

# Instruction Manual

## RE SERIES

 **MATSUSADA Precision Inc.**

*Head Office*      745 Aoji-cho Kusatsu 525-0041 Japan  
Phone: +81-77-561-2111 Fax +81-77-561-2112

*US Office*

*CA office:*      2570 N.First St.,Suite 222 San Jose CA 95131  
Tel:+1-408-273-4573 Fax:+1-408-273-4673

*NY office:*      80 Orville Drive Suite 100 Bohemia NY 11716  
Tel:+1-631-244-1407 Fax:+1-631-244-1496

*IL office:*      2275 Half Day Road, Suite 350 Bannockburn, IL 60015  
Tel:+1-847-821-2789 Fax:+1-847-821-2789

*TX office:*      5430 LBJ Freeway, Suite 1200 Dallas, TX 75240  
Tel:+1-972-663-9336 Fax:+1-972-663-9337

---

## 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.

## CONTENTS

Safety	i
For Safe Use	ii, ii-1
WARRANTY	iii, iv, v
CONTENTS	vi
1. Features and Specifications	vii, viii
1-1 Overview	1-1
1-2 Features	1-1
1-3 Operation Modes	1-1
2. Installation and Operation	2-1
2-1 General	2-1
2-2 Initial Checking	2-1
2-3 Installation	2-1
2-3-1 Installation Condition	2-1
2-3-2 Ventilation	2-2
2-3-3 Bias	2-3
2-3-4 Input Voltage/Current	2-3
2-3-5 AC Input Cable Connection	2-4
2-4 Overview of Panels	2-5
2-4-1 Front panel (750W ~ 1.2kW Type)	2-5
2-4-2 Rear panel (750W ~ 1.2kW Type)	2-5
2-4-3 Front panel (1.8kW ~ 3kW Type)	2-6
2-4-4 Rear panel (1.8kW ~ 3kW Type)	2-6
2-4-5 Front panel (3.75kW ~ 15kW Type)	2-7
2-4-6 Rear panel (3.75kW ~ 15kW Type)	2-7
2-4-7 Dimensions (750W~1.2kw Type)	2-8
2-4-8 Dimensions (1.8kW~3kW Type)	2-8
2-4-9 Dimensions (3.75kW~7.5kW Type)	2-9
2-4-10 Dimensions(9.8kW~15kW,PR10-750,PR15-500,PR20-375,7.5kW-LPfc Type)	2-9
2-5 TB1(Connector for Remote Control)	2-10
2-5-1 Instruction on the Connection of TB1(Connector for Remote Control)	2-11
2-6 Connection	2-12
2-6-1 Connecting Loads	2-12
2-6-2 Attaching the Protective Covers	2-13
3. Normal Operation	3-1
3-1 Description of Operation Modes	3-1
3-1-1 Constant Voltage Mode	3-1
3-1-2 Constant Current Mode	3-1

3-1-3 Crossover Mode .....	3-1
3-2 Fault status .....	3-2
3-3 Local Programming Mode Operation .....	3-2
3-3-1 Initial Setting .....	3-2
3-3-2 Setting Output Voltage/Output Current .....	3-2
3-3-3 OVP(Over Voltage Protection) Setting .....	3-3
3-4 Remote Sensing Operation .....	3-4
3-5 Switching between Local Mode and Remote Mode .....	3-5
3-5-1 Setting Current, Voltage and OVP(No.1) .....	3-5
3-5-2 Setting Current, Voltage and OVP(No.2) .....	3-6
3-6 Blackout Protection .....	3-7
3-7 Over Temperature Protection .....	3-8
4. Advanced Operation .....	4-1
4-1 Serial/Parallel Operation .....	4-1
4-1-1 Serial Operation .....	4-1
4-1-2 Parallel Operation .....	4-1
4-2 Divided Operation .....	4-1
4-3 OVP Program Setting with External Voltage .....	4-2
4-4 Turning Output ON/OFF with the Remote Switch .....	4-3
4-5 Remote Programming .....	4-4
4-5-1 Setting the Voltage Program with External Voltage .....	4-4
4-5-2 Setting the Voltage Program with External Resistance .....	4-4
4-5-3 Setting the Current Program with External Voltage .....	4-5
4-5-4 Setting the Current Program with External Resistance .....	4-5
4-6 Monitor/Status Output .....	4-5
4-6-1 Monitor Output .....	4-5
4-6-2 Status Output .....	4-6

---

# 1 Features and Specifications

---

## 1-1 Overview

The RE Series power supply units output continuously variable voltage and current in wide ranges, which makes them suitable for development, system or burn-in.

The high frequency switching technology of the RE Series units achieves high output power and low output noise with its compact size.

The RE Series units have various functions that can be controlled remotely, which make them suitable for integrating into inspection devices.

## 1-2 Features

- Simultaneous digital indications of voltage and current
- Ten-turn potentiometer allowing high-resolution setting of the voltage and current from 0 to the rated output
- Automatic crossover switching between voltage and current modes
- Compact size and light weight achieved by the unique high frequency switching technology
- Output shutdown with an external signal
- Remote control of voltage and current
- Status signals: CV/CC, TROUBLE
- Output monitor: output voltage and output current

## 1-3 Operation Modes

The RE Series units operate in two basic modes: constant voltage and constant current.

In the constant voltage mode, the set output voltage is maintained even while load current varies.

In the constant current mode, the set output voltage varies to maintain the set output current even the load varies.

The automatic crossover operation allows automatic switching between constant voltage and constant current in accordance with the variation in the load.

When the load current exceeds the set current, for example, the mode is changed from constant voltage to constant current automatically. When the resistance becomes high enough, the mode is brought back to constant voltage.

## 2 Installation and Operation

### 2-1 General

After opening the package, make sure that all of the following accessories are included in addition to the power supply unit:

(Accessories)

- Instruction manual
- AC Input Cable (for 750W, 1.2kW, 2kW type)
- Input change short bar (for 750W, 1.2kW type)
- Cover for D-sub connector
- Optical fiber cable (for LGob option)
- Instruction manual for options (for LGb, LGob, LIs, LIsr, LUs1 options)

### 2-2 Initial Checking













Before attempting to start the unit, check the following to make sure there is no failure.

(Do not put the power cable into the outlet.)

1. Check the panel and chassis for any apparent trace of impact such as a dent.
2. Turn the knobs on the front panel several times. Make sure that the rotation is smooth.
3. Turn the power switch ON and OFF. Make sure that the operation is normal.
4. If any failure is found, contact the carrier and the manufacturer.

### 2-3 Installation

#### 2-3-1 Installation Conditions

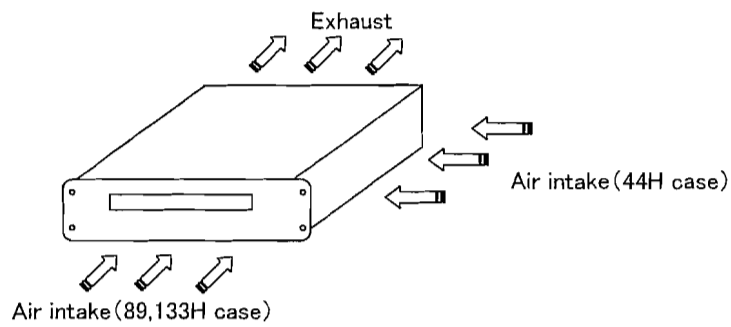
-  **MUST** ▪ Install the power supply unit horizontally for use.
-  **NO** ▪ Do not put any object on the power supply unit.
-  **NO** ▪ Do not install the unit in a place subject to a large amount of dust, corrosive gas, etc.
-  **NO** ▪ Make sure no foreign object such as liquid or metal piece from the air vent because such could cause failure of unit, electrical shock or fire.
-  **NO** ▪ This power supply is designed for the size of 19-inch rack. When you install to the rack hold the chassis with the guide. Do not hold the power supply with only fixing holes on front panel.
-  **NO** ▪ Front panel handle is strictly for the purpose of changing the direction or pull out the power supply from the rack. Not to use the handle to hold the whole weight of the power supply.
-  **MUST** ▪ Be sure to secure air intake (10 cm or more clearance on the right side for 44H and 30 cm or more clearance from the front panel for other models) and exhaust (30 cm or more clearance from the rear panel).
-  **MUST** ▪ Provide the external cabinet with air intake and exhaust of the same areas as those of the clearances of the power supply unit.
-  **MUST** ▪ Do not install in an enclosed cabinet. Provide measures such as forced exhaust to prevent the exhaust heat from returning to the air intake.
-  **MUST** ▪ Where there is dust on air intake holes remove it immediately as it can prevent the enough cooling of the power supply.
-  **NO** ▪ Do not install the power supply unit in a place subject to dew condensation.
-  **MUST** ▪ When operating welding by the power supply, unplug all the connecting cable from power supply.

## 2-3-2 Ventilation

The front and rear panels of the power supply unit are air intake and exhaust respectively for cooling. Secure enough space for use in a place as well ventilated as possible.

Be sure to secure air intake (10 cm or more clearance on the right side for 44H and 30 cm or more clearance from the front panel for other models) and exhaust (30 cm or more clearance from the rear panel).

**!** Where there is dust on air intake holes remove it immediately as it can prevent the enough **MUST** cooling of the power supply.



## 2-3-3 Bias

The maximum voltage for use with the output floating (biased) with reference to the ground is 250 VDC.



Watch for the bias voltage generated at the output terminals and the rear connector TB1.

## 2-3-4 Input Voltage/Current



- Verify that rated input voltage is not decreased more than 10% of rated input voltage (ex. 180VAC for 200VAC) at maximum rated voltage.
- Verify that input voltage is not decreased more than 10% of rated input voltage when operating with all the devices connected.
- Check the input voltage indication on the rear panel of the unit and input the correct voltage. Inputting wrong voltage may damage the device.



- <750W~1.2kW type>
- When inputting 100V/110V/115V/120V AC, input change short bar SHORT.
  - When inputting 200V/220V/230V/240V AC, input change short bar OPEN.



- Do not touch input change short bar, because high Voltage is being generated on it.

MODEL	OUTPUT VOLTAGE	INPUT VOLTAGE (±10% AC50/60Hz)	phase	INPUT CURRENT	
				Normal type (Typ)	PFC type (Typ)
750W to 765W		115V	1 φ	12A	—
		230V		8A	—
1.1kW to 1.2kW		115V	1 φ	19A	—
		230V		11A	—
1.8kW to 2.1kW		220V	1 φ	17A	—
			3 φ	10A	—
2.9kW to 3kW		220V	3 φ	14A	—
3.75kW to 4kW		220V	3 φ	19A	15A
4.5kW to 5.1kW		220V	3 φ	23A	16A
7.35kW to 7.5kW	10V	220V	3 φ	35A	25A
	20V, 35V, 60V	220V	3 φ	34A	25A
	Over 100V	220V	3 φ	33A	25A
9.8kW to 10.5kW	10V	220V	3 φ	46A	—
	20V, 35V, 60V	220V	3 φ	44A	—
	Over 100V	220V	3 φ	41A	—
11.7kW to 15kW		220V	3 φ	68A	—


- L(200V) 115V of above INPUT VOLTAGE / CURRENT table become 100V, and 230V become 200V. Input current is about 115% of Input current. 220V(3 φ) become 200V. Input current is about 110% of Input current.
- L(220V) 115V of above INPUT VOLTAGE / CURRENT table become 110V, and 230V become 220V. Input current is about 105% of Input current.
- L(240V) 115V of above INPUT VOLTAGE / CURRENT table become 120V, and 230V become 240V. Input current is about 95% of Input current. 220V(3 φ) become 240V. Input current is about 90% of Input current.

- ※ 1) Other input voltage than AC115V/AC230V is optional.
- 2) Input current are at rated input voltage

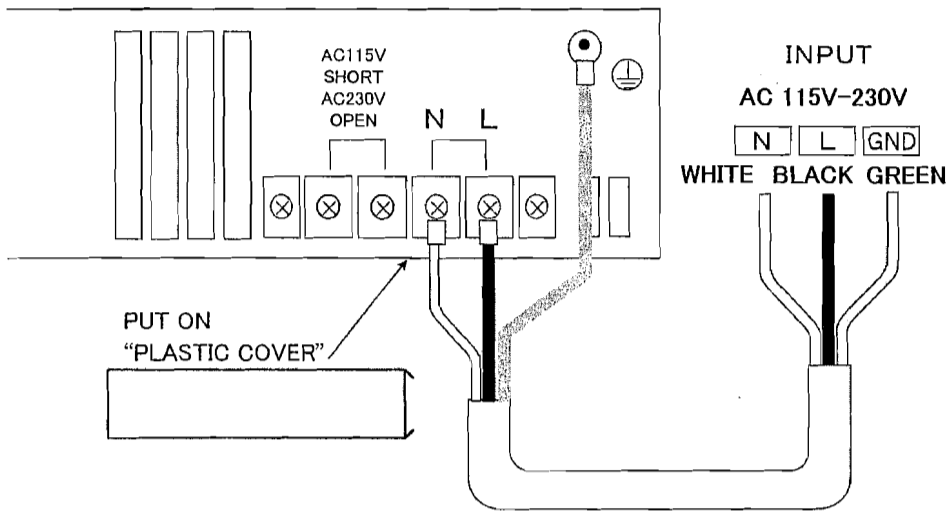


2-3-5 AC Input Cable Connection

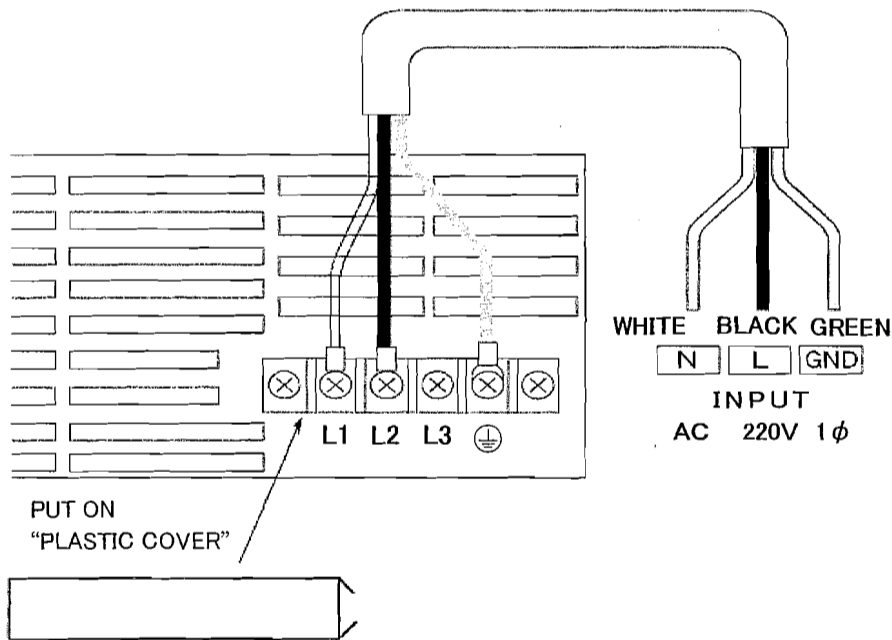
Attach solder less terminal on AC input cable, and screw fix it on L1, L2, L3, ⊕ (750W,1.2kW type : screw fix it on L, N, ⊕) of AC input terminal board on rear panel. (44,89H type : M4, 133H type : M6) In case of 2kW model and single phase input, fix L1 on L(Line), L2 on N(Neutral) and ⊕ on GND of input terminal board with screw.

 ⊕ = GND. Be sure to connect the GND.

**!** For safety, be sure to attach the covers provided.  
MUST



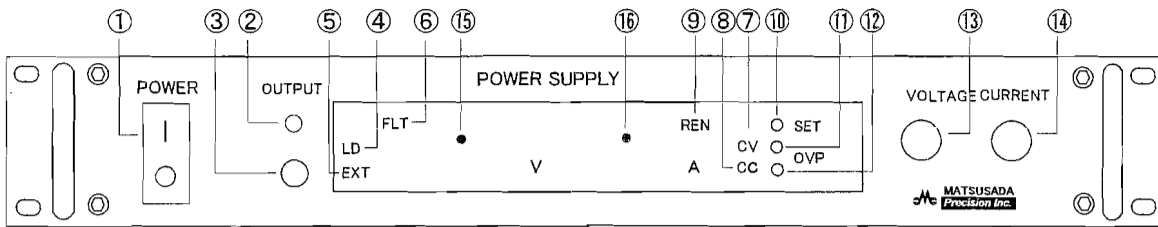
750W,1.2kW type



2kW Input phase 1φ type

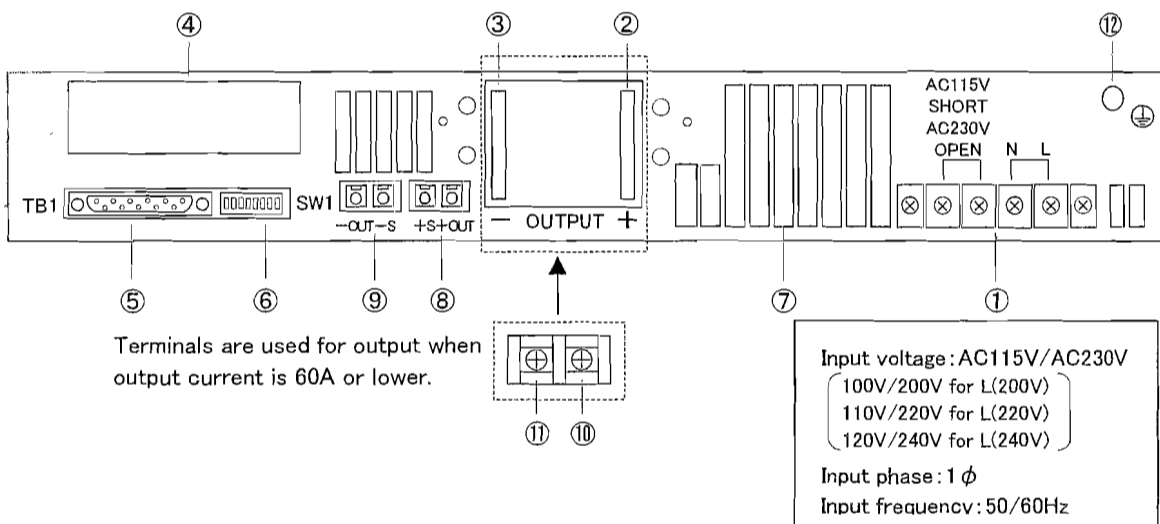
## 2-4 Overview of Panels

## 2-4-1 Front Panel (750W~1.2kW Type)



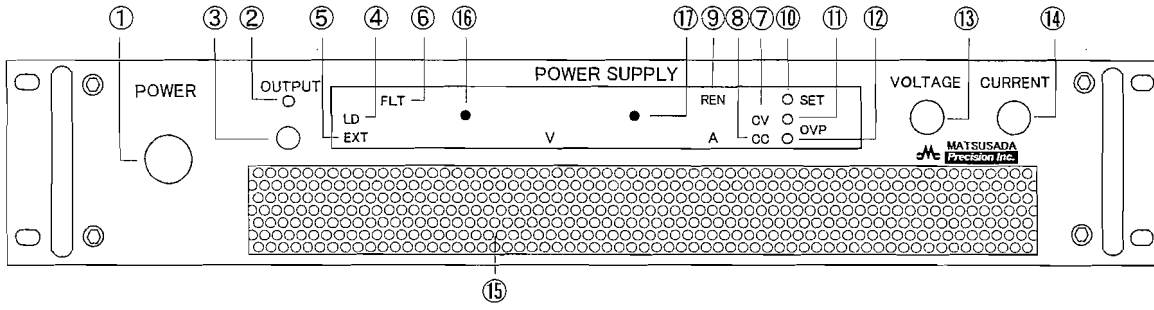
- |                                     |   |
|-------------------------------------|---|
| ① POWER ON/OFF switch               | ⑩ Output voltage/output current preset switch       |
| ② OUTPUT-ON indicator LED           | ⑪ OVP setting switch                                |
| ③ OUTPUT ON/OFF switch              | ⑫ OVP setting volume                                |
| ④ External switch OFF indicator     | ⑬ Output voltage setting volume(potentiometer dial) |
| ⑤ Remote programming indicator      | ⑭ Output current setting volume(potentiometer dial) |
| ⑥ Fault indicator                   | ⑮ Volt meter  |
| ⑦ Voltage mode indicator            | ⑯ Current meter                                     |
| ⑧ Current mode indicator            |   |
| ⑨ Remote enable indicator for GP-IB |   |

## 2-4-2 Rear Panel (750W~1.2kW Type)



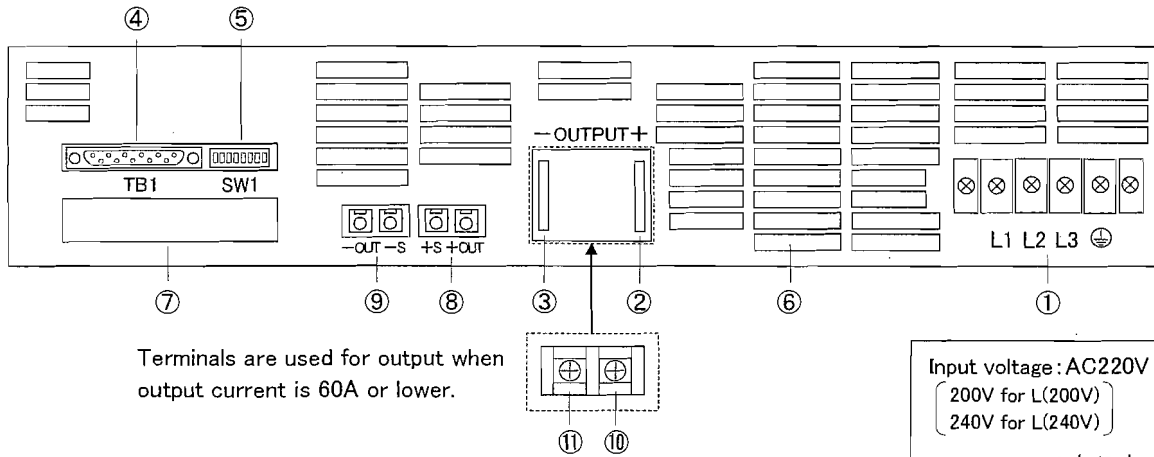
- |  |                        |
|--|------------------------|
| ① AC input terminal board                    | ⑦ Exhaust              |
| ② +Output bus bar                            | ⑧ +Sens connector      |
| ③ -Output bus bar                            | ⑨ -Sens connector      |
| ④ Connector terminals for options            | ⑩ +Output terminal(M5) |
| ⑤ Connector for remote control(D-sub 25-pin) | ⑪ -Output terminal(M5) |
| ⑥ Function setting switch                    | ⑫ GND (⊥)              |

2-4-3 Front Panel (1.8kW~3kW Type)



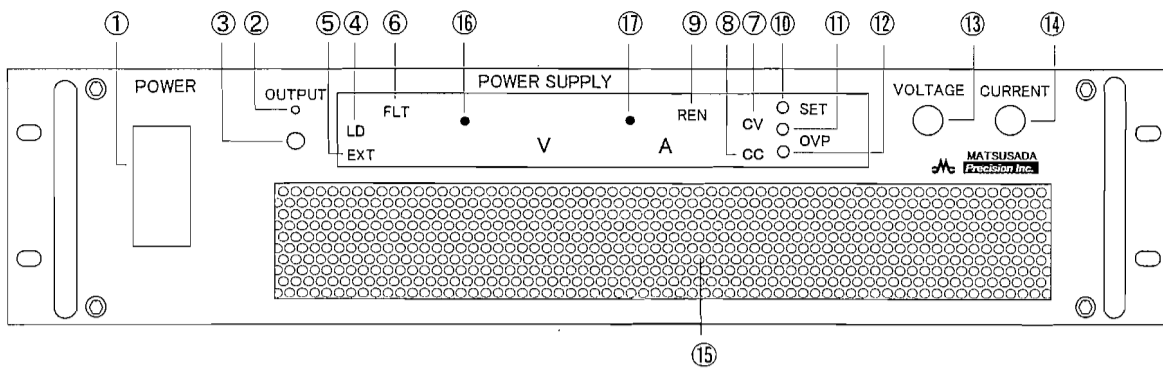
- ① POWER ON/OFF switch
- ② OUTPUT-ON indicator LED
- ③ OUTPUT ON/OFF switch
- ④ External switch OFF indicator
- ⑤ Remote programming indicator
- ⑥ Fault indicator
- ⑦ Voltage mode indicator
- ⑧ Current mode indicator
- ⑨ Remote enable indicator for GP-IB
- ⑩ Output voltage/output current preset switch
- ⑪ OVP setting switch
- ⑫ OVP setting volume
- ⑬ Output voltage setting volume (potentiometer dial)
- ⑭ Output current setting volume (potentiometer dial)
- ⑮ Vent holes
- ⑯ Volt meter
- ⑰ Current meter

2-4-4 Rear Panel (1.8kW~3kW Type)



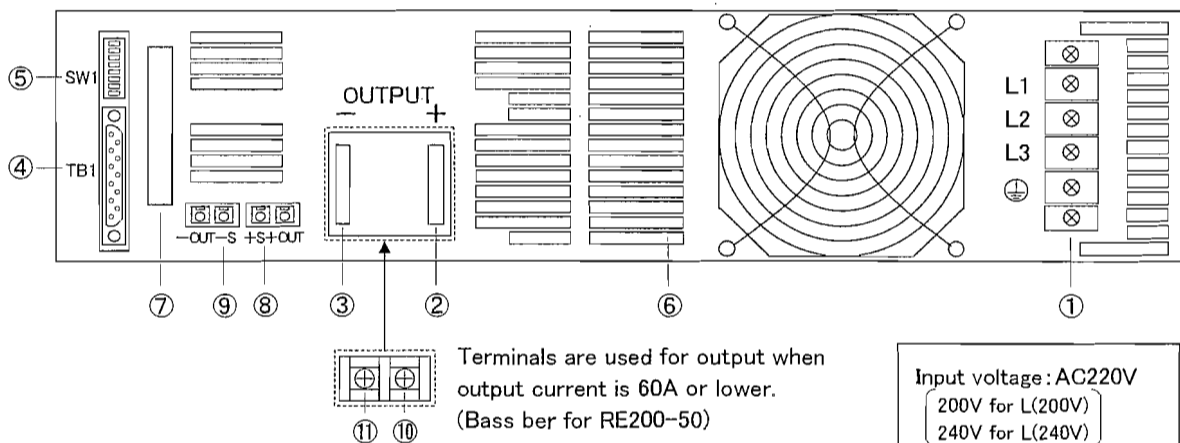
- ① AC input terminal board
- ② +Output bus bar
- ③ -Output bus bar
- ④ Connector for remote control (D-sub 25-pin)
- ⑤ Function setting switch
- ⑥ Exhaust
- ⑦ Connector terminals for options
- ⑧ +Sens connector
- ⑨ -Sens connector
- ⑩ +Output terminal (M5)
- ⑪ -Output terminal (M5)

## 2-4-5 Front Panel (3.75kW~15kW Type)



- |                                     |   |
|-------------------------------------|---|
| ① POWER ON/OFF switch               | ⑩ Output voltage/output current preset switch       |
| ② OUTPUT-ON indicator LED           | ⑪ OVP setting switch                                |
| ③ OUTPUT ON/OFF switch              | ⑫ OVP setting volume                                |
| ④ External switch OFF indicator     | ⑬ Output voltage setting volume(potentiometer dial) |
| ⑤ Remote programming indicator      | ⑭ Output current setting volume(potentiometer dial) |
| ⑥ Fault indicator                   | ⑮ Vent holes  |
| ⑦ Voltage mode indicator            | ⑯ Volt meter  |
| ⑧ Current mode indicator            | ⑰ Current meter                                     |
| ⑨ Remote enable indicator for GP-IB |   |

## 2-4-6 Rear Panel (3.75kW~15kW Type)

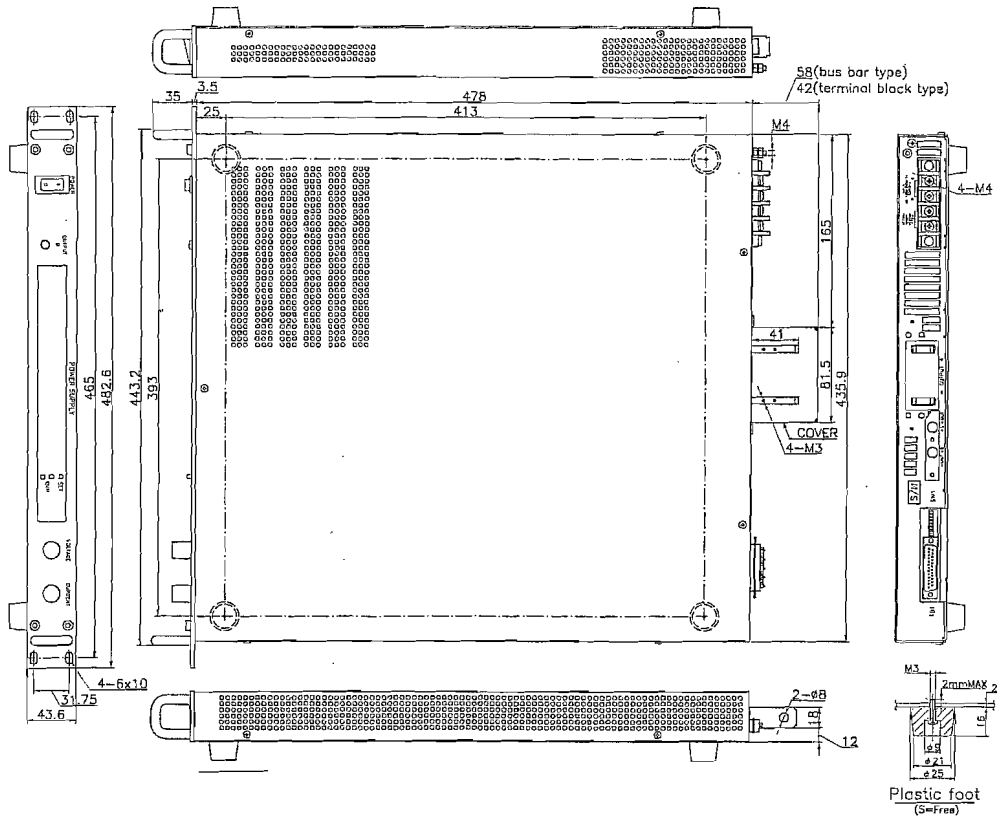


- |  |                        |
|--|------------------------|
| ① AC input terminal board                    | ⑧ +Sens connector      |
| ② +Output bus bar                            | ⑨ -Sens connector      |
| ③ -Output bus bar                            | ⑩ +Output terminal(M5) |
| ④ Connector for remote control(D-sub 25-pin) | ⑪ -Output terminal(M5) |
| ⑤ Function setting switch                    |                        |
| ⑥ Exhaust                                    |                        |
| ⑦ Connector terminals for options            |                        |

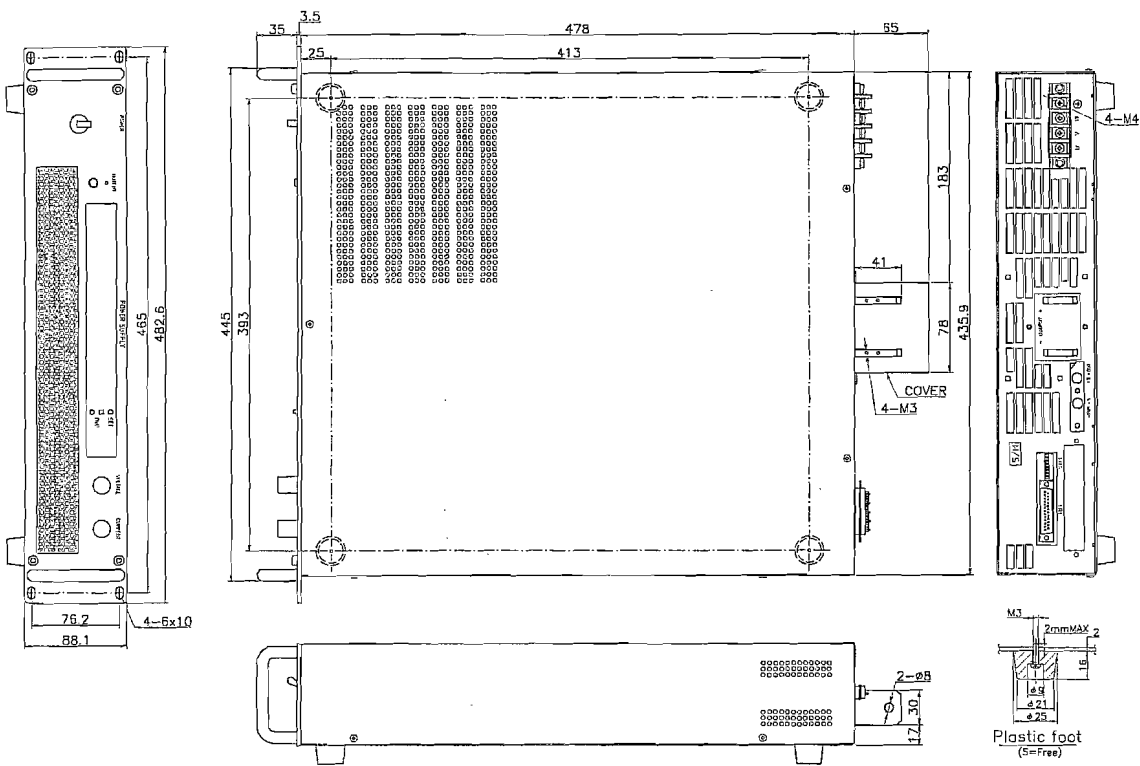
Input voltage: AC220V  
 200V for L(200V)  
 240V for L(240V)

Input phase: 3 $\phi$   
 Input frequency: 50/60Hz

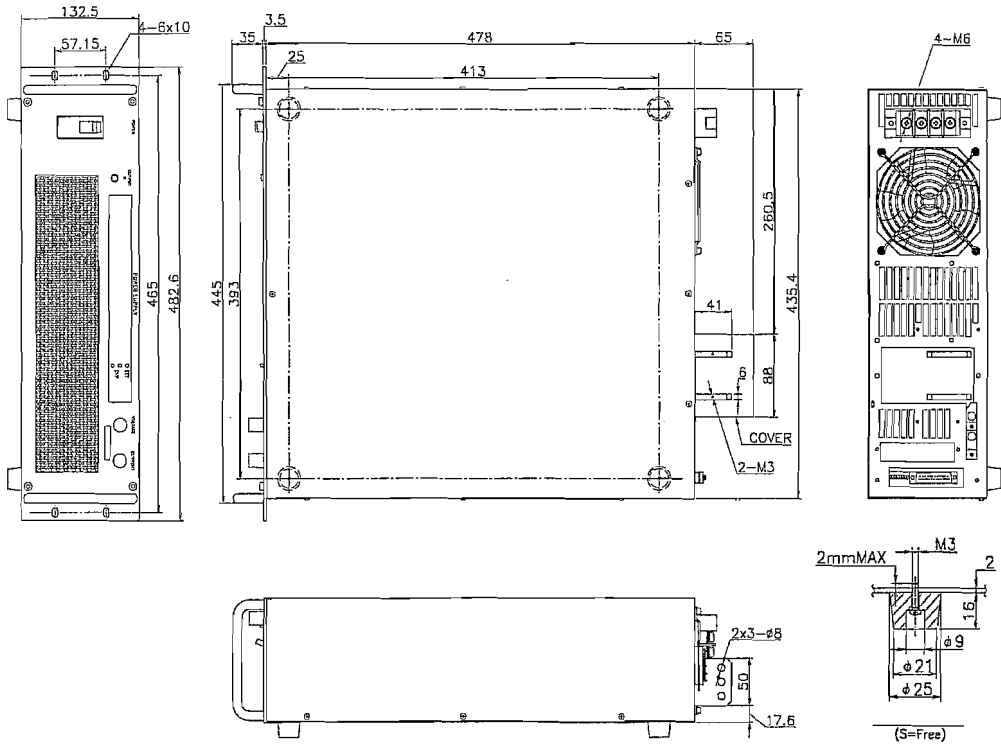
2-4-7 Dimensions (750W~1.2kW Type)



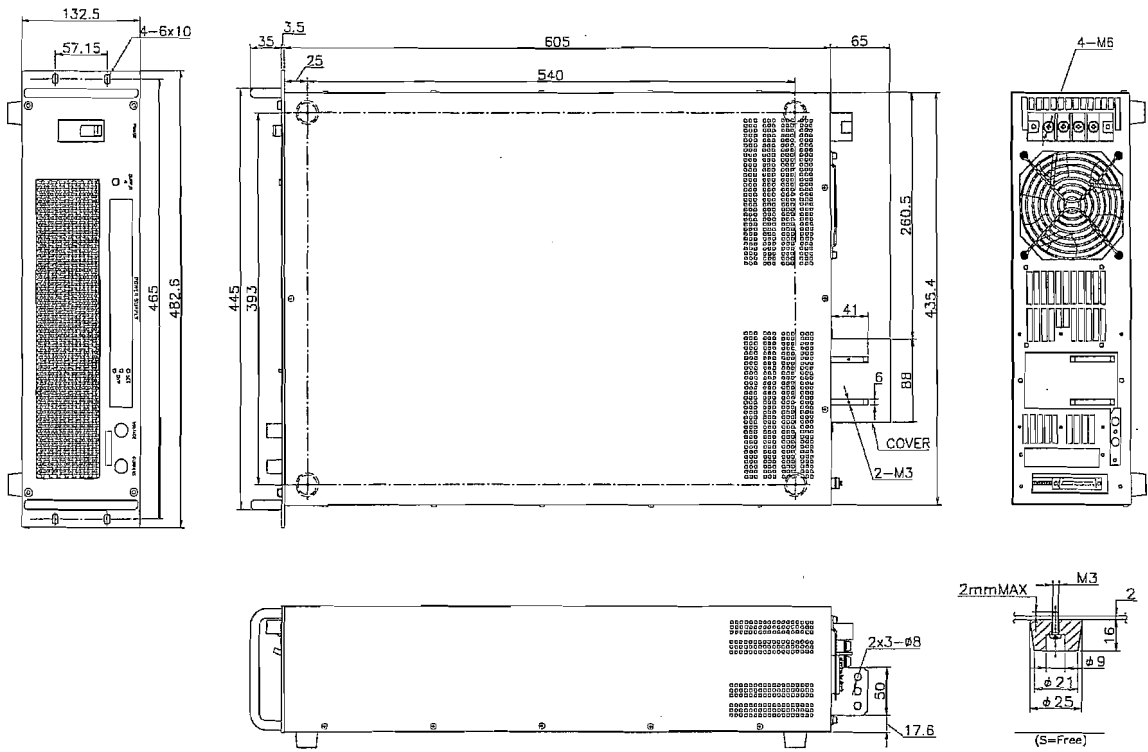
2-4-8 Dimensions (1.8kW~3kW Type)



2-4-9 Dimensions (3.75kW~7.5kW Type)



2-4-10 Dimensions (9.8kW~15kW,PR10-750,PR15-500,PR20-375,7.5Kw-LPfc Type)





## 2-5-1 Instructions on the Connection of TB1(Connector for Remote Control)



CAUTION

This power supply units generates a large amount of current. Running a large amount of current through TB1 by connecting it in a wrong way may damage the control circuit.

Be sure to follow the instructions below:

Wiring from the following pin should be as short as possible.(less than couples of meters.)

TB1 PIN1, 2, 3, 5, 7, 9, 10, 14, 15, 17, 18, 20, 21, 22, 25

(The longer the wiring become, it will be more influenced from the outside noise.)

and kept away from Large noise source.

It might cause malfunction or failure.

(NOTE) In case above condition can not be obtained, combination of

-LGob(GP-IB/RS232C, Interface board) is recommended.



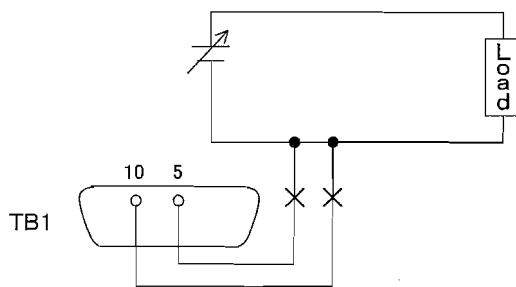
NO

① Do not connect PIN 5 or 10 of TB1 to -output.

(If minas output wire is disconnected from devices with PIN5 or PIN10 is connected.

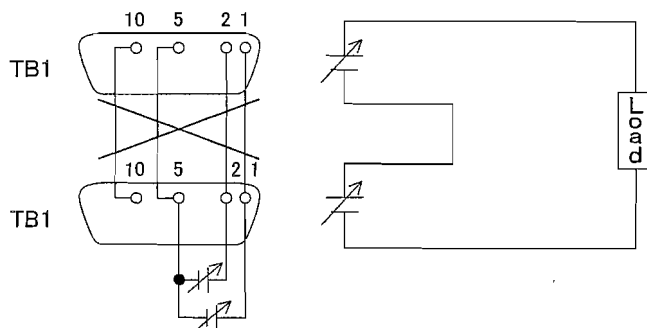
There is a possibility than return current, which draw through PIN5 or PIN10 can

Damage devices)



NO

② Do not connect power supplies serially to connect the commons of the control voltage.





## 2-6 Connection

In order to achieve high performance, high stability and low ripple of RE Series, it is important to make sufficient preparation in advance for installation such as correct connection or grounding.

Be sure to attach the output terminal cover for ensuring safety (see 2-6-2 on the following page).

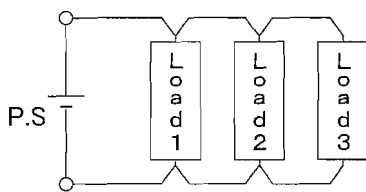
### 2-6-1 Connecting Loads

- Use leads of sufficient thickness and make them as short as possible.
- Use PVC cable that has enough resistance to the voltage used (resistant to 105 deg.C).

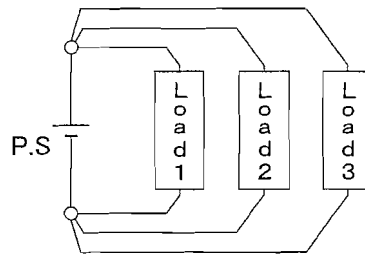
Wiring to loads requires taking into consideration the current capacity of the wire and the limitation to the length of output wire by sensing (0.5 V/lead). Find the proper thickness of wire in accordance with the following table.

AWG	mm <sup>2</sup>	Maximum current (A)	AWG	mm <sup>2</sup>	Maximum current (A)
18	1.1	2	4	21	106
16	1.3	7	2	33	170
14	2.1	11	1	42	209
12	3.3	18	1/0	53	270
10	5.3	23	2/0	67	330
8	8.4	39	3/0	85	350
6	13	67			

### Parallel connection

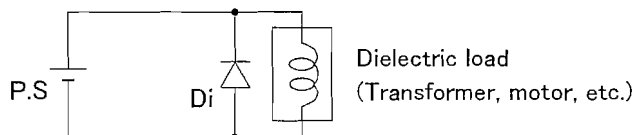


Improper connection



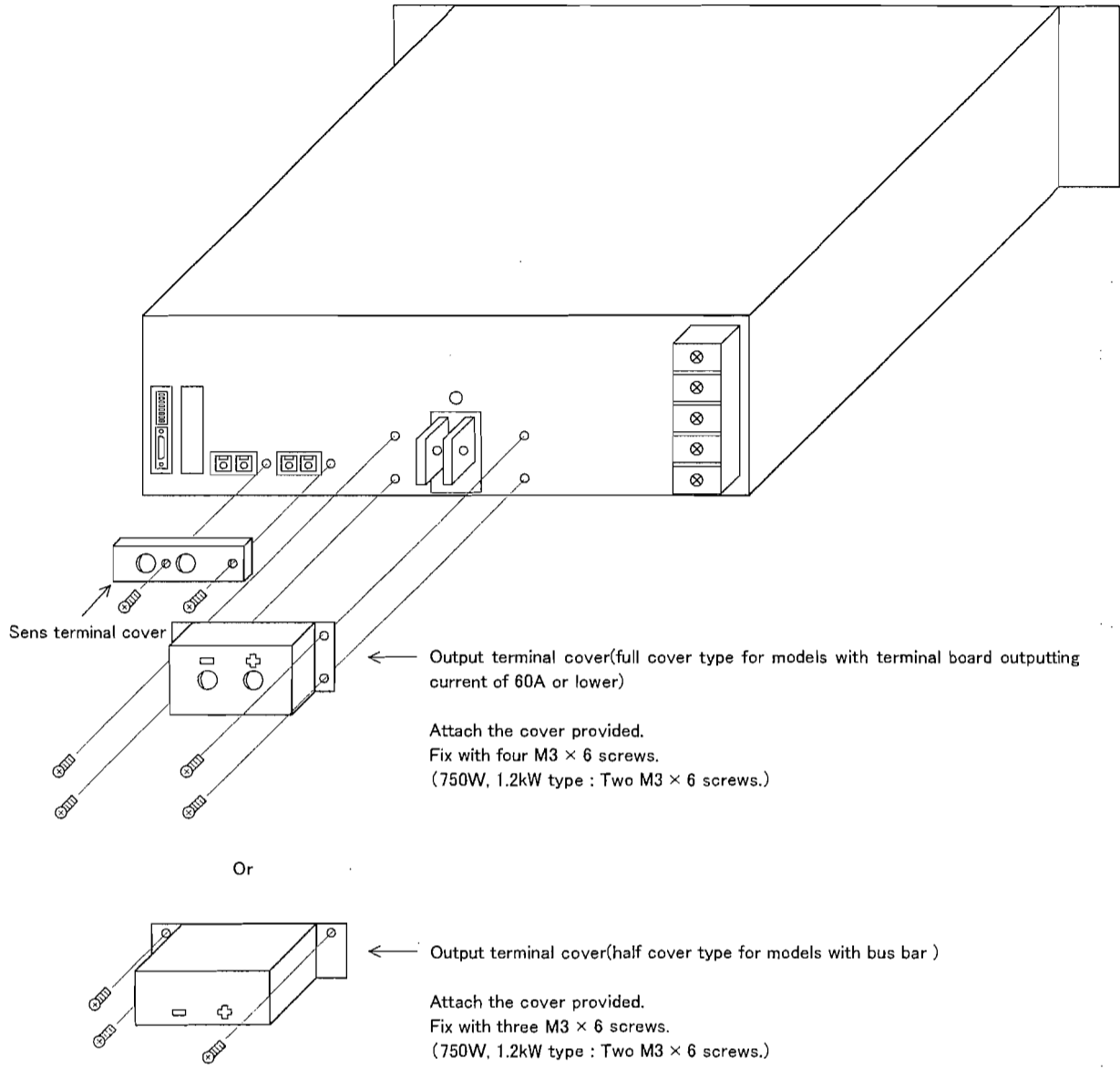
Proper connection

When using a dielectric load, insert a rated diode which has higher output voltage and current of the power than those of the output voltage of the power supply to protect the power supply from the kickback of the load.



2-6-2 Attaching the Protective Covers

**!** Protective covers are provided. Be sure to attach the covers.  
**MUST**



## 3 Normal Operation

### 3-1 Description of Operation Modes

The RE Series power supply units are provided with two operation modes (constant voltage and constant current modes) and two control modes (local and remote modes).

This section describes the constant voltage and constant current modes in the local modes.

The operation mode is determined by the following:

- Output voltage setting  $V_{set}$
- Output current setting  $I_{set}$
- Load resistance  $R_L$

#### 3-1-1 Constant Voltage Mode

The power supply unit operates in the constant voltage mode when the load current  $I_L$  is less than the current setting  $I_{set}$  ( $I_L < I_{set}$ ;  $I_L = V_{set}/R_L$ ).

In the constant voltage mode, the voltage is constant at the set value ( $V_{set}$ ) and the load current  $I_L$  changes according to the load.

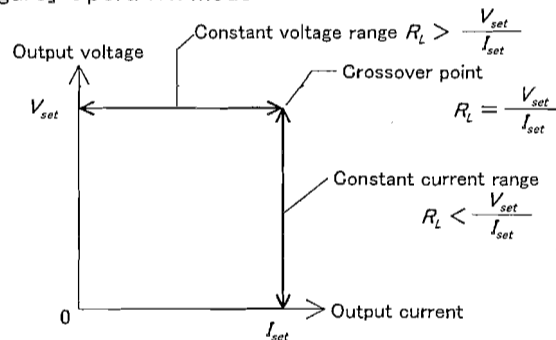
When using the power supply unit in the constant voltage mode, turn the current setting knob clockwise all the way to the maximum or ensure that it is set to the required current, which allows setting to the desired voltage.

#### 3-1-2 Constant Current Mode

The power supply unit operates in the constant current mode when the load resistance is low enough to make the load current  $I_L$  more than the current setting ( $I_L > I_{set}$ ). In the constant current mode, the current is constant at the set value ( $I_{set}$ ) and the load voltage changes according to the load.

- $R_L$  = Load resistance
- $V_{set}$  = Output voltage setting
- $I_{set}$  = Output current setting

[Figure] Operation mode



#### 3-1-3 Crossover Mode

The automatic crossover system functions to automatically switch between the modes as the load response changes. For example, the mode is changed from the constant voltage to constant current when the load current exceeds the current setting. The mode is brought back to the constant voltage when the resistance becomes high enough.

### 3-2 Fault status

When unit is in one of the following status. **FLT** light on in the front panel display.

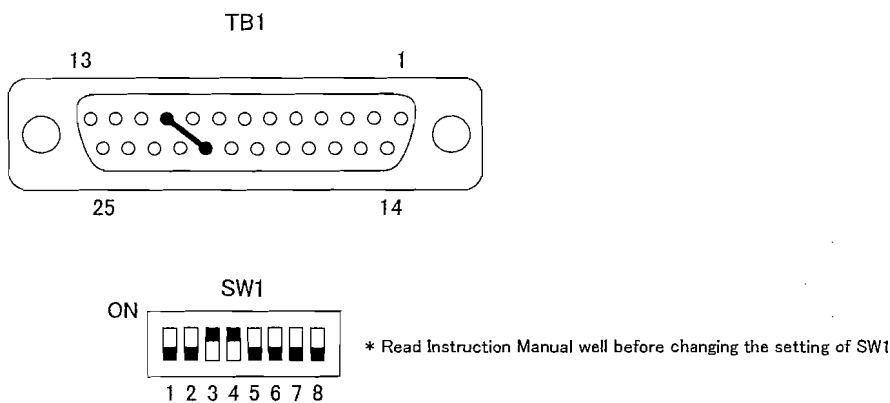
- Over temperature protection (OT)
- Over voltage protection (OVP)
- Input voltage fault (AC FLT)
- OVP program is not sent.(All remote mode setting, OVP setting is remote mode)

While **FLT** is on, unit generates no output.

### 3-3 Local Programming Mode Operation

#### 3-3-1 Initial Setting

The mode is set to the local programming mode when shipped.



[Figure] Local mode(initial setting)

#### 3-3-2 Setting Output Voltage/Output Current

1. Turn counterclockwise the output voltage/output current setting dial on the front panel all the way.
2. Turn the power switch ON.
3. Pressing the output voltage/output current preset switch and keeping it pressed shows the voltage and current settings on the display. Turn the output voltage dial to adjust the voltage as desired. Then turn the output current setting dial to adjust the current as desired.
4. Release the output voltage/output current preset switch.
5. Turn the OUTPUT switch ON to output the set value.

### 3-3-3 OVP(Over Voltage Protection) Setting

OVP protects the load from programming errors, wrong voltage setting or power source failure.

1. Turn the OUTPUT switch OFF.
2. Pressing the OVP setting switch and keeping it pressed indicates the OVP set voltage on the voltmeter of the display. Turn the OVP setting volume to adjust the voltage to the desired value.
3. Turn the output voltage setting dial counterclockwise all the way (minimum).
4. Turn the OUTPUT switch back ON, increase the output voltage gradually and make sure that the output is shut down at the set OVP voltage.

## 3-4 Remote Sensing Operation



When power supply units are connected serially or parallel, the remote sensing operation cannot be used. Please use (shorting -out and -S, and +out and +S) Usage without above connection might cause malfunction.



When using the remote sense function, output cable must be connected. (if used the remote sense function without output cable connected, there is the possibility that large current on sense line can damage the equipment connected)

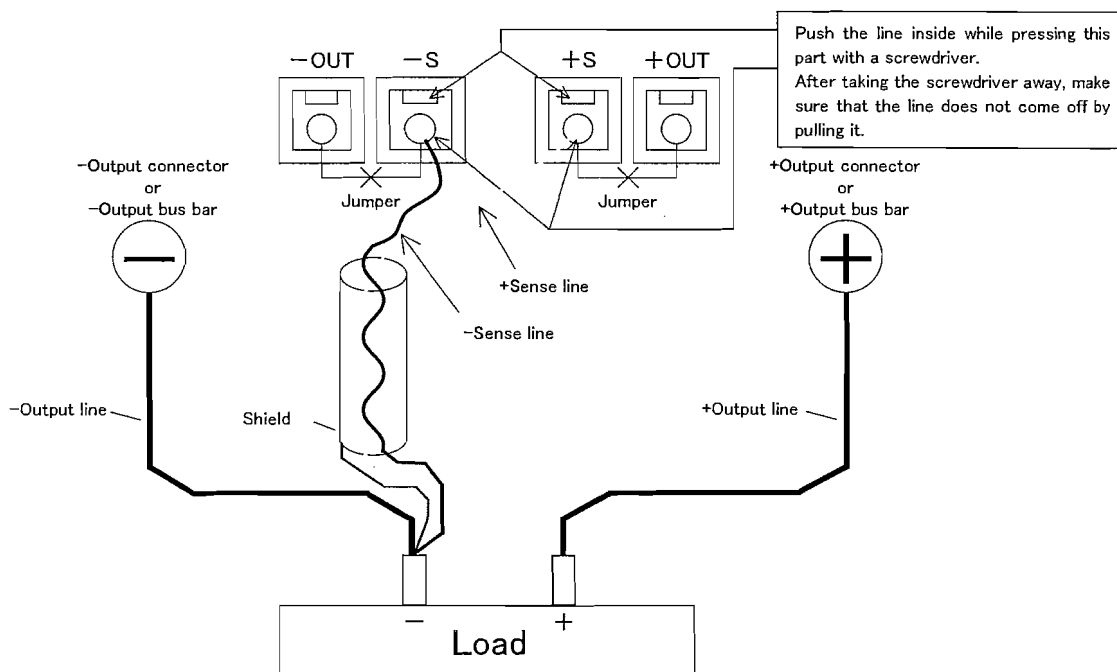
The remote sensing operation allows setting of the stabilization point of the power supply not at the output terminal of the power supply but at the load or other points.

The loss of the lead is adjusted by 0.5 V maximum.

Use twisted or shielded wire as the lead for sensing.

The Sense lines are provided at the Sense connector on the rear panel. Make connections as described below:

1. Turn the power supply OFF, wait for five minutes and remove the jumpers between +S and +OUT, and -S and -OUT.
2. Connect the + Sense and - Sense as shown below. Connect the load in the same way.
3. Ground the shield at one point: power supply or load.
4. Turn the power ON.



[Figure] Remote sensing line connection

Wire and tool to be used for Sense Connector

Conformable wire	Single wire : $\phi 1.0$ (AWG18)
	Twisted wire : $0.75\text{mm}^2$
Allowable range for use	Single wire : $\phi 0.4 \sim \phi 1.0$ (AWG26~18)
	Twisted wire : $0.3\text{mm}^2 \sim 0.75\text{mm}^2$ (AWG22~20)
	Wire diameter $\phi 0.18$ or larger
Standard stripping length	10mm
Tool for operating the button	Screwdriver (shaft diameter $\phi 3$ , nose width 2.6)

### 3-5 Switching between Local Mode and Remote Mode

The method of switching between the local and remote modes can be selected out of the following 3-5-1 and 3-5-2.

In either way, the remote programming indication **EXT** on the front panel is displayed.



#### Note for remote function

Note the following points when remote functions are used.

- Make the wiring for remote function as short as possible
- Try to avoid existence of high frequency power supply nearby wiring of remote function.  
(Especially important in case of high voltage floating)

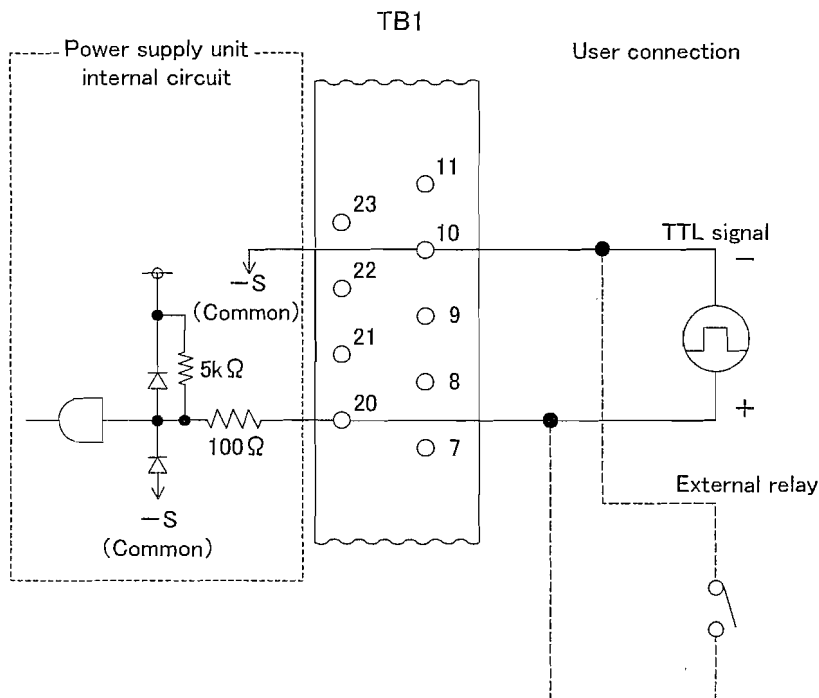
※ Although the unit integrates full protection circuits, there might be the possibility of failure when operated with excessive voltage or energy.

#### 3-5-1 Setting Current, Voltage and OVP(No.1)

The current, voltage and OVP are all set in the remote mode (set externally).

There shall be no output without inputting Voltage program and Current program.

When OVP voltage is not programmed, output is shut off and FLT shall light on.



TTL LOW = OUTPUT : remote mode

TTL HIGH = OUTPUT : local mode

Or

External relay CLOSED = OUTPUT : remote mode

External relay OPEN = OUTPUT : local mode

## 3-5-2 Setting Current, Voltage and OVP(No.2)

Out of the current, voltage and OVP settings, the desired one is set in the remote mode.

TTL LOW = (Voltage, Current or OVP) setting: remote mode

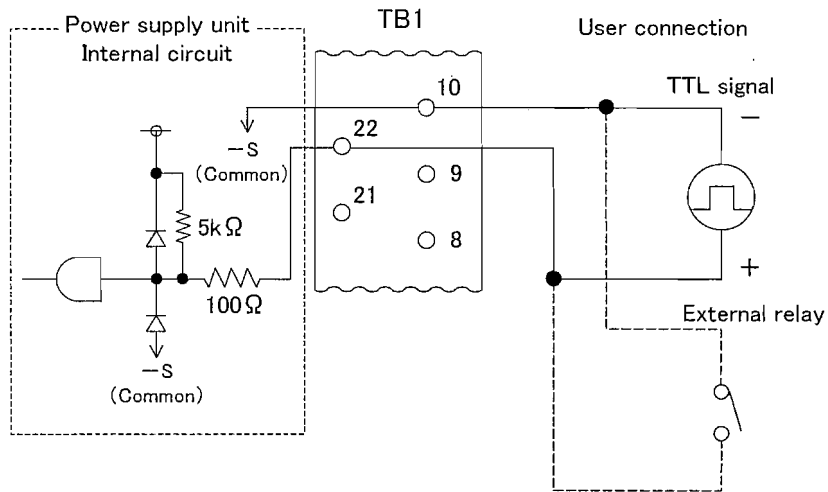
TTL HIGH = (Voltage, Current or OVP) setting: local mode

Or

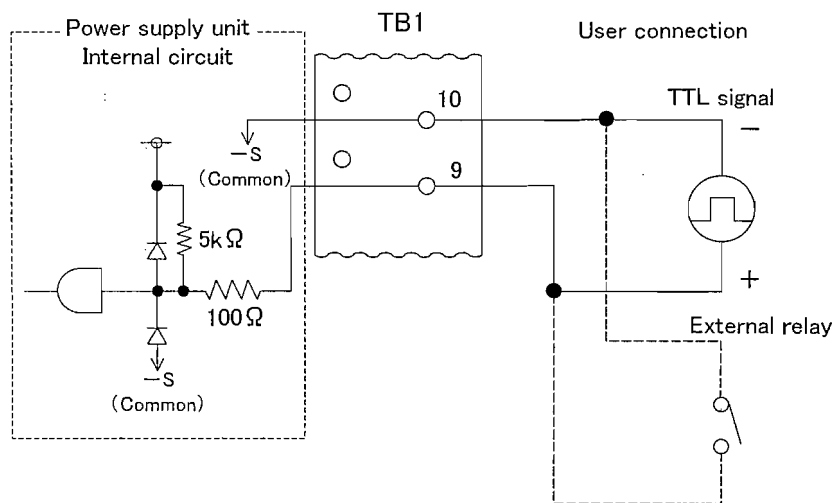
External relay CLOSED = (Voltage, Current or OVP) setting: remote mode

External relay OPEN = (Voltage, Current or OVP) setting: local mode

## ① Voltage set in the remote mode.

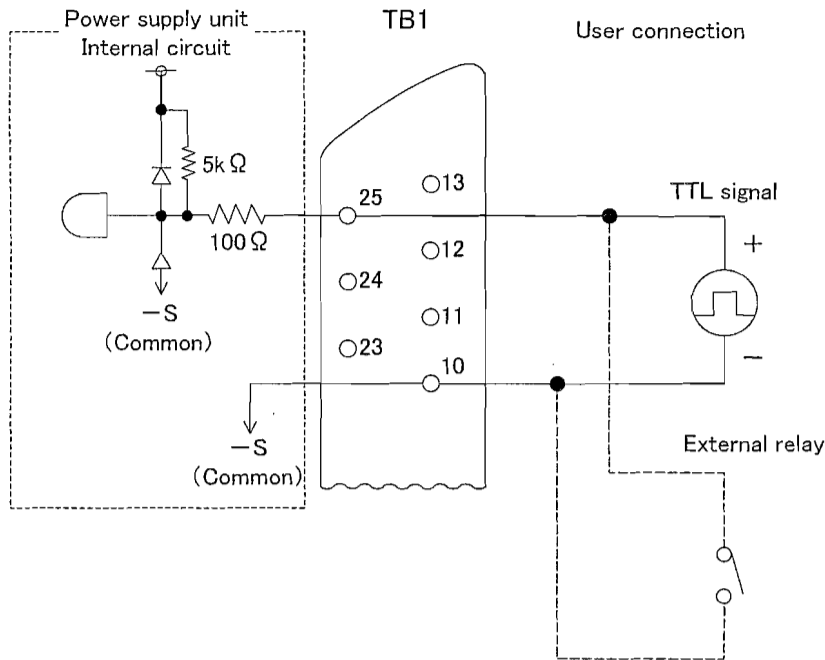


## ② Current set in the remote mode.





③ OVP set in the remote mode



3-6 Blackout Protection

The product is provided with a circuit to prevent accidental restart when the power is recovered after failure. No signal is output if the power is recovered while in operation. To reset, turn the OUTPUT ON/OFF switch to OFF and then back ON.

When the blackout protection function is not to be used, turn SW1-8 ON. In this case, output for the set value is generated when the power is recovered.



### 3-7 Over Temperature Protection

This unit integrates protection circuit which cuts off the output when internal temperature gets abnormally hot.

If SW1 switch is left as factory setting(refer page 3-2), the unit shall get back to normal mode when the internal temperature goes down to normal temperature, and resume the output. (OUTPUT ON/OFF switch shall be ON).

In this case the unit output the set output value after recovery.

For manual recovery, set the 7 pin of SW1 to ON(see below).

In this case, unit shall not recover from over temperature protection even when the internal temperature gets down to normal temperature. Once turn Power switch off, and back on to resume the output.

Then turn off Output ON/OFF switch, and back it on to output the set output value.

(If 8 pin of SW1 is set to ON, pressing Power switch OFF and ON shall resume the output.)



## 4 Advanced Operation

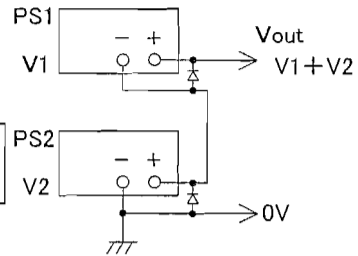
### 4-1 Serial/Parallel Operation

Output voltage or output current of the RE power supply units can be increased by connecting the output of the same model serially or parallel.

#### 4-1-1 Serial Operation

Connect units of identical rated output voltage and current  
As per diagram right.

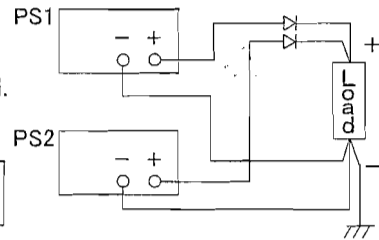
**CAUTION** The maximum output voltage is 250 V in total. Accordingly, serial operation is not allowed for what outputs over 250 V.



#### 4-1-2 Parallel Operation

Connect units of identical rated output voltage and current  
As per diagram right. The same voltage should be set for all.  
Output current is the total of the individual current.

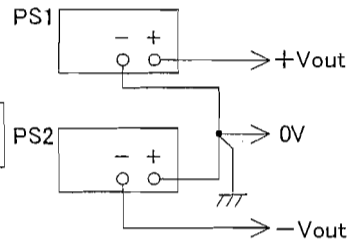
**CAUTION** Set the OVP level of all power supply units to maximum to avoid damage.



### 4-2 Divided Operation

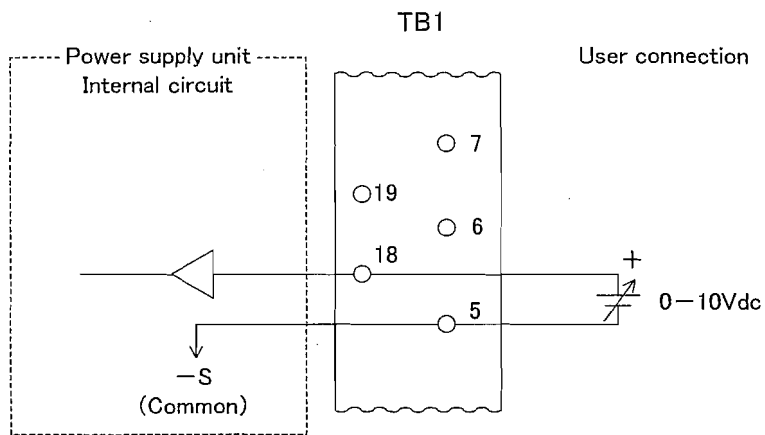
Connect as shown on the right.

**CAUTION** When used in this way, the remote connector is connected to the -output. Do not connect together with any other remote connector.



### 4-3 OVP Program Setting with External Voltage

1. Input the OVP program voltage between the connectors 5 and 18 for remote control.
2. Turn the OUTPUT switch ON and adjust the output voltage to the desired OVP voltage (110 % of the rated output for 10 V).
3. Reduce the OVP program voltage gradually until the FLT (fault) indication is illuminated and the power is shut down.
4. Turn the OUTPUT switch OFF and turn the voltage knob to 0.
5. Turn the OUTPUT switch back ON, increase the output voltage gradually and make sure that the output is shut down at the set OVP voltage.



## 4-4 Turning Output ON/OFF with the Remote Switch

Remote switch enable to turn ON/OFF the output.

(The front panel OUTPUT switch must be ON)

When **LD** on front panel is displayed, there is no output (Remote switch is OFF)

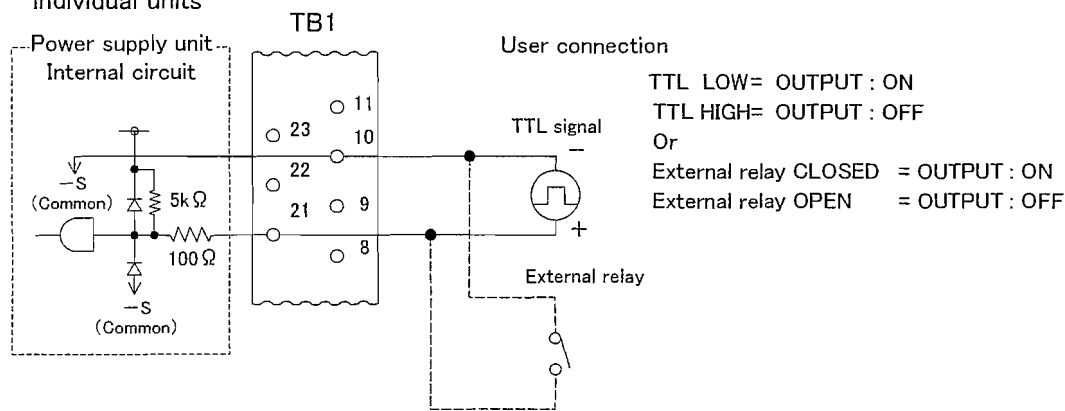
When **LD** on front panel is not displayed, power supply is enable to output

(Remote switch is ON)

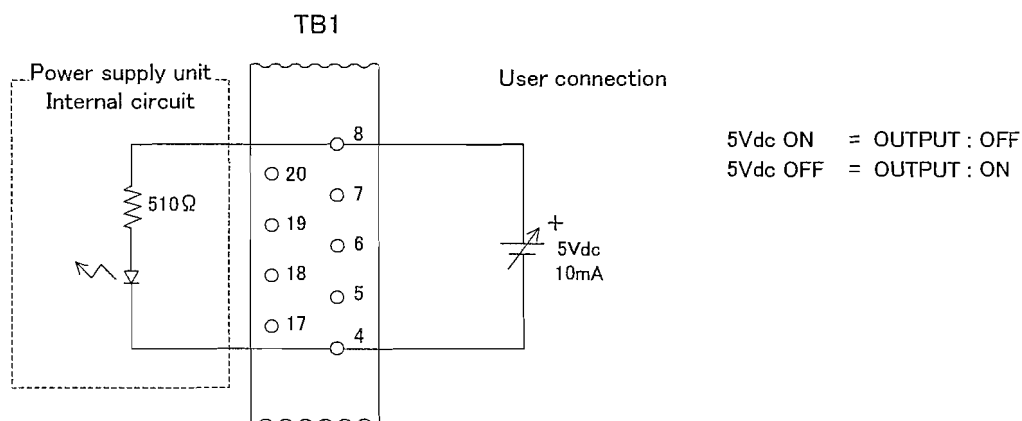
This function can be executed with the following 2 methods.

**CAUTION** Method ② is recommended in case there is possibility of noise coming in from outside onto the wiring (for example there is repeatable short circuit at load end).

- ① Independent operation or separate contacts of the external relay available for the individual units



- ② Turning ON/OFF with power supply units serially connected  
PINS 4 and 8 can be used floating (-S (common) to 100 V).



- ③ To make ON/OFF of ① and ② to OFF/ON (to reverse the logic)

To make ① OFF/ON, apply 5 V between PINs 8 and 4.

To make ② OFF/ON, OPEN the jumper between the PINs 10 and 21. When 5 V is applied

between PINs 8 and 4, it is turned ON. Stopping application of 5 V turns it OFF.

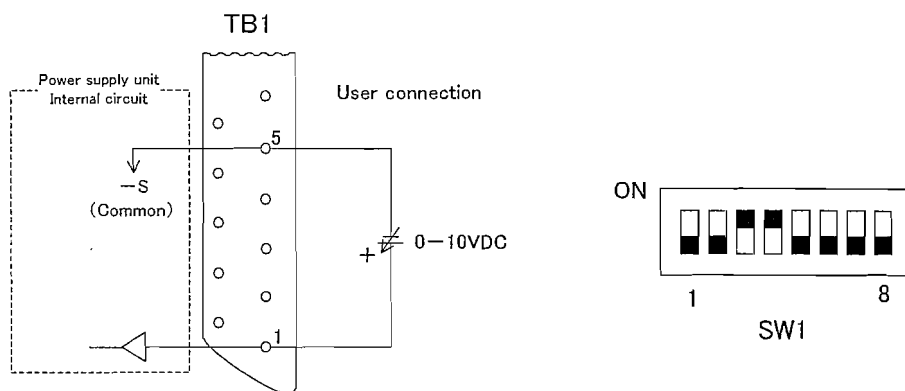
## 4-5 Remote Programming



Fluctuation in external voltage or external resistant directly affects output. Ensure that they are stable.

## 4-5-1 Setting the Voltage Program with External Voltage

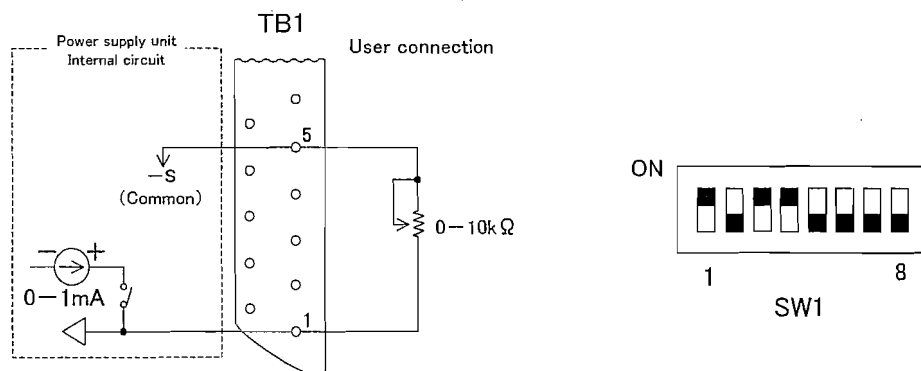
External voltage can control the output voltage.



## 4-5-2 Setting the Voltage Program with External Resistance

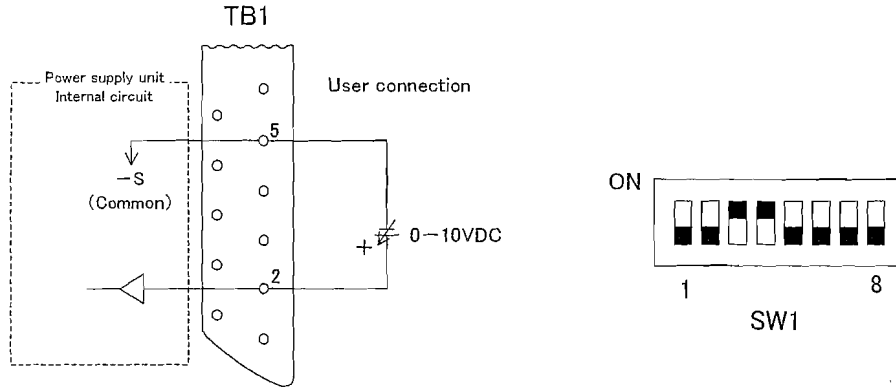
External resistance can control the output voltage.

Turn SW1-1 ON.



### 4-5-3 Setting the Current Program with External Voltage

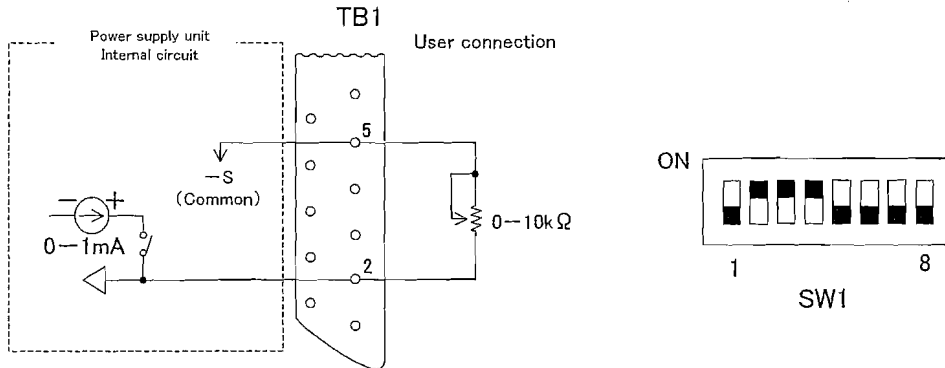
External voltage can control the output current.



### 4-5-4 Setting the Current Program with External Resistance

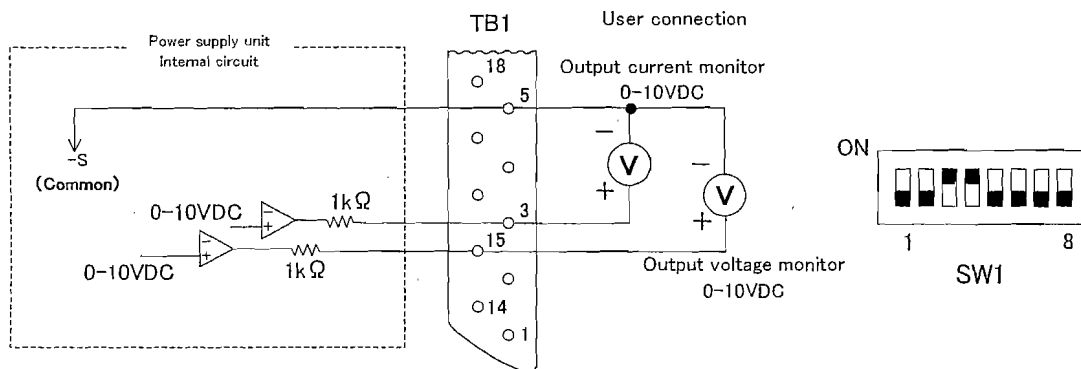
External resistance can control the output current.

Turn SW1-2 ON.



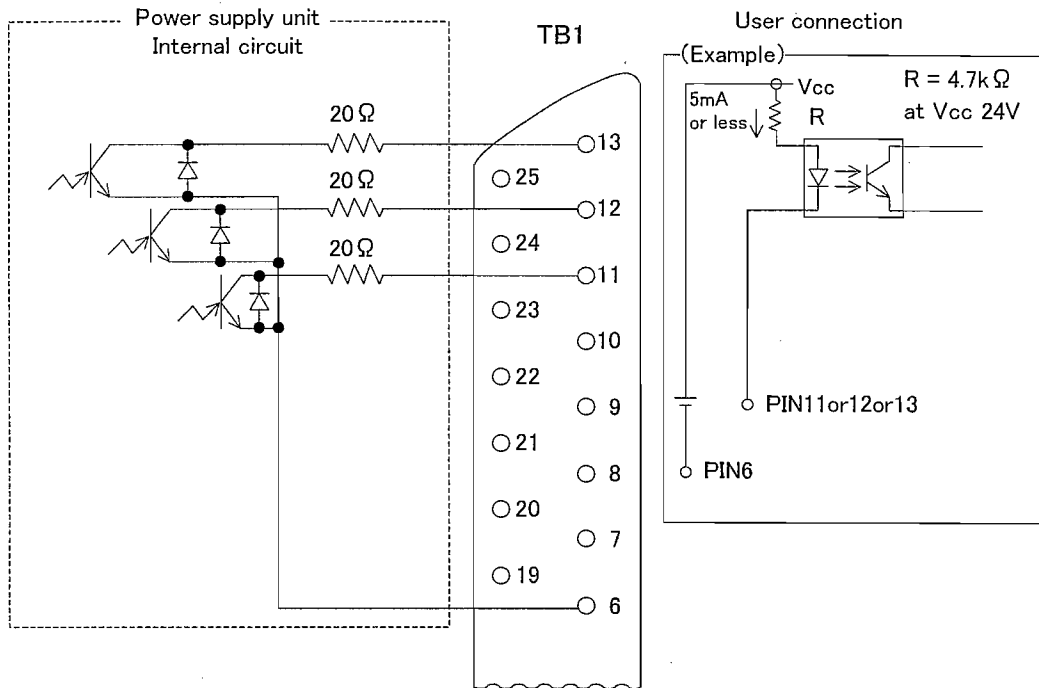
## 4-6 Monitor/Status Output

### 4-6-1 Monitor Output



4-6-2 Status Output

Items	TB1 connector pin	
	Output	Common
<p><b>⚠</b> Status output  <b>CAUTION</b> (open-collector output)                      Use according to the following conditions:                      Resistance to voltage : 30V                      Sink current : 50mA or less</p>	CV	13
	CC	12
	TROUBLE OVP OTP (over-temperature protection) AC fault (AC voltage drop)	11



**⚠ CAUTION** When using with PINs 6, 11, 12 and 13 floating, be sure to maintain the voltage on PINs 5 and 10 at 100 VDC or lower.  
 Especially, be sure to follow the instructions above when using negative output.