

ELECTRIC ACTUATOR

“ **Unic Series** “ ROTARY TYPE DC Version

Unic – 05

Unic – 10

Unic – 20

Unic – 40

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

This is a rotary type actuator for on-off service (or at an intermediate position) operated with external contact signals or by changeover of power source (Open- Close).

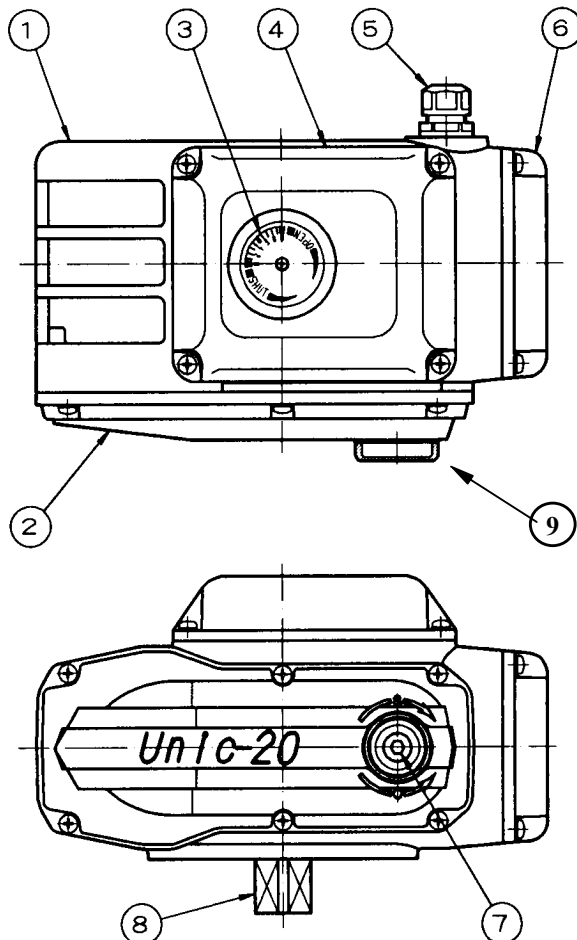
Through aluminum die casting, the unit is miniaturized to a light, compact, high performance and high torque actuator.

⊗ FEATURES

- * Compact and light
- * Easy for handling and useable in a narrow space.
- * Trouble-less simple structure.
- * Easy of mounting, inspection, and maintenance.
- * Manual override with a crank lever (standard accessory)
- * Motor is protected from burnout due to overload.
- * Simple wiring with terminal block.
- * Water tightness : NEMA-4, 4X

2. CONFIGURATION

2-1 Configuration and names of parts



No.	Name
1	Main body
2	Driving unit cover (front cover)
3	Valve position indicator
4	Electric unit cover (top cover)
5	Conduit
6	Terminal unit cover (side cover)
7	Manual override shaft
8	Output shaft
9	Dust cover

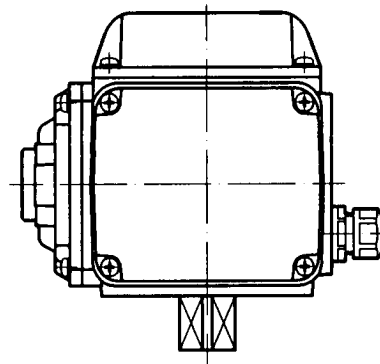


FIG. 1

2-2 Unic-05 Dimensions

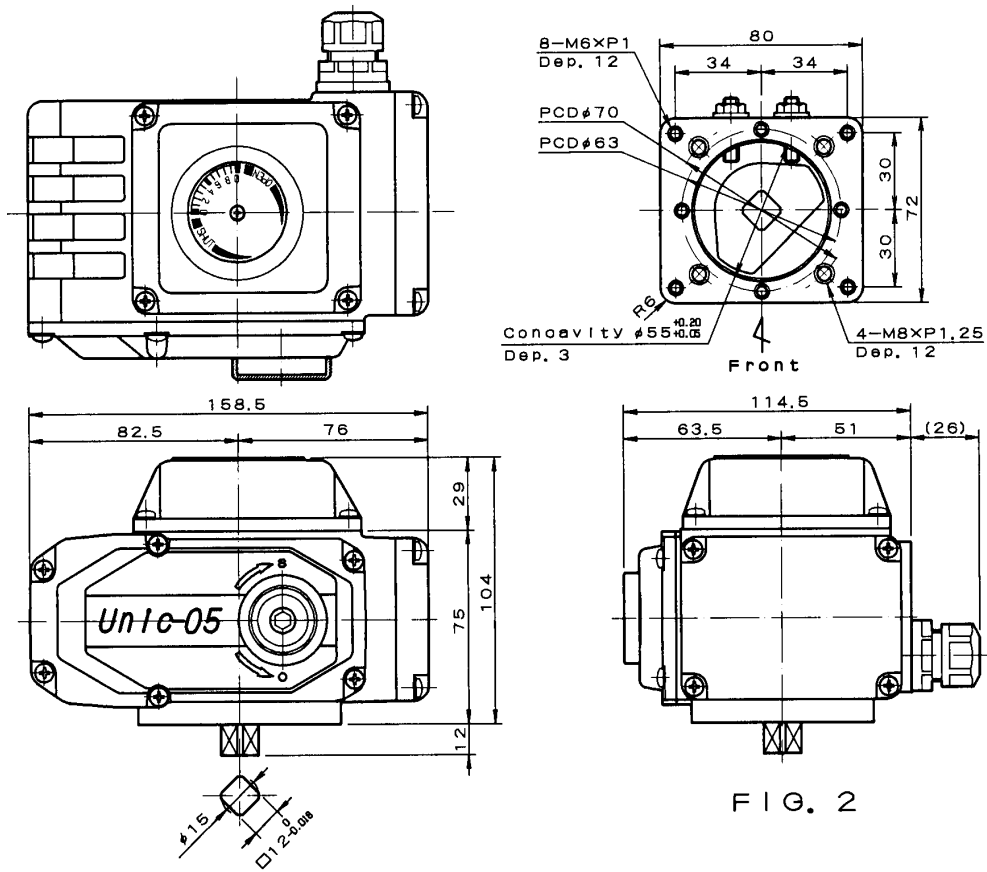


FIG. 2

2-3 Unic-10 Dimensions

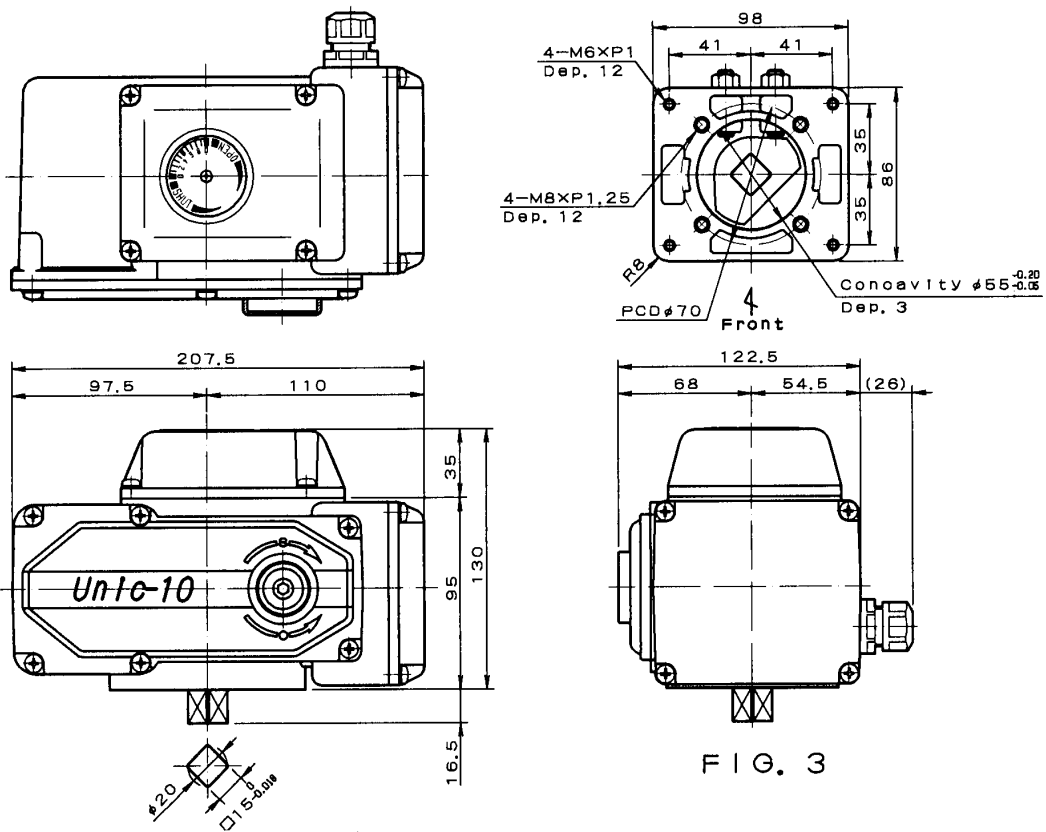


FIG. 3

2-4 Unic-20, 40 Dimensions

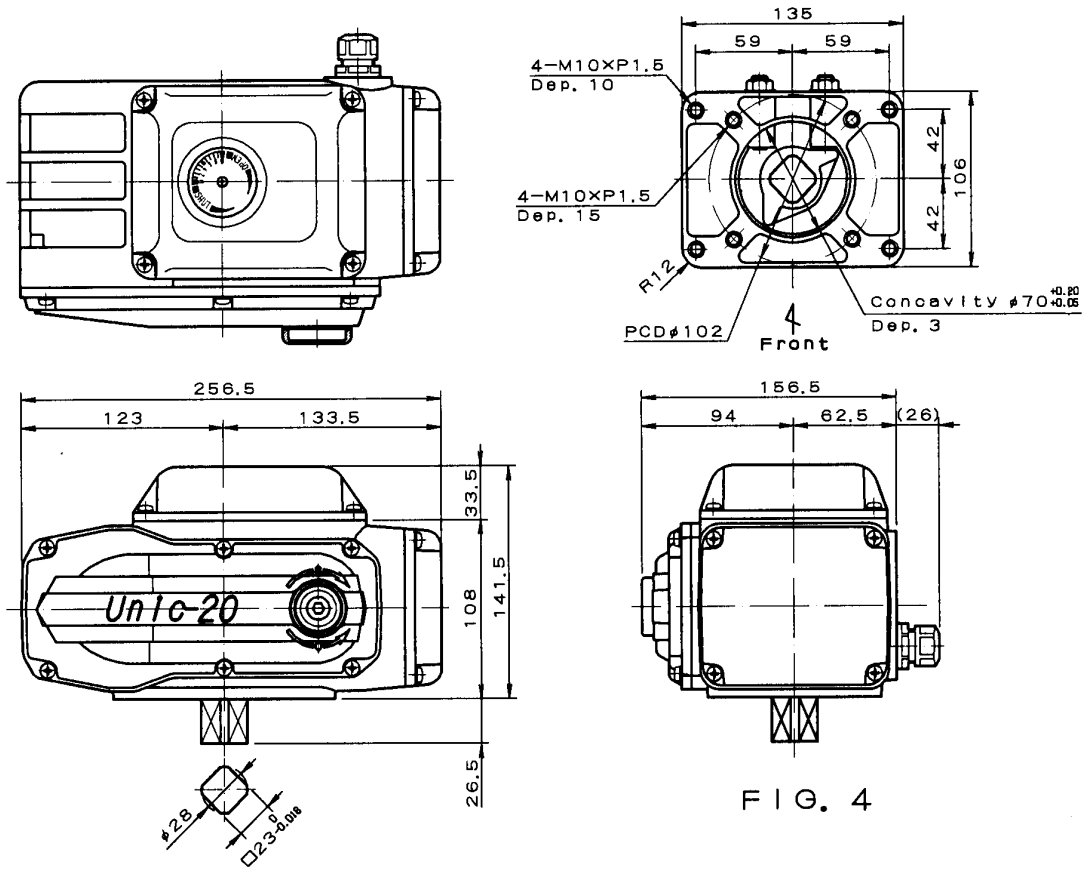


FIG. 4

3. FUNCTIONAL SPECIFICATION

ITEM \ MODEL		Unic-05		Unic-10			Unic-20		Unic-40
POWER		DC24V		DC12 / 24 / 100V			DC12 / 24/ 100V		DC24V
OUTPUT TORQUE		39N·m (4kgf·m)		68 N·m (7kgf·m)			196 N·m (20kgf·m)	176 N·m (18kgf·m)	294 N·m (30kgf·m)
SPEED		4secs.	9.5 secs.	16secs.	20secs.	10secs.	30secs.	10secs.	20secs
RATED CURRENT	12VDC	-	-	-	1.6A	-	4.2A	-	-
	24VDC	1.2A	2.0A	2.5A	-	1.4A	2.0A	3.0A	3.0A
	100VDC	-	-	-	0.2A	-	0.5A	-	-
MOTOR	Output	15W	9.1W	20W	10W	20W	31W	46W	46W
	Insulation	Class A			Class E				
OPERATION ANGLE		90°							
PROTECTION		<ul style="list-style-type: none"> * Posister for motor protection * Open / Close torque limiters (Option) (Unic-05 : Either open or close only) 							
POSITION DETECTION		Open, Close position limit switches							
OUTPUT SIGNAL		No-voltage contact output (standard) Contact capacity : AC250V-5A (Unic-05) AC250V-11A (Unic-10,-20,-40) <ul style="list-style-type: none"> * Potentiometer (Option) * R / I converter (4~20mA , Option) 							
ENVIRONMENTAL CONDITIONS		Ambient temperature : -25~55°C Humidity : 10~90% RH							
INSULATION RESISTANCE		Terminal ~enclosure : More than 500V·DC /100MΩ							
WITHSTAND VOLTAGE		Terminal ~enclosure : 1500V AC/1minute							
MANUAL OVERRIDE		Crank handle lever (Standard accessory)							
WATER TIGHTNESS		NEMA-4, 4X(to IP-66)							
CABLE ENTRY		G1/2×1							
BODY MATERIAL		Die cast aluminum (ADC12)							
COATING		Gray (Munsell N-6)							
WEIGHT		2.2kg	3.6kg			6.9kg	7.1kg		



CAUTION ON INSTALLATION ENVIRONMENT

4.INSTALLATION

4-1 Installation place

☒ Caution on indoor installation

- * Avoid hazardous place. The product is not explosion-proof.
- * Cover whole the unit when installing it in a place with water or material splash.
- * Reserve a space for maintenance or manual work.

☒ Caution on outdoor installation

- * Shade whole the unit from direct sunlight, that may raise the temperature inside the actuator.
- * Reserve a space for maintenance or manual work.

Actuator materials and surface treatment

PART \ MODEL	Unic-05	Unic-10	Unic-20	Unic-40
HOUSING BODY	Die cast Aluminum (ADC12) Chromate treatment ("Alozin" #1200) Electrostatic coating			
FRONT COVER				
SIDE COVER				
TOP COVER				
INDICATOR WINDOW	Tempered glass			
OIL SEAL	NBR			
SCREW/BOLT	SUS304			

4-2 Ambient temperature / fluid temperature

☒ Ambient temperature

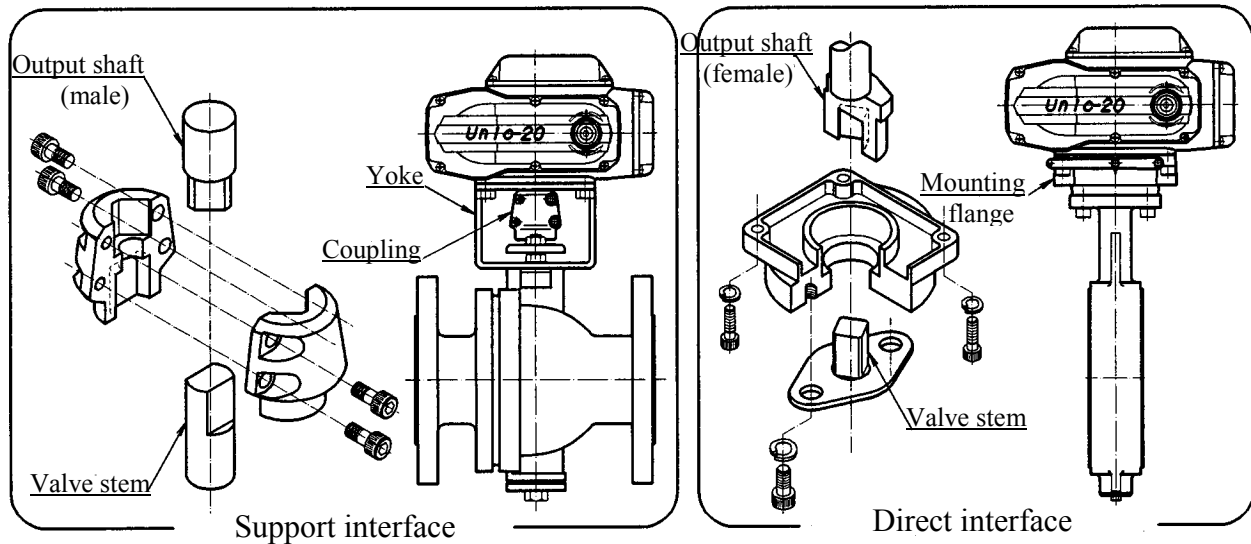
- * Environmental temperature range for use : $-25^{\circ}\text{C}\sim 55^{\circ}\text{C}$.
- * For use in negative temperature, space heater to prevent condensation or freezing is available at option.

☒ Fluid temperature

In case of high fluid temperature (over 65°C), we use radiation type yoke and coupling for mounting.

 CAUTION ON MOUNTING ON VALVE

5. MOUNTING ON VALVE



[Fig.5]

There are 2 mounting methods as shown in the illustrations.
Actuator is dismountable in case of trouble.

⊗ Support interface mounting

- a) Confirm that power is off before making manual drive.
- b) Confirm manually that the valve is normal, and then set it at full close.
- c) Bolt the yoke on the valve.
- d) Set an actuator at full close, and tentatively bolt it on the yoke.
- e) Fix valve stem and actuator output shaft with coupling.
- f) Secure bolts and fix the yoke and actuator.
- g) Confirm manually that the valve turns smoothly without eccentricity.

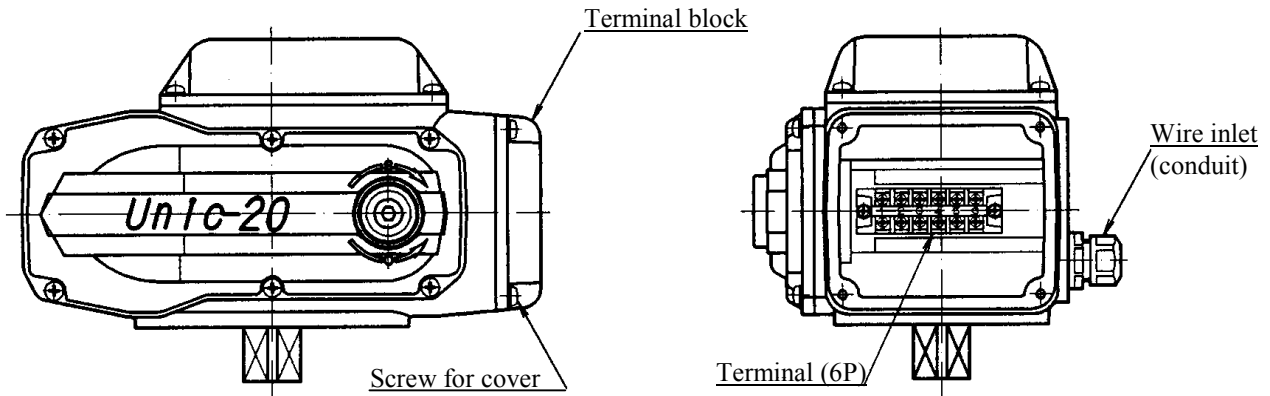
⊗ Direct interface mounting

- a) Confirm that power is off, and then set both valve and actuator at full close.
- b) Fit the concavity of the mounting flange to actuator, and bolt them up.
- c) Insert and fix actuator output shaft (female) to valve stem.
- d) confirm manually that the valve turns smoothly without eccentricity.

6. WIRING

6-1 Power and operation signals

Open terminal cover (side cover). There is a terminal block (6P) for wiring. (See Fig.6)

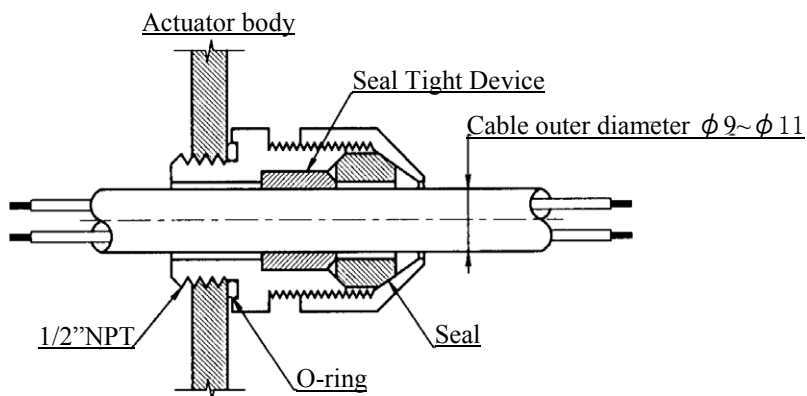


[Fig.6]



CAUTION FOR WIRING WORK

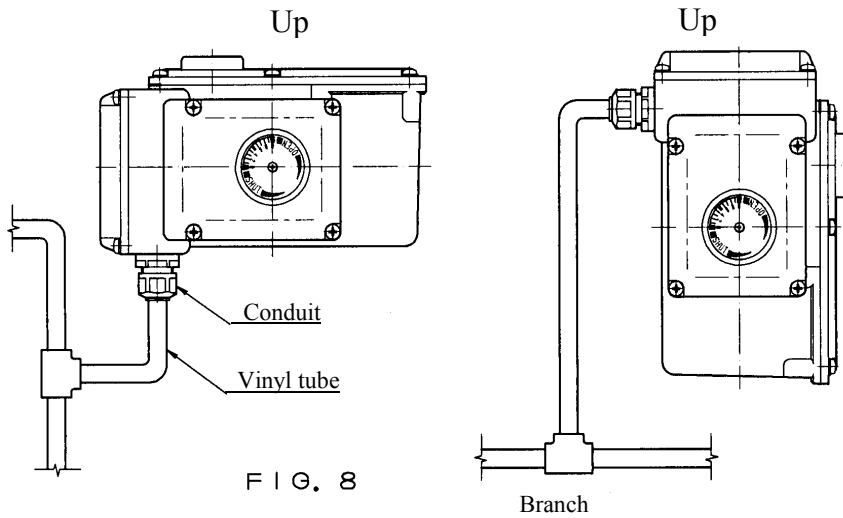
- Wiring work should be made by a qualified engineer in accordance with electrical technical standards.
- Do not make wiring work in the rain or high humid conditions.
- Make proper wiring referring to the wiring diagram.
- For all connections use fork crimped-on terminals.
- Use a cable of outer diameter $\phi 9 \sim 11$ mm for standard conduit (See Fig.7) .
When using a customer conduit, select a proper size one to fit cable diameter, as otherwise, it may cause troubles due to water ingress etc.
- After wiring is completed, screw up terminal cover and conduit, or it may cause troubles due to water ingress etc.



[Fig.7]

6-2 Wiring work

When using a vinyl tube or conduit, make sufficient water prevention.



 CAUTION FOR USE

7. POWER SOURCE AND CIRCUITS

7-1 Power source

Standard voltage	24VDC
Option	12VDC, 100VDC

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

7-2 Fuse and breaker

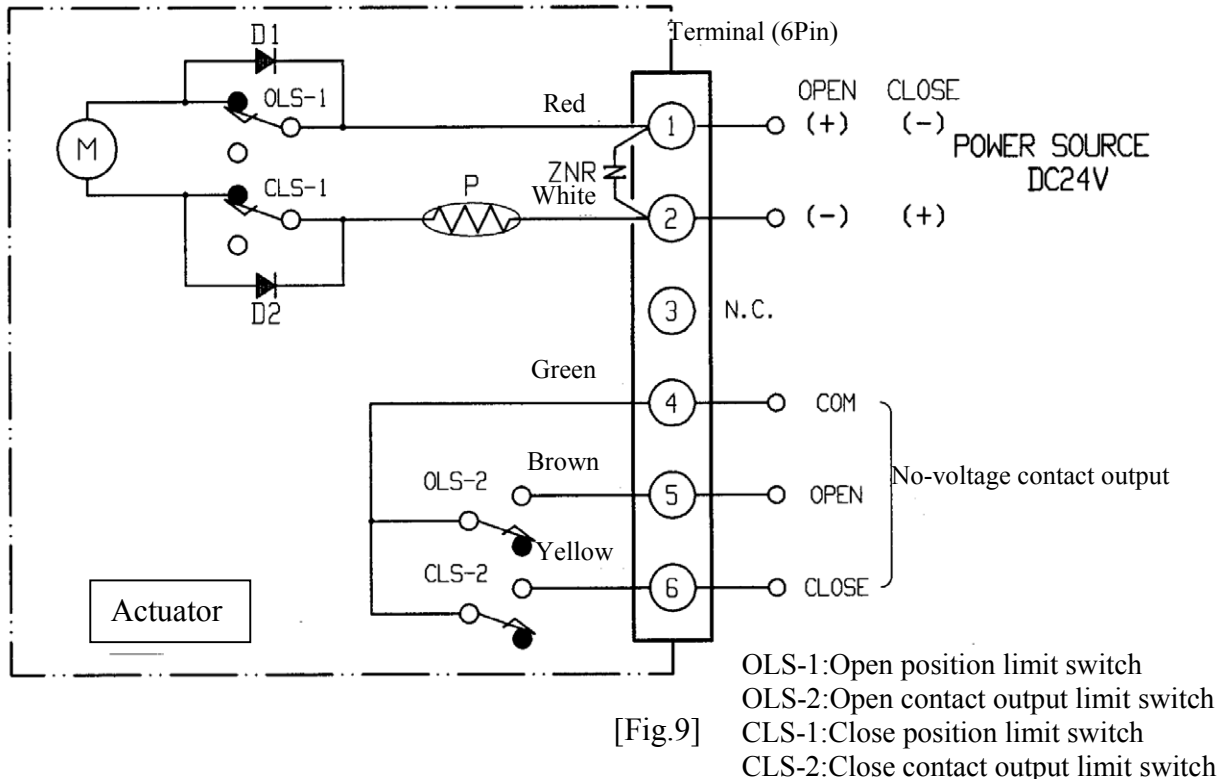
Install a protection fuse or breaker on power source.

<< Table of recommendable fuse and breaker >>

Model	Capacity of fuse/breaker	Motor capacity	
Unic-05	5A	15W	
Unic-10	5A	10W	20W
Unic-20,-40	7A	31W	46W

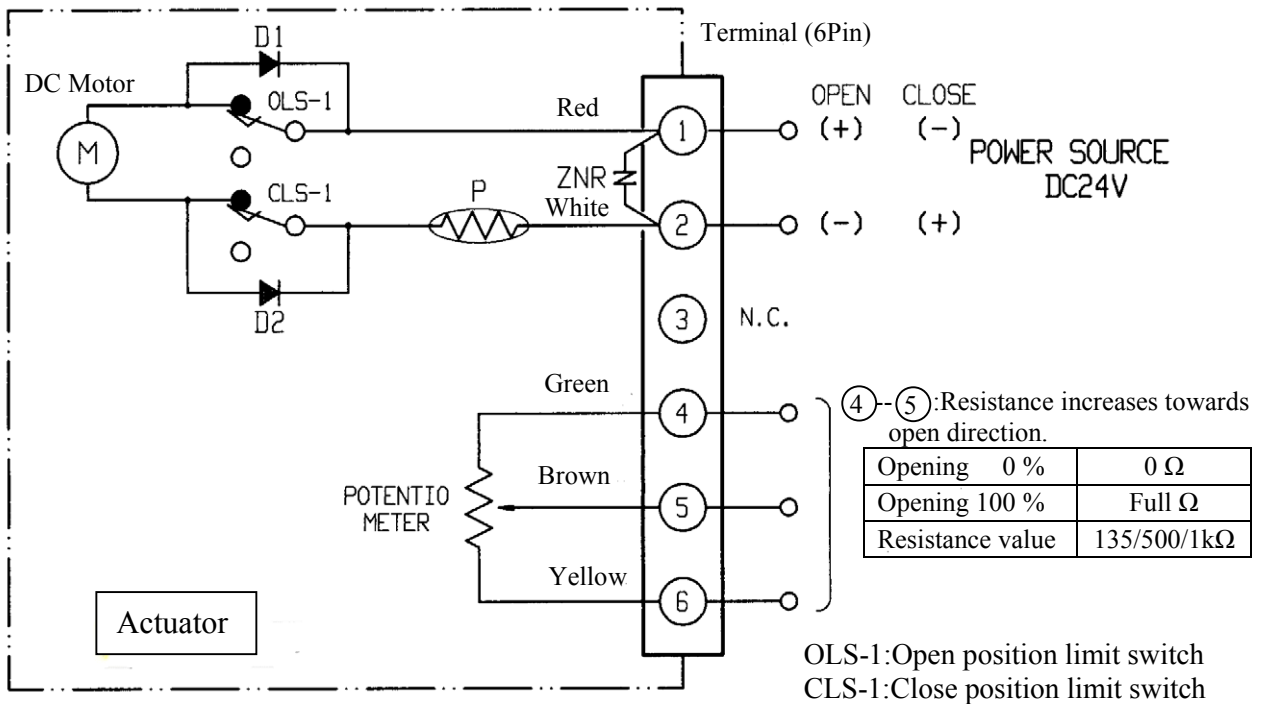
7-3 Circuit diagram

[Standard circuits (Open / close no-voltage contact output)] <Sample of wiring diagram>



[Potentiometer resistance output circuit diagram]

<Sample of wiring diagram>





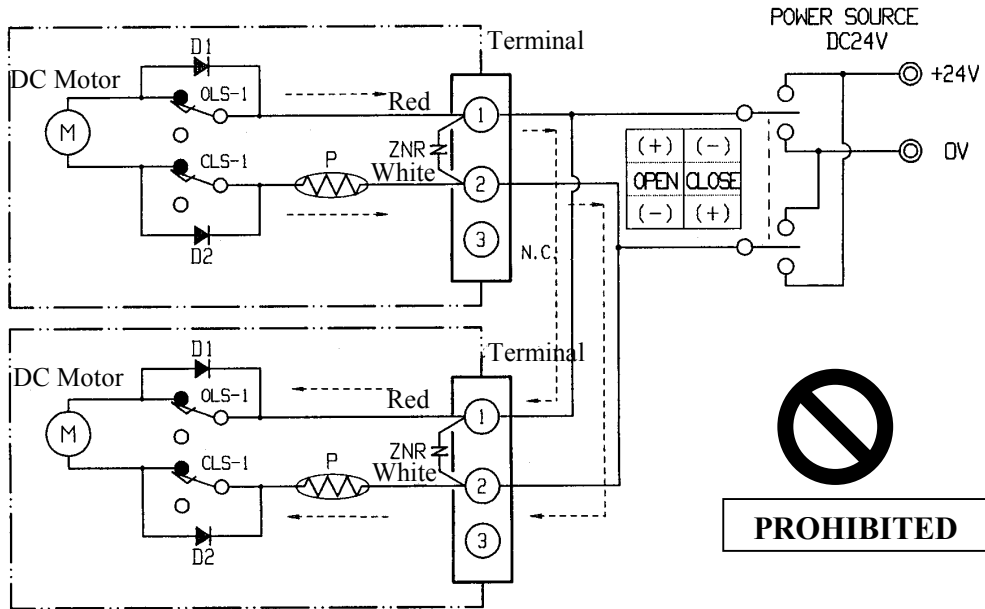
CAUTION FOR USE

Do not make parallel operation

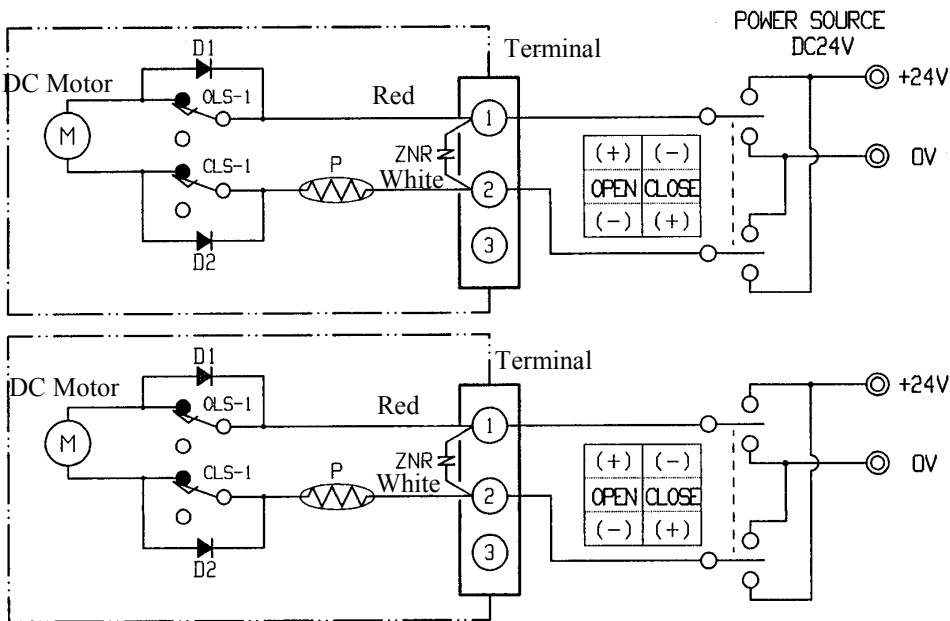
[Note on parallel operation]


When operating plural DC actuators on single power source, make the wiring in the way that each actuator is independently separable from DC source.

Otherwise, when an actuator is manually operated, it is possible that the voltage generated by manual drive will transmit and drive other actuators.



Wire each actuator with independent circuit.



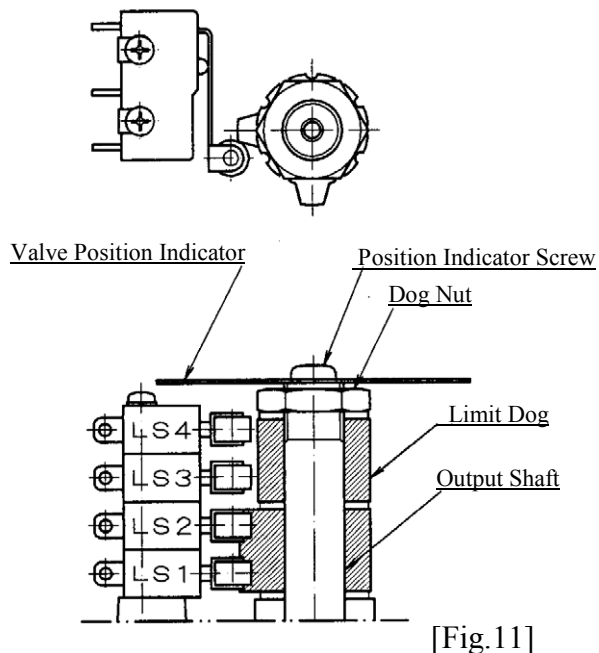
 Confirm that power is “OFF” before making manual operation!

8. ADJUSTMENT

8-1 Limit switch and position indicator

<<Adjustment of no-voltage contact output>>

[Unic-05]



LS1: Open position

LS2: Open signal

LS3: Close position

LS4: Close signal

a) Remove top cover.

Switches and dogs are set as shown in the left.

b) Upper switch and dog are for close, and lower ones are for open position.

c) Manually set an opening.

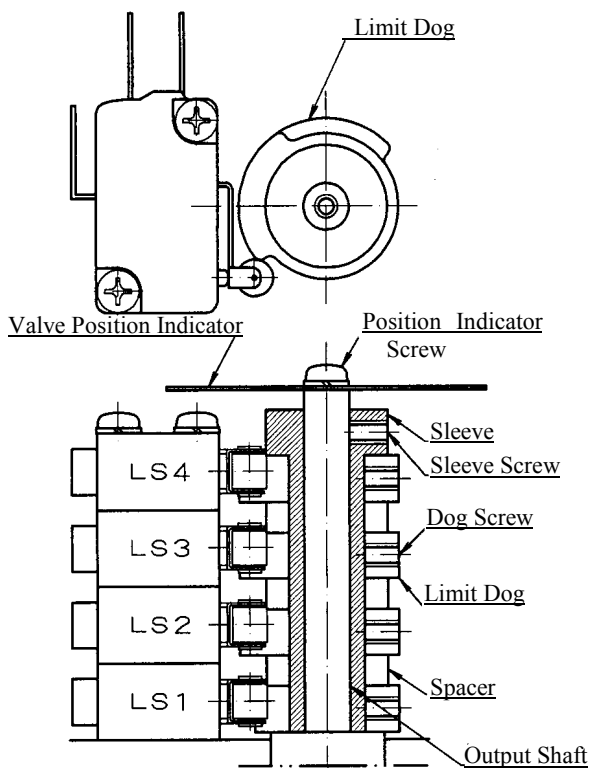
d) Loosen upper nut to release the dog for turn. Turn the switch and fix it with the nut at the position it clicks.

Adjust both upper and lower switches. As an one-piece type dog is installed for both position and contact output switches, as you set the position switch, the position of contact output switch will be determined at the same time.

e) After the adjustment, confirm that the actuator functions before the position switch (stop).

f) Loosen dial plate and fix it at the set opening.

[Unic-10]



a) Remove top cover.

See switches and dogs as shown in the left (Fig 12).

b) LS3,LS4 are for contact output, LS1, LS2 are for position limit.

c) Manually set the opening at 1/2 ~1 handle turn before stop position.

d) Loosen dog screw. Adjust the switch at the position it clicks, and fix the screw.

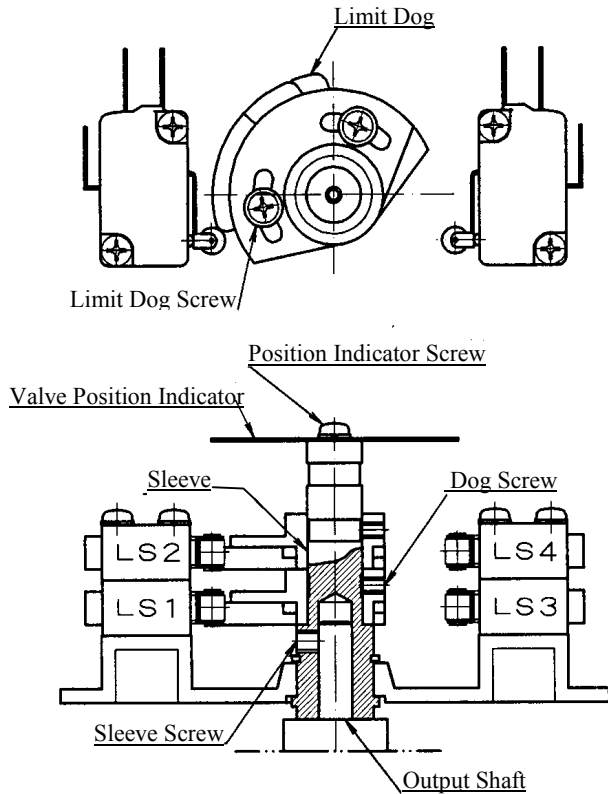
*Adjust both open and close sides.

*Every dog is independent.

e) After adjustment, confirm that the switches function before the stop position.

f) Loosen dial plate and fix at the set opening.

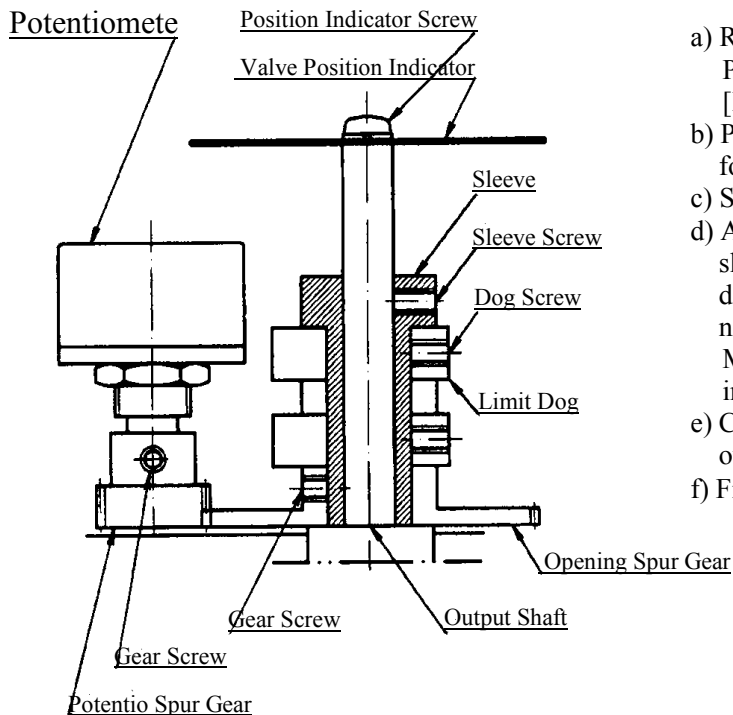
[Unic-20, -40]



[Fig.13]

- a) Remove top cover.
See switches and dogs in the left (Fig.13).
- b) Switches are arranged in the left and right. The right are for close, left are for open.
(Upper for contact output)
- c) Manually set the opening at 1/2 ~1 handle turn before stop position.
- d) Loosen dog screw and fix the switch at the position it clicks.
*Adjust both right and left (open and close).
- e) After the adjustment, confirm that the switches function just before stop position.
- f) Loosen dial plate screw and fix it at the set opening.

8-2 Potentiometer resistance output (option)



[Fig.14]

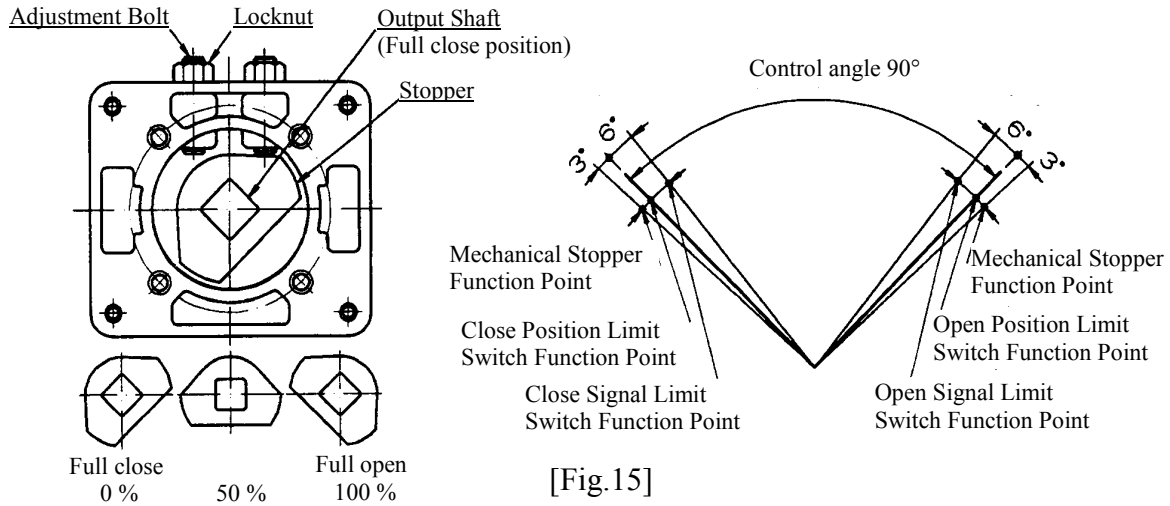
- a) Remove actuator top cover (Electric unit cover).
Potentiometer is connected with gears as shown in [Fig.14].
- b) Potentiometer is available with 135Ω, 500Ω, 1KΩ for users choice.
- c) Set the opening manually at “ Full close ”.
- d) Apply a tester between terminals 4 and 5, and loosen sleeve screw for turn. Set the potentiometer at a desired resistance, then, screw it up. Adjustment is now over.
Make sure that the position switch (stop) functions in position.
- e) Confirm the resistance at full close and full open that output resistance is within the range.
- f) Finally, loosen dial plate and fix it at the set opening.


8-3 Mechanical stopper

Setting is to be made so as that as shown in [Fig.15], contact output switch will function at $3^{\circ}\sim 6^{\circ}$ before position limit switch function point, and mechanical stopper will function at $3^{\circ}\sim 6^{\circ}$ after position limit switch function point.

* On / off positions of the actuator main unit will be determined by output shaft position.

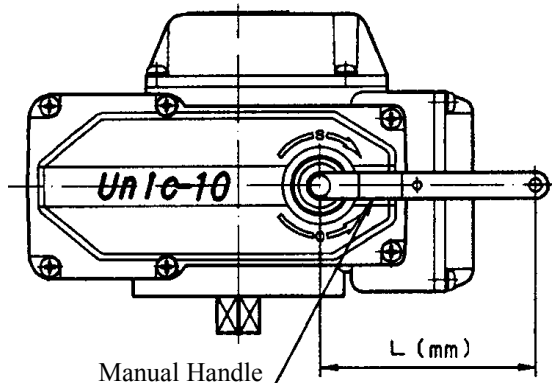
Set position / signal limits and mechanical stopper manually as shown in the figure, while confirming the positions of full close and full open.



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

9. TEST OPERATION

9-1 Manual operation



- Remove dust cover in the actuator front.
- Insert the attached crank lever in the hexagon hole.
Turn CW for CLOSE, CCW for OPEN.
Note : Do not turn manual handle with excessive force beyond the “Full Open ~ Full Close”, for it may cause trouble.

< MANUAL HANDLE DIMENSIONS >

Item \ Model	Unic-05	Unic-10	Unic-20, -40
Opposite of hexagon	5mm	6mm	6mm
Number of handle turns	7.5	15	15
Length	100mm	100mm	120mm
Material	SCS13	SCS13	SCS13



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 manually that valve opening and actuator open / close positions correspond each other.
Check that the valve turns smoothly without eccentricity.
- Confirm with external operation signals that open and close action is normal. (Motor should stop at full close / open positions, and the positions should correspond to valve opening.)
- Start power operation after confirming the above.

10. MAINTENANCE, INSPECTION

✱ Lubrication

The actuator is lubricated with super high grade lubricant (long life, antifriction, corrosion and water resistant) or di-sulfate molybdenum grease (MoS₂) before shipment.
Lubrication after shipment is in principle not required.

Inspection



When starting operation after a long period of rest, make the following inspection before hand.

- a) Cut power off, and confirm manually that the unit work smoothly without eccentricity.
- b) Remove covers and check that there is no rust or condensation inside, also that wiring is proper.

**CAUTION**

After inspection is over,
secure all the covers.
Insufficient screwing may cause troubles
due to water ingress.

11. TROUBLE SHOOTING

TROUBLE AND PROBABLE CAUSE	SOLUTION
Motor does not start up	
Power is not supplied	Supply power
Wire is broken, or terminal is open	Replace wire, or re-connect terminal
Voltage is different or too low	Check terminal voltage
Over current protector worked (Ambient Temperature is too high or valve is constrained)	Lower ambient temperature Check manually open / close action
Limit switch is defective	Replace limit switch
Limit switch adjustment is not proper	Re-adjust limit switch
Limit dog adjustment is not proper	Re-adjust limit dog
Motor coil or lead wire is broken	Renew actuator
Motor is constrained	
Limit switch is set beyond the range	Make re-adjustment
Mechanical stopper setting is not correct	Make re-adjustment
Stopping at an intermediate position	Make re-adjustment
Signal does not output	
Limit switch is not normal	Re-place limit switch
Limit switch adjustment is not proper	Make re-adjustment

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

Optional functions

Potentiometer	135Ω, 500Ω or 1KΩ
Torque limiter	Close or Close / Open (Unic-05 = Close only)
Space heater	
R / I converter	4 ~ 20mA DC output
Speed control unit	Variable range 30 ~ 180 secs. (Unic-05 excepted)
Declutch type hand wheel	

For any special version, contact our Sales Dept.