Perfect Observe and Control Device

Build Smart Cities

TigerIoT

Pressure Independent Control Valve--AHU

Technical Data Sheet

Rev.1.0.1

TPF... Series

PICV-AHU

It can match with most of TW series actuators, which are unaffected by system pressure fluctuations, and have excellent flow regulation and balance functions.

Product Features

- **High Control Precision**

Both control valve core and balancing valve core adopt straight travel design. Compared with rotary design, straight travel has higher control precision.

- **High Close-off DP, Low Leakage Rate**

The valve has a higher close-off differential pressure, while the leakage rate is no more than 0.02% of Qmax.

- **Build-in Diaphragm Capsule and Connecting Pipe**

The valve adopts the build-in diaphragm capsule and connecting pipe. It can avoid damaging during installation compared with external connecting pipe.

- **Anti-blocking Design**

The balance structure of spring diaphragm significantly reduces the probability of blocking inside. Because of the lower requirement for water quality, it can easily deal with the water in heating pipeline.

- **High-quality Materials**

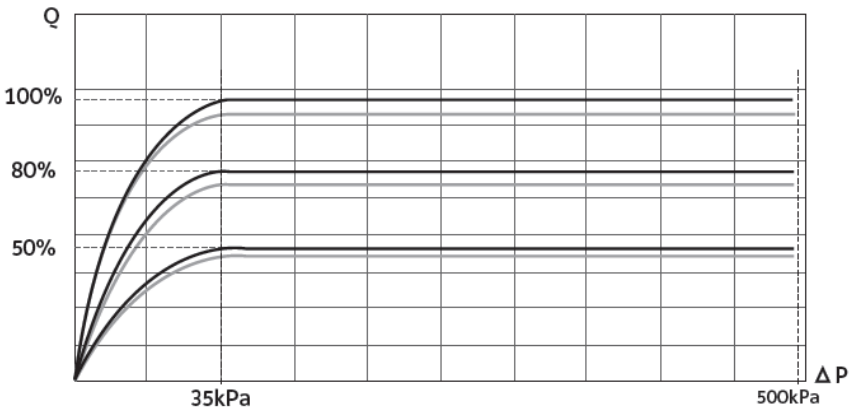
The valve body is made of high-quality ductile iron material(EN-GJS-450-10), and the surface adopts electrostatic spraying craft, the body has better intensity and corrosion resistance.

Type Overview

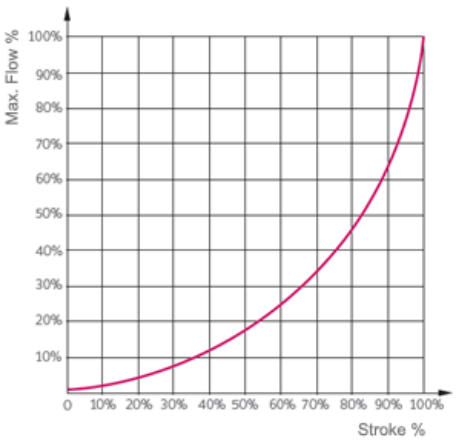
Series	TW500...	TW1001...	TW3000...
Actuator Rated Stroke	26mm	50mm	50mm
Nominal Output Force	500N	1000N	3000N
Icon			
24V, Proportional & floating control	TW500-XD24-S.10	TW1001-XD24-S.14	TW3000-XD24-S.14

Valve Type	Type	DN [mm]	Stroke [mm]	Qmax [m^3/h]	ΔPs [kPa]	ΔPs [kPa]	ΔPs [kPa]
PN16 Medium temp.: -10~120℃	TPF50-2VGC-S.10	DN50	20	13	**400**		
	TPF65-2VGC-S.10	DN65	20	21	**400**		
	TPF80-2VGC-S.14	DN80	40	28		**400**	
	TPF100-2VGC-S.14	DN100	40	50		**400**	
	TPF125-2VGC-S.14	DN125	40	90		**400**	
	TPF150-2VGC-S.14	DN150	40	145		**400**	
	TPF200-2VGC-S.14	DN200	40	208			**400**
	TPF250-2VGC-S.14	DN250	40	240			**400**
PN25 Medium temp.: -10~120℃	TPF50-2VGD-S.10	DN50	20	13	**400**		
	TPF65-2VGD-S.10	DN65	20	21	**400**		
	TPF80-2VGD-S.14	DN80	40	28		**400**	
	TPF100-2VGD-S.14	DN100	40	50		**400**	
	TPF125-2VGD-S.14	DN125	40	90		**400**	
	TPF150-2VGD-S.14	DN150	40	145		**400**	
	TPF200-2VGD-S.14	DN200	40	208			**400**
	TPF250-2VGD-S.14	DN250	40	240			**400**

Flow Characteristics

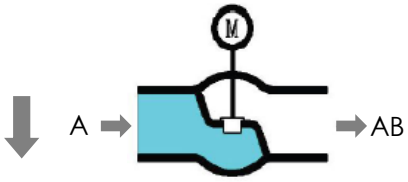


DP Flow Characteristic

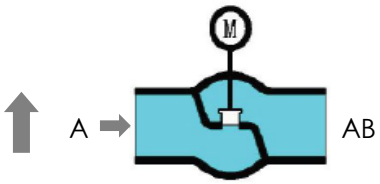


Opening Flow Characteristic
Equal-percentage

Structure Characteristics



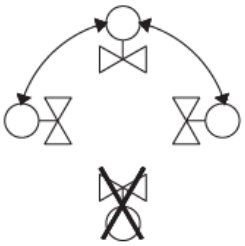
While the valve stem reach lower limit position, the valve is closed.



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

Installation Instruction

1. Please pay attention to the valve mounting orientation! Medium is chilled/hot water, downward installation is forbidden .

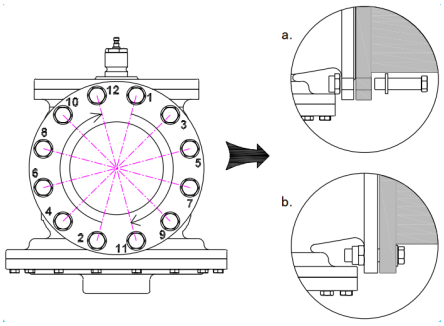


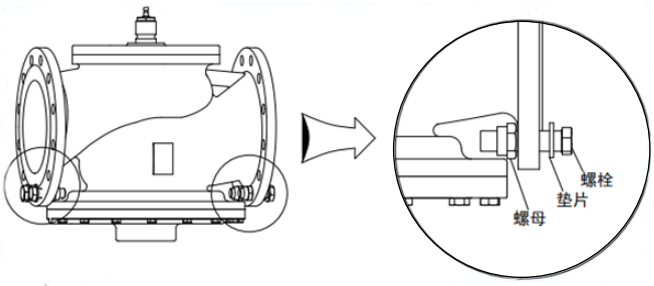
2. Valve can be installed on the water supply pipe or return water pipe (installed on the return water pipe can control the water flow more smoothly, meanwhile the return water temperature is lower which can extends the service time of valve).

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

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

5. As shown in the below figure, when valve is installed, tighten the bolts and nuts diagonally. Please kindly noted, the flange holes for DN200 must use the equipped 4 sets of bolt, washer and nut.





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-stroking 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.

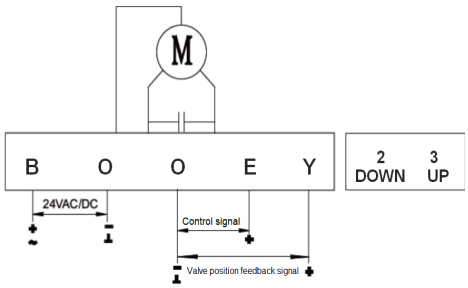
Install the slider on the actuator, then tighten the screws with Allen wrench.

3.

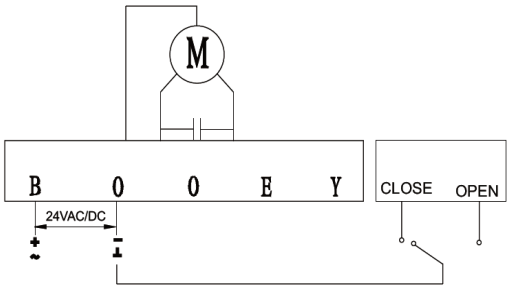
Complete the assembly of valve and actuator.

Wiring Diagram

TW500-XD24...

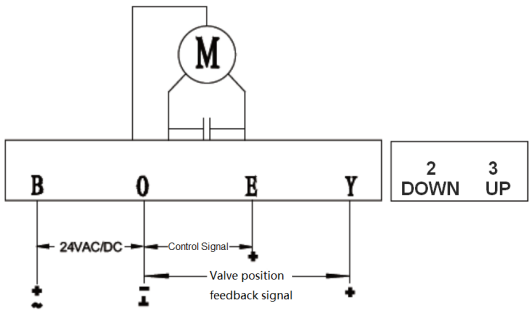


Proportional

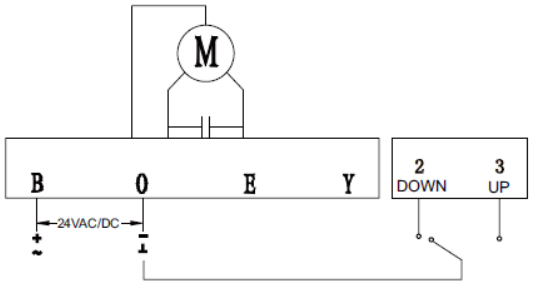


Floating control

TW1001/3000-XD24...

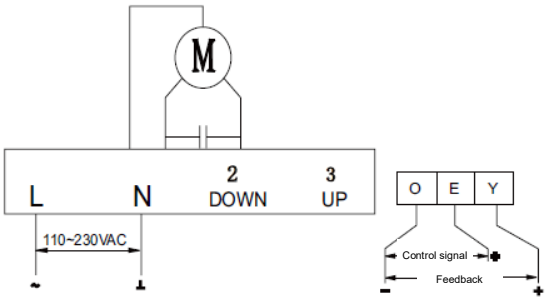


Proportional

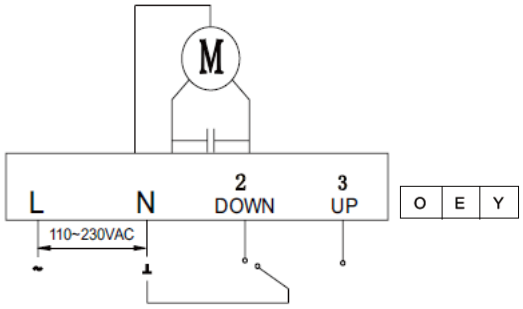


Floating control

TW1001/3000-XD220...

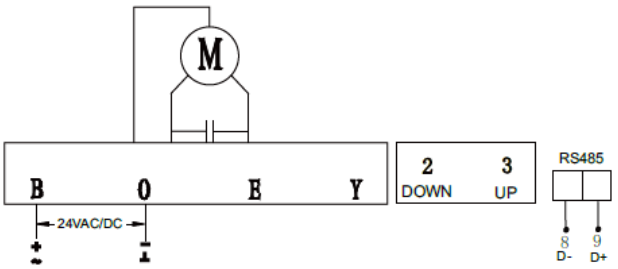


Proportional

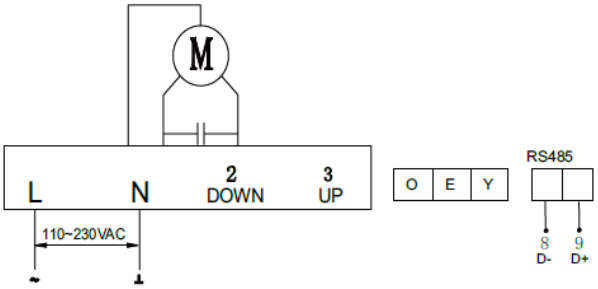


Floating control

TW1001/3000-... –S485...



TW...-XD24-S485...



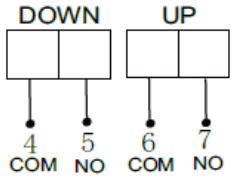
TW...-XD220-S485...

Note:

1) when wire the actuator of BX24 with RS485, only connect terminals B, O and RS485;

1) when wire the actuator of BX220 with RS485, only connect terminals L, N and RS485;

TW1001/3000-... –SF2...



Terminals 4, 5, 6, and 7 are SPDT feedback , normally open contacts, with contact capacity ≤ 30VDC.
When the actuator runs to limiting position 0, terminals 4 and 5 will conduct and output dry contact feed-back.
When the actuator runs to limiting position 1, terminals 6 and 7 will conduct and output dry contact feed-back.

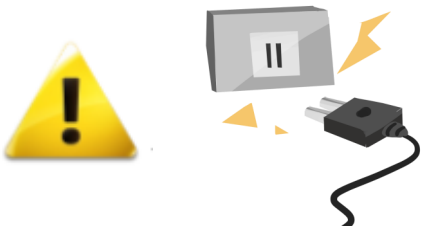
Wiring Instruction

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!

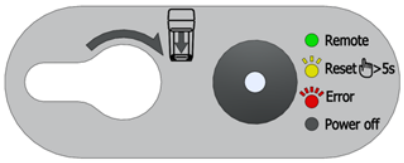
3. Open the cover when wiring, prohibit disassembling other spare parts!

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



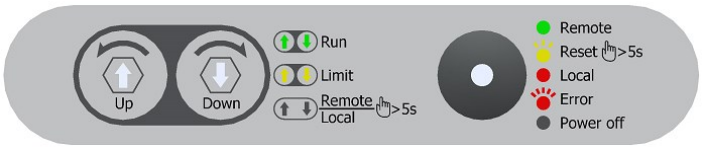
Indicating Light

TW500



Reset	Status	Description
Green	Always	Normal mode
Orange	Flashing	Self-calibrating
Red	Quick flashing	Alarming

TW1001/3000



Reset	Status	Description
Green	Always	Normal mode
Red	Always	Local mode
Orange	Flashing	Testing stroke
Red	Quick flashing	Alarming

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

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

Debugging Instruction

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

B. Automatic self-stroking (factory default setting): actuator will repeat automatic self-stroking 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-stroking stops. By then, actuator running direction can be controlled by control signal.

3) If the Reset red light is quick flashing during the self-stroking, it means the self-stroking 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-stroking function , you can set the 7th switch to OFF, it will change into manual self-stroking.

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

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-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 interface control (ModBus protocol)
		OFF	Proportional type and 3-position type
S1-10	Speed	ON	High speed
		OFF	Low speed

Function Introduction

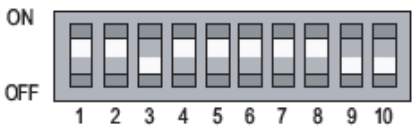
- **Modulating**

Control signal/feedback signal: 4~20mA

Control signal/feedback signal: 0~10VDC

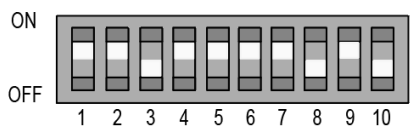
When equipped with PICV, terminal B, O is power input, actuator can be controlled by connecting terminal O, E, as shown above:
Control signal at terminal O, E increasing: actuator shaft retracts, valve stem extends, valve tends to open.
Control signal at terminal O, E decreasing: actuator shaft extends, 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.

- **Floating control**



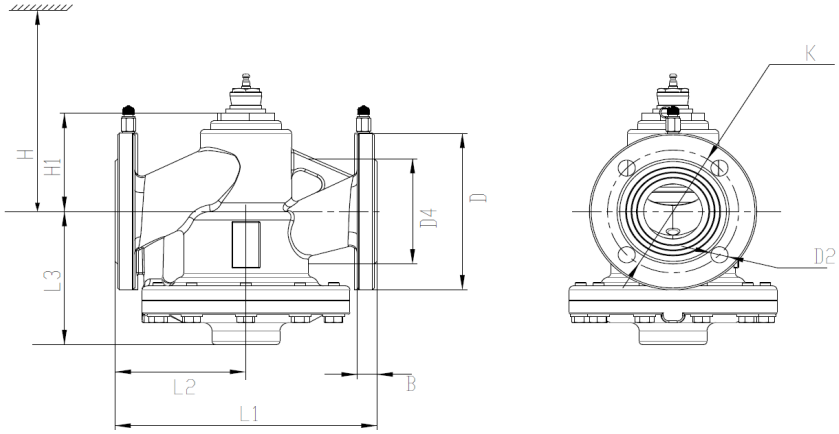
When Dip switch S1-8 is on, it is 3-position type. Terminals B, O is power input, control the actuator by the switch O, UP, DOWN:
O, UP connected: actuator shaft retracts, and valve stem extends
O, DOWN connected: actuator shaft extends, and valve stem retracts

- **RS485 Bus Communication**



When Dip switch S1-9 is on, it is RS485 Bus communication type. Terminals 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: Terminals O, E, Y, UP, DOWN doesn't work by this time!

Dimension

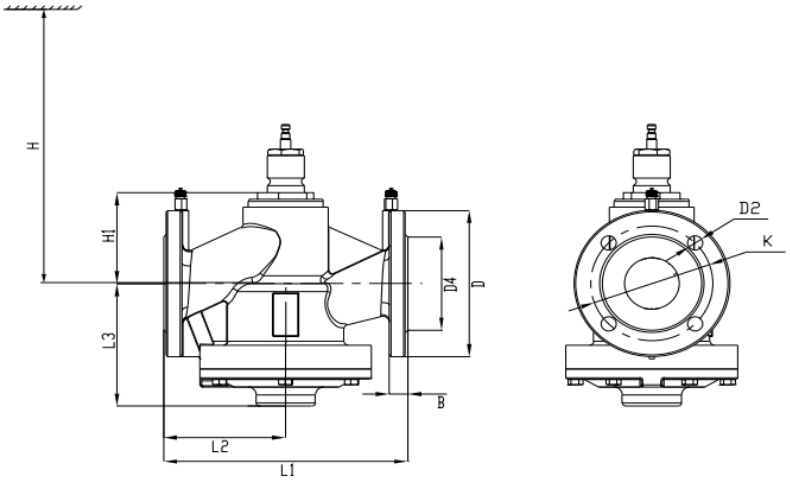


- **PN16**

DN	B (mm)	D (mm)	D2 (mm)	D4 (mm)	K (mm)	L1 (mm)	L2 (mm)	L3 (mm)	H1 (mm)	H (mm)	N.W. Kg
50	20	165	4-19	99	125	230	115	136	95	347	19
65	22	185	4-19	118	145	290	145	155	115	367	28

- **PN25**

DN	B (mm)	D (mm)	D2 (mm)	D4 (mm)	K (mm)	L1 (mm)	L2 (mm)	L3 (mm)	H1 (mm)	H (mm)	N.W. Kg
50	20	165	4-19	99	125	230	115	136	95	347	21
65	22	185	8-19	118	145	290	145	155	115	367	30



- **PN16**

DN	B (mm)	D (mm)	D2 (mm)	D4 (mm)	K (mm)	L1 (mm)	L2 (mm)	L3 (mm)	H1 (mm)	H (mm)	N.W. Kg
80	24	200	8-19	132	160	310	155	167	148	483	36
100	22	220	8-19	156	180	350	175	181	150	485	54
125	26	250	8-19	184	210	400	200	197	163	498	68
150	24	285	8-23	211	240	480	240	222	198	533	89
200	24	340	12-23	266	295	500	250	245	180	525	140
250	26	405	12-28	319	355	600	300	277	210	555	207

- **PN25**

DN	B (mm)	D (mm)	D2 (mm)	D4 (mm)	K (mm)	L1 (mm)	L2 (mm)	L3 (mm)	H1 (mm)	H (mm)	N.W. Kg
80	24	200	8-19	132	160	310	155	167	148	483	38
100	22	235	8-23	156	190	350	175	181	150	485	57
125	26	270	8-28	184	220	400	200	197	163	498	73
150	24	300	8-28	211	250	480	240	222	198	533	94
200	24	360	12-28	274	310	500	250	245	180	525	145
250	26	425	12-31	330	370	600	300	277	210	555	216

Technical Parameters

• Functional data–Valve	
Nominal size	DN50-DN250
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	Flanged connection ISO7005-2

• Functional data–Actuator	
Rated Force	500N / 1000N / 3000N
Operating Voltage TW...-XD24... TW...-XD220…	 24VAC±15%, 24VDC±15% 110VAC -220VAC ± 15%
Sensitivity	Modulating: 0.8% RS485： 0.2% (default setting)
Blind Zone (only for modulating type)	2% (default setting)
Impedance (only for modulating type) Voltage Input Impedance Current Input Impedance	 >100K <0.2K
Load requirements (only for modulating type) Voltage input impedance Current input impedance	 >2K <0.5K
Degree of protection	IP65
cable bond	PG13.5
Lifetime	10 thousand cycles

• Valve spare parts materials	
Valve body	Ductile iron EN-GJS-450-10
Valve stem	Stainless steel
Valve core	Stainless steel
Sealing ring	PTFE
Diaphragm	EPDM

• Actuator spare parts materials	
Cover	PC
Shell	Aluminum die casting
Bracket	Stainless steel
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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