OMEAX

Pressure Independent Control Valve--AHU
Technical Data Sheet

TPL...S.10 Series

PICV-AHU

Equipped with TW500 series electric actuator, the valve has a rich function and compact shape which is suitable for limited space inside of AHU.

Product Features

- **Two Valves in One**

PICV integrates a DPCV and an globe valve, including pressure difference balance function and full stroke adjustment capability.

- **Flow Balancing Function**

The valve adopts the build-in diaphragm capsule and connecting pipe, with pressure difference balancing function. It is not affected by system pressure difference fluctuations and can automatically balance and eliminate overcurrent phenomena to achieve flow balance.

- **Flow adjusting function**

Equipped with TW500 series, it will have an equal percentage flow characteristic, and the rangeability can be reach 100:1.
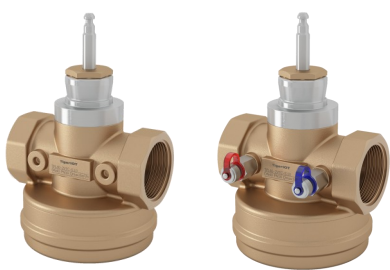
- **Compact Size**

The compact structural design makes the valve small in size and saves system installation space.

- **High-quality Materials**

Thread PICV is made of high-quality brass, while valve core and stem is made of stainless steel to ensure a reliability of long time service time.

Type Overview

	Series	TW500...
	Actuator Rated Stroke	26mm
	Nominal Output Force	500N
	Icon	
	24V, modulating & Floating Control	TW500-XD24-S.10

| Valve body	Type	DN [mm]	Test plugs	Stroke [mm]	Qmax [m³/h]	△Ps [kPa]
PN16 Medium temp. -10~120℃	TPL32-2VTC-S.10	DN32	W/O	20	4	35~500
	TPL40-2VTC-S.10	DN40	W/O	20	6	35~500
	TPL50-2VTC-S.10	DN50	W/O	20	8	35~500
PN16 Medium temp. -10~120℃	TPL32-2VTC-S.10.CY	DN32	W/	20	4	35~500
	TPL40-2VTC-S.10.CY	DN40	W/	20	6	35~500
	TPL50-2VTC-S.10.CY	DN50	W/	20	8	35~500
PN25 Medium temp. -10~120℃	TPL32-2VTD-S.10	DN32	W/O	20	4	35~500
	TPL40-2VTD-S.10	DN40	W/O	20	6	35~500
	TPL50-2VTD-S.10	DN50	W/O	20	8	35~500
PN25 Medium temp. -10~120℃	TPL32-2VTD-S.10.CY	DN32	W/	20	4	35~500
	TPL40-2VTD-S.10.CY	DN40	W/	20	6	35~500
	TPL50-2VTD-S.10.CY	DN50	W/	20	8	35~500

Flow Characteristics
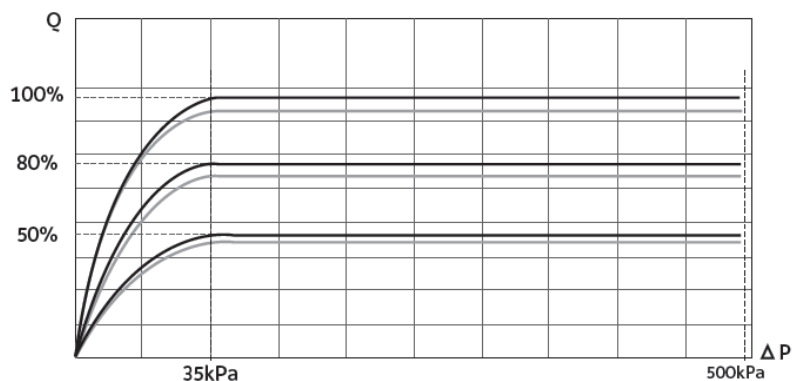
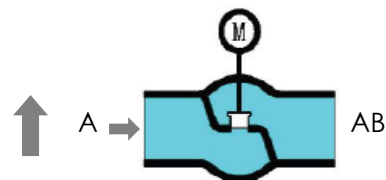DP Flow Characteristic
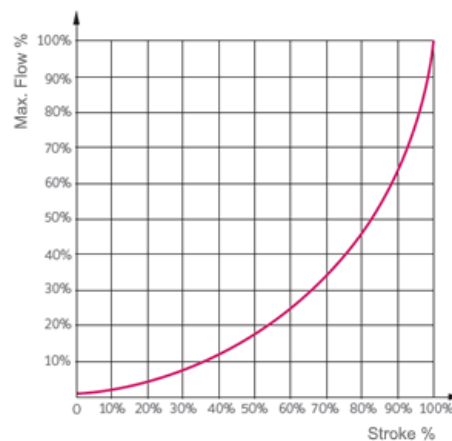
Opening Flow Characteristic

Equal-percentage

Structure Characteristics
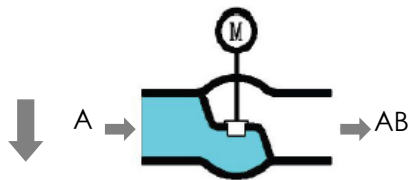
While the valve stem reach lower limit position, the valve is closed.

While the valve stem reach upper limit position, the valve is open.

Installation Introduction

1. Valve can be installed on the water supply pipe or return water pipe (installed on the return water pipe can control the water flow more smoothly, meanwhile the return water temperature is lower which can extends the service time of valve).

2. Filter and check valve are recommended to be installed before the valve.

3. Please note that the medium flow direction in valve should be consistent with the medium of pipeline!

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4. Please pay atten- tion to the valve mounting orientation!
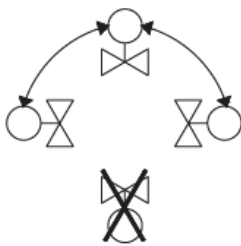
Connection with Actuator

Valve and actuator can be assembled without any special tools, the attached Allen wrench will be enough. There is no need to do any manual adjustment after assembled. The actuator has the self-calibrating function.

Notes: Prohibit installing outdoors to avoid PCB damage due to the condensation and water. Rain cover (TRAIN-1) and heating belt(THOT-3) are necessary in case of outdoor installation.
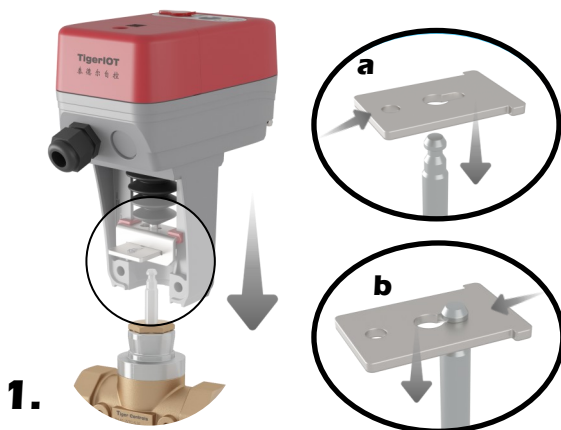
1. Loosen the slider and clip, then put the actuator on the valve body and keep the two connecting faces coinciding, fix the screws on the slit with Allen wrench.
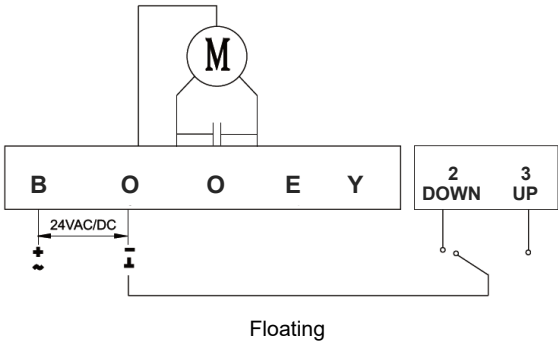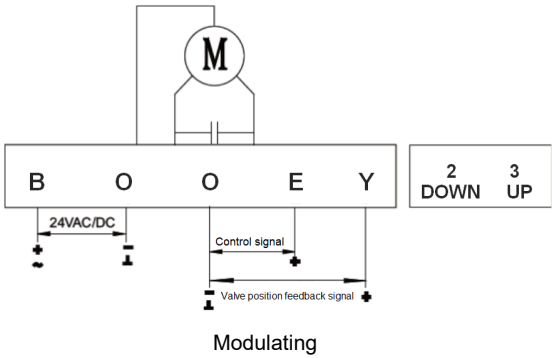
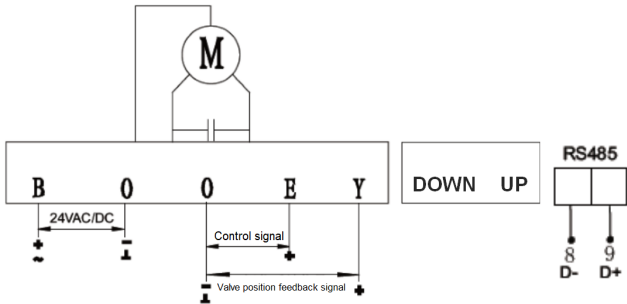**2.** Install the slider on the actuator, then tighten the screws with Allen wrench.

3. Complete the assembly of valve and actuator.

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Wiring Diagram

TW500-XD24-S.10

Modulating

Floating

TW500-XD24-S485.10

Wiring Instruction

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

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!

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

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

Indicating Light

- Remote
- Reset ⏱>5s
- Error
- Power off
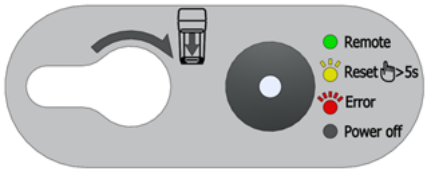
Reset	Status	Description
Green	Always	Normal mode
Orange	Flashing	Testing stroke
Red	Quick flashing	Alarming

Debugging Instruction

A. Connect actuator and valve body, wiring according to wiring diagram.

B. Automatic self-calibrating (factory default setting): actuator will repeat automatic self-calibrating when power on each time, the process is as follows:

1) The Reset yellow indicating light will keep flashing, actuator shaft extends to lower limit position firstly and then, it retracts to upper limit position, actuator will not be controlled by signal by this time.

2) Reset yellow light stop flashing, self-calibrating stops. By then, actuator running direction can be controlled by control signal.

3) If the Reset red light is quick flashing during the self-calibrating , it means the self-calibrating status is not correct and the actuator will start alarming. The actuator can not match with the valve's max. stroke.

Remarks: If you don't need automatic self-calibrating function , you can set the 7th switch to OFF, it will change into manual self-calibrating .

C. Manual self-calibrating function: If self-calibrating is need in a power-on state, press down the Reset button over 5 seconds, and then the actuator starts self-calibrating . The phenomenon is the same as step B.

D. RS485 function:

RS485 adopts standard Modbus protocol, the following parameters can be set through supporting APP:

RS485 address: the default address is 1.

Band rate:2400/4800/9600(Default) /19200

Byte format: 8bit Data Bits, No Parity (Default)/odd check/even check, 1 stop bit

E. Cellphone supporting APP: Open the mobile APP client and close to the actuator scanning area. After connected, it can set the actuator parameters.

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

DIP Switch Instruction

| Switch	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	Type of input impedance	ON	voltage signal
		OFF	Current signal
S1-4	Type of feedback signal	ON	Current signal
		OFF	voltage signal
S1-5	Operating mode	ON	When control signal increases, actuator shaft extends; When control signal decreases, actuator shaft retracts.
		OFF	When control signal increases, actuator shaft retracts; When control signal decreases, actuator shaft extends.
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-calibrating mode	ON	Power on each time, self-calibrating starts automatically.
		OFF	Self-calibrating starts only when press the self-calibrating button manually.
S1-8	Control type (when S1-9 is OFF)	ON	3-position type
		OFF	Proportional type
S1-9	Control mode	ON	RS485 interface control (ModBus protocol)
		OFF	Proportional type and 3-position type
S1-10	Speed	ON	High speed
		OFF	Low speed

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Function Introduction

- **Modulating**

Control signal/feedback signal: 4~20mA
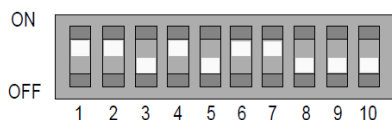
Control signal/feedback signal: 0~10VDC
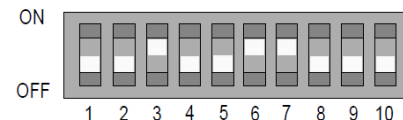
When equipped with PICV, terminal B, O is power input, actuator can be controlled by connecting terminal O, E, as shown above:

Control signal at terminal O, E increasing: actuator shaft retracts, valve stem extends, valve tends to open.

Control signal at terminal O, E decreasing: actuator shaft extends, valve stem retracts, 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 shaft extends, valve closed.
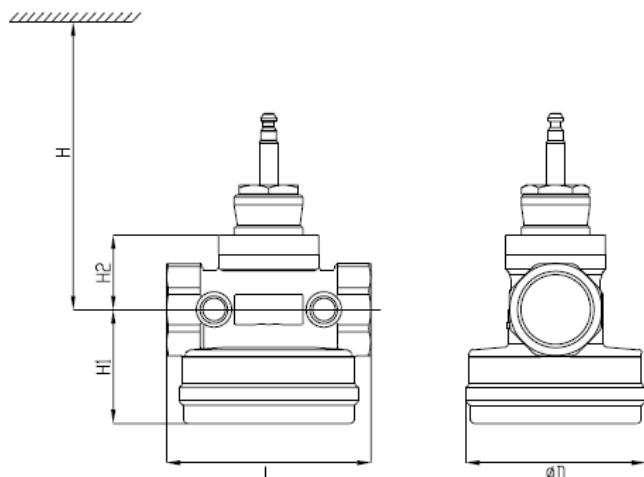
- **RS485 Bus Communication**
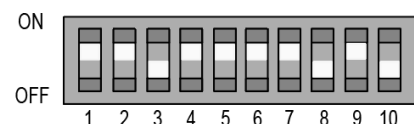
When Dip switch S1-9 is on, it is RS485 Bus communication type. Terminal B,O is power input, remote control by terminal 8,9:
Actuator can be controlled remotely by RS485 bus communication, actuator supports ModBus protocol.
Notes: Terminal O,E,Y,UP,DOWN doesn't work by this time!

Dimension

DN	L (mm)	D (mm)	H1 (mm)	H2 (mm)	H (mm)
DN32	104	92	59	33	225
DN40	115	105	63	36	228
DN50	130	120	70.5	40.5	232.5

Note: Please reserve enough space for actuator assembly and debugging.

It is recommended that 60mm should be reserved above the actuator.

Technical Parameters

• Functional data–Actuator	
Rated Force	500N
Operating Voltage	24VAC±15%, 24VDC±15%
Sensitivity	0.8%
Blind Zone	2%
Impedance (only for modulating type) Voltage Input Impedance	＞100K ＜0.2K
Load requirements (only for modulating type) Voltage input impedance	＞2K ＜0.4K
Degree of protection	IP54

• Functional data–Valve

Nominal size	DN32-DN50
Nominal pressure	PN16 / PN25
Flow characteristics	Equal percentage
Leakage rate	≤0.02% Qmax
Medium temperature	-10~120℃
Medium	Chilled/hot water, glycol under 50%
Connection standard	Female thread connection ISO7-1

• Valve spare parts materials

Valve body	CuZn39Pb2
Valve stem	Stainless steel
Valve core	Stainless steel
Sealing ring	PTFE
Diaphragm	EPDM

• Actuator spare parts materials

Cover	PC
Shell	PC
Bracket	Aluminum die casting
Base	Aluminum die casting

• 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	
PED directive	2014/68/EU
System certification	
QMS	GB/T19001-2016 / ISO9001:2015
EMS	GB/T24001-2016 / ISO14001:2015
OHSAS	GB/T45001-2020 / ISO45001:2018

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