KEYSTONE

EPI$_2$-MAN-652NA-SG

Setup Guide

4 N. A.	03/01/08	Add Storage Instructions	**TK**	
3 N.A.	11/08/07	Corrected text torque seat	**TK**	
1 N.A.	06/2/07	Corrected torque table	**DLP**	
0	05/22/2007	N. A. Versions	**TK**	
Rev.	Date	Description	Prepared	Approved

Note:
Tyco Valves & Controls has made every effort to collect and verify the documentation contained in this Instruction and Operating Manual.

STORAGE AND PRE-INSTALLATION

CHECKS TO BE CARRIED OUT WHEN THE ACTUATOR IS RECEIVED

Check that the information on the nameplate (Model, Serial Number, Nominal Torque, Nominal Voltage range, Protection Degree, Operating Speed range, Protection Class, etc.) is correct for the application.

Check that the actuator was not damaged during shipment: in particular, inspect the local position indicator area glass. If necessary, repair all damages to the exterior coating, etc.

STORAGE PROCEDURE

The base version actuator is weatherproof to NEMA 4, 4X, 6, and IP 66/68. The actuators must be properly installed or properly prepared for storage to maintain this rating.

The standard plastic plugs provided in the cable entries are not weatherproof, and must be replaced prior to installation or storage.

Storage for less than 1 year:

Indoor storage:

Ensure the actuators are kept in a dry place, stored on a wooden pallet (not directly on the floor surface) and protected from dust.
For very humid environments, a moisture absorbent desiccant packet should be used in the motor enclosure. (Desiccant is not included in the actuator package).

Outdoor storage:

1. Ensure the actuators are protected from the direct exposure to the elements (use a canvas tarp or similar);
2. Store the actuators on a wooden pallet, or some raised platform, so that they are not in direct contact with the ground, and protected from dust.
3. For humid environments, a moisture absorbent desiccant packet should be used in the motor enclosure. (Desiccant is not included in the actuator package)
4. Remove the plastic conduit plugs from the conduit entries and replace with weatherproof plugs appropriate for the environmental conditions.

Storage for more than 1 year:

Indoor storage: In addition to the instructions above:

1. Remove the plastic conduit plugs from the conduit entries and replace with weatherproof plugs appropriate for the environmental conditions.
2. Coupling parts (i.e. mounting flange, etc.) must be coated with a protective oil or grease (if possible, blank off the flange with a protective disk)
3. If the actuator is provided with an alkaline battery, remove it and store it in a dry and clean place.

Outdoor storage: In addition to the instructions above:

1. If the actuators are supplied with standard plastic plugs, replace them with weatherproof (metal) plugs;
2. Coupling parts (i.e. flange, etc.) must be coated with a protective oil or grease (if possible, blank off the flange with a protective disk)
3. Inspect the condition of the terminal enclosure and the terminal board to ensure there has been no ingress of foreign materials (dust or moisture)
4. If the actuator was provided with an alkaline battery, remove it and store it in a dry and clean place.

SETTING THE MECHANICAL STOPS

To set the actuator's mechanical stops, proceed as follows:
Loosen the locknuts on both stop screws. Rotate both stop screws counterclockwise 2 turns. See picture below.

Setting of the mechanical stop.

Open position: Move the actuator to the full open position. Rotate Stop Screw #1 clockwise until it bottoms out, then rotate it counterclockwise ½ turn. Tighten the locknut by rotating it clockwise.

Closed position: Move the actuator to the full closed position. Rotate Stop Screw #2 clockwise until it bottoms out, then rotate it counterclockwise ½ turn. Tighten the lock nut by rotating it clockwise.

Using the handwheel, check that the end points of the actuator travel are correct for both open and closed. If the actuator stops before reaching the fully open or closed position of the valve, proceed as follows:

- Rotate the stop screw (#1 or #2 depending on open or close) counterclockwise while holding the lock nut in position with a second wrench. Manually move the actuator until the valve reaches the correct position. Tighten the locknut.

If the actuator travels beyond the full range of valve travel (fully open or closed), proceed as follows:

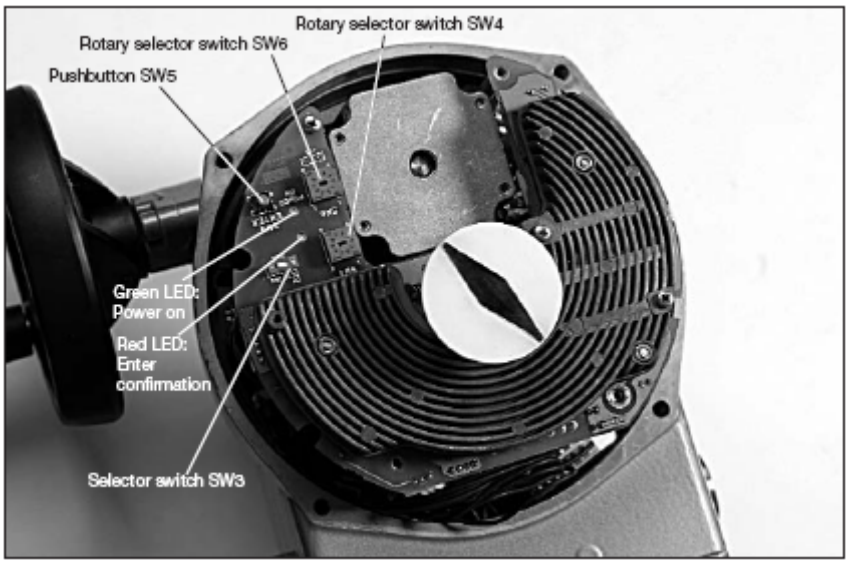
- Move the actuator to the correct closed or open position. Rotate the related stop screw (#1 or #2) clockwise until it bottoms out, then rotate it counterclockwise ½ turn while holding the lock nut in position with a second wrench. Tighten the locknut.

ACTUATOR SETUP

Warning: 	Settings must be performed with power to the actuator energized. Ensure settings are carried out by qualified personnel to ensure safety of all involved.

Modifications to the actuator's settings are done using the following components inside the actuators control enclosure (see following picture):

- Two rotary selector switches **SW4** and **SW6**
  - **SW4** selects the parameter
  - **SW6** selects the setting of the parameter
- Enter push-button **SW5** (confirmation push-button)
- Dip-switch **SW3:** enter setup mode, ON position for setup mode, 1 position for normal operation
- **Green LED**, Power On indication (illuminated when power supply is available).
- **Red LED** for setting confirmation (Illuminates to confirm the setting is accepted)



Internal control panel

EPI$_2$ Default Configuration table

The actuator is supplied with the following default settings:

Function	SW4	SW6	Default Value (SW6)
Limit switch closing	2	1: position 0: torque	*Switch position 1* Position seating
Limit switch opening	3	1: position 0: torque	*Switch position 1* Position seating
Stroke time closing	4	0 to 9	*Switch position 7* Models 006, 013, 025 and 051 – 18 sec. Model E091 – 30 sec. Model E171 – 66 sec.
Stroke time opening	5	0 to 9	*Switch position 7* Models 006, 013, 025 and 051 – 15 sec. Model E091 – 30 sec. Model E171 – 66 sec.
Torque closing	6	0 to 9	*Switch position 9* All Models - 100%
Torque opening	7	0 to 9	*Switch position 9* All Models - 100%
Reverse mode (CCW)	8	0 = off 1 = on	*Switch position 0* OFF

If the application requires different actuator settings from the default setting then proceed as described later in this chapter.

To verify the actual settings of the actuator, using the ***EPI$_2$ Default Configuration Table*** above for reference, proceed as follows:

1. Leave **SW 3** in position 1
2. Rotate **SW 4** to the position corresponding to the function to be checked – see chart above.
3. Depress **SW 5** (ENTER) and hold down
4. Slowly rotate **SW 6** to each position 0 through 9. The RED LED illuminates when you reach the position corresponding to the actual setting.

To restore the actuator's default settings, refer to the ***EPI$_2$ Default Configuration Table*** above –

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Starting with the first function – Close Limit – Rotate **SW4** to the position indicated in the table
3. Rotate **SW6** to the position indicated in the table
4. Confirm by pushing **ENTER** pushbutton **SW5**
5. When pushing **SW5**, the **red LED** will illuminate, confirming that the setting is accepted
6. Repeat this procedure for each following function in the table, then,
7. Exit setup mode (move switch **SW3** to position 1)

Important:	Setting modifications can be performed in any sequence. All parameters can be set independently.

ACTUATOR CALIBRATION – For Position Seated Valves

The actuator is set - by default - for Position Seating. If this default setting has been changed to allow for Torque Seating, it is first necessary to restore the default setting as follows:

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Rotate switch **SW4** to position 2
3. Rotate switch **SW6** to position 1
4. Confirm by pushing **ENTER** pushbutton **SW5**
5. When pushing **SW5**, the **red LED** will illuminate to confirm that the setting is accepted
6. Rotate switch **SW4** to position 3
7. Rotate switch **SW6** to position 1
8. Confirm by pushing **ENTER** pushbutton **SW5**
9. When pushing **SW5**, the **red LED** will illuminate to confirm that the setting is accepted
10. Exit setup mode (move switch **SW3** to position 1) or proceed to step 2 of the following two sections:

Closed position

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Move the actuator to the closed position using the handwheel
3. Rotate switch **SW4** to position 0
4. Rotate switch **SW6** to position 0
5. Confirm by pushing **ENTER** pushbutton **SW5**
6. When pushing **SW5**, the **red LED** will illuminate to confirm that the setting is accepted
7. Exit setup mode (move switch **SW3** to position 1) or proceed to step 2 in the following section:

Open position

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Move the actuator to the open position using the handwheel
3. Rotate switch **SW4** to position 1;
4. Rotate switch **SW6** to position 0;
5. Confirm by pushing **ENTER** pushbutton **SW5**
6. When pushing **SW5**, the **red LED** will illuminate to confirm that the setting is accepted
7. Exit setup mode (move switch **SW3** to position 1)

ACTUATOR CALIBRATION – For Torque Seated Valves

Close position

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Rotate switch **SW4** to position 2
3. Rotate switch **SW6** to position 0
4. Confirm by pushing **ENTER** pushbutton **SW5**
5. When pushing **SW5**, the **red LED** will illuminate to confirm that the setting is accepted
6. Using the OM3 accessory or the remote control inputs on the terminal strip, electrically operate the actuator in the close direction of travel. There are two options that can be utilized:

a. Press, then release the close button on the OM3, it is not necessary to hold the button
b. Provide "momentary" input command to terminal point 36 of the actuators terminal block utilizing one of the three remote control input options detailed on the wiring diagram for the base actuator. (It is not necessary to maintain the jumper after signal is sent).

The actuator will run to the close position and stop.

7. Exit setup mode - move switch **SW3** to position 1; or proceed to the next step:

Open position

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Rotate switch **SW4** to position 3
3. Rotate switch **SW6** to position 0
4. Confirm by pushing **ENTER** pushbutton **SW5**
5. When pushing **SW5**, the red LED will illuminate to confirm that the setting is accepted
6. Using the OM3 accessory or the remote control inputs on the terminal strip, electrically operate the actuator in the open direction of travel. There are two options that can be utilized:
    1. Press, then release the open button on the OM3, it is not necessary to hold the button
    2. Provide "momentary" input command to terminal point 35 of the actuators terminal block utilizing the one of the three remote control input options detailed on the wiring diagram for the base actuator. (It is not necessary to maintain the jumper after the signal is sent).

   The actuator will run to the open position and stop.
7. Exit setup mode - move switch **SW3** to position 1

Stroke time adjustment – closing direction of travel

To modify the default setting, proceed as follows:

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Rotate switch **SW4** to position 4
3. Rotate switch **SW6** to: positions 0-9. Choose the required stroke time from the **STROKE TIME SELECTION TABLE** below.
4. Confirm by pushing **ENTER** pushbutton **SW5**
5. When pushing **SW5**, the **red LED** will illuminate to confirm that the setting is accepted
6. Exit setup mode - move switch **SW3** to position 1

Stroke time adjustment – opening direction of travel

To modify the default setting, proceed as follows:

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Rotate switch **SW4** to position 5;
3. Rotate switch **SW6** to: positions 0-9. Choose the required stroke time from the **STROKE TIME SELECTION TABLE** below:
4. Confirm by pushing **ENTER** pushbutton **SW5**
5. When pushing **SW5**, the **red LED** will illuminate to confirm that the setting is accepted
6. Exit setup mode - move switch **SW3** to position 1

Stroke time selection table

Model	Nominal Torque (lbs-inches)	Operating time (secs/90°) at selected step[1]									
		9	8	7	6	5	4	3	2	1	0
E006	600	12	15	18	26	38	48	60	75	85	110
E013	1300	12	15	18	26	38	48	60	75	85	110
E025	2500	12	15	18	26	38	48	60	75	85	110
E051	5100	12	15	18	26	38	48	60	75	85	110
E091	9100	20	24	30	45	60	80	100	120	140	180
E171	17700	44	53	66	100	132	180	220	264	310	400

Note (1): times are +/- 10% tolerance for a 90° stroke.

Output torque adjustment – closing direction of travel

The settings are adjustable between 40% and 100% of the actuators rated torque output. Each adjustment step using **SW6** is equal to approximately 6.67% of actuators rated torque.

To modify the default setting, proceed as follows:

To adjust, proceed as follows:

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Rotate switch **SW4** to position 6
3. Rotate switch **SW6** to: Choose the required torque setting from the **TORQUE OUTPUT SELECTION TABLE** below:
4. Push **ENTER** pushbutton **SW5** to confirm
5. When pushing **SW5**, the **red LED** will blink once to confirm that the setting is accepted
6. Exit setup mode - move switch **SW3** to position 1; or proceed with the next step:

Output torque adjustment – opening direction of travel

The settings are adjustable between 40% and 100% of the actuators rated torque output. Each adjustment step using **SW6** is equal to approximately 6.67% of actuators rated torque.

To modify the default setting, proceed as follows:

The settings are adjustable between 40% and 100% of the actuators rated torque output. Each adjustment step using SW6 is equal to approximately 6.67% of actuators rated torque.

To adjust, proceed as follows:

1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Rotate switch **SW4** to position 7
3. Rotate switch **SW6** to: Choose the required torque setting from the **TORQUE OUTPUT SELECTION TABLE** below:
4. Push **ENTER** pushbutton **SW5** to confirm
5. When pushing **SW5**, the **red LED** will blink once to confirm that the setting is accepted
6. Exit setup mode - move switch **SW3** to position 1

Torque Output selection table

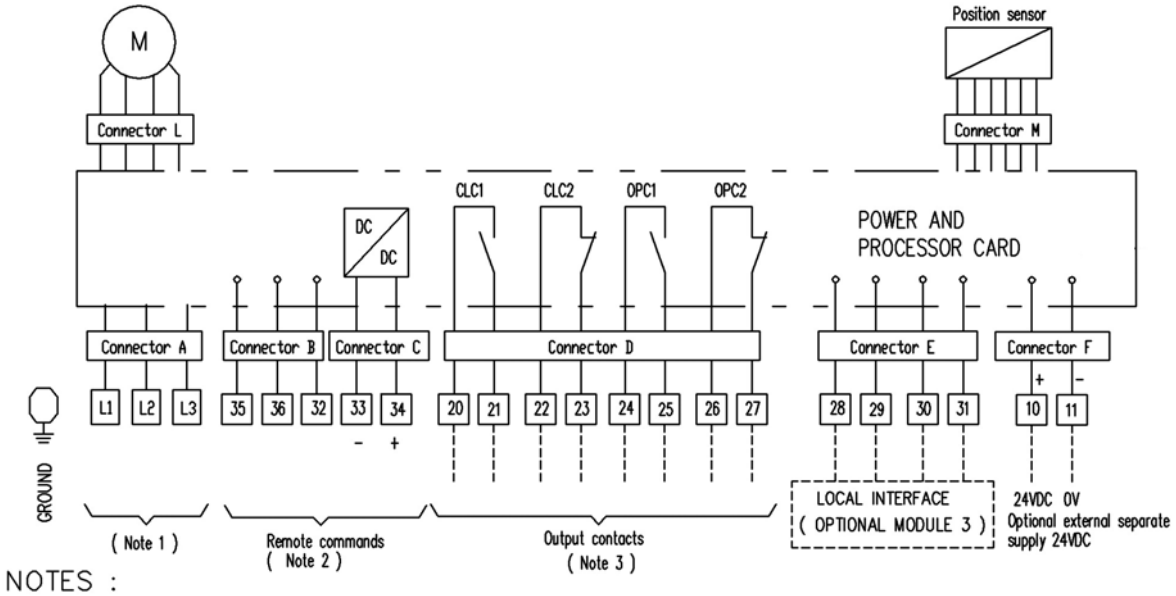
Model	Torque Output at selected setting(1)									
	9	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
E006	**600**	560	520	480	440	400	360	320	280	240
E013	**1300**	1214	1127	1040	954	867	780	693	607	520
E025	**2500**	2334	2167	2001	1834	1667	1500	1334	1167	1000
E051	**5100**	4761	4421	4081	3741	3401	3061	2720	2380	2040
E091	**9100**	8496	7889	7282	6675	6068	5461	4854	4247	3640
E171	**17700**	16520	15340	14160	12980	11800	10620	9440	8260	7080

Note (1): torque is +/- 10% tolerance of nominal.

Output rotation selection (CW or CCW)

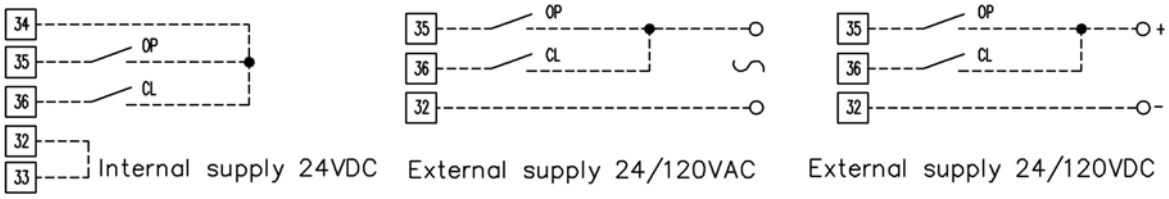
1. Enter setup mode: move switch **SW3** to the ON position (as marked on the switch).
2. Rotate switch **SW4** to position 8
3. Rotate switch **SW6** to - position 1 for counter-clockwise **(CCW)** operation **ON**;
   position 0 for counter-clockwise **(CCW)** operation **OFF**
4. Push the **ENTER** pushbutton **SW5** to confirm;
5. When pushing **SW5**, the **red LED** will blink once to confirm that the setting is accepted
6. Reverse mode (CCW) set is now completed
7. Exit set up mode - move switch **SW3** to position 1

BASE WIRING DIAGRAM



NOTES :

1) Connnection L1–L2 FOR VDC or VAC single phase motor supply from 24 to 240 Volt
   Connnection L1–L2–L3 for 3 phase motor supply from 208 to 575V (Check on the actuator label the correct voltage to be applied.)
2) Remote commands options



3) Contacts shown in intermediate position CLC1–CLC2 end of travel signalling in CLOSING
   Contacts shown in intermediate position OPC1–OPC2 end of travel signalling in OPENING

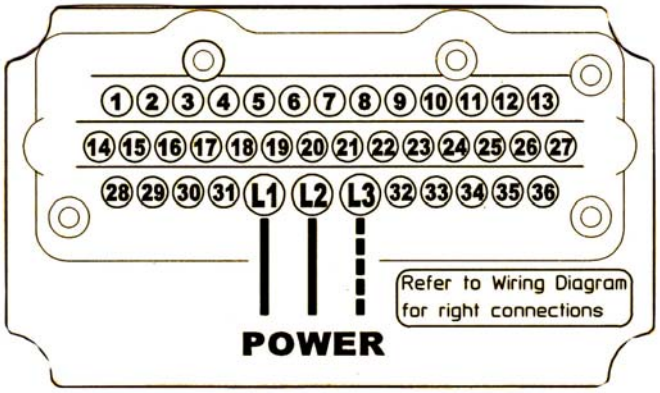
Output contact ratings:

5A @ up to 240 VAC
5A @ up to 30 VDC
0.5A @ 120 VDC

Remote control signals:

- type: Push-to-Run
- minimum pulse duration: ≥300ms

Terminal Enclosure wiring connection identification



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