ELECTRIC ACTUATORS

“Unic Series”
ROTARY TYPE
Unic - Z, 05
Unic - 10
Unic - 20, 40
Unic - 60, 100, 150, 200

OPERATION MANUAL

Koei Industry Co., Ltd.
FOR YOUR SAFETY

In order to 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 human.

⚠️ 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 of falling down.
- Do not make wiring work in the rain or in splashing water.
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1. GENERAL

"Unic Series" is a super high quality quarter-turn rotary type electric valve actuator for on/off and intermediate position service.

*FEATURES

Compact and light
Easy of installation and maintenance
Simple structure with fewest trouble
Manual operation by crank handle
Thermal protection from motor burn-out
Terminal block for simple wiring
Water tightness to NEMA-4X (to IP-66)

2. CONFIGURATION

2-1 Configuration and names of parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body: NEMA-4X Housing</td>
</tr>
<tr>
<td>2</td>
<td>Gear Cover</td>
</tr>
<tr>
<td>3</td>
<td>Valve Position Indicator</td>
</tr>
<tr>
<td>4</td>
<td>Limit Switch/Potentiometer Cover</td>
</tr>
<tr>
<td>5</td>
<td>Conduit</td>
</tr>
<tr>
<td>6</td>
<td>Terminal Strip Cover</td>
</tr>
<tr>
<td>7</td>
<td>Manual Override Socket</td>
</tr>
<tr>
<td>8</td>
<td>Output Shaft (Male)</td>
</tr>
<tr>
<td>9</td>
<td>O/R Socket Dust Cover</td>
</tr>
</tbody>
</table>
2-2 Unic - Z, 05 Configuration

2-3 Unic - 10 Configuration
2-4 Unic - 20, 40 Configuration

2-5 Unic - 60, 100, 150, 200 Configuration
### 3. FUNCTIONAL SPECIFICATION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MODEL</th>
<th>Unic-Z, 05</th>
<th>Unic-10</th>
<th>Unic-20, 40</th>
<th>Unic-60, 100, 150, 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATED VOLTAGE</td>
<td></td>
<td>AC 100/110/115/120V ±10% (50/60Hz)</td>
<td></td>
<td></td>
<td>Unic-60: 2A/100V 0.9A/200V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 200/220/230/240V ±10% (50/60Hz)</td>
<td></td>
<td></td>
<td>Unic-100,-150,200: 3.5A/100V 1.7A/200V</td>
</tr>
<tr>
<td>RATED CURRENT</td>
<td>0.75A/100V 0.6A/100V</td>
<td></td>
<td>0.4A/200V 0.3A/200V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUTPUT SHAFT TORQUE</td>
<td>Unic-Z: 9.8N-m (1kgf-m)</td>
<td></td>
<td>Unic-10: 98N-m (10kgf-m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unic-05: 39N-m (4kgf-m)</td>
<td></td>
<td>Unic-20:</td>
<td>196N-m (20kgf-m)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unic-40: 392N-m (40kgf-m)</td>
<td></td>
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</tr>
<tr>
<td>OPERATION SPEED</td>
<td>Unic-Z: 4 Sec.</td>
<td>30 Sec./50Hz</td>
<td></td>
<td>30 Sec./50Hz</td>
<td>Unic-60,-100: 30 Sec./50Hz</td>
</tr>
<tr>
<td></td>
<td>Unic-05: 15 Sec.</td>
<td></td>
<td></td>
<td></td>
<td>Unic-150: 45 Sec./50Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unic-200: 60 Sec./50Hz</td>
</tr>
<tr>
<td>MOTOR</td>
<td>8W E Class</td>
<td>20W E-Class</td>
<td></td>
<td>Unic-20: 30W E Class</td>
<td>Unic-60: 90W E Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unic-40: 40W E Class</td>
<td>Unic-100,-150,-200: 100W E Class</td>
</tr>
<tr>
<td>OPERATION ANGLE</td>
<td>0~90°</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROTECTOR</td>
<td>Thermal Protector</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMBIENT TEMPERATURE</td>
<td>Ambeint Termperature within: -25°C - +55°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSULATION RESISTANCE</td>
<td>100M O / 500DC</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>WITHSTAND VOLTAGE</td>
<td>1500V AC/ 1 Minute</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>MANUAL OPERATION</td>
<td>Crank Handle Attached</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOP</td>
<td>Mechanical Type (OPEN/CLOSE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENCLOSURE PROTECTION</td>
<td>Water Tightness NEMA-4X (to IP-65)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOUNTING ANGLE</td>
<td>From Vertical to Horizontal Angles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POSITION DETECTION</td>
<td>OPEN/CLOSE limit Switches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BODY MATERIAL</td>
<td>Die Cast Aluminum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COATING COLOR</td>
<td>Silver Gray N-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONDUIT ENTRANCE</td>
<td>P 1/2 X1 with Resin connector</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>WEIGHT</td>
<td>2kg</td>
<td>4.5kg</td>
<td>Unic-20: 9kg</td>
<td>Unic-60: 20kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unic-40: 9.5kg</td>
<td>Unic-100: 21kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unic-150,-200: 22kg</td>
<td></td>
</tr>
</tbody>
</table>
4. INSTALLATION

4-1 Installation

**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**
* Shade the unit from direct sunlight, that may cause overheat and defect to the unit.
* Reserve a space for manual maintenance work.

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**Materials and treatment of the unit surface**

<table>
<thead>
<tr>
<th>MODEL PART</th>
<th>Unic-Z, -05</th>
<th>Unic-10</th>
<th>Unic-20, -40</th>
<th>Unic-60, -100, -150, -200</th>
</tr>
</thead>
<tbody>
<tr>
<td>BODY BASE</td>
<td>Diecast Aluminum</td>
<td>Oxidation Treatment</td>
<td>Melamine baking paint</td>
<td></td>
</tr>
<tr>
<td>DRIVING UNIT COVER</td>
<td>Diecast Aluminum</td>
<td>Oxidation Treatment</td>
<td>Melamine baking paint</td>
<td></td>
</tr>
<tr>
<td>ELECTRIC UNIT COVER</td>
<td>Heat Resisting ABS Resin</td>
<td>Melamine baking paint</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTROL UNIT COVER</td>
<td>Heat resisting ABS resin</td>
<td>Diecast Aluminum</td>
<td>Oxidation Treatment</td>
<td>Melamine baking paint</td>
</tr>
<tr>
<td>OUTPUT SHAFT</td>
<td>SUS 303</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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4-2 AMBIENT TEMPERATURE / FLUID TEMPERATURE

* Ambient temperature
* Environmental temperature range for use : -25°C~55°C.
* For use in minus temperature, in?fit 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 actuator is applied to a high temperature fluid line, the unit may overheat by transmission of line heat. In such a case, use radiation type bracket and couplings. (available at option)
* Standard bracket and couplings : Fluid temperature max. 65°C
* Radiation type bracket and couplings : Fluid temperature over 65°C
5. ASSEMBLY WITH A VALVE

* Names of parts

Assembly procedure
1. Be sure that power is off before making manual operation.
2. Confirm that a valve is smoothly turnable by hands without eccentricity, then position it at full close.
   Note: There are some valves designed in reverse direction of open/close.
3. Bolt a bracket on the valve.
4. Tentatively mount an actuator on the bracket with loose bolts.
5. Position the actuator at 0 (close), joint the output shaft and the valve stem with couplings.
6. Screw up the bolts.
7. Check with the attached crank handle if the valve is turnable smoothly without eccentricity.

6. WIRING

6-1 Power and input signals
Use a cable of F 9~11mm for the standard connector. (See FIG.7)
If a customer connector is used, select a cable of proper diameter, preventing water ingress to the unit.
6-2 Wiring work
Use sufficiently sealed tubes or conduit to prevent water ingress.

![Diagram of wiring (Fig. 8)]

CAUTION ON USE

7. POWER SOURCE AND CIRCUITS

7-1 Power source

Standard supply

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity of Fuse/Braker</th>
<th>Motor Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unic-Z, -05</td>
<td>5A</td>
<td>8W</td>
</tr>
<tr>
<td>Unic-10</td>
<td>5A</td>
<td>20W</td>
</tr>
<tr>
<td>Unic-20</td>
<td>5A</td>
<td>30W</td>
</tr>
<tr>
<td>Unic-40</td>
<td>7A</td>
<td>90W</td>
</tr>
<tr>
<td>Unic-60</td>
<td>7A</td>
<td>90W</td>
</tr>
<tr>
<td>Unic-100,-150,-200</td>
<td>10A</td>
<td>100W</td>
</tr>
</tbody>
</table>

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

7-2 Recommendable fuse and braker

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

Note: Wiring should be made properly to avoid noise disturbance etc.
Do not make parallel operation with plural actuators.
If they are operated at the same time through one open-close switch, the actuators may draw abnormal current into the units, causing chattering, then disturbance to normal operation.
If it goes as is for a long time, actuators may become defective.
Confirm that power is “OFF” before making manual operation

8. ADJUSTMENT

8-1 Adjustment of the limit switches and position meter

LS 1: Open Limit Switch
LS 2: Open Contact Output
LS 3: Close Limit Switch
LS 4: Close Contact Output

1. Fully open valve by manual handle. Loosen and turn the loser limit cam and confirm that the limit switch is effective.
2. For close side, fully close the valve, turn the upper limit cam, and confirm that the switch is effective.
3. Tighten the cam nut up. Adjustment of the valve position indicator is now completed. Contact output positions are also adjusted.
   * Position limit switch is normally at “B” contact, contact output is at “A” contact, respectively.

The upper limit switch is for close, lower one is for open direction. 2 extra limit switches (contact output) are available at option.

1. Open the valve fully by manual handle. Loosen and turn the lower cam. Confirm that the switch has been off, then screw the cam up.
2. Adjust the close side in the same manner. The adjustment is now over.
3. The limit switch is normally at “A” contact.
The limit switch at right is for close, left one is for open direction.

1. Open the valve fully by manual handle.
2. Remove the opening meter.
3. Loosen and turn the limit cam and confirm that the limit switch clicks. Then screw up the cam.
4. Adjust close side in the same manner.
   Adjustment is now over.
* The limit switches are normally at "B" contact.

The limit switch at right is for close, left one is for open direction.

1. Open the valve fully by manual handle.
2. Loosen, then set the position meter at full open.
3. Loosen, and turn the lower limit cam.
   Confirm that the limit switch clicks. Then screw up the cam.
4. Adjust close side in the same manner.
   Adjustment is now over.
* The limit switches are normally at "B" contact.
**8-2 Intermediate limit switch**
(option)

Intermediate limit switch can be set at any position.
1. After setting the actuator at a desired rate, adjust LS 1 cam to a position where the limit switch clicks.
2. Set LS 2 in the same manner.

* Refer to Fig. 13 for wiring diagram.

![Diagram](image1)

**8-3 Potentiometer**
(option)

Standard resistance for your choice:
135, 500,1000 Ω
1. Open the valve fully by manual handle.
2. Loosen opening-meter gear.
3. Applying a tester between 4-5 terminals on the terminal block, set the opening-meter at a point where the resistance rate becomes below 5 Ω, then screw it up.

* Refer to Fig. 14 for wiring diagram.

![Diagram](image2)
Complete Wiring Diagram

Terminal Block
10 pin

1. Green
2. White
3. Black
4. Red
5. Brown
6. Yellow
7. Red
8. Brown
9. Yellow
10. White

1. Open Limit
2. Close Limit

M
Reversible Motor

Thermal Protector

LS-2

LS-1

Potentiometer

Heater

Actuator
8-4 Mechanical Stop

1. Open the valve fully by manual handle.
2. Loosen, and return the stop by 1/2 turn with the adjuster bolt.
3. Screw up the locknut.
4. Adjust close side in the same manner.
   Adjustment is now over.

9. TEST OPERATION
   9-1 Manual operation

1. Cut power off before making manual operation.
2. Insert the manual handle into the hexagonal hole underneath the rubber cap.
3. Turn the handle clockwise for close, counter clockwise for open.

Note: The limit switches become effective at open/close of position meter. The stops are at 1/2 turn beyond those points. Do not apply excessive force to the handle, for it might damage the unit.

<SIZE OF MANUAL HANDLE>

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Unic-Z, -05, -10</th>
<th>Unic-20</th>
<th>Unic-60, -100, -150, -200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opposite of Hexagon</td>
<td>5mm</td>
<td>6mm</td>
<td>15mm</td>
<td></td>
</tr>
<tr>
<td>Number of Handle Turns</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>100mm</td>
<td>120mm</td>
<td>255mm</td>
<td></td>
</tr>
</tbody>
</table>

⚠️ Confirm that power is “OFF” before making manual operation

When making manual operation, be sure power is off. If power is on while manual operation, the handle will suddenly return!
9-2 Power operation

* Before making power operation:

* Confirm that the indication on the position meter and the valve opening are matching each other.

* Confirm that the circuits are properly wired, also that the unit operates in correct direction with external switches.

10. MAINTENANCE, INSPECTION

* Lubrication
As the major parts of the products are lubricated with long life di?sulphate molibdenem grease (MOS2) before shipment, re?lubrication is in principle not required.

* Inspection
When re-starting operation after a long period of rest, make the following confirmation.
* Cut power off, confirm by manual operation that valve moves smoothly without eccentricity.
* Open body cover and check if there is no condensation inside the unit, also no problem on wiring.

Note: After checking, secure 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 improper or too low</td>
<td>Check terminal voltage with a tester</td>
</tr>
<tr>
<td>Trouble on thermal protector (Ambient temperature is too low or valve is constrained)</td>
<td>Lower ambient temperature or check valve movement by manual operation</td>
</tr>
<tr>
<td>Limit Switch is faulty</td>
<td>Renew a limit switch</td>
</tr>
<tr>
<td>Motor is defective or lead wire is broken</td>
<td>Renew an actuator</td>
</tr>
<tr>
<td>Over capacity for motor advancer</td>
<td>Replace an advancer (condenser)</td>
</tr>
<tr>
<td>Limit Cam is not correctly adjusted</td>
<td>Re-adjust limit cam</td>
</tr>
</tbody>
</table>

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

12. OPTION EXTRAS

* No voltage extra limit switches : 2pcs.
* Potentiometer: 135/500/1000 O
* R/I converter: 4 ~ 20 mA DC
* Torque limiters
* Speed controller
* Space heater

For any special version, contact our Sales Dept.