

ELECTRIC ACTUATOR

“ Unic Series “

LINEAR TYPE

Unic – L25

Unic – L50

OPERATION MANUAL

Koei Industry Co., Ltd.

FOR YOUR SAFETY

In order for better and safety use of the product for a long period, please observe this “WARNING and CAUTION” carefully.

Here are the specification and operation manual for the product to prevent suffering injury or loss by accidents.

The contents are divided into “WARNING” and “CAUTION” for different degree of risks.

Please strictly observe them, as both of them are very important for your safety.



WARNING: Improper handling of the product disregarding the notes under this mark may cause injury or death to a man.



CAUTION: Improper handling of the product disregarding the notes under this mark may cause injury or material loss.



WARNING

- * This product is not of explosion-proof.
Do not use it in the environment with flammable gas (gasoline etc.) or corrosive gas.
- * Do not dismantle the actuator from the valve during power operation.
- * Do not make wiring work when power is being supplied.



CAUTION

- * Do not drop the product or give a shock to the product, for it may cause defects to the product.
- * Do not get on the actuator, or it may cause defects or an accident.
- * Do not make wiring work in the rain or in splashing water.



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1. GENERAL

The system is a linear type Electric Actuator for on-off operation at an intermediate position, by changeover (open-close) with external signals or power supply.

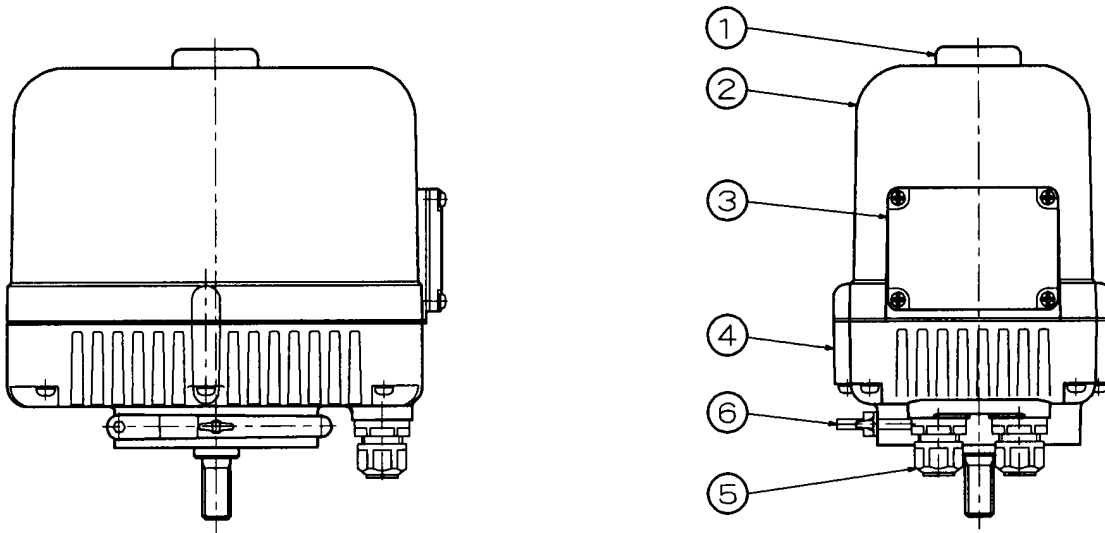
With the die cast aluminum body, the system features light, compact, and high performance.

⌘ FEATURES

- * Compact and light
Convenient for handling and usable in a narrow place.
- * Trouble-less simple structure
Easy for valve-engagement, maintenance and inspection.
- * Manual operation
A crank handle is included in the standard accessories.
- * Protection
A torque limiter and thermal protector fitted.
- * Simple wiring
A terminal block is fitted for easy wiring work.

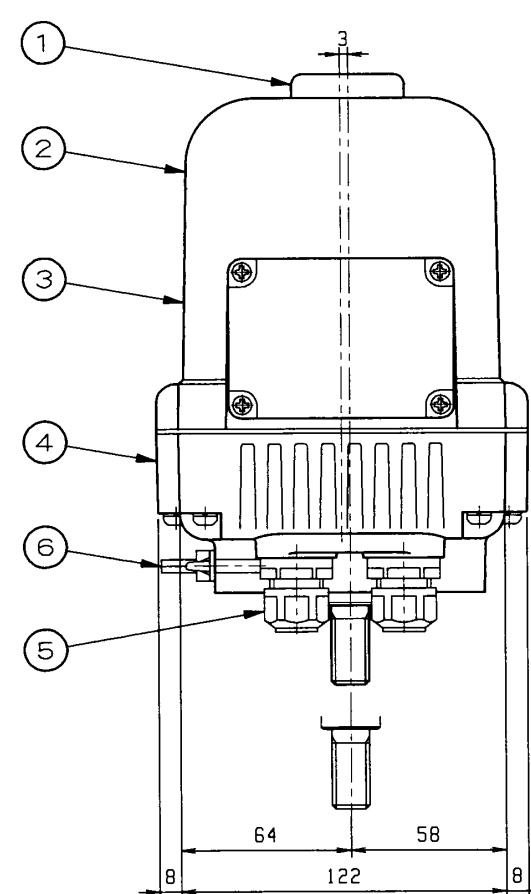
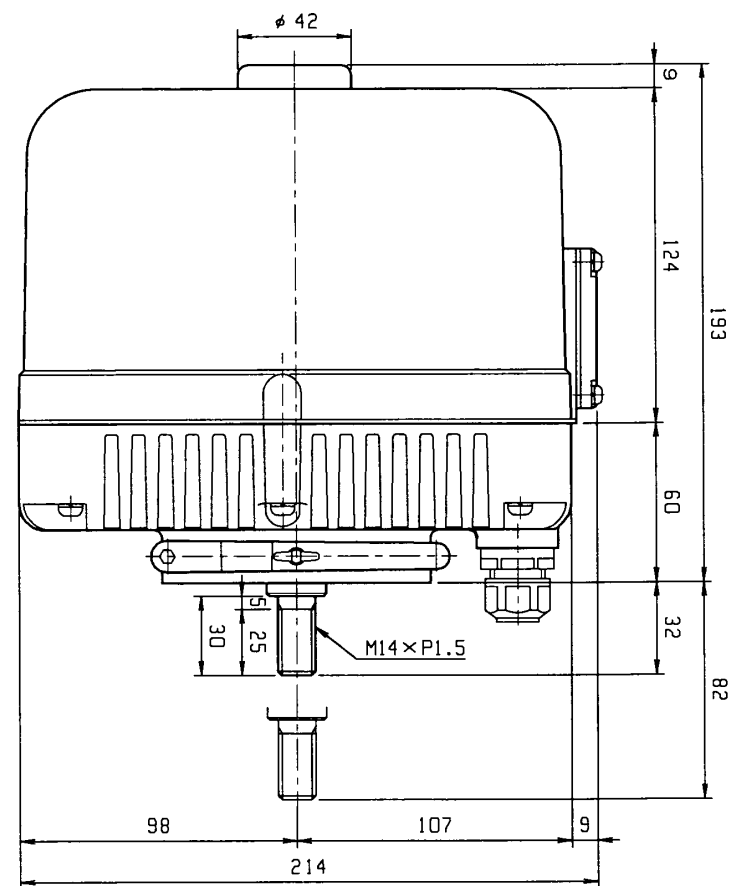
2. EXTERNAL DRAWINGS

2-1 Configuration and names of parts



- FIG. 1 -

No.	NAME OF PART
1	RUBBER CAP FOR MANUAL HOLE
2	BODY COVER
3	CONDUIT COVER
4	BODY BASE
5	CONNECTOR
6	MANUAL HANDLE



(2) - 2
- FIG. 2-

Model: Unic-L25, L50		
No.	NAME OF PART	MATERIAL
1	RUBBER CAP FOR MANUAL HOLE	NBR
2	BODY COVER	ADC12
3	CONDUIT COVER	ADC12
4	BODY BASE	ADC12
5	CONNECTOR	Nylon 66
6	MANUAL HANDLE	SCS13

3. FUNCTIONAL SPECIFICATION

ITEM \ MODEL	Unic-L25	Unic-L50
RATED VOLTAGE	AC100/110V $\pm$ 10% (50/60 Hz) AC115/120V $\pm$ 10% (50/60 Hz) AC200/220V $\pm$ 10% (50/60 Hz) AC230/240V $\pm$ 10% (50/60 Hz)	
SHAFT OUTPUT	1961N(200kgf)	4903N(500kgf)
OPERATION SPEED	1.4 mm/sec (50 Hz) 1.7 mm/sec (60 Hz)	
SHAFT STROKE	0~25mm	0~50mm
PROTECTION SYSTEM	* Upper limit switch (Standard spec.) * Bottom torque limiter (Standard spec.) * Motor thermal protector (120°C)	
AMBIENT TEMPERATURE	Ambient temperature within : -25~55°C	
RATED CURRENT	0.6/0.7A (AC 100/110 V) 0.6/0.7A (AC 115/120 V) 0.3/0.4A (AC 200/220 V) 0.3/0.4A (AC 230/240 V)	0.7/0.8A (AC 100/110 V) 0.7/0.8A (AC 115/120 V) 0.4/0.5A (AC 200/220 V) 0.4/0.5A (AC 230/240 V)
MOTOR	20W Reversible motor	
INSULATION GRADE	E Class	
RATED OPERATION TIME	Continuous	
INSULATION RESISTANCE	Between power terminal --- case : 500V DC/100M Ω	
WITHSTAND VOLTAGE	Between power terminal --- case :1500V AC/1 minute	
OUTPUT SIGNAL	* Top/Bottom limit voltage output (Standard spec.) * Top/Bottom limit no-voltage output (Optional extra) * Potentiometer(Optional extra)	
CONNECTION TERMINAL	7P Terminal block (Extra 3P available at option)	
MANUAL OPERATION	Detachable crank handle (Standard accessory)	
WIRE INLET	G1/2 $\times$ 2 (Water-sealed conduit)	
ENCLOSURE PROTECTION	NEMA-4X (IP-65)	
EXPLOSION PROOF	Non explosion-proof	
MOUNTING ANGLE	From vertical to horizontal angles	
BODY MATERIAL	Die cast Aluminum	
COATING	Melamine baking coating (silver)	
WEIGHT	6.5 kg	



CAUTION ON ENVIRONMENTAL INSTALLATION CONDITIONS

4.INSTALLATION

4-1 Installation place

⊗ Caution on indoor installation

- * The actuators are not of explosion-proof type. Do not install in a hazardous place.
- * Cover whole the unit, if it is installed at a place where water or materials are splashing.
- * Reserve a space for manual maintenance work.

⊗ Caution on outdoor installation

- * Cover the unit from rainfall, to prevent degradation of the seals.
- * Shade the unit from direct sunlight, that may cause overheat and defect to the unit.
- * Reserve a space for manual maintenance work.



Actuator surface materials and treatment



MODEL PART	Unic-L25	Unic-L50
BODY BASE	Die cast Aluminum Oxidation treatment Melamine baking coating	
BODY COVER	Die cast Aluminum Oxidation treatment Melamine baking coating	
SIDE PLATE COVER	Die cast Aluminum Oxidation treatment Melamine baking coating	
OUTPUT SHAFT	SUS 304	
MANUAL DRIVEHOLE CAP	NBR	
OIL SEAL	NBR	

4-2 Ambient temperature / fluid temperature

⊗ Ambient temperature

- * Environmental temperature range for use : $-25^{\circ}\text{C}\sim 55^{\circ}\text{C}$.
- * For use in minus temperature, space-heater is available at option.
- * For use in temperature beyond the specified range, refer to our Sales Dept.

⊗ Fluid temperature

It is occasional that if the actuators are applied to high temperature fluid lines, the unit may be overheated by transmission of the line heat. In such a case, use radiation type yoke and couplings. (available at option)

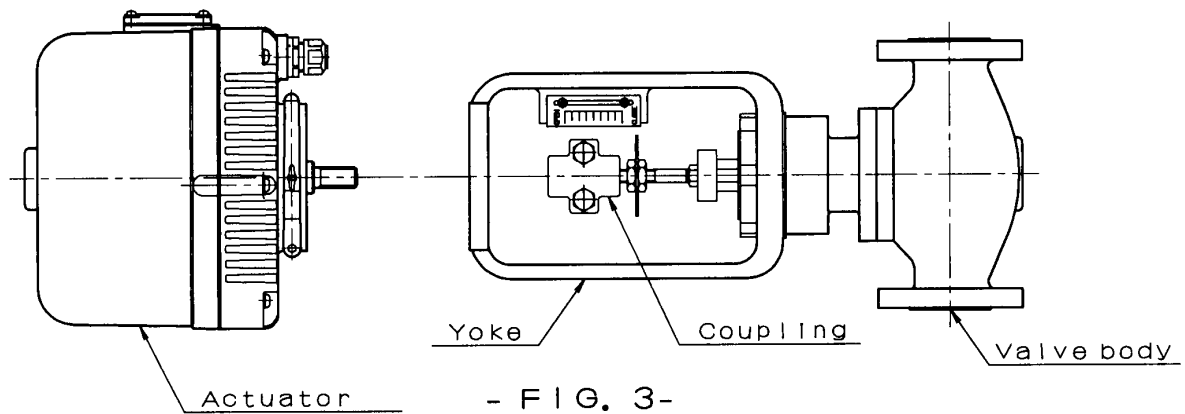
- * Standard yoke and couplings : For fluid temperature below 65°C
- * Radiation type yoke and couplings : For fluid temperature over 65°C



CAUTION ON ASSEMBLY WITH A VALVE

5. ASSEMBLY WITH A VALVE

⌘ Names of parts



As shown in Fig.3, the actuator and a valve are individually structured for easy disengagement when trouble is occurred.

⌘ Assembly procedure

- a) Be sure that power is off before making manual operation.
- b) Drive the valve manually and confirm that it is normal.
Then set it at full close position.
- c) Fit a yoke to the actuator.
- d) After the actuator is set at full close, engage output shaft and the valve stem with coupling.
- e) Manually drive the actuator, and make sure that it moves smoothly without eccentricity.

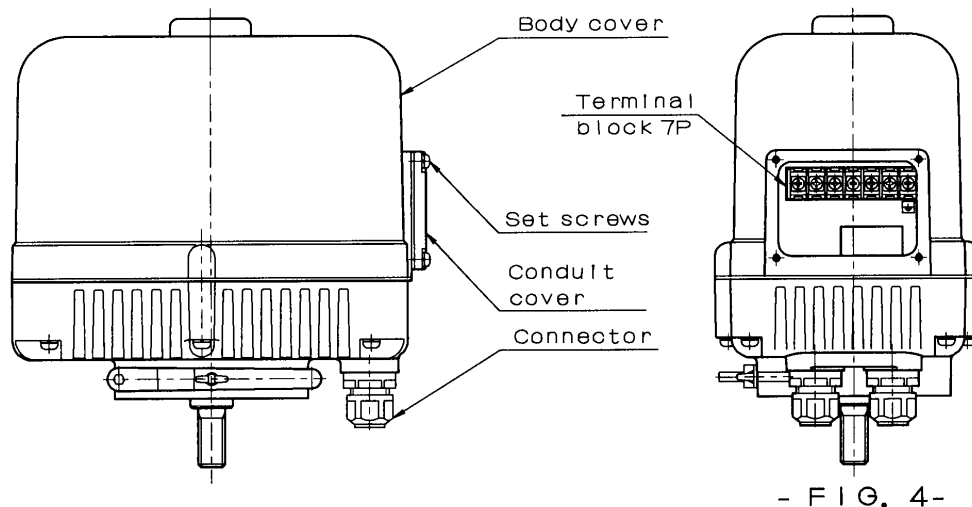


CAUTION ON WIRING WORK

6. WIRING

6-1 Wiring of power and signal cables

Remove the side plate cover (or body cover), and find 6-P terminal block thereunder.



⌘ Caution on wiring

A qualified person based on electric equipment technical standard should make wiring work.

Refrain from wiring work under rainy or high humid conditions.

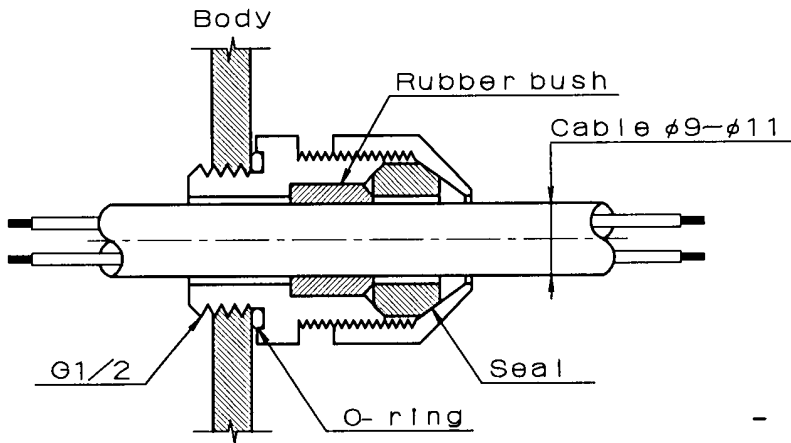
Make proper wiring to the wiring diagram.

For all connections use fork crimped-on terminals.

For the standard resin conduit, use a cable of outer diameter $\phi 9\sim 11$ mm. (Refer to Fig.5)

For customer conduit, select a proper size cable to match it to avoid water ingress through the gap.

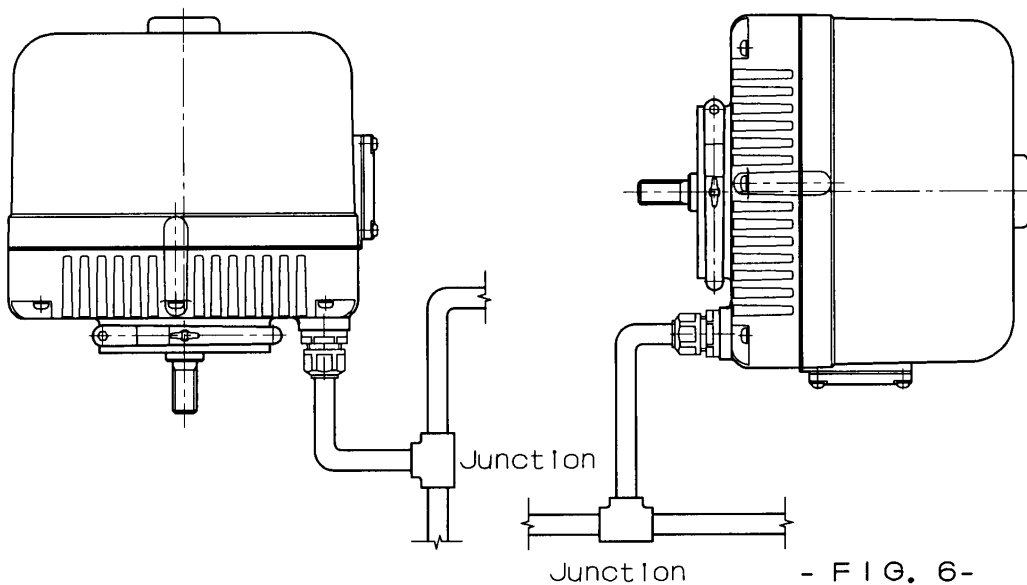
Secure the cover and conduit tightly after power/signal wiring is over to avoid water ingress.



- FIG. 5-

6-2 Wiring work

Use sufficiently sealed tubes or conduit to prevent water ingress.



- FIG. 6-



CAUTION ON USE

7. POWER SUPPLY AND WIRING DIAGRAM

7-1 Power supply

Standard supply

AC 100/110/115/120V $\pm$ 10% (50/60Hz)
AC 200/220/230/240V $\pm$ 10% (50/60Hz)

For different supply from the above, refer to our Sales Dept.

7-2 Recommendable fuse and breaker

Install a fuse or breaker for protection according to the following table.

Model	Capacity of fuse/breaker	Motor capacity
Unic-L25	5A	20W
Unic-L50	5A	20W

Note: Wiring should be made properly to reject noise disturbance etc.

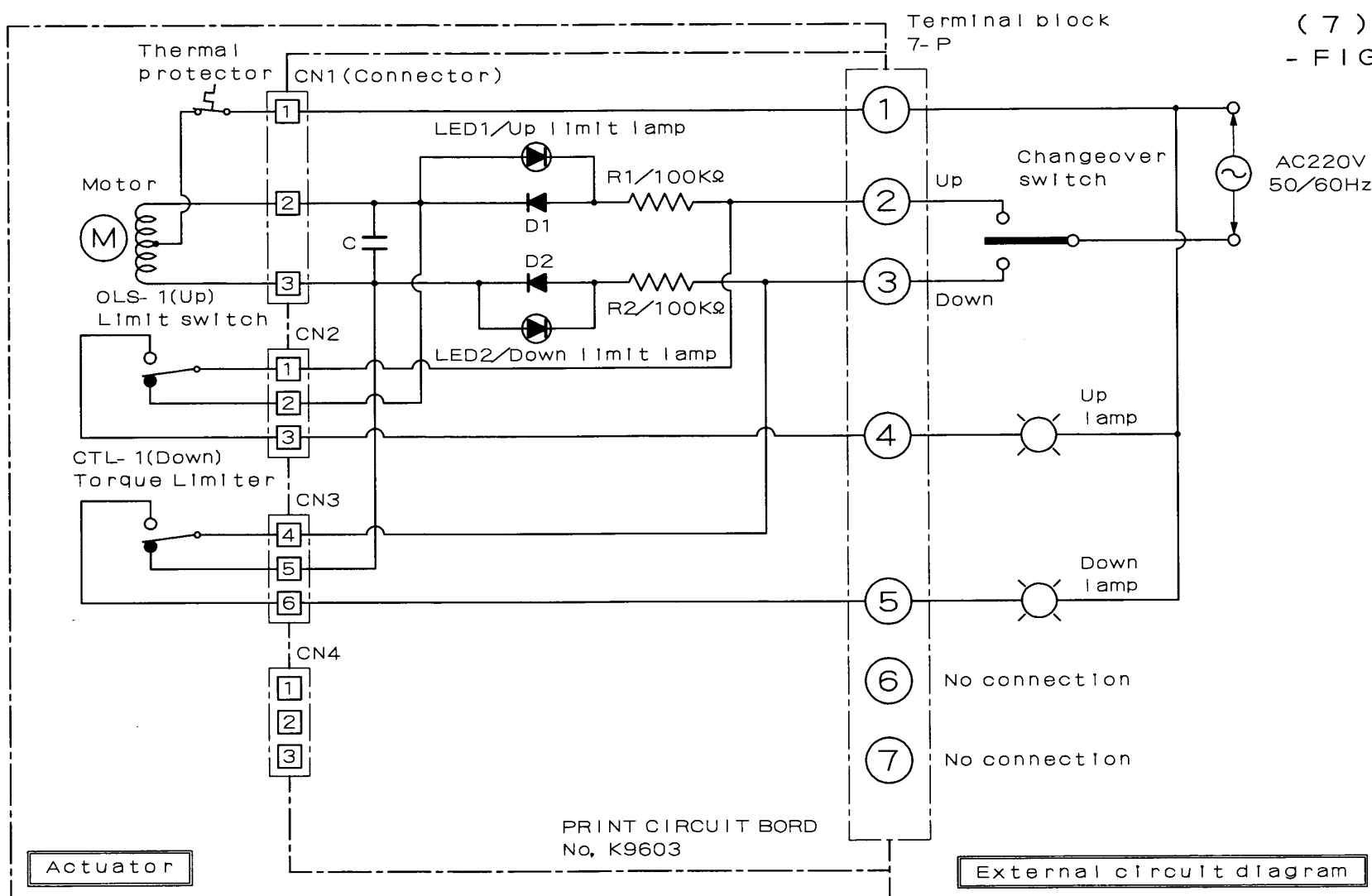
7-3 Wiring diagram

Standard circuits	CIR-9603E (Fig.7)
With top/bottom no-voltage limit switches	CIR-9603F (Fig.8)
With potentiometer	CIR-9603G (Fig.9)

⌘ Caution on use

Do not make parallel operation with plural actuators.

If they are operated with open-close switch for external signals, they may carry abnormal current into the units causing chattering, then disturbance to normal operation. If it goes on as they are, the actuators may become defective.

(7) - 3
- FIG. 7-

ELECTRIC ACTUATOR WIRING DIAGRAM

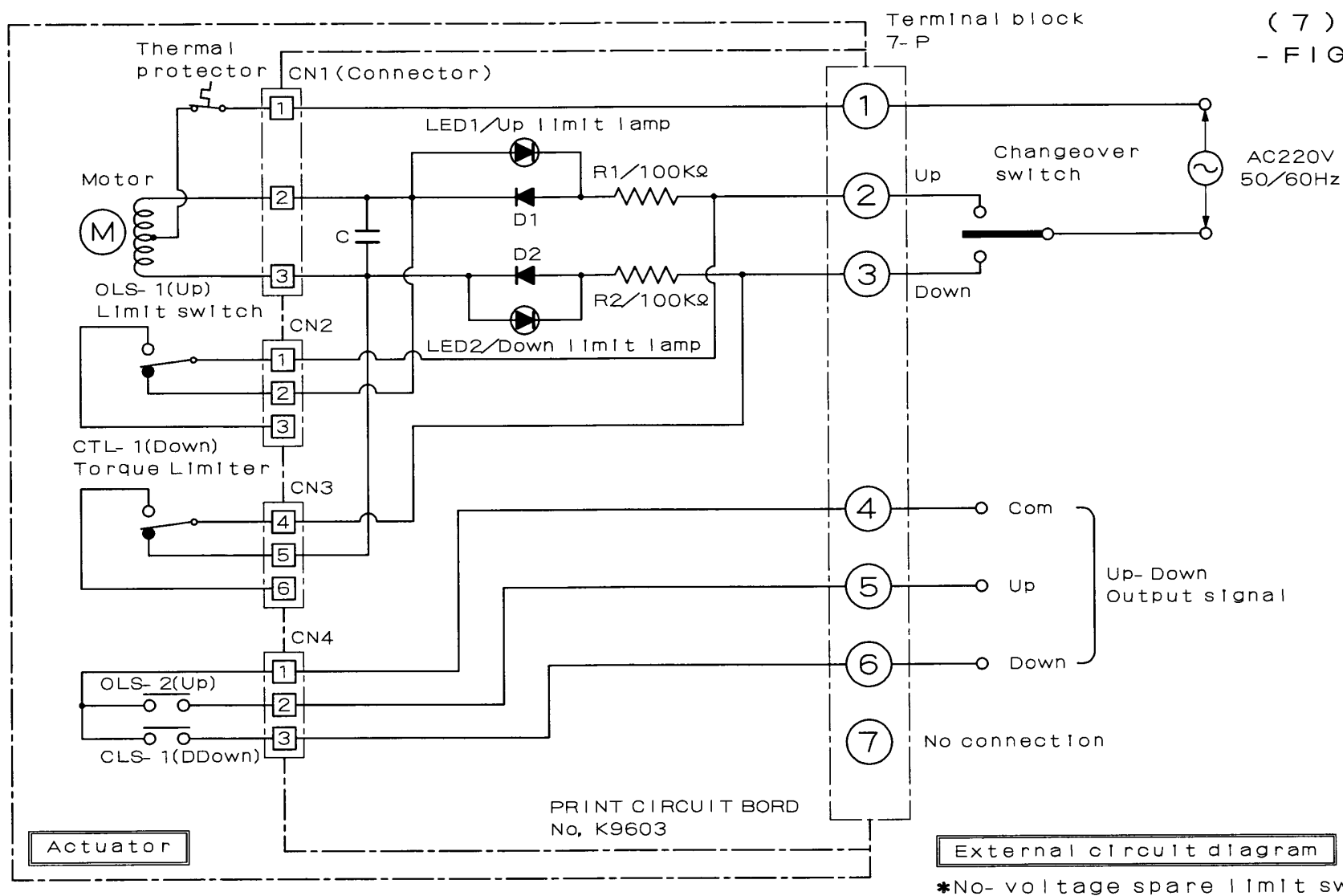
DRAWING No. CIR-9603E

MODEL: UNIC-L25, L50

DATE: '1997, 01, 20

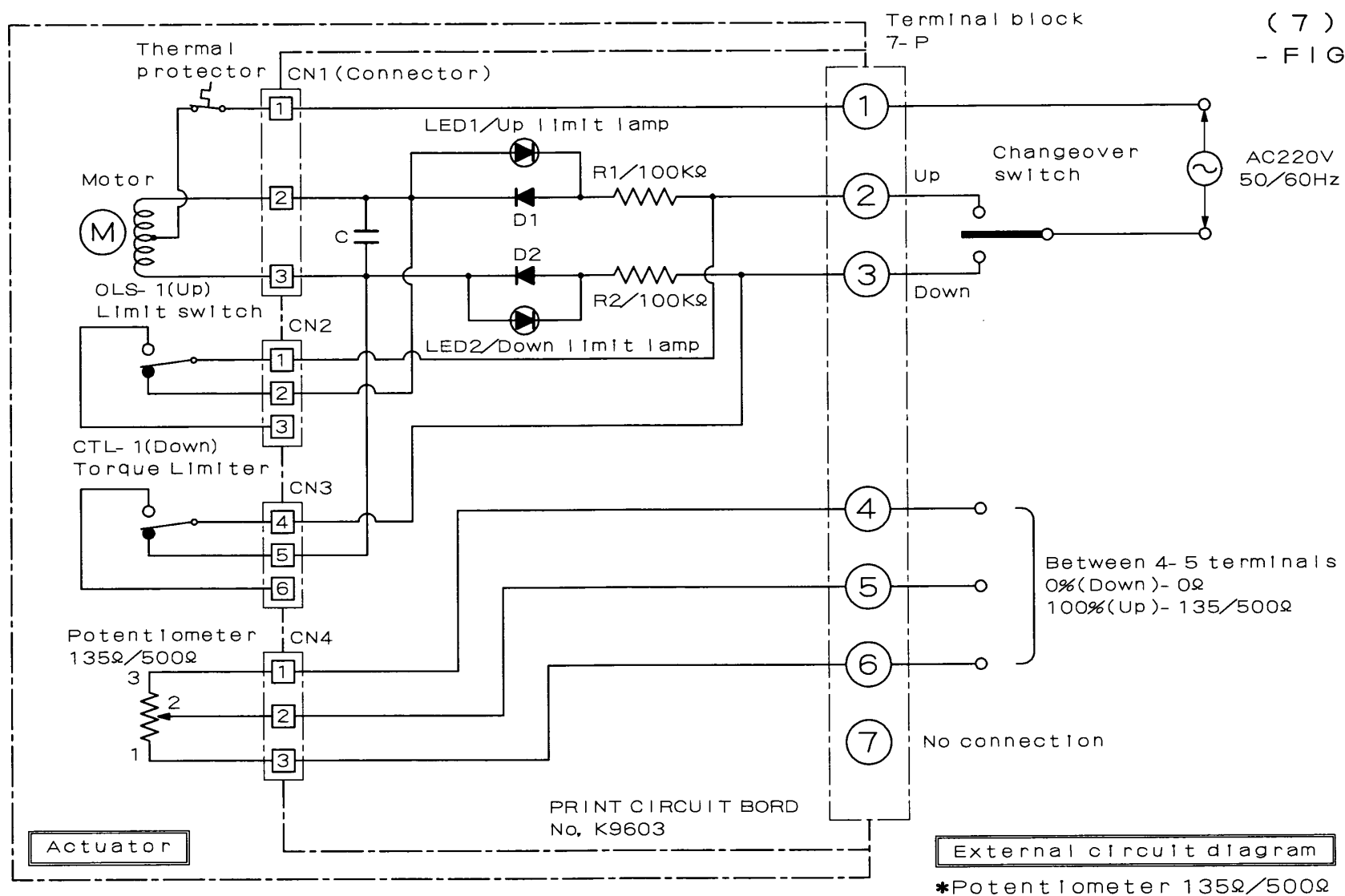
KOEI INDUSTRY CO., LTD.

SPEC: STD

(7) - 3
- FIG. 8-

*No- voltage spare limit switch

ELECTRIC ACTUATOR WIRING DIAGRAM	DRAWING No. CIR- 9603F
MODEL: Unic- L25, L50	DATE: '1997, 01, 20
KOEI INDUSTRY CO., LTD.	SPEC: OPTION

(7) - 3
- FIG. 9-

ELECTRIC ACTUATOR WIRING DIAGRAM

DRAWING No. CIR- 9603G

MODEL: Unic- L25, L50

DATE: '1997, 01, 20

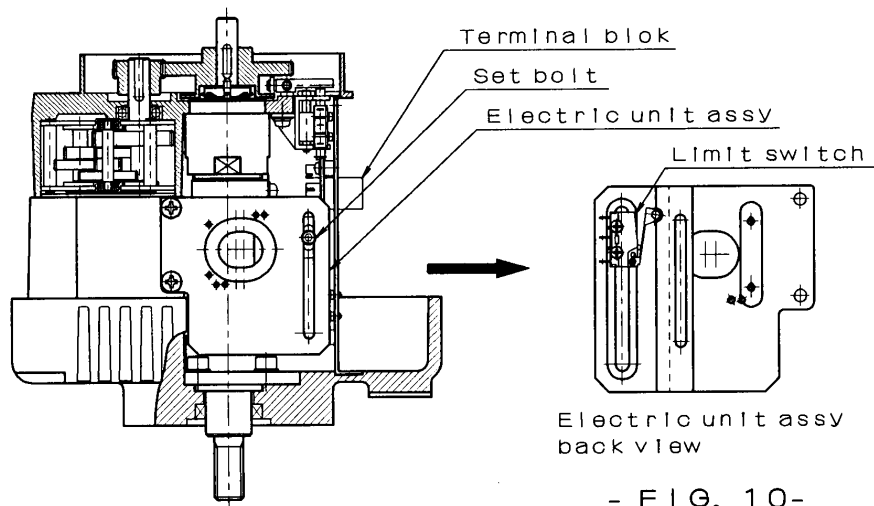
KOEI INDUSTRY CO., LTD.

SPEC: OPTION

 Confirm that power is OFF before making manual operation

8. ADJUSTMENT

8-1 Adjustment of limit switches (Upper / lower limit positions)

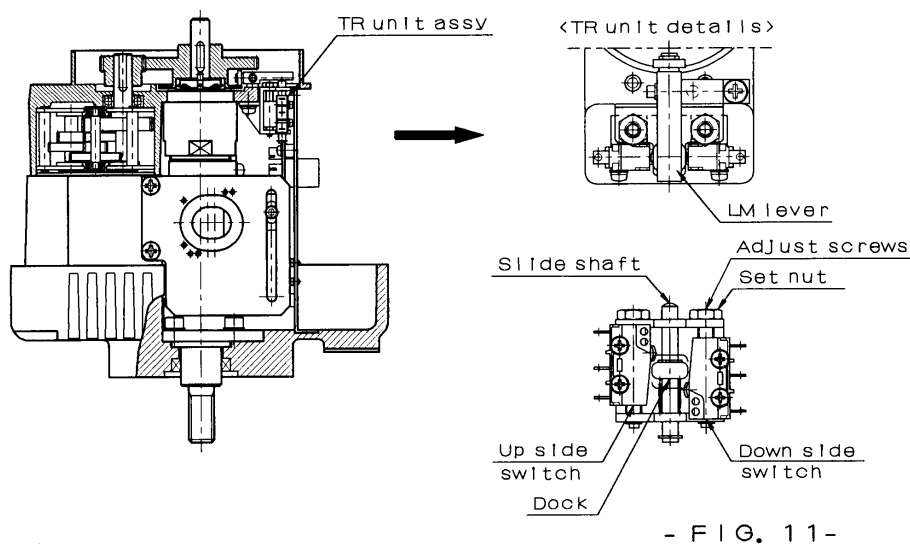


- Remove the body cover.
- Loosen bolts (M3 hexagon socket bolts) to allow the switch sliding up and down.
- Set the output shaft at upper limit position by manual handle, then slide the switch to the position where it clicks (becomes in function), and bolt it up.
- After the setting is over, confirm by manual handle that the switch properly functions, also the lamp lights at the position.

Note : Confirm that power is off before making manual operation.

The unit with top / bottom torque limiters (for 3 way valve) is not fitted with the upper position limit switch.

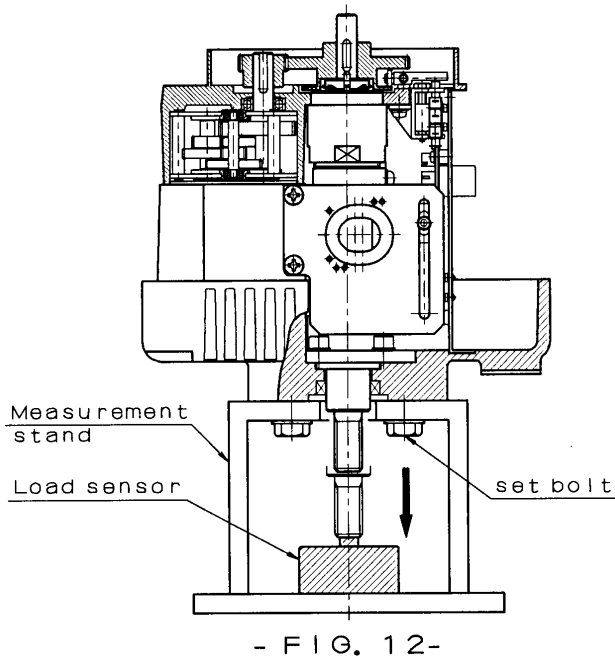
8-2 Adjustment of torque limiters



Note : Upper side switch is only fitted to the unit "with top / bottom torque limiters".
(for 3 way valve)



Confirm that power is OFF before making manual operation



The torque limiter is preset at rated torque before shipment.

As shown Fig.12, with an actuator bolted on the measurement stand, the local cell detects the torque as the limiter switch becomes in function.

Preset torque rate

Unic-L25	1961N (200kgf)
Unic-L50	4903N (500kgf)

Note : In principle, do not reset torque after shipment.

Resetting without proper jigs may make it inexact and may cause trouble.

Avoid power operation without load at the bottom position.

⊗ Resetting procedures with measurement jigs

- Fix an actuator body on measurement jigs (See Fig.12)
- Supply up / down signals to the actuator.
- Install a load cell (detector) so as that the output shaft will touch it at the bottom position.
- Loosen TR unit fixing nut (M4). (See Fig.11)
- Confirm that as the output shaft touches the detector with downward signal, the limit switch becomes effective, the motor stops and the lamp lights.
Load current torque and compare it with desired rate to be reset.
- Adjust screw is turnable with 2mm L-wrench, CW (right turn) for smaller, CCW for larger torque.

Note : Adjust torque slowly from smaller side to larger side.

Avoid to fast turn the screw CCW (left turn), or it may possibly set torque at an excessively large rate and may cause trouble.

<Allowable torque setting range>

Unic-L25	1471~2942N (150~300kgf)
Unic-L50	3432~5394N (350~550kgf)

- After setting, secure the adjust screw with the unit. (See Fig.17)

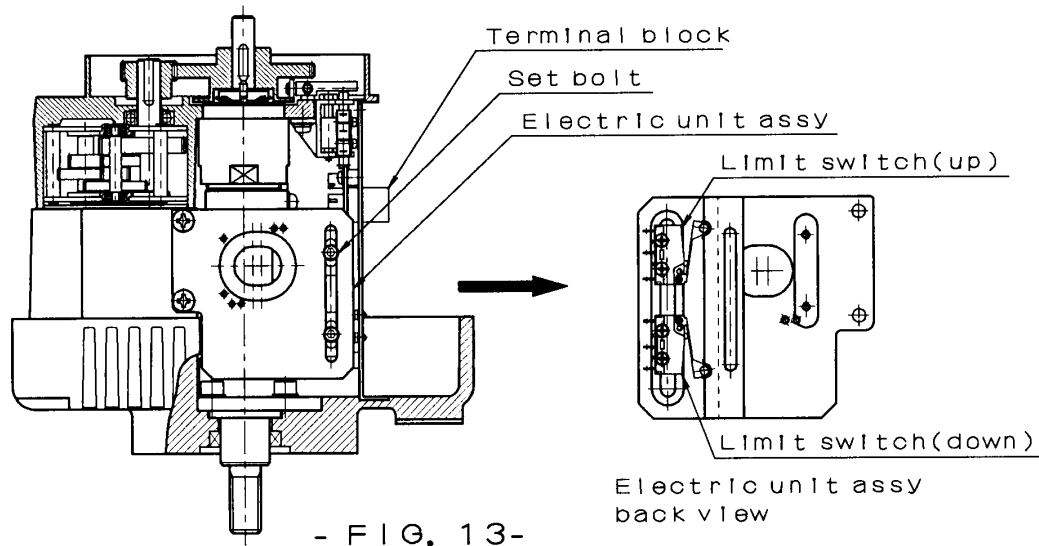
When securing, support the wrench and nut with your finger.

- Repeat test 5 times to confirm the reproducibility of torque limiter's action, then paint the fixing nut with lock paint.



Confirm that power is OFF before making manual operation

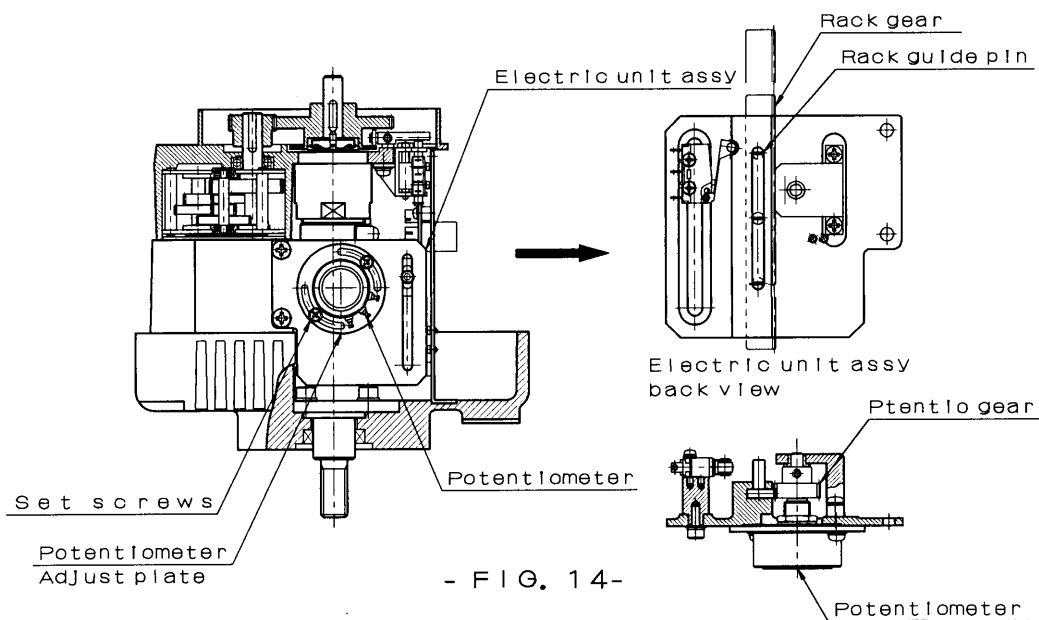
8-3 Adjustment of top / bottom contact output (option)



⌘ Adjustment procedure

- Remove the body cover. (See Fig. 13)
- Loosen top / bottom bolts (M3 hexagon socket bolts) to allow the switch sliding up and down.
- Set the output shaft by manual handle at top / bottom positions, then slide the switch to the position where it clicks (becomes effective), then bolt it up.
- After the setting is over, reconfirm by manual handle that the switch is effective at top / bottom positions.
- Confirm by power operation that the switch is effective to output signals to individual terminals on the terminal block.

8-4 Adjustment of potentiometer





Confirm that power is OFF before making manual operation

- ⌘ As the potentiometer has been preset and tested before shipment, readjustment is in principle not necessary unless it is faulty.

If the length of shaft stroke is changed, adjust ZERO / SPAN volume in the control pack to suit.

If an adjustment is required beyond ZERO / SPAN range, then adjust potentiometer in the following procedures. (See Fig. 14)

- a) Cut power and signal off.
- b) Remove body cover.
- c) Unscrew and remove gear cover and driving spur gear from reducer shaft.
- d) With input signal 4mA (bottom), manually set output shaft at the bottom position.
- e) Supply power and 4mA signal and reducer shaft will turn in either direction.

Note : When input signal and output shaft position are exactly matched each other, the shaft will stop or will not turn.

When supplying power and signals, confirm that the manual handle is removed off.

- f) Loosen fixing screws to allow potentiometer to turn, then fix it at the position where reducer shaft stops, and fix the screw top with locking paint.
- g) After the setting is over, firmly screw up spur gear and gear cover.

Note : Confirm power is off during the work.

- h) Confirm with the power and signals that the positioning is exact to signal rate.

Note : During power operation, a load should be connected with the bottom side, otherwise, positioning may become inexact.

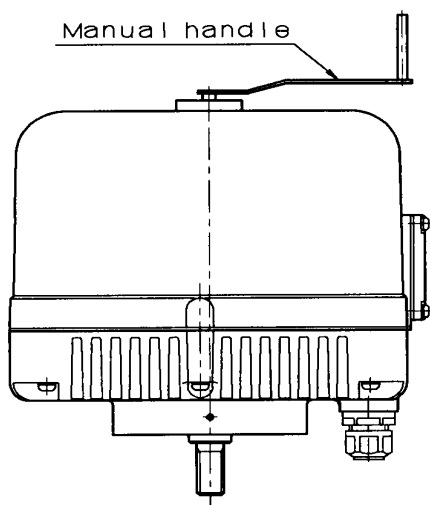
9. OPERATION



CAUTION

When making manual operation,
be sure that power is off.
If power is on while manual operation,
the handle will suddenly return!

9-1 Manual operation



-Fig. 15 -

Size of Hex. hole	Opposite 5mm
1 turn of handle	3mm-Action
Length of handle	100mm

1. Remove the rubber cap from the unit body, and find a hexagonal handle hole thereunder.
 2. Insert manual handle into the hole to turn the shaft CW for downward, CCW for upward.
- Note : Do not apply excessively large force beyond the operation range, for it may cause troubles to the unit.

9-2 Manual operation

- a) Before making power operation, confirm by manual operation that valve position is exactly matching with actuator's top / bottom limit position.
Note : Confirm that the shaft moves smoothly without eccentricity etc.
- b) Check that the wiring is properly made also confirm with external signals that the valve is exactly positioned at top and bottom limits.
Note : Confirm that the motor stops at top / bottom signal positions, also that the lamp lights by the function of bottom torque limiter.
- c) Start operation after the above confirmation is over.

10. MAINTENANCE, INSPECTION

⌘ Lubrication

As the major parts of the products are lubricated with long life di-sulfate molybdenum grease (MoS₂) before shipment, re-lubrication is in principle not required.

⌘ Inspection

- a) Cut power off, confirm by manual operation that valve moves smoothly without eccentricity.
- b) Open body cover and check if there is no condensation inside the unit, also no problem on wiring.
Note : After checking, firmly screw up the cover to prevent water ingress.

11. TROUBLE SHOOTING

TROUBLE AND PROBABLE CAUSE	SOLUTION
✱MOTOR DOES NOT START UP	
Power is off	Supply power
Circuits or terminal are open	Renew cables or re-connect terminal
Supply voltage is improper or too low	Check terminal voltage with a tester
Trouble on thermal protector (Ambient Temperature is too low or valve is constrained)	Lower ambient temperature or check valve movement by manual operation
Limit switch is faulty	Renew a limit switch
Motor is defective or lead wire is broken	Renew an actuator
Over capacity for motor advancer	Replace an advancer (condenser)
Load is insufficient for torque limiter function (Check if lamp lights)	Change the setting rate for torque limiter
✱MOTOR IS CONSTRAINED AT UPPER LIMIT	
Upper position limit switch is set out of range	Re-adjust the switch
Setting rate for torque limiter is too large (Option extra)	Change the setting rate for torque limiter
Limit switch is faulty	Renew limit switch
✱MOTOR IS CONSTRAINED AT LOWER LIMIT	
Setting rate for bottom torque limiter is too large	Change the setting rate for torque limiter
Limit switch is faulty	Change limit switch

* For other situation of troubles than the above, please refer to our Sales Dept.

[OPTIONAL EXTRAS]

- * Top / bottom torque limiters (for 3 way valve)
- * Top / bottom no voltage limit switches
- * Space heater
- * R/I converter : 4 ~ 20 mA DC
- * Potentiometer 135Ω, 500Ω or 1000Ω

For any special version, contact our Sales Dept.