



NIPPON VALVE CONTROLS, INC.

Instruction manual

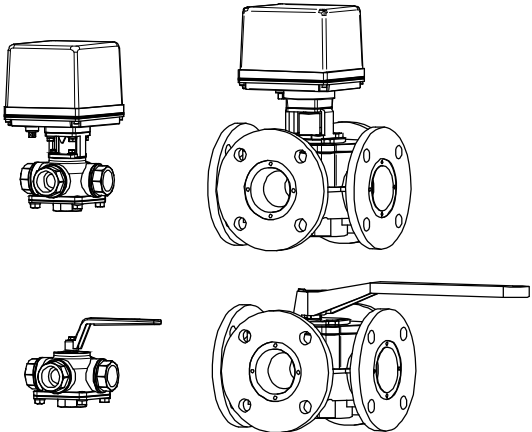
5 Way Ball Valve E5 L5 (For Filtration)

SP-1519

Please read this manual before installation and use.

GENERAL

The E5 / L5 series is composed of stainless body and ball to improve anti-corrosiveness.
5 way valve with standard bore in larger size has an excellent flow characteristic and it's economical.
Filtration can be easily automatized with control unit (FCU-103B) which has a built-in weekly programmer.



Actuator

- AE3 : For AC power
- AD3 : For AC power
- HD3 : For AC power (High speed)

Valve

- E5 type 5 way ball valve (Threaded End Rc)
- L5 type 5 way ball valve (Flanged-end)

PRODUCT CODE

Electric Actuated	E5 type	A E 3 E 5	<input type="checkbox"/>	0	5	T	T	T	-	0	2	5	-	<input type="checkbox"/>			
	L5 type	<input type="checkbox"/>	:	:	L	5	<input type="checkbox"/>	0	<input type="checkbox"/>	T	T	T	-	<input type="checkbox"/>			
Manual lever	E5 type			E	5			5	T	T	T	-	0	2	5	-	<input type="checkbox"/>
	L5 type			L	5			<input type="checkbox"/>	T	T	T	-	<input type="checkbox"/>	:	:	-	<input type="checkbox"/>
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)					

(1) Actuator AE3 AD3 HD3 Nil (Manual type)	(4) Sizing code 0 : Standard 1 : Light 2 : Heavy Nil (Manual type)	(6) Body material T : SCS13A	(10) Option TN : Electroless nickel plating (for sea water)
(2) Valve E5 L5	(5) Connection 1 : JIS 10K 2 : JIS 5K 5 : Threaded End Rc	(7) Ball material T : SCS13A	(11) Flow paths L : Filtrated water outlet on the left R : Filtrated water outlet on the right
(3) Voltage 1 : 100 / 110V AC 2 : 200 / 220V AC Nil (Manual type)	(8) Seat material T : PTFE	(9) Size [mm] ex. 25 A → 025	

VALVES SPECIFICATIONS

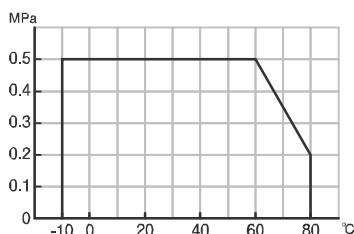
Water
 Oil
 Air, Gas
 Steam
 Chemicals
 Sea water
 Slurry
 Negative pressure

E5 L5 type

Valve type	E5	L5
Design	5 way, Standard port	5 way, Standard port
Connection	Threaded End Rc	JIS 5K Flanged-end JIS 10K Flanged-end
Fluid		
Max pressure	0.5 MPa	0.5 MPa
Size [mm]	025	032 to 125
Material	Body	SCS13A
	Ball	SCS13A
	Seat	PTFE
Stem seal	O-ring	EPDM

Depending on the fluid condition, it can not be used for underground water and sea water.

PRESSURE & TEMPERATURE RATING



FLOW PATHS (Top view of valve)

	Switching; Filtration → Reverse flow → Cleaning		
	Filtration	Reverse flow	Cleaning
Code: L Filtrated water outlet on the left	Filter entrance Filter exit	Filter entrance Filter exit Drain	Filter entrance Filter exit Drain
Code: R Filtrated water outlet on the right	Filter entrance Filter exit Filtered water	Filter entrance Filter exit Drain	Filter entrance Filter exit Drain
Flow paths	Raw water ↓ Filter entrance ↓ Filter exit ↓ Filtered water	Raw water ↓ Filter exit ↓ Filter entrance ↓ Drain	Raw water ↓ Filter exit ↓ Filter entrance ↓ Drain

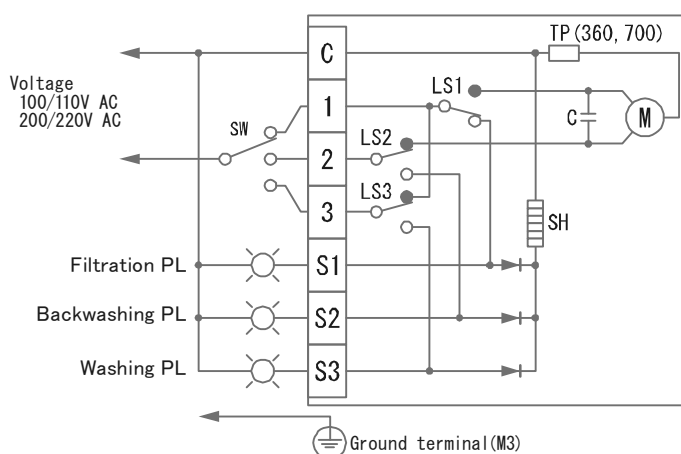
Note) Raw water inlet is bottom of the valve.

ELECTRIC ACTUATOR SPECIFICATIONS

AE3 type

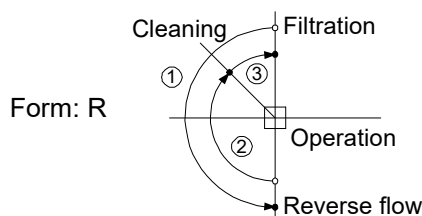
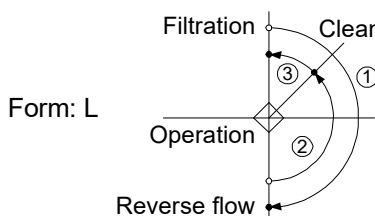
Actuator type (□:Voltage code)	AE3-120-□	AE3-360-□	AE3-700-□	
Voltage	100 / 110 AC V ±10 % 50/60 Hz (Code: 1) 200 / 220 AC V ±10 % 50/60 Hz (Code: 2)			
Rated torque [N·m]	12	36	70	
Operation time [s]	Filtration → Reverse flow	19 / 16 (50/60 Hz)	15 / 12 (50/60 Hz)	30 / 24 (50/60 Hz)
	Reverse flow → Cleaning	14 / 12 (50/60 Hz)	11 / 9 (50/60 Hz)	22 / 18 (50/60 Hz)
	Cleaning → Filtration	5 / 4 (50/60 Hz)	4 / 3 (50/60 Hz)	8 / 6 (50/60 Hz)
Power consumption [VA]	19	60		
Motor	Synchronous motor	Reversible motor		
Overload protection	Thermal protector			
Method of operation	Transfer input type			
Operation	When SW1 is ON, it's Filtration. (Filtration PL is lit.) When SW2 is ON, it's Reverse flow. (Reverse flow PL is lit.) When SW3 is ON, it's Cleaning. (Cleaning PL is lit.)			
Output signal rating	Resistance load 3 A 250 V AC (Minimum 0.1 A)			
Duty cycle	20 % 15 min.			
Ambient temperature	-20 to 55 °C			
Space heater	Built in to the control board			
Manual operation	Manual shaft			
Enclosure	Equivalent to IP65 (IEC 60529)			
Housing material	Aluminum alloy diecast (acrylic resin baking finish)			
Wire connection	Terminal Block: M3, Ground terminal: M3			
Conduct port	2-G1/2 Attachments: Cable gland (for Φ6 to 12 mm cable), plug.			

WIRING



Note) Control switch should be prepared one by one for actuator.
Do not operate two or more actuator from one switch. It might malfunction.

Operation (Top view of valve)

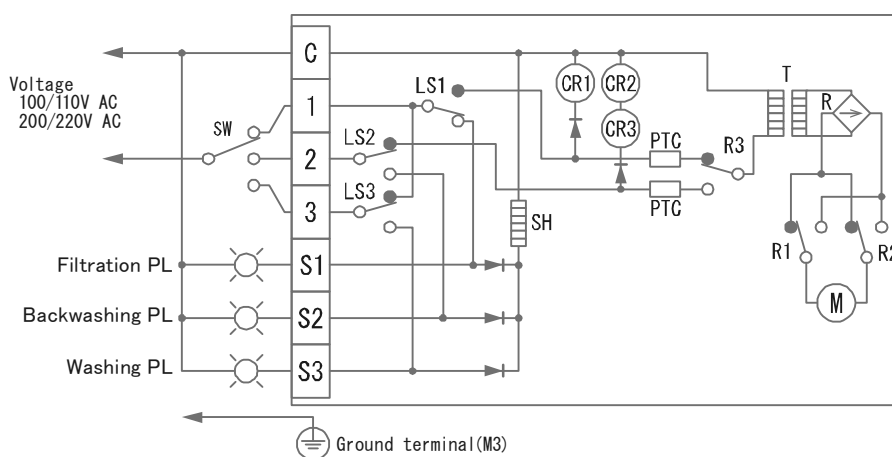


ELECTRIC ACTUATOR SPECIFICATIONS

AD3 HD3 type

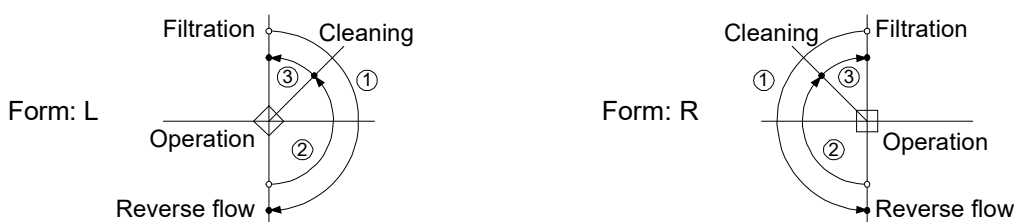
Actuator type (□:Voltage code)	AD3-300-□	AD3-700-□	HD3-02K-□	HD3-06K-□
Voltage	100 / 110 AC V ±10 % 50/60 Hz (Code: 1) 200 / 220 AC V ±10 % 50/60 Hz (Code: 2)			
Rated torque [N·m]	30	70	200	600
Operation time [s]	Filtration → Reverse flow	5 to 8	10 to 18	16 to 30
	Reverse flow → Cleaning	4 to 6	8 to 14	12 to 23
	Cleaning → Filtration	2 to 3	3 to 6	4 to 7
Power consumption (Max) [VA]	100		150	
Motor	DC motor			
Overload protection	Thermistor			
Method of operation	Transfer input type			
Operation	When SW1 is ON, it's Filtration. (Filtration PL is lit.) When SW2 is ON, it's Reverse flow. (Reverse flow PL is lit.) When SW3 is ON, it's Cleaning. (Cleaning PL is lit.)			
Output signal rating	300 to 02K : Resistance load 10 A 250 V AC (Minimum 27 mA) 06K : Resistance load 3 A 250 V AC (Minimum 0.1 A)			
Duty cycle	20 % 15 min. (When ambient temperature is over +50 °C, 10 % 15 min.)			
Ambient temperature	-20 to 55 °C			
Space heater	0.8 W			
Manual operation	Manual over-ride with clutch. (Direct operation / 06K: Operation by manual shaft.)			
Enclosure	Equivalent to IP65 (IEC 60529)			
Housing material	Aluminum alloy diecast (acrylic resin baking finish)			
Wire connection	Terminal Block: M3, Ground terminal: M3			
Conduct port	2-G1/2 Attachments: Cable gland (for Φ6 to 12 mm cable), plug.			

WIRING



Note) It cannot to change at a cleaning process form a filtration process by directly. Once switch to the cleaning process after changing it a reverse cleaning process.

Operation (Top view of valve)



INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS**HANDLING & STORAGE****①HANDLING**

Do not drop or throw the product as it may break.

②STORAGE

- Store away from dust, moisture and direct sunlight. If possible, store in the original package.
- Do not remove a dust proof cap until the piping.

③CHECKING

- Check the product code, power supply, and voltage before installation.
- Make sure that the bolts are not loose.

INSTALLATION**①PRECAUTIONS**

- When installing the manual Lever valve, consider the space for manually operation and length of the lever handle.
- Flush the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the ball and seats.
- Check the flow mark (switching process) on the valve body before piping.
- E5 / L5 valve is shipped at the filtration position.

②PIPING (E5)

- Using a pipe with too long a thread will damage the valve.
- If sealing tape or sealant gets inside the valve, the valve seat leaks or malfunctions.
- When connecting a pipe or fitting to a valve, use a tool on the octagonal or hexagonal part of the insertion side and screw it.
- Refer to the recommended tightening torque table and do not apply excessive torque.

Valve size [mm]	Torque [N·m]
025	50 to 60

③PIPING FLANGES (L5)

- Gasket should be selected appropriately to suit the fluid, pressure and temperature. Use spring washer to prevent from decreasing surface pressure gasket when the temperature change happens frequently.
- Tighten all bolts using crossover method to load the joint evenly.

④ENVIRONMENT

- Do not install in place where corrosive gas is present or where vibration is heavy (0.5 G or more).
- When radiant heat causes the surface temperature of the control unit to exceed 55 °C, provide an appropriate shielding plate.
- If there is a possibility that the fluid and drive part freeze, please take measures to prevent freezing.

⑤POSITIONING

Should be positioned through 90° upward from horizontal. Provide space around the product to allow manual operation, inspection and replacement work.

Maintenance space for upper part of actuator.

AE3	More than 105 mm
AD3 HD3	More than 120 mm

⑥OTHER NOTES

Until the wiring is completed there must be no condensation or flooding in the interior of the actuator, after piping. Protective caps on the cable gland are not waterproof.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS**WIRING****①PRECAUTIONS**

- Remove the actuator cover before wiring.
- Two G1/2 electrical connections are provided with a cable gland and plug. Usable cable size is $\Phi 6$ to 12 mm.
- When using a flexible tube, dew condensation may occur inside the actuator due to respiration from the inside of the tube and malfunction may result. Seal the flexible tube connector part with a sealant.
- Sealants that affect the electrical contacts should not be used inside the electric actuator.
- If long distance wiring or low voltage operation, check that terminal voltage is in the proper range.

②CONNECTION

- Do not wiring outdoors on a rainy day.
- Check the power supply and voltage. Connect the signal as shown in the wiring diagram. Do not connect unnecessarily terminal.
- Actuator should be electrically grounded. Use the terminal marked (\equiv) inside the actuator.

PREVENT DEW CONDENSATION

- When installing the cover after wiring, perform the bolt by the temporary tightening procedure and the permanent tightening procedure to tightly and securely tighten the rubber packing so that water does not enter from the outside.
- Tighten the cable gland nut so that there is no leakage from the wire entrance.

CONTROL**①AE3**

Each control switch should be prepared one by one. Do not operate two or more from one switch at the same time.

②AD3, HD3

It cannot to change at a cleaning process form a filtration process by directly. Once switch to the cleaning process after changing it a reverse cleaning process.

③USE OF OPEN/SHUT SIGNALS

Use signals within the capacity of output signal rating.

OPERATION**①TESTING**

Check that there is no leakage from the joint of body flange and gland packing.

②Electric type

- Check operating position, speed and signals.
- Make sure there is no miswiring before operation and check that power supply voltage is correct.

③DUTY CYCLE

Confirm that the operation frequency is within the specified duty cycle.

Use beyond the load time rate range will affect product life. Also, it may cause burnout.

Duty cycle is a value that regulates the opening / closing frequency of the actuator. The meaning of 20 % 15 minutes for Duty cycle is that 3 minutes (20 % of 15 minutes) operation is possible. The calculated value obtained by dividing 3 minutes by the operation time is the number of times of operation within 15 minutes.

④ATTENTION

- Keep power supplied for built-in space heater to prevent condensation inside actuator.
- Do not touch the moving parts of actuator in operation.
- Do not insert a reverse signal during operation. It may shorten the life of product.
- Never put anything on the actuator or make it into a foothold.
- You can't switch directly from Filtration to Cleaning.
- Make sure to switch to Reverse flow then to Cleaning.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

OPERATION OF THE MANUAL VALVE

- Do not turn the lever handle more than 180 degrees (1/2 turn).
- Do not move the lever handle by hitting it with a hammer or extend it with a pipe.
- Do not use the valve in the middle position for an extended period of time. Otherwise, damage or leakage may occur inside the valve.

MANUAL OPERATION (ELECTRIC ACTUATED)

① PRECAUTIONS

- Be sure to turn off the power before manual operation.
- Operate manually with reference to the opening degree label. Do not turn beyond the fully open / fully closed position. Operation failure may occur during automatic operation.

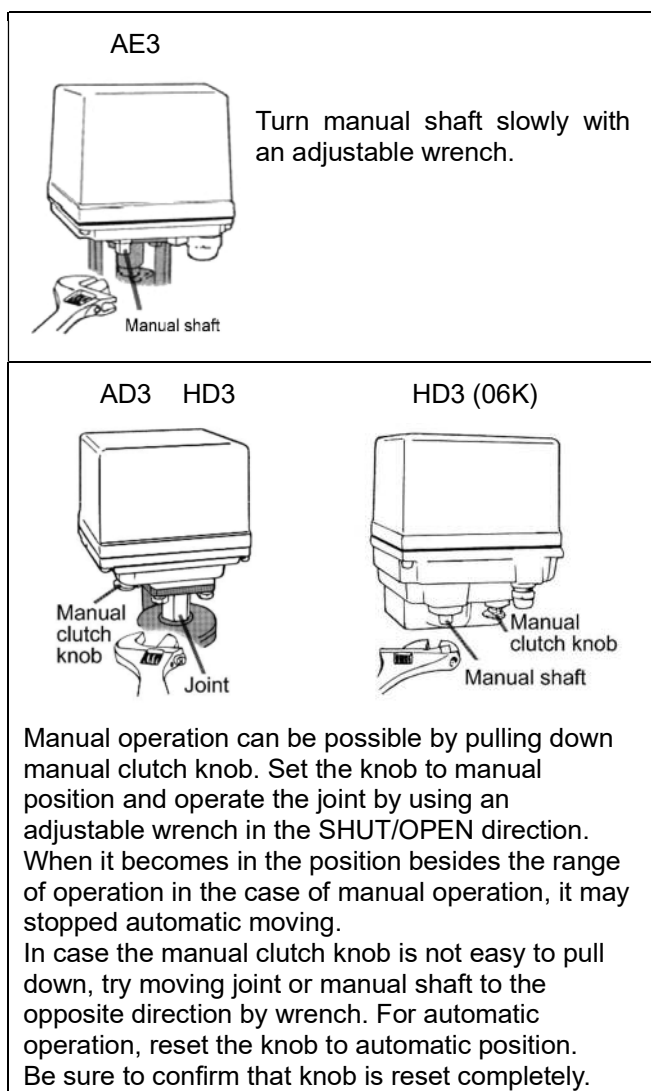
② THE WAY OF OPERATION

MAINTENANCE

- To prevent electric shock, be sure to turn off the power when removing the actuator cover.
- Do the routine maintenance at least once in half a year.

Inspection items

- Confirm operation of opening and closing.
- Confirm that an actuator is not hot excessively.
- Confirm existence of abnormal noise and vibration during operation.
- Confirm whether screws are loose or not.
- Confirm that water or condensation no remains in the actuator.
- Confirm the fluid temperature or pressure.
- Confirm the leak from valve stem.



Before automatic operation, be sure to remove wrench.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS**TROUBLE SHOOTING**

Problem	Cause	Solution
Actuator does not move.	Faulty wiring.	Correct the wiring.
	No voltage is coming.	Check the voltage.
	Incorrect voltage.	When it's burned out by excess voltage, replace the actuator.
	Short the circuit, contact failure.	Review wires and connection.
	Motor is too old.	Replace the actuator. Repair in our factory.
Operation is unstable.	Excess surge or voltage was applied.	<ul style="list-style-type: none"> Replace the control board or limit switch. (Repair in our factory) Replace the actuator.
	Rainwater entered the actuator.	<ul style="list-style-type: none"> Dry the inside. Replace the actuator.
	Added high harmonics noise from an inverter.	Attachment a filter for each inverter maker option.
	Effect of high level noise.	Use the shielded wire and ground the wiring. Separate signal wire from power line.
	Two or more valves operated by the same switch. AE3	Each control switch should be prepared one by one.

Problem	Cause	Solution
Stop in the mid position.	<ul style="list-style-type: none"> Biting of valve seat. The scale has adhered to the valve ball. 	Manually operate an actuator and remove a foreign object.
	Overload protector runs because of over-torque.	Turn off the power for about 3 minutes to remove a heat from motor protection circuit.
Stop automatic moving after manual operation. AD3 HD3	Manual clutch knob is not reset.	Reset manual clutch knob.
	Out of operating range. (06K)	Reset by manual operation.
Leakage from valve body	<ul style="list-style-type: none"> Valve cap get loose. Valve body is damaged. 	Replace the valve.
Leakage from drain port	Seat is worn or damaged.	Replace the seat.
Leakage from valve stem	Stem packing is worn or distorted.	Replace the packing.

For more information contact
NIPPON VALVE CONTROLS, INC. for consultation.