Basic Installation Manual

UniTorq UTM Electric Actuator

Thank you for purchasing our UTM series actuator! Before startup or operation of the actuator, carefully review this manual to gain a thorough understanding of all installation, operation, and maintenance procedures.

The contents of this manual are subject to change due to continuous quality improvement processes.

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PRECAUTIONS

Please read this manual thoroughly before installing and operating your UTM Actuator. A full understanding of the material will assist in the most effective installation of the actuator.

- Inspect the nameplate to confirm that the actuator has been provided as specified.
- Before starting the installation process, completely **disconnect ALL in- coming power.**
- Avoid wiring the actuator during rain.
- Strictly wire the actuator per the supplied wiring diagram. Incorrect wiring may cause damage to the actuator and/or valve.
- Connect main power leads directly to the matching motor terminals. Connect external grounding lug located in the left cable entry boss in addition to the grounding connection inside the terminal compartment.
- If actuators are stored for long periods connect power to space heaters. During final installation, ensure that all cable entries are correctly sealed to prevent the ingress of water or moisture. (Failure to do so will void the warranty.)
- Tightly close switch cover and terminal compartment cover after wiring, adjustment, and calibration. (Failure to do so will void the warranty.) Also, check and clean all mating surfaces and V-packing rings prior to closing.
- Do not operate the actuator manually with any levers or cheater devices other than the supplied hand wheel. Using cheater devices may cause dam- age to the actuator and/or valve, and could cause personal injury. (The use of cheater devices will void the warranty.)
- Always start calibration and trial operation from the mid-travel position. Do not adjust torque settings without first consulting your UniTorq representative.
- In the event of high vibration (amplitude of 1.0G or above) consult UniTorq prior to installation.
- For performance enhancement, internal actuator specifications are subject to change without notice.

USAGE

Our UTM actuators can be used to control a wide variety of valves, dampers, and other appurtenances. The actuators can be used in direct-mount, multi-turn applications (e.g., gates, globes, penstocks), or may be side- mounted on gearboxes for either multi-turn or quarter-turn (e.g., butterfly, plug, ball, dampers) applications.

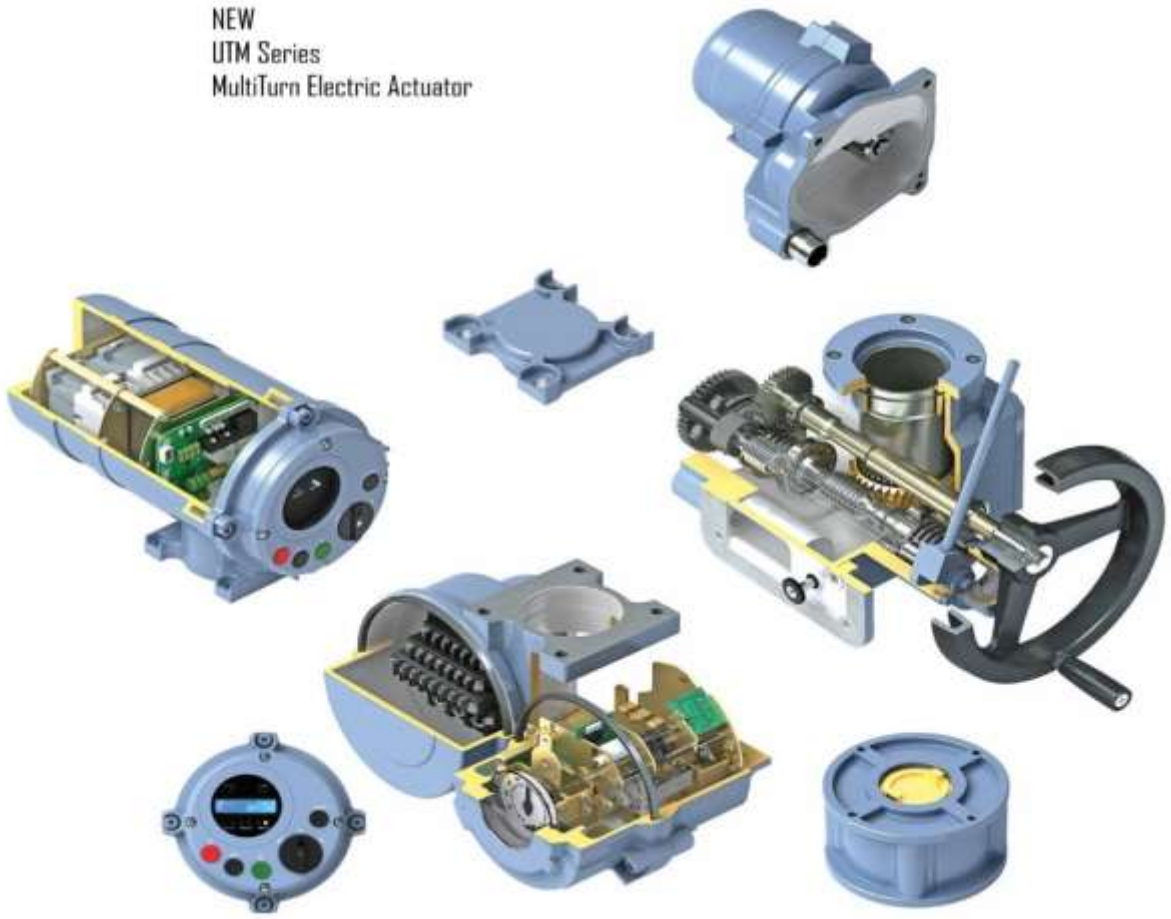
STORAGE

Until installation, indoor storage is strongly preferred. If outdoor storage is unavoidable, store actuators off the ground on pallets in dry sheltered areas.

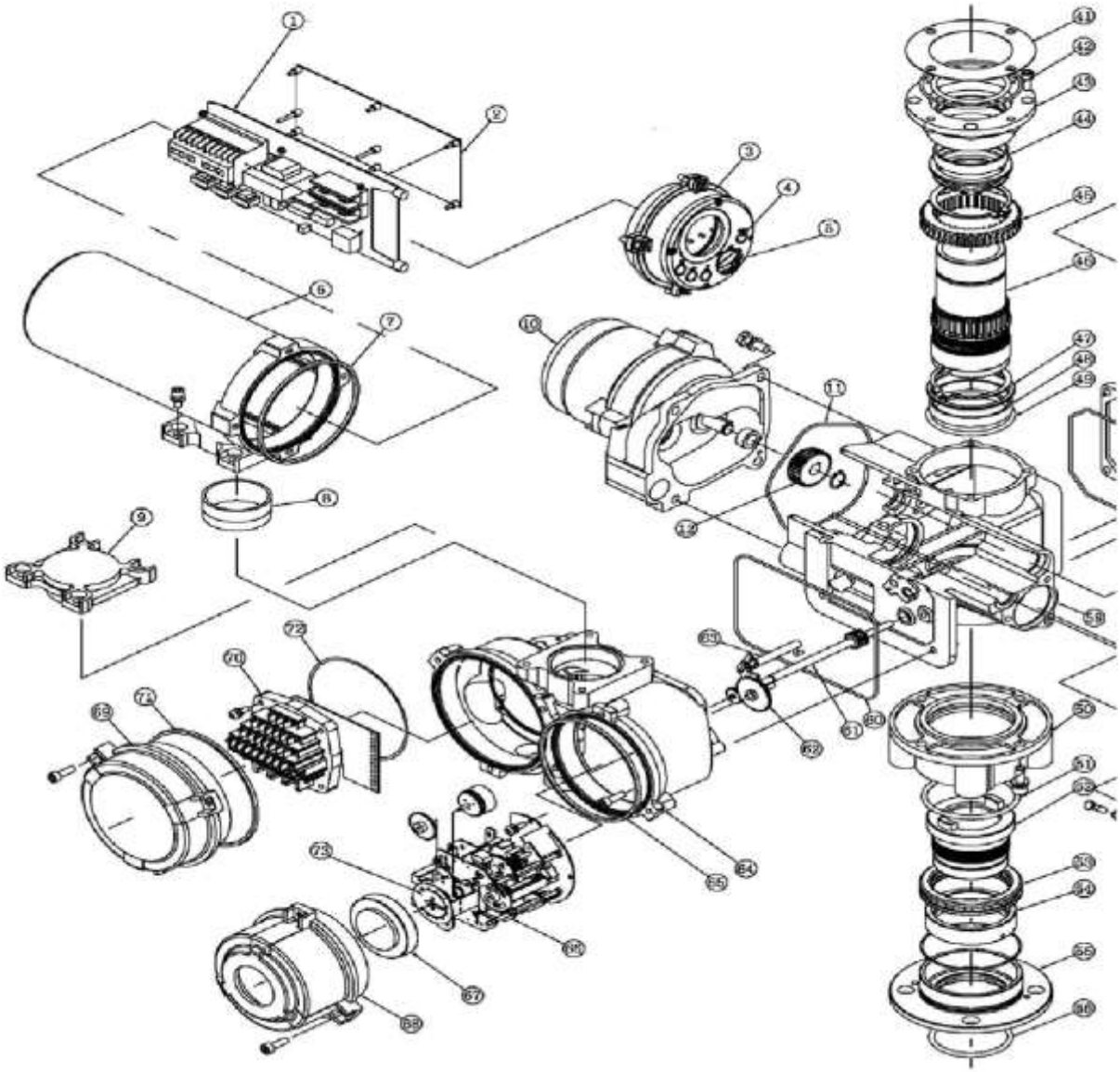
For long term storage, or in damp environments, it is required to connect power to the actuator space heaters to avoid condensation damage.

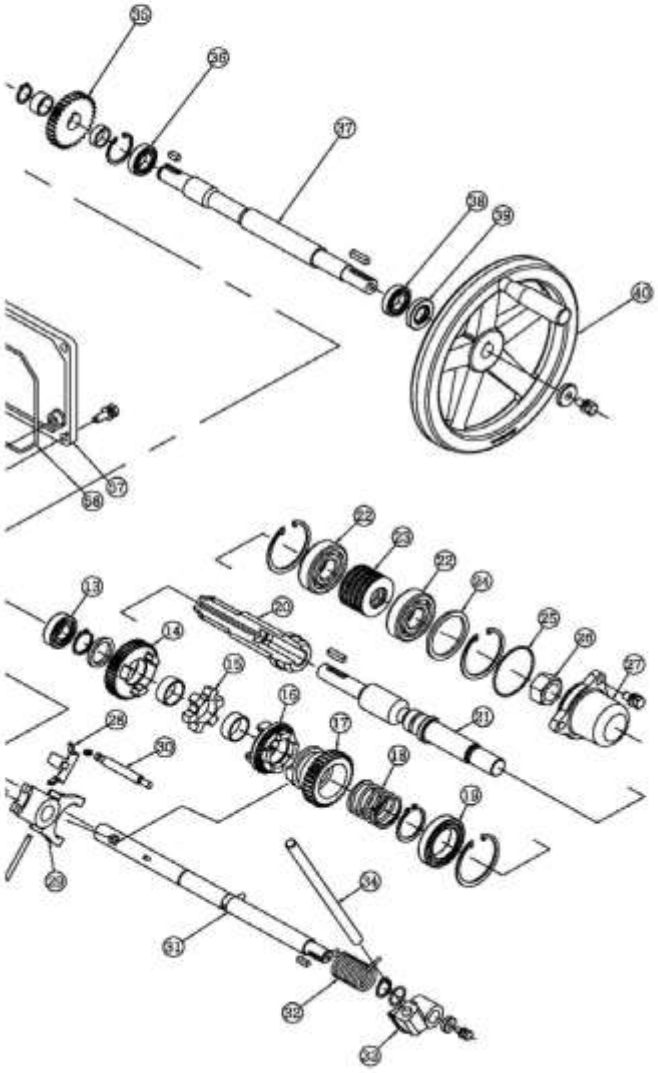
A desiccant pack is supplied inside the switch unit at shipment. Remove the desiccant pack prior to startup and operation.

CONFIGURATION of UTM SERIES



Configuration of UTM-Series





No.	Description
1	Integral Unit Ass'y
2	Printed Circuit Board
3	Integral Unit Cover
4	Push Button
5	Select Switch
6	Integral Unit Case
7	V-ring
8	Collar
9	Common Case Cover
10	Motor
11	O-ring
12	Gear "A"
13	Bearing
14	Gear "B"
15	Middle Rubber
16	Clutch
17	Manual Gear "B"
18	Spring
19	Bearing
20	"B" Gear Boss
21	Worm
22	Bearing
23	Torque Spring
24	Collar
25	O-ring
26	Power Lock
27	Cover "B"
28	Lock Lever
29	Shifter
30	Spring Holder
31	Change Shaft
32	Tortion Spring
33	Change Lever Boss
34	Change Lever
35	Manual Gear "A"
36	Bearing
37	Handle Shaft
38	Bearing
39	Oil-seal
40	Hand Wheel
41	Gasket
42	O-ring
43	Bracket
44	DU Bush
45	Worm Wheel
46	Sleeve
47	Collar
48	DU Bush
49	O-ring
50	Thrust Base
51	O-ring
52	Stem Bush
53	Thrust Ball Bearing
54	Lock Nut
55	Thrust B-Cover
56	O-ring
57	Cover "A"
58	O-ring
59	Gear Case
60	O-ring
61	Limit Shaft
62	Limit Gear
63	Torque Shaft
64	Common Case
65	V-ring
66	Switch Unit Ass'y
67	Indicator Cap
68	Switch Cover
69	Terminal Cover
70	Terminal
71	V-ring
72	O-ring
73	Position Indicator

INSTALLATION

UTM actuators have two types of drive bushings… either bored and keyed for non-rising stems or shafts; or threaded for rising stem applications. When disassembling and re-assembling thrust bases and/or drive bushings, follow all recommended procedures and keep all parts clean.

Disassembly and reassembly of thrust base (see detail – following page):

Caution: Foreign matter or objects may cause damage to bearings, o- rings, and other parts, and may impede the function of the actuator.

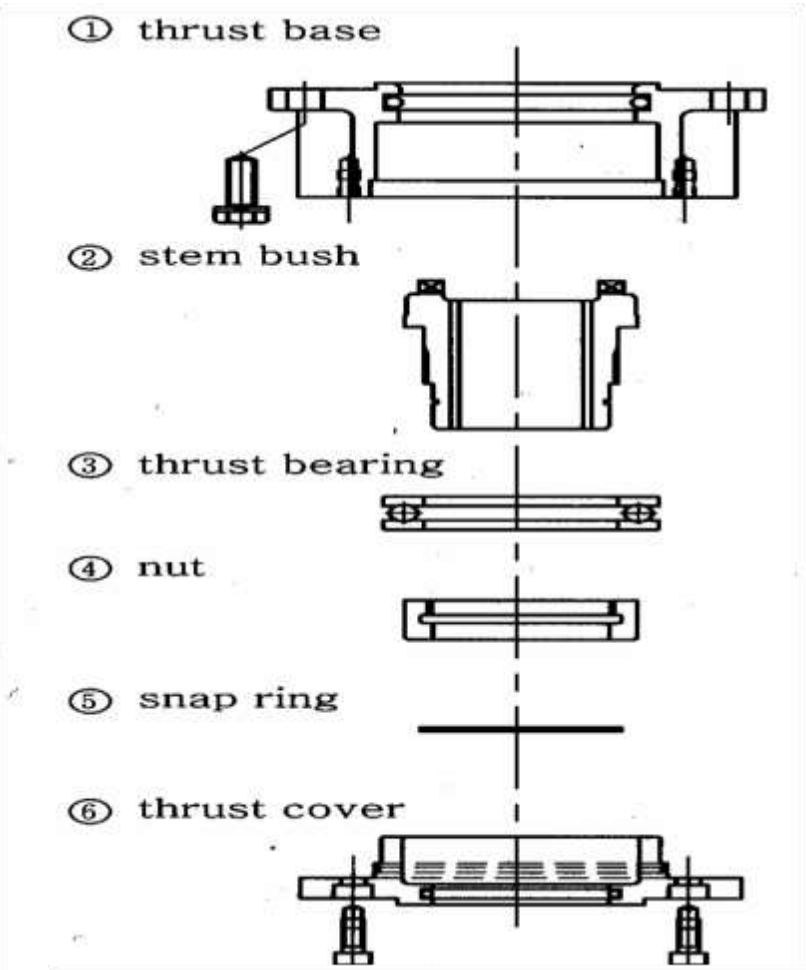
A. Disassembly—See Figure 5.1

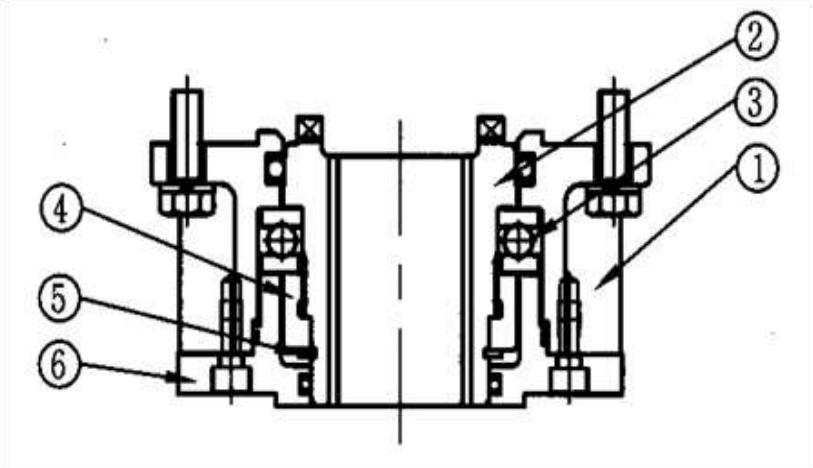
Note: the drive bushing may have been machined per order at the factory. If so, confirm machined parameters prior to installations. If the bushing is shipped blank from the factory:

- Remove the thrust base from the actuator via 4 bolts.
- Remove the thrust cover, snap ring, nut, and thrust bearing to access the drive bushing.
- Remove the drive bushing and machine per the application.
- Re-assembly of thrust base.—See Figure 5.2
- Grease the machined drive bushing, especially the inner wall and the o-ring contact surface.
- Grease the thrust bearing and insert into the drive bushing.
- Fasten the nut to the drive bushing, and re-insert the snap ring.
- Insert the assembled drive bushing/nut/snap ring/thrust bearing into the thrust base.
- Grease the thrust cover and re-fasten to the thrust base.

Thrust Unit

Fig. 5-1 Disassembled Thrust Unit





CAUTION: MAINTAIN THE PROCEDURE ABOVE & KEEP ALL THE PARTS CLEAN. FOREIGN OBJECTS INSIDE MAY CAUSE DAMAGE TO BEARING, O-RING & OTHER PARTS.

Mounting of actuator on valve or gearbox:
Prior to mounting, verify matching dimensions of all flanges and mating surfaces.

1. Apply grease to valve stem/shaft and drive bushing. (General purpose, heavy duty grease)
2. Mount the thrust base on the valve or gear flange and fasten the bolts be- tween the two. (Fig. 5-3)
3. Lift the actuator body by eye-bolt and mount it on the thrust unit; if necessary, align the groove of the drive sleeve with the lugs of the drive bushing by turning the handwheel. (Fig. 5-4)
4. Fasten the bolts between the actuator and thrust unit.

Fig. 5.3

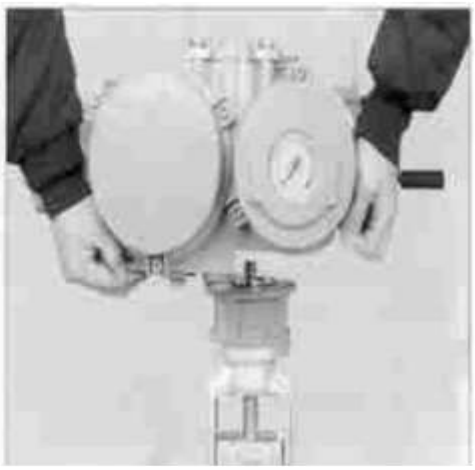


Fig. 5.4

OPERATION
Manual Operation

Manual operation is required for initial installation, calibration, and startup. Manual operation will be available in the event of power failure or electrical component failure.

Manual mode may be achieved by simply shifting the manual lever to its maximum position in the direction of the arrow marking. The manual power train will be engaged and retained by clutch, even though the lever returns to its original position.

Manual operation is now possible simply by turning the handwheel.

Normal operation is “Clockwise to Close.” However, verify actual direction to close from the direction mark on the handwheel, and by operating the valve from the mid-travel position.

Upon re-energization of the motor, the handwheel is automatically disengaged from drive gearing.

** The use of lever devices or “cheater bars” on the handwheel may damage the actuator or valve, and will void the actuator warranty.

Power Operation

Electrical connections

* Prior to wiring, re-verify nameplate supply voltage details versus specification requirements. Threaded holes for internal and external grounding are provided, which are located inside the terminal compartment and adjacent to conduit entries.

1. Remove the terminal and switch covers from the actuator.
2. Connect all wires to the terminal block per the applicable wiring diagram.
3. After wiring completion, ensure that all cable entries are properly sealed, and seal unused cable entries with threaded metal plugs.
4. Verify the direction of rotation. If the valve stem is not visible, remove the stem cover to observe the direction of rotation. (Note: unless otherwise re- quested, standard rotation is “Clockwise to close” or “Counter-Clockwise to open”.)
5. *With the valve/device in the mid-travel position (approximately 50%), press the “Open‟ pushbutton. If the stem rotates “Counter-clockwise” then proper rotation is confirmed, and wiring is completed.
6. If the “Open” button is pressed and the stem rotation is „Clockwise‟ then immediately stop operation and disconnect power!!! (Note: with incorrect rotation, limit and torque switches will be out of synch and will not function.) Exchange any 2 of the 3 motor leads and re-verify rotation. Again, when correct rotation is achieved, wiring is completed and final commissioning may resume.
7. After wiring completion, clean all mating faces, replace the covers, and fasten cover bolts tightly.
8. There are 2 switch operating modes… “Inching‟ and “Hold‟. “Inching” mode is considered standard and will be supplied unless ordered otherwise. (Note: actuator may be changed to “Hold‟ mode by installing a jumper between terminals 1 and 4.)

Electric operation

Before starting to commission the actuator, re-confirm that the actuator is in- stalled correctly on the valve and main power is on.

1. Place the selector switch in the “LOC” position.
2. Press the “Open” or “Close pushbutton and confirm the rotational direction.

Limit Switch Setting
Close Limit Setting (—S)

Manually close the valve completely. (If power is available and correct rotational direction is confirmed, you may power operate the valve *NEAR* to the full closed position, and then manually to the full closed position.

Draw the pointer of the mechanical position indicator out, and fix to the “S” position.

Using a flat screwdriver, press in and turn the “S‟ adjusting shaft in the direction of the arrow (ccw). As the screwdriver turns, the pointer rotates (cw) in 90° increments.

When the pointer approaches the set point (A) turn the screwdriver very slowly until the pointer reaches the set point and a “click” is heard. Stop turning and release the adjusting shaft immediately. Close limit seating has been completed. (Note: if you inadvertently overrun the set position, simply repeat the procedure.

To verify limit switch actuation, shift change lever to manual mode, rotate handwheel ½ to 1 turn in the "open" direction, and ensure that the pointer arrow moves 90° "ccw" from the set position. Then rotate the handwheel back in the "close" direction by ½ to 1 turn and verify that the pointer moves "cw" back to the set position.

Open Limit Setting
Fully open the valve. (Again, you may use the motor until you NEAR the full open position. Then complete the travel via handwheel.)

Using the flat screwdriver, press down and turn the "O" adjusting shaft in the direction of the arrow "cw". As the shaft is rotating "cw" the pointer will rotate "ccw" in 90° increments.

When the pointer approaches the final quadrant before the set point, turn the adjusting shaft very slowly until the pointer turns to the set point and you hear the "clicking" sound of the switch contacts. (As before, if you overrun the set point, simply repeat steps 2 and 3.)

To verify limit switch actuation, shift change lever to manual mode, rotate handwheel ½ to 1 turn in the "close" direction, and ensure that the pointer arrow moves 90° "cw" from the set position. Then rotate the handwheel back in the "open" direction by ½ to 1 turn and verify that the pointer moves "ccw" back to the set position.

Torque Switch Setting
Torque switches are pre-set at the factory based upon given application and specification requirements. If application and specification details remain un- changed, then torque switch adjustments should not be necessary.

If torque switch adjustments are required after shipment, contact your UniTorq representative for assistance. Torque switches may be adjusted within the unmarked areas of the torque dials, but may not be adjusted into the "Red-marked" zones. *** Setting within the Red zones may cause damage to the valve and/or actuator, and will void the warranty.

Adjust torque switches simply by loosening the set screws and rotating the dials within the unmarked (non-Red zone) areas of the dials. After adjustment re-tighten set screws.

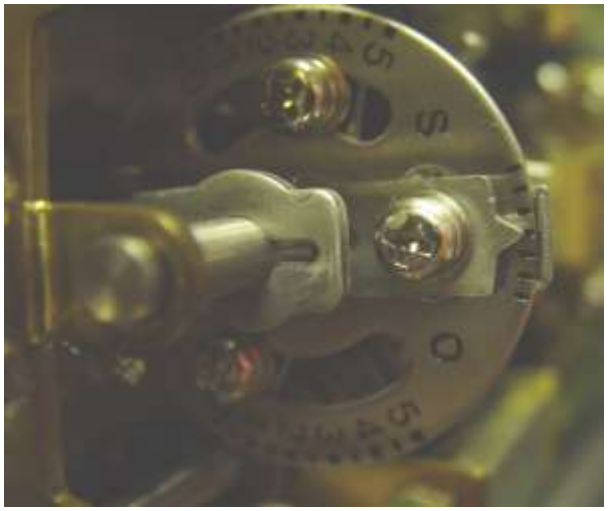
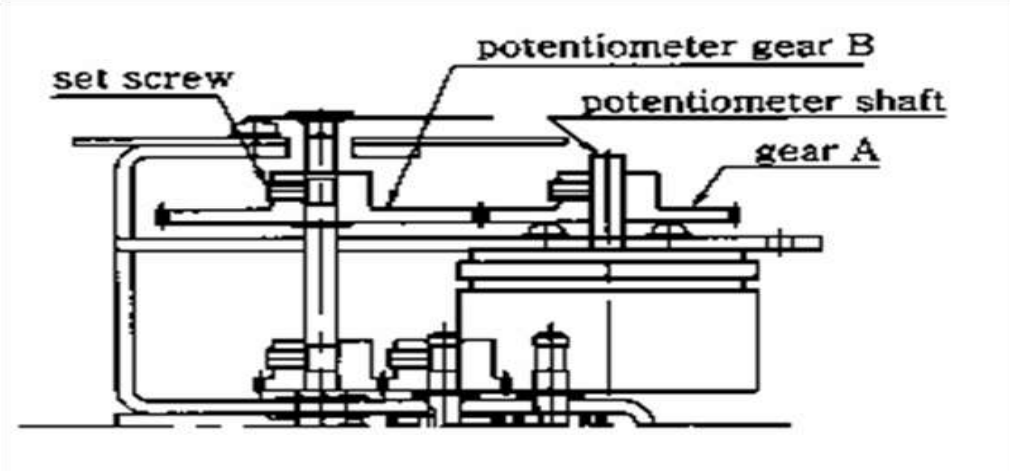


Fig. 6-5 Potentiometer (optional parts)

Setting the Potentiometer and R/I Converter (4-20 mA signal)

1. Fully close the valve.
2. Connect circuit tester to signal output terminal (+,-) per the supplied wiring diagram.
3. If the tester indicates a value between 3.4 and 4.6 mA, set “Z” (zero) volume of transmitter to 4.0 mA OR if the tester indicates the value is outside of 3.4 – 4.6 mA, turn potentiometer shaft with flat screwdriver until the tester indicates the value between 3.4 and 4.6 mA. (Note: tightly hold the potentiometer drive gear A in place while turning the potentiometer shaft.)
4. Set “Z” zero volume of transmitter to 4.0 mA.
5. Fully open the valve and set “S” span to 20.0 mA.
6. Repeat this procedure 2-3 times for more precise settings.



ELECTRICAL START-UP

Before turning on power to the actuator, re-confirm that the supply voltage details on the nameplate match the specification requirements. Incorrect supply voltage to the actuator terminals could severely or permanently damage the actuator's electrical and electronic components. Apply power to the actuator and carefully verify the calibration and settings. Operation mode is automatically changed from manual to motor by re-energizing the motor.

Local Control

1. Place the selector switch in "LOC" mode.
2. Push either the Open or Close pushbuttons on the operating panel. Repeat several times.
3. To stop the actuator in mid-travel, either push the Stop pushbutton, or turn the selector switch to OFF>
4. Observe the on/off lamps for correct performance during these steps.

Remote Control

1. Place the selector switch in Remote mode to permit command via the plant control center or other remote device.
2. Re-confirm the cable connections versus the supplied wiring diagram, and then send commands from plant or remote controls. Test Open, Close, and Stop commands.
3. Rotate to the selector switch to OFF to test automatic shut off of Remote commands.
4. Monitor On/Off lamps for proper performance during these procedures.

TROUBLE SHOOTING

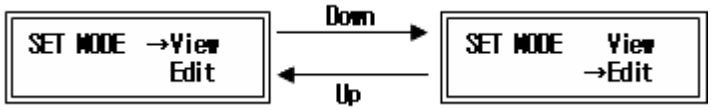
Motor does not respond.	a. No power	a. Check and repair incoming power
	b. Voltage differs from motor	b. Compare input voltage with nameplate; change voltage to match.
Motor stops during operation.	a. Torque switch is tripped	a. Find and remove cause of overload; press reset to release torque trip. Consult UniTorq prior to resetting torque.
	b. Valve stem is improperly re-lubricated	b. Clean stem and re-grease.
	c. Foreign matter in valve mounting area.	c. Remove foreign matter; clean area.
	d. Valve packing gland is too tight.	d. Loosen packing and apply grease.
Motor runs; valve does not move.	a. Stem nut thread is worn away.	a. Replace stem nut.
	b. Drive bushing is not installed in actuator.	b. Install properly machined drive bushing.
Limit switch fails to stop motor.	a. Limit switch is set incorrectly	a. Reset limit switch.
	b. Control wire is damaged.	b. Inspect and replace wiring.
	c. Micro switch does not work.	c. Replace micro switch and PCB set.
Torque switch fails to stop motor.	a. Micro switch does not work	a. Replace micro switch and PCB set.
	b. Control wire is damaged.	b. Inspect and replace wiring.
Actuator moves only in either Local or Remote.	a. Wiring is not correct.	a. Inspect/repair the connection of the flat cable between the terminal and MCU board.
Actuator displays power indication, but actuator does not move.	a. R or T phase is dropped; LED lamps off.	a. Connect dropped phase.
	b. S phase is dropped or wiring reversed; Red or Green lamp is flickering when open or close pushbutton is engaged.	b. Connect the dropped phase, or wire 3 phases correctly.

CUSTOMIZING THE ACTUATOR IN LCD TYPE

The actuator setting can be customized. That is, the default setting can be changed and the purchased options can be re-configured.

1) Original display for setting mode

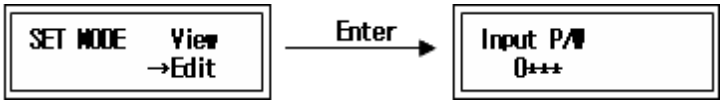
When shifting the selector switch to OFF and pressing the RESET button for 2 seconds, you can enter into setting mode.



* You can choose View or Edit Mode by pushing Button "A"or "C"
* In Edit Mode, you can change and save each of parameters.
* In View Mode, you can only look into each of parameters.

2) Entering into Edit Mode

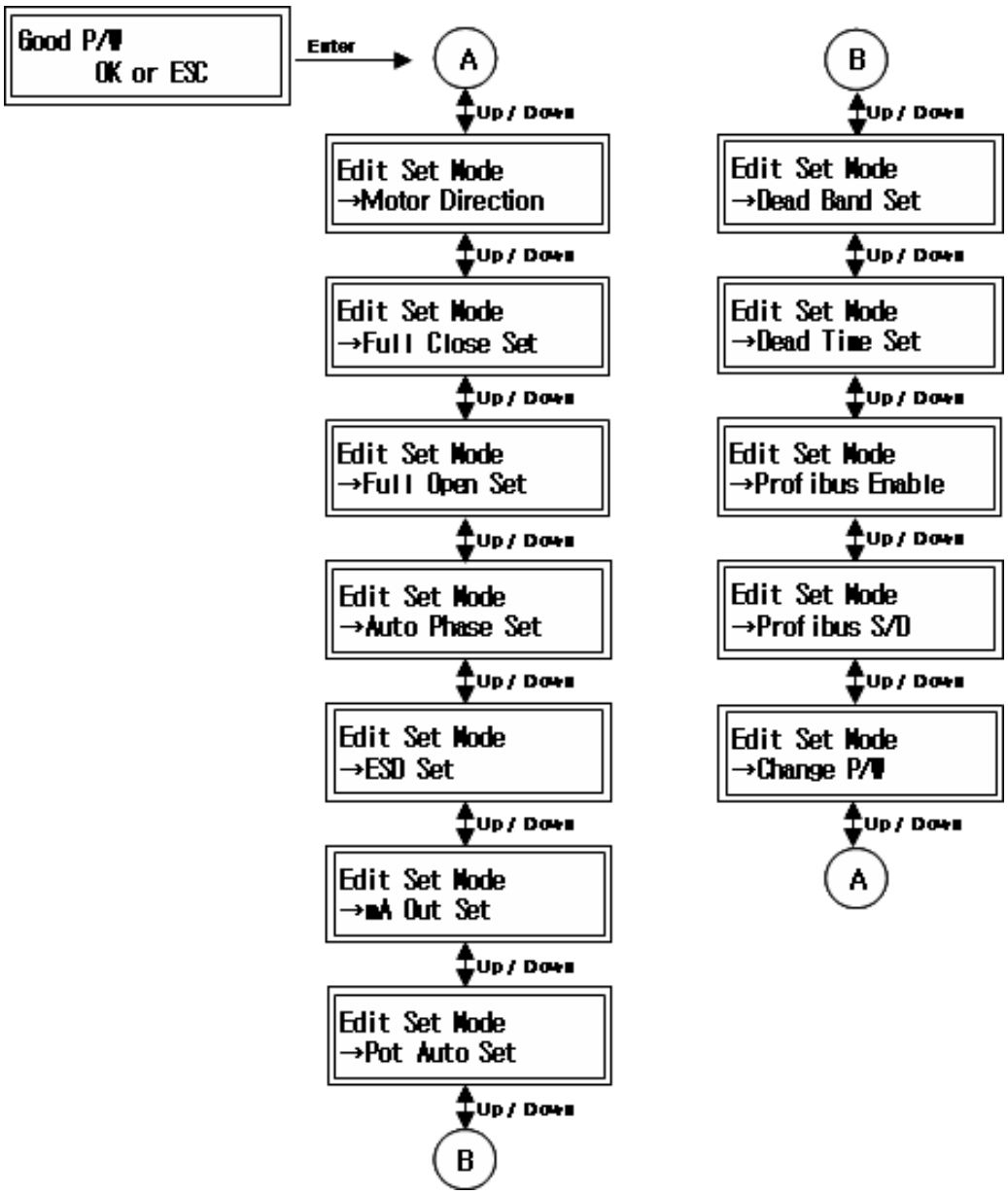
After choosing EDIT, press button "D" to move into Input P/W screen.



* Start to input password from first digit and press button “D” to move into next digit.
* Arabic number can be up and down by Button “A” and “C”.
* If Good P/W message is displayed in screen, you can enter to next mode by button "D", and if Wrong P/W , you have to retry password input after pressing button "D"
* The original set password would be “0000” when shipped

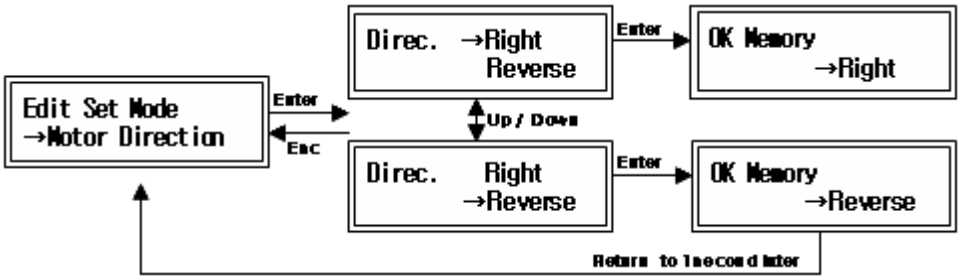
When password is correct When password is incorrect

※ "Enter" in the flow schematics means "RESET" button on the operating panel.



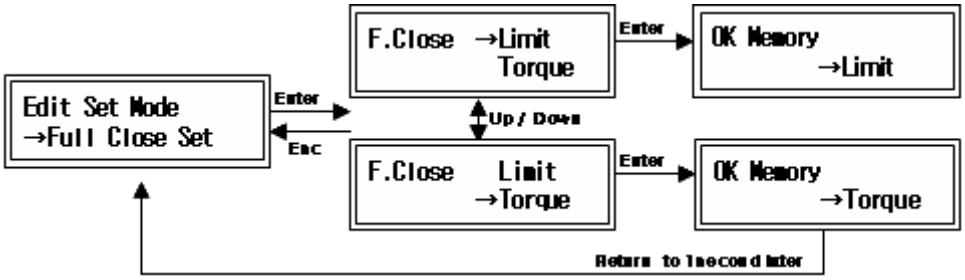
Schematics for customizing the parameters

3) Setting of motor rotating direction (Option)



* You can decide the rotating direction of motor in this mode.
* The original set direction would be "Right" when shipped.

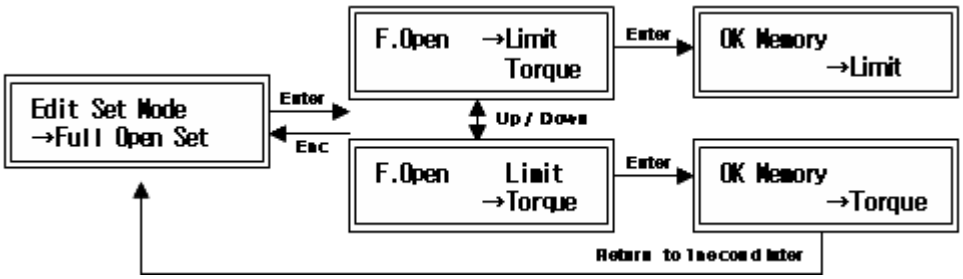
4) Decision of the seating method in full close position



You can choose seating method, limit or torque, in full close position.

* The original set condition would be "Limit" seating when shipped.

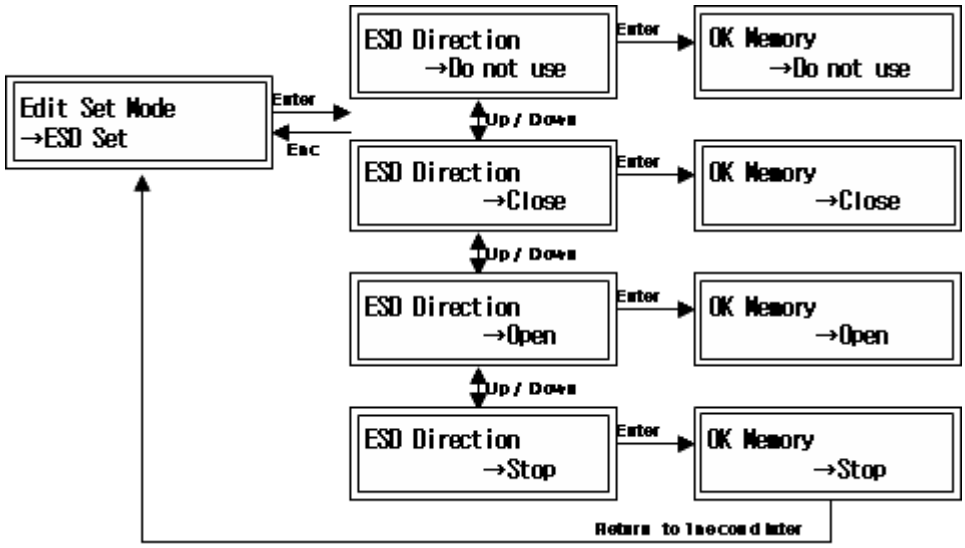
5) Decision of the seating method in full open position



You can choose seating method, limit or torque, in full open position.

* The original set condition would be "Limit" seating when shipped.

6) Decision of behavior for Emergency Shutdown signal

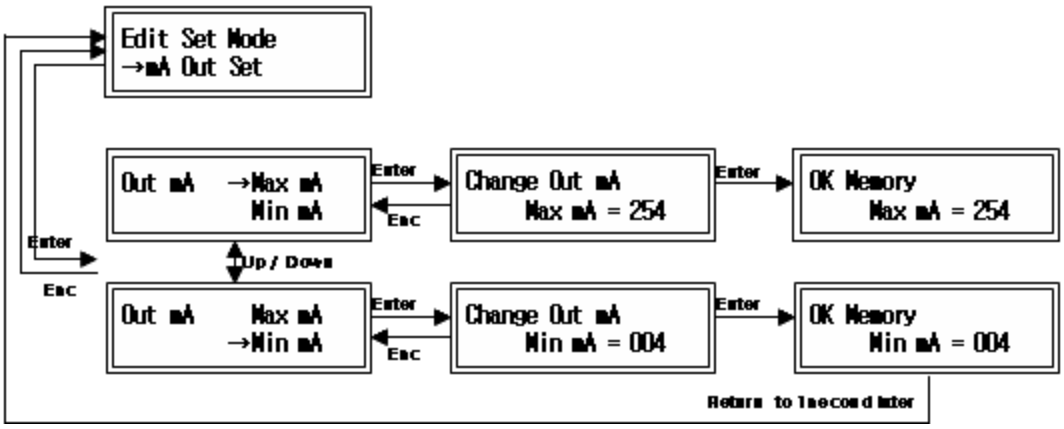


When ESD signal detected, the actuator moves on corresponding to pre-set condition. In "Close", the actuator move to full close position and "Open" to full open position. In "Stop", the actuator keeps as-is position.

Also in "Do not use", ESD signal will be neglected by the actuator.

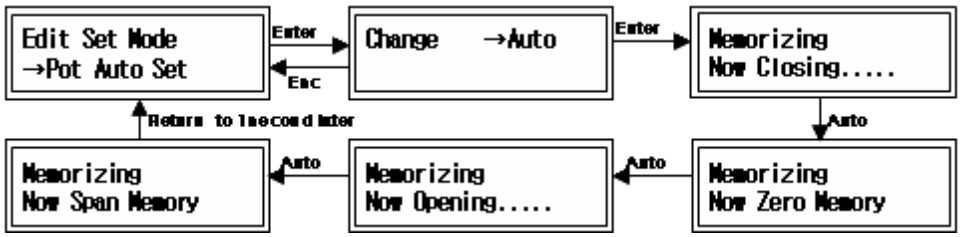
* The original set condition would be "Do not use" when shipped.

7) Fine adjustment of Output mA in zero and span



* In this mode, you can adjust precisely the Output mA.
  Max mA can be adjusted from 254 to zero on the base of 0~23mA and 5V. Min mA can be adjusted from 254 to zero on the base of 0~23mA and 5V. However, as the values are optimized by manufacturer, you are strongly advised not to adjust them, except for inevitability.

8) Automatic memory of potentiometer value



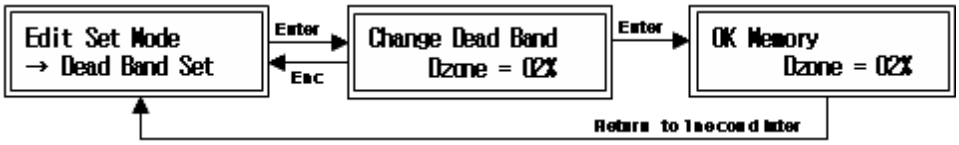
* You can automatically save the potentiometer value when the open and close position are detected in this mode.
  After switching the selector switch to "LOC", move the actuator to full close position.

  When the actuator arrive in full close position, it starts for full open position automatically.

  Thus, during moving on, do not try to do any operation.

  Through these procedures, the actuator will memorize the current potentiometer value in full close position as the start point of Zero. Also, in full open position as the start point of Span.

9) Adjustment of Dead Band value

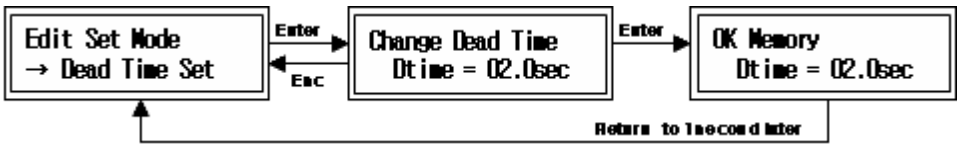


Dead Band is an area of a signal range or band where no action occurs.

* It can be used in proportional operation or automatic positioning in profibus.
* The value is adjustable between 0% and 20% in 1% increment.
* Recommended value is above 3%.

* The original set value is 3% when shipped.
* You are sure to check the value before use.

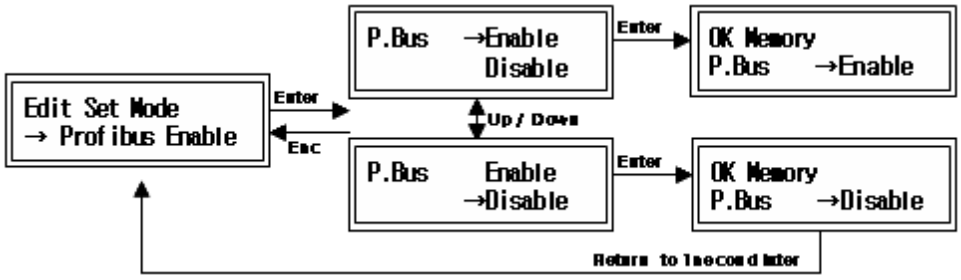
10) Adjustment of Dead Time value



Dead Time means that implementation of any signal is delayed when any input signal is above dead band.

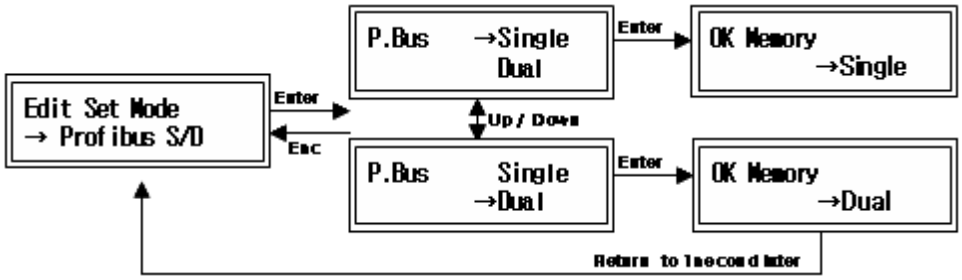
* It can be used in proportional operation or automatic positioning in profibus.
* The value is adjustable between 0.0 sec and 10.0 sec in 0.5 sec increment.
* Recommended value is above 1.0 sec.
* The original set value is 2.0 sec when shipped.
* You are sure to check the value before use.

11) Decision of Profibus accessibility



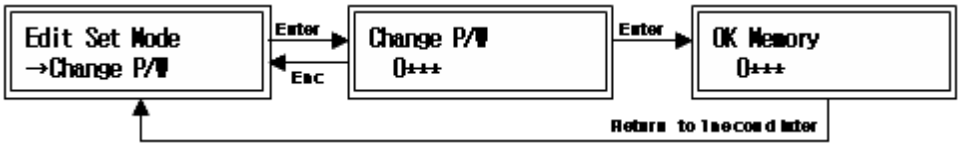
* In this mode, it can be decided whether you use Profibus remote control or not.
* The original set condition would be "Disable" when shipped.

12) Set-up of Profibus line redundancy



When using Profibus line redundancy, you can choose control type Single or Dual. For adapting Line Redundancy in your control, the specification of Master and configuration of system have to satisfy the requirement.

13) Password Set -up



* You can change and save a password in this mode.
* When you press button "D" in last digit, new password will be restored.

MAINTENANCE

After trial operation, check for paint damage and blemishes and touch up as necessary. Before fastening covers, check V-ring integrity and placement. Use suitable cable glands or conduit entry sealing materials to maintain IP68 enclosure and/or explosion proof certification.

Lubrication

UTM Series actuators are filled with Lithium soap grease as shown below. Renewal or re-lubrication of grease is not required for normal operation.

If actuators are disassembled for inspection or repair, refill with grease as shown below.

Lithium grease from different manufacturers may be mixed, if the chemical bases are identical. DO NOT MIX greases of different chemical bases.

Recommended Grease: Shell: Albania E.P. RO / Isu Chemical: Total Multis EPO / Ssangyong: Asaring EPO or equivalent.

Total amount per actuator: UTM-01 … 3.52 pounds UTM-04 … 5.5 pounds UTM-07 … 15.18 pounds UTM-1 … 16.5 pounds

For the threaded portion of rising valve stems… apply general purpose, heavy duty grease periodically to prevent drive bushing wear and improve performance.

Miscellaneous

For seldom used valves, periodic test operation is recommended to maintain satisfactory operating condition.

CONTACT INFORMATION

For all service or support issues, ***have the actuator serial number available*** and please contact:

UniTorq Actuators and Controls

2150 Boggs Road, Suite 410 • Duluth, GA 30096 • 770.446.7074 • fax 770.447.1825 email: unitorq.sales@unitorq.com • www.unitorq.com

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