10VDC

ON
OFF
1 2 3 4 5 6 7 8 9 10
S1
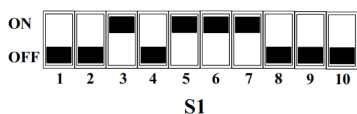
When TW...is proportional type, terminal B,O is power input, actuator can be controlled by connecting terminal O,E

As shown in the left, when equipped with our TBL.../TBF...series Ball Valve, DIP Switch S1-5 is DA mode:

Control signal at terminal O,E increasing: actuator runs to "1", valve tends to open

Control signal at terminal O,E decreasing: actuator runs to "0", valve tends to close

Control signal at terminal O,E 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 closed.

3-position Type
(the terminal O,E,Y doesn't work)
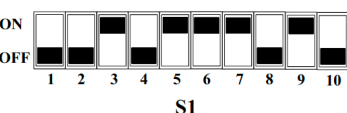
ON
OFF
1 2 3 4 5 6 7 8 9 10
S1
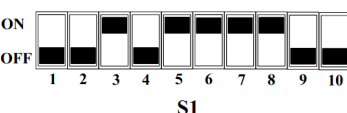
When TW...is 3-position type, terminal B,O is power input, control the actuator by the switch O,CLOSE,OPEN:

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

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

Notes:Terminal E,Y doesn't work by this time!

RS485 Bus Communication

ON
OFF
1 2 3 4 5 6 7 8 9 10
S1

When TW...is RS485 bus communication, terminal B,O is power input, remote control by terminal 8,9:

Actuator can be controled remotely by RS485 bus communication, actuator supports ModBus protocol.
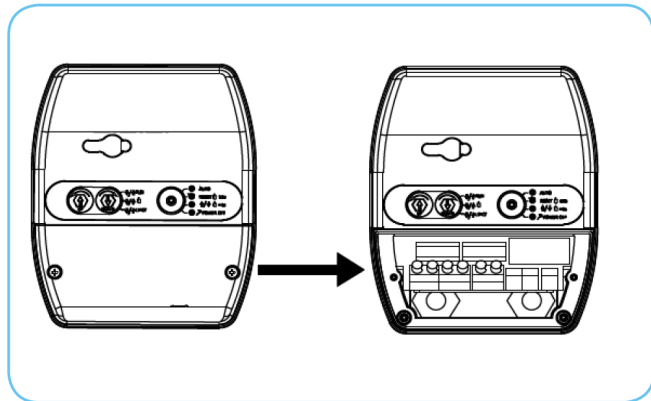
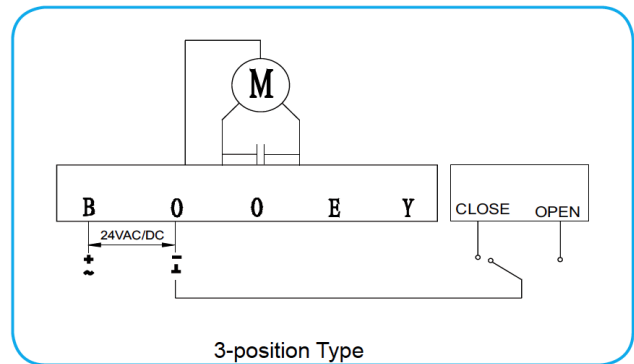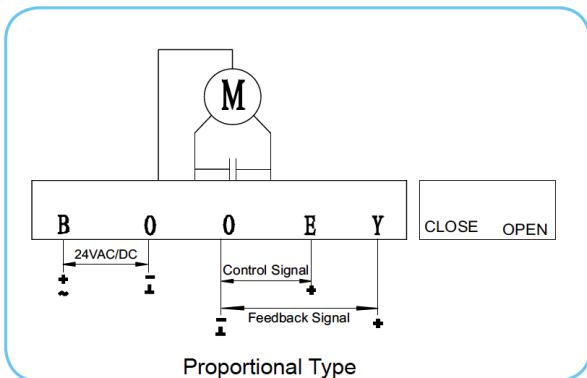Notes:Terminal O,E,Y, CLOSE,OPEN doesn't work!

WIRING INSTRUCTION

⚠️ Notes：

1. Open the cover when wiring, prohibit to disassemble other spare parts!

2. Carefully check the power voltage when wiring, wiring according to the product parameters, otherwise, it may cause fire and endanger personal safety in servere case!

3. Please cut off power supply during wiring to ensure personal safety!

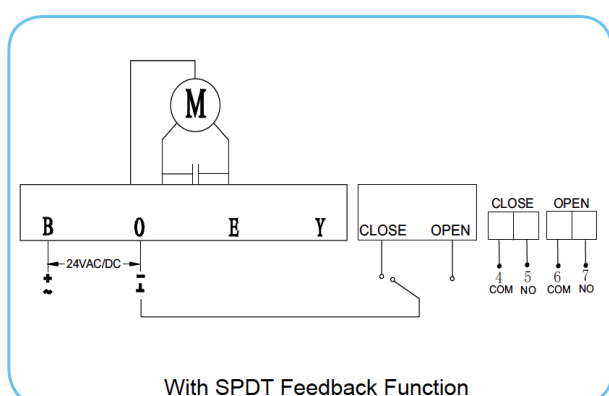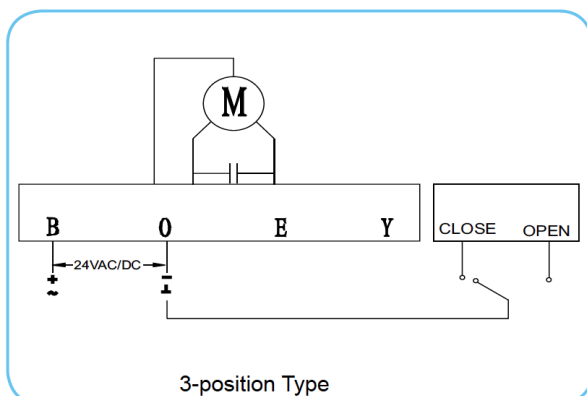4. After wiring, please install the cover to the origional position to avoid the danger of electric shock caused by exposed terminal!
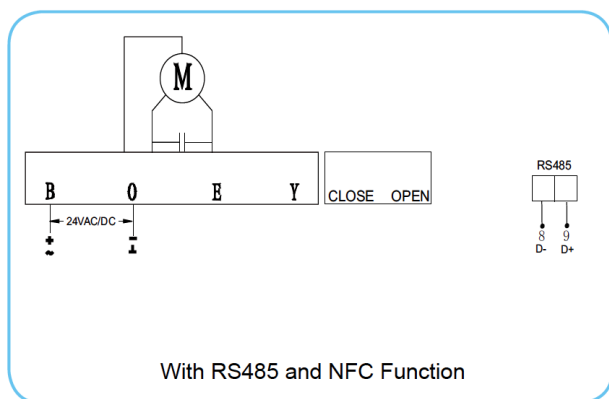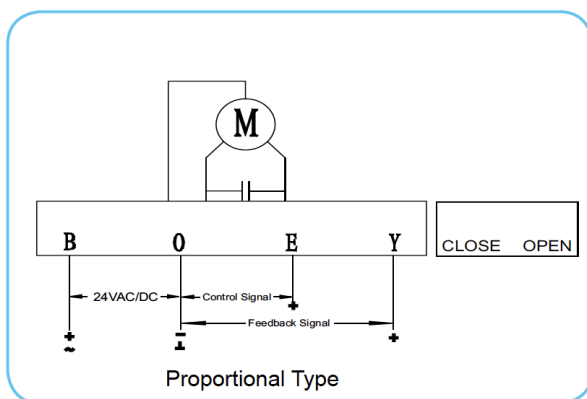
WIRING DIAGRAM

- TW8/15NM wiring diagram

Proportional Type

3-position Type

- TW20/50NM...-BX24... wiring diagram

Proportional Type

With RS485 and NFC Function

3-position Type

With SPDT Feedback Function

- TW20/50NM...-BX220... wiring diagram

Proportional Type

With RS485 and NFC Function

3-position Type

With SPDT Feedback Function
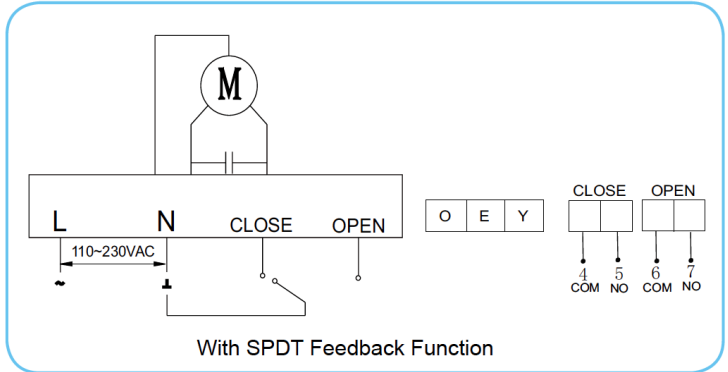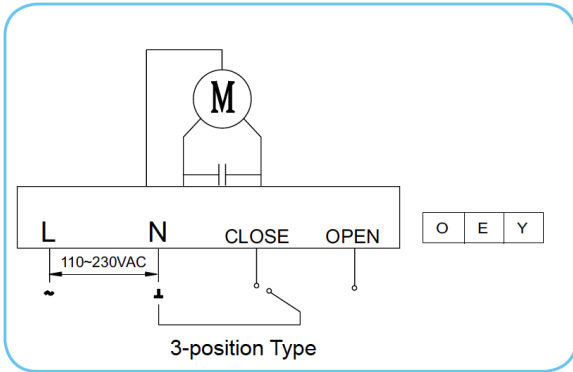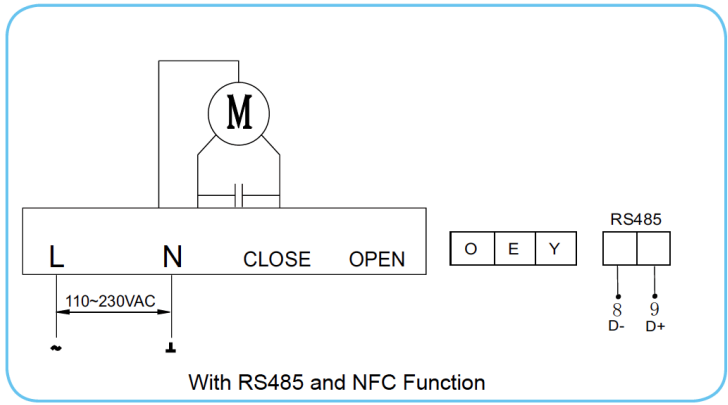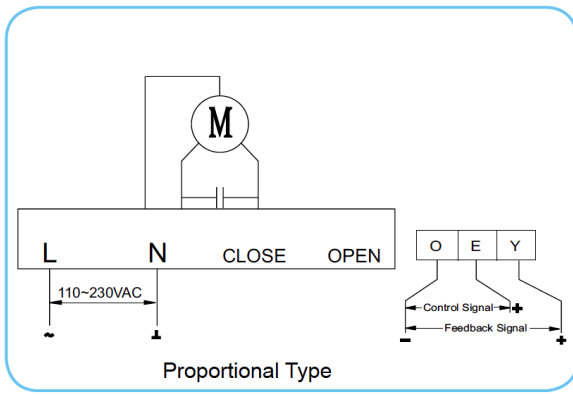
INDICATING LIGHT

- TW8/15NM Indicating Light

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

- TW20/50NM Indicating Light

- Reset Light

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

- Retractive Light-UP

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

- Extended Light-DOWN

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

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 the 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 actuator Reset yellow light flashes (1Hz), actuator runs to "0" limit position firstly (valve close), then runs to "1" limit position (valve full open), actuator will not controlled by control 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).

F. TW20NM/50NM Local mode: press the button OPEN, CLOSE at the same time over 5s, loosen the buttons and the actuator starts the local mode. At this time, the OPEN, CLOSE and Reset lights are in red. If the valve needs to be open, long press the button OPEN and it will turn to green. If the valve needs to be closed, long press the button CLOSE and it will turn to green. After it reaches the expected position, repress OPEN, CLOSE at the same over 5s and then it will exit the local mode.

Notes:

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).
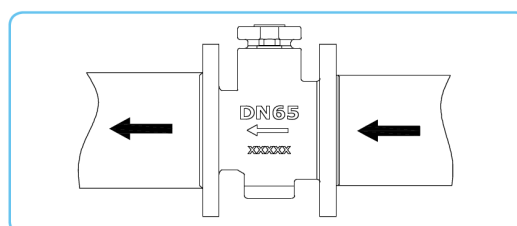
INSTALLATION ORIENTATION

Medium is chilled/hot water
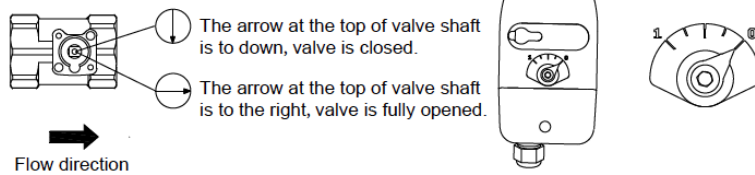Downward installation is forbidden
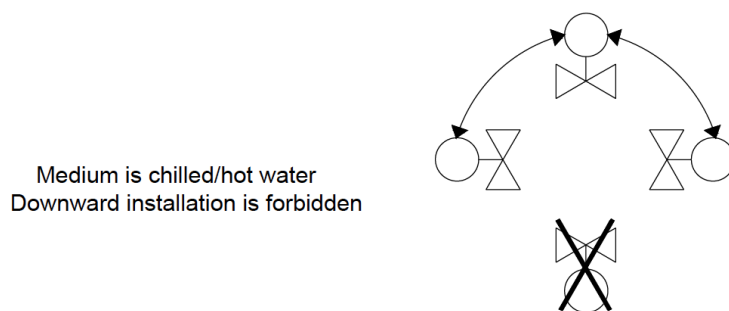
INSTALLATION NOTES

⚠️ Notes:

When the valve is installed on the pipeline, please note the flow direction of valve medium should be consistent with the flow direction of pipeline!
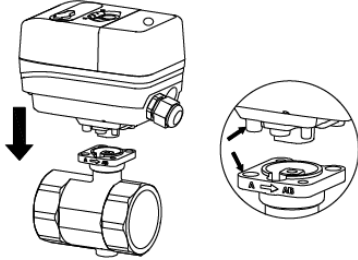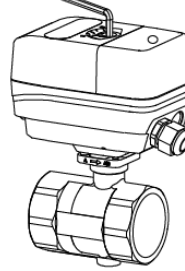
1. In order to make the valve and actuator match better，please make sure the valve is full-closed and the actuator opening pointer is at the "0" position before installation.

The arrow at the top of valve shaft is to down, valve is closed.

The arrow at the top of valve shaft is to the right, valve is fully opened.
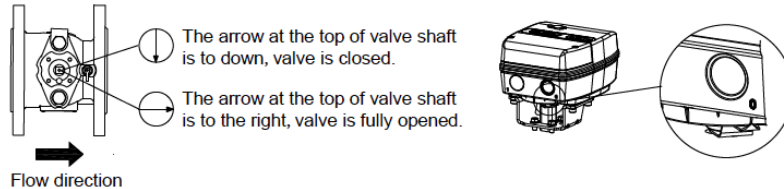
Flow direction

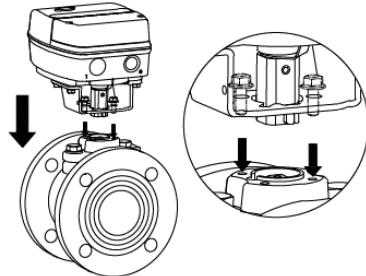2. Align to location hole, install actuator vertically on the valve body according to the direction shown below.

3. Insert the pointer hole by 5mm Allen wrench on the top and tighten manually.

1. In order to make the valve and actuator match better，please make sure the valve is full-closed and the actuator opening pointer is at the "0" position before installation.

The arrow at the top of valve shaft is to down, valve is closed.

The arrow at the top of valve shaft is to the right, valve is fully opened.

Flow direction

2. Align to the screw hold, install actuator vertically on the valve body.
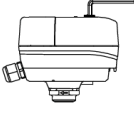
3. Tighten the screw by allen wrench.

10mm
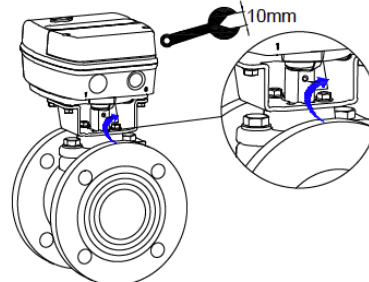
Notes:

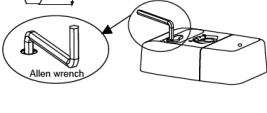When assembling valve and actuator, please pay attention to valve opening and actuator position!

Please reserve a detachable distance when install to the pipe！

MANUAL DEVICE OPERATION

1 Shut off and take down the Allen wrench, prepare for manual operation.

2 Insert the Allen wrench into the manual hole on the top of the cover.
S=5mm
Allen wrench

3 Turn the Allen wrench anticlockwise, the valve open; Turn the Allen wrench clockwise, the valve close.

4 Manual operation is done, take out the wrench and put it back, cover tightly the red plug.
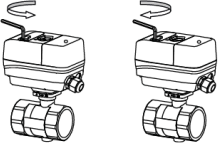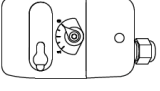
1 Shut off and take down the Allen wrench, prepare for manual operation.

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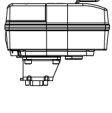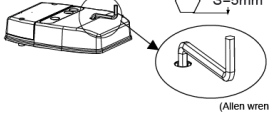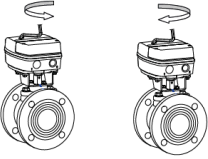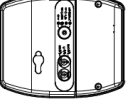S=5mm
(Allen wrench)

3 Turn the Allen wrench anticlockwise, the valve open; Turn the Allen wrench clockwise, the valve close.

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

Notes:

Under the situation of power off, the actuator needs to self-stroking again after the manual operation is completed.

Manual self-stroking method is : press the Reset button over 5s，actuator will enter into self-stroking status！

DIMENSION FIGURE

DN	Rp	L [mm]	H1 [mm]	H [mm]
15	1/2	55	38.3	146.3
20	3/4	60	41.8	149.8
25	1	65	44.8	152.8
32	1-1/4	80	49.8	157.8
40	1-1/2	85	48.1	156.1
50	2	100	59.8	167.8
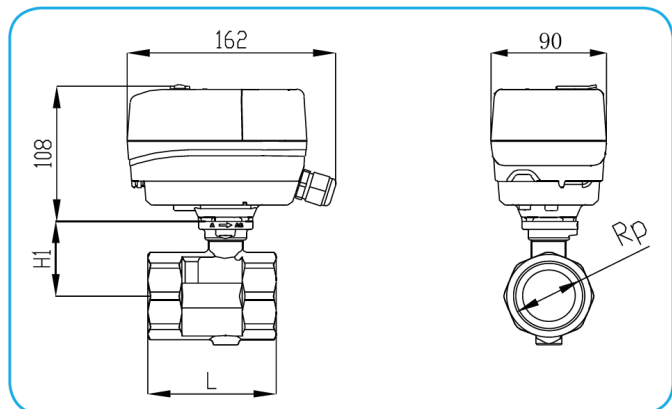
DN	D [mm]	D2 [mm]	K [mm]	L [mm]	H1 [mm]	H [mm]
PN16						
40	150	4-19	110	136.5	85	220
50	165	4-19	125	136.5	90.5	225.5
65	185	4-19	145	136.5	96.5	231.5
80	200	8-19	160	168	107	242
100	220	8-19	180	211	122	257
125	250	8-19	210	262.5	137.5	272.5
150	285	8-23	240	315	149	284
PN25						
40	150	4-19	110	136.5	85	220
50	165	4-19	125	136.5	90.5	225.5
65	185	4-19	145	136.5	96.5	231.5
80	200	8-19	160	168	107	242
100	235	8-23	190	211	122	257
125	270	8-28	220	262.5	137.5	272.5
150	300	8-28	250	315	149	284

TECHNICAL PARAMETERS
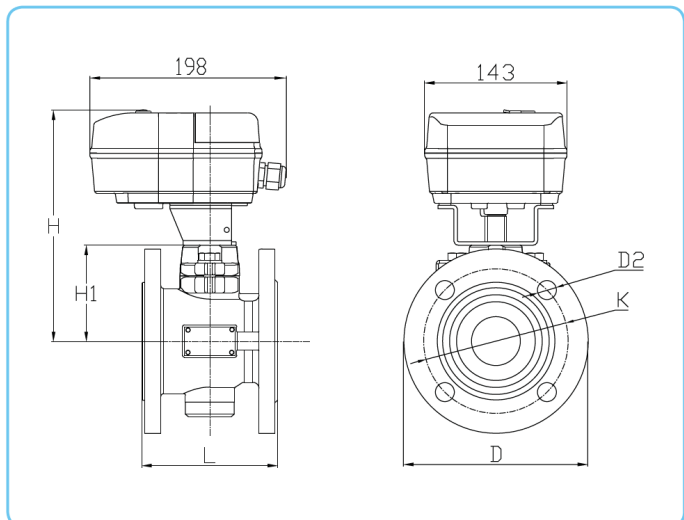
Operating Parameters-valve body

Caliber Range	DN15~DN150
Pressure	DN15~DN50:PN25 DN40~DN150:PN16/PN25 are optional
Flow Characteristic	Equal Percentage
Rangeability	>100
Leakage Rate	One way zero leakage (A-AB zero leakage)
Permissible Medium Temperature	-5~+120℃
Connection Standard	DN15~DN50: Female threaded connection ISO 7/1 DN40~DN150:Flanged connection ISO 7005-2

Spare Parts Materials-valve body

Valve Body	DN15~DN50 Brass DN40~DN150 Ductile iron
Valve Core	Stainless steel
Valve Stem	Stainless steel
Sealing Ring	FKM

Operating Parameters-actuator

Rated Torque	8N.M/ 15N.M/ 20N.M/ 50N.M
Operating Voltage TW...-BX24... TW...-BX220...	24VAC± 15%, 24VDC−15% 110~230VAC, +10...-15%
Frequency	50Hz or 60Hz
Power Consumption TW8NM-BX24... TW15NM-BX24... TW20NM-BX24... TW50NM-BX24... TW20NM -BX220... TW50NM-BX220...	24VAC: 9VA Recommended AC Transformer：30VA 24VDC: 4VA Recommended DC Transformer：15VA 24VAC: 15VA Recommended AC Transformer：30VA 24VDC: 6VA Recommended DC Transformer：15VA 24VAC: 30VA Recommended AC Transformer：50VA 24VDC: 12VA Recommended DC Transformer：30VA 24VAC: 42VA Recommended AC Transformer：60VA 24VDC: 20VA Recommended DC Transformer：50VA Run: 10VA; Max: 20 VA Run: 20VA; Max: 40 VA
Sensitivity (can be adjusted between 0.5%~10% by NFC mobile software)	Proportional type：1.0 % (factory setting) RS485: 0.5% (factory setting)
Dead Zone(Can be adjusted between 1%~10% by NFC mobile software)	3% (factory setting)
Impedance (only for proportional type) Voltage Input Impedance Current Input Impedance	 >100K <0.15K
Parallel Operation TW...-BX24...	 <10pcs (depending on controller output impedance)
Load Requirements (only for proportional type) Voltage Output Load Requirement Current Output Load Requirement	 >2K <0.5K
Control Signal TW...-BX... TW...-BX...-485	 0(2)~10VDC, 0(4)~20mA RS485
Valve Position Feedback Signal TW...-BX... TW...-BX...-F2 TW...-BX...-485	 0(2)~10VDC, 0(4)~20mA 2 SPDT feedback RS485
Protection Level TW8NM/15NM TW20NM/50NM	 IP54 IP68
Life Cycles	100 thousands cycles

Spare Parts Materials-actuator

Cover	PC
Base	TW20/50NM: Aluminum die casting TW8/15NM: PC

Environment Parameters

Operation	
Ambient temperature	-25~+65℃
Ambient humidity	≤95% RH
Storage	
Ambient temperature	-40~+65℃
Ambient humidity	≤95% RH

Certificates

|	
CE Conformity	
PED Directive	2014/68/EU
EMC Directive	2014/30/EU
Low-voltage Directive	2014/35/EU
Machinery Directive	2006/42/EC
EMS	ISO14001：2004
QMS	ISO9001：2008
OHSAS	OHSA18001：2007

RS485 COMMUNICATION FUNCTION (OPTIONAL)

RS485 Communication: there is RS485 communication interface on the PCB

RS485 Communication can set the actuator control mode：Remote (Modbus) Control, Local control.

- It can control the actuator opening remotely.
- It can read the valve position feedback value remotely.
- It can read the actuator operating status remotely.
- It can remotely set the actuator operating speed, dead zone and so on.

NFC NEAR FIELD COMMUNICATION (OPTIONAL)
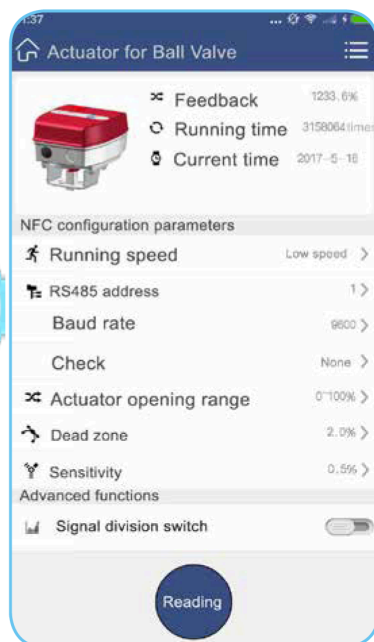
NFC supports the actuator's parameter reading and setting without the electricity supply. Open the mobile NFC client and close to the actuator NFC scanning area. After connected, it can set the actuator parameters.

As shown on the left, the NFC client mainly contains the Actuator basic parameters, Actuator configuration parameters and Advanced functions, the functions of each part are shown as below:

Actuator basic parameters: the actuator feedback, running cycle, current time and valve stroke can be read.

Actuator configuration parameters: the actuator curve type, running speed, actuator address, opening range, dead zone, sensitivity can be set.

Advanced functions: it contains signal division and conversion function, winter and summer mode conversion function and so on.

Notes:

1. Current type actuator can't set signal division, please use the function after setting voltage type.

2. The factory default of winter and summer mode conversion function is close state, when using the function, actuator must in a power on state.

3. The default address is 1.