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.
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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 -

<table>
<thead>
<tr>
<th>No.</th>
<th>NAME OF PART</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RUBBER CAP FOR MANUAL HOLE</td>
</tr>
<tr>
<td>2</td>
<td>BODY COVER</td>
</tr>
<tr>
<td>3</td>
<td>CONDUIT COVER</td>
</tr>
<tr>
<td>4</td>
<td>BODY BASE</td>
</tr>
<tr>
<td>5</td>
<td>CONNECTOR</td>
</tr>
<tr>
<td>6</td>
<td>MANUAL HANDLE</td>
</tr>
</tbody>
</table>
Model: UNIC-L100

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rubber Cap for Manual Hole</td>
<td>NBR</td>
</tr>
<tr>
<td>2</td>
<td>Body Cover</td>
<td>AC4A</td>
</tr>
<tr>
<td>3</td>
<td>Conduit Cover</td>
<td>A5052P</td>
</tr>
<tr>
<td>4</td>
<td>Body Base</td>
<td>AC4A</td>
</tr>
<tr>
<td>5</td>
<td>Connector</td>
<td>Nylon 66</td>
</tr>
<tr>
<td>6</td>
<td>Manual Handle</td>
<td>SCS13</td>
</tr>
</tbody>
</table>

-2-
3. FUNCTIONAL SPECIFICATION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MODEL</th>
<th>Unic-L100</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATED VOLTAGE</td>
<td>AC100/110/115/120V±10% (50/60 Hz) AC200/220/230/240V±10% (50/60 Hz)</td>
<td></td>
</tr>
<tr>
<td>SHAFT OUTPUT</td>
<td>11767N(1200kgf)</td>
<td></td>
</tr>
<tr>
<td>OPERATION SPEED</td>
<td>2.0 mm/sec (50 Hz) 2.4 mm/sec (60 Hz)</td>
<td></td>
</tr>
<tr>
<td>SHAFT STROKE</td>
<td>0~75mm</td>
<td></td>
</tr>
<tr>
<td>PROTECTION SYSTEM</td>
<td>* Upper limit switch (Standard spec.) * Bottom torque limiter (Standard spec.) * Motor thermal protector fitted (120°C)</td>
<td></td>
</tr>
<tr>
<td>AMBIENT TEMPERATURE</td>
<td>Ambient temperature within : –25°C~55°C</td>
<td></td>
</tr>
<tr>
<td>RATED CURRENT</td>
<td>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)</td>
<td></td>
</tr>
<tr>
<td>MOTOR</td>
<td>90W Reversible motor</td>
<td></td>
</tr>
<tr>
<td>INSULATION GRADE</td>
<td>E Class</td>
<td></td>
</tr>
<tr>
<td>RATED OPERATION TIME</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>INSULATION RESISTANCE</td>
<td>Between power terminal --- case : 500V DC/100MΩ</td>
<td></td>
</tr>
<tr>
<td>WITHSTAND VOLTAGE</td>
<td>Between power terminal --- case :1500V AC/1 minute</td>
<td></td>
</tr>
<tr>
<td>OUTPUT SIGNAL</td>
<td>* Top/Bottom limit voltage output (Standard spec.) * Top/Bottom limit no-voltage output (Optional extra) * Potentiometer(Optional extra)</td>
<td></td>
</tr>
<tr>
<td>CONNECTION TERMINAL</td>
<td>6P Terminal block</td>
<td></td>
</tr>
<tr>
<td>MANUAL OPERATION</td>
<td>Detachable crank handle (Standard accessory)</td>
<td></td>
</tr>
<tr>
<td>WIRE INLET</td>
<td>G1/2 × 2 (Water-sealed conduit)</td>
<td></td>
</tr>
<tr>
<td>ENCLOSURE PROTECTION</td>
<td>NEMA-4X (IP-65)</td>
<td></td>
</tr>
<tr>
<td>EXPLOSION PROOF</td>
<td>Non explosion-proof</td>
<td></td>
</tr>
<tr>
<td>MOUNTING ANGLE</td>
<td>From vertical to horizontal angles</td>
<td></td>
</tr>
<tr>
<td>BODY MATERIAL</td>
<td>Die cast Aluminum</td>
<td></td>
</tr>
<tr>
<td>COATING</td>
<td>Melamine baking coating (silver)</td>
<td></td>
</tr>
<tr>
<td>WEIGHT</td>
<td>15 kg</td>
<td></td>
</tr>
</tbody>
</table>
4. INSTALLATION

4-1 Installation place

X 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.

X 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

<table>
<thead>
<tr>
<th>PART</th>
<th>MODEL</th>
<th>Unic-L100</th>
</tr>
</thead>
<tbody>
<tr>
<td>BODY BASE</td>
<td>Die cast Aluminum</td>
<td>Oxidation treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Melamine baking coating</td>
</tr>
<tr>
<td>BODY COVER</td>
<td>Die cast Aluminum</td>
<td>Oxidation treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Melamine baking coating</td>
</tr>
<tr>
<td>SIDE PLATE COVER</td>
<td>Die cast Aluminum</td>
<td>Oxidation treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Melamine baking coating</td>
</tr>
<tr>
<td>OUTPUT SHAFT</td>
<td>SUS 304</td>
<td></td>
</tr>
<tr>
<td>MANUAL DRIVEHOLE CAP</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>OIL SEAL</td>
<td>NBR</td>
<td></td>
</tr>
</tbody>
</table>

4-2 Ambient temperature / fluid temperature

X 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.

X 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
- Be sure that power is off before making manual operation.
- Drive the valve manually and confirm that it is normal. Then set it at full close position.
- Fit a yoke to the actuator.
- After the actuator is set at full close, engage output shaft and the valve stem with coupling.
- 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.
6-2 Wiring work

Use sufficiently sealed tubes or conduit to prevent water ingress.
7. POWER SUPPLY AND WIRING DIAGRAM

7-1 Power supply

Standard supply

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity of fuse/breaker</th>
<th>Motor capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unic-L100</td>
<td>7A</td>
<td>90W</td>
</tr>
</tbody>
</table>

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.

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

7-3 Wiring diagram

<table>
<thead>
<tr>
<th>Feature</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard circuits</td>
<td>CIR-9702E (Fig.7)</td>
</tr>
<tr>
<td>With top/bottom no-voltage limit switches</td>
<td>CIR-9702F (Fig.8)</td>
</tr>
<tr>
<td>With potentiometer</td>
<td>CIR-9702G (Fig.9)</td>
</tr>
</tbody>
</table>

× 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.
8. ADJUSTMENT
8-1 Positions of top and bottom limits

a) Remove the body cover.
b) Loosen bolts (M3 hexagon socket bolts) to allow the switch sliding up and down.
c) 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.
d) 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 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) |

Resetting procedures with measurement jigs

a) Fix an actuator body on measurement jigs (See Fig.12)
b) Supply up / down signals to the actuator.
c) Install a load cell (detector) so as that the output shaft will touch it at the bottom position.
d) Loosen TR unit fixing nut (M4). (See Fig.11)
e) 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.
f) 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) |

g) After setting, secure the adjust screw with the unit.
   When securing, support the wrench and nut with your fingers.
h) 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)

Adjustment procedure
a) Remove the body cover. (See Fig. 13)
b) Loosen top / bottom bolts (M3 hexagon socket bolts) to allow the switch sliding up and down.
c) 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.
d) After the setting is over, reconfirm by manual handle that the switch is effective at top / bottom positions.
e) 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)
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 potentio-gear on the potentio-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

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.

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

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

* 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.