

# Quarter Master Series 94 Actuator



## Installation, Operation and Maintenance Manual



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## **Series 94 Electric Actuator Introduction**

### **Description**

The Series 94 electric actuators feature a reversing, capacitor run motor, with a permanently lubricated gear train. These actuators are equipped with integral thermal overload protection (AC models) with automatic reset, independently adjustable limit switches, declutchable manual override, position indicator, Zytel FR50 housing with stainless steel trim, ISO bolt circle, and 2 (two) ½" NPT conduit entries.

Standard models are offered in 120 VAC, feature a Nema Type 4X enclosure, and provide up to 300 in/lbs of output torque.

Various options are available such as operating voltages, additional limit switches, heater and thermostat, feedback potentiometers, etc. Please see page 8 regarding these options.

### **Electrical Requirement**

**CAUTION:** Proper voltage must be supplied to actuator or damage will result.



**CAUTION:** If 120vac & 220vac models are PLC driven, output contacts of PLC should be rated at a minimum of 1.5 times required input voltage of actuator

**NOTE:** To conform to various electrical codes, **a green grounding screw** has been installed (on the baseplate) inside of actuator.

**Terminal Strip Wiring:** 75° C Copper Supply Wires up to #14 AWG, wired as per the attached diagrams or the wiring diagram affixed inside of actuator cover. Control Wiring shall be insulated with conductors rated 105° C, 300V minimum. Torque Terminal Strip wiring to 5 in/lbs.

| Model | Torque<br>(in/lbs) | 120 Vac     |               | 220 Vac     |               | 12 Vdc      |               | 24 Vdc      |               | 12 Vac      |               | 24 Vac      |               | Cycle Time<br>per 90<br>Degrees<br>(Seconds) | Weight<br>(lbs) |
|-------|--------------------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|----------------------------------------------|-----------------|
|       |                    | Amp<br>Draw | Duty<br>Cycle | Amp<br>Draw | Duty<br>Cycle | Amp<br>Draw | Duty<br>Cycle | Amp<br>Draw | Duty<br>Cycle | Amp<br>Draw | Duty<br>Cycle | Amp<br>Draw | Duty<br>Cycle |                                              |                 |
| A94   | 150                | 0.5         | 100%          | 0.4         | 100%          | 2.0         | 75%           | 4.0         | 75%           | 2.0         | 75%           | 4.0         | 75%           | 5                                            | 3.5             |
| B94   | 300                | 0.8         | 75%           | 0.6         | 75%           | 2.0         | 75%           | 4.0         | 75%           | 2.0         | 75%           | 4.0         | 75%           | 5                                            | 3.5             |

**Note:** Amp rating is considered locked rotor

Duty cycles are for ambient temperature (73° F)

## **Installation**

### **Electrical** **Reference Drawing #279QM**

1. To gain access to terminal strip (Part #8 & 9) it is necessary to remove manual override handle (Part #34) by loosening slotted setscrew (Part #35). Remove 8 cover screws and cover.
2. Make electrical connections to terminal strip as shown on wiring schematic located inside the cover (per various electrical codes there is a green screw on the actuator base plate for grounding purposes). Terminals are suitable for up to #14 AWG wire. All units are completely calibrated prior to shipment, and no internal adjustments should be required.
3. Install 1/2" NPT conduit fitting(s) to actuator base.

**Note:** Proper conduit fitting must be used to maintain NEMA Type 4X enclosure rating

**NOTE:** We recommend sealing conduit openings on units installed outdoors or exposed to large temperature swings (15°F or more).

We also recommend the heater and thermostat option in these applications.

4. Replace actuator (gasket if removed) cover, and install 8 cap screws supplied and tighten securely. For outdoor or wet locations it is recommended prior to replacing the cover that the top shaft seal be cleaned and coated with silicone grease. Also clean shaft and lightly coat seal area of shaft with silicone grease. Unit is now ready for operation.

### **Type 21 Ball Valve**

Position the valve and the actuator to corresponding positions (either OPEN or CLOSED). The flats on the actuator shaft extension indicate valve position

#### **Type 21 Ball Valves (See Drawing #0106BV sizes ½" – 2")**

Install mounting bracket #3 to actuator #2 using bolts #8 and washers #9. Insert coupling #4 on stem of valve #1 and then bolt valve #1 to mounting bracket #3 using bolts #5, nuts #7, and washers #6.

**Note:** All bolts should be snug and not excessively over tightened.

#### **Type 21 Ball Valves (See Drawing #0112BV sizes 2-1/2" - 3")**

Install mounting bracket #3 to actuator #2 using bolts #8 and washers #9. Insert coupling #4 on stem of valve #1 and then bolt valve #1 to mounting bracket #3 using bolts #5, nuts #7, and washers #6.

**Note:** All bolts should be snug and not excessively over tightened.

### **Type 23 Ball Valve (3-way)**

Position the valve and the actuator to corresponding positions (either OPEN or CLOSED). The flats on the actuator shaft extension indicate valve position

#### **Type 23 Ball Valves (3-way): (See Drawing #0129BV, sizes ½" - 3")**

Install mounting bracket #3 to actuator #2 using bolts #8 and washers #9. Insert coupling #4 on stem of valve #1 and then bolt valve #1 to mounting bracket #3 using bolts #5, nuts #7, and washers #6.

### **Type 57/57L Butterfly Valves**

**CAUTION:** If valve is in line, system must be shut down and have no line pressure before removing throttle plate and retaining washer.

Position the valve and the actuator to corresponding positions (either OPEN or CLOSED). The flats on the actuator shaft extension indicate valve position

#### **Butterfly Valves (See Drawing # 0203BF57 sizes 1-1/2" - 4")**

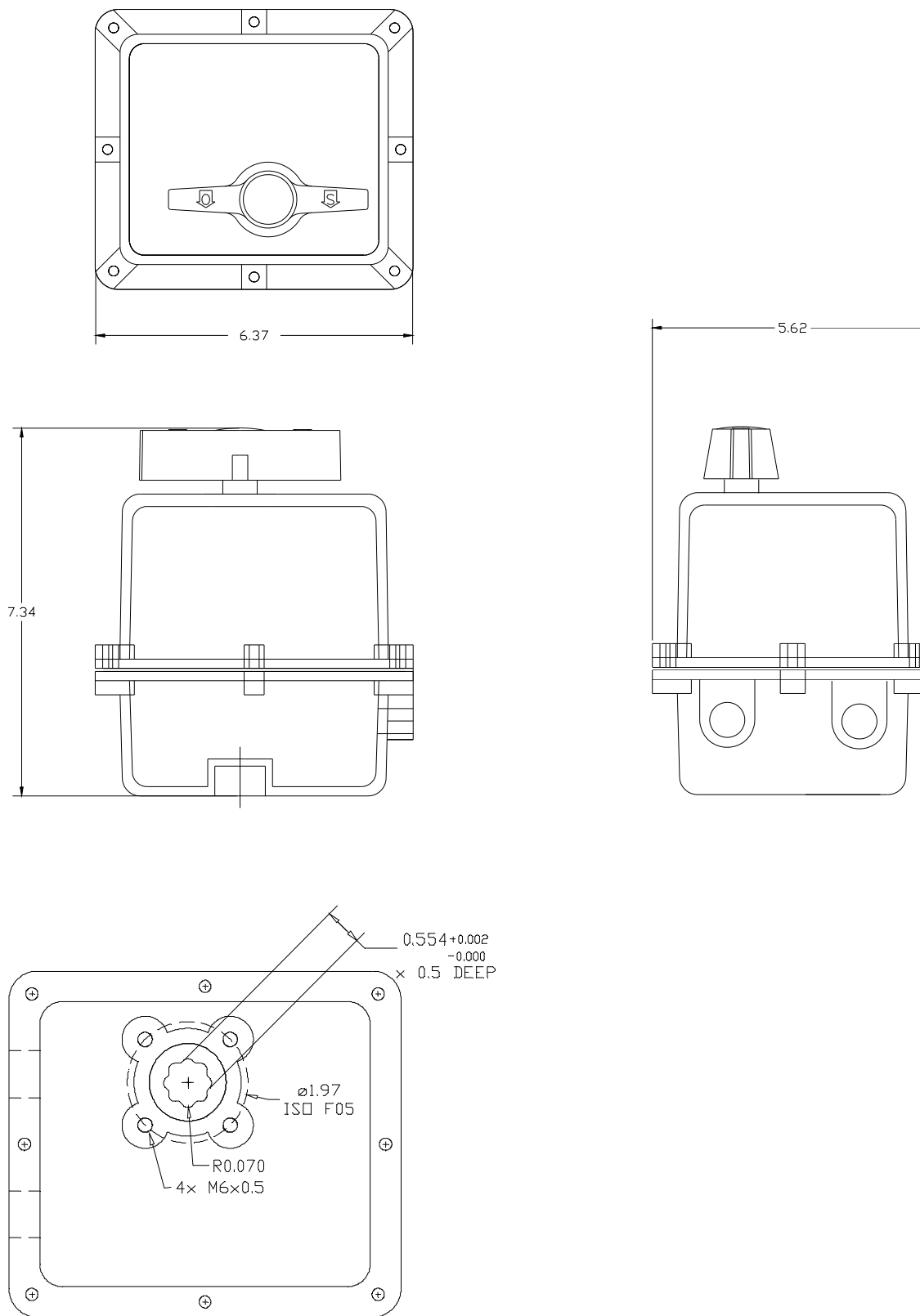
No specially machined stem or valve body drilling required. Remove handle (remove handle cap and hex head bolt) to expose throttle plate screws. Remove throttle plate and retaining washer to expose existing bolt pattern.

Mount bracket #3 to actuator #2 with bolts #8 and washers #9 and tighten evenly. Insert coupling #4 into actuator #2. Install valve #1 onto mounting bracket #3 and align stem of valve to engage with coupling. (Line scribed on top of stem indicates disc orientation). Install bolts #5, washers #6 and nuts #7 and tighten evenly.



**CAUTION:** If mounted unit is installed other than straight up, the actuator should be supported independently to prevent side loading and loosening up of fasteners.

**Actuator Mounting Dimensions**



## **Operation**

### **Manual Override Operation** **Reference Drawing #279QM**

Push down on handle (Part #34) and rotate within labeled limits.  
To re-engage simply rotate actuator handle in opposite direction until it moves up and re-engages.

**CAUTION:** The manual override should only be used when there is no power applied to actuator. When power is restored the actuator will automatically resume normal operation.

### **Setting Limit Switches** **Reference Drawing #279QM**



**Disconnect power!**

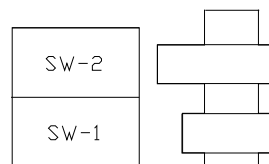
#### **Open Travel Limit Switch (SW-2 Part #14):**

Using declutchable manual override, move the valve into a full open position. Then loosen set screws on top cam (Part #21) and rotate cam (CCW) into limit switch arm until a click is heard, this designates the switch circuit has opened and defines a full open position. Tighten 2 set screws (Part #22) on cam.

#### **Close Travel Limit Switch (SW-1 Part #14):**

Using declutchable manual override, move the valve to a full closed position, loosen set screws on bottom cam (Part #21) and rotate cam (CW) into limit switch arm until a click is heard, this designates the switch circuit has opened and defines a full closed position. Tighten 2 set screws (Part #22) on cam.

Manually position valve to midstroke. Reapply power to actuator and drive to open or closed position. Actuator motor will run. The shaft will not turn until drive pins (Part #7) reseat in drive gear. This could take up to 10 seconds.



SW-2 OPEN TRAVEL SWITCH

SW-1 CLOSE TRAVEL SWITCH

## Options

### Models A94 & B94

#### Single Limit Switch

Install additional limit switch directly on top of standard limit switches using screws provided.

Wiring for SW-3 is as follows:

Pink = Common to Terminal #6  
 Purple = NC to Terminal #7  
 Blue = NO to Terminal #8

***Cam must be set so that this switch is tripped just ahead of Closed limit switch.***

Wire tie loose wiring and check operation before installing cover.

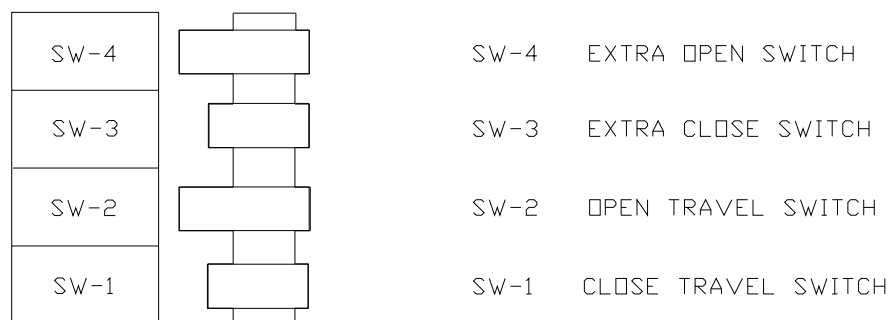
#### Double Limit Switch

Installation and wiring is the same as for the single limit switch, with the addition of wiring for SW-4 as follows:

Brown = Common to Terminal #9  
 Green = NC to Terminal #10  
 Orange = NO to Terminal #11

***Cam must be set so that this switch is tripped just ahead of Open limit switch.***

Wire tie loose wiring and check operation before installing cover.





### **Heater and Thermostat**

Install Heater into threaded hole located on actuator base plate.

Wiring is as follows:

Heater lead = Terminal #12

Thermostat lead = Terminal #13

Wire tie loose wiring and check operation before installing cover.

### **RHM**

**Reference Appropriate Drawing Number:**

**M00EL9903 - x92RHM 12vac & 24vac**

**M00EL9904 - x92RHM 12vdc & 24vdc**

**M00EL9905 - x92RHM 120vac & 220vac**

The RHM is a combination heater and thermostat, and 2-SPDT dry contacts for the open and closed positions. Its best feature is to provide a means of powering the heater and thermostat without the need of additional wiring. When the actuator reaches end of travel, the NO contact on the travel switch is tripped, and provides power for optional light indication. At the same time, the appropriate relay is triggered providing dry contact position indication as well as powering the heater and thermostat. The heater and thermostat are not powered during travel, only at the end of travel. These units are easily identified with "RHM" in the model number; A94RHMW as an example.

### **Mechanical Brake**

Loosen two (2) motor screws diagonally from each other and install bracket with tabs facing upward. Tighten screws

Install hexagonal adapter over armature shaft and tighten set screws.

**NOTE:** The adapter should be resting on the step of the armature shaft.

Install brake assembly onto hexagonal adapter making sure that the brake assembly is sitting flush on the bracket. Tighten with supplied screws.

Remove motor leads "A" & "B" from capacitor and install "piggy back connectors to capacitor, the re-install motor leads to their original locations.

Connect brake leads to piggy back connectors on capacitor (orientation does not matter)

Wire tie loose wiring and check operation before installing cover.

### **Feedback Potentiometer**

Install drive gear face up over output shaft.

Install potentiometer and bracket on to base plate with potentiometer gear facing output shaft.

Wiring for potentiometer as follows:

|                                            |                        |
|--------------------------------------------|------------------------|
| #1 on potentiometer (white w/black stripe) | #16 on terminal strip. |
| #2 on potentiometer (grey)                 | #15 on terminal strip. |
| #3 on potentiometer (brown w/white stripe) | #14 on terminal strip. |

Using multimeter set at 2k ohms, calibrate potentiometer with leads from meter connected to terminals #15 and #16. With actuator in closed position multimeter should read between 95 and 100 ohms.

Rotate actuator 90 degrees (open position).

Connect leads from multimeter to terminal #14 and #15; multimeter should read 95 to 100 ohms. If necessary adjust open limit switch cam so that multimeter will read 95-100 ohms.

### **Series 94 Options Codes for Serial # Tags**

|     |                          |
|-----|--------------------------|
| M1  | 1 extra limit switch     |
| M2  | 2 extra limit switches   |
| HT  | Heater & thermostat      |
| RHM | RHM Module               |
| P   | Feedback potentiometer   |
| C1  | 4-20 mA Positioner       |
| M   | Mechanical brake         |
| CO  | Center off               |
| CLC | Cycle length control     |
| 2WC | 2-wire control           |
| FS  | Failsafe Battery Pak     |
| C3  | 4-20mA Output Transducer |

Example 1: A94**HTPW**

Heater & thermostat and feedback potentiometer installed.

Example 2: **AM94RHMW**

Mechanical brake and RHM Module installed.

## **Troubleshooting**

**Q:** *What if there is no output, but the motor runs?*

**A:** Manual override possibly engaged.

When the manual override is engaged, the motor will run, but no output will be observed until the manual override re-engages with the output shaft.

**A:** Valve stem broken. When the valve stem is broken, there will not be a change in fluid movement, making it seem as if the actuator has no output.

**Q:** *What if valve does not cycle?*

**A:** No power source to actuator. Check for power.

**A:** Power source disconnected. Check for broken wire, loose connection or no connection as per appropriate wiring diagram.

**A:** Low or wrong power source. Check for proper voltage.

**A:** Mechanical Brake jammed or misaligned. Check alignment of brake assembly.

This could occur during installation when someone would rest their hand on the Mechanical Brake to steady themselves.

**Q:** *What if there is water and/or moisture inside of the unit?*

**A:** Conduit fitting installed improperly. Re-install correctly.

**A:** Cover and/or base seal damaged. Replace damaged seal(s).

**A:** Base gasket damaged or installed improperly. Check gasket and replace if necessary.

**A:** Temperature swings of more than 15 degrees F. Install heater and thermostat to eliminate condensation.

When these temperature swings occur, the unit will “sweat” on the inside causing internal corrosion unless the actuator is equipped with a heater and thermostat to keep a constant temperature inside of the housing.

**A:** Unit has been submerged. Raise unit above liquid level.

An actuator that is to be submerged MUST meet NEMA Type 6 for the proper protection of the actuator and the elimination of a potential hazard. We do not recommend submerging the Series 94 Actuator as the electrical rating does not meet NEMA 6.

**Q:** *What if unit is oscillating?*

**A:** Valve torque exceeds output torque of actuator. Check for chemical compatibility of valve, and flange torque.

**Q:** *What if thermal overload frequently cuts out motor?*

**A:** Frequency of operation exceeds duty cycle rating. Check cycling period.

**A:** Unit is oscillating. Refer to above.

**Q:** *What if motor hums and no output is observed?*

**A:** Foreign material caught in valve. Remove material and inspect valve for damaged and/or worn parts. Replace parts as necessary.

**A:** Unit wired incorrectly (simultaneously powering open and closed). Check wiring as per appropriate wiring diagram.

**A:** Capacitor worn. Replace.

**Q:** *What if actuator “over-shoots” limit switches without stopping?*

**A:** Actuator wired in parallel to each other. Please note that each actuator requires it's own set of switch contacts.

## **Maintenance**

### **Disconnect power!**



***NEVER REMOVE ACTUATOR COVER WHILE CIRCUITS ARE LIVE!***

**CAUTION:** It is imperative for reducing the chance of electrical shock, and to prevent ignition of hazardous atmospheres that you

### **Disconnect power**

**before** any maintenance or repairs are performed.

Series 94 actuators are virtually maintenance free. We do however, recommend that periodic checks are made to ensure that all fasteners are tight and properly torqued to extend the life of the actuator and valve.

Series 94 Actuators are manufactured with factory lubricated grease in the gear case and gearbox. This lubricant should never have to be replenished.

For outdoor or wet locations keep top and bottom seals coated with a silicone based grease.

### **Spare Parts**

#### **Reference Drawing #279QM**

We recommend that the following be kept on hand as spare parts.

1 --- Limit Switch (Part #14)

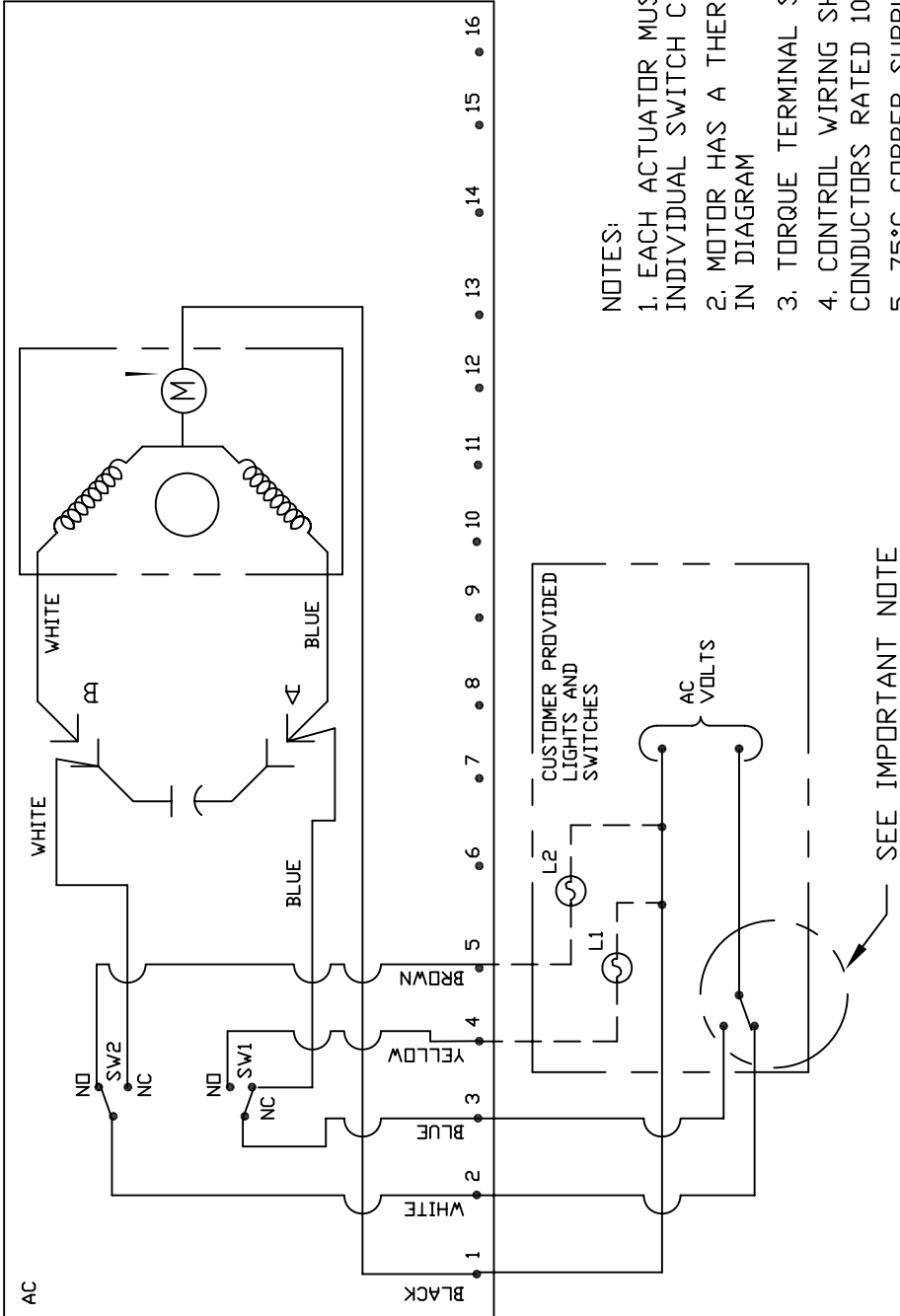
1 --- Capacitor (Part #13)

**NOTE:** When ordering replacement motor parts and/or options specify model # and voltage.

### **Attachments:**

12 drawings: 296S92, 295S92, 297S92, 7403119, 0106BV, 0112BV, 0129BV, 0203BF, 279QM, M00EL9903, M00EL9904, M00EL9905

WIRING DIAGRAM FOR 115 VAC AND 220 VAC ONLY  
ACTUATOR SHOWN IN COUNTER-CLOCKWISE EXTREME OF TRAVEL, OR "OPEN" POSITION

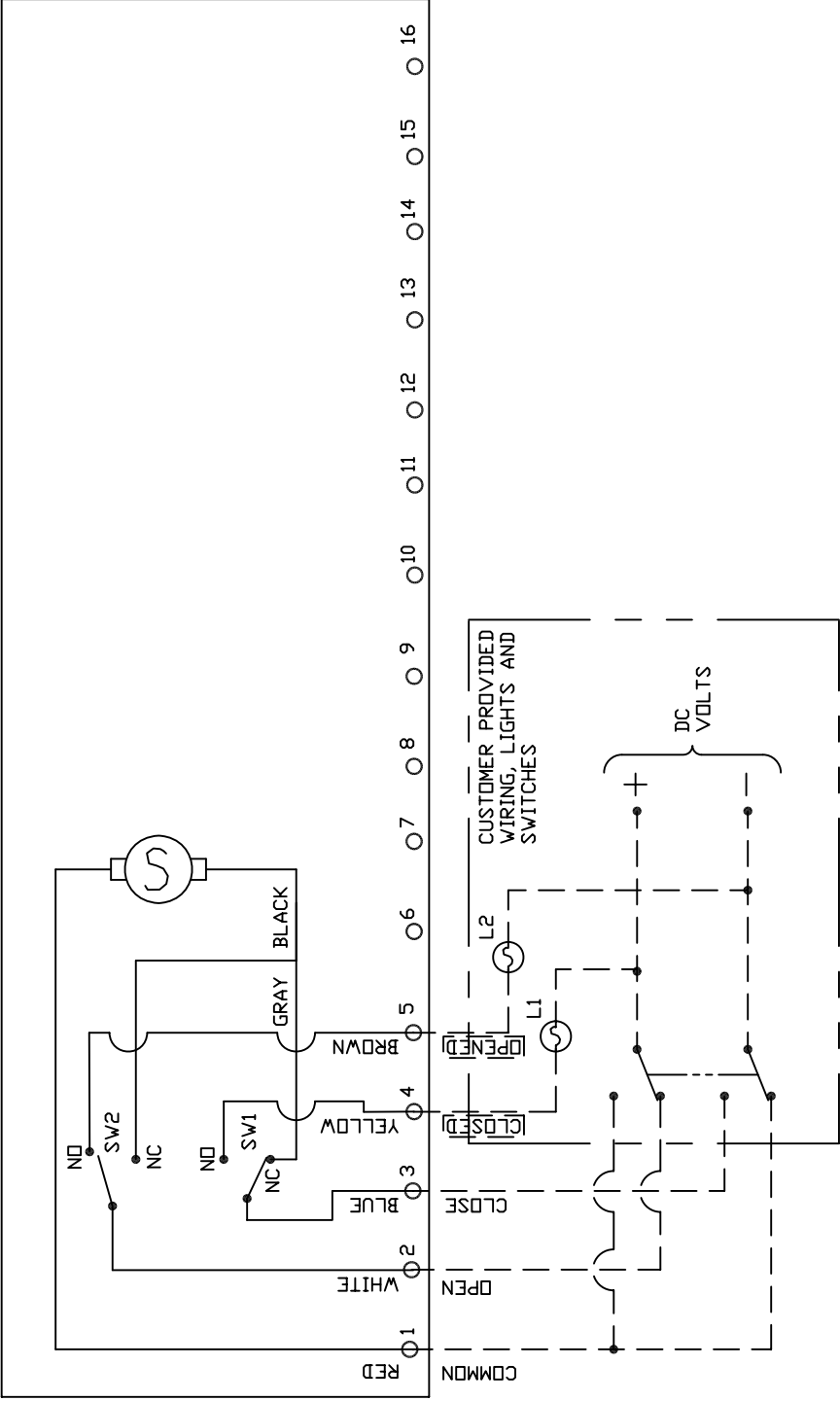


NOTES:

1. EACH ACTUATOR MUST BE POWERED THRU ITS OWN INDIVIDUAL SWITCH CONTACTS TO AVOID CROSS FEED.
2. MOTOR HAS A THERMAL PROTECTOR AS SHOWN BY (M) IN DIAGRAM
3. TORQUE TERMINAL STRIP WIRING TO 5 IN-LBS.
4. CONTROL WIRING SHALL BE INSULATED WITH CONDUCTORS RATED 105°C, 300V MINIMUM.
5. 75°C COPPER SUPPLY WIRES ONLY.

ACTUATOR SHOWN IN COUNTER CLOCKWISE EXTREME  
OF TRAVEL OR "OPEN" POSITION

DC WIRING DIAGRAM



NOTES:

1. TORQUE TERMINAL STRIP WIRING TO 5 IN-LBS.
2. CONTROL WIRING SHALL BE INSULATED WITH CONDUCTORS RATED 105°C, 300V MINIMUM.
3. 75°C COPPER SUPPLY WIRES ONLY.

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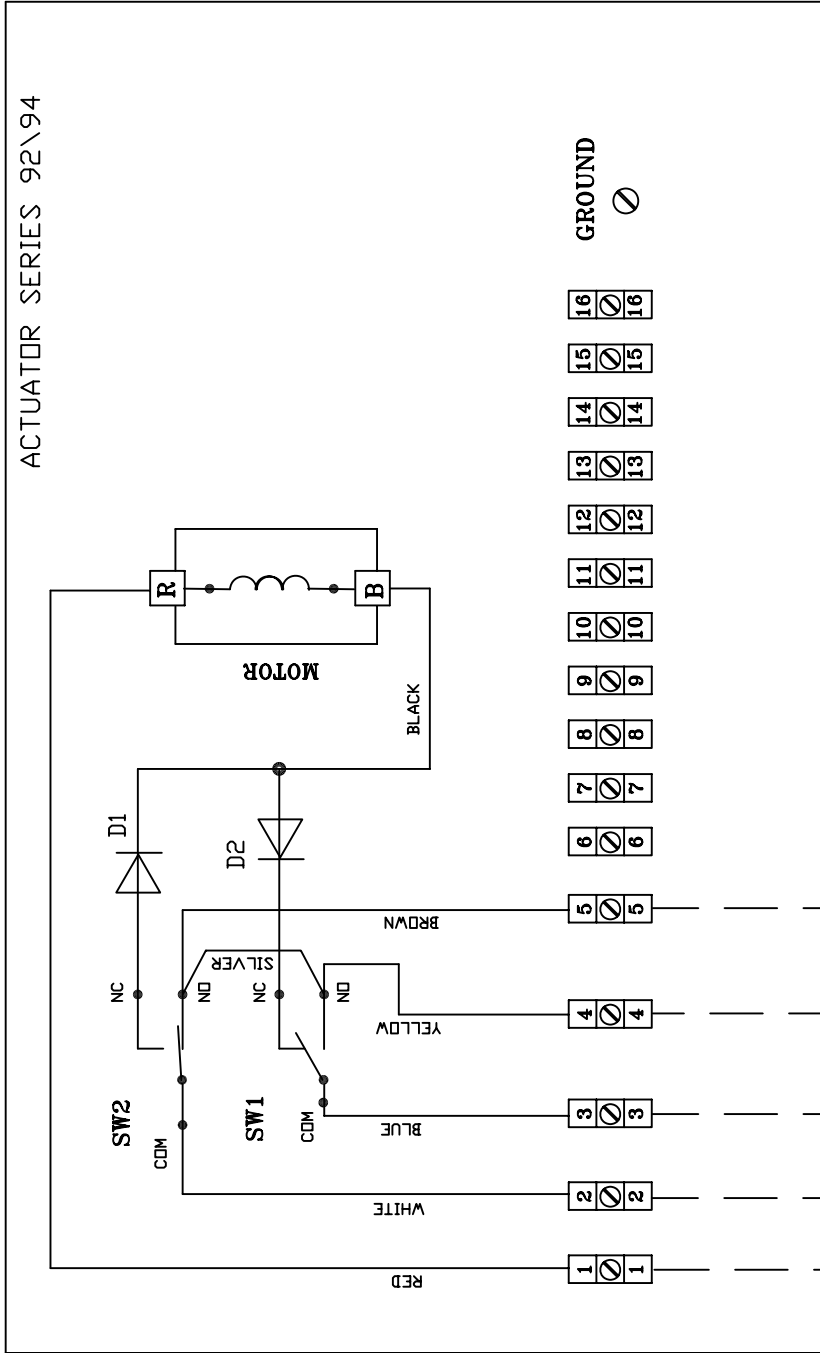
QUATER MASTER - 94  
DC WIRING DIAGRAM

|       |     |          |         |     |   |
|-------|-----|----------|---------|-----|---|
| SIZE  | A   | DWG. NO. | 295SS92 | REV | C |
| SCALE | NTS | SHEET 1  | OF 1    |     |   |

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|-------------------|------------|
| DR JOHN GLASSFORD | 6/18/07    |
| APPD DAVE HURLEY  | 6/18/07    |
| PROD LEO LESTER   | 6/19/07    |
| WO#/SO#           |            |
| FILE              | ACAD11\S92 |

WIRING DIAGRAM FOR 12 OR 24VAC ONLY  
ACTUATOR SHOWN IN COUNTER-CLOCKWISE EXTREME OF TRAVEL, OR "OPEN" POSITION

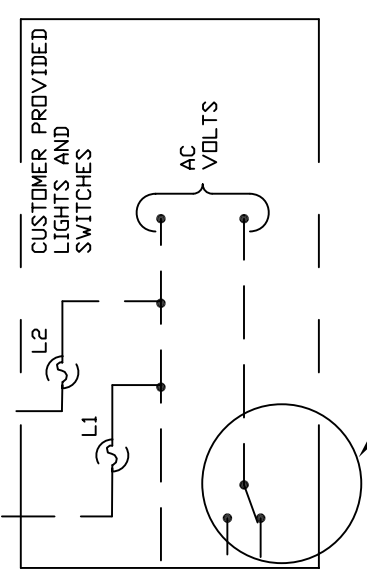


NOTES:

- 1. EACH ACTUATOR MUST BE POWERED THRU ITS OWN INDIVIDUAL SWITCH CONTACTS TO AVOID CROSS FEED
- 2. MOTOR LEADS ARE REVERSED FOR 1100 & 2000 IN/LB ACTUATOR

SWITCH LOCATION VIEWED FROM TERMINAL STRIP FRONT

- SW-2 - OPEN
- SW-1 - CLOSE



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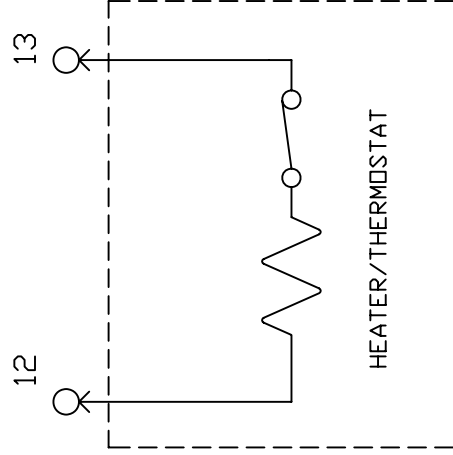
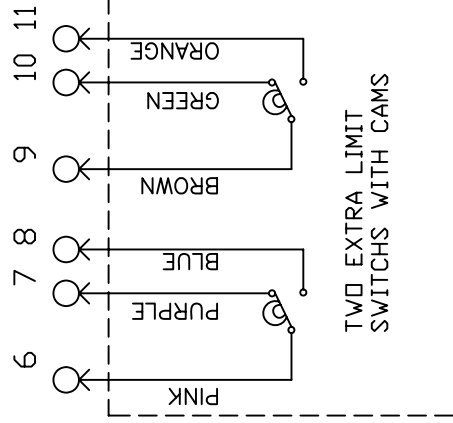
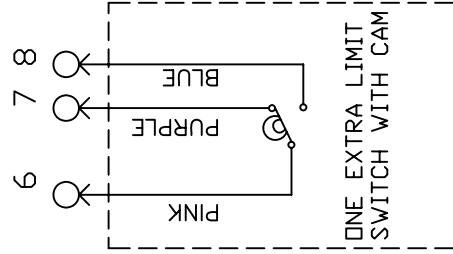
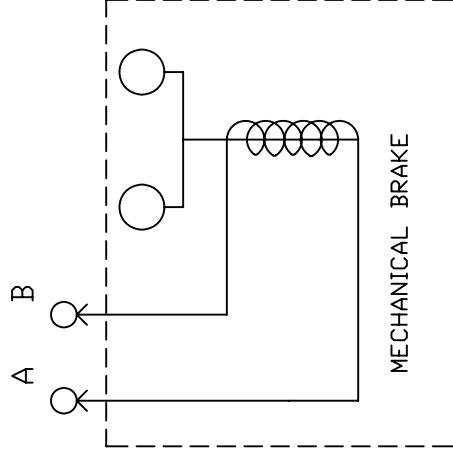
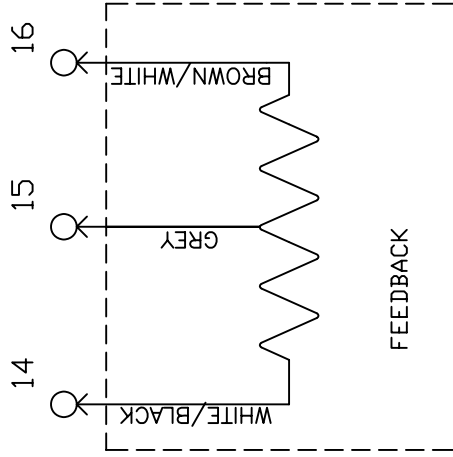
SERIES 92/94 12/24 VAC  
WIRING DIAGRAM

|       |     |          |         |     |   |
|-------|-----|----------|---------|-----|---|
| SIZE  | A   | DWG. NO. | 7403119 | REV | A |
| SCALE | NTS | SHEET 1  | OF 1    |     |   |

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| APPD K.BLYSTONE | 5/26/06 |
| PROD            |         |
| WO#/SO#         |         |
| FILE            |         |





NOTES:

1. TORQUE TERMINAL STRIP WIRING TO 5 IN-LBS.
2. CONTROL WIRING SHALL BE INSULATED WITH CONDUCTORS RATED 105°C, 300V MINIMUM.
3. 75°C COPPER SUPPLY WIRES ONLY.

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| PROD LEO LESTER   | 6/19/07    |
| WO#/SO#           |            |
| FILE              | ACAD11/S92 |

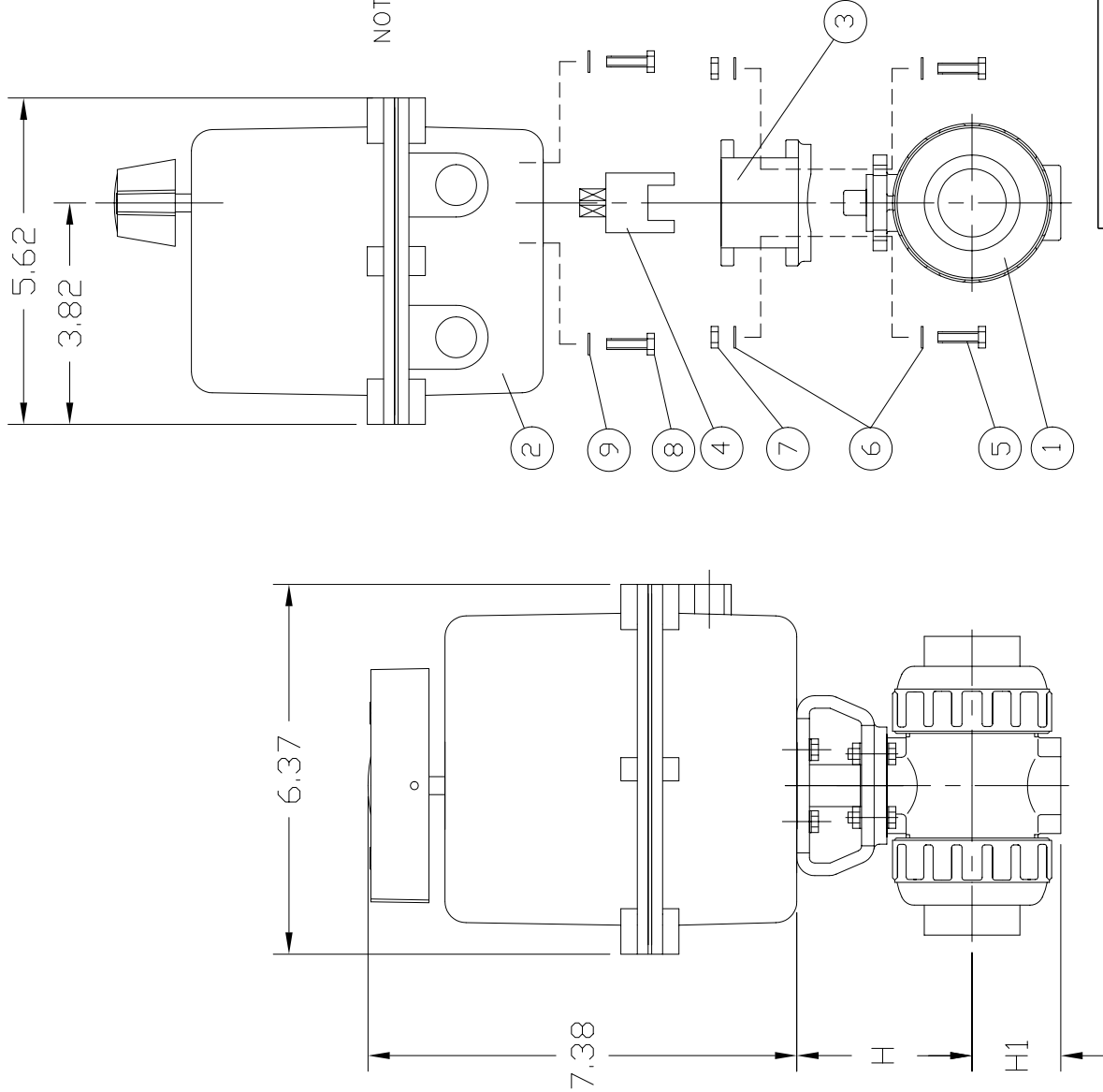
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QUATER MASTER - 94  
OPTIONS WIRING DIAGRAM

|        |                 |              |
|--------|-----------------|--------------|
| SIZE A | DWG. NO. 297S92 | REV C        |
| SCALE  | NTS             | SHEET 1 OF 1 |



UNIT: INCH

| VALVE SIZE | 1/2" | 3/4" | 1"   | 1-1/4" | 1-1/2" | 2"   |
|------------|------|------|------|--------|--------|------|
| H          | 2.76 | 3.01 | 3.29 | 3.64   | 3.98   | 4.43 |
| H1         | 1.14 | 1.38 | 1.54 | 1.85   | 2.17   | 2.60 |

NOTE: The shape and appearance of assembly differ a little with nominal size compared to this drawing.

|      |                                                                              |                     |     |
|------|------------------------------------------------------------------------------|---------------------|-----|
| 9    | FLAT WASHER (M6.0)                                                           | STAINLESS STEEL     | 4   |
| 8    | BOLT (M6.0x1-16LG)                                                           | STAINLESS STEEL     | 4   |
| 7    | NUT (FOR 1/2" THRU 1-1/4" : M5.0x8) (FOR 1-1/2" THRU 2" : M6.0x1)            | STAINLESS STEEL     | 4   |
| 6    | FLAT WASHER (FOR 1/2" THRU 1-1/4" : M5.0) (FOR 1-1/2" THRU 2" : M6.0)        | STAINLESS STEEL     | 8   |
| 5    | BOLT (FOR 1/2" THRU 1-1/4" : M5.0x8-16LG) (FOR 1-1/2" THRU 2" : M6.0x1-20LG) | STAINLESS STEEL     | 4   |
| 4    | COUPLING                                                                     | STAINLESS STEEL 303 | 1   |
| 3    | MOUNTING BRACKET                                                             | PPG                 | 1   |
| 2    | ACTUATOR SERIES 94                                                           | ZYTEL               | 1   |
| 1    | BALL VALVE TYPE 21                                                           | PVC,CPVC,PP,PVDF    | 1   |
| ITEM | DESCRIPTION                                                                  | MATERIAL            | QTY |

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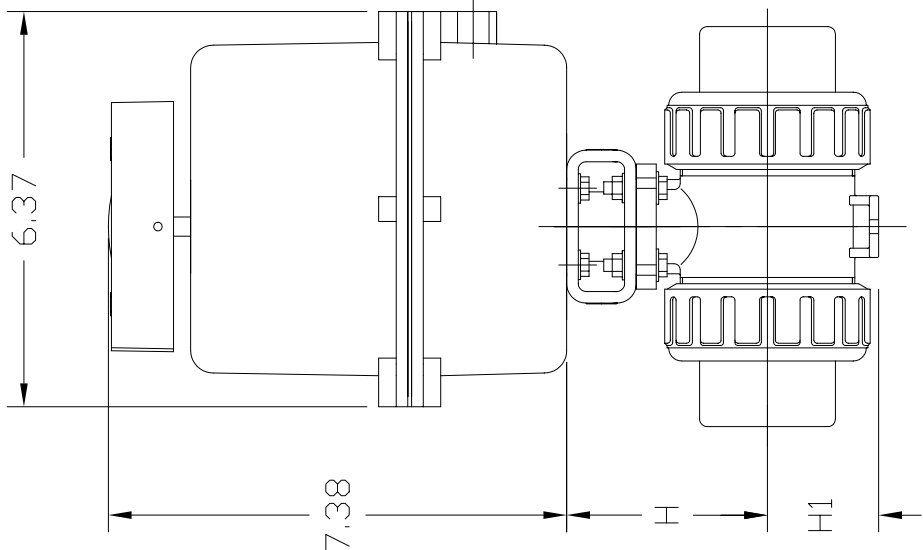
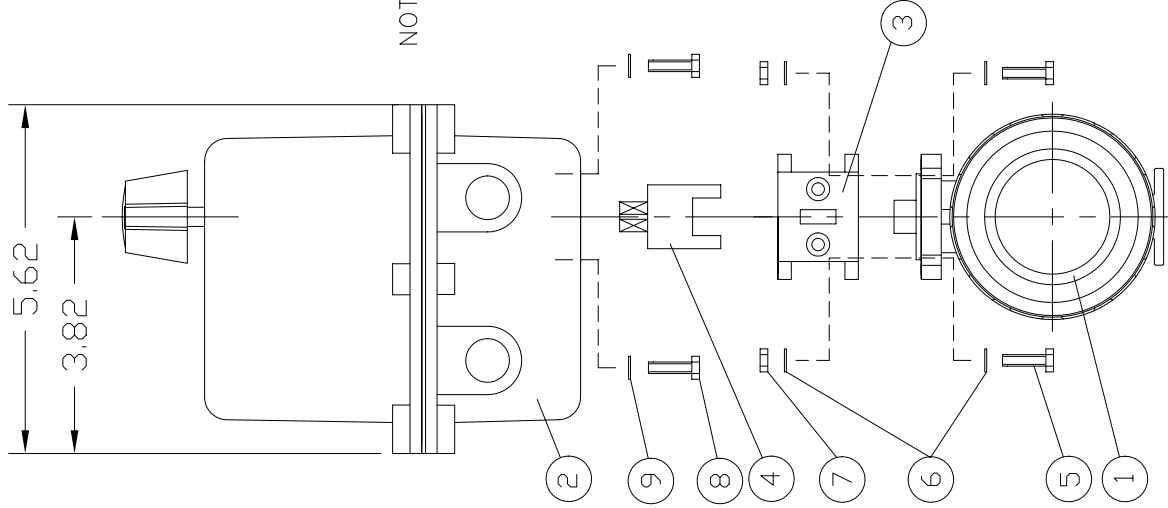
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**BALL VALVE TYPE21**  
**SERIES94 ELECTRIC ACTUATOR**  
**1/2" THRU 2"**

|       |     |          |        |     |   |
|-------|-----|----------|--------|-----|---|
| SIZE  | A   | DWG. NO. | 0106BV | REV | A |
| SCALE | NTS | SHEET    | 1      | OF  | 1 |



UNIT: INCH

| VALVE SIZE | 2-1/2" | 3"   |
|------------|--------|------|
| H          | 5.12   | 5.47 |
| H1         | 2.83   | 3.35 |

NOTE. The shape and appearance of assembly differ a little with nominal size compared to this drawing.

| ITEM | DESCRIPTION           | MATERIAL            | QTY |
|------|-----------------------|---------------------|-----|
| 9    | FLAT WASHER (M6.0)    | STAINLESS STEEL     | 4   |
| 8    | BOLT (M6.0x1-16LG)    | STAINLESS STEEL     | 4   |
| 7    | NUT (M8.0x1.25)       | STAINLESS STEEL     | 4   |
| 6    | FLAT WASHER (M8.0)    | STAINLESS STEEL     | 8   |
| 5    | BOLT (M8.0x1.25-35LG) | STAINLESS STEEL     | 4   |
| 4    | COUPLING              | STAINLESS STEEL 303 | 1   |
| 3    | MOUNTING BRACKET      | PPG                 | 1   |
| 2    | ACTUATOR SERIES 94    | ZYTEL               | 1   |
| 1    | BALL VALVE TYPE 21    | PVC,CPVC,PP,PVDF    | 1   |

**ASAHI/AMERICA**  
**ISO 9001 CERTIFIED**  
 35 GREEN STREET, P.O. BOX 653, MALDEN, MA.



BALL VALVE TYPE21  
 SERIES94 ELECTRIC ACTUATOR  
 2-1/2" THRU 3"

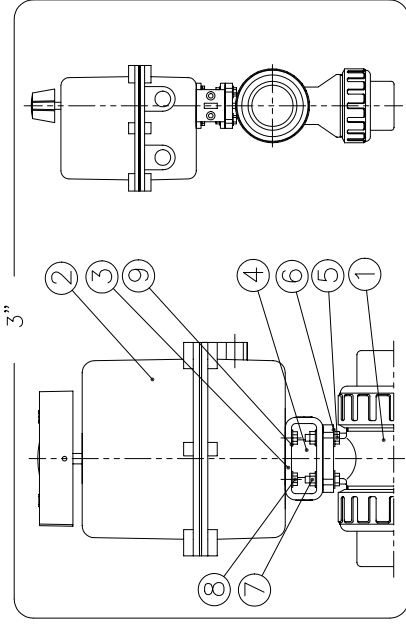
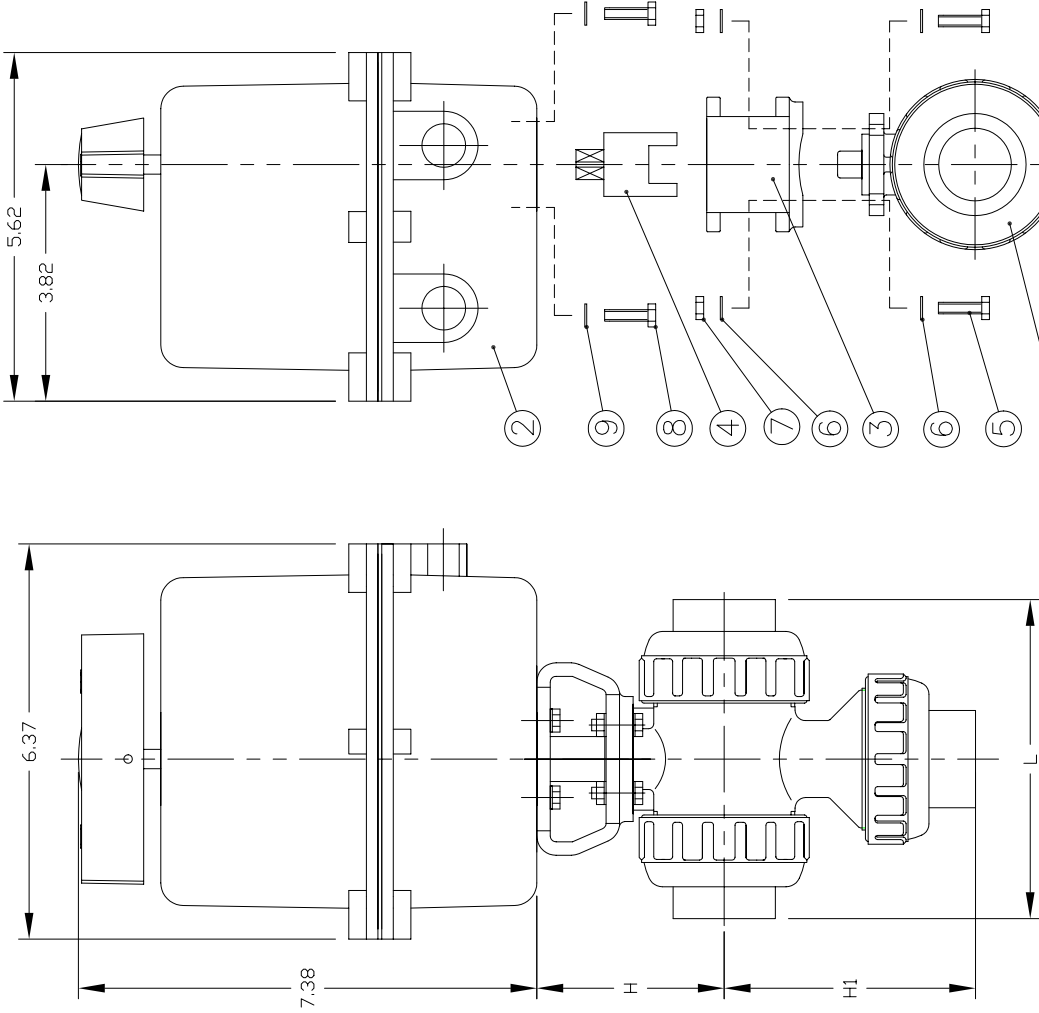
|      |   |          |        |     |   |
|------|---|----------|--------|-----|---|
| SIZE | A | DWG. NO. | 0112BV | REV | A |
|------|---|----------|--------|-----|---|

|       |     |         |      |
|-------|-----|---------|------|
| SCALE | NTS | SHEET 1 | OF 1 |
|-------|-----|---------|------|

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| NAME                | DATE    |
|---------------------|---------|
| DR KENICHI MIYAZAKI | 8/14/01 |
| APPD DAVE HURLEY    | 8/14/01 |
| PROD LEO LESTER     | 8/14/01 |
| WO#/CO#             |         |
| FILE                |         |

**FOR REFERENCE ONLY**  
**ASAHI/AMERICA**



DIMENSIONS TABLE

UNIT: inch

| NOMINAL<br>SIZE | H    | FLANGED |       | THREADED |       | SOCKET    |       |                |      |                |       | SPIGOT (BUIT END) |       |
|-----------------|------|---------|-------|----------|-------|-----------|-------|----------------|------|----------------|-------|-------------------|-------|
|                 |      | H1      | L     | H1       | L     | PVC, CPVC |       | PP, PPDF (DIN) |      | PP, PPDF (IPS) |       |                   |       |
| 1/2" 15mm       | 2.76 | 3.70    | 5.63  | 2.89     | 4.02  | 3.08      | 4.45  | 2.80           | 3.90 | 3.09           | 4.45  | 3.27              | 4.88  |
| 3/4 20          | 3.01 | 4.50    | 6.77  | 3.48     | 4.72  | 3.56      | 5.08  | 3.27           | 4.49 | 3.61           | 5.08  | 3.90              | 5.67  |
| 1 25            | 3.29 | 5.24    | 7.36  | 4.13     | 5.16  | 4.32      | 5.75  | 3.94           | 4.84 | 4.37           | 5.75  | 4.53              | 6.06  |
| 1 1/2 40        | 3.98 | 6.50    | 8.35  | 5.53     | 6.42  | 5.71      | 7.24  | 5.16           | 5.83 | 5.85           | 7.24  | 6.02              | 6.85  |
| 2 50            | 4.43 | 7.34    | 9.21  | 6.61     | 7.76  | 6.66      | 8.23  | 6.06           | 6.93 | 6.76           | 8.23  | 7.01              | 8.82  |
| 3 80            | 5.47 | 10.06   | 11.97 | 9.25     | 10.39 | 9.59      | 11.10 | 8.82           | 9.88 | 11.10          | 11.10 | 9.69              | 11.61 |

NOTE: 1) THE SHAPE AND APPEARANCE OF ASSEMBLY DIFFER A LITTLE WITH NOMINAL SIZE COMPARED TO THIS DRAWING.

2) FOR DETAILED VALVE DIMENSIONS,

REFER TO DWG. NO. 0126BV, 0127BV, 0128BV.

L-PORT : DWG. NO. 0126BV

DOUBLE L-PORT : DWG. NO. 0127BV

CROSS PORT : DWG. NO. 0128BV

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ASAHI/AMERICA

|      |                                                                                                             |                     |     |
|------|-------------------------------------------------------------------------------------------------------------|---------------------|-----|
| 9    | FLAT WASHER <M6.0>                                                                                          | STAINLESS STEEL     | 4   |
| 8    | BOLT <M6.0x1-16LG>                                                                                          | STAINLESS STEEL     | 4   |
| 7    | NUT<br><FOR 1/2" THRU 1" : M5.0x.8><br><FOR 1-1/2" THRU 2" : M6.0x1><br><FOR 3" : M8.0x1.25>                | STAINLESS STEEL     | 4   |
| 6    | FLAT WASHER<br><FOR 1/2" THRU 1" : M5.0><br><FOR 1-1/2" THRU 2" : M6.0><br><FOR 3" : M8.0>                  | STAINLESS STEEL     | 8   |
| 5    | BOLT<br><FOR 1/2" THRU 1" : M5.0x8-16LG><br><FOR 1-1/2" THRU 2" : M6.0x1-20LG><br><FOR 3" : M8.0x1.25-35LG> | STAINLESS STEEL     | 4   |
| 4    | COUPLING                                                                                                    | STAINLESS STEEL 303 | 1   |
| 3    | MOUNTING BRACKET                                                                                            | PPG                 | 1   |
| 2    | ACTUATOR SERIES 94                                                                                          | ZYTEL               | 1   |
| 1    | MULTI-PORT BALL VALVE TYPE23                                                                                | PVC,CPVC,PP,PVDF    | 1   |
| ITEM | DESCRIPTION                                                                                                 | MATERIAL            | QTY |

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| NAME                | DATE    |
|---------------------|---------|
| DR KENICHI MIYAZAKI | 1/28/03 |
| APPD DAVE HURLEY    | 1/28/03 |
| PROD LEO LESTER     | 1/28/03 |
| WO#/CO#             |         |
| FILE                |         |

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35 GREEN STREET, P.O. BOX 653, MALDEN, MA.



MULTI PORT BALL VALVE  
TYPE23 WITH SERIES94 ACT.  
1/2" THRU 3"

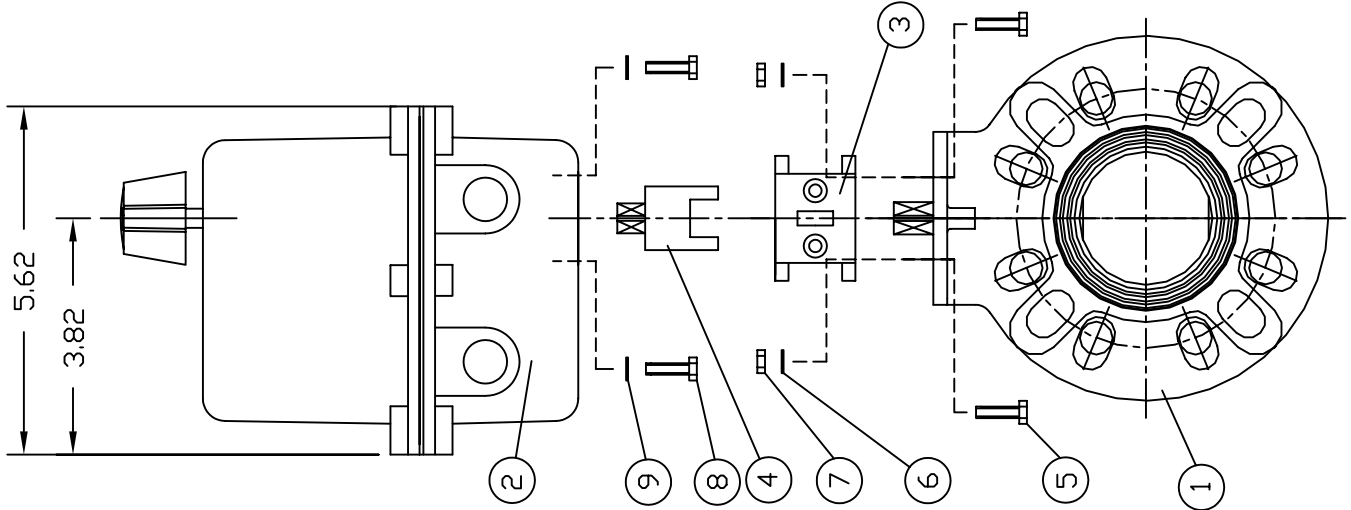
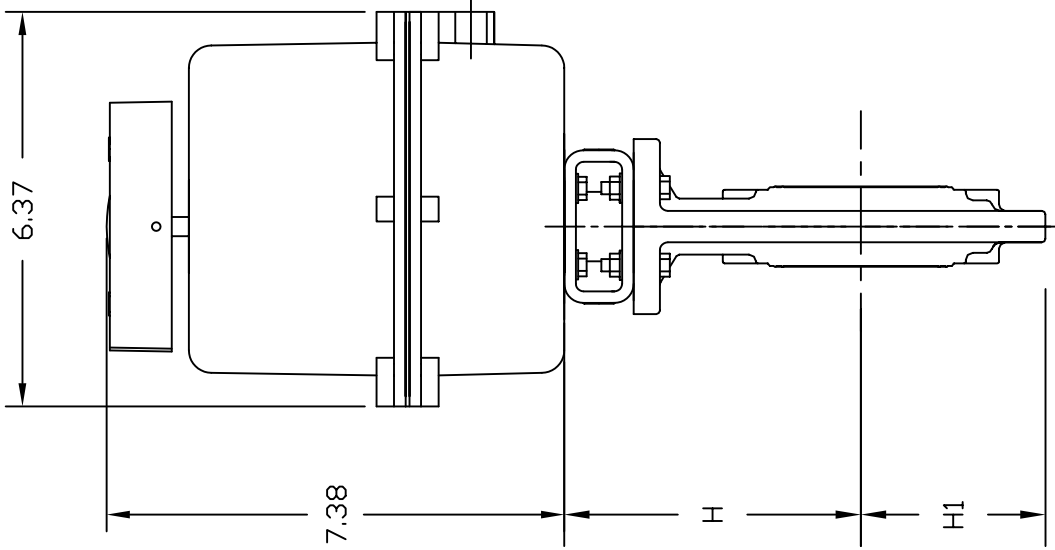
|           |                 |       |
|-----------|-----------------|-------|
| SIZE A    | DWG. NO. 0129BV | REV A |
| SCALE NTS | SHEET 1         | OF 1  |

UNIT: INCH

| VALVE SIZE | 1-1/2" | 2"   | 2-1/2" | 3"   | 4"   |
|------------|--------|------|--------|------|------|
| H          | 5.51   | 5.75 | 6.18   | 6.46 | 7.16 |
| H1         | 2.95   | 3.27 | 3.66   | 3.94 | 4.53 |

NOTE: 1. The shape and appearance of assembly differ a little with nominal size compared to this drawing.

2. For Mounting Bracket : F07XF05, F07



FOR REFERENCE ONLY  
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| ITEM | DESCRIPTION                                 | MATERIAL            | QTY |
|------|---------------------------------------------|---------------------|-----|
| 9    | FLAT WASHER (M6.0)                          | STAINLESS STEEL     | 4   |
| 8    | BOLT (M6.0x1-16LG)                          | STAINLESS STEEL     | 4   |
| 7    | NUT (FOR 1-1/2" THRU. 4" : M8.0x1.25)       | STAINLESS STEEL     | 4   |
| 6    | FLAT WASHER (FOR 1-1/2" THRU. 4" : M8.0)    | STAINLESS STEEL     | 8   |
| 5    | BOLT (FOR 1-1/2" THRU. 4" : M8.0x1.25-35LG) | STAINLESS STEEL     | 4   |
| 4    | COUPLING                                    | STAINLESS STEEL 303 | 1   |
| 3    | MOUNTING BRACKET                            | PPG                 | 1   |
| 2    | ACTUATOR SERIES 94                          | ZYTEL               | 1   |
| 1    | BUTTERFLY VALVE TYPE 57                     | U-PVC,PP,PVDF       | 1   |

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35 GREEN STREET, P.O. BOX 653, MALDEN, MA.

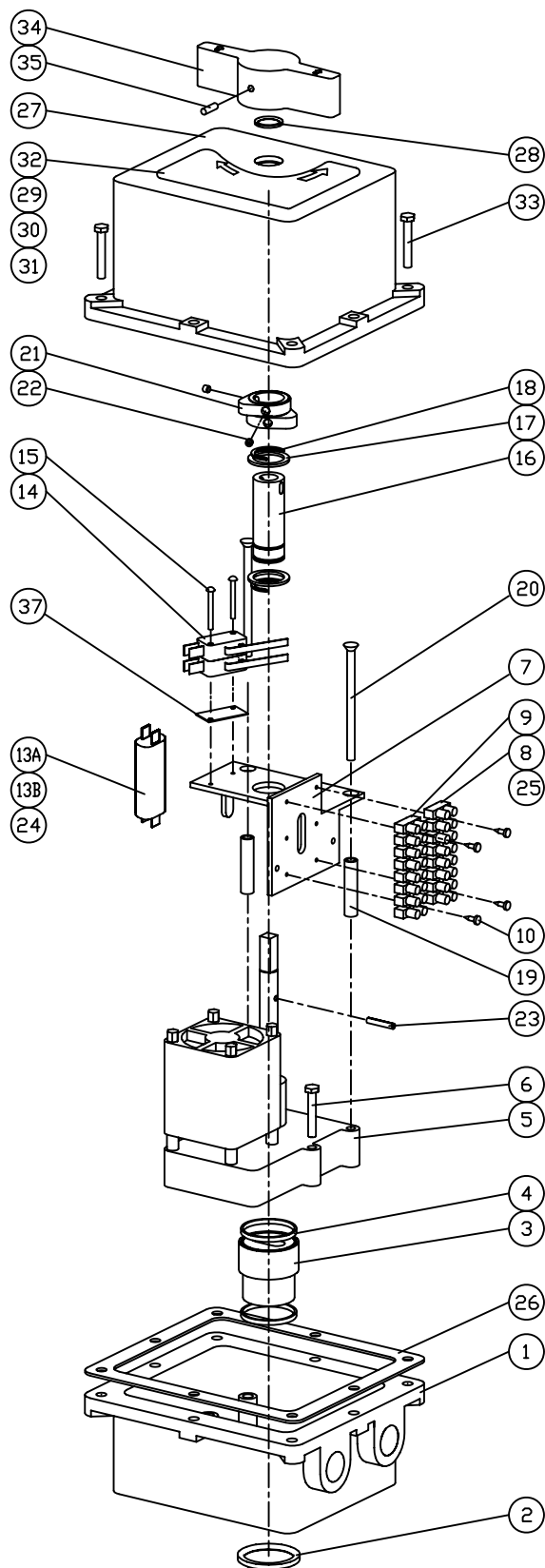


BUTTERFLY VALVE TYPE57  
SERIES94 ELECTRIC ACTUATOR  
1-1/2" THRU 4"

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| NAME              | DATE    |
|-------------------|---------|
| DR JOHN GLASSFORD | 6/10/05 |
| APPD DAVE HURLEY  | 6/10/05 |
| PROD LEO LESTER   | 6/10/05 |
| WO#/CO#           |         |
| FILE              |         |

|        |                   |         |      |
|--------|-------------------|---------|------|
| SIZE A | DWG. NO. 0203BF57 | REV     | A    |
| SCALE  | NTS               | SHEET 1 | OF 1 |



| ITEM | PART NO | QTY | DESCRIPTION                         |
|------|---------|-----|-------------------------------------|
| 1    | 7403002 | 1   | BASE                                |
| 2    | 7403000 | 1   | BASE SEAL                           |
| 3    | 7403017 | 1   | OUTPUT COUPLING                     |
| 4    | 7403005 | 2   | COUPLING GASKET                     |
| 5    | 7403004 | 1   | MOTOR                               |
| 6    | ACTMSC  | 2   | MOTOR SCREW                         |
| 7    | 7403011 | 1   | BASE PLATE                          |
| 8    | 7401420 | 1   | TERMINAL BLOCK 1-8                  |
| 9    | 7401425 | 1   | TERMINAL BLOCK 9-16                 |
| 10   | ACTMSC  | 4   | TERMINAL BLOCK SCREW                |
| 13A  | 7401948 | 1   | 4.2 MFD CAPACITOR - A94             |
| 13B  | 7402004 | 1   | 6.7 MFD CAPACITOR - B94             |
| 14   | 7401460 | 2   | MICRO SWITCH (V7-6C13D8-132)        |
| 15   | ACTMSC  | 2   | LIMIT SWITCH SCREW                  |
| 16   | 7403016 | 1   | OUTER SHAFT                         |
| 17   | 7403006 | 2   | OUTER SHAFT GASKET                  |
| 18   | ACTMSC  | 2   | RETAINING RING                      |
| 19   | ACTMSC  | 2   | STANDOFF                            |
| 20   | ACTMSC  | 2   | BASE PLATE SCREW                    |
| 21   | 7401480 | 2   | CAM                                 |
| 22   | ACTMSC  | 4   | CAM SCREW                           |
| 23   | ACTMSC  | 1   | PIN                                 |
| 24   | 7403023 | 1   | 2 PC HARNESS                        |
| 25   | 7403015 | 1   | 4 PC HARNESS                        |
| 26   | 7403007 | 1   | BASE GASKET                         |
| 27   | 7403001 | 1   | COVER                               |
| 28   | 7403020 | 1   | COVER SEAL                          |
| 29   | 7403019 | 1   | WIRE DIAGRAM LABEL                  |
| 30   | 7403025 | 1   | OPTION LABEL                        |
| 31   | 7403030 | 1   | QM II LABEL                         |
| 32   | 7403040 | 1   | OVERRIDE LABEL                      |
| 33   | ACTMSC  | 8   | COVER SCREW                         |
| 34   | 7403003 | 1   | HANDLE                              |
| 35   | ACTMSC  | 1   | HANDLE SCREW                        |
| 36   | 7403021 | 1   | QM II BOX                           |
| 37   | 7403240 | 1   | NOMEX INSULATOR PLATE (220VAC ONLY) |

NOTE:

1. LOCATE ITEM 29 & 30 ON INSIDE SURFACES OF COVER (ITEM 27).
2. LOCATE ITEM 31 ON OUTSIDE BACK SURFACE OF COVER (ITEM 27).

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|         | NAME        | DATE    |
|---------|-------------|---------|
| DR      | J.GLASSFORD | 6/18/07 |
| APPD    | D.HURLEY    | 6/18/07 |
| PROD    | L.LESTER    | 6/19/07 |
| WO#/SO# |             |         |
| FILE    | ACAD11/QM   |         |

**ASAHI/AMERICA**

ISO 9001 CERTIFIED

35 GREEN STREET, P.O. BOX 653, MALDEN, MA.

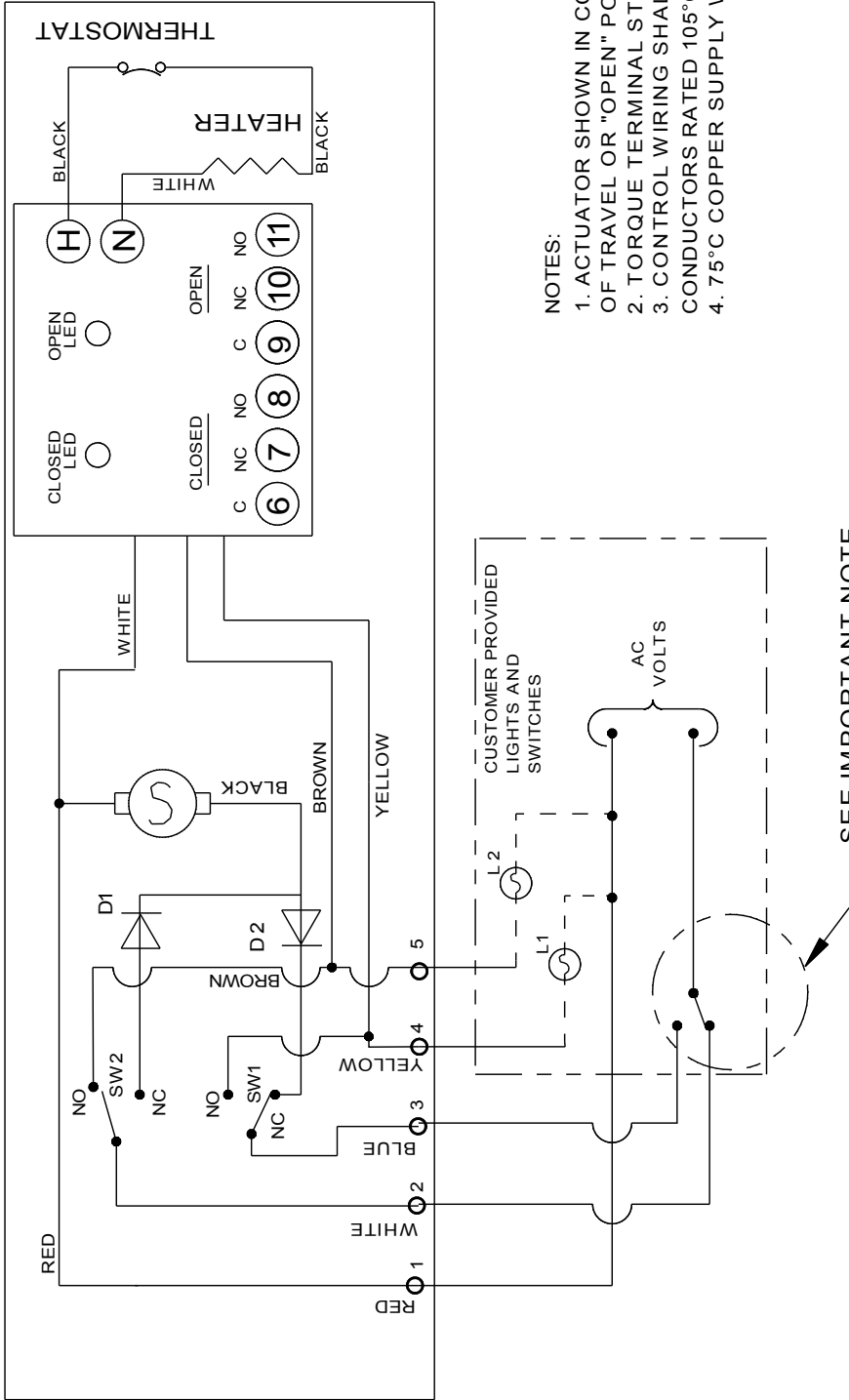


SERIES 94  
EXPLODED VIEW

|       |     |          |       |         |      |
|-------|-----|----------|-------|---------|------|
| SIZE  | A   | DWG. NO. | 279QM | REV     | D    |
| SCALE | NTS |          |       | SHEET 1 | OF 1 |

| REV | DATE    | DESCRIPTION | BY | FROM |
|-----|---------|-------------|----|------|
| A   | 6/22/17 | FIRST ISSUE | JH | KB   |

AC WIRING DIAGRAM



NOTES:

1. ACTUATOR SHOWN IN COUNTER CLOCKWISE EXTREME OF TRAVEL OR "OPEN" POSITION.
2. TORQUE TERMINAL STRIP WIRING TO 5 IN.-LBS.
3. CONTROL WIRING SHALL BE INSULATED WITH CONDUCTORS RATED 105°C, 300V MINIMUM.
4. 75°C COPPER SUPPLY WIRES ONLY.

SEE IMPORTANT NOTE

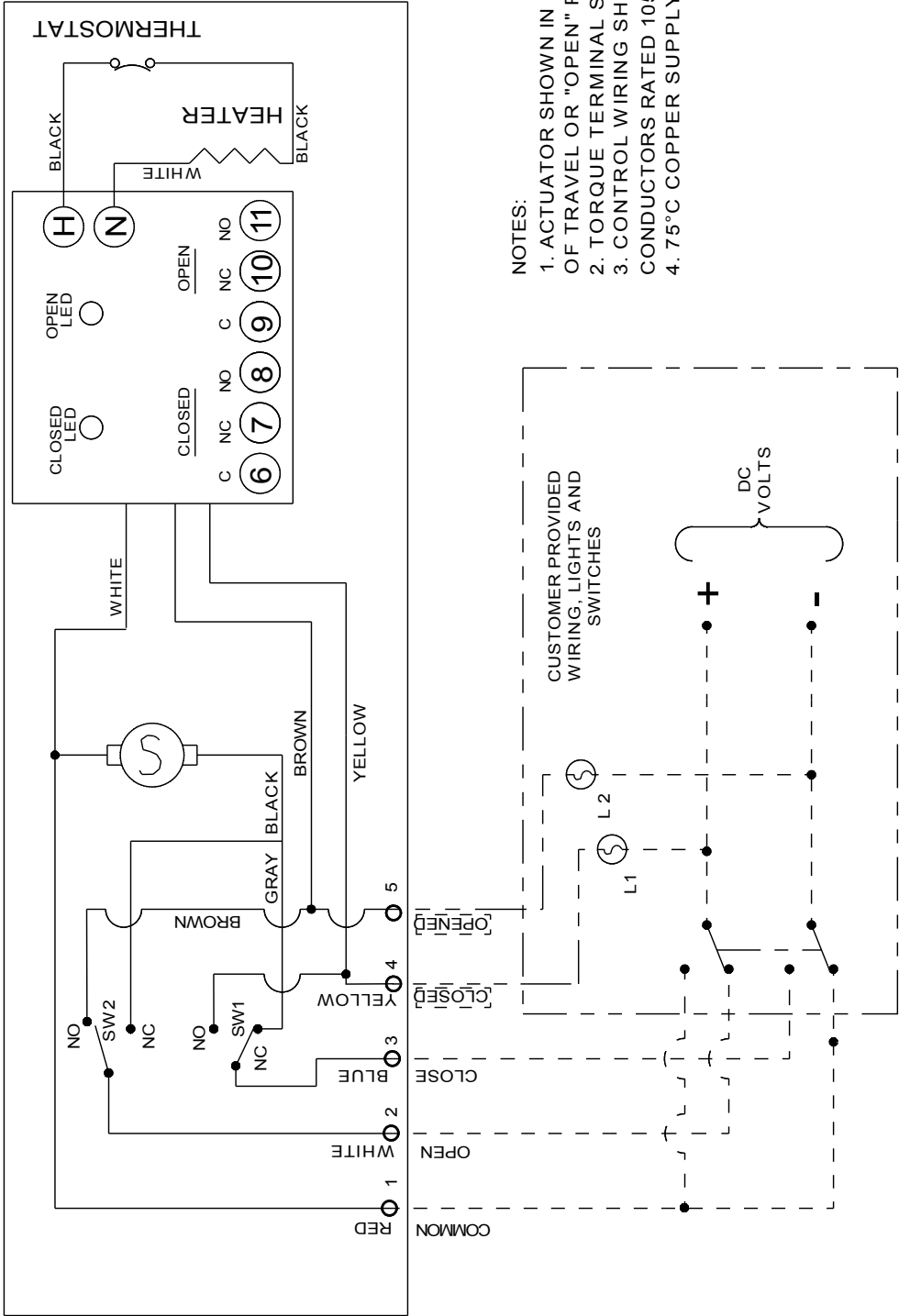
| UNLESS OTHERWISE SPECIFIED |                      |
|----------------------------|----------------------|
| DIMENSIONS ARE IN INCHES   |                      |
| MACHINING                  | 2 PL DECIMALS ± .01  |
| TOLERANCES:                | 3 PL DECIMALS ± .005 |
| ANGULAR                    | ± 1/2°               |
| FRACTIONAL                 | ± 1/64               |
| 1/2" - 8"                  | ± 1/4                |
| 10" AND UP                 | ± 1/2                |
| ANGULAR                    | ± 1.0°               |
| WELD TYPE:                 | N/A                  |
| MATERIAL:                  | AS NOTED             |
| FINISH:                    | 125μ"                |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| NAME                                                                                                                                                          | DATE                 |
| J. Hughes                                                                                                                                                     | 06/22/17             |
| DR                                                                                                                                                            | REV                  |
| K. Blystone                                                                                                                                                   | 06/22/17             |
| APPR                                                                                                                                                          | PRODUCT: VALVE & ACT |
| WO#/SO #                                                                                                                                                      |                      |

|                                                                         |           |                                                |        |
|-------------------------------------------------------------------------|-----------|------------------------------------------------|--------|
| ASAHI/AMERICA<br>ISO 9001 CERTIFIED<br>655 ANDOVER STREET, LAWRENCE, MA |           | SERIES 94 WITH RHM WIRING<br>DIAGRAM 12/24 VAC |        |
| JDE PART #                                                              | M00EL9903 | SIZE                                           | A      |
| DWG #                                                                   | M00EL9903 | REVISION                                       | A      |
| SCALE                                                                   | N/A       | SHEET                                          | 1 OF 1 |

| REV | DATE    | DESCRIPTION | BY | FROM |
|-----|---------|-------------|----|------|
| A   | 6/22/17 | FIRST ISSUE | JH | KB   |

DC WIRING DIAGRAM



NOTES:

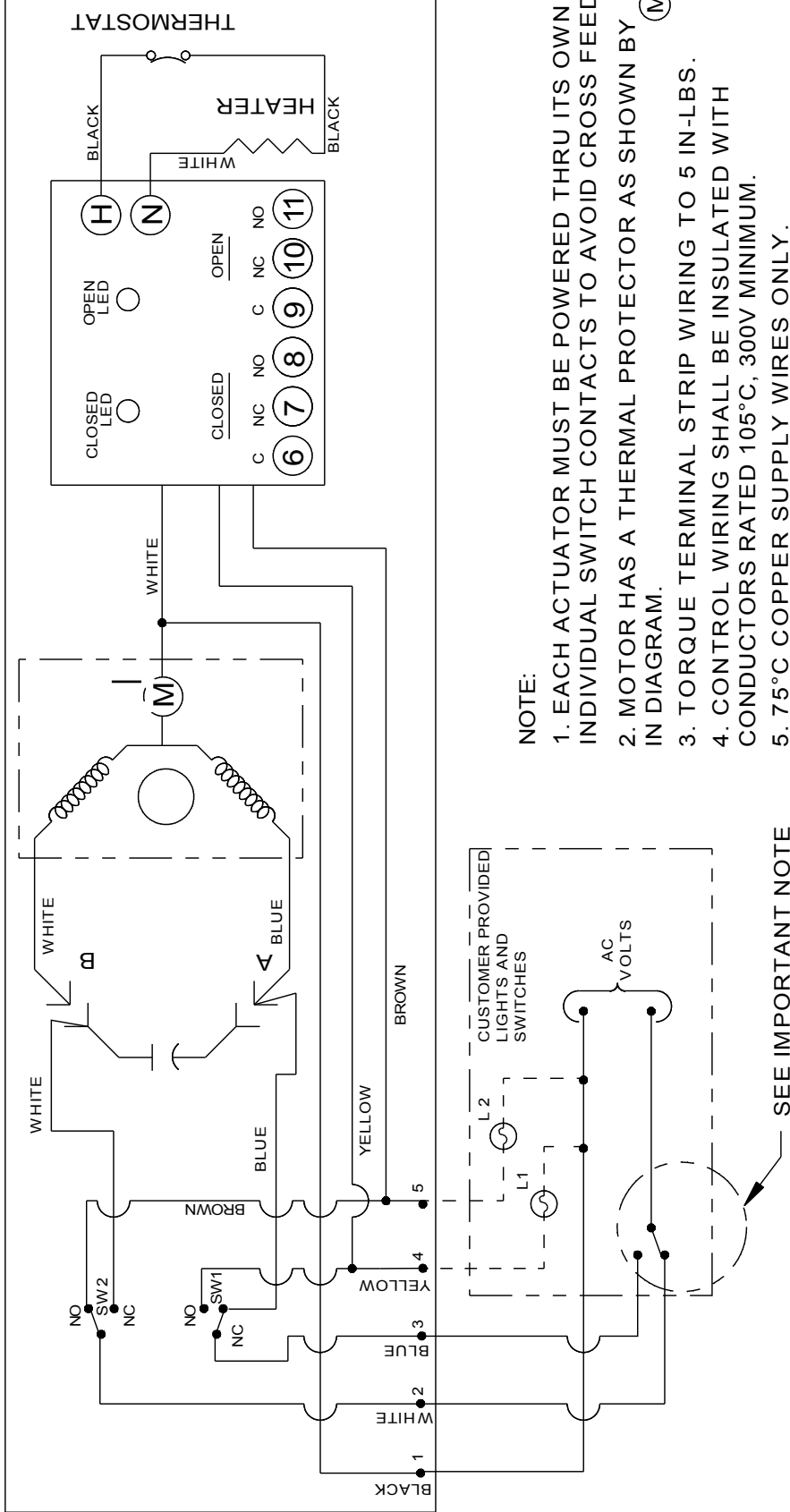
- 1. ACTUATOR SHOWN IN COUNTER CLOCKWISE EXTREME OF TRAVEL OR "OPEN" POSITION.
- 2. TORQUE TERMINAL STRIP WIRING TO 5 IN-LBS.
- 3. CONTROL WIRING SHALL BE INSULATED WITH CONDUCTORS RATED 105°C, 300V MINIMUM.
- 4. 75°C COPPER SUPPLY WIRES ONLY.

|                                                                                                                                                                                                                                                                                                                 |  |                                                                                                                                                               |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| UNLESS OTHERWISE SPECIFIED<br>DIMENSIONS ARE IN INCHES<br>MACHINING 2 PL DECIMALS ± .01<br>3 PL DECIMALS ± .005<br>TOLERANCES:<br>ANGULAR ± 1/2°<br>FRACTIONAL ± 1/64<br>FABRICATION 1/2" - 8" ± 1/4<br>TOLERANCES: 10" AND UP ± 1/2<br>ANGULAR ± 1.0°<br>WELD TYPE: N/A<br>MATERIAL: AS NOTED<br>FINISH: 125μ" |  | THIS DRAWING AND ALL INFORMATION HEREIN IS THE PROPERTY OF ASAHI/AMERICA. ANY COPYING, REPRODUCTION OR UNAUTHORIZED USE IS FORBIDDEN WITHOUT WRITTEN CONSENT. |                  |
|                                                                                                                                                                                                                                                                                                                 |  | NAME<br>J. Hughes                                                                                                                                             | DATE<br>06/22/17 |
| ASAHI/AMERICA<br>ISO 9001 CERTIFIED<br>655 ANDOVER STREET, LAWRENCE, MA                                                                                                                                                                                                                                         |  | SERIES 94 WITH RHM WIRING<br>DIAGRAM 12/24 VDC                                                                                                                |                  |
| JDE PART # M00EL9904                                                                                                                                                                                                                                                                                            |  | SIZE A DWG # M00EL9904                                                                                                                                        |                  |
| SCALE N/A                                                                                                                                                                                                                                                                                                       |  | SHEET 1 OF 1                                                                                                                                                  |                  |



WIRING DIAGRAM FOR 120 VAC AND 220 VAC ONLY

ACTUATOR SHOWN IN COUNTER-CLOCKWISE EXTREME OF TRAVEL, OR "OPEN" POSITION



NOTE:

1. EACH ACTUATOR MUST BE POWERED THRU ITS OWN INDIVIDUAL SWITCH CONTACTS TO AVOID CROSS FEED.
2. MOTOR HAS A THERMAL PROTECTOR AS SHOWN BY **(M)** IN DIAGRAM.
3. TORQUE TERMINAL STRIP WIRING TO 5 IN-LBS.
4. CONTROL WIRING SHALL BE INSULATED WITH CONDUCTORS RATED 105°C, 300V MINIMUM.
5. 75°C COPPER SUPPLY WIRES ONLY.

SEE IMPORTANT NOTE

| UNLESS OTHERWISE SPECIFIED |                      |
|----------------------------|----------------------|
| DIMENSIONS ARE IN INCHES   |                      |
| MACHINING                  | 2 PL DECIMALS ± .01  |
| TOLERANCES:                | 3 PL DECIMALS ± .005 |
| ANGULAR                    | ± 1/2°               |
| FRACTIONAL                 | ± 1/64               |
| 1/2" - 8"                  | ± 1/4                |
| 10" AND UP                 | ± 1/2                |
| ANGULAR                    | ± 1.0°               |
| WELD TYPE:                 | N/A                  |
| MATERIAL:                  | AS NOTED             |
| FINISH:                    | 125μ"                |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| NAME                                                                                                                                                          | DATE     |
| DR J. Hughes                                                                                                                                                  | 06/22/17 |
| REV                                                                                                                                                           |          |
| APPR K. Blystone                                                                                                                                              | 06/22/17 |
| PRODUCT: VALVE & ACT                                                                                                                                          |          |
| WO#/SO #                                                                                                                                                      |          |

|                                                                         |           |
|-------------------------------------------------------------------------|-----------|
| ASAHI/AMERICA<br>ISO 9001 CERTIFIED<br>655 ANDOVER STREET, LAWRENCE, MA |           |
| SERIES 94 WITH RHM WIRING<br>DIAGRAM 120/220 VAC                        |           |
| JDE PART #                                                              | M00EL9905 |
| SIZE                                                                    | A         |
| DWG #                                                                   | M00EL9905 |
| REVISION                                                                | A         |
| SCALE                                                                   | N/A       |
| SHEET                                                                   | 1 OF 1    |