

Instruction Manual

MODEL EJ SERIES



SAFETY

**This power supply unit generates high voltage and energy.
Electric shock may lead to death or serious injury.
Be sure to follow the instructions below and handle the unit with caution.**

1. BE SURE TO GROUND!!

Be sure to ground the power supply unit before use.

2. DO NOT TOUCH ANY HIGH VOLTAGE TERMINALS!!

Do not operate the power supply unless someone who is familiar with the operation precede, the hazards of high voltage, and the treatment for the electrical shock is present.

3. UNDERSTAND THE HAZARDS OF HIGH VOLTAGE!!

In case you let somebody operate the power supply for you, must be sure that he/she fully understands the hazards of high voltage and the areas where never can be touched.

4. CUT OFF THE POWER BEFORE TOUCH THE UNIT!!

Cut off the power, and check that the power is OFF, before you touch the power supply. Capacitors in the output circuit are still charged and dangerous even after the power has been cut off. Discharge all remaining high voltage by grounding them.

5. DISCONNECT THE INPUT LINES(AC LINES) !!

In case you need to touch the inside of the power supply following instruction manual, cut off the power and disconnect the input lines(AC lines), and ground all the capacitors and high voltage section.

Don't remove the case or touch the inside of power supply unless so instructed in the instruction manual.


6. OPERATE THE POWER SUPPLY WITH YOUR RIGHT HAND!!


In order to avoid the electric shock to your important organs, operate the power supply with your right hand and keep your left hand off from the power supply.

For Safe Use

Symbols


Various symbols are used in this instruction manual and on the product for ensuring safety. What will be caused by ignoring the instructions given with the symbols or by improper handling are classified as shown below. Read carefully and understand the descriptions before proceeding to the main body of this manual.


 **Warning:** failure to follow the instructions with this indication may lead to death or serious injury.


 **Caution:** failure to follow the instructions with this indication may lead to injury or damage in property.

Meanings of the Symbols

Some of the symbols used are shown on the right.

 Indicates that which requires caution.

 Indicates that which forbidden.

 Indicates that which must be done.

 Indicates electric shock hazard.

Warning



NO

- Do not touch the output terminal or the leads or load connected to it while the unit is in operation or immediately after it is stopped. Otherwise it may cause electric shock or injury.



NO

- Do not install the unit in a place subject to steam or water vapor. Otherwise it may cause poor insulation and lead to fire or electric shock.



NO

- Do not install the unit in a place subject to dew condensation. Otherwise it may cause electric shock.



NO

- Do not modify or damage the cables. Otherwise it may cause electric shock.



NO

- Do not place any object on the unit. Dangerous situations may occur if the object drops or falls.
- Do not put any object in the unit. It may cause damage.



GROUND

- Be sure to ground the unit to avoid a rare possibility of electric shock. Otherwise it may lead to fire, electric shock or injury.



NO
DISASSEMBLY

- Do not disassemble, remodel or repair the unit. High voltage may be built up inside, which may cause electric shock.
- Disassembly, remodeling or repair hamper ensuring of safety and may lead to dangerous situations.



NO

- Do not install the unit outdoors or in a place subject to leaking of water, flood or snow. Otherwise it may cause electric shock.

Caution



NO

- Do not install the unit upside down or on a wrong side.
Insufficient heat release may cause deterioration of parts, which may generate smoke or set fire.



NO

- Do not use the unit in a place subject to high temperature or in an enclosed, limited area.
It not only hampers the unit from achieving its performance but also causes deterioration of parts leading to smoking or burning.



NO

- Do not cover the vent holes of the unit. Vent holes are provided to prevent elevation of temperature inside. Covering them not only hampers the unit from achieving its performance but also causes deterioration of parts, which may generate smoke or set fire.



NO

- Do not install the unit and the remote controller in a place subject to direct cold air. Condensation may lead to electrical leak/burning.



NO

- Do not wipe the unit with chemicals (such as thinner) or wet cloth. It may allow water inside leading to electric shock, electrical leak or burning.



NO

- Do not install the unit in a place subject to corrosive gas or liquid (such as a place where chemicals are handled). Deterioration of parts may cause generation of smoke or burning.

- After reading this manual, be sure to store it in a place convenient for the users so that it can be referred to at anytime.

First-aid procedures to be implemented in case of electrical shock

RESCUE

1. Free victim from contact with live conductor quickly.
Avoid contact with neither live conductor nor victim's body.
2. Shut off high voltage at once and ground the circuit. If high voltage cannot be turned off quickly, ground the circuit to discharge, or cut high voltage line by an ax with dry wooden handle. Be careful of electric flash.
3. If circuit cannot be broken or grounded, use a dry board, dry clothing, or other nonconductor to free victim.
4. Call an ambulance immediately.

SYMPTOMS

NEVER TAKE ELECTRICALLY SHOCKED CONDITION AS DEATH.

Symptoms of electric shock may include unconsciousness, failure to breathe, absence of pulse, pallor, and stiffness, as well as severe burns.

Whenever victim is not breathing properly, give artificial respiration(see next page).

TREATMENT

1. Start artificial respiration at scene of accident. Only in case victim's or operator's life is endangered, remove victim to safe location nearby.
2. After starting artificial respiration, continue without loss of rhythm until victim start breathing without help, or being passed to medical aid.
3. When operator change while giving artificial respiration, do so without losing the rhythm of respiration.
4. After giving first aid, try to get a diagnosis by a doctor as soon as possible because shock can cause internal burn, which can be lethal if left untreated.

AFTER VICTIM REVIVES

Be prepared to resume artificial respiration, as he may stop breathing again.

Keep victim warm and lying down until he or she has been conscious for at least thirty minutes.

Artificial respiration

1. PLACE VICTIM

Place victim in face-upward position horizontally.

2. CLEAR THROAT

Turn head to one side quickly wipe out any fluid, mucus, or foreign body from mouth and throat with fingers.

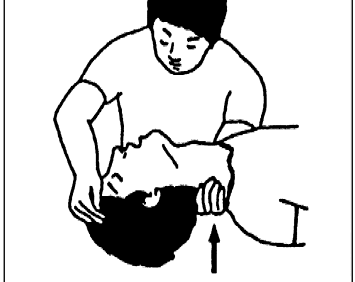
2. Clear throat



3. OPEN AIR PASSAGE

Tilt head back and extend neck to open air passage.

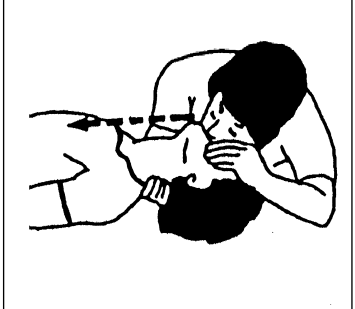
3. Open air passage



4. LIFT JAW FORWARD

Put thumb in victim's mouth and grasp jaw firmly. Lift jaw forward to pull tongue out of air passage. Do not hold or depress tongue.

6. Blow air in



5. PINCH NOSTRILS CLOSED

With other hand pinch nostrils closed to prevent air leak.

6. BLOW AIR IN

Take a deep breath, seal victim's open mouth and exhale firmly into victim's mouth until chest is seen to lift.

Make sure to open mouth widely to avoid air leakage.

7. Remove mouth and check



7. REMOVE MOUTH AND CHECK

Check the sound of breathing out air and see normal breathing when releasing mouth. If no sound, repeat from OPEN AIR PASSAGE. Continue at a rate of 12 to 20 times per minute.

Quantity of air have to be increased gradually. Especially when victim is infant, be carefully not to be too strong, not to blow in too much air.

Keep giving artificial respiration until victim start breathing without help, or being passed to medical aid.

WARRANTY

1. WARRANTY POLICY

Matsusada Precision Inc. ("Matsusada") warrants that the products supplied by it will be free from defects in materials and workmanship for a period of twelve (12) months from the date of original shipment to buyer. This warranty shall not apply to any product which has been repaired, modified or worked on by persons unauthorized by Matsusada, used other than in accordance with the instruction manuals, used in inappropriate environment (with corrosive gas, high humidity, etc) or damaged by any event beyond Matsusada's control such as force majeure. Matsusada shall in no way be liable for any incidental, special or consequential damages relating to this warranty.

Matsusada's sole liabilities and the buyer's sole remedies shall be limited, at Matsusada's discretion, to a repair or replacement of the products.

The foregoing warranty is in lieu of all other warranties, express or implied, including those of merchantability or fitness for a particular purpose.

As the products are not designed and manufactured for applications which require extraordinary reliability or safety, or affecting people's life (nuclear energy, aerospace, socially fundamental facility, medical equipment, etc), this warranty shall not be applied for such applications. The specific design and manufacturing might be required for such applications.

No modification or supplement of this warranty shall be binding unless in writing and signed by a duly authorized officer of Matsusada.

2. INSTRUCTION MANUAL AND TEST DATA

- Each rack mount and bench top power supply have 1 instruction manual. Extra instruction manuals available with charge.
- Schematics of products shall not be submitted to users. Test result or test data for the products shall be available upon request with charge.

1 Introduction

1—1 Introduction

Thank you very much for your purchase of our product HIGH VOLTAGE POWER SUPPLY. We have done our best for the quality control of the unit.

Please handle this unit properly according to this instruction manual so that you can use the full performance of this unit safely for long.

We have carefully prepared this instruction manual, but if you find any doubtful or unclear point or any omission, please kindly contact us shortly.

1—2 Unpacking the POWER SUPPLY

When unpacked the unit, you will please check the following accessories are enclosed with power supply main body.

〈Accessories〉

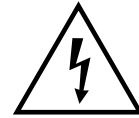
- AC input cord (1 pc)
- Instruction manual (1 pc)
- Output Cable (1 pc)
- D —sub connector (1 pc)
- Cover for D —sub connector (1 pc)

1—3 Installation conditions

- Install the power supply unit horizontally when use.
- Never put any object on the power supply unit.
- The top and side surfaces are the cooling air supply and exhaust openings. The power supply must be provided with adequate space and good ventilation.
- Do not operate the power supply in a dusty area or in corrosive gas environment

1-4 Caution for handling

WHEN TOUCHING LOAD AFTER TURNING OFF A HIGH VOLTAGE

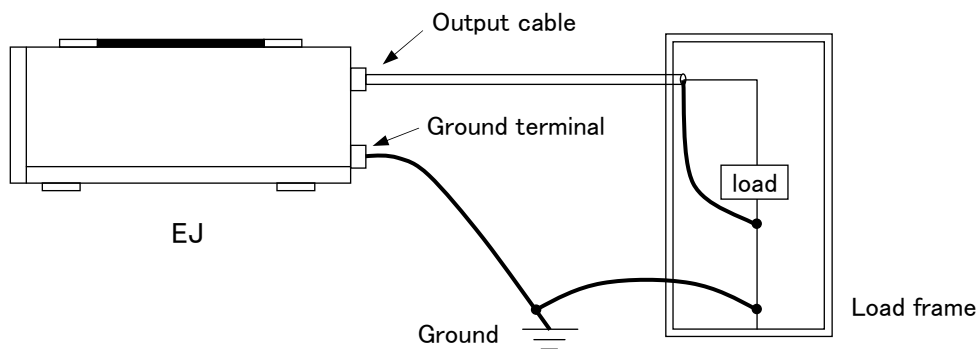


1. Make the setting of an output voltage to zero (0). Turn off the HV ON/OFF switch.
2. Make sure that the output voltage is zero with the output voltmeter of this unit.
3. Turn off the POWER ON/OFF switch.
4. Ground the output for more than 10 seconds, and make sure that the output voltage is zero at another HV voltmeter. It is especially dangerous when a capacitive load is connected or a long cable is attached there to.
5. Make it a rule to touch loads with right hand.



How to GROUND

- For safer operation, be sure to ground the ground terminal of power supply at One point on the ground.



- Make sure to connect the GROUND terminal correctly as shown above. Improper grounding is dangerous and may cause an electric shock or damage the power supply.
- In case output short circuit or discharging is expected, use shorter and thicker grounding wire.

FOR SAFER OPERATION

1. It would be rather safe if the power supply is operated on an insulation board, which is withstand the voltage used.
2. Try to handle the power supply or load with your right hand, and try to keep the left hand, for example, putting it pocket.
3. Ground the output more than 10 seconds before touching the load after turning off the power supply even long time has past after turning off the power supply.

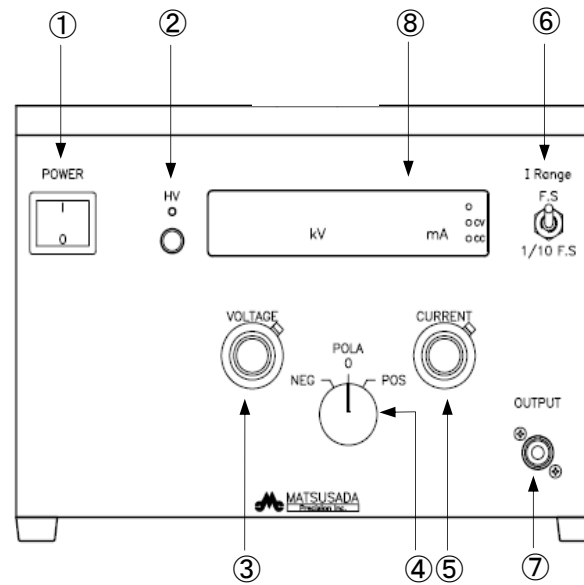
1—5 Troubleshooting

•In case there is no output voltage

1. Check if the proper input voltage is supplied to the power supply.
 - Power supply input voltage, AC $\pm 10\%$, 50/60Hz single phase
 - Control voltage for external voltage control is 0 to +10V
2. Check if the connection of control on the rear panel is correct.
3. Check if the function of option is properly operated.

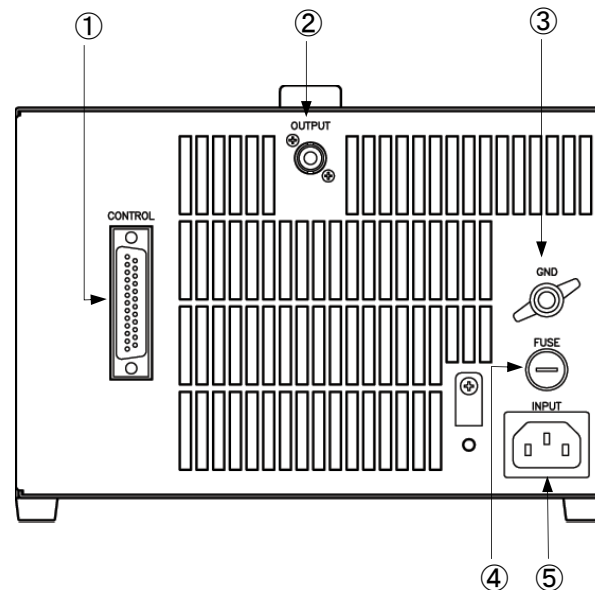
2 Exterior view diagram

Front panel



- | | |
|---------------------------------|--|
| ① POWER ON/OFF switch | ⑤ Output current setting dial |
| ② HV ON/OFF switch | ⑥ Current range change switch (Option) |
| ③ Output voltage setting dial | ⑦ Output connector |
| ④ Output polarity change switch | ⑧ Output voltage meter, current meter |

Rear panel



- | | |
|---------------------|----------------------|
| ① Control connector | ④ FUSE (5A) |
| ② Output connector | ⑤ INPUT AC connector |
| ③ Ground terminal | |

Dimensions inch

5.51(140)H × 16.93(430)D × 8.35(212)W (mm)

3.Operation manual

3—1 Outline

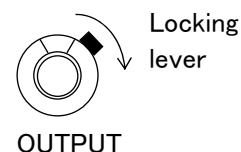
This unit is a polarity switchable bi-polar compact handy type high voltage power supply with 2 outputs channels

3—2 Operation method

1. Upon confirming the connection made with this unit as specified (Refer to 1-4[HOW TO GROUND]), operate it. Be sure to connect the earth with the ground terminal of the unit.
2. Connect the attached AC input cord with AC input connector on the rear panel and plug socket. (For extra safety fix the cord on the vinyl clamp for cable fixation.)
3. Connect the interlock. (Refer to P7. d. Interlock)
4. Turn on the POWER Switch. The unit gets in stand-by mode.
No high voltage is generated on the output terminal when unit is in this mode.
5. When the HV ON/OFF switch is turned on, the red lamp lights on, and the unit gets in enable mode(when local mode).
6. With the output voltage setting dial, set an desired voltage.

If you want to lock the output at a set voltage, turn the locking lever to the direction of arrow mark as illustrated.

Output voltage and current are displayed at the digital-meter on front panel.



7. When polarity change switch is set to NEG, output polarity shall be negative.
When set to POS, output polarity shall be positive. When set to 0, the output shall be 0.
8. For ending the operation of the power supply, be sure to return the output voltage setting dial to 0 (if the same voltage is to be used again, leave it as it is), turn off the switches in the order of HV ON/OFF switch, POWER ON/OFF switch.

3—3 Other function

a. Over voltage protection (O.V.P) NOTE 1

This unit has an over voltage protection. Even at the time of abnormality, it is limited at approx. 110% of the maximum rated voltage, protecting power supply and load from damage.

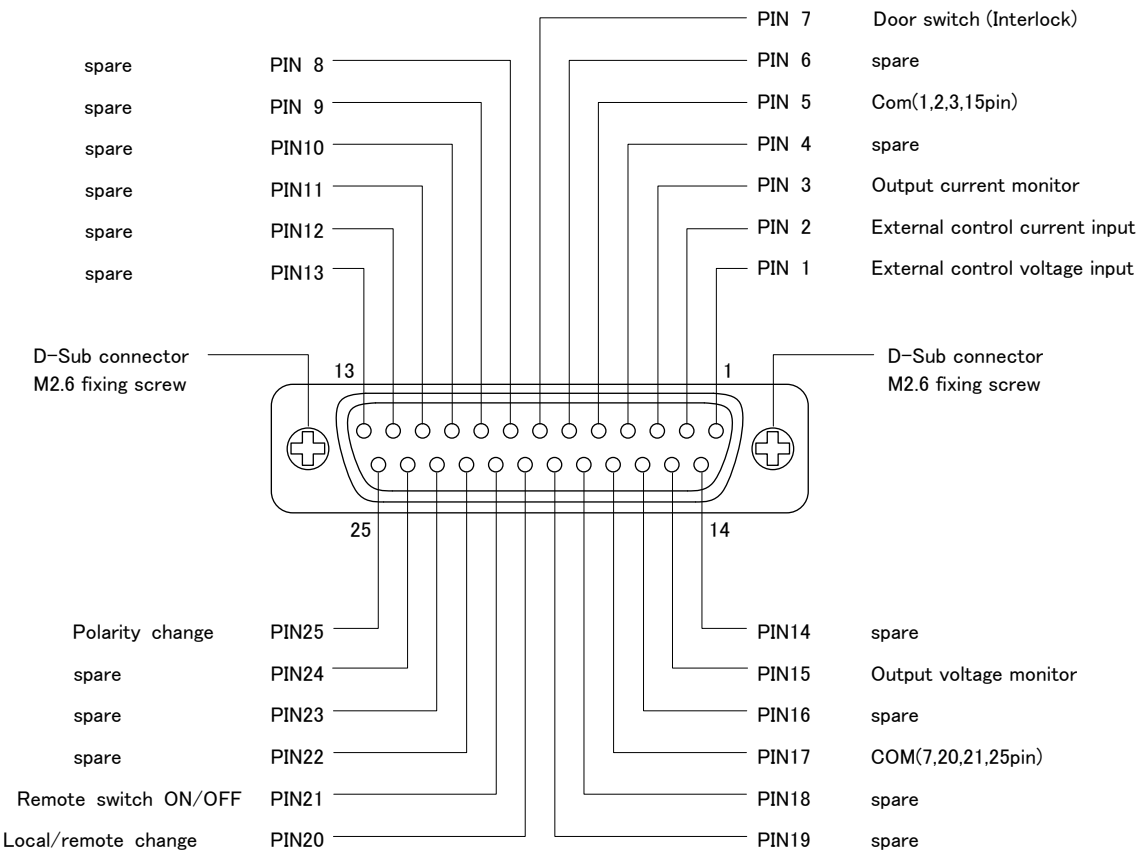
b. Over current protection (O.C.P) NOTE 2

This unit has an over current protection. When over current, the output current is limited by decreasing the output voltage.

NOTE1) O.V.P.— Over Voltage Protection.

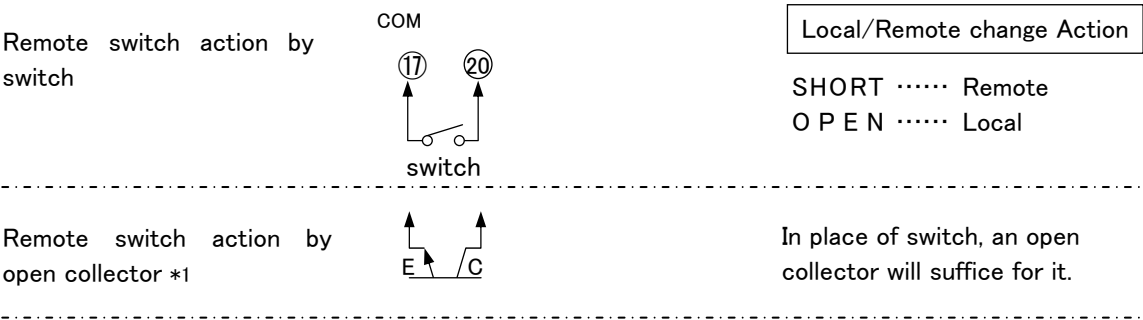
NOTE2) O.C.P.— Over Current Protection.

Control connector ··· D-sub 25S type



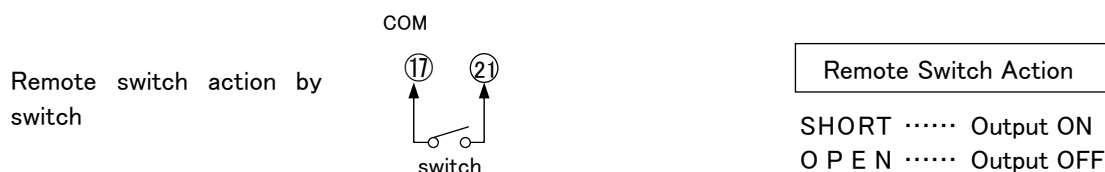
c. Local/Remote change

Local Remote mode of Vcon, Icon, POLA can be changed with a remote switch.



d. Remote switch ON/OFF (LS)

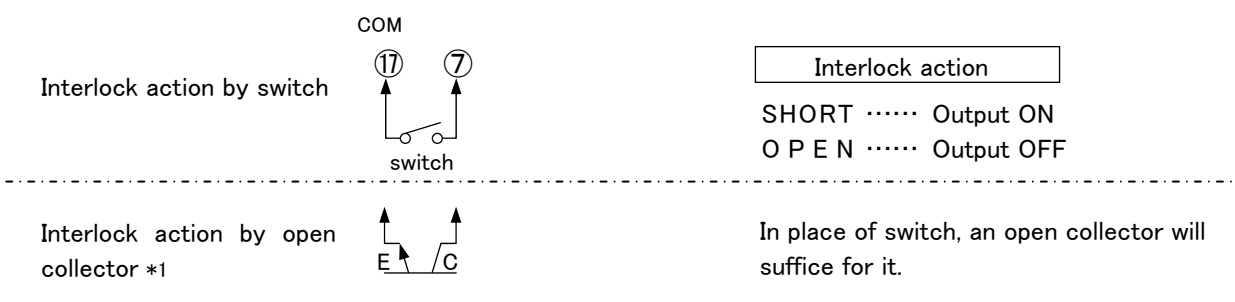
The output can be turned on and off with remote switch.



e. Door switch (Interlock)

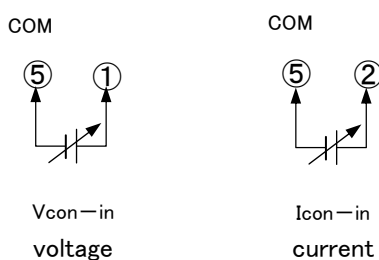
High voltage output can be cut off with external switch off. For safety reason, once the output is cut off, the unit shall not resume the output even turning the external switch back on.

To reset this status, turn the Power switch on after shorting the interlock terminal.



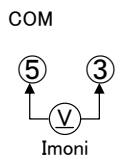
f. External voltage control

By turning Local/Remote change on the control panel to Remote, output voltage, current can be set with external voltage 0 to +10V.



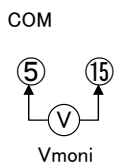
g. Output current monitor

$\pm 10V$ output for the maximum rated output current. Output impedance is 1k ohm. The polarity of monitor output is identical to that of high voltage output.



h. Output voltage monitor

$\pm 10V$ output for the maximum rated output voltage. Output impedance is 1k ohm. The polarity of monitor output is identical to that of high voltage output.



i. Polarity change

When unit is in local mode, output polarity can be changed with the polarity change switch on front panel.

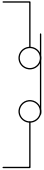
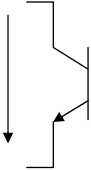
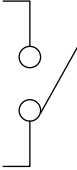

When unit is in remote mode, output polarity can be changed individually with external signal to connector on rear panel.



Precautions in using the open collector *1

Use the open collector according to the following rule.

Rule of open collector

Output	Switch	Open collector
ON	 Short	 VCE Under 0.4V (10mA)
OFF	 Open	5V  VCE Over 2V (Open 5V)

4 Explanation of optional function

4 Option function

This product is equipped with features of checked in the table below.

	Name of option
<input type="checkbox"/>	Current range change 100%⇔10% F.S (-LCr)
<input type="checkbox"/>	Cancel power outage protection (-LN)
<input type="checkbox"/>	Handle for carrying (-LZ)

4—1 Current range change (LCr)

Current range can be changed with the toggle switch on front panel (100%⇔10% F.S)

4—2 Cancel power outage protection (LN)

Power outage protection is installed in standard, but this function can be cancelled with this option, which enables you to turn on and off power supply by AC input on and off.

4—3 Handle for carrying (-LZ)

Handle for carrying can be installed.



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