

POWERPACK

MODEL AJ02, AJ03

The Powerpack is an electro-hydraulic actuator which converts DC signals (4 to 20 mA) into movements of a hydraulic work cylinder. A proportional positioning system is used to change the position of the work cylinder in proportion to electric signals. The Powerpack is an ideal actuator for use in garbage incineration plants, sewage treatment plants, etc. Because its output shaft rotates, it is suitable for final control elements such as a butterfly valve.

FEATURES

- High-speed, high-power operation can be obtained by hydraulic pressure converted from electric signals.
- Because a hydraulic servo valve is used in the control element, high response and easy maintenance assure high reliability.
- An electric feedback system is used.
- A power supply is required only for the motor. No power supply is needed for the amplifier because a transformer is incorporated.
- Manual local operation is available by changing over the switch.
- Opening output signals (4 to 20 mA) are available as standard.
- No oil leaks from joints because work cylinder and control elements are incorporated in the oil reservoir. No external piping is needed.
- Safety functions are provided.

The crank arm moves in the safety direction when input signals are abnormal (excessively low or high input) or the wiring of the feedback potentiometer is broken. The direction for safe movement can be changed as required.



Photo1 AJ02



Photo2 AJ03

SPECIFICATIONS · MODEL CODES

Specifications by model

Model		AJ02	AJ03
Operating torque kN · m	Max	1.2 *	2.4
	Min	0.9 *	1.8
Maximum no-load speed (standard setting)	°/sec	4 to 5	3 to 4
Hydraulic pressure	MPa	2	2.2
Cylinder bore X stroke	mm	φ 80 X 120	φ 100 X 140
Length of crank arm	mm	250	300
Motor (3 φ, 4P)		0.4kW3 φ 4P	0.75kW3 φ 4P
Oil required	ℓ	18(21 for ACC)	28.5(35 for ACC)
Mass (excl. hydraulic fluid)	kg	115	150

- Notes 1 : No explosion-proof specifications are available.
2 : The operating torque values are for 2.0 MPa in AJ02, and 2.2 MPa in AJ03.

MODEL CODES

Type	Model	Power
02	AJ02	0.4kW
03	AJ03	0.75kW

Code	Description	Specifications
L	Normal arm	Crank arm
S	Reverse arm	
F	Crank arm turns CCW when input signal increases.	Operation
R	Crank arm turns CW when input signal increases.	
N	None	Accumulator (ACC)
A	Provided (Crank arm turns CCW by ACC operation.)	
B	Provided (Crank arm turns CW by ACC operation.)	
1	Provided (Crank arm turns CCW when OPEN is selected.)	Manual operation switch
2	Provided (Crank arm turns CW when OPEN is selected.)	
1	Crank arm turns CCW when an error occurs.	Input signal or Feedback signal errors
2	Crank arm turns CW when an error occurs.	
N	None	Valve opening signal
I	Provided (Signal increases when crank arm turns CCW.)	
D	Provided (Signal decreases when crank arm turns CCW.)	

Code	Description	Specifications
E1	Indoor type	Motor and control element case
E2	Outdoor type	
1	Indoor type	Control section
2	Outdoor type	
1	200V 50/60Hz	Power supply
2	200V 60Hz	
3	400V 50/60Hz	
4	440V 60Hz	
N	None	Pressure switch
1	SPS-K225 (indoor type) provided	
2	SPS-K225WQ (Class 3 water spray-proof) provided	
N	None	Limit switch
1A	1(for counter-clockwise crank arm end position)	
1B	1(for clockwise crank arm end position)	
2	Two switches provided	
N	None	Manual operation lever
1	Provided	
N	None	Power box for solenoid valves
1	Indoor type	
2	Outdoor type	

Code	Description
Y	Special specifications (described in detail)

CW : clockwise CCW : counterclockwise

Common specifications

Input signal 4 to 20mA DC
 Input resistance 250Ω
 Opening output signal 4 to 20mA DC (max. load 250Ω)
 Control action Proportional action
 Operating direction Can be changed to any direction
 Linearity ± 2%
 Hysteresis error (no load) 2%
 Temperature drift 5% (0 to 60°C)
 Maximum crank rotation 60°
 Installation Horizontal
 Ambient temperature -10 to +50°C
 Temperature range of hydraulic fluid +10 to +70°C
 Paint Silver
 Manual operation function AUTO/MAN, OPEN/CLOSE

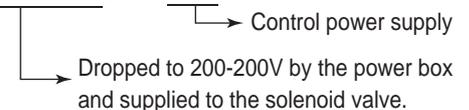
Notes

- Crank arm rotation directions are from the crank arm side.
- Operation direction and specifications when using an accumulator (ACC)

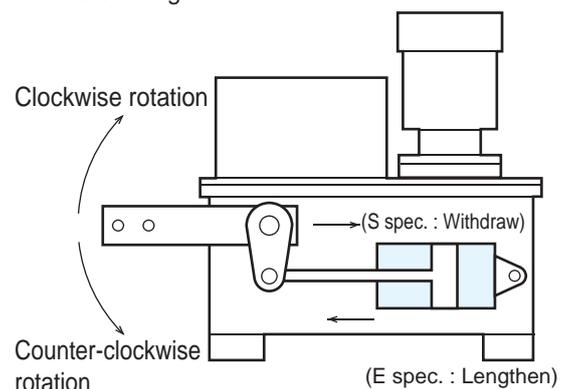
Crank arm	Operated by ACC	Specifications (Refer to following diagram)
Normal arm (L)	Counter-clockwise rotation (A)	S Specifications
	Clockwise rotation (B)	E Specifications
Reverse arm(S)	Counter-clockwise rotation (A)	E Specifications
	Clockwise rotation (B)	S Specifications

The charged pressure of the accumulator's N₂ gas is 1.5MPa. Shipped without gas in accordance with the High Pressure Gas Control Law.

- Signal errors will occur in the following situations.
 - Insufficient input signal (3.5mA or lower)
 - Excessive input signal (21mA or above)
 - Feedback signal cutoff
- Standard pressure switch setup values are as follows.
 - A = 0.5MPa, B = 0.3MPa
 - (Operates at 0.2MPa or less and reverts at 0.5MPa or more)
- The solenoid valve power box is used when power is supplied from two systems, as in the following example. Example : 400V/440V and 100V



- Wiring layout for this device is as follows.
 - If both motor and control element are outdoor type, use flexible conduit tubing.
 - For situations other than the above, use cable wiring.



STRUCTURE

The hydraulic unit of the Powerpack consists of a current-hydraulic converter (servo valve), hydraulic pump, and work cylinder. The compact cast-iron reservoir incorporates a work cylinder, pump, crank, and feedback mechanism, and it needs no external piping.

An amplifier and an AUTO/MAN switch are provided inside the box on the reservoir to simplify operation at the site. Fig.1 and Fig.2 are a hydraulic circuit diagram and a structural diagram of the Powerpack, respectively. As shown in the figures, pressure oil from the hydraulic pump is introduced into the oil pressure gauge and the filter, and is supplied to the servo valve.

When electric current is applied to the moving coil, it moves, and the spool valve directly coupled with the moving coil also moves.

The oil is sent from port ① or ② to move the piston of the work cylinder and to rotate the crank shaft.

This moves the wire of the feedback mechanism directly, rotates the potentiometer via a pulley, and inputs a feedback signal into the amplifier.

The input signal and the feedback signal are operated in the amplifier. When a desired value is reached, the output signal becomes 0 mA, and the spool valve is balanced and stopped at the desired position.

The current signal is proportional to the force generated by the moving coil, and the rotating angle of the crank arm is proportional to the signal of the potentiometer.

Therefore, the input current signal is proportional to the rotating angle of crank arm.

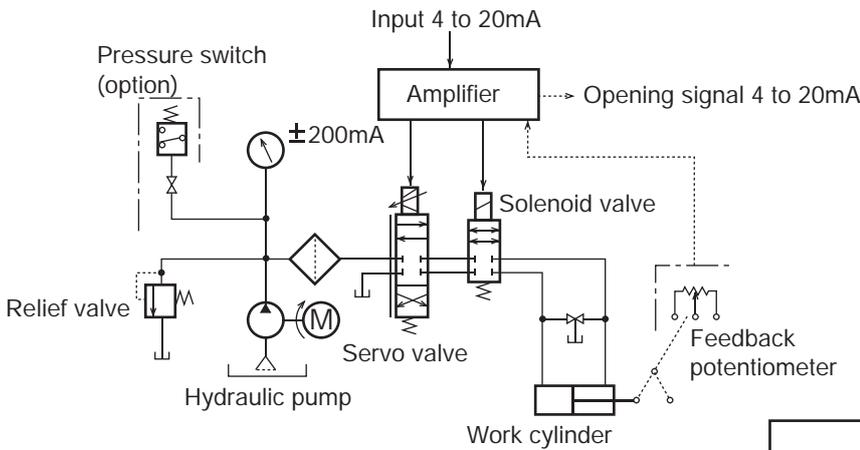


Fig.1 Hydraulic Circuit Diagram of Powerpack AJ02/AJ03

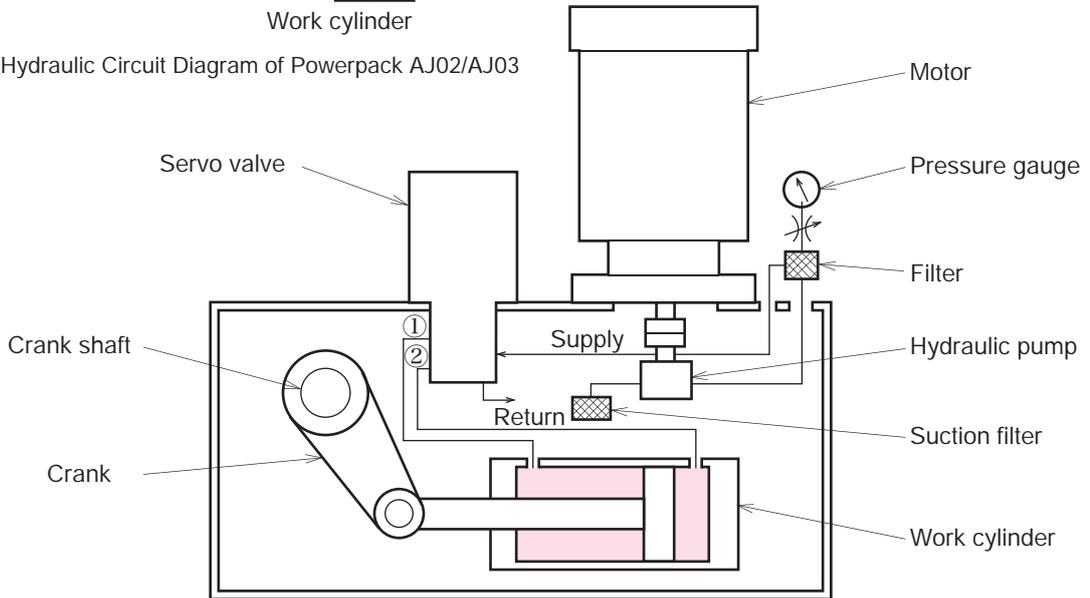


Fig.2 Structural Diagram of Powerpack AJ02/AJ03

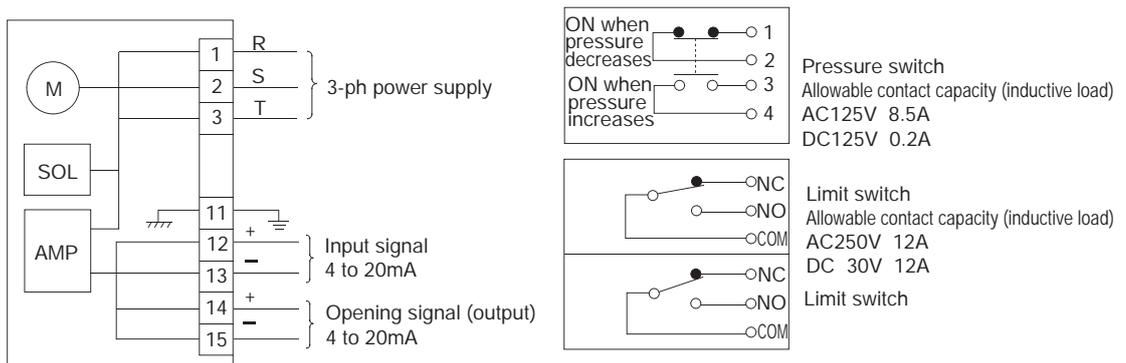


Fig.3 Wiring Diagram

E TERNAL DIMENSIONS

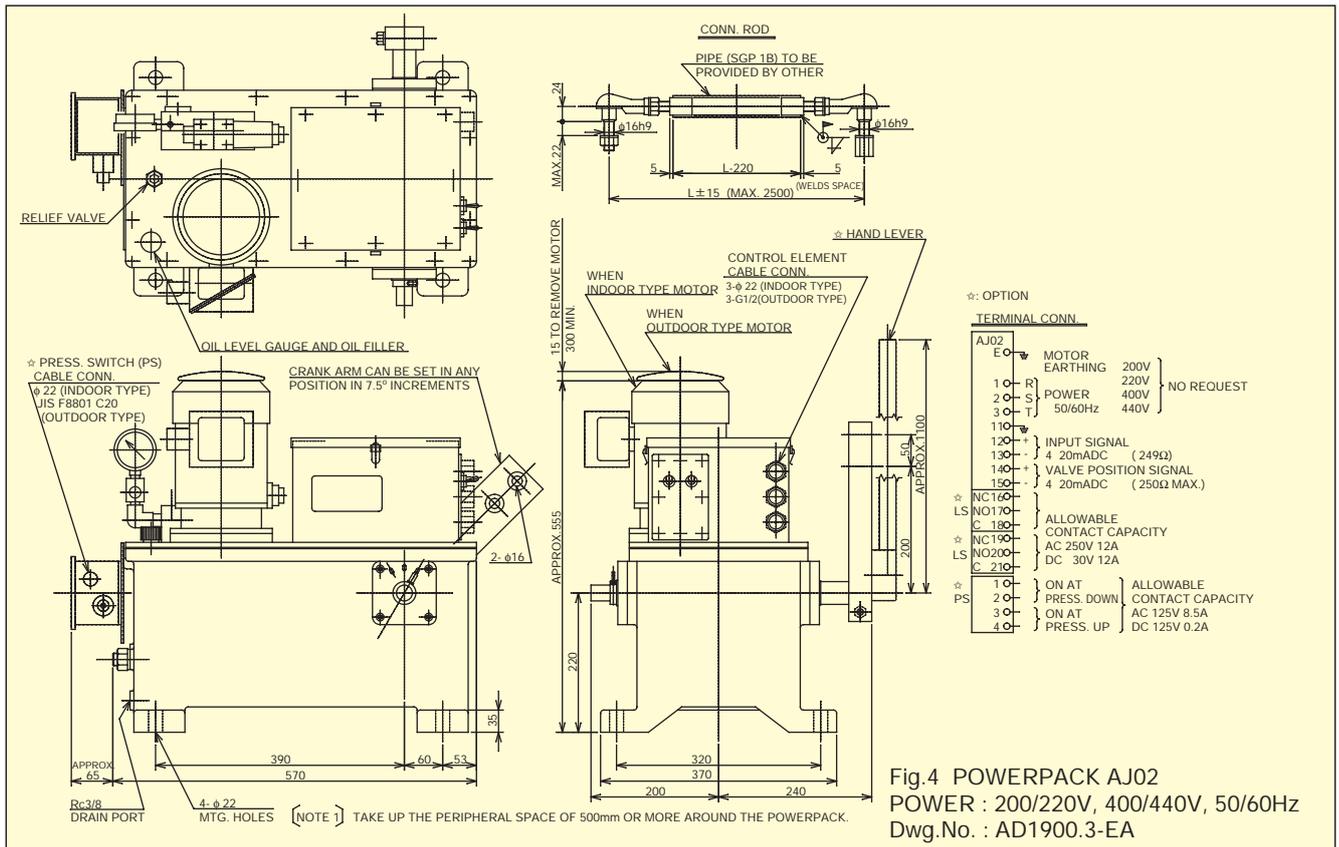


Fig.4 POWERPACK AJ02
POWER : 200/220V, 400/440V, 50/60Hz
Dwg.No. : AD1900.3-EA

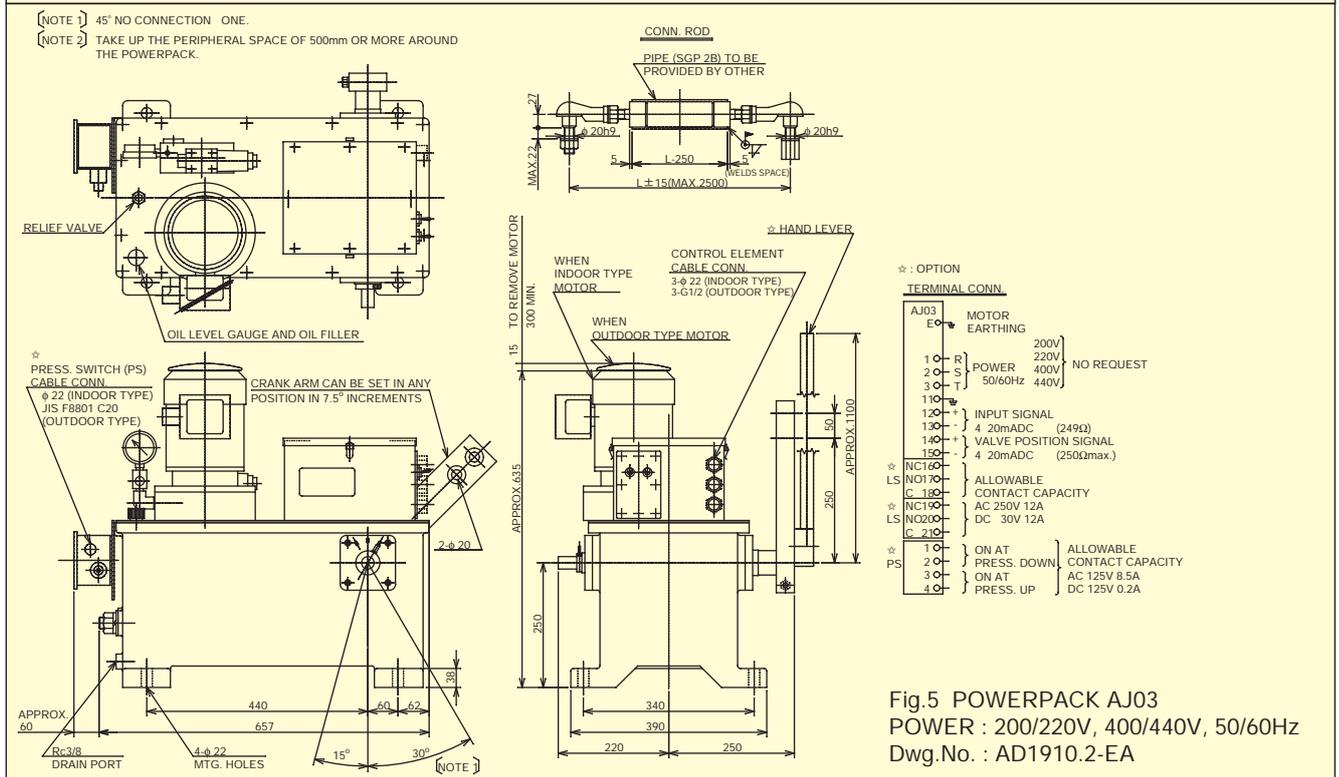


Fig.5 POWERPACK AJ03
POWER : 200/220V, 400/440V, 50/60Hz
Dwg.No. : AD1910.2-EA

We reserve the right to change the specifications in this catalog without prior notice to improve and update our products.

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