

ELECTRIC ACTUATOR

“ Unic Series “
LINEAR TYPE
Unic – L100

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.



CONTENTS



1. GENERAL
2. EXTERNAL DRAWINGS
 - 2-1 Configuration and names of parts
 - 2-2 External drawing Unic-L100
3. FUNCTIONAL SPECIFICATION
4. INSTALLATION
 - 4-1 Installation place
 - 4-2 Ambient temperature / fluid temperature
5. ASSEMBLY WITH A VALVE
6. WIRING
 - 6-1 Wiring with power / signal sources
 - 6-2 Wiring work
7. POWER SUPPLY AND WIRING DIAGRAM
 - 7-1 Power supply
 - 7-2 Protection fuse and breaker
 - 7-3 Wiring diagram
8. ADJUSTMENT
 - 8-1 Positions of top and bottom limits
 - 8-2 Adjustment of torque limiters
 - 8-3 Top and bottom limits of no-voltage contact output (Optional extra)
 - 8-4 Adjustment of potentiometer (Optional extra)
9. OPERATION
 - 9-1 Manual operation
 - 9-2 Power operation
10. MAINTENANCE / INSPECTION
11. TROUBLE SHOOTING

1. GENERAL

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

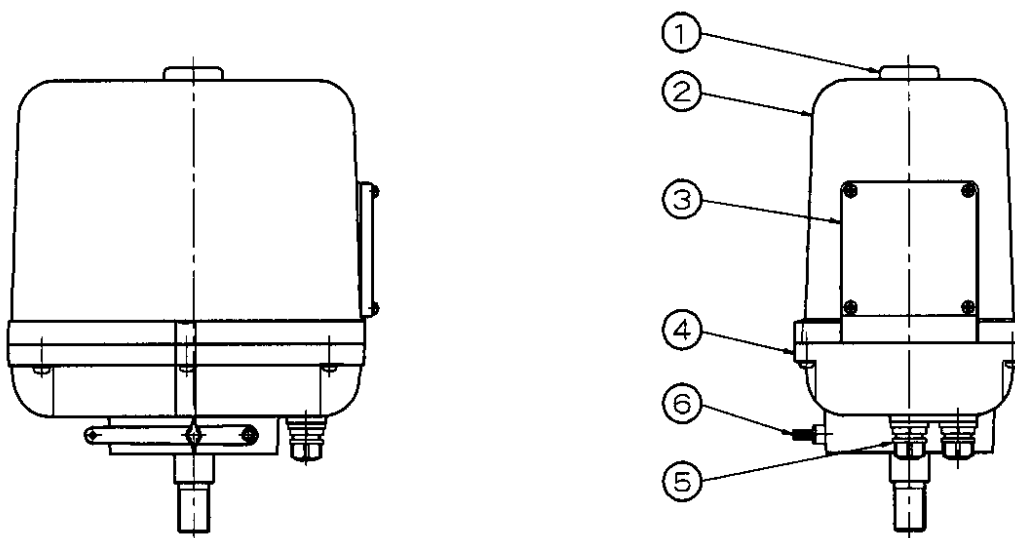
With the die cast aluminum body, the system features light, compact, and high performance.

⌘ 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.

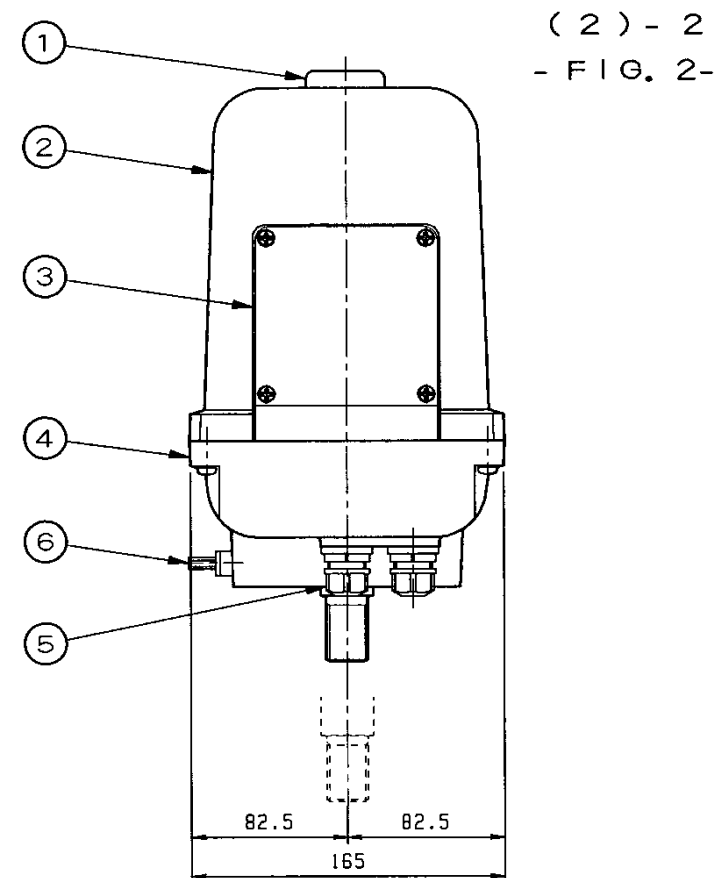
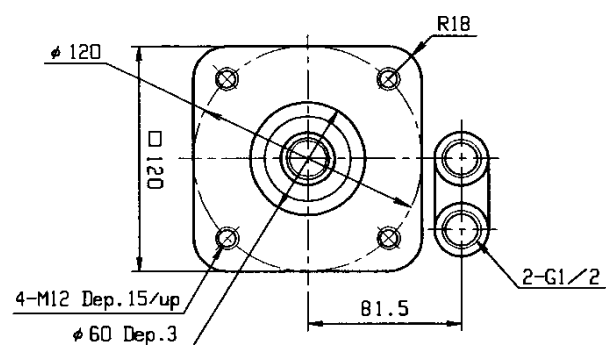
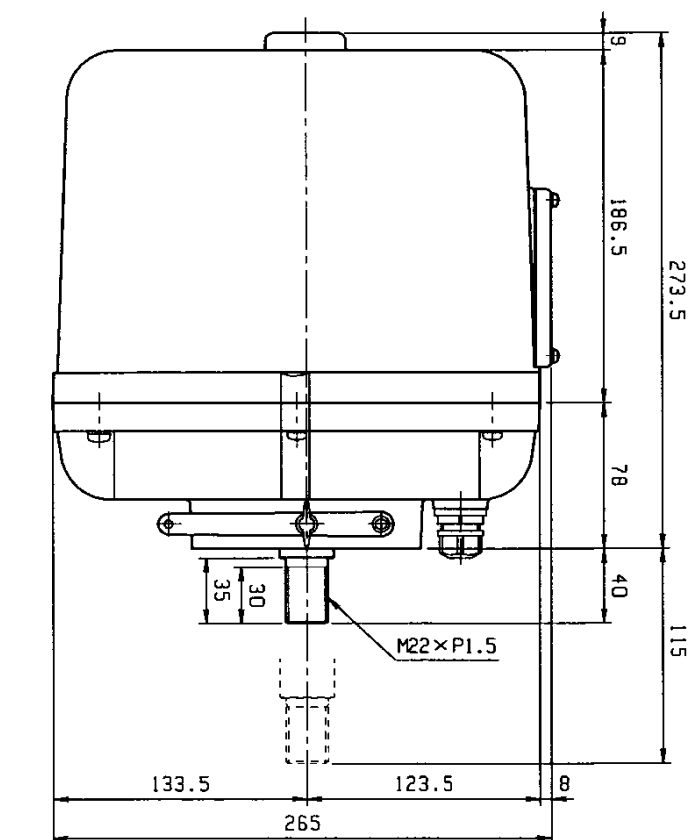
2. EXTERNAL DRAWINGS

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 - L100		
No.	NAME OF PART	MATERIAL
1	RUBBER CAP FOR MANUAL HOLE	NBR
2	BODY COVER	AC4A
3	CONDUIT COVER	A5052P
4	BODY BASE	AC4A
5	CONNECTOR	NYlon 66
6	MANUAL HANDLE	SCS13

3. FUNCTIONAL SPECIFICATION

ITEM \ MODEL	Unic-L100
RATED VOLTAGE	AC100/110/115/120V $\pm$ 10% (50/60 Hz) AC200/220/230/240V $\pm$ 10% (50/60 Hz)
SHAFT OUTPUT	11767N(1200kgf)
OPERATION SPEED	2.0 mm/sec (50 Hz) 2.4 mm/sec (60 Hz)
SHAFT STROKE	0~75mm
PROTECTION SYSTEM	* Upper limit switch (Standard spec.) * Bottom torque limiter (Standard spec.) * Motor thermal protector fitted (120°C)
AMBIENT TEMPERATURE	Ambient temperature within : -25°C~55°C
RATED CURRENT	1.3/1.6A (AC 100/110 V) 1.3/1.6A (AC 115/120 V) 0.7/0.8A (AC 200/220 V) 0.7/0.8A (AC 230/240 V)
MOTOR	90W 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	6P Terminal block
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	15 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 when installing it in 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, to prevent overheat and defect to the unit.
- * Reserve a space for manual maintenance work.



Actuator surface materials and treatment



MODEL PART	Unic-L100
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°C ~ 55°C .
- * For use at a minus temperature, an in-fit space heater is available at option.
- * For use at a 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 units may be overheated by transmission of the line heat. In such a case, use radiation type yoke and couplings. (available at option)

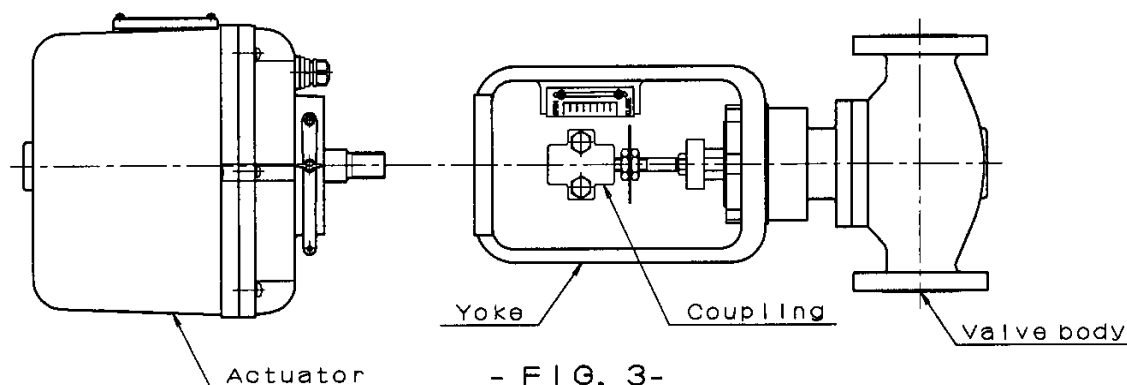
- * Standard yoke and couplings : For fluid temperature below 65°C
- * Radiation type yoke and couplings : For fluid temperature over 65°C



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.

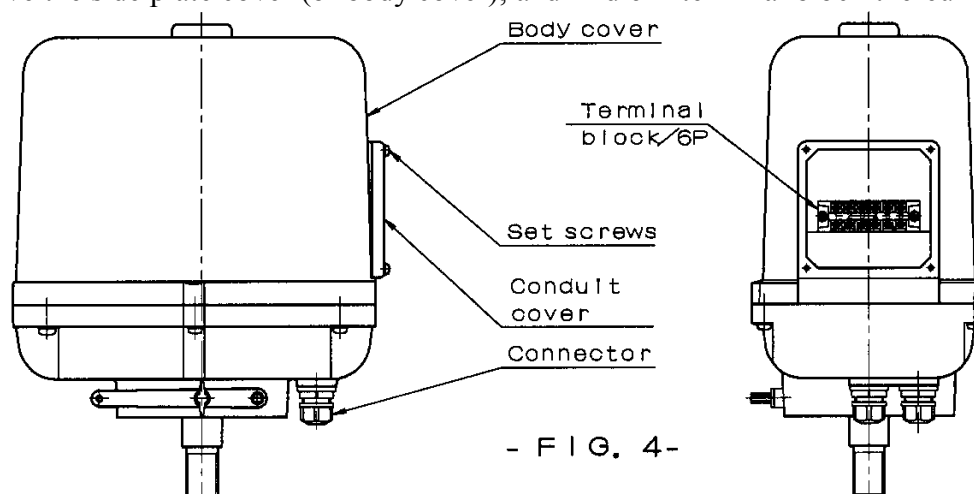


CAUTION ON WIRING WORK

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

Wiring work should be made by a qualified person based on electric equipment technical standard. Refrain from wiring work under rainy or high humid conditions.

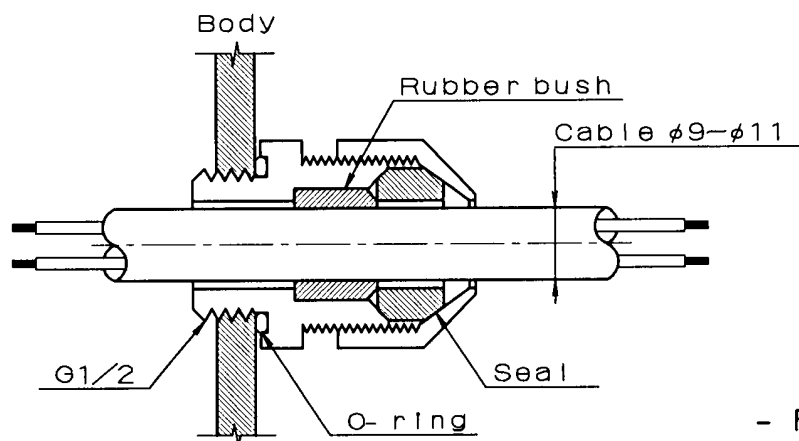
Make proper wiring to the wiring diagram.

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.

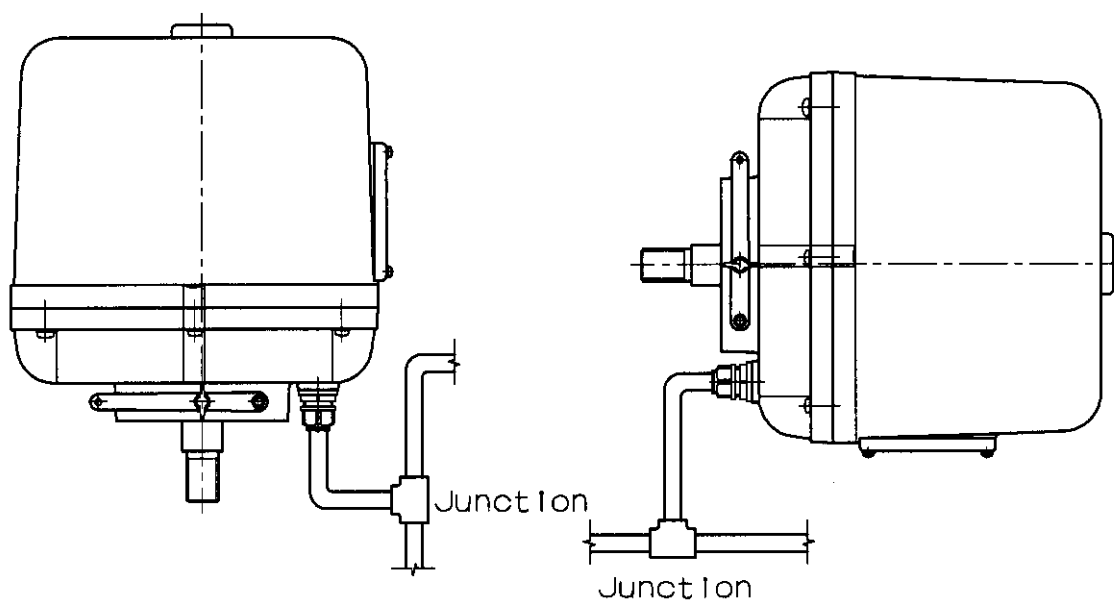
Secure the cover and conduit tightly after power/signal wiring is over to avoid water ingress.



- 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-L100	7A	90W

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

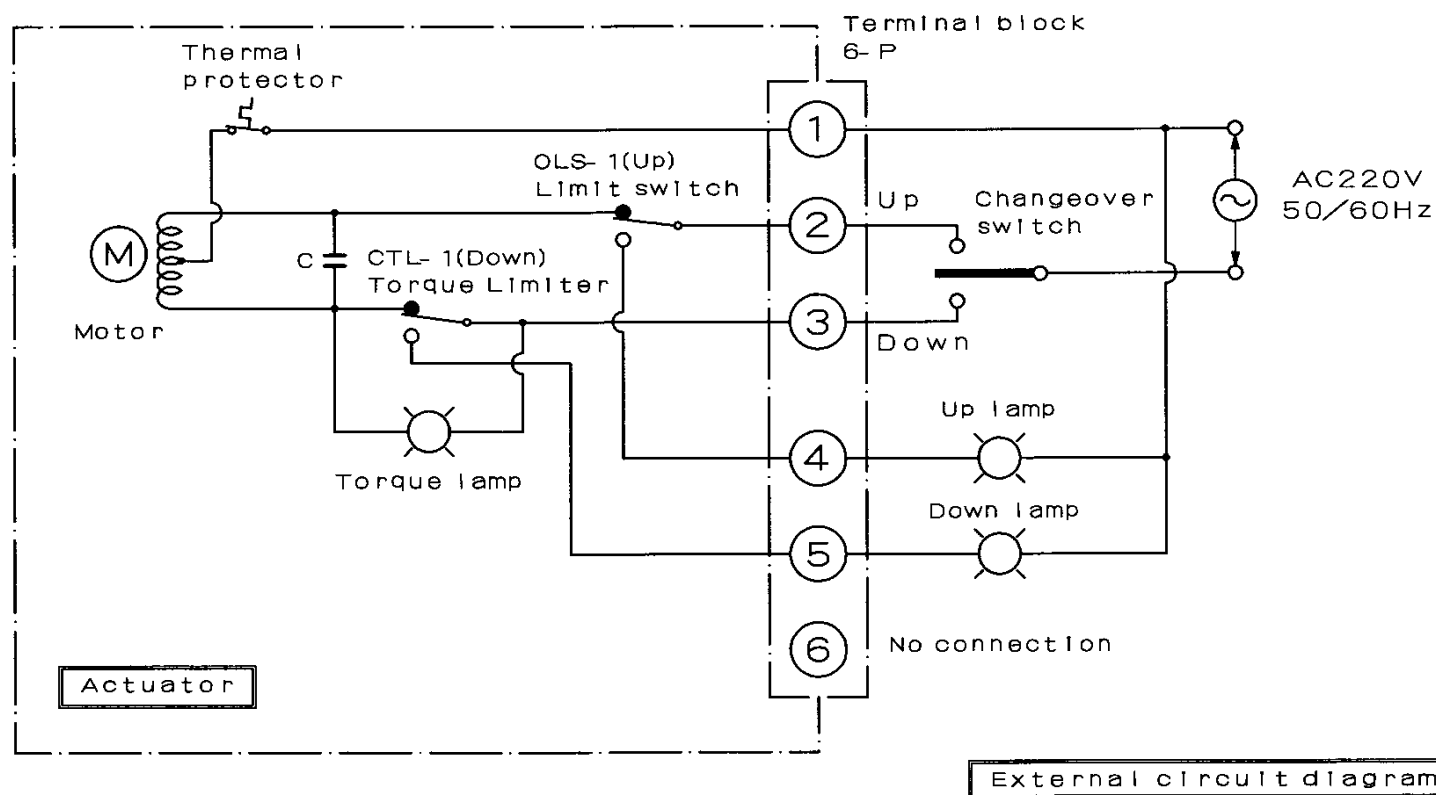
7-3 Wiring diagram

Standard circuits	CIR-9702E (Fig.7)
With top/bottom no-voltage limit switches	CIR-9702F (Fig.8)
With potentiometer	CIR-9702G (Fig.9)

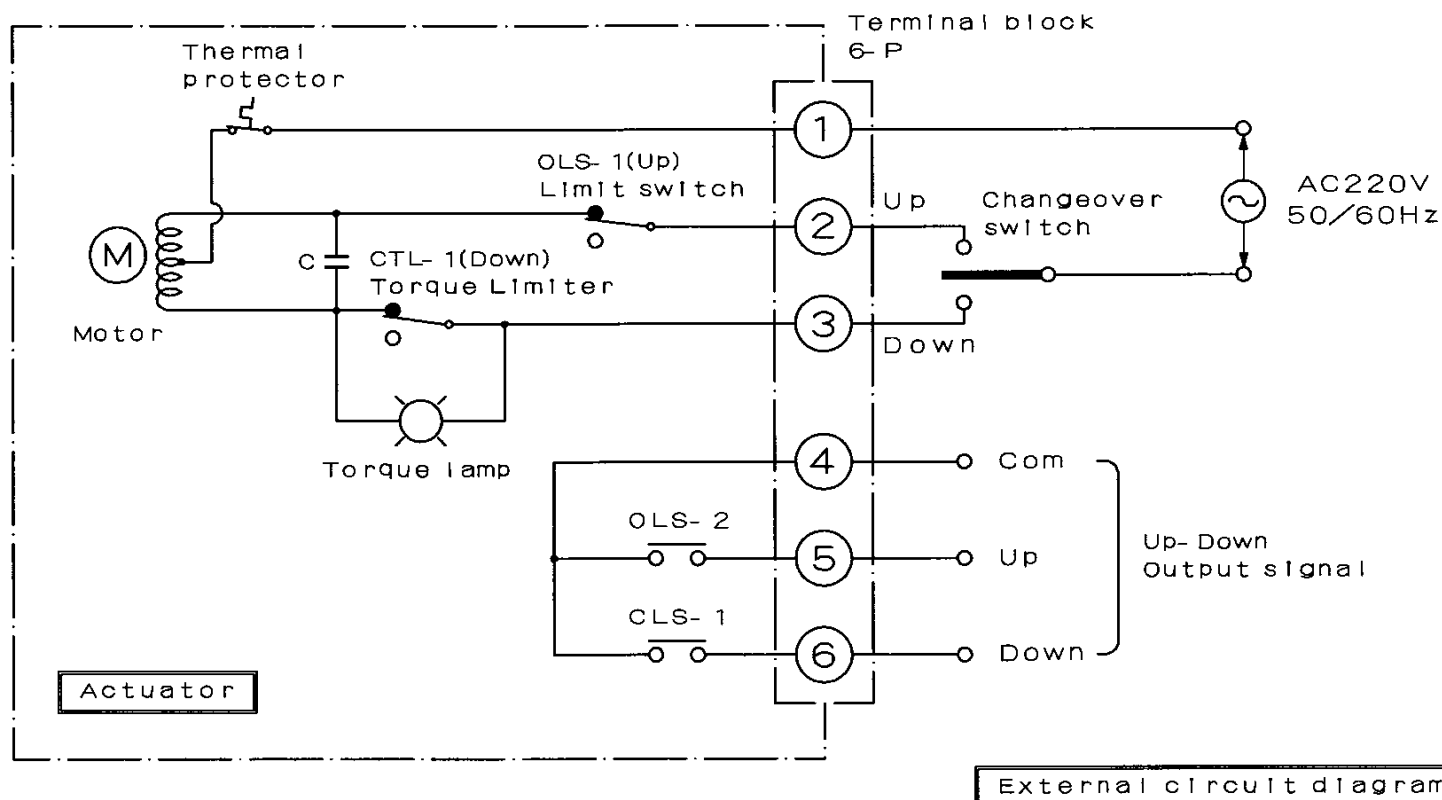
⌘ Caution on use

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-9702E
MODEL: Un1c-L100	DATE: '1997, 01, 20
KOEI INDUSTRY CO., LTD.	SPEC: STD

(7) - 3
- FIG. 8-

*No-voltage spare limit switch

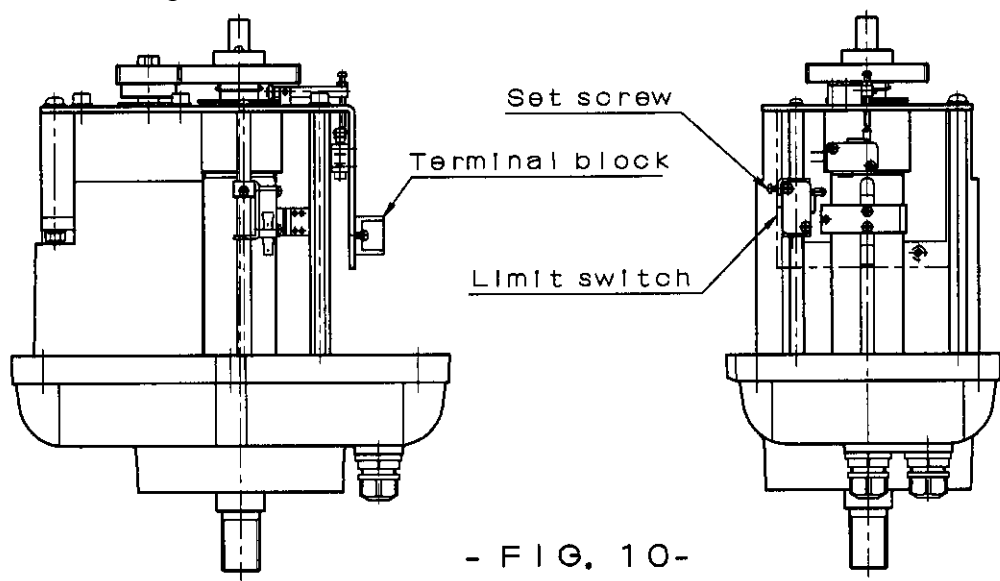
ELECTRIC ACTUATOR WIRING DIAGRAM	DRAWING No. CIR-9702F
MODEL: Unic-L100	DATE: '1997, 01, 20
KOEI INDUSTRY CO., LTD.	SPEC: OPTION



Confirm that power is OFF before making manual operation

8. ADJUSTMENT

8-1 Positions of top and bottom limits



- FIG. 10 -

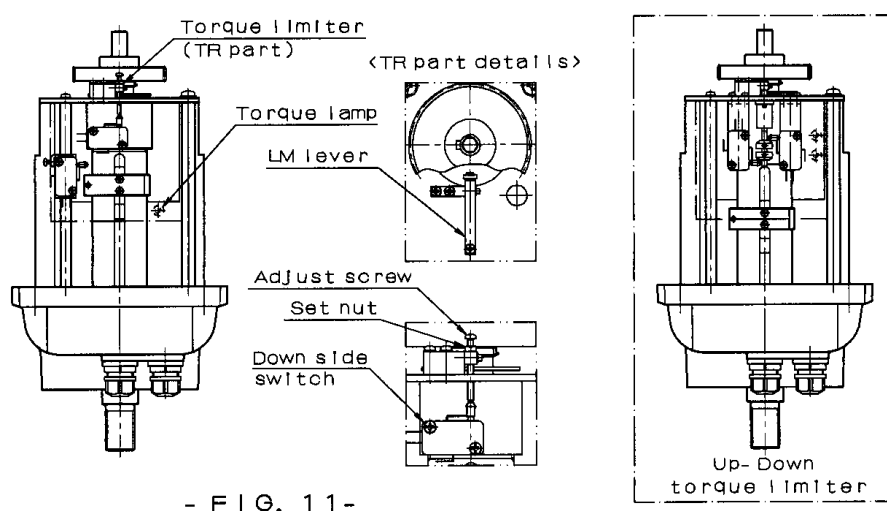
- Remove the body cover.
- Loosen bolts (M3 hexagon socket bolts) to allow the switch sliding up and down.
- Set the output shaft at upper limit position by manual handle, then slide the switch to the position where it clicks (becomes in function), and bolt it up.
- After the setting is over, confirm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

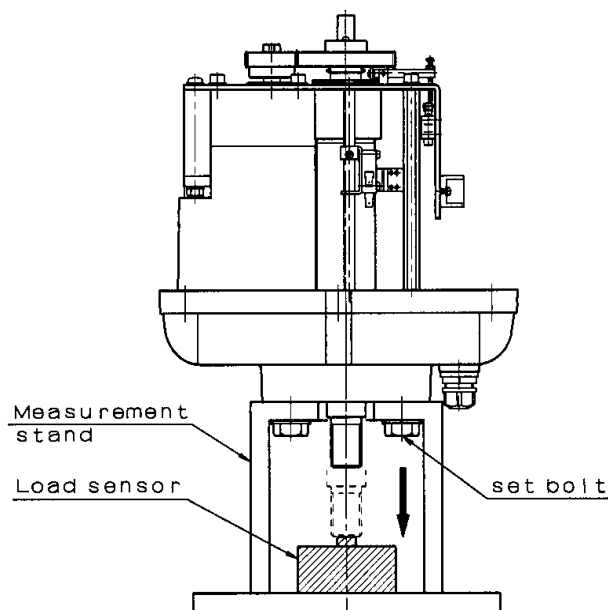
Note : Upper side switch is only fitted to the unit “with top / bottom torque limiters”.
(for 3 way valve)



- FIG. 11 -



Confirm that power is OFF before making manual operation



- FIG. 12 -

The torque limiter is preset at rated torque before shipment.

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

Preset torque rate :

Unic-L100	11767N (1200kgf)
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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 turns 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>

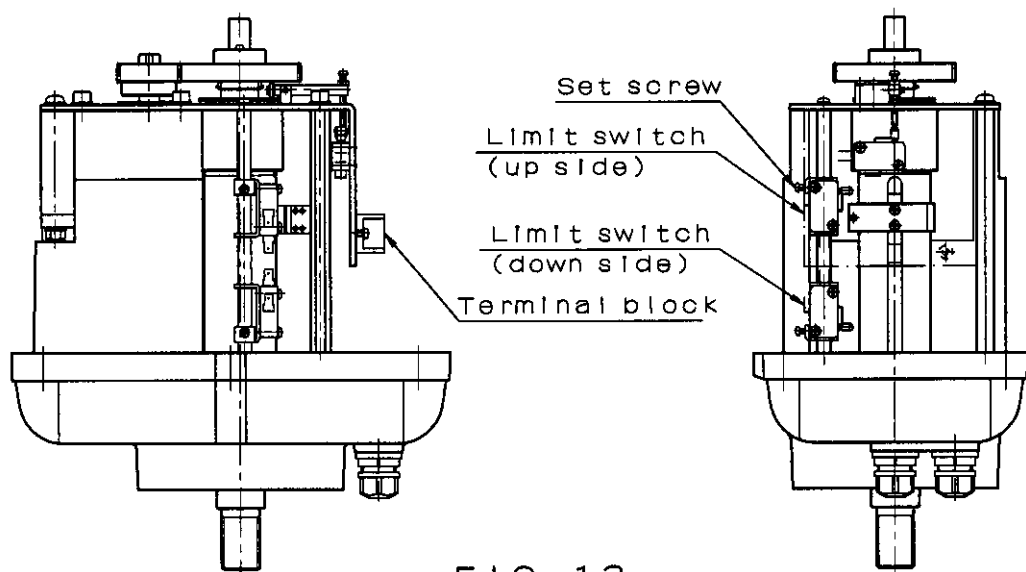
Unic-L100	4903~12748N (500~1300kgf)
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- After setting, secure the adjust screw with the unit.
When securing, support the wrench and nut with your fingers.
- Repeat test 5 times to confirm the reproducibility of torque limiter's action, then paint the fixing nut with lock paint.



Confirm that power is OFF before making manual operation

8-3 Top and bottom limits of no-voltage contact output (Optional extra)

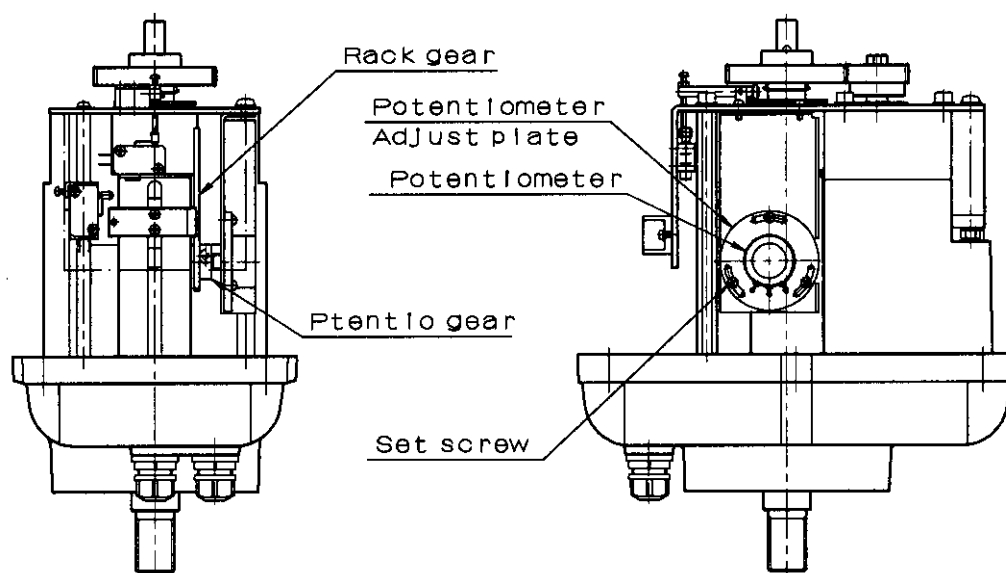


- FIG. 13 -

⌘ 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 (Optional extra)



- FIG. 14 -



Confirm that power is OFF before making manual operation

- a) Unscrew and remove body cover.
- b) Connect a digital tester at the specified terminals (No.4-5).
- c) Manually set the output shaft at Top/Bottom limit, and read the resistance output rate at each position.
When necessary, make adjustment in the following order.
- d) Unscrew potentiometer adjustment plate to allow the plate and potentiometer to turn for adjusting the resistance output rate.

<< When resistance output is largely deviated beyond the range of the plate >>

Remove the screws and draw the plate and potentiometer.

Turn the potention-gear on the potention-shaft by fingers, and set the resistance output at an optional rate.

Fix the potentiometer and the adjustment plate in position.

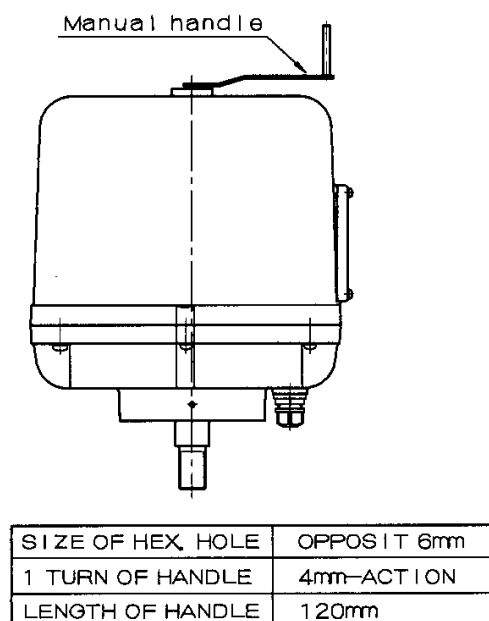
Note : Be sure that the adjustment plate is fixed in the right position where the potentiometer and the rack gear properly engages.

- e) After adjustment, identify by manual operation each resistance output rate at Top/Bottom limit.
- f) By power operation, confirm that output rate varies smoothly at Top/Bottom position and while moving.

Note : While power operation, the shaft will not stop at the position without load at the bottom side.

9. OPERATION

9-1 Manual operation



- FIG. 15-

- a) Remove the rubber cap from the unit body, and find a hexagonal handle hole thereunder.
- b) 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.



CAUTION

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



Confirm that power is OFF before making manual operation

9-2 Power 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

When restarting operation after a long period of rest, make the following confirmation.

- 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
Thermal protector functioned	Lower ambient temperature or check valve movement by manual operation
Limit switch is faulty	Renew limit switch
Motor is defective or lead wire is broken	Renew actuator
Over capacity for motor advancer	Replace 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 135 Ω , 500 Ω or 1000 Ω

For any special version, contact our Sales Dept.