



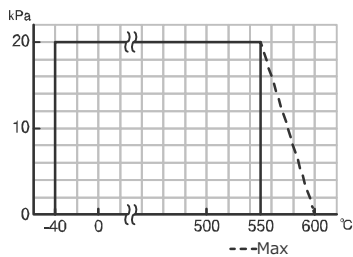


**DAMPER SPECIFICATIONS**

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

Damper type		WT (Without seat)		WT (With SUS316 seat)
Design		2-way, Wafer		2-way, Wafer
Connection		JIS Flanges 5K		JIS Flanges 5K
Fluid				
Max pressure		20 kPa		20 kPa
Size [mm]		040 to 250	300 to 400	040 to 400
Material	Body	SCS13A		SCS13A
	Disc	SUS420J2	SUS420J1	SUS410S / SUS420J2
	Seat	None		SUS316
Stem seal	Packing	Expansion graphite		Expansion graphite

**PRESSURE & TEMPERATURE RATING**

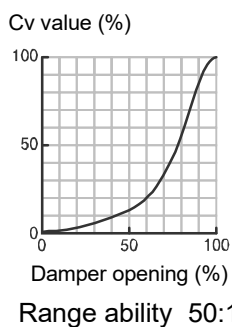


Temperature range : -40 to 600 °C

**SEAT LEAKAGE VOLUME**

	Damper size [mm]	Remarks
WT-2TG0 (Without seat)	040 to 050	Less than 2 % of rated Cv.
	065 to 400	Less than 1 % of rated Cv.
WT-2TGS (With SUS316 seat)	040	Less than 1 % of rated Cv.
	050	Less than 0.5 % of rated Cv.
	065	Less than 0.2 % of rated Cv.
	080 to 400	Less than 0.1 % of rated Cv.

**INHERENT FLOW CHARACTERISTIC**



## ELECTRIC ACTUATOR SPECIFICATIONS

Actuator type (□: Voltage code)	ABR-300-□	ABR-700-□	HBR-300-□	HBR-700-□	HBR-02K-□	HBR-06K-□
Voltage	100 / 110 V AC ±10 % 50/60 Hz (Code: 1) 200 / 220 V AC ±10 % 50/60 Hz (Code: 2) 24 V DC (Code: 0) Note) Cannot use a half or full-wave DC power.					
Rated torque [N·m]	30	70	30	70	200	600
Operation time [s]	3 to 4	6 to 10	1 to 2	3 to 5	AC: 8 to 15 DC: 12 to 17	AC: 24 to 45 DC: 36 to 50
Power consumption (Max) [VA]	AC power 100 DC power 80		AC power 150 DC power 120			
Motor	DC motor					
Overload protection	Current limiter					
Control switch	a-contact input type, with built-in relay					
Operation *1	[Mode A] SW is OFF → SHUT. SW is ON → OPEN. (Standard) [Mode B] SW is ON → SHUT. SW is OFF → OPEN. (Option: Q)					
Power failure *2	[Response mode] (Standard) Mode A : SHUT. Mode B : OPEN. [Standby mode] After power failure, waiting for an external signal input to the switch in a fixed period. Waiting time of power failure: more than 50 hours (It becomes short due to the influence of use environment.) Shift the damper to OPEN / SHUT (or HOLD) by battery out. Stop waiting for the external input signal. [FINISH] Battery out → [Mode A] SHUT [Mode B] OPEN [HOLD] Battery out → Hold the current damper position.					
Battery	Compact seal lead acid battery: 12 V, 2.5 Ah * It is recommend to exchange a battery for every 5 years (at 25 °C).					
Charge system	Constant voltage charge current					
Input signal current	2.5 mA 12 V DC (O-terminal) Leakage current in SW: less than 0.5 mA					
Output signal rating	Resistance load : 0.5 A 120 V AC / 0.6 A 24 V DC Micro load : 1 mA 5 V DC					
Alarm signal	Overtorque : It returns by power supply OFF or reverse operating signal. Battery out : The contacts turn on as battery consumption progresses.					
Duty cycle	20 % 15 min.					
Ambient temperature	-20 to 50 °C					
Space heater	Built in to the control board					
Manual operation	Manual over-ride with clutch. (Direct operation / 06K: Operation by manual shaft.)					
Enclosure	Equivalent to IP65 (IEC 60529)					
Housing material	AC4C Aluminum alloy castings (acrylic resin baking finish)					
Terminal block	For bare wire 0.2 to 2.5 mm <sup>2</sup> (AWG 24 to 12) , Ground terminal: M3					
Conduct port	2-G1/2 Attachments: Cable gland (for Φ6 to 12 mm cable), plug.					

\*1 Change by DIP switch. (Standard → Mode B)

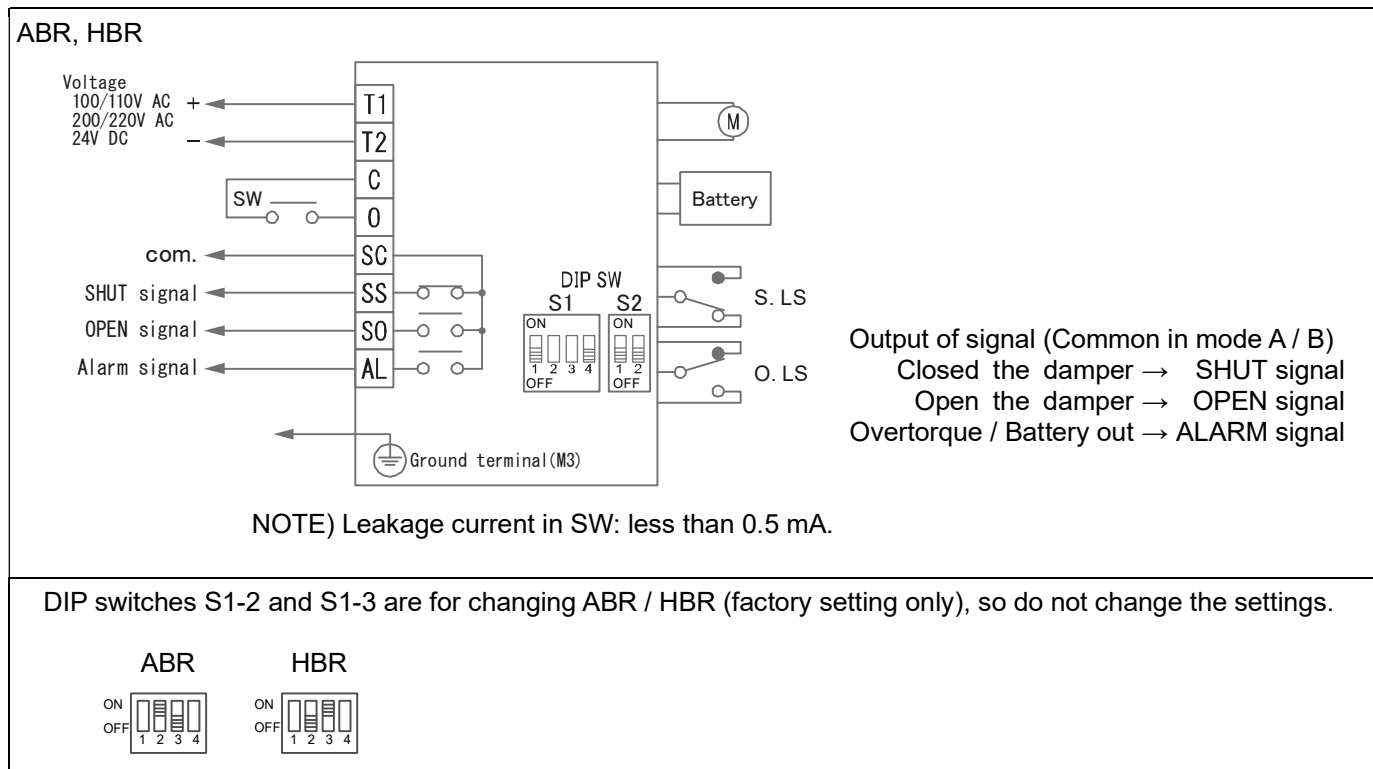
\*2 Change by DIP switch. (Standard → Standby mode)

## OPERATION MODE / POWER FAILURE

	Power failure		Factory settings
Response mode	[Mode A] SHUT.		Standard (Nil)
	[Mode B] OPEN.		Option: Q
Standby mode	HOLD	Battery out → [FINISH] [Mode A] SHUT.	Setting is required
		[Mode B] OPEN.	
		Battery out → [HOLD] Hold the current damper position.	

**ELECTRIC ACTUATOR SPECIFICATIONS**

**WIRING**



**SETTING WITH DIP SW**

	Mode			Damper OPEN / SHUT				DIP SW		
	Power failure	Operation	Battery out	Input signal		Power failure	Battery out	Power failure	Mode A / B	Battery out
				OFF	ON					
Factory setting; Standard (Non)	Response mode	Mode A	/	SHUT	OPEN	SHUT	/	ON OFF 1 2	ON OFF 1 2 3 4	/
Factory setting; Option: Q		Mode B		OPEN	SHUT	OPEN		ON OFF 1 2 3 4		
Setting is required	Standby mode	Mode A	FINISH mode	SHUT	OPEN	HOLD	SHUT	ON OFF 1 2	ON OFF 1 2 3 4	ON OFF 1 2 3 4
			HOLD mode				HOLD			ON OFF 1 2 3 4
		Mode B	FINISH mode	OPEN	SHUT	OPEN	ON OFF 1 2 3 4			
			HOLD mode			HOLD	ON OFF 1 2 3 4			

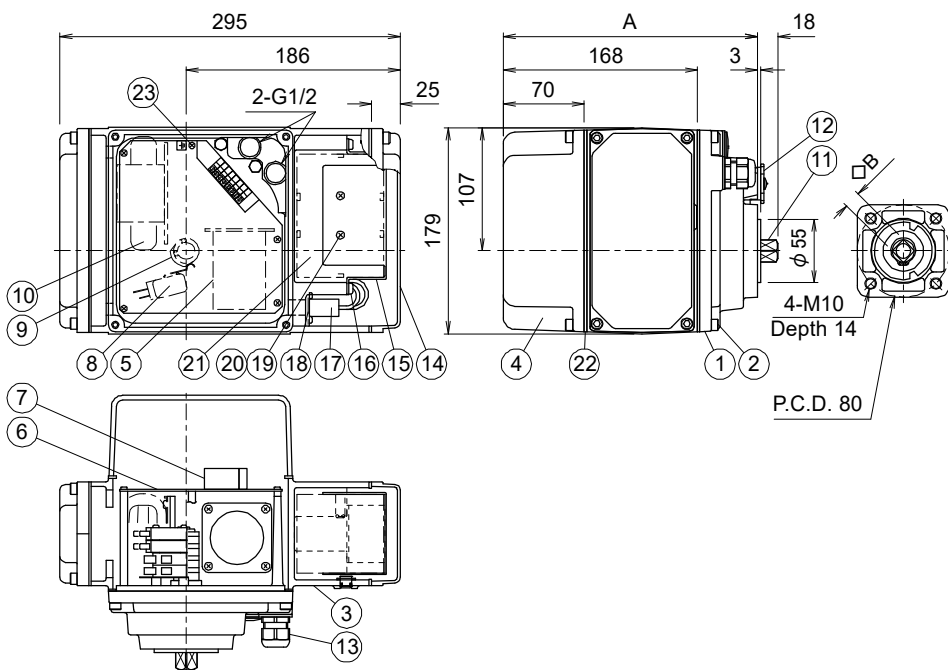
**OPTIONAL PARTS**

Specifications		Code No.	Remarks
Operation mode	SW is OFF → SHUT , SW is ON → OPEN.	Nil	Mode A (Standard)
	SW is ON → SHUT , SW is OFF → OPEN.	Q	Mode B
Manual lever handle	Mounted on the drive shaft.	M0	Except HBR-06K.

**ELECTRIC ACTUATOR SPECIFICATIONS**

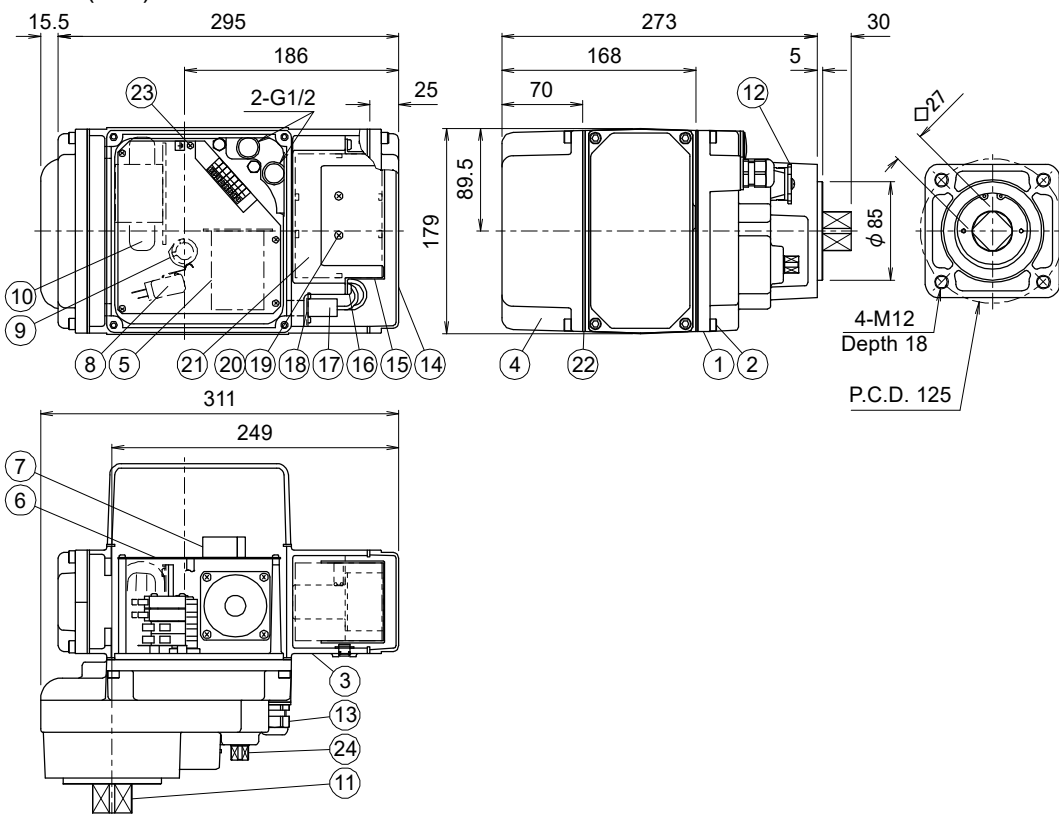
**DIMENSIONS**

ABR, HBR



		Actuator	
A	B	ABR	HBR
220	14	300	300
		700	700
242	19	-	02K

HBR (06K)



**Parts name**

1	Body	7	Terminal block	13	Cable gland	19	Battery fix screw
2	Body cover lower part screw	8	Limit switch	14	Battery cover	20	Nut
3	Body cover	9	SW setting cam	15	Battery bracket	21	Battery
4	Motor cover	10	Transformer	16	Bracket fix screw	22	Rubber packing
5	Motor	11	Drive shaft	17	Battery connector	23	Earth screw (M3)
6	Control board	12	Manual clutch	18	Relay board	24	Manual shaft (For 06K)

**INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS**

**HANDLING & STORAGE**

①HANDLING

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

②STORAGE

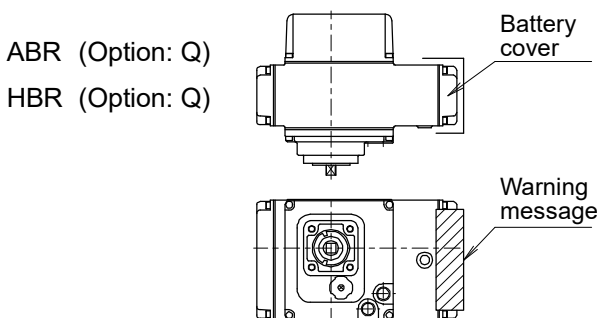
- Store away from dust, moisture and direct sunlight. If possible, store in the original package.
- Do not remove a dust proof cap until the piping.
- If it is not used more than 30 days, remove a battery from actuator and keep it in a place with little humidity.

③CHECKING

- Check the product code, power supply, and voltage before installation.
- Make sure that the bolts are not loose.
- The DIP switch should be set up before the power is turned on. Do not touch unnecessary switches.

④BATTERY CONNECTOR (Power failure: OPEN)

- For the following models, Battery connector is not connected before shipment. Please connect before use.



ABR (Option: Q)

HBR (Option: Q)

- It may move unexpectedly by connecting the battery connector. Please be careful.

**INSTALLATION**

①PRECAUTIONS

- Flush the pipeline carefully before installing the damper. Foreign particles, such as sand or pieces of welding electrode, will damage the disk and seats.
- For dampers with specified flow direction (WT), check the arrows on the product before piping.
- Damper is shipped closed. (allows quick piping.)
- Disc interference may also occur when damper is installed in pipeline with smaller than normal inside diameter such as thick wall pipe, or lining pipe. Suitable corrective measurement must be taken (taper boring the pipe or pipe liner, etc.)

②PIPING FLANGES

- 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.
- Wafer type butterfly damper is put between two seats of flanged-end and tightened with long bolts.
- Before bolts are tightened, damper should be centered within the bolts to prevent possible disc interference or damage by contact with the pipe or flange.
- Tighten all bolts using crossover method to load the joint evenly.

③ENVIRONMENT

- 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 50°C, provide an appropriate shielding plate.
- If there is a possibility that the fluid and drive part freeze, please take measures to prevent freezing.

④POSITIONING

- Should be positioned through 90° upward from horizontal. Provide space around the product to allow manual operation, inspection and replacement work.
- Be sure to enough space around the actuator for battery replacement.

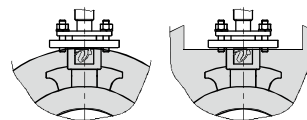
Maintenance space for upper part of actuator.	
ABR	HBR
More than 70 mm	

⑤CAUTION AFTER PIPING

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.

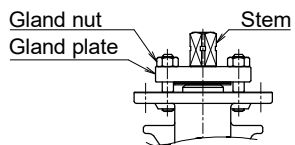
⑥INSULATION WORK

- For maintenance of gland packing, insulation should be below the ground part.
- The upper part of the ground plate part is a heat dissipation part, do not insulate it.



**INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS****TIGHTEN THE GLAND NUTS**

- Check that there is no leakage from the gland packing.
- If it leakage, tighten gland nuts by alternately.  
Do not over-tighten the gland nuts.



Damper size [mm]	Recommended torques [N·m]
040 050 065	1
080 100 125	2
150 200 250 300	5
350 400	8

**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.
- Do not remove the body cover lower screw.

**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 ( $\oplus$ ) 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****①CONTROL OF SWITCHING**

When using control switch with current leakage (more than 0.1 mA) such as TRIAC or relay with CR, it can cause malfunction.

**②DC POWER SUPPLY**

- Cannot use a half or full-wave power supply.
- Consider an inrush current of motor. (It is 1.5 to 3 times of consumed current.)
- When using a DC voltage, be selected the wire thickness by the wiring distance.
- Do not use power supply that require more than 1 second with rise and fall time.

**③USE OF OPEN/SHUT SIGNALS**

Use signals within the capacity of output signal rating.

**OPERATION****①ABR-Q and HBR-Q (Power failure: OPEN)**

Battery connector is not connected before shipment. Please connect before use.

**②TESTING**

- Before operation, charge of 24 hours or more is performed.
- Make sure that power supply voltage is correct. Also check operating position, wiring, speed and signals.
- During trial operation, check that damper movement and OPEN and SHUT signals are 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**

- Be sure to set the DIP-SW before turning on the power supply.
- 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.



## INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

### BATTERY

#### ① HANDLING

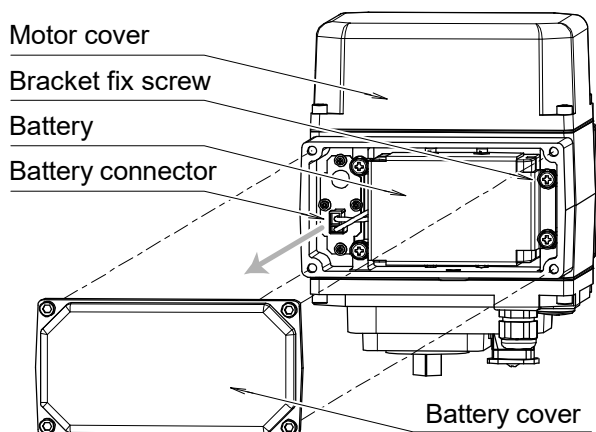
- The battery can be expected a service life over 8 to 9 years at 25 °C.
- Built-in battery should be keep reliability of operation, we recommend you to exchange every 5 years.

#### ② AFTERCARE

- Battery exchange can use during the power supplying.
- Please follow the attachment exchange manual or procedure with battery.
- Dispose of used batteries in the correct way. Order industrial waste disposers, or send them back to us.

### BATTERY REPLACEMENT

#### ① Remove the battery cover.



#### ② Remove the battery connector.

Hold the connector body and pull it straight forward. Do not pull electric wire by any means.

#### ③ Remove the bracket fix screw and battery.

#### ④ New battery is attached with a bracket fix screw.

#### ⑤ Insert the battery connector.

Please be sure to plug it straight in all the way.

#### ⑥ Attach the battery cover.

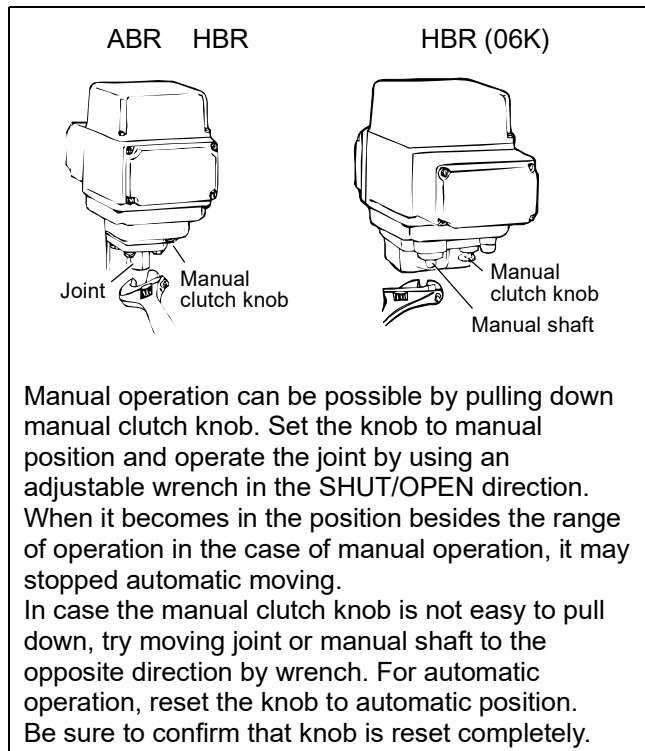
#### ⑦ Make sure that operation by battery is securely performed.

### MANUAL OPERATION

#### ① PRECAUTIONS

- Remove the battery connector before manual operation for safety. (Refer the battery replacement)
- Manual operation should be a temporary operation.
- 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



Before automatic operation, be sure to remove wrench.

### 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.
- Turn off the power and check if the damper operates normally with built-in battery.
- Confirm the fluid temperature or pressure.
- Confirm the leak from damper stem.
- Confirm the bolt tightening torque.

**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.
	Battery lifetime.	Replace the battery.
Operation is unstable.	Excess surge or voltage was applied.	<ul style="list-style-type: none"> <li>• Replace the control board or limit switch. (Repair in our factory)</li> <li>• Replace the actuator.</li> </ul>
	Rainwater entered the actuator.	<ul style="list-style-type: none"> <li>• Dry the inside.</li> <li>• Replace the actuator.</li> </ul>
	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.
	Switch leakage current is large.	Current leakage should be less than 0.5 mA.

Problem	Cause	Solution
Stop in the mid position.	There is a foreign object in the damper.	Remove a foreign object.
	Damper is distorted.	Replace the damper.
	Overload protector runs because of over-torque.	Motor protection circuit returns by the signal of operation of an opposite direction. Turn on the power again.
	Battery is worn out.	Replace the battery.
	Received the alarm signal.	
Stop automatic moving after manual operation.	Manual clutch knob is not reset.	Reset manual clutch knob.
	Out of operating range. (06K)	Reset by manual operation.
Leakage from damper gland	Gland packing is worn or distorted.	Tighten the gland nut.
		Replace the gland packing.

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