

QT Series On/Off 90° Electric Valve Actuator

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Due to wide variations in the terminal numbering of actuator products, actual wiring of this device should follow the print supplied with the unit.

GENERAL INFORMATION

INTRODUCTION

Jordan Controls, Inc., designs, manufactures, and tests its products to meet many national and international standards. For these products to operate within their normal specifications, they must be properly installed and maintained. The following instructions must be followed and integrated with your safety program when installing, using and maintaining Jordan Controls products:

- Read and save all instructions prior to installing, operating and servicing this product.
- If you do not understand any of the instructions, contact your Jordan Controls representative for clarification.
- Follow all warnings, cautions and instructions marked on, and supplied with, the product.
- Inform and educate personnel in the proper installation, operation and maintenance of the product.
- Install equipment as specified in Jordan Controls installation instructions and per applicable local and national codes. Connect all products to the proper electrical sources.
- To ensure proper performance, use qualified personnel to install, operate, update, tune and maintain the product.
- When replacement parts are required, ensure that the qualified service technician uses replacement parts specified by Jordan Controls. Substitutions may result in fire, electrical shock, other hazards, or improper equipment operation.
- Keep all product protective covers in place (except when installing, or when maintenance is being performed by qualified personnel), to prevent electrical shock, personal injury or damage to the actuator.

WARNING

Before installing the actuator, make sure that it is suitable for the intended application. If you are unsure of the suitability of this equipment for your installation, consult Jordan Controls prior to proceeding.

WARNING - SHOCK HAZARD

Installation and servicing must be performed only by qualified personnel.

WARNING - ELECTROSTATIC DISCHARGE

This electronic control is static-sensitive. To protect the internal components from damage, never touch the printed circuit cards without using electrostatic discharge (ESD) control procedures.

RECEIVING/INSPECTION

Carefully inspect for shipping damage. Damage to the shipping carton is usually a good indication that it has received rough handling. Report all damage immediately to the freight carrier and Jordan Controls, Inc.

Unpack the product and information packet—taking care to save the shipping carton and any packing material should return be necessary. Verify that the items on the packing list or bill of lading agree with your own.

STORAGE

If the product will not be installed immediately, it should be stored in a clean, dry area where the ambient temperature is not less than -20° F. The actuator should be stored in a non-corrosive environment. The actuator is not sealed to NEMA 4 until the conduit entries are properly connected.

GENERAL INFORMATION

EQUIPMENT RETURN

A Returned Goods authorization (RG) number is required to return any equipment for repair. This must be obtained from Jordan Controls. (Telephone: 414/461-9200) The equipment must be shipped, freight prepaid, to the following address after the RG number is issued:

Jordan Controls, Inc.
5607 West Douglas Avenue
Milwaukee, Wisconsin 53218
Attn: Service Department

To facilitate quick return and handling of your equipment, include:

RG Number on outside of box
Your Company Name, Contact Person, Phone/Fax No.
Address
Repair Purchase Order Number
Brief description of the problem

IDENTIFICATION LABEL

An identification label is attached to each actuator cover. When ordering parts, requesting information or service assistance, provide all of the label information.

ABBREVIATIONS USED IN THIS MANUAL

A or Amps	Ampere
ac	Alternating Current
° C	Degrees Celsius
CW	Clockwise
CCW	Counterclockwise
dc	Direct Current
° F	Degrees Fahrenheit
G	Earth Ground
Hz	Hertz
kg	Kilogram
L	Line (power supply)
lbs	Pounds
lbf.	Lbs. Force
LVDT	Linear Variable Differential Transformer
mA	Milliamp
mfd	Microfarad
mm	Millimeters
N	Newton (force)
NEMA	National Electrical Manufacturing Assoc.
Nm	Newton Meter
NPT	National Pipe Thread
Ph	Phase
PL	Position Limit Switch
RPM	Revolutions per Minute
SEC	Second
TL	Thrust Limit Switch
Vac	Volts ac
Vdc	Volts dc
VR	Variable Resistance
W	Watt

PRODUCT SPECIFICATIONS

GENERAL ACTUATOR DESCRIPTION

The Jordan Controls QT Series actuators are designed to provide on/off control of 1/4 turn butterfly, ball and plug valves in a wide variety of industries. Utilizing a split phase, reversing ac motor, these actuators can provide output torques from 150 to 3000 inch pounds (17 Nm to 339 Nm). Jordan Controls offers a full two-year warranty on all QT Series actuator mechanical components.

SPECIFICATIONS

Temperature Limits: 32° to 130° F (0° to 55° C) without heater. -40° to 130° F (-40° to 55° C) with heater.

Environmental Ratings: Enclosures designed for NEMA 4, NEMA 4X, Class I, Division 1, Groups C & D and Class II, Division 1, Groups E, F & G.

Rotation: 5° minimum, 320° maximum

Power Input: 120 or 240 Vac, 50/60 Hz versions

Field Wiring Terminations: Barrier terminal strip

PERFORMANCE SPECIFICATIONS

Model	Running Torque	90° Cycle Time
QT-0150	150 in. lbs. (113 Nm)	10 sec.
QT-0300	300 in. lbs. (226 Nm)	20 sec.
QT-0600	600 in. lbs. (339 Nm)	35 sec.

Approximate Weight: 13 lb. (5.9 kg)

Amp Draw: 0.3A at 120Vac, 0.2A at 240 Vac, 60 Hz

Model	Running Torque	90° Cycle Time
QT-1000	1000 in. lbs. (113 Nm)	20 sec.
QT-2000	2000 in. lbs. (226 Nm)	35 sec.
QT-3000	3000 in. lbs. (339 Nm)	60 sec.

Approximate Weight: 25 lb. (11.3 kg)

Amp Draw: 0.7A at 120Vac, 0.3A at 240 Vac, 60 Hz

Note: All cycle times are nominal full load values. These times will be longer by approximately 20% and the actuator will draw approximately 20% more current at 50 Hz.

Duty Cycle: 25%

All actuators contain single phase, 3 wire, permanent split-capacitor motors. Motor power is applied across the motor common wire and one of the directional input wires. The capacitor creates a phase shift to the other motor directional input wire. This allows the motor to run and develop torque. With external input power applied to one winding, the opposite winding (energized by the capacitor) will have a voltage on it which is greater than the applied voltage while the motor is running. The voltage will be approximately 150 Vac for 120 Vac units and 300 Vac for 240 Vac units.

As such, the actuators must never be connected in parallel or any inductive or resistive load be connected with the directional inputs. When operating more than one actuator from a common source, the use of isolated contacts between each actuator is required. Wiring ac actuators in parallel without isolation will cause one of the actuators to operate at a reduced torque when an end of travel limit switch in the other actuator is opened. The actuator with the opened switch may continue to run, receiving power to the direction winding with the closed switch, by way of the power supplied from the actuator that has not reached its limit switch.

END OF TRAVEL LIMIT SWITCHES are factory wired in series with the proper motor directional winding. When a switch is tripped (opened), motor power is removed from the winding and the motor will stop.

Exceeding the actuator's rated duty cycle may cause the thermal overload switch to temporarily shut off power to the motor. A 25% duty cycle means that for every operating cycle that the actuator is ON (to open or close the valve) the actuator must be OFF for a time equal to three operating cycles. For example, with an operating cycle time of 10 seconds ON, it must be OFF for 30 seconds before it is again operated.

INSTALLATION

CAUTION

Before installing the actuator, make sure the actuator supplied is suitable for the intended application with respect to torque, environmental conditions and the voltage/frequency of available line power.

WIRING

WARNING - SHOCK HAZARD

Installation and servicing must be performed only by qualified personnel. De-energize all sources of power BEFORE removing the actuator cover. KEEP COVER TIGHT WHEN CIRCUITS ARE ALIVE. Failure to follow these precautions may result in serious injury.

FUSING IS NOT PROVIDED WITHIN THE ACTUATOR. Line fusing must be provided by the customer and should not exceed 5 amperes; they should be of the "slow blow" motor type.

These actuators are designed to meet NEMA 4X, Class I, Division 1, Groups C & D; and Class II, Division 1, Groups E, F & G only when the installation is complete with conduit entry(s) sealed in accordance with all prevailing electrical code requirements, and the actuator cover is in place with the gasket and all cover bolts installed.

MOUNTING THE ACTUATOR

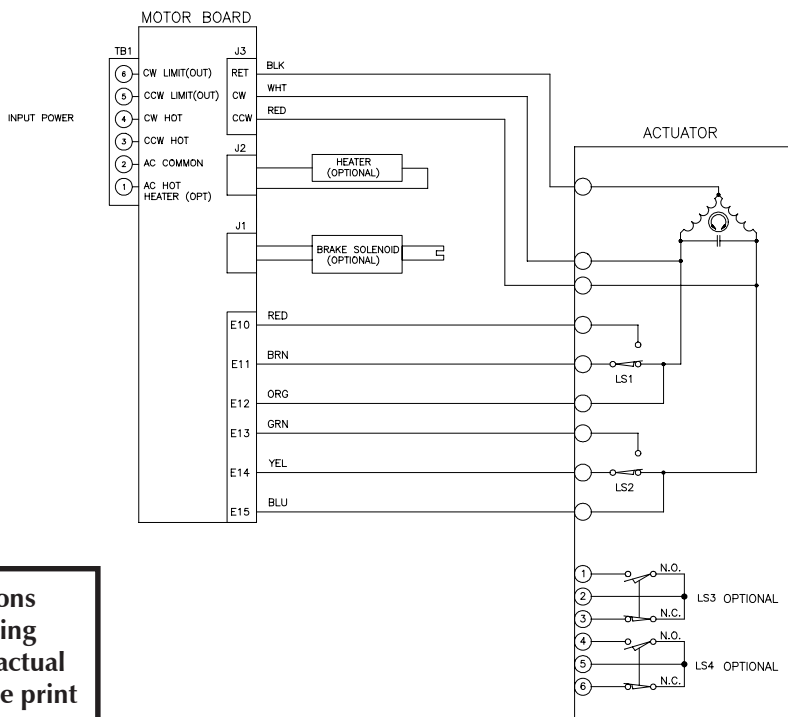
The actuator may be mounted in any position, except it is not recommended to install the actuator upside down in outdoor applications.

The actuator must be firmly secured to a sturdy mounting bracket. A minimum of four bolts with lock washers should be used to secure the actuator to the bracket. Flexibility in the bracket is not desired, and backlash, or "play," in the coupling should be minimized. The actuator output shaft must be in line (centered) with the valve shaft to avoid side-loading the shaft.

See Figure 3, page 6 for mounting dimensions

High Valve Fluid Temperatures: For valve fluid temperatures between 200° F (93° C) and 300° F (149° C), a shielding plate (about one inch larger than the actuator in each dimension and at least 1/16" thick) should be placed between the actuator and the mounting bracket. For fluid temperatures above 300° F (149° C), an extended valve shaft mounting arrangement should be used.

WIRING & SET-UP

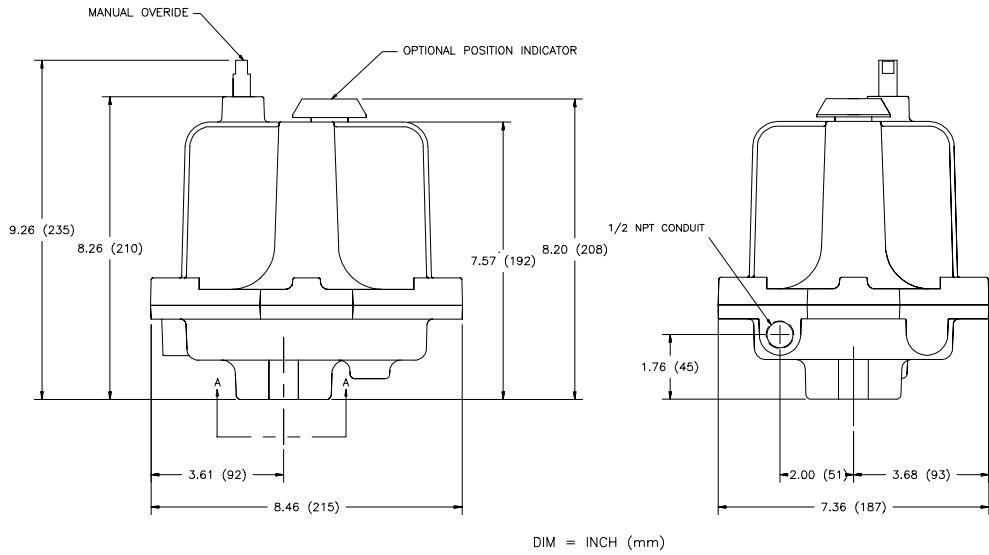


Due to wide variations in terminal numbering of actuator products, actual wiring should follow the print supplied with the actuator.

MAJOR DIMENSIONS

QT-0150, QT-0300, QT-0600

Figure 1



QT-1000, QT-2000, QT-3000

Figure 2

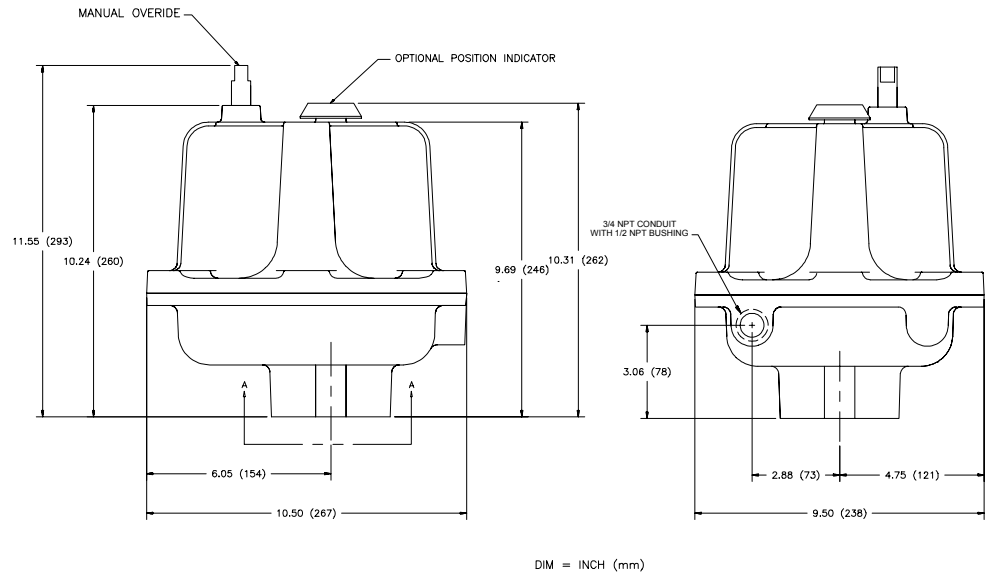
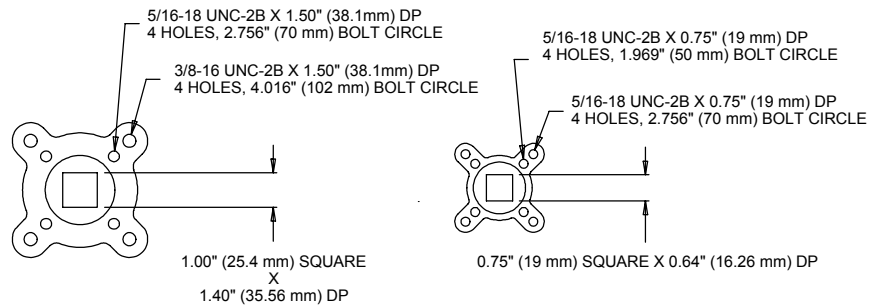


Figure 3



QT 1000, 2000, 3000

QT 0150, 0300, 0600

ORIENTATION OF DRIVE TO MOUNTING HOLES IS FIELD ADJUSTABLE

CALIBRATION

The two limit switches operating off the cams on the output shaft determine the exact positions where the actuator will stop at the end of each cycle. The first limit switch (upper) determines the CCW position rotation. The second limit switch (lower) determines the CW position rotation. The limit switches can be adjusted from 5 to 320 degrees of actuator rotation. If an adjustment of any of the positions is required, proceed as follows:

- A. Remove actuator cover.
- B. Adjust the CW Limit Switch Cam
 1. Using a 1/16 inch hex wrench, loosen the set screw in the LS1 (CW) limit switch cam (the bottom one).
 2. Apply power to terminals common and 4 to drive the actuator to the full CW position.
 3. Remove the power from the actuator
 4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
 5. Re-tighten the set screw on the limit switch cam, being careful not to over-tighten the screw.
- C. Adjust the CCW Limit Switch Cam
 1. Using a 1/16 inch hex wrench, loosen the set screw in the LS2 (CCW) limit switch cam (the second up from the bottom).
 2. Apply power to terminals common and 3 to drive the actuator to the full CCW position.
 3. Remove the power from the actuator.
 4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
 5. Re-tighten the set screw on the limit switch cam, being careful not to overtighten the screw.

The actuator's travel limit switches may be used to indicate the open and closed status of the actuator. Power at terminal 4 is switched to terminal 6 when the actuator is fully CW. Power at terminal 3 is switched to terminal 5 when the actuator is fully CCW.

OPTIONAL ADDITIONAL LIMIT SWITCHES

Two additional limit switches may be installed in the actuator.

These limit switches may be adjusted to trip anywhere in the range of actuator rotation.

OPTIONAL POSITION FEEDBACK POTENTIOMETER

- A. Calibrate potentiometer
 1. Apply power (or use the manual override) to drive the actuator to its full CCW position.
 2. Connect an ohmmeter to the black and red pot leads.
 3. Rotate the cam shaft gear clockwise until the feedback pot just hits its stop.
 4. Now rotate the cam shaft gear counterclockwise until the ohmmeter reads 50 ohms (± 5 ohms).
 5. While holding this reading, tighten the cam shaft set screw.
- B. Confirm Proper Calibration
 1. Apply power (or use the manual override) to drive the actuator to its full CCW position.
 2. Connect the ohmmeter to the black and red pot leads. The reading should be between 35 and 60 ohms. If not, repeat the above procedure for calibrating the potentiometer.

OPTIONAL MOTOR BRAKE

Whenever the motor runs, the solenoid is energized and holds the friction pads away from the fan. Immediately after power is removed from the motor, the solenoid is de-energized and the friction pads contact the fan to prevent further rotation of the motor.

OPERATION

MANUAL OVERRIDE FUNCTION

To use the manual override function, push the override shaft down approximately 1/4 inch to disengage the motor from the gear train. While holding the shaft down, turn the shaft with a wrench reach the desired position. To avoid possible damage to installed options such as a feedback potentiometer, be careful not to drive the actuator past the limit switch settings.

NOTE: The manual override shaft must be returned to its fully upward position before the motor is re-engaged.

TROUBLESHOOTING

If the actuator fails to operate:

- Check that the proper voltages are present at the actuator's terminal connections.
- Check all the plug-in connections to be sure they are properly installed.

If the motor is hot, the actuator may have gone into thermal overload protection (the motors are equipped with internal thermal overload protection). Let the motor cool and check the following:

- Are the limit switches properly set?
- Is the actuator's duty cycle correct for the application?
- Is the actuator's output torque within the required range?
- If the actuator's motor hums or turns slowly:
- Check the actuator's motor capacitor to see if it is broken or cracked.
- Make sure power is applied only to one terminal, either 3 or 4, but not both.
- Check for a bad connection at motor connector J3.
- Check for parallel wiring with other actuators, resistive or inductive devices.
- Check for actuator output shaft overload.

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These dimensions are subject to change without notice and should not be used for preparation of drawings or fabrication of installation mounting. Current installation dimension drawings are available upon request.

