JFS

BEIJING JOINT FLOW SYSTEM CO.

BUTTERFLY VALVE

POWER-PACK CONTROLLED BUTTERFLY VALVE

Power-pack Controlled Butterfly Valve is a kind of tailor-made products, as it can be different combination with butterfly valve and control system.

The basic valve is designed to be automatically closed by gravity closing devices, and opened by electric and hydraulic actuator.

STRUCTURE

- Power-pack controlled butterfly valve is an assembly product with two major parts: Butterfly valve and Control System (Power-pack control unit and local control panel).
- It adopts hydraulic oil pot force as power to open, close and elevate counter-weight.

FUNCTION

- With check valve function, permitting media to flow in single direction only.
- With butterfly valve (or sluice) function, blocking media in pipe completely.
- With eliminating water hammer, avoiding back flow damage on pump and delete the surge in pipeline.
- Two speed closing. First step 85% valve stroke quick closing, last 15% slow closing(adjustable)
- Internal UPS will make the power failure closing as an option

Power-pack controlled butterfly valve can be used as pump control valve and inlet valve of turbine. When it was used at the discharge side of pump, it is a kind of pump control valve as it has two stage of valve opening and closing (quick 85%+15% slow adjustable) to avoid water hammer damage and protecting pipe system. When it was used at the inlet of turbine, it is a kind of emergency shut-off valve, close the valve within a very short time and prevent turbine reaching its runaway speed.

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STANDARD

Design and Manufacture	AWWA C504/BS 5155
Inspection and Testing	ISO 5208/API 598
Face to Face Dimension	ISO 5752/EN 558/ASME B16.10
Flange Dimension	ASME B16.5/ASME B16.47/AWWA C207/ISO 7005/EN 1092

*More standard specifications are available on request.

TEST DATA

Nominal Diameter DN (mm)	1200-3400	500-2600	500-2000	500-1600	20"-144"	16"-80"
Nominal Pressure PN (MPa)	0.25	0.6	1.0	1.6	86(psi)	150(psi)
Hydraulic Shell Test Pressure (MPa)	0.375	0.9	1.5	2.4	129psi	225psi
Hydraulic Seal Test Pressure (MPa)	0.275	0.66	1.1	1.76	95psi	165psi
Temperature (℃)	-10~300(CI)		-10~300(DI)	-29~425(CS)		-40~550(SS)
Valve Structure	Center Line		Double Eccentric		Triple Eccentric	

*More test specifications are available on request.

MATERIAL SPECIFICATION

Parts Name	Material
Body	Ductile Iron/Carbon Steel/Stainless Steel
Bottom Cap	Carbon Steel/Stainless Steel
Disc	Ductile Iron/Carbon Steel/Stainless Steel
Shaft	Stainless Steel
Body Seat Ring	Body material Stainless Steel/Overlay Stainless Steel or Hard Alloy/Stainless Steel Ring Inserted
Disc Sealing Ring	Laminated Sealing Ring (S.S.+Graphite, Asbestos Sheet or PTFE)/Rubber
Shaft Pin	Stainless Steel
Retaining Ring	Carbon Steel/Stainless Steel
Packing Gland	Ductile Iron/Carbon Steel/Stainless Steel
Yoke	Cast Iron/Cast Steel
Electric Cabinet	Subassembly
Hydraulic Power-pack	Subassembly
Counter Weight	Cast Iron

*More material specifications are available on request.

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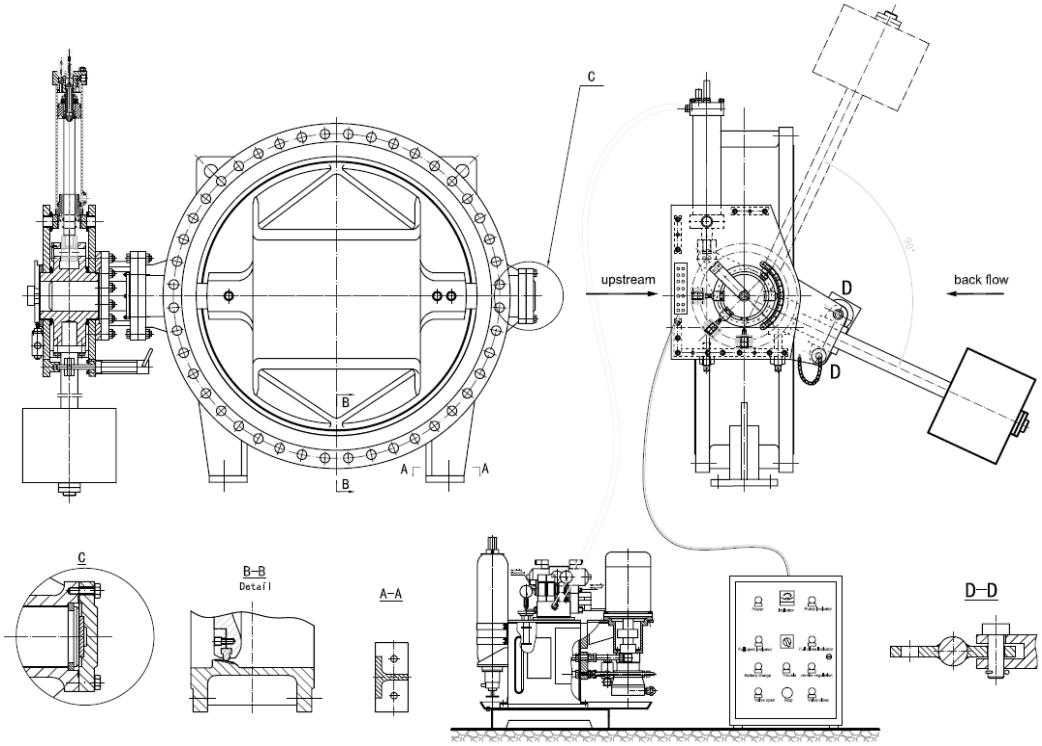
TYPICAL DRAWING

1. GA Drawing (D is for manual lock of counter-weight)



2. Operating Sequence Diagram

			Full close	Valve opening						Full open	Valve closing						
			0°	0°	15°	30°	45°	60°	75°	90°	90°	75°	60°	45°	30°	15°	0°
Cylinder																	
RP 33 RP 34	SQ1	NO															
		NC															
	SQ2	NO															
		NC															
	SQ3	NO															
		NC															
	SQ4	NO															
		NC															
Solenoid valve																	
oil pump electric motor	electric motor																

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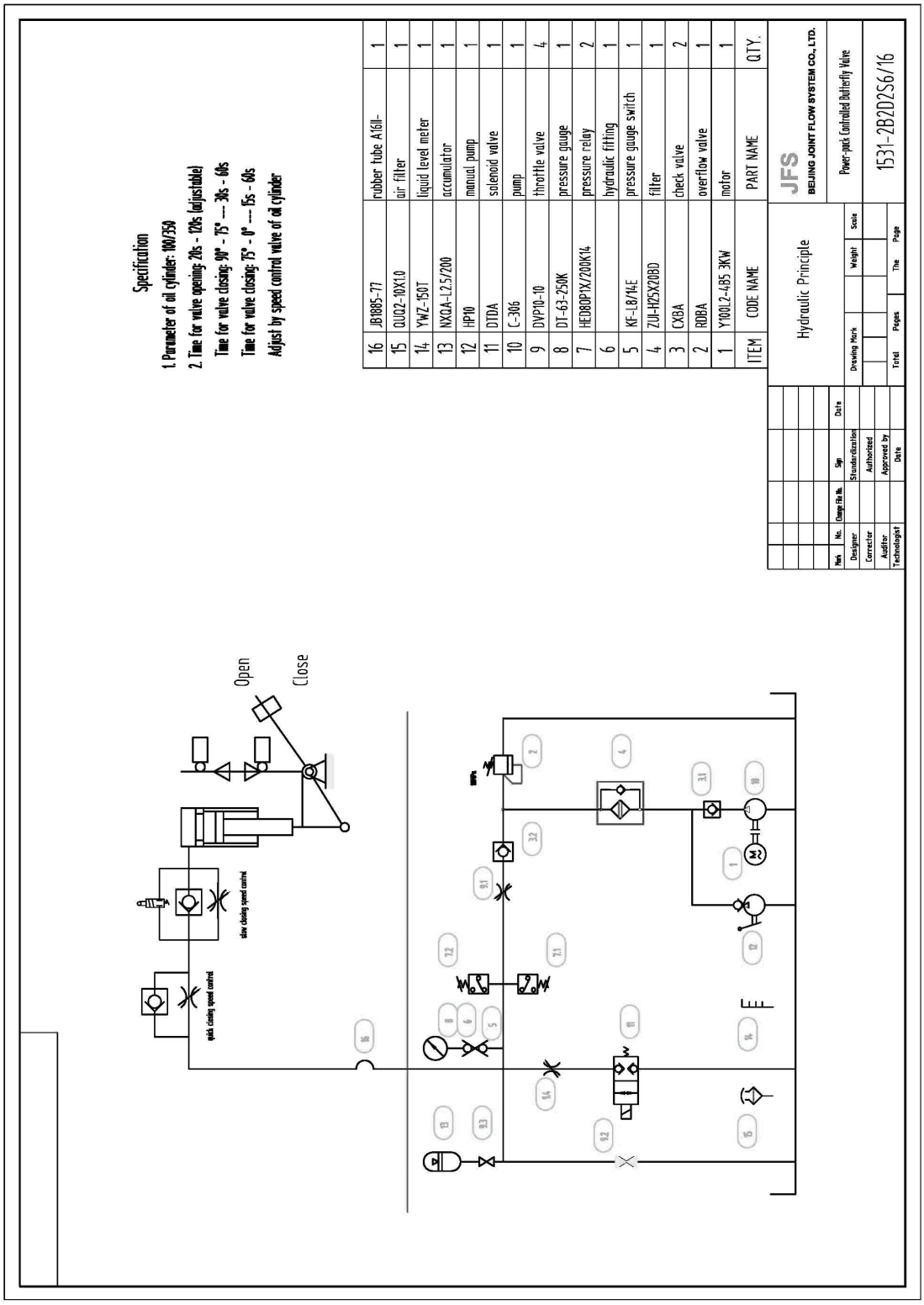
3. Hydraulic Principle



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CONTROL SYSTEM

Electric actuator with clutch system, hydraulic control devices or pneumatically control unit which meets various open and close speed requirements.

1. Control with hydraulic system

The valve is hydraulically operated by an AC solenoid controlled ball valve (the solenoid is with manual operation).In case of emergency, the valve can be closed under the flow condition at maximum discharge and maximum head. The closing time is adjustable for both opening and closing.

The operating mechanism consists of hydraulic cylinder and counter weight. The valve is held open by hydraulic pressure in the cylinder only, closing by loss of pressure.

Manually lock is provided on disc when it is in close position by a set of control units.

The cylinder is fabricated of welded steel pipe. The cylinder bore is honed to a polished finish. Flange is steel and with gaskets or seal rings to remain oil-tight at all operating pressure ranges. The rod end flanges contain a bronze bushing with sealing.

The piston is made of cast steel with V type of packing and metal piston rings which is according to oil pressure rating. The rod is straight and true, made of chromium-plated forged steel.

The oil pressure system is provided .Any oil leakage will be collected and returning to the oil sump tank.

2. Basic Logic

The hydraulic power pack controlled butterfly valve is interlock with pump.

A. Under normal working condition:

First, open the valve to 15% degree, then start the pump, valve will continue to open till fully opened;

In closing procedure, shut off the butterfly valve to 75% closing degree first, then shut down the pump, valve will close continuously till fully closed position. The speed of this two steps closure is adjustable.

B. Power failure:

The pump will be shut down by unexpected power failure; the power-pack controlled butterfly valve will be automatically closed as the valve in normal working condition—Two adjustable speed closure. Because the internal build in UPS will automatically shift the position of the solenoid and allow the oil back to oil tank.

3. Operating Procedure

- **Valve open**

Starting the oil pump, pressurized oil will go through filter, throttling valve, check valve, high pressure oil tube to the bottom of oil cylinder. The pressurized oil will push the piston, make the lever lifting the counterweight, at the same time, and make the valve shaft and disc turning, then open the valve. The opening speed is adjustable, and can be achieved by adjusting the throttle valve. The fully open time is between 20~90s (can be set according to customer's request).

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- **Valve close**

In pump close procedure or unexpected power failure occurred, the solenoid is de-energized., with the help of counterweight, valve starts to close. The closing procedure has two features:

a. Quick closing the first 60~80% stroke is in quick closing, and takes time about 2.5~10s;

b. The last 10~30% is slow closing, closing time can be adjustable between 50~80 s.

- **Manually open/close the valve (power loss or solenoid in trouble)**

a. Manually open the valve: close the solenoid manually, turning the pump by hand, the valve can be opened, and counterweight will be lifted.

b. Manually close the valve: Open the stop valve，pressurized oil will go back to oil cylinder, with the help of counterweight, valve will be closed.

4. Two types of Solenoid Control Feature

- It is the one which mentioned above, solenoid should be energized all the time when valve opened.
- The other is that solenoid will be de-energized, and will be energized only when close the valve. This type of solenoid is highly recommended to the end-user who has the UPS system. It will be more safely. **Please specify this when ordering.**

5. Oil Accumulator

There is an oil accumulator inside the hydraulic control unit. The oil accumulator will start to work automatically when there is a leakage. In case, the oil pressure is below 4MPa, pressure relay will start the motor, and compensate the pressure automatically, and it will be stopped when pressure reaches 16MPa. (Another relay will work, and shut down the motor)

6. Electric and Control

- Power source: AC380V/50Hz
- The control system can meet the requirement for local and remote control. There are feedback signals to center control room. The signal includes (can be according to customer 's request):

  1. Local /remote control for opening valve
  2. Local /remote control for closing valve
  3. A flashing lamp to indicate the opening sequence, and remain ON when valve is open
  4. A flashing lamp to indicate the closing sequence, and remain OFF when valve is closed.
  5. A manually operated switch located in the control room will allow the operator to override all controls and initiate the emergency close sequence.

7. Disc Lock System

There are two ways to lock the disc. One is interlink with pump control panel. The pump control panel will send out a opening signal to the electric control panel of power-pack controlled valve when pump is running at its rated head, then the control panel of valve will start the procedure of valve opening. Before that, the valve will remain in close position until the opening commend coming. The second is manual lock the disc by means of locking the counter-weight. The mechanical lock of disc needs man-power to open the lock before opening the valve (please see part D in GA drawing).

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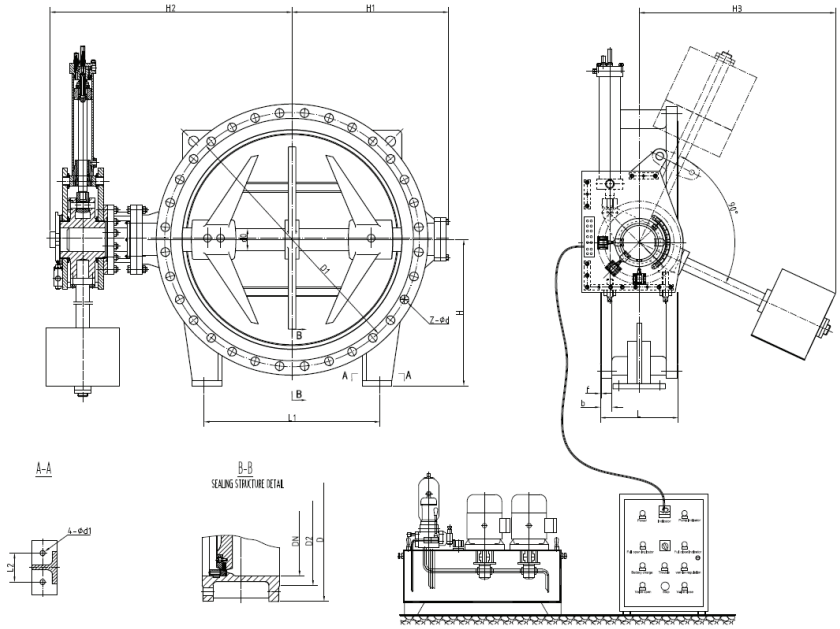
DIMENSION



DN (mm)	NPS (inch)	L		H_1	H_2	H_3	H	L_1	L_2	d_1
		Short body	Long body							
500	20	229	350	385	640	400	400	350	150	34
600	24	267	390	445	700	500	450	400	150	34
700	28	292	430	510	805	600	500	450	150	34
800	32	318	470	570	950	700	550	500	180	37
900	36	330	510	630	1000	700	600	500	180	37
1000	40	410	550	700	1140	800	700	500	180	37
1200	48	470	630	830	1350	1000	800	500	180	37
1400	56	530	710	960	1470	1200	900	700	180	41
1600	64	600	790	1080	1630	1400	1000	1000	180	41
1800	72	670	870	1215	1750	1600	1100	1100	190	41
2000	80	760	950	1350	1850	1800	1200	1200	240	43
2200	88	800	1000	1600	1980	1800	1300	2200	330	43
2400	96	850	1100	1750	2120	2000	1360	2400	330	45
2600	104	900	1200	1880	2230	2000	1500	2600	300	45
2800	112	950	1300	1980	2400	2200	1610	2800	400	48
3000	120	1000	1400	2080	2600	2200	1690	3000	470	48
3200	128	1100		2130	2730	2400	1850	3200	500	52
3400	136	1200		2250	2840	2500	1950	3400	500	52

*Face to face dimensions (L) herein are according to EN 558/ISO 5752 series 13 (Short Body) and series 14 (Long Body).

*Flange dimensions (D, D_1, D_2, Z-d, b, f) refer to Catalogue of Accessory: Series 8 – Flange.

*More dimension specifications are available on request.