



ECSPD, ENSPD Educational Installation Manual

GD-2000(Grounding leakage current shielding device)

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ENERPARK CO. LTD.

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ECSPD SPEC

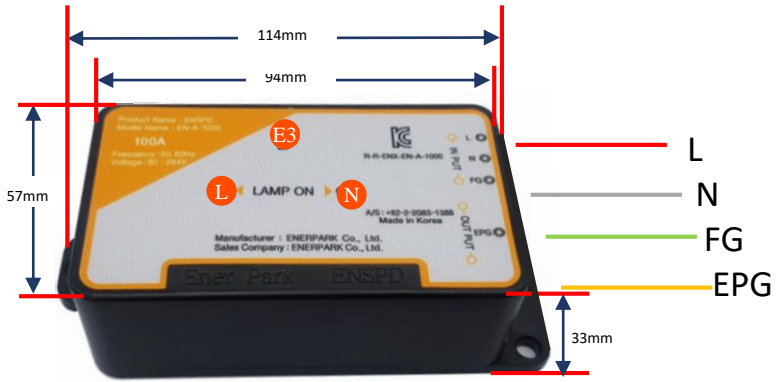


Name	AC ECSPD (For single phase)
Rated current	<ul style="list-style-type: none"> • 30A (AC 30A or less) - Leakage current shielding amount (absorption, reduction) : 10mA • 100A (AC 100A or less) - Leakage current shielding amount (absorption, reduction) : 30mA
Voltage	• 90V ~ 264V.
Frequency	• Does not matter whether 50HZ or 60HZ (110V / 220V compatible)
Range	<ul style="list-style-type: none"> • Installation distance : within about 10~90cm in terminal power supply part • Install the ECSPD by attaching it directly to the terminal load (motor, equipment).(the closer the distance is, the better it is)
Main function	• With shielding and decreasing leakage current, prevent electric shock
Additional function	• Shielding lighting surge.(40KA - 8/20μS)
Precaution	<ul style="list-style-type: none"> • Check and make sure the polarity matches before installation. • Select and install suitable products depending on the purpose of installation (shielding electromagnetic wave-noise, shielding leakage current) and the installation location.

All products have a specification. Install according to the specification when installing ECSPD. ECSPD develops and supplies GD-2000(Multifunction grounding leakage current shielding device) as a set for system installation. The above two products should be installed in a set to make full use of the product's performance.

ECSPD develops and supplies products in range or capacity. Therefore, it must be installed according to the range or capacity

ENSPD SPEC



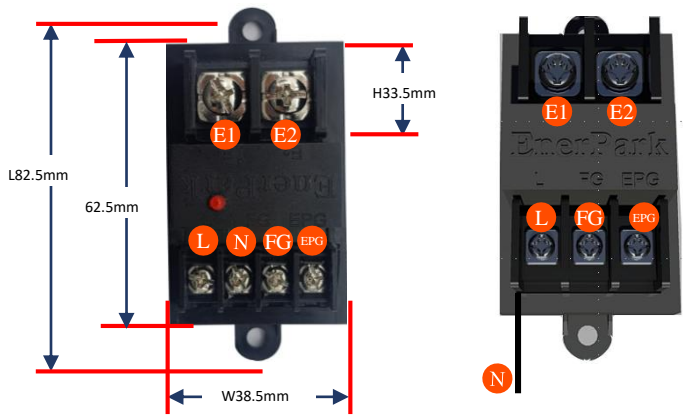
All products have a specification. Install according to the specification when installing ENSPD. ENSPD develops and supplies GD-2000(Multifunction grounding leakage current shielding device) as a set for system installation. The above two products should be installed in a set to make full use of the product's performance.

Name	AC ECSPD (For single phase)
Rated current	<ul style="list-style-type: none"> • 30A (AC 30A or less) - Leakage current shielding amount (absorption, reduction) : 10mA • 100A (AC 100A or less) - Leakage current shielding amount (absorption, reduction) : 30mA
Electromagnetic wave range	<ul style="list-style-type: none"> • 1KHz ~ 1GHz reduction effect(Noise, electromagnetic waves) ❖ The electromagnetic waves of high frequency band is measurable by Spectrum Analyzer (dB), however, AC 60HZ extremely low frequency electric fields (V/m), magnetic field (mG) tests are not measurable by tester.
Voltage	• 90V ~ 264V.
Frequency	• Does not matter whether 50HZ or 60HZ (110V / 220V compatible)
Range	<ul style="list-style-type: none"> • Installation distance : within about 10~90cm in terminal power supply part • Install the ENSPD by attaching it directly to the terminal load (motor, equipment).(the closer the distance is, the better it is)
Main function	<ul style="list-style-type: none"> • Shielding and reducing electromagnetic waves- noise • With shielding and reducing leakage current, prevent electric shock
Additional function	• Shielding switching surge.(3.5KA)
Precaution	<ul style="list-style-type: none"> • Check and make sure the polarity matches before installation. • Select and install suitable products depending on the purpose of installation (shielding electromagnetic wave-noise, shielding leakage current) and the installation location.

ENSPD develops and supplies products in range or capacity. Therefore, it must be installed according to the range or capacity

Function of Product - Multifunction grounding leakage current shielding device

GD-2000 maintains the grounding state normally before electricity is supplied. And in conjunction with ECSPD, ENSPD, it transforms the signal in the form of constant voltage and sinusoidal voltage and frequency. In this manner, the terminal block capture leakage current and shields grounding current.



Product Name: Multifunction grounding leakage current shielding device

Model name: GD-2000

Role / Reason:

- Grounding leakage current shielding.
- Grounding divider role.
- Designed to enable connect FG-E1 and EPG-E2 to utilize 100% of ENSPD functions.

Precaution:

- E1 : Connect E1 and load ground wire.
- E2 : Connect E2 and load.
- ➔ If there are lots of load ground wire, additional ground dividers may be installed to connect the load ground wires.
- (Change the existing load ground connection to the new ground terminal)
- ※ E1 and E2 can be connected according to the ground wire capacity.

Thickness of ground wire:

- Thickness of ground wire = capacity of circuit breaker (rated current) × 0.0496
- ex) capacity of circuit breaker 50A is $50 \times 0.0496 = 2.48$ (i.e. 4SQ), capacity of circuit breaker 100 A is $100 \times 0.0496 = 4.96$ (i.e. 6 SQ) capacity of circuit breaker 250A is $250 \times 0.0496 = 12.4$ (i.e. 16SQ).
- Use an ground wire that is one size larger than that calculated for safety considerations.
- Proper thickness of ground wire shall be selected considering the function and protection level of the installation site.
- Comply with the Electrical Facilities Technical Standards and the Consumer's Electrical Installation Guide

How to connect GD-2000(Sub grounding and EC,ENSPD)

GD	SUB E3	GD	EC,ENSPD
		EPG	EPG connection
E2	Output connection	FG	FG connection
E1	Input connection	N	N connection
		L	L connection

GD-2000 develops and supplies products in range or capacity. Therefore, it must be installed according to the range or capacity

ECSPD Pre-Installation Compliance I

1. Electricity is like a living creature, so the result depends on the field conditions.
2. ECSPD is an electrical safety device that prevents electric shock by shielding, absorbing and reducing leakage current. Therefore, during installation, it is necessary to understand the site conditions such as leakage current. Must be installed after obtaining sufficient consent from the customer (reason, function, and effect)
3. ECSPD products are not universal. After reading the specifications of this product, you should install it according to the purpose and environment. We run a training program for the smooth on-site installation of the product. You must understand the product through continuous and repetitive training. The installation manual provides basic installation instructions. Every site has a different environment In this case, you need to increase your installation capacity through experience and training.
4. This product is a different concept from the existing electrical appliances. You must understand our products through our training.
5. Look at the field environment
 - When (+), (-) changes from wrong electrical wiring
 - If the wire sheath is peeled off but not known (it is difficult to find the leak point even if leakage occurs).
 - The switchboard has three types of ground, but the rest is not grounded.
 - When there is a large amount of leakage (installed after checking for leakage current) in large loads and other large refrigerators for restaurants.
 - If the wire touches the ground but the breaker does not trip
 - Even if the wire sheath is peeled off, it is okay in normal times, but if the sheath is blown under the eaves.
 - When a lot of leakage flows to other load (large load, medium load, small load)
 - There are many other cases that only experienced people can know → This cannot be solved by education alone.
6. We are upgrading our products to make installation as simple as possible. (Example: GD-2000 Development.)

ECSPD Pre-Installation Compliance II

I. Cause of leakage.

1. Leakage occurs in all places where electricity is used.

Leakage is affected by a number of environments-equipment life, cable life, ageing of facilities, exposure to cables, etc.

2. The older the wire, the greater the leakage.
3. The amount of leakage varies depending on the load (capacity) used.
4. The amount of leakage depends on the number of outlets.
5. The amount of leakage varies depending on the construction environment.
6. Other

Even if the leakage is measured at the same place and the same time as above, the leakage is measured differently.

Therefore, the installer must install the ECSPD by predicting the leakage in the field.

II. ECSPD quantity calculation and installation.

1. The quantity of ECSPD is calculated according to the site conditions (leakage), so the installer must check the site.

In addition, the installer must complete the installation training of the head office and be eligible.

2. ECSPD cannot be installed by anyone.

-Electrical Safety Standards Act: It is to be installed by employees of companies registered with Korea Electrical Safety Corporation.

-The contract with the installer is based on the registration of the Electrical Safety Corporation.

ECSPD Pre-Installation Compliance II

I . ECSPD is a product to prevent electric shock due to leakage current shielding, absorption and reduction.

ECSPD must be installed together with the GD-2000 in the distribution board.

-ECSPD and GD-2000 are one set.

II. ENSPD shields, absorbs and reduces electromagnetic and noise. → This product protects the human body and the device.

- Install in the same way as ECSPD.

- ENSPD and GD-2000 are one set.

- ENSPD is equipped with ECSPD function as well as electromagnetic wave, noise shielding and reduction.

III. Even if ECSPD and ENSPD are installed in one place, they are installed to be interoperable.

IV. Why release the GD-2000 as a set with ECSPD or ENSPD

1. It can shield the ground current from the ground.

2. In addition, cutting the ground wire may deviate from electrical safety construction standards.

So use the ground wire without cutting

3. GD-2000 can utilize ground fault current shielding and absorption function of FG and load leakage current shielding and absorption function of EPG. -> 100% leverage the functionality of ECSPD and ENSPD

Headquarters Principle

※ Qualification standard to be able to install

1. According to the Electricity Installation Construction Act, it must be installed by a licensee (business operator).
2. Each country complies with its regulations.
3. Please be sure to install it according to our installation manual after understanding the product.

※ When the product is connected to the load, the existing ground current (or leakage current by the equipment used) may occur suddenly.

1. In this case, the leakage current caused by the ground current is collected (or extinct) and the device is not affected.
(Electric shock prevention)

2. For this purpose, the standard of the product design was set to 5 ohms.

3. Each site may have less than the existing ground resistance.
To prepare for this, we will provide a guideline for the installation manual.
4. Before installing ECSPD and ENSPD, check the ground resistance of each device and make sure to check for safety accidents.

ECSPD Installation order and method

1. Install ECSPD + GD-2000 in the distribution panel [ECSPD must be installed together with GD-2000].
 - 1) 1 phase: 1 installation. 2) 3 phase: 3 installation
2. Checklist before installation
 - 1) Measure leakage current of main ground before installing ECSPD + GD-2000 in the distribution board.
 - 2) After installing ECSPD + GD-2000 in the distribution board, measure the leakage current of the main ground. (Confirm with the consumer)
 - After installing ECSPD + GD-2000 in the distribution board,
 - if the main ground check is over 1 ~ 2mA, install one load of ECSPD (from large load).
 - > Install one ECSPD and check the main ground again, or > Put the bulb with the demo kit's collecting net under water for testing.
 - If it is tripped because of the light bulb in the water, it is the evidence of high leakage.
 - > Install ECSPD on the next load.

What is GD-2000?

GD-2000 maintains the grounding state normally before electricity is supplied. And in conjunction with ECSPD, ENSPD, it transforms the signal in the form of constant voltage and sinusoidal voltage and frequency. In this manner, the terminal block capture leakage current and shields grounding current

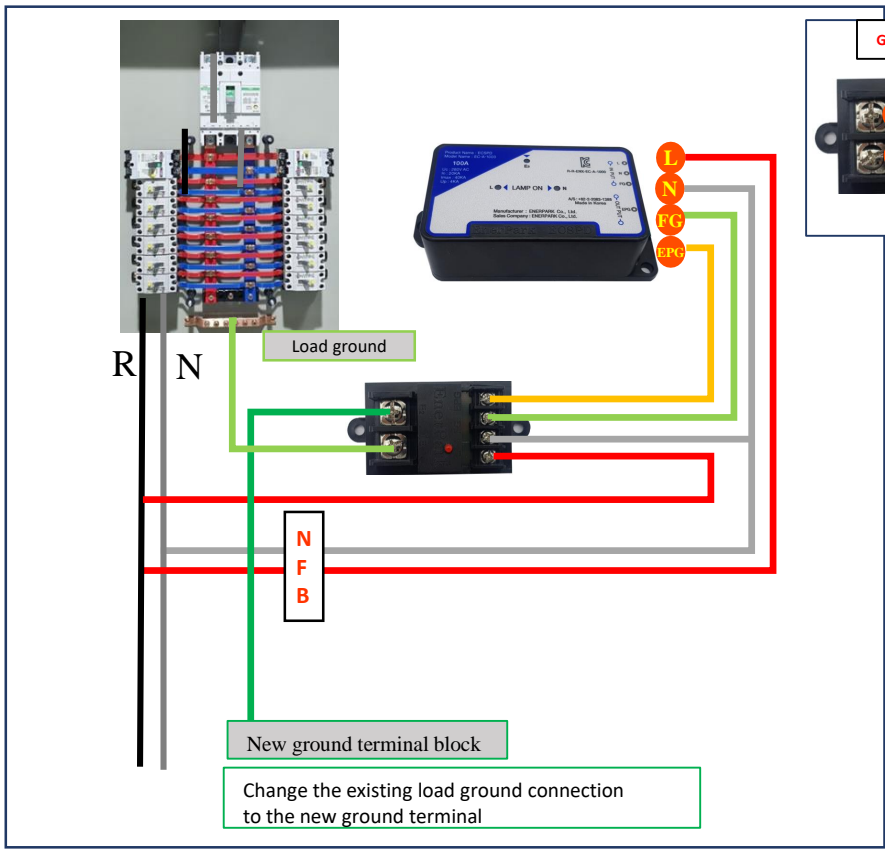
- E1 : Connect E1 and load ground wire.
- E2 : Connect E2 and load.
 - ➔ If there are lots of load ground wire, additional ground dividers may be installed to connect the load ground wires.
- E1 and E2 can be connected according to the ground wire capacity.

◆ How to check polarity.

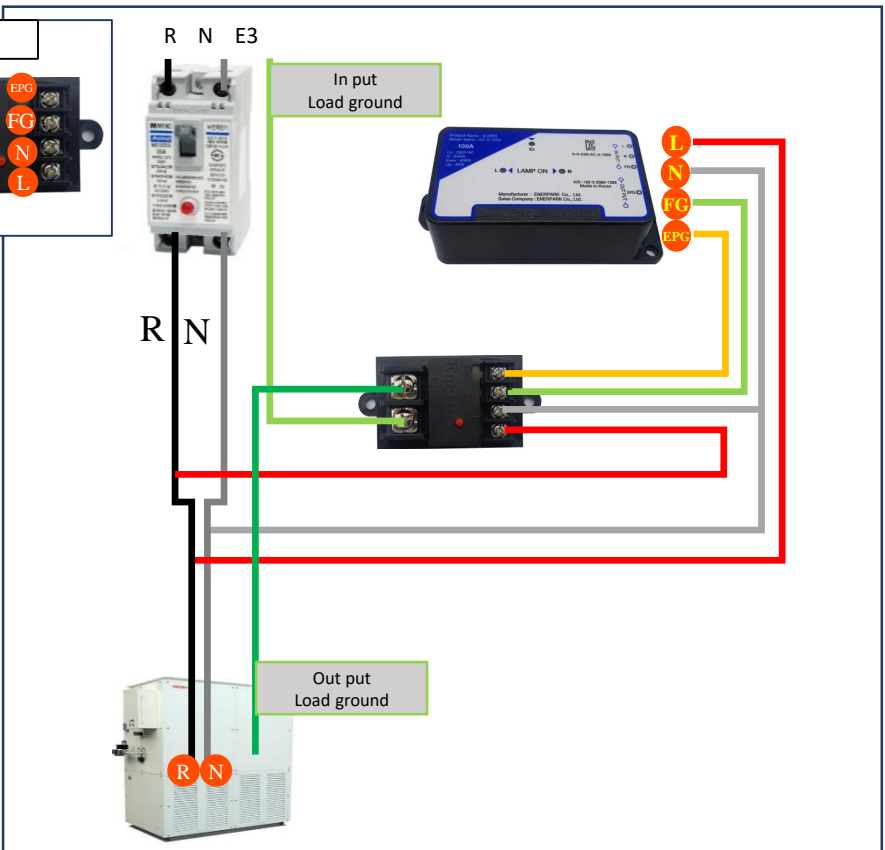
- If the polarity is correct.
 - : L, N and E3 lamp-On.

Installation Method - in case there is an ground(For shielding leakage current)

❖ Distribution board (1 phase 2-wire system)

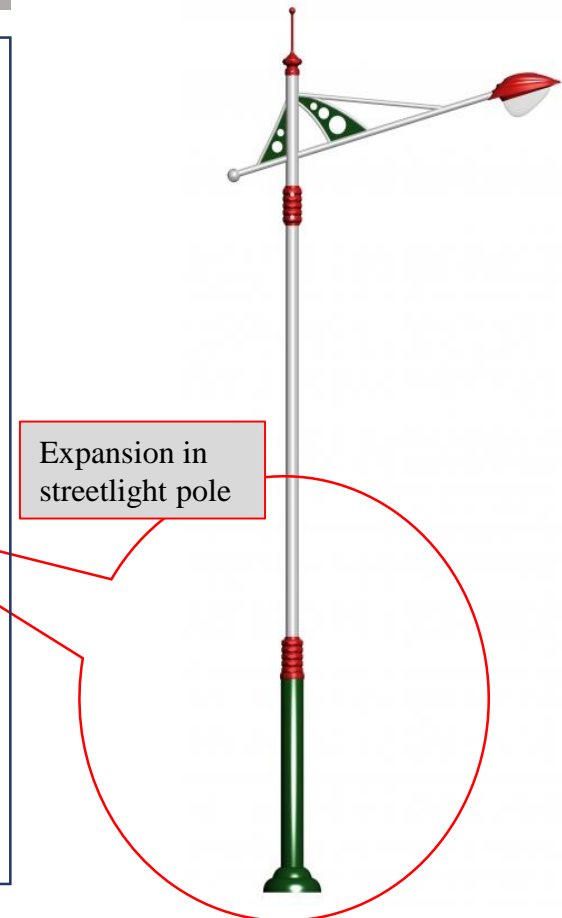
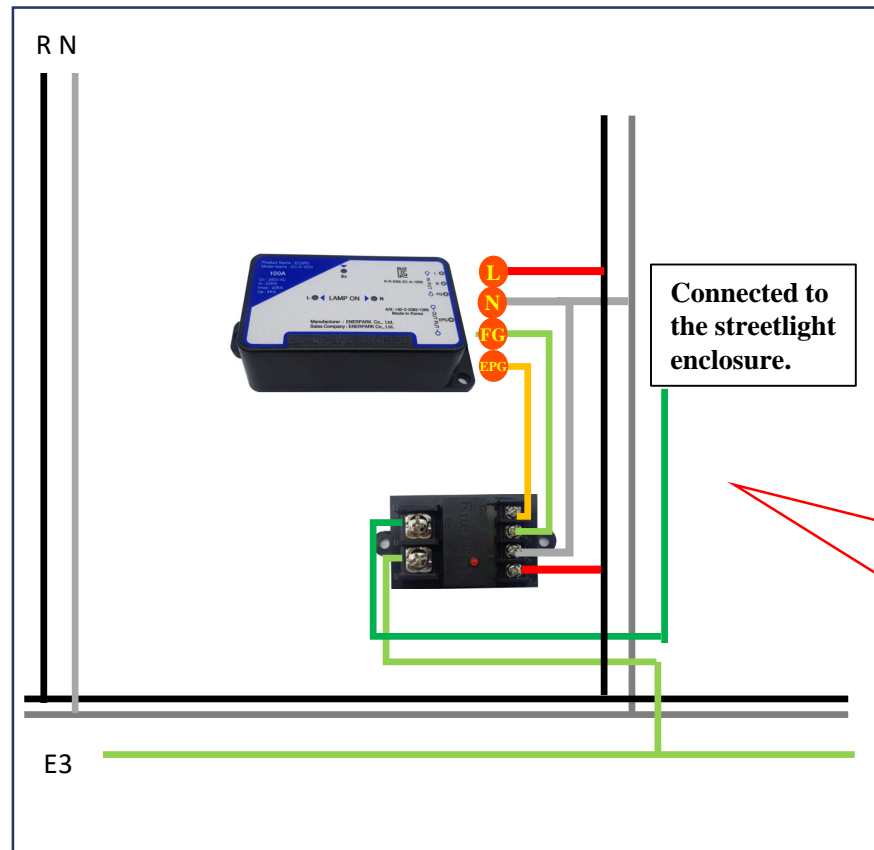


❖ Load (1 phase 2-wire system)



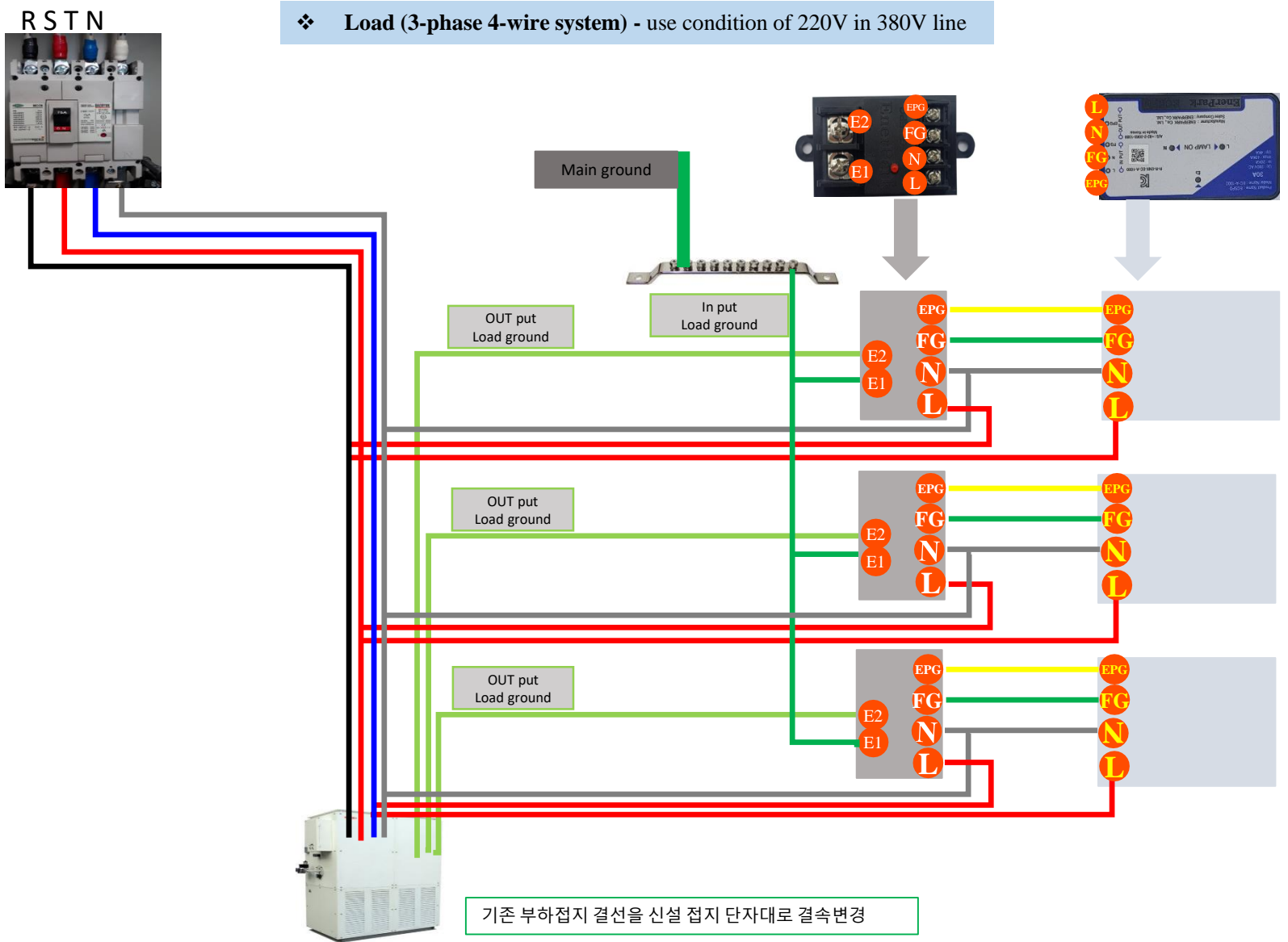
Installation Method - in case there is an ground(For shielding leakage current)

❖ Installation method of streetlight pole (1 phase 2-wire system)



Installation Method - in case there is an ground(For shielding leakage current)

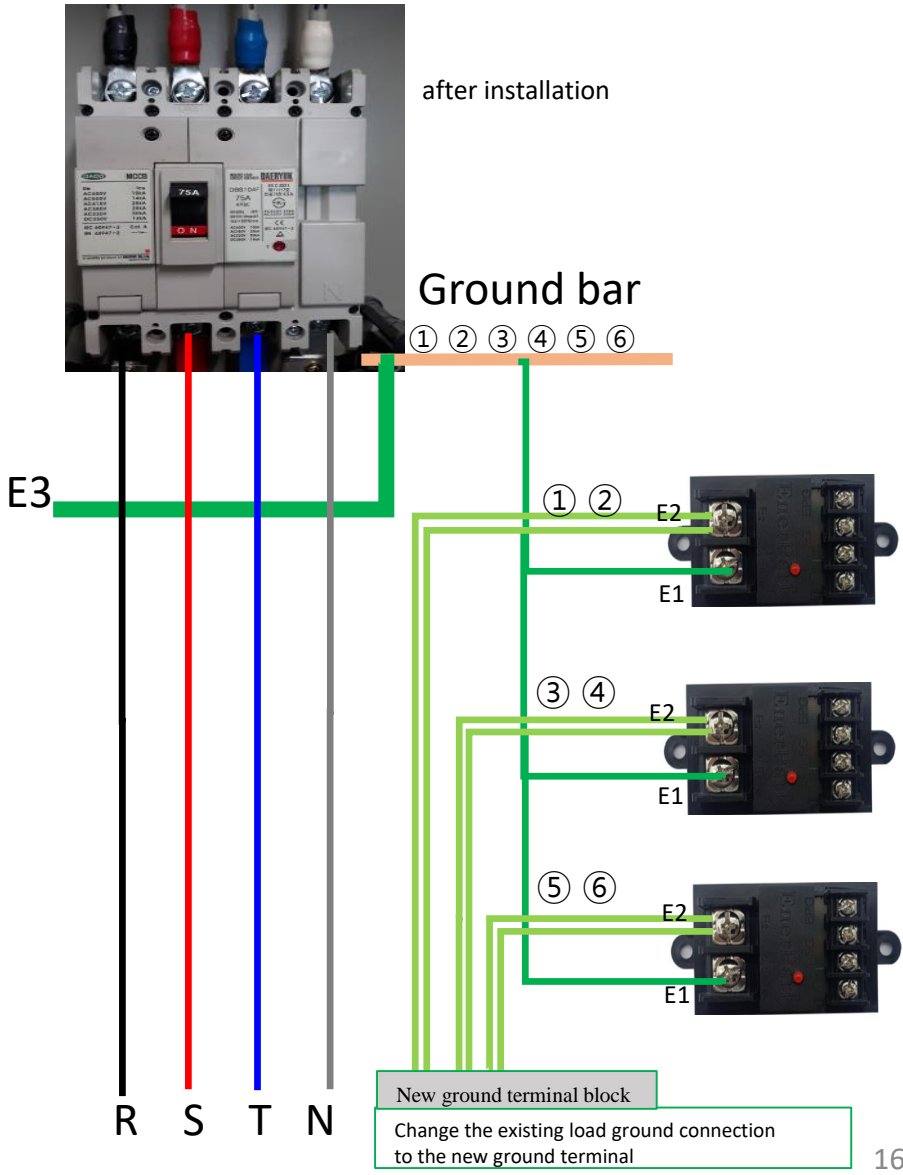
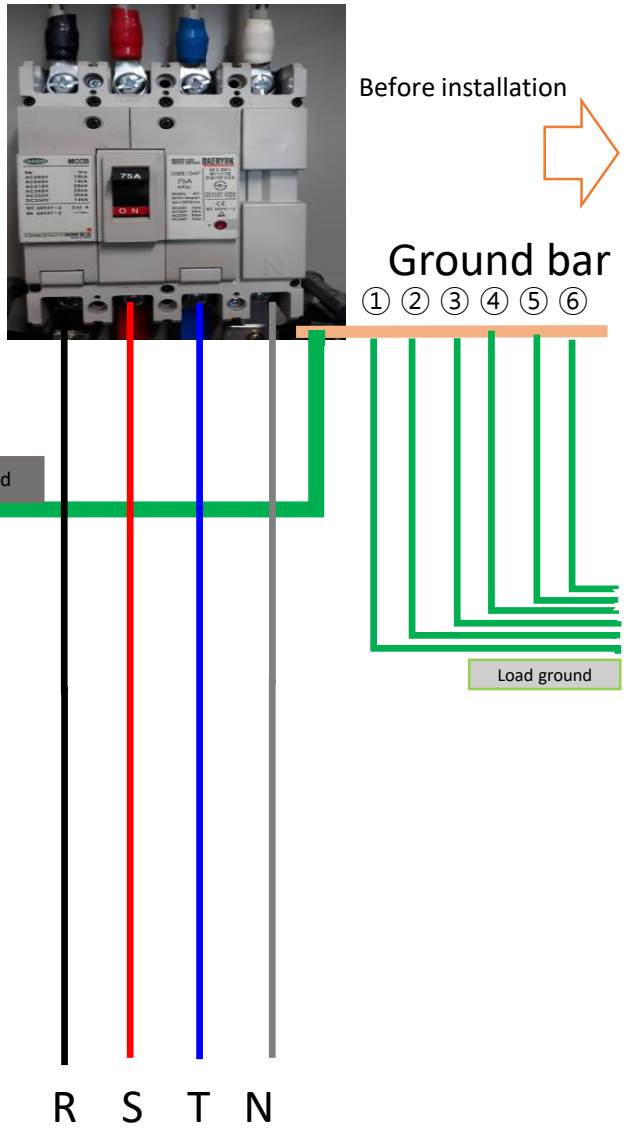
❖ Load (3-phase 4-wire system) - use condition of 220V in 380V line



기존 부하접지 결선을 신설 접지 단자대로 결속변경

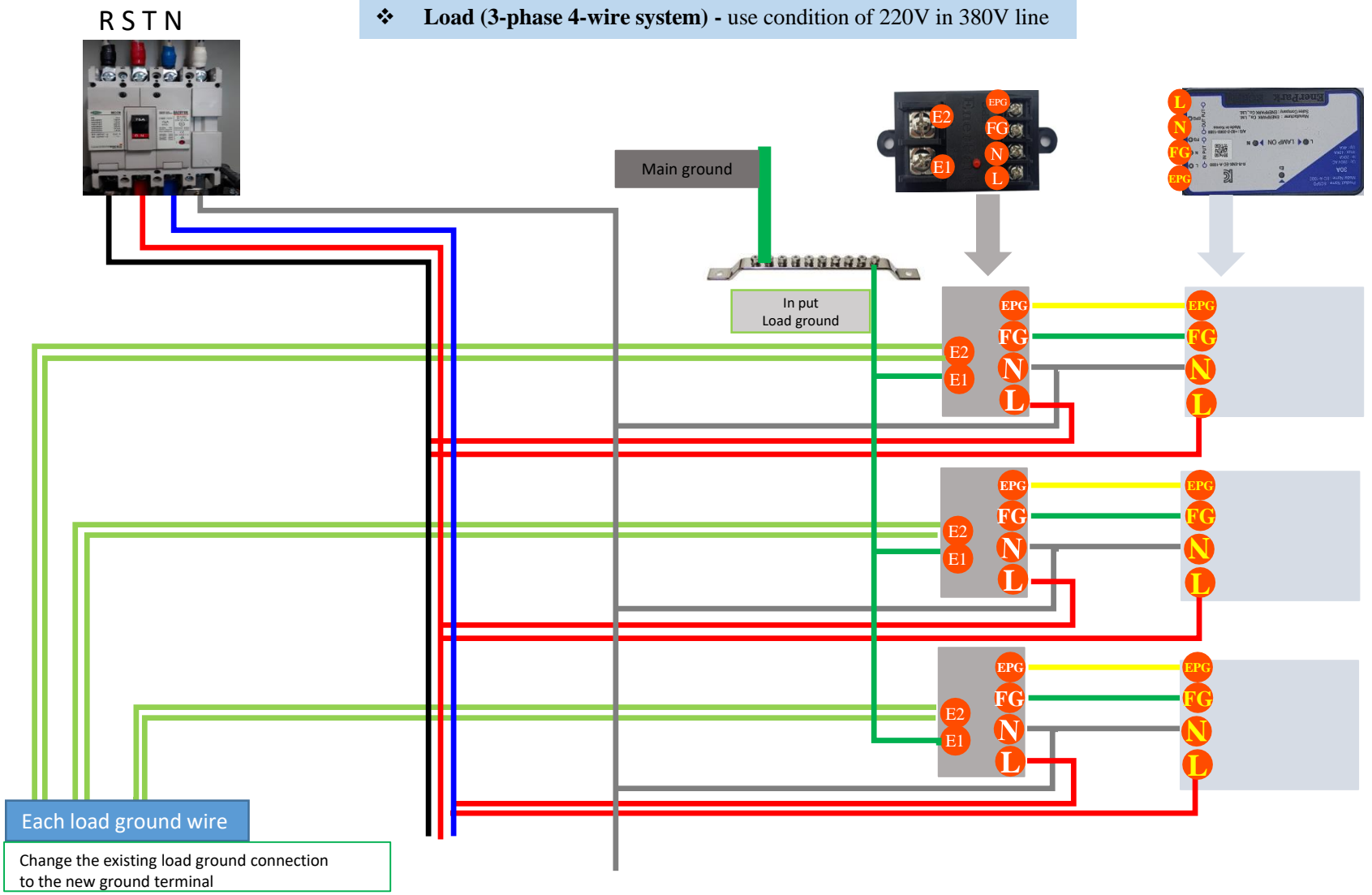
Installation Method - in case there is an ground(For shielding leakage current)

✘ How to install if there are 6 sub grounds



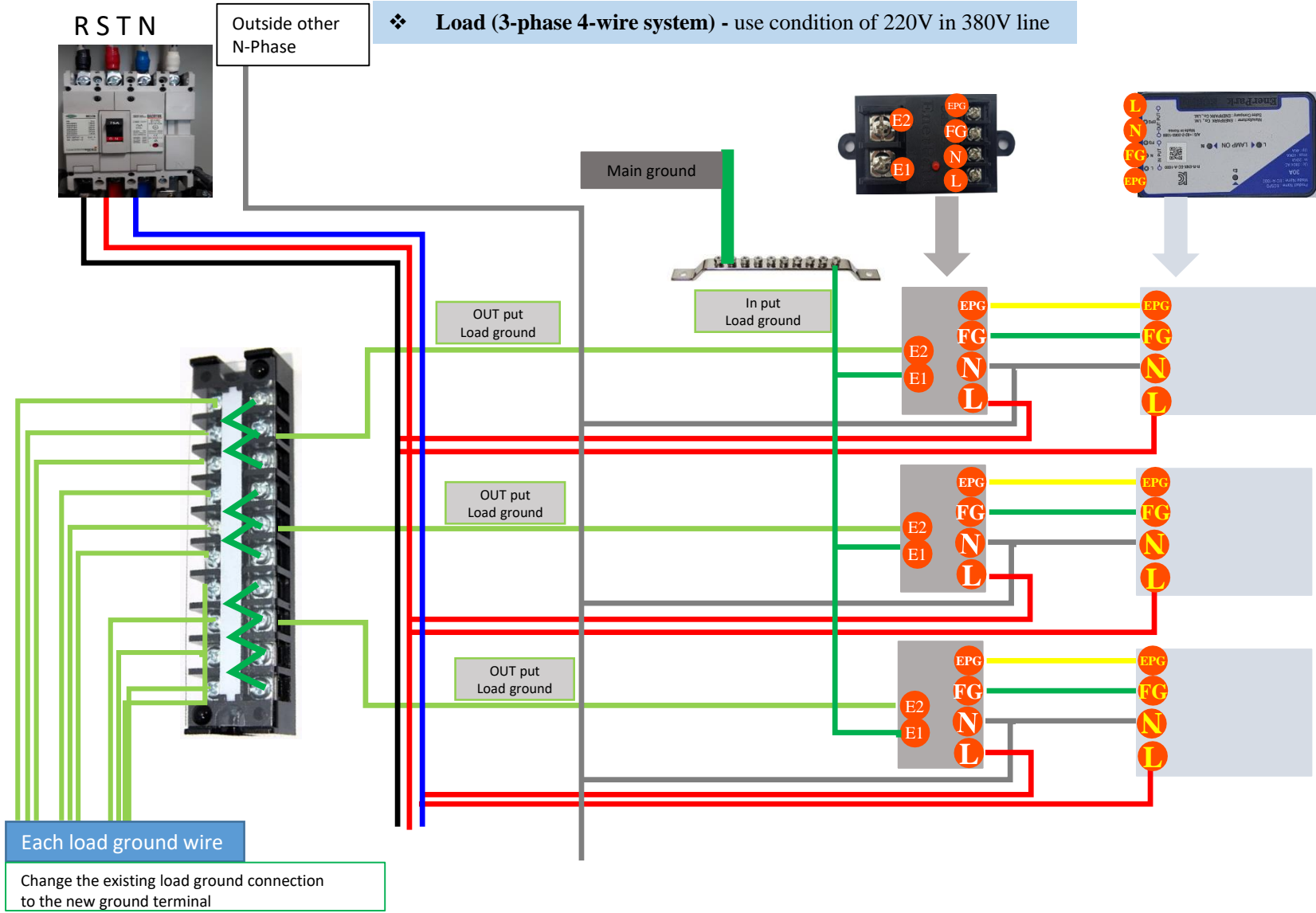
Installation Method - in case there is an ground(For shielding leakage current)

❖ Load (3-phase 4-wire system) - use condition of 220V in 380V line

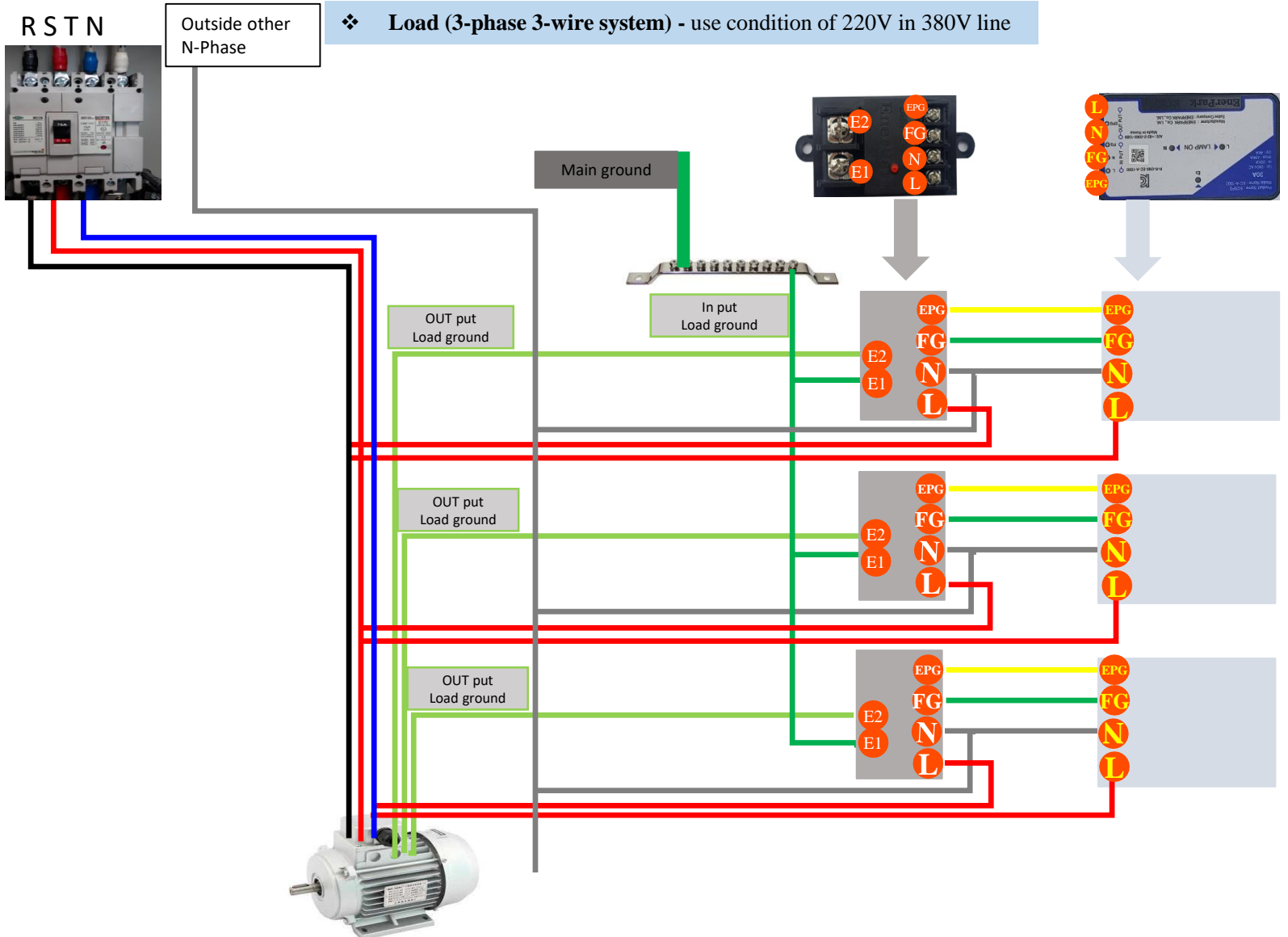


Installation Method - in case there is an ground(For shielding leakage current)

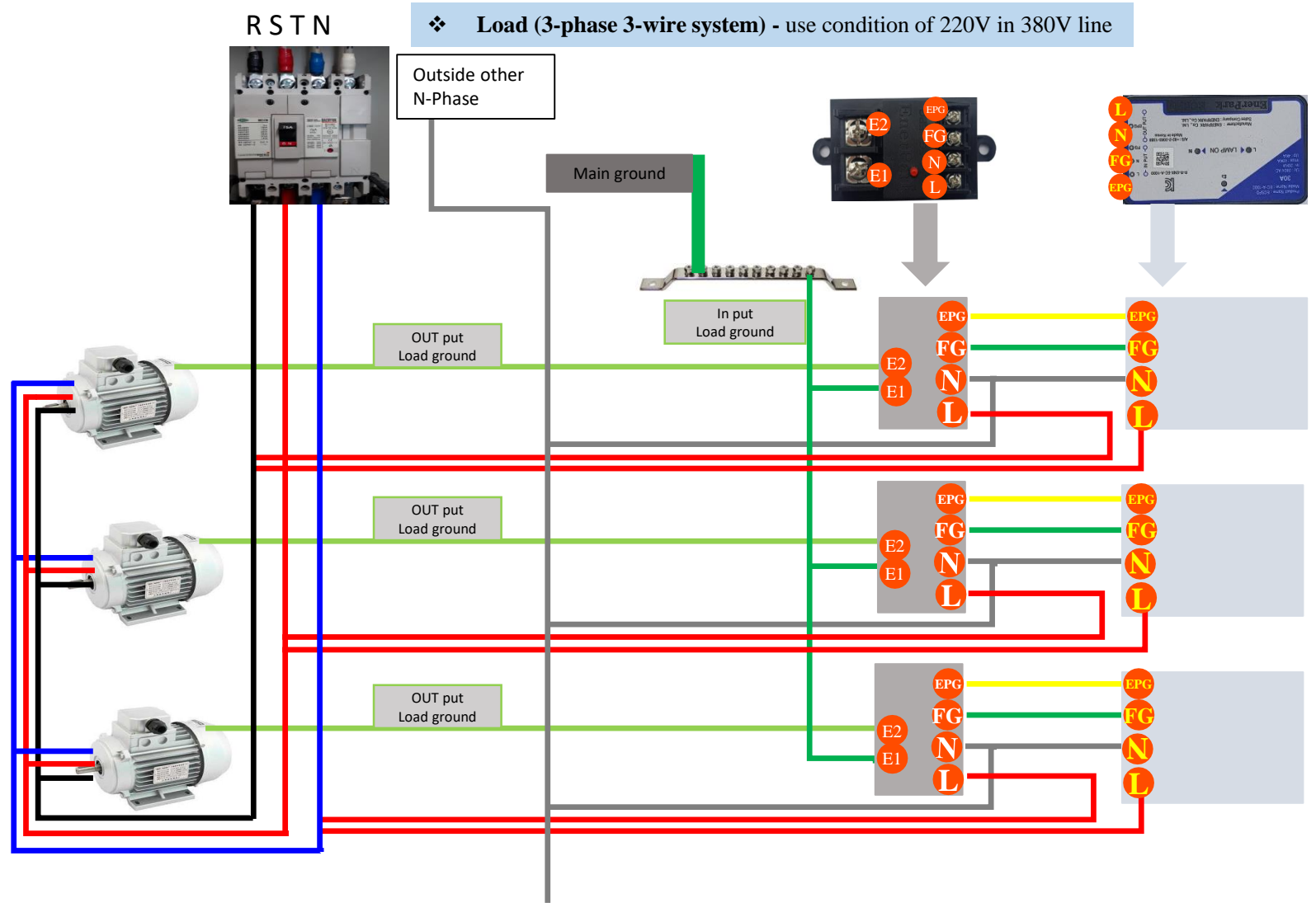
❖ Load (3-phase 4-wire system) - use condition of 220V in 380V line



Installation Method - in case there is a ground (For shielding leakage current)

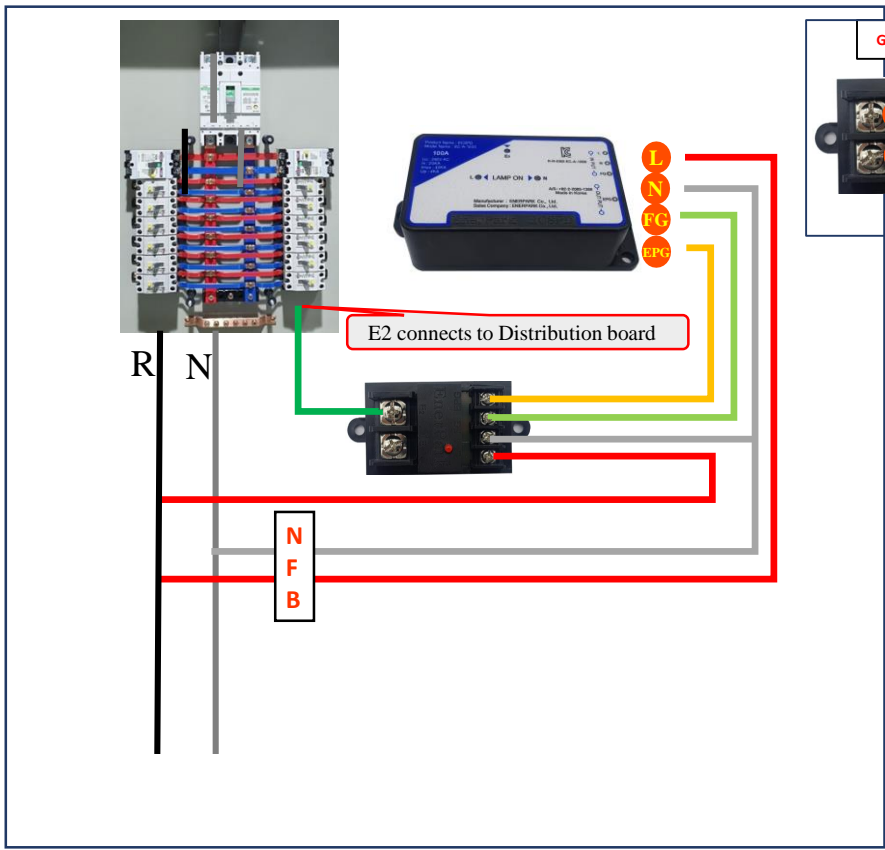


Installation Method - in case there is an ground(For shielding leakage current)

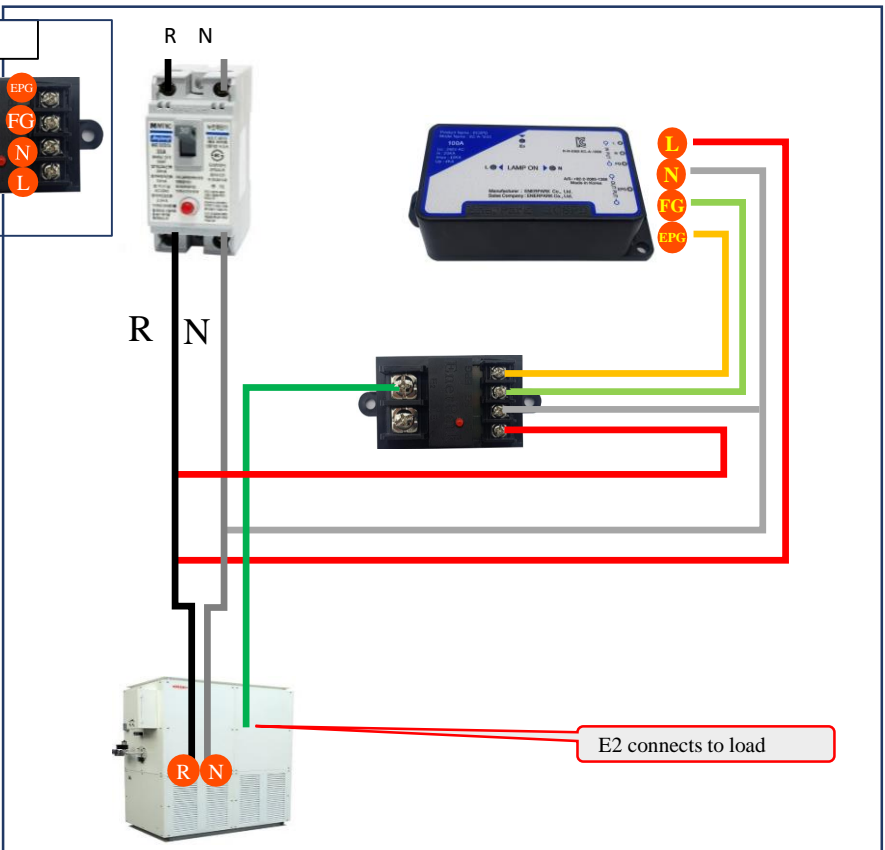


Installation Method - in case there is no ground (For shielding leakage current)

❖ Distribution board (1 phase 2-wire system)

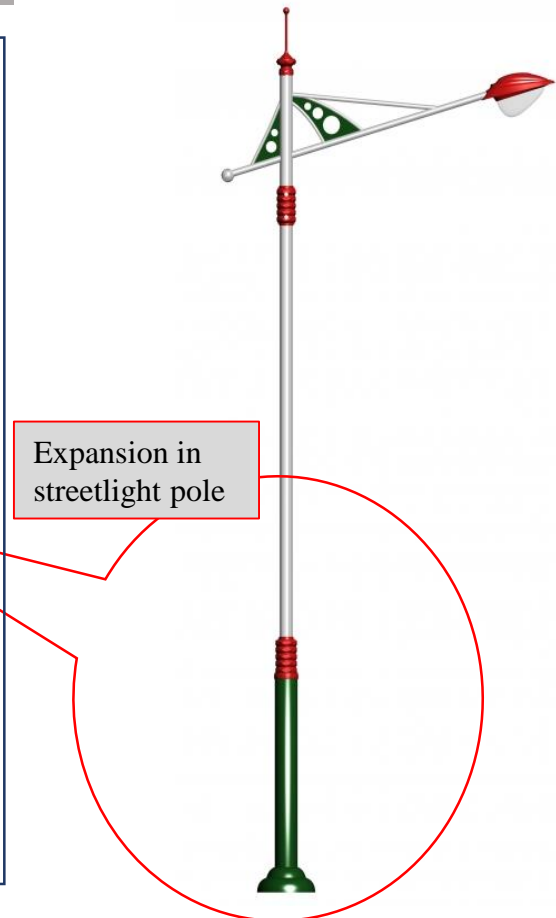
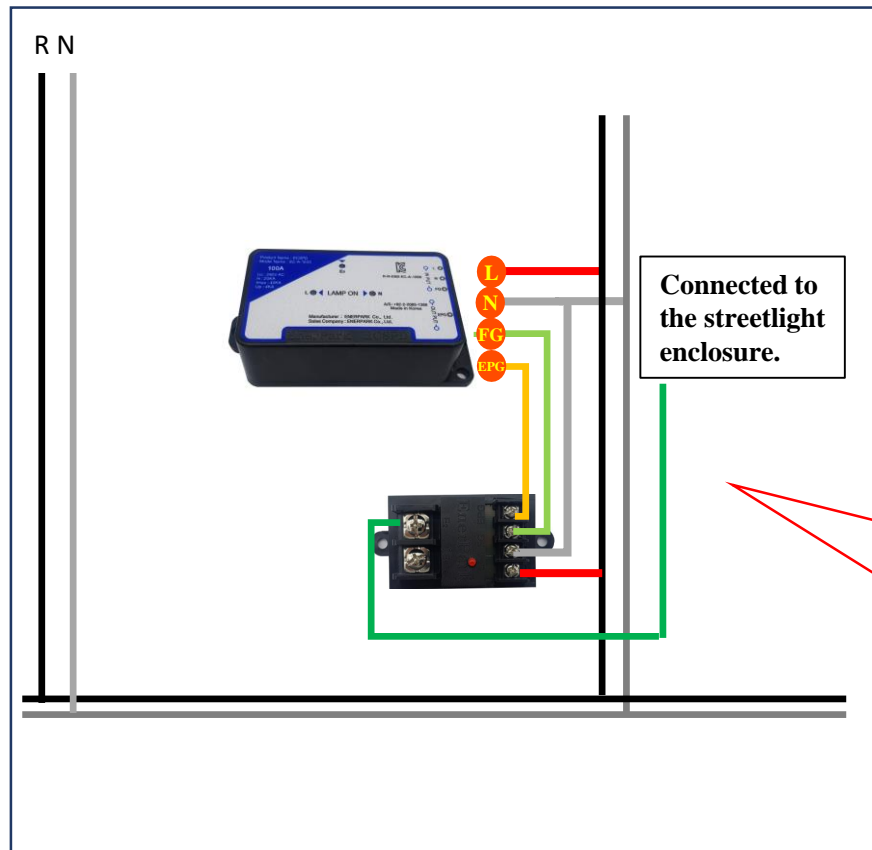


❖ Load (1 phase 2-wire system)



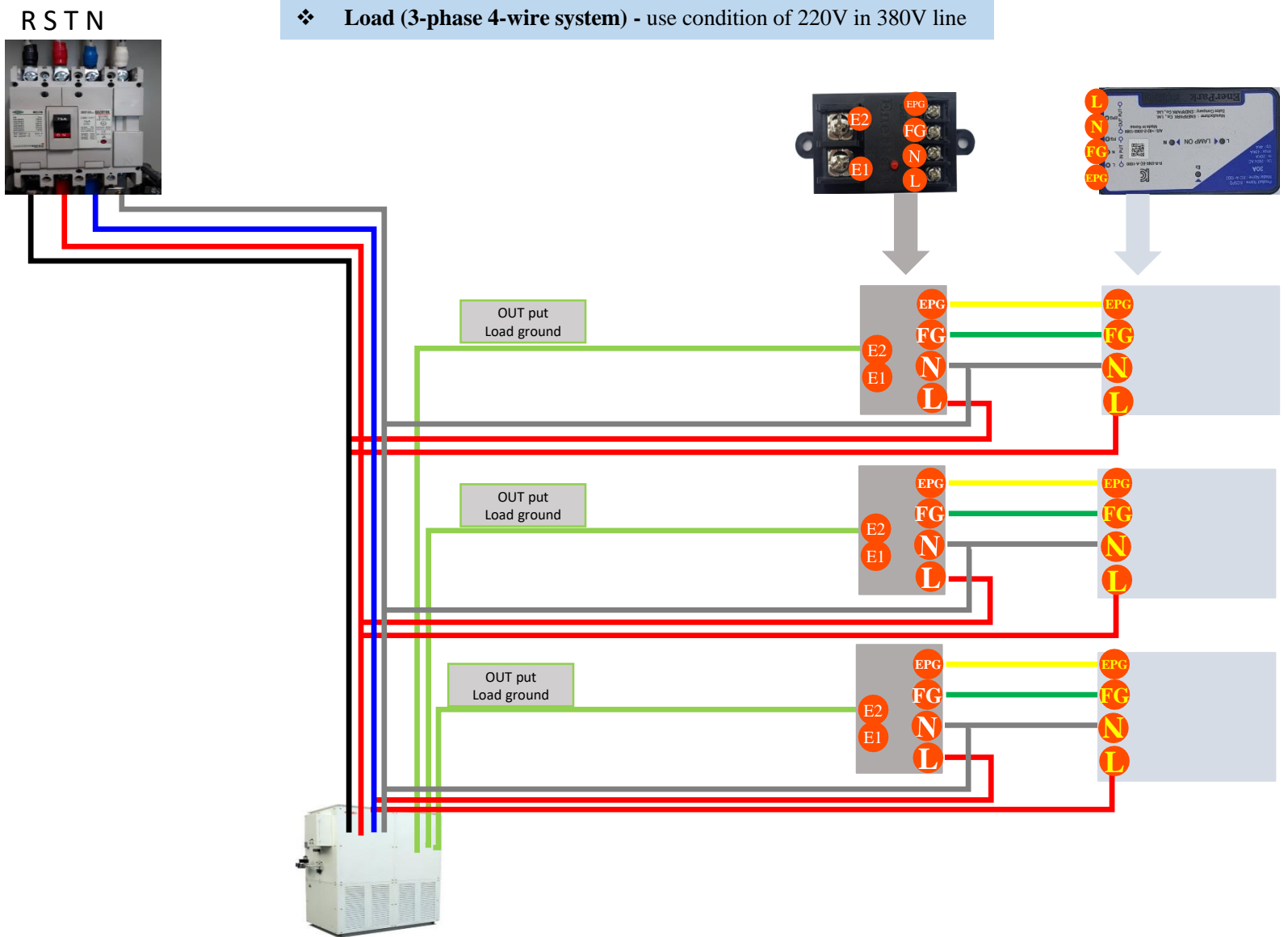
Installation Method - in case there is no ground (For shielding leakage current)

❖ Installation method of streetlight pole (single phase 2-wire system)



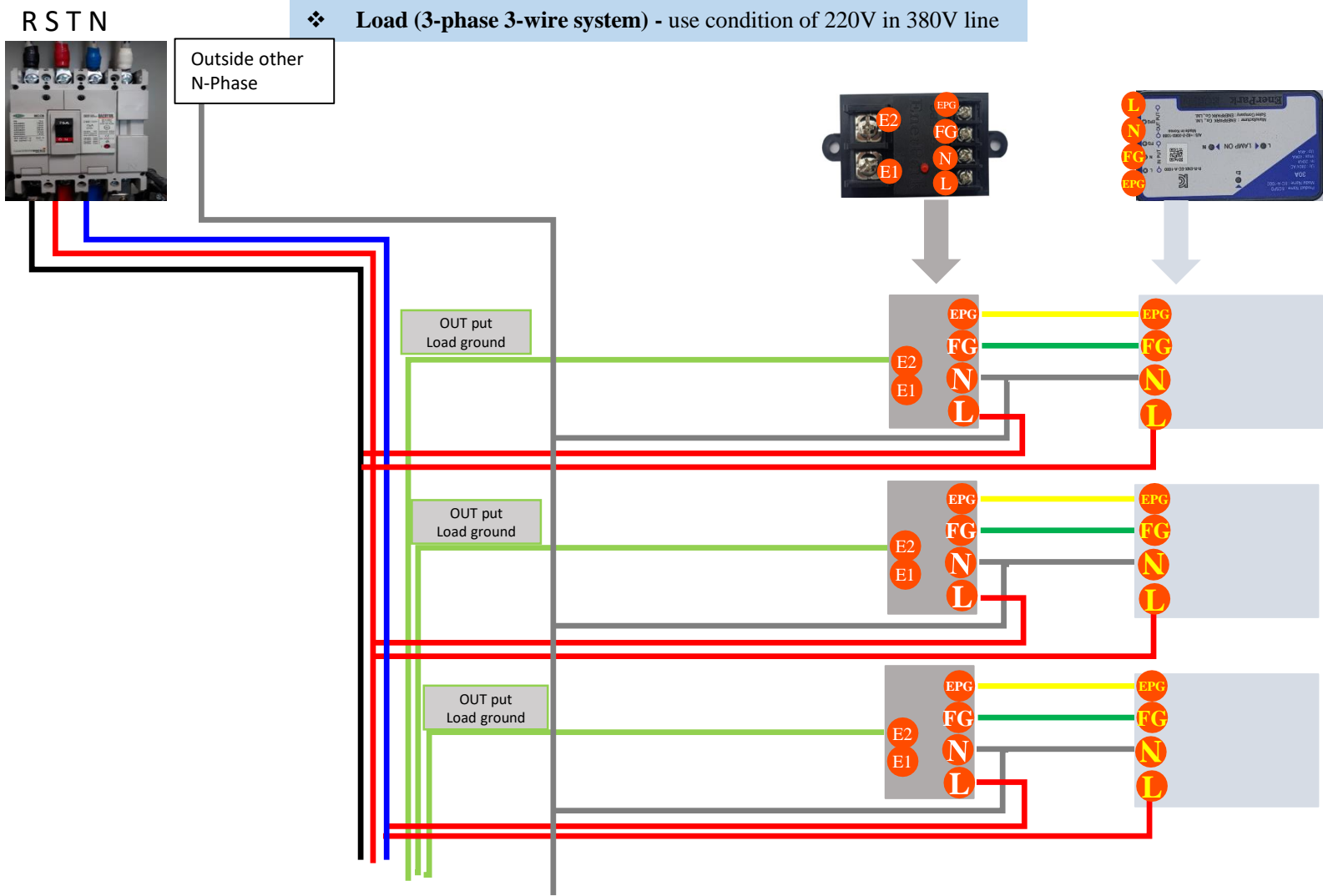
Installation Method - in case there is no ground (For shielding leakage current)

❖ Load (3-phase 4-wire system) - use condition of 220V in 380V line

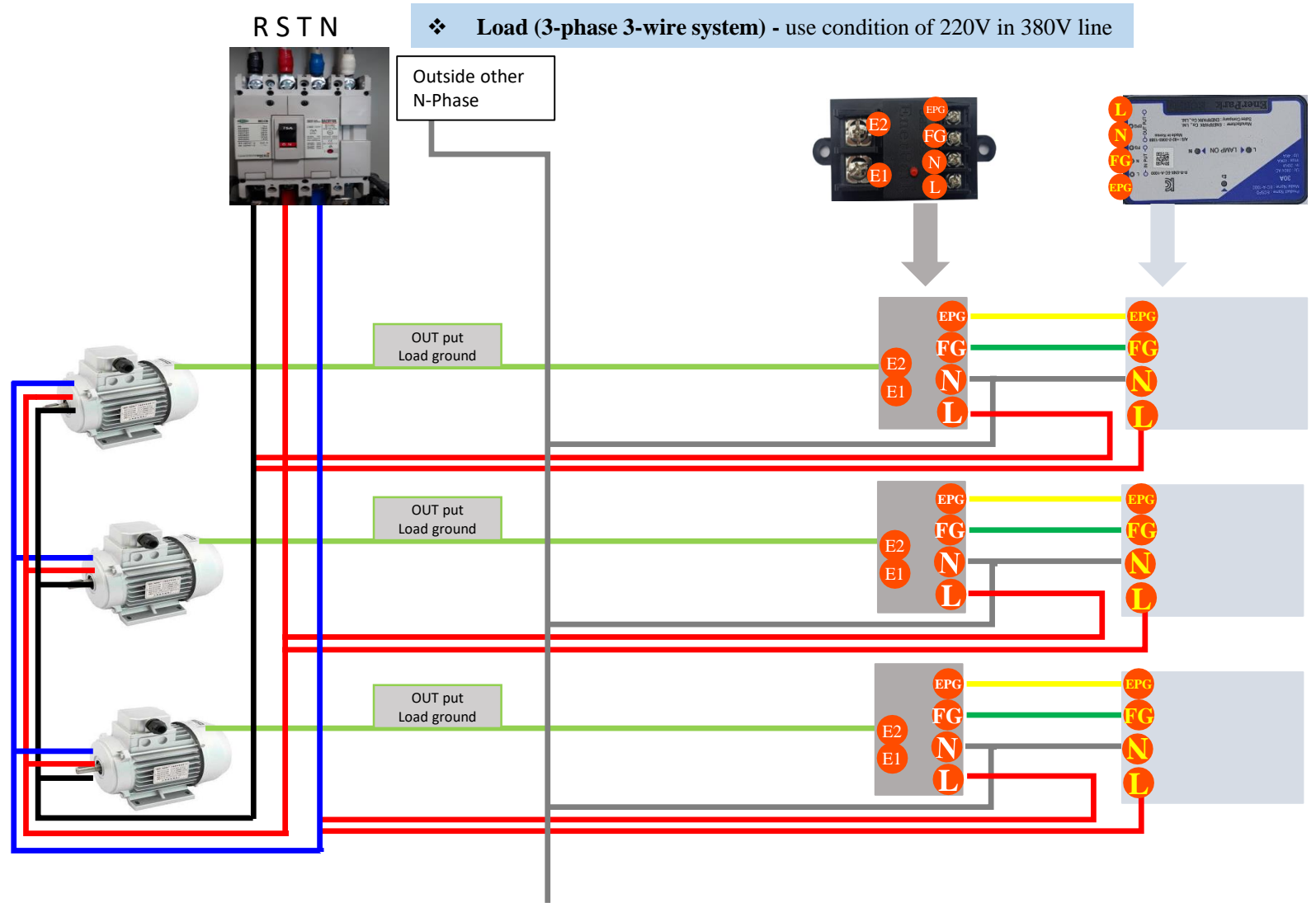


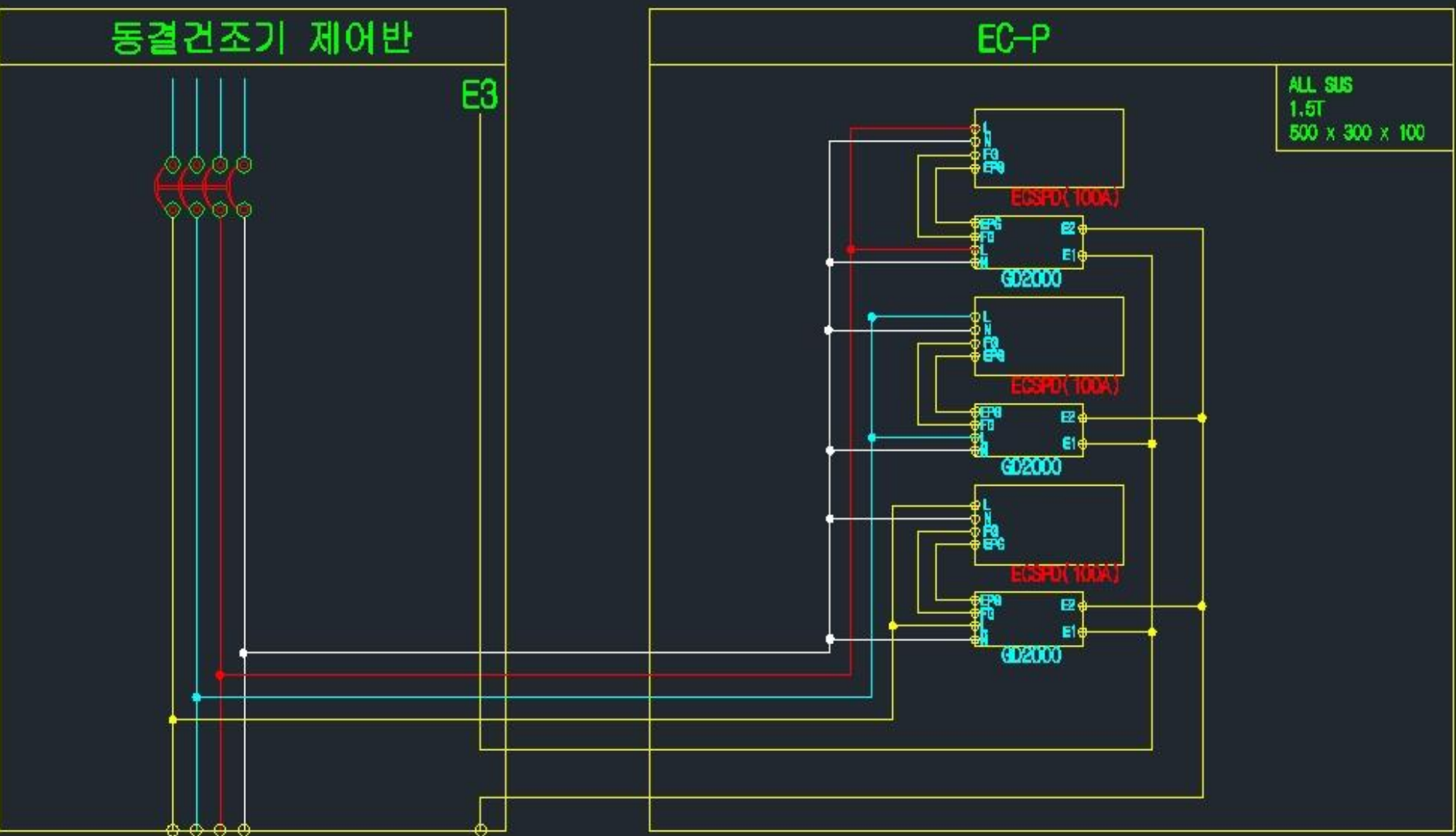
Installation Method - in case there is no ground (For shielding leakage current)

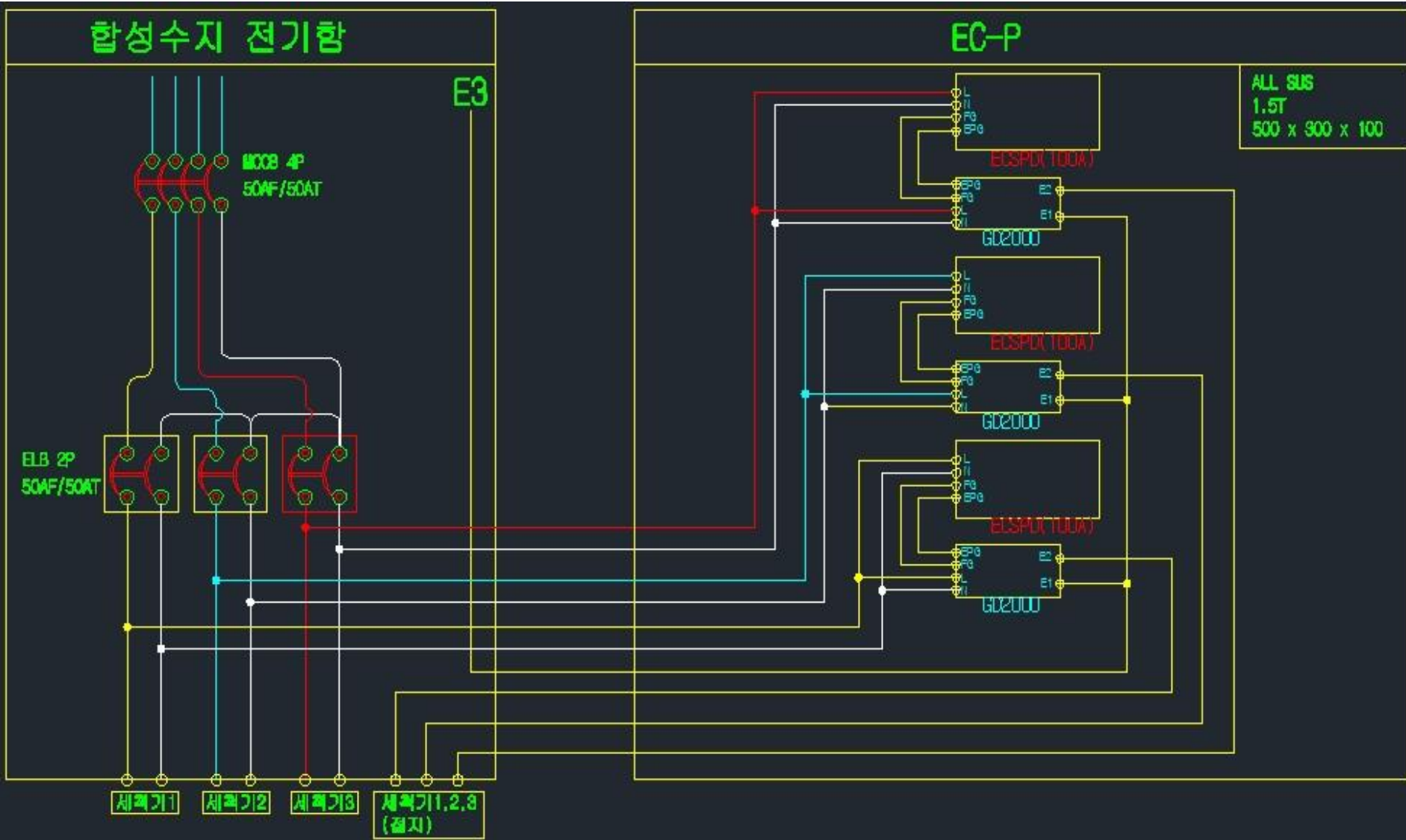
❖ Load (3-phase 3-wire system) - use condition of 220V in 380V line



Installation Method - in case there is no ground (For shielding leakage current)

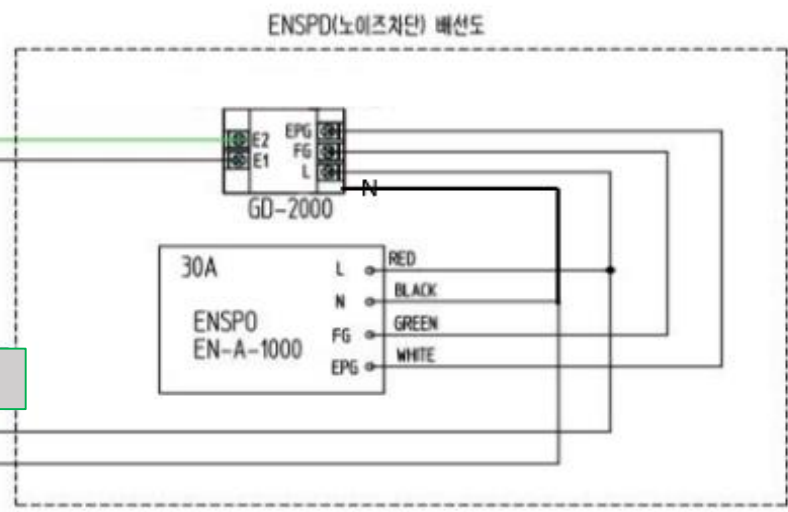
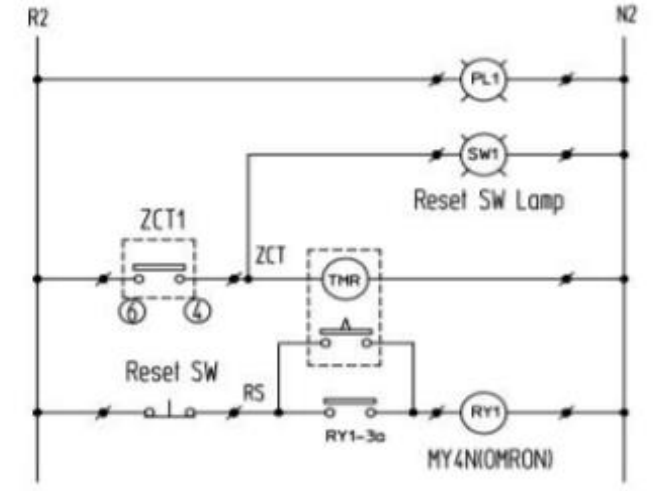
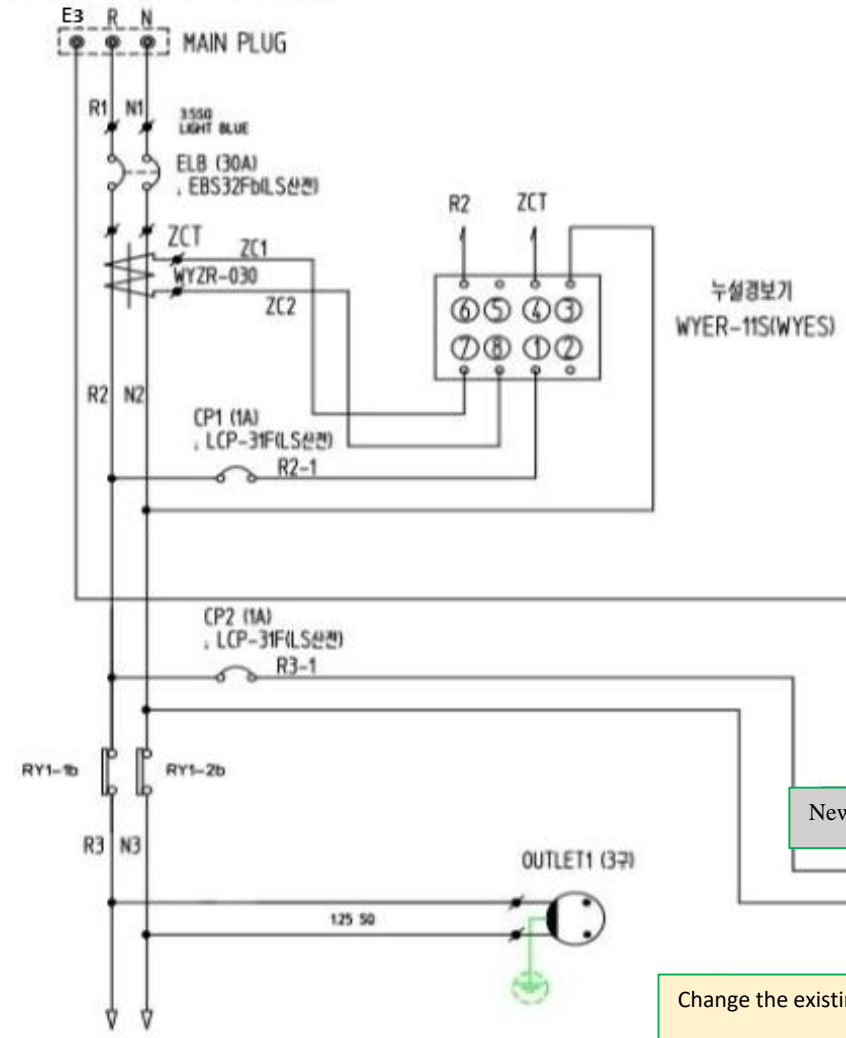






ECSPD, ENSPD + GD-2000 (Educational Installation Manual)

1P 3W AC220V 60/50Hz



Change the existing load ground connection to the new ground terminal

ECSPD, ENSPD + GD-2000 (Educational Installation Manual)

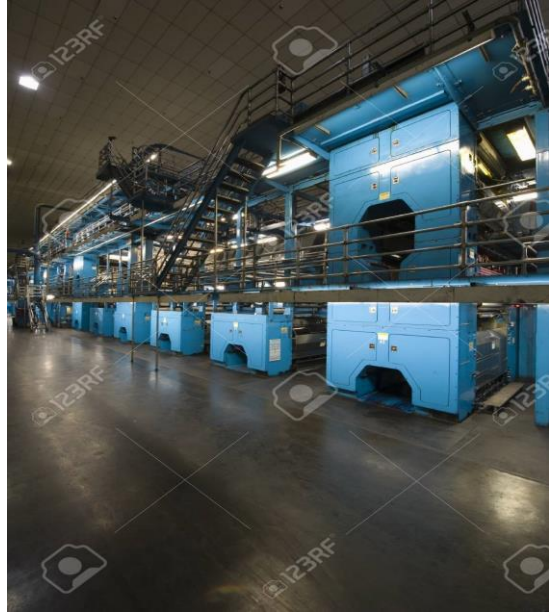
In case of integrated installation -How to install factory



- ◆ -Distribution board :
3Ø - 4w.
- Install three ECSPDs.
- GD must be included.



- Load
- ENSPD(Electromagnetic waves, noise)
- 1Ø : 1 installations.
- 3Ø : 3 installations.
- GD must be included.



- ◆ Load
- ENSPD (Electromagnetic waves, noise)
- 1Ø : 1 installations.
- 3Ø : 3 installations.
- GD must be included.



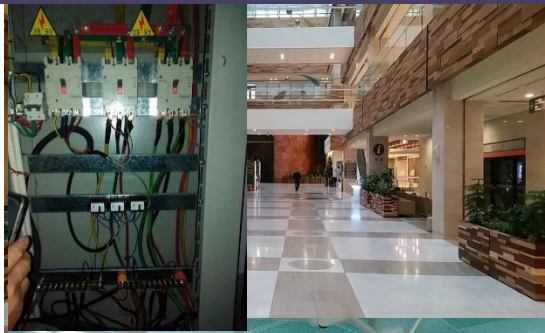
- Distribution board : 1Ø
- Install 1 ENSPD.
- GD must be included.



- Distribution board : 1Ø
- ECSPD :1 installations or ENSPD : 1 installations
- GD must be included.

-When installing the ECSPD, measure the leakage current of the distribution panel main ground.
-If the leakage current is 10mA, install 1set (ECSPD or ENSPD + GD) in each part as above.
- Measure leakage current of main ground and install ECSPD or ENSPD until 1 ~ 2mA comes out.

In case of integrated installation - How to install hospital



◆ Distribution board :
 3Ø - 4W.
 -Install three ECSPDs.
 -GD must be included.



-Distribution board : 1Ø
 -ECSPD :1 installation.
 -GD must be included.



◆ Operating room
 -Distribution board :
 3Ø - 4W.
 -Install three ENSPDs.
 -GD must be included.



-Distribution board : 1Ø
 -ECSPD :1 installation.
 -GD must be included.



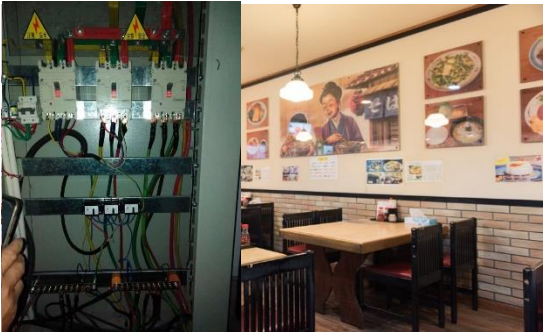
◆ Operating room
 -Distribution board :
 3Ø - 4W.
 -Install three ENSPDs.
 -GD must be included.



-Distribution board : 1Ø
 -ECSPD :1 installation.
 -GD must be included.

-When installing the ECSPD, measure the leakage current of the distribution panel main ground.
 -If the leakage current is 10mA, install 1set (ECSPD or ENSPD + GD) in each part as above.
 - Measure leakage current of main ground and install ECSPD or ENSPD until 1 ~ 2mA comes out.

In case of integrated installation - How to install restaurant



◆ Distribution board :
 3Ø - 4W.
 -Install three ECSPDs.
 -GD must be included.



-Distribution board : 1Ø
 -ECSPD : 1 installation.
 -GD must be included.



◆ Distribution board :
 3Ø - 4W
 -Install three ECSPDs.
 -GD must be included.



-Distribution board : 1Ø
 -ECSPD : 1 installation.
 -GD must be included.



-Distribution board : 1Ø
 -ECSPD : 1 installation.
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-When installing the ECSPD, measure the leakage current of the distribution panel main ground.
 -If the leakage current is 10mA, install 1set (ECSPD or ENSPD + GD) in each part as above.
 - Measure leakage current of main ground and install ECSPD or ENSPD until 1 ~ 2mA comes out.

In case of integrated installation - How to install apartment



- Distribution board : 1-phase 2-wire.
- Install 1set(ECSPD + GD)
- If leakage current value is less than 2mA: complete
- If leakage current value is more than 2mA: In addition, one set(ECSPD + GD)is installed in the load.



- Distribution board : 3-phase 4-wire.
- Install 3set(ECSPD + GD)
- If leakage current value is less than 2mA: complete
- If leakage current value is more than 2mA: In addition, one set(ECSPD + GD)is installed in the load.

- When installing the ECSPD, measure the leakage current of the distribution panel main ground.
- If the leakage current is 10mA, install 1set (ECSPD or ENSPD + GD) in each part as above.
- Measure leakage current of main ground and install ECSPD or ENSPD until 1 ~ 2mA comes out.



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THANK YOU!