

KE-SERIES

User Manual



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◆ Change Notice ◆

[illegible]

1. Precautions

It describes outline, part name, installation and maintenance method of KVA's **KE SERIES ACTUATOR**. Please read this manual carefully before use.

On **MARK** of the Manual

「**Danger**」 and 「**Caution**」 in this Manual indicates the following definition and warning. Warning mark is important for safe work. As it indicates important issues to prevent physical accident or property loss or damage, please understand it fully before use.

 **Danger** ... It may cause serious injury or death to user if handled improperly.

 **Caution** ... It may cause injury or property damage if handled improperly.

Danger

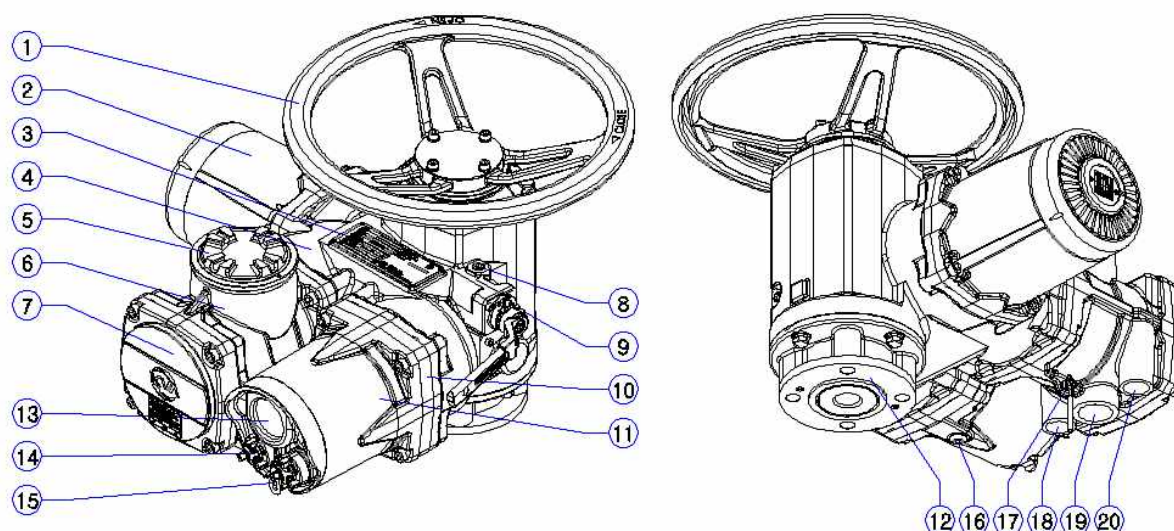
- Before opening the cover of Actuator, cut power OFF.
- Do not open the cover of Actuator if there is a concern for explosiveness.
User and Operator shall check if safety work method is applied or if it fits to region or country code applicable to a specific site.
- Check if all cable entry parts have proper finishing in compliance with the national standard or the regulation of the regulatory authority. Cable entry in which temporary plug is removed and not used must be fastened at an approved method.
See cable entry type and size indicated in the warning plate of Terminal Block Cover.
- The flamepath gaps are less than that permitted by IEC60079-1 and must not be enlarged in service.

Caution

- To install and run Actuator, disassemble Terminal Block Cover and Main Cover. See [FIG. 2-1] ⑤, ⑦, and ⑩.
- If other covers than Terminal Block Cover and Main Cover are disassembled, it cannot receive quality warranty. If inside parts are exposed to vulnerable external environment, it cannot receive quality warranty.
- Cover of KE Series Actuator is sealed with O-Ring, and cable entry part is made with plastic plug, which protects Terminal Block until cable is connected. If Actuator is not installed immediately, it is recommended to keep it in clean and dry place without much temperature change.
- Plug for Cable Entry is plastic plug installed only for transportation purpose, and it cannot be used by permanent sealing.
- Please do not activate the actuator when it stops automatically by the thermal protector in the motor part. It occurs only when all the control devices(Position & Torque Switch) in the Actuator have failed. So once it happened, please inspect the Actuator and valve before resume the operation.
In case of unavoidable operation in such circumstance, please take 30 minutes at least before its operation to avoid any damage to the valve.

2. Product Design

2-1. Structure and parts name



[FIG 2-1] KE-01 & KE-02 model structure

No	Part Name	No	Part Name
1	Manual Handle	11	Main Cover
2	Motor	12	Thrust Unit or Side Unit
3	Name plate	13	Window (Position Indicator or Lamp)
4	Body	14	Selector Knob (Local/Stop/Remote, Open/Close)
5	Power Housing Cap	15	Lock Plate
6	Power Housing	16	Vent Plug *1
7	Terminal Block Cover	17	Ground earth lug
8	Oil Plug	18	Cable entry No.3
9	Auto / Manual Selector Lever(Auto Return)	19	Cable entry No.2
10	Control Unit	20	Cable entry No.3

* 1 : Blanking element(Dongabestech DASP-SH-M16 : 09-AV2BO-0072U)

2-2. Actuator Name Plate

Name plate attached at the top of the Actuator body and it described following information.

TAG No.		Ex db IIC T4 Gb IECEX BAS 17.0076X Ta -30°C ~ 70°C
Model		
Serial No.		
Manufacture Data		
Enclosure		 KVA CO., LTD. T.82-43-279-3600 www.kva.co.kr / Made In Korea.
Power Supply		
Motor Rating	kw S3 50%-30min	
Motor Rated Current	Amp	
Max/Setting Torque	/ kgf-m	
SPEED	RPM	

3. KE Series Actuator Introduction

3-1. Outline

The KE Series Actuator is a device that opens and closes various valves, dampers, and sluices using an electric motor as a power source. The main part consists of an electric motor and a worm decelerator.

The electric motor is equipped with Thermal Protect for stopping when overheating occurs. In addition, a manual handle is attached for manual operation if it cannot be operated due to power failure or faulty actuator

- **S** and **i** Type are electric Actuators equipped with a Position Indicator to check the position of the position limit switch and the valve for automatic stop at specified location, and a Torque switch for automatic stop when an Over Torque occurs due to abnormalities in the valve.
- **E** Type is an electronic actuator equipped with Encoder Module for position and torque settings, and has a digital LCD for checking the valve position and fault history.

3-2. Features

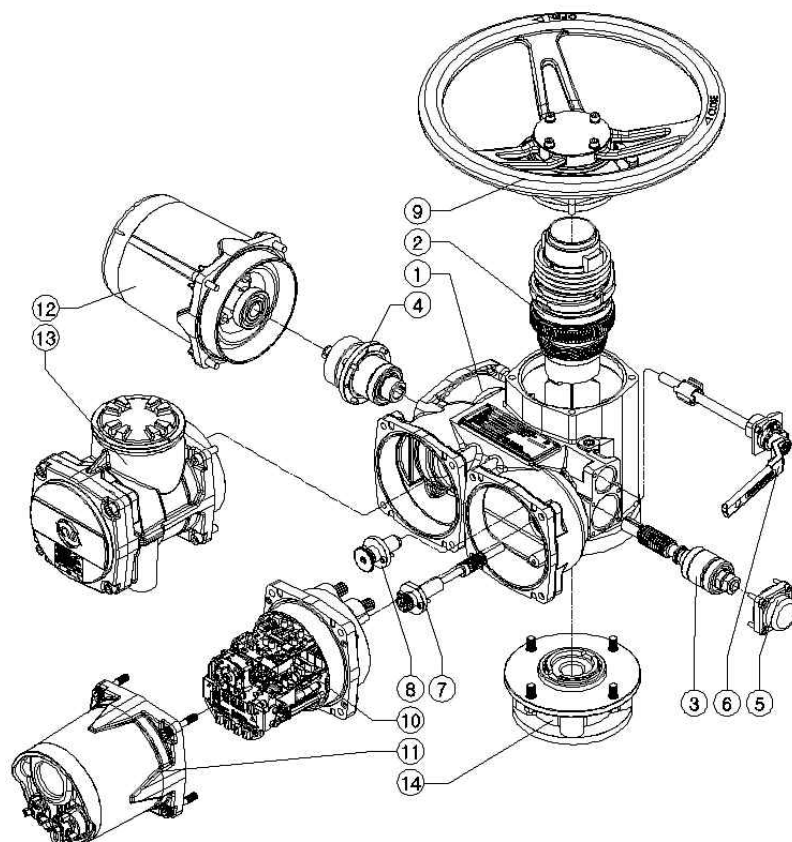
- ① Appearance: Main Cover and Terminal Block Cover are installed for User friendly location to operate the device at one direction and to check status of Actuator at the same time.
- ② It has excellent water proof (IP68 10m 72 Hr) and explosion proof (Ex db IIC T4 Gb) performance.
- ③ As Hand wheel is serially connected to Drive Shaft, it is easy for manual operation.
- ④ As operating switch is non-penetrating type, which prevents moisture penetration inside and which is easy for operation.
- ⑤ Component is made in Unit type for easy maintenance and repair.
- ⑥ Side and bearing position of Worm gear is made with precision processing for high efficient operating effect and it produced by carburizing thermal treatment.
- ⑦ Position Limit Switch is Change Gear Type which is excellent in precision and has no location change.
- ⑧ It can obtain accurate and safety close torque and open torque by high tech mechanical torque limit, which facilitates easy operation of target valve.
- ⑨ **E** Type Encoder Module has excellent precision and does not change its position.

3-3. Conformity

- | | |
|------------------------------|---|
| ① Explosion proof | : Ex db IIC T4 Gb internal pressure explosion proof structure |
| ② Ambient temp. | : -30°C ~ 70°C |
| ③ Motor Rating | : S3 50% |
| ④ Explosion proof certifier | : SGS Baseefa |
| ⑤ IECEx Certification Number | : IECEx BAS 17.0076X |
| ⑥ IP Grading / Test Lab. | : IP68(10m 72hr) / Komeri |
| ⑦ Rating Time | : 30Min |

4. KE SERIES Model Deal Drawing

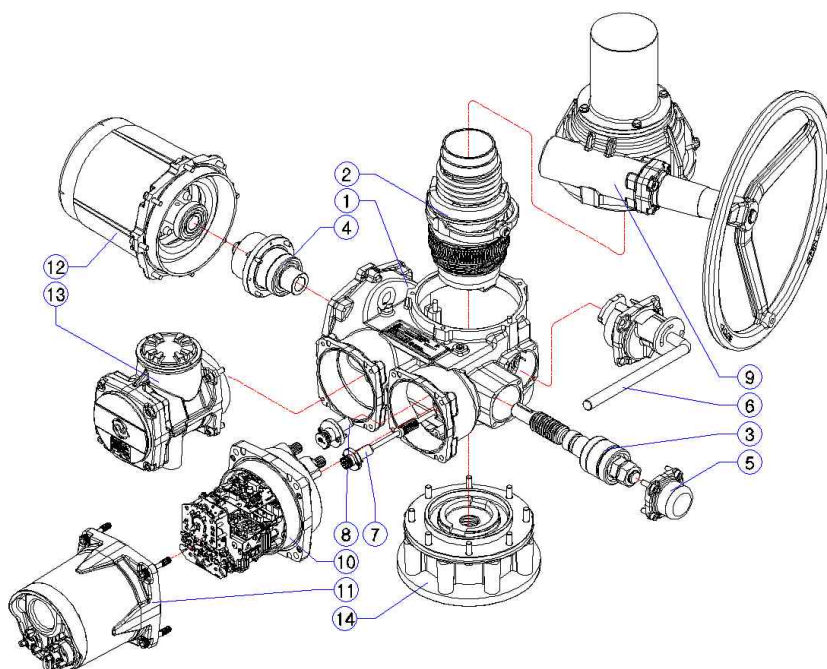
4-1. KE - 01/02 Model



No	Part Name
1	Body
2	Drive Shaft
3	Worm Shaft
4	Input Bearing Cover
5	Worm Cover
6	Declutch Lever
7	Output Shaft Housing
8	Torque Housing
9	Manual Handle
10	Control Unit
11	Main Cover
12	Motor
13	Power Unit
14	Thrust Unit

[FIG. 4-1] KE - 01 / KE - 02 Model parts name

4-2. KE - 03 MODEL



No	Part Name
1	Body
2	Drive Shaft
3	Worm Shaft
4	Input Bearing Cover
5	Worm Cover
6	Declutch Lever
7	Output Shaft Housing
8	Torque Housing
9	Manual Handle
10	Control Unit
11	Main Cover
12	Motor
13	Power Unit
14	Thrust Unit

[FIG. 4-2] KE-03 Model parts name

5. Product Configurations and Features

5-1. Basic Configuration and options

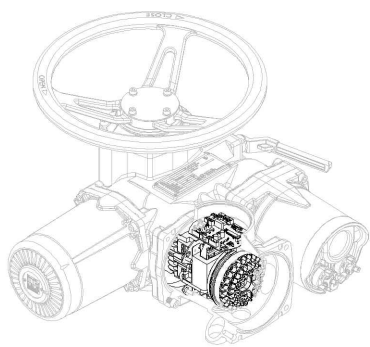
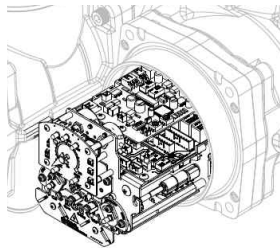
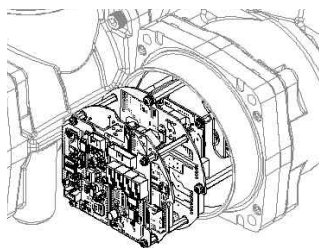
1) Basic components per model

Basic Component	Body, Motor, Driving Unit, Terminal Block, Power Housing, Main Cover
S Type	Control Gear Unit, Limit Switch Board, Indicator Unit
i Type	Connection Board, Limit Switch Board, Phase Relay Board, Operation Board, LED Board
E Type	Encoder Module, Power Board, Main Board, Phase Relay Board, Operation & LED Board

2) Option

- Additional Limit Switch
- Potentiometer (Copal, 1K Ω)
- R/I Converter(4wire, 2wire) : 4~20mA Output
- Proportional Control : 4~20mA Input and Output
- Modbus(RTU)

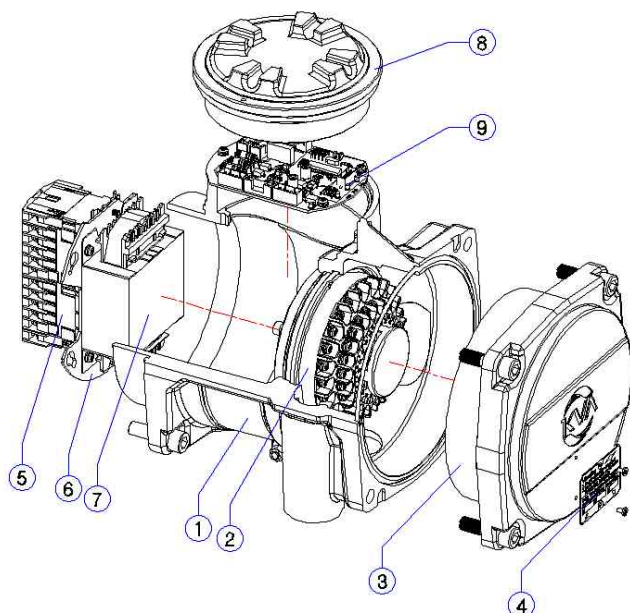
5-2. Unit Configuration

Name	Power Unit		Control Unit			
			i, S Type		E Type	
	Part Name	Abbr.	Part Name	Abbr.	Part Name	Abbr.
Config.	① Power Housing & Cap ② Terminal Block ③ Transformer ④ Magnet Contactor (Open/Close) ⑤ Phase Relay Board ※ S Type includes ①, ④ only	 T/B T/R M/C P/B	① Control Gear Unit ② Indicator Unit ③ Limit Switch Board ④ Connection Board ⑤ Operation Board ⑥ LED Board ⑦ Option Board ※ S Type includes ①, ②, ③ only	C/G I/D S/B C/B OP LED/B	① Encoder Module ② Main Board ③ Power Board ④ Operation Board ⑤ Option Board	
Image						

[Table 5-2] Unit Configuration

5-3. Power Unit

1) Unit configuration



No	Part Name	Q'ty
1	Power unit housing	1
2	Terminal block	1
3	Terminal block cover	1
4	Warning plate	1
5	Magnetic contactor	1
6	Power unit bracket	1
7	Transformer	1
8	Power housing cap	1
9	Phase relay board	1

2) Features by Part

① Magnet Contactor

- It supplies forward and reverse direction power to Motor.
- It uses both mechanical interlock and electric interlock to secure safety of motor operation.
- By capacity of motor, 3 types including GMC-16M, GMC-18B and GMC-22B are applied.

② Transformer

- Convert Main Power to be used as the control power and power the board below.

Type	Supply
<i>i</i> Type	AC110V, AC25V : Connection Board / AC8V : Phase Relay Board
<i>E</i> Type	AC110V, AC25V : Phase Relay Board, Power Board

③ Phase Relay Board (P/B)

- Includes a three-phase input power check function and a fuse to shut off control power and input power to the transmission in the event of an over-current failure or malfunction in the control unit.

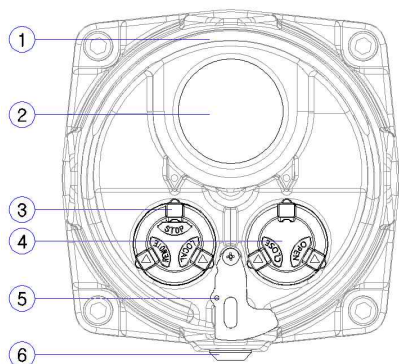
Type	Function
<i>i</i> Type	Check the normal and reverse conditions of the main power source and connect/disconnect the control power to the controller.
<i>E</i> Type	Contact output functionality has been added to the basic function of <i>i</i> Type. (Local, Remote, Power, Opening, Closing)

④ Terminal block (T/B)

- It is a part that connects wiring such as Main Power supply, Remote control and contact output.
- Assembly Type : External and Internal only Screw type (Power : M6-3P / Earth : 1P / Signals : M4-48P)

5-4. Main Cover

1) Unit composition



No	Part Name	Q'ty
1	Window(Display)	1
2	Remote / Stop / Local Selector knob	1
3	Close / Open Control Knob	1
4	Lock plate	1
5	Vent plug (Blanking element)	1

2) Window(Display)

Sort	<i>i</i> Type		<i>E</i> Type	
Image				
No	Name	Color	Name	Color
1	Indicator Name Plate		LCD Display	
2	Close LED	Blue	Close LED	Green ^{*1}
3	Open LED	Red	Open LED	Red ^{*1}
4	Power LED	Red	Power LED	Yellow
5	Fault LED	Yellow	Fault LED	Orange
6	Action LED	Green		
7	Pointer			

※ ^{*1}can be changed to Red or Green in the setting mode.

3) Lamp lighting

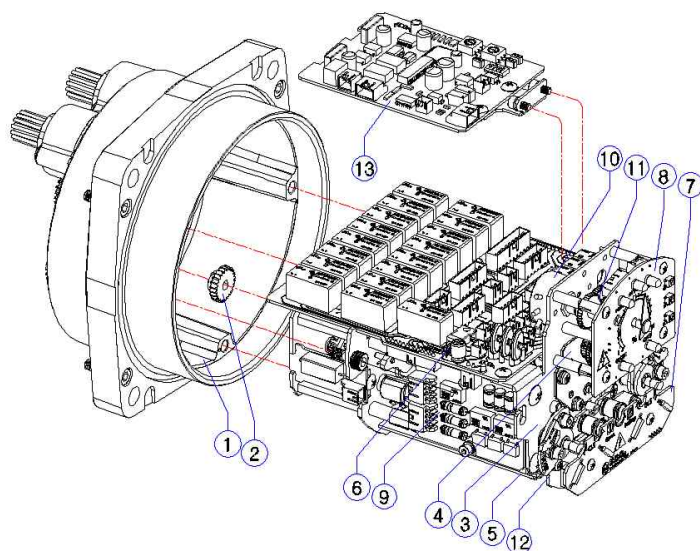
Name	<i>i</i> Type	<i>E</i> Type
Close	Fully Closed, Closing : on	Fully Closed : on, Closing : blinking
Open	Fully Open, Opening : on	Fully Open : on, Opening : blinking
Power	Power : on	Power : on
Fault	Over Torque : on	Function error : on ^{*2}
Action	Closing or Opening : blinking	-

※ ^{*2}allows you to check the details on the LCD.

5-5. Control Unit

5-5-1 *i* Type

1) Unit configuration



No	Part Name	Q'ty
1	Control unit blind	1
2	Spur gear	1
3	Control unit	1
4	Indicator unit	1
5	Limit switch board	1
6	Connection board	1
7	Operation board	1
8	Indicator board	1
9	Wet Contact board	1
10	Potentiometer	1
11	Potentiometer gear	1
12	R/I Converter	1
13	Proportional board	1

[FIG. 5-5] Control Unit

2) Limit Switch Board (S/B)

It converts mechanical signal from Control Gear Unit to electric signal (Position or Torque Limit Switch) and transfers to C/B or T/B.

3) Connection Board (C/B)

The board that controls the actuator by inputting control signals from the remote and local states and signals from the S/B(Position & Torque)

- ① The OP receives either an operate signal in Local State or an external signal in Remote State to operate the actuator.
- ② Receive a S/B signal (position or torque switch) and output the status of the actuator to T/B
- ③ Outputs (contacts) signals such as Power, Local, Remote, etc. to the external (T/B).
- ④ The standard remote control is Dry Contact with an internal AC 110V.

* Contact KVA for Wet(24VDC, 110VDC) Contact

* J12 CLS By Pass : Close Limit Switch By Pass, J19 CTLS By Pass : Close Torque Limit Switch By Pass

* P/C : P-Control Board

4) Operation Board (OP)

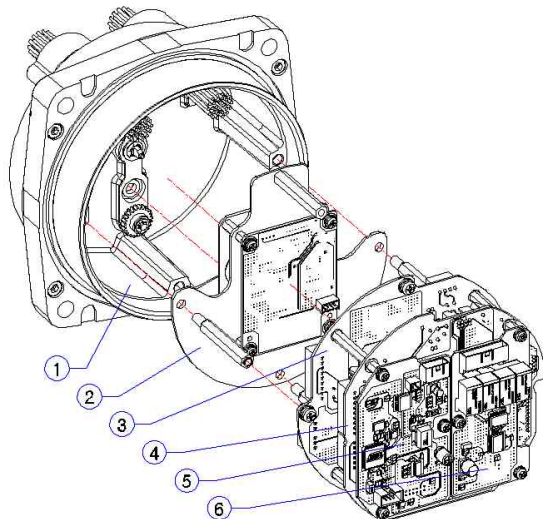
It sends the actuator's input control signal (Local or Remote) to the Connection Board.

5) Indicator board (I/B)

Displays the operation status of the actuator from 0 to 100% of the LED lamp and valve.

5-5-2 E Type

1) Default Configuration



No	Part Name	Q'ty
1	Control unit blind	1
2	Encoder module	1
3	Power Board	1
4	Main Board	1
5-1	Opt' R/I Converter(4P)	1
5-2	Opt' R/I Converter(2P)	1
5-3	Opt' Proportional board	1
6	Opt' Modbus(RTU)	1
7	Operation Board	1

[Fig. 5-5] Control Unit

2) Encoder module

It converts the position of the actuator or the mechanical physical quantity of the torque to digital and sends it to the main board.

3) Power Board

The Power board is responsible for three main functions.

Create DC Power to Each Board in the Actuator (DC3.3V and DC24V)

Magnetic Contactor Control circuit

Position Limit & Torque Limit Relay

4) Main Board

The main board is the most important function of the actuator configuration board.

Features such as processing and control of internal and external inputs, and status indication of the actuator.

Functional distinctions are as below.

- Remote and ESD Inputs
- Built-in storage device to store settings such as Position (EEPROM)
- Communication function to control the boards (SPI, I2C, UART)
- Connector for fitting Option board (2ea)

5) Operation Board

The ability to send a Local or Remote input control signal from the actuator to the Main Board, mounted on the main cover, and displays the operation status of the LED lamp and valve ratio (0-100%) and the actuator information on the LCD.

6. Installation

6-1. Precautions and safety check

- 1) Check order details and name plate details of actuator for proper main power supply.
- 2) Check the follow for safe installation of Actuator.
 - ① Install Actuator as horizontal as possible.
 - ② To set the position limit, operate the valve into the middle position by manual hand wheel.
(If it rotates in reverse direction, it may damage Actuator and valve.)

6-2. Actuator installation type

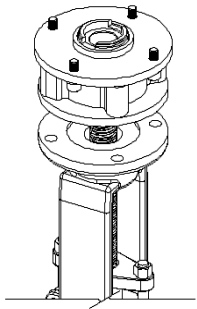
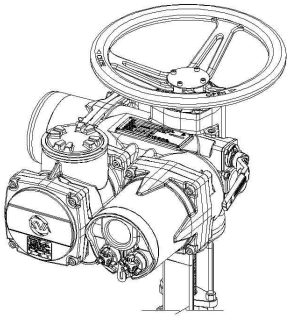
- 1) Installation method of KE Actuator has two base designs.
 - ① If there is nothing in suffix, it is Thrust base : Thrust Unit
 - ② If there is "S" in suffix, it is Side Type base : Side Unit
- 2) Size and type of base per Model (ISO5210/11)

Type \ Model	KE-01	KE-02	KE-03	Remark
Thrust Unit	F10	F14	F25	
	F12	F16		
	F14			
Side Unit	F10S	F14S	F16S	

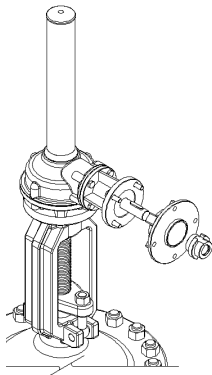
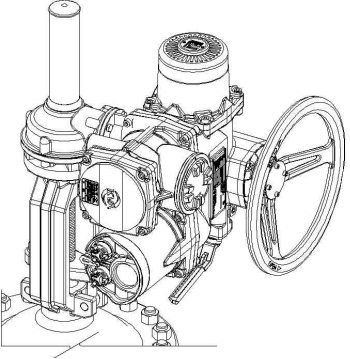
- 3) The standard base of this Actuator is Thrust Unit Type.

6-3. Installation diagram

- 1) Thrust Unit : Gate, Globe Valve Install

Valve + Thrust Unit	Thrust Unit + Actuator
	

- 2) Side Unit : Gear Box Type Install

Valve or Gear Box + Side Unit	Side Unit + Actuator
	

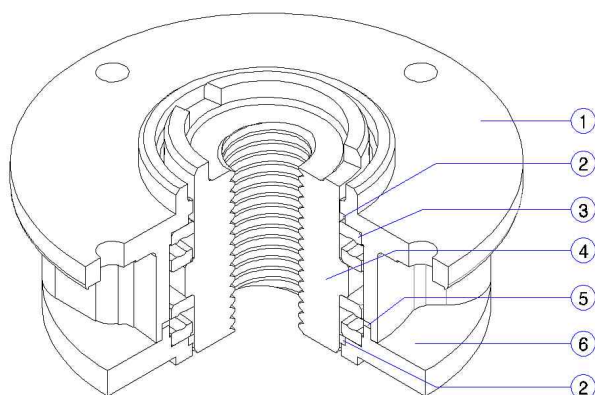
6-4. Flange size and bolts

No	Model	Flange Size	Bolt Size	Torque [Nm]	Q'ty	Remark
1	KE-01	F10	M10 * 45L	45	4	STD.
		F12	M12 * 45L	75	4	-
		F14	M16 * 40L	189	4	-
		F10S	M10 * 40L	45	4	-
2	KE-02	F14	M16 * 50L	189	4	STD.
		F16	M20 * 50L	373	4	-
		F14S	M16 * 50L	189	4	-
3	KE-03	F25	M16 * 70L	189	8	STD.
		F16S	M20 * 50L	373	4	-

6-5. Unit structure for each installation type

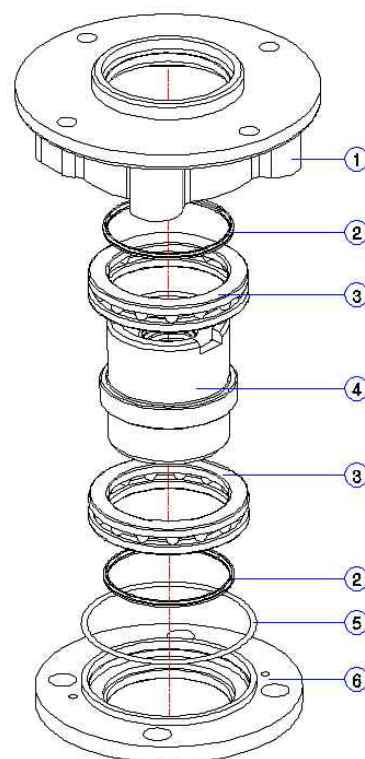
1) Structure and assembly sequence of thrust unit

① Structure of thrust unit



No	Part Name	Q'ty
1	Thrust Unit Base	1
2	Quad Ring	2
3	Thrust Bearing	2
4	Stem Bush	1
5	O-Ring	1
6	Thrust Base Cover	1

② Assembly sequence of thrust unit



2) Thrust Unit assembly

- ① Apply grease on housing orbit plate of Thrust Bearing and insert it into Thrust Base.
- ② Assemble ball & retainer on housing orbit plate.
- ③ Apply grease on Stem Bush screw part, then assemble top and bottom shaft orbit plat and insert it into Thrust Base.
- ④ Apply grease on ball & retainer on bottom shaft orbit plate and assemble it with housing orbit plate.
- ⑤ Apply grease on Thrust Base Cover and assemble it.

⚠ Caution

- Comply with the above procedure and make all parts clean to prevent impurities. If impurities enter inside, it may cause damage to parts.

3) Thrust Unit installation

- ① Check pilot diameter of flange, depth and fastening bolt size.
- ② Check assembly condition of Stem Bush and Stem.
- ③ Apply high load general grease on Stem.
- ④ Install Thrust Unit on valve flange and fasten bolt.
- ⑤ For fastening bolt, see "Table 6-4. Base size and bolt by model."

4) Side unit installation

- ① Check pilot diameter of gear box flange, depth and fastening bolt size.
- ② Check assembly condition of gear box shaft and coupling.
- ③ Install Torque Unit on gear box and fasten bolt.
- ④ For fastening bolt, see "Table 6-4. Base size and bolt by model."

6-6. Actuator installation

- ① Mount Actuator on Thrust Unit or Torque Unit using rope or belt sling.
- ② Set direction considering operation position and fasten bolt to Actuator.
- ③ Fastening bolts are as follows.

No.	Model	Bolt Size	Torque [Nm]	Q'ty	Remark
1	KE-01	M10 * 35L	45	4	-
2	KE-02	M12 * 35L	75	4	-
3	KE-03	M12 * 45L	75	8	-

⚠ Danger

- Do not lift Actuator when rope or belt sling is on while the Actuator and valve are assemble. It may cause damage the Actuator and may fall to the ground.

⚠ Caution

- Do not lift Actuator by holding hand wheel. It may cause damage to Actuator.

6-7. Check points after installation

After installation of KE Series Actuator, check the followings for safe operation.

- ① After wiring and Setup, fasten bolts of Main Cover and Terminal Block Cover using exclusive tools.
- ② Fasten Cable Gland using proper torque to prevent moisture penetration when it is flooded.
※ See to 8-1 Cable Entry Size & Marking
- ③ Check if plug is properly treated at Cable Entry part which is not used.

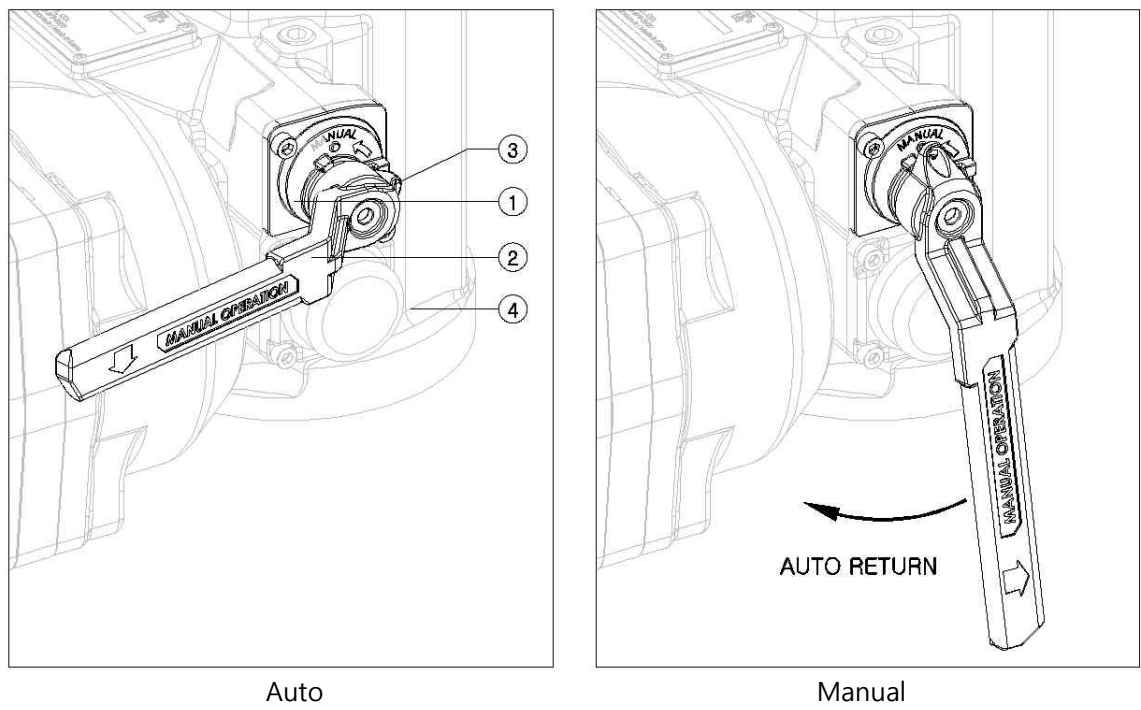
⚠ Caution

- When operating valve with Manual Handle, do not use other tools (pipe, wrench or bar). (It may cause damage to Actuator and valve.)
- If bolt is fastened too much, it may cause bolt fracture or damage of screw. If bolt is fastened too loosely, it may cause flooding.

7. Hand wheel

7-1. Hand wheel operation

- ① Please, turn Declutch Lever at the side of the actuator body to the arrow direction to turn into manual mode. If the lever is not moved to the manual position, rotate the manual hand wheel about 45 degrees and then use Declutch Lever.
- ② In general, with the same method of manual valve, it can be open or closed with manual hand wheel. (Clockwise → Close, anti-clockwise → Open)



No	Part Name	Q'ty	Remark
1	Declutch Lever Cover	1	-
2	Declutch Lever	1	-
3	Declutch Lever Lock Hole	1	-

[Fig. 7-1] Auto/Manual Selector Lever

7-2. Type of Manual Handle

KE-01/02 Top Type	KE-01/02 Side Type	KE-03

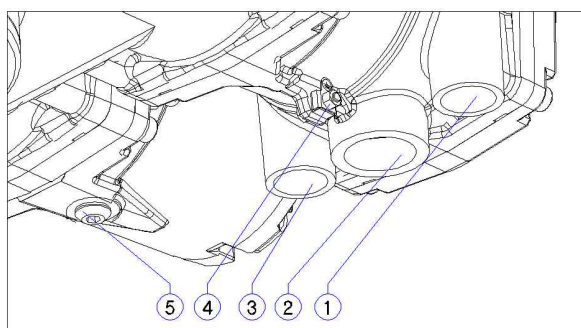
8. Cable Entry and Wiring

⚠ Danger

- ① The Actuator is explosion proof product at **Ex db IIC T4 Gb level**. Cable entry part must have internal pressure explosion proof product at **Ex d IIC T4 Gb level** IECEx or ATEX(KCs).
- ② Do not open the cover of Actuator if there is a concern for explosiveness.
User and Operator shall check if safety work method is applied or if it fits to region or country code applicable to a specific site.
- ③ Before wiring, check if power is OFF. Otherwise, it may cause electric shock.
- ④ Cable entry part which is not used must be fully fastened using explosion proof plug with **Ex db IIC T4 Gb level**.

⚠ Caution

- ① Cable Entry size and fastening depth must comply with [8-1].
- ② Cable thickness must be at least 1.2SQ using stranded cable. Thickness of cable of main power must comply with electric specification.
- ③ If raining, do not wire outside.
- ④ Earth must be made in 3-type earth and thickness of earth cable must be over 5.5SQ. Refer to [Figure 8-1].
- ⑤ For KE-01 & KE-02, minimum insulation temperature of cable with 80 °C or above shall be connected to main power supply and signal terminal. Main power and signal cable of KE 03 shall have minimum 135°C or above of insulation temperature.



No	Part Name	Size
1	Cable Entry No.1	Refer to Table 8-1
2	Cable Entry No.2	Refer to Table 8-1
3	Cable Entry No.3	Refer to Table 8-1
4	Ground Earth Lug	M6*P1.0
5	Vent Plug *1	M16*P1.5

* 1 : Blanking element(Dong-A Bestech DASP-SH-M16 : 09-AV2BO-0072U)

[Fig. 8-1] Cable Entry and Earth

8-1. Cable Entry Size & Marking

Type		Type1	Type2	Type3 (Waterproof type only)	Remark
Entry No.	Tap Size	M25xP1.5	1"NPT	1"PF	
	Assembly Depth	Min 15mm	Min 17mm	Min 17mm	
2	Tap Size	M40xP1.5	1½"NPT	1½"PF	
	Assembly Depth	Min 15mm	Min 17mm	Min 17mm	
3	Tap Size	M25xP1.5	1"NPT	1"PF	
	Assembly Depth	Min 15mm	Min 17mm	Min 17mm	
Marking		M	N	P	

[Table 8-1] Cable Entry Marking

8-2. Wiring

1) Wiring Work

- ① Separate Terminal Block Cover and Power Housing Cap from Power Housing.
 ※ **E** Type only removes the Terminal Block Cover
- ② Place Selector(Local/Stop/Remote) Knob at Stop.
- ③ Power wiring adopts 3-phase 3-wire method. Wire by referring to circuit diagram in Terminal Block Cover.
 If it is improperly wired, it may cause damage to Actuator and valve.
 (If circuit diagram is damaged or not available, refer to "8-3, 8-4, 8-5")

! Caution

- When referring to "paragraphs 8-3, 8-4 and 8-5", be sure to check the details of the remote control option.

- ④ When wiring is complete, make sure that Cable Entry sealing is properly made.
- ⑤ Apply power to check the LED lamp on the Phase Relay Board.
 When the green LED on LED1 (PASS) is illuminated, it is a normal runoff.
 ※ **E** Type can be checked for normal status through Display LCD.

! Danger

- If the Selector Knob(Local/Stop/Remote) is located in the remote, the actuator may be operated due to incorrect wiring on the remote side

- ⑥ Open / Close Check the direction of actuator rotation with Selector Knob.

! Danger

- Actuator Rotation direction must be checked at the middle position of the valve. The valve or Actuator may be damaged by reverse action during initial operation.

- ⑦ The LED lamp on the Phase Relay Board functions as follows.

LED No.	LED1	LED2	LED3	LED4
Color	Green	Yellow	Red	Red
LED On	Pass	P-ERR (Reverse Phase)	D-ERR (Open Phase)	Power applied

- ⑧ After wiring is complete, cleanse fastening surface of Terminal Block Cover and fasten bolts.

2) Reverse Phase Solution

- ① When the Phase Relay Board's LDE2 or LED3 is lit, it is connected in reverse phrase, so after power is turned off, replace the 3-phase wiring with normal to re-wire.

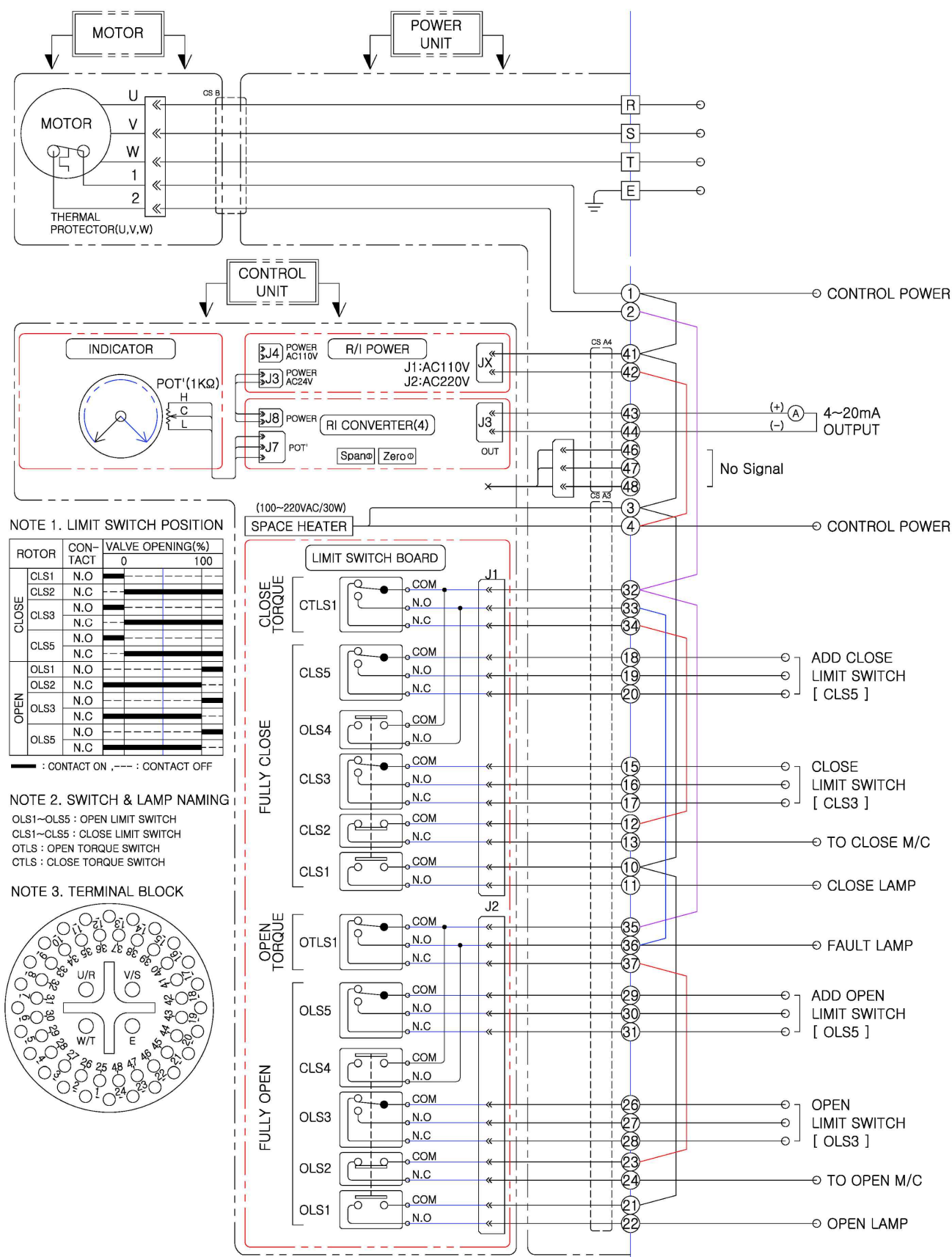
! Danger

- To change reverse phase in Actuator, check power OFF before work. Otherwise it may cause electric shock.

- ② Make sure that the green LED on LED1 (PASS) is illuminated.
- ③ If the green LED on LED1 (PASS) is illuminated, follow phrase ⑥~⑧ as this is a normal run off.

8-3. S Type Wiring Diagram

1) Diagram



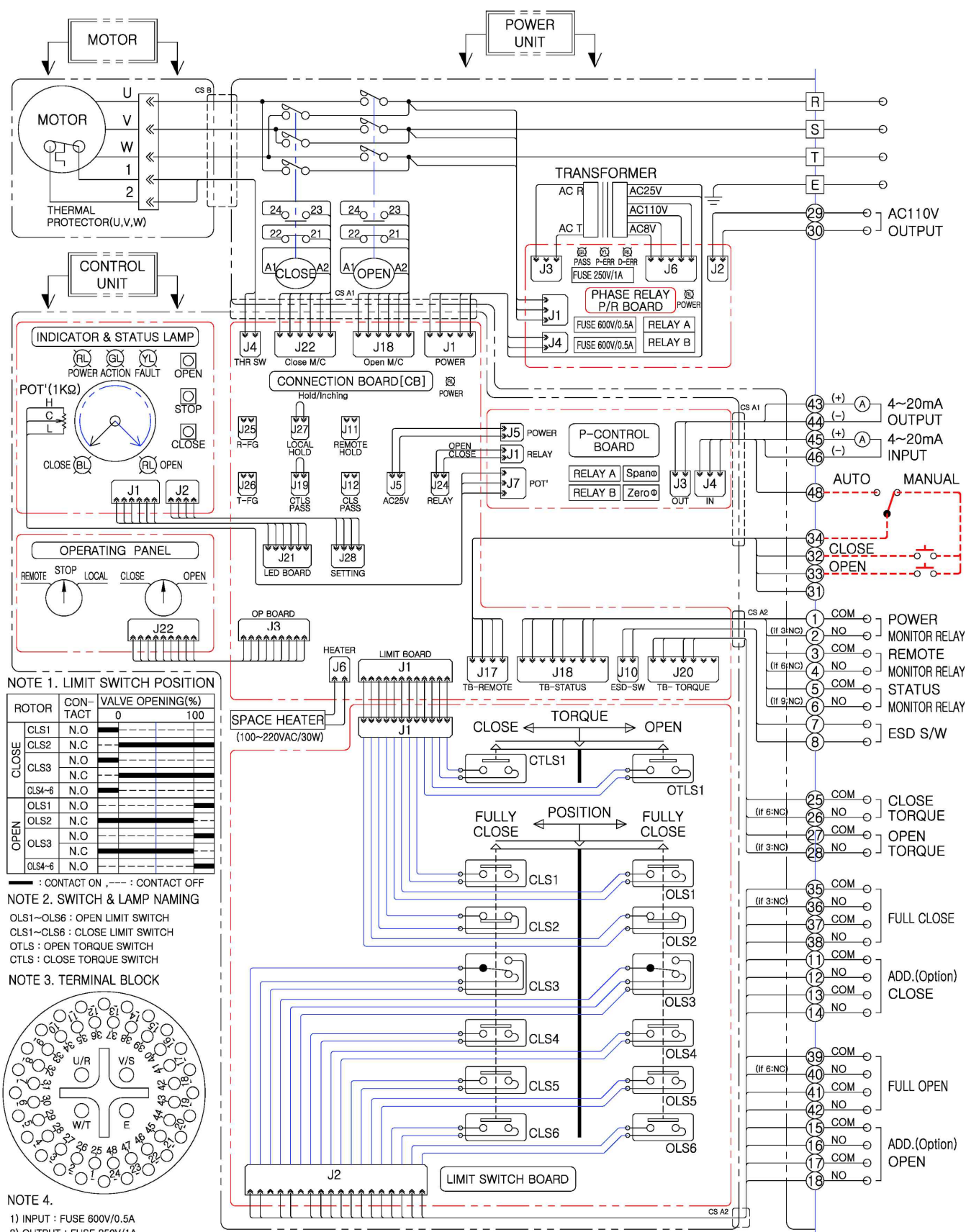
※ OPTION : ADD LIMIT, 4~20mA OUTPUT

2) Terminal Block Naming

TB No.	Detail	TB No.	Detail
1	THERMAL - COMMON	25	SPARE
2	THERMAL - N.C	26	OLS3 - COM (OPEN POSITION S/W)
3	HEATER - R	27	OLS3 - N.O (OPEN POSITION S/W)
4	HEATER - T	28	OLS3 - N.C (OPEN POSITION S/W)
5	(ADD) CTLS2 - COM (CLOSE POSITION S/W)	29	(ADD) OLS4 - COM (OPEN POSITION S/W)
6	(ADD) CTLS2 - N.O (CLOSE POSITION S/W)	30	(ADD) OLS4 - N.O (OPEN POSITION S/W)
7	(ADD) CTLS2 - N.C (CLOSE POSITION S/W)	31	(ADD) OLS4 - N.C (OPEN POSITION S/W)
8	SPARE	32	CTLS1 - COM (CLOSE TORQUE S/W)
9	SPARE	33	CTLS1 - N.O (CLOSE TORQUE S/W)
10	CTL1 - COM (CLOSE POSITION S/W)	34	CTLS1 - N.C (CLOSE TORQUE S/W)
11	CTL1 - N.O (CLOSE POSITION S/W)	35	OTLS1 - COM (OPEN TORQUE S/W)
12	CTL2 - COM (CLOSE POSITION S/W)	36	OTLS1 - N.C (OPEN TORQUE S/W)
13	CTL2 - N.C (CLOSE POSITION S/W)	37	OTLS1 - N.O (OPEN TORQUE S/W)
14	SPARE	38	(ADD) OTLS2 - COM (OPEN TORQUE S/W)
15	CLS3 - COM (CLOSE POSITION S/W)	39	(ADD) OTLS2 - N.O (OPEN TORQUE S/W)
16	CLS3 - N.O (CLOSE POSITION S/W)	40	(ADD) OTLS2 - N.C (OPEN TORQUE S/W)
17	CLS3 - N.C (CLOSE POSITION S/W)	41	(ADD) RI - AC110V - R
18	(ADD) CLS4 - COM (CLOSE POSITION S/W)	42	(ADD) RI - AC110V - T
19	(ADD) CLS4 - N.O (CLOSE POSITION S/W)	43	(ADD) +DC4~20mA OUTPUT
20	(ADD) CLS4 - N.C (CLOSE POSITION S/W)	44	(ADD) -DC4~20mA OUTPUT
21	OLS1 - COM (OPEN POSITION S/W)	45	SPARE
22	OLS1 - N.O (OPEN POSITION S/W)	46	(ADD) POT - CW
23	OLS2 - COM (OPEN POSITION S/W)	47	(ADD) POT - S
24	OLS2 - N.C (OPEN POSITION S/W)	48	(ADD) POT - CCW

8-4. i Type Wiring Diagram

1) Wiring Diagram



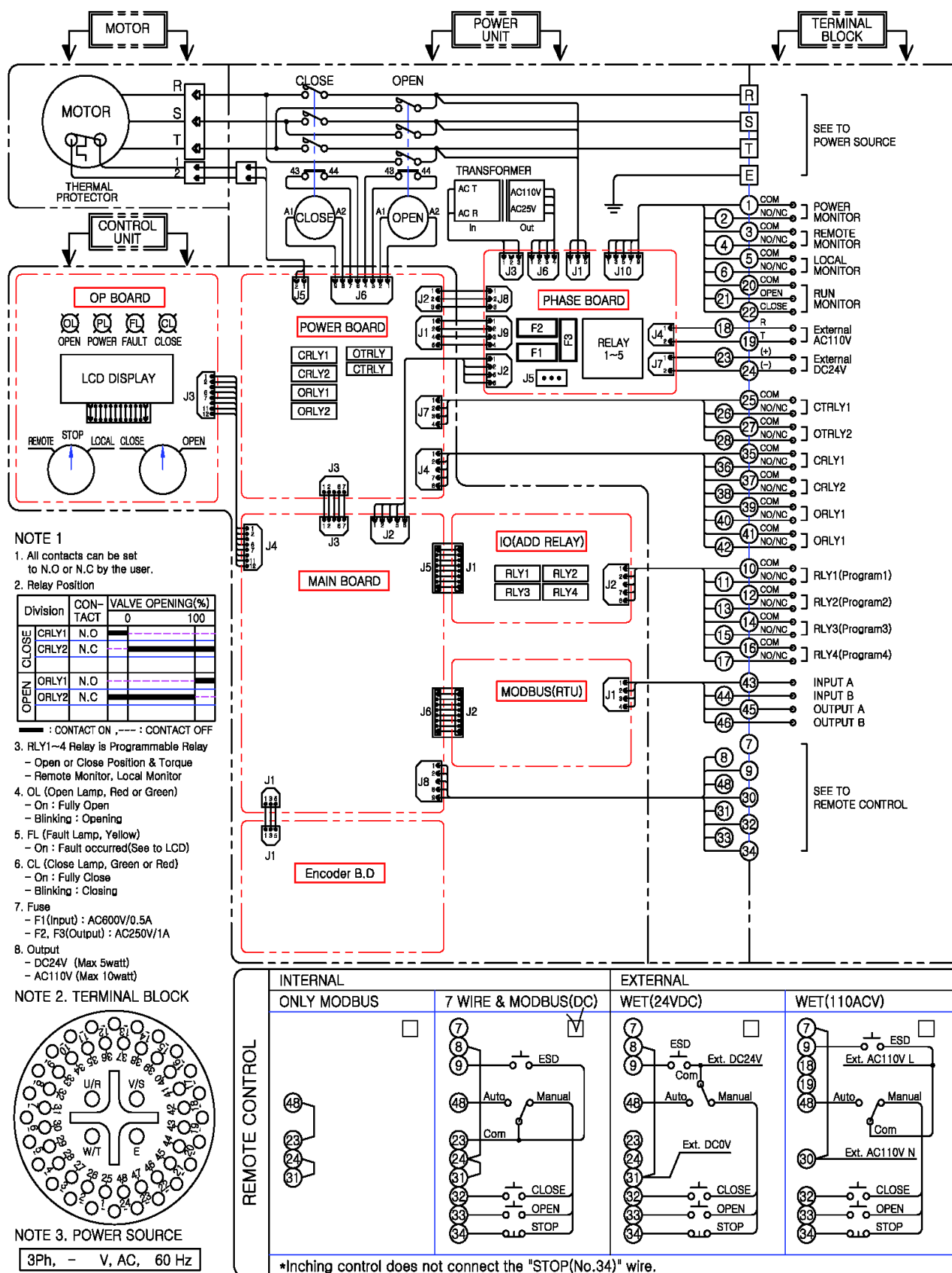
※ OPTION : ADD LIMIT, WET CONTACT(24VDC, 110VDC), 4~20mA INPUT, 4~20mA OUTPUT

2) Terminal Block Naming

TB No.	Detail	TB No.	Detail
1	POWER MONITOR - COM	25	CTLS – COM (CLOSE TORQUE S/W)
2	POWER MONITOR – N.O or N.C	26	CTLS – N.O or N.C (CLOSE TORQUE S/W)
3	REMOTE MONITOR - COM	27	OTLS – COM (OPEN TORQUE S/W)
4	REMOTE MONITOR – N.O or N.C	28	OTLS – N.O or N.C (CLOSE TORQUE S/W)
5	STATE MONITOR - COM	29	AC110V-R OUTPUT
6	STATE MONITOR – N.O or N.C	30	AC110V-T OUTPUT
7	EMERGENCY SWITCH - COM	31	REMOTE SWITCH - COM
8	EMERGENCY SWITCH – STOP (N.O or N.C)	32	REMOTE SWITCH - CLOSE
9	SPARE	33	REMOTE SWITCH - OPEN
10	SPARE	34	REMOTE SWITCH - STOP
11	(ADD) CLS3 – COM (CLOSE POSITION S/W)	35	CLS1 – COM (CLOSE POSITION S/W)
12	(ADD) CLS3 – N.O (CLOSE POSITION S/W)	36	CLS1 – N.O or N.C (CLOSE POSITION S/W)
13	(ADD) CLS4 – COM (CLOSE POSITION S/W)	37	CLS2 - COM (CLOSE POSITION S/W)
14	(ADD) CLS4 – N.O (CLOSE POSITION S/W)	38	CLS2 – N.O (CLOSE POSITION S/W)
15	(ADD) OLS3 – COM (OPEN POSITION S/W)	39	OLS1 – COM (OPEN POSITION S/W)
16	(ADD) OLS3 – N.O (OPEN POSITION S/W)	40	OLS1 – N.O or N.C (OPEN POSITION S/W)
17	(ADD) OLS4 – COM (OPEN POSITION S/W)	41	OLS2 – COM (OPEN POSITION S/W)
18	(ADD) OLS4 – N.O (OPEN POSITION S/W)	42	OLS2 – N.O (OPEN POSITION S/W)
19	SPARE	43	(ADD) +DC4~20mA OUTPUT
20	SPARE	44	(ADD) -DC4~20mA OUTPUT
21	(ADD) RUN CLOSE – COM (CLOSE POSITION S/W)	45	(ADD) +DC4~20mA INPUT
22	(ADD) RUN CLOSE – N.O (CLOSE POSITION S/W)	46	(ADD) -DC4~20mA INPUT
23	(ADD) RUN OPEN – COM (OPEN POSITION S/W)	47	SPARE
24	(ADD) RUN OPEN – N.O (OPEN POSITION S/W)	48	(ADD) AUTO / MANUAL SELECT

8-5. E Type Wiring Diagram

1) Wiring Diagram



※ OPTION : IO REALY BOARD, 4~20mA INPUT, 4~20mA OUTPUT, MODUBUS(RTU)

2) Terminal Block Naming

TB No.	Detail	TB No.	Detail
1	POWER MONITOR RELAY - COM	25	CLOSE TORQUE LIMIT SWITCH - COM
2	POWER MONITOR RELAY – N.O or N.C	26	CLOSE TORQUE LIMIT SWITCH – N.O or N.C
3	REMOTE MONITOR RELAY - COM	27	OPEN TORQUE LIMIT SWITCH - COM
4	REMOTE MONITOR RELAY – N.O or N.C	28	OPEN TORQUE LIMIT SWITCH – N.O or N.C
5	LOCAL MONITOR RELAY - COM	29	
6	LOCAL MONITOR RELAY – N.O or N.C	30	REMOTE SWITCH - AC COM
7	EMERGENCY SWITCH - AC COM	31	REMOTE SWITCH - DC COM
8	EMERGENCY SWITCH - DC COM	32	REMOTE SWITCH - CLOSE
9	EMERGENCY SWITCH – STOP (N.O or N.C)	33	REMOTE SWITCH - OPEN
10	CLS3–COM(ADD CLOSE LIMIT SWITCH)	34	REMOTE SWITCH - STOP
11	CLS3–N.OorN.C(ADDCLOSELIMITSWITCH)	35	CLS1 – COM
12	CLS4–COM(ADDCLOSELIMITSWITCH)	36	CLS1–N.OorN.C
13	CLS4–N.CorN.O(ADDCLOSELIMITSWITCH)	37	CLS2 – COM
14	OLS3–COM(ADDOPENLIMITSWITCH)	38	CLS2–N.CorN.O
15	OLS3–N.OorN.C(ADDOPENLIMITSWITCH)	39	OLS1–COM
16	OLS4–COM(ADDOPENLIMITSWITCH)	40	OLS1–N.OorN.C
17	OLS4–N.CorN.O(ADDOPENLIMITSWITCH)	41	OLS2 – COM
18	AC110V-R OUTPUT	42	OLS2–N.CorN.O
19	AC110V-T OUTPUT	43	+DC4~20mA OUTPUT
20	RUN MONITOR RELAY - COM	44	-DC4~20mA OUTPUT
21	OPEN RUN MONITOR RELAY – N.O or N.C	45	+DC4~20mA INPUT
22	CLOSE RUN MONITOR RELAY – N.O or N.C	46	-DC4~20mA INPUT
23	DC24V+ OUTPUT	47	
24	DC24V- OUTPUT	48	AUTO / MANUAL SELECT

9. Actuator Set-up

9-1. S, i Type

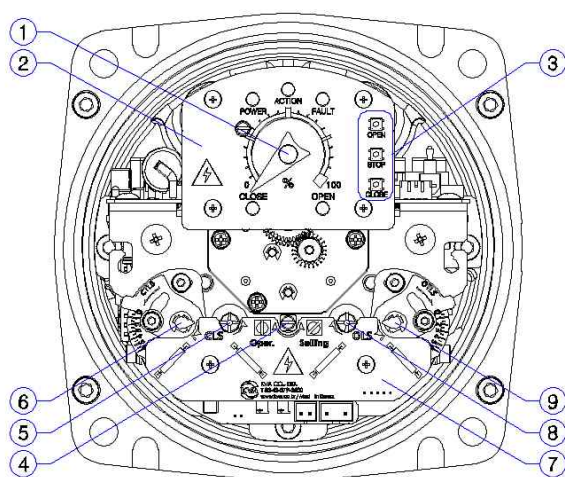
9-1-1. Preparations for commissioning operation

Conduct the following works after Actuator installation and electric wiring.

- ① Select Open/Close Selector Switch randomly at the manual position of declutch lever and check motor operation status. (If declutch lever is at manual position, it rotates motor only and valve is not actually open or closed)
- ② Disassemble the Vent Plug from the Main Cover and remove the Main Cover from the actuator body (see ⑪, ⑫ in [Figure 2-1]).
- ③ Remember the name and location of [Figure 9-1]. The figure indicates details of Position & Torque Setup. It also shows how to change the Setup mode of OP Board Bracket.

9-1-2. Position limit set-up

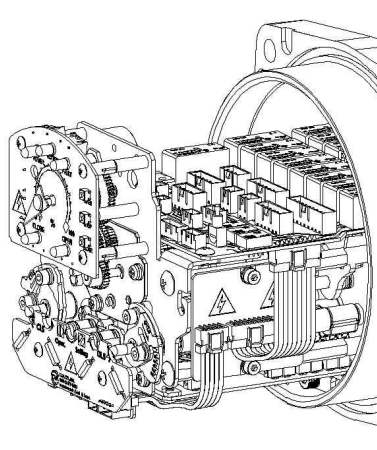
1) Position Limit Setting Parts names and locations



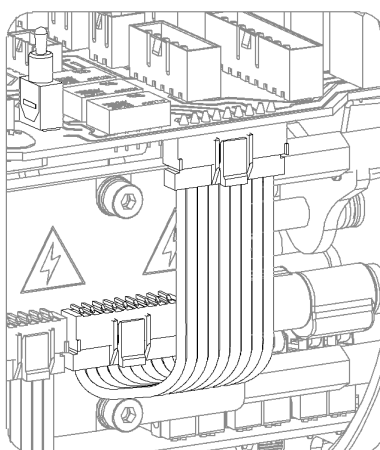
No	Part Name
1	Indicator Point
2	LED Board
3	Setting Push Button
4	Set Button
5	Close Position Set Shaft
6	Close Limit Pointer
7	Operation Board
8	Open Position Set Shaft
9	Open Limit Pointer

[Fig. 9-1] Position Part Description

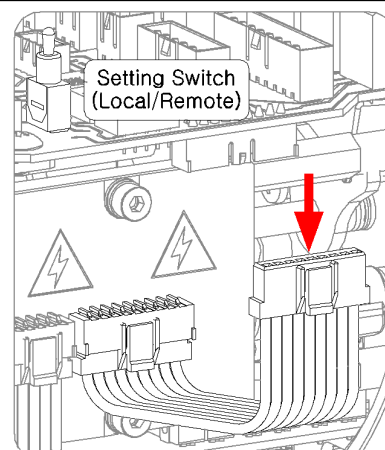
2) Setting Mode Change



Image



Default Mode



Setting Mode

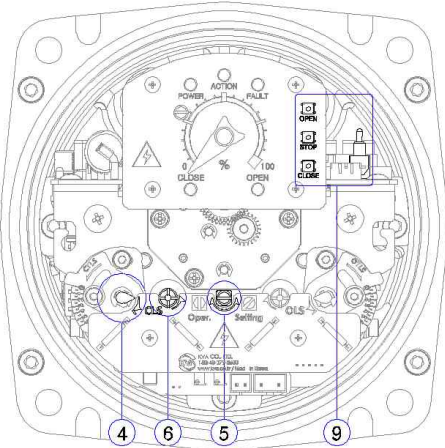
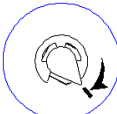
[Fig 9-2] Mode

! Caution

- Before work, get a permission from valve manager for valve on/off operation.
- The actuator cannot be controlled with toggle switch unless it switch to Setup mode.

3) Close position limit set-up

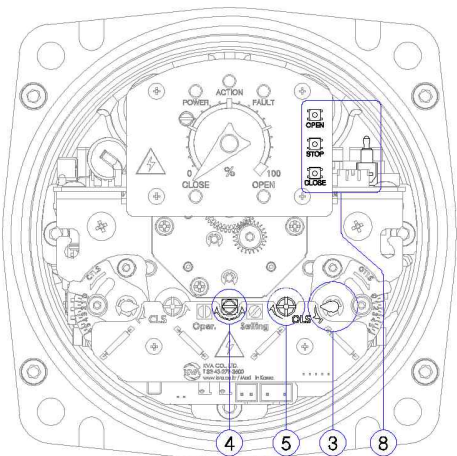
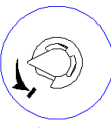
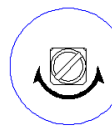
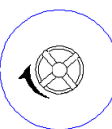
- ① Close valve completely by hand wheel.
(If electrical power is ON, close the valve near full close position by close switch on the Actuator and use hand wheel for complete close.)
- ② Disassemble Main Cover from the actuator body.
- ③ Refer to [Fig. 9-2] and switch to Setting Mode. (Remove C/B to O/B Wire harness)
- ④ Make sure that the Close Limit Pointer status is On or Off.
- ⑤ After pressing the Set button, rotate it about 45° to the right or left.
(The state in which the Set button is pressed is the setting state.)
- ⑥ Rotate 'Close Set Shaft' to arrow direction as figure below until Close Pointer turns On state.
※ If it is Switch On state, rotate Close Set Shaft to reverse direction to Switch Off, then perform ⑥.

	 S/W Off	 S/W On	④ Check the Close limit Pointer On/Off
	 Default	 Setting Mode	⑤ Press the Set button and rotate it to change to the setting mode.
			⑥ Rotate Close Set Shaft to Arrow direction(CCW)

- ⑦ Rotate the Set button 45° to the right or left to return to the original state.
※ If the set button does not return, slightly rotate the Close position set shaft left and right.
(It is in a state that the gear has not been restored due to the misalignment of the teeth.)
- ⑧ Manual mode, then open and close the valve about 1/2~1 turn. Check the Close Pointer turns to Switch Off and Switch On according to valve operation.
- ⑨ Auto mode, then open and close the Valve 1~2 turn(s). Check Actuator and Valve performs properly.
- ⑩ Set Position Indicator([Fig. 9-1] Table No.1) Pointer at 0%.

4) Open position limit set-up

- ① Open the valve to near Full Open state by Auto mode.
 - ② Manual mode, then close the valve about $\frac{1}{2}$ ~1 turn by hand wheel.
 - ③ Make sure that the Open Limit Pointer status is On or Off.
 - ④ After pressing the Set button, rotate it about 45° to the right or left.
 - ⑤ Rotate Open Limit Setting Shaft to arrow direction until Open Position Pointer turns On state.
- ※ If it is Switch On state, rotate Setting Shaft clockwise to Switch Off then perform ⑤.

	 S/W Off	 S/W On	③ Check the Open limit Pointer On/Off
	 Default	 Setting Mode	④ Press the Set button and rotate it to change to the setting mode.
			⑤ Rotate Open Set Shaft to Arrow direction(CW)

- ⑥ Rotate the Set button 45° to the right or left to return to the original state.
- ⑦ Switch to Manual mode, then open and close the valve about 1/2~1 turn. Check if the open Pointer works properly as Switch Off (valve close) and Switch On (valve open) according to valve operation.
- ⑧ Switch to Auto mode(TSW1, TSW2), then close and open the Valve 1~2 turn(s). Check Actuator and Valve performs properly.
- ⑨ Make sure that "Indicator Pointer" is located at 100% position.
- ⑩ Insert the connector as shown in Default Mode in [Fig. 9-2].
- ⑪ Assemble Main Cover to Actuator body.

! Caution

- After completing limit set-up, make sure the 'Setting gear' returned to the original state. If not, Limit Switch will not activate and it may cause Valve or Actuator damage.
- After completing the setting, the connector must be insert as shown in the Default Mode in [Fig.9-2] for normal operation of the actuator.
- Check whether the O-Ring of the main cover assembly is properly assembled.
Failure to assemble or damage the O-Ring may be caused by a malfunction in which moisture penetrates the product.

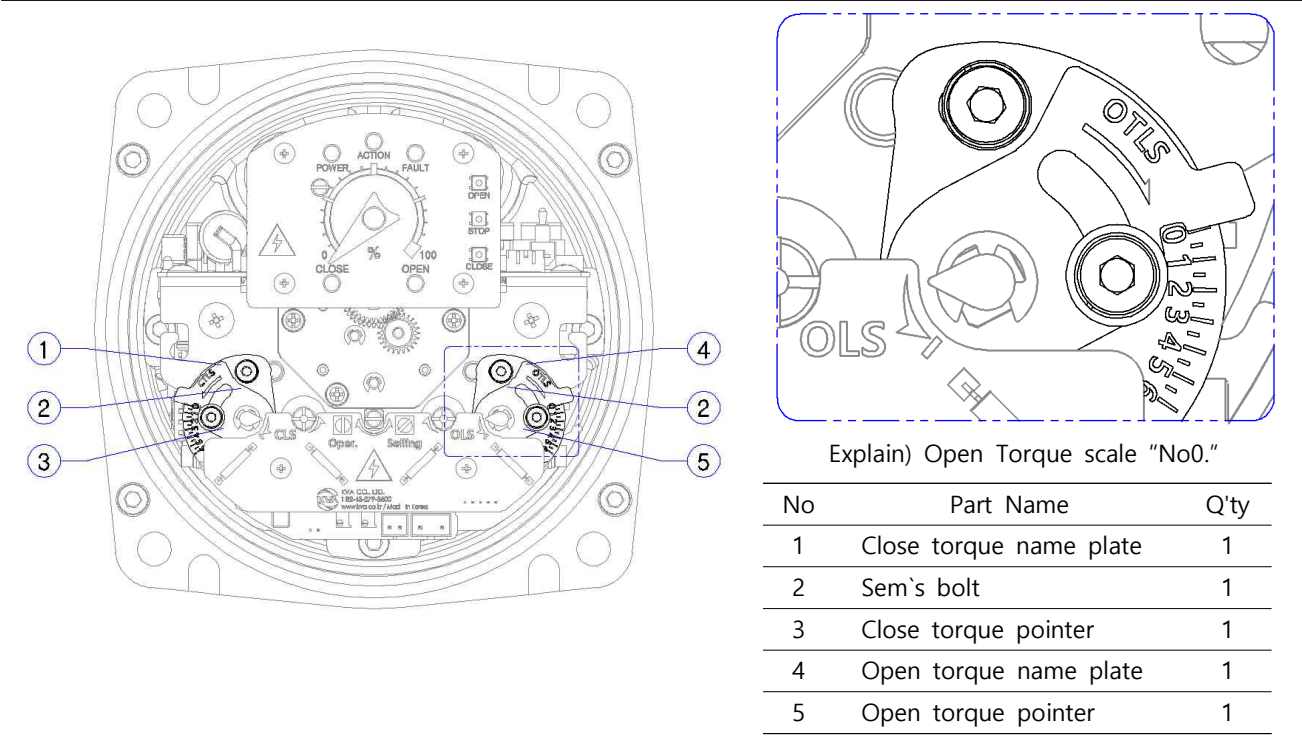
! Danger

- In case of failing Position Limit Switch set-up, please attach prohibition label to the Actuator, and set the Local/Stop/Remote Selector to Stop position and secure it with lock to Lock Plate.
- If Actuator operates before Position Limit Switch set-up, it may bring critical accident.

5) Position limit Setup is completed.

9-1-3. Torque limit setup

- 1) Torque Limit setup is set at optimal value at torque tester according to valve size, rating and process and there is no need to adjust at the site.
- 2) If adjustment is required at the site, check the followings.
 - ① Check if valve Grand Flange bolt is excessively fastened.
 - ② If grease is applied to Valve Stem and Thrust Unit.
 - ③ If there is any distortion of Valve Stem.
- 3) Torque Limit setup method
 - ① Be aware of name and position of [FIG.9-3].
 - ② Check and record the current setting value of Torque Pointer.
 - ③ Loosen the fix bolt by one or two turns with a ⊕ driver.
 - ④ Turn "Torque Pointer" by hand to adjust the torque.
 - ⑤ As the number increases, the torque increases. When the number decreases, the torque decreases.



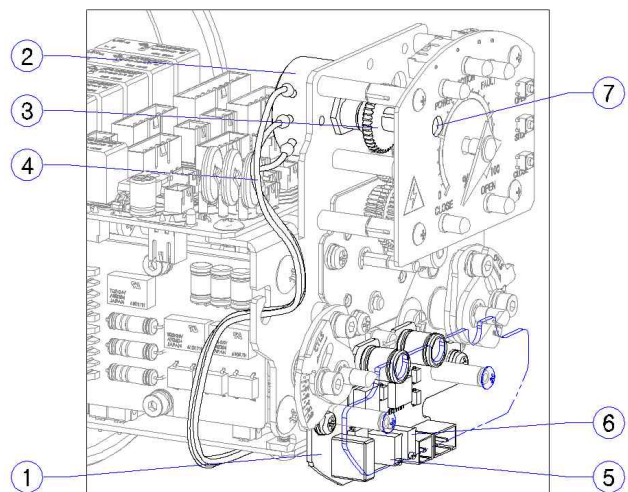
[Fig. 9-3] Torque Part description

⚠ **Caution**

- ① Consult with us for torque adjustment in advance.
- ② Re-adjust if valve operation is available manually.
- ③ If torque increases too much more than 1scale in Torque Gear per time, it may cause damage to valve or Actuator.
- ④ At adjustment at site, do not increase scale beyond red marking of Torque NP.
- ⑤ If red marking is exceeded in Torque NP, Torque Switch may not be worked.

9-1-4. 4~20mA Setup

R/I converts the resistance value of potentiometer to DC 4 ~ 20mA / 24V and output it via T/B. It is set as follows, and it receives output from Terminal Block No. 43(+), 44(-).



No	Part Name	Q'ty
1	R/I Converter J8 : AC25V Input J7 : Potentiometer J3 : 4~20mA (+) - to TB 43 4~20mA (-) - to TB 44	1
2	Potentiometer	1
3	Pot' Gear	1
4	Pot' Wire harness	1
5	R/I Converter [Zero]	1
6	R/I Converter [Span]	1
7	Potentiometer Set Hole	1

[Fig 9-4] R/I Converter, Potentiometer description

1) Type-specific function and position of each part

4Wire type			2Wire type		
Con. No	Connector Name	Connection	Con. No	Connector Name	Connection
J3	4~20mA Output	to T/B (43,44)	J3	4~20mA Output	to T/B (43,44)
J7	Potentiometer Input	to Pot'	J7	Potentiometer Input	to Pot'
J8	AC25V	to C/B	R3	ZERO	
R3	ZERO		R4	SPAN	
R4	SPAN				

2) Current Setting

Category	R/I Converter (Current value)	
Basic default value	4mA (Min.)	20mA (Max)
Default value range	2.5mA~4.7mA	17mA~24mA

3) Resistance value adjustment of Potentiometer

- ① Separate Pot' Wire harness with R/I Converter(J7)
- ② [Fig 9-4 ⑦] Insert ⊖ driver into Potentiometer Set Hole and rotate to adjust the resistance value.
- Full close reference resistance value is 30~50Ω

! Caution

- When measuring the resistance value, the resistance must be measured with the J7 connector of the R/I Converter removed
- When the potentiometer is not rotated as a stopper type, do not rotate with force.

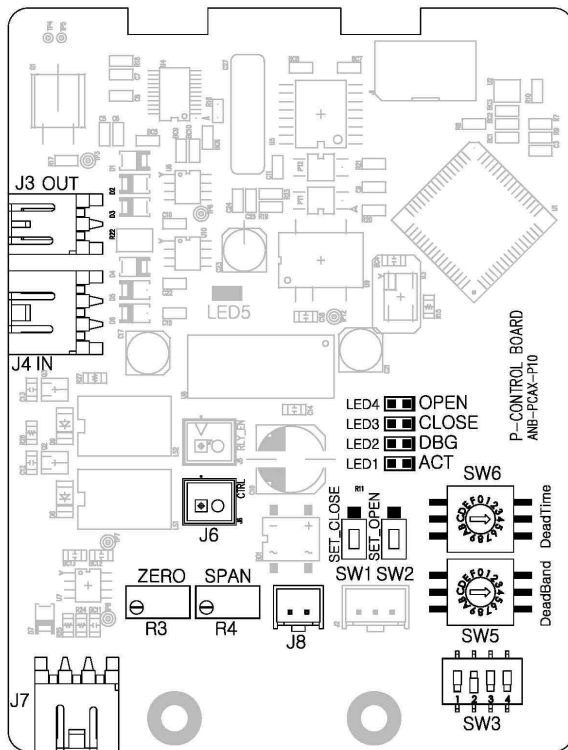
4) 4~20mA set-up

- ① Disassemble Main Cover from main body using exclusive tools.
- ② After fully closing the valve, check the resistance value of the potentiometer.(30~50Ω.)
- ③ Check output currency from Terminal Block 43(+) and 44 (-) terminal.
- ④ Check 2.5mA~4.7mA output and rotate R/I Converter Zero(R3) to set recommended value of 4mA.
- ⑤ Select Open and open valve for 10~20% and close completely if 4mA is output.
- ⑥ Repeat ⑤ for 1 ~ 2 times to check if 4mA is normal and then open the valve fully.
- ⑦ Check if 17mA~24mA is output at Terminal Block 43(+) and 44 (-) terminal.
- ⑧ Rotate R/I Converter Span(R4) to set 20mA.
- ⑨ Repeat ⑧for 1~2 times, check if 20mA is normally output.

※ Zero or Span adjustment value changes clockwise to + and counterclockwise to -.

9-1-5. Proportional Control Board Setup

At Remote control, it runs Actuator in proportion to currency value input to DCS(Control Room) per 4~20mA and controls valve location.



① Connector indication

Con. No	Connector Name	Connection
J6	Open/Close Control	to C/B
J3	DC4~20mA Output	to T/B
J4	DC4~20mA Input & Auto Select	to T/B
J7	Potentiometer Input	to Pot'
J8	AC25V In	to C/B

② Switch unction indication

Part No	Part Name
SW1	Set Close(4mA Setting Switch)
SW2	Set Open(20mA Setting Switch)
SW3	Mode Selector
SW5	Dead Band Setup Switch
SW6	Dead Time Setup Switch
R3	ZERO
R4	SPAN

[Fig. 9-5] Proportional Control Board

1) Current Tolerance range

Category	Output Current value	
Basic default value	4mA (Min.)	20mA (Max.)
Default value range	3.5mA~6.0mA	17mA~24mA

2) Method of Potentiometer resistance value change

See [Fig. 9-4-3] Method of potentiometer resistance value change.

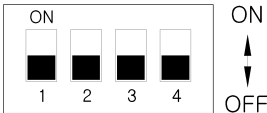
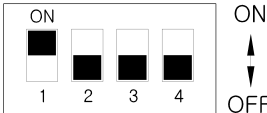
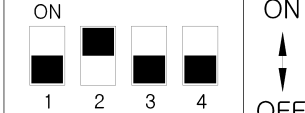
3) Light ON of Proportional Control Board Lamp

PART No.	PART NAME	Light ON	Flickering	Remark
LED1	Action	-	Pro/B in action	
LED2	Debug	-	Cable not connected	
LED3	Close	Close in action	1 time at Close set	
LED4	Open	Open in action	1 time at Open set	
LED5	Power	Power is ON	-	

※ LED2 blinks when 4 ~ 20mA is not set or input polarity is changed.

4) Proportional Control set-up

- ① Close valve completely.
- ② Disassemble Main Cover and Terminal Cover from main body using exclusive tools.
- ③ Separate cable in Terminal Block 43 and 45 terminal.
- ④ [FIG. 9-5] SW3 Mode Select Switch is Local status and [FIG. 9-5] SW3 Dead Band Setup Switch is set to be 0.

Default	Setting Mode	
	Input 4~20mA Setup	Output 4~20mA Setup
		
Before or complete Setup	Setup in progress status	

[Fig 9-6] SW2 Dip Switch

5) Input 4mA setup

- ① As in 'Input 4~20mA Setup' in [Figure 9-6], switch no.1 On at SW3 Dip Switch and off 2, 3, 4 Off.
- ② Input DC 4mA to Terminal Block 45 (+) and 46 (-), and check if Debug Lamp(LED2) is OFF.
- ③ Press and release 'Set Close Switch(SW1)' and check if Close Lamp(LED3) is ON for 1 second and then OFF.
- ④ If the Close Lamp(LED3) doesn't light, press the 'Set Close Switch(SW1)' again for a second.
- ⑤ Input DC 20mA to Terminal Block 45 (+) and 46 (-), and check if Debug Lamp(LED2) is OFF.
- ⑥ Press and release the 'Set Open Switch(SW2)' on the PC Board, check if the Open lamp(LED4) is on for a second and goes out.
- ⑦ If Open Lamp(LED4) is not ON, Press 'Set Open Switch(SW2)' until it is ON.
- ⑧ Turn off all DIP switches of SW3.

❗ **Caution**

- If ③ Debug(DBG) Lamp continues flickering, check if 4~20mA input polarity is changed.

6) Output 4~20mA set-up

- ① Close valve completely.
- ② As in 'Output 4~20mA Setup' in [Figure 9-6], switch no.2 On at SW2 Dip Switch and off 1, 3, 4 Off.
- ③ Check if the Debug Lamp(LED2) is on and off.
- ④ Measure the output current from Terminal Block no. 43(+) and no. 44(-).
- ⑤ If the output current ranged 3.5mA~6mA, then press and release Close Set switch(SW1) and see if the Close Lamp(LED3) light for a second and goes out.
※ In case the output current ranged out of 3.5mA~6mA, then adjust resistance value and perform
- ⑥ Full Open the valve by Selector Switch.
- ⑦ Press and release the Set Open Switch(SW2), then see if Open Lamp(LED4) light for a second and goes out.
- ⑧ Check if the Debug Lamp(LED2) goes out.

! Caution

- If Debug Lamp(LED2) keeps light on and off while performing ⑧, please check Potentiometer connection.

7) Fine tuning for Output 4~20mA

- ① Full Close the valve by Selector Switch.
- ② Measure the output current from Terminal Block no. 43(+) and no. 44(-) is 4mA.
※ If output current is over/under 4mA, turn Zero(R3) and set it to 4mA.(CW +, CCW -)
- ③ Open and close the valve 10~20% and check its output current is measured as 4mA properly.
- ④ Repeat ③ 1~2 times.
- ⑤ Full Open the valve by Selector Switch.
- ⑥ Measure the output current from Terminal Block no. 43(+) and no. 44(-) is 20mA.
※ If output current is over/under 20mA, turn Span(R4) and set it to 20mA(CW +, CCW -)
- ⑦ Open and close the valve 10~20% and check its output current is measured as 20mA properly.
- ⑧ Repeat ⑦ 1~2 times.
- ⑨ After completing 4~20mA fine tune, switch Off every Dip Switch.
- ⑩ Connect no. 43 and 45 to Terminal Block.

8) DEAD BAND and DEAD TIME Set-up

① DEAD BAND

- Set the Actuator's operating accuracy as shown in the table below.
- The error range for the input and output of scale of SW5 can be set from 1.5 to 4.5%.

Variable Resistance	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Band(%)	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5

② Dead Time

- It is possible to delay the motor drive time when switching OPEN and CLOSE directions.
- Set the delay time with the scale of SW6 Set up to 0.2 ~ 7.7 seconds.

Select No	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Time(sec)	0.2	0.7	1.2	1.7	2.2	2.7	3.2	3.7	4.2	4.7	5.2	5.7	6.2	6.7	7.2	7.7

9-1-6. Commissioning complete

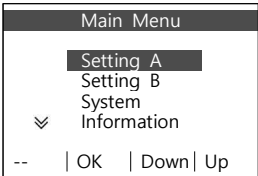
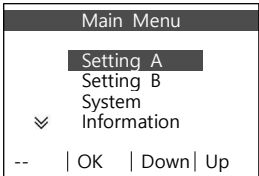
After completing commissioning operation, clear the engaging surface of Main Cover, apply grease and screw bolts to secure it.

9-2. E Type

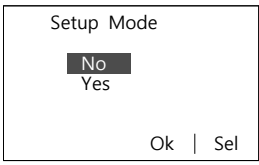
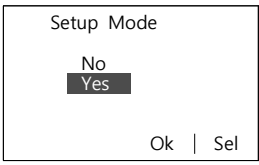
The below only contains reduced information of the default settings, so please refer to the E Type Setup Manual for details.

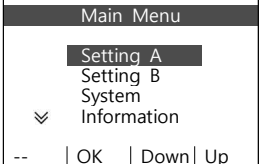
9-2-1. Get to know before setting up

1) How to use Knob

No.	Knob CW Rotation		Knob CCW Rotation		Remark
Display					
Knob	before	 	 		
	after	 	 		
Select	OK(Remote) Up(Close)		--(Local) Down(Open)		

2) Enter Setup Mode

No.	1	2	3
Display			
Knob Status	 	 	 
detail	- Selector Knob Stop - Hold Close for 2 sec	- Select Sel(Close)	- Select OK(Open)

No.	4	5	6
Display			
Knob Status	 	 	 
detail	- Enter password *1	- Select OK(Open)	- Select Menu

*1 If the initial password is 0000, enter main menu by selecting OK

9-2-2. Setting A set-up

1) Position Limit settings

A menu to set the position of Valve's Open and Close.

By default, the Actuator does not operate "OPEN" and "CLOSE" when the Position setting is not complete. Therefore, position setting must be performed after installation.

Display	Setting A Position Torque Action & Dir Maintained ⌘ -- OK Down Up	Position Turn : 0.0 New Position Exit OK Sel	Position Close : Open : Exit OP CL OK Sel	Position Close : Change Open : Exit OP CL OK Sel
Knob	OK(Remote)	OK(Open)	① → ②OK(Open)	③Sel(Close)

Display	Position Close : Change Open : Change Exit OP CL OK Sel	Position Close : Change Open : Change Exit OP CL OK Sel	Position Turn : 0.0 New Position Exit OK Sel	Setting A Position Torque Action & Dir Maintained ⌘ -- OK Down Up
Knob	④ → ⑤OK(Open)	Sel(Close) → OK(Open)	Sel(Close) → OK(Open)	Down(Open) → Exit

※ Proceed to the following details after selecting New Position (OK).

- ① Select CL (Remote) to close it close to the full closure and manually close the valve completely.
- ② Select OK (Open) to set the Close Position. "Change" appears when setup is complete.
- ③ Select Sel(Close) to switch to the Open Position select position.
- ④ Select OP (Local) to open the valve close to deployment and manually position it in the setup Open Position.
- ⑤ Select OK(Open)to set Open Position. "Change" appears when setup is complete.

!

Caution

- Prior to operation, be sure to obtain permission from the valve manager for open/close operations.
- If the position setting is not correct, a problem may occur.
- Set the selector Knob (Remote/Stop/Close) in the Stop position during setup.
- When selecting CL (Remote) or OP (Local) to set the position of the valve, the valve is driven, so operate with care.
- Please operate after setup is complete. The actuator will not operate during the setup.

!

Danger

- If the Position Limit Switch setting is not inevitable, attach the "Not Used" identification to the actuator, locate the Local/Stop/Remote Selector Knob in Stop and place the lock on the Lock Plate.

2) Torque settings

2.1) Limit

- During the operation, the Actuator stops when the torque value is above the setting torque value (Over Torque Fault)

Display	Setting A Position Torque Action & Dir Maintained ⌵ -- OK Down Up	Torque Limit Bypass AutoReset Exit ⌵ -- OK Down Up	Action & Direction - Limit Set Open : 40% Close : 40% Exit +10 +1 -- Sel	Action & Direction - Limit Set Open : 50% Close : 50% Exit OK Sel
Knob	OK(Remote)	OK(Remote)	② → Sel(Close)	Sel(Close) → OK(Open)

※ Torque can be adjusted from 40~100%. In the Limit Set state, proceed with the details of ②~③.

- ① If you need to adjust the torque at the site, check 9-1-3 phrase 2) before proceeding.
- ② Adjust the Torque value as Remote +1, Local +10
- ③ Select Sel(Close) to adjust from selection.

! Caution

- ① Only re-adjust the valve if manual opening and closing of the valve is possible.
- ② If you raise the torque more than 10% at a time, it can damage the valve.

2.2) Bypass

- When the actuator is operated in Full Open or Full Close, the actuator stops at a torque exceeding 100% without stopping at the torque value set within a certain opening rate
(Opening: Opening rate 0~2%, Closing: Opening rate 98~100%).

2.3) Auto Reset

- The auto release function when actuator stops due to over torque,
Auto Reset's default set is "On".
- When Auto Reset is set to Off, Place Local/Stop/Remote knob in Stop and the hold the Open Knob for more than 2 seconds to release.

3) Action & Dir Settings

Set the Stop condition(Limit & Torque) and Close Drive Direction

- Action : This is to set the condition to stop at the designated position when the actuator is operated Open or Close. Open and Close can be set respectively, and it can be set to either "Torque" or "Limit"
- Dir : Direction, which sets the rotation direction when the Actuator closes.

No.	Step 1	Step 2.1	Step 2.2	Step 2.3
Display	Setting A Position Torque Action & Dir Maintained ⌵ -- OK Down Up	Action & Direction - Action Open : Limit Tor Close : Limit Tor - Direction Close : CW CCW Exit << >> -- Sel	Action & Direction - Action Open : Limit Tor Close : Limit Tor - Direction Close : CW CCW Exit << >> -- Sel	Action & Direction - Action Open : Limit Tor Close : Limit Tor - Direction Close : CW CCW Exit OK Sel
Knob	OK(Remote)	<<(L) or >>(R)	Sel(Close) ⇒ <<(L) or >>(R)	Sel(Close) → OK(Open)

※ Default values are as follows.

Sort	Action		Direction
	Close	Open	
Set Value	Limit	Limit	Close CW

4) Maintained settings

In "Local Mode" from the Actuator Operating Mode, You can set Inching and Holding for Open and Close inputs.

① This setting is valid only in "Local Mode". In "Remote Mode", according to the terminal block wiring method.

The "Inching" and "Holding" methods are determined (refer to the circuit diagram).

Display	Setting A Position Torque Action & Dir ≡ Maintained -- OK Down Up	Maintained Local : Holding Exit << >> -- Sel	Maintained Local : Inching Exit << >> -- Sel	Maintained Local : Holding Exit OK Sel
Knob	Down(Open)	>>(Remote)	Sel(Close)	>>(Remote) ⇒ OK(Open)

※ Default value is Holding.

5) Relay settings

Display	Setting A ≡ Torque Action & Dir ≡ Relay -- OK Down Up	Relay Open Close Torque Monitor -- OK Down Up	Relay - Open Position ORLY1 : N.O N.C Action : 100 % ORLY2 : N.O N.C Action : 100 % Exit << >> -- Sel	Relay - Open Position ORLY1 : N.O N.C Action : 100 % ORLY2 : N.O N.C Action : 100 % Exit << >> -- Sel
Knob	Down(Open)	OK(Remote)	Sel(Close) → >>(Remote)	OK(Open)

* The "Action" function is to make the contact output operate at the set position (opening rate).

Name	Close Relay	Torque Relay	Monitor Relay	Option Relay*1
Display	Relay - Close Position CRLY1 : N.O N.C Action : 100 % CRLY2 : N.O N.C Action : 100 % Exit << >> -- Sel	Relay - Torque OTRLY : N.O N.C CTRLY : N.O N.C Exit << >> -- Sel	Relay - Status Local : N.O N.C Remote : N.O N.C OP Run : N.O N.C CL Run : N.O N.C Exit << >> OK Sel	Relay RLY 1 RLY 2 RLY 3 RLY 4 -- OK Down Up
Detail	- N.O or N.C contact setting - Output position setting within 0~100%	- N.O or N.C contact setting	- N.O or N.C contact setting	- N.O or N.C contact setting - Output position setting within 0~100% *2

*1 Setting Function : Choose between Open Position, Close Position, Open Torque, Close Torque, Remote Monitor, Local Monitor.

*2 Only for Position(Close or Open) settings.

9-2-3. Setting B settings

1) ESD settings (Emergency Shut-Down)

In special circumstances, there are cases where an actuator must perform a specific operation even when it is in a stopped state or in operation. ESD takes precedence over any input or state to perform a specific action. (Can be operated even when Knob is in "STOP" state)

Display	Details
Setting B ESD Delay 4~20mA ≡ Communication -- OK Down Up	Relay - Status Enable : N.O Yes Signal : N.O N.C Mode : Inching Action : Stop Exit << >> -- Sel
	Enable : Choose whether to use ESD Signal : Input signal's N.O or N.C contact setting Mode : Input signal inching or holding setting Action : Operation direction setting Open, Stop, Close

① Caution

It must be set after checking the state of the input signal of ESD. If the contact is reversed, an accident may occur that may damage the valve or actuator.

2) Delay setting : Delay

Function to set action time delay for input signal. The setting range is 0 to 9 seconds, and can be set in 1 second increments.

Display		Details
Setting B ESD Delay 4-20mA Communication -- OK Down Up	Delay Enable : No Yes Open : 0 sec Close : 0 sec Stop : 0 sec Exit << >> Sel	Enable : Delay 사용 유무 선택(Default : off)
		Open : Open 동작 지연
		Close : Close 동작 지연
		Stop : Stop 동작 지연

3) 4-20mA settings

This is the setting for the 4~20mA current input/output of the actuator. This setting can be set only when "Proportional Control Board" or "R/I Converter Board" is installed among Option Boards.

① Output

Display		Details
Setting B Output Input Control Exit -- OK Down Up	4 - 20mA - Output Setting Low : 4.00 mA High : 20.00 mA Reset Exit OK Sel	Low : Can be set from 3.00 to 5.99mA
		High : 1Can be set from 9.00 to 21.99mA
		Reset : Reset Settings

※ Current is output in the set Low ~ High range.

② Input

Display		Details
Setting B Output Input Control Exit -- OK Down Up	4 - 20mA Input : x.x mA Setting Low : 4.00 mA High : 20.00 mA Reset Exit OK Sel	Input : x.xmA : Measurement of current input.
		Low : Check Full Close inputs, OK to apply
		High : Check Full Open inputs, Ok to apply
		Reset : Reset Settings

※ Low = Full Close Operate High = Full Open Operate

③ Control

Display		Details
Setting B Output Input Control Exit -- OK Down Up	4 - 20mA - Control Dead Band : 5.0 % Dead Time : 5 s Exit +1 +0.1 OK Sel	Dead Band : 0~20.0% can be set(Default : 5.0%)
		Dead Time : 0~100sec can be set(Default : 5s)

※ Available when the actuator is equipped with a Proportional Control Board and is recommended to be applied to products under 40RPM.

! Caution

- If the set current is significantly outside the range of 4 to 20 mA, an inspection of the equipment (LCS, DCS) is required.

4) Communication settings

This is the setting related to the communication between the actuator and the external controller.

This setting requires the installation of the "Modbus Board" of the Option Board, which consists of the following:

- Address: Set the device's unique control address for communication. (1~250)
 - ※ Each actuator must have its own control address, and if it is duplicated, it may cause a problem.
- Baud Rate: Set the transmission rate. (Unit: bps, Default: 9600)
 - (Baud rate: 300, 600, 1200, 2400, 4800, 9600, 19.2k, 38.4k, 57.6k, 115.2k)
 - ※ Transmission speed is affected by the distance between devices and the type of wiring used. The longer the transmission speed, the lower the transmission speed.
- Parity: Error detection method setting. (Default: "None")
 - ① None : Don't use
 - ② Even : Use even parity
 - ③ Odd : Use odd parity
- Stop bit : 1 bit or 2 bit can be selected as the stop bit setting for identification. (Default : 1 bit)

Display	Communication	Communication	Communication	Communication
	- Status Address : xxx Baud Rate : 9600 Parity : None Stop bit : 1 Exit << >> OK Sel	- Status Address : xxx Baud Rate : 9600 Parity : None Stop bit : 1 Exit << >> OK Sel	- Status Address : xxx Baud Rate : 9600 Parity : None Stop bit : 1 Exit << >> OK Sel	- Status Address : xxx Baud Rate : 9600 Parity : None Stop bit : 1 Exit << >> OK Sel
Details	Address setting	Baud Rate setting	Parity setting	Stop bit setting

⚠ Caution

- Incorrect setting may cause communication failure, so please set it carefully.

9-2-4. System

This is the setting menu related to the internal system of the actuator.

Display	System	Display	Password	Reset the Actuator?
	- Display Password Reset Exit -- OK Down Up	- LCD LED Exit -- OK Down Up	Current : 0000 Change No Yes OK Sel	Reset the Actuator? (The Setting data is not Changed) No Yes OK Sel
Details		LCD and LED function setting	Change Password	Reset function

① Display – LCD and LED settings

This is a menu to make settings related to the display that displays the information of the actuator.

Display	Details						
- LCD BL Always : ON OFF On Time : 30 Contrast : 30 OK Sel	LCD <table border="1"> <tr> <td>BL Always</td><td>: On, Off setting for LCD Back-Light lighting</td></tr> <tr> <td>On Time</td><td>: When BL Always is Off, On Time is valid, Back-Light On Time can be set (5~60sec)</td></tr> <tr> <td>Contrast</td><td>: Set up to 15~45 high contrast of characters displayed on LCD (Default 30)</td></tr> </table>	BL Always	: On, Off setting for LCD Back-Light lighting	On Time	: When BL Always is Off, On Time is valid, Back-Light On Time can be set (5~60sec)	Contrast	: Set up to 15~45 high contrast of characters displayed on LCD (Default 30)
BL Always	: On, Off setting for LCD Back-Light lighting						
On Time	: When BL Always is Off, On Time is valid, Back-Light On Time can be set (5~60sec)						
Contrast	: Set up to 15~45 high contrast of characters displayed on LCD (Default 30)						
- LED Color OPEN : RED GREEN CLOSE : RED GREEN Exit OK Sel	LED <table border="1"> <tr> <td>Open</td><td> - Blink when Open operating, lights up when Full Open. - LED Color can be selected Red(Default) or Green </td></tr> <tr> <td>Close</td><td> - Blink when Close operating, lights up when Full Close. - LED Color can be selected Green(Default) or Red. </td></tr> </table>	Open	- Blink when Open operating, lights up when Full Open. - LED Color can be selected Red(Default) or Green	Close	- Blink when Close operating, lights up when Full Close. - LED Color can be selected Green(Default) or Red.		
Open	- Blink when Open operating, lights up when Full Open. - LED Color can be selected Red(Default) or Green						
Close	- Blink when Close operating, lights up when Full Close. - LED Color can be selected Green(Default) or Red.						

② Password

When entering the Actuator's Setup Mode, you must enter the 4-digit administrator password. The purpose is to prevent accidents caused by incorrect settings from preventing access by missing users.

(If you do not know the password, you cannot enter setup mode.)

The default password is "0000" and can be changed.

! Caution

- There is no field response method if the user cannot enter Setup Mode due to the password changed by the user, so it should be changed carefully.

③ Reset

It may be necessary to "off" the actuator and then "on" the actuator's power to correct errors in LCD display or some functions. The "Reset" function allows the operator to restart regardless of the three-phase power source. In this case, the set value and status information are not affected.

After performing the "Reset" operation, the default screen is Normal Mode.

! Caution

- Use the "Reset" function only when absolutely necessary.

9-2-5. Information

It is necessary to check related information while using the actuator. Related information includes actuator operation time, installed Option Board, fault code, and internal temperature/humidity.

Display	Details
Information Run Time Operating Torque Temp & Humi -- OK Down Up	Run Time Operating Torque : Information about the usage time of the Actuator. - Total : Total time the power was applied - Uptime : Usage time after power is applied (Reset when power is off) - Motor : Accumulated motor operating time : Actuator operating count information.(Open, Stop, Close) : Information when the actuator is stopped by Over Torque (Open, Close last 3 times)
Information Temp & Humi Option Fault List Exit -- OK Down Up	Temp & Humi Option Fault list : Temperature and humidity information inside the actuator : Option Board List installed in Actuator : Error code history that occurred while using the actuator. (10 information accumulation, see Fault codes)

9-2-6. Fault Code

The error code consists of 8 hexadecimal digits. It is expressed in hexadecimal to express not only one error but also a complex error. The code type displayed on the actuator's LCD screen is "Fault: 00000000". Each digit is expressed in hexadecimal, so it is displayed as 0~F. (Numbers: 0~9, Letters: A~F)

Fault Code	0	0	0	0	0	0	0	0
Digit	#8	#7	#6	#5	#4	#3	#2	#1

See below for instructions on how to check for error codes.

Ex) If "Fault: 00000009" is displayed on the LCD screen, if you see "9" in the #1 table below, ① and ④ are checked "●".

☞ The error '00000009' is "① Magnetic Contactor No. 1 error" and

"④ Actuator operation command keeps stopping." Two errors occurred in combination.

Fault Code Code

Digit	#1				#2				#3				#4			
내역	Actuator operating error ① M/C 1 error ② M/C 2 error ③ Rotation direction error (reverse) ④ Stopped even on drive command				Sensor error ① Position Sensor error ② Torque sensor error ③ Main Power Phase (reverse, loss) ④ Not Defined				Internal Controller, Motor error ① Internal Temp. too high ② Internal Temp. too low ③ Internal Humidity above average ④ Motor Temp. too high				① Information Storing Memory error ② Motor type setting error ③ 4~20mA output error ④ 4~20mA input error			
#	①	②	③	④	①	②	③	④	①	②	③	④	①	②	③	④
0	No Error				No Error				No Error				No Error			
1	●				●				●				●			
2		●				●				●				●		
3	●	●			●	●			●	●			●	●		
4			●				●				●				●	
5	●		●		●		●		●		●		●		●	
6		●	●			●	●			●	●			●	●	
7	●	●	●		●	●	●		●	●	●		●	●	●	
8				●								●				●
9	●			●					●			●	●			●
A		●		●						●		●		●		●
B	●	●		●					●	●		●	●	●		●
C			●	●							●	●			●	●
D	●		●	●					●		●	●	●		●	●
E		●	●	●						●	●	●		●	●	●
F	●	●	●	●					●	●	●	●	●	●	●	●

Digit	#5				#6				#7				#8			
내역	Valve Position setting error ① Position not set ② Range error ③ Under ④ Over				Torque Related Error ① Open Torque Over ② Close Torque Over ③ Torque setting error ④ Torque Range Over				① Torque Zero Return ② not defined. ③ not defined. ④ not defined.				① not defined. ② not defined. ③ not defined. ④ not defined.			
#	①	②	③	④	①	②	③	④	①	②	③	④	①	②	③	④
0	No Error				No Error				No Error				No Error			
1	●				●				●							
2		●				●										
3	●	●			●	●										
4			●				●									
5	●		●		●		●									
6		●	●			●	●									
7	●	●	●		●	●	●									
8				●				●								
9	●			●	●			●								
A		●		●		●		●								
B	●	●		●	●	●		●								
C			●	●			●	●								
D	●		●	●	●		●	●								
E		●	●	●		●	●	●								
F	●	●	●	●	●	●	●	●								

is hexadecimal.

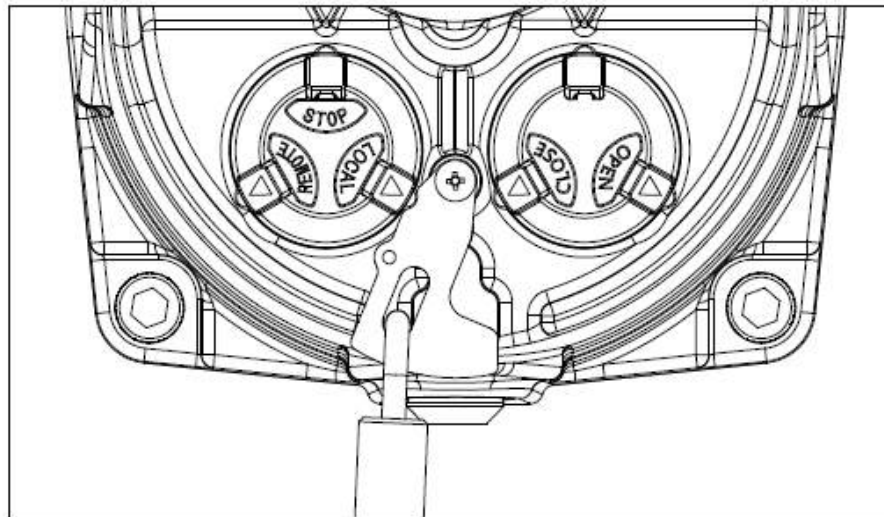
10. Automatic Operation

10-1. Automatic operation

- 1) Use Actuator as AUTO When commissioning is complete, use Actuator at AUTO RUN.
- 2) Select Local/Remote Selector Switch to Local and select Open/Close Selector Switch to Open or Close. Then, valve is actually run.
- 3) For Remote use, proper wiring required.

10-2. Selector knob locking function(LOCAL/REMOTE)

- 1) If Local/Remote Selector Knob Lock is selected and it is fixed with locker, AUTO RUN(Local, Remote) is not possible.
- 2) Use entry of locker is less than $\Phi 6$.



[Fig. 10.1] Knob Lock

⚠ Caution

- If locker is removed to clear lock, it must be approved by the valve manager.

11. Regular maintenance

11-1. Maintenance method

- 1) If the valve has not been operated for a long time, perform idle operation of the motor at least once per month to check proper operation of it. (For idle operation, set Auto/Manual Selector Lever to Manual and hold lever, then only the motor perform idle operation without valve operation)
- 2) Check the fastening state of Actuator bolts and Cover bolts regularly.
- 3) It is recommended to take regular maintenance at every 3 years.

11-2. Lubrication

The gear part of KE Series Actuator is shipped with LTG-360 grease filled.

This Grease may used for $-30^{\circ}\text{C}\sim 70^{\circ}\text{C}$ ($-22^{\circ}\text{F}\sim 160^{\circ}\text{F}$) operation.

- 1) Our product has sufficient semi-permanent lithium soap grease and there is no need to input or exchange grease during normal operation.
- 2) When it is disassembled and assembled for regular maintenance, please fill in 70~80% of the inner space with lithium grease. Please refer to charge amount below.

No.	Model	Grease Amount[L]	Remark
1	KE-01	1.5	
2	KE-02	2.5	
3	KE-03	4.0	

- 3) For reassembling cover and bolts after its disassembling, grease must be applied on its engaging surface and bolts.
- 4) Same type of lithium grease may be used no matter its brand, but mix use of other type grease is strongly prohibited.
- 5) Regular application and charging of high load grease are required for STEM and THRUST UNIT.

11-3. Lubrication Type

- 1) For internal use

No.	Company	Product	Remark
1	GS-CALTEX	Golden Pearl EP0	
2	GS-CALTEX	Multiwhak EP	
3	Mobil	Beacon325	
4	UEO USA	LTG-360	

- 2) For explosion proof joint surface use

No.	Company	Product	Remark
1	UEO USA	NEO SCG-570	
2	DOW Corning	Molykote 111 Compound	

- 3) For external securing bolt use

No.	Company	Product	Remark
1	UEO USA	NEO CPG-250	
2	DOW Corning	Molykote 111 Compound	
3	Nambang CNA	N-500	

12. Trouble Shooting

12-1. Problem/Cause/Correction

Problem	Cause	Correction
Motor is not rotating	• Power is OFF or cut • Different voltage • L/R Selector Knob is in stop position • Fuse cut • Thermal Protection Activated (Fault operation)	☞ Check incoming power ☞ Compare incoming power and voltage in the plate ☞ Select Local or Remote in L/R Selector Knob ☞ Fuse replacing ☞ Re-start after 30 min.s
Motor is stopped during opening / closing	• Torque Limit Switch operated due to overload • Valve Stem impurities • Valve Stem lubrication failure • Valve grand packing excessive • Yoke sleeve lubrication failure • Thermal Protection Activated (Fault operation)	☞ Check cause of overload and check Torque value. Then adjust the value → Contact us ☞ Cleanse Stem and apply grease again ☞ Valve disassembly for check ☞ Loose fastening and insert grease ☞ Inject grease to yoke sleeve ☞ Re-start after 30 min.s
Motor is rotated but valve is not moved	• Stem Bush abrasion • Worm Wheel abrasion	☞ Stem Bush replacing ☞ Worm Wheel replacing
Motor is not stopped with Position Limit Switch	• Limit Switch setup failure • Magnetic Contactor operation failure • Limit Switch failure • Control cable is earthing • Limit Switch operation failure	☞ Readjust ☞ Magnetic Contactor replacing ☞ Limit Switch replacing →Contact us ☞ Measure resistance between earthing ☞ Replacing
Torque Limits Switch is run, but motor is not stopped	• Magnetic Contactor failure • Torque Limit Switch operation failure • Control cable is earthing	☞ Magnetic Contactor replacing ☞ Torque Limit Switch replacing →Contact us ☞ Measure resistance between earthing
Manual Lever is not operated	• Manual Lever Ass'y operation failure	☞ Manual Lever Ass'y replacing
Abnormal Noise	• Bearing Failure or Damaged	☞ Bearing Replacement Required
Oil Leak	• Seal Parts Damaged	☞ Seal Parts Replacement

13. Specifications and Features

13-1. RPM/Torque data

Model	RPM kw	Max(Rated) Torque [kgf-m]								
		21	27.0	42	62	84	124	140	165	190
KE-01	0.2	10.5 (2.4)	8.5 (2.0)	7.0 (1.6)	5.5 (1.3)	4.5 (1.0)	3.0 (0.8)			
	0.4	20 (4.8)	17 (4.0)	13.5 (3.1)	11 (2.6)	9 (3.1)	6.5 (1.5)			
	0.75	30 (9.0)	30 (7.4)	25 (5.9)	20 (4.9)	18 (3.9)	12 (2.8)			
KE-02	0.75	41.0 (9.5)	35 (8.3)	30 (6.8)	24 (5.1)	18 (4.2)	13 (3.0)	11 (2.5)	9 (2.1)	8 (1.9)
	1.5		70.0 (16.6)	52 (13.6)	42 (10.3)	34 (8.4)	25 (6.0)	22 (5.0)	19 (4.3)	16 (3.8)
	2.2			70.0 (19.9)	62 (15.1)	50 (12.4)	35 (8.8)	32 (7.3)	26 (6.3)	24 (5.6)
	3.7				70.0 (25.0)	70.0 (20.8)	54 (14.8)	45 (12.3)	38 (10.6)	33 (9.3)
KE-03	3.7	185 (47.2)	170 (44.4)	125 (32.7)	95 (25.0)	75 (20.9)	52 (14.5)			
		250 (70.2)	250 (66.0)	185 (48.6)	140 (37.1)	115 (31.1)	80 (21.6)			
	7.5			250 (66.2)	190 (50.6)	155 (42.3)	110 (29.5)			
Control	Proportional	O			X			X		
	On-Off	O			O			O		
Starts per hour		200			100			50		
Install		Direct & Gear Box			Direct & Gear Box			Onlay Gear Box		
Worm Self Locking		O			X			X		

13-2. Machine data

Model	Max Torque		Max Thrust		Max Stem Dia(mm)		ISO No. Flange Dia Tap PCD/Size pilot dia. mm	Motor included Weight [kg]
	kgf.m	Nm	ton	Kn	key	threaded		
KE-01	30.0	294	9	88.2	36	42	F10, Φ125 Φ102/4xM10 Φ70	44
								45
								48
KE-02	70.0	686	13	127.4	52	60	F14, Φ175 Φ140/4xM16 Φ100	55
								60
								63
								70
KE-03	250.0	2450	27	264.6	80	95	F25, Φ300 Φ254/8xM16 Φ200	112
								118
								126

* Weight : Thrust Unit excluded

14. KE-SERIES Model Selection label

1) KE-SERIES ACTUATOR Model Selection label

KE	–	□ □ △ △ △ ○ ◇
Series name		Model name and structure

SERIES Name : KE

TYPE NUMBER : □□ → MOV Model

01 : Torque 0 ~ 30kgf-m

02 : Torque 0 ~ 70kgf-m

03 : Torque 0 ~ 250kgf-m

△△△ → Motor Size

020 : 0.2kw Squirrel cage induction motor

040 : 0.4kw Squirrel cage induction motor

075 : 0.75kw Squirrel cage induction motor

150 : 1.5kw Squirrel cage induction motor

220 : 2.2kw Squirrel cage induction motor

370 : 3.7kw Squirrel cage induction motor

550 : 5.5kw Squirrel cage induction motor

750 : 7.5kw Squirrel cage induction motor

○ → Control Type

S : Standard Type

ACTION TYPE : (No all-in-one operation panel)

i : Integral Type

(Electrical integrated operation panel and feed-back provided)

E : Electronic Type

(Electronic integrated operation panel and feed-back provide)

◇ → Cable Entry Type

CABLE ENTRY N : 2-NPT1", 1-NPT1½"

M : 2-M25xP1.5, 1-M40xP1.5

P : 2-PF1", 1-PF1½"(Waterproof type only)

2) KE-Series Actuator & Valve Model Selection label

KE-□□△△△○◇

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-

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-

Series Name

Valve Size

01 : 1"

02 : 2"

04 : 4"

40 : 40"

Valve Type

G : Gate

L : Globe

B : Ball

U : Butterfly

P : Plug

E : others

Valve Rating

1 : ANSI 150, JIS10K

2 : ANSI 300, JIS10K

3 : ANSI 600, JIS10K

4 : ANSI 900

5 : ANSI 1500

6 : ANSI 2500

7 : others

Gear Box

N : None

V : Bevel

W : Worm

S : Spur



www.kva.co.kr



KE-SERIES[MOV]



KQ-SERIES[MOV]



KA-SERIES[AOV]



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