

## 1. INTRODUCTION

The NT electric actuator by Valvsys, LLC brings the latest technology in valve actuation. The NT large series range of actuators delivers 600Nm-12000Nm of torque in a completely enclosed compact package. The unit is designed for IP67 corrosion protection.

## 2. INSTALLATION

Installing the NT series actuator is simple and straightforward. Read all of these installation instructions before applying power or commencing calibration and set-up. The principle of operation requires a signal (voltage source) to be supplied, which tells the unit to drive to the open position or to drive to the close position. Note that separate signals must be sent to tell the unit which

**Caution: Position actuator to mid-stroke before applying power. Phase reversal may produce unexpected rotation.**

direction to rotate.

1. Before applying power to the unit and before mounting it onto a valve, make sure the unit is able to rotate freely. Use the manual override handwheel to rotate it back and forth. (See 'Manual Override' operation below)
2. Also make sure manually that the valve rotates freely. Remove any physical valve stops if possible to prevent valve damage from stalling the motor.
3. Mount the actuator onto the valve such that it is in the same operating sequence as the valve (i.e. valve open – actuator

**Caution:**  
**Keep cover closed while circuits are energized.**

- open).
4. Carefully align the output shaft of the actuator with the valve or damper stem. Mis-alignment will cause pre-mature failure. Tighten the bolts to the actuator evenly.
5. Position the valve/actuator assembly in the mid-stroke position manually before applying power to prevent damage.
6. The unit must be properly grounded. Connect a grounding lug to the external ground nut which is located



**CAUTION:**  
**Some valves and dampers have manual stops; remove if appropriate or adjust actuator travel switches to operate within those stops.**

ground screw is marked as shown at right. There is also an internal ground terminal for grounding purposes.

7. See Fig. 3 for the wire inlet sealing structure. Refer to the wiring schematic located inside the cover for the proper power and control connections.
8. Connect to a power supply as per the wiring instructions. Almost all applications require some type of customer-supplied switch used to direct the rotation of the unit.
9. Power to the unit should be fused with an appropriately sized quick acting fuse or circuit breaker See nameplate for the current draw requirements. All wiring is to be completed in accordance to National and Local electric codes.
10. Rotate the actuator to the middle position manually. Once wired, the unit should be rotated electrically to verify directional operation. If the unit turns opposite of expected, flip two of the 3-phase connections and try again.
11. Check to see that the actuator travels to the full open and full close positions. If adjustment is needed use a hex wrench to adjust the top switch for the close position and the bottom switch for the open position.

## 3. OPERATION

### Limit Switches

The limit switches are factory set for 90° rotation. Consult the wiring diagram to determine which contacts may be used for end of travel indication.

Two extra switch contacts may be ordered as an option (dry contacts). These switches can be used for indication or to control other devices.

A feedback potentiometer is provided on some models. The potentiometer is gear and shaft are shipped in a loose state to avoid damage in the shipping and calibration phase of set-up.

### Manual Override

The manual override can be rotated at any time. There is no need to shift into manual operation. Manual-electric drive shifting is automatic. The gear box of the NT series uses a planetary gear design that doesn't require any de-clutching for the override. Turn the handwheel CW for CW rotation of the actuator (as viewed from above looking down onto the position indicator sight glass). The two mechanical limit screws on the case have been adjusted at the factory. It is not recommended that the user adjust these screws. It is imperative that the mechanical stops are not set to stop the motor before it is electrically stopped by the travel switches. Do not adjust the mechanical screws in so far as to stop actuator rotation before the motor cuts off from the travel switches.

### AC Motors

Single phase AC motors have an automatically re-setting thermal protector. This means that if the unit is excessively stroked in an elevated temperature environment, the unit will shut down. The thermal switch buried in the windings of the motor opens up the current flow through the windings preventing it from burning. After the unit is left to cool the thermal switch will automatically close

allowing operation again. The length of time the unit can run continuously without thermal trip is known as its duty cycle and depends on the ambient temperature. All Valvsys 3-Ph motors are sized specifically for valve automation. The motors are rated for 50Hz. However, 60Hz may be used. The speed ratings are based on 60Hz operation. 60Hz supply decreases the cycle time by approximately 1.2 times and reduces the duty cycle.

### Spline Adaptor

The output shaft is fitted with a removable spline adaptor for easy removal and machining to the required valve stem. Note that several different versions can be supplied ready machined such as bore and key or double D drive.

### Conduit Entries

The conduit entries have a sealing ring and nut to prevent egress contamination from the elements. See fig. 3 for the placement of the seal. Remove the cover shield and run the wires through the entrance taking care not to allow any wires to rub rotating parts i.e. cam mechanism.

### Torque Switches

The NT series comes with torque control switches for both directions of travel. See fig 2 for adjustment of the torque switches. The cams are marked to show which direction is controlled. The factory setting is for maximum torque.

### Local Control Selector Switch – Non Integral Control Type

The NT series comes with a local control selector switch mounted on the side of the housing. Rotation of the selector activates the motor when wired properly and allows a technician to locally position the valve. The switch is spring to center.

### Gears

The NT actuators are equipped with a spur gear, one step worm gear, and a NN type satellite gear.

## 4. MAINTENANCE

There are no special requirements for maintaining your EV electric actuator. The gear train has been permanently lubricated for a long life. If it should become necessary to re-fill the lubrication it is recommended that the unit be filled with Multi-purpose grease. If possible use Mobiltemp<sup>®</sup> SHC32 or equivalent.

The unit should be cycled periodically to verify its operation. If the unit will be stored for more than a year please refer to bulletin B00006 Long Term Storage and Care of Electric Actuators.

## 5. SPECIFICATIONS AND ALLOWABLE OPERATING CONDITIONS

\*Refer to the nameplate attached to the outside of enclosure for specific voltage and amperage requirements.

1. The NT series is for indoor/outdoor with an IP67 rated protection.

2. Working temperature - -20°C to 50°C.
3. Altitude not above 1000m.
4. Ambient relative moisture is not over 90% at 25°C.
5. Not to be used in strong corrosive environments.
6. Not to be used in explosive environments.
7. No heavy vibration allowed.
8. The duty cycle is intermittent.

## 6. TROUBLE SHOOTING

- 1 PROBLEM: There is power to the unit but it does not respond.
  - 1.1 Verify that the correct voltage has been applied according to the ratings listed on the nameplate.
  - 2 Check the wiring to verify it against the wiring schematic.
    - 2.1 Check the limit switches to see if they are tripped and operating in the correct range.
    - 2.2 Check the operation of the torque switches to see if they have been tripped.
  - 3 PROBLEM: Power is getting to the motor but it merely hums.
    - 3.1 Check to make sure that the proper voltage is applied and that all of the wiring connections are tight.
    - 3.2 Check to see that the unit is properly grounded.

- 3.3 Check to see that the CW and CCW switches are not being powered at the same time. This will happen if the customer directional control switch is not wired correctly.
- 4 **PROBLEM:** The actuator performs erratically.
  - 4.1 Check to see that the actuator is not stalling. Remove the actuator from the valve and verify the freeness of the valve operation.
  - 4.2 Check to see that the valve torque requirements are less than the rated torque output of the actuator.
  - 4.3 Check the ambient temperature rating. The motors are equipped with thermal protectors which cut power to the motor if excessively cycled. High temperature ambients and cycle frequencies may heat up the motor causing the thermal protector to automatically turn off power to the motor. Simply allow the unit to cool and it will automatically re-set.

## 7. TECHNICAL ASSISTANCE

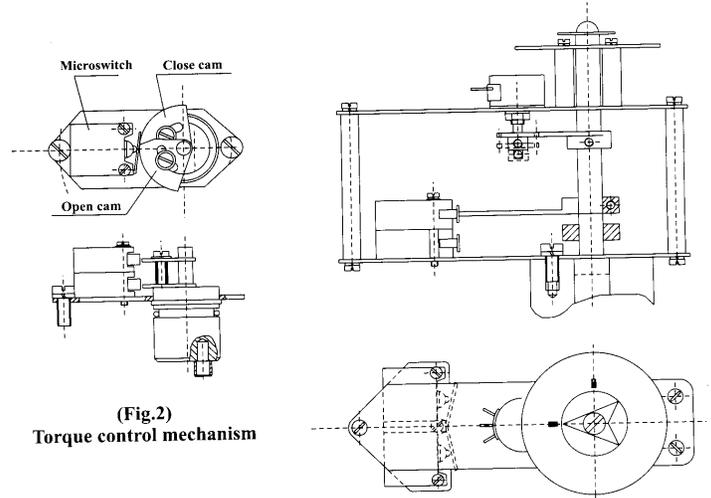
Valvsys LLC will be more than happy to provide technical assistance should it become necessary.

Please have the following available when calling for assistance:

1. Actuator model number
2. Actuator serial number
3. Input signal being used
4. Valve application

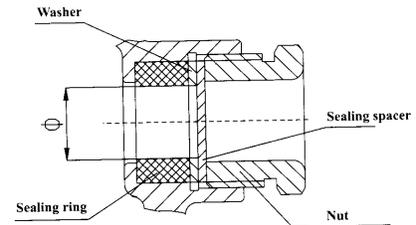
## 8. PRECAUTIONS

1. In order to ensure the protective performance of the case and of the whole electric actuator, users must strictly follow the requirements in these operating instructions.
2. Ensure that the unit is closed-up tight after calibration including the control box, connection box, outlet jacket junction.
3. After completing the calibration users should ensure that all of the fasteners are securely tightened and not loose. Also, check to see that none of the gaskets have been cut or are out of place.
4. After the power and control cables are installed the user shall make sure that the gland nut and gland are secure and tight. Teflon should be applied for thread sealing between the gland nut and case. Also silicone caulking should be applied between the cable and inner hole of the gland nut.
5. After disassembly and reassembly of parts on some other locations, such as opening window or on-site button etc., for some reason, users shall make sure that there will be no adverse affect on the sealing result.



(Fig.2)  
Torque control mechanism

(Fig.1)  
Stroke control and indicating mechanism



(Fig.3)  
Cable inlet structure

**Wiring:**

The wiring diagram shown below is typical and includes a separate Control Box containing local remote switches and a reversing contactor. In this case the contactor is operated by a 115Vac control. The SPDT Automatic Control switch and some of the other items (i.e. indicating lights) are not provided and must be wired by the customer.

**Typical AC Wiring Schematic**

