



Please read this manual before installation and use.

GENERAL

Compact and lightweight electric actuated needle valve. (Linear)
 LAX type actuator has a high quality positioner.

Actuator

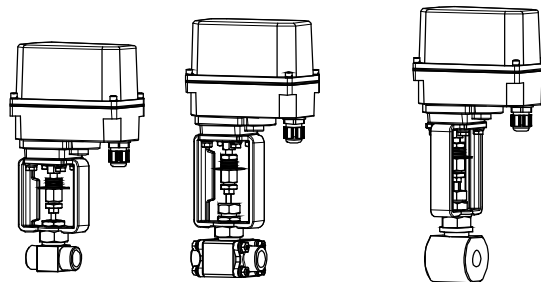
LAX : For AC power

Valve

NS type For general use

NH type 3 piece / For high pressure and high temp.

NP type For Corrosive fluid



Threaded End Rc

Wafer

PRODUCT CODE

| | | | | | | | | | | | | | | | | | |
|------------------|-----------|--------------------------|-----|-----|-----|-----|-------|--------------------------|-----|--------------------------|--------------------------|------|--------------------------|--------------------------|---|--------------------------|--------------------------|
| NS type (Linear) | L A X N S | <input type="checkbox"/> | 0 | 5 | U | U | F | <input type="checkbox"/> | 0 | <input type="checkbox"/> | : | - | <input type="checkbox"/> | : | - | <input type="checkbox"/> | |
| (EQ%) | L A X N S | <input type="checkbox"/> | 0 | 5 | U | U | F X E | 1 | 5 | - | <input type="checkbox"/> | : | - | <input type="checkbox"/> | : | - | <input type="checkbox"/> |
| NH type | L A X N H | <input type="checkbox"/> | 0 | 5 | U | U | T | <input type="checkbox"/> | 0 | <input type="checkbox"/> | : | - | <input type="checkbox"/> | : | - | <input type="checkbox"/> | |
| NP type | L A X N P | <input type="checkbox"/> | 0 | 1 | K | K | T | <input type="checkbox"/> | 0 | 1 | 5 | - | <input type="checkbox"/> | : | - | <input type="checkbox"/> | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | | | | |

| | | |
|---|--|--|
| (1) Actuator LAX | (6) Body material U : SCS14A / SUS316 K : PEEK | (10) Flow characteristics 0 : Linear E : EQ% |
| (2) Valve NS NH NP | (7) Trim material U : SUS316 K : PEEK | (11) Size [mm] ex. 10 A → 10 |
| (3) Voltage 1 : 100 / 110 V AC 2 : 200 / 220 V AC | (8) Stem packing material F : F-PTFE T : PTFE | (12) Option |
| (4) Sizing code 0 : Standard 1 : Light 2 : Heavy | (9) Cv value S : 0.05 M : 0.13 L : 0.34 H : 0.8 (NP: 1.4) X : 2 (NP: 0.8) | (13) Operation mode Nil : Mode A J : Mode B |
| (5) Connection 1 : JIS 10K 5 : Threaded End Rc | | |

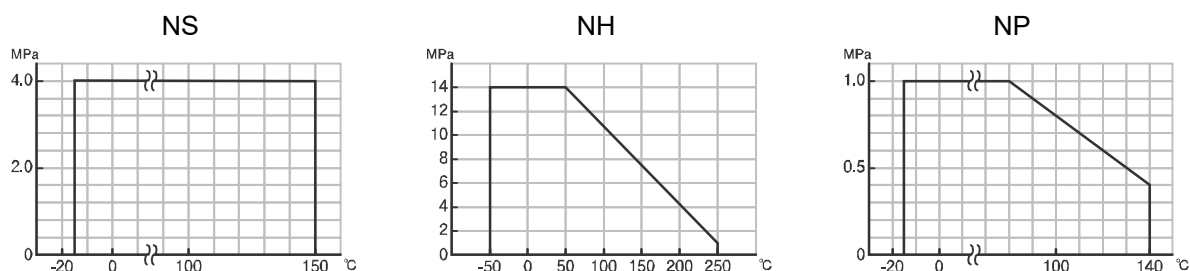
VALVES SPECIFICATIONS

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

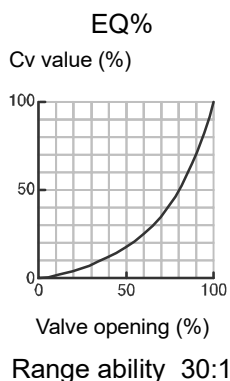
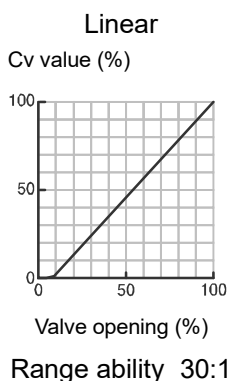
NS NH NP type

| | | | | |
|-----------------------------------|---------|-------------------------|--|--------------------|
| Valve type | | NS | NH | NP |
| Design | | 2-way | 2-way | 2-way, Wafer |
| Connection | | Threaded End Rc | Threaded End Rc | JIS10K Flanged-end |
| Fluid | | | | |
| Max pressure | | 4 MPa | 14 MPa | 1 MPa |
| Size [mm] | | 10 to 15 | 10 to 15 | 15 |
| Material | Body | SCS14A | SUS316 | PEEK |
| | Trim | SUS316 | SUS316 + HCr PLTD | PEEK |
| | Seat | F-PTFE | SUS316 | None |
| Stem seal | Packing | F-PTFE | PTFE | PTFE |
| Flow characteristics | | Linear EQ% | Linear | Linear |
| Allowable Leak Rate (JIS B2005-4) | | Bubble-tight (Class VI) | $10^{-4} \times$ rated Cv value or less. (Class IV or less.) | |

PRESSURE & TEMPERATURE RATING



INHERENT FLOW CHARACTERISTIC

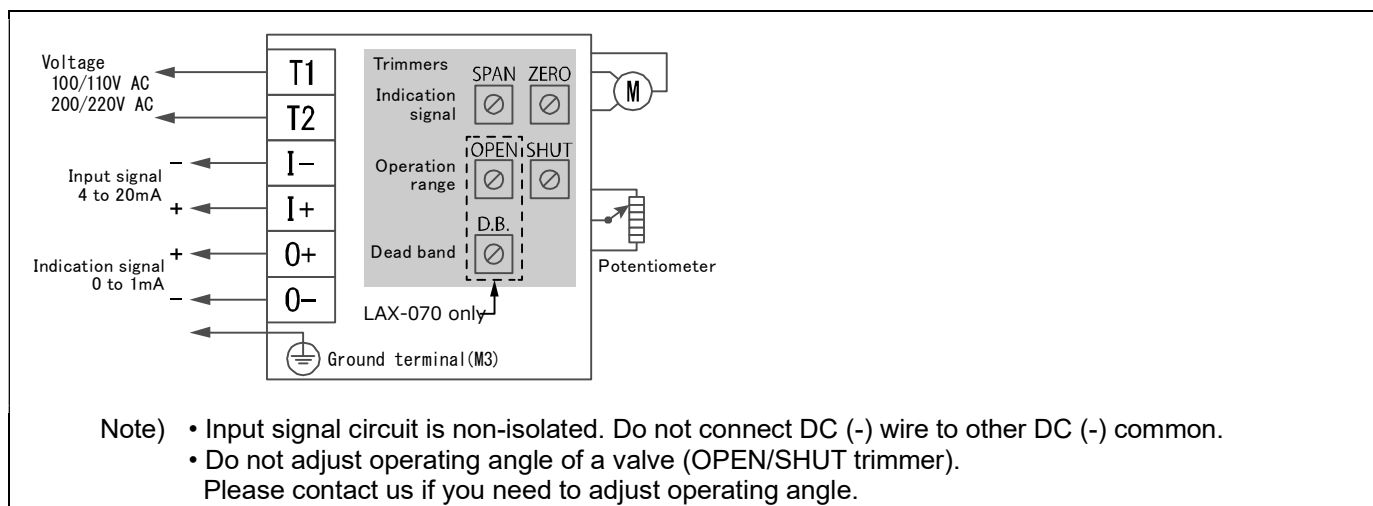


ELECTRIC ACTUATOR SPECIFICATIONS

LAX type

| | | |
|--------------------------------|---|--------------------------------------|
| Actuator type (□:Voltage code) | LAX-030-□ | LAX-070-□ |
| Voltage | 100 / 110 V AC ±10 % 50/60 Hz (Code: 1) 200 / 220 V AC ±10 % 50/60 Hz (Code: 2) | |
| Thrust [N] | 300 | 700 |
| Operation time [mm/s] | 0.39 / 0.47 (50/60 Hz) | 0.46 / 0.55 (50/60 Hz) |
| Stroke [mm] | 7.5 | 7 to 11.5 |
| Adjustment range | Fixed | Adjust by OPEN / SHUT trimmers |
| Power consumption [VA] | 4.5 | 11 |
| Motor | Synchronous motor (Triac control) | |
| Overload protection | Timer | |
| Method of operation | Proportional control (linear motion) | |
| Input signal | 4 to 20 mA (Input resistance: 220 Ω) | 4 to 20 mA (Input resistance: 250 Ω) |
| Operation | [Mode A] SHUT by decreased signal ↔ OPEN by increased signal (Standard) [Mode B] SHUT by increased signal ↔ OPEN by decreased signal (Option: J) Impossible to change the mode. Please appoint it at the time of the order. | |
| Indication signal | 0 mA : SHUT ↔ 1 mA : OPEN (External load resistance: less than 3 kΩ) Common in mode A / B | |
| Resolution | Less than 0.2 % | |
| Duty cycle | 100 / 200 V AC : 100 % 110 / 220 V AC : 50 % 30 min. | |
| Ambient temperature | -10 to 50 °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) | |
| Terminal block | For bare wire 0.2 to 1.5 mm ² (AWG 26 to 16) Ground terminal: M3 | |
| Conduct port | G3/8 Cable gland (for Φ5 to 10.5 mm cable) | |

WIRING



ELECTRIC ACTUATOR SPECIFICATIONS

DIMENSION

LAX-030

LAX-070

| Parts name | |
|------------|----------------|
| 1 | Body |
| 2 | Motor cover |
| 3 | Motor |
| 4 | Control board |
| 5 | Terminal block |
| 6 | Potentiometer |
| 7 | Drive shaft |
| 8 | Manual shaft |
| 9 | Rubber packing |

ADJUSTMENT

LAX-030

- ① Adjust ZERO / SPAN trimmer
The trimmer is already setting when the shipped.
- ② Adjust SHUT trimmer
Please contact us if you need to adjust trimmer.

LAX-030

Terminal board : Mode A

LAX-070

- ① Adjustment of dead band
Adjustment of dead band is useful to prevent hunting of the actuator. Turning D.B. trimmer clockwise increases the dead band range.
- ② Adjust ZERO / SPAN trimmer
The trimmer is already setting when the shipped.
- ③ Adjust OPEN / SHUT trimmer
The trimmer is already setting when the shipped.

LAX-070

Terminal board : Mode A

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.

③CHECKING

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

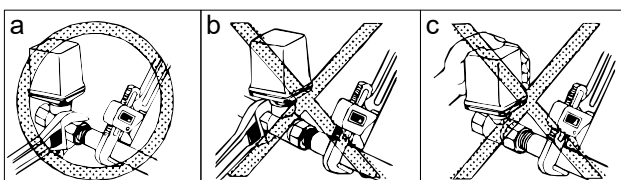
INSTALLATION

①PRECAUTIONS

- Flush the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the trim and seats.
- For valves with specified flow direction (NS, NH, NP), check the arrows on the product before piping.
- When the Cv value is small, the foreign object contained in the fluid causes blockage. Use a filter before the valve.

②PIPING (NS, NH)

- 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.
- To prevent the valve from being damaged by stress, always hang a wrench on the end of the valve on the side where the pipe is to be connected when screwing in the pipe or when unscrewing it after correcting the angle (Fig a and b) and do not use a pipe wrench on the valve. Do not apply force to the actuator when working on the piping. (Fig. c)



- Refer to the recommended tightening torque table and do not apply excessive torque.

| Valve size [mm] | Torque [N·m] |
|-----------------|--------------|
| 010 | 15 to 20 |
| 015 | 25 to 35 |

③Flanged-end (NP)

- Use only rubber gasket for plastic flange.
- 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.
- Wafer type needle valve is put between two seats of flanged-end and tightened with long bolts.

④SUPPORT (NP)

Use proper support to prevent distortion of the valve.

⑤ENVIRONMENT

- 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.

⑥POSITIONING

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 | |
|--|-----------------|
| LAX | More than 90 mm |

⑦OTHER 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

- 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.
- Use suitable flexible cable (Φ5 to 10.5 mm).
Lock and seal the cable completely to prevent condensation inside the actuator.
- Built-in terminal block can clamp up to 1.5 mm in diameter without using solderless terminal.
- Allow proper cable slack for maintenance.
- Actuator should be electrically grounded.
Use the terminal marked (≡) 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

- Set to stabilize the MV value the PID constant of the adjustment meter.
- The life of the actuator and the valve becomes short if the movement of MV value is used on unstable condition.
- Use shielded wire for signal wiring where high level noise is generated or when the wiring distance is long.
- When wiring, if wiring of a signal is mistaken, it will not operate correctly. Contact us when you use two valve or more by one controller or indicator.
- Input signal circuit is non-isolated.
Do not connect DC (-) wire to other DC (-) common.
- The input signal and operation mode are set as follows. (Factory shipped)

| | |
|----------------|--|
| Input signal | 4 to 20 mA |
| Operation mode | Mode A |
| Operation | SHUT by decreased signal OPEN by increased signal |

OPERATION

①TESTING

- Make sure that power supply voltage is correct. Also check operating position, wiring, speed and signals.
- During trial operation, check that valve movement and output signal are correct.

②ATTENTION

- Keep power supplied for built-in space heater to prevent condensation inside actuator.
- Do not touch the moving parts of actuator in operation.
- Never put anything on the actuator or make it into a foothold.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS**ADJUSTABLE RANGE OF STROKE**

①LAX-030

- SHUT by an input signal 4 mA and shipped.
- It is not necessary to adjust the stroke.

②LAX-070

- SHUT by an input signal 4 mA and shipped.
- Can be adjusted in the range of 7 to 11.5 mm.
(default stroke: 11.5 mm)

MANUAL OPERATION

①PRECAUTIONS

- Manual operation should be a temporary operation.
- Be sure to turn off the power before manual operation.

②NOTE

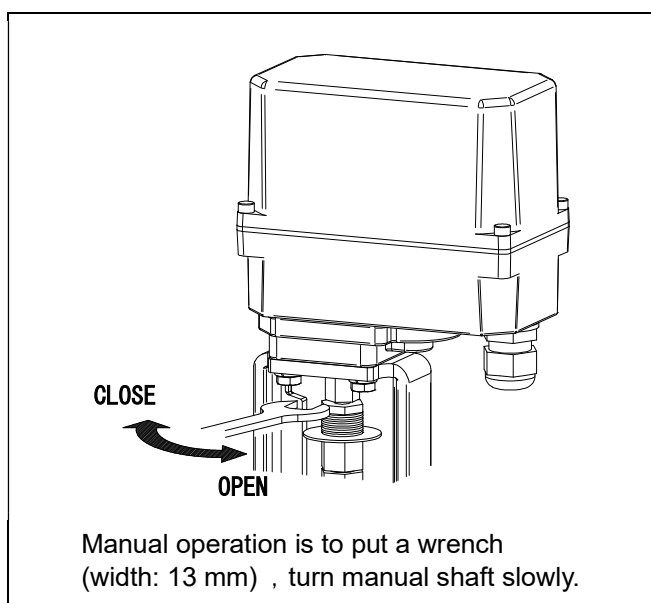
- See indicator during operation and check OPEN / CLOSE position to prevent overturn.
- For manual operation, do not give more than the rated torque and make at a slow rate. Actuator might be damaged if excessive force is added.

MAINTENANCE

- To prevent electric shock, be sure to turn off the power when removing the actuator cover.
- Perform the first time in the state of the first stage included in real operation.
- 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 that operate the hunting or move continuously at high frequency.



INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

TROUBLE SHOOTING

| Problem | Cause | Solution |
|-------------------------|--|--|
| Actuator does not move. | Faulty wiring. | Correct the wiring. |
| | Voltage and input signal are not coming. | Check the voltage and input signal. |
| | Incorrect voltage. | When it's burned out by excess voltage, replace the actuator. |
| | Connection or wiring is not correct. | Correct the miswiring and misconnection. Be careful not to mistake the plus and minus of wiring. |
| | Short the circuit, contact failure. | Review wires and connection. |
| | Motor is too old. | Replace the actuator. |
| Operation is unstable. | Excess surge or voltage was applied. | Replace the actuator. |
| | Rainwater entered 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. |

| 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 trim. | Remove a foreign object. |
| | | Clean or replace valve parts. NH |
| | 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. |
| Leakage from valve body | <ul style="list-style-type: none"> • Valve cap get loose. • Valve body is damaged. | Replace the valve. NS NP |
| Leakage from valve seat | Seat is worn or damaged. | Replace the valve. Replace the actuator. |
| | Loose seal-spring, damage. | Replace seal-spring. |
| Leakage from valve trim | Packing is worn or distorted. | Replace the valve. |
| | | Tighten the gland nut. NH |

Note) Needle valve product repair must be done at our factory.

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