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## Overview

### Features:

- 30% duty cycle at rated torque
- Self-locking function, allows a smooth running, dependable robust drive system
- Built-in thermal protection prevents motor burning out. AC motor is **257°F (125°C)** and **194°F (90°C)** for DC motor (the 75% duty cycle actuator uses DC motor)
- Models are ISO 5211 compliant
- Visual position indicator on top of actuator cover and manual override (except BM-2 and OM-A)
- Manual operations is non-clutch design that can be operated without any lever, clutch, or brake upon power outage. Design is patented in Taiwan, U.S., and China

Model	Maximum Torque		Weight		Manual Override
	Nm	lb-in	Kg	lb	
OM-A	50	443	3	6.61	-
OM-A-M	50	443	3	6.61	lever
OM-1	35	310	2	4.41	
BM-2	120	1063	5.5	12.13	-
OM-F	65	576	11	24.25	handwheel
OM-2	90	797	11	24.25	
OM-G	90	797	11	24.25	
OM-3	150	1328	11	24.25	
OM-4	400	3542	20	44.09	
OM-5	500	4427	20	44.09	
OM-6	650	5756	20	44.09	
OM-7	1000	8855	32	70.55	
OM-8	1500	13282	32	70.55	
OM-9	2000	17709	71	156.53	
OM-10	2500	22137	71	156.53	
OM-11	3000	26564	72	158.73	
OM-12	3500	30991	72	158.73	
OM-13	4500	39846	106	233.69	

## Important Notices



1. Check for correct voltage prior to wiring.
2. Turn power off before servicing or for maintenance purpose.
3. Use sealant to seal conduit connections after wiring to prevent dust or water contamination.
4. The angle of electric actuator installation must be between 0 to 180 degrees. Do not install upside down or below the horizontal line.
5. When more than one electric actuator is needed to operate simultaneously, please connect with the individual cables or install the coupling board.
6. Not intended for vacuum spaces and avoid installing near explosive atmospheres.
7. Actuators should be placed in a clean and dry place for storage, and protected with outer carton from being affected by great temperature difference or serious vibration.
8. To avoid functional failure caused by static, do not touch any components on the PCB with metal tools or bare hands.
9. Please connect the ground wire to PE inside the electric actuator.
10. The warranty period of our products is one year.

### Duty Cycle - Compliance to IEC Standard

"Duty cycle" means the starting frequency.

The formula:  $\text{Running Time} \div (\text{Running Time} + \text{Rest Time}) \times 100\% = \text{duty cycle}$

$\text{Rest Time} = \text{Running Time} \div (1 - \text{duty cycle}) - \text{duty cycle}$

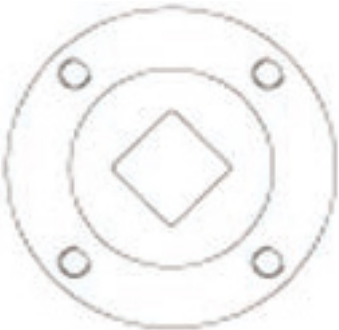

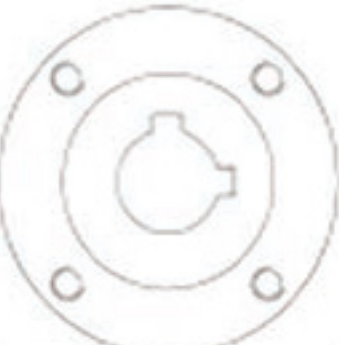
For example: The running time for OM-2 is 15 seconds.

30% duty cycle  $15 \times [(1 - 30\%) / 30\%] = 35$  → The rest time will be 35 seconds.

75% duty cycle  $15 \times [(1 - 75\%) / 75\%] = 5$  → The rest time will be 5 seconds.

If the duty cycle is higher, the rest time will be shortened. It means the starting frequency will be higher.

## Standard Mounting

Model		Mounting Flange	Shaft		Depth of Shaft		Key	
		(ISO 5211)	mm	in	mm	in	mm	in
BM-2		F07	22	0.87	30	1.18	-	
OM-A		F05 / F07	17	0.67	20	0.78	-	
OM-A-M		F05 / F 07	17	0.67	20	0.78		
OM-1		F03 / F05	14	0.55	17	0.67		
OM-F, OM-G		F07	22	0.87	30	1.18		
OM-2 to OM-3		F07	22	0.87	30	1.18		
OM-4 to OM-6		F10	36	1.38	40	1.57		
OM-7 to OM-8		F12 or F14	35	1.38	60	2.36	10x10	0.39x0.39
OM-9 to OM-12		F14 or F16	75	2.95	100	3.94	12x10	0.47x0.39
OM-13		F16 / F25	72	2.83	110	4.33	20x12	0.79x0.47

## Specifications

Model	Maximum Torque		Speed (90°)	Motor Power	12V DC/AC			24V DC/AC		
	Nm	lb-in			Run	Start	Lock	Run	Start	Lock
<b>BM-2</b>	-	-	-	-	-	-	-	-	-	-
<b>OM-A</b>	50	443	20s	10W	1.3A	1.5A	2.8A	0.8A	0.9A	1.6A
<b>OM-A-M</b>	50	443	20s	10W	1.3A	1.5A	2.8A	0.8A	0.9A	1.6A
<b>OM-1</b>	35	310	15s	10W	1.9A	2.0A	2.8A	1.1A	1.1A	1.6A
<b>OM-2</b>	90	797	15s	40W	3.4A	5.2A	16.5A	2.2A	4.5A	14.5A
<b>OM-F</b>	65	576	6s	60W	-	-	-	2.6A	3.8A	11.0A
<b>OM-3</b>	150	1328	22s	40W	4.4A	4.9A	16.5A	2.4A	5.0A	14.5A
<b>OM-G</b>	120	1063	8s	60W	-	-	-	4.4A	4.8A	11.0A
<b>OM-4</b>	400	3542	16s	80W	16.1A	16.1A	33.0A	8.5A	9.2A	30.0A
<b>OM-5</b>	500	4427	22s	80W	14.1A	13.5A	33.0A	7.5A	9.0A	30.0A
<b>OM-6</b>	650	5756	28s	80W	12.3A	12.5A	33.0A	7.0A	8.5A	30.0A
<b>OM-7</b>	1000	8855	46s	80W	-	-	-	6.8A	7.8A	30.0A
<b>OM-8</b>	1500	13282	46s	80W	24A	26A	59A	8.1A	8.0A	30.0A
<b>OM-9</b>	2000	17709	58s	80W	-	-	-	8.8A	11.0A	26.0A
<b>OM-10</b>	2500	22137	58s	80W	28A	60A	59A	11.8A	11.0A	26.0A
<b>OM-11</b>	300	26564	58s	220W	-	-	-	15.1A	11.0A	33.0A
<b>OM-12</b>	3500	30991	58s	220W	-	-	-	17.8A	12.0A	33.0A

### Single Phase

Model	Maximum Torque		Speed (90°)		Motor Power	110V Current			220V-240V Current		
	Nm	lb-in	60 Hz	50 Hz		Run	Start	Lock	Run	Start	Lock
<b>BM-2</b>	120	1063	8s	10s	40W	1.3A	1.6A	1.6A	0.6A	0.9A	0.9A
<b>OM-A</b>	50	443	20s	24s	10W	0.6A	0.7A	0.7A	0.3A	0.4A	0.5
<b>OM-A-M</b>	50	443	20s	24s	10W	0.6A	0.7A	0.7A	0.3A	0.4A	0.58A
<b>OM-1</b>	35	310	12s	13s	10W	0.6A	0.7A	0.7A	0.3A	0.4A	0.4A
<b>OM-2</b>	90	797	15s	17s	40W	1.0A	1.6A	1.6A	0.5A	0.8A	0.9A
<b>OM-F</b>	65	576	6s	6s	60W	1.4A	3.1A	3.1A	0.7A	1.0A	1.5A
<b>OM-3</b>	150	1328	22s	26s	40W	1.2A	1.6A	1.6A	1.0A	1.2A	0.9A
<b>OM-G</b>	120	1063	8s	8s	60W	1.6A	3.1A	3.1A	0.8A	1.2A	1.5A
<b>OM-4</b>	400	3542	16s	18s	80W	1.9A	3.6A	3.6A	1.1A	2.0A	2.2A
<b>OM-5</b>	500	4427	22s	25s	80W	2.0A	3.6A	3.6A	1.1A	2.0A	2.2A
<b>OM-6</b>	650	5756	28s	31s	80W	2.1A	3.6A	3.6A	1.1A	2.0A	2.2A
<b>OM-7</b>	1000	8855	46s	55s	120W	3.1A	9.0A	9.0A	1.4A	4.1A	5.0A
<b>OM-8</b>	1500	13282	46s	55s	120W	3.3A	9.0A	9.0A	1.6A	4.4A	5.0A
<b>OM-9</b>	2000	17709	58s	70s	180W	3.3A	5.9A	5.9A	2.1A	3.8A	3.6A
<b>OM-10</b>	2500	22137	58s	70s	180W	4.0A	5.9A	5.9A	2.3A	4.0A	3.6A
<b>OM-11</b>	3000	26564	58s	70s	180W	4.5A	5.9A	5.9A	2.5A	4.2A	3.6A
<b>OM-12</b>	3500	30991	58s	70s	220W	4.0A	7.5A	7.5A	2.4A	4.4A	4.8A
<b>OM-13</b>	4500	39846	80s	95s	220W	4.2A	7.5A	7.5A	2.4A	4.8A	4.8A

# Specifications

## Three Phase

Model	Maximum Torque		Speed (90°)		Motor Power	220V Current			380V Current			440V Current		
	Nm	lb-in	60 Hz	50 Hz		Run	Start	Lock	Run	Start	Lock	Run	Start	Lock
<b>BM-2</b>	120	1063	8s	10s	40W	0.8A	1.4A	1.5A	0.4A	0.9A	0.7A	0.4A	0.5A	0.6A
<b>OM-A</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>OM-A-M</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>OM-1</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>OM-2</b>	90	797	15s	17s	40W	0.8A	1.4A	1.5A	0.4A	0.7A	0.7A	0.4AA	0.9A	0.6A
<b>OM-3</b>	150	1328	22s	26s	40W	0.8A	1.4A	1.5A	0.4A	0.7A	0.7A	0.4A	0.9A	0.6A
<b>OM-4</b>	400	3542	16s	18s	80W	1.0A	1.8A	2.3A	0.7A	1.3A	1.5A	0.6A	1.4A	1.4A
<b>OM-5</b>	500	4427	22s	25s	80W	1.0A	1.8A	2.3A	0.7A	1.3A	1.5A	0.6A	1.4A	1.4A
<b>OM-6</b>	650	5756	28s	31s	80W	1.0A	1.8A	2.3A	0.7A	1.3A	1.5A	0.6A	1.4A	1.4A
<b>OM-7</b>	1000	8855	46s	55s	120W	0.9A	2.0A	2.2A	0.7A	1.2A	1.4A	0.5A	1.3A	1.3A
<b>OM-8</b>	1500	13282	46s	56s	120W	1.0A	2.4A	2.6A	0.7A	1.5A	1.5A	0.6A	1.2A	1.2A
<b>OM-9</b>	2000	17709	58s	70s	180W	1.3A	3.7A	3.9A	0.7A	2.0A	2.3A	0.7A	2.0A	2.2A
<b>OM-10</b>	2500	22137	58s	70s	180W	1.3A	3.4A	3.9A	0.7A	2.0A	2.4A	0.7A	2.0A	2.2A
<b>OM-11</b>	3000	26564	58s	70s	180W	1.3A	3.5A	3.9A	0.7A	2.0A	2.4A	0.7A	2.0A	2.2A
<b>OM-12</b>	3500	30991	58s	70s	220W	1.5A	4.8A	5.4A	0.9A	2.5A	2.5A	0.8A	2.6A	2.4A
<b>OM-13</b>	4500	39846	80s	95s	220W	1.5A	4.9A	5.4A	1.0A	2.5A	2.5A	0.8A	2.6A	2.4A

NOTE: Run - Full Load Ampere

Lock - Locked Rotor Ampere



## **Storage Information**

### **Receiving / Inspection**

1. Carefully inspect for shipping damage. Damage to the shipping carton is usually a good indication that it has received rough handling. Report all damage immediately to the freight carrier and your seller.
2. After unpacking the product and information packet, please take care to save the shipping carton and any packing material in case of product return or replacement. Verify that the item on the packing list or bill of lading is the same as your own documentation. If there is any discrepancy, please contact the seller.

### **Storage**

1. If the actuator cannot be installed immediately, store it in a dry place. It must be protected from excess moisture, dust, and weather until you are ready to connect cables.
2. If the actuator has to be installed but cannot be cabled, please don't remove the plastic transit cable entry plugs. When the actuator has to be cabled, it is recommended to replace the suitable water-proof plugs with IP protection.

### **Lubrication**

The gear train has been permanently lubricated at the factory.

## Installation

1. Before mounting actuator, verify that the torque requirement is less than the output torque of the actuator. (The suggested safety factor is 30% of the maximum torque of valve).

For example:

If the maximum torque of 5" valve is  $80\text{N}\cdot\text{m}$   $\rightarrow 80 \times 1.3$  (safety factor) =  $104\text{N}\cdot\text{m}$

$104\text{N}\cdot\text{m} < 150\text{N}\cdot\text{m}$  (OM-3)  $\rightarrow$  OK!

$104\text{N}\cdot\text{m} > 90\text{N}\cdot\text{m}$  (OM-2)  $\rightarrow$  NO!

2. Check if the output shaft fits to the stem of valve before inserting into actuator. Please use mounting plate or adaptor to connect if it does not match.
3. Insert output shaft adaptor into actuator. Make sure it fits well.
4. Determine that actuator position, open or closed, matches with position of equipment prior to mounting. Use manual override to change position if necessary.
5. Remove valve's manual device and mount on the proper connection.

### CAUTION

Don't remove any necessary parts for the proper operation of the valve.

6. Check again that the valve and actuator are in the same position.
7. Install the actuator to valve directly or with mounting kits, then tighten all screws and nuts.
8. Remove actuator cover.

### CAUTION

Be sure power is off at the main power box.

9. Wire actuator using the wiring diagram inside cover.

### CAUTION

For the 3-Phase on-off controller actuator, please use the handwheel to turn the actuator to  $45^\circ$  before test. If the operating direction is opposite after supplying power, please change any two of the U, V, W.

10. Supply power to actuator.

### CAUTION

Use remarkable mark warning "there are live circuits that could cause electrical shock or death."

11. Make sure if it is needed to calibrate the fully-open or fully-closed position of the actuator. Refer to pages 49 to 52 to set the fully-open or fully-closed position and mechanical stops.
12. If the actuator is modulating type, refer to pages 56 to 73 to set the functions.

### CAUTION

Turn power off before changing any setting.

13. Replace cover and secure cover screws.

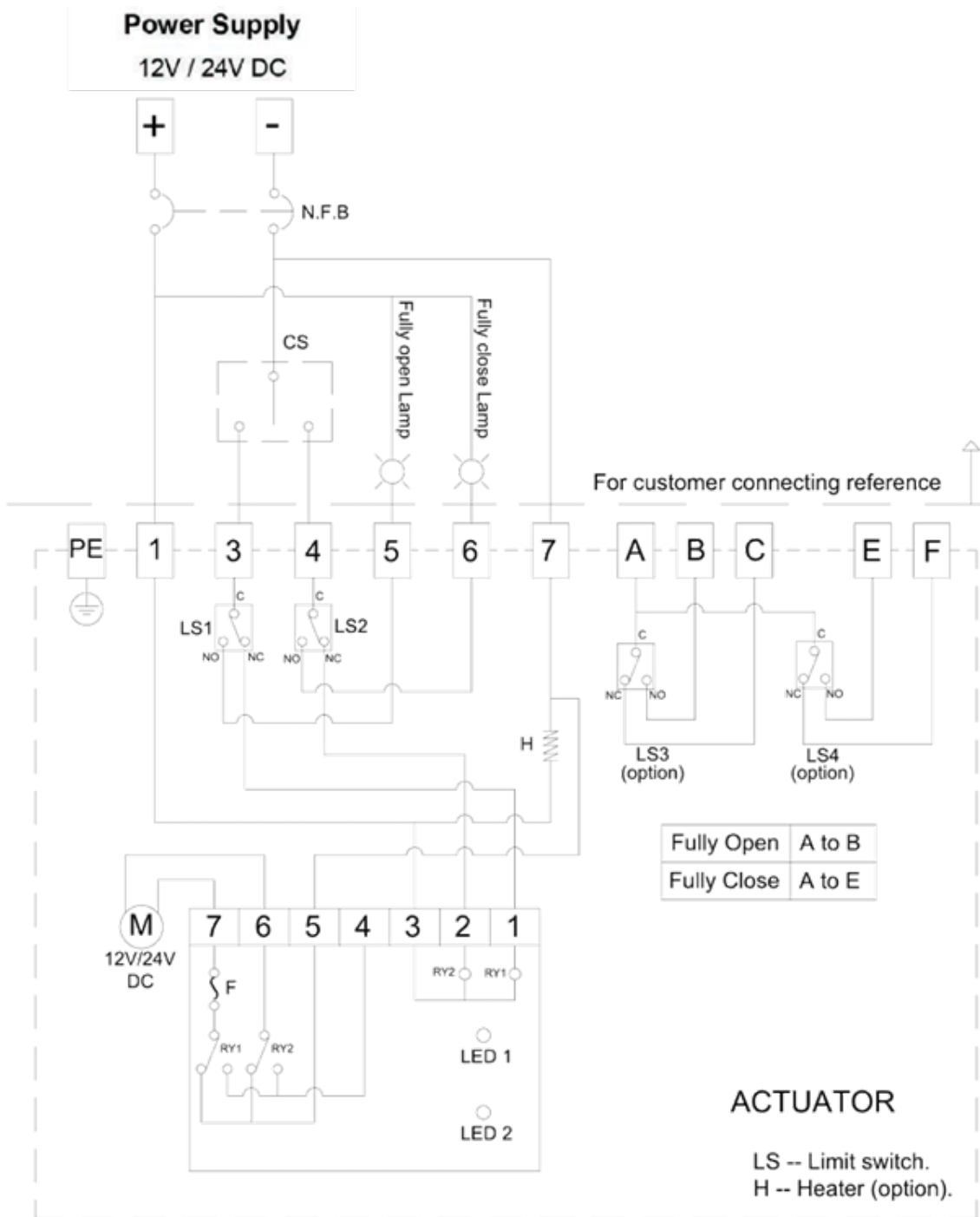
## Wiring Diagram

1. MC1 & MC2: Electromagnetic contractor
2. NFB: No fuse breaker
3. C.S.: Control switch
4. C: Capacitor
5. N: Neutral
6. L: Live Wire
7. PE: Protective Earth
8. O.L.: Over-load relay
9. H: Heater
10. LS: Limit Switch
11. TS: Torque Switch
12. Switch(1): Local/Remote Control. Switch(2): Open/Stop/Close select
13. Duty cycle (standard model):  
BM-2, OM-A, OM-A-M, OM-F, OM-G, OM-1 to OM-13: 30% duty cycle  
Extended duty cycle:  
OM-A, OM-A-M, OM-1 to OM-8: 75% duty cycle  
OM-9 to OM-13: 50% duty cycle
14. LS1: Limit switch for open  
LS2: Limit switch for close
15. The usage for 2 additional limit switches:  
**OM-1, OM-A, OM-A-M**  
LS3 Fully-Open: Terminal "A" connects to terminal "B"  
LS4 Fully Closed: Terminal "A" connects to terminal "E"  
**OM-1, OM-A, OM-A-M (Option: MODBUS)**  
LS3 Fully-Open: Terminal "A" connects to terminal "C"  
LS4 Fully-Closed: Terminal "D" connect to terminal "F"  
**BM-2, OM-A, OM-AM, OM-F, OM-G, OM-2 to OM-13**  
LS3 Fully-Open: Terminal "A" connects to terminal "C"  
LS4 Fully-Closed: Terminal "D" connects to terminal "F"

NOTE: When a set of control wires or switches needs to control two or more actuators at the same time, please refer to page 51 or install the coupling board.

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 12V, 24V DC
- On-Off Controller

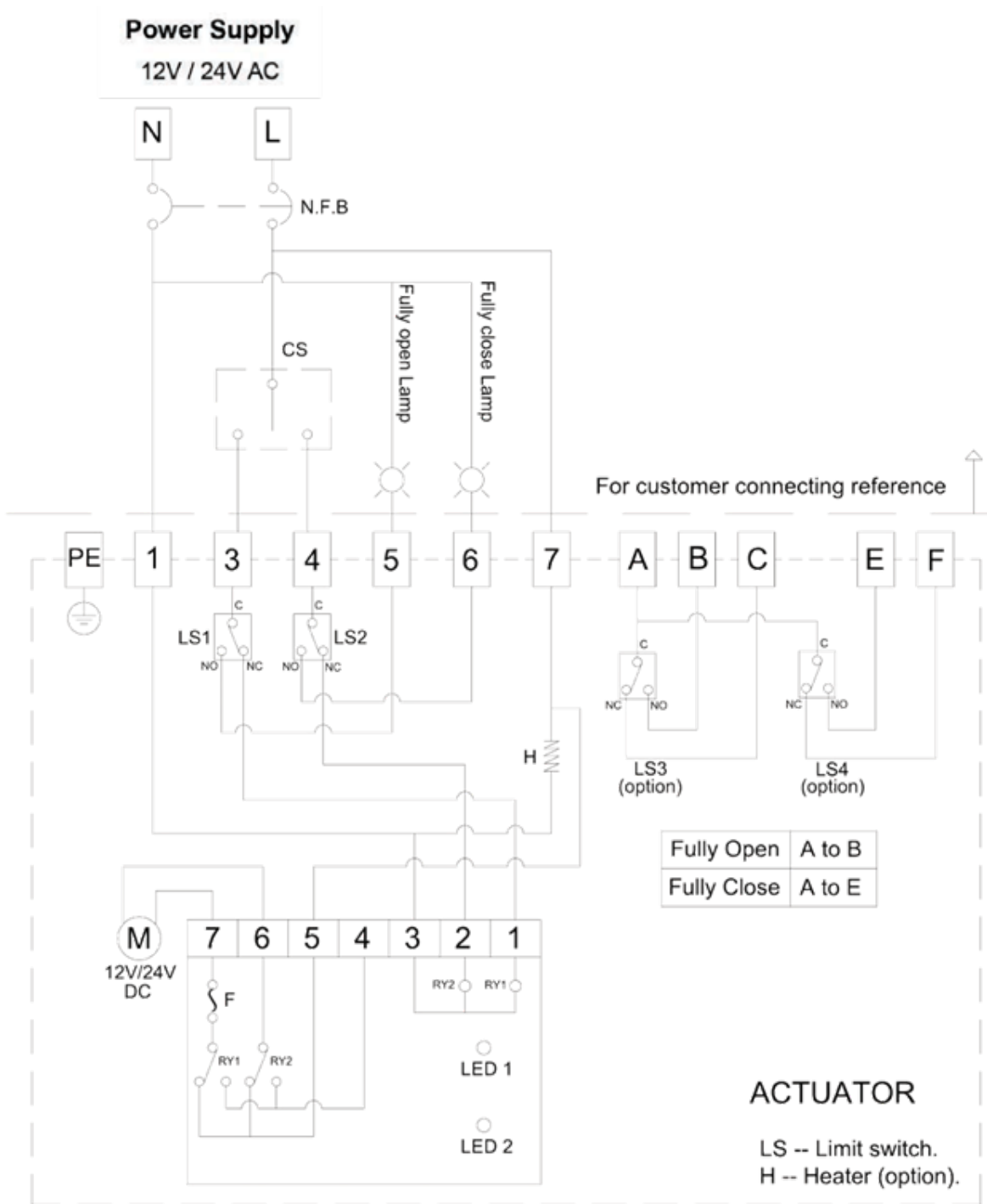


**NOTE:**

1. "+" connects to #1, "--" connects to #7
2. "--" connects to #3 for "OPEN", "--" connects to #4 for "CLOSE"
3. Using less than 3A current for "A, B, C, E, F"
4. Using battery to supply power for DC units

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 12V, 24V AC
- On-Off Controller

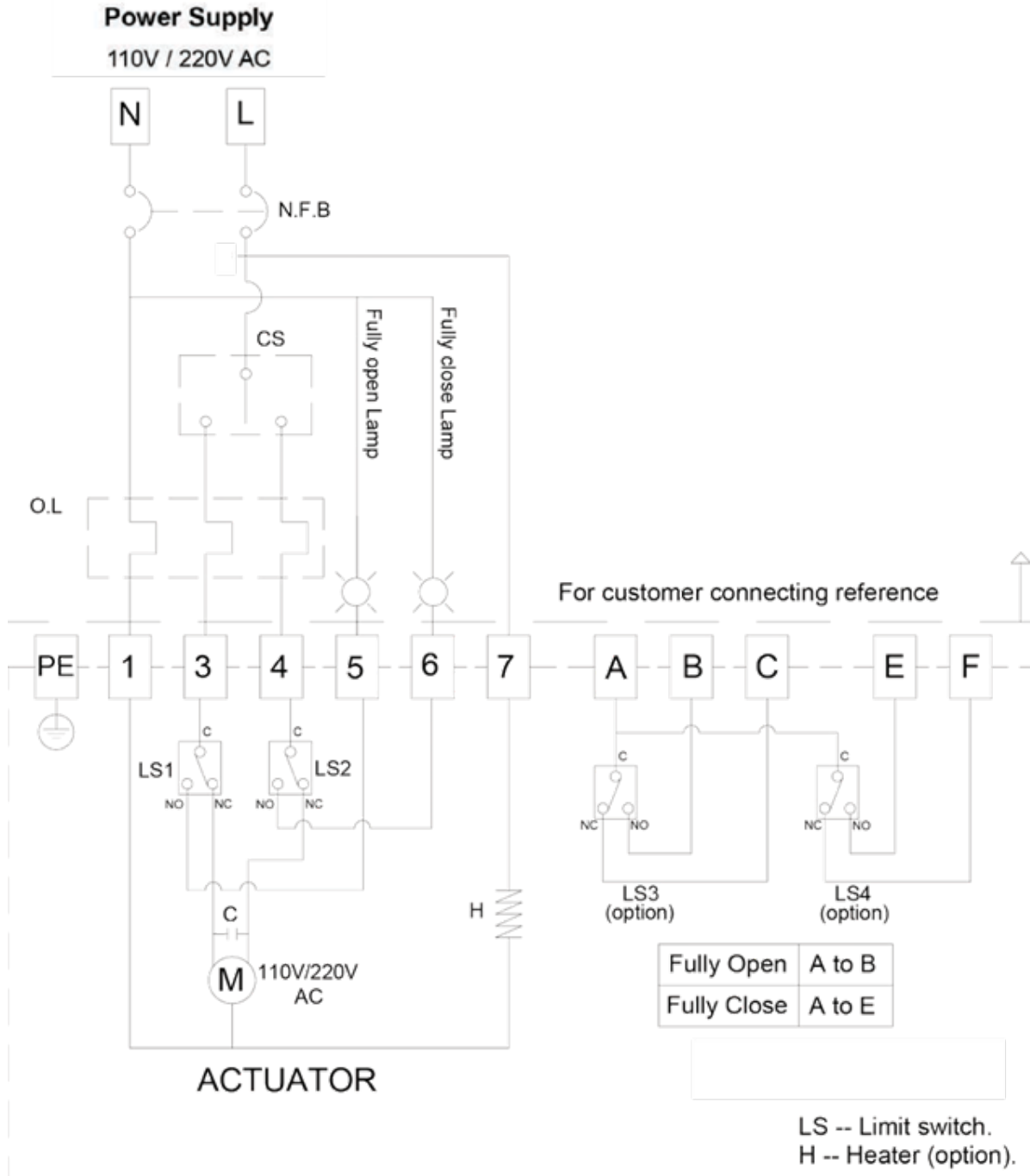


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 3A current for "A, B, C, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 110V, 220V AC 1-Phase
- On-Off Controller

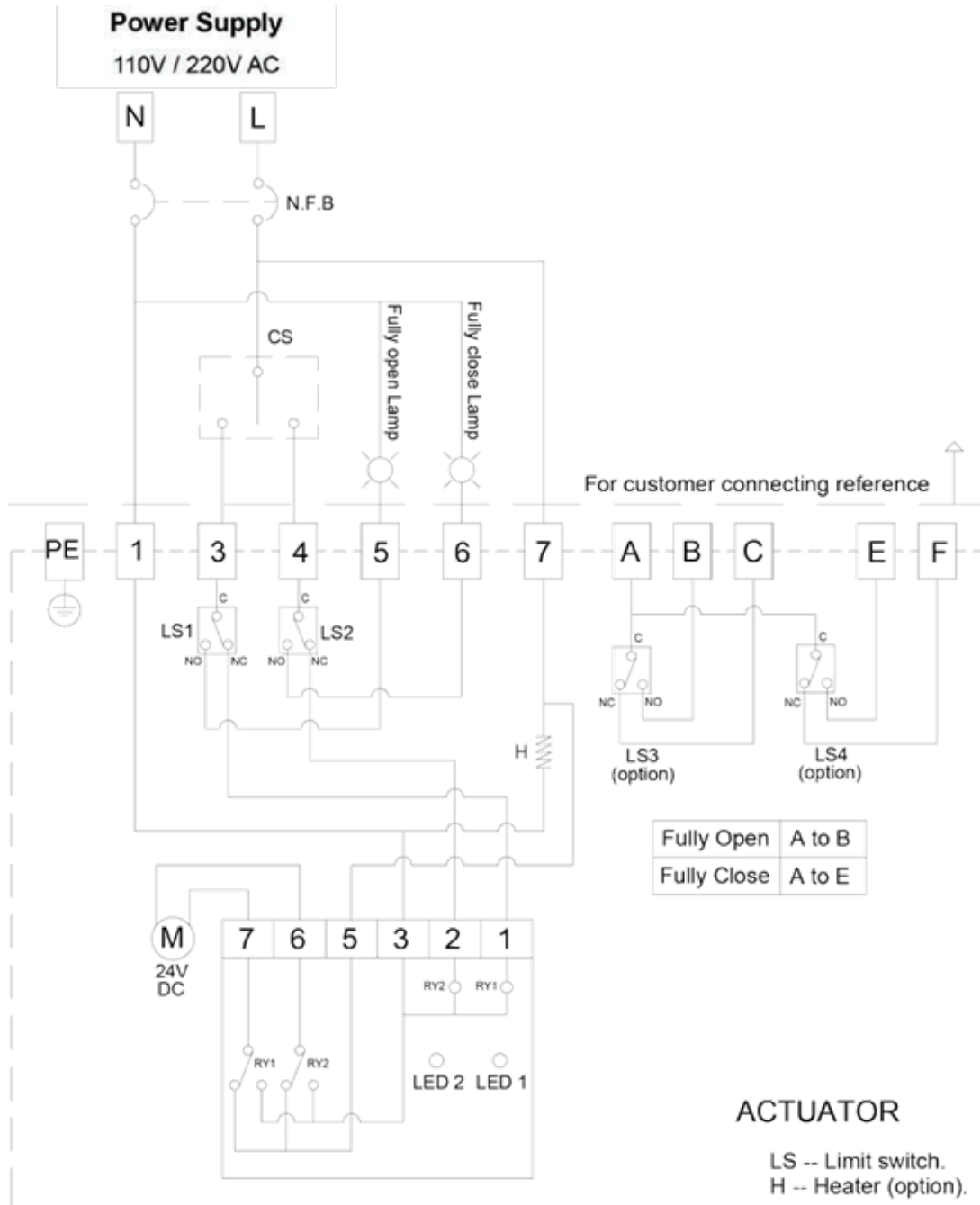


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 3A current for "A, B, C, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 110V, 220V AC 1-Phase
- On-Off Controller, 75% duty cycle

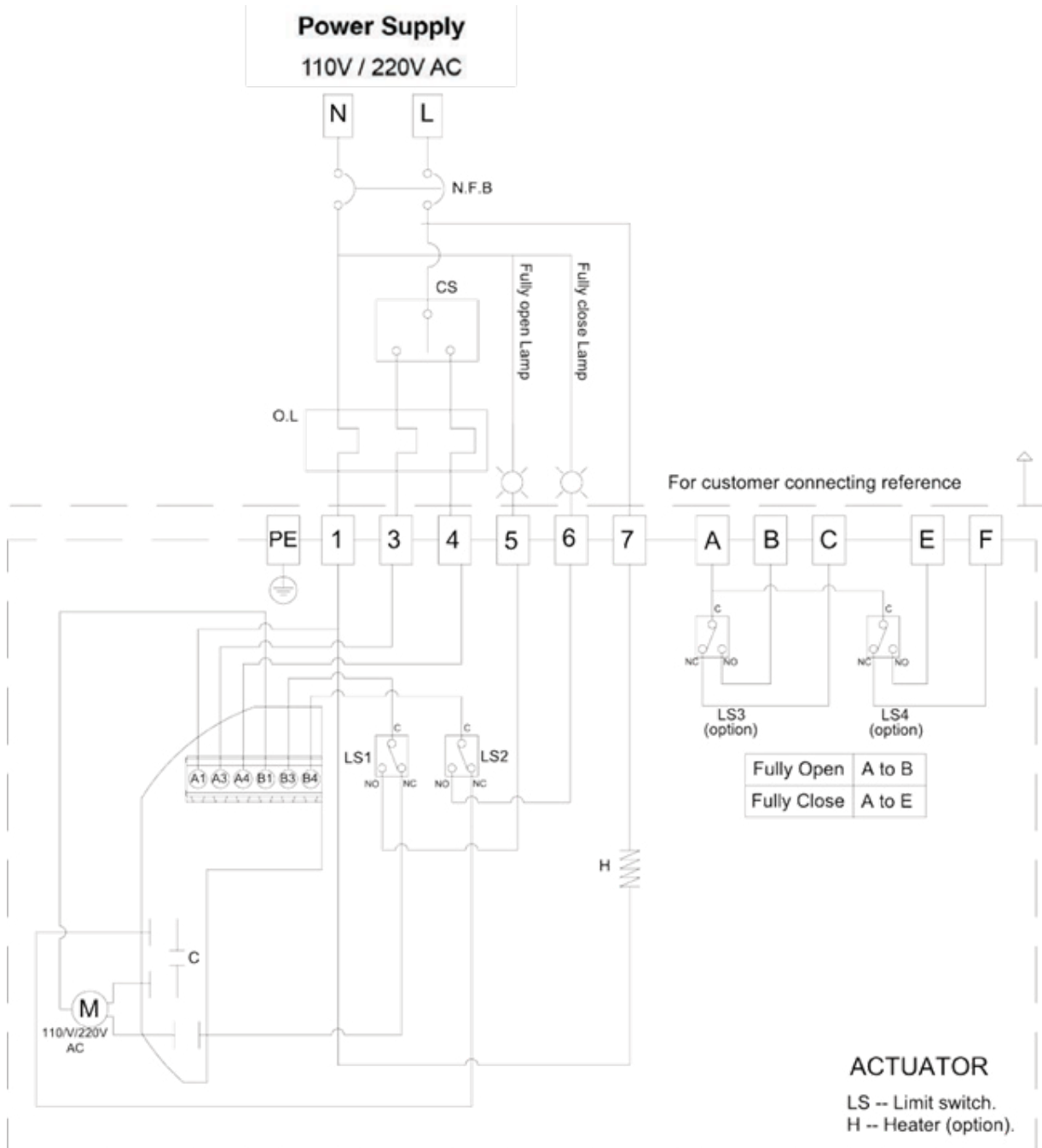


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 3A current for "A, B, C, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 110V, 220V AC 1-Phase
- On-Off Controller, coupling board



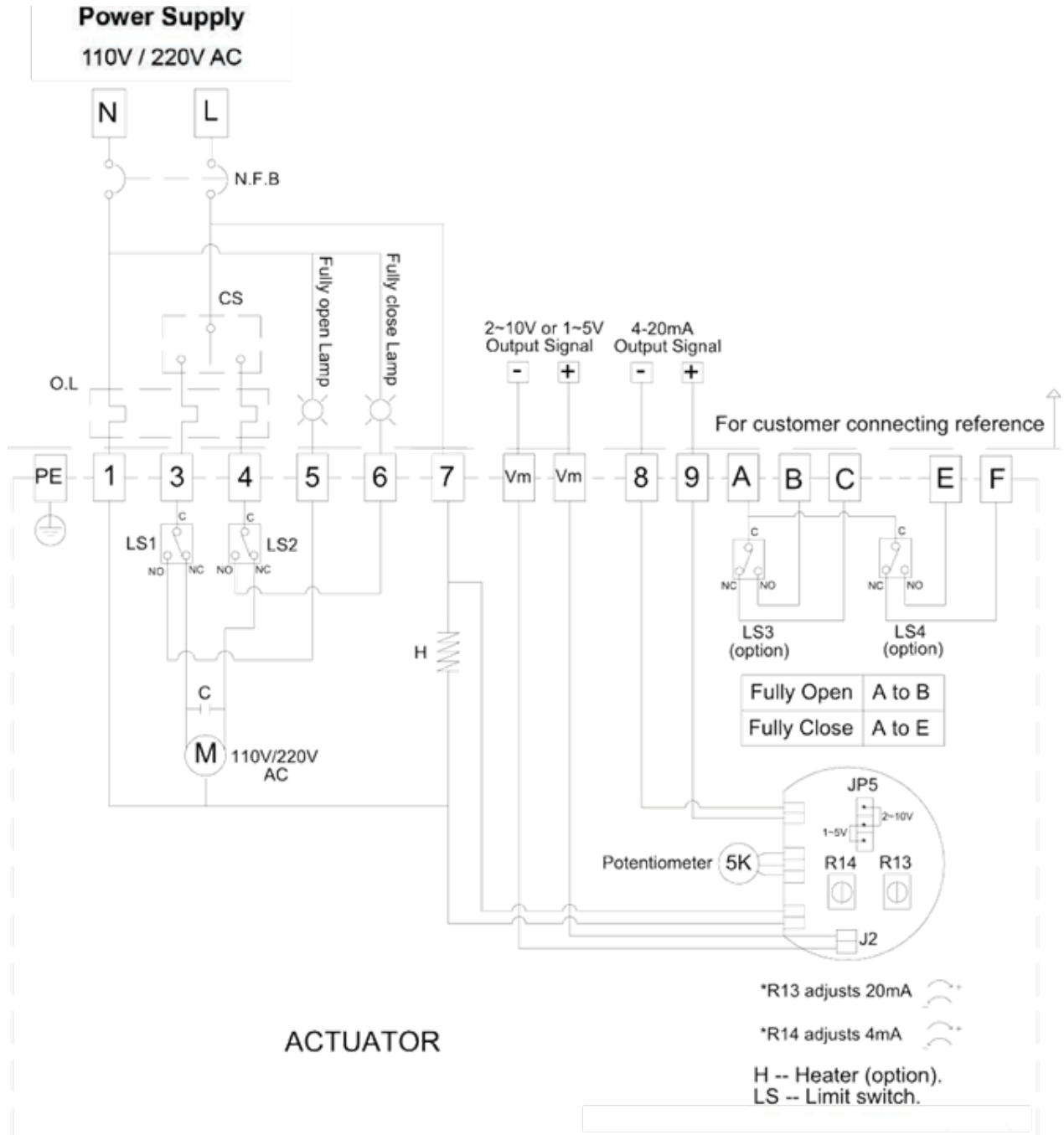
**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 3A current for "A, B, C, E, F"



## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 110V, 220V AC 1-Phase
- On-Off Controller, Analog Signal Output

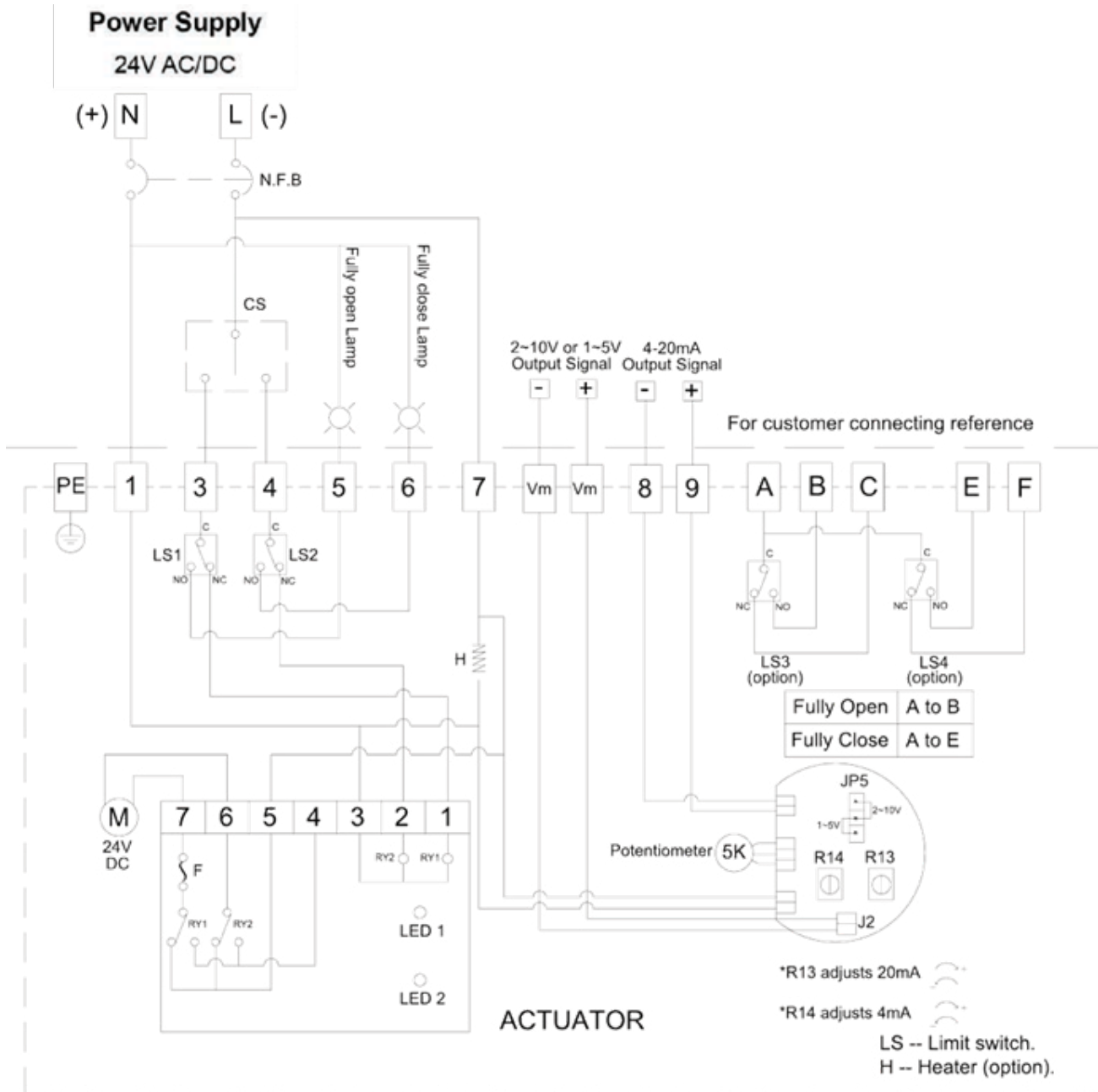


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "-" connects to #4 for "CLOSE"
3. Using less than 3A current for "A, B, C, E, F"
4. JP5: 2 to 10V or 1 to 5V output mode: J2: 2 to 10V or 1 to 5V output signal

# Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 24V AC/DC
- On-Off Controller, Analog Signal Output

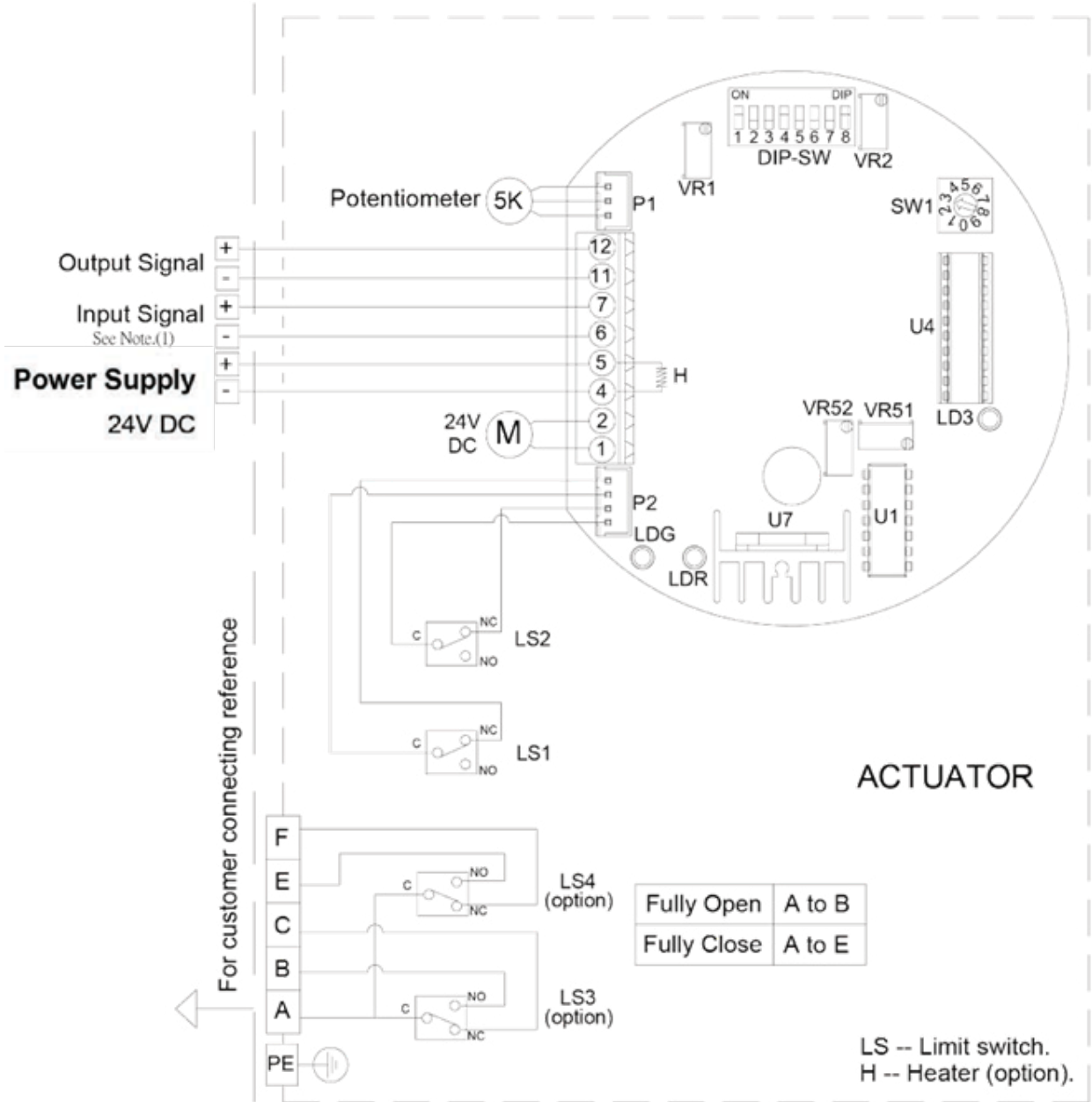


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "-" connects to #4 for "CLOSE"
3. Using less than 3A current for "A, B, C, E, F"
4. JP5: 2 to 10V or 1 to 5V output mode: J2:2 to 10V or 1 to 5V output signal

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 24V DC
- Modulating Controller

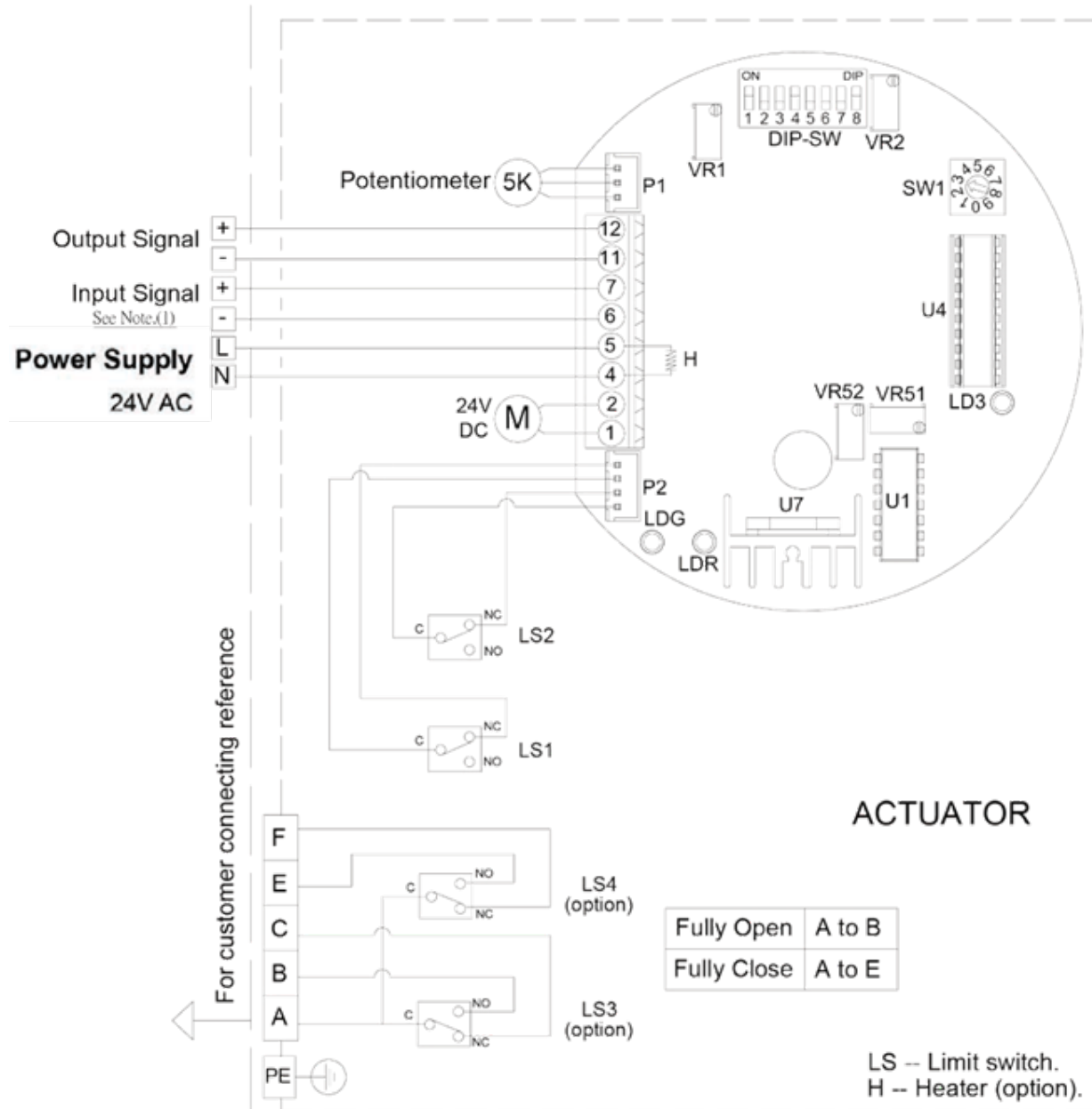


**NOTE:**

1. Modulating board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 3A current for "A, B, C, E, F"
3. Using battery to supply power for DC units

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 24V AC
- Modulating Controller

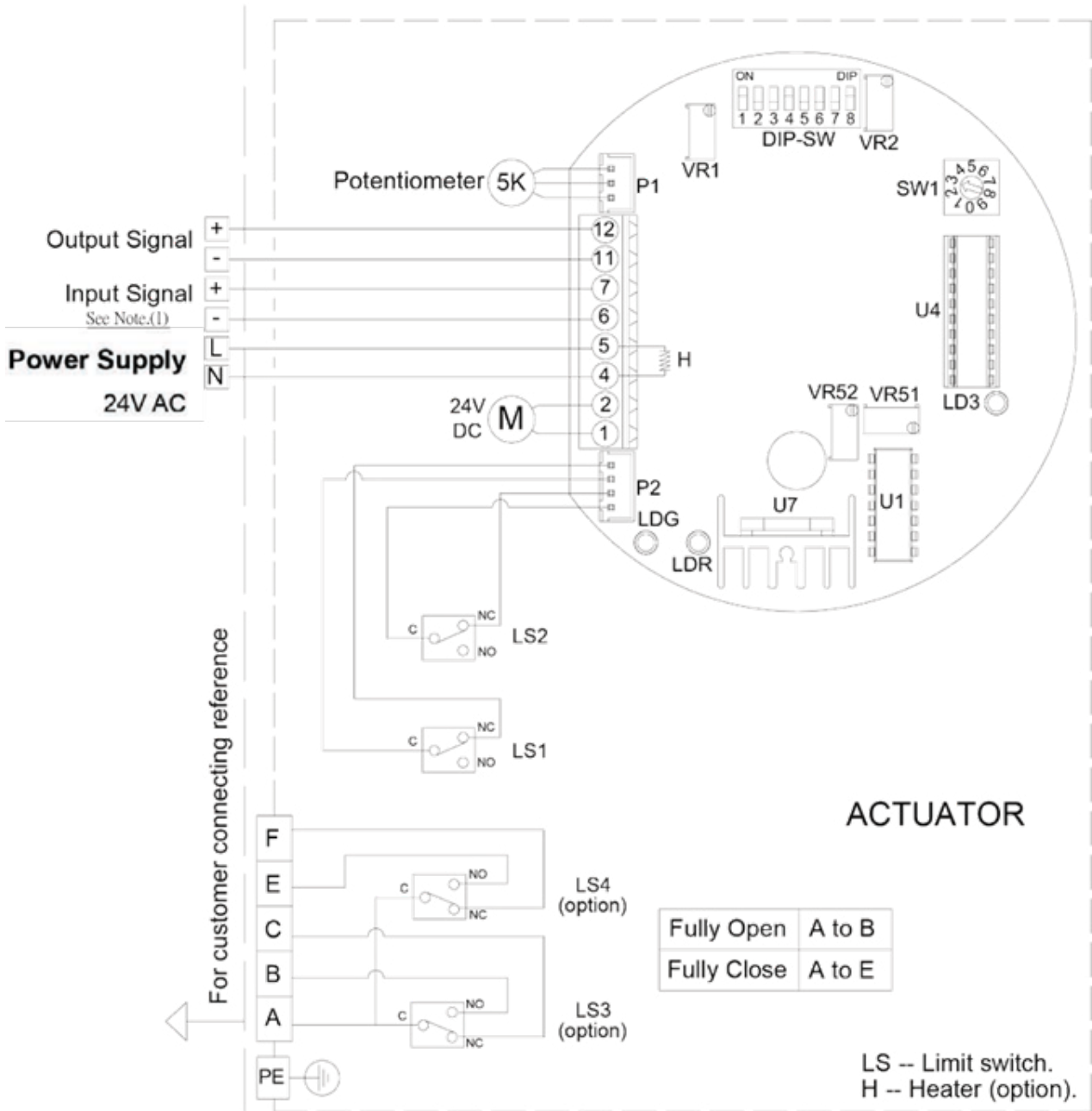


**NOTE:**

1. Modulating board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 3A current for "A, B, C, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 110V, 220V AC 1-Phase
- Modulating Controller

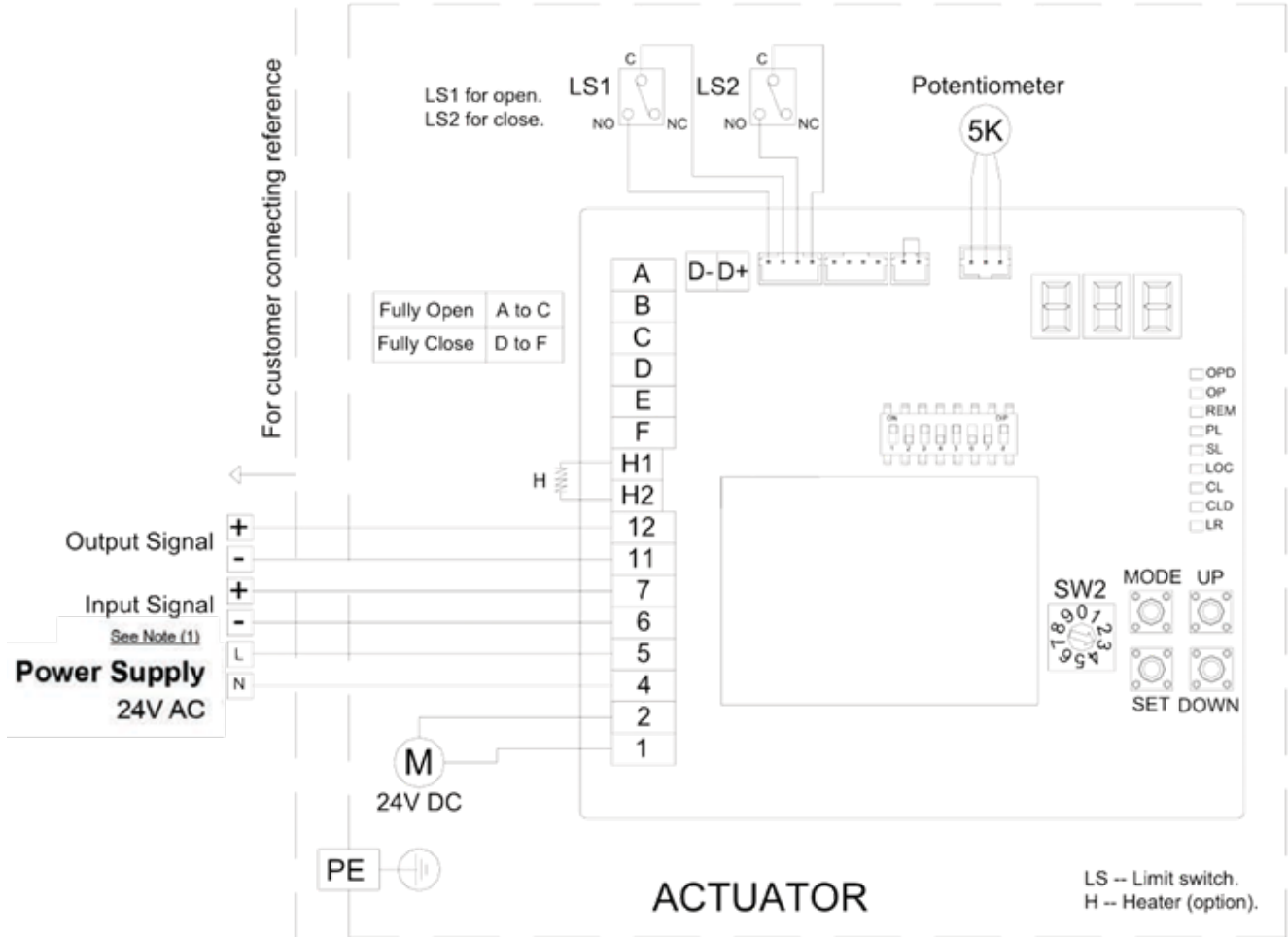


**NOTE:**

1. Modulating board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 3A current for "A, B, C, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 24V AC
- Modulating Controller, MODBUS

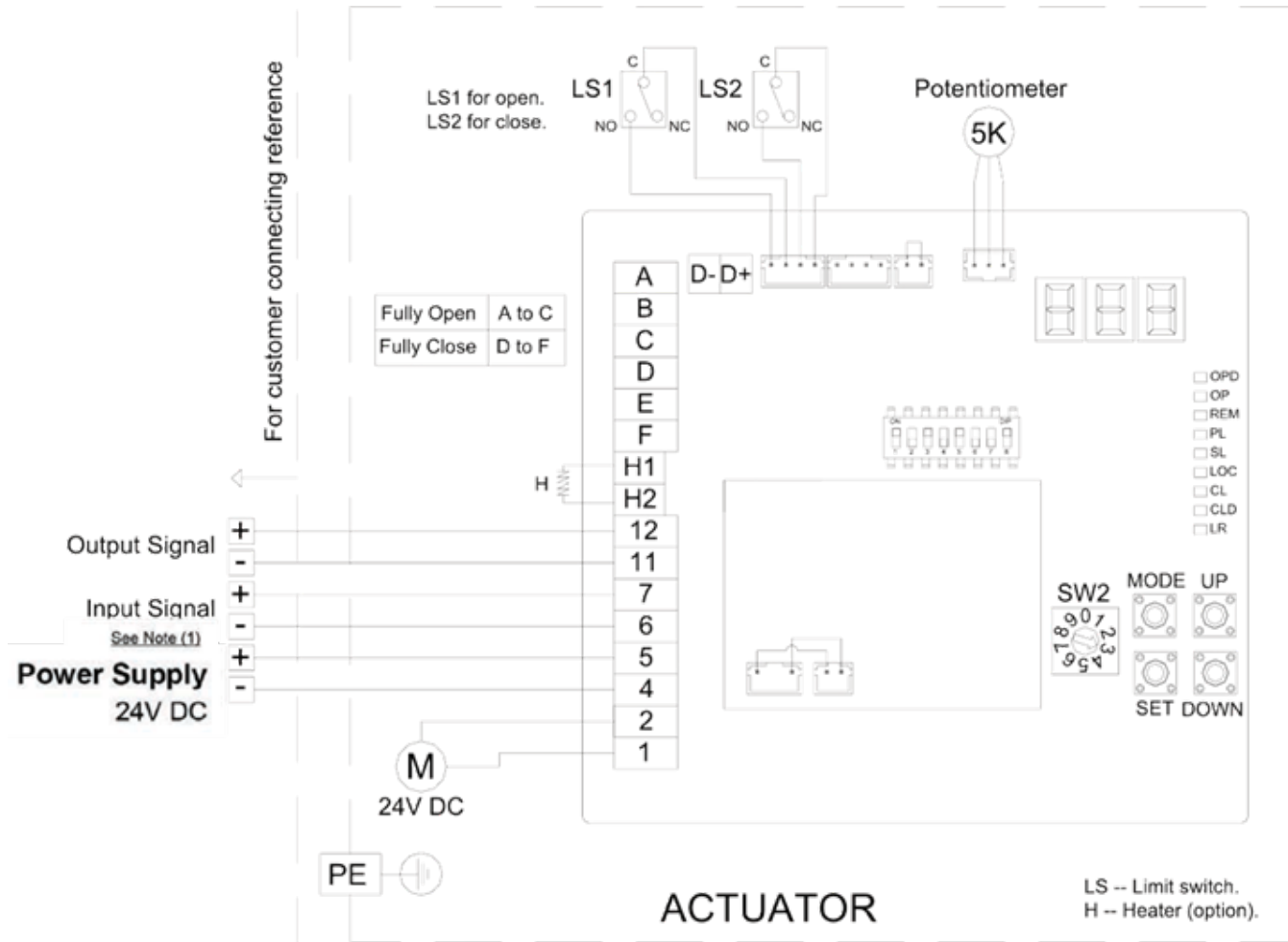


**NOTE:**

1. Modulating board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 3A current for "A, B, C, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 24V DC
- Modulating Controller, MODBUS

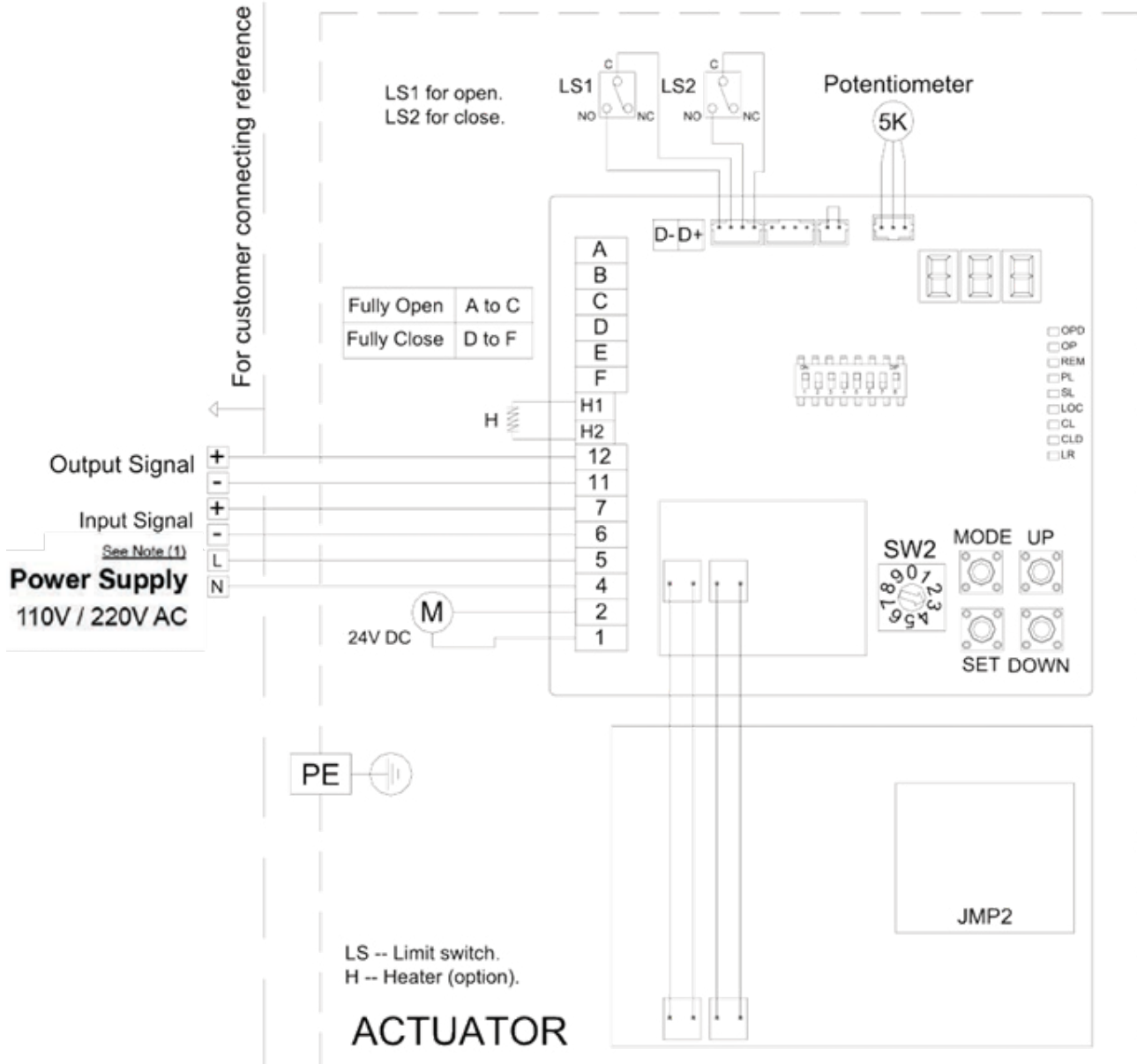


**NOTE:**

1. Modulating board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 3A current for "A, B, C, E, F"
3. Using battery to supply power for DC units

# Wiring Diagram - Quarter Turn Actuator

- OM-1, OM-A, OM-A-M, 110V, 220V AC 1-Phase
- Modulating Controller, MODBUS



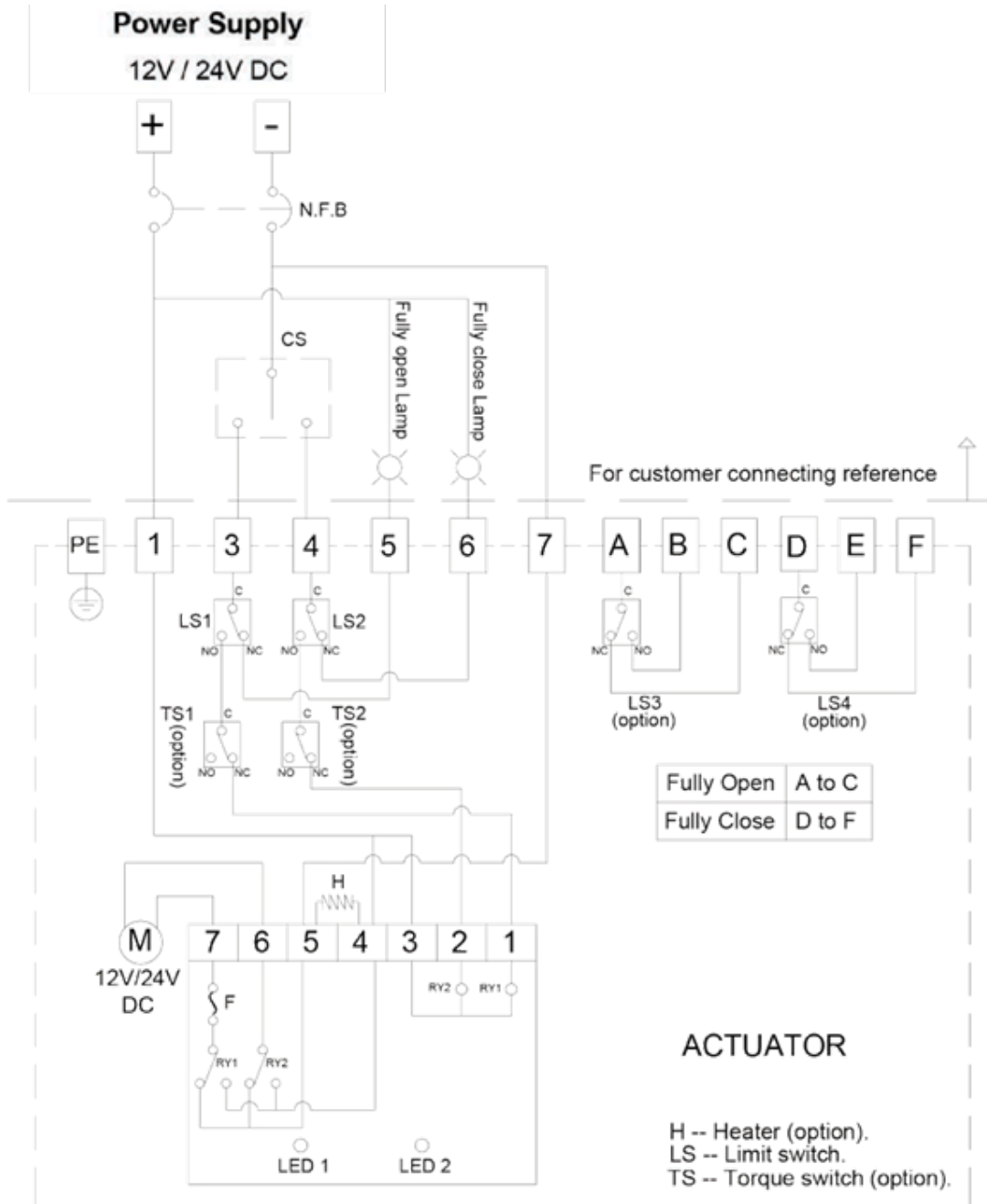
**NOTE:**

1. Modulating board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 3A current for "A, B, C, E, F"



## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-6, 12V DC
- OM-2 to OM-12, OM-F, OM-G, 24V DC
- On-Off Controller

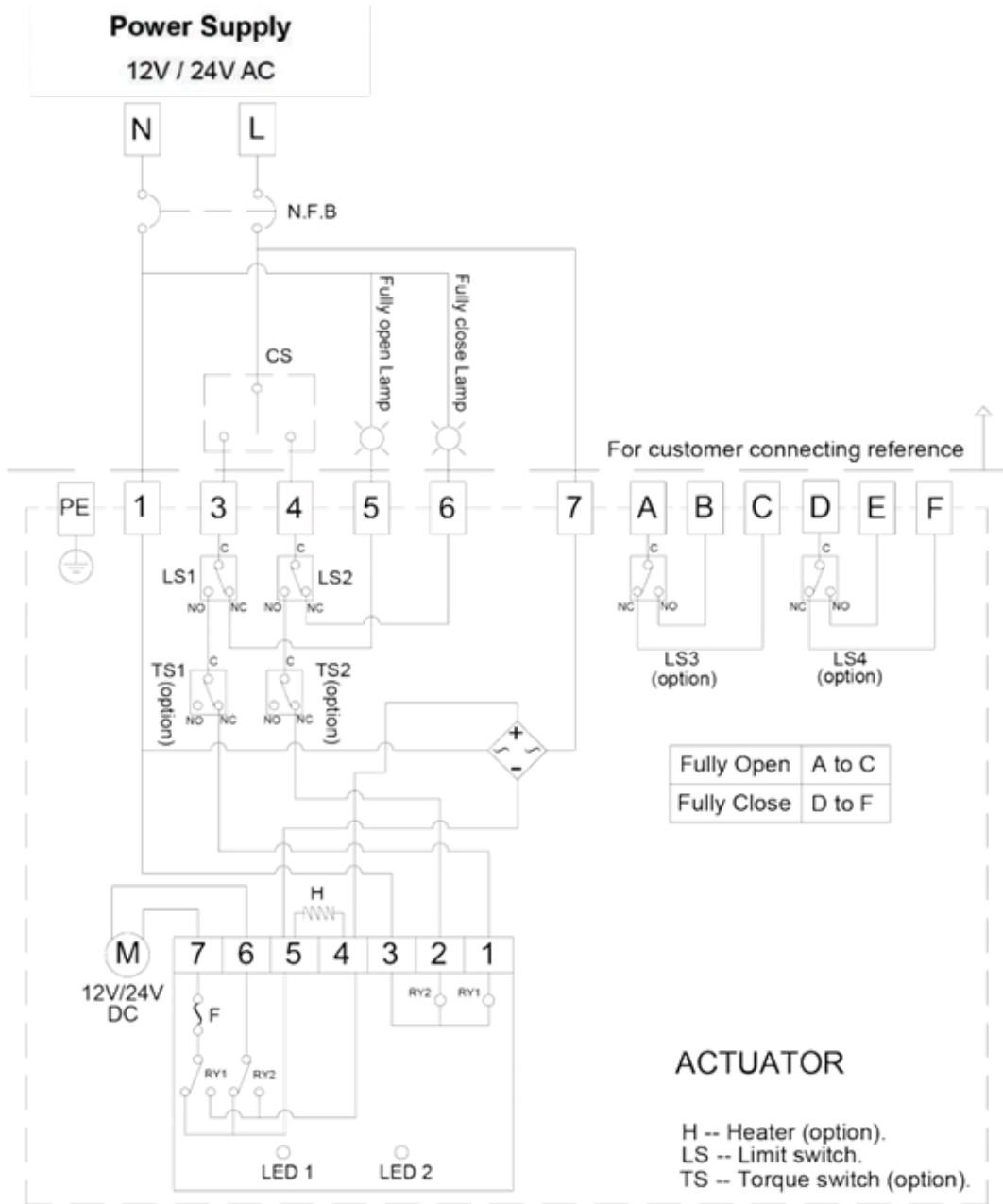


**NOTE:**

1. "+" connects to #1, "-" connects to #7
2. "-" connects to #3 for "OPEN", "-" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"
4. Using battery to supply power for DC units

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-6, 12V AC
- OM-2 to OM-12, OM-F, OM-G, 24V AC
- On-Off Controller

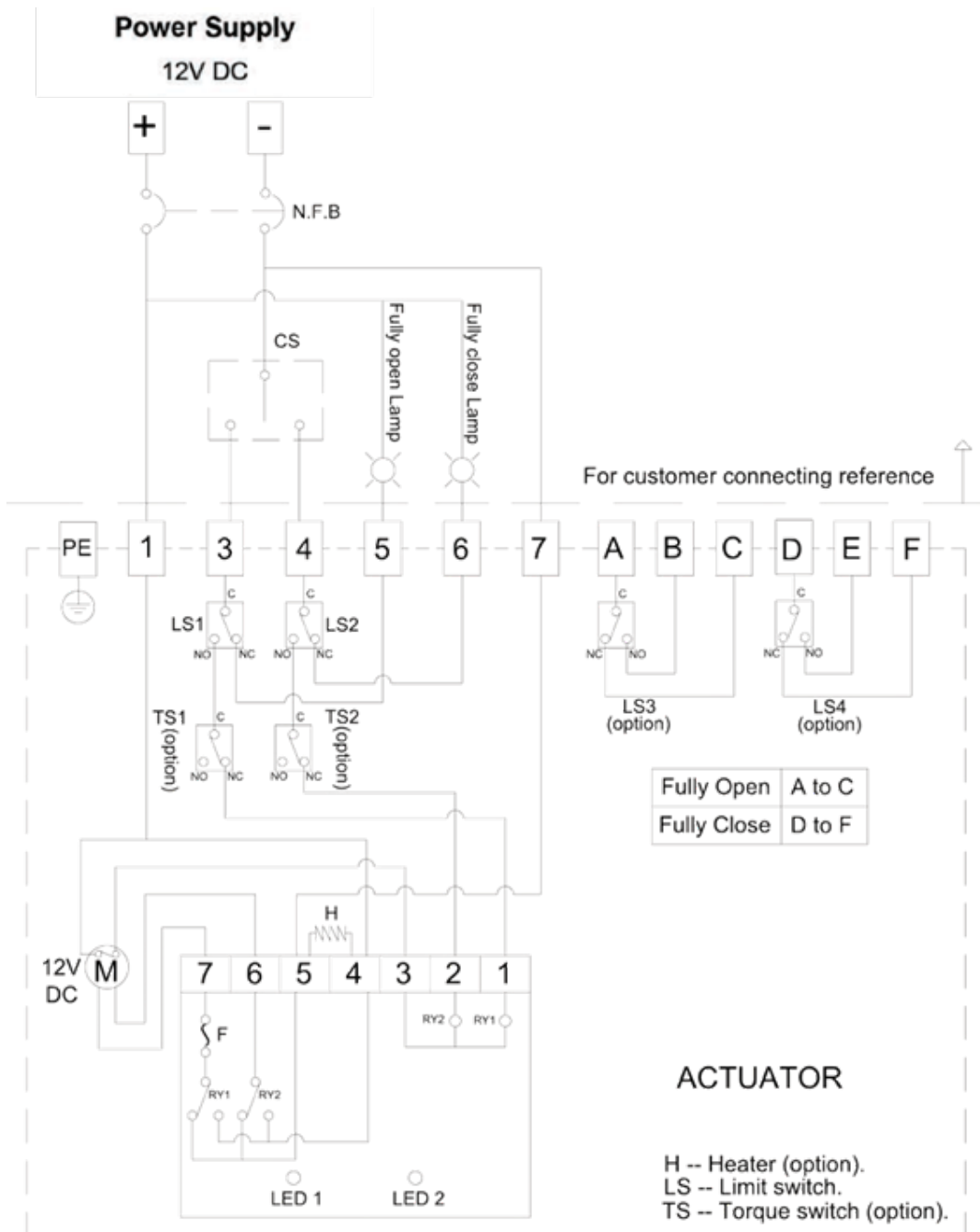


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-7 to OM-10, 12V DC
- On-Off Controller

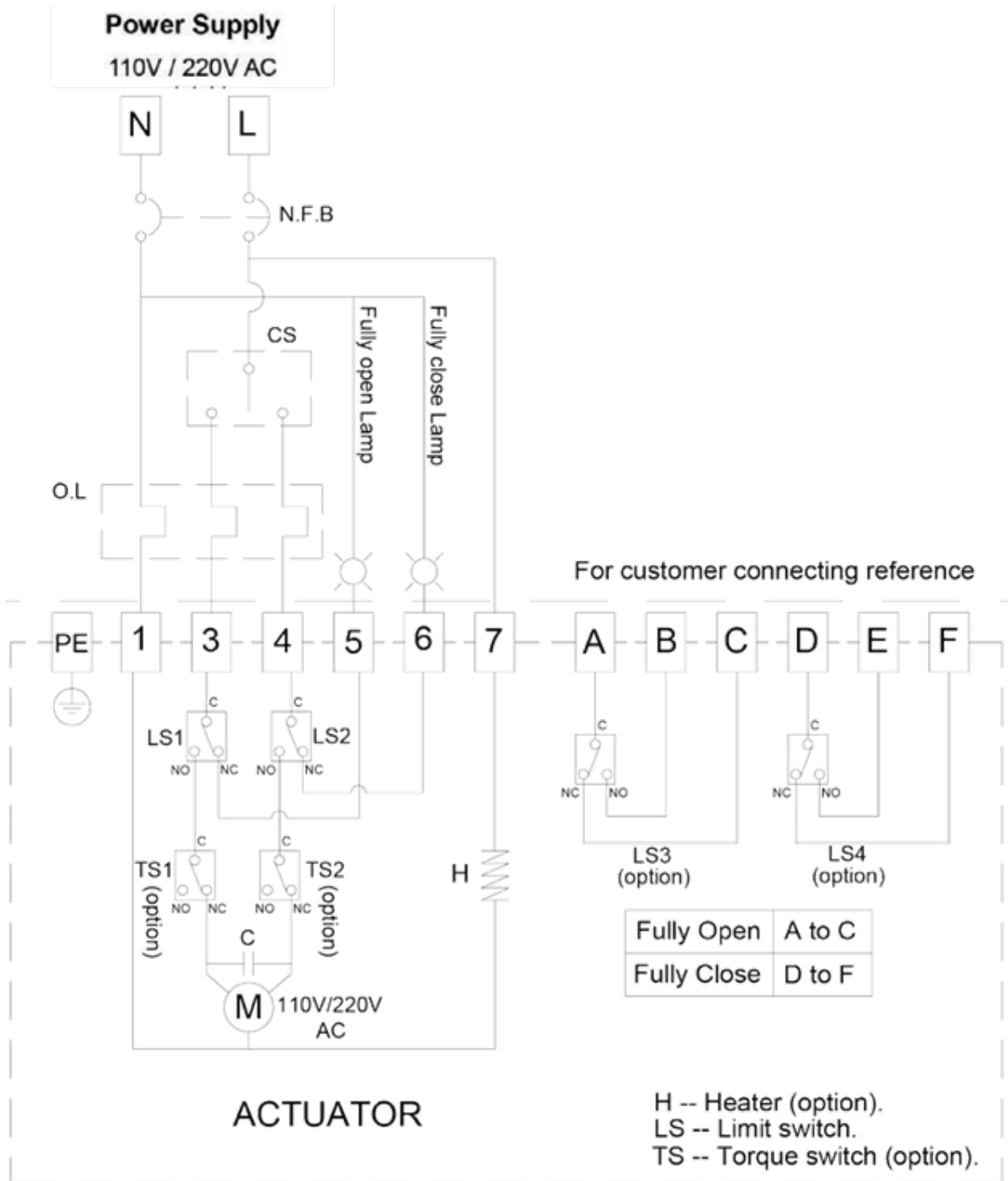


**NOTE:**

1. "+" connects to #1, "-" connects to #7
2. "-" connects to #3 for "OPEN", "-" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"
4. Using battery to supply power for DC units

## Wiring Diagram - Quarter Turn Actuator

- BM-2, OM-2 to OM-3, OM-F, OM-G, 110V, 220V AC 1-Phase
- On-Off Controller

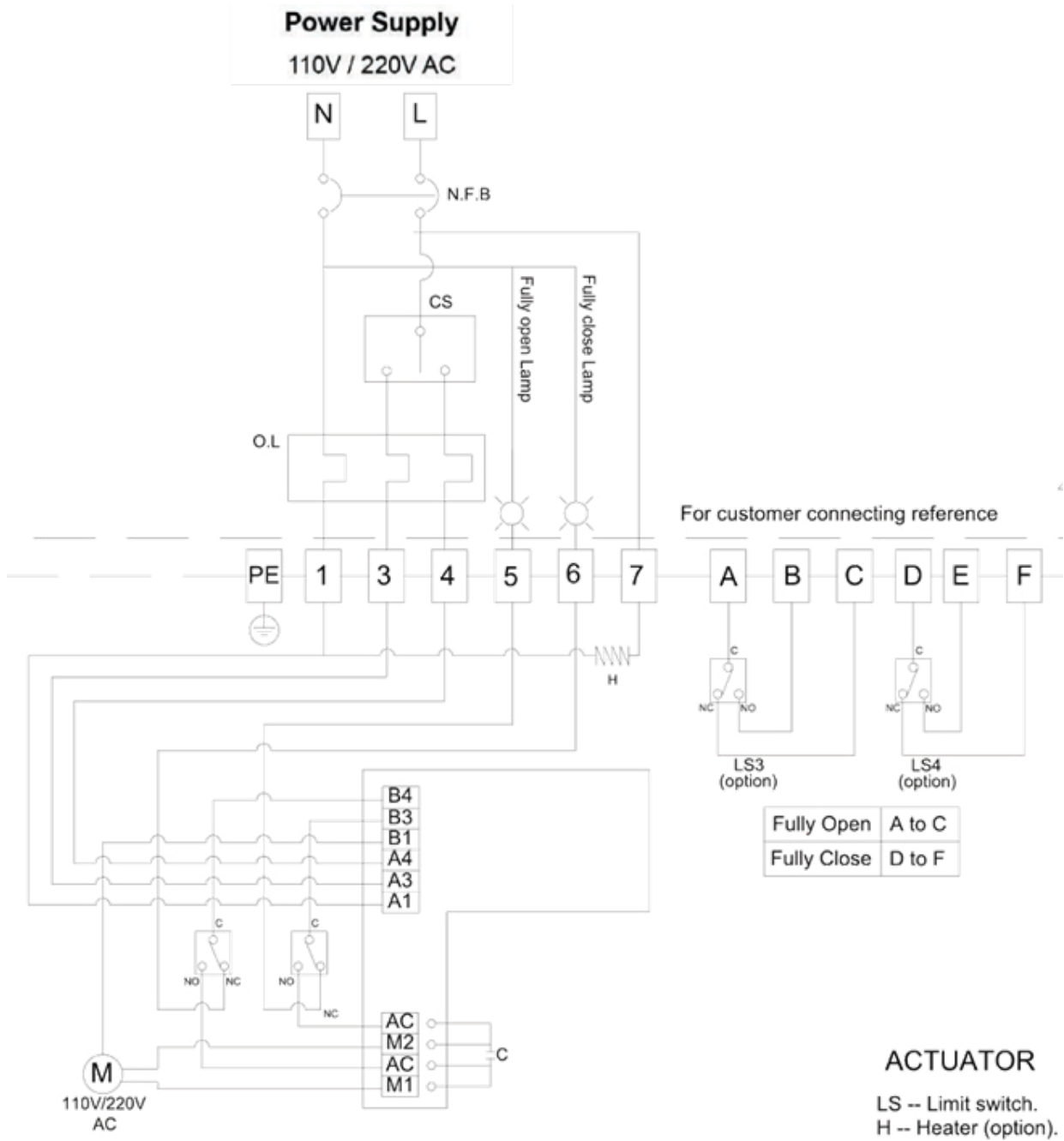


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"
4. BM-2 could not install torque switches

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-13, OM-F, OM-G, 110V, 220V AC 1-Phase
- On-Off Controller, Coupling Board

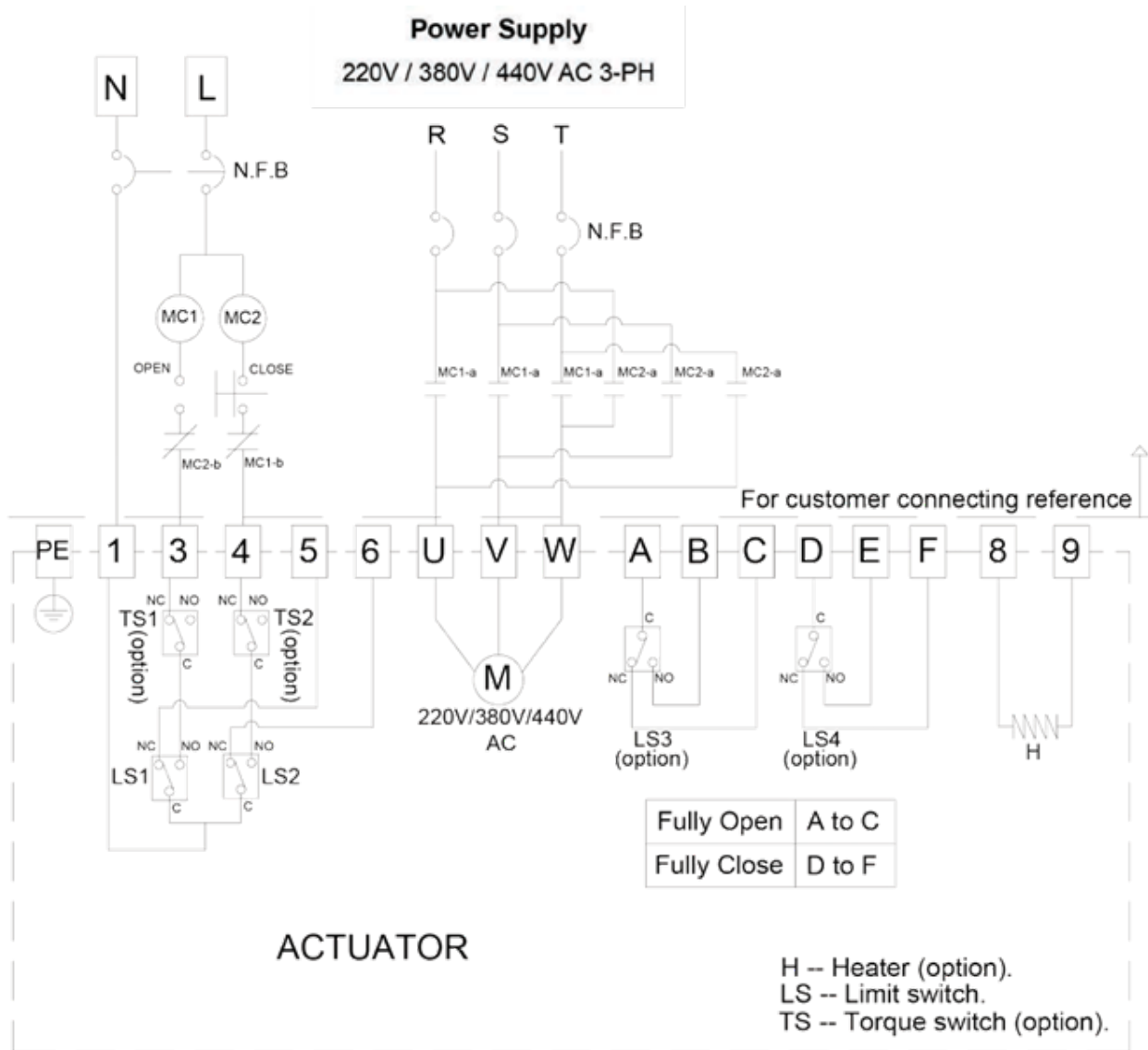


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"

# Wiring Diagram - Quarter Turn Actuator

- BM-2, OM-2 to OM-13, 220V, 380V, 440V AC 3-Phase
- On-Off Controller

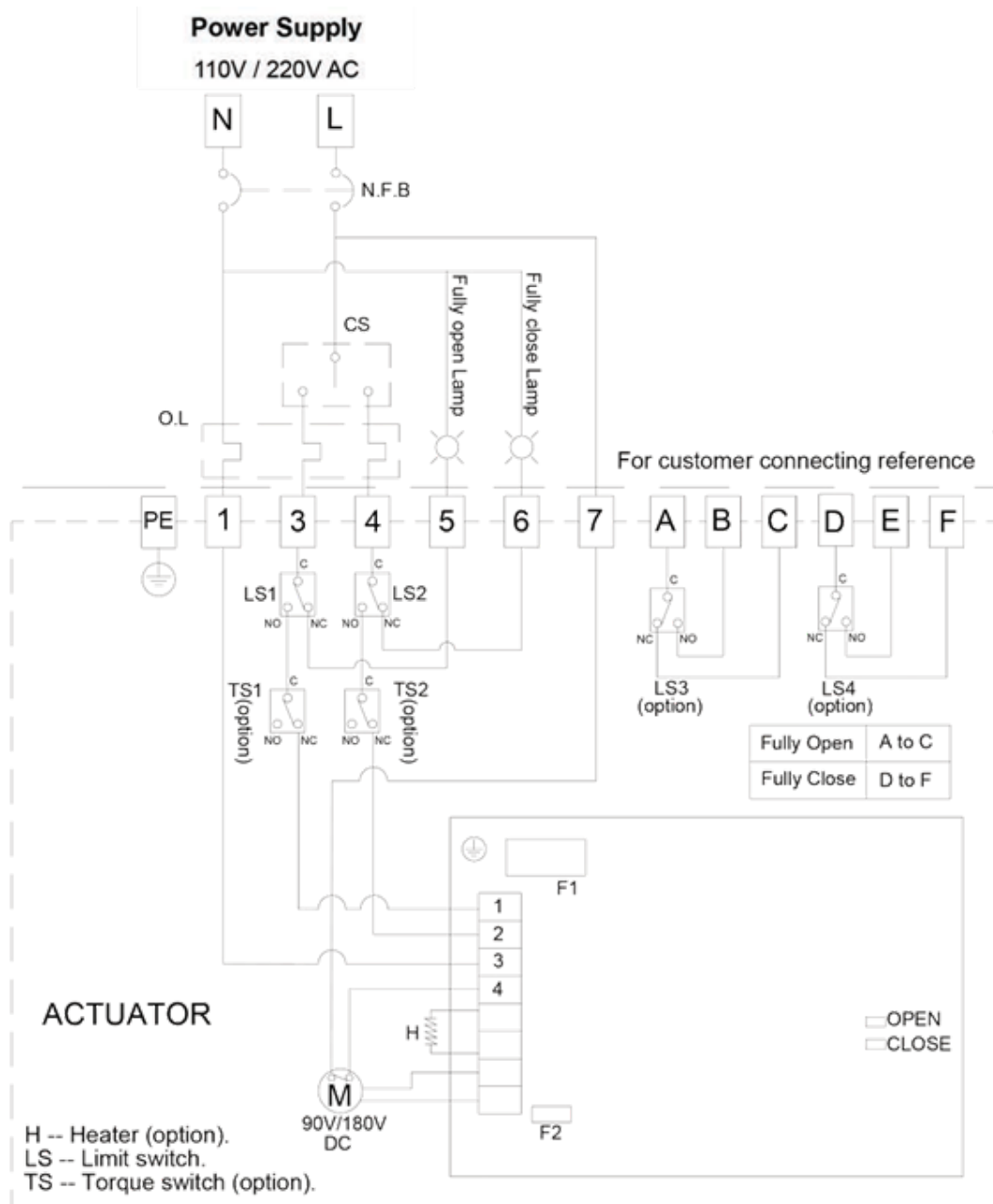


**NOTE:**

1. Using the handwheel to turn the actuator to 45° before test. If the operating direction is opposite after supplying power, please change any two of the U, V, W.
2. Using less than 5A current for "A, B, C, D, E, F"
3. BM-2 could not install torque switches

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-8, 110V, 220V AC 1-Phase
- On-Off Controller, 75% duty cycle

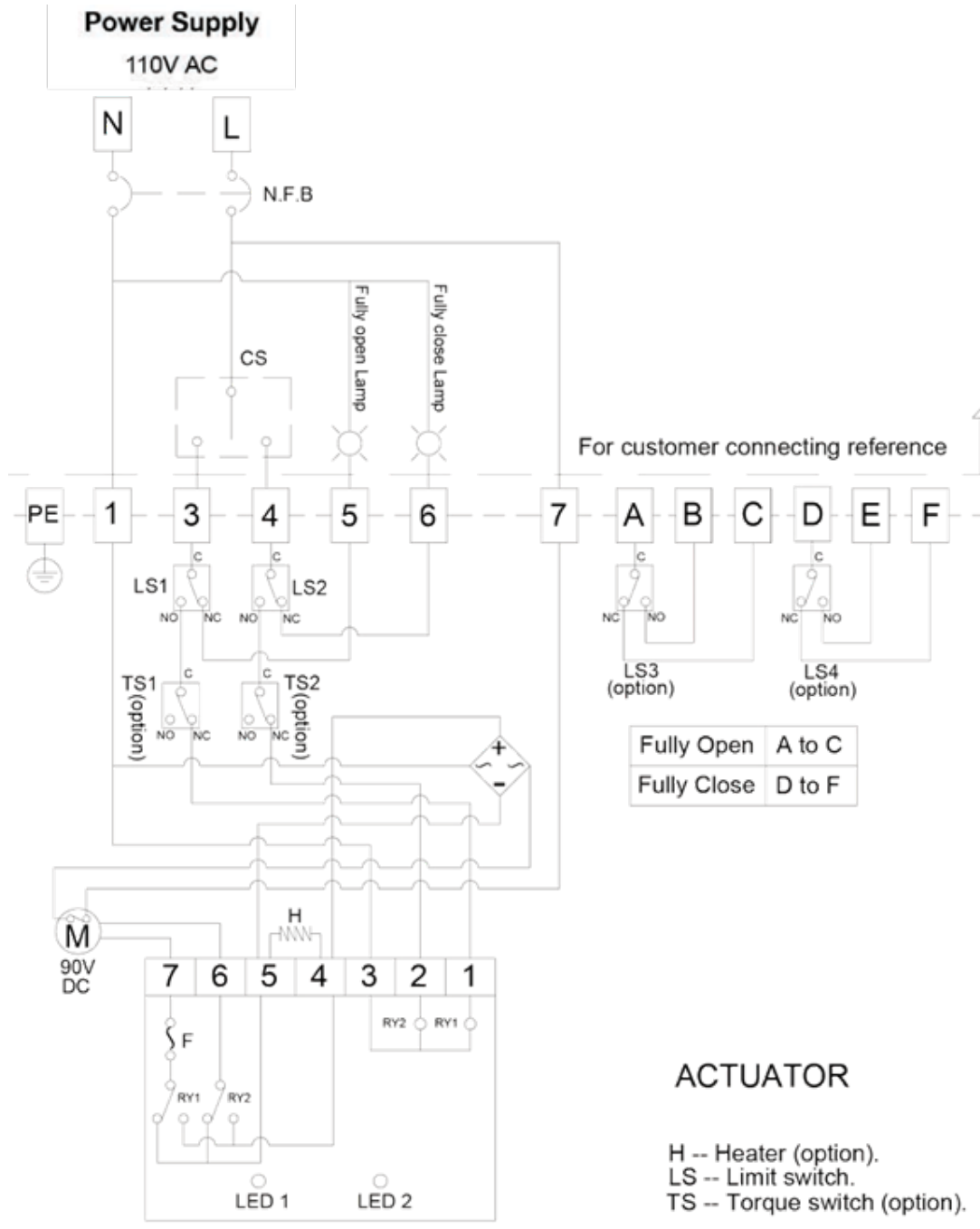


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-9 to OM-13, 110V AC 1-Phase
- On-Off Controller, 50% duty cycle



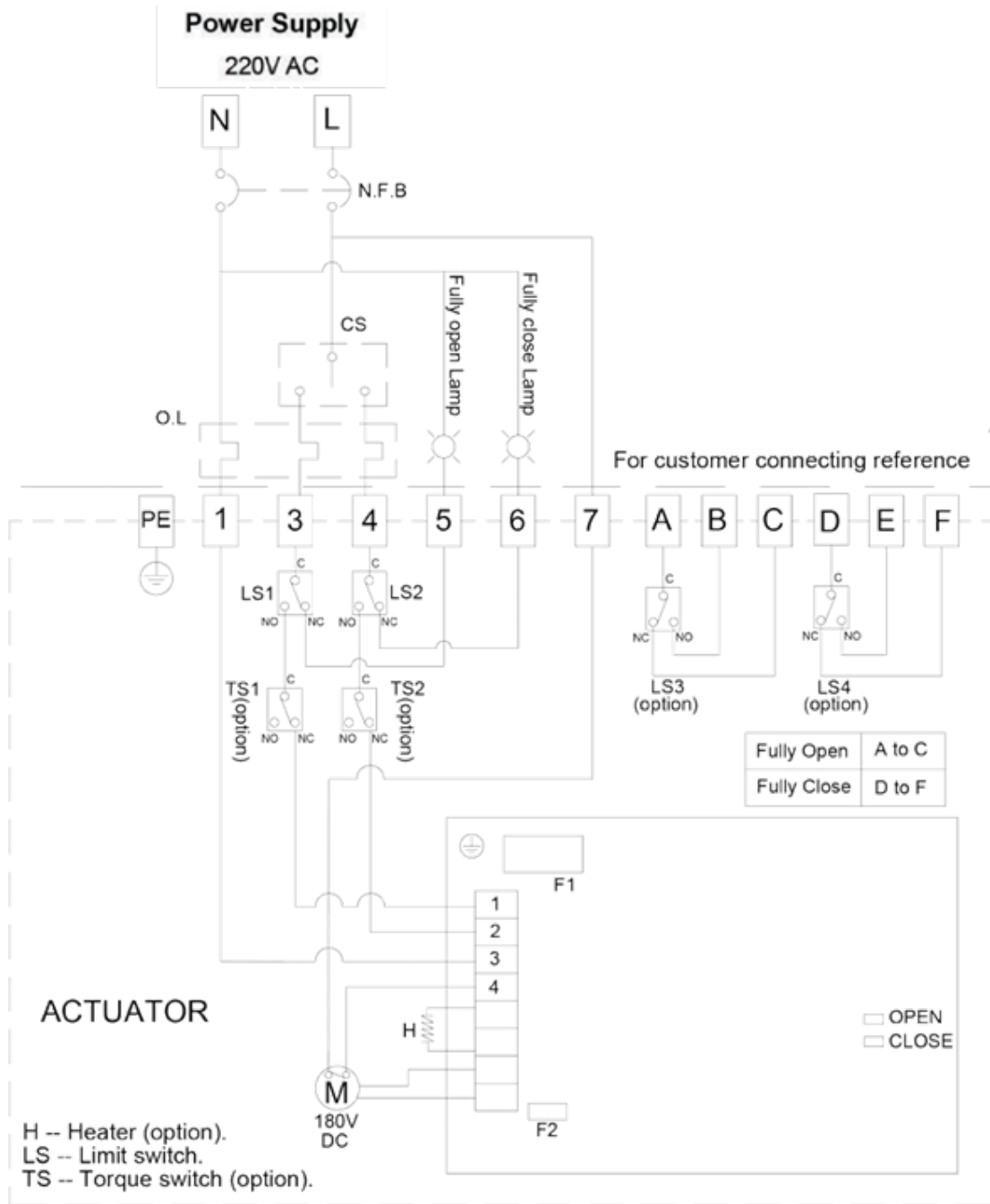
**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"



## Wiring Diagram - Quarter Turn Actuator

- OM-9 to OM-13, 110V AC 1-Phase
- On-Off Controller, 50% duty cycle

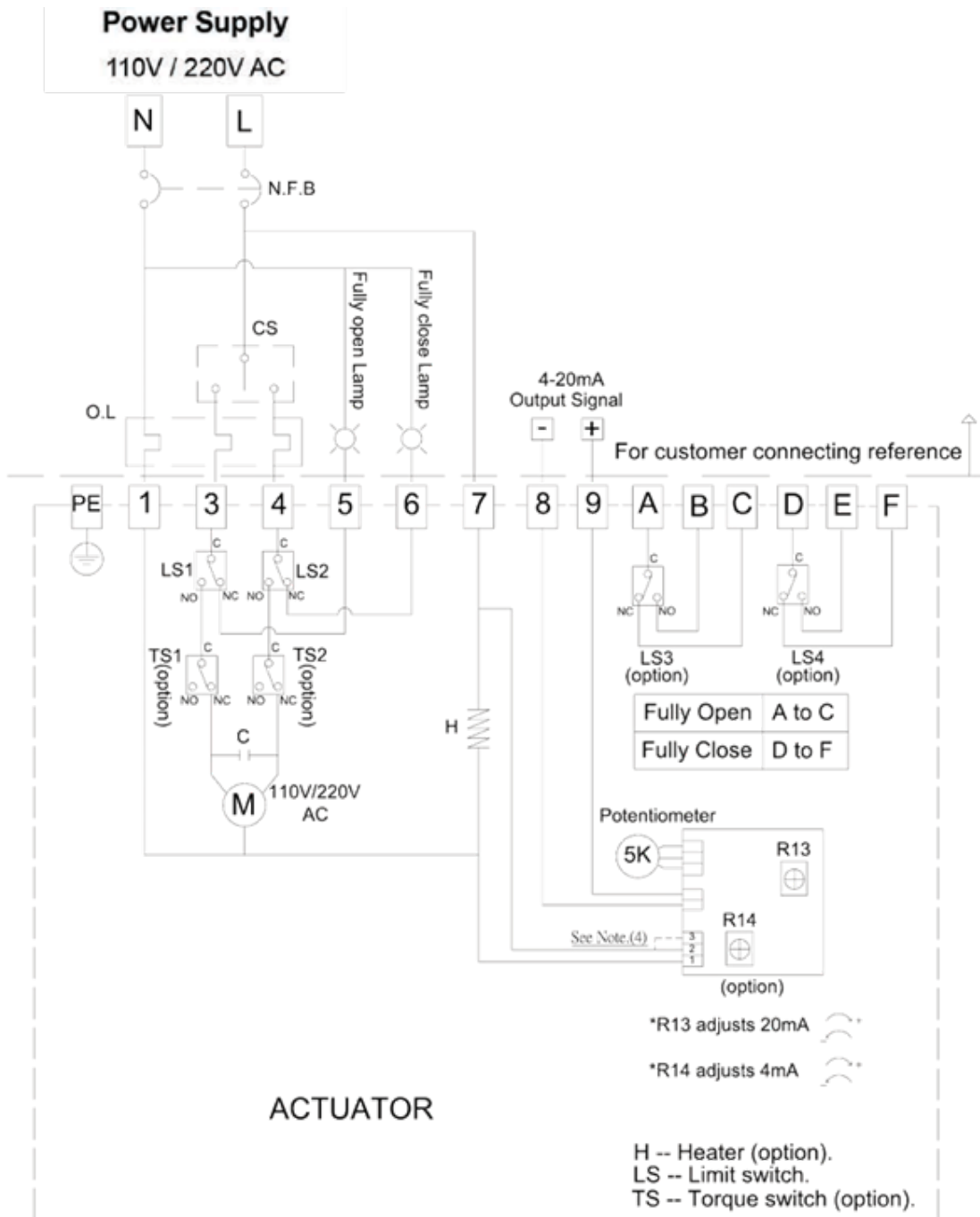


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-13, 110V, 220V AC 1-Phase
- On-Off Controller, Analog Signal Output

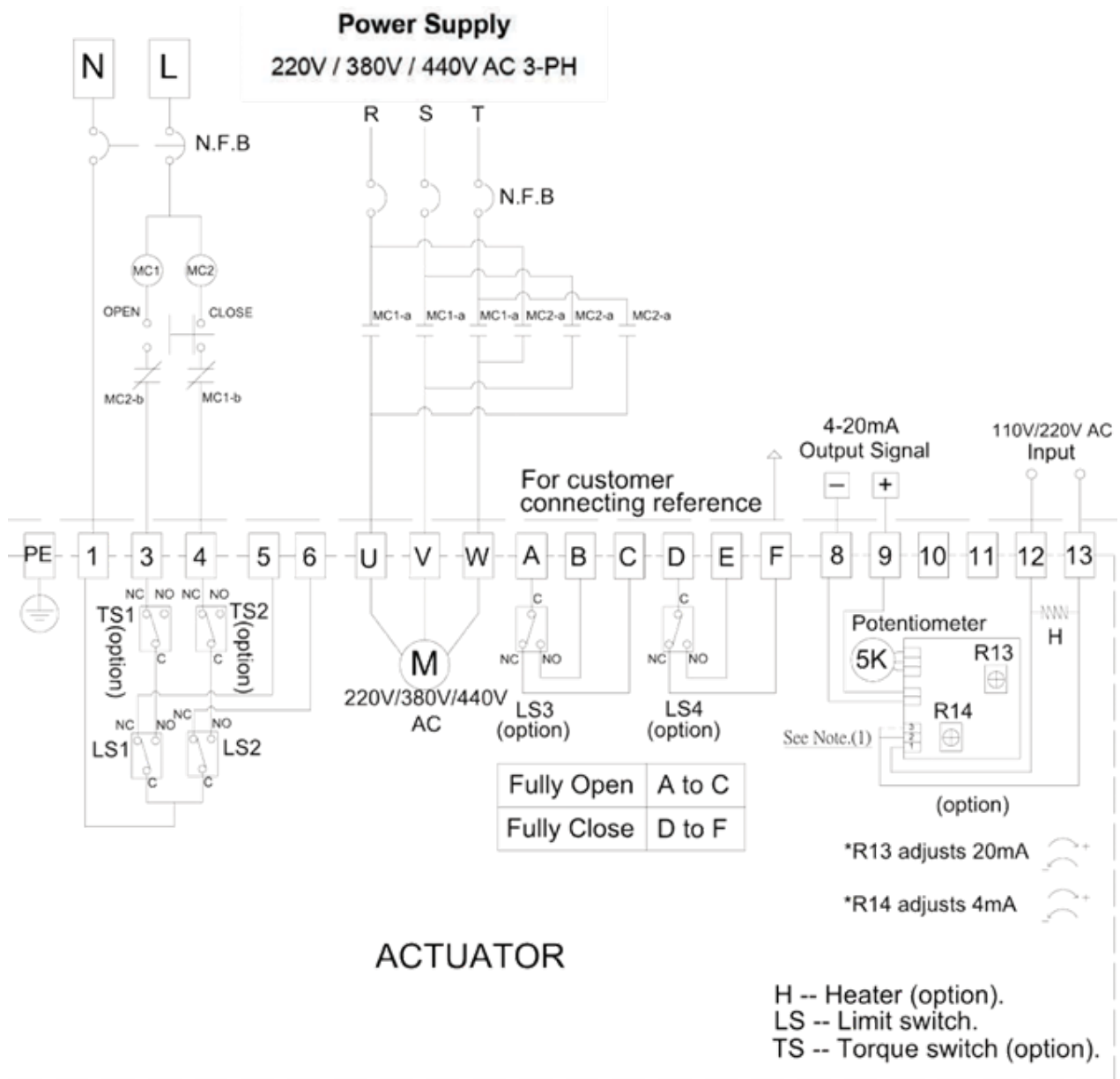


**NOTE:**

1. "N" connects to #1, "L" connects to #7
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE"
3. Using less than 5A current for "A, B, C, D, E, F"
4. If the control power is 220V AC, N & L connect to #1 & #3
5. If the control power is 110V AC, N & L connect to #1 & #2 or #2 & #3

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-13, 220V, 380V, 440V AC 3-Phase
- On-Off Controller, Analog Signal Output

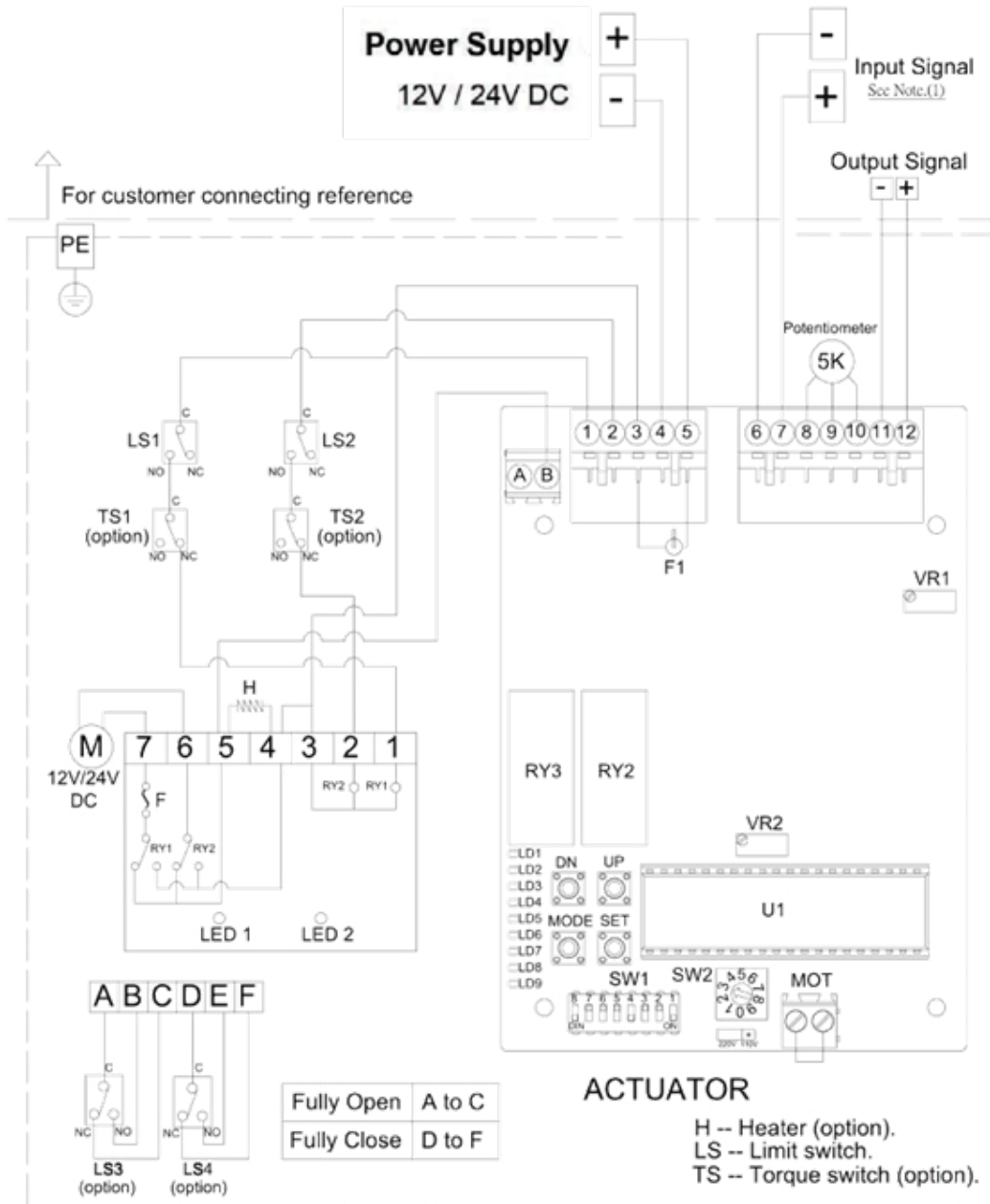


**NOTE:**

1. If the control power is 220V, N & L connect to #1 & #3  
If the control power is 110V AC, N & L connect to #1 & #2 or #2 & #3
2. Using the handwheel to turn the actuator to 45° before test. If the operating direction is opposite after supplying power, please change any two of the U, V, W
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-6 110V, 12V DC
- OM-2 to OM-12, OM-F, OM-G, 24V DC
- Modulating Controller

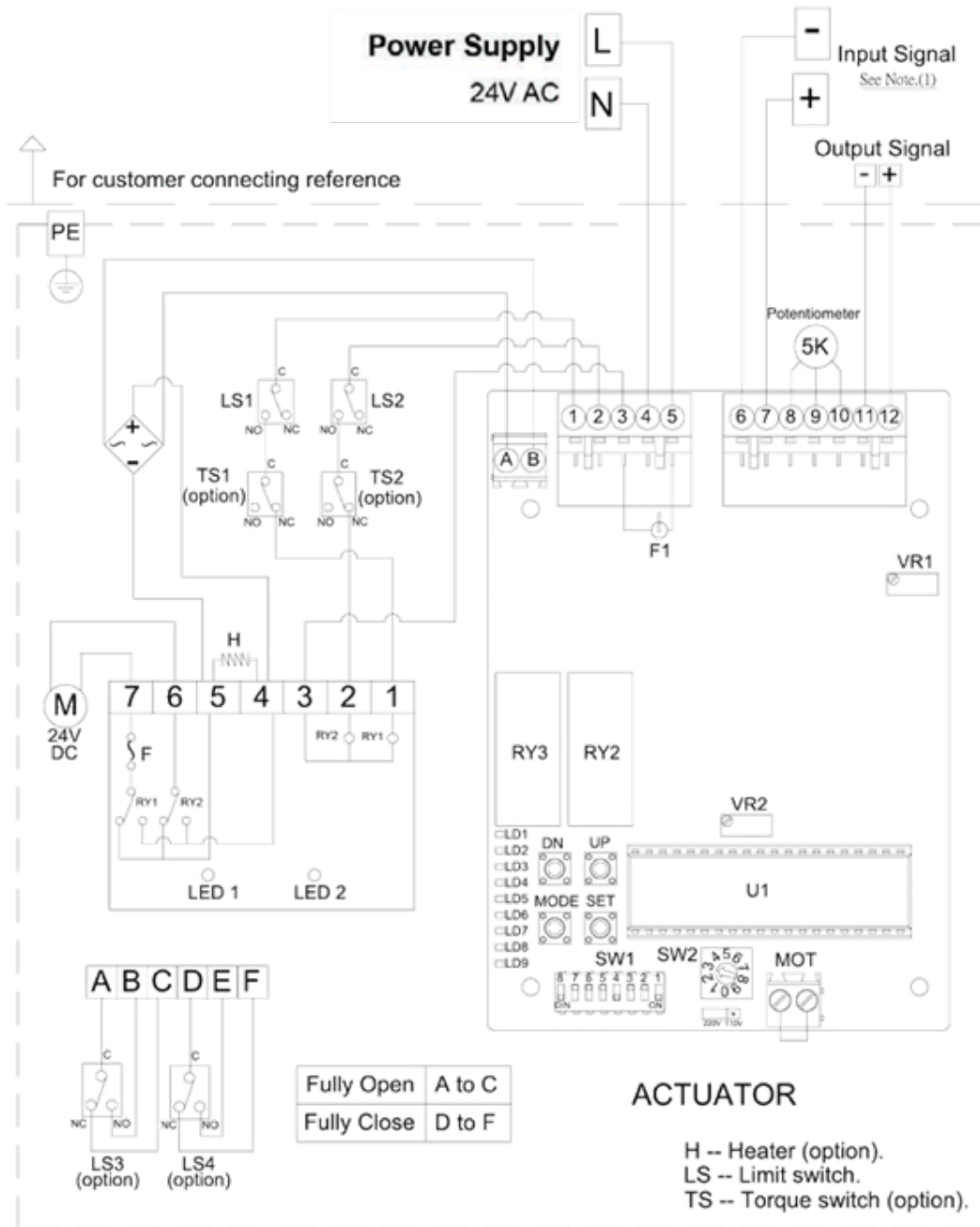


**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 5A current for "A, B, C, D, E, F"
3. Using battery to supply power for DC units

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-12, OM-F, OM-G, 24V AC
- Modulating Controller

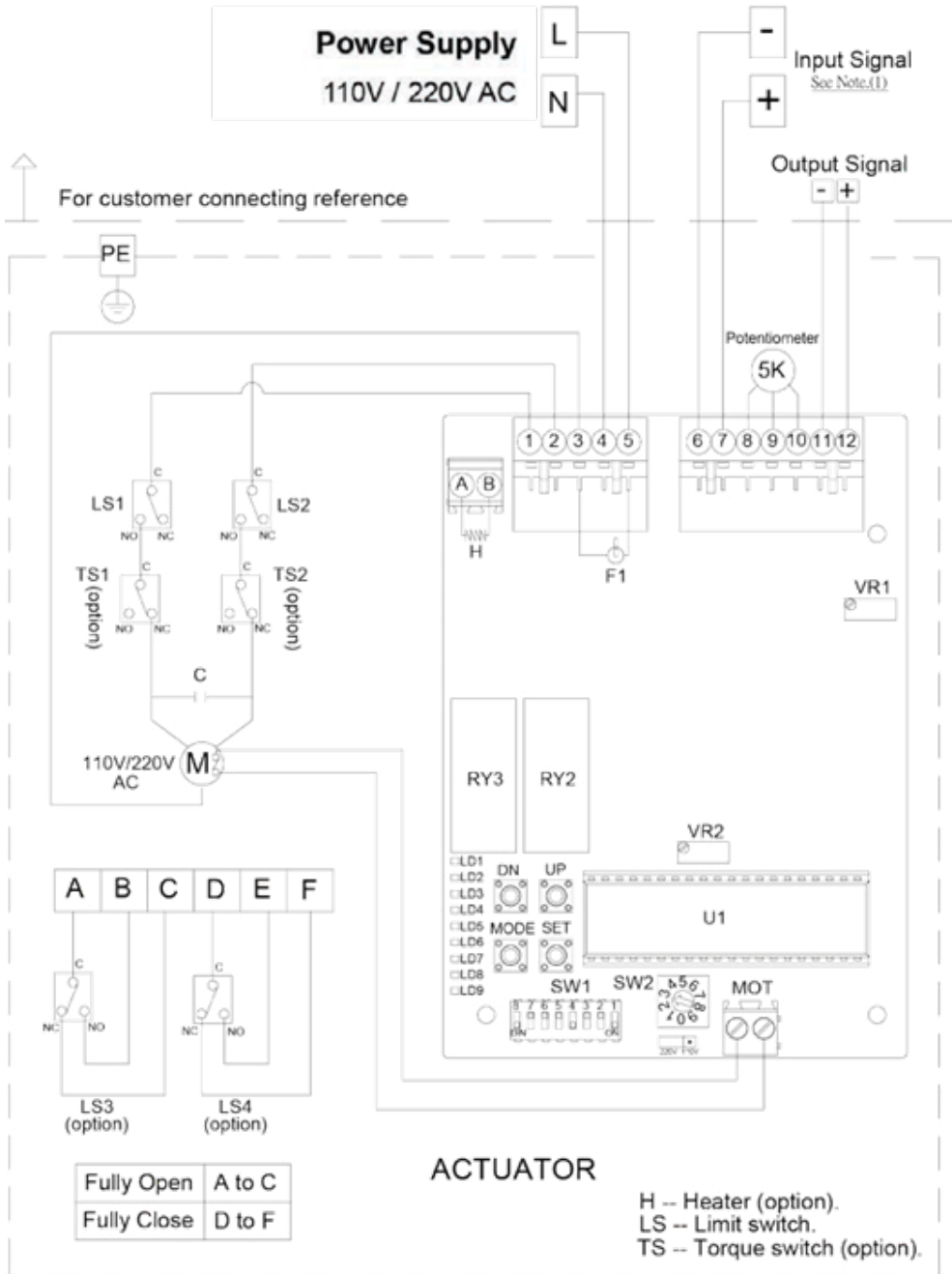


**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
 It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-8, OM-F, OM-G, 110V, 220V AC 1-Phase
- Modulating Controller

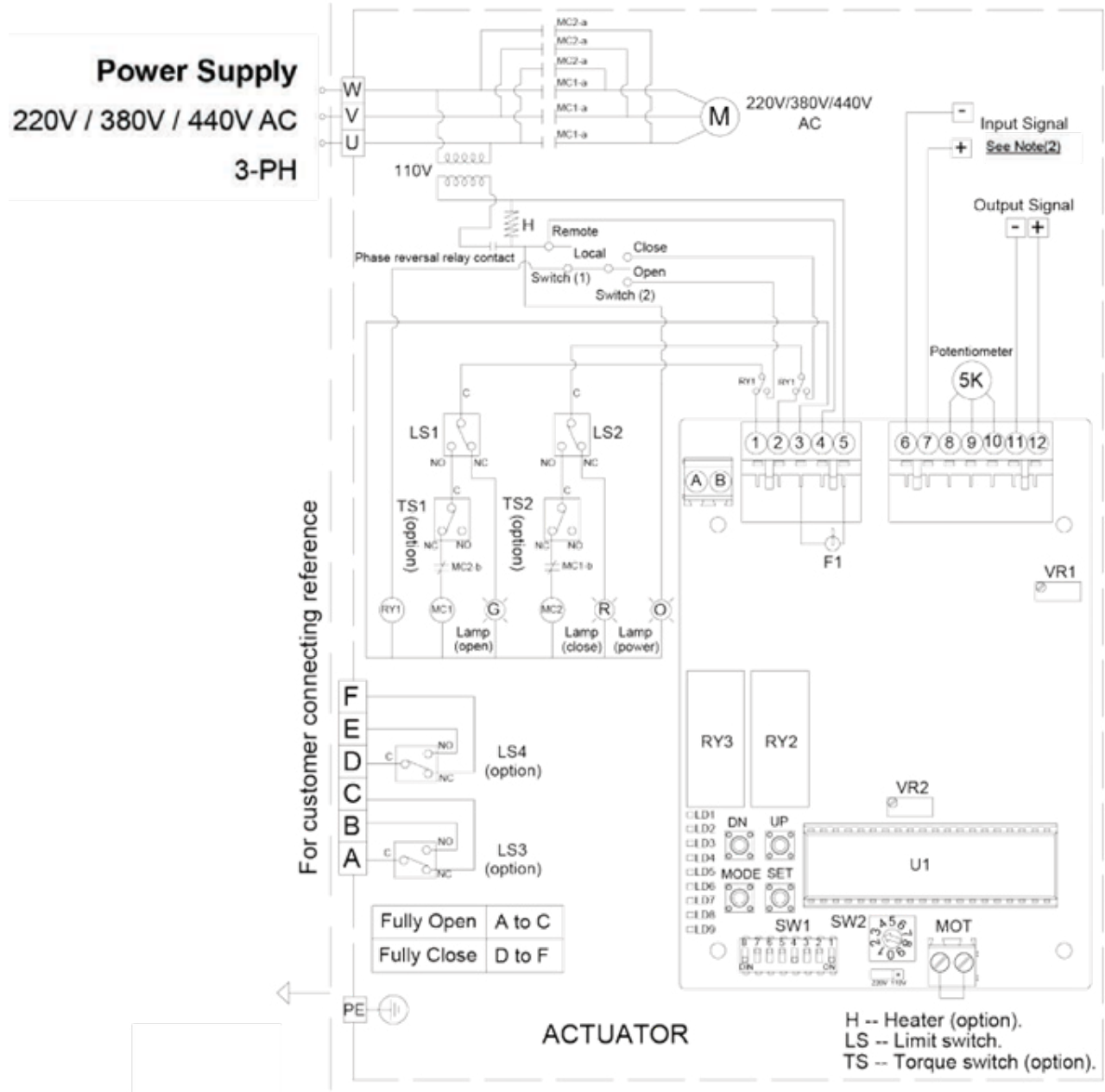


**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-13, 220V, 380V, 440V AC 3-Phase
- Modulating Controller

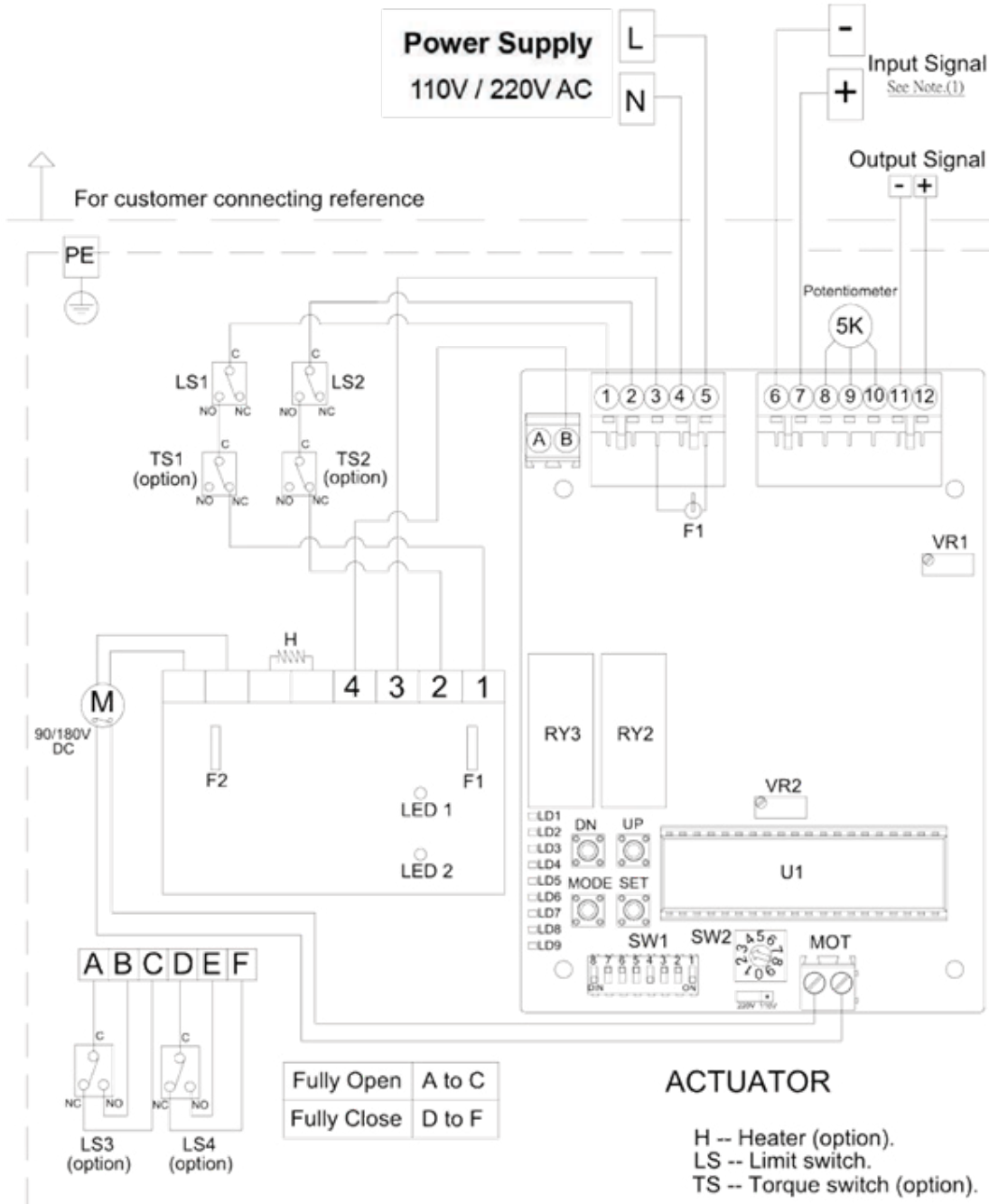


**NOTE:**

1. Please change any two of the U, V, W when the power lamp is off
2. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m.
  - b. Output signal: 4 to 20mA, 2 to 10V
3. Local/Remote Switches
  - a. Select "Remote": Controlled by signal
  - b. Select "Local": Controlled by switch (2)
4. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-8, 110V, 220V AC 1-Phase
- Modulating Controller, 75% duty cycle



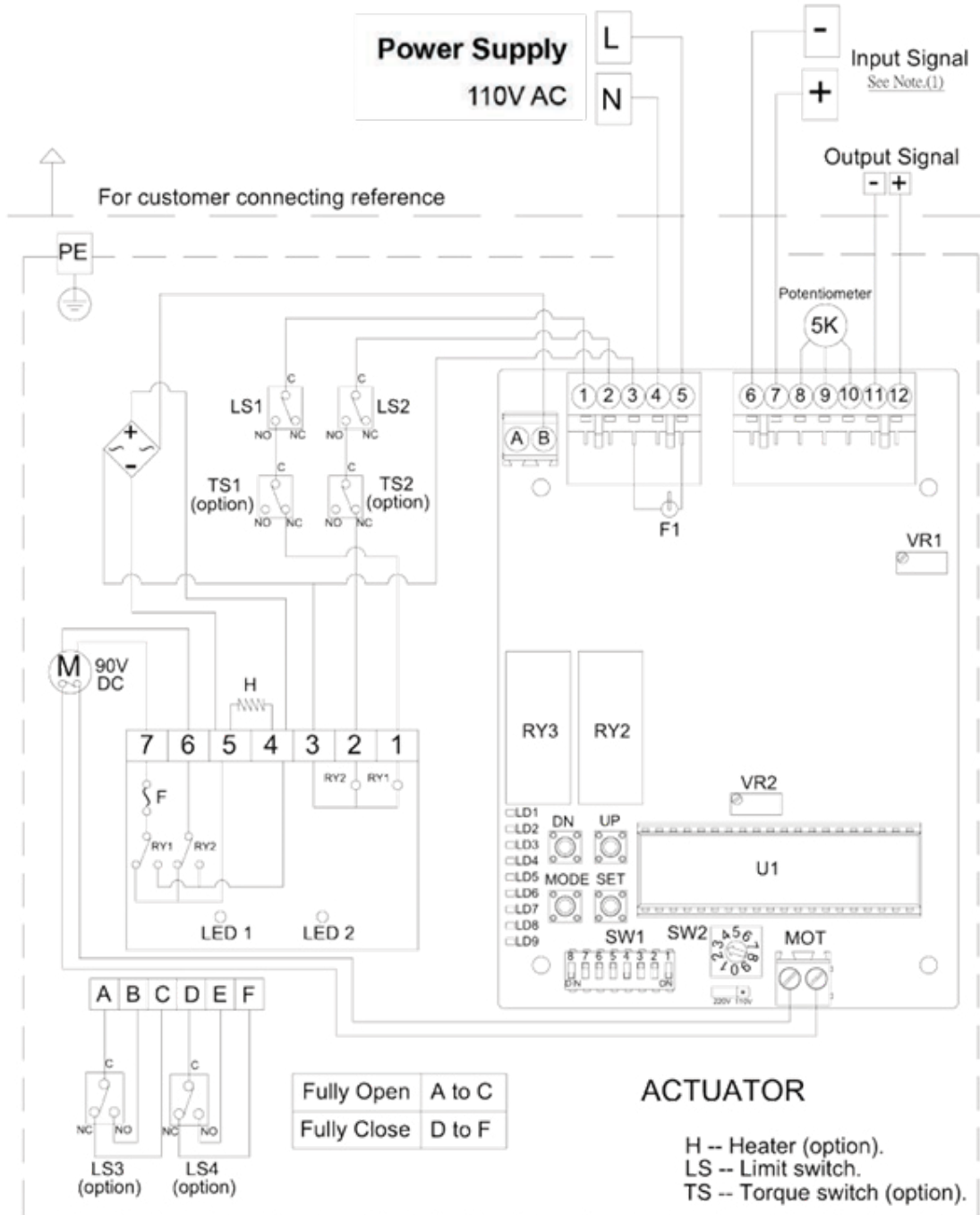
**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 5A current for "A, B, C, D, E, F"



## Wiring Diagram - Quarter Turn Actuator

- OM-9 to OM-13, 110V AC 1-Phase
- Modulating Controller, 50% duty cycle

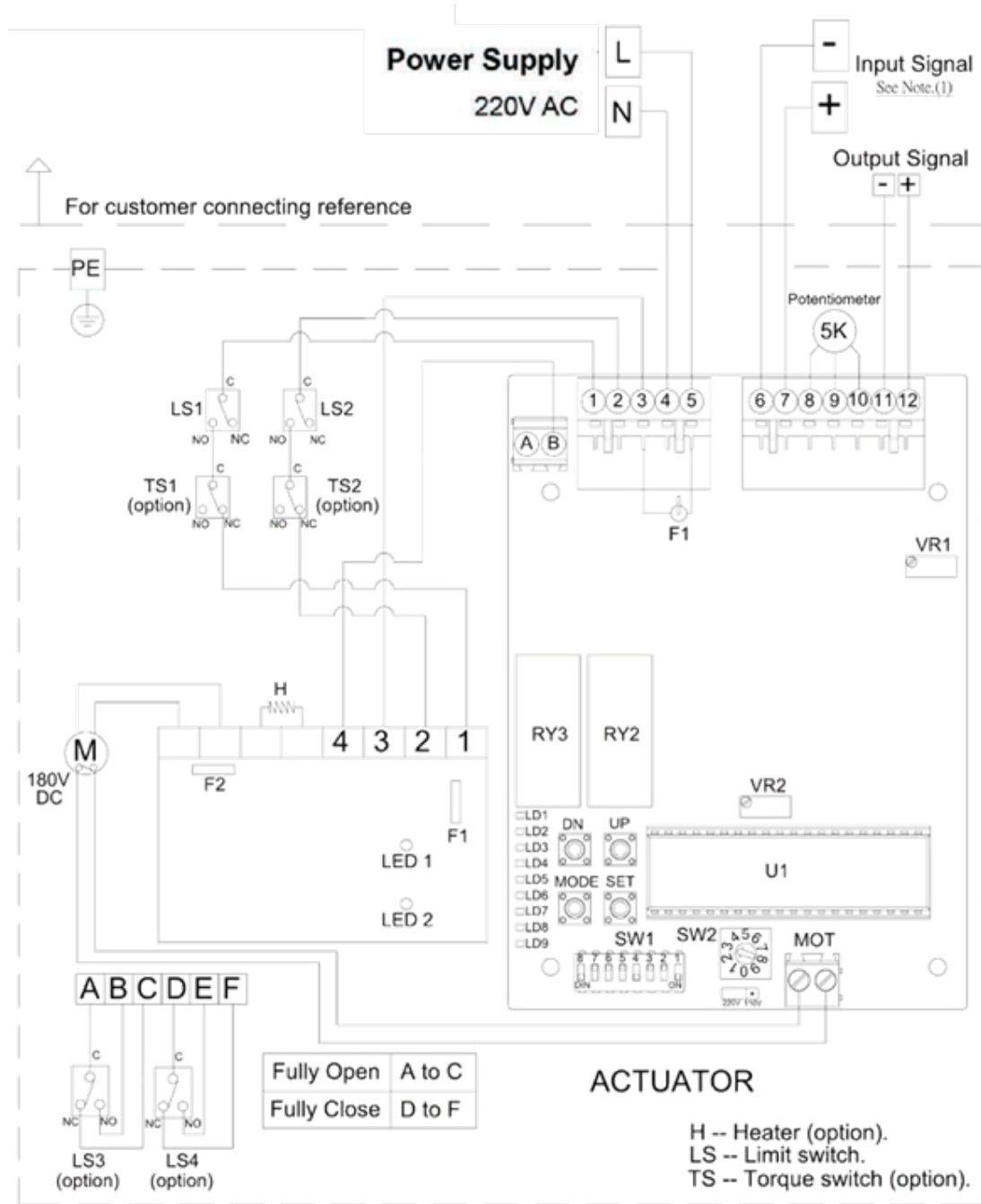


**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-9 to OM-13, 220V AC 1-Phase
- Modulating Controller, 50% duty cycle

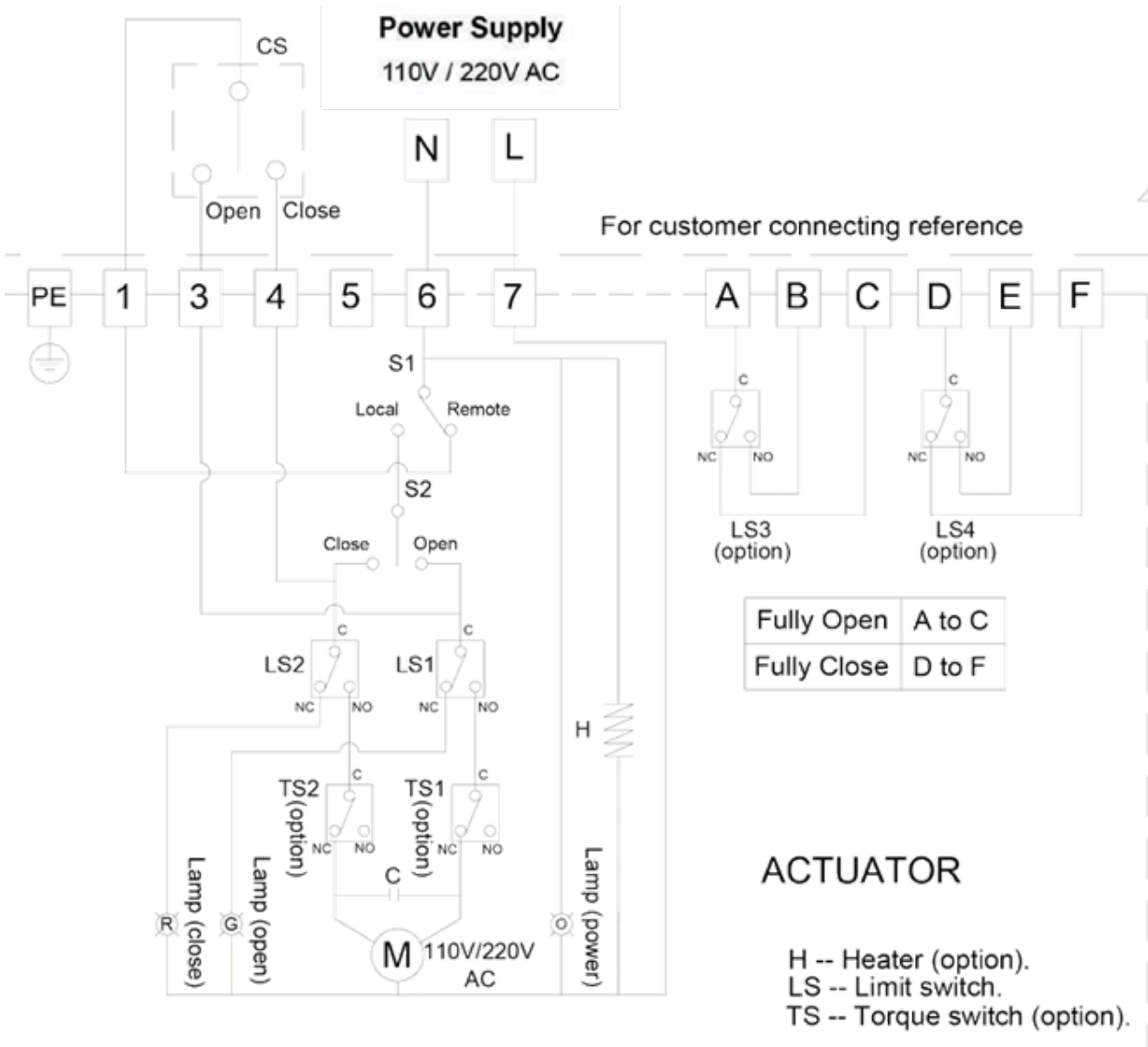


**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-13, 110V, 220V AC 1-Phase
- On-Off Controller, Local Control Unit

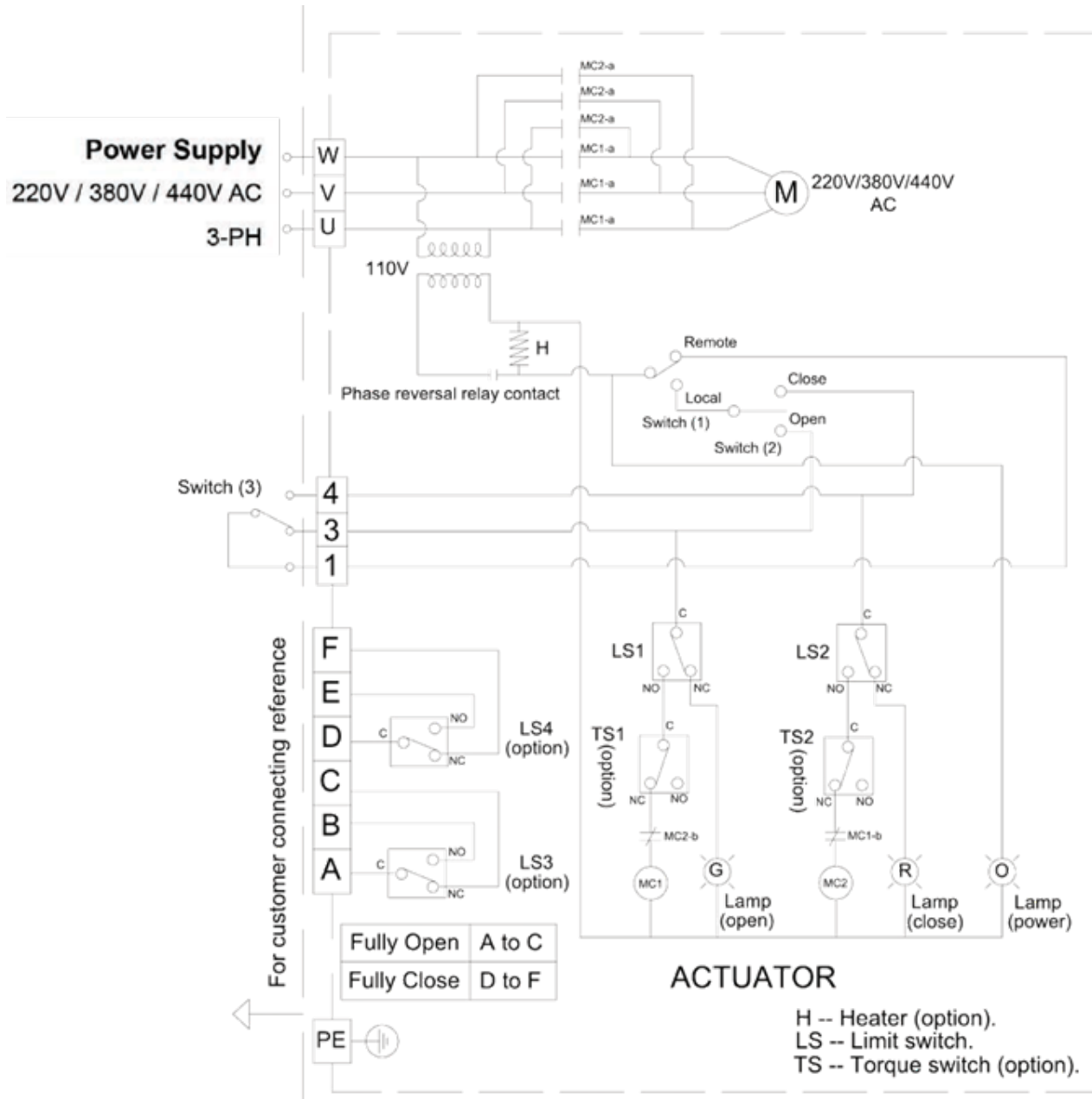


**NOTE:**

1. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-13, 220V, 380V, 440V AC 3-Phase
- On-Off Controller, Local Control Unit

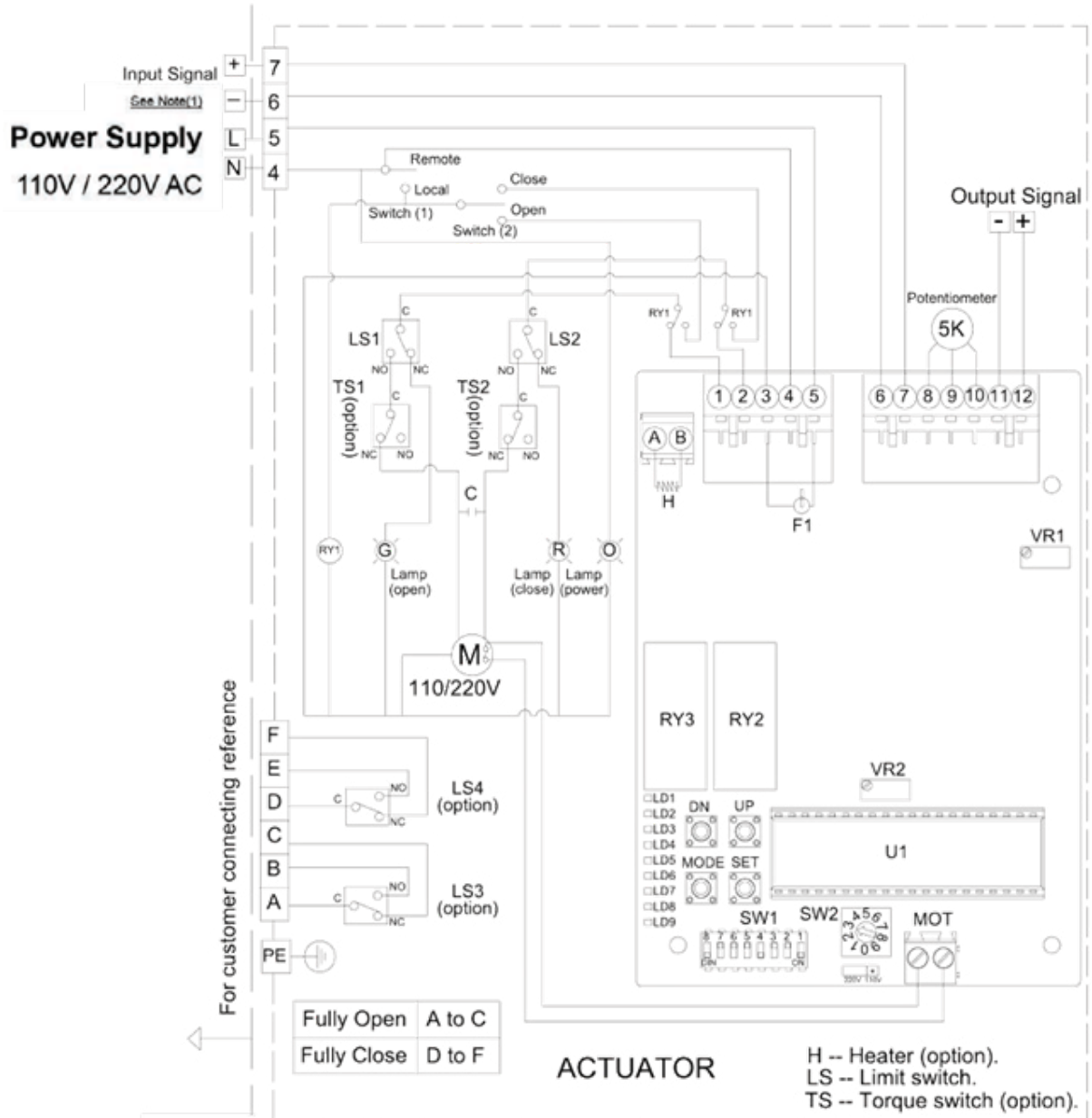


**NOTE:**

1. Please change any two of the U, V, W when the power lamp is off
2. Switch (3) is the switch of remote control (provided by user)
  - a. Connecting #1 & #3 for OPEN
  - b. Connecting #1 & #4 for CLOSE
  - c. #1, #3, #4 cannot connect together at the same time
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-8, 110V, 220V AC 1-Phase
- Modulating Controller, Local Control Unit

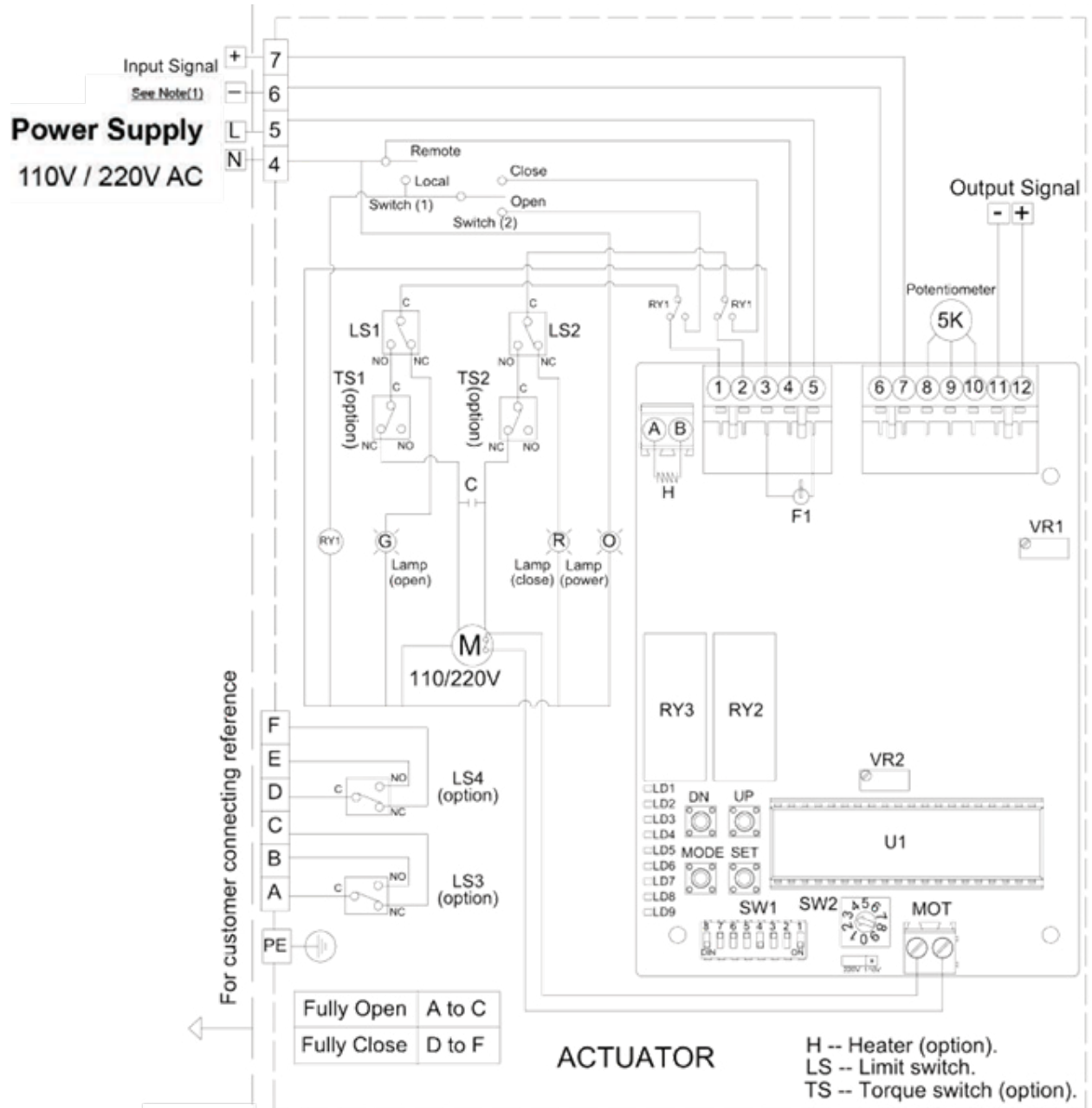


**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Local/Remote Switches
  - a. Select "Remote": Controlled by signal
  - b. Select "Local": Controlled by switch (2)
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-8, 110V, 220V AC 1-Phase
- Modulating Controller, Local Control Unit, 75% duty cycle

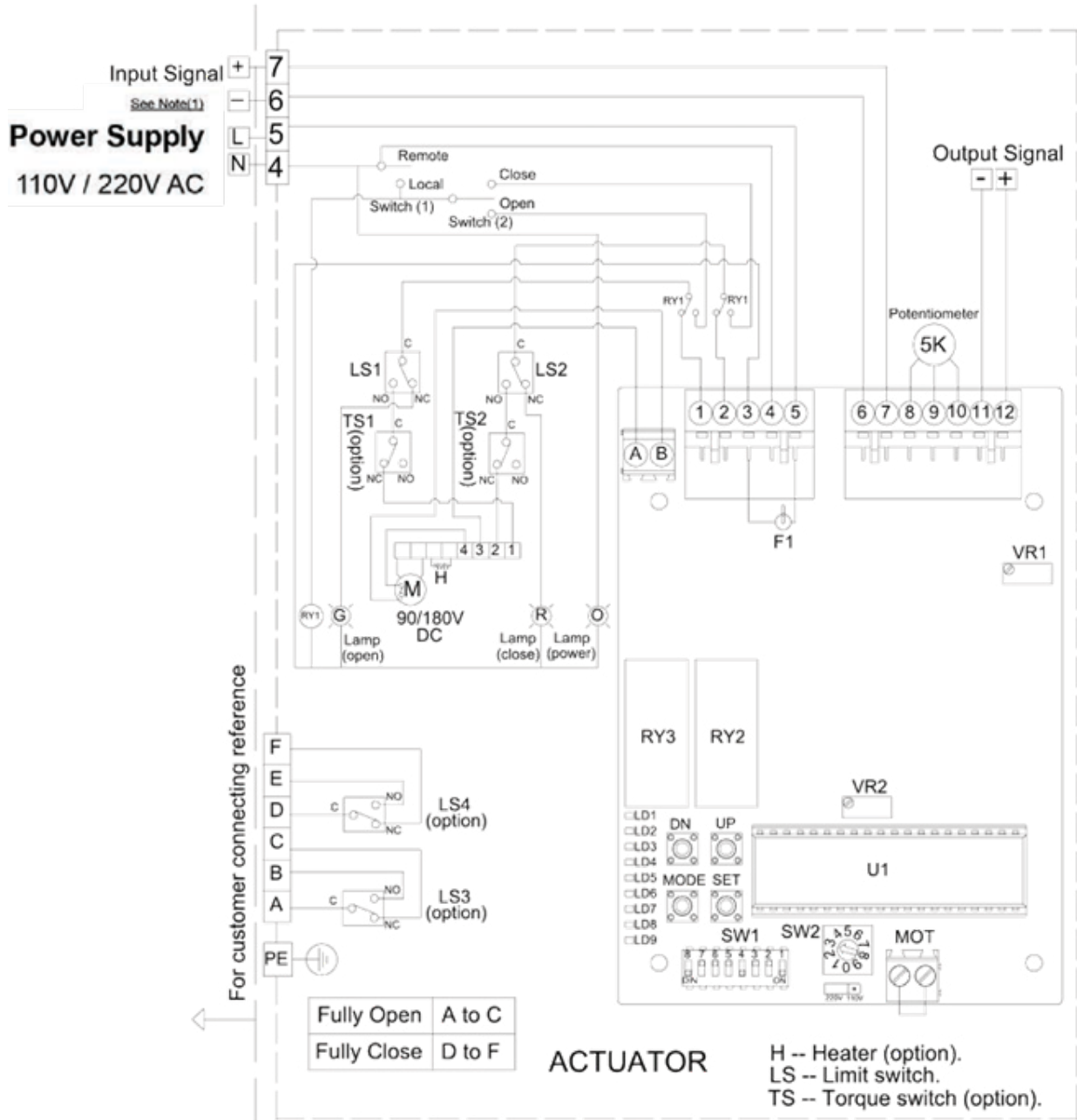


**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Local/Remote Switches
  - a. Select "Remote": Controlled by signal
  - b. Select "Local": Controlled by switch (2)
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-9 to OM-13, 110V AC 1-Phase
- Modulating Controller, Local Control Unit, 50% duty cycle

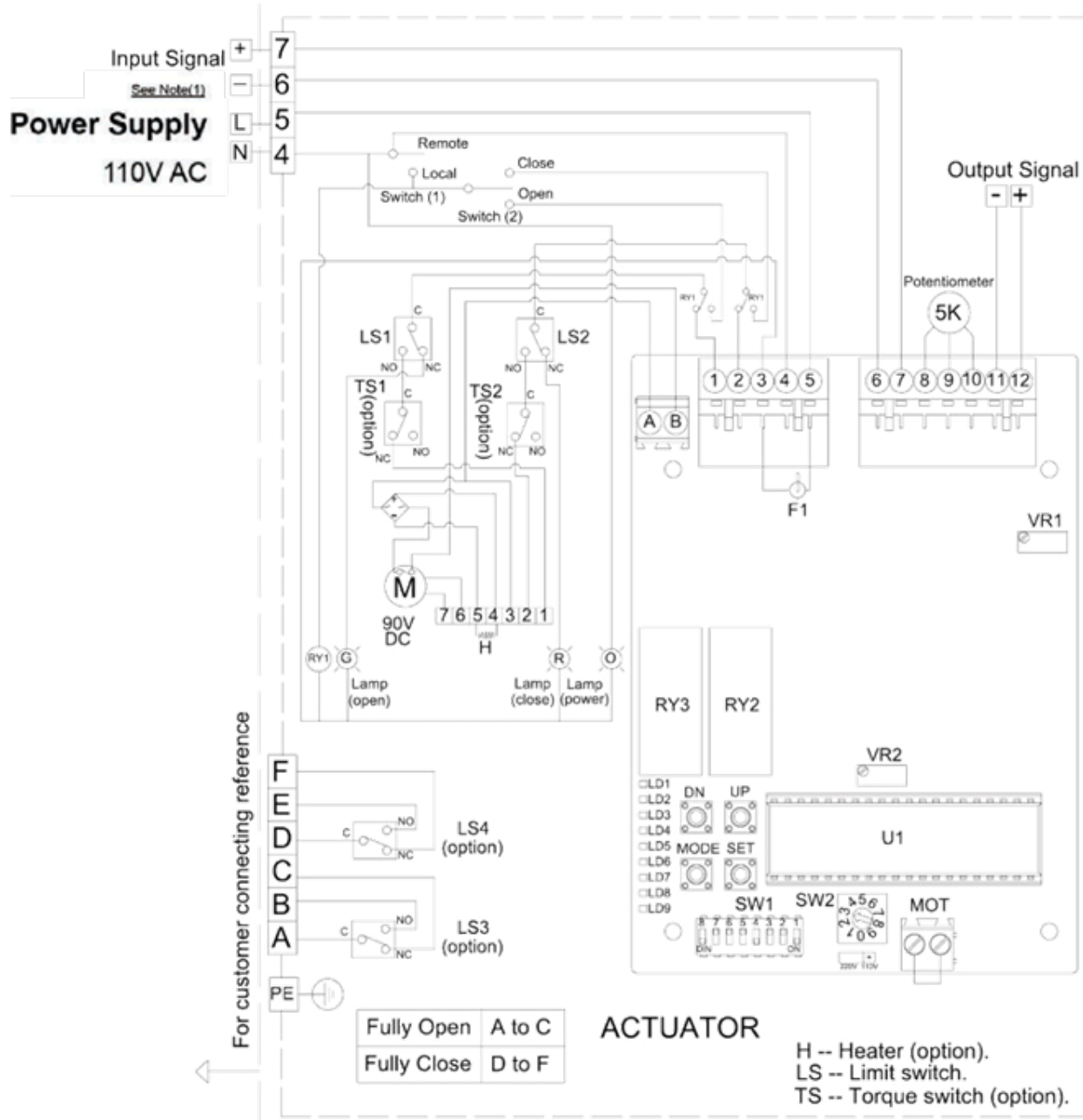


**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Local/Remote Switches
  - a. Select "Remote": Controlled by signal
  - b. Select "Local": Controlled by switch (2)
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- OM-9 to OM-13, 220V AC 1-Phase
- Modulating Controller, Local Control Unit, 50% duty cycle



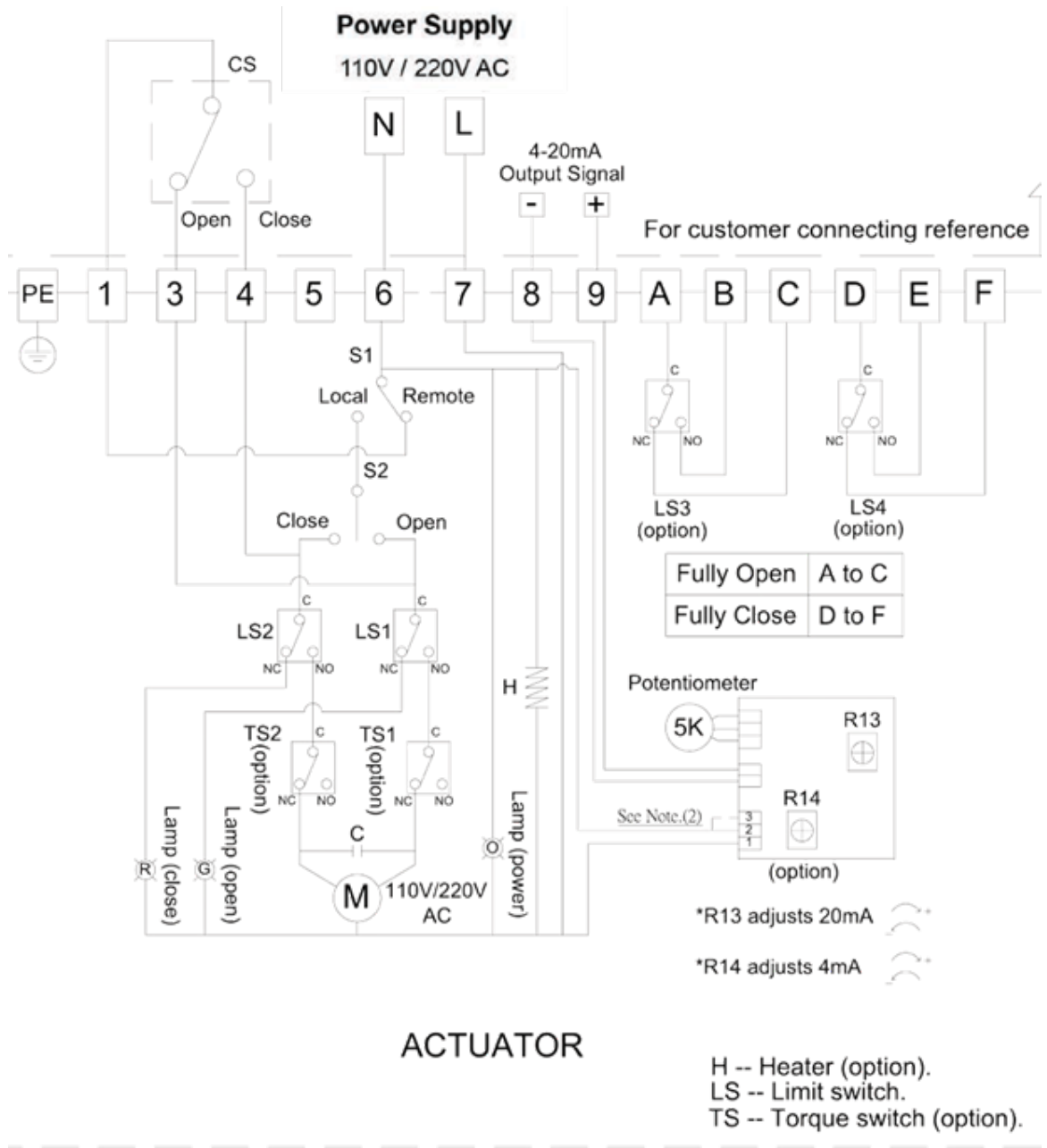
**NOTE:**

1. Modulating Board
  - a. Input signal: 4 to 20mA, 1 to 5V, 2 to 10V  
It is suggested to use the shielding wire and its length should not exceed 30m
  - b. Output signal: 4 to 20mA, 2 to 10V
2. Local/Remote Switches
  - a. Select "Remote": Controlled by signal
  - b. Select "Local": Controlled by switch (2)
3. Using less than 5A current for "A, B, C, D, E, F"



## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-13, 110V, 220V AC 1-Phase
- On-Off Controller, Local Control Unit, Analog Signal Output

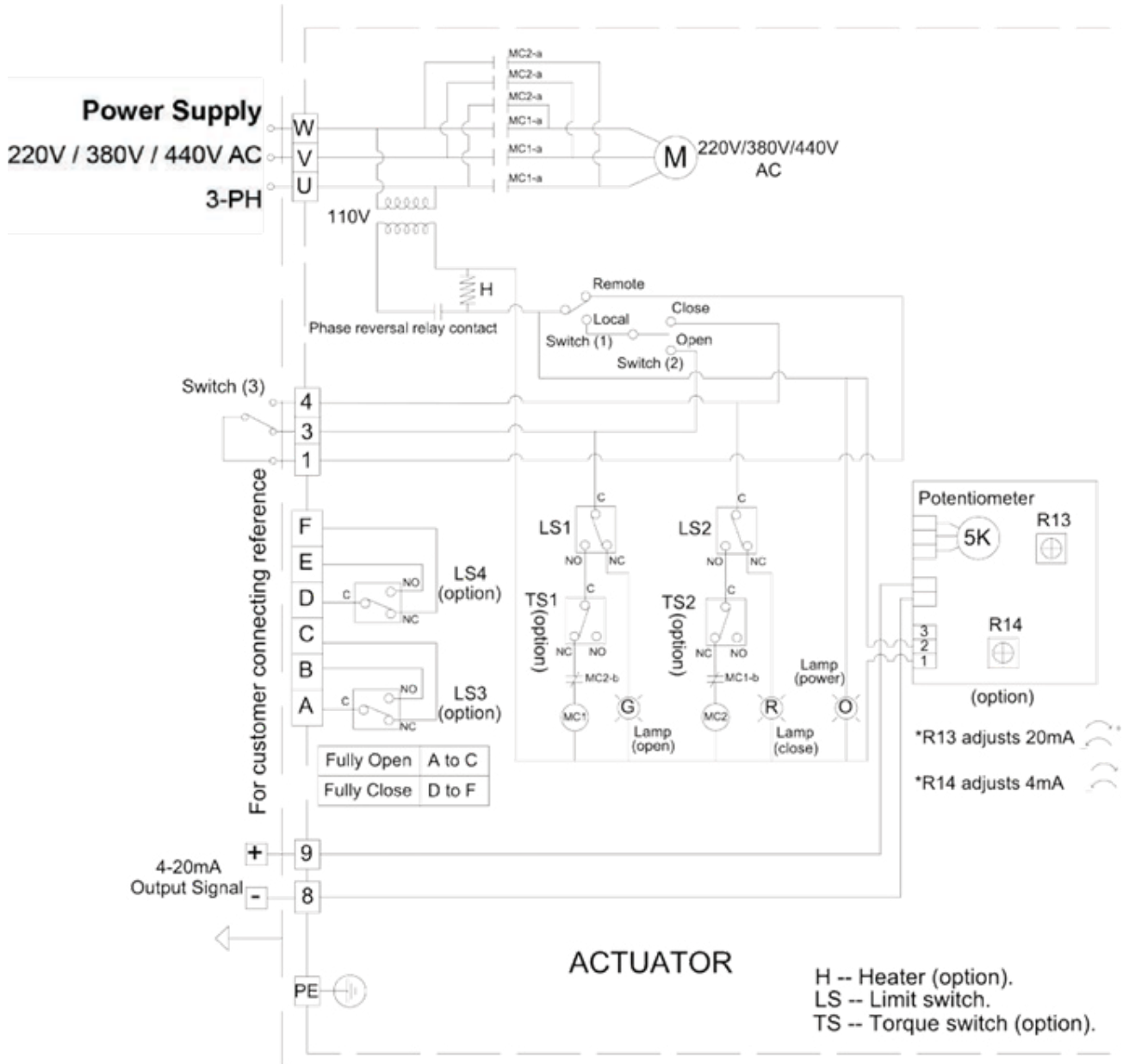


**NOTE:**

1. Using less than 5A current for "A, B, C, D, E, F"
2. If the control power is 220V AC, N & L connect to #1 & #3  
 If the control power is 110V AC, N & L connect to #1 & #2 or #2 & #3

## Wiring Diagram - Quarter Turn Actuator

- OM-2 to OM-13, 220V, 380V, 440V AC 3-Phase
- On-Off Controller, Local Control Unit, Analog Signal Output

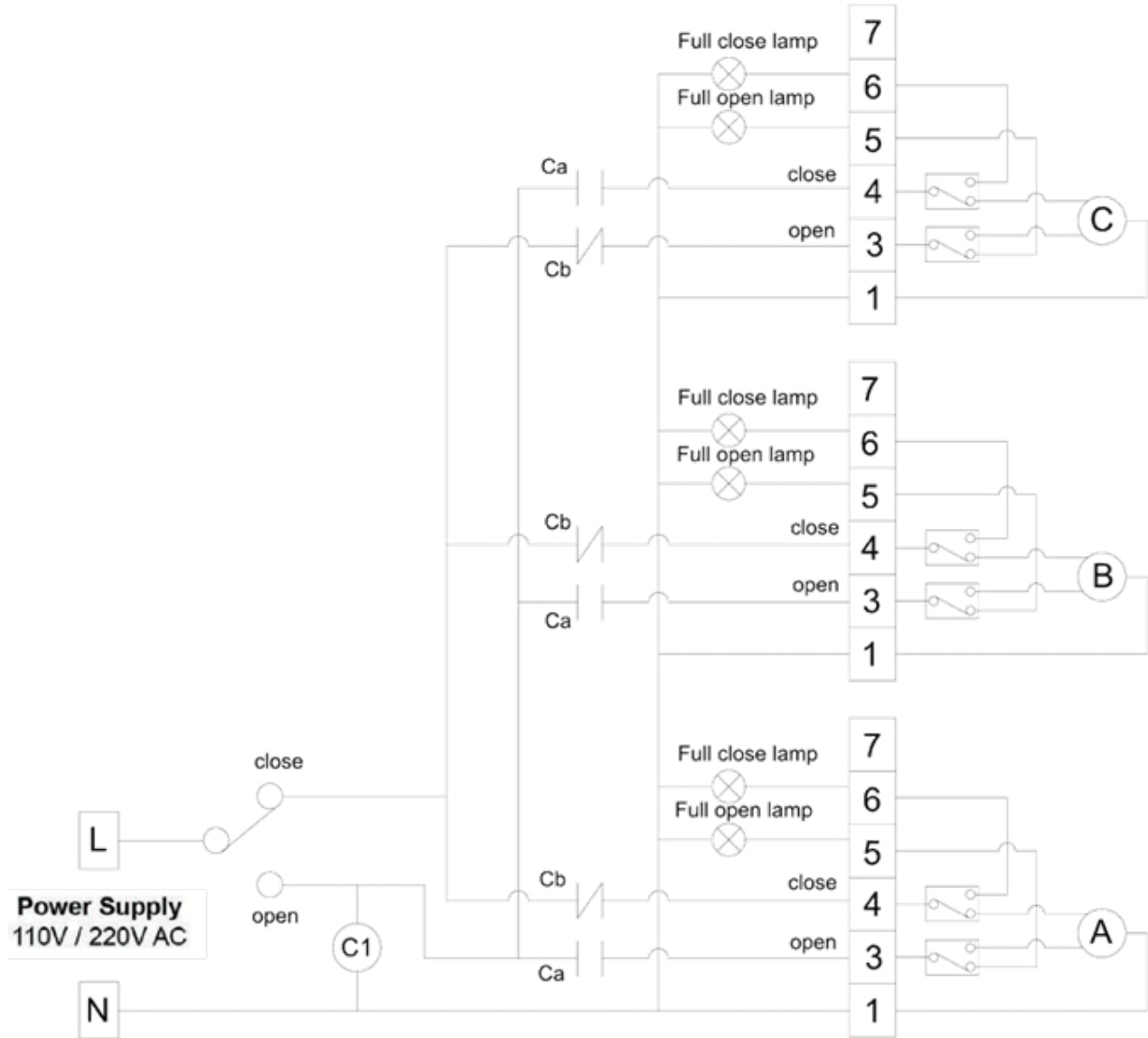


**NOTE:**

1. Please change any two of the U, V, W when the power lamp is off
2. Switch (3) is the switch of remote control (provided by user)
  - a. Connecting #1 # #3 for OPEN
  - b. Connecting #1 & #4 for CLOSE
  - c. #1, #3, #4 cannot connect together at the same time
3. Using less than 5A current for "A, B, C, D, E, F"

## Wiring Diagram - Quarter Turn Actuator

- BM-2, OM-A, OM-A-M, OM-1 to OM-13, OM-F, OM-G, 110V, 220V AC 1-Phase
- Same Switch Coupling Wiring



**NOTE:**

1. The wiring is based on 3 sets of actuators for one switch - 1 set is open and 2 sets are close (if more sets, the rest can be done by this logic)
2. When a set of control wire or switch needs to control two or more actuators at the same time, please refer to the wiring diagram
3. Add on contractor for separation to prevent the interference of compression coupling
4. C1 = 3a3b contractor

## Adjustment - Travel Cam & Limit Switches

NOTE: If LS3 & LS4 are fitted, they should be set to trip prior to LS1 & LS2 to avoid over travel.

The travel cams are set to control the open and closed position of the valve. The position is set to stop the travel of the actuator when the travel cams activate the limit switch. Standard is two limit switches (LS1 & LS2), one for open, one for closed. LS1 & LS2 limit the maximum range by disabling the electric motor. LS3 & LS4 are optional. They allow external equipment to confirm that the valve has reached the fully-open and fully-closed positions.

The travel cams can be adjusted with a 2.5mm Allen key. The cams are preset at the factory. When additional adjustments are needed, follow steps described below.

### OM-A, OM-A-M

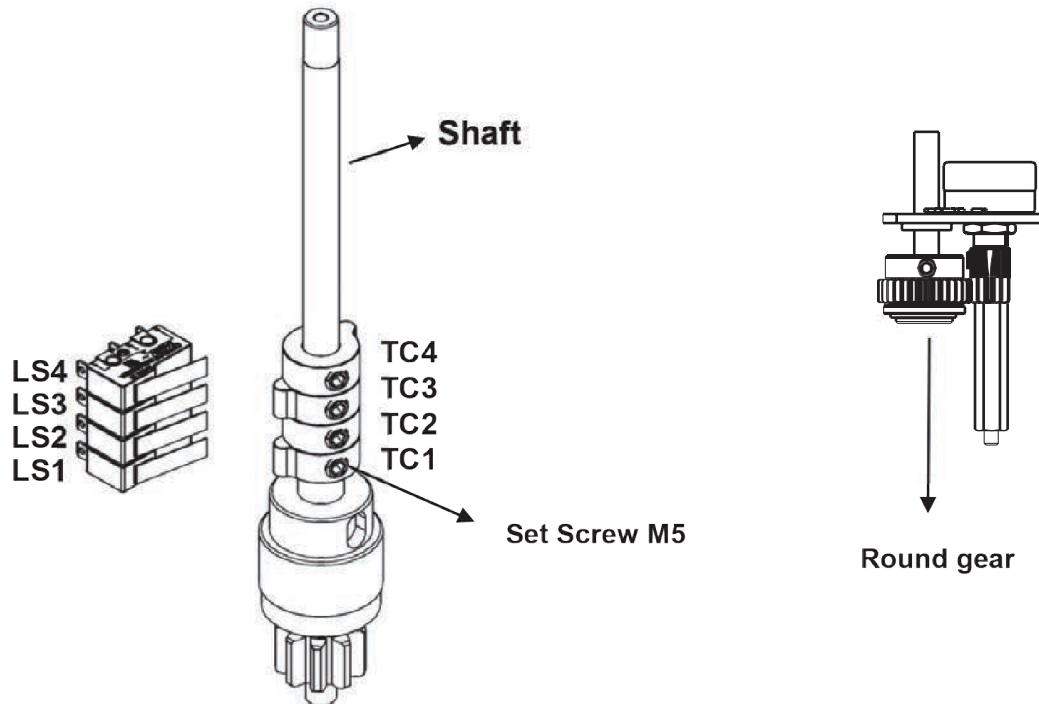
1. To set the open position:
  - a. Turn power off
  - b. Use manual override to turn valve to the fully-open position
  - c. Remove cover and loosen the M5 set screw on the TC1 with a 2.5mm Allen Key
  - d. Rotate cam (TC1) counterclockwise to contact with switch
  - e. Slowly rotate cam (TC1) clockwise until a light click is heard
  - f. Securely tighten the M5 set screw and apply power to check the travel position. If the position is not correct, please repeat steps a to f
  - g. After the adjustment is completed, check again the M5 set screw is securely tightened
2. To set the close position:
  - a. Turn power off
  - b. Use manual override to turn valve to the fully-closed position
  - c. Loosen the M5 set screw on the TC2 with a 2.5mm Allen key
  - d. Rotate cam (TC2) clockwise to contact with switch
  - e. Slowly rotate cam (TC2) counterclockwise until a light click is heard
  - f. Securely tighten the set screw and apply power to check the traveling position. If the position is not correct, please repeat steps a to f
  - g. After the adjustment is completed, check again the M5 set screw is securely tightened

### Modulating type:

Loosen M5 set screw on round gear before setting, after completing fully-open and fully-closed calibration, run the actuator to fully-closed position, then rotate round gear counterclockwise to the end and tighten M5 set screw.

## Adjustment - Travel Cam & Limit Switches

- OM-A, OM-A-M



**TC 4 Synchronous turn with TC2 (optional).**

**TC 3 Synchronous turn with TC1 (optional).**

**TC 2 “CLOSE”**  **Clockwise: increase closing degree to fully closed.**

 **Counterclockwise: decrease closing degree.**

**TC 1 “ OPEN”**  **Clockwise: decrease opening degree.**

 **Counterclockwise: increase opening degree to fully open.**

### OM-1, BM-2, OM-2 to 13, OM-F, OM-G

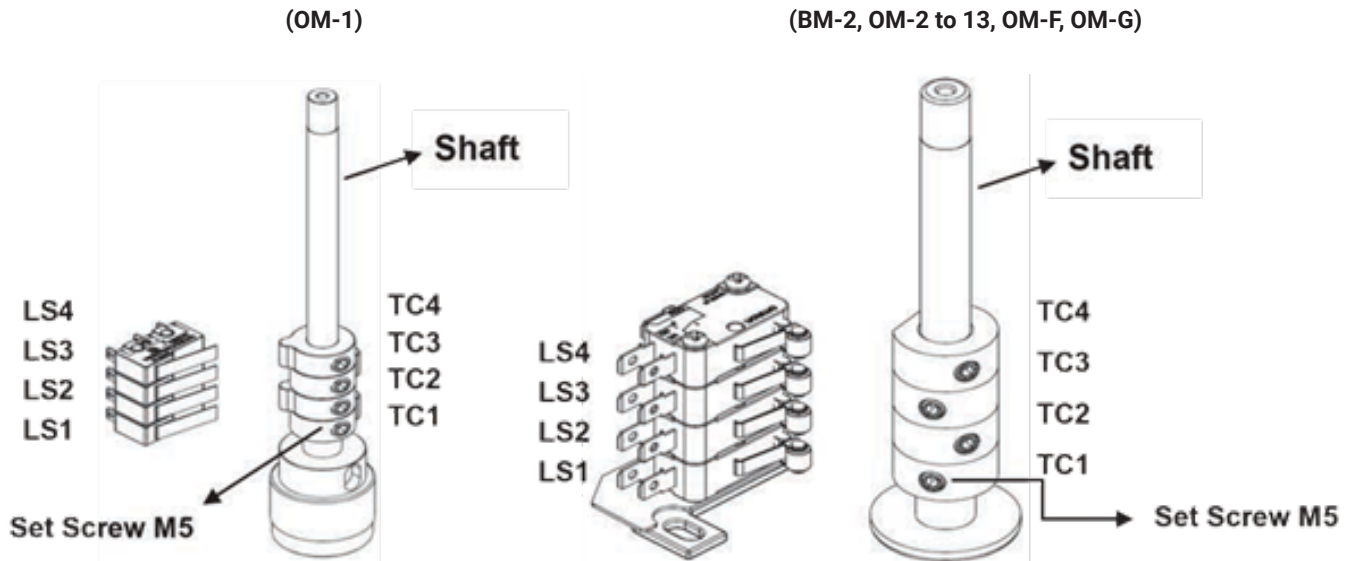
- To set the open position:
  - Turn power off and loosen both mechanical stops (please refer to page 55 and except OM-A, BM-2, OM-A, OM-A-M)
  - Use manual override to turn valve to the fully-open position
  - Remove cover and loosen the M5 set screw on the TC1 with a 2.5mm Allen Key
  - Rotate cam (TC1) clockwise to contact with switch
  - Slowly rotate cam (TC1) counterclockwise until a light click is heard
  - Securely tighten the set screw and apply power to check the travel position. If the position is not correct, please repeat steps a to f
  - After the adjustment is completed, check again the M5 set screw is securely tightened

## Adjustment - Travel Cam & Limit Switches

1. To set the close position:
  - a. Turn power off
  - b. Use manual override to turn valve to the fully-closed position
  - c. Loosen the M5 set screw on the TC2 with a 2.5mm Allen Key
  - d. Rotate cam (TC1) clockwise to contact with switch
  - e. Slowly rotate cam (TC2) clockwise until a light click is heard
  - f. Securely tighten the set screw and apply power to check the travel position. If the position is not correct, please repeat steps a to f
  - g. After the adjustment is completed, check again the M5 set screw is securely tightened
  - h. Tighten both mechanical stops per page 55

### Modulating type:

Loosen M5 set screw on sector gear (round gear) before setting, after completing fully-open and fully-closed calibration, run the actuator to fully-closed position, then rotate sector gear (round gear) clockwise to the end and tighten M5 set screw.



- |             |   |
|-------------|---|
| <b>TC 4</b> | <b>Synchronous turn with TC2 (optional).</b>                        |
| <b>TC 3</b> | <b>Synchronous turn with TC1 (optional).</b>                        |
| <b>TC 2</b> | <b>“CLOSE”</b>  |
|             | ↻ <b>Clockwise: decrease closing degree.</b>                        |
|             | ↺ <b>Counterclockwise: increase closing degree to fully-closed.</b> |
| <b>TC 1</b> | <b>“ OPEN”</b>  |
|             | ↻ <b>Clockwise: increase opening degree to fully-open.</b>          |
|             | ↺ <b>Counterclockwise: decrease opening degree.</b>                 |

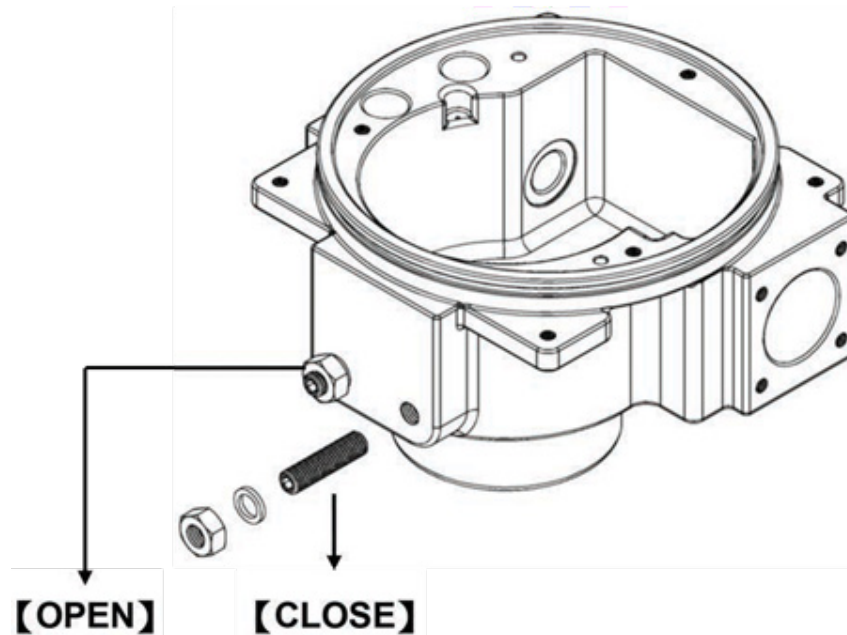
## Adjustment - Mechanical Stops



Mechanical stops should only be reached during manual operation

The mechanical stops are factory set, though in some cases adjustment may be required once a valve is fitted.

1. For Electric Operation
  - a. Please refer to "Adjustment - Travel Cam & Limit Switches"
2. For Manual Operation
  - a. Turn power off
  - b. Loosen locknut and unwind it a few turns
  - c. For modulating type, loosen the set screw on the sector gear first
  - d. Use manual override to turn the actuator to desired limit position
  - e. For modulating type, rotate sector gear clockwise to the end, then tighten set screw
  - f. Tighten the mechanical stop screw until it reaches the shaft, then reverse one cycle
  - g. Tighten locknut
  - h. Check that the electrical limit switches can still be reached

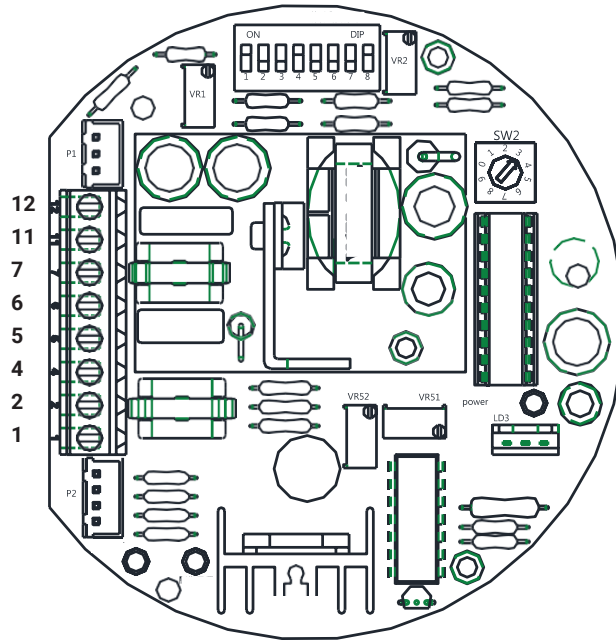


## Adjustment - Modulating Control Board

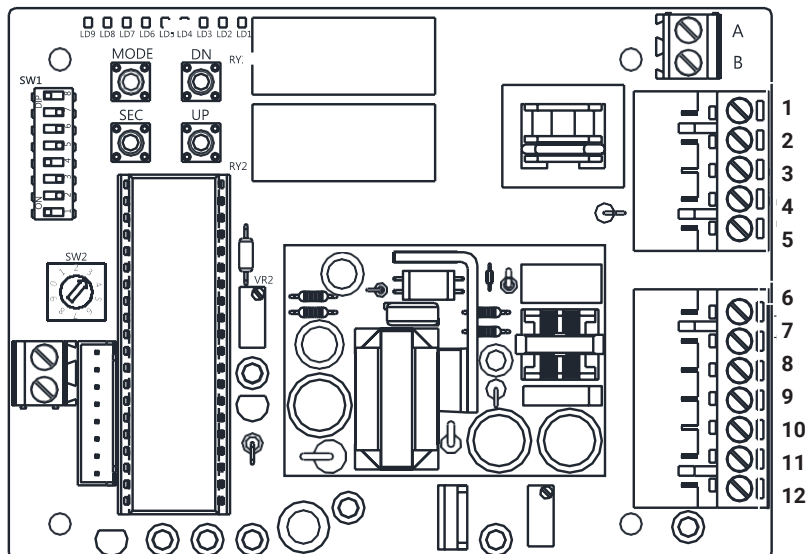
Part A: Suitable for OM-1 to OM-13 ' OM-A ' OM-A-M ' OM-F ' OM-G

1. Surface (the surface is based on the actuator in 110 / 220V voltage)

OM-1 ' OM-A ' OM-A-M



OM-2 to OM-13 ' OM-F ' OM-G

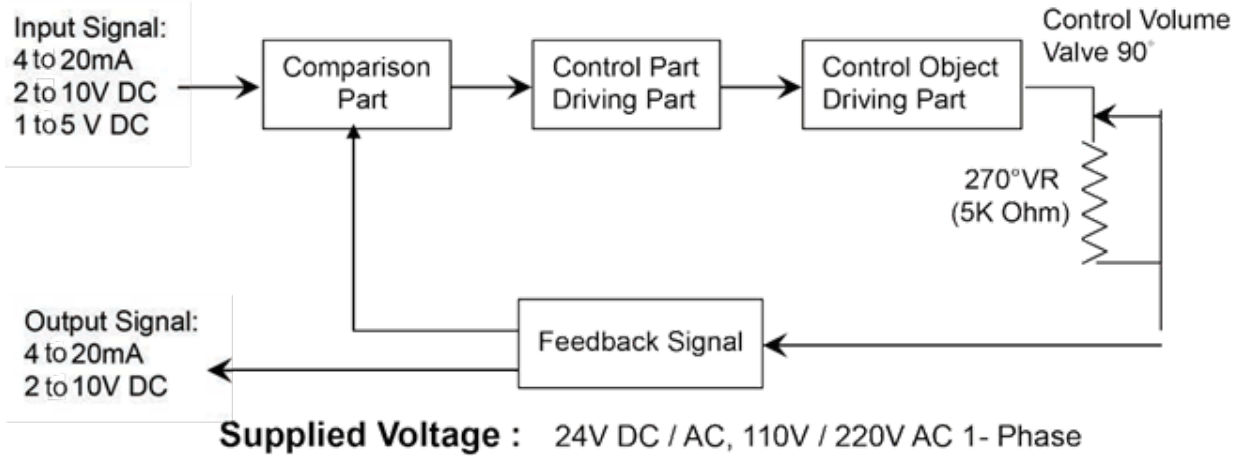




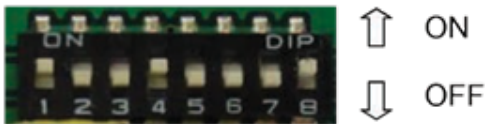
## Adjustment - Modulating Control Board

Part A: Suitable for OM-1 to OM-13 'OM-A' 'OM-A-M' 'OM-F' 'OM-G

### 2. Procedure



### 3. Dip-switch setting (SW1)



	1	2	3	4	5	6	7	8
<b>Factory setting</b>	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
4to20mA input	ON	OFF						
1to5V input	OFF	OFF						
2to10V input	OFF	ON						
4to20mA output			OFF	ON	OFF			
2to10V output			ON	OFF	ON			
20mA / 5V / 10V means valve fully-open						OFF		
20mA / 5V / 10V means valve fully-closed						ON		
Close valve if input signal disconnected ( when S6 sets " OFF")							OFF	ON
Open valve if input signal disconnected ( when S6 sets " OFF")							ON	OFF
Actuator will not operate if input signal disconnected (when S6 sets " OFF")							ON	ON
							OFF	OFF

#### NOTE:

1. After completing dip-switch setting, restart the actuator.
2. The standard factory presetting is 1, 4, 8 for ON and 2, 3, 5, 6, 7 for OFF.

## Adjustment - Modulating Control Board

Part A: Suitable for OM-1 to OM-13 ' OM-A ' OM-A-M ' OM-F ' OM-G

	Function	Setting
<b>S1, 2</b>	Input signal select	"4 to 20mA" set 1-ON / 2 OFF "1 to 5V" set 1-OFF / 2-OFF "2 to 10V" set 1-OFF / 2-ON
<b>S3, 4, 5</b>	Output signal select	"4 to 20mA" set 3-OFF / 4-ON / 5-OFF "2-10V" set 3-ON / 4-OFF / 5-ON
When S6 sets "ON"		
<b>S6</b>	Input signal select 4mA, 2V, 1V → valve fully-open 20mA, 10V, 5V → valve fully-closed	Set 6-ON
<b>S7, 8</b>	Position select (When the input signal fails)	"valve fully-closed" set 7-ON / 8-OFF "valve fully-open" set 7-OFF / 8-ON "valve stops" set 7-ON / 8-ON or 7-OFF / 8-OFF
When S6 sets "OFF"		
<b>S6</b>	Input signal select 4mA, 2V, 1V → valve fully-closed 20mA, 10V, 5V → valve fully-open	Set 6-OFF
<b>S7, 8</b>	Position select (When the input signal fails)	"valve fully-closed" set 7-OFF / 8-ON "valve fully-open" set 7-ON / 8-OFF "valve stops" set 7-ON / 8-ON or 7-OFF / 8-OFF

## Adjustment - Modulating Control Board

### Part A: Suitable for OM-1 to OM-13 ' OM-A ' OM-A-M ' OM-F ' OM-G

#### 4. Sensitivity Switch Setting (SW2)



- When switched to "1": the highest sensitive and the 0 to 90 degree can be divided up to around 50 times movement.
- When switched to "0": the lowest sensitive and the 0 to 90 degree can be divided up to around 10 times movement.
- The sensitivity decreases 5 times movement by sectors from SW1 to SW2, SW2 to SW3, SW3 to SW4 and so on.

#### 5. Settings for OPEN and CLOSE (OM-1, OM-A, OM-A-M)

The settings are set at factory, though in some cases reset may be required when a particular rate of signal is requested.

#### Adjust output signal / input signal

VR1-Adjust 10V, 20mA (Input signal: fully-open)

VR51-Adjust 10V, 20mA (Output signal: fully-open)



VR2-Adjust 2V, 4mA (Input signal: fully-closed)

VR52-Adjust 2V, 4mA (Output signal: fully-closed)



} The function of VR

**NOTE: If it is necessary to adjust VR51 and VR52, VR1 and VR2 also need to be adjusted accordingly.**

- Rotate VR1 counterclockwise until a light click is heard, then supply 10V (or 20mA) modulating board. Slightly rotate VR1 clockwise until green LED keeps on. Adjust VR51 to complete.

VR51 :  Clockwise: decreasing signal.  
 Counterclockwise: increasing signal.

- Rotate VR2 clockwise until a light click is heard, then supply 2V (or 4mA) to modulating board. Slightly rotate VR2 counterclockwise until red LED keeps on. Adjust VR51 to complete.

VR52 :  Clockwise: decreasing signal.  
 Counterclockwise: increasing signal.

## Adjustment - Modulating Control Board

### Part A: Suitable for OM-1 to OM-13 ' OM-A ' OM-A-M ' OM-F ' OM-G

#### 6. Settings for OPEN and CLOSE (OM-2 to OM-13 ' OM-F ' OM-G)

The settings are set at factory, though in some cases reset may be required when a particular rate of signal is requested.

#### OPEN Setting



- a. Keep pressing "SET" for 2 seconds, then LD 9 comes on, it will enter into manual mode.
- b. Keep pressing "UP" until actuator runs to fully open position, LD2 comes on, then supplies the input signal (5V or 10V or 20mA).
- c. Press "MODE" once. The OPEN setting is completed.

#### CLOSE Setting

- a. Keep pressing "DOWN" until actuator runs to fully-closed position, LD1 comes on, then supplies input signal (1V or 2V or 4mA).
- b. Press "MODE" once. The CLOSE setting is completed.

**After completing the above settings, press "SET" once**

#### Adjust output signal

- VR2 :  Clockwise: increasing signal.  
 Counterclockwise: decreasing signal.

## Adjustment - Modulating Control Board

### Part A: Suitable for OM-1 to OM-13 ' OM-A ' OM-A-M ' OM-F ' OM-G

#### 7. Lamp signal (OM-2 to OM-13 ' OM-F ' OM-G

LD1	Fully-closed	LD6	Motor thermostat turn off
LD2	Fully-open	LD7	Output signal short circuit
LD3	Power	LD8	Motor current is excessive
LD4	Abnormal voltage	LD9	Manual mode
LD5	Wrong input signal		

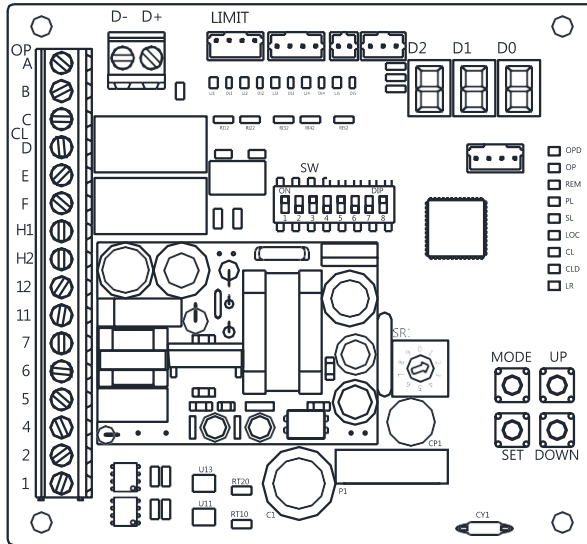
If the LED (LD4 to LD9) is flashing under modulating control, refer to the following "Modulating Board Troubleshooting".

Lamp	Possibilities	Solution
No Lamp LD3 off	<ul style="list-style-type: none"> <li>a. No power supply</li> <li>b. The voltage is over 260V to cause the board burn out</li> <li>c. Wrong connection for the #8, #9 of the VR</li> <li>d. Faulty modulating board</li> </ul>	<ul style="list-style-type: none"> <li>a. Check the power supply and wiring (#4 &amp; #5 of modulating board).</li> <li>b. Check the voltage.</li> <li>c. Check the wiring.</li> <li>d. Send back to factory for inspection.</li> </ul>
LD5	<ul style="list-style-type: none"> <li>a. Setting in 2 to 10V input signal but supply 4 to 20mA</li> <li>b. Setting in 2 to 10V input signal, but the input signal is over 13.5V</li> </ul> <p>**Setting in 4 to 20mA but supply 2 to 10V signal. The actuator could be still operated within 2 to 7V. But if the signal is over 7.2V the LED5 will come ON.</p>	<p>Confirm if the input signal is the same as dip switch setting (refer to pages 57 and 58).</p>
LD6	Motor thermostat turns off	<ul style="list-style-type: none"> <li>a. Too high frequency for rated duty cycle (refer to page 5).</li> <li>b. Motor thermostat (MOT) is not connected.</li> </ul>
LD7	<ul style="list-style-type: none"> <li>a. Output signal short circuit</li> <li>b. Wrong connecting of the 2-10V input signal</li> </ul>	<ul style="list-style-type: none"> <li>a. Confirm the wiring of output signal #11 (-) ' #12 (+).</li> <li>b. Confirm the input signal for #6 (-) ' #7 (+).</li> </ul>
LD8	Motor current is excessive	<ul style="list-style-type: none"> <li>a. Too high frequency for rated duty cycle (refer to P5).</li> <li>b. Check the load (refer to page 7 and 8).</li> <li>c. Check if the motor rotor is locked. (for example: Valve is stuck by foreign objects)</li> </ul>
LD9	Manual mode - setting position for open & close	After completing the settings, press "SET" once.

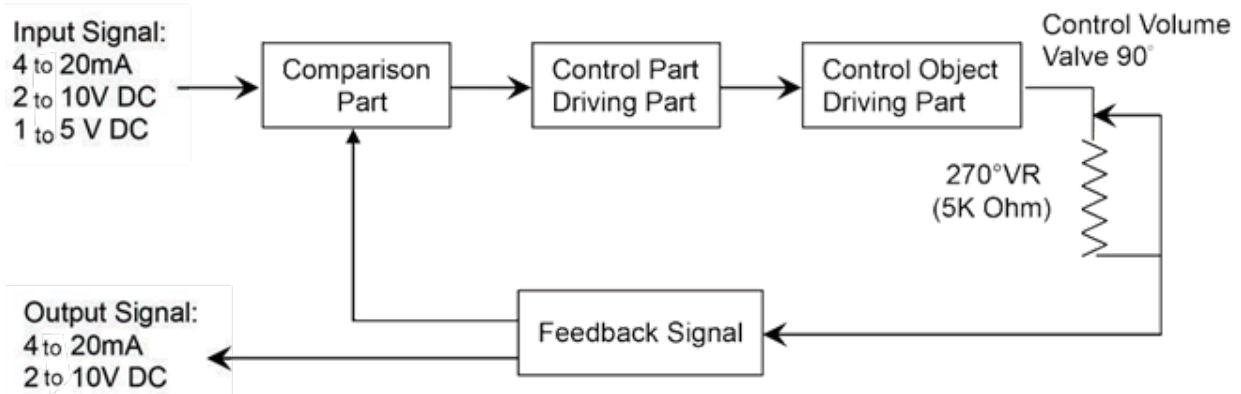
# Adjustment - Modulating Control Board

Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

## 1. Surface



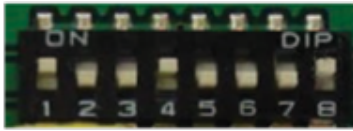
## 2. Procedure



## Adjustment - Modulating Control Board

Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

### 3. Dip-switch setting (SW)



↑ ON  
↓ OFF

	1	2	3	4	5	6	7	8
<b>Factory setting</b>	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
4to20ma input	ON	OFF						
1to5V input	OFF	OFF						
2to10V input	OFF	ON						
MODBUS	ON	ON	ON	ON	ON			
4-20mA output			OFF	ON	OFF			
2-10V output			ON	OFF	ON			
20mA / 5V / 10V means valve fully-open						OFF		
20mA / 5V / 10V means valve fully-closed						ON		
Close valve if input signal disconnected ( when S6 sets"OFF")							OFF	ON
Open valve if input signal disconnected ( when S6 sets"OFF")							ON	OFF
Actuator will not operate if input signal disconnected (when S6 sets "OFF")							ON OFF	ON OFF

**NOTE:**

1. After completing dip-switch setting, restart the actuator or wait for 5 seconds.
2. The standard factory presetting is 1, 4, 8 for ON and 2, 3, 5, 6, 7 for OFF.

## Adjustment - Modulating Control Board

Part B: Suitable for OM-1 ' OM-A ' OM-A-M (Option: MODBUS)

	Function	Setting
<b>S1, 2</b>	Input signal select	"4 to 20mA" set 1-ON / 2 OFF "1 to 5V" set 1-OFF / 2-OFF "2 to 10V" set 1-OFF / 2-ON
<b>S3, 4, 5</b>	Output signal select	"4 to 20mA" set 3-OFF / 4-ON / 5-OFF "2-10V" set 3-ON / 4-OFF / 5-ON "MODBUS" set 3-ON / 4-ON / 5-ON
When S6 sets "ON"		
<b>S6</b>	Input signal select 4mA, 2V, 1V → valve fully-open 20mA, 10V, 5V → valve fully-closed	Set 6-ON
<b>S7, 8</b>	Position select (When the input signal fails)	"valve fully-closed" set 7-OFF / 8-ON "valve fully-open" set 7-ON / 8-OFF "valve stops" set 7-ON / 8-ON or 7-OFF / 8-OFF
When S6 sets "OFF"		
<b>S6</b>	Input signal select 4mA, 2V, 1V → valve fully-closed 20mA, 10V, 5V → valve fully-open	Set 6-OFF
<b>S7, 8</b>	Position select (When the input signal fails)	"valve fully-closed" set 7-OFF / 8-ON "valve fully-open" set 7-ON / 8-OFF "valve stops" set 7-ON / 8-ON or 7-OFF / 8-OFF



## Adjustment - Modulating Control Board

**Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)**

### 4. Sensitivity Switch Setting (SR1)



- a. When switched to "1": The highest sensitive and can be divided up to around 76 times movement. The accumulative variation for each movement is 0.2mA.
- b. When switched to "0": The lowest sensitive and can be divided up to around 15 times movement. The accumulative variation for each movement is 1.0mA.

### 5. Lamp Indication

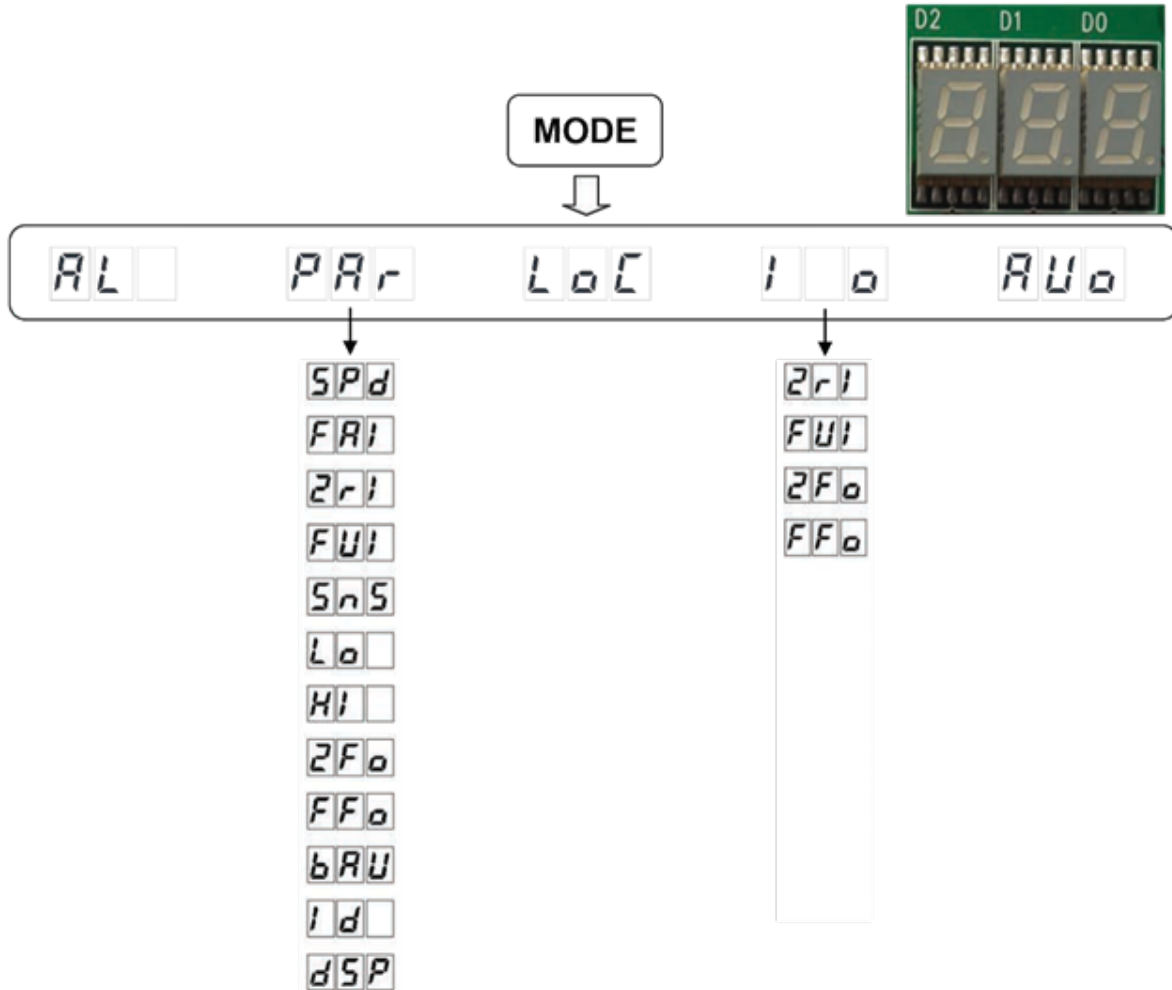
Lamp	Actuator Status
OPD	Fully-open position
OP	Opening direction
REM	Remote control mode
PL	Alerting signal
SL	Setting mode
LOC	Local control mode
CL	Closing direction
CLD	Fully-closed position

## Adjustment - Modulating Control Board

Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

### 6. LED Indication

#### a. Setup flow chart



## Adjustment - Modulating Control Board

Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

b. The function of LED indication

LED indication	Function
<b>AL</b>	Error log
<b>PAR</b>	Basic parameter
<b>LoC</b>	Local control
<b>Io</b>	Fast setting
<b>AUo</b>	Auto run
<b>SPd</b>	Running time setting
<b>FRI</b>	Wrong input signal
<b>2r1</b>	Input signal setting for fully-closed position
<b>FUI</b>	Input signal setting for fully-open position
<b>SnS</b>	Sensitivity Setting
<b>Lo</b>	Fully-closed position setting
<b>HI</b>	Fully-open position setting
<b>2Fo</b>	Output signal setting for fully-closed position
<b>FFo</b>	Output signal setting for fully-open position
<b>bRU</b>	Baud rate setting for MODBUS
<b>Id</b>	Station setting for MODBUS
<b>dSP</b>	Display setting

# Adjustment - Modulating Control Board

## Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

### 7. Adjustable Speed Setting

- a. Press "MODE" several times to get into PAr, then press "SET" once to enter parameter setting mode.
- b. Get into SPd and keep pressing "SET" (around 3 sec) to enter setting mode.
- c. Adjust with "UP" and "DOWN" to the required selection.

Selection	1	2	3	4	5	6	7	8	9	10
Running time (sec)	standard	30	60	80	100	120	150	180	200	200

- d. Press "SET" once to complete the adjustable speed setting
- e. Press "MODE" five times to go back to position indicator to complete the setting

### 8. Travel Setting

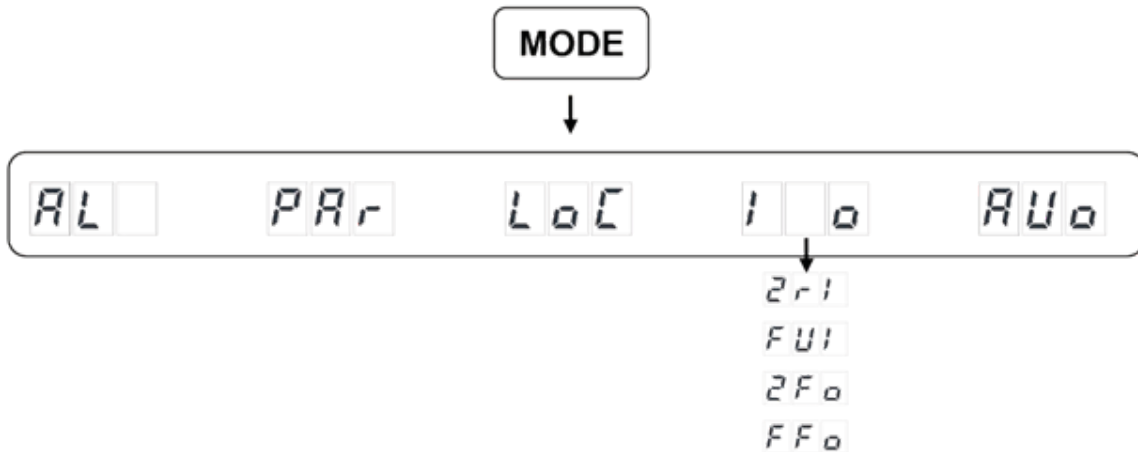
- a. Press "MODE" five times to get into AUo.
- b. Keep pressing "SET" (around 5 sec) until "LOC" comes on, entering the Auto run mode.
- c. When the Auto run is completed, "LOC" comes off and the actuator will stop running. The travel setting is completed.

# Adjustment - Modulating Control Board

Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

## 9. Signal Setting

If the travel setting could not satisfy your request, the signal needs to be adjusted separately, please follow the steps of signal setting.



### Input signal setting for fully-closed position

- Press "MODE" several times until you get into I o, then press "SET" once to enter signal setting mode.
- Get into 2r1 and keep pressing "SET" (around 3 sec) until 2r1 is glittering.
- Supply the input signal according to the dip switch setting (1V or 2V or 4mA).
- Press "SET" once and "MODE" twice to complete the input signal setting for fully-closed position.

## Adjustment - Modulating Control Board

### Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

#### Input signal setting for fully-open position

- a. Press "MODE" several times until you get into I o, then press "SET" once to enter signal setting mode.
- b. Adjust with "UP" and "DOWN" until you get FUI.
- c. Keep pressing "SET" (around 3 sec) until FUI is glittering.
- d. Supply the input signal according to the dip switch setting (5V or 10V or 20mA).
- e. Press "SET" once and "MODE" twice to complete the input signal setting for fully-open position.

#### Output signal setting for fully-closed position

Install the ammeter or monitor to correspond to output signal setting.

- a. Press "MODE" several times until you get into I o, then press "SET" once to enter signal setting mode.
- b. Adjust with "UP" and "DOWN" until you get into 2Fo.
- c. Keep pressing "SET" (around 3 sec).
- d. Adjust the output value with "UP" and "DOWN" until the value can fit with your request.
- e. Press "SET" once and "MODE" twice to complete the output signal setting for fully-closed position.

#### Output signal setting for fully-open position

Install the ammeter or monitor to correspond to output signal setting.

- a. Press "MODE" several times until you get into I o, then press "SET" once to enter signal setting mode.
- b. Adjust with "UP" and "DOWN" until you get FFo.
- c. Keep pressing "SET" (around 3 sec).
- d. Adjust the output value with "UP" and "DOWN" until the value can fit with your request.
- e. Press "SET" once and "MODE" twice to complete the output signal setting for fully-open position.

## Adjustment - Modulating Control Board

**Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)**

10. Warning Message

- a. Press "MODE" once to get into AL, then press "SET" once to get into warning message.
- b. Adjust with "UP" and "DOWN" to review the history log of warning message.



<u>Item (9,8,7...0)</u>	<u>Warning Message</u>	<u>Solution</u>
<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">9. (The latest data)</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">8.</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">7.</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">6.</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">5.</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">4.</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">3.</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">2.</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">1.</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">0. (The oldest data)</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">0 1</div> <p>Wrong Input signal.</p>	<ol style="list-style-type: none"> <li>a. Input signal fails.</li> <li>b. Check if the input signal and dip switch setting are correct.</li> </ol>
	<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">5 5</div> <p>No abnormal records.</p>	

※ The latest data will stay with the item 9.

# Adjustment - Modulating Control Board

## Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

### c. Example

- If you want to check the latest data, press "MODE" several times until you get into AL, Press "SET" once, the LED display will show the latest data.
- If you want to check eighth data, press "MODE" several times until you get into AL, press "SET" once, press "DOWN" seven times and the LED display will show the eighth data.

## 11. MODBUS Setting

MODBUS and modulating controller cannot be operated at the same.

1. Adjust the dip switch (SW) Pin1 to Pin5 to "ON" position.

2. Baud rate setting.

- Press "MODE" twice until you get into PAR.
- Press "SET" once to get into SPd.
- Press "DOWN" ten times to enter bAU.
- Keep pressing "SET" (around 3 sec) until the LED indicator is glittering to get into setting mode.
- Adjust the "UP" and "DOWN" to set baud rate for MODBUS. Adjust to your demand value (default valve #4).

Setting Value	Baud Rate
4	9600
5	19200

- Press "SET" once to complete the setting.



## Adjustment - Modulating Control Board

### Part B: Suitable for OM-1 ' OM-A ' OM-A-M ' (Option: MODBUS)

#### 3. Station Setting

- a. Press "DOWN" once to get into Id.
- b. Keep pressing "SET" (around 3 sec) until the LED indicator is glittering to get into setting mode.
- c. Adjust the "UP" and "DOWN" to set the station. (Station Range 1 to 127, default Station: 1)
- d. Press "SET" once to complete the setting.

#### 4. Press "MODE" four times to get back to home page.

# Trouble Shooting

## ON-OFF Controller

### 1. Motor does not operate and overheats.

Possibilities	Solution
<ul style="list-style-type: none"> <li>a. Supply power to #3 &amp; #4 simultaneously (parallel connection)</li> <li>b. The capacitor failed (whether the surface of the capacitor deforms)</li> <li>c. Valve's rubber is getting hardened or the valve's torque is excessive (it takes longer time to reach fully-closed position)</li> <li>d. Foreign objects in the flow stream</li> <li>e. Broken motor stem or bearing</li> <li>f. The limit switch for fully-closed does not trip</li> </ul>	<ul style="list-style-type: none"> <li>a. Check the wiring (for coupling wiring, refer to page 51)</li> <li>b. Replace to a new part</li> <li>c. Use handwheel for test or change to a new valve</li> <li>d. Check for any obstructions</li> <li>e. Replace to a new part</li> <li>f. Operate the actuator manually to fully-closed position and confirm if the limit switch trips</li> </ul>

### 2. The actuator is operated very well but the motor is hot.

Possibilities	Solution
<ul style="list-style-type: none"> <li>a. Actuator operates too frequently (starting frequency is too high)</li> <li>b. Overload</li> <li>c. Under or over rated voltage</li> <li>d. Mechanical stops are reached by the gear train at fully-open or fully-closed position</li> <li>e. Wrong power supply</li> </ul>	<ul style="list-style-type: none"> <li>a. Change system bandwidth or replace to a higher duty cycle actuator (page 5)</li> <li>b. This situation often happens after operating for a long time. It is suggested to replace to a new valve</li> <li>c. Check the supply circuit (refer to page 7 and 8)</li> <li>d. Reset the mechanical stops and cam (TC1 &amp; TC2) (refer to page 52 to 55)</li> <li>e. Check the power supply</li> </ul>

### 3. When operating two or more actuators simultaneously, the actuator works abnormally some times and the motor is getting hot.

Possibilities	Solution
<ul style="list-style-type: none"> <li>a. Parallel connection</li> </ul>	<ul style="list-style-type: none"> <li>a. Check current values and install a relay respectively (refer to wiring diagram on page 51)</li> </ul>

## Trouble Shooting

### 4. The valve cannot fully-open or fully-close by either power supply or handwheel.

Possibilities	Solution
<ul style="list-style-type: none"> <li>a. The actuator does not mount with the valve tightly during installation process</li> <li>b. The torque of valve is larger than the torque of actuator</li> <li>c. The set screw of the cam is loose</li> <li>d. The installing angle of actuator and valve is not correct</li> </ul>	<ul style="list-style-type: none"> <li>a. Check the wiring (for coupling wiring, refer to page 51)</li> <li>b. Replace to a new valve or a larger actuator</li> <li>c. Readjust the mechanical stops and limit switches (refer to page 52 to 55)</li> <li>d. Check the angle of the valve and actuator</li> </ul>

### 5. The capacitor has failed.

Possibilities	Solution
<ul style="list-style-type: none"> <li>a. Overload (exceed the rated torque of actuator)</li> <li>b. Starting frequency is too high or ambient temperature is too high</li> <li>c. Over service life</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace to a new part. It is suggested to change a new valve or a larger actuator</li> <li>b. Replace to a new part and change to 75% duty cycle actuator (refer to page 5)</li> <li>c. Check the capacitance and surface every year</li> </ul>

### Modulating Controller

#### 1. The LED (LD5 to LD9) is flashing after the operating check is completed.

Solutions
Refer to page 58

#### 2. The lamps on the modulating board are normal but the actuator can't work properly during test or it only can turn to full open/closed position.

Possibilities	Solution
<ul style="list-style-type: none"> <li>a. The signal is connected oppositely (means to signal failure)</li> </ul>	<ul style="list-style-type: none"> <li>a. Confirm if the input signal and the wiring are correct (terminal #6 connects to "-" and terminal #7 connects to "+")</li> </ul>

#### 3. Cannot operate by modulating controller.

Possibilities	Solution
<ul style="list-style-type: none"> <li>a. Faulty VR</li> <li>b. The sector gear of the VR is loose</li> <li>c. Wrong input signal</li> <li>d. Faulty modulating board</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace to a new VR</li> <li>b. Remove the input signal wires. Operate the actuator to fully closed. Then readjust the VR (refer to page 52 to 54)</li> <li>c. Check if the input signal is correct (refer to page 52 to 54)</li> <li>d. Send back to factory for inspection</li> </ul>



## Limited Warranty

DIXON VALVE AND COUPLING COMPANY, LLC (herein called "Dixon") warrants the products described herein and manufactured by Dixon to be free from defects in material and workmanship for a period of one (1) year from date of shipment by Dixon under normal use and service. Its sole obligation under this warranty being limited to repairing or replacing, as hereinafter provided, at its option any product found to Dixon's satisfaction to be defective upon examination by it, provided that such product shall be returned for inspection to Dixon's factory within three (3) months after discovery of the defect. The repair or replacement of defective products will be made without charge for parts or labor. This warranty shall not apply to: (a) parts or products not manufactured by Dixon, the warranty of such items being limited to the actual warranty extended to Dixon by its supplier; (b) any product that has been subject to abuse, negligence, accident, or misapplication; (c) any product altered or repaired by others than Dixon; and (d) to normal maintenance services and the replacement of service items (such as washers, gaskets, and lubricants) made in connection with such services. To the extent permitted by law, this limited warranty shall extend only to the buyer and any other person reasonably expected to use or consume the goods who is injured in person by any breach of the warranty. No action may be brought against Dixon for an alleged breach of warranty unless such action is instituted within one (1) year from the date the cause of action accrues. This limited warranty shall be construed and enforced to the fullest extent allowable by applicable law.

Other than the obligation of Dixon set forth herein, Dixon disclaims all warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose, and any other obligation or liability. The foregoing constitutes Dixon's sole obligation with respect to damages, whether direct, incidental or consequential, resulting from the use or performance of the product.

Some products and sizes may be discontinued when stock is depleted or may require a minimum quantity for ordering.

