Basic Installation Manual

UniTorq UTQ Electric Actuator

Contents

1. Notes

Please carefully read this manual before installing and operating UTQ Actuator. A full understanding of this manual will assist in installing the actuator in the most effective manner.

- Check the name plate and confirm the actuator specifications are correct and meet necessary requirements.
- Before wiring, disconnect all incoming power
- Wiring should be performed as indicated in the wiring diagram. Incorrect wiring may cause damage to actuator and/or valve.
- Correctly connect main power cables to the motor terminals in matching phase.
- Connect a ground wire to the ground connection inside the terminal compartment.
- Connect power to space heaters if actuators are to be stored in a damp place for long period prior to installation.
- During final installation, ensure that all cable entries are correctly sealed to prevent water or moisture from infiltrating.
- Tightly close switch cover and terminal cover after wiring, adjusting and setting. Loose fastening of the cover bolts may cause rain water infiltration. Check and clean the mating faces and V-packings before closing the covers.
- Do not manually operate actuator with devices other than installed handwheel.
- Using additive force devices (bars, wrenches or the like) on the handwheel or change lever may cause personal injury and/or damage to the actuator or valve.
- Perform setting and trial operation after bringing the actuator manually to the intermediate position.
- Do not have an unqualified person adjust the pre-set value or parameter without any consultation or permission.
- If the amplitude of vibration is over 0.5G at the installation site, contact us for consulting appropriate solutions.

For performance improvement, the specifications of the actuator are subject to change without any notice in advance.

2. USAGE

Our UTQ is a quarter turn electric actuator that controls 90 degree valves such as ball, butterfly and plug, and dampers. UTQ is the result of our accumulated technology over 20 years of experience in valve actuation, offering customers reliable and economical product quality.

3. STORAGE

Storing actuators indoors is preferable.

If outdoor storage is unavoidable for long time, store actuators on a raised platform under proper shelter or cover and connect wiring to space heaters to avoid condensation.

A dry agent pack is put inside switch unit and take it out before trial operation.

4. CONFIGURATION of UTQ SERIES (1/2)

Construction

❶ Motor
the squirrel cage induction motor with thermostat embedded.

❷ Position Indicator
continuous type 0~ 100 %.
option : LCD display available for the model with which integral control unit is fitted.

❸ Limit switch
easy setting, adjustable by □screw driver.

❹ Torque switch
automatically stops the motor when the torque bigger than the set value is applied to the valve shaft.

❺ Potentiometer
slip mechanism is provided for easy setting of zero point adjustment by turning the potentiometer shaft with□ screw driver.

❻ Integral control unit
- non-intrusive push buttons are integrated with the actuator.
- the inner circuit is isolated from the remote command signals by the opto-isolator to withstand the surge.
- Once the torque switch triggers, the actuator responds to no other command signals until the reset button is pushed to protect motor and valve.

❼ Manual handle
side mounted for easy handling.

❽ Change lever
automatic declutchable type.

❾ Terminal block
9-1 basic type : located inside the actuator body.
9-2 integral control unit type : located at the integral control unit which is double sealed with V-ring and gasket to prevent the ingress of foreign materials when the terminal cover is removed for site hook-up.
9-3 option for basic type : separate double sealed terminal block is available.

❿ Space heater : thermistor type(PTC - 5).

4. CONFIGURATION of UTQ SERIES (2/2)

5. INSTALLATION

5.1 Orientation of installation of actuator.

1) Position the switch cover facing the top, if possible, for easier access during maintenance.

2) It is recommended to install the actuator with cable entries facing the ground for and the handwheel facing the front for easy manual operation.

3) Reserve the overhaul space for opening switch cover.

MODEL	010	020	040	060	080	120	200	300
Overhaul Space								

5.2 Installations

1) Check the dimension of the actuator base and drive bushing with the dimension of the valve or damper bracket.

2) Fit actuator to valve (or damper) when both are in the closed position.

3) After applying grease to the damper stem and drive bushing, assemble valve or damper with spring washers and bolts.

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

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6. OPERATION

6.1 Electrical Connections and Conduit

Before wiring, check one more time that the supply voltage details on the nameplate are correct for this installation.

1) Check the electrical specifications (i.e. power, wiring, etc.) to be certain they are correct.

2) Perform the wiring as per the given wiring diagram, such as power, control power, internal wiring and ground.

3) Make sure to supply electric power to heater for keeping inside of actuator clean and dry.

4) Make sure that one relay operates one actuator only. A relay cannot operate two or more actuators simultaneously.

5) Cable entries are machined with two PF 1" taps and sealed with Plug at delivery. Please allow the plug to remain if unused, so the sealing will remain intact.

6) After the completion of wiring, clean the mating faces, put on the covers and fasten the cover bolts tightly.

7) When the actuator is used as explosion proof, make sure to use the certified connection component which is the same grade as the actuator.

6.2 Check Direction of Rotation

In case of a 3 phase actuator, the operator should check the rotating direction of actuator before electrical operation. If the operating direction is wrong, limit switches won't function and the result will be damage from jamming or the motor overheating.

1) Check the direction of rotation by operating the actuator in mid position. If the rotation is incorrect reverse any 2 of the three phase power leads. Then recheck the rotation direction again to confirm.

6.3 Driving the Actuator

Before starting to commission the actuator, check that the actuator is installed correctly on the valve and main power is on.

1) Place the selector switch in "LOC" position.

2) Press the OPEN or CLOSE button in complying with desired position.

Confirm whether the direction is correct or not.
Function of buttons and lamps in LED type

Fig. 1 Operating panel in LED type

Marking	Status	Explanation
A	Flickering red lamp	During Opening
	Red lamp on	Fully opened
B	Yellow lamp on	Error detecting (TORQUE, TH)
C	Flickering green lamp	During Closing
	Green lamp on	Fully closed
D	Push button for OPEN	Opening command in LOCAL mode
E	Push button for STOP	Stop command in LOCAL mode
F	Push button for CLOSE	Closing command in LOCAL mode
G	REMOTE	Selection of REMOTE operation
	OFF	Neutral, ACTUATOR's STOP
	LOCAL	Selection of LOCAL operation
H	RESET	Release from TORQUE FAULT

Function of buttons and lamps in LCD type

Fig. 2 Operating panel in LCD type

-Function of selector swtch (Common in LED and LCD type)

MODE	Function
REMOTE	Available to remote control but unable to enter into setting mode
STOP	Able to enter into setting mode
LOCAL	Available to local control but unable to enter into setting mode

-In LCD screen

	During operating mode	During setting mode
First Line	Displaying the current mode	Displaying current setting mode
Second Line	Displaying current status / valve position	Change of setting status

-In status of lamps

	Flickering lamp	Illuminated lamp
LED①(Red)	Opening	Full open
LED②(Green)	Closing	Full close
LED③ LED④(Yellow) LED⑤		Open torque Motor protection tripped Close torque

Function of buttons

	REMOTE MODE	STOP MODE	LOCAL MODE
Button "A"(Green)	-	Up scroll / parameter changing	Open command
Button "B"(Red)	-	Escape	Stop
Button "C"(Black)	-	Down scroll / parameter changing	Close
Button "D"(Blue)	-	Reset / Enter	-

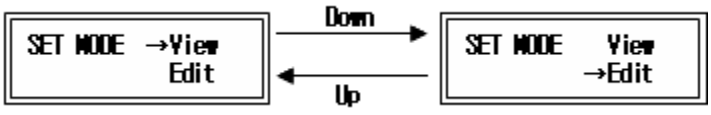
6.4 Viewing the existing setting in LCD type

All the existing setup data can be viewed on the LCD screen by following a simple step-by-step dialogue.

All other actuator parameters are factory-set either in accordance with UniTorq's standard set of default values or the requirements specified with the purchase order. Reconfirm these preconfigured setting before placing the actuator into service because the requirements of the application may have changed after the manufacture of the actuator.

1) Place the selector switch in "OFF" position and press the "RESET" button for over 2 seconds to enter setting mode.

2) Place the arrow (⟶) in front of VIEW character in pushing "A" green button and press "RESET" blue button.



Then, you can view the setting parameter by pushing "A" or "C" button.

※ Please refer to Fig. 2 in front page about button identification.

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

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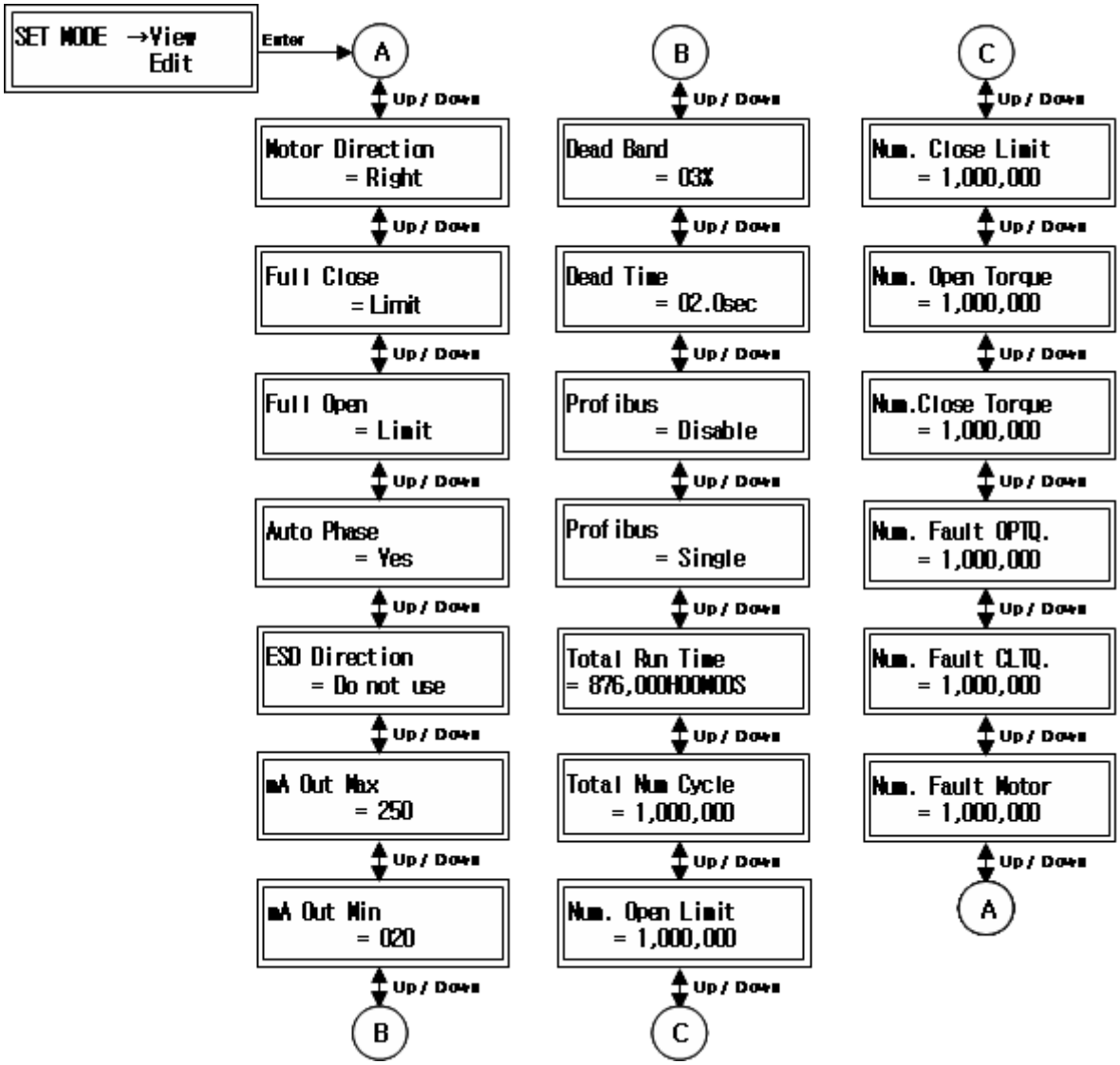
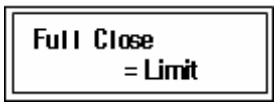


Fig. 7 Schematics for viewing configuration

3) Check of motor rotating direction (Option)

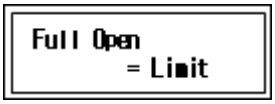
You can check the rotating direction of motor in this mode, which is right or left.

4) Check of stop condition in full close position



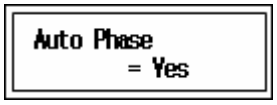
In this mode, you can check the method for stopping in the full close position, which is limit or torque.

5) Check of stop condition in full open position



In this mode, you can check the method for stopping in the full close position, which is limit or torque.

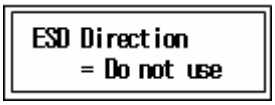
6) Check of the wiring error for power supply



"Auto Phase = Yes" means that the auto phase discriminator is effective,

and "Auto Phase = No" means that auto phase discriminator is not effective.

7) Check of behavior for ESD signal

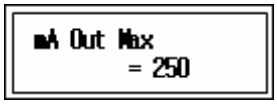


You can check the current setting condition for Emergency Shut Down signal. In "Close", the actuator moves to full close position for ESD signal.

In "Open", the actuator moves to full open position for ESD signal.
In "Stop", the actuator keeps as-is position for ESD signal.

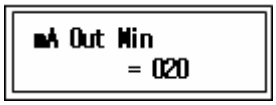
In "Do not use", ESD signal will be neglected by actuator.

8) Check of maximum output mA value



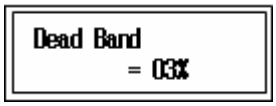
You can check the maximum output mA value which is set.

9) Check of Minimum output mA value



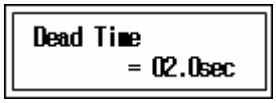
You can check the minimum output mA value which is set.

10) Check of Dead Band value



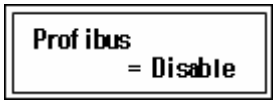
You can check the dead band value which is set.

11) Check of Dead Time value



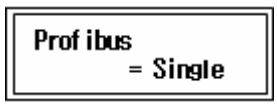
You can check the dead time value which is set.

12) Check of Profibus availability



You can check whether profibus communication can be used or not.

13) Check of the type of line redundancy in profibus communication



Check the type of line redundancy, which is single or dual type.

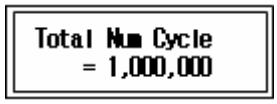
14) Check of the total running time of Motor

You can check the total time which motor ran.

###H##M##S means Hours, Minutes and Seconds.

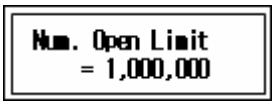
Total memory capacity is about 876,000 hours, equal to 100 years, in case the memorized time unit is seconds.

15) Check of the total cycle



You can check the total cycle which was operated so far.
Total memory capacity is 100 million cycle.

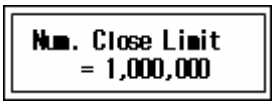
16) Check of the total touching number of limit in open position.



You can check the total number which the limit switch in full open position was touched so far.

The data will be restored only if stop condition is "Limit seating" in full open position. Total memory capacity is 100 million times.

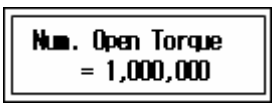
17) Check of the total touching number of limit in close position.



You can check the total number which the limit switch in full close position was touched so far.

The data will be restored only if stop condition is Limit seating in full close position. Total memory capacity is 100 million times.

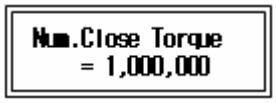
18) Check of the total touching number of torque in open position.



You can check the total number which the torque switch in full open position was touched so far.

The data will be restored only if stop condition is "Torque seating" in full open position. Total memory capacity is 100 million times.

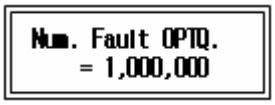
19) Check of the total touching number of torque in close position.



You can check the total number which the torque switch in full close position was touched so far.

The data will be restored only if stop condition is "Torque seating" in full close position. Total memory capacity is 100 million times.

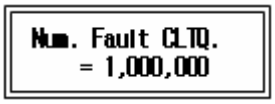
20) Check of the total number of torque fault in open position.



You can check the total number which open torque fault occurred so far.

The data will be restored only if stop condition is "Limit seating" in full open position. Total memory capacity is 100 million times.

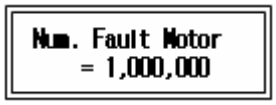
21) Check of the total number of torque fault in close position.



You can check the total number which close torque fault occurred so far.

The data will be restored only if stop condition is "Limit seating" in full close position. Total memory capacity is 100 million times.

22) Check of Total Number Of Motor Protection Faults.



You can check the total number which motor protection fault occurred so far. Motor protection fault means that thermal, high temperature stopped motor. Total memory capacity is 100 million times.

* Default Configuration Set

> Full Open stopped by "Position limit": Open limit seating

> Full Close stopped by "Position limit": Close limit seating

> Switch activated by "Inching mode"-non maintained control

> Clockwise to close (CW)

> Phase to "Auto Phase=Yes": Auto phase discriminator is effective

> ESD is "Do not use". That is, ESD signal is neglected.

> Password is 0000 (4zero)

6.5 Setting of the limit switch

1) Upper two limit switches (RLS) are used for close and lower two limit switches(LLS) are used for open.
2) RLS1 and LLS1 are used for limiting position and RLS2 and LLS2 are used for control lamp in advance.
3) If push the limit switch, it sounds 'click' twice.

>> Setting procedure of close position

Turn the lever for manual operation and turn hand wheel to move actuator to full

1) Close position. (Refer to STOPPER BOLT SETTING)
2) Turn the close cam until the micro switch is on, by pushing the slot of the cam by using driver (-).
3) Turn the indicator dial plate of 0% or close position and fix the bold.
4) Confirm the setting by electrical operation of the actuator. (0→100%)

>> Setting procedure of open position

Carry out same manner of setting procedure of close position

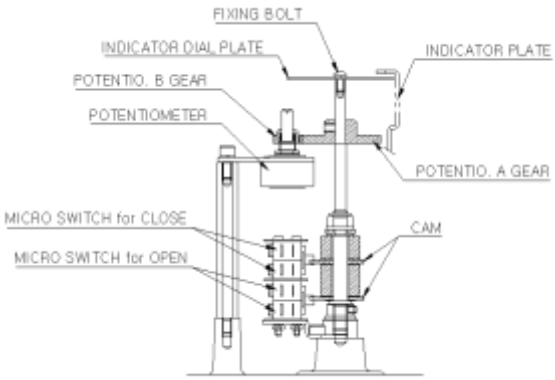


Fig. 3 Schematic of switch cluster

6.6 Setting the potentiometer and transmitter (R/I converter)

※ Optional parts

1) Fully close valve.

2) Connect circuit tester (DC, mA) to, referring wiring diagram attached inside, signal output terminal (+, –) and ;

> in case tester reads the value between 3.4 and 4.6mA, set zero point of transmitter or, > in case tester reads the value outside 3.4 – 4.6mA, turn potentiometer shaft

With ⊖ screwdriver until tester reads value between 3.4 - 4.6mA.

* When turing potentiometer shaft with ⊖ screwdriver, tightly grip gear A with another hand so that it should not rotate.

3) Set zero point of transmitter, fully open valve and set span.

Repeat this procedure 2 -3 times.

6.7 Stopper bolt setting

1) For setting position limit switches, loose the nut which are engaged with stopper bolts and turn stopper bolt to pull out within the ranges of following.

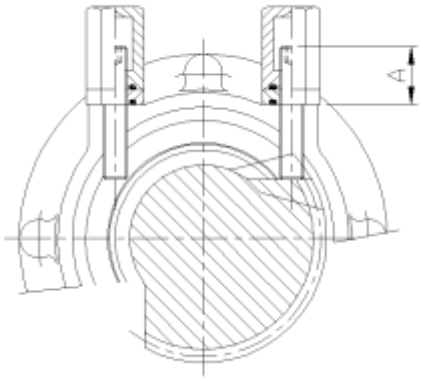
6.8

1) Move actuator full close position by manual. Once cam hit the lever of limit switch to trip, stop manual operation. Then turn close stopper boltto go forward until it don't not go further (End of stopper bolt contacts the 2nd worm wheel).

   After that turn close stopper bolt to come out by 2 threads and tighten the loosen nut.

2) Do as per same with above for open stopper bolt.

※ Maximum range of stopper bolt setting



DIVISION	UTQ-010	UTQ-020	UTQ-060	UTQ-120
BOLT SIZE	M6× 1P	M8× 1.25P	M12 × 1.75P	M14× 2P
Max. allow. range (mm)	18	28	35	43

Fig. 4 Schematic of stopper bolts

CAUTION : Please pay an attention that the worm wheel is net out of range of matching the worm by setting within above range "A".

6.8 Torque switch setting (Except UTQ-010)

1) Torque Switches are set by factory before delivery, therefore no need to set the switches again.

2) When trip the torque switch, check the valves or dampers.

3) No guaranty in performance if this switches are set again.

4) If required resetting of the torque switches, please consult with our design dept.

6.9 Trial operation by handwheel

1) Turn the change lever toward manual position until change lever stands perpendicularly.

   If lever does not stand perpendicularly, pull over it again turning handwheel slowly. This require about 10 ~ 20Kg force.

2) Confirm the direction of manual operation

   – Clockwise is close direction and counter clockwise is open direction.

3) No need to position the change lever to original for electrical operation by manual. Once electrical power is on, thechange lever automatically return its original position by internal clutch mechanism.

* CAUTION: USING CHEATER BAR OR THE LIKE ON HANDWHEEL MAY CAUSE DAMAGE TO THE ACTUATOR AND/OR VALVE

6.10 Trial operation by motor power

Before switching power on to the actuator, check that the supply voltage details on the nameplate are correct for this installation. An incorrect supply connected to the actuator terminals could cause severe or permanent damage to the electrical or electronic components in the actuator.

Apply power to the actuator and carefully check that it has been set up and configured correctly for its intended application before operating the actuator. The operation mode is automatically changed from manual to power by just energizing the motor.

1) Local control

1-1) Place the selector switch in LOCAL mode.

1-2) In order to open or close the valve, push open "A" or close "C" button on the operating panel.

Repeat this 3 ~ 4 times to both directions.

1-3) If you want to stop the actuator in the middle of opening or closing, just push the STOP button or shift the selector switch to OFF.

1-4) carefully check on/off of lamp during operation.

2) Remote control

2-1) Place the selector switch in REMOTE mode to permit command control by a remote device.

Local open or close command will be non-effective in this mode.

2-2) After checking once more the cable connection compared to wiring diagram, send required signals from a remote device for opening and closing of valve.

3-3) When you want to stop the actuator in the middle of operation, send stop signal from a remote device.

Rotating the selector switch to the "OFF" position will automatically stop the actuator regardless of the remote control signal. 3-

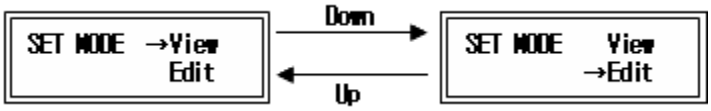
4) Carefully check on/off of lamp during operation.

6.11 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.



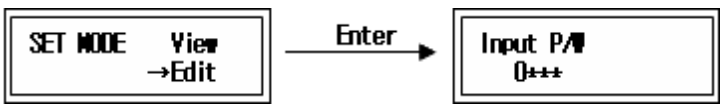
* You can choose View or Edit Mode by pushing Button "A"or "C"

* In Edit Mode, you can change and save each of parameters.

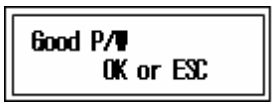
* In View Mode, you can only look into each of parameters.

2) Entering into Edit Mode

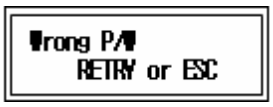
After choosing EDIT, press button "D" to move into Input P/W screen.



* 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.

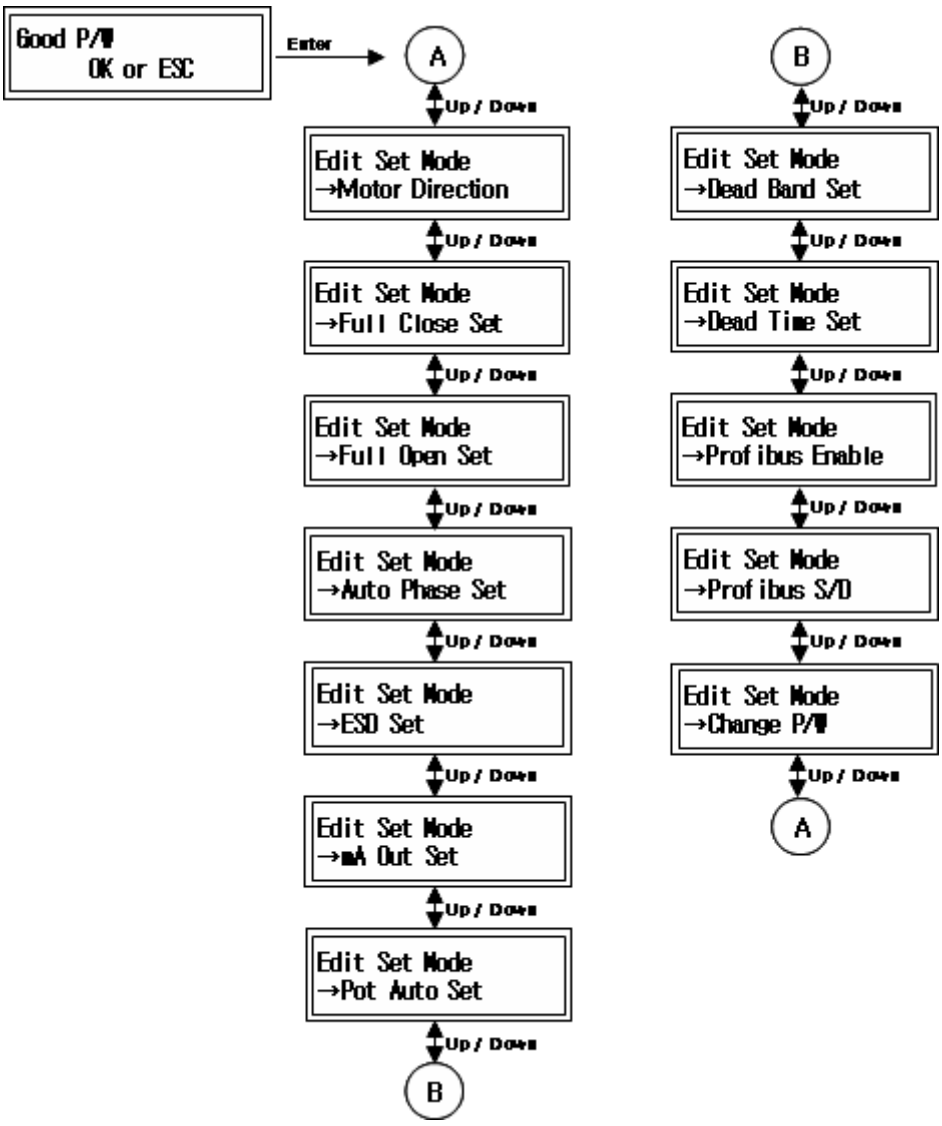
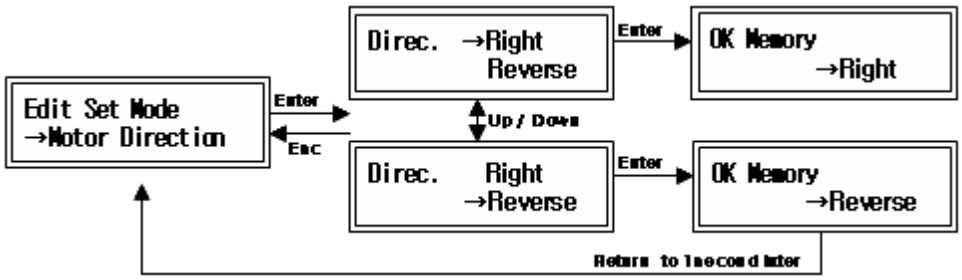


Fig. 5 Schematics for customizing the parameters

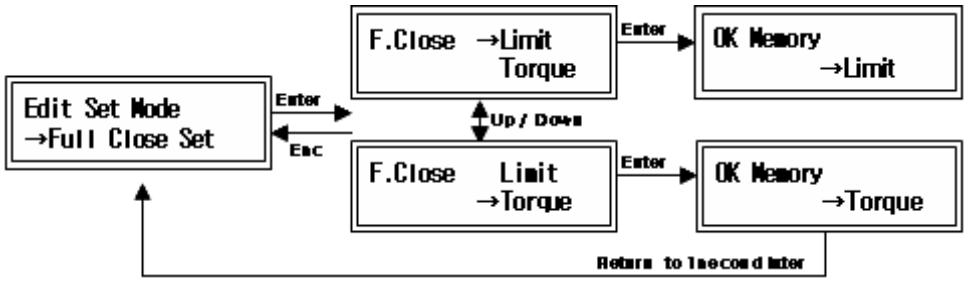
3) Setting of motor rotating direction (Option)



* You can decide the rotating direction of motor in this mode.

* The original set direction would be "Right" when shipped.

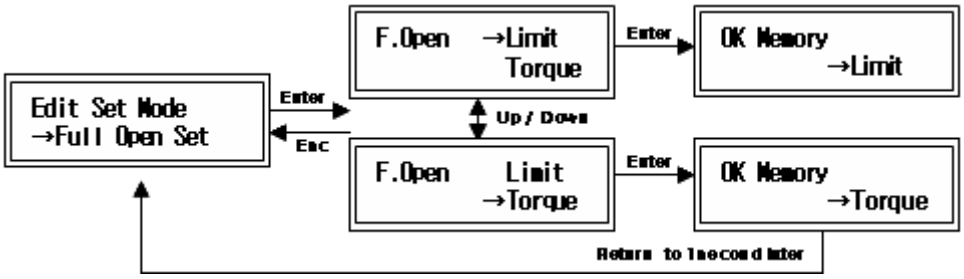
4) Decision of the seating method in full close position



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

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

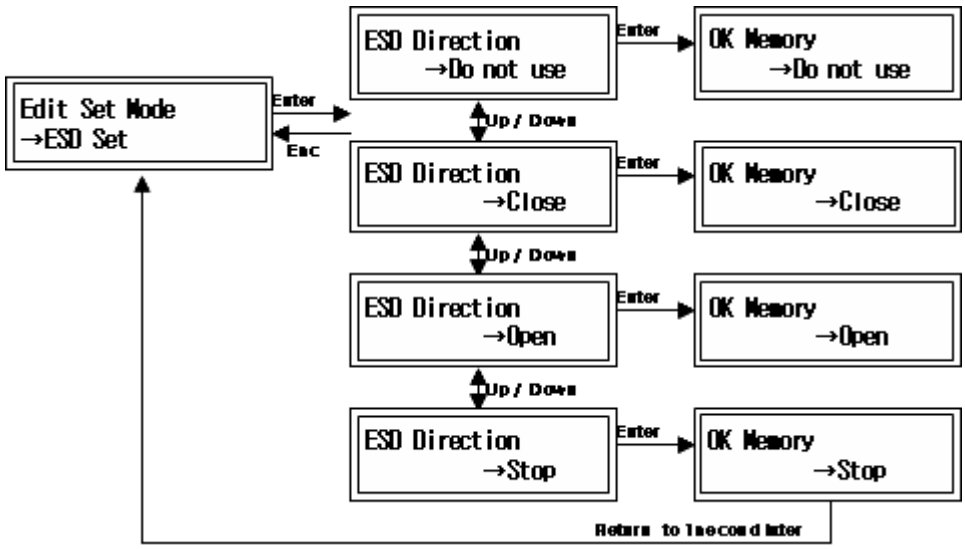
5) Decision of the seating method in full open position



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

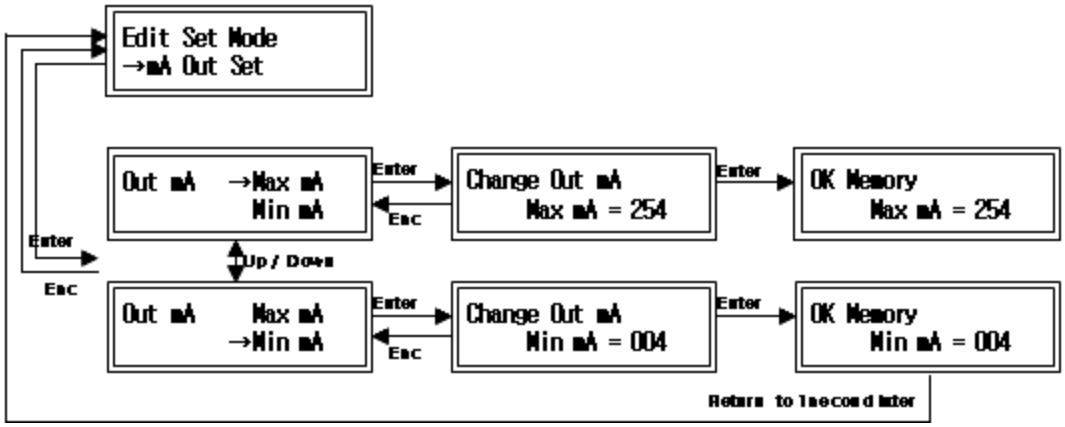


When ESD signal detected, the actuator moves on corresponding to pre-set condition. In "Close", the actuator move to full close position and "Open" to full open position. In "Stop", the actuator keeps as-is position.

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

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

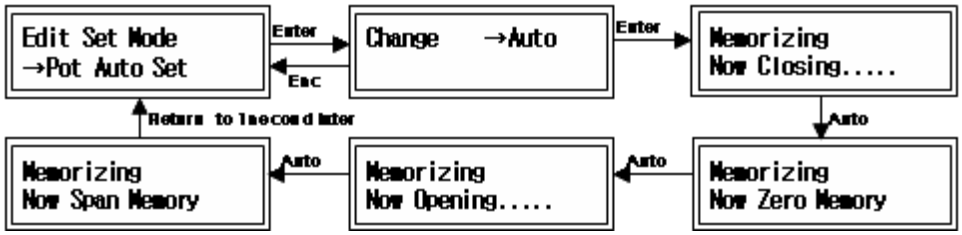
7) Fine adjustment of Output mA in zero and span



* 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.

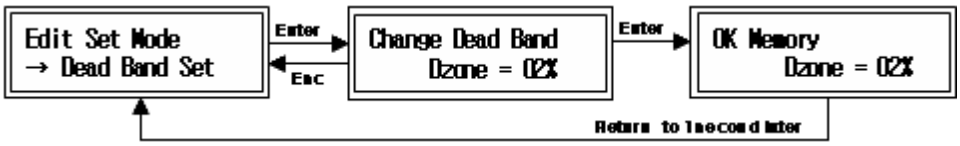
  After switching the selector switch to "LOC", move the actuator to full close position.

  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.

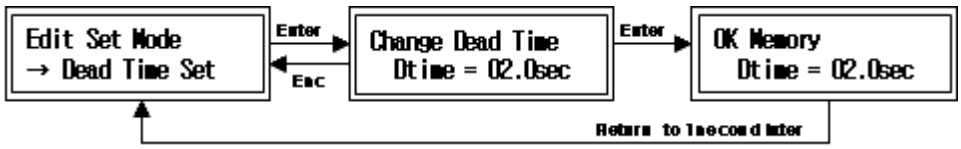
9) Adjustment of Dead Band value



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.

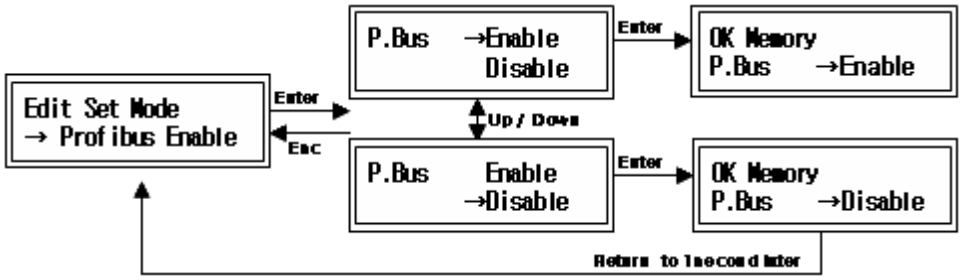
10) Adjustment of Dead Time value



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

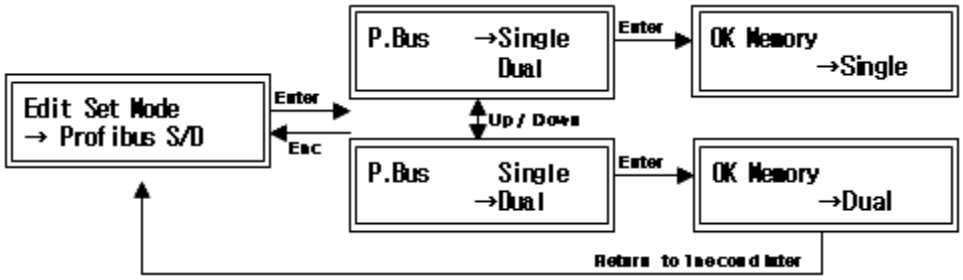
* It can be used in proportional operation or automatic positioning in profibus.
* The value is adjustable between 0.0 sec and 10.0 sec in 0.5 sec increment.
* Recommended value is above 1.0 sec.
* The original set value is 2.0 sec when shipped.
* You are sure to check the value before use.

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.

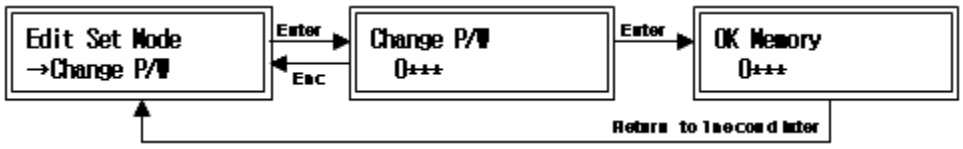
12) Set-up of Profibus line redundancy



When using Profibus line redundancy, you can choose the type of control, which is Single or Dual

* For adapting Line Redundancy in your control, the specification of Master and configuration of system have to satisfy the requirement.

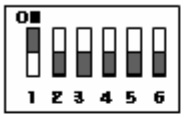
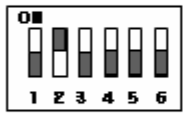
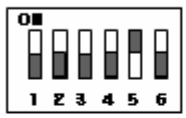
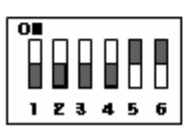
13) Password Set -up



* You can change and save a password in this mode.

* When you press button "D" in last digit, new password will be restored.

6.12 Customizing the actuator in LED type

No.	DIP S/W	Description	Explanation
1		Motor Direction [No.1 Switch]	OFF : Actuator's pre-set rotating ON : Actuator's reverse rotating
2		Close Torque Seating [No.2 Switch]	OFF : stop by Limit Switch ON : stop by Torque Switch
3		Auto Phase [No.3 Switch]	OFF : detecting of reverse phase ON : 3 phase compensator (Default)
4		Torque Lock-up [No.4 Switch]	OFF : not use ON : keep the lock-up circuit when Torque switch activated
5		ESD Motion [No.5&6 Switch]	Move to fully Open
			Move to fully Close
			To Stop at this point

6.13 Setting Profibus-DP

UniTorq's TM Series offer Profibus-DP of network options. Profibus is based on RS 485 communication. Particular cares should be taken when terminating a shielded twisted pair cable for Profibus in a control network. Avoid any inappropriate finishing such as nicks or cuts in the insulation of data communication cables, since this may result in inadvertent ground connection.

1) General data for Profibus-DP

PROFIBUS-DP General Data			
Communication log	PROFIBUS-DP according to EN 50 170, DIN 19 425		
Network topology	Linear-BUS-structure. With repeaters tree structure can also be realized. Coupling and uncoupling of stations during operation without affecting other stations is possible.		
Transmission medium	Twisted, screened copper cable according to EN 50 170. (SIEMENS : 6XV1830-0EH10)		
Interface	RS-485		
Transmission speed / Cable length	Baudrate(kbit/s)	Cable length (without repeater)	Cable length (with repeater)
	9.6 19.2 45.45 93.75 187.5 500 1,500	1,200m 1,200m 1,200m 1,200m 1,000m 400m 200m	approx. 10km approx. 10km approx. 10km approx. 10km approx. 10km approx. 4km approx. 2km
Station types	DP-Master class 1, e.g. central controller such as PLC, PC DP-Master class 2, e.g. programming / configuration tools DP-Slave, e.g. devices with digital and/or analogue inputs/ outputs such as actuators, sensors		
Number of station	32 stations without repeater, with repeater expandable up to 126.		
Bus access	Token-passing between the masters and polling for slaves. Mono-master or multi-master systems are possible.		

2) Wiring the bus cable

MASTER TERMINATION

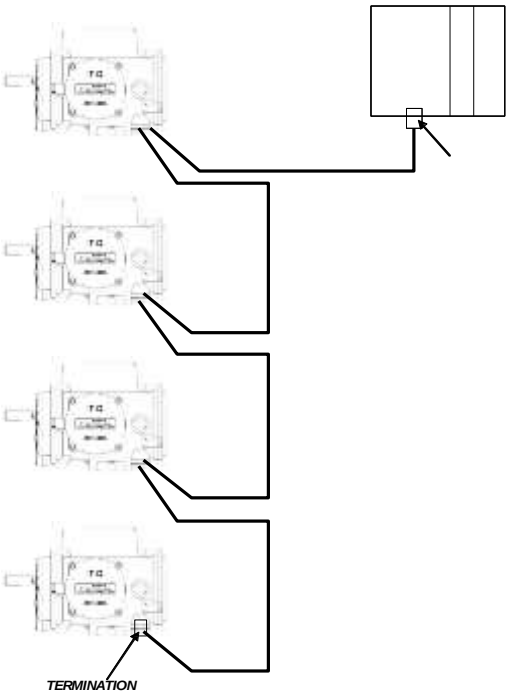
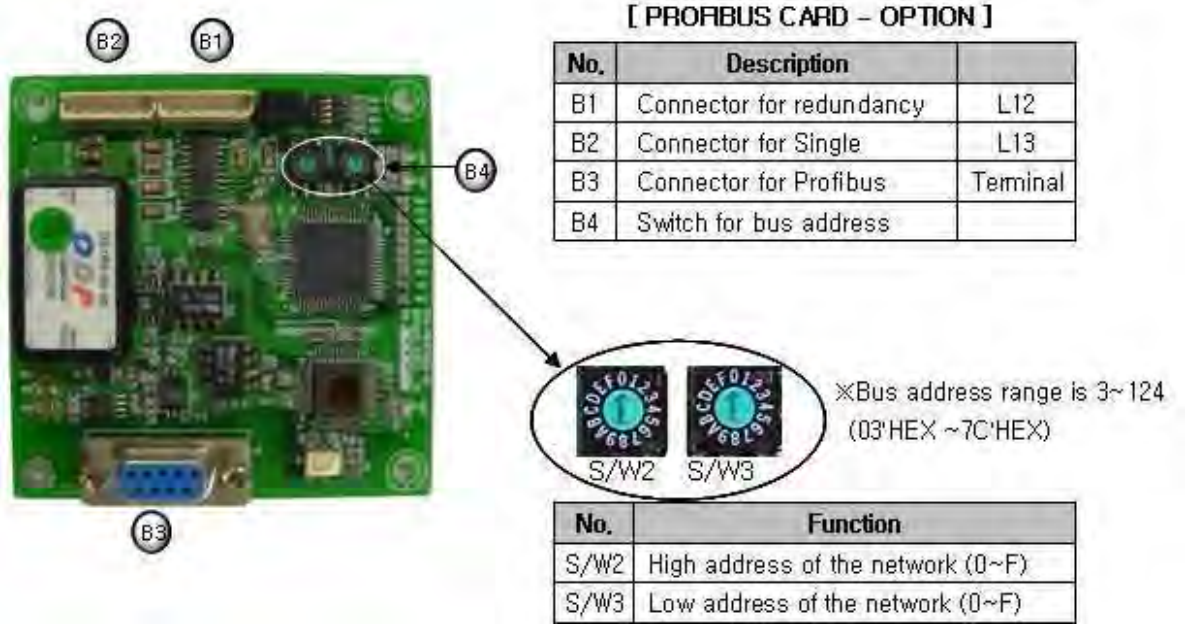


Fig. 6 Schematic of Profibus Connection

3) Allocating the bus address

You can allocate the bus address to the actuators installed in system by mixing the numbers of S/W2 and S/W3.



[PROFBUS CARD – OPTION]

No.	Description	
B1	Connector for redundancy	L12
B2	Connector for Single	L13
B3	Connector for Profibus	Terminal
B4	Switch for bus address	

No.	Function
S/W2	High address of the network (0~F)
S/W3	Low address of the network (0~F)

Fig. 7 Profibus Card

4) Symbol and address

Sym.	Add.	Sym.	Add.
0	0	8	128
1	16	9	144
2	32	A	160
3	48	B	176
4	64	C	192
5	80	D	208
6	96	E	224
7	112	F	240

+

Sym.	Add.	Sym.	Add.
0	0	8	8
1	1	9	9
2	2	A	10
3	3	B	11
4	4	C	12
5	5	D	13
6	6	E	14
7	7	F	15

Example : Fig. 8 Table of Symbol and Address in switch

If you choose "5" of Symbol in S/W 2 and "E" in S/W 3,
the selected addresses are 80 and 14 respectively.

Thus, the allocated bus address will be 94, which equals 80 plus 14.

7. TROUBLE SHOOTING

7.1 Jamming

1) What's jamming

In case that actuator moves wrong direction due to negative phase and moves over the travel limit, internal worm gear contacts the stopper bolt and engaged each other. This is we call, jamming and can not move actuator at all.

2) How to solve

2-1) Turn Off the power.

2-2) If the jamming is happened during close, turn close stopper bolt to come out by about 2 threads.

(If during open, turn open stopper bolt to come out by about 2 threads.)

2-3) Turn the change lever to manual position and operate by hand wheel.

2-4) If jamming is happened during open, procedure is same with close, but turn hand wheel to clockwise by manual.

Turn hand wheel to counterclockwise until 50% open position. Check rotating direction again.

2-6) If everything is O.K, fix the stopper bolt at original position. (Refer to "Stopper bolt setting")

2-7) Close switch cover with bolts.

7.2 Diagnosis by operator

1) 110/220V AC 1 PH , 380/440 AC 3 PH STANDARD SPEC

Trouble	Cause	How to solve
Actuator don't work at all	Check if power is on.	Power on.
	Check if voltage is too low.	Check power.
	Motor and supplied power is different.	Check motor power and supplied power
	Wiring is not correct.	Do wiring again.
	Wiring is loosen.	Do wiring tightly.
	Coil of motor is damaged.	Change the motor
	Thermostat of motor trips. (High duty cycle)	Lower around temperature and duty cycle.
	Capacitor is damaged.	Change the capacitor.
	Limit switch works.	Refer to "Limit s/w setting"
	Torque switch works.	Check valve and torque value.
	Jamming happens.	Check rotating direction per instruction.
Torque switch works abnormally	Actuator is undersized.	Select again as per real required torque.
	Foreign material between valve seat and disc.	Check and change the valve.
	Stopper bolt is set prior to limit switch.	Reset the stopper bolt.
Switching to manual is not possible	Lever is not fully pulled over.	Fully pull over the lever.
	Lever is not pulled over because of jamming.	Disengage the jamming.
	Clutch of lever and handle is engaged each other.	Turning handle slowly, pull over lever.
Abnormal signal indicator	Damage of signal indicator(option).	Change the signal LED unit.
	Damage of micro switches	Change the micro switches.
	Setting of limit switch is wrong.	Do setting switch again.
	Stopper bolt is set prior to limit switch.	Do setting stopper bolt again.
Remote operation is not possible	Wiring is not correct.	Do wiring again.
	Switch is not at remote position.	Put the switch at remote position.

2) Proportional Control Unit Option

Trouble	Cause	How to solve
Proportional Control Unit doesn't work	Input signal is fault.	Check input signal.
	R/I Convertor signal is failed.	Check the resistance of potentiometer and change it if resistance is not correct.
	Proportional Control Unit card is damaged.	Change the Proportional Control Unit card.
Output signal is not detected	R/I Convertor signal is failed.	Check the resistance of potentiometer and change it if resistance is not correct.
	Proportional Control Unit card is damaged.	Change the Proportional Control Unit card.

3) R/I converter option

Trouble	Cause	How to solve
Output signal is not detected	R/I converter signal is failed.	Check the resistance of potentiometer and change it if resistance is not correct.
	R/I converter is damaged.	Change the R/I converter.

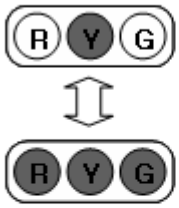
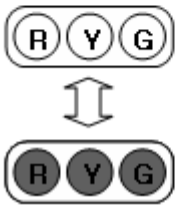
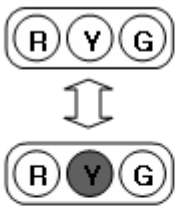
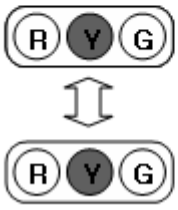
4) Others

Trouble	Cause	How to solve
Remote operation is not possible	Switch is not at remote position.	Put the switch at remote position.
Occasionally fail	Wring is loosen or switch is not contacted	Change the switch and check wiring.
Proportional Control Unit fails occasionally	Thermostat is on and off due to motor overheated	Lower duty cycle.
Proportional Control Unit fail and return to normal	Defect of wire, high volts & noise	Remove the cause.
Output signal from Proportional Control Unit is unstable	Defect of wire, high volts & noise	Remove the cause.
R/I converter signal fails occasionally	PIU is not contacted tightly	Check the resistance of potentiometer and change the PIU
Output signal from R/I converter is unstable	Defect of wire, high volts & noise	Remove the cause.
Valve torque is sharply increased	Foreign material in valve.	Check and change the valve.

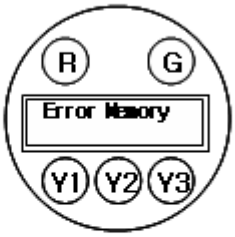
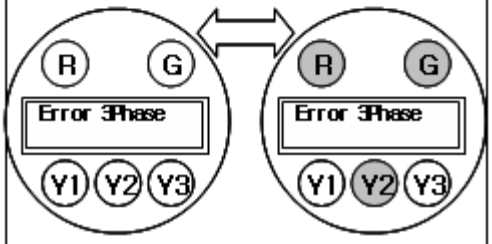
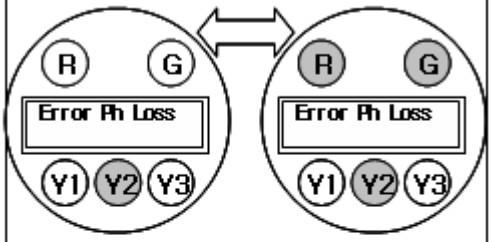
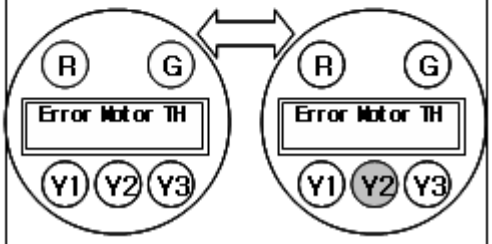
Resistance of coil is sharply increased	Humidity or gas invade in heater.	Check and change the heater.

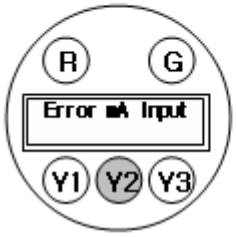
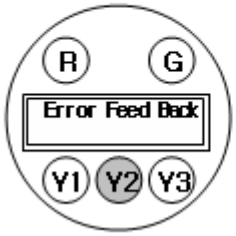
7.3 Self diagnosis

1) In LED type

No.	Lamp Display	Message	How to solve
1		Drop of one phase	☞After checking the wiring of 3 phase, connect the dropped phase correctly.
2		Negative phase	☞After checking the wiring of 3 phase, connect them correctly by R,S,T ☞ When you want to operate by 3 phase compensator mode, shift No3 dip switch to "on"
3		Overheating of Motor coils.	☞After removing the causes of motor's overheating and lowering motor's temperature, restart.
4		Over torque	☞After taking measures to remove the causes of over-torque, cancel the over-torque error by reset button and restart.

2) In LCD type

No.	Lamp Display	How to solve
1	Internal Setting Memory Error 	☞ Turn power supply off and turn it on. ☞ Please start the setting work again.
2	Negative Wiring Error 	☞ After checking the wiring of 3 phase, connect them correctly by R,S,T
3	Dropping Error of Phase 	☞ After checking the wiring of 3 phase, connect the dropped phase correctly.
4	Motor Thermal Error 	☞ After removing the causes of motor's overheating and lowering motor's temperature, restart.

No.	Lamp Display	How to solve
5	Input Error of Proportional Control 	☞ This error can occur when mA input signal is not transmitted into apparatus in proportional control mode. Please check the input elements such as a wire and connector one more time.
6	Input Error of Potentiometer 	☞ This error can occur when potentiometer value is not input. Please check the elements such as a wire and connector connected with potentiometer one more time.

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8. MAINTENANCE

After trial operation, check damages on paint and touch-up, if necessary. Before fastening, check V-rings at the covers of switch unit and terminal unit are rightly placed.

Use suitable cable gland and fasten tightly to secure IP68 class watertightness and/or flame proofness.

8.1 Lubrication

Lubrication(EP R0 grade grease)is already done at the factory and there is generally no need to do it again. If a refill is required, fill through the space of output base after disassembling the output base. Regular operation

8.2 Regular check-up

In order to use actuator for long time, regular maintenance once a year is required. Pleas check operating condition, corrosion, painting & etc.

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9. AUXILIARIES

This chapter shows the general electrical specification and the schematics for sub assembly of electrical parts to help user do maintenance the actuator.

9.1 General specification

In LED type

Description	Specification	Remarks
Main Power	Refer to the wiring diagram	
Control Power	Control : [DC] 24V (200mA), 12V (100mA), 5V (500mA) M/C & Space heater : [AC] 110V (100mA)	Standard
Protection Function	Detecting drop and reverse of phase (Trip), Lock-up circuit of Torque	3 Phase compensator
Input Signal	Open, Close & Stop Selecting of LOCAL / REMOTE mode	Input dry contact
Output Signal	Opening, Closing, Full open, Full close, Monitor, Power Fault, Over torque	Output dry contact
Ambient temp. & Humidity	- 20℃ ~ 80 ℃ / 90% RH , MAX	

In LCD type

Description	Specification	Remarks
Main Power	Refer to the wiring diagram	
Control Power	Control : [DC] 24V (200mA), 12V (100mA), 5V (500mA), 32V (100mA) M/C & Space heater : [AC] 110V (100mA)	Standard
Protection Function	Detecting drop and reverse of phase (Trip) Lock-up circuit of Torque	3 Phase compensator
Input Signal	4~20mA[DC]	Option: Profibus DP
Output Signal	4~20mA[DC]	
POTENTIOMETER	1 kΩ	
Ambient Temp. & Humidity	-20℃ ~ 80 ℃ / 90% RH , MAX	

1) Control circuit is isolated from the remote signal by the opto-isolater so that it might not be affected by any disturbance.

2) Two operating modes of INCHING / HOLD. If there is no any requirement when ordering, the actuator will be shipped as INCHING mode.

   If you want HOLD mode, please connect ① and ④ of terminal by using jumper line.

3) Transformer

Motor	Transformer	Motor	Transformer
0.2㎾ ~ 2.2㎾	40VA	3.7㎾ ~ 7.5㎾	80VA

4) Please use Magnetic contactor and Fuse as followings.

Item	Type	Model	Manufacturer
Magnetic - Contactor	Right/Reverse type	GMC(D)-□□	LS Industrial Electric
Fuse	Glass tube type	250V 0.5A	General (Φ5*20mm)

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9.2 Integral unit

1) For LED type

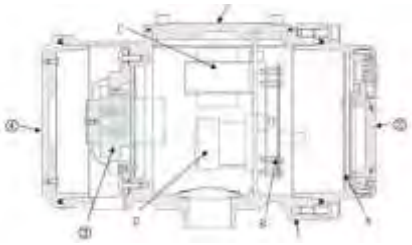


Fig. 9 Integral unit for LED type

No.	Items	Description
A	Control board	By pushing Button, the desired operation will be done. Displaying the status of operation
B	Power board	After converting AC power into DC, delivering it to each board
C	Transformer	After making lower voltage than input 3 phase voltage, distributing it to each board
D	Magnetic contactor	Mechanical reverse magnetic contactor to control motor's rotating direction

2) For LCD type

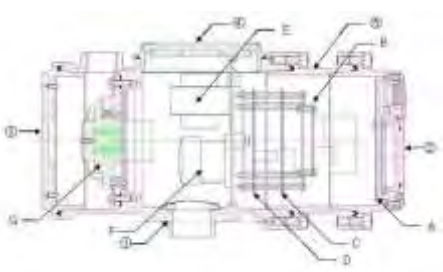


Fig. 10 Integral unit for LCD type

No.	Items	Description
A	Control board	By pushing button, the desired operation will be done, Displaying the status of operation,
B	Profibus card	Profibus board (Option),
C	Logic board	Board for processing signals
D	Power board	After converting AC power into DC, delivering it to each board,
E	Transformer	After making lower voltage than input 3 phase voltage, distributing it to each board
F	Magnetic contactor	Mechanical reverse magnetic contactor to control motor's rotating direction

9.3 Printed circuit board

1) For LED type

[CONTROL BOARD]

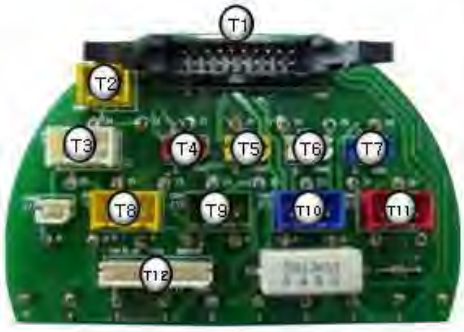
No.	Description	Matching to
C1	LED for open	
C2	LED for fault	
C3	LED for close	
C4	For selecting operating mode	
C5	For inputting DC power	P2
C6	For inputting Relay signal	P1
C7	For input/output signal	T1

Fig. 11 Control board for LED type

[POWER BOARD]

No.	Description	Matching to
P1	For inputting Relay signal	C11
P2	For outputting DC power	C1
P3	For receiving T/R power	T/R
P4	For detecting 3 phase	M/C
P5	For inputting AC power	T/R
P6	For outputting outside Relay contact	T12
P7	For outputting AC 110V	S/H
P8	For inputting AC 110V	T/R
P9	For outputting rotation direction	M/C

Fig. 12 Power board for LED type



[TERMINAL BOARD]

No.	Description	Matching to
T1	For inputting/outputting signal	C10
T2	For inputting TH,	T/H
T3	For inputting Option	
T4	For Open limit	M/C
T5	For Open torque	T/R
T6	For Close torque	T12
T7	For Close limit	
T8	For aux. Open torque	
T9	For aux. Close torque	
T10	For aux. Close limit	S/H
T11	For aux. Open limit	
T12	For outputting outside Relay signal	P6

Fig. 13 Terminal board for LED type

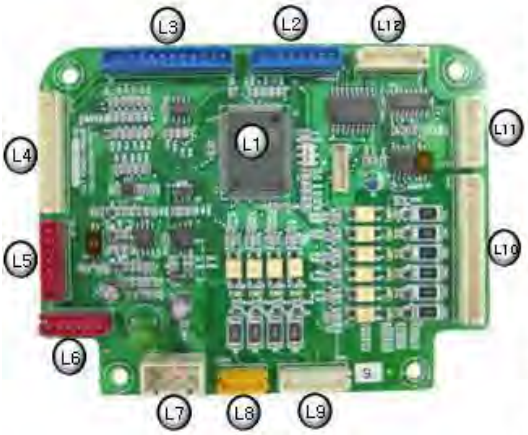
2) For LCD type

[CONTROL BOARD]

No.	Description	Matching to
C1	For output button signal (Rear	L6
C2	For input DC power (Rear side	
C3	For input LED signal (Rear sid	L5
C4	LED for open	
C5	LED for close	
C6	LCD display module	
C7	LED for open torque fault	
C8	LED for motor thermal fault	
C9	LED for close torque fault	
C10	Reed sensor (Local operating)	
C11	Reed sensor (Mode select)	
C12	Reed sensor (Reset)	

Fig. 14 Control board for LCD type

– Intended blank –



[LOGIC BOARD]

No.	Description	Matching to
L1	Single-ship 16bit CMOS CPU	
L2	For output relay signal	P1
L3	For input DC power	P2
L4	For output LCD signal	LCD
L5	For output LED signal	C3
L6	For input button signal	C1
L7	For input value of the potentiome	
L8	For input/output proportional s	Terminal
L9	For input Micro-switch signal	T10
L10	For input remote signal	T9
L11	Profibus DP (Redundancy)	B1
L12	Profibus DP (Single ch.)	B2

Fig. 15 Logic board for LCD type

[POWER BOARD]

No.	Description	Matching to
P1	For input relay signal	L2
P2	For output DC power	L3
P3	For receive T/R power	T/R
P4	For detecting 3 phase	
P5	For input AC power	T/R
P6	For output outside relay contact	Terminal
P7	For output AC 110V	
P8	For input AC 110V	T/R
P9	For output ratation direction	M/C

Fig. 16 Power board for LCD type

– Intended blank –

9.4 Terminal board

1) For LED type

No.	Description	Matching to
T1	For inputting/outputting signal	C10
T2	For inputting TH.	T/H
T3	For inputting Option	
T4	For Open limit	M/C
T5	For Open torque	T/R
T6	For Close torque	T12
T7	For Close limit	
T8	For aux. Open torque	
T9	For aux. Close torque	
T10	For aux. Close limit	S/H
T11	For aux. Open limit	
T12	For outputting outside Relay signal	P6

Fig. 17 Terminal board for LED type

2) For LCD type

No.	Description	Matching to
T1	For input thermal protactor signal	Motor
T2	For output close limit signal	Micro s/w
T3	For output open limit signal	Micro s/w
T4	For input close torque signal	Micro s/w
T5	For input open torque signal	Micro s/w
T6	For input close limit signal	Micro s/w
T7	For input open limit signal	Micro s/w
T8	For output outside relay signal	P6
T9	For output remote signal	L10
T10	For output micro-s/w signal	L9
T11	Profibus DP (single ch.)	B4-1
T12	Profibus DP (redundancy)	B4-2

Fig. 18 Terminal board for LCD type

– Intended blank –

9.5 Terminal block

1) For LED type

Fig. 19 Terminal blocks for LED type

Items	Terminal No.(34P)	Description	Remarks
Input terminal	①	For INPUT COM. In remote	
	②	For OPEN in remote	
	③	For CLOSE in remote	
	④	For STOP in remote (STD:B contact)	
Output terminal	⑦ ⑧ ⑨	For MONITOR output ("C" contact)	
	⑬ ⑭ ⑮	For OPENING/CLOSING ("A" contact)	
		For OVER TORQUE RELAY ("C" contact)	
		For FULL OPEN LIMIT ("C" contact)	
		For FULL CLOSE LIMIT ("C" contact)	
Option		Refer to Wiring diagram	

– Intended blank –

2) For LCD type

Fig. 20 Terminal blocks for LCD type

Item	Terminal No. (34P)	Description
Input terminal	1	For input COM. remote
	2	For OPEN in remote
	3	For CLOSE in remote
	11	For choosing proportional operation
	33(-), 34(+)	Proportional signal input
Output terminal	4,8	External output COM.
	9	External Monitor output
	7	External FAULT output
	6	External CLOSE output
	5	External OPEN output
	32(-), 31(+)	Proportional signal output
Option		Refer to wiring diagram

– Intended blank –

9.6 Name of main parts

1) Externals

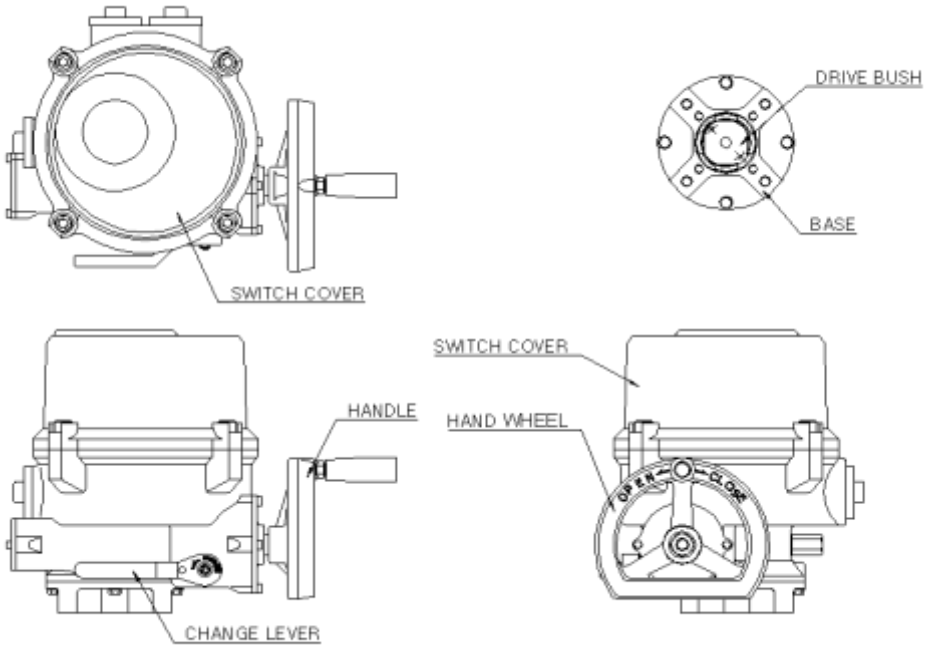
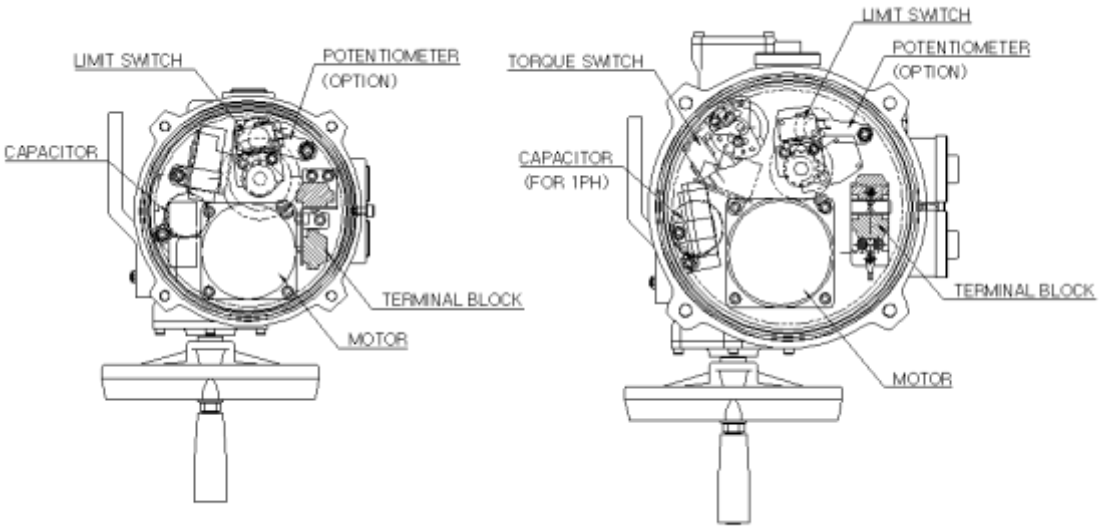


Fig. 21 External View for UTQ-010, 020, 040, 060, 080, 120

2) Internals



for UTQ-010 for UTQ-020/040/060/080/120

Fig. 22 Internal View

9.7 Drive Bushing Size

	Allowable Key Size		Remark
	inside d(mm)	(mm)	
UTQ-010	18	6 × 6	
UTQ-020	φ 30	8 × 7	
	φ		
	φ		
UTQ-040	φ40	12 × 8	
UTQ-060	φ40	12 × 8	
UTQ-080	φ 50	14 × 9	
UTQ-120	50	14 × 9	

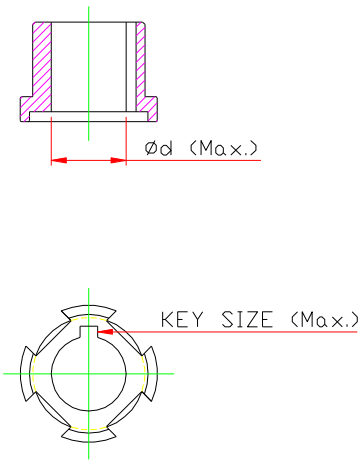


Fig. 23 Bushing drawing

※ Caution: Be careful of position of key way during machining.

For further more information about our products or service, please do not hesitate to contact us.

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