

K4 Series

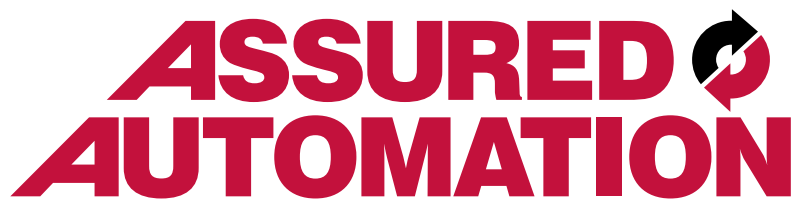
Heavy Duty Weatherproof Worm Gear Electric Actuators



Installation, Operation, & Maintenance Manual



Scan for more product information
Doc. AA-K4-IOM-2021.10.20



K4 Series

Heavy Duty Weatherproof Worm Gear Electric Actuators

On/Off Valve Actuators

Unic Models

Unic-Z

Unic-05

Unic-10

Unic-20

Unic-40

Unic-60

Unic-100

Unic-150

For **Nucom**
Modulating Control Models
See Page 21


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. CONFIGURATION

2-1 Configuration and names of parts

2-2 Unic-Z,05

2-3 Unic-10

2-4 Unic-20,40

2-5 Unic-60,100,150,200

3. SPECIFICATION

4. INSTALLATION

4-1 Installation place

4-2 Ambient temperature, fluid temperature

5. ASSEMBLY WITH A VALVE

6. WIRING

6-1 Power and input signals

6-2 Wiring work

7. POWER SOURCE AND CIRCUITS

7-1 Power source

7-2 Fuse and braker

7-3 Circuit diagram

8. ADJUSTMENT

8-1 Limit switches and position meter

8-2 Intermediate limit switch (option)

8-3 Potentiometer (option)

8-4 Mechanical stop

9. TEST OPERATION

9-1 Manual operation

9-2 Power operation

10. MAINTENANCE / INSPECTION

11. TROUBLE SHOOTING

12. OPTIONAL EXTRAS

1. GENERAL

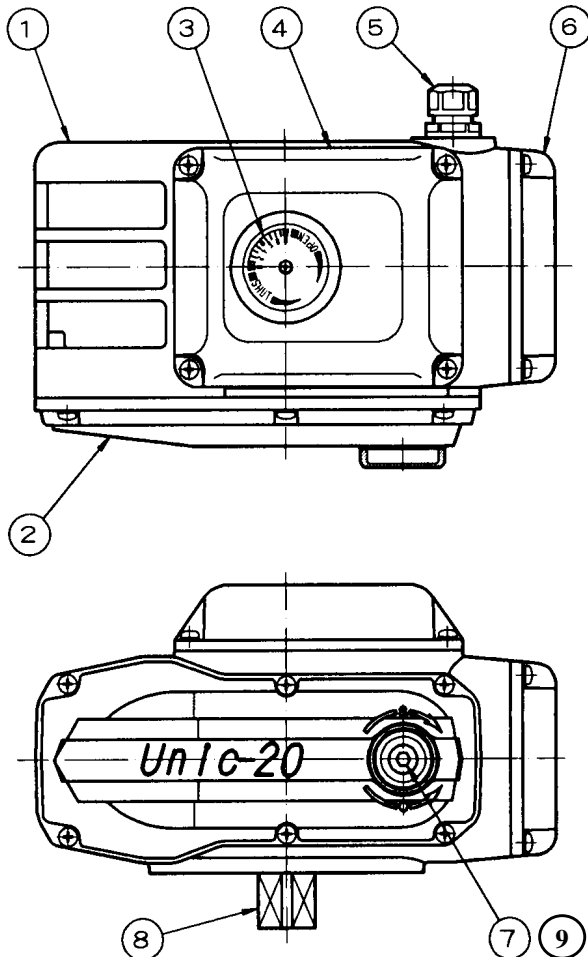
“Unic Series” is a super high quality quarter-turn rotary type electric valve actuator for on/off and intermediate position service.

⊗ 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

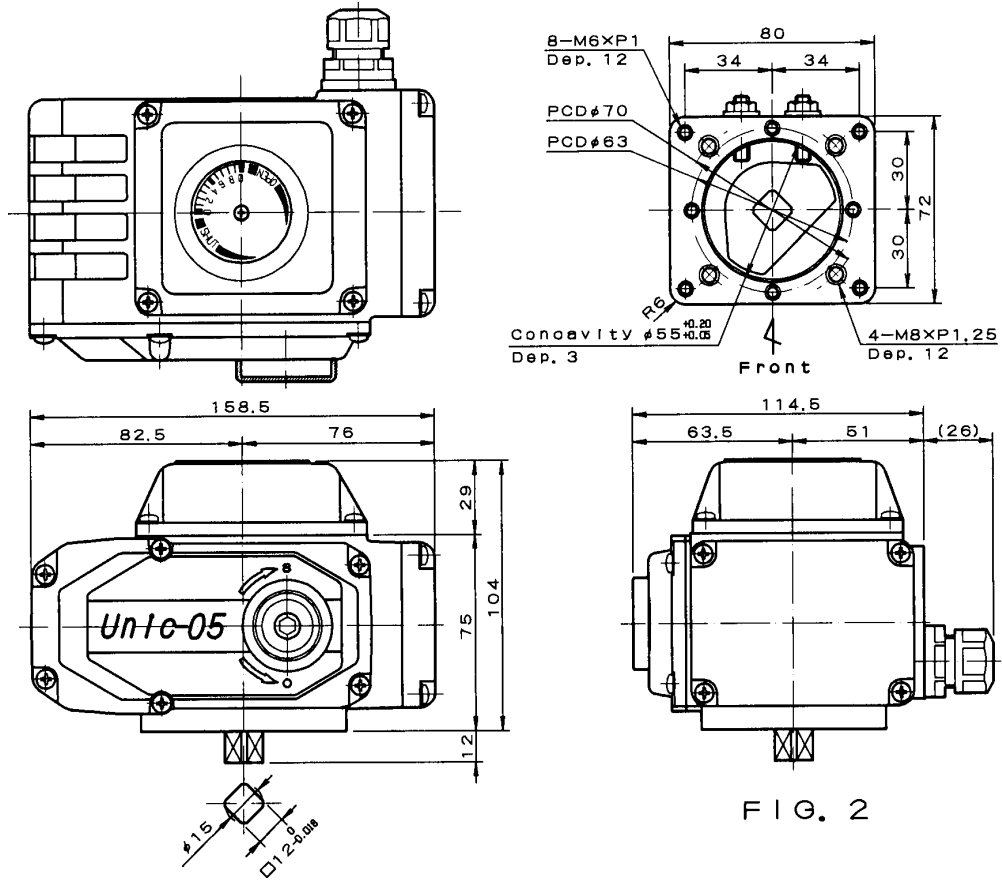
2-1 Configuration and names of parts



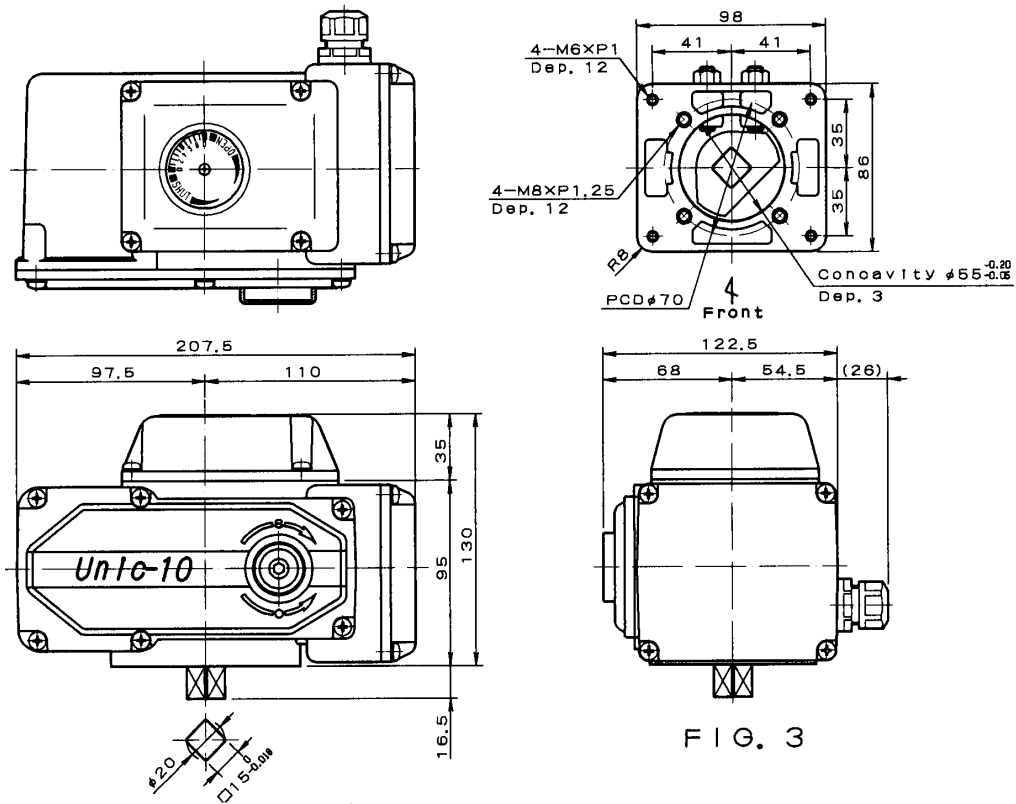
No	Name
1	Body: NEMA 4X Housing
2	Gear Cover
3	Valve Position Indicator
4	Limit Switch / Pot Cover
5	Conduit
6	Terminal Strip Cover
7	Manual Over Ride Socket
8	Output Shaft (Male)
9	O/R Socket Dust Cover

FIG. 1

2-2 Unic-Z, 05 Configuration



2-3 Unic-10 Configuration



2-4 Unic-20, 40 Configuration

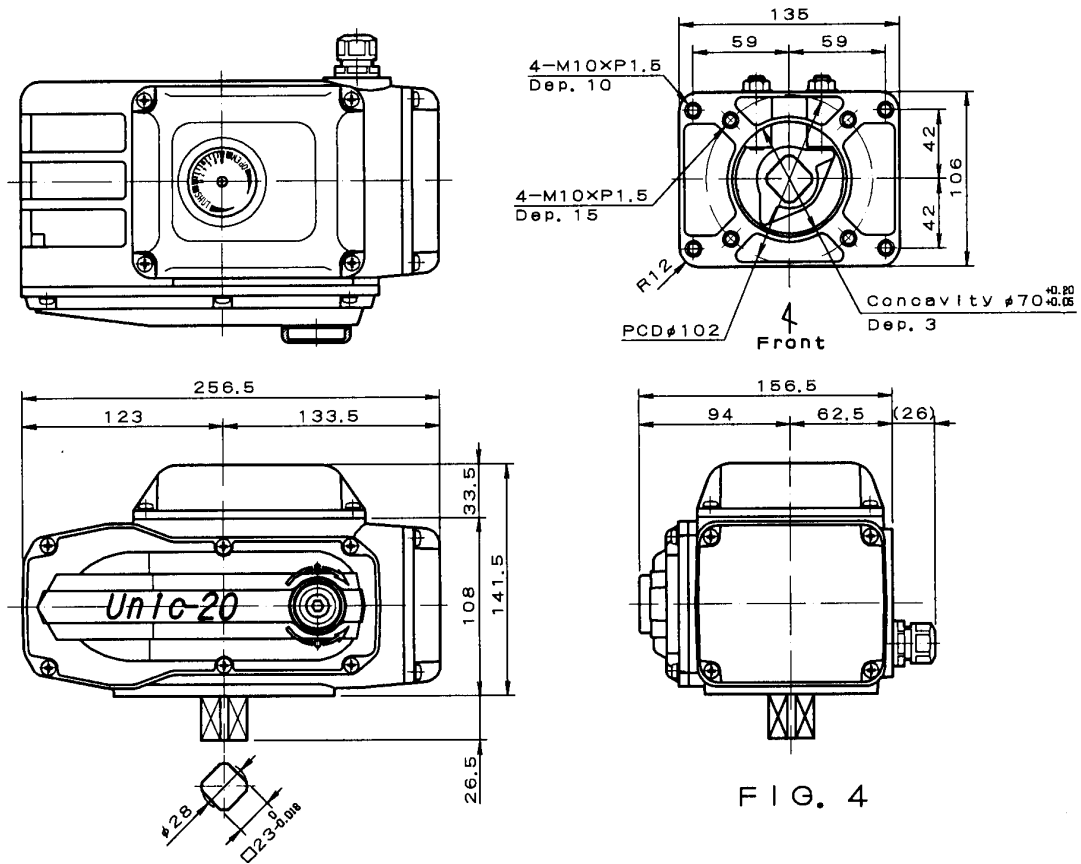


FIG. 4

2-5 Unic-60, 100, 150, 200 Configuration

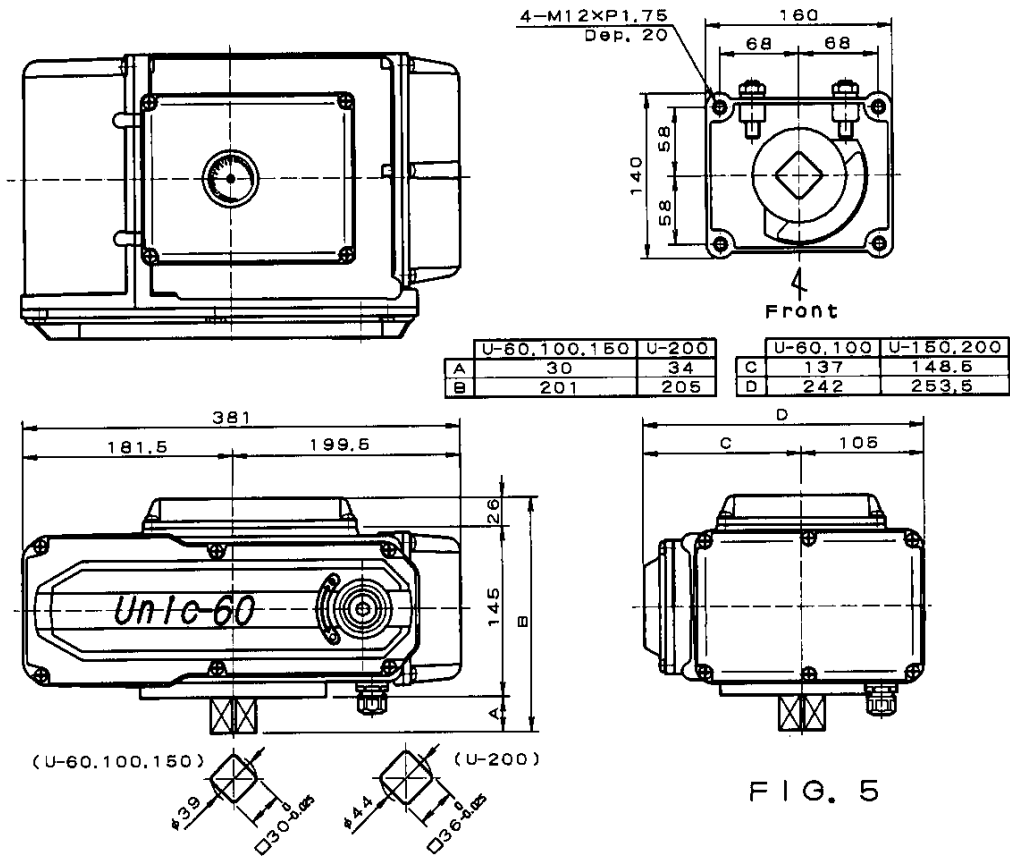


FIG. 5

3. FUNCTIONAL SPECIFICATION

ITEM \ MODEL		Unic-Z	Unic-05	Unic-10	Unic-20	Unic-40
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)				
RATED CURRENT	AC100/110V	0.7/0.9A		0.65/0.70A	1.1/1.2A	1.8/2.0A
	AC115/120V	0.6/0.7A		0.60/0.65A	1.0/1.1A	1.6/1.8A
	AC200/220V	0.4/0.5A		0.35/0.40A	0.55/0.60A	0.9/1.0A
	AC230/240V	0.25/0.30A		0.30/0.35A	0.50/0.55A	0.7/0.9A
OUTPUT SHAFT TORQUE		9.8N·m (1kgf·m)	39N·m (4kgf·m)	98N·m (10kgf·m)	196N·m (20kgf·m)	392N·m (40kgf·m)
OPERATION SPEED		4/3.3sec (50/60Hz)	15/12.5sec (50/60Hz)	30/25sec (50/60Hz)		
MOTOR		8W E-class		20W E-class	30W E-class	90W E-class
OPERATION ANGLE		0 ~ 90 °				
PROTECTOR		Thermal protector				
AMBIENT TEMPERATURE		Ambient temperature within : -25 ~ 55				
INSULATION RESISTANCE		100M /500DC				
WITHSTAND VOLTAGE		1500V AC/1minute				
MANUAL OPERATION		Crank handle attached				
STOP		Mechanical type(OPEN/CLOSE)				
ENCLOSURE PROTECTION		Water tightness NEMA-4X(to IP-65)				
MOUNTING ANGLE		From vertical to horizontal angles				
POSITION DETECTION		OPEN/CLOSE limit switches				
BODY MATERIAL		Die cast Aluminum				
COATING COLOR		Silver gray N-6				
CONDUIT ENTRANCE		P1/2 \times 1 with resin connector				
WEIGHT		2.3kg		4.5kg	7.8kg	8.5kg

ITEM \ MODEL		Unic-60	Unic-100	Unic-150	Unic-200
RATED VOLTAGE		AC110/110V \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)			
RATED CURRENT	AC100/110V	1.8/2.0A	2.9/3.0A	3.4/3.5A	3.4/3.5A
	AC115/120V	1.7/1.9A	2.6/2.8A	3.2/3.4A	3.2/3.4A
	AC200/220V	1.0/1.1A	1.5/1.6A	1.8/1.9A	1.8/1.9A
	AC230/240V	0.9/1.0A	1.3/1.4A	1.6/1.7A	1.6/1.7A
OUTPUT SHAFT TORQUE		588N \cdot m (60kgf \cdot m)	981N \cdot m (100kgf \cdot m)	1471N \cdot m (150kgf \cdot m)	1961N \cdot m (200kgf \cdot m)
OPERATION SPEED		30/25sec (50/60Hz)		45/38sec (50/60Hz)	60/50sec (50/60Hz)
MOTOR		90W E-class	100W E-class		
OPERATION ANGLE		0 ~ 90 °			
PROTECTOR		Thermal protector			
AMBIENT TEMPERATURE		Ambient temperature within : -25 ~ 55			
INSULATION RESISTANCE		100M /500DC			
WITHSTAND VOLTAGE		1500V AC/1minute			
MANUAL OPERATION		Crank handle attached			
STOP		Mechanical type(OPEN/CLOSE)			
ENCLOSURE PROTECTION		Water tightness NEMA-4X(to IP-65)			
MOUNTING ANGLE		From vertical to horizontal angles			
POSITION DETECTION		OPEN/CLOSE limit switches			
BODY MATERIAL		Die cast Aluminum			
COATING COLOR		Silver gray N-6			
CONDUIT ENTRANCE		P1/2 \times 1 with resin connector			
WEIGHT		20kg	21kg	22kg	

CAUTION ON ENVIRONMENTAL INSTALLATION CONDITIONS

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.

Materials and treatment of the unit surface

MODEL PART	Unic-Z/05	Unic-10	Unic-20/40	Unic-60/100/150/200
BODY BASE	Diecast Aluminum Chromate treatment Electrostatic coating			
DRIVING UNIT COVER	Diecast Aluminum Chromate treatment Electrostatic coating			
ELECTRIC UNIT COVER	Diecast Aluminum Chromate treatment Electrostatic coating			
CONTROL UNIT COVER	Diecast Aluminum Chromate treatment Electrostatic coating			
OUTPUT SHAFT	SUS 303			

4-2 AMBIENT TEMPERATURE / FLUID TEMPERATURE

⊗ Ambient temperature

- * Environmental temperature range for use : -25 ~ 55 .
- * 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
- * Radiation type bracket and couplings : Fluid temperature over 65



CAUTION ON ASSEMBLY WITH A VALVE

5. ASSEMBLY WITH A VALVE

☒ Names of parts

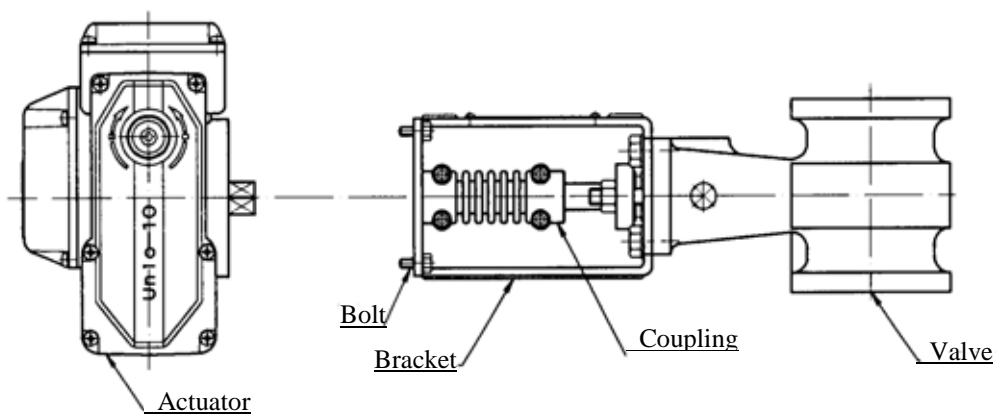


FIG. 6

☒ 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.



CAUTION ON WIRING WORK

6. WIRING

6-1 Power and input signals

Use a cable of 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.

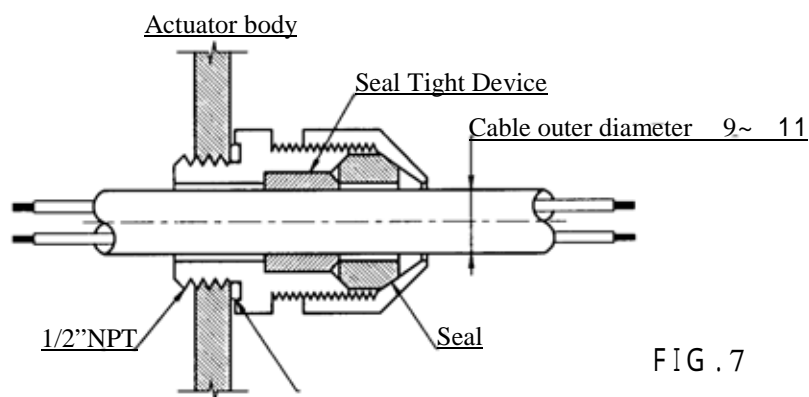
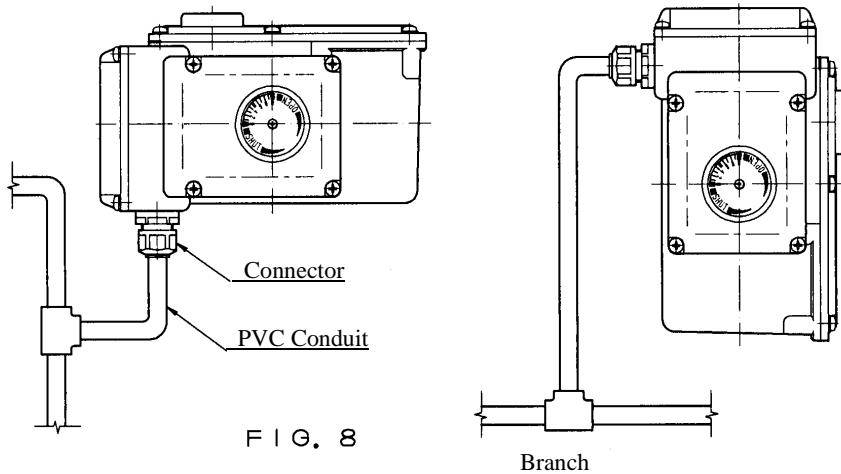


FIG. 7

6-2 Wiring work

Use sufficiently sealed tubes or conduit to prevent water ingress.



 CAUTION ON USE

7. POWER SOURCE AND CIRCUITS

7-1 Power source

Standard supply: Single Phase AC Power 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.

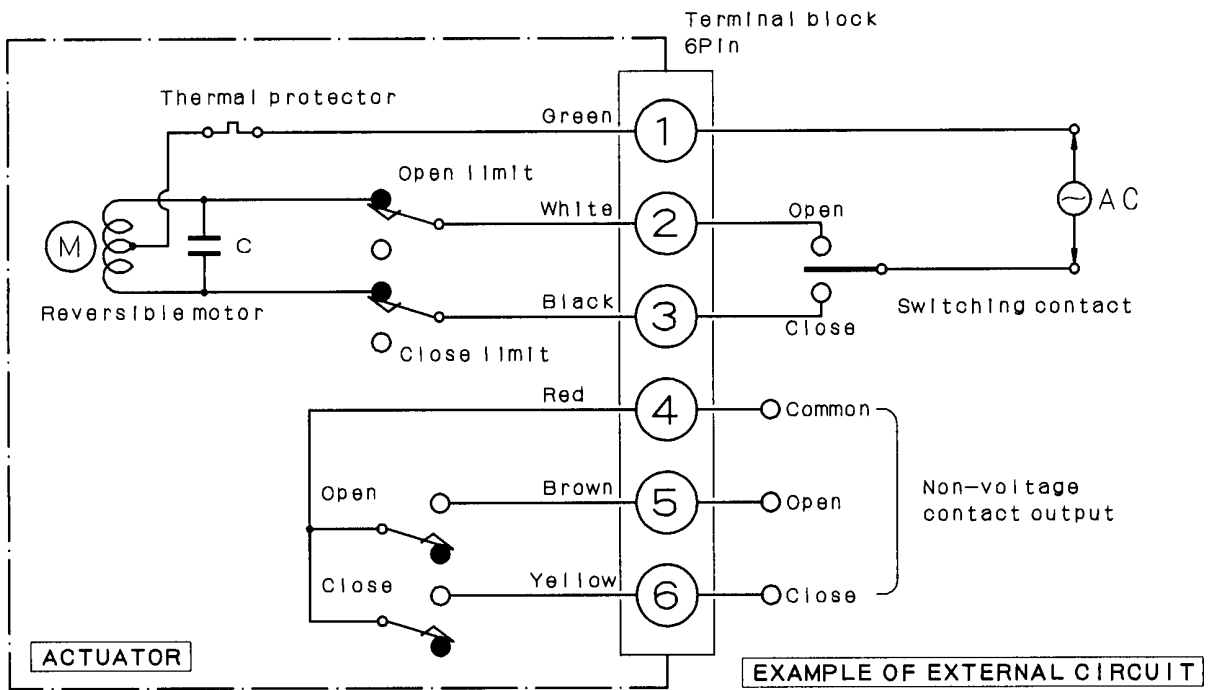
7-2 Recommendable fuse and braker

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

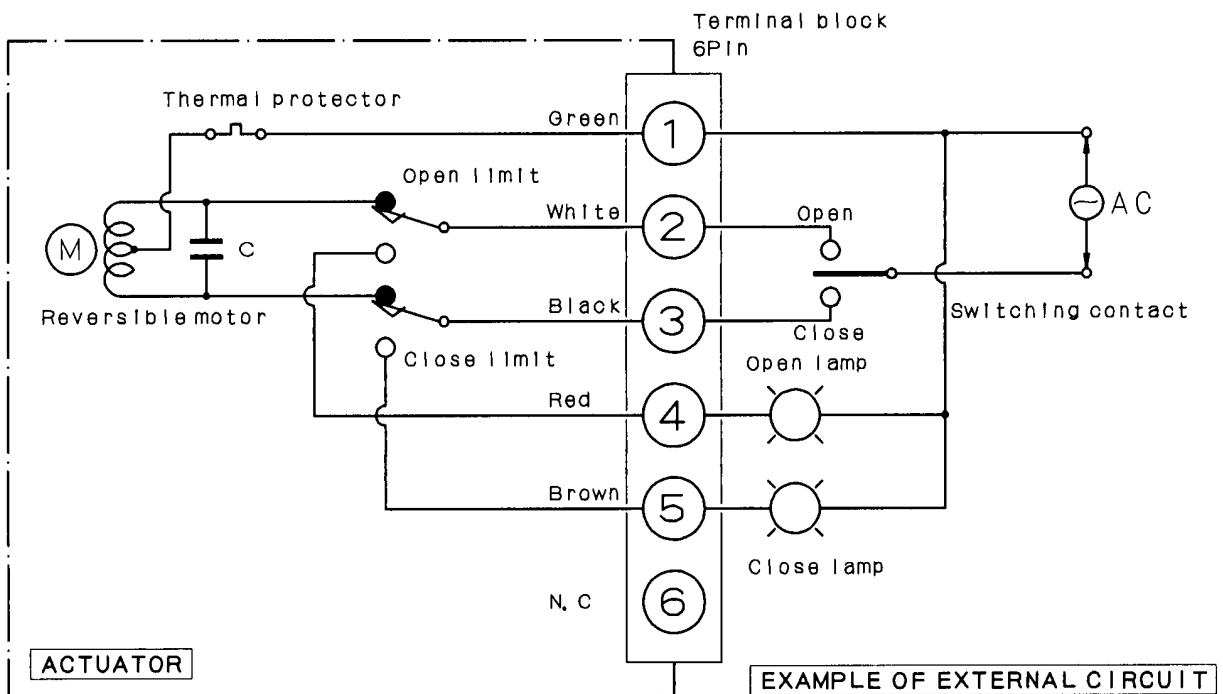
Model	Capacity of fuse/braker	Motor capacity
Unic-Z, 05	5A	8W
Unic-10	5A	20W
Unic-20	5A	30W
Unic-40	7A	90W
Unic-60	7A	90W
Unic-100,150, 200	10A	100W

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

7-3 Circuit diagram
 [Unic-Z, 05, Standard circuit]



[Unic-10,20, 40, 60, 100, 150, 200 Standard circuit]



Do not make parallel operation with multiple actuators. If they are operated at the same time through one open-close switch or relay, the actuators may draw abnormal feed-back current into the units, causing chattering, then disturbance to normal operation. If it goes as is for a long time, actuators may become defective. Always use individual switch / relay for each actuator.

 Confirm that power is OFF before making manual operation

8. ADJUSTMENT

8-1 Adjustment of limit switches and position indicator

(1) Unic-Z, 05

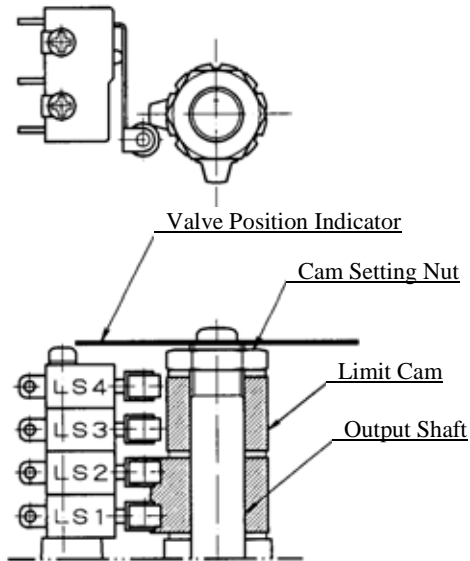


FIG. 9

(2) Unic-10

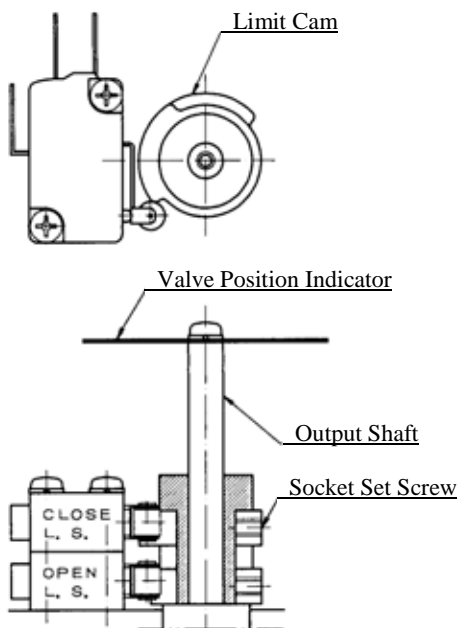


FIG. 10

LS1: Open travel limit switch
LS2: Open Aux. contact output switch
LS3: Close travel limit switch
LS4: Close Aux. contact output switch

1. Fully open the valve by manual handle.
Loosen and turn the lower limit cam and confirm that the limit switch is effective (click sound).
2. For close side, fully close the valve, turn the upper limit cam, and confirm that the switch is effective.

* Make sure that the mechanical stop at each travel end does not intervene the motion.

When mechanical stop restricts motion, retiring the stopper bolt, and adjust the bolt position so as to hit the stopper after 1/4 – 1/2 handle turn from the electrical travel limit.

*The Aux. contact output positions are shifting together with travel limit positions at constant angle.

3. Tighten up the cam nut. Adjust the valve position indicator, and check the motion.

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 is effective (making click sound).
Then secure the cam by set screw.

2. Adjust the close side in the same manner.

* Make sure that the mechanical stop at each travel end does not intervene the motion.

When mechanical stop restricts motion, retiring the stopper bolt, and adjust the bolt position so as to hit the stopper after 1/2 handle turn from the electrical travel limit.

3. Adjust the valve position indicator, and check the motion.

* The limit switch is normally at “A” contact.

(2) Unic-20, 40

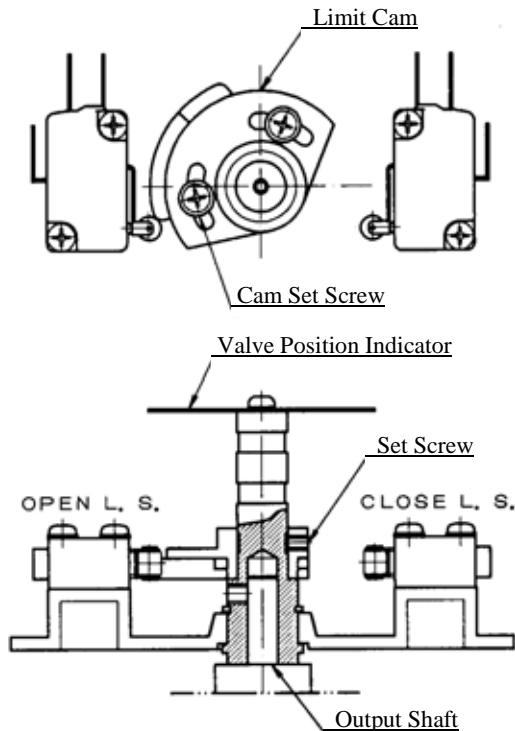


FIG. 11

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 position indicator.
3. Loosen and turn the limit cam.
 - * By working on Philips screws, the cam angle can be adjusted for open / close sides.
 - * By working on Set screw on side, shifting the whole cam.
4. Confirm that the limit switch is effective at travel end (making click sound). Then secure the cam by Philips screws /set screw.
5. Adjust the close side in the same manner.

- * Make sure that the mechanical stop at each travel end does not intervene the motion. When mechanical stop restricts motion, retiring the stopper bolt, and adjust the bolt position so as to hit the stopper after 1/2 handle turn from the electrical travel limit.
6. Adjust the valve position indicator, and check the motion.

* The limit switches are normally at "B" contact.

(2) Unic-60, 100, 150, 200

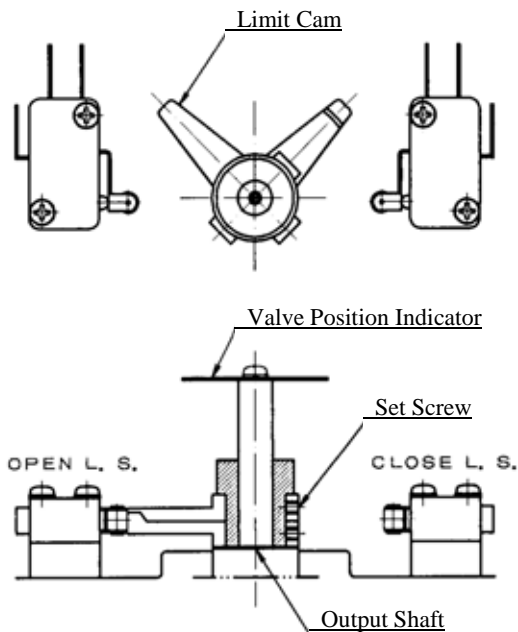


FIG. 12

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 indicator at full open.
3. Loosen, and turn the lower limit cam. Confirm that the limit switch is effective (making click sound). Then secure the cam by set screw.
4. Adjust close side in the same manner.

- * Make sure that the mechanical stop at each travel end does not intervene the motion. When mechanical stop restricts motion, retiring the stopper bolt, and adjust the bolt position so as to hit the stopper after 1/2 handle turn from the electrical travel limit.

5. Adjust the valve position indicator, and check the motion.

* The limit switches are normally at "B" contact.

8-2 Open/Close Non-Voltage Aux. Limit Switch (option)

The following diagram shows Unic-10 case as an example.

* For Unic-20,40, 60 and larger, the additional set of cam/switches are added on the top of existing travel limit switches for each open/close side. (Top switch is for Aux. contact, Bottom for travel limit.)

1. After setting the actuator output shaft at a desired position, adjust LS-1 cam to a position where the limit switch makes click sound.
2. Set LS-2 in the same manner.

* Refer to Fig.13 for wiring diagram.

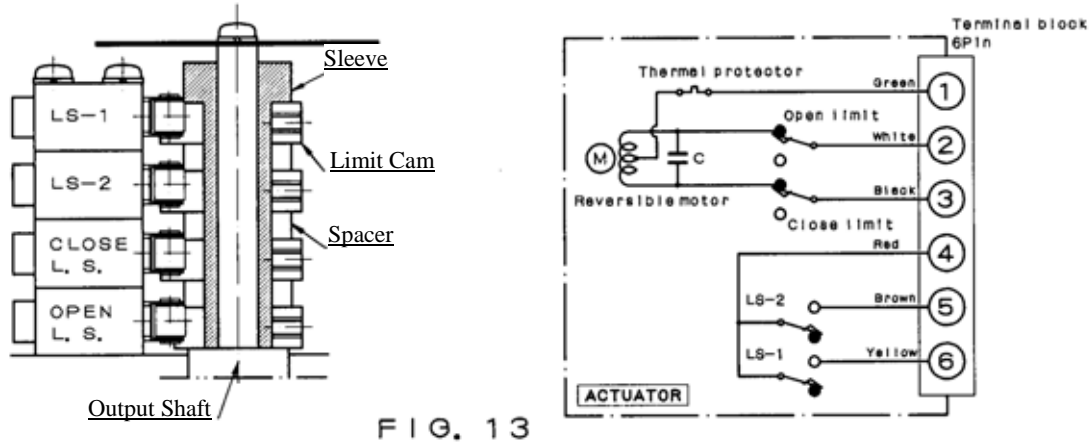


FIG. 13

8-3 Potentiometer (option)

Standard resistance for your choice:

135, 500, 1000

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.

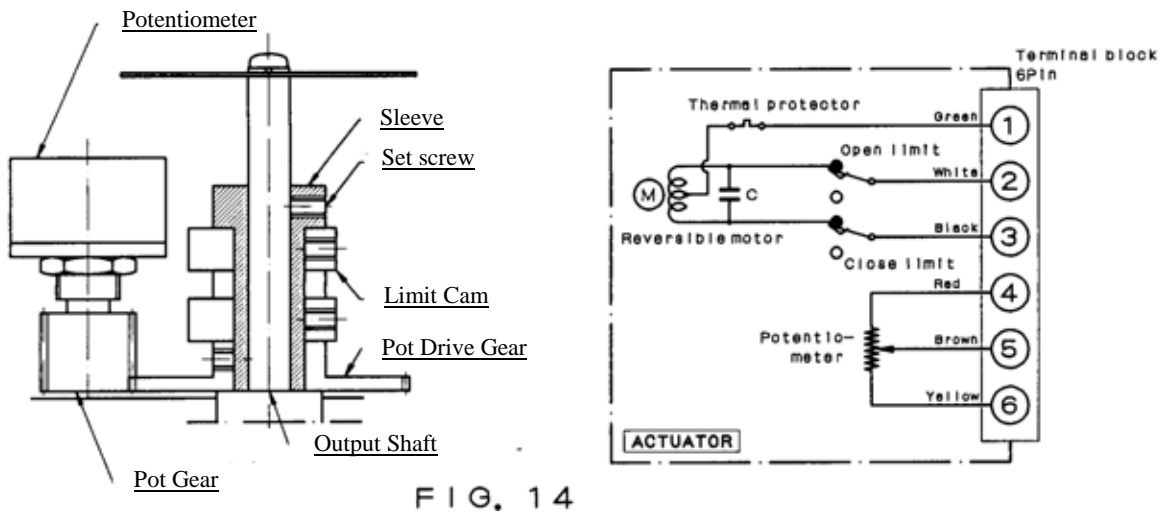


FIG. 14

8-4 Mechanical stop

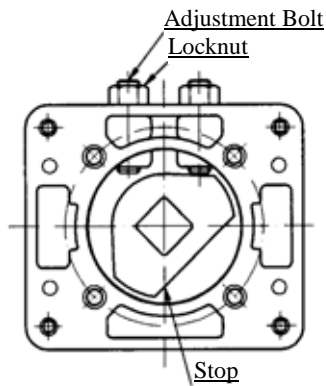


FIG. 15

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

* Make sure the electric motion is not constrained by the mechanical stop.
Travel limit switches must make contact before the stopper hits mechanical stop bolt.

9. TEST OPERATION

9-1 Manual operation

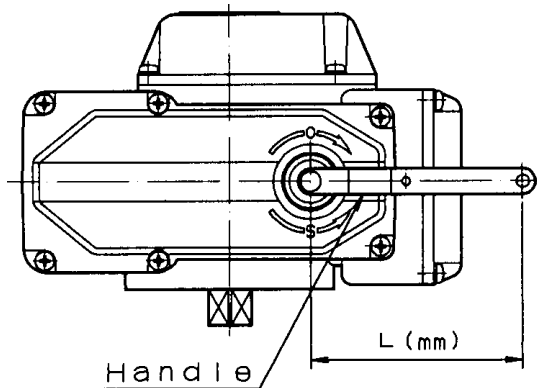


FIG. 16

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 indicator. The mechanical stops are set at around 1/2 handle-turn beyond those electrical travel limits. Do not apply excessive force to the handle, for it might damage the unit.

<SIZE OF MANUAL HANDLE>

Item \ Model	Unic-Z/05	Unic-10	Unic-20,40	Unic-60,100,150,200
Opposite of hexagon	5mm	5mm	6mm	10mm
Number of handle turns	7-1/2	15	15	15
Length	100mm	100mm	120mm	230mm



CAUTION

When making manual operation,
be sure that 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

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)
Limit cam is not correctly adjusted	Re-adjust limit cam
✳LAMP(open/close) DOES NOT LIGHT UP	
Lamp is broken	Replace a lamp
Limit switch is faulty	Renew a limit switch
Stop is not correctly adjusted	Re-adjust a stop



Do not make parallel operation with multiple actuators.

If they are operated at the same time through one open-close switch or relay, the actuators may draw abnormal feed-back current into the units, causing chattering, then disturbance to normal operation.

If it goes as is for a long time, actuators may become defective.

Always use individual switch / relay for each actuator.

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

12. OPTIONAL EXTRAS

- * Open/Close Non-voltage Aux. Limit Switches
- * Potentiometer : 135/500/1000
- * R/I Converter : 4 ~ 20 mA DC Position Feedback Signals
- * Torque Limiters
- * Speed Controller
- * Space Heater

For any special version, contact our Sales Dept.



CAUTION ON USE

Do not make parallel operation

[Parallel operation]

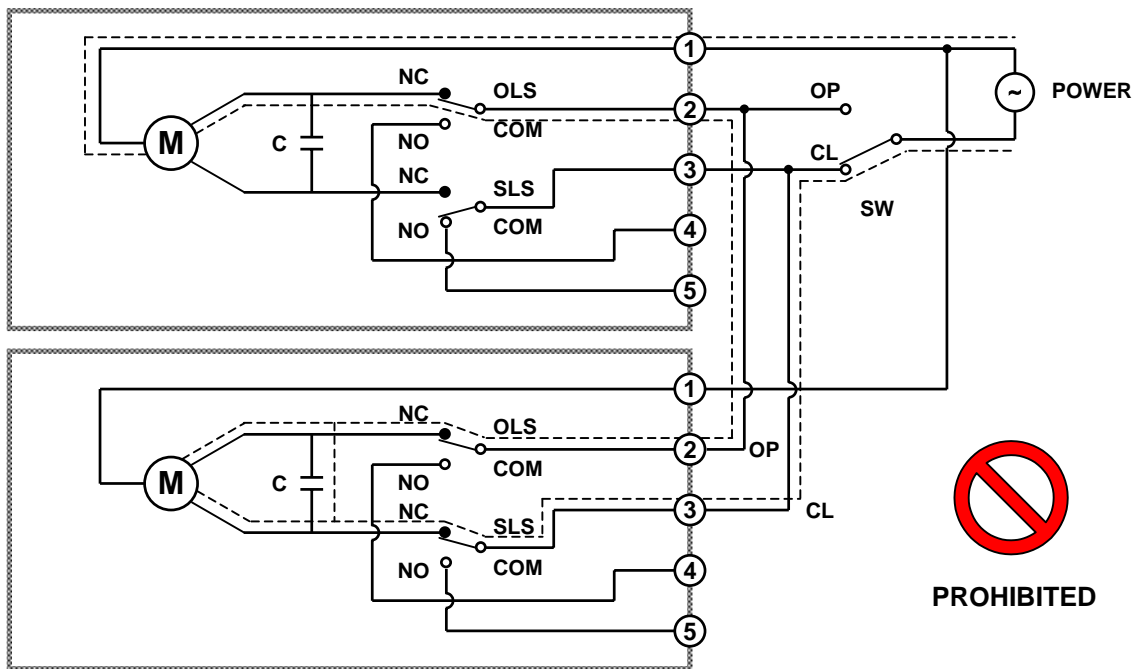
Parallel operation means operating plural units at the same time with one open-close switch.

Trouble by parallel operation:

As shown in Fig. 6, an abnormal current flow will occur along with the dotted line, causing chattering to the actuators, then disturbance to normal operation.

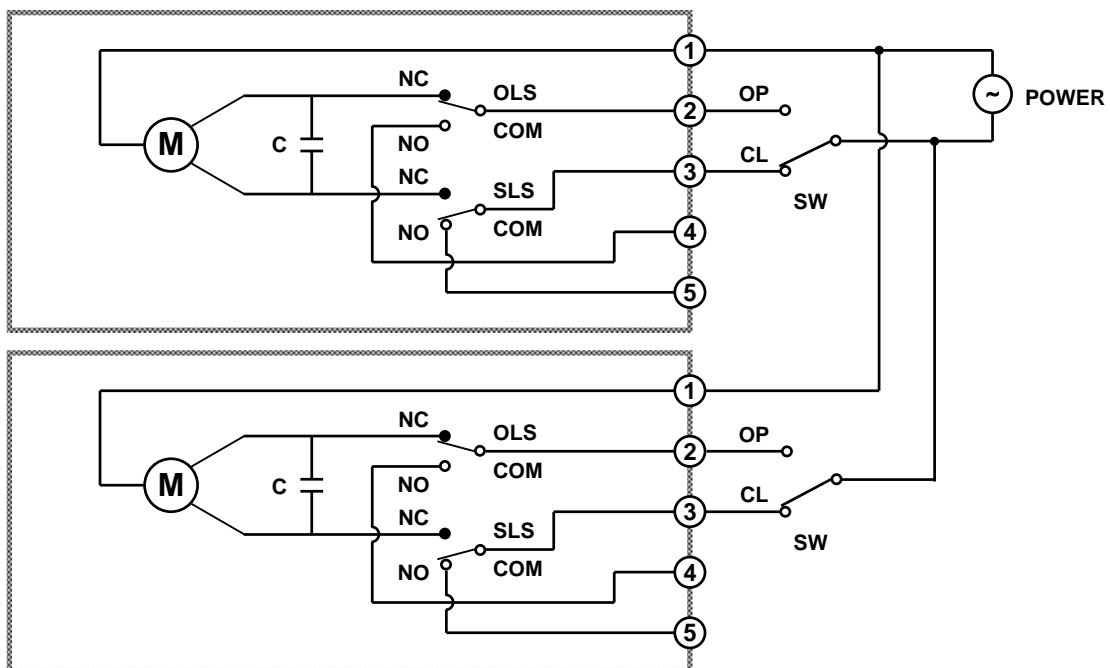
If it goes as is for a long time, the actuators may be defective.

Fig. 6



[Solution]

Apply an open-close switch to each actuator, or apply relays.





K4 Series

Heavy Duty Weatherproof Worm Gear Electric Actuators

Modulating Control Valve Actuators

Nucom Models

Nucom-10NS

Nucom-10NM

Nucom-10NL

Nucom-10NL-100

Nucom-10NL-150

Nucom-10NL-200

For **Unic**
On/Off Models
See Page 2

FOR YOUR SAFETY

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

These notes are to clarify specifications and proper operation of the product, for preventing injury or loss by accidents.

The contents are divided into WARNING and CAUTION for different degree of risks. Please strictly follow these instructions. They 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 explosionproof.
- ※ Do not use it in the environment with flammable gas (gasoline etc.) or corrosive gas.
- ※ Do not disassemble the actuator from the valve during electrical operation.
- ※ Do not conduct wiring work when external 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 step on the actuator, or it may cause defects or fall down accident.
- ※ Do not make wiring work in the rain or in splashing water.

CONTENTS

1. GENERAL
2. CONFIGURATION
 - 2-1 Configuration and names of parts
 - 2-2 External drawings
3. FUNCTIONAL SPECIFICATIONS
4. OPERATION PRINCIPLE
 - 4-1 Operation principle
 - 4-2 Block diagram
5. INSTALLATION
 - 5-1 Installation
 - 5-2 Ambient Temperature / Fluid Temperature
6. WIRING
 - 6-1 Cables
 - 6-2 Water prevention
7. ASSEMBLY WITH A VALVE
 - 7-1 Names of parts
 - 7-2 Assembly procedures
8. POWER AND SIGNALS
 - 8-1 Supply voltages
 - 8-2 Fuse and breaker
 - 8-3 Input signals
 - 8-4 Wiring diagram
9. CONTROL PACK
 - 9-1 Names of parts
 - 9-2 Action mode
 - 9-3 Signal "off" mode
 - 9-4 Sensitivity volume (Resolution adjustment)
 - 9-5 Zero / Span adjustment
10. OPERATION
 - 10-1 Manual operation
 - 10-2 Electrical operation
11. ADJUSTMENT
 - 11-1 Limit Switches
 - 11-2 Mechanical Stop
12. TROUBLESHOOTING
13. MAINTENANCE
14. OPTIONAL EXTRAS

1. GENERAL

Nucom series electric modulating actuators are designed for quarter turn valve control with 4~20mA DC (or 1~5V DC) command signals from a computer / controller.

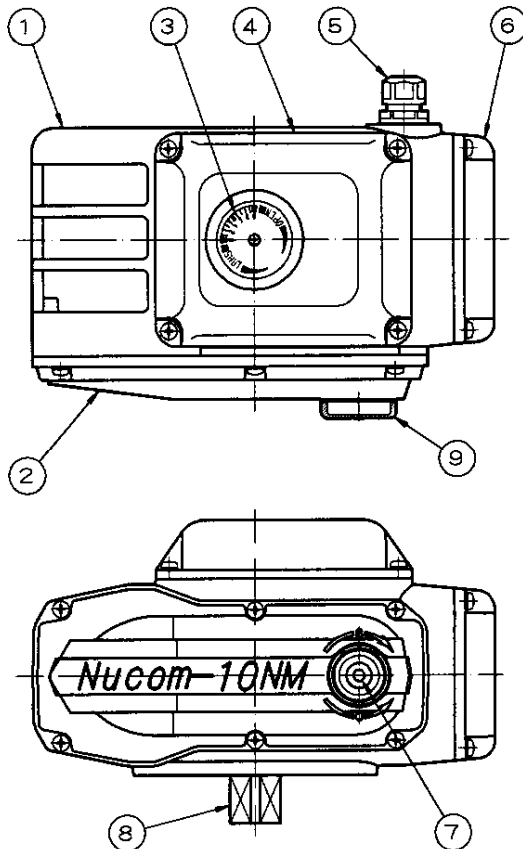
The precise output shaft positioning (control resolution over 1/250 with no-overflow, no-hunting) and continuous duty, quick reaction / positioning motions realize far superior process control results, at the same time, its maintenance free and lower energy / high efficiency design contribute to lower maintenance cost than the conventional pneumatic / electric actuation products.

⊗ FEATURES

1. Compact / light-weight and low-profile design, all metal gear / final reduction worm gear (self-locking) in the robust aluminum die-cast body.
2. High control resolution of over 1/250 (adjustable) by the original servo control circuit.
3. Field selectable mode setting switches for Action mode (Direct or Reverse) and Signal Off mode (Open, Close or Stop).
4. Resin encapsulated servo control circuits (Control Pack) for vibration and moisture protection.
5. Built-in motor structure for the highly efficient motor heat dissipation.
6. Auto-reset type motor thermal protector shuts down the motor circuit under overload situation.
7. Water tight housing: NEMA-4/4X (to IP-66).
8. Manually operable by a crank handle when power is off. Position indicator on top.

2. CONFIGURATION

2-1 Configuration and names of parts

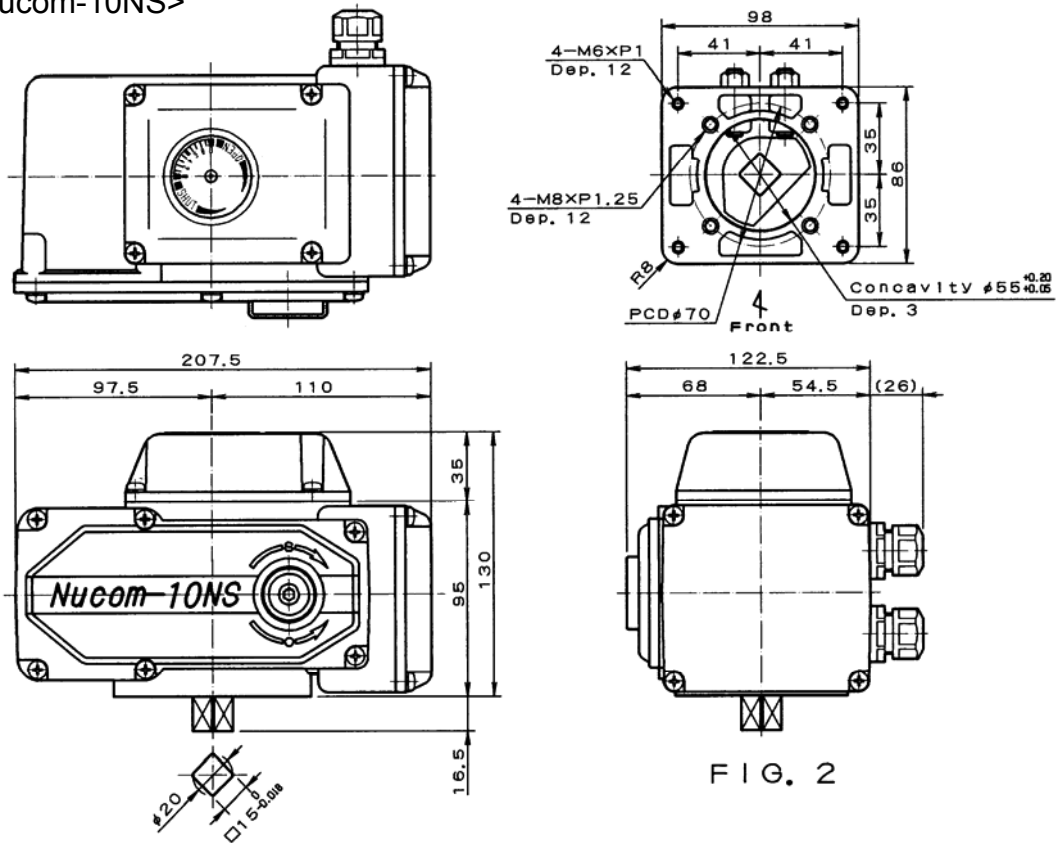


No.	NAME
1	Body / Motor Housing
2	Driving Unit Cover
3	Position Indicator
4	Electrical Unit Cover
5	Conduit (example)
6	Control Unit Cover
7	Manual Override Socket
8	Male Output Shaft
9	Manual Socket Dust Cover

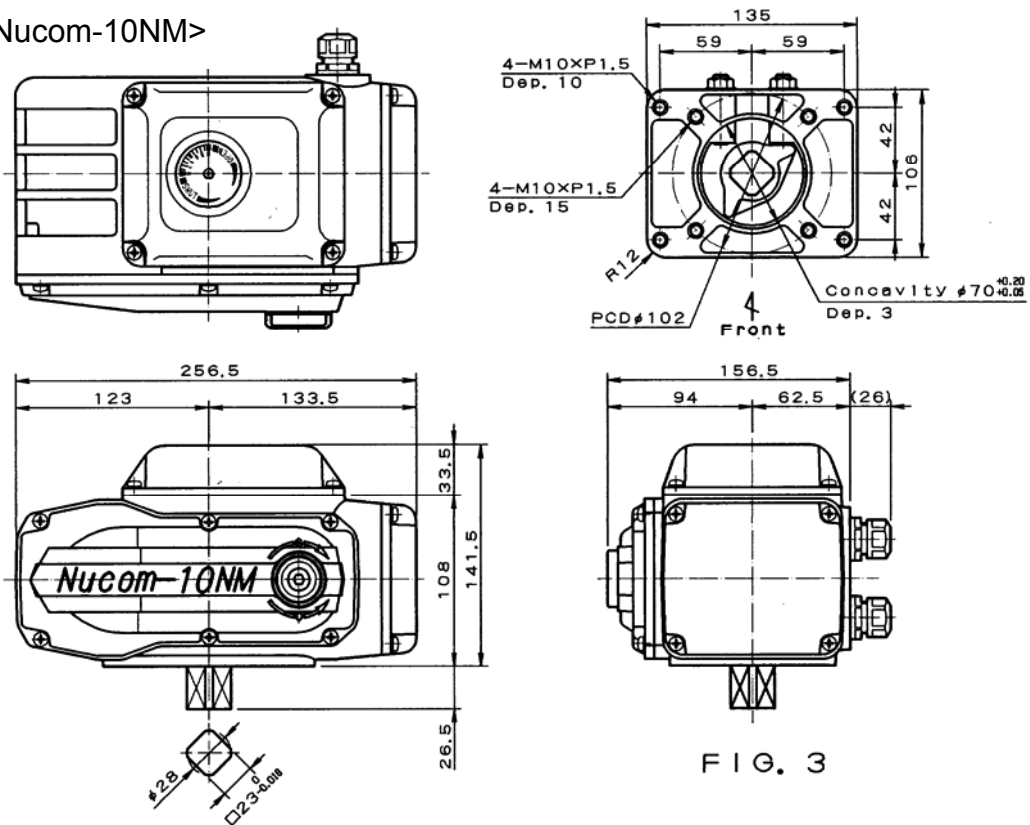
FIG. 1

2-2 External drawings (Male square shaft standard types)

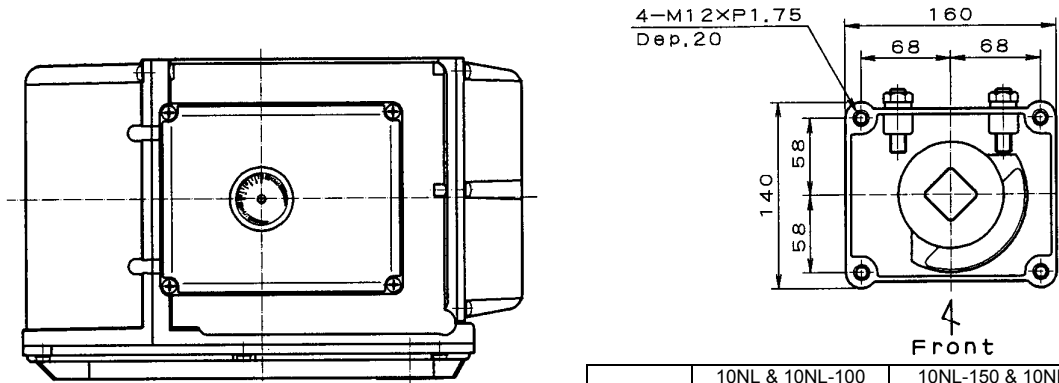
<Nucom-10NS>



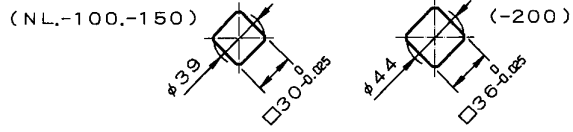
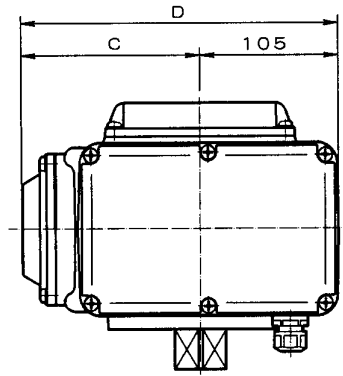
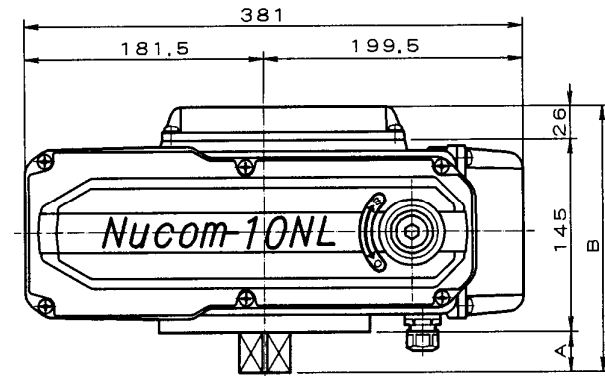
<Nucom-10NM>



<Nucom-10NL, 10NL-100, 10NL-150, 10NL-200>



	10NL & 10NL-100	10NL-150 & 10NL-200
C	137	148.5
D	242	253.5



	10NL, 10NL-100 & 10NL-150	10NL-200
A	30	34
B	201	205

3. FUNCTIONAL SPECIFICATIONS

ITEM		MODEL	Nucom-10NS	Nucom-10NM
RATED POWER			AC120V±10% (50/60 Hz) (US Standard) AC240V±10% (50/60 Hz) (Option)	
INPUT SIGNAL			4~20mA·DC (Standard) 4~12mA·DC, 12~20mA·DC, 0~10V·DC (Option)	
TORQUE OUTPUT			49 N·m (434 in·lb)	196 N·m (1736 in·lb)
OPERATION SPEED	50Hz		15 sec	15 sec
	60Hz		12.5 sec	12.5 sec
TRAVEL ANGLE			0~90°	
RESOLUTION			Over 1/250 : adjustable	
DEAD BAND			Max. 0.5% F.S.	
LINEARITY			Max. 0.5% F.S.	
ACTION MODE			Direct Action or Reverse Action : selectable	
SIGNAL OFF MODE			Close / Stop / Open : selectable	
PROTECTION			Open / Close limit switches Open / Close mechanical stopper Motor thermal protector, Auto-reset type (120°C/248°F)	
AMBIENT TEMPERATURE			-25~55°C (-13~131°F)	
RATED CURRENT	AC120V		0.65A	1.8A
	AC240V		0.35A	0.9A
MOTOR			20W Reversible	90W Reversible
INSULATION GRADE			E Class	
RATED OPERATION TIME			Continuous	
POSITION DETECTOR			Potentiometer (Backlash revision type)	
OUTPUT SIGNAL			4~20mA·DC (Standard) Open / Close limit no-voltage contact output (Option)	
INSULATION RESISTANCE			Between power terminal - case : 500V·DC / 100MΩ	
WITHSTAND VOLTAGE			Between power terminal - case : 1500V·AC / 1 minute	
SERVO CONTROL UNIT			Resin encapsulated Control Pack	
MANUAL OPERATION			Detachable crank handle (Standard accessory)	
WIRE INLET			NPT1/2×2	
ENCLOSURE PROTECTION			NEMA-4,4X (IP-66)	
EXPLOSION PROOF			Non explosion-proof	
MOUNTING ANGLE			360° all directions	
BODY MATERIAL			Die cast aluminum	
COATING COLOR			Munsell N-6 (Light Gray)	
NET BODY WEIGHT (W/O MOUNTING PLATE)			4.4 kg (9.7 lb)	8.2 kg (18.0 lb)

ITEM		MODEL	Nucom-10NL	Nuocm-10NL -100	Nucom-10NL -150	Nucom-10NL
RATED POWER		AC120V±10% (50/60 Hz) (US Standard) AC240V±10% (50/60 Hz) (Option)				
INPUT SIGNAL		4~20mA·DC (Standard) 4~12mA·DC, 12~20mA·DC, 0~10V·DC (Option)				
TORQUE OUTPUT		490 N·m (4340 in·lb)	980 N·m (8680 in·lb)	1470 N·m (13020 in·lb)	1960 N·m (17360 in·lb)	
OPERATION SPEED	50Hz	15 sec	30 sec	45 sec	60 sec	
	60Hz	12.5 sec	25 sec	37.5 sec	50 sec	
TRAVEL ANGLE		0~90°				
RESOLUTION		Over 1/250 : adjustable				
DEAD BAND		Max. 0.5% F.S.				
LINEARITY		Max. 0.5% F.S.				
ACTION MODE		Direct Action or Reverse Action : selectable				
SIGNAL OFF MODE		Close / Stop / Open : selectable				
PROTECTION		Open / Close limit switches Open / Close mechanical stopper Motor thermal protector, Auto-reset type (120°C/248°F)				
AMBIENT TEMPERATURE		-25~55°C (-13~131°F)				
RATED CURRENT	AC120V	2.4A	2.8A	3.4A		
	AC240V	1.2A	1.4A	1.7A		
MOTOR		100W Reversible				
INSULATION GRADE		E Class				
RATED OPERATION TIME		Continuous				
POSITION DETECTOR		Potentiometer (Backlash revision type)				
OUTPUT SIGNAL		4~20mA·DC (Standard) Open / Close limit no-voltage contact output (Option)				
INSULATION RESISTANCE		Between power terminal - case : 500V·DC / 100MΩ				
WITHSTAND VOLTAGE		Between power terminal - case : 1500V·AC / 1 minute				
SERVO CONTROL UNIT		Resin encapsulated Control Pack				
MANUAL OPERATION		Detachable crank handle (Standard accessory)				
WIRE INLET		NPT1/2×2				
ENCLOSURE PROTECTION		NEMA-4,4X (IP-66)				
EXPLOSIONPROOF		Non explosionproof				
MOUNTING ANGLE		360° all directions				
BODY MATERIAL		Diecast aluminum				
COATING COLOR		Munsell N-6 (Light Gray)				
NET BODY WEIGHT (W/O MOUNTING PLATE)		20.5 kg (45.1 lb)		21.5 kg (47.3 lb)		22.5 kg (49.5 lb)

4. OPERATION PRINCIPLE

4-1 Operation principle

The backlash revision type potentiometer precisely detects and feedbacks the exact output shaft position to the servo control circuit (Control Pack).

The servo control circuit makes comparison between input signal level (4~20mA DC) and output shaft position internal feedback level, then turns the motor in direction to balance them, and stops the motor instantaneously when they are balanced.

The motor torque is transmitted through the spur gear / worm gear power train to the actuator shaft. Action mode (Direct or Reverse) and Signal Off mode (Open / Stop / Close) is selectable by the mode setting switch.

Open / Close limit switches are equipped to stop the motor outside the 0 – 100% signal control range, and for Signal Off mode action to Open or Close.

(BLOCK DIAGRAM)

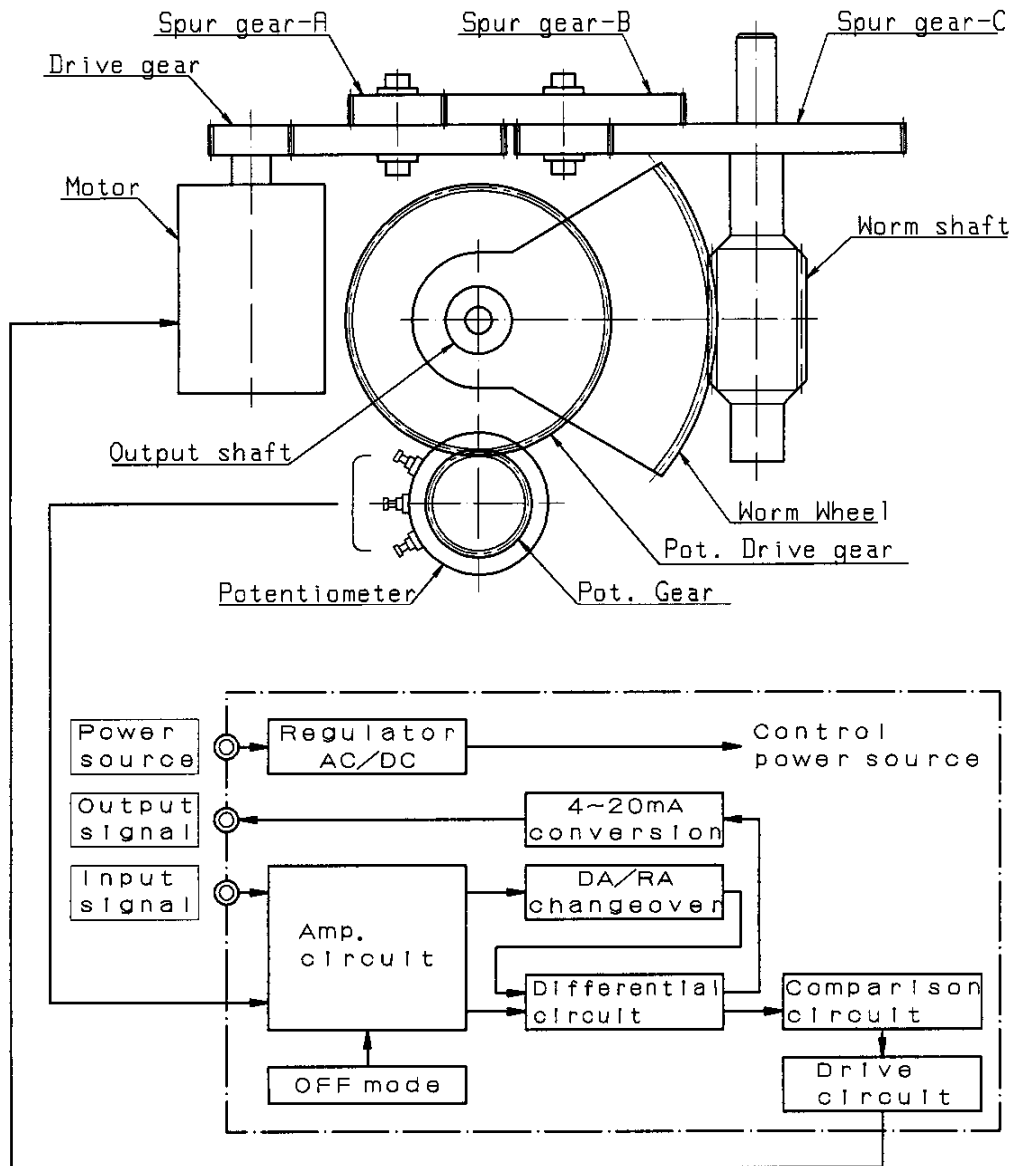


FIG. 5



CAUTION ON ENVIRONMENTAL AND INSTALLATION CONDITIONS

5. INSTALLATION

5-1 Installation

⊗ Cautions on indoor installation

- * Avoid a hazardous environment, as this product is not explosionproof.
- * Cover the whole body when installing the unit in a place with water or fluid splashing.
- * Reserve a room for manual override operation and wiring / installation work.

⊗ Cautions on outdoor installation

- * To avoid rainwater or direct sunlight, it is necessary to cover or shade the whole body.
(This is to protect the unit from temperature rise due to sun heat, and to prolong the life of seal packing.)
- * Reserve a room for manual override operation and wiring / installation work.

▣ ACTUATOR SURFACE MATERIALS AND TREATMENT ▣

PART	MODEL	Nucom-10NS	Nucom-10NM	Nucom-10NL, -100, -150, -200
	BODY	Die cast Aluminum / Chromate treatment / Electrostatic coating		
DRIVE UNIT COVER (Front Cover for Gear Train)	Die cast Aluminum / Chromate treatment / Electrostatic coating			
ELECTRIC UNIT COVER (Top Cover for Indicator, LS & Cam)	Die cast Aluminum / Chromate treatment / Electrostatic coating			
CONTROL UNIT COVER (Side Cover for Terminal Block)	Die cast Aluminum / Chromate treatment / Electrostatic coating			
OUTPUT SHAFT	SUS 304 / Joint Stopper: Zn DC + Sleeve: Brass			

5-2 Ambient Temperature / Fluid Temperature

⊗ Ambient temperature

- * Ambient temperature range: $-25^{\circ}\text{C} \sim 55^{\circ}\text{C}$ ($-13 \sim 131^{\circ}\text{F}$)
- * When an optional Space Heater (green ceramic resistor) is equipped on the actuator, it is recommendable to disconnect the Space Heater cables (two purple wires to the Control Pack AC power terminals) for high-duty operation under the environment where ambient temp. is constant and always high (eg. always over 40°C (100°F)).
- * For application beyond the rated temperature range, consult our Sales Dept.

⊗ Fluid temperature

- * Heat from high temperature fluid may be transmitted via valve stem, yoke (bracket) / coupling to the actuator body. To prevent such high-heat conditions, the heat radiation type extension yoke and coupling are required.
- * Standard (lower height) yoke and couplings: Fluid temperature max. 65°C (149°F).
- * Heat radiation type extension yoke and couplings: Fluid temperature higher than 65°C (149°F).
- * For application beyond the rated temperature range, consult our Sales Dept.


CAUTION ON WIRING WORK

6. WIRING

6-1 Cables

⊗ Power cable

Use a proper size power cable to provide sufficient current to the unit.

When cord-lock type conduit is used, use a proper size / round shape cable and sealing materials to prevent water ingress from the thread part.

For normal type 1/2 inch cord-lock, $\Phi 9\sim 11\text{mm}$ (outside dia.) cable is recommended. (FIG.6)

⊗ Signal cable

Use a shield cable for input / output signal wiring to block electrical noise.

It is recommendable to keep the signal cable away from the high-voltage power lines.

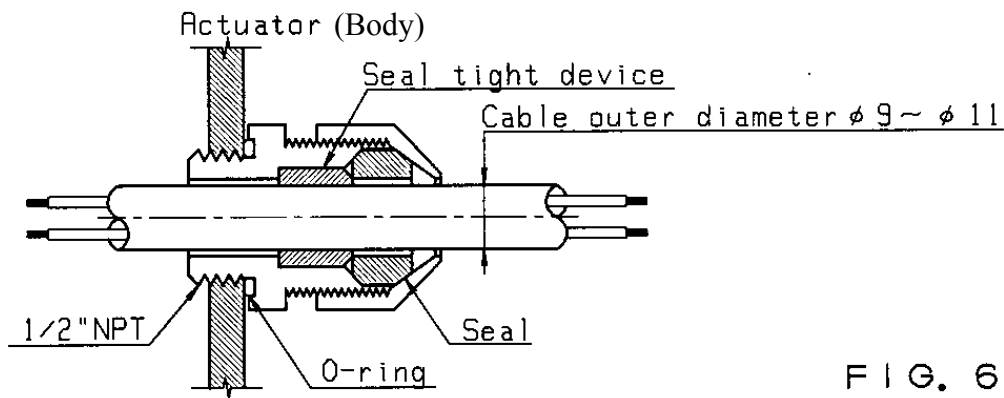


FIG. 6

6-2 Water prevention

To protect the actuator from water ingress, it is best to position the actuator always higher than the conduit / tube entry so that water drips will go down and away from the actuator body. (FIG.7)

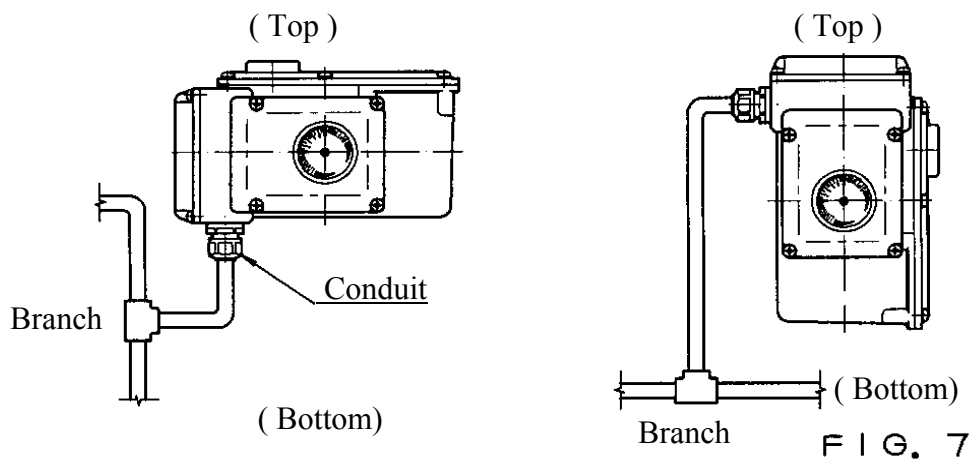


FIG. 7

Note: Conduit is not supplied. Seal the conduit entry tightly to prevent moisture penetration.



CAUTION: Make sure that external power is OFF before attempting manual operation

7. ASSEMBLY WITH A VALVE

7-1 Names of parts

An actuator is assembled with a valve by mounting hardware. The actuator is easily detached from the valve in case of trouble / maintenance.

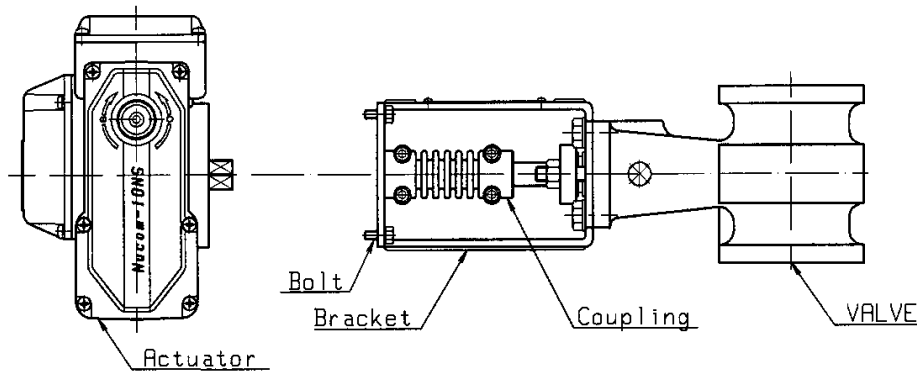


FIG. 8

7-1 Assembly procedures (Example of open yoke with two piece cramp type coupling)

A : For a valve without mechanical stop on close side

- A-1. Manually operate the valve and confirm the valve is operating smoothly.
- A-2. Set the valve position to full close. (In case of a ball valve, position the valve at full open.)
- A-3. Place a bracket (yoke) on the valve and loosely bolt the actuator on the bracket.
- A-4. With the actuator position at 0 % (close), joint the output shaft and the valve stem with a coupling. Make sure the valve stem and the actuator output shaft are in line.
- A-5. Secure the coupling bolts first.
- A-6. Manually check that the actuator turns smoothly without eccentricity.
Then secure the bracket (yoke) bolts and fix the actuator against the bracket firmly.

B : For a valve with mechanical stop on close side (eg. a metal seated butterfly valve)

- B-1. Manually operate the valve and confirm the valve is operating smoothly.
- B-2. Set the valve position to full close. Be sure that the position is just inside the valve stop.

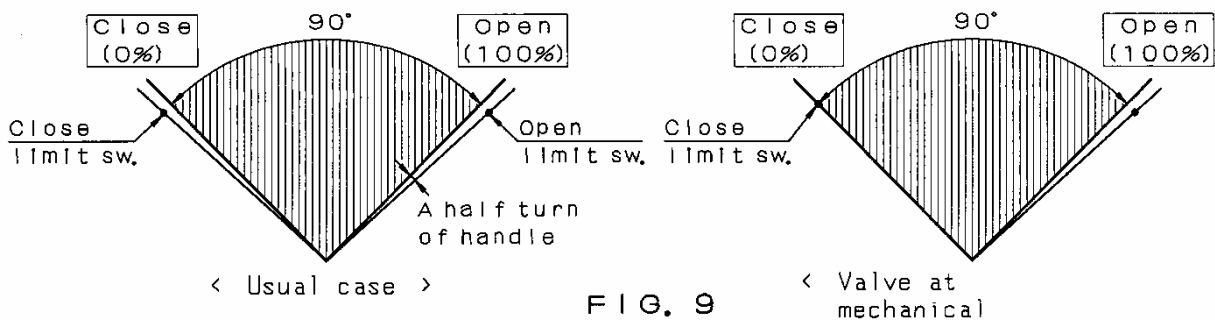


FIG. 9

- B-3. Position the actuator at 0 % (full close), and set the actuator limit switch so as to work at 0 %. (Note that the close limit switch is usually set at a half turn of manual handle beyond the full close signal position.) (See FIG.9)
- B-4. Place a bracket (yoke) on the valve and loosely bolt the actuator on the bracket.
- B-5. With the actuator position at 0% (close), joint the actuator shaft and the valve stem with a coupling. Make sure the valve stem and the actuator output shaft are in line.
- B-6. Secure the coupling bolts first.
- B-7. Manually check that the actuator turns smoothly without eccentricity. Then secure the bracket (yoke) bolts and fix the actuator against the bracket firmly.
- B-8. Confirm that the limit switch works at 0 % before the valve disc touches at the stop.

NOTE: If the valve disc hits the valve stop before the limit switch off position, the actuator will be self-constrained and cause overheat. Although the thermal protector will cut off the motor power supply at high temp., repeating overheat problem will damage the actuator.

8. POWER AND SIGNALS

8-1 Supply voltages

US Standard	AC 120V±10% (50/60Hz) Single Phase
Option	AC 100, 110, 200, 220, 230, 240V±10% (50/60Hz) Single Phase for All Models AC 24V±10% (50/60Hz) Single Phase, for Nucom-10NS and 10NM only DC 24V±10% for Nucom-10NM only

8-2 Fuse and breaker

Recommendable fuse/breaker capacities

Model	Capacity of fuse/breaker	Motor wattage
Nucom-10NS	5A	20W
Nucom-10NM	7A	90W
Nucom-10NL, -100, -150, -200	10A	100W

8-3 Input signals

Standard	4~20mA (or 1~5V) DC
Option	4~12mA (or 1~3V) DC
	12~20mA (or 3~5V) DC
	0~10V DC / 4~20mA (or 1~5V) DC selectable

8-4 Wiring diagram (Standard Spec.)

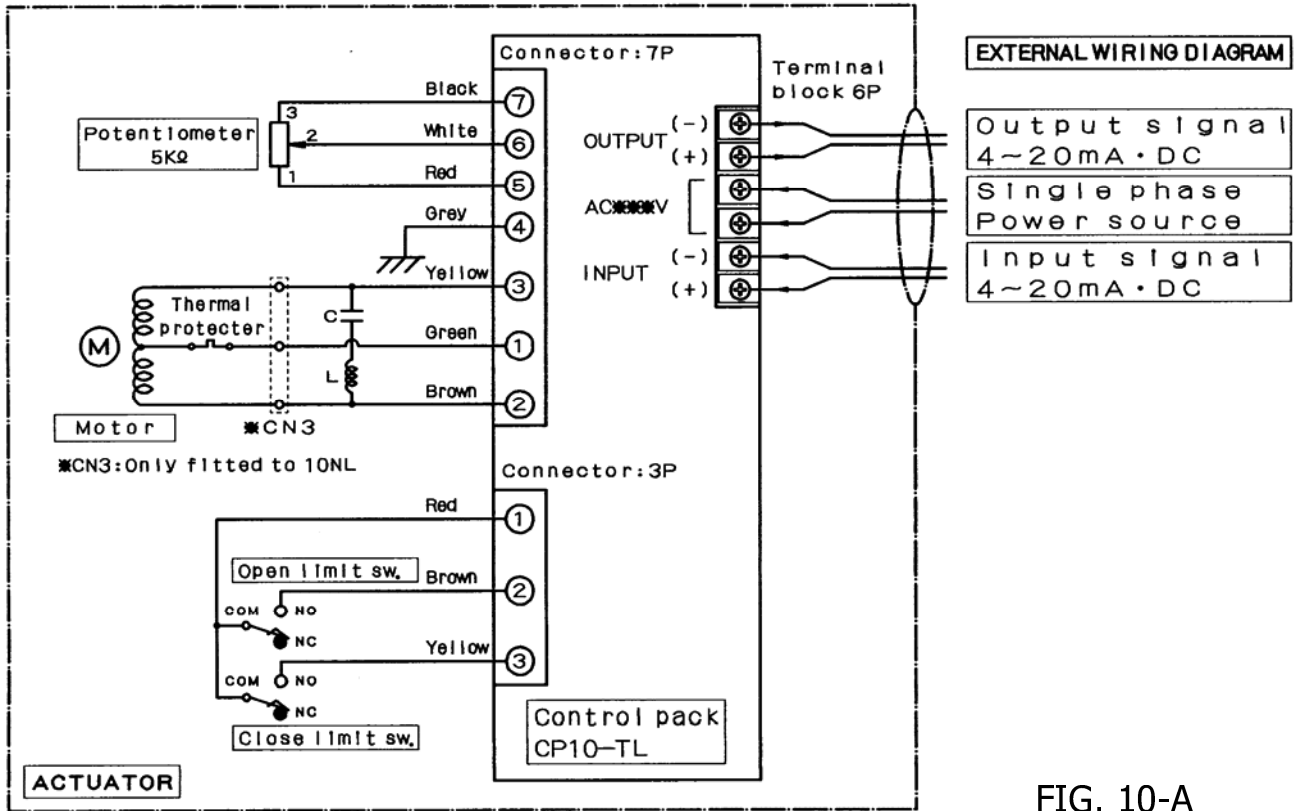


FIG. 10-A

8-4 Wiring diagram (Optional Spec. with 0~10V DC input and Space Heater)

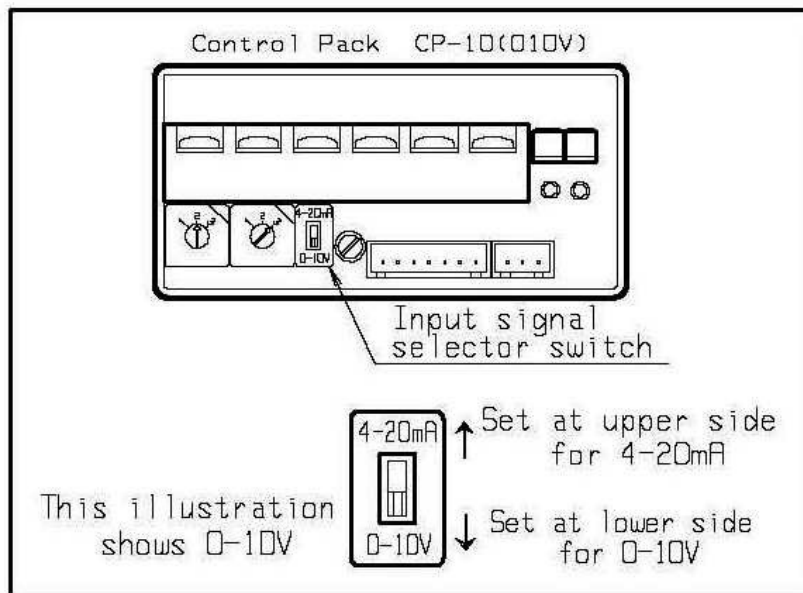
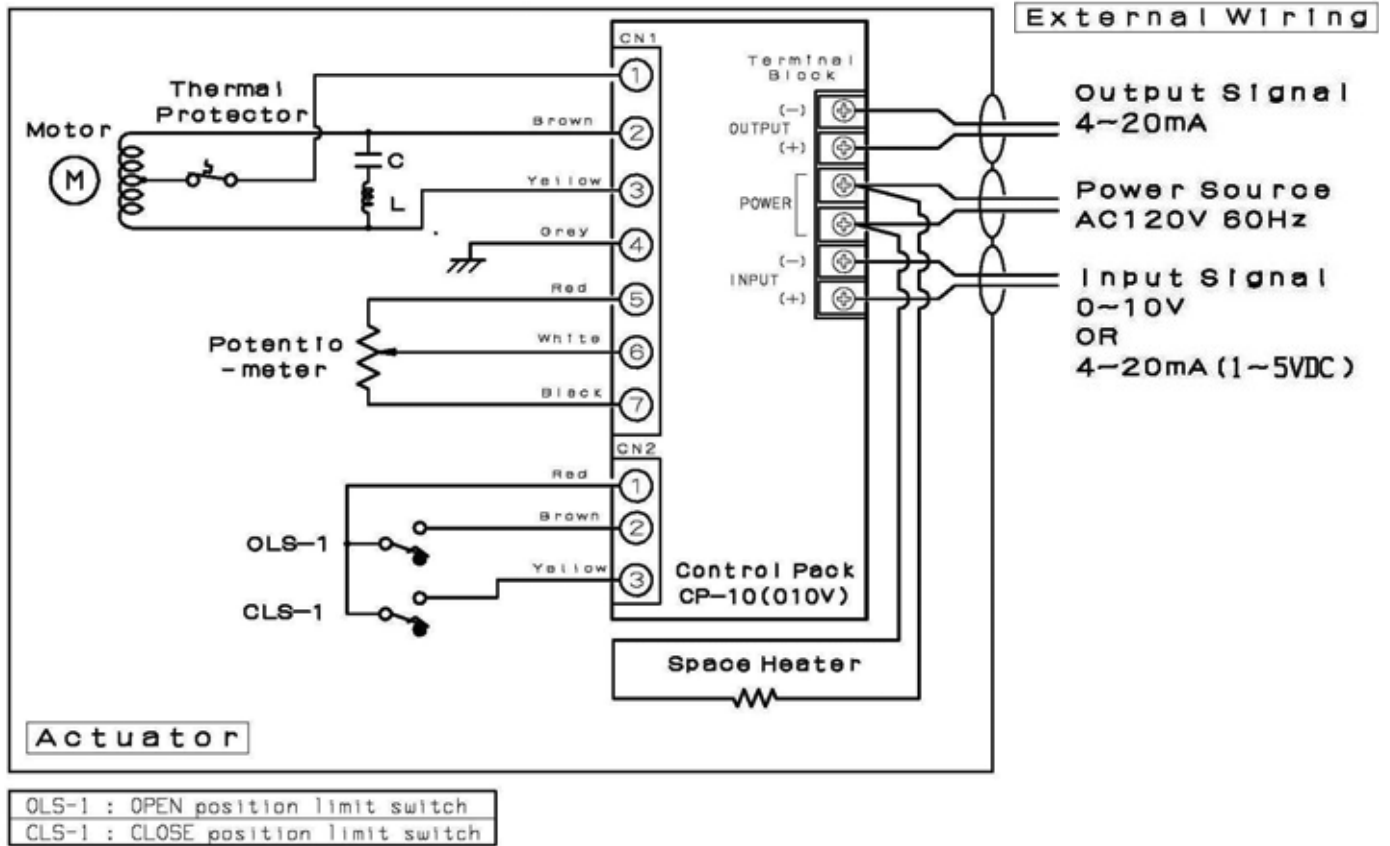


FIG. 10-B

 CAUTION: DO NOT TOUCH HOT (POWERED) WIRES

9. CONTROL PACK

9-1 Names of parts

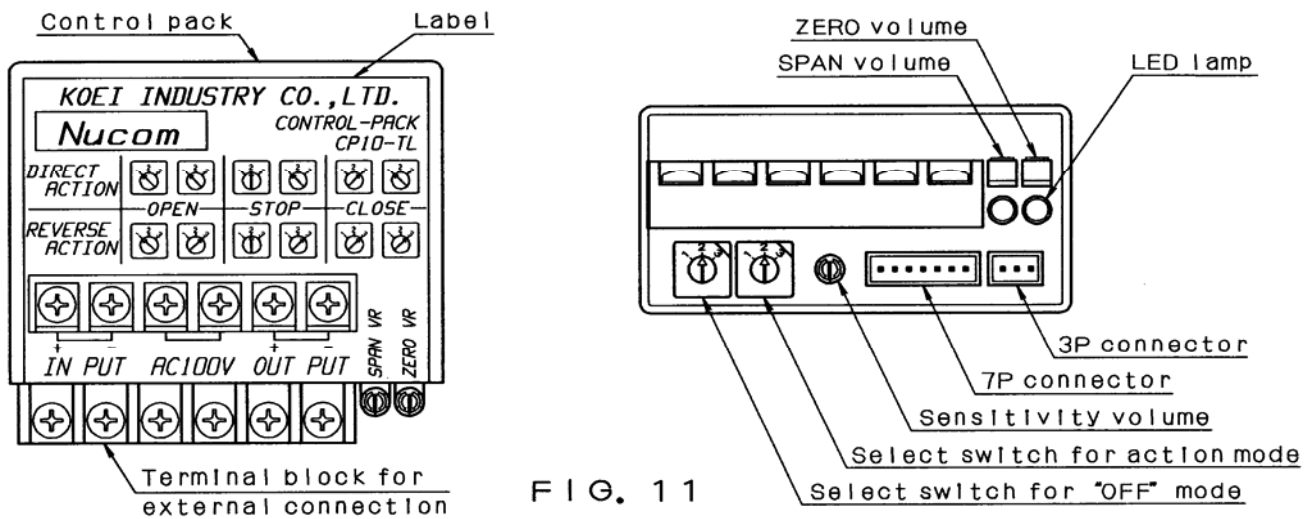


FIG. 11

CAUTION: Do not connect AC power supply to the IN PUT signal terminals.
 If AC power is applied to IN PUT terminals the Control Pack circuit will be damaged instantly.
AC power supply terminals are the center two terminals with AC voltage indication.

9-2 Action mode

Direct action (DA) or Reverse action (RA) is selectable at this switch.

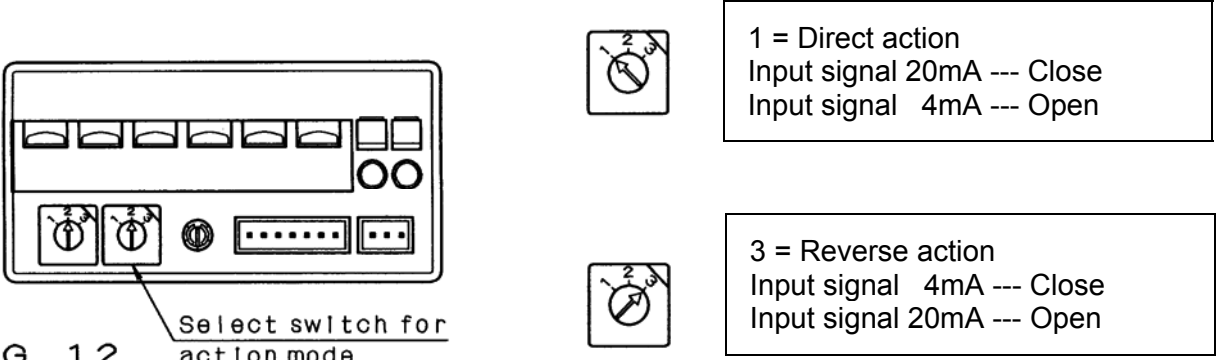


FIG. 12

◆ For US users

Nucom Direct Action	=	US Reverse Action
Nucom Reverse Action	=	US Direct Action

9-3 Signal Off mode

When input signal is interrupted (or less than 2mA), the actuator will automatically go to the preset positions of open/stop/close. The signal off position is easily set by the 1-2-3 position switch. Note that this is not a power-fail-safe function. The external power supply must be supplied to operate the motor. This is only for the signal loss situation.

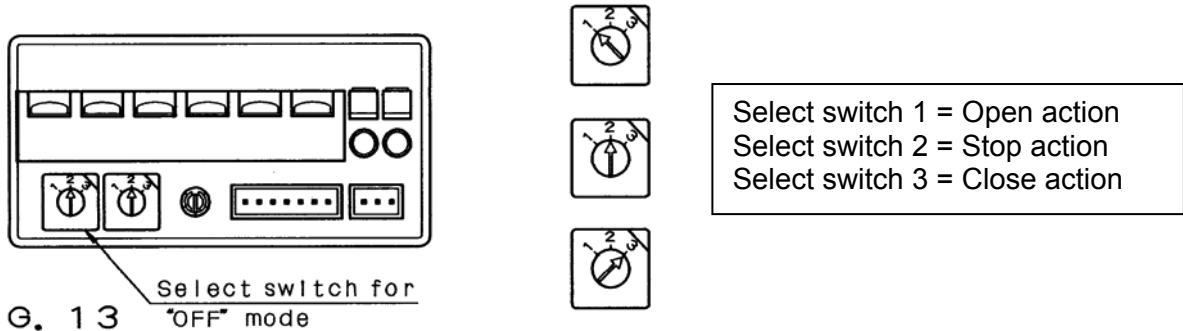


FIG. 13

Combination of Action mode (DA / RA) and Signal Off mode are shown in FIG.14.

(Note) The factory default setting is the following combination (RA / Stop) unless otherwise specified.

Action mode	Reverse (RA)
Signal Off mode	Stop

DIRECT ACTION						
	OPEN		STOP		CLOSE	
REVERSE ACTION						

FIG. 14

◆ For US users

Nucom Direct Action	=	US Reverse Action
Nucom Reverse Action	=	US Direct Action

(Note) When input signal drops to below 2mA, the actuator will recognize the low signal as signal loss, and automatically run to the preset position of Open/Stop/Close.

To prevent erroneous action, the 0% close input signal level should be properly adjusted.

9-4 Sensitivity volume (Resolution adjustment)

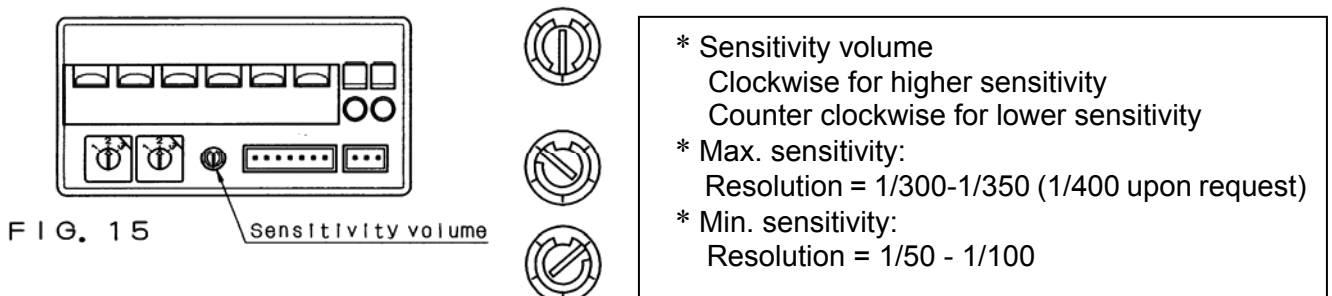
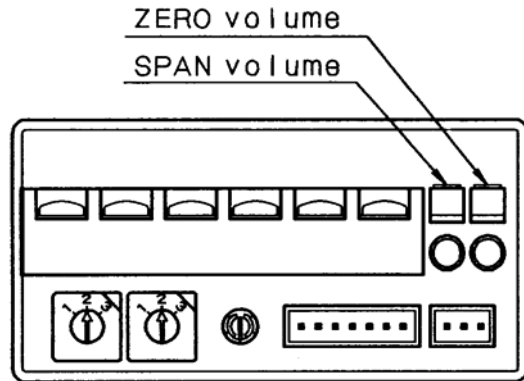


FIG. 15

9-5 Zero/Span adjustment



- * ZERO volume
CW = To increase (to OPEN direction)
Adjustable range:
- 25 ~ +25 %
- * SPAN volume
CW = To increase (to OPEN direction)
Adjustable range:
- 50 ~ +200 %

FIG. 16

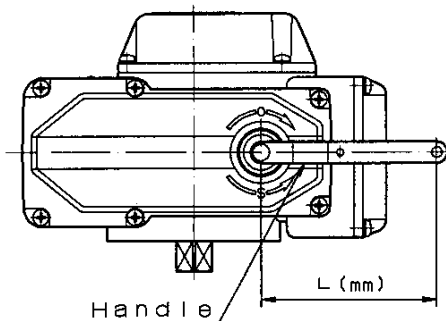
- * Zero/Span volumes are appropriately adjusted before shipment.
Do not adjust them after shipment unless imperatively required.
For adjustment, use a small screw driver with no more than 300 g·cm (0.26 in·lb) torque.
The volumes are delicate and part-turn (Not 360 deg.) Applying excessive force may cause damages.
- * First adjust Zero (with 0% signal), then adjust Span (with 50% and 100% signals).



CAUTION: Make sure that external power is OFF before attempting manual operation

10. OPERATION

10-1 Manual operation



<SIZE(mm)>	10NS	10NM	10NL
Allen Key SIZE	5	6	10
No. of handle turns	15	15	15
Length of handle	100	120	350

FIG. 17

Manual operation procedures:

1. Remove the rubber cap from the actuator.
2. Insert the attached crank handle lever into the hexagonal hole.
3. Turn the handle CW for close, CCW for open.
It is 15 turns between full close to full open.

* By turning the handle beyond the position indicator's "OPEN" / "CLOSE" positions, the output shaft will touch at the mechanical stop. Excessive force may cause damages to the actuator.



CAUTION

When making manual operation, be 100% sure that power is off. If power is on while manual operation, the handle may suddenly turn back and may cause bodily injury.



CAUTION: Confirm safety and cable connections before starting electrical operation

10-2 Electrical operation

1. Before starting electrical operation, confirm the followings are all appropriate:

- ※ Installation conditions
- ※ Ambient temperature and fluid temperature
- ※ Assembly with valve
- ※ Positions at full close and full open
- ※ Wiring conditions and connections (no breaks, no short circuits)
- ※ Water ingress prevention at conduit entry
- ※ Covers closed tightly
- ※ Power supply voltage and input signals (check against specification sheet)

(Note) Power supply voltage is 120VAC +/- 10% on the US standard model.

If power supply voltage is too high or too low, the actuator will not perform normally and such improper voltage will cause damages to the unit.

2. Supply electrical power and input signals.

3. Check the actuator / valve positions with various levels of input signals.

[eg. 4~20mA input signal / Reverse action]

4mA	20mA	12mA
Full close	Full open	50 % open

4. Check the control resolution at middle positions.

[eg. 4~20mA input signal]

Resolution	Minimum change in input signals
1/250	0.064mA
1/200	0.080mA

The resolution is usually preset at 1/200 - 1/250 before shipment.

If it is necessary to change the resolution, adjust it by the sensitivity volume (See 9-4).

At higher-resolution setting, in some cases, electrical noises on the signal line may cause unwanted hunting or high-speed vibrating motions on the actuator.

It is best to eliminate the noise from the signal line by noise cancelling devices and a proper shield cable.

For instant cure before permanent fix, it is recommended to reduce the resolution to the minimum level so that the actuator will not respond to the noises.

11. ADJUSTMENT

11-1 Limit Switches

Adjustment procedures are explained in the following sections for 4~20mA input signal example.

<Nucom-10NS>

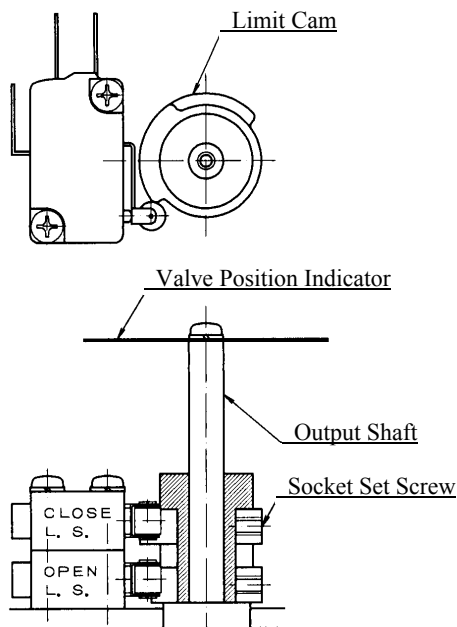


FIG. 18

1. Retire the Mechanical Stopper Bolts. (See 11-2)
2. Remove Electric Unit Cover (top with window).
3. Remove Position Indicator.

The upper limit switch is for Close, lower limit switch is for Open. (2 extra limit switches (contact output) are available as option.)

4. Open the valve fully at 20mA.
5. Cut-off the power supply, and using crank handle, turn the actuator output shaft to further opening (CCW) by 1/2 handle turn. (1/2 turn = 3 deg.)
6. Loosen and turn the lower cam. Confirm that the switch is functioning (making a click sound) at the very position. Then secure the cam by the set screw.
7. Adjust the close side in the same manner. Close the valve fully at 4mA.
8. Cut-off the power supply, and using crank handle, turn the actuator output shaft to further closing (CW) by 1/2 handle turn. (1/2 turn = 3 deg.)
9. Loosen and turn the upper cam. Confirm that the switch is functioning (making click sound) at the very position. Then secure the cam by the set screw.

* Make sure that the mechanical stop bolt at each travel end does not intervene the motion.

10. Adjust the Mechanical Stopper Bolts so as to hit the stopper after 1/2 handle turn from the Open / Close limit switch stop.

* It is easy to confirm Open / Close limit switch position by using Signal Off Mode.
While supply power, cut off the signal and turn the Signal Off mode switch carefully from 2 (Stop / factory default) to 1 (Open) or 3 (Close). The actuator goes beyond 4mA / 20mA positions and will stop at OLS or CLS positions.

CAUTION: NEVER touch power supply line when turning the switch, which will cause electrical shock and severe injury.

11. Place / adjust the valve position indicator, and assemble the Electric Unit cover.

12. Test the actuator for the entire operational range.

<Nucom-10NM>

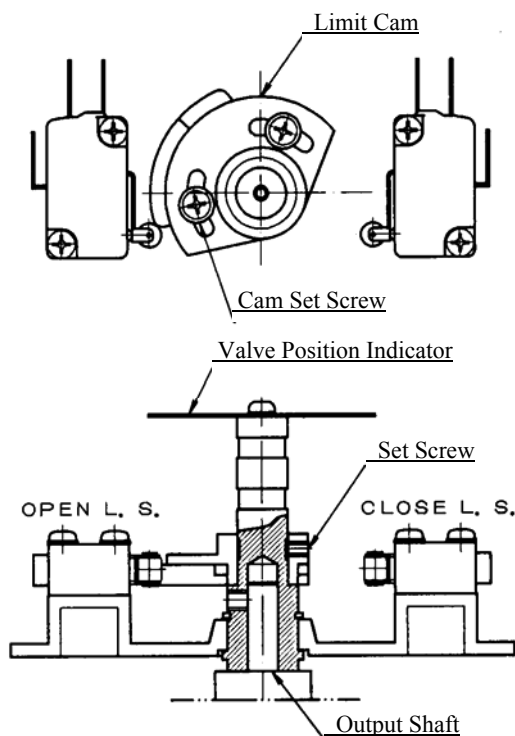


FIG. 19

1. Retire the Mechanical Stopper Bolts. (See 11-2)
2. Remove Electric Unit Cover (top with window).
3. Remove Position Indicator.

Looking from the Control Pack side, left limit switch is for Open, and right limit switch is for Close.
(2 extra limit switches (contact output) are available as option.)
The cam is 3 layer structure. Second (mid) layer for Open and third (bottom) layer for Close.

4. Open the valve fully at 20mA.
5. Cut-off the power supply, and using crank handle, turn the actuator output shaft to further opening (CCW) by 1/2 handle turn. (1/2 turn = 3 deg.)
6. Loosen two cam set screws and turn the middle layer cam. Confirm that the switch is functioning (making click sound) at the very position.
Then secure the cam by a cam set screw at the OLS side.
7. Adjust the close side in the same manner.
Close the valve fully at 4mA.
8. Cut-off the power supply, and using crank handle, turn the actuator output shaft to further closing (CW) by 1/2 handle turn. (1/2 turn = 3 deg.)
9. Loosen and turn the bottom layer cam. Confirm that the switch is functioning (making click sound) at the very position.
Then secure the cam by a cam set screw at the CLS side.

* Make sure that the mechanical stop bolt at each travel end does not intervene the motion.

10. Adjust the Mechanical Stopper Bolts so as to hit the stopper after 1/2 handle turn from the Open / Close limit switch stop.

* It is easy to confirm Open / Close limit switch position by using Signal Off Mode.
While supply power, cut off the signal and turn the Signal Off mode switch carefully from 2 (Stop / factory default) to 1 (Open) or 3 (Close). The actuator goes beyond 4mA / 20mA positions and will stop at OLS or CLS positions.

CAUTION: NEVER touch power supply line when turning the switch, which will cause electrical shock and severe injury.

11. Place / adjust the valve position indicator, and assemble the Electric Unit cover.
12. Test the actuator for the entire operational range.

<Nucom-10NL, -100, -150, -200>

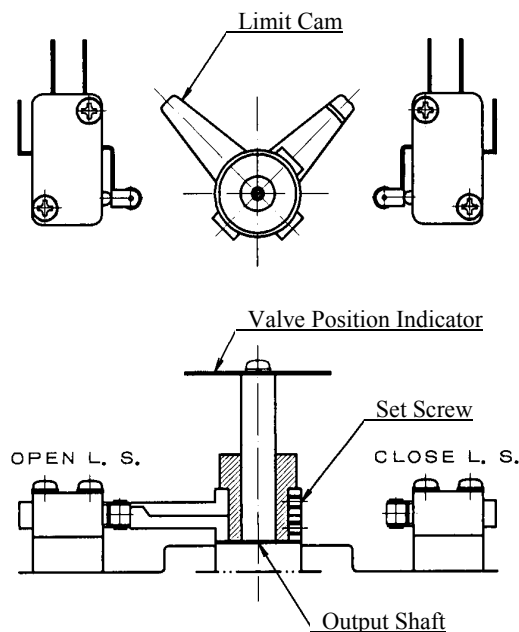


FIG. 20

1. Retire the Mechanical Stopper Bolts. (See 11-2)
2. Remove Electric Unit Cover (top with window).
3. Remove Position Indicator.

Looking from the Control Pack side, left limit switch is for Open, and right limit switch is for Close.
(2 extra limit switches (contact output) are available as option.)

4. Open the valve fully at 20mA.
5. Cut-off the power supply, and using crank handle, turn the actuator output shaft to further opening (CCW) by 1/2 handle turn. (1/2 turn = 3 deg.)
6. Loosen cam set screw and turn the cam. Confirm that the switch is functioning (making click sound) at the very position. Then secure the cam by the set screw.
7. Adjust the close side in the same manner. Close the valve fully at 4mA.
8. Cut-off the power supply, and using crank handle, turn the actuator output shaft to further closing (CW) by 1/2 handle turn. (1/2 turn = 3 deg.)
9. Loosen cam set screw and turn the cam. Confirm that the switch is functioning (making click sound) at the very position. Then secure the cam by the set screw.

* Make sure that the mechanical stop bolt at each travel end does not intervene the motion.

10. Adjust the Mechanical Stopper Bolts so as to hit the stopper after 1/2 handle turn from the Open / Close limit switch stop.

* It is easy to confirm Open / Close limit switch position by using Signal Off Mode.
While supply power, cut off the signal and turn the Signal off mode switch carefully from 2 (Stop / factory default) to 1 (Open) or 3 (Close). The actuator goes beyond 4mA / 20mA positions and will stop at OLS or CLS positions.

CAUTION: NEVER touch power supply line when turning the switch, which will cause electrical shock and severe injury.

11. Place / adjust the valve position indicator, and assemble the Electric Unit cover.

12. Test the actuator for the entire operational range.

11-2 Mechanical Stop

1. Referring to Fig.21, adjust the mechanical stops with the stopper bolts and nuts as follows.

A) Set the limit switches effective (on) at 1/2 handle turn outside the input signal Open/Close positions (i.e. 20mA (5V) = Open / 4mA (1V) = Close in RA setting). (See 11-1)

B) Set the mechanical stop at 1/2 handle turn outside the limit switch "on" positions.

2. Adjusting procedures

Loosen the locknuts first, and then turn the stop bolts by using a hex. wrench.

Move the stopper bolts at the proper position (above (B), see FIG.21), and secure the stopper bolts by the locknuts.

CAUTION:

If the mechanical stops are maladjusted to function within the range of electrical operation (0 - 100% normal operation range plus limit switch Open - Close range), the actuator will be self-constrained and overheated, resulting in loss of process control (motor thermal protector stops the motor under high-temp.). Repeating overheat will shorten the life of the actuator.

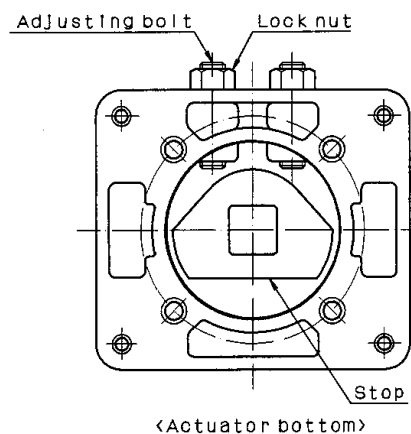
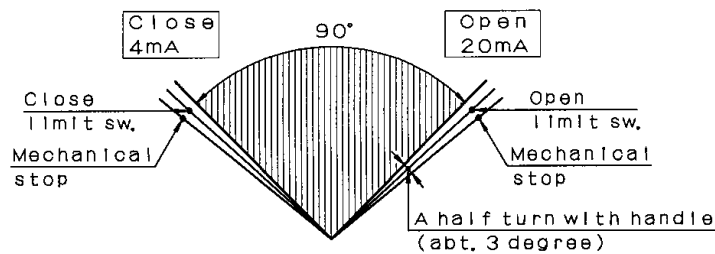


FIG. 21

12. TROUBLE SHOOTING

TROUBLE AND PROBABLE CAUSE	SOLUTION
✳️ Motor does not start	
Power failed or dropped	Check and supply correct range of power
Signal failed or dropped	Check and input correct range of signals
Wire broken or disconnected	Change the wire or re-connect the terminal
Thermal protector functioned	Lower the ambient temperature or decrease duty rate Eliminate overload at valve
Limit switches functioned at an intermediate position	Re-adjust the limit cam
Motor advancer defective	Replace capacitor (at factory only)
Control Pack defective	Change Control Pack
✳️ Unstable Positioning (Hunting)	
Noise on signal line	Check input signal / Reduce resolution
Improper controller parameter setting	Change controller setting / Reduce resolution
Noise on potentiometer	Replace potentiometer (at factory only)
Potentiometer gear loose	Check the fixing screws and Re-adjust
✳️ Position does not match input signal	
A wrong signal input	Check the input signals
Improper adjustment of Mechanical Stopper	Re-adjust Mechanical Stopper
Improper adjustment of Zero/Span	Re-adjust Zero/Span
Valve jam / Mechanically restricted	Clear the jam / Eliminate restriction
✳️ Position signal does not output	Check the wiring connection

* For other types of troubles, please contact to our Sales Dept.

13. MAINTENANCE AND INSPECTION

13-1. Lubrication

The moving parts are permanently lubricated with long life Molybdenum Disulfide grease (MoS₂) and other types of grease before shipment. Periodical lubrication is in principle not required.

13-2. Inspection

When restart operation after a long break period, confirm the following:

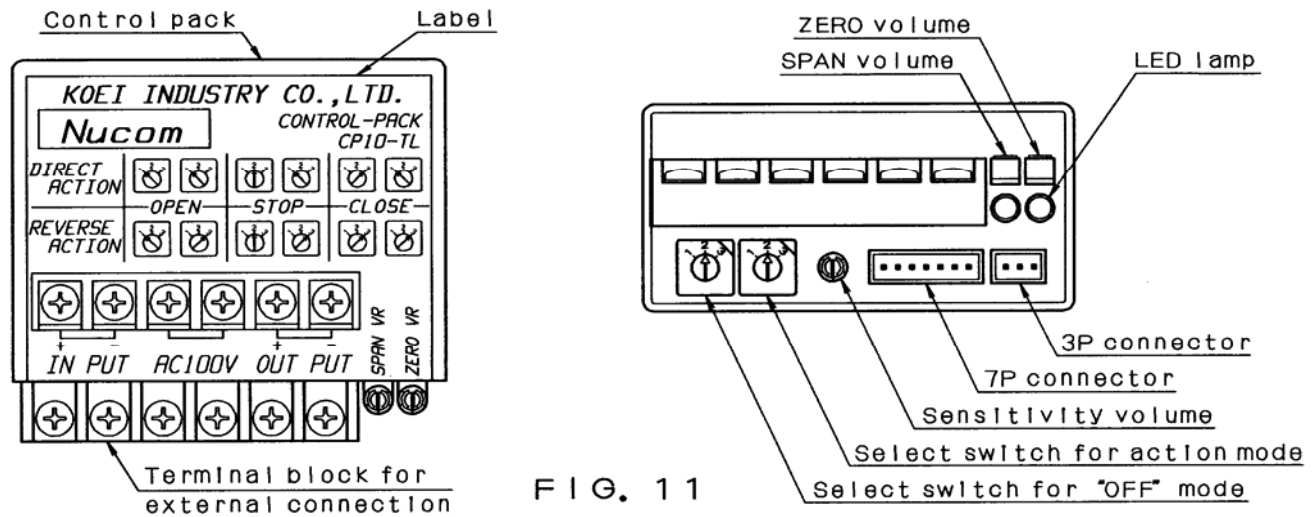
- 1) Cut off power supply and operate the actuator manually by the crank handle.
Make sure the valve is operable smoothly.
- 2) Open the covers and visually confirm that no water condensation inside, and no problem on wiring.

* After the inspection, check the cover packing and secure the cover properly to prevent moisture ingress.

14. OPTIONAL EXTRAS

- * Various power supply voltage specifications
- * Split range input signal (4~12mA, 12~20mA), Voltage input signal (0~10V)
- * Open/Close no-voltage output contacts (10NS and 10NM: supplied with pre-wired cable 6ft)
- * Torque limiter (Close only, Open / Close both directions)

Modulating Electric Operation Manual/Supplemental – Action Monitor LED on Control Pack CP-10



Opening Action Monitor LED – Span Volume Side
Closing Action Monitor LED – Zero Volume Side

NORMAL OPERATION

During Opening Action ----- Open LED – ON
At Open Travel / Torque Limit (OLS-1 / OTL-1) ----- Both LEDs – ON

During Closing Action ----- Close LED – ON
At Close Travel / Torque Limit (CLS-1 / CTL-1) ----- Both LEDs – ON

When Input Signal = Opening Position Matched and Paused ----- Both LEDs – OFF

WHEN INPUT SIGNAL “OFF” (or Below 2 mA)

44000M automatically switches to Signal Off Mode:

In “Signal Loss to Open” mode, Going to Open Travel Limit (OLS-1) ----- Both LEDs – ON
In “Signal Loss to Close” mode, Going to Close Travel Limit (CLS-1) ----- Both LEDs – ON
In “Signal Loss to Stop” mode, Stopping at Last Position ----- Both LEDs – OFF

NOTE: LED Monitors are not affected by Direct / Reverse Action Mode change.

- eg) Direct Action Mode (in US, referred to as Reverse Action Mode)
 - Signal Increase 4mA → 20mA to Close (CW motion): Close LED –ON
 - Signal Decrease 20mA → 4mA to Open (CCW motion): Open LED –ON