

# Instruction Manual

MODEL R4K-80 series

 Matsusada Precision



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# For Safe Use of the Product

## ◆ Introduction

The product generates high-voltage and high-energy.

Therefore, wrongly handling or operating the product may result in death or serious injury and maybe property damage as well. In order to use the product safely, read the instruction manual thoroughly before use to understand how to use and operate it properly.

Please note that we will not be held responsible for any damage or loss caused by not following the warnings, cautions, and procedures described in the manual.

Keep the manual with you so that you can read it whenever you want.

## ◆ Symbols

Symbols are used in the manual and product, which indicate precautions to be observed for safe use.

Understand these symbols first and then read the manual thoroughly.

Some symbols below are not used in products.

 <b>WARNING</b>	Indicates a potentially hazardous situation, which, if not avoided, may result in serious injury or death.		
 <b>CAUTION</b>	Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury or in property damage.		
	Indicates danger/warning/caution. Refer to the instruction manual when this symbol appears on the unit.		Frame or chassis terminal
	Indicates the possible danger of electric shock under specific conditions, which may result in serious injury or death.		Ground terminal
	High Temperature Caution: Indicates the possible danger of injury by high temperature under specific conditions.		Power ON
	Indicates general prohibitions, including warnings.		Power OFF
	Indicates what must be followed.		Standby
	Protective earth terminal (ground terminal for preventing electric shock)		Bistable push button switch ON
	Indicates the possible danger of death if you drink it and burns or blindness if it attaches.		Bistable push button switch OFF
 <b>Radiation</b>	Indicates the possible danger of exposure to radiation.		Alternative Current

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 **WARNING**

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◆ **Understand the risks.**

The Product generates high-voltage and high-energy.

The product is designed for electrical engineers or the equivalents who install, wire, and operate it.

Read the instruction manual thoroughly before use and familiarize yourself with the proper use and danger of the product.

◆ **Make sure to allow only specific people to handle the product.**

Make sure to allow only the following people to handle the product:

1. who are electrical engineers or the equivalents and have already familiarized themselves with the proper use and danger of the product, or
2. who are electrical engineers or the equivalents and have already been trained by the above-mentioned people, or
3. who work under the supervision of the above-mentioned people.

If people other than those listed above install, wire, or operate the product, it may cause electric shock, burnout, or injury.

◆ **Do not open or remove the case or panel of the product.**

Do not disassemble, repair, or modify the product by yourself. High-voltage is applied to the inside of it.

Otherwise, it may cause electric shock, fire, or malfunction.

Moreover, if you do it, the safety and functions are not covered with the warranty.

◆ **The product does not suit to install and use in places where children may be present.**

The product is designed to be installed in places such as factories or laboratories. Do not install and use it where children may be present.

◆ **Make sure to ground it.**

When the product has a protection ground terminal or GND terminal, make sure to ground it.

When the AC line input of it is an inlet type, connect the attached power cable or a power cable suitable for your area to an outlet with the ground. Otherwise, it may result in electric shock or fire.

◆ **Regarding power cable**

When a power cable is enclosed or attached to the product, do not use it for other products.

When no power cable is enclosed with the product, prepare the power cable suitable for the usage environment and area by yourself.

◆ **Regarding the connection of power cable**

Electrical engineers or the equivalents who have already been familiarized with the proper use and danger of the product should connect the power cable to the AC input by referring to the instruction manual.

Regarding products that have acquired the safety standard, check the page describing the over-voltage categories too.

◆ **Do not process or damage power cables**

It may result in electric shock or fire.

◆ **Regarding the input voltage**

Check the page describing the input terminals and input voltage in the instruction manual.

Do not provide any voltage out of the specifications.

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 **WARNING**

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**◆ Regarding the fuse**

The product builds in a protective fuse. In the case where a fuse holder is arranged outside of the product, you can replace it by yourself. Refer to the instruction manual to replace it.

In the case where a fuse holder is not arranged outside of the product, you cannot replace it by yourself. In this case, do not open the case or panel of the product and contact us.

**◆ The product is designed for indoor use.**

Use the product indoors only, not outdoors. Even indoors, do not use it if there is a possibility of water leakage, flooding, or snow covering.

**◆ Regarding operating temperature and humidity**

Use the product within the range of the specifications describing in the instruction manual.

Do not use it in a place where the ambient temperature exceeds the specified range or a closed place.

**◆ Do not install the product in places where condensation may occur.**

Otherwise, insulation deteriorates and it may cause electric shock, fire, or malfunction.

**◆ Do not place anything on top of the product.**

Otherwise, they may fall or tumble from it.

**◆ Do not put anything into the product.**

Do not put foreign objects such as metal or liquid into the product through the air inlets, air outlets, or other openings. Otherwise, it may result in electric shock, fire, or malfunction.

**◆ Operate the product with the right hand.**

Use only your right hand to operate the product and keep your left hand away from it, which can reduce the risk of electric current flowing through the left hand to the vital organs of the body in the event of an electric shock.

**◆ Do not touch the wiring/load connected to the output and any terminals/connectors during the operation or just after turning output off.**

Very high-voltage is on the terminals and connectors during the operation and even just after the output is turned off. Touching them may result in serious injury or death by electric shock.

The terminals here mean all terminals like input and output terminals and terminals for communications and remote controls.

**◆ Turn off the product before touching the wiring/load connected to the product and any terminals/connectors on the product and cut it off from the AC input.**

Before touching the terminals/connectors and wiring/load, turn off the product and unplug the AC input cable from the outlet or turn off the AC input breaker. Then, check there is no voltage remained using a tester.

Since the output and sense terminals are connected to condensers in it, there is high-voltage remained on them even just after it is turned off.

In order to avoid electric shock, ground the terminals to discharge using a short-circuit grounding apparatus and check the voltage again.

The terminals here mean all terminals like input and output terminals and terminals for communications and remote controls.

---

 **CAUTION**

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- ◆ **Level the product out to use for good heat dissipation.**  
Do not install the product upside down or sideways. If not, the inner heat dissipation will be insufficient. It may result in smoke or fire due to components deterioration.
- ◆ **Do not install the product in a place where cold air directly blows to it.**  
It may result in electric leakage or burnout due to condensation.
- ◆ **Do not install the product in a place where it is exposed to corrosive gases or liquids.**  
It may result in smoke or burnout due to components deterioration.
- ◆ **Do not install the product in a dusty place.**  
Accumulating dust in the air inlet will make hard to cool it down it, it may result in malfunction. In that case, remove dust immediately.
- ◆ **Do not block the air inlet and outlet.**  
Secure 30 cm space at least around the openings. If they are blocked, the product cannot show the rated performance due to the internal temperature increase. Moreover, components deteriorate and it may result in smoke or fire.
- ◆ **Remove wiring to and from the product when work like welding near it is done.**
- ◆ **Do not wipe the equipment with a dust cloth wet with chemicals (thinner or the like) or water.**  
Otherwise, it may result in an electric shock, electric leakage, or burnout due to water getting inside.
- ◆ **Regarding fan replacement**  
When products equip a fan, it has a lifetime. It will be worn out and deteriorated with the time passed and its operation may become unstable. Also, its lifetime greatly varies depending on the usage environment such as temperature, humidity, dust. It requires to be replaced at regular intervals to extend the lifetime. For the replacement, contact us.  
(It requires a replacement charge separately. Do not replace it by yourself, as there is a risk of electric shock.)

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# 1 Introduction

## 1-1 Greeting

Thank you very much for choosing our R4K series.

We expend every possible means to assure the quality of our products. To maximise performance and ensure safe use, please handle the product appropriately in accordance with this Manual.

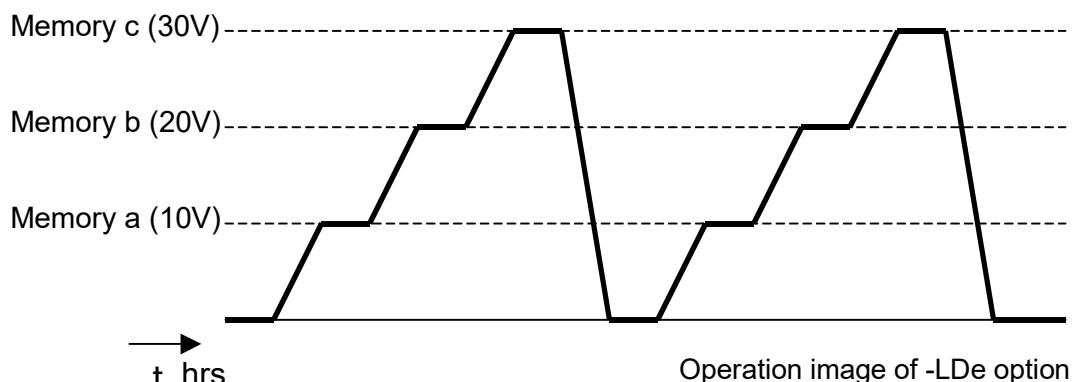
Although we have created this Manual with care, please kindly contact us if any ambiguity, errors or omission is found.

## 1-2 Overview

R4K series power supply generates wide range of variable output voltage and current with high stability, which is required for various applications such as test for components (LCD, semiconductors and etc.) or system power supplies.

With high frequent switching technology, R4K series enable high power and low noise output in such a compact body.

Further, the -LDe option adds output options including the pulse sequence function that repeats on and off and the lamp/sweep function that arbitrarily sets rising/falling time, allowing our customers to change the output state according to their own environment.



### 1-3 Features

- With high-performance D/A converter equipped, settings can be more accurate.
- Simultaneous digital display of voltage and current (our unique display of the world's smallest 4-digit pitch)
- With setting dial, voltage and current can be set from 0 to rated output.
- Constant voltage mode and constant current mode changes with automatic crossover.
- High frequent switching technology realized compact and light weight.
- Protection circuit which disable output when AC line is recovered is integrated.  
(factory setting is ON)
- Output terminals are both on front panel and rear panel.
- 2 mode LOCK function
- High accuracy and performance with micro computer control.
- World wide input of 100V to 240V AC.
- Output cut off with external signal.
- With voltage/current control at the maximum power (84.05W), the range of use of voltage/current is expanded (variable range function)

MODEL	Maximum rated voltage	Maximum rated current
R4K - 80L	16.00V	10.00A
R4K - 80	36.00V	5.000A
R4K - 80M	110.0V	1.300A
R4K - 80H	320.0V	500.0mA

- Output Delay function (0.0-99.9 sec.)
- Voltage/Current Memory function (allows presetting of 3 types of voltage/current in addition to the normal presetting).

### 1-4 Operation mode

R4K series power supply has 2 operation modes of constant voltage and constant current as standard.

When unit is in constant voltage mode, unit keep the set output voltage even when load is changed.

When unit is in constant current mode, unit keep the set output current even when load is changed.

Unit shall be in either of the 2 modes, and 2 modes shall not be effective at the same time.

(see section “4-1-3 Crossover Mode”)

## 2 Before Use

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### 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)

- Basic Instruction manual
- AC input cord
- Front-ground terminal clasp
- M4 screw (for ground terminal)
- CO-M cable (not attached for -LUs1 option / -LGob option / -LEt option)

<Accessories for R4K binder option>

- Clasps (2 pcs)
- Belt (1 pc)
- Support screws (units to be connected x 2 pcs)
- M3 screws (units to be connected x 2 pcs)

<Accessories for LGob option>

- CO-OPT cable

### 2-2 Initial Checking

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

(Do not plug the power cord into the outlet yet.)

1. Check the panel and chassis for any apparent trace of impact such as a dent.
2. Check the position of disable output protection switch on the top of the unit.  
(factory setting is ON)
3. If any failure is found, contact the carrier and us.

### 2-3 Notes



Warning

- When system has high voltage power supply, equipments connected might receive damage due to high voltage.
- When operate with GPIB interface, connect only cables required for system operation.
- The power supply has protection for intermittent short circuit, however operation with repeatable short circuit with arc should be avoided.
- The power supply has enough protection for noise, however if hung-up or voltage output, which is not programmed, are observed, turn off the power supply and reset the unit, then resend the command again from controller.
- **Any system change shall be done while the power of all the equipments of system is turned off. Sometimes it prevents the unit to function properly that causing of high voltage.**

## 2-4 Installation

### 2-4-1 Installation Conditions



- Never place object on power supply.
- Do not install the unit in a place subject to a large amount of dust, corrosive gas, etc.
- Make sure to prevent any metal piece or liquid from inhaling and exhausting holes. Such can cause failure, electrical shock or fire.
- Do not cover the inhaling and exhausting holes.
- Make sure to retain space on the top (approx. 20mm) and the bottom (approx. 8mm) of the power body (for natural cooling).



Side space (about 50mm) at a windless place, Side space (about 10mm) at a Windy place (At forced air cooling by a fan), please reserve space.

- Remove dust on inhaling holes immediately. Such dust can cause poor cooling.



- Do not install the power supply unit in a place subject to dew condensation
- In case welding process is present around power supply, disconnect all the wires from power supply.



- Install the unit horizontally when use.
- The max current of output terminal on rear panel is 10A per terminal.
- In case the current drew is over 10A, use 2 terminals.

## 2-4-2 Ventilation

There are inhaling and exhalation holes on upper and bottom side of power supply for cooling.

Please have enough room for air flow and operate it in good ventilation condition.

(When the temperature rises 10°C by the Arrehenius law has been said that life halved.)

Make a flow of air around it, Lower the power supply internal temperature use.

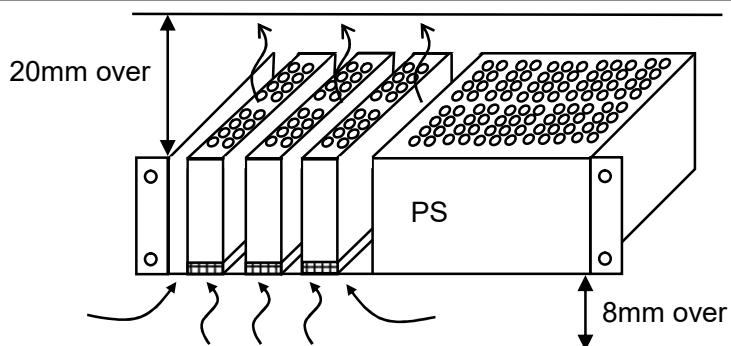
When removing the plastic foot, please secure a space of more than bottom 8mm.

Side space (about 50mm) at a windless place, Side space (about 10mm) at a Windy place

(At forced air cooling by a fan), please reserve space.



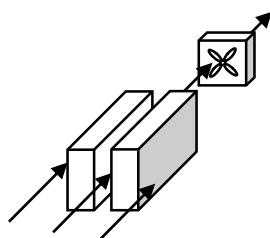
**MUST** Remove dust accumulated on inhaling holes.  
Such dust might prevent air cooling and cause failure.



In the case of use in a rack, remove the plastic foot, please use in the space where is a flow of such air above.

( Especially careful on the lower surface of the power supply. )

When it can not be above ensure, Using our rack mount holder, please forced air cooling fans.



In no place of the air flow, please cooling toward the rear by a fan.

### 2-4-3 Bias

The maximum voltage for use with the output floating (biased) with reference to the ground is 100 VDC.



**CAUTION** Please note that there is bias voltage on the output terminal.

### 2-4-4 Input Voltage/Current

(50/60Hz 1φ input for all model)

Input voltage	Input current max (at 100V input)	Input current Protection (Fuse)
AC100V - 240V	1.1A	3A



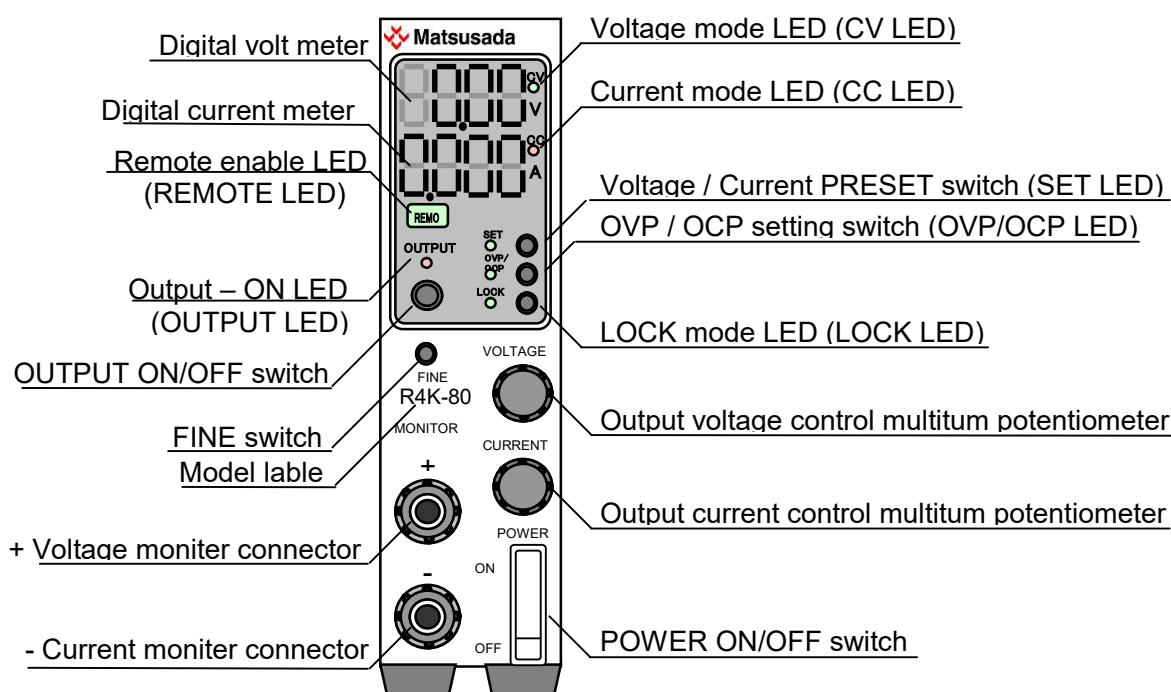
**MUST** Referring the input voltage indication on rear panel of the unit, input correct voltage.  
Incorrect input voltage might damage devices.



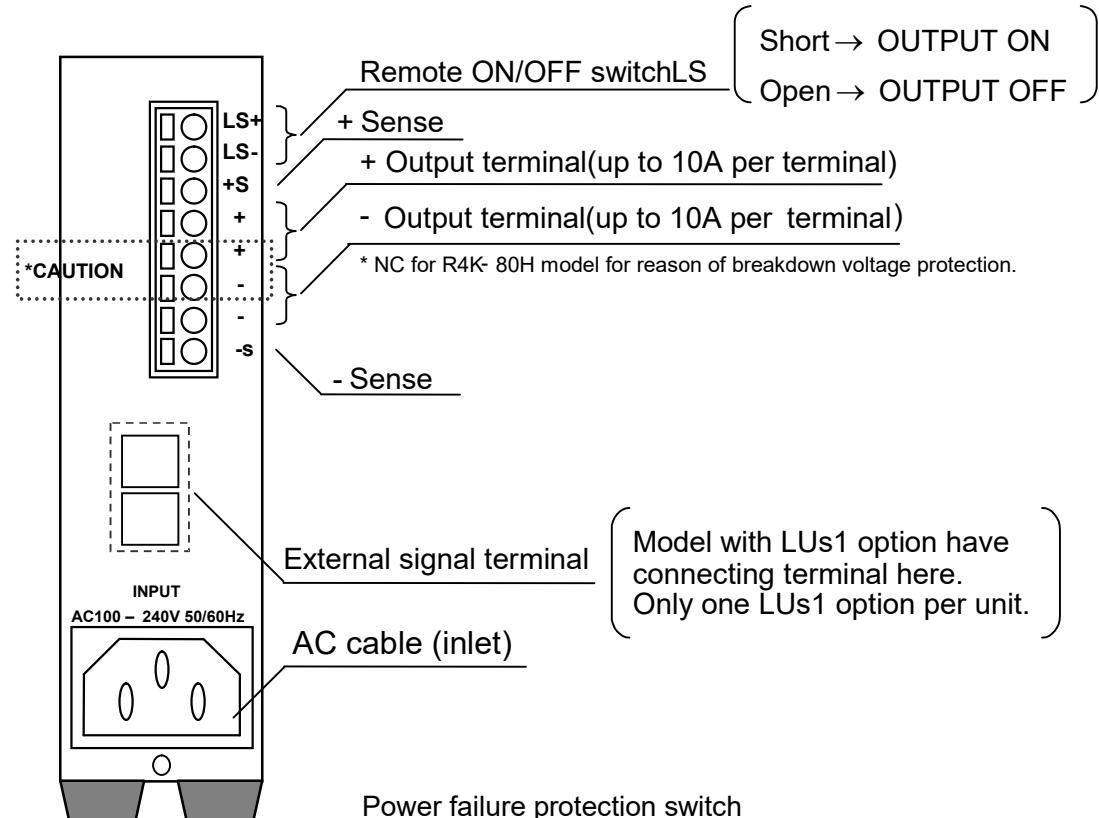
**CAUTION** Inrush current limiting circuit is built-in.  
The thermistor is used for protection from inrush current. When power is turned ON/OFF repeatedly within a short period of time, It is necessary to have enough time for power supply to cool down.

## 2-5 Overview of Panels

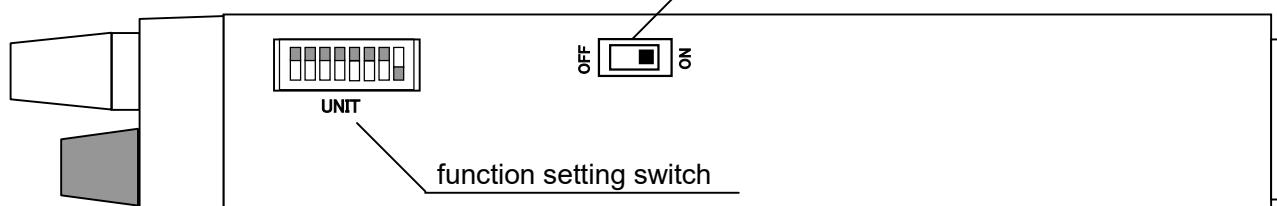
### 2-5-1 Front Panel (※Below is adapted only FINE switch product with a function.)



### 2-5-2 Rear Panel

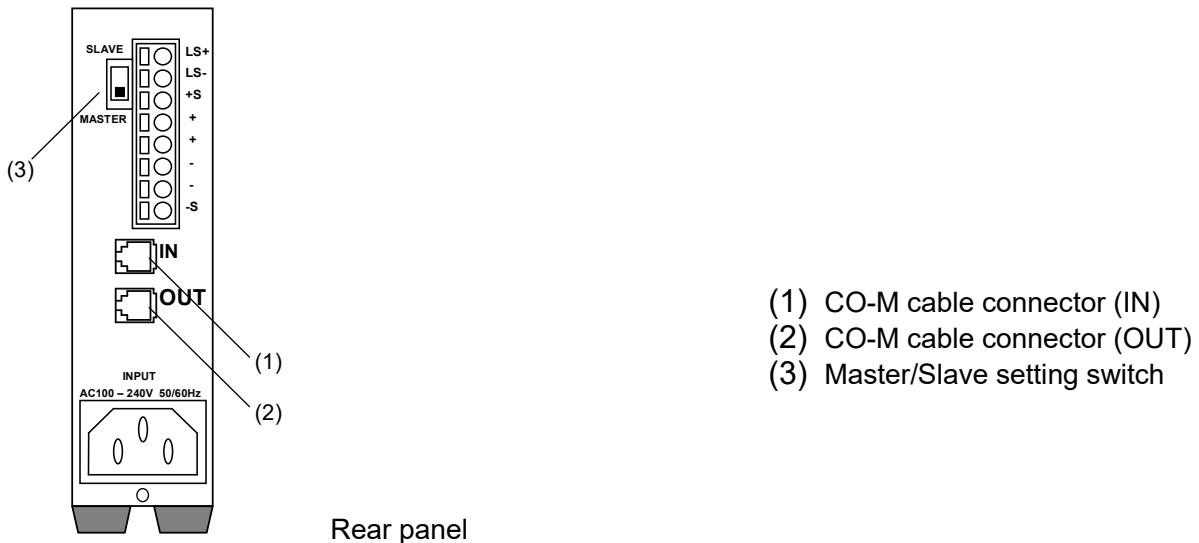


### 2-5-3 Upper View



\* If the upper switch (Setting switch / Power Failure Protection switch) is not, Setting of the upper switch (NSC setting switch / Power Failure Protection switch) is done in the Start menu.

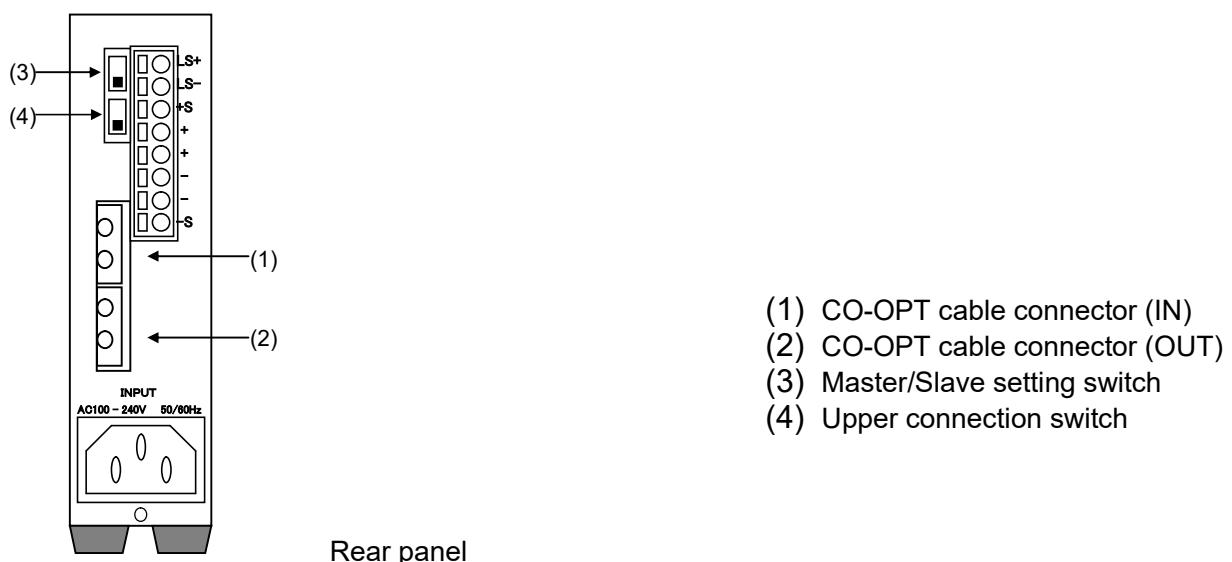
## 2-5-4 Standard Digital Interface



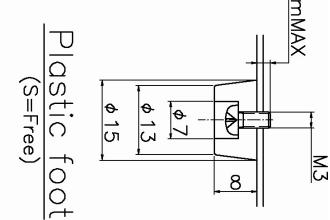
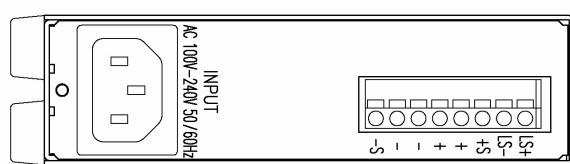
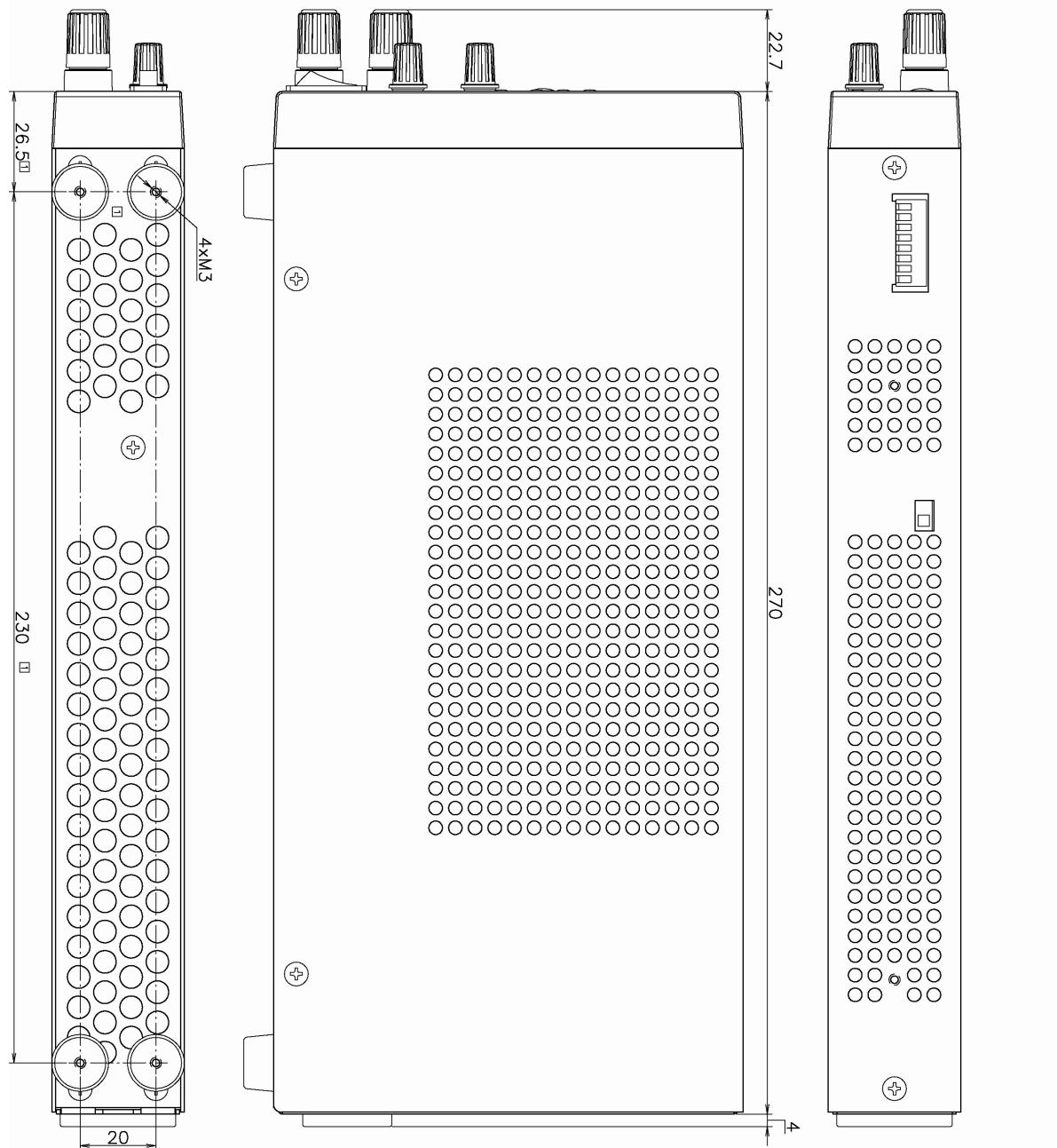
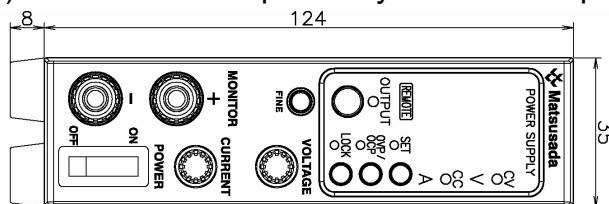
## 2-5-5 LUs1 Option



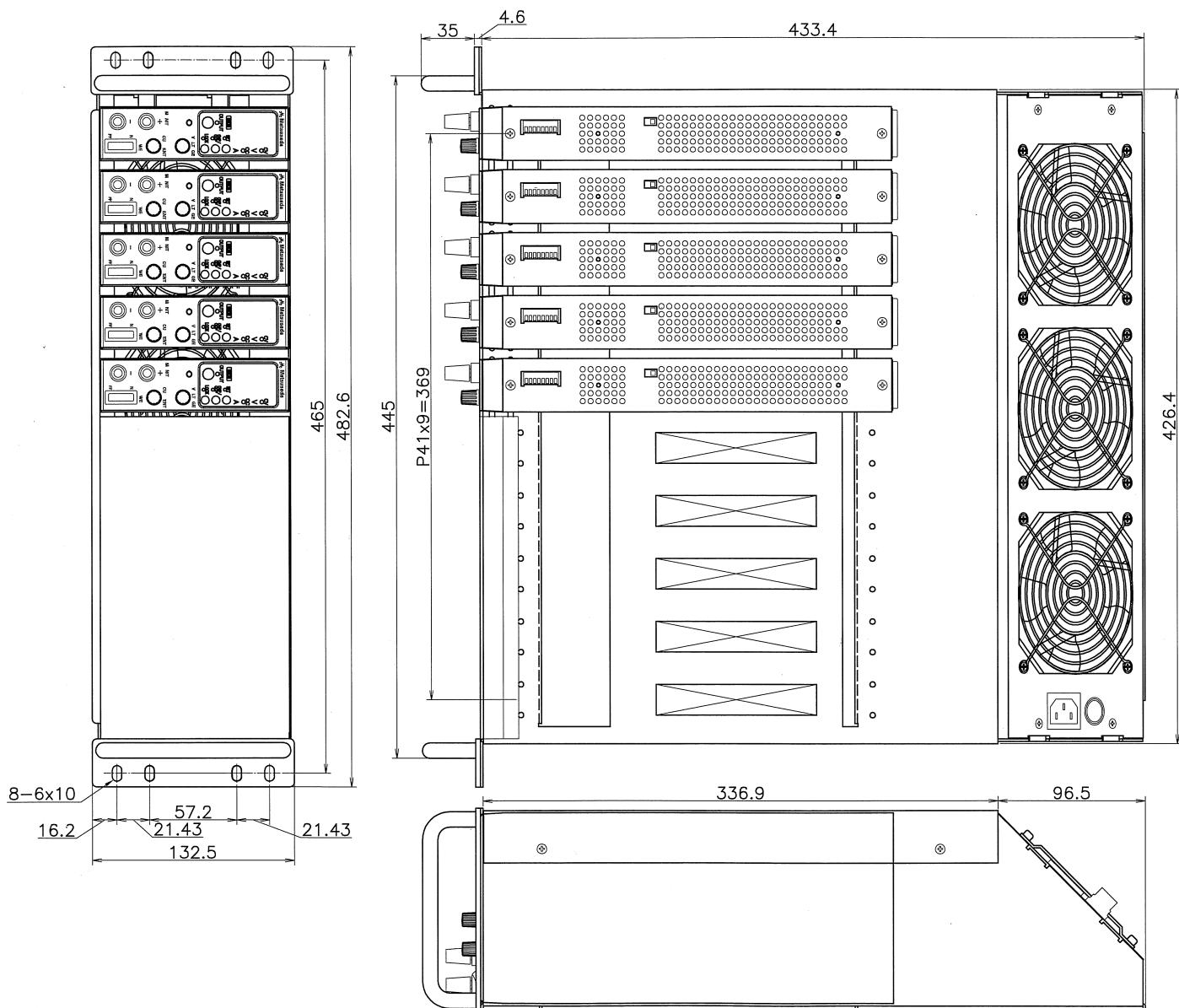
## 2-5-6 LGob Option



## 2-5-7 Dimensions (mm) (※Below is adapted only FINE switch product with a function)



## 2-5-8 Rack Mount Holder



## 2-6 Connection

It is important to have correct connection and grounding in order to use R4K series power supply with high performance, high reliability and low ripple.

### 2-6-1 Connecting with load

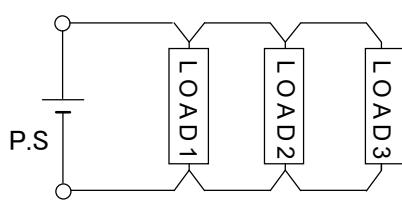
- Use leads of sufficient thickness and make them as short as possible.
- Use PVC cable that has enough resistance to the voltage used (resistant to 105 deg.C).
- Wiring to loads requires taking into consideration the current capacity of the wire and the limitation to the length of output wire by sensing (0.5 V/lead).

AWG	mm <sup>2</sup>	Current(A)	AWG	mm <sup>2</sup>	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			

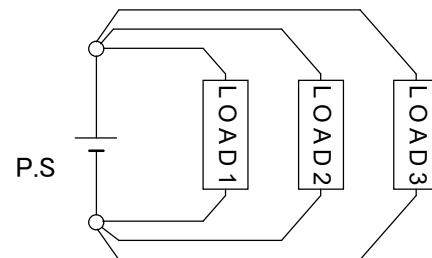
- Maximum current for rear panel output terminal is 10A per terminal.

In case the current is over 10A use more than 2 terminals.

#### Parallel connection

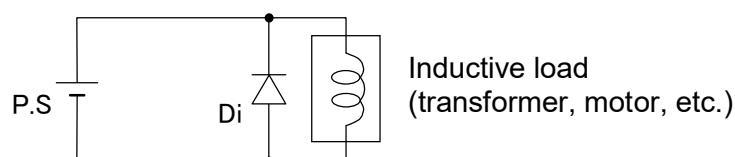


Wrong connection



Proper connection

When using an inductive 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.



Inductive load  
(transformer, motor, etc.)

## 2-6-2 Connection of remote sensing wire

Below table indicates the rating of wire when connecting from rear panel terminal.

Conformable wire	Single wire : $\phi 1.2$ (AWG16) Twisted wire : $1.25\text{mm}^2$ (AWG16) Wire diameter $\phi 0.18$ or larger
Allowable range for use	Single wire : $\phi 0.4 - \phi 1.2$ (AWG26 - 16) Twisted wire : $0.3\text{mm}^2 - 1.25\text{mm}^2$ (AWG26 - 16) Wire diameter $\phi 0.18$ or larger
Standard stripping length	11mm
Tool for operating the button	Screwdriver (shaft diameter $\phi 3$ , nose width 2.6)

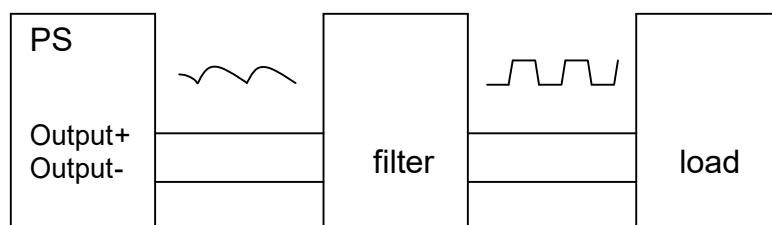
### Notes of the rear panel connector terminal

- An electric wire can not be used other than copper wire.
- Desorption of the electric wire, please turn off the power.
- An electric wire range outside line material shall not be connected.
- The coating of the electric wire to peel off the length of the specified.
- The use of a single the electric wire to one of the insertion opening, when you connect two or more, it will be the cause of the failure.
- Desorption of the electric wire is done by holding down the button to the lower limit. In addition, the electric wire, please fully inserted until the end.
- High temperature, low temperature, humid environment, environment in which the occurrence of condensation and freezing, environment exposed to direct sunlight, environment exerted vibration or shock, dust-rich environment Water, various types of oil, (including detergent) chemicals, can not be used in corrosive gas consuming environment.
- The diameter of the electric wire, but you have to display the cross-sectional area, when  $\text{mm}^2$  and AWG do not match, please apply the  $\text{mm}^2$ .
- Terminal intended for indoor use, it can not be used outdoors.
- Insertion and removal of connectors and the electric wire, please straight to.
- The electric wire connected, please fix the electric wire so that tension is not applied.
- Do not apply a load of more than necessary to the terminal in the desorption of the electric wire.

## 2-6-3 In case of connecting load which has frequent discharge

When connecting to a load which has large ripple current such as plasma discharge, it could affect the lifetime of the power supply, and recommend to have a protection such as putting low pass filter between power supply and load as shown below.

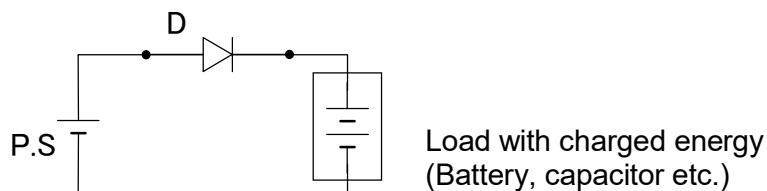
When used for a load which has arc or short circuit of faster than 1 per second without such additional protection, there is a possibility of smoke or liquid leakage from power supply. In such case contact our sales office for a solution before operation.



## 2-6-4 When connecting to a capacitive load with energy

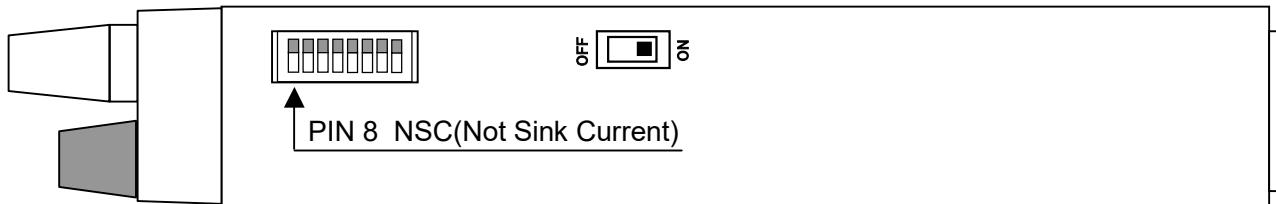
When connect to a capacitive load with energy such as battery, there shall be current flow from load to inside circuit of power supply, which can damage the power supply or cause the shorter lifetime of power supply.

In the R4K series, besides the case where the diode is not connectable in series or where that is connected in series, the suction current function of the body turns off by turning on the NSC (Not Sink Current) switch of the upper setting switch (No. 8). Note that fall time becomes slow when turning output off.



**CAUTION** Select a protection diode to protect load or power supply from countercurrent with following criteria.

- Select a diode with reverse voltage rating is 2 times more than rated output voltage of power supply.
- Select a diode with rated current is 3 to 10 times more than rated output current of power supply.
- Select a diode with less loss.
- Consider the heat of protection diode for countercurrent. Poor heat dissipation can burn the protection diode for countercurrent connected.
- Operation with remote sensing function is not possible.



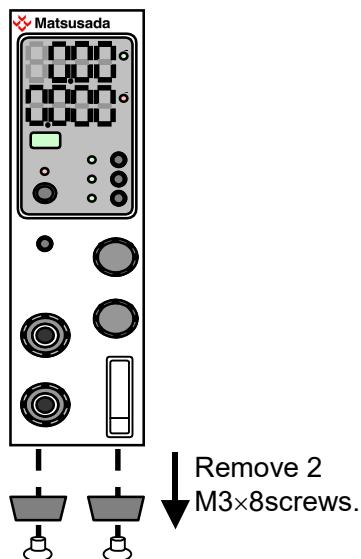
\* If the upper switch (Setting switch / Power Failure Protection switch) is not, Setting of the upper switch (NSC setting switch / Power Failure Protection switch) is done in the Start menu.

## 2-7 Installation of front-ground terminal

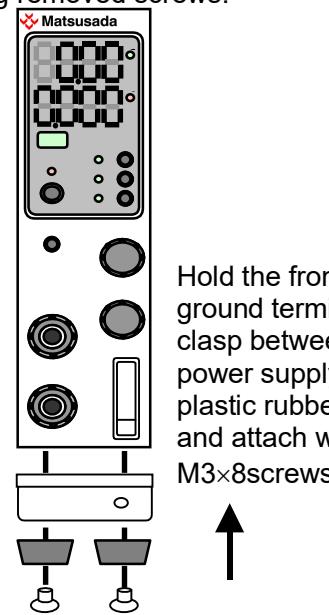
R4K series power supply can connect to ground terminal from front.  
Use attached front-ground terminal clasps and M4 screws.

### [Installation of front-ground terminal]

1. Remove 2 plastic rubber foot that mounted to front of power supply.



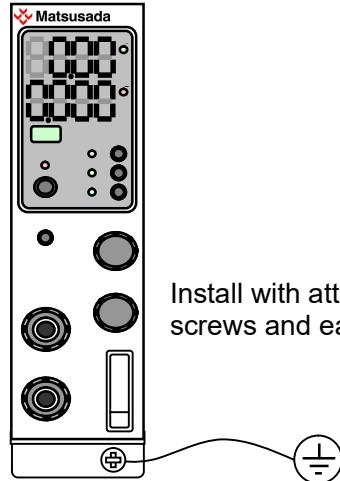
2. Hold the front-ground terminal clasp between power supply and plastic rubber foot as ground lead face bottom, and mount them using removed screws.



Hold the front-ground terminal clasp between power supply and plastic rubber foot, and attach with 2 M3×8screws.

\* Do not tighten plastic rubber foot too hard, or it will be deformed.

3. Connect attached M4 screws and the earth into the hole of ground terminal.



Install with attached M4 screws and earth.

### 3 Outputting

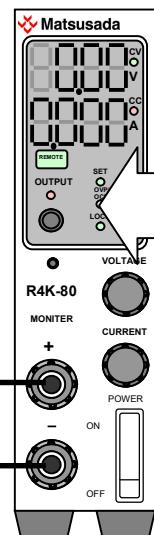
This section describes simple operation from power on to output.

#### Connection to load

Both +/- monitor terminals on the front panel and

+/- output terminals on the rear panel can be used.

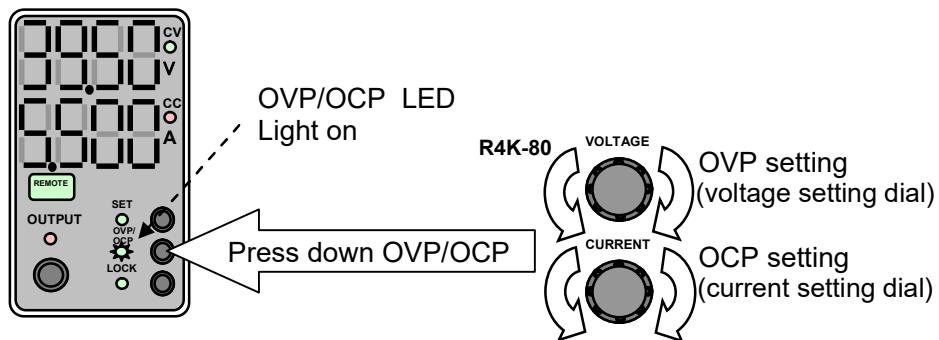
(\*Up to 10A per terminal for connection to the +/- output terminals on the rear panel)



\* When connecting the load, be sure to check that the OUTPUT is OFF and no output is made (the OUTPUT LED is turned off). Otherwise, the load to be connected may be damaged.

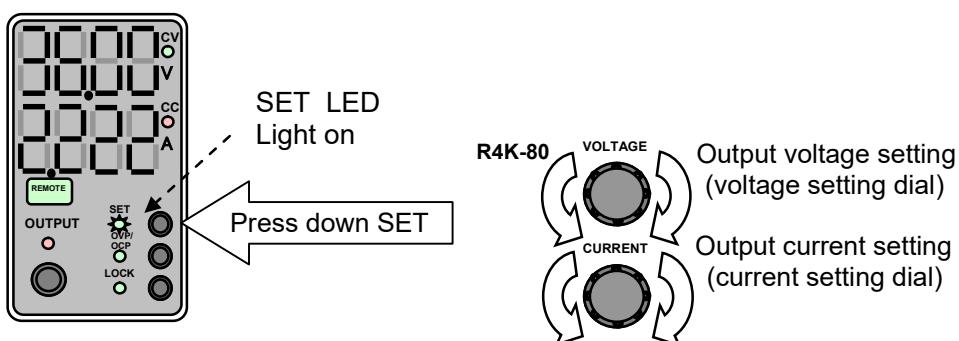
#### Set OVP/OCP values

Set Over voltage/Over current protection values to the maximum. (R4K-80)



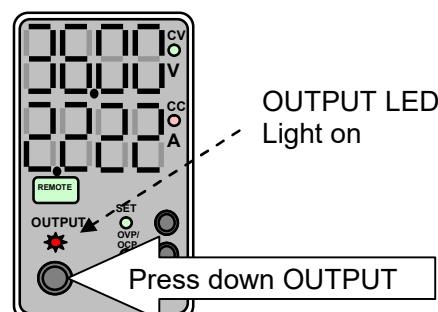
#### Set voltage/current values

Set voltage/current values to output. (R4K-80)



#### Start the output

Press the OUTPUT switch to start the output. (R4K-80)



## 4 Operation

### 4-1 Description of Operation Modes

The R4K 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  $R_L$

#### 4-1-1 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.

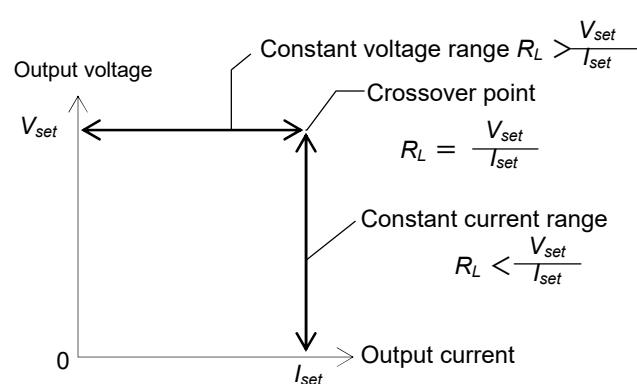
#### 4-1-2 Constant Current Mode

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

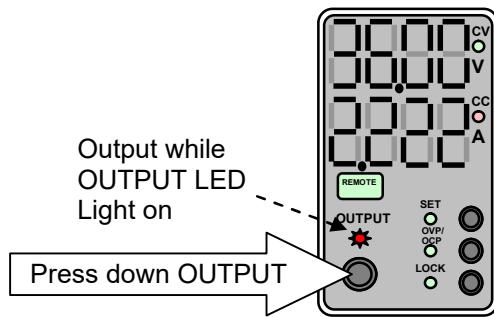


#### 4-1-3 Crossover Mode

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.

## 4-2 Output switch

Output switch changes output ON/OFF. When Output LED on (Red), unit generate voltage and current set from the output terminal on front and rear panel. When Output LED is turn off, output is off.

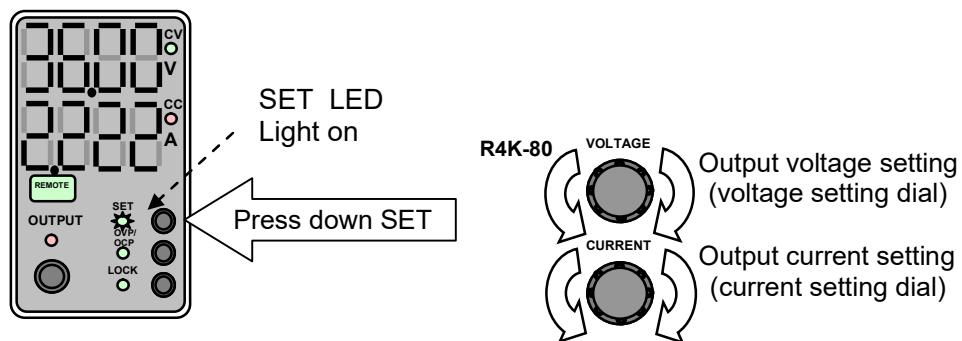


## 4-3 Output voltage, output current preset button

- When pressing down output voltage/current preset button(SET), preset voltage and current value shall be displayed on the display.
- When press output voltage/current preset button(SET), output voltage and output current can be set with output voltage dial and output current dial respectively.
- When OUTPUT ON/OFF switch is ON (OUTPUT LED light on)unit generate voltage and current, so be careful.
- Setting of output voltage/output current has power control function.

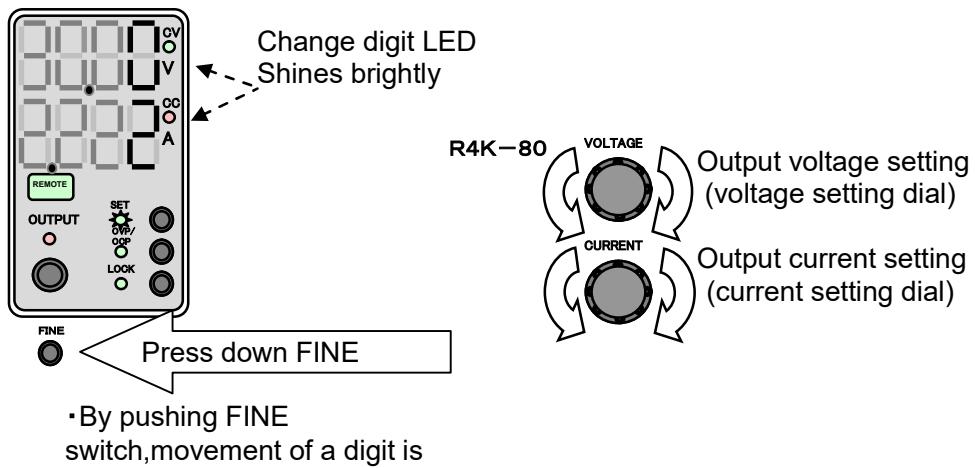
With the limitation of maximum output power 84.05W, current setting is to be automatically set when voltage setting and voltage settling is to be automatically set when current setting. Please note the drop of voltage or current when generating output.

- When OUTPUT ON/OFF switch is OFF (OUTPUT LED is off), by turning voltage/current setting dial, set voltage and current value are to be displayed on voltage meter and current meter respectively for about 2 seconds like the case preset switch is pressed.



#### 4-3-1 FINE switch (※Below is adapted only FINE switch product with a function)

- By pushing FINE switch to change the digit both of digital voltage meter and digital current meter.
- Output voltage and output current can be set with output voltage dial and output current dial respectively.
- When OUTPUT ON/OFF switch is ON (OUTPUT LED light on) unit generate voltage and current, so be careful.



#### 4-4 O.V.P (Over voltage protection) / O.C.P (Over current protection)

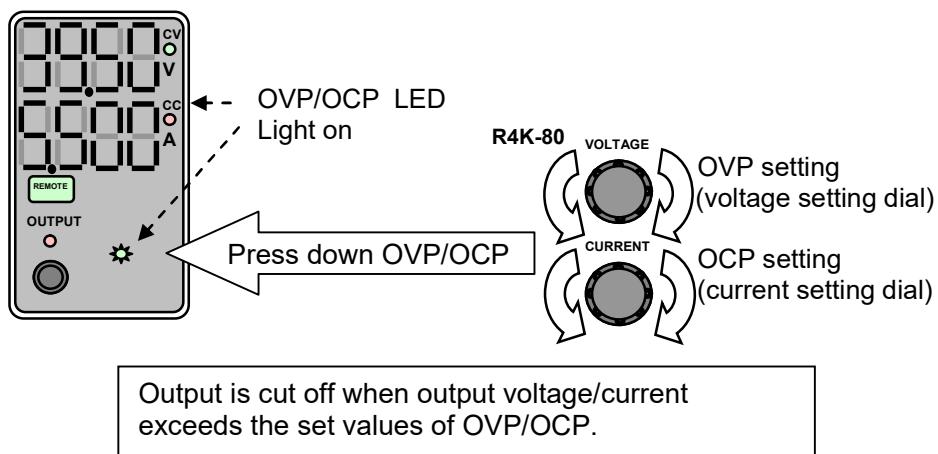
- When pressing “O.V.P/O.C.P” button O.V.P value on voltage meter, and O.C.P value on current meter shall be displayed on the display for about 2 seconds.
- On O.V.P/O.C.P setting display O.V.P/O.C.P value can be set by turning voltage/current setting dial.

##### [O.V.P]

- When output voltage gets higher than set voltage value O.V.P protection stop output.
- When O.V.P is effective display shows “OVP/E01” and cut off the output. (OUTPUT LED light off)
- To cancel, turn OFF the OUTPUT ON/OFF switch or turn OFF the LS (remote switch) and reset. (Screen display returns from “OVP/E01” to the original screen).
- To resume the output turn on the output switch or turn ON the LS (remote switch). (after adjusting output voltage of O.V.P voltage value) (OUTPUT LED light on)

##### [O.C.P]

- When output current gets higher than set current value O.C.P protection stop output.
- When O.C.P is effective display shows “OCP/E05” and cut off the output. (OUTPUT LED light off)
- To cancel, turn OFF the OUTPUT ON/OFF switch or turn OFF the LS (remote switch) and reset. (Screen display returns from “OCP/E05” to the original screen).
- To resume the output turn on the output switch or turn ON the LS (remote switch). (after adjusting output current of O.C.P current value) (OUTPUT LED light on)



## 4-5 LOCK

- This unit is built in with two LOCK functions (Normal LOCK / Full LOCK).
- When the unit enters the Normal LOCK mode, the LOCK LED turns on and the output voltage setting dial and the output current setting dial are disabled so that the settings cannot be changed. However, the following functions are available even in the Normal LOCK mode.

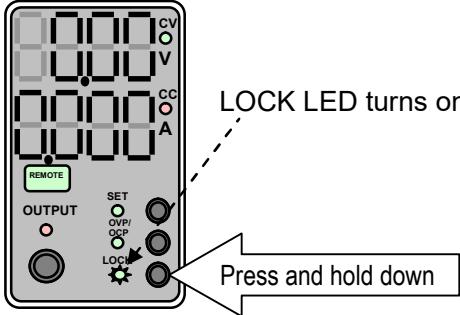
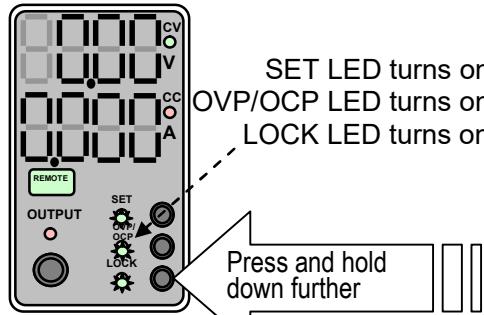
ON/OFF of output using OUTPUT button  
Check of preset values using SET switch  
Check of OVP/OCP values using OVP/OCP switch  
Switching among memories "a", "b" and "c" under Multi-set function (\*Changing the preset values of each memory is disabled.)

- In the Full LOCK mode, all front panel operations except for the POWER switch are totally disabled (cancellation using the LOCK switch is enabled). (\*When the Multi-set function is in operation, the Full LOCK function cannot be used.)
- Press and hold down the LOCK switch for 2 seconds or more. The last setting is kept and the unit enters the Normal LOCK mode (the LOCK LED turns on). Pressing the LOCK switch further (for 10 seconds or more) makes the unit enter the Full LOCK mode (the SET LED, OVP/OCP LED and LOCK LED turn on).
- To cancel the Normal LOCK / Full LOCK states, press the LOCK switch for 2 seconds or more again.

Normal LOCK mode : LOCK LED turns off

Full LOCK mode : SET LED, OVP/OCP LED and LOCK LED turn off

\* The display indicates the output voltage and the output current.

	Normal LOCK	Full LOCK
Functions locked	Voltage/current dial operation Voltage/current preset values OVP/OCP values Preset values for Multi-set function	Voltage/current dial operation Button switches on front panel OUTPUT switch SET switch OVP/OCP switch
Functions not locked	ON/OFF of output using OUTPUT switch Check of preset values using SET switch Check of values using OVP/OCP switch Memory switching operation in Multi-set function LOCK switch (to be used for cancellation)	LOCK switch (to be used for cancellation) Check of preset values using SET switch Check of values using OVP/OCP switch
How to set	Press and hold down the LOCK switch (for approx. 2 sec.)	Press and hold down the LOCK switch (for approx. 12 sec.)
How to cancel	Press and hold down the LOCK switch (for approx. 2 sec.) in Normal LOCK state.	Press and hold down the LOCK switch (for approx. 2 sec.) in Full LOCK state.
How to check	 <p>LOCK LED turns on</p>	 <p>SET LED turns on OVP/OCP LED turns on LOCK LED turns on</p>
Remarks	Not applicable when Multi-set function is enabled.	

#### 4-6 Power Failure Protection

This unit integrates a circuit to stop the output when it is recovered from power failure.

During the operation, when recovered from power failure, unit does not resume the output.

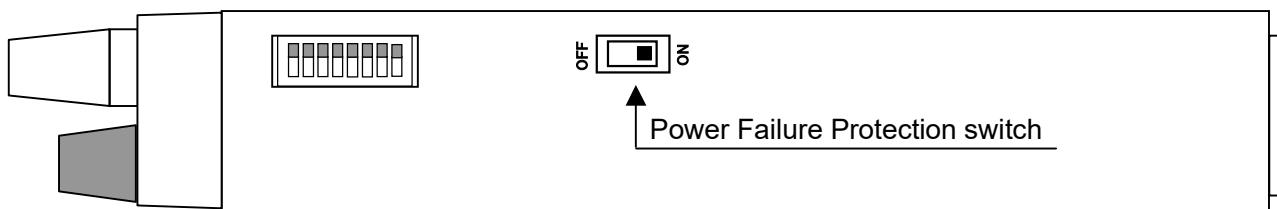
Turn off OUTPUT ON/OFF switch and back it on to resume the output.

When power failure protection is not in use, turn PFP switch to OFF.

Then, when recovered from power failure, or when turn on POWER ON/OFF switch, power supply shall get back to the status when power failure is happened.

(If power is failure when OUTPUT ON/OFF is ON, then the unit resume the output automatically.

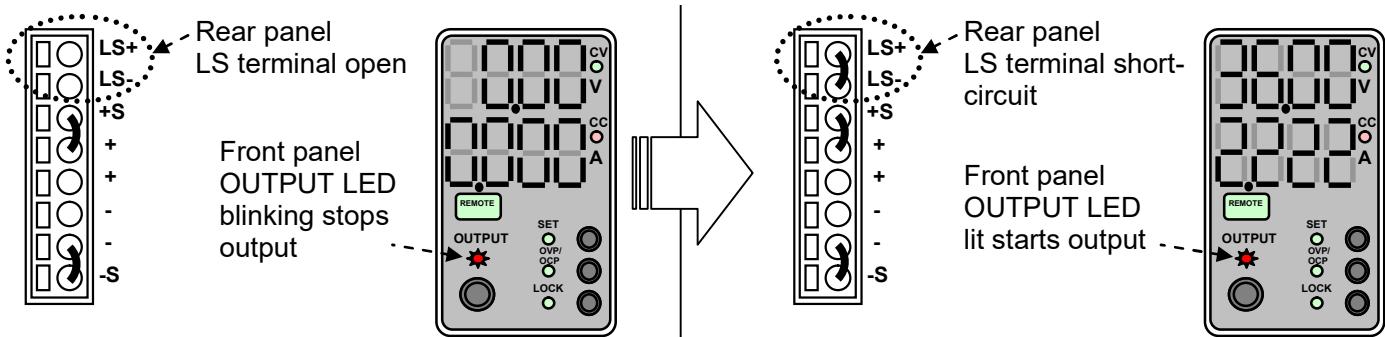
When power is failure when OFF, power supply keep off.)



\* If the upper switch (Setting switch / Power Failure Protection switch) is not,  
Setting of the upper switch (NSC setting switch /  
Power Failure Protection switch) is done in the Start menu.

#### 4-7 LS (Remote Switch) ON/OFF

Using the LS + terminal and LS – terminal (common) on the rear panel, output ON/OFF can be switched. Shorting the LS + terminal and LS – terminal (common) starts output while opening the LS + terminal and LS – terminal (common) stops output.



\* To start output by LS, make sure to start output from the output enable mode with the OUTPUT LED blinking.

Confirm that the OUTPUT LED is blinking with the LS + terminal and LS – terminal (common) are open. Blinking OUTPUT LED indicate that unit is enable mode, from which short-circuit of the LS + terminal and LS – terminal (common) starts output.

\* When press the OUTPUT switch, while the LS + and LS – terminals are open and when the OUTPUT LED is blinking, the OUTPUT LED turn off.

At that time even LS + and LS – terminals are shorted, there will be no output.

Opening the LS + terminal and LS – terminal (common) in the same state (the LS + terminal and LS - terminal (common) short-circuited), the OUTPUT LED blinks, and output starts when short-circuiting the LS + terminal and LS – terminal (common) next time.

\* Operating LS (remote switch) in power on

- When power failure protection is switched on

Powering off in output enable mode (OUTPUT LED blinking) with the LS (remote switch) open, power failure protection works, which results in the output enable mode cancelled (OUTPUT LED turned off) when powering on again.

To start output, open, short-circuit, then open the LS (remote switch) for output enable mode (OUTPUT LED blinking). Note that you need to short the LS (remote switch) following this operation to start output.

- When power failure protection is switched off

Powering off in output enable mode (OUTPUT LED blinking) with the LS (remote switch) open, power failure protection is cancelled; therefore, activation occurs retaining the output enable mode when powering on again.

To start output, short the LS (remote switch).

(Note that in powering on, output starts when the LS (remote switch) is short-circuited.)

#### 4-8 LS (Remote Switch) Connection

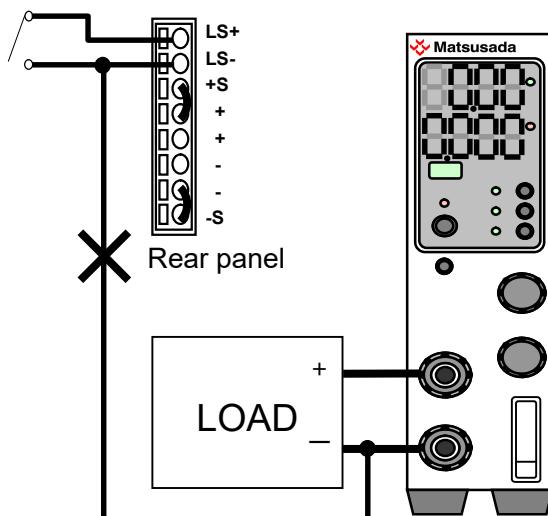
NO Do not connect rear panel LS – terminal (common) directly to –s.

NO Never ground rear panel LS – terminal (common) directory to the earth.  
When need to ground, ground the +( positive) output. (Connected to +(positive) output internally).

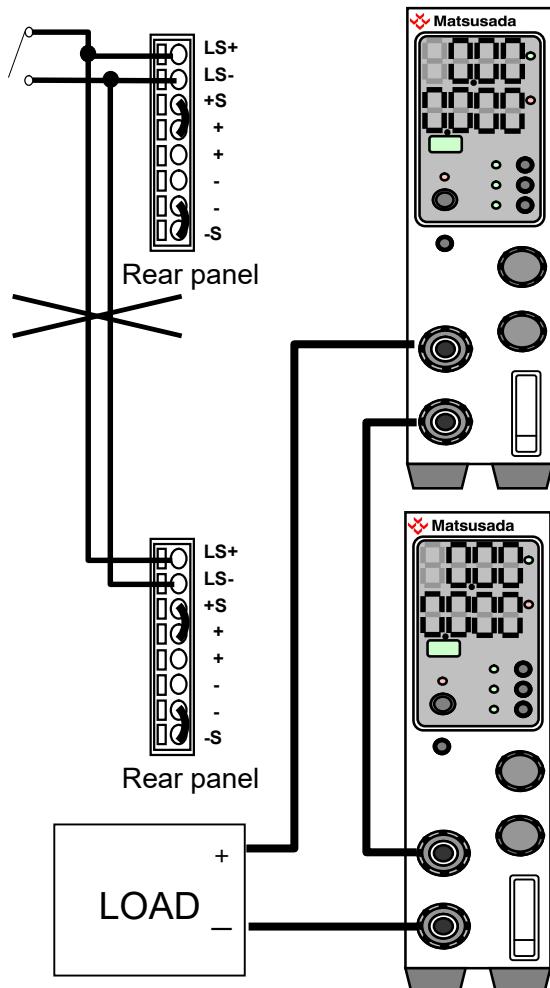
MUST Since rear panel LS – terminal (common) is internally connected to +S, devices to be connected to rear panel LS +/- require floating.

Caution Wiring with following LS terminal must be short (less than several meters), and kept away from large noise source.  
It might cause malfunction or failure.  
If it really becomes longer, Please protect from noise and use it by shielding wire.

NO Do not connect LS – terminal (common) to –output.



NO Do not connect power supplies in series to connect the commons of the LS -terminal.



## 4-9 Remote Sense function



**CAUTION** +S and -S shall be connected with output terminal (+sense → +OUTPUT terminal, -sense → -OUTPUT terminal) when remote sense function is not used or when unit is connected in parallel or series.

If unit is operated without +sense and -sense connected with output terminal, it can cause failure.

- With remote sense function, stabilize point of power supply can be set to other point than output terminal such as load or other point.
- The loss of the lead wire is compensated by 0.5 V maximum.
- Use twisted or shielded lead wire for sensing.
- The sense lines are provided at the sense connector on the rear panel. Make connections as described below:
  - Turn the power supply OFF, wait for five minutes and remove the jumpers between +S and +OUTPUT terminal, and -S and -OUTPUT terminal.
  - Connect the + Sense and - Sense as shown below. Connect the load in the same way.
  - Ground the shield at one point: power supply or load.
  - Turn the power ON.

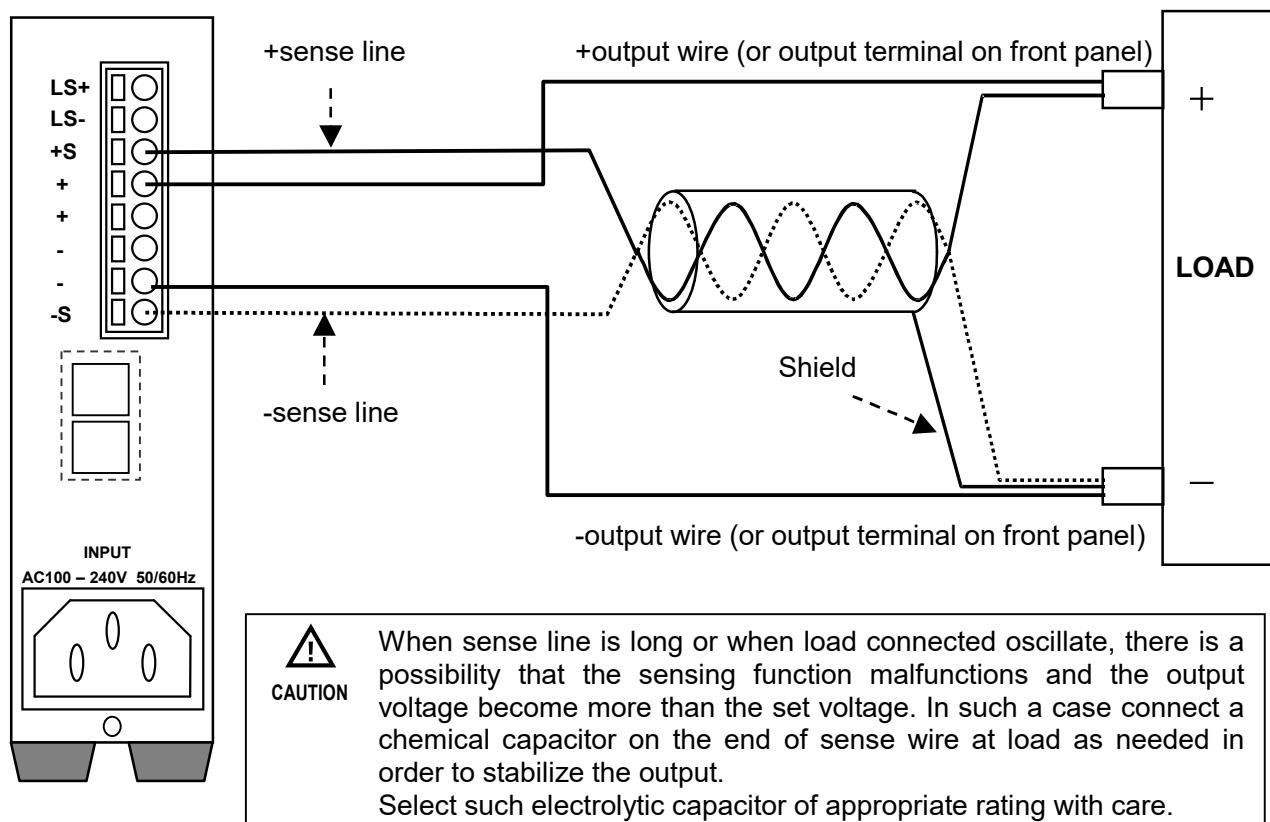
\* If +sense line and -sense line is connected conversely, display indicates "Sr/E03", and output is cut off.

\* See section "2-6-2 Connection of remote sensing wire"

\* To cancel "Sr/E03", turn OFF the OUTPUT ON/OFF switch or turn OFF the LS (remote switch) and reset. (Screen display returns from "Sr/E03" to the original screen.)

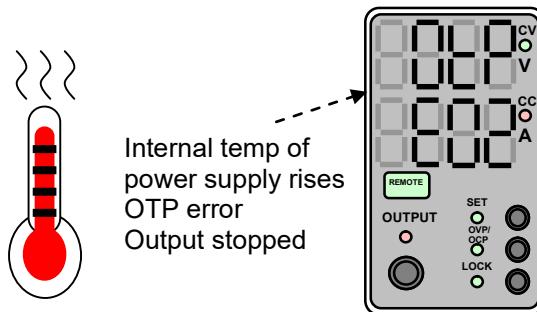
\* To resume the output, turn ON the output switch or turn ON the LS (remote switch).

(after connecting the sense line correctly) (OUTPUT LED light on)



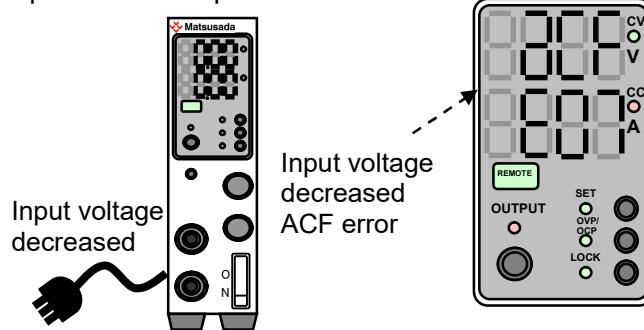
#### 4-10 O.T.P (Over temperature protection)

- When the temperature of power supply inside get high due that environmental temperature is high or when vent holes are closed, OTP become effective, and shut off the output.
- When OTP is effective, the display shall show “OtP/E02”, and stop the output. (OUTPUT LED light off)
- To cancel, turn OFF the OUTPUT ON/OFF switch or turn OFF the LS (remote switch) and reset. Display get back to normal from “OtP/E02”
- Turn on OUTPUT ON/OFF switch (after temperature of inside the power supply get down) to resume the output or turn ON the LS (remote switch). (OUTPUT LED light on)



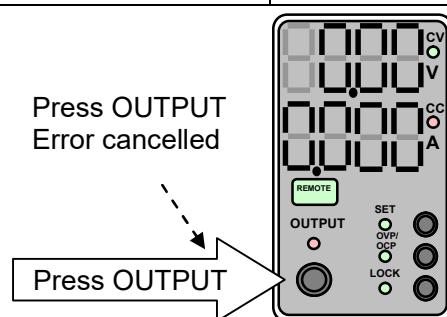
#### 4-11 ACF (AC Fault Insufficient AC input voltage)

ACF become effective and cut off the output when input voltage drop or unstable input voltage to the extent that normal operation is not possible.



#### 4-12 Error List

display	Meaning	Page number to be referred
OVP / E01	OVP (Over Voltage Protection)	4-4 O.V.P (Over voltage protection) / O.C.P (Over current protection)
OtP / E02	OTP (Over temperature Protection)	4-10 O.T.P (Over temperature protection)
Sr/ E03	Sense reverse connection	4-9 Remote Sense function
OCP / E05	OCP (Over Current Protection)	4-4 O.V.P (Over voltage protection) / O.C.P (Over current protection)
ACF / E07	ACF (AC Fault Insufficient AC input voltage)	4-11 ACF (AC Fault Insufficient AC input voltage)



## 5 Useful Functions

### 5-1 Series/Parallel Operation

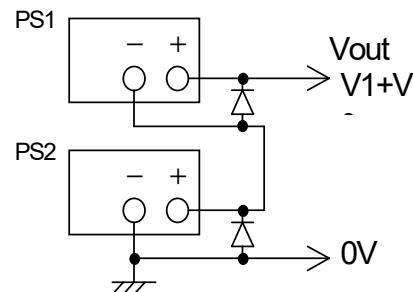
Output voltage or output current of the R4K power supply units can be increased by connecting the output of the same model in series or parallel.

#### 5-1-1 Series Operation

Connect as shown on the right dialog.



- CAUTION**
- The maximum output voltage is 250V in total.
  - Accordingly, series operation is not allowed when output is over 250V.
  - Output current shall be the current of unit whose current is lowest.



#### 5-1-2 Parallel Operation

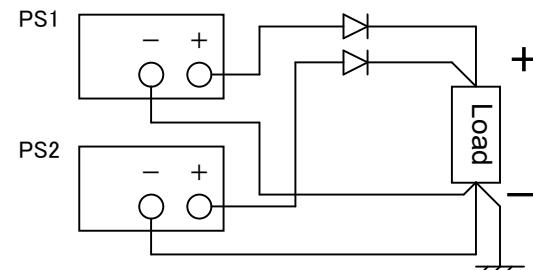
Connect as shown on the right dialog. The same voltage should be set for all. Output current is the total of the individual current.



- CAUTION**
- Set the OVP level of all power supplies to maximum in order to avoid damage.



- CAUTION**
- Connect as shown on the drawing on the right for parallel connection during Master/Slave operation.
  - If diode is not connected in series, the suction current function of this product will operate (when the suction current function is ON) and cause the current to flow through the internal circuits with low output value and cause damage.

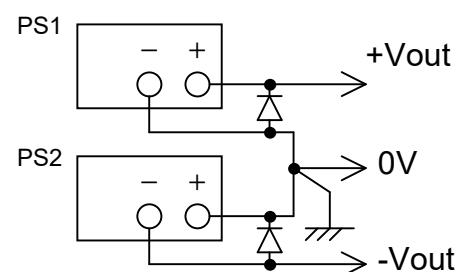


#### 5-1-3 Divided Operation

Connect as shown on the right dialog.



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



## 5-2 Operation of Master/Slave (at Standard Digital Interface)

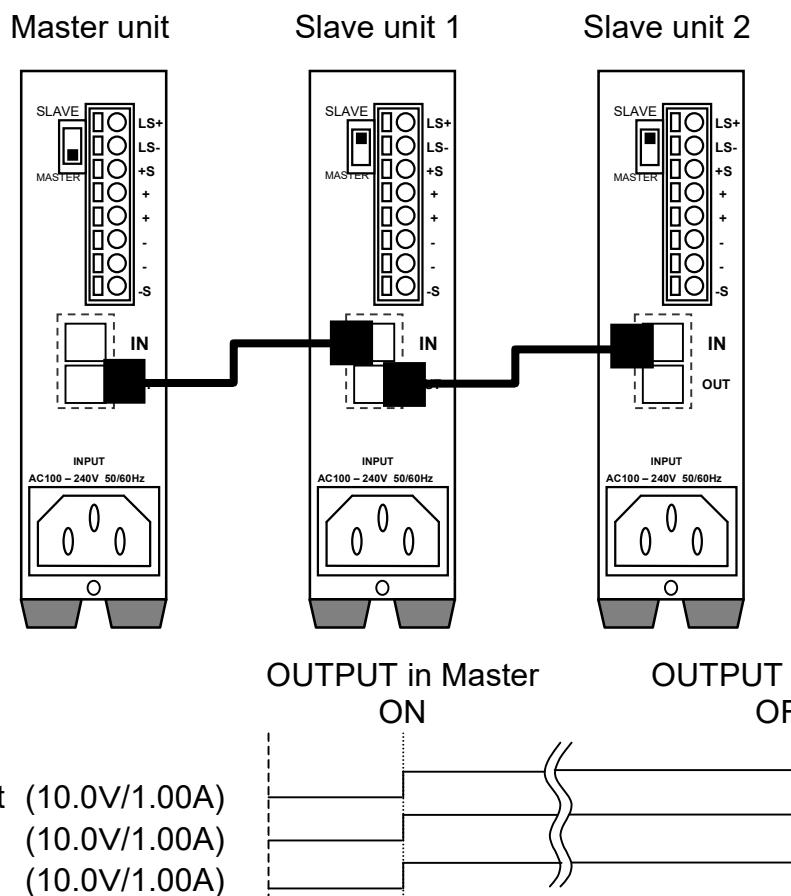
Master/Slave operation in digital interface enable to set the Slave units which are connected to the Master units to have the same output voltage, current, OVP, OCP and OUTPUT as that of Master unit by one control on the Master unit.

When using multiple units, no need to set all units.

\* In use of Master/Slave, make sure to begin with powering on Slave unit.

\* When Slave unit with the delay trigger function is set as Local, only the OUTPUT state follows to Master unit.

When starting up the Master unit the settings are sent to the Slave units.



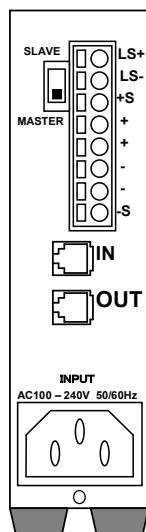
### Master / Slave connection

When Master/Slave connection, unit of same model number can be connected.  
Master/Slave connection of different model could cause malfunction or failure.

### 5-2-1 Master/Slave Setting (at Standard Digital Interface)

Set Master/Slave using the Master/Slave setting switch on rear panel, overthrow the switch at the upper part to set the power supply to be master, and under side to set it to be slave.  
(default setting Master)

\* When the Master/Slave setting switch is set at "slave", the power supply shall be only remote mode, and the operation of voltage-current setting dial of the front panel becomes invalid.



Set the [Master/Slave setting switch] of unit assigned as Master unit to master side, and that of unit assigned as Slave unit to slave side, then connect connection terminal (OUT) side of CO-M cable of Master unit and connection terminal (IN) side of CO-M cable of Slave unit with enclosed CO-M cable (not enclosed with unit with option).

Slave units follow the each operation of output ON/OFF (\*when OUTPUT of Slave unit is ON), output voltage setting, output current setting, OVP and OCP. Control of those operations of both Master unit and Slave unit can be done at the same time.

\* When using remote sensing function, use +Sense, -Sense terminals of all the Master/Slave units.  
(see section "5-5-2 Using Delay Trigger at Master/Slave (at Standard Digital Interface)")



#### CAUTION Note for Master/Slave function

As for each protection function, when it is detected at Master unit, all the Slave unit connected to Master unit shut off the output.

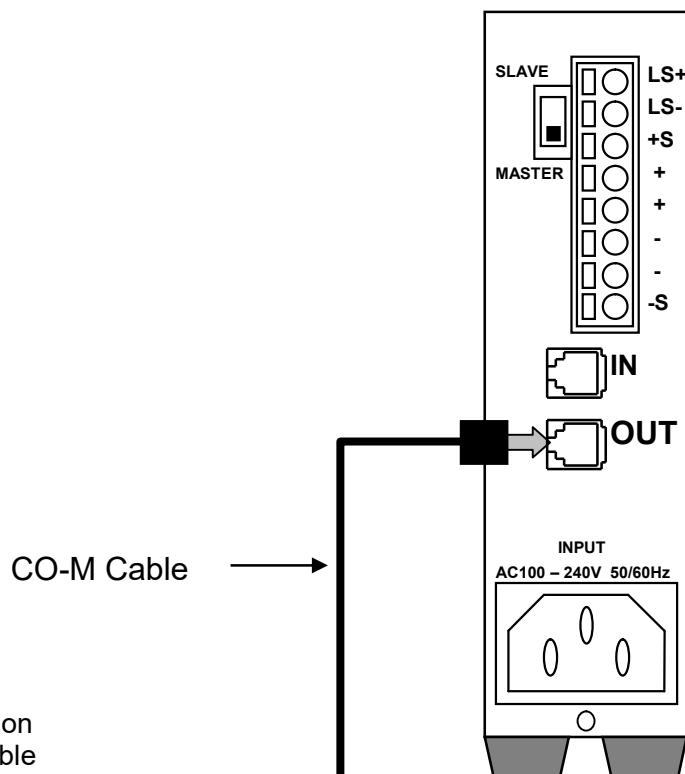
When detected at each Slave unit, only the Slave unit, which detect the failure condition, shut off the output.

In order to resume the output of Slave unit shut off, turn off OUTPUT from the Master unit to reset all, then restart.

\* The above is applied for OVP, OTP, sensing wire reverse connection, and OCP.

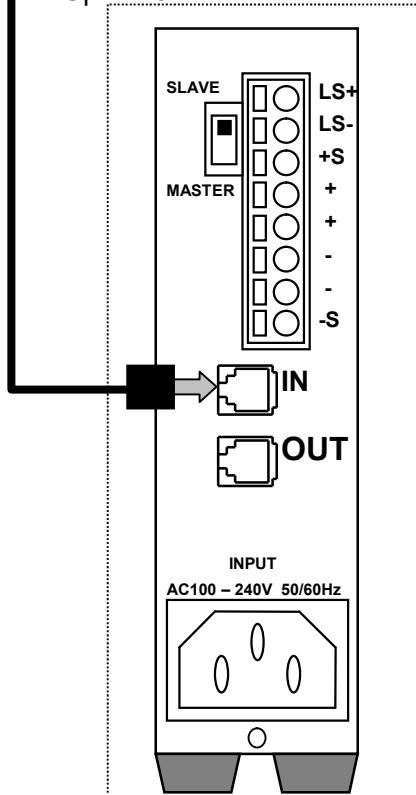
### 5-2-2 Master/Slave (at Standard Digital Interface)

R4K Series Rear Panel



\* -LGob option  
CO-OPT cable  
Up to 32 units can be connected

R4K Series Rear Panel  
Up to 16 units can be connected

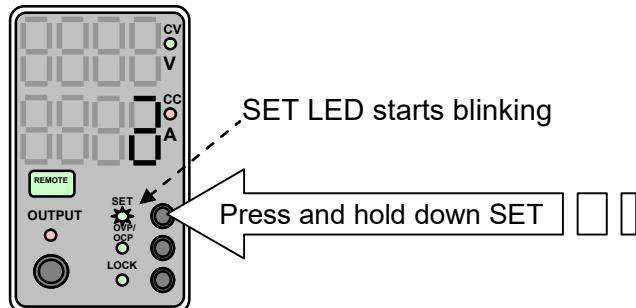


### 5-3 Multi-set Function

The preset voltage/current values can be stored aside from the normal preset voltage/current values, in three memories, "a", "b" and "c".

1. The Multi-set function is enabled by pressing and holding down the preset switch (for approx. 5 sec. or more).

The "SET LED" starts blinking and the unit enters the Multi-set mode.



2. In the Multi-set mode, memory "a" is read by pressing the "Preset" switch, memory "b" by pressing the "OVP/OCP" switch, and memory "c" by pressing the "LOCK" switch. Thus, the voltage/current for "a", "b" or "c", whichever being pressed", can be preset.

The preset voltage/current values are displayed for approximately 2 seconds which is the same for the normal state.

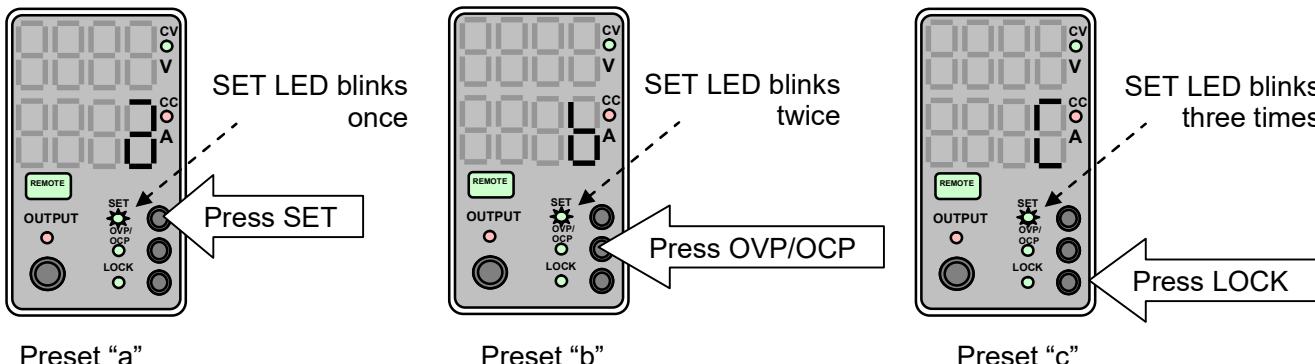


When outputting from OUTPUT in the Multi-set mode, the preset memory values change by pressing each switch. The connected device can be damaged since the output voltage/current are switched over at the same time. We recommend that you once stop the output when you switch over among the memories "a", "b" and "c".

\* The mode "a", "b" or "c" is displayed only when the corresponding "SET", "OVP/OCP", or

"LOCK" is pressed. You can check the present memory through the blink interval of SET LED.

Mode No.	Blink interval
Memory "a"	[Blinking pattern: 1 long, 3 short]
Memory "b"	[Blinking pattern: 2 long, 1 short]
Memory "c"	[Blinking pattern: 3 long, 1 short]



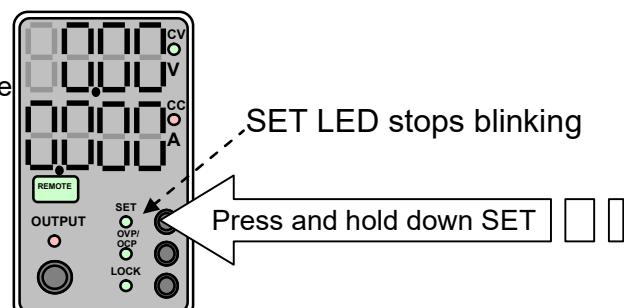
Preset "a"

Preset "b"

Preset "c"

3. To cancel the Multi-set function, press and hold down the Preset switch (for approx. 5 sec. or more). The "SET LED" stops blinking and the Multi-set mode is cancelled.

\* When the POWER ON/OFF switch of this unit is turned on, the Multi-set function restores to the state being kept when the power was turned off.



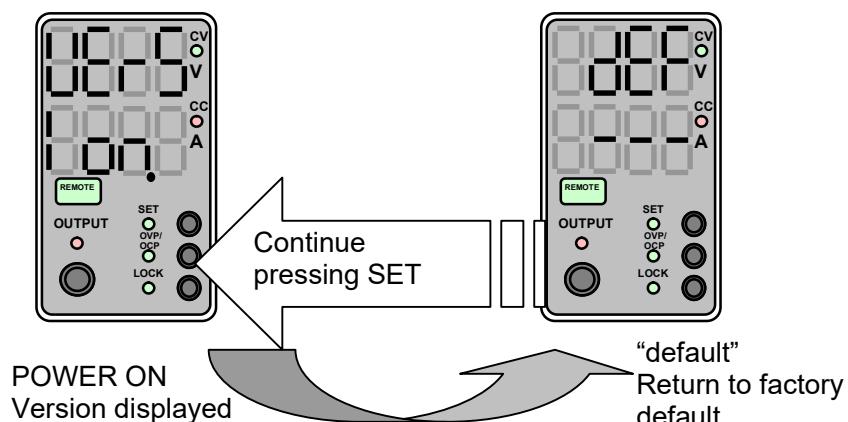
## 5-4 Start Menu

In the start menu, settings of the following functions and initialisation to the factory default are executed.

- “dEf”: default    initialises to the factory default.
- “dly”: delay trigger setting                                         sets the delay trigger function.
- “Unt”: unit setting    sets UNIT numbers.
- “PLS”: pulse sequence setting                                        sets the pulse sequence function (for –LDe option)
- “rap”: ramp setting    sets the ramp function (for –LDe option)
- “nPFP”: power failure protection                                        sets power failure protection  
(If the upper switch is not)
- “nSC”: sink current cancellation function                            sets sink current cancellation function  
(If the upper switch is not)

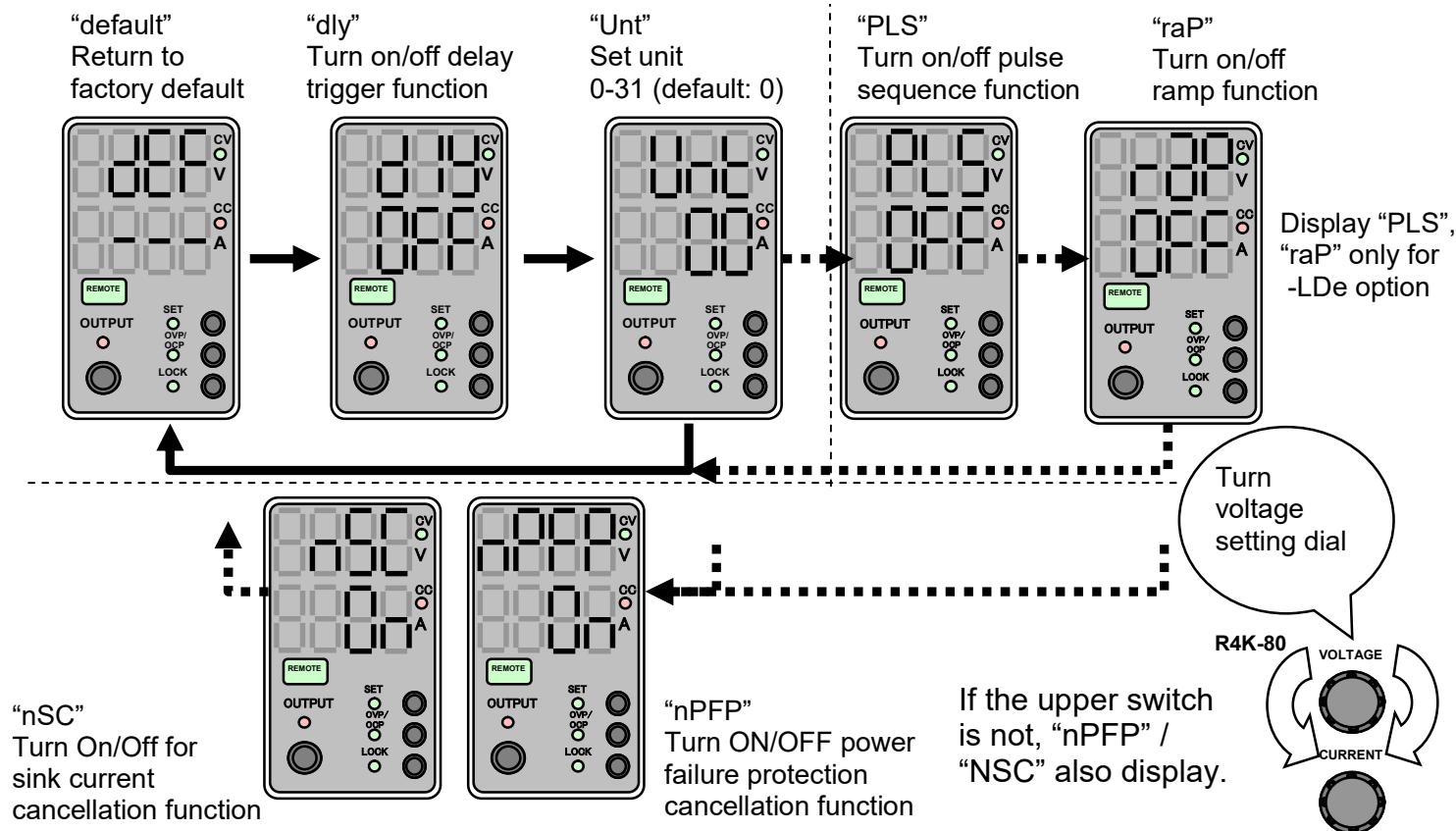
### 5-4-1 Setting Start Menu

Continue to press the preset switch while Version is displayed when the power switch of the body is on, so that the display is changed to “def”.



1. To change the menu display, turn the voltage setting dial so that the display is switched to menus.

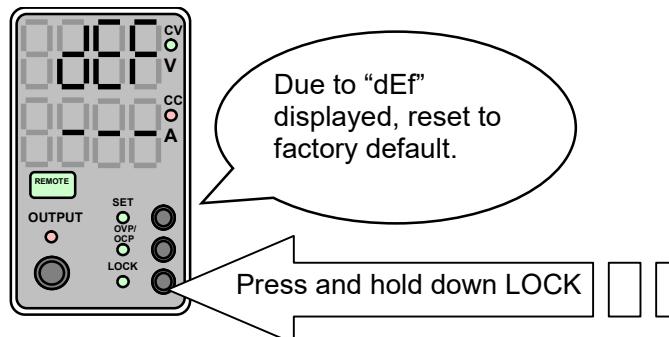
(\*“PLS” (pulse sequence function) and “rap” (ramp function) menus are displayed for –LDe option only.)



2. To end (register) the menu, press and hold down the LOCK switch in the state of the menu to be registered.

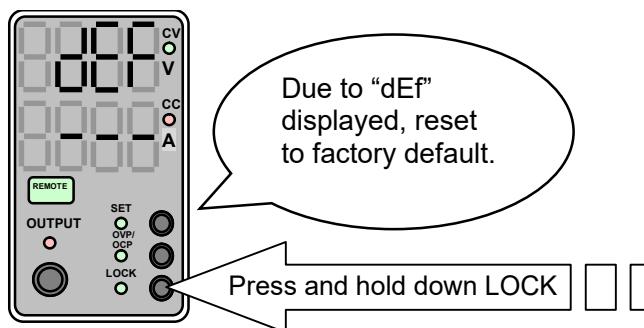
\* “dEf”: when the default is displayed, all settings are initialised to the factory default.

\* Note that “PLS” (pulse sequence function) in the –LDe option and “rap” (ramp function) cannot be used with “dly” (delay trigger function).



## 5-4-2 Menu Modes

1. “dEf”: Menu to reset to factory default
  - a. LOCK switch (press and hold down): initialised to factory default

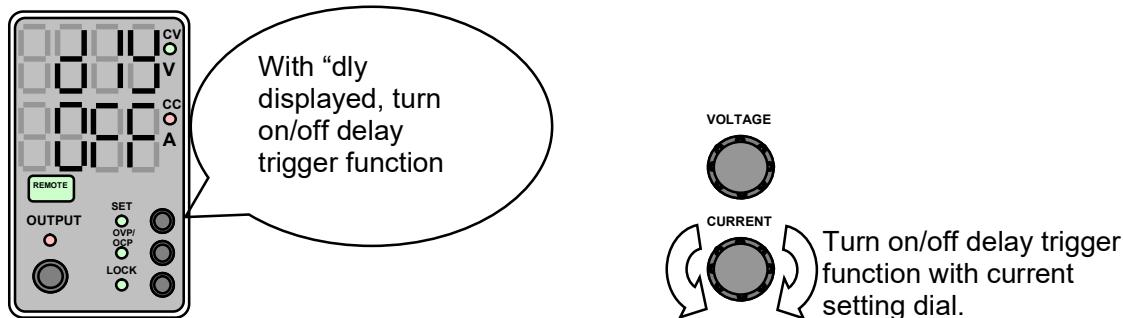


2. “dly”: delay trigger function menu

(For details of the delay trigger, refer to 5-5 Features of Delay Trigger Function in p.44.)

- a. “dly” displayed:

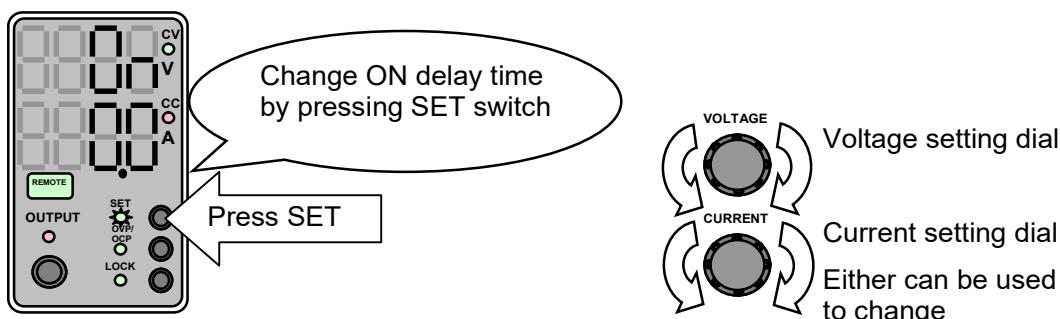
The delay trigger function can be turned on/off by turning the current setting dial.



- b. SET switch (press):

With the SET LED lit for approx. 10 seconds, it transfers to the change mode of the ON delay time setting.

The ON delay time setting can be changed with either the voltage or current setting dial.  
(0.0 – 99.9 secs)

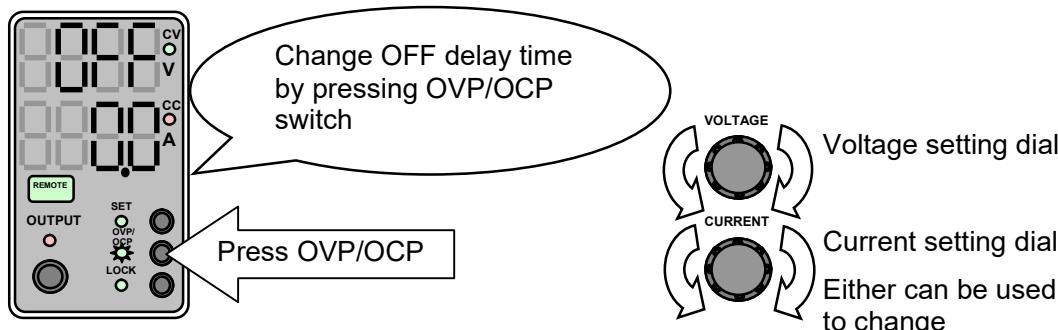


c. OVP/OCP switch (press):

With the OVP/OCP LED lit for approx. 10 seconds, it transfers to the change mode of the OFF delay time setting.

The OFF delay time can be changed with either the voltage or current setting dial.

(0.0 – 99.9 secs)

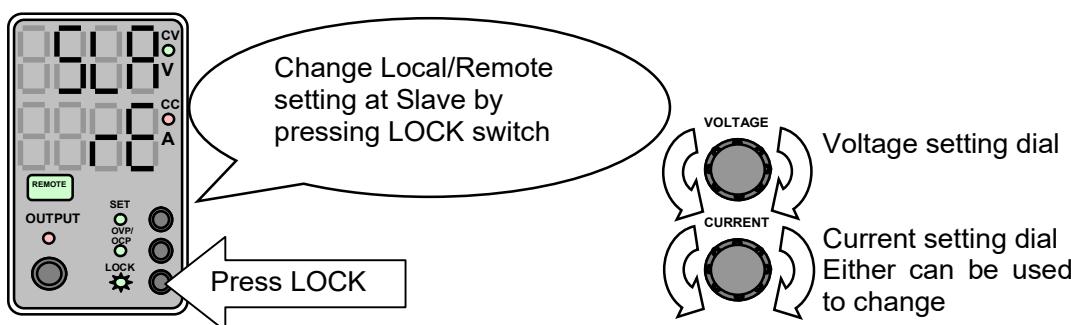


d. LOCK switch (press):

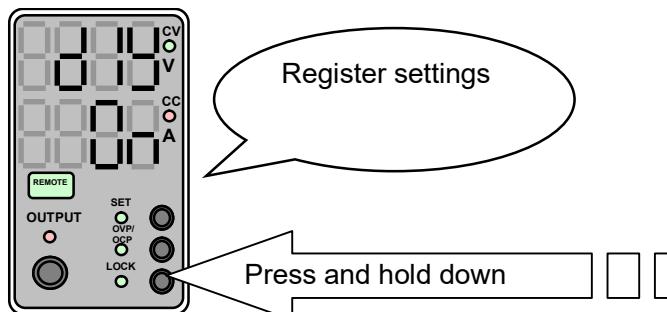
With the LOCK LED lit for approx. 5 seconds, it transfers to the change mode of Local/Remote setting at Slave.

The Local/Remote setting at Slave can be changed with either the voltage or current setting dial.

(Counterclockwise: Local, clockwise: Remote)



e. LOCK switch (press and hold down): register settings

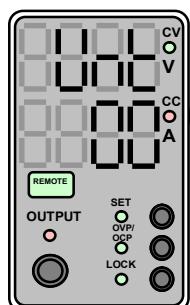


### 3. “Unt”: UNIT Number Setting Menu

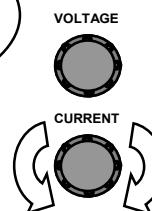
#### a. “Unt” displayed:

UNIT numbers can be changed by turning the current setting dial. (0 - 31)

(\* “0” is set by factory setting and default.)

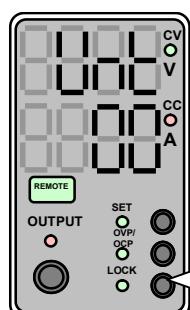


When “Unt” is displayed,  
change setting with  
current setting dial (0 – 31)



Change unit  
numbers with  
current setting dial.

#### b. LOCK switch (press and hold down): register settings



Register settings.

Press and hold down LOCK

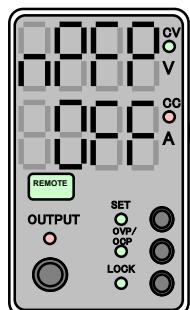


#### 4. “nPFP” power failure protection cancellation function Setting Menu

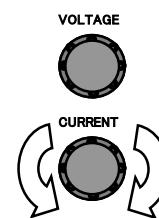
##### a. “nPFP” displayed:

On/Off for power failure cancellation function is changed by current setting dial.

(※ “OFF” is set by factory setting and default.)

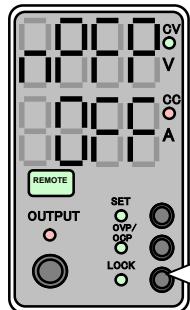


When “nPFP” is displayed,  
On/Off for power failure protection



On/Off for power failure cancellation function is changed by current setting dial.

##### b. LOCK switch (press and hold down): register settings



Register settings.

Press and hold down LOCK

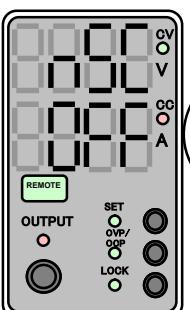


#### 5. “nSC”: sink current cancellation Setting Menu

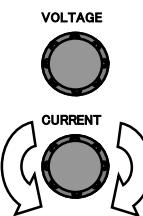
##### a. “nSC” displayed:

On/Off for current cancellation function is changed by current setting dial.

(※ “OFF” is set by factory setting and default.)

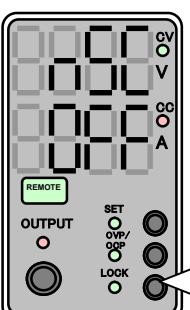


When “nSC” is displayed,  
On/Off for sink current



On/Off for sink current cancellation function is changed by current setting dial.

##### b. LOCK switch (press and hold down): register settings



Register settings.

Press and hold down LOCK

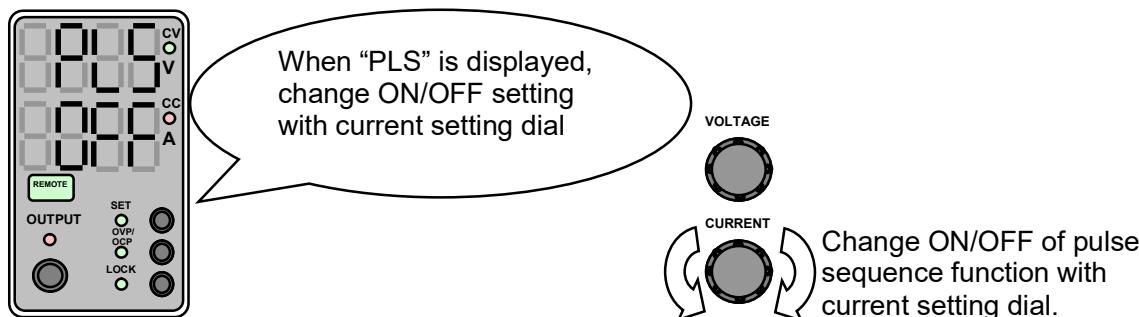


## 6. "PLS": Pulse Sequence Function Menu (for -LDe option)

(For details of pulse sequence, 8-2 Features of Pulse Sequence in p.131.)

### a. "PLS" displayed:

The pulse sequence function can be turned on/off by turning the current setting dial.



### b. SET switch (press):

With the SET LED lit for approx. 10 seconds, it transfers to each change mode of the ON time setting of pulse sequence.

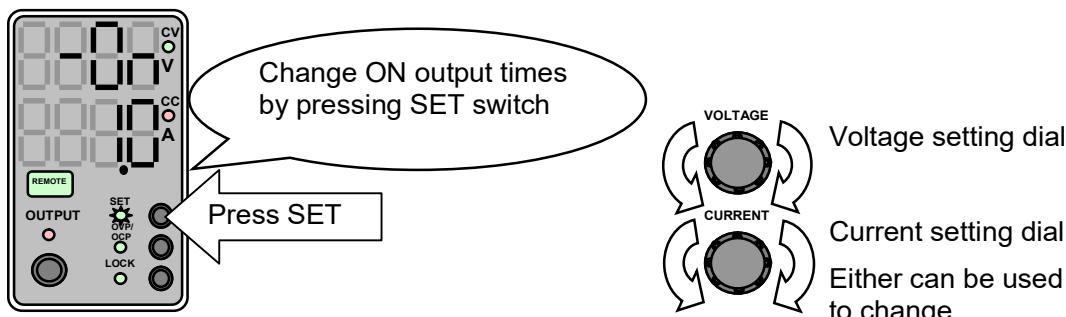
Each ON time setting can be changed with either the voltage or current setting dial.

(1.0 (s) - 99.9 (h))

\* To change ON time setting, use the "SET switch (press and hold down)" for "-On", "a On", "b On", and "c On".

\* To change time unit, use the "OVP/OCP switch (press and hold down)" for "s", "m", and "h". (Please execute this setting first since change of time unit clears ON time settings.)

\* For time setting, 1.0 sec or shorter is not applicable. However, 0.0 can be set only at "a On", "b On", and "c On".



c. SET switch (press and hold down):

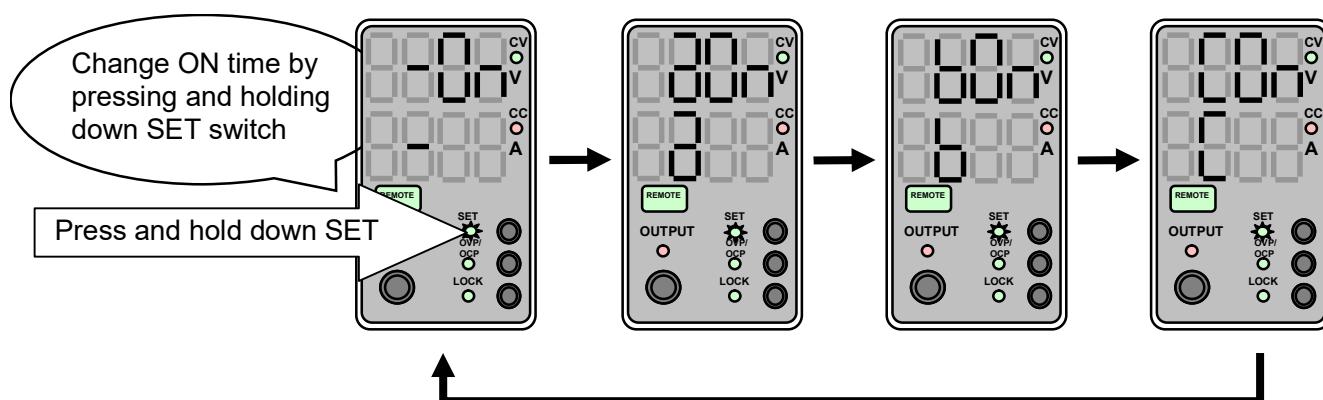
By pressing and holding down the SET switch, ON time settings are changed to “-On”, “a On”, “b On” or “c On”.

“-On”: ON output time can be set when the pulse sequence function is ON/OFF.

“a On”: In the pulse sequence function, output time of the memory A used in combination with the Multi-set can be set.

“b On”: In the pulse sequence function, output time of the memory B used in combination with the Multi-set can be set.

“c On”: In the pulse sequence function, output time of the memory C used in combination with the Multi-set can be set.

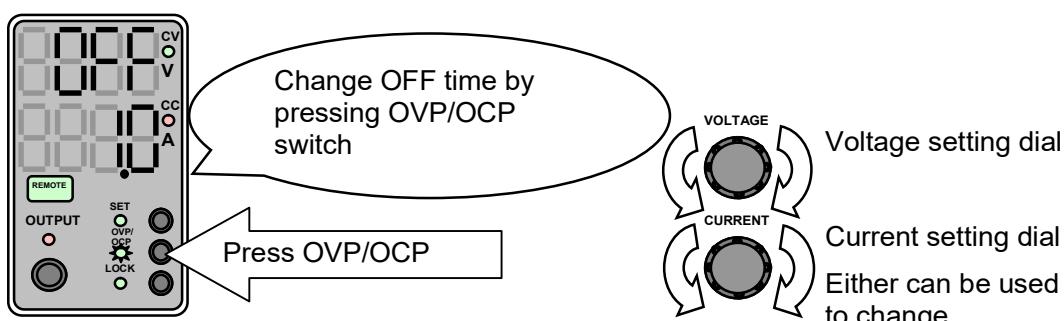


d. OVP/OCP switch (press):

With the OVP/OCP LED lit for approx 10 seconds, it transfers to the change mode of the OFF time setting of pulse sequence.

Each OFF time setting can be changed with either the voltage or current setting dial.  
(0.0 – 99.9)

\* For OFF time setting, 1.0 sec or shorter is not applicable although 0.0 can be set.



e. OVP/OCP switch (press and hold down):

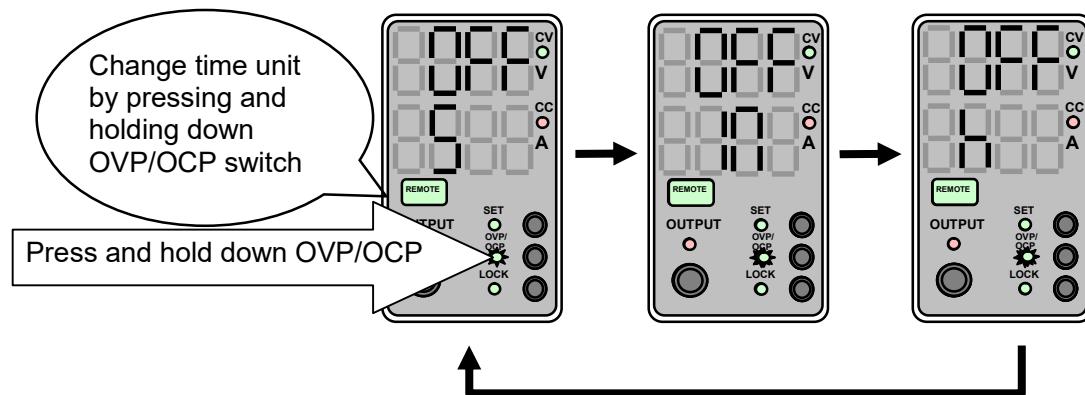
Time unit settings of the pulse sequence can be changed by pressing and holding down the OVP/OCP switch.

“s”: can set the setting time of the pulse sequence function at seconds.

“m”: can set the setting time of the pulse sequence function at minutes.

“h”: can set the setting time of the pulse sequence function at hours.

\* Make sure to set the time unit first as changing the time unit setting clears the set value of “s” to 1.0 sec, “m” to 0.1min, and “h” to 0.1 hr .

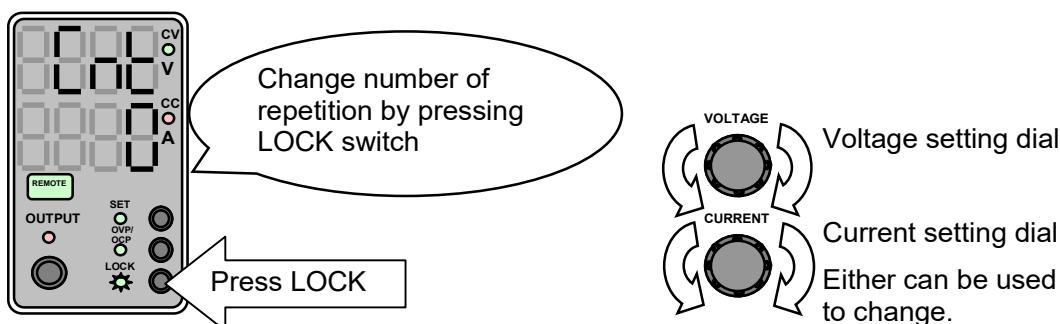


f. LOCK switch (press):

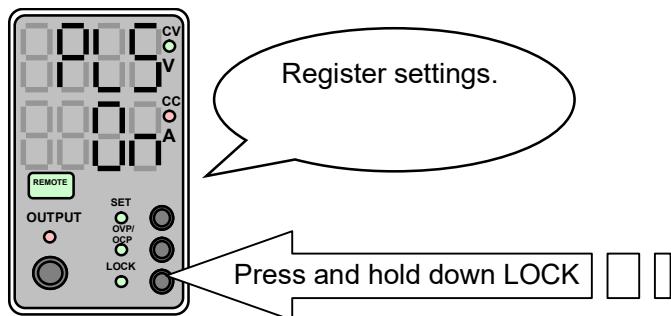
With the LOCK LED lit for approx 10 seconds, it transfers to the change mode of the repetition time of pulse sequence.

Repetition time can be changed with either the voltage or current setting dial. (0 – 9999)

\* Pulse sequence is infinitely repeated when set to 0 times.



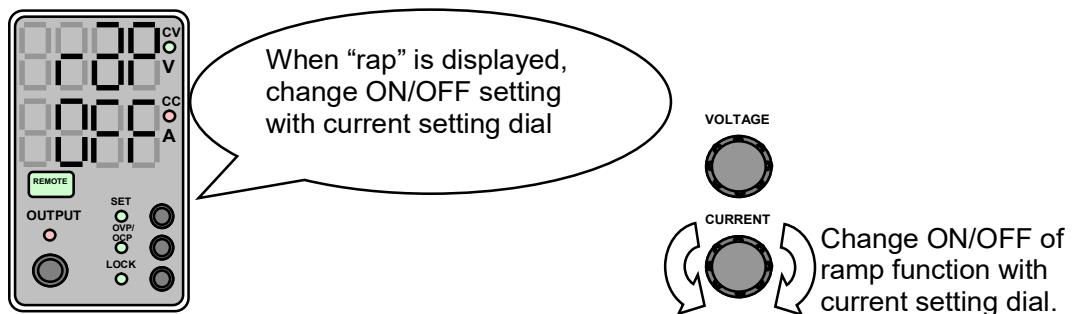
g. LOCK switch (press and hold down): register settings



7. “rap”: Ramp Function Menu (for –LDe option)

a. “rap” displayed:

ON/OFF of the ramp function can be changed by turning the current setting dial.



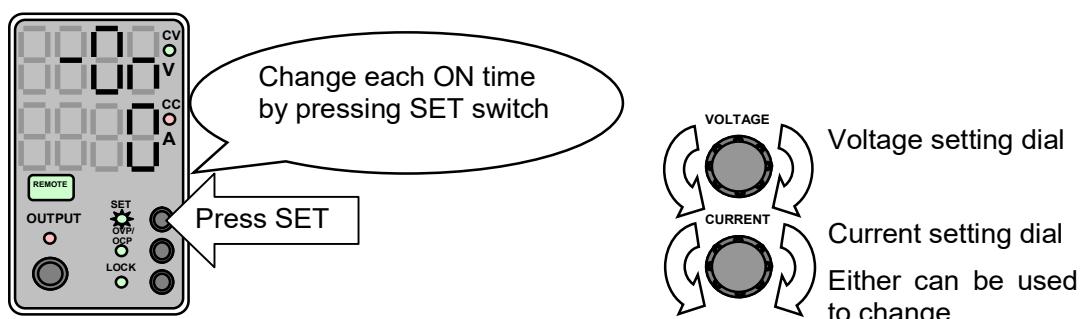
b. SET switch (press):

With the SET LED lit for approx 10 seconds, it transfers to the change mode of each ON time setting.

Each ON time can be changed with either the voltage or current setting dial.

(0 – 999 (s))

\* To change each ON time setting at ramp, use the “SET switch (press and hold down)” to change to “-On”, “a On”, “b On”, or “c On”.



c. SET switch (press and hold down):

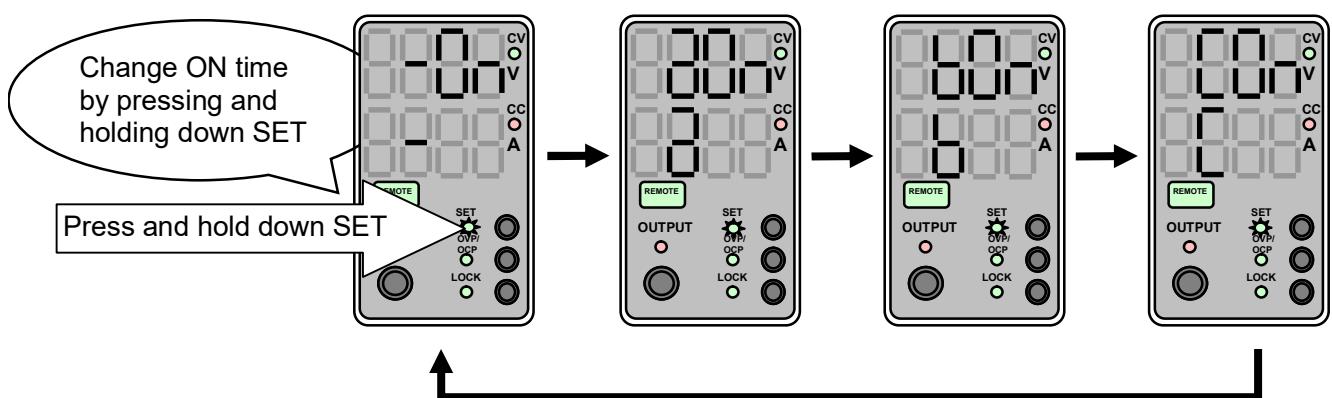
Pressing and holding down the SET switch changes each ON time setting to “-On”, “a On”, “b On”, or “c On”.

“-On”: Ramp time at ON can be set when the ramp function is ON/OFF.

“a On”: Ramp time when transferred to memory A can be set when used in combination with Multi-set/pulse sequence.

“b On”: Ramp time when transferred to memory B can be set when used in combination with Multi-set/pulse sequence.

“c On”: Ramp time when transferred to memory C can be set when used in combination with Multi-set/pulse sequence.

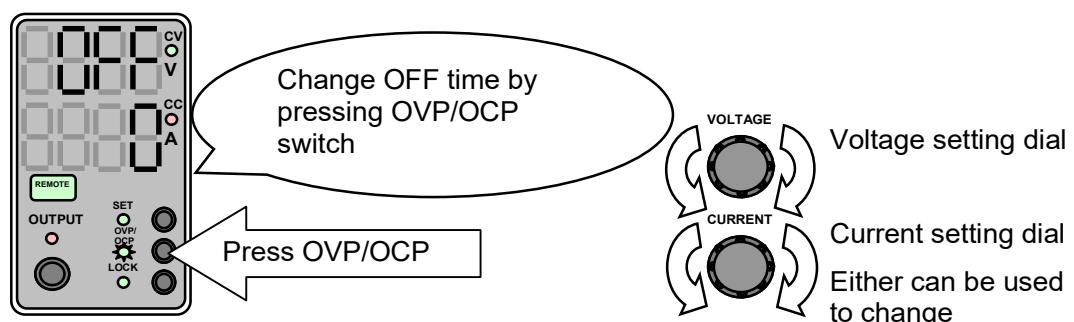


d. OVP/OCP switch (press):

With the OVP/OCP LED lit for approx 10 seconds, it transfers to the change mode of each OFF time setting.

Each OFF time can be changed with either the voltage or current setting dial.

(0 – 999 (s))



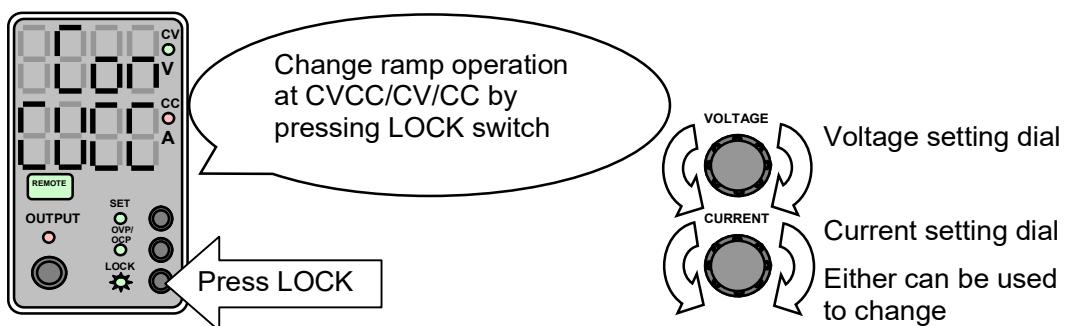
e. LOCK switch (press): change of ramp operation mode

Change of the ramp operation setting and pressing the LOCK switch can change the ramp operation setting.

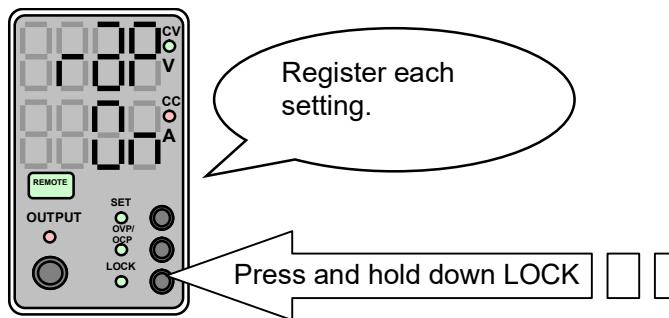
“CVCC”: can set ramp operation at both CV and CC.

“CV”: can set ramp operation only at CV.

“CC”: can set ramp operation only at CC.



f. LOCK switch (press and hold down): register each setting



## 5-4-3 List of Start Menus

		Standard Function			Upper switch is not	
Display (V) Click VOLTAGE knob		“dEf”	“dly”	“Unt”	“nPFP”	“nSC”
Display (A) Click CURRENT knob		“---”	“On/OFF”	“0 - 31”	“On/OFF”	“On/OFF”
Function name		Factory default	Delay trigger function	Unit number setting	power failure protection cancellation function	sink current cancellation function
SET button	Press	None	On delay time (0.0 - 99.9secs)	None	None	None
	Press and hold down	None	None	None	None	None
OVP/OC Pbutton	Press	None	OFF delay time (0.0 - 99.9secs)	None	None	None
	Press and hold down	None	None	None	None	None
LOCK button	Press	None	Slave unit setting (Local/Remote)	None	None	None
	Press and hold down	Reset to factory default	Register settings	Register settings	Register settings	Register settings

		For -LDe option	
Display (V) Click VOLTAGE knob		“PLS”	
Display (A) Click CURRENT knob		“On/OFF”	
Function name		Pulse sequence function	
SET button	Press	Each On time (1.0sec - 99.9hrs) (* Min. 1.0 in case of sec)	Each On time (0 - 999secs)
	Press and hold down	Switch to -On/a On/b On/c On (* Min. 0.0 in case of a On/b On/c On)	Switch to -On/a On/b On/c On
OVP/OC Pbutton	Press	OFF time (0.0sec - 99.9hrs)	OFF time (0 - 999secs)
	Press and hold down	Change Sec/Min/Hour (* Min. 1.0 in case of sec)	None
LOCK button	Press	Number of repetition (0 - 999 times) * Infinite repetition at 0	Ramp control setting (OFF/CV/CC)
	Press and hold down	Register settings	Register settings

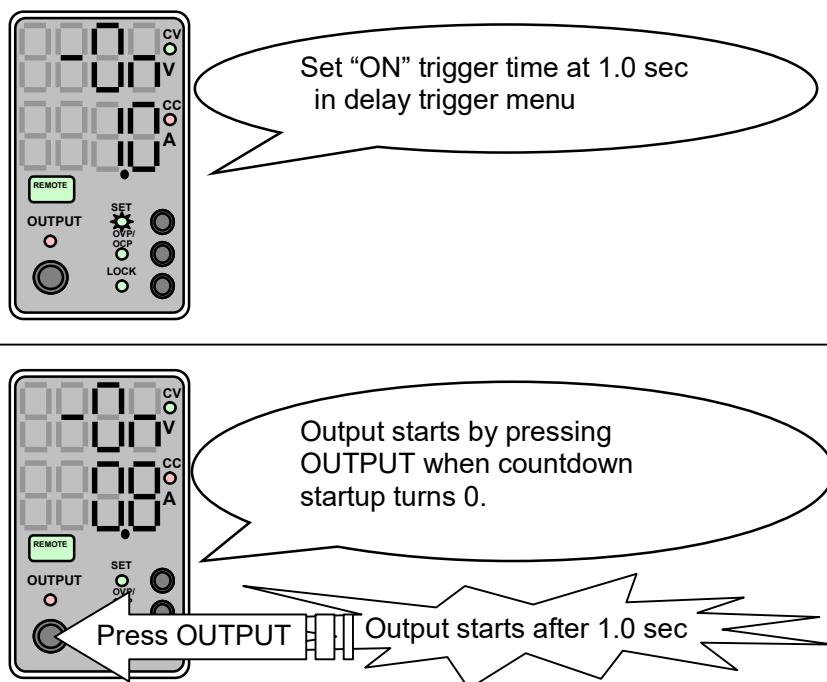
## 5-5 Features of Delay Trigger Function

This function starts output by delaying the time from pressing the OUTPUT switch to the actual start of output.

### 5-5-1 Using Delay Trigger Function

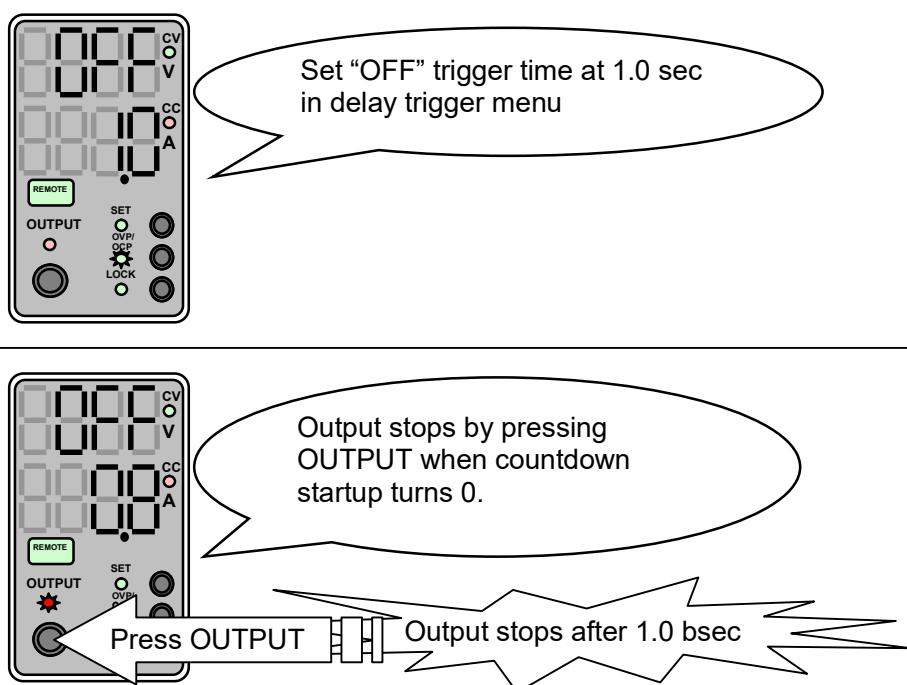
#### 1. Setting Example of Using “ON” Delay Function (1.0 sec)

Turn on “dly” in the delay trigger menu.



#### 2. Setting Example of Using “OFF” Delay Function

Turn on “dly” in the delay trigger menu.



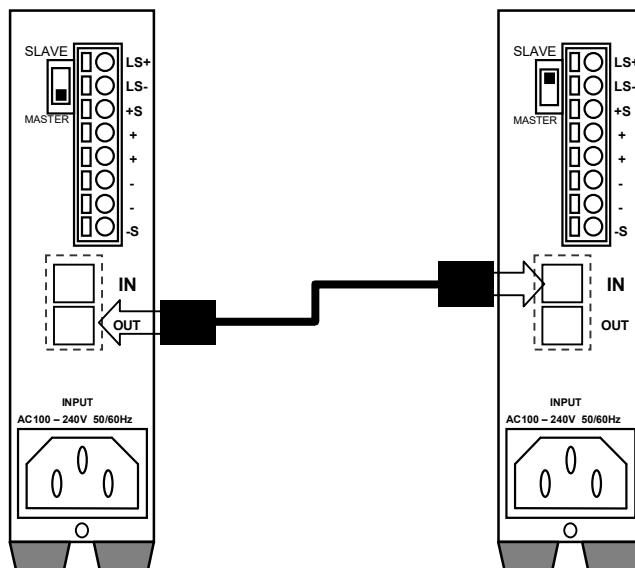
## 5-5-2 Using Delay Trigger at Master/Slave (at Standard Digital Interface)

Using Master/Slave, the delay trigger function can set the delay trigger on Master unit and Slave unit separately.

### 1. Connecting Master/Slave when Delay Trigger Is Set

This is not used when –LUs1 option is selected.

For information on how to use Master/Slave, refer to 5-2-1 Master/Slave Setting (at Standard Digital Interface).



## 5-5-3 How to Stop Delay Trigger in Case of Emergency

In the delay trigger function, the “ON/OFF” delay count is displayed after pressing the OUTPUT switch to start/stop output. However, when you wish to cancel delay processing due to emergency or others, switch off the LS (remote switch) while the count is displayed, or turn off the POWER ON/OFF switch, so that output stops.

Note that pressing the OUTPUT switch while counting resets to the state before the switch is pressed.

## 2. Usage Example of Delay Trigger Setting “Slave Remote” at Master/Slave

In the “Slave Remote”, only the delay trigger setting of nominal Master/Slave operation can be set for Master unit and Slave unit individually.

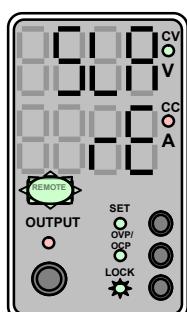
In the “Slave Remote”, the preset voltage/current and the set values of OVP/OCP depend on the settings of Master unit.

As the delay trigger can be set independently, output timing of each unit is arbitrarily adjustable by one-clicking OUTPUT of Master unit.

### a. Setting Slave unit

Set “Remote” of the “Slave Local/Remote” in the delay trigger menu.

\* The “Slave Local/Remote” is set to “Remote” as the factory default.



“Remote”  
Slave unit not  
settable

REMOTE LED lit

As an example here, set the delay trigger “dly” to “ON”, and ON delay time/OFF delay time to 2.0 secs.

\* Note that in the “Slave Remote”, the setting of Slave unit depends on Master unit, and thus not becoming settable.

### b. Setting Master unit

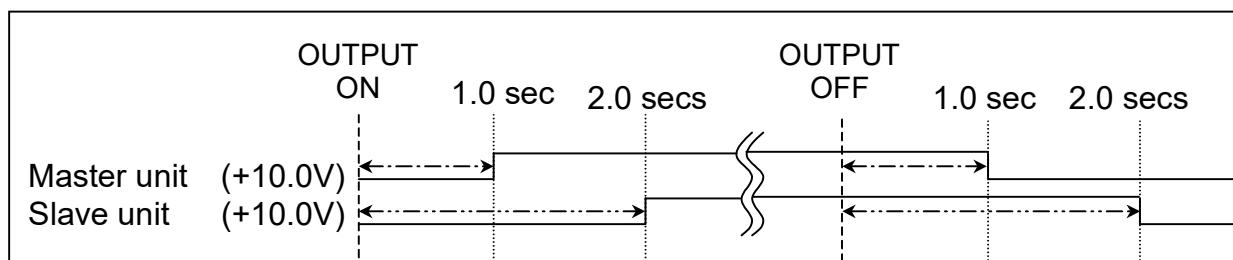
As an example of the delay trigger of Master unit, turn on “dly” to set ON delay time/OFF delay time to 1.0 sec.

Since in the “Slave Remote” the normal preset voltage/current and the normal set values of OVP/OCP of Master unit are set also to Slave unit, execute all settings with Master unit.

### c. Start/stop output

To start output, press the OUTPUT button on Master unit so that both Master unit and Slave unit start countdown to start output. When the count reaches 0, output starts.

To stop output, press the OUTPUT button on Master unit so that both Master unit and Slave unit start countdown to stop output. When the count reaches 0, output stops.



### 3. Usage Example of "Slave Local" at Master/Slave

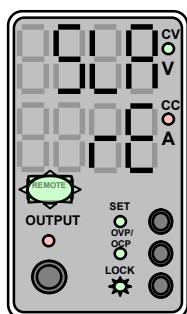
In the "Slave Local", the preset voltage/current and the set values of OVP/OCP can be set Master unit and Slave unit independently, only the OUTPUT operation is for Master/Slave function.

As the delay trigger can be set independently, output timing of each unit is arbitrarily adjustable by one-clicking OUTPUT of Master unit.

#### d. Setting Slave unit

Set "Local" of the "Slave Local/Remote" in the delay trigger menu.

\* The "Slave Local/Remote" is set to "Remote" as the factory default.



"Remote"  
Slave unit not  
settable

REMOTE LED lit

As an example here, set the delay trigger "dly" to "ON", and ON delay time/OFF delay time to 2.0 secs.

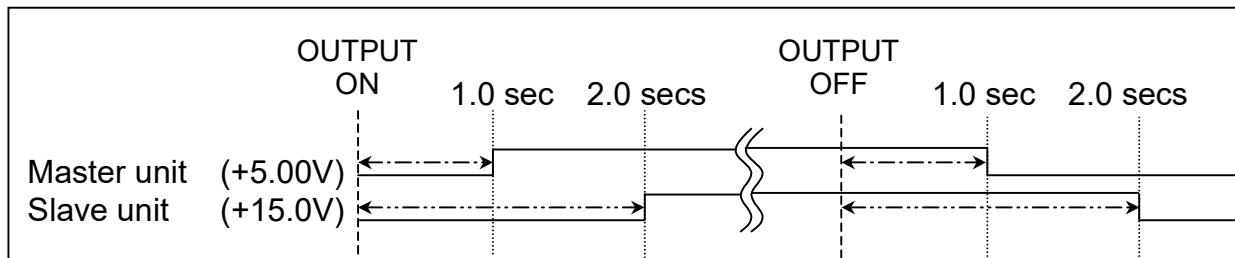
In the "Slave Local", the normal preset voltage/current and the normal set values of OVP/OCP are set on Master unit and Slave unit independently, and so set them on each unit.

\* Note that in the "Slave Local", the OUTPUT operation of Slave unit depends on Master unit, and thus not becoming settable.

#### e. Setting Master unit

As an example of the delay trigger of Master unit, turn on "dly" to set ON delay time/OFF delay time to 1.0 sec.

#### f. Start/stop output



## 6 Using with Digital Control (Standard Digital Interface, LUs1 Option)

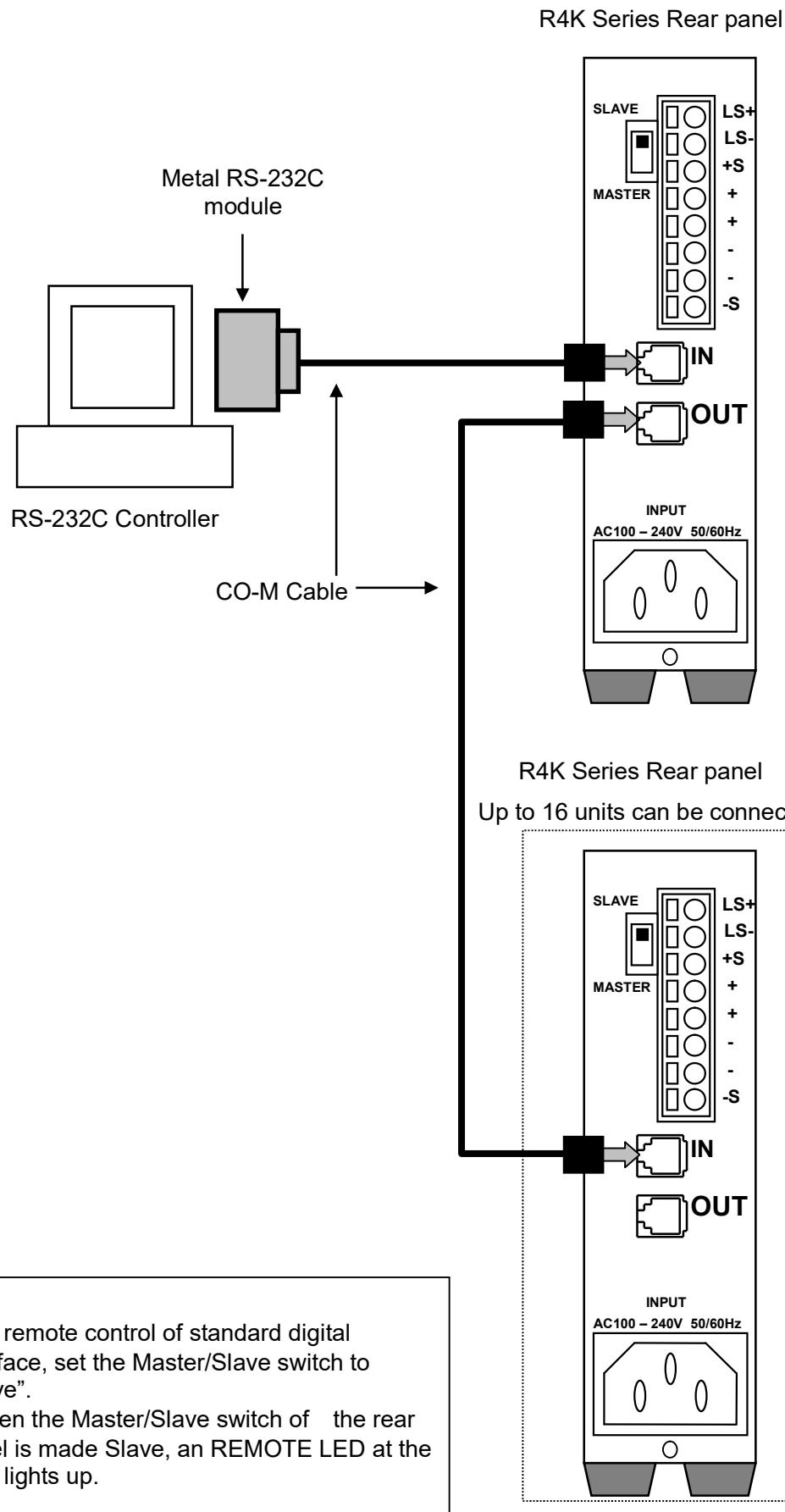
### 6-1 Summary

The R4K series can be operated by external control with digital communication besides operation from the front panel.

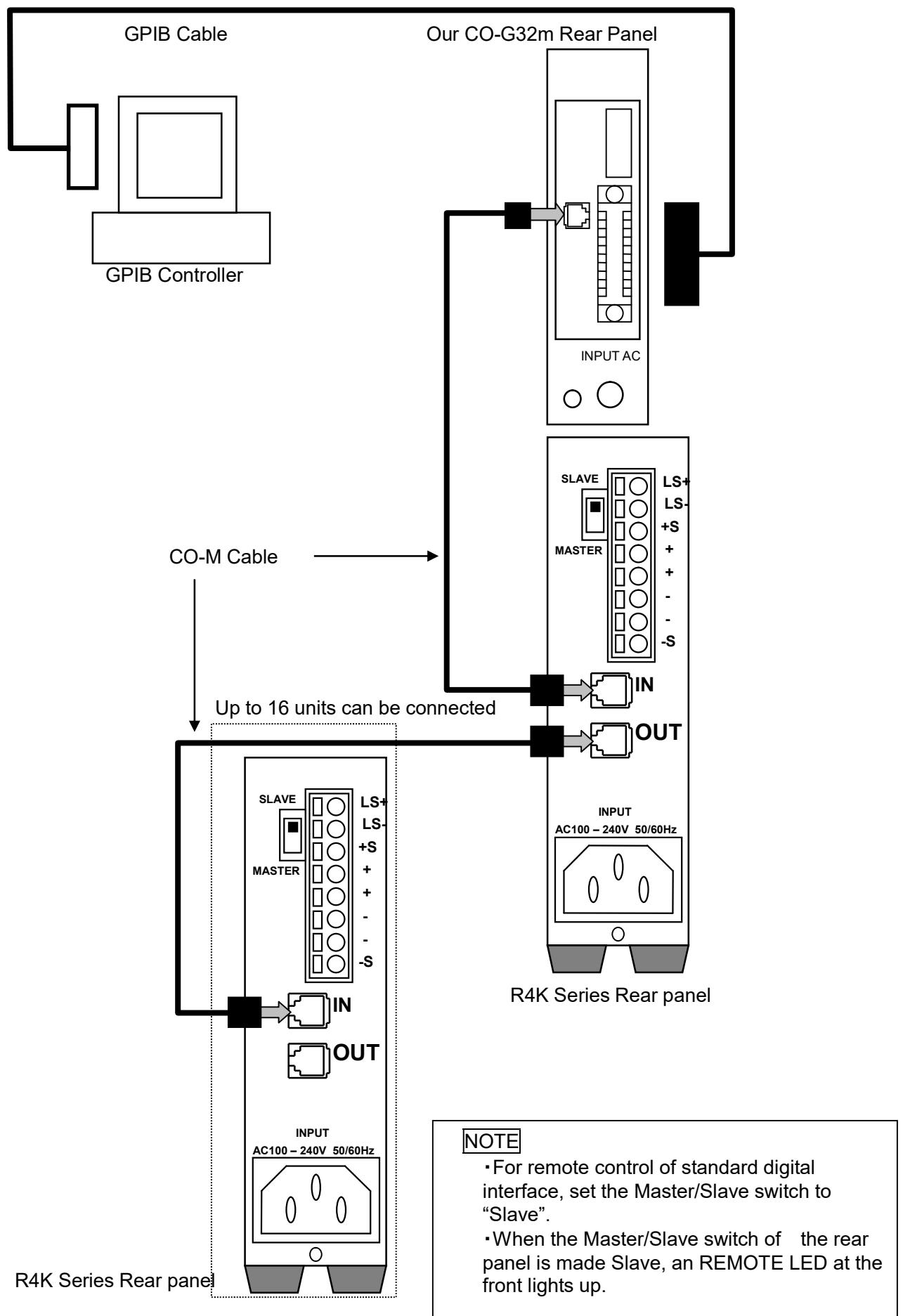
- (1) Program output voltage and current (16Bit)
  - (2) Program output ON/OFF
  - (3) Measuring output voltage and current (12Bit)
  - (4) Setting of delay trigger (ON delay/OFF delay individually, 0.0 to 99.9sec)
  - (5) Control of up to 16 units with one GPIB address
  - (6) Setting of output voltage and current at Multi-set (16bit)
  - (7) Setting of UNIT number
- <For -LDe option>
- (8) Setting of pulse sequence function
  - (9) Setting of ramp function
  - (10) Sweep operation

## 6-2 Digital Connection (Standard Digital Interface, LUs1 Option)

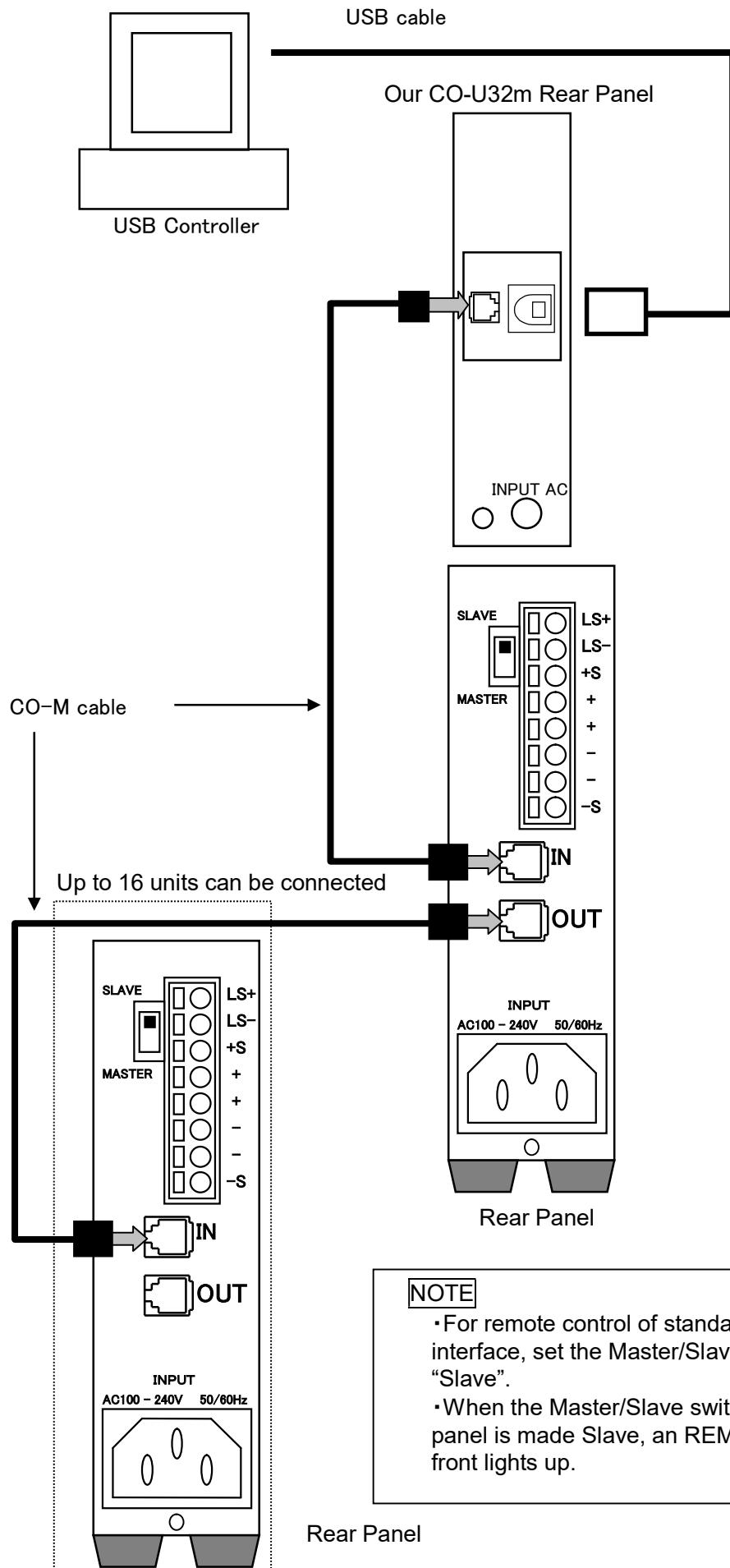
### 6-2-1 Connecting Metal RS-232C Module and Standard Digital Interface



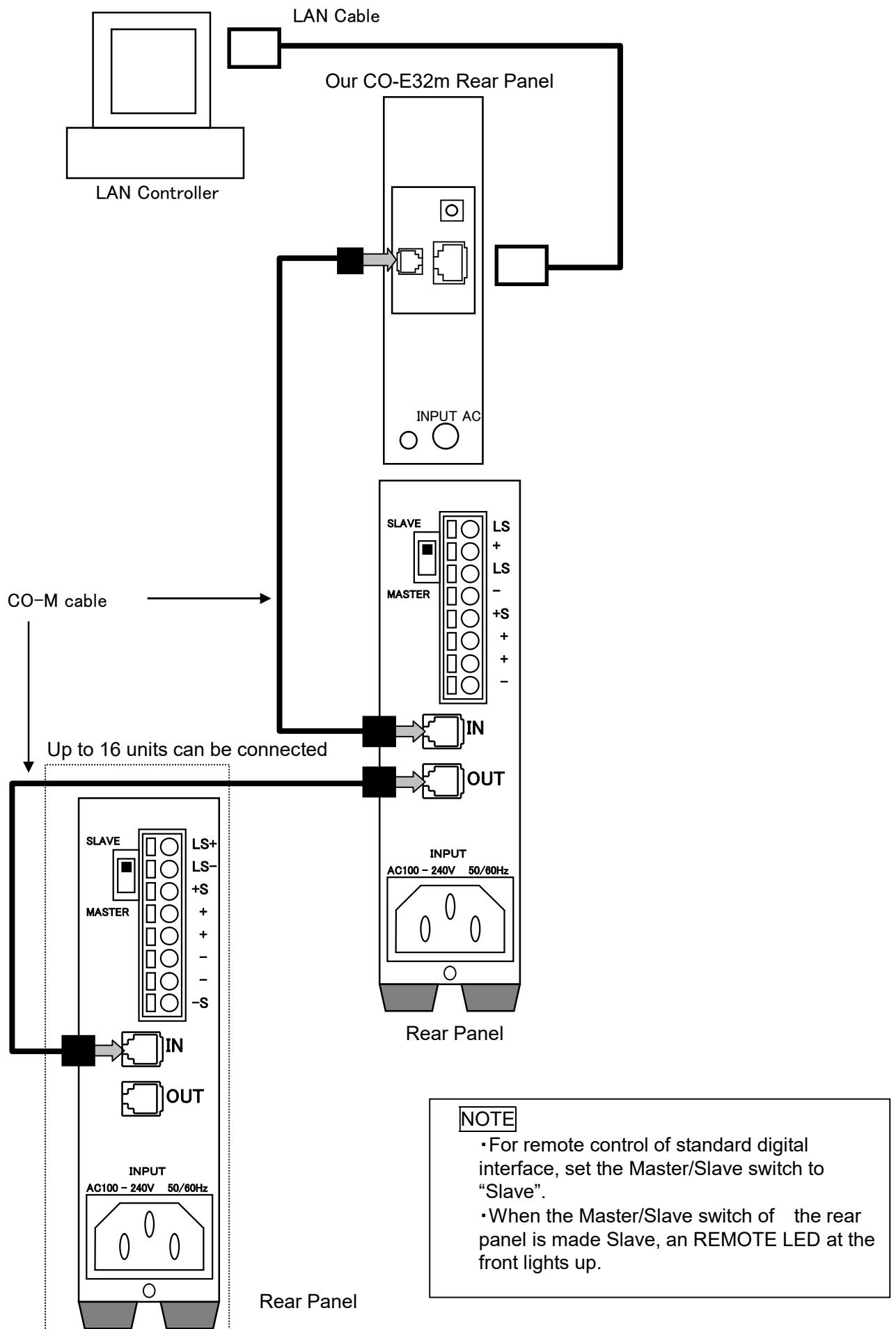
## 6-2-2 Connecting Our CO-G32m Controller and Standard Digital Interface (Connection in GPIB Communication)



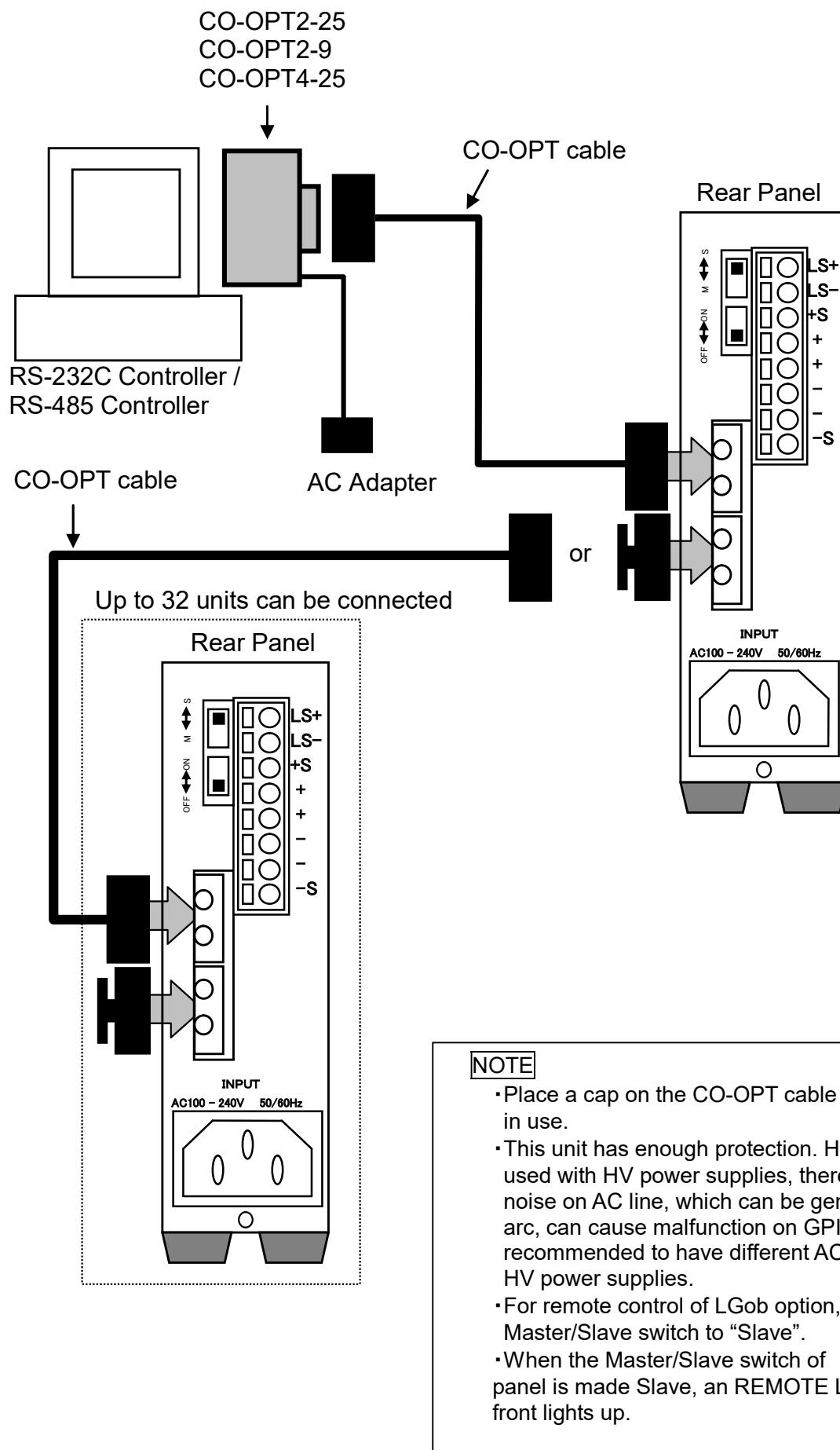
### 6-2-3 Connecting Our CO-U32m Controller and Standard Digital Interface



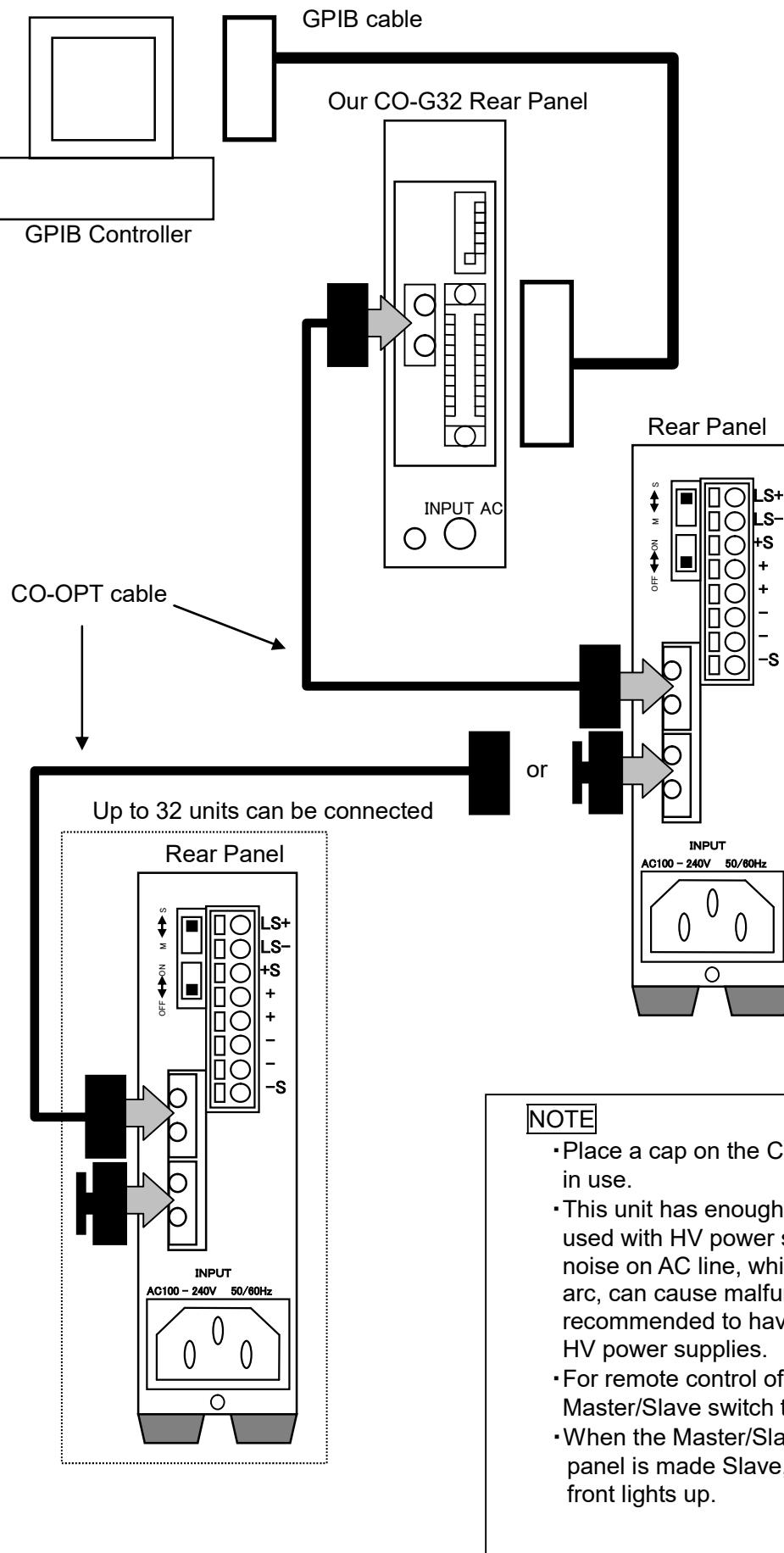
## 6-2-4 Connecting Our ET-32m Controller and Standard Digital Interface



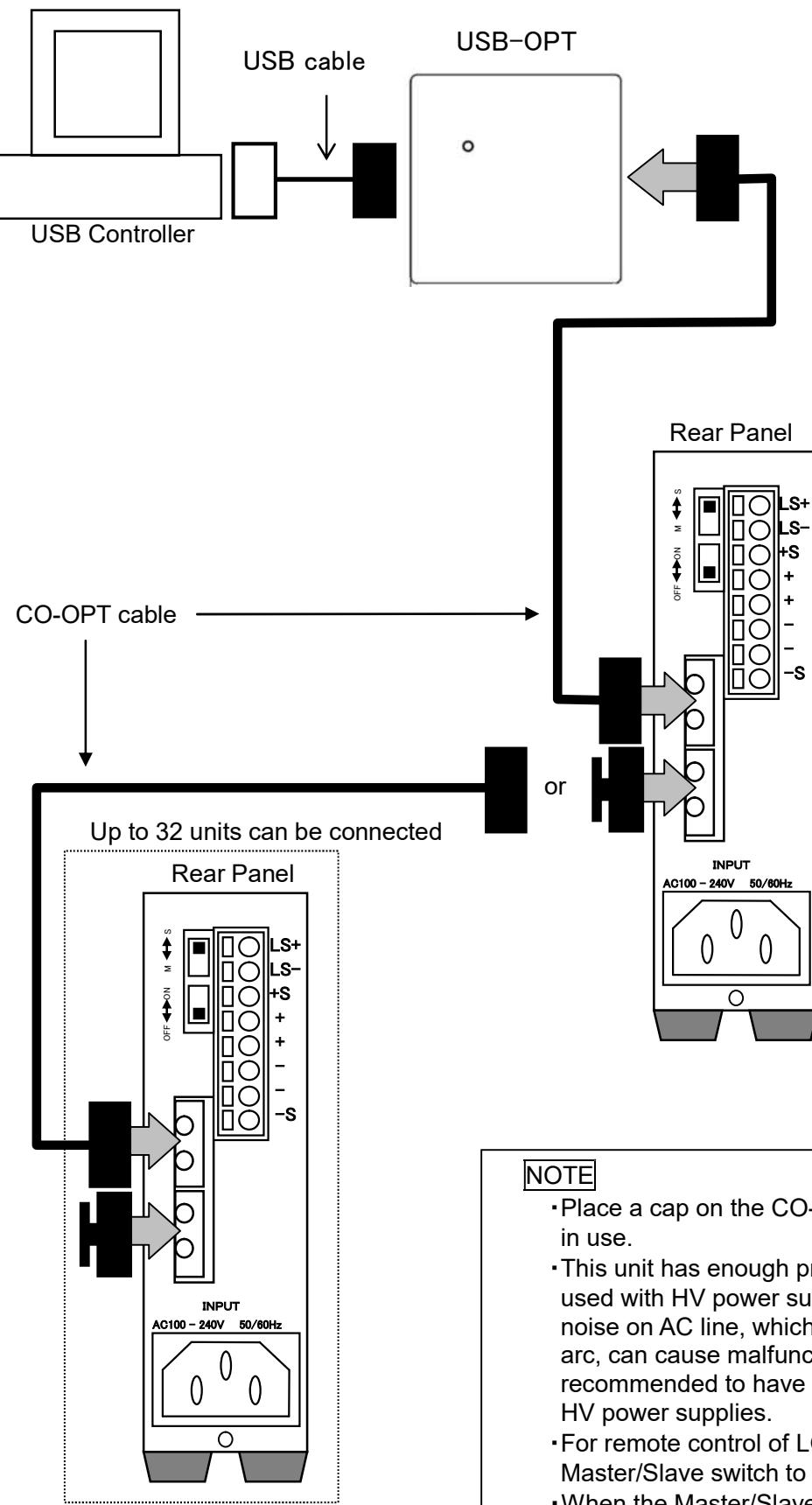
## 6-2-5 Connecting CO-OPT2-25 / CO-OPT2-9 / CO-OPT4-25 and LGob option



## 6-2-6 Connecting Our CO-G32 Controller and LGob option (Connection in GPIB – optical Communication)



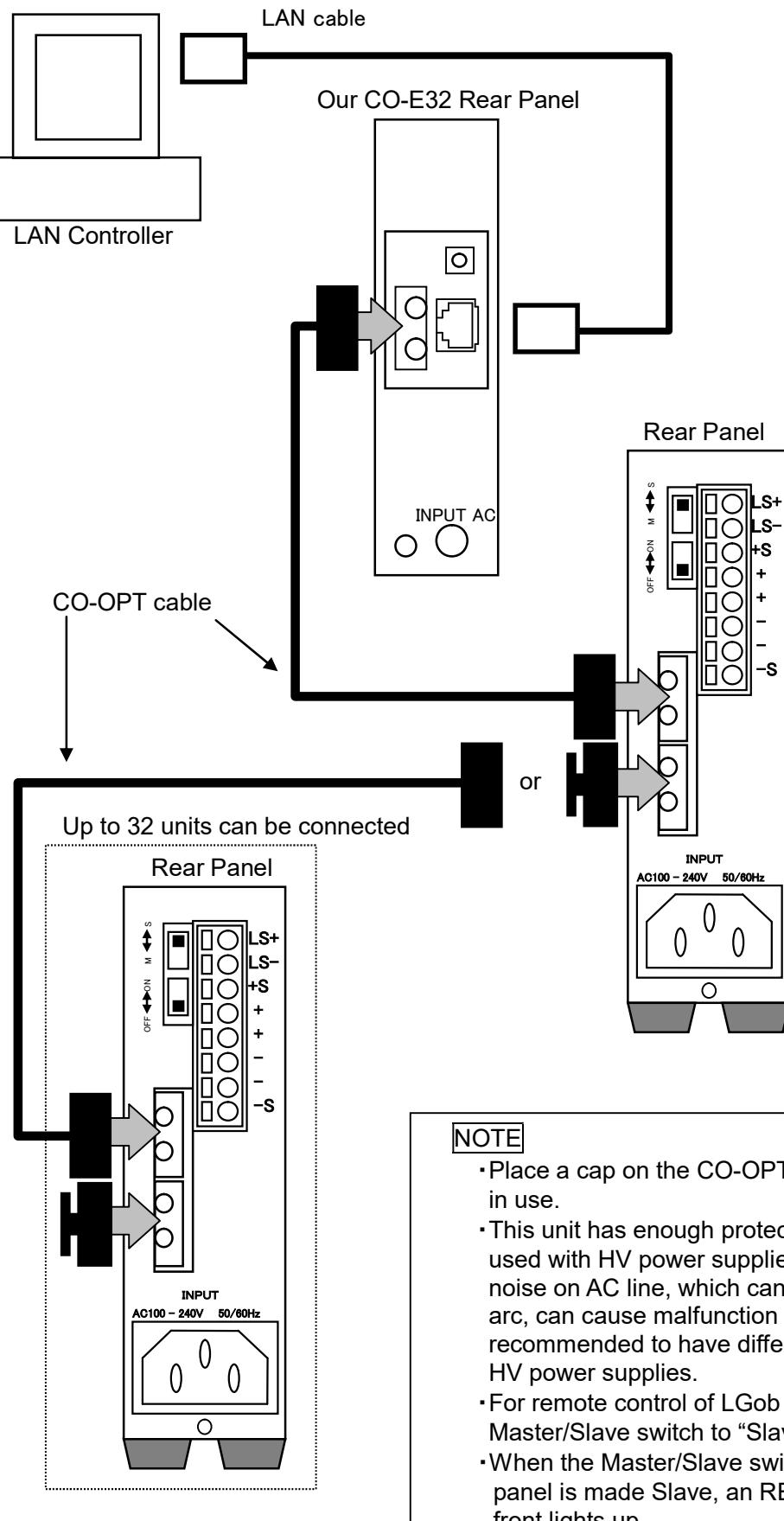
## 6-2-7 Connecting Our USB-OPT Controller and LGob option (Connection in USB - optical Communication)



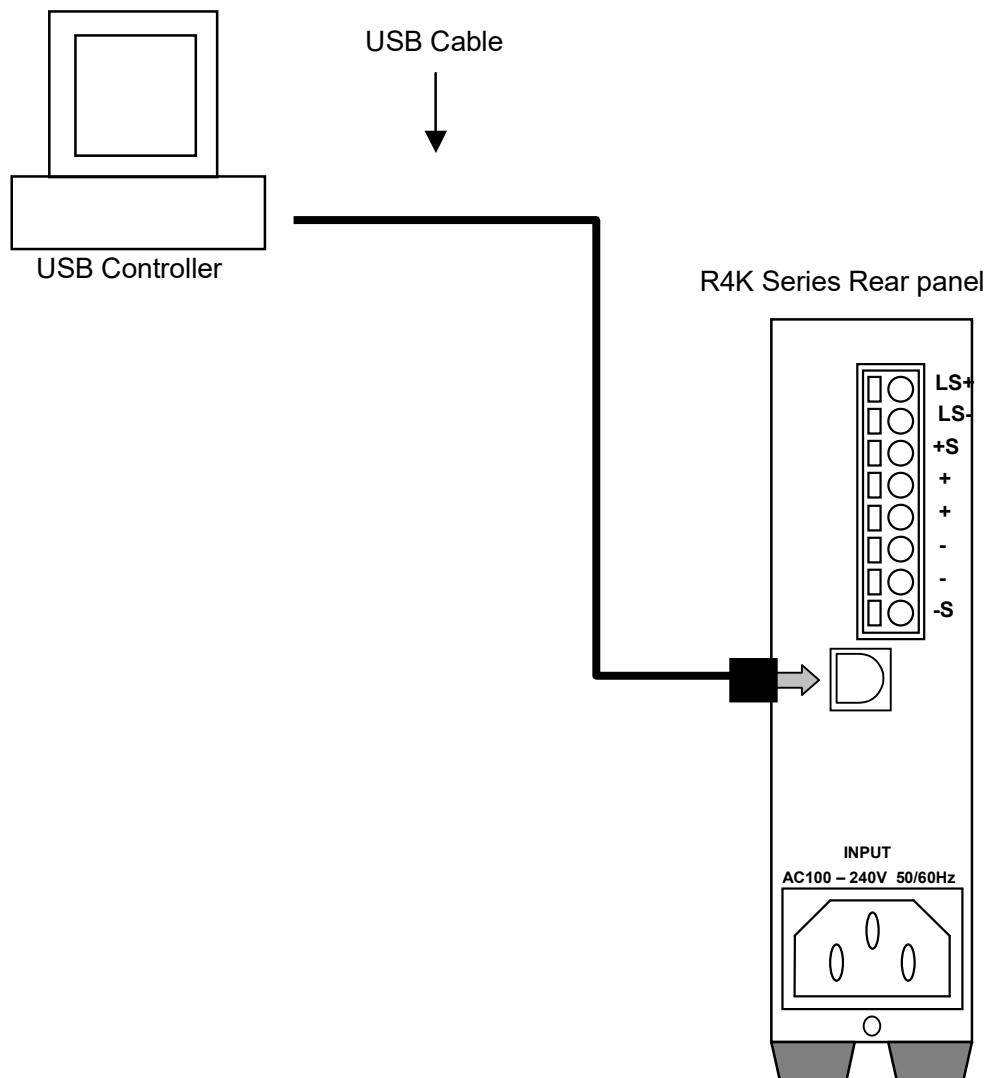
### NOTE

- Place a cap on the CO-OPT cable connector not in use.
- This unit has enough protection. However when used with HV power supplies, there is possibility that noise on AC line, which can be generated when HV arc, can cause malfunction on GPIB adapter, so it is recommended to have different AC line from that of HV power supplies.
- For remote control of LGob option, set the Master/Slave switch to "Slave".
- When the Master/Slave switch of the rear panel is made Slave, an REMOTE LED at the front lights up.

## 6-2-8 Connecting Our CO-E32 Controller and LGob option (Connection in LAN - optical Communication)



## 6-2-9 Connecting LUs1 Option

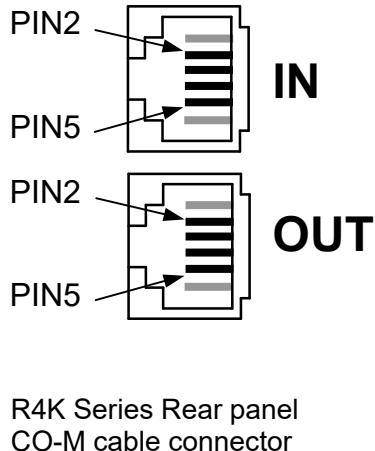


### 6-3 CO-M cable connector Interface terminal details (Standard Digital Interface)

R4K series uses 3 signals of TxD, RxD and GND of RS-232C signal for external interface control of digital communication.

Using Matsusada [Metal RS-232C module / CO-G32m], connect them properly to controller (such as personal computer)

Connector pin assignment power supply side (RJ-11, 6 polar 4 pin female)



Pin #	In/ out direction	Data direction
<b>CO-M cable connector (IN)</b>		
1	-	-
2	-	NC
3	Output	TxD0
4	-	GND
5	Input	Rxd0
6	-	-
<b>CO-M cable connector (OUT)</b>		
1	-	-
2	-	NC
3	Input	RxD1
4	-	GND
5	Output	TxD1
6	-	-

R4K Series Rear panel  
CO-M cable connector

#### Communication Method

Baud Rate	: asynchronous 9600[bps] (fixed)
Data Length	: 8[bit]
Stop Bit	: 1[bit]
Parity	: None
Flow control	: None

### 6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)

To set the UNIT number of each unit, change it in the menu display at the time of startup, or set the number in the “UNIT” of the digital control command.

For the UNIT number, an arbitrary value between 0 and 31 is settable. However, make sure not to set the same value as the other devices.

The UNIT number is set to 0 as the factory default.

## 6-5 Settings address and delimiter for GPIB(CO-G32 /CO-G32m)

On the rear panel of CO-G32 / CO-G32m there is an eight DIL switch labeled "ADDRESS". The desired address is set with this DIL switch from S1 to S5 in the binary format. (S1 is LSB.) "ON" (turn to left or up) stands for logic 1. The address is valid for the Listener and the Talker function. Take care that the same address is not set on different device. Each value from 0 to 30 can be assigned to the device address.

It is used for the termination mark that the delimiter shows end of the command string in the communication between CO Series and the controller. The rest of the three from S5 to S8 make character of delimiter as following.

- S6.....LF( $0A_H$ )
- S7.....CR( $0D_H$ )
- S8.....EOI

The factory setting of address is number 1, and delimiter is EOI.

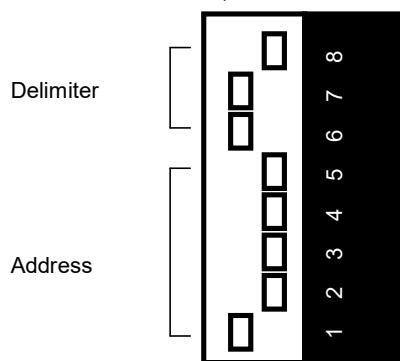


Fig. Example of setting

- GPIB address....1

- Delimiter.....CR+LF

These settings must be done when power is off. So CO Series read these setting only when power turns on.

## 6-6 USB Setting(USB-OPT/CO-U32m/LUs1 Option)

Download and install the USB driver from our WEB site.

To install the USB driver, refer to the downloaded "USB Driver Installation Guide".

The USB delimiter is CR( $0D_H$ ).

## 6-7 IP Address Setting (CO-E32/CO-E32m)

Please set IP address with Web page of our CO-E32/CO-E32m or the reset switch or setting of the start menu for LEt option.

\* As for setting of CO-E32/CO-E32m, please confirm the instruction manual.

Default setting value

IP address	192	168	10	1
Subnet mask	255	255	255	0
Default gateway	0	0	0	0
Remote port number	10001			

IP address can be set any value for, but please notice so as not to set the same value with other units. And the delimiter is set the same CR( $0D_H$ ) with RS-232C (Standard digital interface).

## 6-8 UNIT number and Settings upper connection (LGob Option)

If you want to set the UNIT number, make a setting from "Unt": unit number setting on the start menu.

Each value from 0 to 31 can be assigned to the unit number. Take care that the same unit number is not set on different device.

The factory setting of unit number is 0.

Operating with an option either LUs1 / LEt the unit number is required to configure 0 as same that of factory setting.

### Settings upper connection(LGob Option)

On the rear panel of R4K Series –LGob option there is an upper connection switch.

Switch selects the upper connection, what unit connects to CO-OPT cable connector (IN).

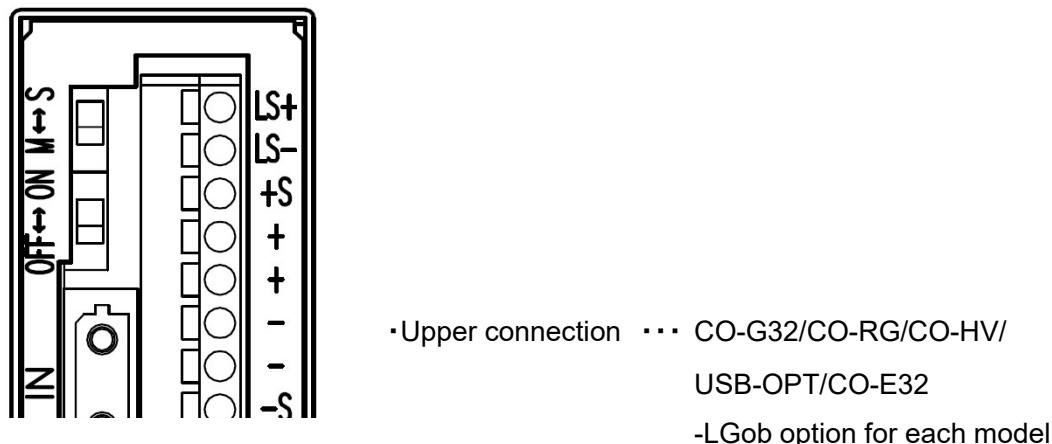
The selection is following.

- OFF ..... CO-G32, CO-RG, CO-HV, USB-OPT, CO-E32 or -LGob option for each model
- ON ..... CO-OPT2-25, CO-OPT2-9 or CO-OPT4-25

Upper connection equipment configuration switch located on the rear panel, the device that are connected to the CO-OPT cable connector (IN) is, to set the switch case of our company made CO-G32, CO-RG, CO-HV, USB-OPT, CO-E32 or -LGob option for each model on the side of “OFF”.

If the device connected to the IN is a controller such as a personal computer, and set the switch to the “ON”.

The factory setting of upper connection is “CO-G32, CO-RG, CO-HV, USB-OPT, CO-E32 or –LGob option for each model”.



## 6-9 Notes on more than one connection

R4K-80 Series in digital communication, if you use more than one, to set the Master / Slave switch to “Slave”.

MASTER : Communication delay will occur in order to process the data for each power.

SLAVE : Was in the master, there is no delay.

Slave, the maximum number of units connected because the attenuation of the communication signal is generated will be 16 units.

The more connections, please put the R4K-80 Series you set the master unit to 16 pcs eyes.  
( Master machine of between, the delay will occur. )

\* LGob can of 32 units connection.

## 6-10 Settings of CO-MET2-25 / CO-MET2-9 (Standard Digital Interface)

CO-MET2-25 / CO-MET2-9 connection uses 3 RS-232C signals of TxD, RxD and GND for communication.

Referring to the following diagram, properly connect the CO-MET2-25 / CO-MET2-9 with controller to be used(e.g. PC).

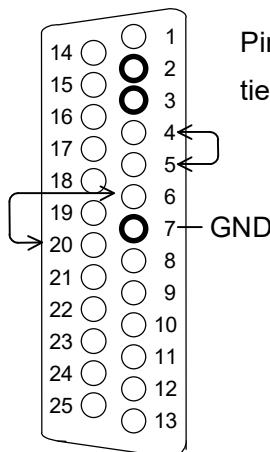


Fig. Metal RS-232C module pin assignment  
(D-Sub 25 pin MALE)

Pin #	Data direction
2	RxD(input)
3	TxD(output)
7	GND

Pin 4 - 5 and 6 - 20 are tied together inside.

Pin 4 - 6 and 7 - 8 are tied together inside.

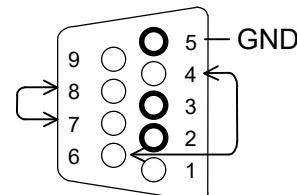


Fig. Metal RS-232C module pin assignment  
(D-Sub 9 pin FEMALE)

Pin #	Data direction
2	TxD(output)
3	RxD(input)
5	GND

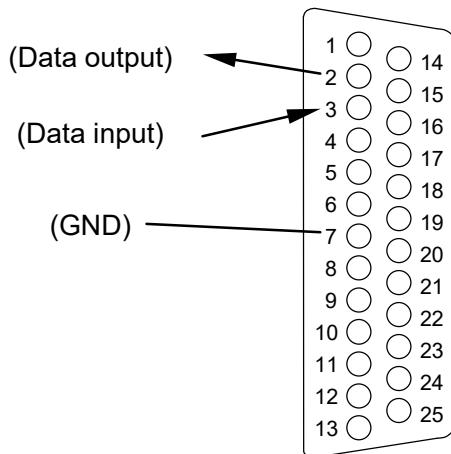


Fig. controller to be used(e.g. PC)  
pin assignment

(D-Sub 25 pin FEMALE)

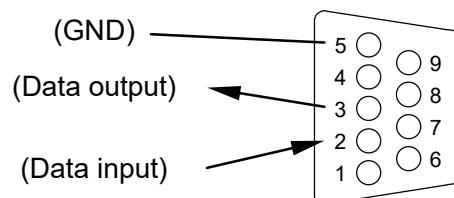


Fig. controller to be used(e.g. PC)  
pin assignment

(D-Sub 9 pin MALE)

### Communication Method

Baud Rate	asynchronous 9600 [bps] (fixed)
Data Length	8 [bit]
Stop Bit	1 [bit]
Parity	None
Flow control	None

Delimiter is CR(0DH) fixed

## 6-11 Settings of CO-OPT2-25/CO-OPT2-9 (LGob Option)

CO-OPT2-25/CO-OPT2-9 uses 3 RS-232C signals of TxD, RxD and GND for communication. Referring to the following sketches, properly connect the RS-232C module with controller(e.g. PC).

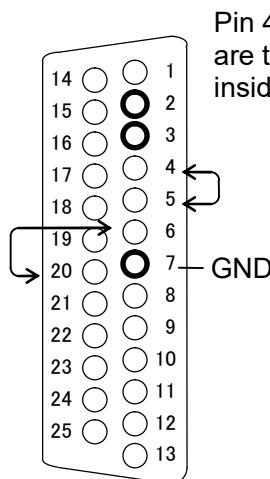


Fig. CO-OPT2-25 pin assignment  
(D-Sub25 pin MALE)

Pin 4 – 6 and 7 – 8 are tied together inside.

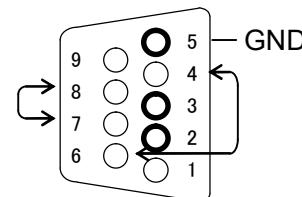


Fig. CO-OPT2-9 pin assignment  
(D-Sub9 pin FEMALE)

Pin #	Data Direction		Change switch	
	DTE	DCE		
2	RxD(Input)	TxD(Output)		
3	TxD(Output)	RxD(Input)		
7		GND		

Pin #	Data Direction		Change switch	
	DTE	DCE		
2	RxD(Input)	TxD(Output)		
3	TxD(Output)	RxD(Input)		
5				GND

The setting of DTE/DCE change switch should be done in accordance with the pin assignment of RS-232C port of controller to be used. So make sure the pin assignment before setting. Incorrect setting will result malfunction.

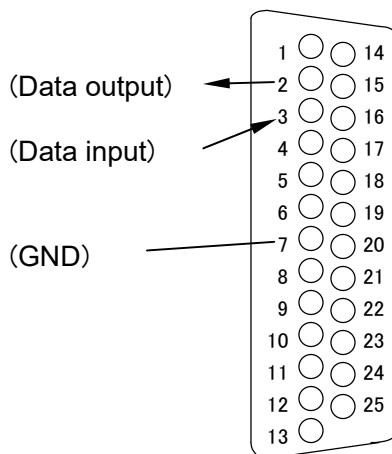


Fig. Controller to be used(e.g. PC)  
pin assignment  
(D-Sub 25 pin FEMALE)

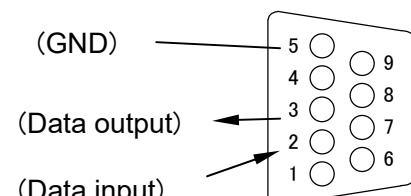


Fig. Controller to be used(e.g. PC)  
pin assignment  
(D-Sub 9 pin MALE)

### Communication Method

Baud Rate	: asynchronous 9600 [bps] (fixed)
Data Length	: 8 [bit]
Stop Bit	: 1 [bit]
Parity	: None
Flow control	: None

Delimiter is CR(0DH) fixed

## 6-12 Settings of CO-MET4-25/CO-OPT4-25

CO-MET4-25/CO-OPT4-25 uses 5 RS-485 signals of TxD+, TxD-, RxD+, RxD- and GND for communication.

Referring to the following sketches, properly connect the CO-MET4-25/CO-OPT4-25 with controller(e.g. PC).

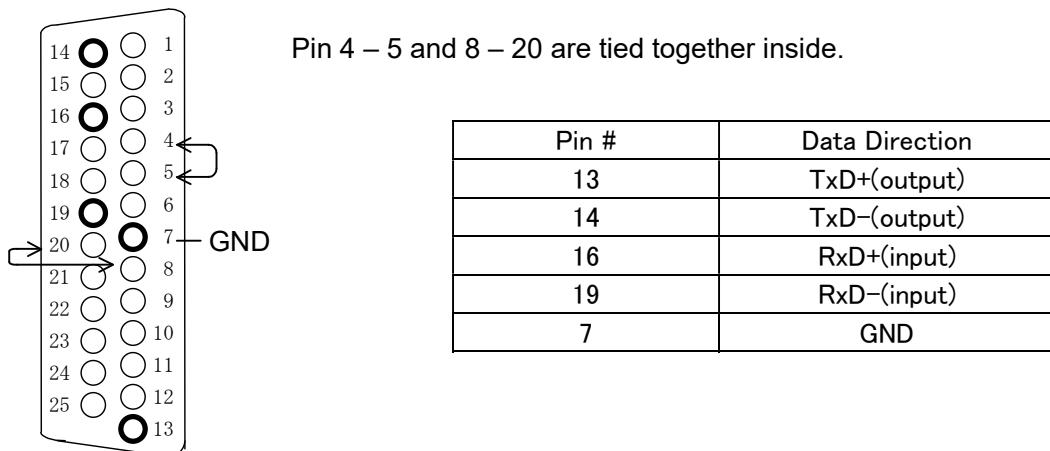


Fig. CO-MET4-25/CO-OPT4-25 pin assignment  
(D-Sub25 pin MALE)

### Communication Method

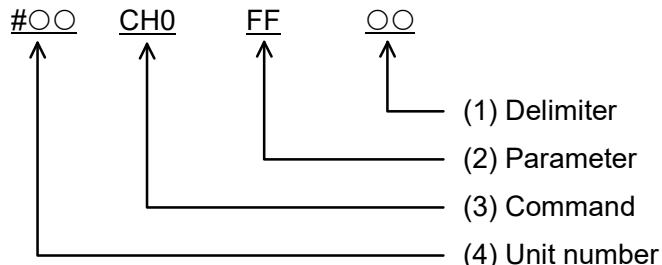
Baud Rate	: asynchronous 9600 [bps] (fixed)
Data Length	: 8 [bit]
Stop Bit	: 1 [bit]
Parity	: None
Flow control	: None

Delimiter is CR(0DH) fixed

## 6-13 DigitalProgram (Standard Digital Interface / LUs1 Option)

### 6-13-1 Summary of Syntax

For example, following programming set the output voltage of the unit to rated maximum voltage.



(1) Input delimiter.

- GPIB connection ..... ➔ GPIB delimiter

(See Section “6-5 Settings address and delimiter for GPIB(CO-G32 /CO-G32m)”)

- RS-232C(Standard Digital Interface) ..... ➔ CR(0DH)
- USB connection(Lus1 Option) ..... ➔ CR(0DH)

(2) Some commands require a parameter.

(3) Wrong commands are to be ignored.

(4) Specify the UNIT number.

- Standard Digital Interface,LGob Option ..... ➔ #0 to #31, or #AL
- LUs1 Option ..... ➔ Do not specify

#### Caution

Number of letters for one command shall be maximum 20 excluding delimiter.

If the number of letter exceed 20, then letters of multiple of 20, for example 20th, 40th, 60th, ... letter from the top shall be ignored and rest of the letters are input.

(Syntax)      #1 VCN 12.3456789012345 CR(0DH)      Total 25 letters.  
                   ↓

345 CR(0DH)      20 letters are to be ignored,  
                   and balance 5 letters are to  
                   be input.

(Description)    In the above case [345 CR(0DH)]is considered as invalid command,  
                   and input shall be ignored.



There are some cases that communication buffer is overflowed and it cannot receive commands when a lot of configuration command is sent continuously.  
       In such cases please give priority to each command.

### 6-13-2 Multiple command

By using "AL" for UNIT number, command is sent to all the unit connected.

(Syntax) (1) #AL CH0 FFFF All units set to a maximum of rated voltage.

(2) #AL SW1 All units enables to output.

(Description) Commands applicable to Multiple command are :  
 CH0, CH1, CH2, CH7, VCN, ICN, OVP, OCP, VSET, ISET, OVPSET,  
 OCPSET, SW, REN, GTL, DELAY, TON, TOFF, SLAVE  
 MLT, MEM, CH9, CHA, CHB, CHC, CHD, CHE, AVCN, AICN, BVCN, BICN,  
 CVCN, CICN, AVSET, AISET, BVSET, BISET, CVSET, CISET,  
 (\* PLS, PTION, PTOFF, PTA, PTB, PTC, PTL, PCNT, RMP,  
 RTON, RTOFF, RTA, RTB, RTC, RSET, CH5, CH6, VSWP, ISWP, VSSWP,  
 ISSWP, TSWP, SWP, SWPSTS, SWPEV, SWPEI are compatible with the -LDe option.)

### 6-13-3 Character set for the command

- Do not use the characters(codes) of section  in the following ASCII code table.
- Use the LF (0A<sub>H</sub>) and CR (0D<sub>H</sub>) only for delimiter.
- Command string is not case sensitive.
- Use space (20<sub>H</sub>) to punctuate unit number, command and parameter in the command strings.

table 1 ASCII code

下位 上位	0 <sub>H</sub>	1 <sub>H</sub>	2 <sub>H</sub>	3 <sub>H</sub>	4 <sub>H</sub>	5 <sub>H</sub>	6 <sub>H</sub>	7 <sub>H</sub>
0 <sub>H</sub>	NUL	DLE	SP	0	@	P	\	p
1 <sub>H</sub>	SOH	DC1	!	1	A	Q	a	q
2 <sub>H</sub>	STX	DC2	"	2	B	R	b	r
3 <sub>H</sub>	ETX	DC3	#	3	C	S	c	s
4 <sub>H</sub>	EOT	DC4	\$	4	D	T	d	t
5 <sub>H</sub>	ENQ	NAK	%	5	E	U	e	U
6 <sub>H</sub>	ACK	SYN	&	6	F	V	f	v
7 <sub>H</sub>	BEL	ETB	'	7	G	W	g	w
8 <sub>H</sub>	BS	CAN	(	8	H	X	h	x
9 <sub>H</sub>	HT	EM	)	9	I	Y	i	y
A <sub>H</sub>	LF	SUB	*	:	J	Z	j	z
B <sub>H</sub>	VT	ESC	+	:	K		k	
C <sub>H</sub>	FF	FS	,	<	L	¥	l	
D <sub>H</sub>	CR	GS	-	=	M	]	m	
E <sub>H</sub>	SO	RS	.	>	N	^	n	~
F <sub>H</sub>	SI	US	/	?	O	-	o	

### 6-13-4 Returned data

If readout commands are sent, an answer character string and a delimiter as follows are returned.

- GPIB connection ..... ➤ GPIB delimiter  
(See section 6-5 Settings address and delimiter for GPIB(CO-G32 /CO-G32m))
  - RS-232C / RS-485 connection ➤ CR(0D<sub>H</sub>)
  - LAN Returned ..... ➤ CR(0D<sub>H</sub>)
  - USB connection ..... ➤ CR(0D<sub>H</sub>)
- If answerless commands are sent, nothing returned.

"STS" Command receiving example:"#1 CO LO CC"

#	1	SP	C	O	SP	L	O	SP	C	C	CR
23 <sub>H</sub>	31 <sub>H</sub>	20 <sub>H</sub>	43 <sub>H</sub>	4F <sub>H</sub>	20 <sub>H</sub>	4C <sub>H</sub>	4F <sub>H</sub>	20 <sub>H</sub>	43 <sub>H</sub>	43 <sub>H</sub>	0D <sub>H</sub>

## 6-14 Checking Digital Operation (Standard Digital Interface, LUs1 Option)

### 6-14-1 CO-MET2-25 / CO-MET2-9 / CO-MET4-25, Standard Digital Interface

Control a R4K series power supply connected to CO-MET2-25 / CO-MET2-9 / CO-MET4-25 via RS-232C / RS-485



#### CAUTION

- Voltage is output actually.
- Do not connect any load to power supply before this procedure is completed.

#### (1) Set UNIT number

Set the UNIT number to “0” with the start menu.

(See Section “6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)”)

#### (2) Connect CO-MET2-25 / CO-MET2-9 / CO-MET4-25

Connect CO-MET2-25 / CO-MET2-9 / CO-MET4-25 to RS-232C / RS-485 controller (e.g. PC)

#### (3) Connect CO-MET2-25 / CO-MET2-9 / CO-MET4-25 to R4K series power supply

Connect CO-MET2-25 / CO-MET2-9 / CO-MET4-25 to modular cable connector (IN) of R4K series with modular cable enclosed together with power supply.

#### (4) Turn on the power

Turn on POWER ON/OFF switch.

#### (5) Enable remote control

Send a command of “#0 REN” from RS-232C / RS-485 controller.  
REMOTE LED shall light on.

#### (6) Enable the output

Send a command of “#0 ICN 100”, “#0 OVP 100”, “#0 SW1” from RS-232C controller.  
OUTPUT LED shall light on.

#### (7) Set output voltage and output

Send a command of “#0 VCN xxxx” from RS-232C / RS-485 controller. Enter numbers of 0 to 100 for xxxx. Refer to Command list for details.

#### (8) Stop the output

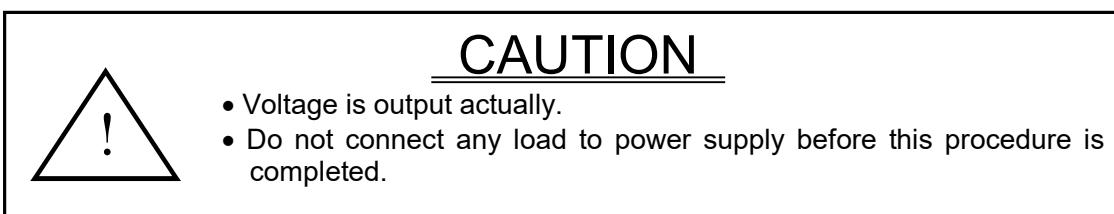
Send a command of “#0 SW0” from RS-232C / RS-485 controller.  
OUTPUT LED shall turn off.

#### (9) Ending the operation

Turn off POWER ON/OFF switch

## 6-14-2 Our CO-G32m, Standard Digital Interface

The R4K series connected to our CO-G32m is controlled through GPIB.



### (1) Set GPIB address and delimiter

Set GPIB address and delimiter with Address setting switch on rear panel of CO-G32m.  
(See Section "6-5 Settings address and delimiter for GPIB(CO-G32 /CO-G32m)")

### (2) Set UNIT number

Set the UNIT number to "0" with the start menu.  
(See Section "6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)")

### (3) Connect to GPIB

Connect IEEE-488 connector of CO-G32m to GPIB controller(e.g. PC) with GPIB cable(available at stores).

### (4) Connect R4K series power supply to CO-G32m

Connect CO-M cable connector(OUT) of CO-G32m to CO-M cable connector(IN) with CO-M cable enclosed together with power supply.

### (5) Turn on the power of CO-G32m

Turn on POWER ON/OFF switch of CO-G32m.

### (6) Turn on the power of R4K series power supply

Turn on POWER ON/OFF switch.

### (7) Enable remote control

Send a command of "#0 REN" from GPIB controller.  
REMOTE LED shall light on.

### (8) Enable the output

Send a command of "#0 ICN 100", "#0 OVP 100" , "#0 SW1" from GPIB controller.  
OUTPUT LED shall light on.

### (9) Set output voltage and output

Send a command of "#0 VCN xxxx" from GPIB controller. Enter numbers of 0 to 100 for xxxx.  
Refer to Command list for details.

### (10) Stop the output

Send a command of "#0 SW0" from GPIB controller.  
OUTPUT LED shall turn off.

### (11) Ending the operation

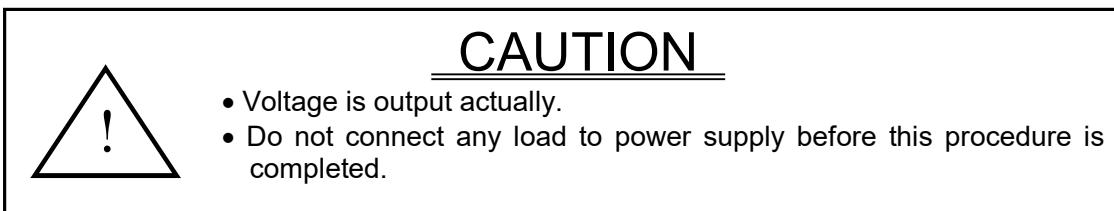
Turn off POWER ON/OFF switch of R4K series power supply

### (12) Stop remote control

Turn off POWER ON/OFF switch of CO-G32m

### 6-14-3 Our CO-U32m, Standard Digital Interface

The R4K series connected to our CO-U32m is controlled through USB.



#### (1) Set UNIT number

Set the UNIT number to “0” with the start menu.

(See Section “6-5 Settings address and delimiter for GPIB(CO-G32 /CO-G32m)”)

#### (2) Connect to USB

Connect USB connector of CO-U32m to USB controller(e.g. PC) with USB cable(available at stores).

#### (3) Connect R4K series power supply to CO-U32m

Connect CO-M cable connector(OUT) of CO-U32m to CO-M cable connector(IN) with CO-M cable enclosed together with power supply.

#### (4) Turn on the power of CO-U32m

Turn on POWER ON/OFF switch of CO-U32m.

#### (5) Turn on the power of R4K series power supply

Turn on POWER ON/OFF switch.

#### (6) Enable remote control

Send a command of “#0 REN” from GPIB controller.

REMOTE LED shall light on.

#### (7) Enable the output

Send a command of “#0 ICN 100”, “#0 OVP 100” ,“#0 SW1” from GPIB controller.

OUTPUT LED shall light on.

#### (8) Set output voltage and output

Send a command of “#0 VCN xxxx” from GPIB controller. Enter numbers of 0 to 100 for xxxx.

Refer to Command list for details.

#### (9) Stop the output

Send a command of “#0 SW0” from GPIB controller.

OUTPUT LED shall turn off.

#### (10) Ending the operation

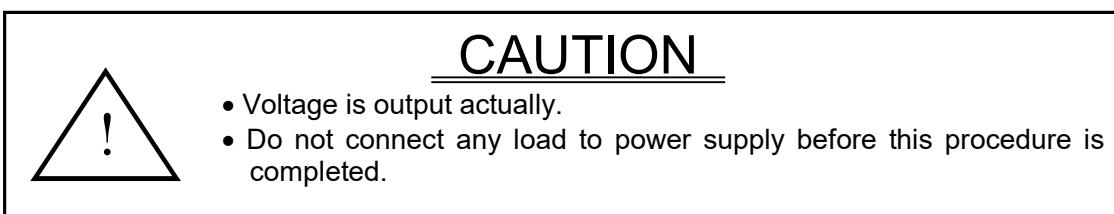
Turn off POWER ON/OFF switch of R4K series power supply

#### (11) Stop remote control

Turn off POWER ON/OFF switch of CO-U32m

## 6-14-4 Our CO-E32m, Standard Digital Interface

The R4K series connected to our CO-E32m is controlled through LAN.



### (1) Set IP address

Set IP address.

(See Section "6-7 IP Address Setting (CO-E32/CO-E32m)")

### (2) Set UNIT number

Set the UNIT number to "0" with UNIT number setting switch on the rear of the unit.

(See Section "6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)")

### (3) Connect to LAN

Connect LAN connector of CO-E32m to LAN controller(e.g. PC) with LAN cable(available at stores).

### (4) Connect R4K series power supply to CO-E32m

Connect CO-M cable connector(OUT) of CO-E32m to CO-M cable connector(IN) with CO-M cable enclosed together with power supply.

### (5) Turn on the power of CO-E32m

Turn on POWER ON/OFF switch of CO-E32m.

### (6) Turn on the power of R4K series power supply

Turn on POWER ON/OFF switch.

### (7) Enable remote control

Send a command of "#0 REN" from LAN controller.

REMOTE LED shall light on.

### (8) Enable the output

Send a command of "#0 ICN 100", "#0 OVP 100", "#0 SW1" from LAN controller.

OUTPUT LED shall light on.

### (9) Set output voltage and output

Send a command of "#0 VCN xxxx" from LAN controller. Enter numbers of 0 to 100 for xxxx.

Refer to Command list for details.

### (10) Stop the output

Send a command of "#0 SW0" from LAN controller.

OUTPUT LED shall turn off.

### (11) Ending the operation

Turn off POWER ON/OFF switch of R4K series power supply

### (12) Stop remote control

Turn off POWER ON/OFF switch of CO-E32m

## 6-14-5 CO-OPT2-25 / CO-OPT2-9 / CO-OPT4-25, LGob option

Control a R4K series power supply connected to CO-OPT2-25 / CO-OPT2-9 / CO-OPT4-25 via RS-232C / RS-485



### CAUTION

- Voltage is output actually.
- Do not connect any load to power supply before this procedure is completed.

#### (1) Set UNIT number

Set the UNIT number to “0” with UNIT number setting switch on the rear of the unit.  
(See Section “6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)”)

#### (2) Connect CO-OPT2-25 / CO-OPT2-9 / CO-OPT4-25

Connect CO-OPT2-25 / CO-OPT2-9 / CO-OPT4-25 to RS-232C / RS-485 controller (e.g. PC)

#### (3) Connect CO-OPT2-25 / CO-OPT2-9 / CO-OPT4-25 to R4K series power supply

Connect CO-OPT2-25 / CO-OPT2-9 / CO-OPT4-25 to modular cable connector (IN) of R4K series with modular cable enclosed together with power supply.

#### (4) Turn on the power

Turn on POWER ON/OFF switch.

#### (5) Enable remote control

Send a command of “#0 REN” from RS-232C / RS-485 controller.  
REMOTEhall light on.

#### (6) Enable the output

Send a command of “#0 ICN 100”, “#0 OVP 100”, “#0 SW1” from RS-232C controller.  
OUTPUT LED shall light on.

#### (7) Set output voltage and output

Send a command of “#0 VCN xxxx” from RS-232C / RS-485 controller. Enter numbers of 0 to 100 for xxxx. Refer to Command list for details.

#### (8) Stop the output

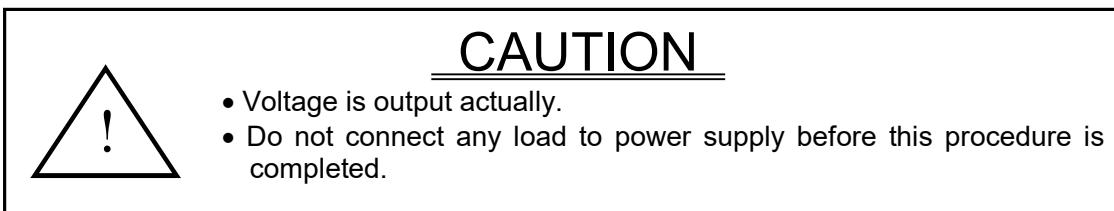
Send a command of “#0 SW0” from RS-232C / RS-485 controller.  
OUTPUT LED shall turn off.

#### (9) Ending the operation

Turn off POWER ON/OFF switch

## 6-14-6 Our CO-G32, LGob option

The R4K series connected to our CO-G32 is controlled through GPIB



### (1) Set GPIB address and delimiter

Set GPIB address and delimiter with Address setting switch on rear panel of CO-G32.  
(See Section "6-5 Settings address and delimiter for GPIB(CO-G32 /CO-G32m)")

### (2) Set UNIT number

Set the UNIT number to "0" with UNIT number setting switch on the rear of the unit.  
(See Section "6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)")

### (3) Connect to GPIB

Connect IEEE-488 connector of CO-G32m to GPIB controller(e.g. PC) with GPIB cable(available at stores).

### (4) Connect R4K series power supply to CO-G32

Connect CO-OPT cable connector(OUT) of CO-G32 to CO-OPT cable connector(IN) with CO-OPT cable enclosed together with power supply.

### (5) Turn on the power of CO-G32

Turn on POWER ON/OFF switch of CO-G32.

### (6) Turn on the power of R4K series power supply

Turn on POWER ON/OFF switch.

### (7) Enable remote control

Send a command of "#0 REN" from GPIB controller.  
REMOTE LED shall light on.

### (8) Enable the output

Send a command of "#0 ICN 100", "#0 OVP 100" , "#0 SW1" from GPIB controller.  
OUTPUT LED shall light on.

### (9) Set output voltage and output

Send a command of "#0 VCN xxxx" from GPIB controller. Enter numbers of 0 to 100 for xxxx.  
Refer to Command list for details.

### (10) Stop the output

Send a command of "#0 SW0" from GPIB controller.  
OUTPUT LED shall turn off.

### (11) Ending the operation

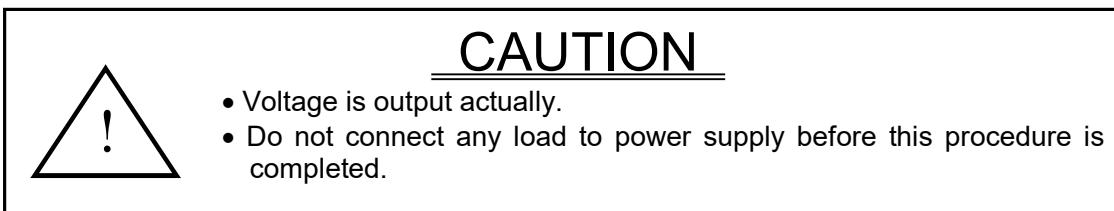
Turn off POWER ON/OFF switch of R4K series power supply

### (12) Stop remote control

Turn off POWER ON/OFF switch of CO-G32

## 6-14-7 Our USB-OPT, LGob option

The R4K series connected to our USB-OPT is controlled through USB.



### (1) Set UNIT number

Set the UNIT number to “0” with the start menu.

(See Section “6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)”)

### (2) Connect to USB

Connect USB connector of USB-OPT to USB controller(e.g. PC) with USB cable(available at stores).

### (3) Connect R4K series power supply to USB-OPT

Connect CO-OPT cable connector(OUT) of USB-OPT to CO-OPT cable connector(IN) with CO-OPT cable enclosed together with power supply.

### (4) Turn on the power of USB-OPT

Turn on POWER ON/OFF switch of USB-OPT.

### (5) Turn on the power of R4K series power supply

Turn on POWER ON/OFF switch.

### (6) Enable remote control

Send a command of “#0 REN” from USB controller.

REMOTE LED shall light on.

### (7) Enable the output

Send a command of “#0 ICN 100”, “#0 OVP 100” ,”#0 SW1” from GPIB controller.

OUTPUT LED shall light on.

### (8) Set output voltage and output

Send a command of “#0 VCN xxxx” from GPIB controller. Enter numbers of 0 to 100 for xxxx.  
Refer to Command list for details.

### (9) Stop the output

Send a command of “#0 SW0” from GPIB controller.

OUTPUT LED shall turn off.

### (10) Ending the operation

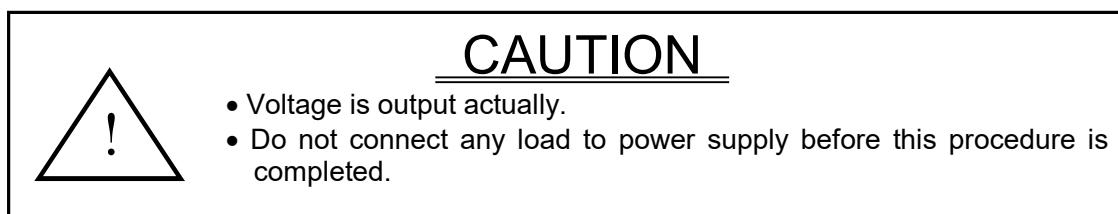
Turn off POWER ON/OFF switch of R4K series power supply

### (11) Stop remote control

Turn off POWER ON/OFF switch of USB-OPT

## 6-14-8 Our CO-E32, LGob option

The R4K series connected to our CO-E32m is controlled through LAN.



### (1) Set IP address

Set IP address.

(See Section "6-7 IP Address Setting (CO-E32/CO-E32m)")

### (2) Set UNIT number

Set the UNIT number to "0" with the start menu.

(See Section "6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)")

### (3) Connect to LAN

Connect LAN connector of CO-E32 to LAN controller(e.g. PC) with LAN cable(available at stores).

### (4) Connect R4K series power supply to CO-E32

Connect CO-OPT cable connector(OUT) of CO-E32 to CO-OPT cable connector(IN) with CO-OPT cable enclosed together with power supply.

### (5) Turn on the power of CO-E32

Turn on POWER ON/OFF switch of CO-E32.

### (6) Turn on the power of R4K series power supply

Turn on POWER ON/OFF switch.

### (7) Enable remote control

Send a command of "#0 REN" from LAN controller.

REMOTE LED shall light on.

### (8) Enable the output

Send a command of "#0 ICN 100", "#0 OVP 100", "#0 SW1" from GPIB controller.

OUTPUT LED shall light on.

### (9) Set output voltage and output

Send a command of "#0 VCN xxxx" from LAN controller. Enter numbers of 0 to 100 for xxxx.

Refer to Command list for details.

### (10) Stop the output

Send a command of "#0 SW0" from LAN controller.

OUTPUT LED shall turn off.

### (11) Ending the operation

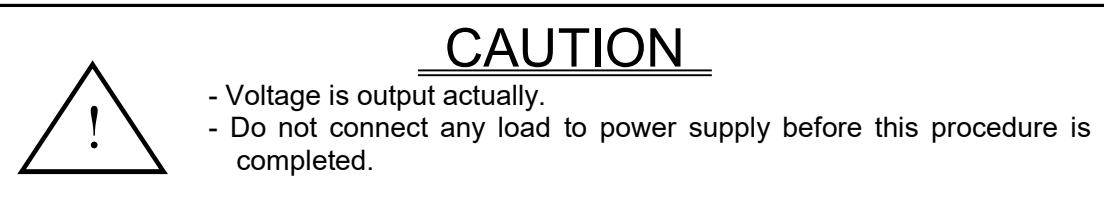
Turn off POWER ON/OFF switch of R4K series power supply

### (12) Stop remote control

Turn off POWER ON/OFF switch of CO-E32

## 6-14-9 LUs1 option

Control a R4K series power supply via USB



### (1) Connect R4K series power supply to USB controller

Connect R4K series power supply to USB controller (e.g. PC) with USB cable.

### (2) Set UNIT number

Set the UNIT number to “0” with the start menu.

(See Section “6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)”)

### (3) Turn on the power

Turn on POWER ON/OFF switch.

### (4) Enable remote control

Send a command of “REN” from USB controller.

### (5) Enable the output

Send a command of “ICN 100”, “OVP 100”, “SW1” from USB controller.

OUTPUT LED shall light on.

### (6) Set output voltage and output

Send a command of “VCN xxxx”. Enter numbers of 0 to 100 for xxxx. Refer to Command list for details.

### (7) Stop the output

Send a command of “SW0” from USB controller.

OUTPUT LED shall turn off.

### (8) Ending the operation

Turn off POWER ON/OFF switch.

## 6-15 Digital Command (Standard Digital Interface, LUs1 Option)

## 6-15-1 Command list (Standard Digital Interface , LUs1 Option)

table1 Command list

Mode	Command	Function	page	
Write	Output setting	CH0 CH1 CH2 CH7 VCN ICN OVP OCP VSET ISET OVPSET OCPSET	Set output voltage (HEX mode) Set output current (HEX mode) Set over voltage protection (HEX mode) Set over current protection (HEX mode) Set output voltage (percent mode) Set output current (percent mode) Set over voltage protection (percent mode) Set over current protection (percent mode) Set output voltage (voltage value) Set output current (current value) Set over voltage protection (voltage value) Set over voltage protection (current value)	80 80 81 81 82 82 83 83 84 84 85 85
	Multi-set output setting	CH9 CHA CHB CHC CHD CHE AVCN AICN BVCN BICN CVCN CICN AVSET AISET BVSET BISET CVSET CISET	Memory "a" Set output voltage (HEX mode) Memory "a" Set output current (HEX mode) Memory "b" Set output voltage (HEX mode) Memory "b" Set output current (HEX mode) Memory "c" Set output voltage (HEX mode) Memory "c" Set output current (HEX mode) Memory "a" Set output voltage (percent mode) Memory "a" Set output current (percent mode) Memory "b" Set output voltage (percent mode) Memory "b" Set output current (percent mode) Memory "c" Set output voltage (percent mode) Memory "c" Set output current (percent mode) Memory "a" Set output voltage(voltage value) Memory "a" Set output current (current value) Memory "b" Set output voltage (voltage value) Memory "b" Set output current (current value) Memory "c" Set output voltage (voltage value) Memory "c" Set output current (current value)	86 86 87 87 88 88 89 89 90 90 91 91 92 92 93 93 94 94
	Mode Setting	SW1/0 REN GTL	Enable/Disable to output Enable remote control Disable remote control	95 95 95
	Delay Setting	DELAY OFF/ON TON TOFF SLAVE LO/RE	ON/OFF delay trigger function Set ON delay time (0.0 to 99.9 sec) Set OFF delay time (0.0 to 99.9 sec) Set Local / Remote of slave unit	96 96 96 96
	Multi-set Setting	MLT OFF/ON MEM A/B/C	Turn ON/OFF Multi-set function. Set memory number A/B/C of Multi-set function.	97 97
	UNIT Setting	UNIT	Set UNIT number. (0 – 31)	97

Mode	Command	Function	page	
Read	Output	MN1 MN2 VM IM VGET IGET	Measuring output voltage (HEX mode) Measuring output current (HEX mode) Measuring output voltage (percent mode) Measuring output current (percent mode) Measuring output voltage (voltage value) Measuring output current (current value)	98 98 98 98 98 98
		STS	Query the status of the power supply	99
		CH0? CH1? CH2? CH7? VCN? ICN? OVP? OCP? VSET? ISET? OVPSET? OCPSET?	Read the setting of output voltage (HEX mode) Read the setting of output current (HEX mode) Read the setting of over voltage protection (HEX mode) Read the setting of over current protection (HEX mode) Read the setting of output voltage (percent mode) Read the setting of output current (percent mode) Read the setting of over voltage protection (percent mode) Read the setting of over current protection (percent mode) Read the setting of output voltage (voltage value) Read the setting of output current (current value) Read the setting of over voltage protection (voltage value) Read the setting of over current protection (current value)	100 100 100 100 101 101 101 101 102 102 102 102
		CH9? CHA? CHB? CHC? CHD? CHE? AVCN? AICN? BVCN? BICN? CVCN? CICN? AVSET? AISET? BVSET? BISET? CVSET? CISET?	Confirm memory A output voltage (HEX mode) Confirm memory A output current(HEX mode) Confirm memory B output voltage (HEX mode) Confirm memory B output current (HEX mode) Confirm memory C output voltage (HEX mode) Confirm memory C output current (HEX mode) Confirm memory A output voltage (percent mode) Confirm memory A output current (percent mode) Confirm memory B output voltage (percent mode) Confirm memory B output current (percent mode) Confirm memory C output voltage (percent mode) Confirm memory C output current (percent mode) Confirm memory A output voltage (voltage value) Confirm memory A output current (current value) Confirm memory B output voltage (voltage value) Confirm memory B output current (current value) Confirm memory C output voltage (voltage value) Confirm memory C output current (current value)	103 103 103 103 103 103 104 104 104 104 105 105 105 105 105 105 106 106 107 107
		SW?	Read the setting of output ON/OFF	108
	Delay confirmation	DELAY? TON? TOFF? SLAVE?	Read the status of ON/OFF of delay trigger function Read the setting of ON delay time Read the setting of OFF delay time Read the Local / Remote setting of slave unit	108 108 108 108
		MLT? MEM?	Confirm ON/OFF of Multi-set function. Confirm memory number A/B/C of Multi-set function.	109 109
		UNIT?	Confirm UNIT number. (0 – 31)	109

## 6-15-2 Command list (LDe Option)

table2 LDe Option Command list

Mode	Command	Function	Page	
Write	Pulse sequence setting	PLS PLS OFF/ON PT ON PT OFF PTA PTB PTC PLT S/M/H PCNT	Turn ON/OFF pulse sequence function. Set normal ON time (0.0 – 99.9) Set OFF time (0.0 – 99.9) Set Multi-set and memory A time (0.0 – 99.9) Set Multi-set and memory B time (0.0 – 99.9) Set Multi-set and memory V time (0.0 – 99.9) Set time unit (sec/min/hr) Set number of repetition (0 – 9999 times)	110 110 110 111 111 112 112 112
	Ramp setting	RMP OFF/ON RT ON RT OFF RTA RTB RTC RSET CVCC/CV/CC	Turn ON/OFF ramp function. Set normal ON ramp time (0 – 999 secs) Set OFF ramp time (0 – 999 secs) Set Multi-set and memory A ramp time (0 – 999 secs) Set Multi-set and memory A ramp time (0 – 999 secs) Set Multi-set and memory A ramp time (0 – 999 secs) Set ramp operation (for CVCC/CV only / CC only)	113 113 113 114 114 114 115
	Sweep setting	CH5 CH6 VSWP ISWP VSSWP ISSWP TSWP SWP ON/OFF SWPSTS ON/OFF SWPEV SWPEI	Set attained voltage (HEX mode) Set attained current (HEX mode) Set attained voltage (percent mode) Set attained voltage (percent mode) Set attained voltage (voltage value) Set attained voltage (current value) Set attainment time (0.0 – 1300.0 secs) Start/stop sweep output. Permit/prohibit attained status. Set attained voltage (0: 0V, 1: retained, 2: previous setting) Set attained current (0: 0V, 1: retained, 2: previous setting)	116 116 117 117 118 118 119 119 119 120 120

Mode	Command	Function	Page	
Read	Pulse sequence confirmation	PLS? PTON? PTOFF? PTA? PTB? PTC? PLT? PCNT?	Confirm pulse sequence function ON/OFF. Confirm normal ON time (0.0 – 99.9) Confirm OFF time (0.0 – 99.9) Confirm Multi-set and memory A tim. (0.0 – 99.9) Confirm Multi-set and memory B time (0.0 – 99.9) Confirm Multi-set and memory C time (0.0 – 99.9) Confirm unit time (sec/min/hr) Confirm number of repetition. (0 – 9999 times)	121 121 121 122 122 122 123 123
	Ramp confirmation	RMP? RTON? RTOFF? RTA? RTB? RTC? RSET?	Confirm ramp function ON/OFF. Confirm normal ON ramp time (0 – 999 secs) Confirm OFF ramp time (0 – 999 secs) Confirm Multi-set and memory A ramp time (0 – 999 secs) Confirm Multi-set and memory A ramp time (0 – 999 secs) Confirm Multi-set and memory A ramp time (0 – 999 secs) Confirm ramp operation (for CVCC/CV only / CC only)	124 124 124 125 125 125 125
	Sweep confirmation	CH5? CH6? VSWP? ISWP? VSSWP? ISSWP? TSWP? SWP? SWPSTS? SWPEV? SWPEI?	Confirm attained voltage (HEX mode) Confirm attained current (HEX mode) Confirm attained voltage (percent mode) Confirm attained voltage (percent mode) Confirm attained voltage (voltage value) Confirm attained voltage (current value) Confirm attainment time (0.0 – 1300.0 secs) Confirm start/stop of sweep output. Confirm permission/prohibition of attained status. Confirm attained voltage (0: 0V, 1: retained, 2: previous setting) Confirm attained current (0: 0V, 1: retained, 2: previous setting)	126 126 126 126 127 127 127 128 128 128

## 6-16 Reference

### **CH0 Command**

This command programs output voltage of power supply with hexadecimal format.\*

(Syntax) (1) CH0 FFFF ← A maximum of rated output voltage

(2) CH0 7FFF ← A half of rated output voltage

(3) CH0 F0 ← Same as “CH0 00F0”

(4) CH0 12345 ← Output voltage is not changed

(Default) CH0 0000

(Description) It ignores as a parameter of a number over 4 digit (e.g. (4))

Parameter requires hexadecimal format from  $0000_H$  to  $FFFF_H$

Featuring multiple command

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

### **CH1 Command**

This command programs output current of power supply with hexadecimal format.\*

(Syntax) (1) CH1 FFFF ← A maximum of rated output current

(2) CH1 7FFF ← A half of rated output current

(3) CH1 F0 ← Same as “CH1 00F0”

(4) CH1 12345 ← Output current is not changed

(Default) CH1 0000

(Description) It ignores as a parameter of a number over 4 digit (e.g. (4))

Parameter requires hexadecimal format from  $0000_H$  to  $FFFF_H$

Featuring multiple command

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## **CH2 Command**

This command programs over voltage protection with hexadecimal format.\*

Maximum over voltage protection value = maximum rated voltage x 110%

- (Syntax) (1) CH2 FFFF ← (Over voltage protection value) = (maximum over voltage protection value)  
 (2) CH2 7FFF ← (Over voltage protection value) = (half of maximum over voltage protection value)  
 (3) CH2 F0 ← Same as "CH2 00F0"  
 (4) CH2 12345 ← Over voltage protection value does not change

(Default) CH2 0000

(Description) It ignores as a parameter of a number over 4 digits (Syntax (4))

For the setting less than 1%, over voltage protection will not function.

Featuring multiple command

## **CH7 Command**

This command programs over current protection with hexadecimal format.\*

Maximum over current protection value = maximum rated current x 110%

- (Syntax) (1) CH7 FFFF ← (Over current protection value) = (maximum over current protection value)  
 (2) CH7 7FFF ← (Over current protection value) = (half of maximum over current protection value)  
 (3) CH7 F0 ← Same as "CH7 00F0"  
 (4) CH7 12345 ← Over current protection value does not change

(Default) CH7 0000

(Description) It ignores as a parameter of a number over 4 digits (Syntax (4))

For the setting less than 1%, over current protection will not function.

Featuring multiple command

## VCN Command

This command programs output voltage of power supply with percentage of the rated.  
(increment of 0.01%)

- (Syntax) (1) VCN 100 ← A maximum of rated output voltage  
 (2) VCN 12.34 ← 12.34% of rated output voltage  
 (3) VCN 123.4 ← Output voltage is not changed  
 (4) VCN 12.345 ← Same as "VCN 12.34"

(Default) VCN 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

Parameter requires from 0.0 to 100.0

Featuring multiple command

- \* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

## ICN Command

This command programs output current of power supply with percentage of the rated.

(increment of 0.01%)

- (Syntax) (1) ICN 100 ← A maximum of rated output current  
 (2) ICN 12.34 ← 12.34% of rated output current  
 (3) ICN 123.4 ← Output current is not changed  
 (4) ICN 12.345 ← Same as "ICN12.34"

(Default) ICN 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (3))

Parameter requires from 0.0 to 100.0

Featuring multiple command

- \* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## OVP Command

This command programs over voltage of power supply with percentage of the rated.  
(increment of 0.01%)

Maximum over voltage protection value = maximum rated voltage x 110%

- (Syntax) (1) OVP 100 ← A maximum of rated over voltage  
 (2) OVP 12.34 ← 12.34% of rated over voltage  
 (3) OVP 123.4 ← Over voltage is not changed  
 (4) OVP 12.345 ← Same as "OVP 12.34"

(Default) OVP 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

Parameter requires from 0.0 to 100.0

For the setting of 1% or less, over voltage protection will not function.

Featuring multiple command

## OCP Command

This command programs over current of power supply with percentage of the rated.  
(increment of 0.01%)

Maximum over current protection value = maximum rated current x 110%

- (Syntax) (1) OCP 100 ← A maximum of rated over current  
 (2) OCP 12.34 ← 12.34% of rated over current  
 (3) OCP 123.4 ← Over current is not changed  
 (4) OCP 12.345 ← Same as "OCP 12.34"

(Default) OCP 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

Parameter requires from 0.0 to 100.0

For the setting of 1% or less, over current protection will not function.

Featuring multiple command

## **VSET Command**

This command programs output voltage with 0.0 to rated voltage(V)

(Syntax) In case of R4K-80 36V/5A(increment of 0.01V)

- (1) VSET 36      ← (output voltage) = (36V)
- (2) VSET 12.34    ← (output voltage) = (12.34V)
- (3) VSET 123.4    ← output voltage does not change
- (4) VSET 12.345   ← (output voltage) = (12.34V)

(Default) VSET 0

(Description) It ignores as a parameter of integer over rated voltage (Syntax (3))

It ignores as a parameter under 2 decimal (Syntax (4))

Featuring multiple command

\* Minimum setting value of VSET command is different for each model ,R4K.

(See Section "6-17 Minimum setting / return value list".)

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

## **ISET Command**

This command programs output current with 0.0 to rated current (A)

(Syntax) In case of R4K-80 36V/5A (increment of 0.001A)

- (1) ISET 5      ← (output current) = (5A)
- (2) ISET 1.234    ← (output current) = (1.234A)
- (3) ISET 12.34    ← output current does not change
- (4) ISET 1.2345   ← (output current) = (1.234A)

(Default) ISET 0

(Description) It ignores as a parameter of integer over rated current (Syntax (3))

It ignores as a parameter under 2 decimal (Syntax (4))

Featuring multiple command

\* Minimum setting value of ISET command is different for each model ,R4K.

(See Section "6-17 Minimum setting / return value list".)

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## OVPSET Command

This command programs over voltage protection value with 0.0 to rated over voltage protection (V) setting value. (increment of 0.01V)

Maximum over voltage protection value = Maximum rated voltage x 110%

(Syntax) For R4K-80 36V/5A (increment of 0.01V)

(Syntax) In case of R4K-80 36V/5A

- |                   |   |
|-------------------|---|
| (1) OVPSET 39.6   | ← (over voltage protection setting) = (39.6V)     |
| (2) OVPSET 12.34  | ← (over voltage protection setting) = (12.34V)    |
| (3) OVPSET 123.4  | ← over voltage protection setting does not change |
| (4) OVPSET 12.345 | ← (over voltage protection setting) = (12.34V)    |

(Default) OVPSET 0

(Description) It ignores as a parameter of integer over maximum over voltage protection setting value. (Syntax (3))

It ignores as a parameter under 2 decimal (Syntax (4))

For the setting of 1% or less, over voltage protection will not function.

Featuring multiple command

\* Minimum setting value of OVPSET command is different for each model ,R4K.

(See Section "6-17 Minimum setting / return value list".)

## OCPSET Command

This command programs over current protection value with 0.0 to rated over current protection (A) setting value. (increment of 0.001A)

Maximum over current protection value = Maximum rated current x 110%

(Syntax) In case of R4K-80 36V/5A

- |                   |   |
|-------------------|---|
| (1) OCPSET 5.5    | ← (over current protection setting) = (5.5A)      |
| (2) OCPSET 1.234  | ← (over current protection setting) = (1.234A)    |
| (3) OCPSET 12.34  | ← over current protection setting does not change |
| (4) OCPSET 1.2345 | ← (over current protection setting) = (12.34A)    |

(Default) OCPSET 0

(Description) It ignores as a parameter of integer over maximum over current protection setting value.(Syntax (3))

It ignores as a parameter under 3 decimal (Syntax (4))

For the setting of 1% or less, over current protection will not function.

Featuring multiple command

\* Minimum setting value of OCPSET command is different for each model ,R4K.

(See Section "6-17 Minimum setting / return value list".)

**CH9 Command**

This command programs memory A output voltage value of Multi-set between  $0000_H$  and  $FFFF_H$  (16bit).\*

- (Syntax) (1) CH9 FFFF ←—— A maximum of rated output voltage  
 (2) CH9 7FFF ←—— A half of rated output voltage  
 (3) CH9 F0 ←—— Same as “CH9 00F0”  
 (4) CH9 12345 ←—— Output voltage is not changed

(Default) CH9 0000

(Description) It ignores as a parameter of a number over 4 digit (e.g. (4))

Parameter requires hexadecimal format from  $0000_H$  to  $FFFF_H$

Featuring multiple command

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

**CHA Command**

This command programs memory A current value of Multi-set between  $0000_H$  and  $FFFF_H$  (16bit).\*

- (Syntax) (1) CHA FFFF ←—— A maximum of rated output current  
 (2) CHA 7FFF ←—— A half of rated output current  
 (3) CHA F0 ←—— Same as “CHA 00F0”  
 (4) CHA 12345 ←—— Output current is not changed

(Default) CHA 0000

(Description) It ignores as a parameter of a number over 4 digit (e.g. (4))

Parameter requires hexadecimal format from  $0000_H$  to  $FFFF_H$

Featuring multiple command

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

**CHB Command**

This command programs memory B output voltage value of Multi-set between  $0000_H$  and  $FFFF_H$  (16bit).\*

- (Syntax) (1) CHB FFFF ← A maximum of rated output voltage  
 (2) CHB 7FFF ← A half of rated output voltage  
 (3) CHB F0 ← Same as “CHB 00F0”  
 (4) CHB 12345 ← Output voltage is not changed

(Default) CHB 0000

(Description) It ignores as a parameter of a number over 4 digit (e.g. (4))

Parameter requires hexadecimal format from  $0000_H$  to  $FFFF_H$

Featuring multiple command

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

**CHC Command**

This command programs memory B output current value of Multi-set between  $0000_H$  and  $FFFF_H$  (16bit).\*

- (Syntax) (1) CHC FFFF ← A maximum of rated output current  
 (2) CHC 7FFF ← A half of rated output current  
 (3) CHC F0 ← Same as “CHC 00F0”  
 (4) CHC 12345 ← Output current is not changed

(Default) CHC 0000

(Description) It ignores as a parameter of a number over 4 digit (e.g. (4))

Parameter requires hexadecimal format from  $0000_H$  to  $FFFF_H$

Featuring multiple command

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

**CHD Command**

This command programs memory C output voltage value of Multi-set between  $0000_H$  and  $FFFF_H$  (16bit).\*

- (Syntax) (1) CHD FFFF ← A maximum of rated output voltage  
 (2) CHD 7FFF ← A half of rated output voltage  
 (3) CHD F0 ← Same as "CHD 00F0"  
 (4) CHD 12345 ← Output voltage is not changed

(Default) CHD 0000

(Description) It ignores as a parameter of a number over 4 digit (e.g. (4))

Parameter requires hexadecimal format from  $0000_H$  to  $FFFF_H$

Featuring multiple command

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

**CHE Command**

This command programs memory C output current value of Multi-set between  $0000_H$  and  $FFFF_H$  (16bit).\*

- (Syntax) (1) CHE FFFF ← A maximum of rated output current  
 (2) CHE 7FFF ← A half of rated output current  
 (3) CHE F0 ← Same as "CHE 00F0"  
 (4) CHE 12345 ← Output current is not changed

(Default) CHE 0000

(Description) It ignores as a parameter of a number over 4 digit (e.g. (4))

Parameter requires hexadecimal format from  $0000_H$  to  $FFFF_H$

Featuring multiple command

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## AVCN Command

This command programs memory A output voltage value of Multi-set between 0.0 and 100.00% (increment of 0.01%).

- (Syntax) (1) AVCN 100 ←—— A maximum of rated output voltage  
 (2) AVCN 12.34 ←—— 12.34% of rated output voltage  
 (3) AVCN 123.4 ←—— Output voltage is not changed  
 (4) AVCN 12.345 ←—— Same as "AVCN 12.34"

(Default)AVCN 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

Parameter requires from 0.0 to 100.0

Featuring multiple command

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

## AICN Command

This command programs memory A output current value of Multi-set between 0.0 and 100.00% (increment of 0.01%).\*

- (Syntax) (1) AICN 100 ←—— A maximum of rated output current  
 (2) AICN 12.34 ←—— 12.34% of rated output current  
 (3) AICN 123.4 ←—— Output current is not changed  
 (4) AICN 12.345 ←—— Same as "AICN12.34"

(Default)AICN 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

Parameter requires from 0.0 to 100.0

Featuring multiple command

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## **BVCN Command**

This command programs memory B output voltage value of Multi-set between 0.0 and 100.00% (increment of 0.01%).

- (Syntax) (1) BVCN 100 ←—— A maximum of rated output voltage  
 (2) BVCN 12.34 ←—— 12.34% of rated output voltage  
 (3) BVCN 123.4 ←—— Output voltage is not changed  
 (4) BVCN 12.345 ←—— Same as “BVCN 12.34”

(Default) BVCN 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

Parameter requires from 0.0 to 100.0

Featuring multiple command

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

## **BICN Command**

This command programs memory B output current value of Multi-set between 0.0 and 100.00% (increment of 0.01%).\*

- (Syntax) (1) BICN 100 ←—— A maximum of rated output current  
 (2) BICN 12.34 ←—— 12.34% of rated output current  
 (3) BICN 123.4 ←—— Output current is not changed  
 (4) BICN 12.345 ←—— Same as “BICN12.34”

(Default) BICN 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

Parameter requires from 0.0 to 100.0

Featuring multiple command

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## **CVCN Command**

This command programs memory C output voltage value of Multi-set between 0.0 and 100.00% (increment of 0.01%).

- (Syntax) (1) CVCN 100 ← A maximum of rated output voltage  
 (2) CVCN 12.34 ← 12.34% of rated output voltage  
 (3) CVCN 123.4 ← Output voltage is not changed  
 (4) CVCN 12.345 ← Same as "VCN 12.34"

(Default) CVCN 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

Parameter requires from 0.0 to 100.0

Featuring multiple command

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

## **CICN Command**

This command programs memory C output current value of Multi-set between 0.0 and 100.00% (increment of 0.01%).\*

- (Syntax) (1) CICN 100 ← A maximum of rated output current  
 (2) CICN 12.34 ← 12.34% of rated output current  
 (3) CICN 123.4 ← Output current is not changed  
 (4) CICN 12.345 ← Same as "CICN12.34"

(Default) CICN 0

(Description) It ignores as a parameter of integer over 3 digit (e.g.(3))

It ignores as a parameter under 2 decimal (e.g. (4))

It ignores as a parameter under 2 decimal (e.g. (4))

Featuring multiple command

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## AVSET Command

This command programs memory A output voltage value between 0.0 and the maximum rated voltage value (V).\*

(Syntax) In case of R4K-80 36V/5A(increment of 0.01V)

- (1) AVSET 36      ← (output voltage) = (36V)
- (2) AVSET 12.34    ← (output voltage) = (12.34V)
- (3) AVSET 123.4    ← output voltage does not change
- (4) AVSET 12.345   ← (output voltage) = (12.34V)

(Default)AVSET 0

(Description) It ignores as a parameter of integer over rated voltage (Syntax (3))

It ignores as a parameter under 2 decimal (Syntax (4))

Featuring multiple command

\* Minimum setting value of AVSET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

## AISET Command

This command programs memory A output current value between 0.0 and the maximum rated current value (A).\*

(Syntax) In case of R4K-80 36V/5A (increment of 0.001A) consideration.

- (1) AISET 5      ← (output current) = (5A)
- (2) AISET 1.234    ← (output current) = (1.234A)
- (3) AISET 12.34    ← output current does not change
- (4) AISET 1.2345   ← (output current) = (1.234A)

(Default)AISET 0

(Description) It ignores as a parameter of integer over rated current (Syntax (3))

It ignores as a parameter under 3 decimal (Syntax (4))

Featuring multiple command

\* Minimum setting value of AISET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## **BVSET Command**

This command programs memory B output voltage value between 0.0 and the maximum rated voltage value (V).\*

(Syntax) In case of R4K-80 36V/5A(increment of 0.01V)

- (1) BVSET 36      ← (output voltage) = (36V)
- (2) BVSET 12.34    ← (output voltage) = (12.34V)
- (3) BVSET 123.4    ← output voltage does not change
- (4) BVSET 12.345   ← (output voltage) = (12.34V)

(Default) BVSET 0

(Description) It ignores as a parameter of integer over rated voltage (Syntax (3))

It ignores as a parameter under 2 decimal (Syntax (4))

Featuring multiple command

\* Minimum setting value of BVSET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

## **BISET Command**

This command programs memory B output current value between 0.0 and the maximum rated current value (A).\*

(Syntax) In case of R4K-80 36V/5A (increment of 0.001A)

- (1) BISET 5      ← (output current) = (5A)
- (2) BISET 1.234    ← (output current) = (1.234A)
- (3) BISET 12.34    ← output current does not change
- (4) BISET 12.345   ← (output current) = (1.234A)

(Default) BISET 0

(Description) It ignores as a parameter of integer over rated current (Syntax (3))

It ignores as a parameter under 3 decimal (Syntax (4))

Featuring multiple command

\* Minimum setting value of BISET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## **CVSET Command**

This command programs memory C output voltage value between 0.0 and the maximum rated voltage value (V).\*

(Syntax) In case of R4K-80 36V/5A(increment of 0.01V)

- (1) CVSET 36      ← (output voltage) = (36V)
- (2) CVSET 12.34    ← (output voltage) = (12.34V)
- (3) CVSET 123.4    ← output voltage does not change
- (4) CVSET 12.345   ← (output voltage) = (12.34V)

(Default) CVSET 0

(Description) It ignores as a parameter of integer over rated voltage (Syntax (3))

It ignores as a parameter under 2 decimal (Syntax (4))

Featuring multiple command

\* Minimum setting value of CVSET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

\* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.

## **CISET Command**

This command programs memory C output current value between 0.0 and the maximum rated current value (A).\*

(Syntax) In case of R4K-80 36V/5A (increment of 0.001A)

- (1) CISET 5      ← (output current) = (5A)
- (2) CISET 1.234    ← (output current) = (1.234A)
- (3) CISET 12.34    ← output current does not change
- (4) CISET 1.2345   ← (output current) = (1.234A)

(Default) CISET 0

(Description) It ignores as a parameter of integer over rated current (Syntax (3))

It ignores as a parameter under 3 decimal (Syntax (4))

Featuring multiple command

\* Minimum setting value of CISET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

\* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.

## **SW Command**

This command programs output ON/OFF.

(Syntax) (1) SW0 ←—— Disable the output

(2) SW1 ←—— Enable the output

(Default) SW0

(Description) In case the power supply has blackout protection, this command might not enable to output.

Refer to the instruction manual of power supply for details of how to reset blackout protection.

Featuring multiple command

\* When an error is displayed, it is reset by the SW0 command in a similar fashion to the OUTPUT ON/OFF switch.

\* If the SW1 Command is used for OUTPUT ON, the LS(Remote Switch) [See Instruction Manual4-7 LS (Remote Switch) ON/OFF] is OFF (Open) when the OUTPUT LED is flashing.

## **REN Command**

This command enable power supply remote control.

(Syntax) (1) REN

(Description) This command enable power supply to use all the command after turning on the power of power supply. (even not receiving this command STS command always available to use) REMOTE LED shall light on.

Featuring multiple command

(Default) GTL

## **GTL Command**

This command disable power supply remote control.

(Syntax) (1) GTL

(Description) After receiving this command any other command other than REN and STS shall be ignored.

Until receiving REN command power supply maintain the same setting of before receiving this command.

REMOTE LED shall turn off.

Featuring multiple command

\* Output measurement commands of MN1, MN2, VM, IM, VGET and IGET are receivable even after GTL.

(Default) GTL

**DELAY Command**

This command programs ON/OFF of delay trigger function.

(Syntax) (1) DELAY OFF ← delay trigger function OFF

(2) DELAY ON ← delay trigger function ON

(Default) DELAY OFF

(Description) Featuring multiple command

**TON Command**

This command programs ON delay time (0.0 to 99.9 sec)

(Syntax) (1) TON 99.9 ← (ON delay time) = (99.9sec)

(2) TON 12.3 ← (ON delay time) = (12.3sec)

(3) TON 123.4 ← No change of ON delay time

(4) TON 12.34 ← TON is set to be 12.3

(Default) TON 0

(Description) It ignores as a parameter of integer over maximum over 99.9 setting value. (Syntax (3))

It ignores as a parameter under 1 decimal (Syntax (4))

Featuring multiple command

**TOFF Command**

This command programs OFF delay time (0.0 to 99.9 sec)

(Syntax) (1) TOFF 99.9 ← (OFF delay time) = (99.9sec)

(2) TOFF 12.3 ← (OFF delay time) = (12.3sec)

(3) TOFF 123.4 ← No change of OFF delay time

(4) TOFF 12.34 ← TOFF is set to be 12.3

(Default) TOFF 0

(Description) It ignores as a parameter of integer over maximum over 99.9 setting value. (Syntax (3))

It ignores as a parameter under 1 decimal (Syntax (4))

Featuring multiple command

**SLAVE Command**

This command programs Local / Remote setting of slave unit

(Syntax) (1) SLAVE LO ← slave function Local

(2) SLAVE RE ← slave function Remote

(Default) SLAVE RE

(Description) Featuring multiple command

**MTL Command**

This command programs ON/OFF of the Multi-set function.

(Syntax) (1) MLT OFF      ← Multi-set function OFF

             (2) MLT ON      ← Multi-set function ON

(Default) MLT OFF

(Description)      Featuring multiple command

**MEM Command**

This command programs the memory number of the Multi-set function.

(Syntax) (1) MEM A      ← Multi-set function: memory A

             (2) MEM B      ← Multi-set function: memory B

             (3) MEM C      ← Multi-set function: memory C

(Default) MEM A

(Description)      Featuring multiple command

**UNIT Command**

This command programs the UNIT number.

(Syntax) (1) UNIT 0      ← (UNIT number) = (0)

             (2) UNIT 31      ← (UNIT number) = (31)

             (3) UNIT 123      ← UNIT number does not change.

(Default) UNIT 0

(Description)      The setting with the input value exceeding 31 is ignored as an invalid value (Syntax (3))

                        The input value stays between 0 and 31.

### **MN1 Command**

This command allows receiving the output voltage monitor with  $000_H$  to  $FFF_H$  h(12 bit)

(Syntax) MN1

- |                         |   |
|-------------------------|---|
| (Return) (1) MONI1=FFFH | ← (Monitor value) = (maximum rated voltage)         |
| (2) MONI1=7FFH          | ← (Monitor value) = (half of maximum rated voltage) |

### **MN2 Command**

This command allows receiving the output current monitor with  $000_H$  to  $FFF_H$  (12 bit).

(Syntax) MN2

- |                         |   |
|-------------------------|---|
| (Return) (1) MONI2=FFFH | ← (Monitor value) = (maximum rated current)         |
| (2) MONI2=7FFH          | ← (Monitor value) = (half of maximum rated current) |

### **VM Command**

This command allows receiving output voltage monitor with 0.0 to 100.0%(increment of 0.01%)

(Syntax) VM

- |                       |   |
|-----------------------|---|
| (Return) (1) VM=100.0 | ← (Monitor value) = (maximum rated voltage)             |
| (2) VM=12.34          | ← (Monitor value) = (12.34% of maximum rated voltage)   |
| (3) VM=25.0           | ← Output voltage is a quarter of the rated              |
| (Description)         | 0 value of 2 decimal point is not displayed(Return (3)) |

### **IM Command**

This command allows receiving output current monitor with 0.0 to 100.0%(increment of 0.01%)

(Syntax) IM

- |                       |   |
|-----------------------|---|
| (Return) (1) IM=100.0 | ← Output current is a maximum of the rated              |
| (2) IM=12.34          | ← (Monitor value) = (12.34% of maximum rated current)   |
| (3) IM=25.0           | ← Output current is a quarter of the rated              |
| (Description)         | 0 value of 2 decimal point is not displayed(Return (3)) |

### **VGET Command**

This command allows receiving output voltage monitor with 0.0 to rated voltage(V)

(Syntax) VGET In case of R4K-80 36V/5A (increment of 0.01V)

- |                        |   |
|------------------------|---|
| (Return) (1) VGET=36.0 | ← (Monitor value) = (36V)   |
| (2) VGET=12.34         | ← (Monitor value) = (12.34V)  |
| (Description)          | 0 value of 2 decimal point is not displayed(Return (1))<br>* Minimum setting value of VGET command is different for each model ,R4K.<br>(See Section "6-17 Minimum setting / return value list".) |

### **IGET Command**

This command allows receiving output current monitor with 0.0 to rated current(A)

(Syntax) IGET In case of R4K-80 36V/5A (increment of 0.001A)

- |                       |   |
|-----------------------|---|
| (Return) (1) IGET=5.0 | ← (Monitor value) = (5A)  |
| (2) IGET=1.234        | ← (Monitor value) = (1.234A)  |
| (Description)         | 0 value of 2 decimal point is not displayed(Return (1))<br>* Minimum setting value of IGET command is different for each model ,R4K.<br>(See Section "6-17 Minimum setting / return value list".) |

**STS Command**

This command allows to receive the character string of the power supply's output status and setting status.

(Syntax) STS

(Return) # [UNIT number] [Status]

The number of 0 to 31

Status	Description
CF	Output cut off status
CO	Output enable status
LO	Local mode
RM	Remote mode
CC	Constant current mode
CV	Constant voltage mode
OVP	Over voltage protection
OCP	Over current protection
OT	Over temperature protection
ACF	AC input fault
RS	Sense reverse connect
LD	Inter Lock off

- (Return) (1) #1 CO RM CV ← The unit number 1 is in the status of Output enable, Remote mode and Constant voltage mode  
 (Standard Digital Interface)
- (2) CO RM CV ← The unit is in the status of Output enable, Remote mode and Constant voltage mode (LUs1 Option)

**CH0? Command**

This command allows receiving the setting value of output voltage with hexadecimal format.

(Syntax) CH0?

- (Return) (1) CH0=FFFFH ← Output voltage is set to a maximum of the rated  
 (2) CH0=7FFFH ← Output voltage is set to a half of the rated

**CH1? Command**

This command allows receiving the setting value of output current with hexadecimal format.

(Syntax) CH1?

- (Return) (1) CH1=FFFFH ← Output voltage is set to a maximum of the rated  
 (2) CH1=7FFFH ← Output voltage is set to a half of the rated

**CH2? Command**

This command allows receiving the setting value of over voltage protection setting value with hexadecimal format.

Maximum over voltage protection value = maximum rated voltage x 110%

(Syntax) CH2?

- (Return) (1) CH2=FFFFH ← Set to a maximum over voltage protection value  
 (2) CH2=7FFFH ← Set to a half of maximum over voltage protection value

**CH7? Command**

This command allows receiving the setting value of over current protection setting value with hexadecimal format.

Maximum over current protection value = maximum rated current x 110%

(Syntax) CH7?

- (Return) (1) CH7=FFFFH ← Set to a maximum over current protection value  
 (2) CH7=7FFFH ← Set to a half of maximum over current protection value

**VCN? Command**

This command allows receiving the setting value of output voltage with 0.0 to 100.0%  
 ( increment of 0.01%)

(Syntax) VCN?

- |                        |  |
|------------------------|--|
| (Return) (1) VCN=100.0 | ←—— Output voltage is set to a maximum rated voltage         |
| (2) VCN=12.34          | ←—— Output voltage is set to 12.34% of maximum rated voltage |
| (3) VCN=25.0           | ←—— Output voltage is set to 25% of maximum rated voltage    |

**ICN? Command**

This command allows receiving the setting value of output current with 0.0 to 100.0%  
 ( increment of 0.01%)

(Syntax) ICN?

- |                        |  |
|------------------------|--|
| (Return) (1) ICN=100.0 | ←—— Output current is set to a maximum rated current         |
| (2) ICN=12.34          | ←—— Output current is set to 12.34% of maximum rated current |
| (3) ICN=25.0           | ←—— Output current is set to 25% of maximum rated current    |

**OVP? Command**

This command allows receiving the setting value of over voltage protection setting value with 0.0 to 100.0% ( increment of 0.1%)

Maximum over voltage protection value = maximum rated voltage x 110%

(Syntax) OVP?

- |                        |   |
|------------------------|---|
| (Return) (1) OVP=100.0 | ←—— Set to a maximum over voltage protection value        |
| (2) OVP=12.3           | ←—— Set to 12.3% of maximum over voltage protection value |
| (3) OVP=25.0           | ←—— Set to 25% of maximum over voltage protection value   |

**OCP? Command**

This command allows receiving the setting value of over current protection setting value with 0.0 to 100.0% ( increment of 0.1%)

Maximum over current protection value = maximum rated current x 110%

(Syntax) OCP?

- |                        |   |
|------------------------|---|
| (Return) (1) OCP=100.0 | ←—— Set to a maximum over current protection value        |
| (2) OCP=12.3           | ←—— Set to 12.3% of maximum over current protection value |
| (3) OCP=25.0           | ←—— Set to 25% of maximum over current protection value   |

**VSET? Command**

This command allows receiving the setting value of output voltage with 0.0 to rated voltage  
(increment of 0.01V)

(Syntax) VSET? (in case of R4K-80 36V/5A)

(Return) (1) VSET=36.0 ← Set to 36.0V  
 (2) VSET=12.34 ← Set to 12.34V  
 (3) VSET=0.8 ← Set to 0.8V

(Description) 0 value of 2 decimal point is not displayed (Return (3))

\* Minimum setting value of VSET command is different for each model ,R4K.  
 (See Section “6-17 Minimum setting / return value list”).

**ISET? Command**

This command allows receiving the setting value of output current with 0.0 to rated voltage  
(increment of 0.001A)

(Syntax) ISET? (in case of R4K-80 36V/5A)

(Return) (1) ISET=5.0 ← Set to 5.0A  
 (2) ISET=1.234 ← Set to 1.234A  
 (3) ISET=2.5 ← Set to 2.5A

(Description) 0 value of 3 decimal point is not displayed (Return (3))

\* Minimum setting value of ISET command is different for each model ,R4K.  
 (See Section “6-17 Minimum setting / return value list”).

**OVPSET? Command**

This command allows receiving the setting value of over voltage protection value with 0.0 to rated voltage  
(increment of 0.01V)

Maximum over voltage protection value = maximum rated voltage x 110%

(Syntax) OVPSET? (in case of R4K-80 36V/5A)

(Return) (1) OVPSET=40.6 ← Set to 40.6V  
 (2) OVPSET=12.34 ← Set to 12.34V  
 (3) OVPSET=2.3 ← Set to 2.3V

(Description) 0 value of 2 decimal point is not displayed (Return (3))

**OCPSET? Command**

This command allows receiving the setting value of over current protection value with 0.0 to rated current  
(increment of 0.001A)

Maximum over current protection value = maximum rated current x 110%

(Syntax) OCPSET? (in case of R4K-80 36V/5A)

(Return) (1) OCPSET=5.64 ← Set to 5.64A  
 (2) OCPSET=1.234 ← Set to 1.234A  
 (3) OCPSET=2.3 ← Set to 2.3A

(Description) 0 value of 3 decimal point is not displayed (Return (3))

**CH9? Command**

This command returns the set value of memory A output voltage of Multi-set between  $0000_H$  and  $FFFF_H$  (16 bit).

(Syntax) CH9?

- (Return) (1) CH9=FFFFH ←———— Output voltage is set to a maximum of the rated  
 (2) CH9=7FFFH ←———— Output voltage is set to a half of the rated

**CHA? Command**

This command returns the set value of memory A output current of Multi-set between  $0000_H$  and  $FFFF_H$  (16 bit).

(Syntax) CHA?

- (Return) (1) CHA=FFFFH ←———— Output voltage is set to a maximum of the rated  
 (2) CHA=7FFFH ←———— Output voltage is set to a half of the rated

**CHB? Command**

This command returns the set value of memory B output voltage of Multi-set between  $0000_H$  and  $FFFF_H$  (16 bit).

(Syntax) CHB?

- (Return) (1) CHB=FFFFH ←———— Output voltage is set to a maximum of the rated  
 (2) CHB=7FFFH ←———— Output voltage is set to a half of the rated

**CHC? Command**

This command returns the set value of memory B output current of Multi-set between  $0000_H$  and  $FFFF_H$  (16 bit).

(Syntax) CHC?

- (Return) (1) CHC=FFFFH ←———— Output voltage is set to a maximum of the rated  
 (2) CHC=7FFFH ←———— Output voltage is set to a half of the rated

**CHD? Command**

This command returns the set value of memory C output voltage of Multi-set between  $0000_H$  and  $FFFF_H$  (16 bit).

(Syntax) CHD?

- (Return) (1) CHD=FFFFH ←———— Output voltage is set to a maximum of the rated  
 (2) CHD=7FFFH ←———— Output voltage is set to a half of the rated

**CHE? Command**

This command returns the set value of memory C output current of Multi-set between  $0000_H$  and  $FFFF_H$  (16 bit).

(Syntax) CHE?

- (Return) (1) CHE=FFFFH ←———— Output voltage is set to a maximum of the rated  
 (2) CHE=7FFFH ←———— Output voltage is set to a half of the rated

**AVCN? Command**

This command returns the set value of memory A output voltage of Multi-set between 0.0 and 100.00% (increment of 0.01%).

(Syntax) AVCN?

- |                         |   |
|-------------------------|---|
| (Return) (1) AVCN=100.0 | ←— Output voltage is set to a maximum rated voltage         |
| (2) AVCN=12.34          | ←— Output voltage is set to 12.34% of maximum rated voltage |
| (3) AVCN=25.0           | ←— Output voltage is set to 25% of maximum rated voltage    |

**AICN? Command**

This command returns the set value of memory A output current of Multi-set between 0.0 and 100.00% (increment of 0.01%).

(Syntax) AICN?

- |                         |   |
|-------------------------|---|
| (Return) (1) AICN=100.0 | ←— Output current is set to a maximum rated current         |
| (2) AICN=12.34          | ←— Output current is set to 12.34% of maximum rated current |
| (3) AICN=25.0           | ←— Output current is set to 25% of maximum rated current    |

**BVCN? Command**

This command returns the set value of memory B output voltage of Multi-set between 0.0 and 100.00% (increment of 0.01%).

(Syntax) BVCN?

- |                         |   |
|-------------------------|---|
| (Return) (1) BVCN=100.0 | ←— Output voltage is set to a maximum rated voltage         |
| (2) BVCN=12.34          | ←— Output voltage is set to 12.34% of maximum rated voltage |
| (3) BVCN=25.0           | ←— Output voltage is set to 25% of maximum rated voltage    |

**BICN? Command**

This command returns the set value of memory B output current of Multi-set between 0.0 and 100.00% (increment of 0.01%).

(Syntax) BICN?

- |                         |   |
|-------------------------|---|
| (Return) (1) BICN=100.0 | ←— Output current is set to a maximum rated current         |
| (2) BICN=12.34          | ←— Output current is set to 12.34% of maximum rated current |
| (3) BICN=25.0           | ←— Output current is set to 25% of maximum rated current    |

**CVCN? Command**

This command returns the set value of memory C output voltage of Multi-set between 0.0 and 100.00% (increment of 0.01%).

(Syntax) CVCN?

- |                         |   |
|-------------------------|---|
| (Return) (1) CVCN=100.0 | ←— Output voltage is set to a maximum rated voltage         |
| (2) CVCN=12.34          | ←— Output voltage is set to 12.34% of maximum rated voltage |
| (3) CVCN=25.0           | ←— Output voltage is set to 25% of maximum rated voltage    |

**CICN? Command**

This command returns the set value of memory C output current of Multi-set between 0.0 and 100.00% (increment of 0.01%).

(Syntax) CICN?

- |                         |   |
|-------------------------|---|
| (Return) (1) CICN=100.0 | ←— Output current is set to a maximum rated current         |
| (2) CICN=12.34          | ←— Output current is set to 12.34% of maximum rated current |
| (3) CICN=25.0           | ←— Output current is set to 25% of maximum rated current    |

**AVSET? Command**

This command allows receiving the setting value of output voltage with 0.0 to rated voltage (increment of 0.01V)

(Syntax) AVSET? (in case of R4K-80 36V/5A)

- |                         |                  |
|-------------------------|------------------|
| (Return) (1) AVSET=36.0 | ←— Set to 36.0V  |
| (2) AVSET=12.34         | ←— Set to 12.34V |
| (3) AVSET=0.8           | ←— Set to 0.8V   |

(Description) 0 value of 2 decimal point is not displayed(Return (3))

\* Minimum setting value of AVSET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

**AISET? Command**

This command allows receiving the setting value of output current with 0.0 to rated voltage (increment of 0.001A)

(Syntax) AISET? (in case of R4K-80 36V/5A)

- |                       |                  |
|-----------------------|------------------|
| (Return) (1) ISET=5.0 | ←— Set to 5.0A   |
| (2) ISET=1.234        | ←— Set to 1.234A |
| (3) ISET=2.5          | ←— Set to 2.5A   |

(Description) 0 value of 2 decimal point is not displayed(Return (3))

\* Minimum setting value of AISET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

**BVSET? Command**

This command allows receiving the setting value of output voltage with 0.0 to rated voltage  
(increment of 0.01V)

(Syntax) BVSET? (in case of R4K-80 36V/5A)

(Return) (1) BVSET=36.0 ← Set to 36.0V

(2) BVSET=12.34 ← Set to 12.34V

(3) BVSET=0.8 ← Set to 0.8V

(Description) 0 value of 2 decimal point is not displayed(Return (3))

\* Minimum setting value of BVSET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

**BISET? Command**

This command allows receiving the setting value of output current with 0.0 to rated voltage  
(increment of 0.001A)

(Syntax) BISET? (in case of R4K-80 36V/5A)

(Return) (1) BISET=5.0 ← Set to 5.0A

(2) BISET=1.234 ← Set to 1.234A

(3) BISET=2.5 ← Set to 2.5A

(Description) 0 value of 2 decimal point is not displayed(Return (3))

\* Minimum setting value of BISET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

### **CVSET? Command**

This command allows receiving the setting value of output voltage with 0.0 to rated voltage  
(increment of 0.01V)

(Syntax) CVSET? (in case of R4K-80 36V/5A)

(Return) (1) CVSET=36.0 ← Set to 36.0V

(2) CVSET=12.34 ← Set to 12.34V

(3) CVSET=0.8 ← Set to 0.8V

(Description) 0 value of 2 decimal point is not displayed(Return (3))

\* Minimum setting value of CVSET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

### **CISET? Command**

This command allows receiving the setting value of output current with 0.0 to rated voltage  
(increment of 0.001A)

(Syntax) CISET? (in case of R4K-80 36V/5A)

(Return) (1) CISET=5.0 ← Set to 5.0A

(2) CISET=1.234 ← Set to 1.234A

(3) CISET=2.5 ← Set to 2.5A

(Description) 0 value of 2 decimal point is not displayed(Return (3))

\* Minimum setting value of CISET command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

**SW? Command**

This command allows receiving the setting output status with 0 or 1(OFF/ON)

(Syntax) SW?

(Return) (1) SW0 ← Disable the output  
 (2) SW1 ← Enable the output

**DELAY? Command**

This command allows receiving the status of delay trigger function.

(Syntax) DELAY?

(Return) (1) DELAY OFF ← delay trigger function OFF  
 (2) DELAY ON ← delay trigger function ON

**TON? Command**

This command allows receiving the setting of ON delay time 0.0 to 99.9(sec)

(Syntax) TON?

(Return) (1) TON=0.1s ← Set to 0.1sec  
 (2) TON=12.3s ← Set to 12.3sec  
 (3) TON=2.3s ← Set to 2.3sec

**TOFF? Command**

This command allows receiving the setting of OFF delay time 0.0 to 99.9(sec)

(Syntax) TOFF?

(Return) (1) TOFF=0.1s ← Set to 0.1sec  
 (2) TOFF=12.3s ← Set to 12.3sec  
 (3) TOFF=2.3s ← Set to 2.3sec

**SLAVE? Command**

This command allows receiving the Local / Remote status of slave setting.

(Syntax) SLAVE?

(Return) (1) SLAVE LOCAL ← slave setting is Local  
 (2) SLAVE REMOTE ← slave setting is Remote

**MLT? Command**

This command returns the status of the Multi-set function by ON/OFF.

(Syntax) MLT?

(Return) (1) MLT OFF	←	Multi-set function OFF
(2) MLT ON	←	Multi-set function ON

**MEM? Command**

This command returns the memory number of the Multi-set function by 0/1/2.

(Syntax) MEM?

(Return) (1) MEM A	←	Multi-set function: memory A
(2) MEM B	←	Multi-set function: memory B
(3) MEM C	←	Multi-set function: memory C

**UNIT? Command**

This command returns the UNIT number between 0 and 31.

(Syntax) UNIT?

(Return) (1) UNIT=0	←	UNIT number set to 0.
(2) UNIT=31	←	UNIT number set to 31.

**PLS Command**

This command programs ON/OFF of the pulse sequence function.

(Syntax) (1) PLS OFF      ← Pulse sequence function OFF

                  (2) PLS ON      ← Pulse sequence function ON

(Default)      PLS OFF

(Description)    Featuring multiple command

(For -LDe option only)

**PTON Command**

This command programs the ON time of the pulse sequence function. (0.1 - 99.9)

(Syntax) (1) PTON 99.9      ← (ON time) = (99.9)

                  (2) PTON 12.3      ← (ON time) = (12.3)

                  (3) PTON 123.4      ← ON time does not change.

                  (4) PTON 12.34      ← PTON at 12.3

(Default)      PTON 1.0

(Description)    Time unit depends on the setting of PLT (time unit).

When the time unit is Sec, the setting range is between 1.0 and 99.9.

The setting with the input value exceeding 99.9 is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding 1 digit, the number up to the first decimal place is valid, ignoring the second place onwards (Syntax (4)).

Featuring multiple command

(For -LDe option only)

**PTOFF Command**

This command programs the OFF time of the pulse sequence function. (0.1 - 99.9)

(Syntax) (1) PTOFF 99.9      ← (OFF time) = (99.9)

                  (2) PTOFF 12.3      ← (OFF time) = (12.3)

                  (3) PTOFF 123.4      ← OFF time does not change.

                  (4) PTOFF 12.34      ← PTOFF at 12.3

(Default)      PTOFF 1.0

(Description)    Time unit depends on the setting of PLT (time unit).

When the time unit is Sec, settings ranged between 0.1 and 0.9 are ignored.

The setting with the input value exceeding 99.9 is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding 1 digit, the number up to the first decimal place is valid, ignoring the second place onwards (Syntax (4)).

Featuring multiple command

(For -LDe option only)

**PTA Command**

This command programs memory A output time at pulse sequence of Multi-set. (0.0 – 99.9)

(Syntax) (1) PTA 99.9      ← (Memory A output time) = (99.9)

(2) PTA 12.3      ← (Memory A output time) = (12.3)

(3) PTA 123.4      ← Memory A output time does not change.

(4) PTA 12.34      ← PTA at 12.3

(Default)      PTA 1.0

(Description) Time unit depends on the setting of PLT (time unit).

When the time unit is Sec, settings ranged between 0.1 and 0.9 are ignored.

The setting with the input value exceeding 99.9 is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding 1 digit, the number up to the first decimal place is valid, ignoring the second place onwards (Syntax (4)).

Featuring multiple command

(For -LDe option only)

**PTB Command**

This command programs memory B output time at pulse sequence of Multi-set. (0.0 - 99.9)

(Syntax) (1) PTB 99.9      ← (Memory B output time) = (99.9)

(2) PTB 12.3      ← (Memory B output time) = (12.3)

(3) PTB 123.4      ← Memory B output time does not change.

(4) PTB 12.34      ← PTB at 12.3

(Default)      PTB 1.0

(Description) Time unit depends on the setting of PLT (time unit).

When the time unit is Sec, settings ranged between 0.1 and 0.9 are ignored.

The setting with the input value exceeding 99.9 is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding 1 digit, the number up to the first decimal place is valid, ignoring the second place onwards (Syntax (4)).

Featuring multiple command

(For -LDe option only)

**PTC Command**

This command programs memory C output time at pulse sequence of Multi-set. (0.0 - 99.9)

(Syntax) (1) PTC 99.9      ← (Memory C output time) = (99.9)

(2) PTC 12.3      ← (Memory C output time) = (12.3)

(3) PTC 123.4      ← Memory C output time does not change.

(4) PTC 12.34      ← PTC at 12.3

(Default)      PTC 1.0

(Description) Time unit depends on the setting of PLT (time unit).

When the time unit is Sec, settings ranged between 0.1 and 0.9 are ignored.

The setting with the input value exceeding 99.9 is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding 1 digit, the number up to the first decimal place is valid, ignoring the second place onwards (Syntax (4)).

Featuring multiple command

(For -LDe option only)

**PTL Command**

This command programs the time unit of the pulse sequence function to sec/min/hr.

(Syntax) (1) PLS S      ← Time unit of pulse sequence function: sec

(2) PLS M      ← Time unit of pulse sequence function: min

(3) PLS H      ← Time unit of pulse sequence function: hr

(Default)      PLS S

(Description) Featuring multiple command

\* Changing the setting of time unit, programmed times of pulse sequence are initialised.

(For -LDe option only)

**PCNT Command**

This command programs the number of repetition of pulse sequence.

(Syntax) (1) PCNT0      ← (No. of repetition) = (0) \*repeated infinitely with the setting of 0

(2) PCNT9999      ← (No. of repetition) = (9999)

(3) PCNT1234      ← No. of repetition does not change.

(Default)      PCNT0

(Description) The setting with the input value exceeding 9999 is ignored as an invalid command (Syntax (3))

The input set value stays between 0 and 9999.

(For -LDe option only)

**RMP Command**

This command programs ON/OFF of the ramp function.

(Syntax) (1) RMP OFF      ← Ramp function OFF

                  (2) RMP ON      ← Ramp function ON

(Default)      RMP OFF

(Description)    Featuring multiple command

(For -LDe option only)

**RTON Command**

This command programs the ramp time when the ramp function is ON (0 - 999 secs)

(Syntax) (1) RTON 999      ← (Ramp time at ON) = (999 secs)

                  (2) RTON 123      ← (Ramp time at ON) = (123 secs)

                  (3) RTON 1234     ← Ramp time at ON does not change.

                  (4) RTON 12.34    ← Ramp time at ON does not change.

(Default)      RTON 0

(Description)    The setting with the input value exceeding 999 secs is ignored as an invalid command

(Syntax (3))

Settings with the fractional part are ignored as an invalid command (Syntax (4))

Featuring multiple command

(For -LDe option only)

**RTOFF Command**

This command programs the ramp time when the ramp function is OFF (0 - 999 secs)

(Syntax) (1) RTOFF 999      ← (Ramp time at ON) = (999 secs)

                  (2) RTOFF 123      ← (Ramp time at ON) = (123 secs)

                  (3) RTOFF 1234     ← Ramp time at ON does not change.

                  (4) RTOFF 12.34    ← Ramp time at ON does not change.

(Default)      RTOFF 0

(Description)    The setting with the input value exceeding 999 secs is ignored as an invalid command

(Syntax (3))

Settings with the fractional part are ignored as an invalid command (Syntax (4))

Featuring multiple command

(For -LDe option only)

**RTA Command**

This command programs the ramp time when pulse sequence of the ramp Multi-set transfers to memory A.

(0 - 999 secs)

- (Syntax) (1) RTA 999 ← (Ramp time when transferring to memory A) = (999 secs)  
 (2) RTA 123 ← (Ramp time when transferring to memory A) = (123 secs)  
 (3) RTA 1234 ← Ramp time when transferring to memory A does not change.  
 (4) RTA 12.34 ← Ramp time when transferring to memory A does not change.

(Default) RTA 0

(Description) The setting with the input value exceeding 999 secs is ignored as an invalid command

(Syntax (3))

Settings with the fractional part are ignored as an invalid command (Syntax (4))

Featuring multiple command

(For -LDe option only)

**RTB Command**

This command programs the ramp time when pulse sequence of the ramp Multi-set transfers to memory B.

(0 - 999 secs)

- (Syntax) (1) RTB 999 ← (Ramp time when transferring to memory B) = (999 secs)  
 (2) RTB 123 ← (Ramp time when transferring to memory B) = (123 secs)  
 (3) RTB 1234 ← Ramp time when transferring to memory B does not change.  
 (4) RTB 12.34 ← Ramp time when transferring to memory B does not change.

(Default) RTB 0

(Description) The setting with the input value exceeding 999 secs is ignored as an invalid command

(Syntax (3))

Settings with the fractional part are ignored as an invalid command (Syntax (4))

Featuring multiple command

(For -LDe option only)

**RTC Command**

This command programs the ramp time when pulse sequence of the ramp Multi-set transfers to memory C.

(0 - 999 secs)

- (Syntax) (1) RTC 999 ← (Ramp time when transferring to memory C) = (999 secs)  
 (2) RTC 123 ← (Ramp time when transferring to memory C) = (123 secs)  
 (3) RTC 1234 ← Ramp time when transferring to memory C does not change.  
 (4) RTC 12.34 ← Ramp time when transferring to memory C does not change.

(Default) RTC 0

(Description) The setting with the input value exceeding 999 secs is ignored as an invalid command

(Syntax (3))

Settings with the fractional part are ignored as an invalid command (Syntax (4))

Featuring multiple command

(For -LDe option only)

## **RSET Command**

This command programs operation of the ramp function at OFF/CV/CC.

(Syntax) (1) RMP CVCC ← Ramp function: both CV and CC

(2) RMP CV ← Ramp function: CV only

(3) RMP CC ← Ramp function: CC only

(Default) RMP CVCC

(Description) Featuring multiple command

(For -LDe option only)

## **CH5 Command**

This command programs the attained voltage value between  $0000_H$  and  $FFFF_H$  (16 bit).\*

- (Syntax) (1) CH5 FFFF      ← (Attained voltage) = (maximum rated voltage)  
 (2) CH5 7FFF      ← (Attained voltage) = (half of maximum rated voltage)  
 (3) CH5 F0      ← CH5 at OOFO.  
 (4) CH5 12345      ← Attained voltage does not change.

(Default)      CH5 0000

(Description)    The setting with four or more digits is ignored as an invalid command (Syntax (4))  
 Featuring multiple command

- \* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.  
 (For -LDe option only)

## **CH6 Command**

This command programs the attained current value between  $0000_H$  and  $FFFF_H$  (16 bit).\*

- (Syntax) (1) CH6 FFFF      ← (Attained current) = (maximum rated current)  
 (2) CH6 7FFF      ← (Attained current) = (half of maximum rated current)  
 (3) CH6 F0      ← CH6 at OOFO.  
 (4) CH6 12345      ← Attained current does not change.

(Default)      CH6 0000

(Description)    The setting with four or more digits is ignored as an invalid command (Syntax (4))  
 Featuring multiple command

- \* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.  
 (For -LDe option only)

## **VSWP Command**

This command programs the attained voltage value between 0.0 and 100.00% (increment of 0.01%)

- (Syntax) (1) VSWP 100      ← (Attained voltage) = (maximum rated voltage)  
                               (2) VSWP 12.34      ← (Attained voltage) = (12.34% of maximum rated voltage)  
                               (3) VSWP 123.4      ← Attained voltage does not change.  
                               (4) VSWP 12.345     ← VSWP at 12.34.

(Default)      VSWP 0

(Description) The setting exceeding 100 is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding 2 digits, the number up to the second decimal place is valid, ignoring the third place onwards (Syntax (4)).

Featuring multiple command

- \* The setting of output voltage includes the maximum power control. Therefore, note that this command changes the output current as limited at the maximum power of 84.05W if the output current value exceeding 84.05W is set in setting voltage.  
     (For -LDe option only)

## **ISWP Command**

This command programs the attained current value between 0.0 and 100.00% (increment of 0.01%)<sup>\*</sup>

- (Syntax) (1) ISWP 100      ← (Attained current) = (maximum rated current)  
                               (2) ISWP 12.34      ← (Attained current) = (12.34% of maximum rated current)  
                               (3) ISWP 123.4      ← Attained current does not change.  
                               (4) ISWP 12.345     ← ISWP at 12.34.

(Default)      ISWP 0

(Description) The setting exceeding 100 is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding 2 digits, the number up to the second decimal place is valid, ignoring the third place onwards (Syntax (4)).

Featuring multiple command

- \* The setting of output current includes the maximum power control. Therefore, note that this command changes the output voltage as limited at the maximum power of 84.05W if the output voltage value exceeding 84.05W is set in setting current.  
     (For -LDe option only)

## **VSSWP Command**

This command programs the attained voltage value between 0.0 and the maximum rated voltage value (V).\*

(Syntax) in case of R4K-80 36V/5A (increment of 0.01V)

- (1) VSSWP 36      ← (Attained voltage) = (36V)
- (2) VSSWP 12.34    ← (Attained voltage) = (12.34V)
- (3) VSSWP123.4    ← Attained voltage does not change.
- (4) VSSWP 12.345   ← (Attained voltage) = (12.34V)

(Default)      VSSWP 0

(Description) The setting with the input value exceeding the maximum rated voltage is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding digits in “6-17 Minimum setting / return value list”, the number up to the minimal digit of the model valid, ignoring the subsequent digits (Syntax (4)).

Featuring multiple command

\* Minimum setting value of VSSWP command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

\* The setting of attained voltage includes the maximum power control. Therefore, note that this command changes the attained current as limited at the maximum power of 84.05W if the attained current value exceeding 84.05W is set in setting voltage.

(For -LDe option only)

## **ISSWP Command**

This command programs the attained current value between 0.0 and the maximum rated current value (A).\*

(Syntax) in case of R4K-80 36V/5A (increment of 0.001A)

- (1) ISSWP 5      ← (Attained current) = (5A)
- (2) ISSWP 1.234    ← (Attained current) = (1.234A)
- (3) ISSWP 12.345   ← Attained current does not change.
- (4) ISSWP 1.2345   ← (Attained current) = (1.234A)

(Default)      ISSWP 0

(Description) The setting with the input value exceeding the maximum rated current is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding digits in “6-17 Minimum setting / return value list”, the number up to the minimal digit of the model valid, ignoring the subsequent digits (Syntax (4)).

Featuring multiple command

\* Minimum setting value of ISSWP command is different for each model, R4K.

(See Section “6-17 Minimum setting / return value list”.)

\* The setting of attained current includes the maximum power control. Therefore, note that this command changes the attained voltage as limited at the maximum power of 84.05W if the attained voltage value exceeding 84.05W is set in setting current.

(For -LDe option only)

## **TSWP Command**

This command programs the attainment time between 0.0 and 1300.0 secs (increment of 0.1 sec).

(Syntax) (1) TSWP 1300.0 ← (Attainment time) = 1300 secs (approx. 21 mins)

(2) TSWP 60 ← (Attainment time) = 60 secs

(3) TSWP 1234.5 ← Attainment time does not change.

(4) TSWP 12.34 ← TSWP at 12.3.

(Default) TSWP 0

(Description) The setting exceeding 1300 secs is ignored as an invalid command (Syntax (3))

For the setting with the fractional part exceeding 1 digit, the number up to the first decimal place is valid, ignoring the second place onwards (Syntax (4)).

Featuring multiple command

(For -LDe option only)

## **SWP Command**

This command starts/stops sweep output.

(Syntax) (1) SWP ON ← Start sweep output

(2) SWP OFF ← Stop sweep output

(Default) SWP OFF

(Description) Sweep output stops in the commands

CH0, CH1, CH5, CH6, CH9, CHA, CHB, CHC, CHD,  
CHE, VCN, ICN, AVCN, AICN, BVCN, BICN, CVCN, CICN, VSET, ISET, AVSET, AISET,  
BVSET, BISET, CVSET, CISET, VSWP, ISWP, VSSWP, ISSWP, TSWP, and SWP.

Featuring multiple command

(For -LDe option only)

## **SWPSTS Command**

This command permits/prohibits output of status after attainment

(Syntax)(1) SWPSTS ON ← Permit output of status after attainment

(2) SWPSTS OFF ← Prohibit output of status after attainment

(Default) SWPSTS OFF

(Status) #OO SWP

↑ UNIT number (0 to 31)

(Description) Featuring multiple command

(For -LDe option only)

### **SWPEV Command**

This command programs the voltage after attainment.

- (Syntax) (1) SWPEV 0 ← Voltage after attainment = 0V  
(2) SWPEV 1 ← Voltage after attainment = retaining attained voltage value  
(3) SWPEV 2 ← Voltage after attainment = voltage value before sweep output  
(Default) SWPEV 1  
(Description) Featuring multiple command  
(For -LDe option only)

### **SWPEI Command**

This command programs the current after attainment.

- (Syntax) (1) SWPEI 0 ← Current after attainment = 0A  
(2) SWPEI 1 ← Current after attainment = retaining attained current value  
(3) SWPEI 2 ← Current after attainment = current value before sweep output  
(Default) SWPEI 1  
(Description) Featuring multiple command  
(For -LDe option only)

**PLS? Command**

This command returns the status of the pulse sequence function by ON/OFF.

(Syntax) PLS?

(Return) (1) PLS OFF	←	Pulse sequence function: OFF
(2) PLS ON	←	Pulse sequence function: ON

(Description) (For -LDe option only)

**PTON? Command**

This command returns the ON output set value of the pulse sequence function between 0.0 and 99.9 (s/m/h).

(Syntax) PTON?

(Return) (1) PTON=1.0s	←	Set to 1.0 sec.
(2) PTON=12.3m	←	Set to 12.3 mins.
(3) PTON=2.3h	←	Set to 2.3 hrs.

(Description) The time unit (s/m/h) depends on the setting of PLT (time unit).

(For -LDe option only)

**PTOFF? Command**

This command returns the OFF output set value of the pulse sequence function between 0.0 and 99.9 (s/m/h).

(Syntax) PTOFF?

(Return) (1) PTOFF=1.0s	←	Set to 1.0 sec.
(2) PTOFF=12.3m	←	Set to 12.3 mins.
(3) PTOFF=2.3h	←	Set to 2.3 hrs.

(Description) The time unit (s/m/h) depends on the setting of PLT (time unit).

(For -LDe option only)

**PTA? Command**

This command returns the memory A output set value of the pulse sequence function between 0.0 and 99.9 (s/m/h).

(Syntax) PTA?

- |                       |   |                   |
|-----------------------|---|-------------------|
| (Return) (1) PTA=1.0s | ← | Set to 1.0 sec.   |
| (2) PTA=12.3m         | ← | Set to 12.3 mins. |
| (3) 9 PTA=2.3h        | ← | Set to 2.3 hrs.   |

(Description) The time unit (s/m/h) depends on the setting of PLT (time unit).

(For -LDe option only)

**PTB? Command**

This command returns the memory B output set value of the pulse sequence function between 0.0 and 99.9 (s/m/h).

(Syntax) PTB?

- |                       |   |                   |
|-----------------------|---|-------------------|
| (Return) (1) PTB=1.0s | ← | Set to 1.0 sec.   |
| (2) PTB=12.3m         | ← | Set to 12.3 mins. |
| (3) PTB=2.3h          | ← | Set to 2.3 hrs.   |

(Description) The time unit (s/m/h) depends on the setting of PLT (time unit).

(For -LDe option only)

**PTC? Command**

This command returns the memory C output set value of the pulse sequence function between 0.0 and 99.9 (s/m/h).

(Syntax) PTC?

- |                       |   |                   |
|-----------------------|---|-------------------|
| (Return) (1) PTC=1.0s | ← | Set to 1.0 sec.   |
| (2) PTC=12.3m         | ← | Set to 12.3 mins. |
| (3) PTC=2.3h          | ← | Set to 2.3 hrs.   |

(Description) The time unit (s/m/h) depends on the setting of PLT (time unit).

(For -LDe option only)

**PLT? Command**

This command returns the time unit of the pulse sequence function by sec/min/hr.

(Syntax) PLT?

- |                      |   |   |
|----------------------|---|---|
| (Return) (1) PLT Sec | ← | Time unit of pulse sequence function: sec |
| (2) PLT Min          | ← | Time unit of pulse sequence function: min |
| (3) PLT Hour         | ← | Time unit of pulse sequence function: hr  |

(Description) (For -LDe option only)

**PCNT? Command**

This command returns the number of repetition of the pulse sequence function between 0 and 9999.

(Syntax) PCNT?

- |                     |   |                                |
|---------------------|---|--------------------------------|
| (Return) (1) PCNT=0 | ← | No. of repetition set to 0.    |
| (2) PCNT=9999       | ← | No. of repetition set to 9999. |

(Description) (For -LDe option only)

**RMP? Command**

This command returns the status of the ramp function by ON/OFF.

(Syntax) RMP?

- |                      |   |                    |
|----------------------|---|--------------------|
| (Return) (1) RMP OFF | ← | Ramp function: OFF |
| (2) RMP ON           | ← | Ramp function: ON  |

**RTON? Command**

This command returns the set value of ramp time when the ramp function is ON between 0 and 999 secs.

(Syntax) RTON?

- |                      |   |                  |
|----------------------|---|------------------|
| (Return) (1) RTON=1s | ← | Set to 1 sec.    |
| (2) RTON=12s         | ← | Set to 12 secs.  |
| (3) RTON=123s        | ← | Set to 123 secs. |

(Description) (For -LDe option only)

**RTOFF? Command**

This command returns the set value of ramp time when the ramp function is OFF between 0 and 999 secs.

(Syntax) RTOFF?

- |                       |   |                  |
|-----------------------|---|------------------|
| (Return) (1) RTOFF=1s | ← | Set to 1 sec.    |
| (2) RTOFF=12s         | ← | Set to 12 secs.  |
| (3) RTOFF=123s        | ← | Set to 123 secs. |

(Description) (For -LDe option only)

**RTA? Command**

This command returns the set value of ramp time when the pulse sequence of the ramp Multi-set transfers to memory A between 0 and 999 secs.

(Syntax) RTA?

- |                     |   |                  |
|---------------------|---|------------------|
| (Return) (1) RTA=1s | ← | Set to 1 sec.    |
| (2) RTA=12s         | ← | Set to 12 secs.  |
| (3) RTA=123s        | ← | Set to 123 secs. |

(Description) (For -LDe option only)

**RTB? Command**

This command returns the set value of ramp time when the pulse sequence of the ramp Multi-set transfers to memory B between 0 and 999 secs.

(Syntax) RTB?

- |                     |   |                  |
|---------------------|---|------------------|
| (Return) (1) RTB=1s | ← | Set to 1 sec.    |
| (2) RTB=12s         | ← | Set to 12 secs.  |
| (3) RTB=123s        | ← | Set to 123 secs. |

(Description) (For -LDe option only)

**RTC? Command**

This command returns the set value of ramp time when the pulse sequence of the ramp Multi-set transfers to memory C between 0 and 999 secs.

(Syntax) RTC?

- |                     |   |                  |
|---------------------|---|------------------|
| (Return) (1) RTC=1s | ← | Set to 1 sec.    |
| (2) RTC=12s         | ← | Set to 12 secs.  |
| (3) RTC=123s        | ← | Set to 123 secs. |

(Description) (For -LDe option only)

**RSET? Command**

This command returns the setting of the ramp operation by OFF/CV/CC.

(Syntax) RSET?

- |                        |   |                                |
|------------------------|---|--------------------------------|
| (Return) (1) RSET CVCC | ← | Ramp operation: both CV and CC |
| (2) RSET CV            | ← | Ramp operation: CV only        |
| (3) RSET CC            | ← | Ramp operation: CC only        |

**CH5? Command**

This command returns the set value of attained voltage between  $0000_H$  and  $FFFF_H$  (16 bit).

(Syntax) CH5?

(Return) (1) CH5=FFFFH ←———— Output voltage is set to a maximum of the rated

(2) CH5=7FFFH ←———— Output voltage is set to a half of the rated

(Description) (For -LDe option only)

**CH6? Command**

This command returns the set value of attained current between  $0000_H$  and  $FFFF_H$  (16 bit).

(Syntax) CH6?

(Return) (1) CH6=FFFFH ←———— Output voltage is set to a maximum of the rated

(2) CH1=7FFFH ←———— Output voltage is set to a half of the rated

(Description) (For -LDe option only)

**VSWP? Command**

This command returns the set value of attained voltage between 0.0 and 100.00% (increment of 0.01%).

(Syntax) VSWP?

(Return) (1) VSWP=100.0 ←———— Output voltage is set to a maximum rated voltage

(2) VSWP=12.34 ←———— Output voltage is set to 12.34% of maximum rated voltage

(3) VSWP=25.0 ←———— Output voltage is set to 25% of maximum rated voltage

(Description) (For -LDe option only)

**ISWP? Command**

This command returns the set value of attained current between 0.0 and 100.00% (increment of 0.01%).

(Syntax) ISWP?

(Return) (1) ICN=100.0 ←———— Output current is set to a maximum rated current

(2) ICN=12.34 ←———— Output current is set to 12.34% of maximum rated current

(3) ICN=25.0 ←———— Output current is set to 25% of maximum rated current

(Description) (For -LDe option only)

**VSSWP? Command**

This command returns the attained voltage value between 0.0 and the rated voltage (V) (increment of 0.01V).

(Syntax) VSSWP? (in case of R4K-80 36V/5A)

(Return) (1) VSSWP=36.0 ← Set to 36.0V

(2) VSSWP=12.34 ← Set to 12.34V

(3) VSSWP=0.8 ← Set to 0.8V

(Description) 0 value of 2 decimal point is not displayed(Return (3))

\* Minimum setting value of VSSWP command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

(For -LDe option only)

**ISSWP? Command**

This command returns the attained current value between 0.0 and the rated voltage (A) (increment of 0.001A).

(Syntax) ISSWP? (in case of R4K-80 36V/5A)

(Return) (1) ISSWP=5.0 ← Set to 5.0A

(2) ISSWP=1.234 ← Set to 1.234A

(3) ISSWP=2.5 ← Set to 2.5A

(Description) 0 value of 2 decimal point is not displayed(Return (3))

\* Minimum setting value of ISSWP command is different for each model ,R4K.

(See Section “6-17 Minimum setting / return value list”.)

(For -LDe option only)

**TSWP? Command**

This command returns the set value of attainment time between 0.0 and 1300.0 secs (increment of 0.1 sec).

(Syntax) TSWP?

(Return) (1) TSWP=1300 ← Set to 1300 secs.

(2) TSWP=12.3 ← Set to 12.3 secs.

(3) TSWP=5 ← Set to 5 secs.

(Description) 0 value of 1 decimal point is not displayed (Return (3)).

(For -LDe option only)

**SWP? Command**

This command returns sweep in output/not in output.

(Syntax) SWP?

- |                     |   |                     |
|---------------------|---|---------------------|
| (Return) (1) SWP ON | ← | Sweep in output     |
| (2) SWP OFF         | ← | Sweep not in output |

(Description) (For -LDe option only)

**SWPSTS? Command**

This command returns the setting of status output after attainment.

(Syntax) SWPSTS?

- |                        |   |                    |
|------------------------|---|--------------------|
| (Return) (1) SWPSTS ON | ← | Set as permitted.  |
| (2) SWPSTS OFF         | ← | Set as prohibited. |

(Description) (For -LDe option only)

**SWPEV? Command**

This command returns the setting of voltage after attainment.

(Syntax) SWPEV?

- |                      |   |   |
|----------------------|---|---|
| (Return) (1) SWPEV 0 | ← | Set to OV.                                |
| (2) SWPEV 1          | ← | Set to retaining attained voltage value.  |
| (3) SWPEV 2          | ← | Set to voltage value before sweep output. |

(Description) (For -LDe option only)

**SWPEI? Command**

This command returns the setting of current after attainment.

(Syntax) SWPEI?

- |                      |   |   |
|----------------------|---|---|
| (Return) (1) SWPEI 0 | ← | Set to OA.                                |
| (2) SWPEI 1          | ← | Set to retaining attained current value.  |
| (3) SWPEI 2          | ← | Set to current value before sweep output. |

(Description) (For -LDe option only)

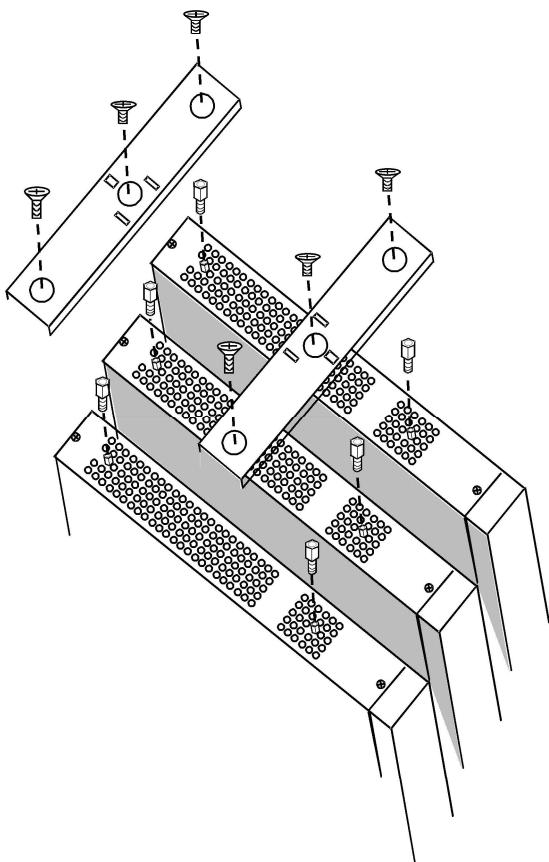
## 6-17 Minimum setting / return value list

Minimum setting / return value for each command

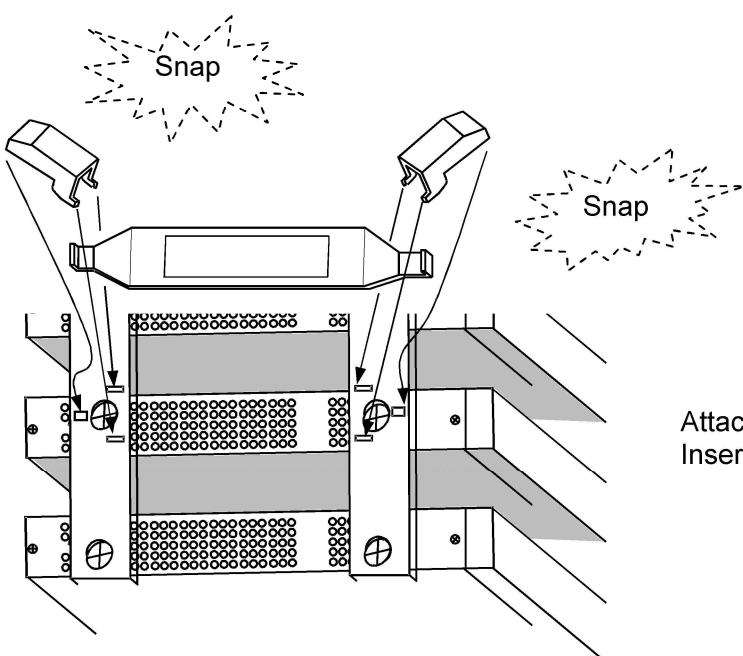
Command	R4K Series Model	Increment
VSET, OVPSET, VGET, VSET?, AVSET, BVSET, CVSET, AVSET?, BVSET?, CVSET?	R4K-80L	0.01V
	R4K-80	0.01V
	R4K-80M	0.1V
	R4K-80H	0.1V
ISET, OCPSET, IGET, ISET?, AISET, BISET, CISET, AISET?, BISET?, CISET?	R4K-80L	0.01A
	R4K-80	0.001A
	R4K-80M	0.001A
	R4K-80H	0.1mA

\* Minimum value of each mode is same as minimum display digit on display.

## 7 R4K Binder Attachment (R4K Binder Option)



Put the attached support screws to R4K.  
Secure the metals with the attached screws.



Attach a belt to the metals with fixtures.  
Insert the fixtures deep enough until they snap.

## 8 -LDe Option

### 8-1 Overview

The -LDe option adds the pulse sequence function that automatically repeats OUTPUT ON/OFF, the ramp function that easily designates the time of rising/falling, and the sweep program that can set these control in more detail with the digital command.

### 8-2 Features of Pulse Sequence

Pulse sequence is a function that outputs the set ON time by pressing OUTPUT to repeat stop of output of the set OFF time the designated number of times.

The pulse sequence function enables automated stop the designated number of times and forced stop by pressing OUTPUT.

When the pulse sequence function is in operation, LOCK LED flashes.

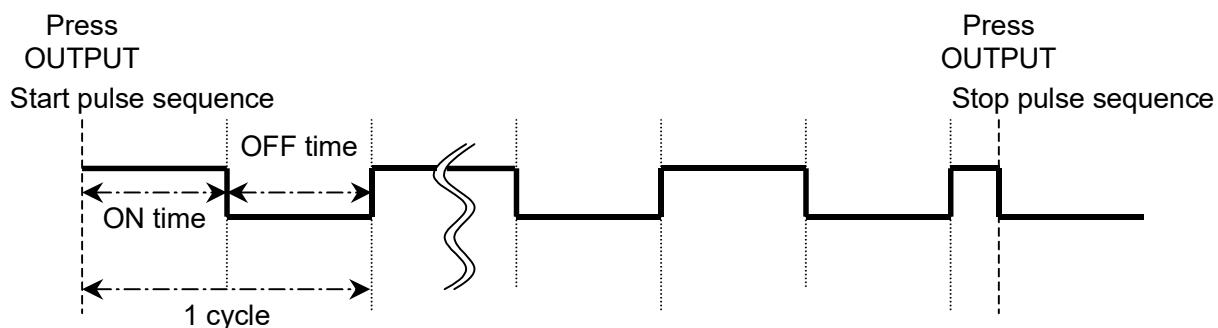
- \* Pressing the SET switch while the pulse sequence function is in operation, the remaining time of ON/OFF and time unit are displayed alternately.
- \* Pressing the OVP/OCP switch while the pulse sequence function is in operation, the remaining number of times of repetition is displayed.

In case of setting 0 times (infinite repeating), the number of times of repetition is counted up and displayed.

(Maximum of 9999 times or more is cleared to 0.)



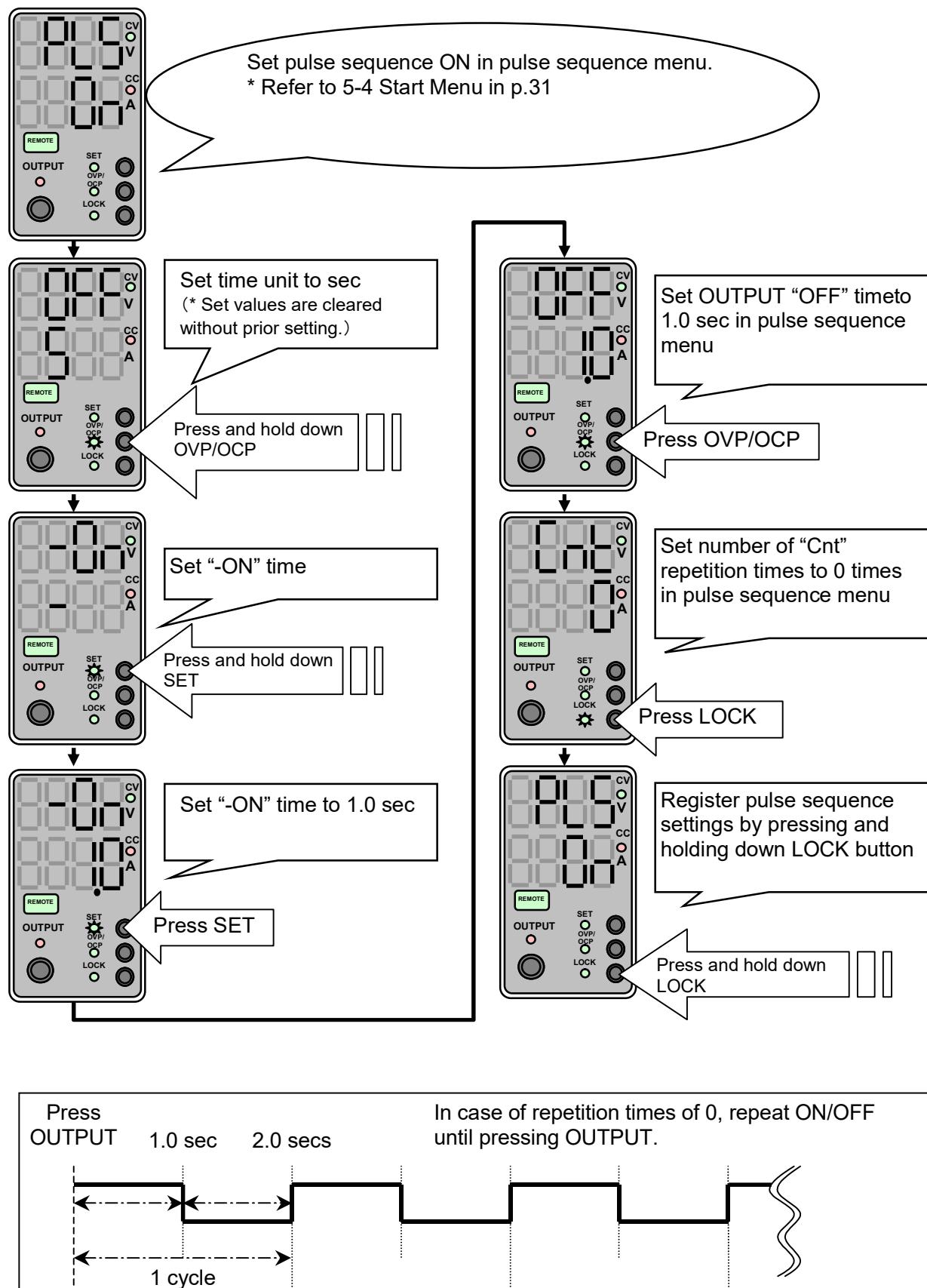
- Caution**
- The pulse sequence function cannot be used in combination with the delay trigger function.
  - While pulse sequence is in operation, the PRESET value of voltage/current and the set value of OVP/OCP is not to be displayed so please check them when stopped.  
\* Output monitor values are displayed while it is in operation.
  - The LOCK function cannot be used while the pulse sequence function is set.
  - The pulse sequence function cannot be used in combination with the Master/Slave function.
  - The repeat accuracy of pulse sequence is  $\pm 0.5\%$  due to the internal oscillation device so please consider accuracy when operating for a long period of time.



## 8-2-1 Example of Pulse Sequence Usage

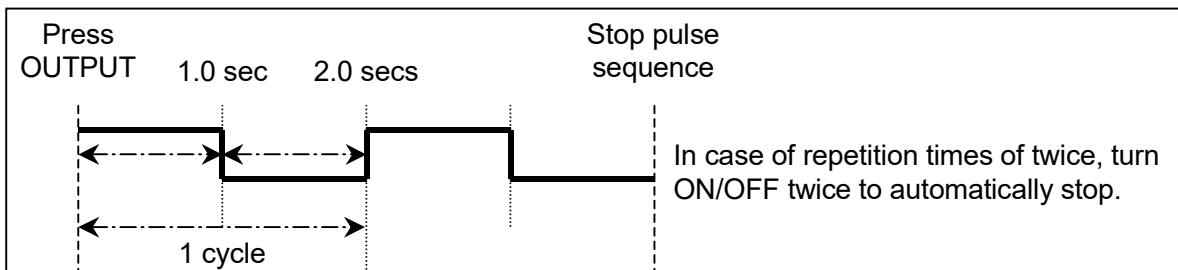
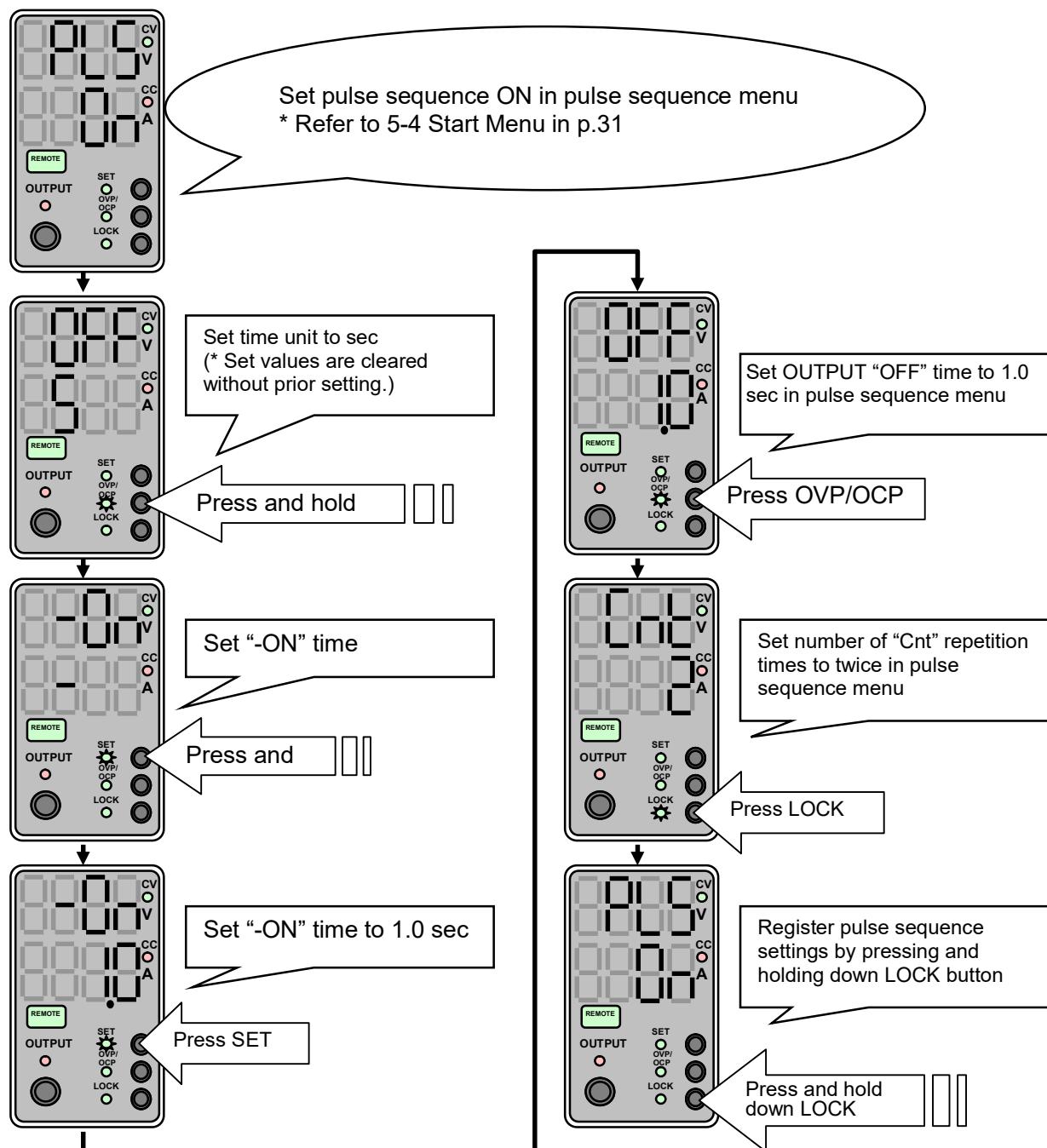
1. Use in infinite number of times

As an example here, set pulse sequence to "on", OUTPUT ON time unit/OUTPUT OFF time unit to sec, OUTPUT ON time/OUTPUT OFF time to 1.0 sec, and Cnt to 0 times.

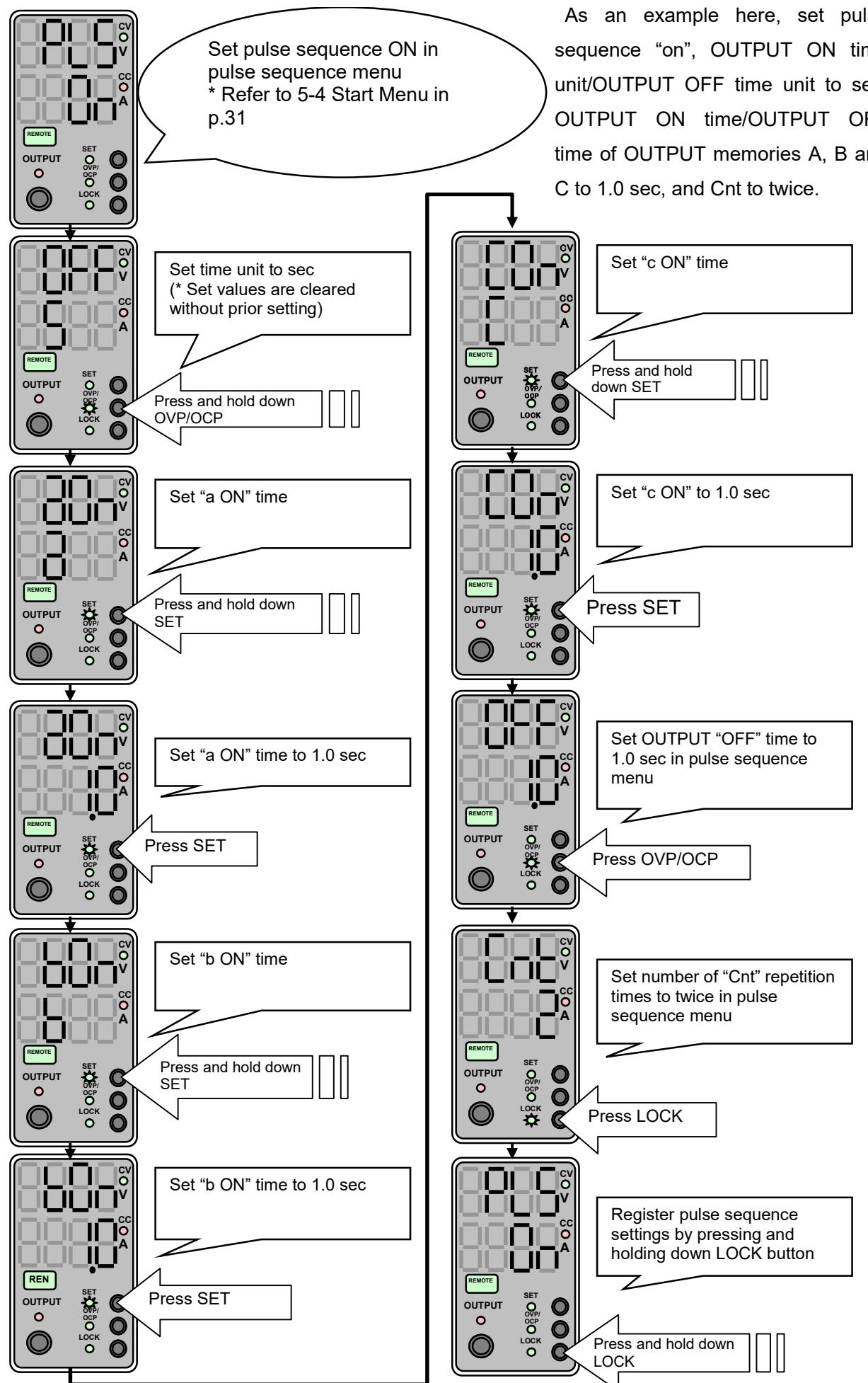


## 2. Use in designated number of times

As an example here, set pulse sequence “on”, OUTPUT ON time unit/OUTPUT OFF time unit to sec, OUTPUT ON time/OUTPUT OFF time to 1.0 sec, and Cnt to twice.

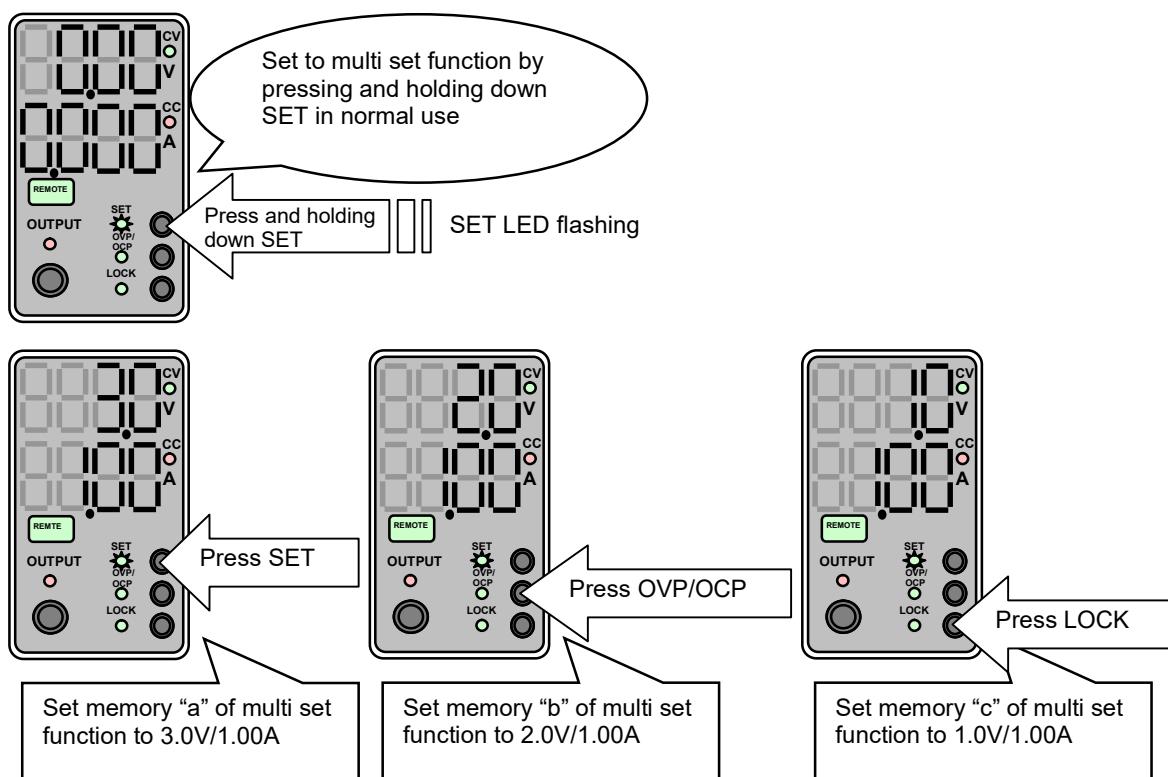


## 3. Use in Multi-set mode

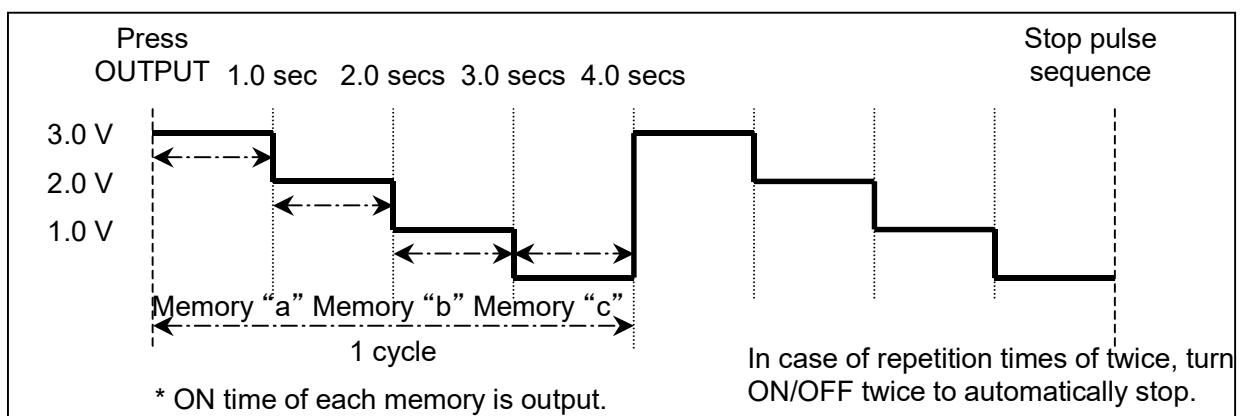


Moving on to normal use, set the values of Multi-set.

Set the values of Multi-set while the pulse sequence function is stopped.



In case of Multi-set, set memory "a" to 3.00V, memory "b" to 2.00V, and memory "c" to 1.00V.



### 8-3 Ramp Function

The ramp function sets rising/falling time arbitrarily.

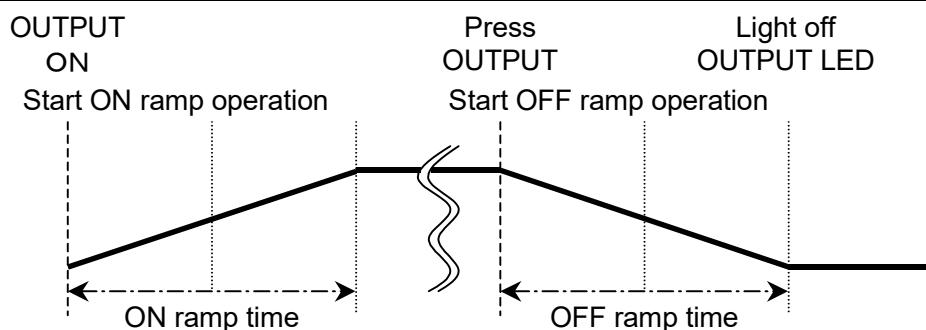
In addition, the operation mode of rising/falling can set both voltage and current simultaneously, voltage only, or current only.

- \* Pressing the SET switch while ramp is in operation, you can check the state of rising/falling.



#### Caution

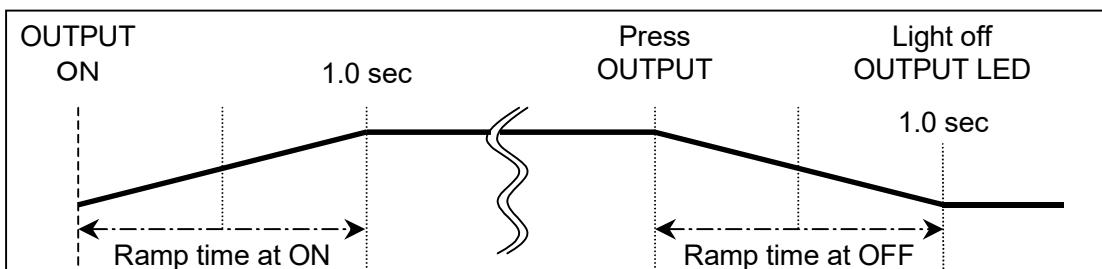
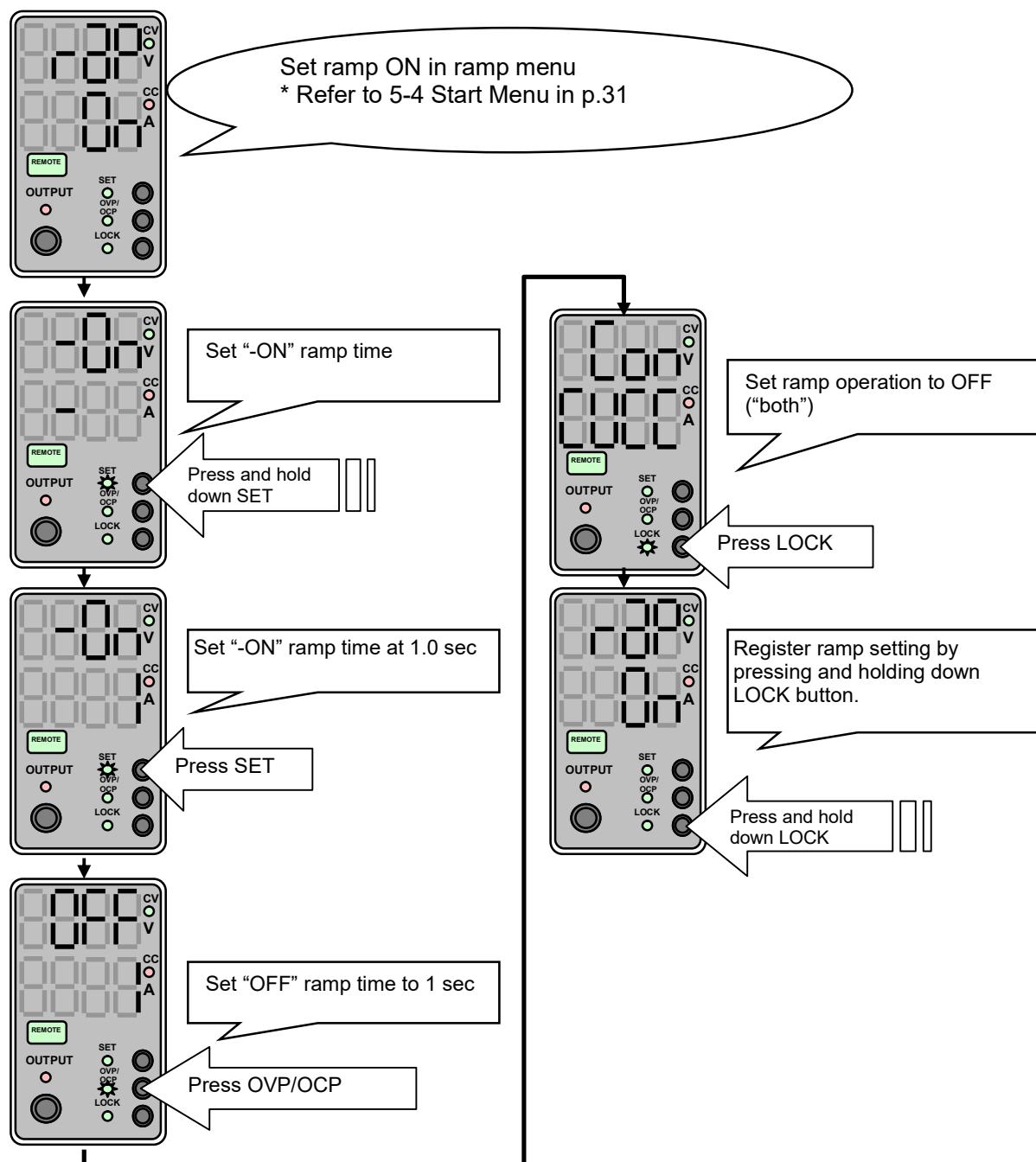
- This function cannot be used in combination with the delay trigger function.
- In use in combination with Multi-set, the pulse sequence function also needs to be turned on.  
\* In use of ramp in combination with Multi-set only, ramp works only at OUTPUT ON/OFF. Note that ramp does not work when switching memories.



### 8-3-1 Example of Ramp Usage

#### 1. Normal ramp operation and its usage example

As an example here, set ramp "on", ON ramp time/OFF ramp time to 1 sec, and ramp operation to "both" (OFF).



## 2. Pulse sequence function and its usage example

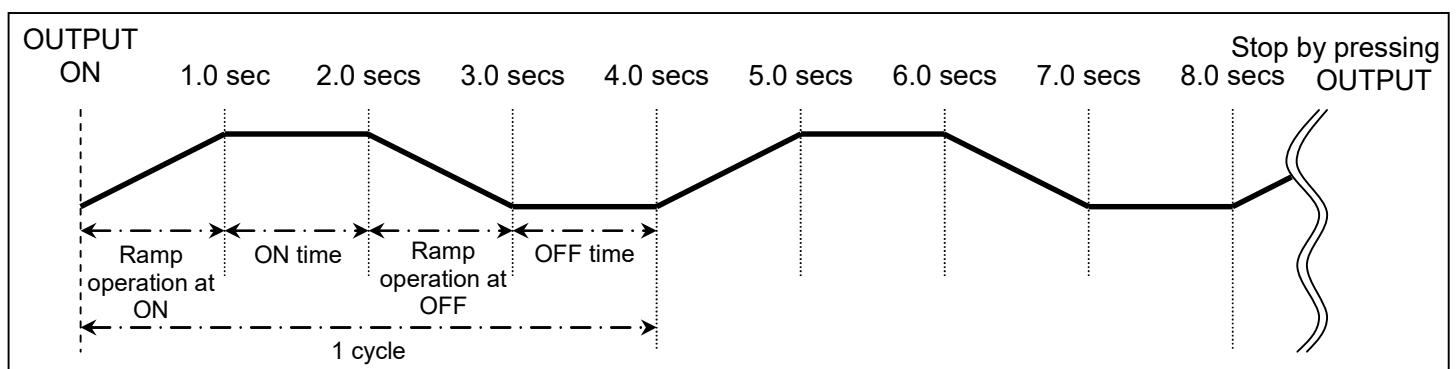
Using the ramp function in combination with the pulse sequence function, ramp works at rising/falling when repeating ON/OFF.

As an example here, set pulse sequence “on”, OUTPUT ON time unit/OUTPUT OFF time unit to sec, OUTPUT ON time/OUTPUT OFF time to 1.0 sec, and Cnt to 0 times.

(For information on how to set, refer to 8-2-1 Example of Pulse Sequence Usage 1. Use in infinite number of times)

Set ramp “on”, ON ramp time/OFF ramp time to 1 sec, and ramp operation to “both” (OFF).

(For information on how to set, refer to 1. Normal ramp operation and its usage example)



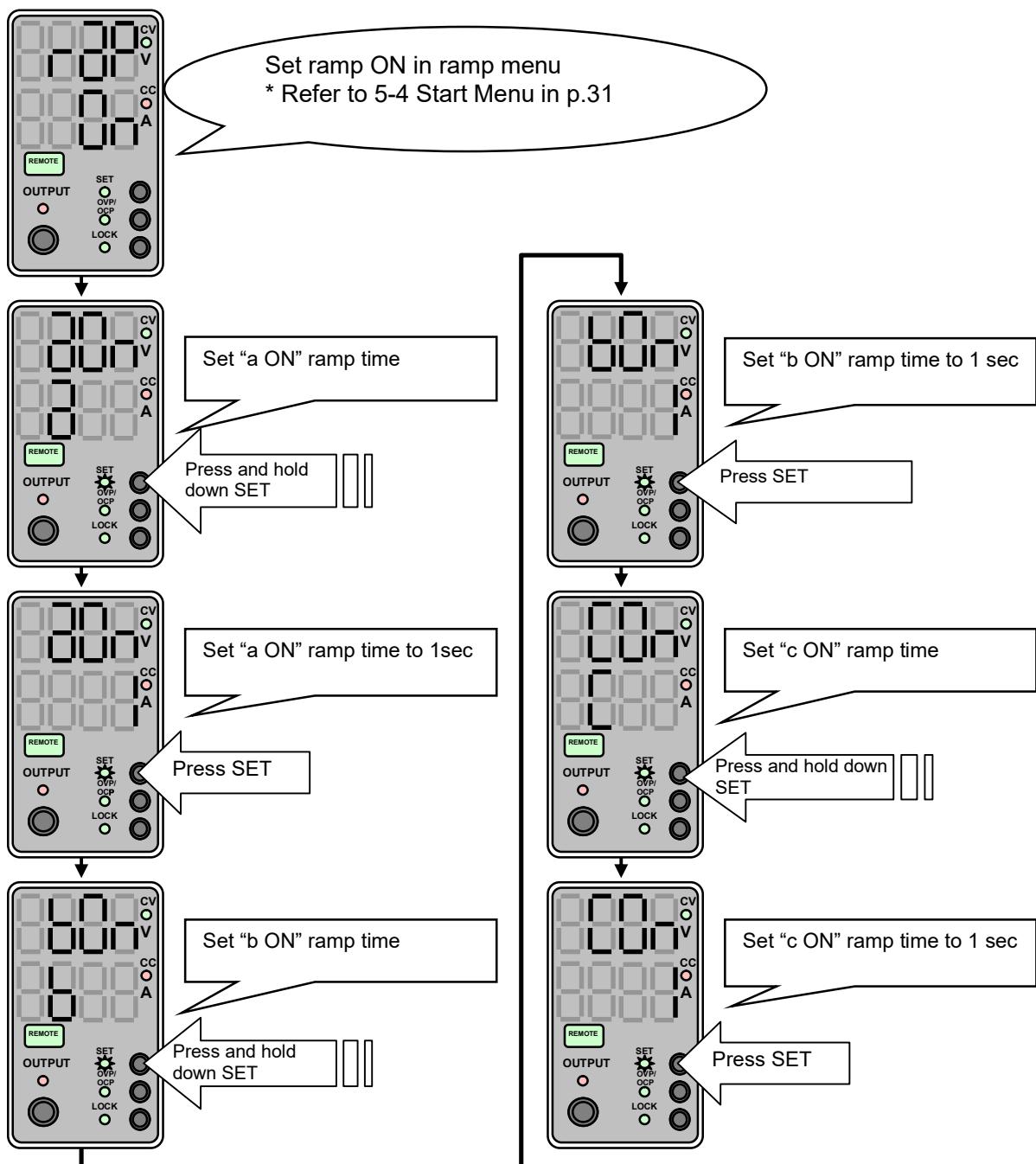
### 3. Usage example in combination with Multi-set and pulse sequence function

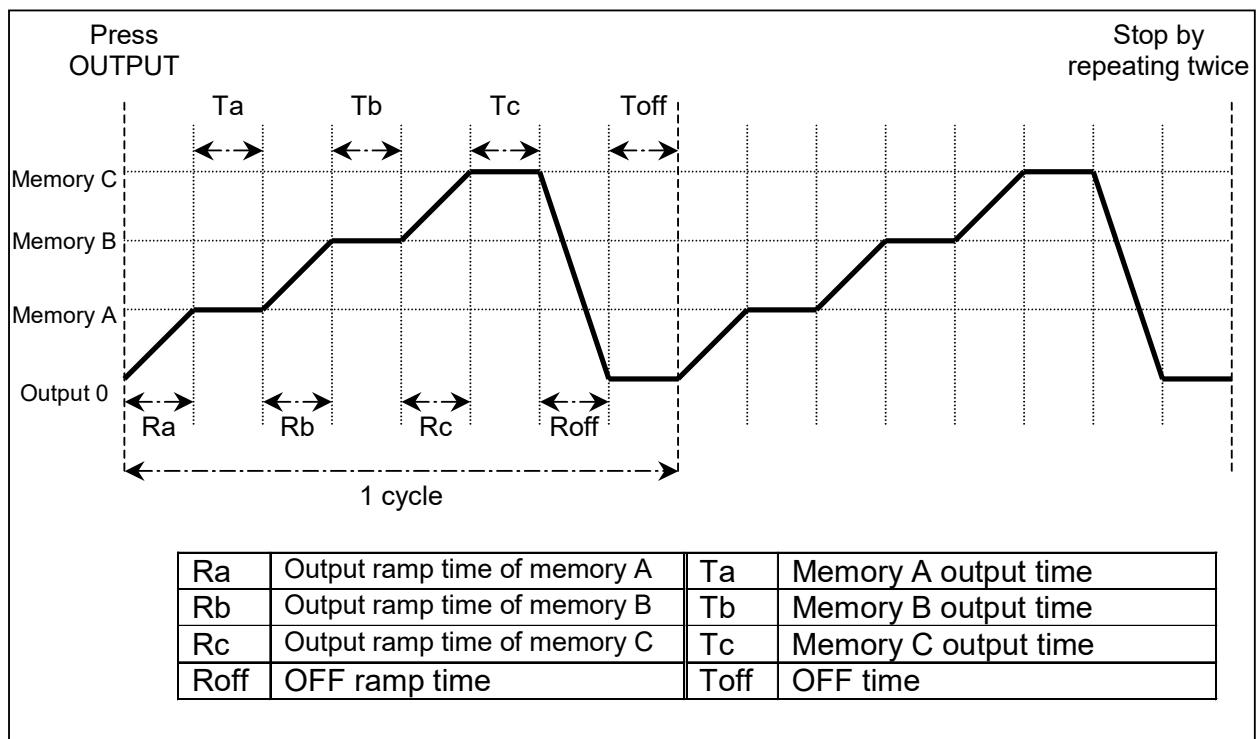
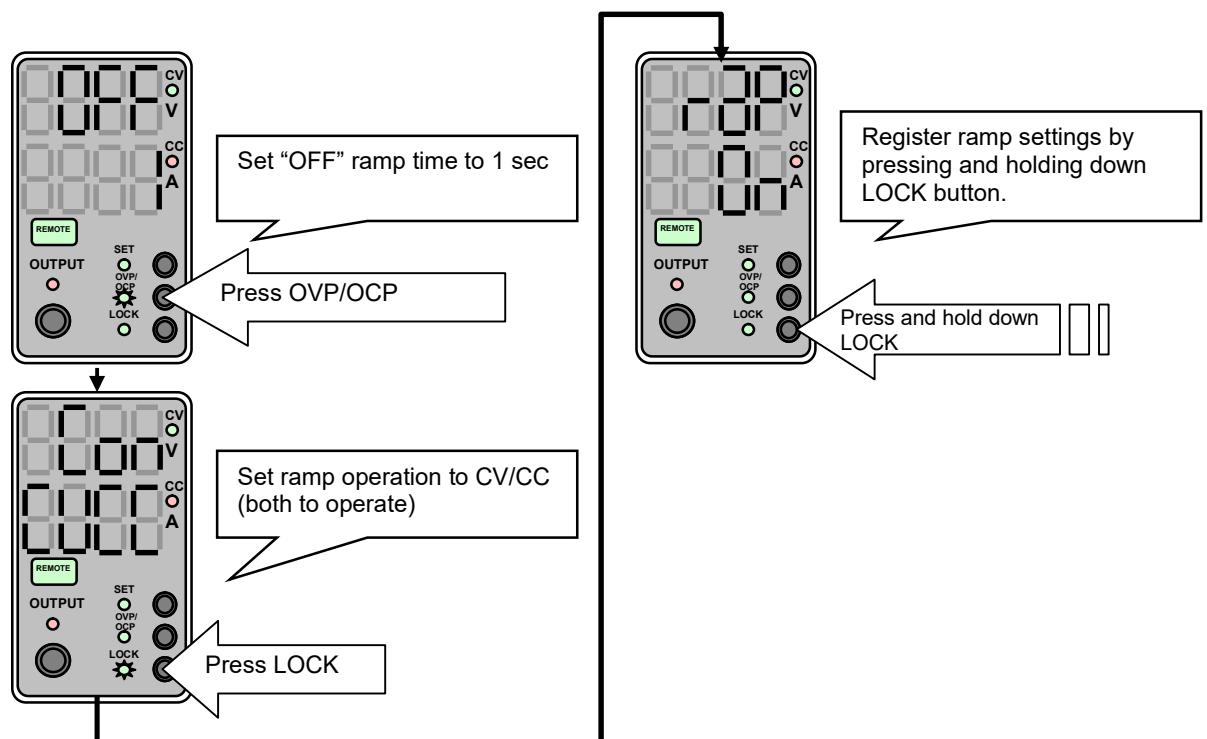
The ramp function repeats memories A/B/C/OFF by using in combination with the pulse sequence function and Multi-set function to operate ramp in rising/falling.

As an example here, set pulse sequence “on”, OUTPUT ON time unit/OUTPUT OFF time unit to sec, OUTPUT ON time/OUTPUT OFF time of memories A, B and C to 1.0 sec, and Cnt to twice.

(For information on how to set, 8-2-1 Example of Pulse Sequence Usage 3. Use in Multi-set mode)

Set ramp “on”, ON ramp time/OFF ramp time of memories A, B and C to 1 sec, and ramp operation to “both” (CVCC).





## 8-4 Features of Sweep Program

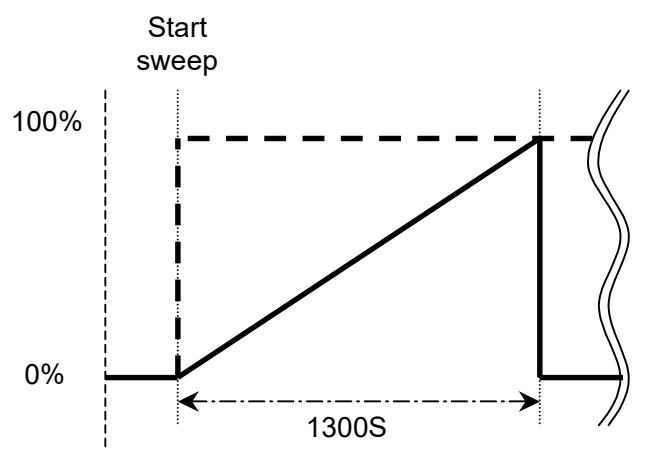
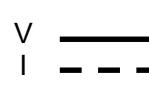
The sweep program covers some operations the ramp operation cannot program to control more detailed output operation (for -LDe option).

- Operating from the set voltage/current to the attained voltage/current because output is separated from start/stop sweep
- Setting maximum of 1300 secs (approx. 21 mins)
- Controlling output status after attainment (0V/value before sweep/retaining value after sweep)
- Outputting status after attainment
- Compatible with various output patterns due to control by digital command

\* Note: Sweep and ramp cannot be used together. Use with the ramp setting turned off.

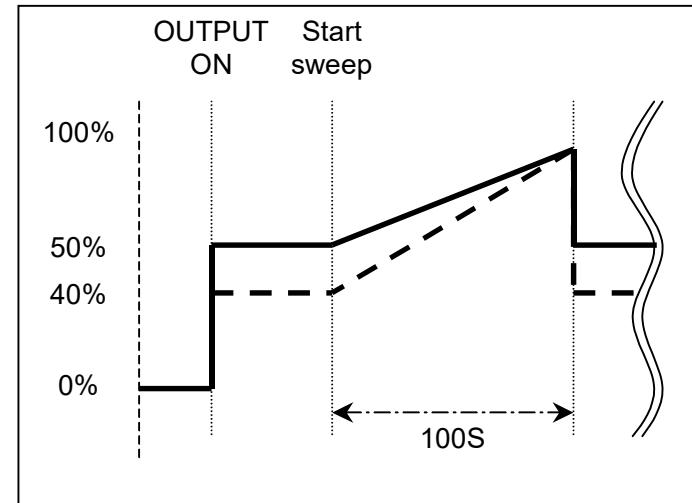
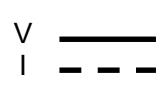
"Example of usage only in constant voltage"

- When voltage after attainment is set to 0V
- Attainment time of 1300 secs



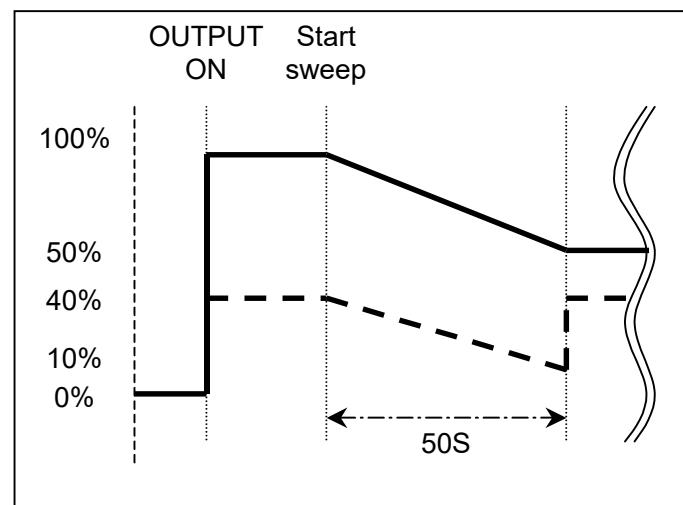
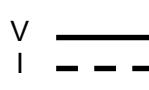
"Example of usage that sweeps from constant value to undo it after attainment"

- Undo voltage/current after attainment
- Attainment time of 100 secs



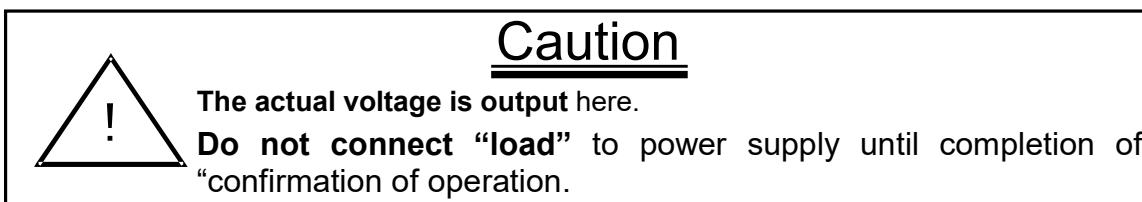
"Example of usage that sweeps from constant value to undo it after attainment"

- Retain voltage/undo current after attainment
- Attainment time of 50 secs



## 8-4-1 Checking Operation of Sweep Program

The R4K series connected to metal RS-232C module is sweep controlled via RS-232C.



### (1) Set UNIT number.

Set the UNIT number to "0" in the setting of UNIT numbers.

For details of how to set, refer to "6-4 Setting of UNIT number (at Standard Digital Interface,-LGob Option)

### (2) Connect metal RS-232C module.

Connect the metal RS-232C module to the RS-232C controller (e.g. computer).

### (3) Connect the metal RS-232C module to R4K series.

Connect the metal RS-232C module and the "CO-M cable connector (IN)" of R4K series with the attached "CO-M cable".

### (4) Power on.

Turn on the "POWER ON/OFF" switch.

### (5) Allow remote controlling.

Deliver "#0 REN" from the RS-232C controller, when the "REMOTE LED" lights on.

### (6) Allow output.

Deliver

"#0 VCN 0"	(Set output voltage to 0%).
"#0 ICN 0"	(Set output current to 0%).
"#0 OVP 100"	(Set over voltage protection to set value of maximum over voltage.)
"#0 OCP 100"	(Set over current protection to set value of maximum over current.)
"#0 SWPEV 0"	(Set the set value of voltage after attainment to 0V.) *Sweep command
"#0 VSWP 100"	(Set attained voltage value to maximum rated voltage value of 100%.) *Sweep command
"#0 ISWP 100"	(Set attained current value to maximum rated current value of 100%.) *Sweep command
"#0 TSWP 60.0"	(Set attainment time to 60 secs.) *Sweep command
"#0 SWPSTS ON"	(Permit status output after attainment.) *Sweep command
"#0 SW1"	(Output.) *At this time "OUTPUT LED" lights on.
"#0 SWP ON"	(Start sweep output.)

from the RS-232C controller.

### (7) Stop output.

Deliver "#0 SW0" from the RS-232C controller, when "OUTPUT LED" lights off.

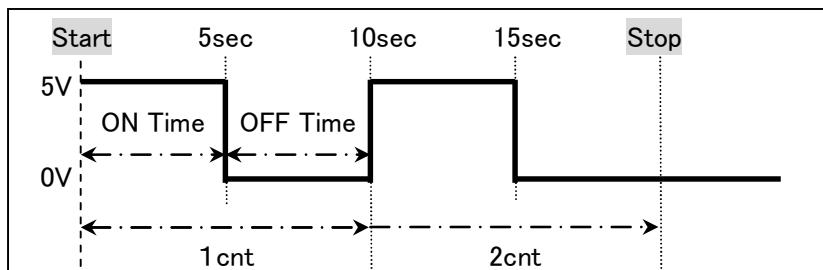
### (8) End operation.

Turn off the "POWER ON/OFF" switch.

## 8-5 LDe option quick setting

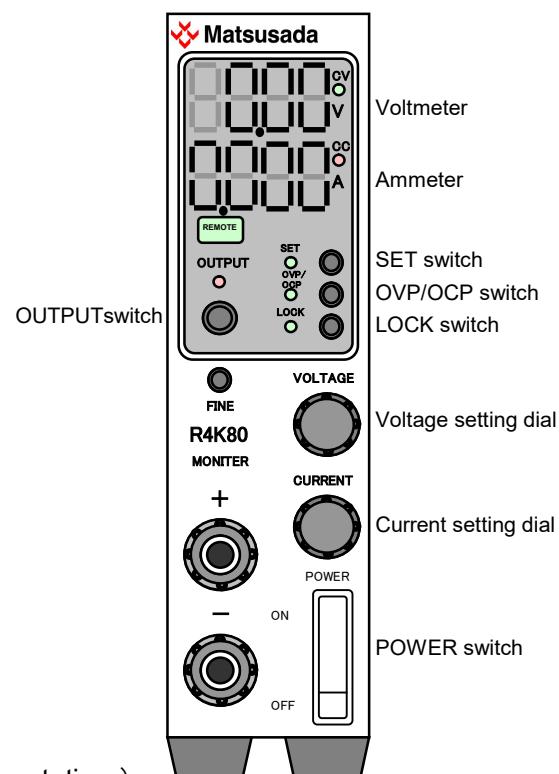
As for quick setting of pulse and ramp sequence, setting procedures of pulse sequence and ramp are as follows.

### 8-5-1 Pulse sequence setting



#### ★Sample setting★

ON Time : 5secs  
OFF Time : 5secs  
Repeat count: 2 回  
Output : 5V



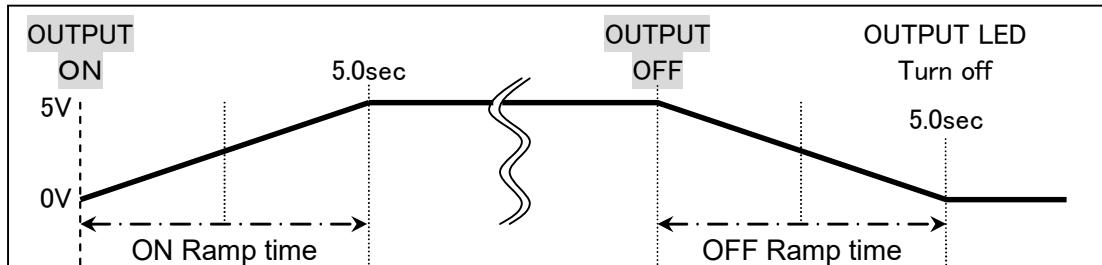
#### Setting Procedures

- ① Turn POWER switch ON pressing SET switch.
- ② Display "PLS" by rotating the voltage setting dial.  
(Display is switched as "dEF" → "dly" → "PLS" → "raP" according to its rotation.)
- ③ Display "ON" on the ammeter by rotating the current setting dial, as "OFF" has been displayed.
- ④ Ammeter is switched as "s" → "m" → "h" according to its pressing and holding down OVP/OCP switch.
- ⑤ As this time unit is second, to be set "s".
- ⑥ Press SET switch. **《Ramp time setting becomes ON.》**
- ⑦ As this example is 5 seconds, rotate the current setting dial so as to be "5.0" on the ammeter.
- ⑧ Press OVP/OCP switch. **《Ramp time setting becomes OFF.》**
- ⑨ As this example is 5 seconds, rotate the current setting dial so as to be "5.0" on the ammeter.
- ⑩ Press LOCK switch. **《Setting is repetition time》**
- ⑪ As this example is of two cycle, rotate the current setting dial so as to be "2" on the ammeter.  
(Infinitely repeated when set to 0 times.)
- ⑫ Hold down LOCK switch. **《Setting is completed》**

#### How to use

- ① Press SET switch. **《Output setting》**
  - ② As this example is 5 volts, rotate the voltage setting dial so as to be 5.00 on the voltmeter.  
Set any value on the ammeter by rotating current setting dial.
  - ③ Turn OUTPUT switch ON. **《Start program》**  
(LOCK LED blinking to sequence running.)
  - ④ If the output cycle repeated twice program stops. **《Stop program》**  
(Output is stopped by pressing OUTPUT switch)
- \* If setting is impossible with above procedures, it may be other settings inputted.  
Execute procedure ① and execute action ⑩ after "dEF" displayed by rotating the voltage setting dial.  
Settings return to the factory default.

## 8-5-2 Ramp setting



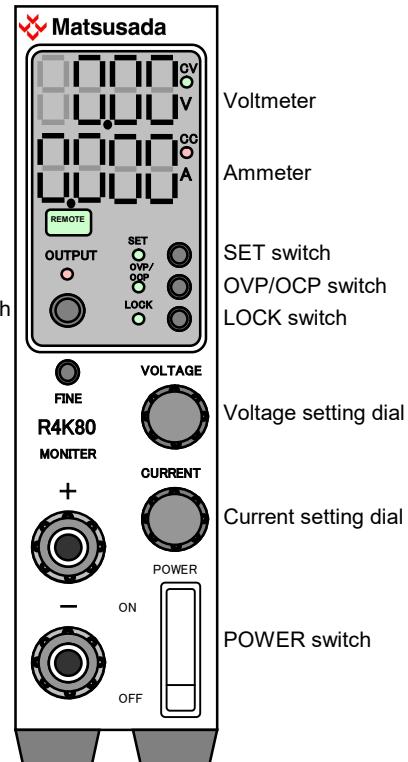
### ★Sample setting★

ON Ramp Time : 5.0sec  
OFF Ramp Time : 5.0sec  
Control mode : CV  
Output : 5V

### Setting Procedures

- ① Turn POWER switch ON pressing SET switch.
- ② Display "raP" by rotating the voltage setting dial.  
(Display is switched as "dEF" → "dly" → "PLS" → "raP" according to its rotation.)
- ③ Display "ON" on the ammeter by rotating the current setting dial, as "OFF" has been displayed.
- ④ Press SET switch. **«Ramp time setting becomes ON.»**
- ⑤ As this example is 5 seconds, rotate the current setting dial so as to be "5.0" on the ammeter.
- ⑥ Press OVP/OCP switch. **«Ramp time setting becomes OFF.»**
- ⑦ As this example is 5 seconds, rotate the current setting dial so as to be "5.0" on the ammeter.
- ⑧ Press LOCK switch. **«Setting of control mode»**
- ⑨ As this example is of CV, rotate the current setting dial so as to be "CV" on the ammeter.
- ⑩ Hold down LOCK switch. **«Setting is completed»**

OUTPUTswitch



### How to use

- ① Press SET switch. **«Output setting»**
- ② As this example is 5 volts, rotate the voltage setting dial so as to be 5.00 on the voltmeter.  
Set any value on the ammeter by rotating current setting dial.
- ③ Turn OUTPUT switch ON. **«Start program»**

\* To stop ramp action....

During ON ramp action: Output is stopped by pressing again OUTPUT switch.

During OFF ramp action: Output values return ones before OFF ramp action by pressing OUTPUT switch again.

**Quick setting is only an example.**

**Please confirm usage examples for combinations and detail settings.**

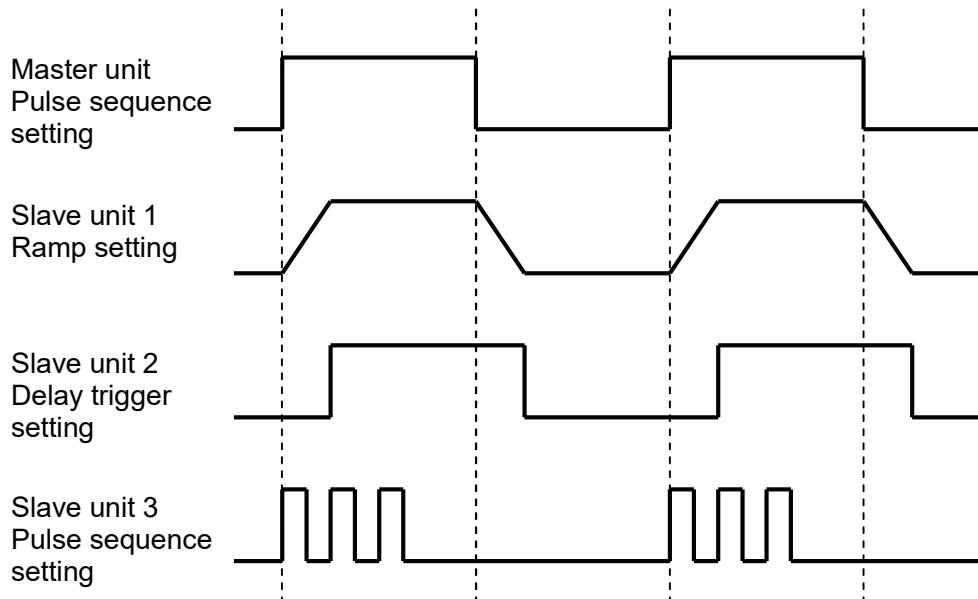
\* If setting is impossible with above procedures, it may be other settings inputted.

Execute procedure ① and execute action ⑩ after "dEF" displayed by rotating the voltage setting dial.  
Settings return to the factory default.

## 8-6 Features of Master Follow

While pulse sequence function and ramp function is working, output signal is sent to slave units. Herewith, it is possible for slave units to output with different conditions from the master unit.

You can not use the Master Follow function at the time of -LUs option / -LEt option selection.



### 8-6-1 Features of Master Follow

- Execute Master/Slave connection. (Refer to 5-2-1 Master/Slave Setting (at Standard Digital Interface))
  - Make settings of pulse sequence or ramp on the master unit.
  - Make settings of pulse sequence or ramp on slave units.
- Output signals are sent to slave units at output ON/OFF on the master unit.

# Troubleshooting

If you think that the product may have a failure, please stop the power supply to the product and check the following items.

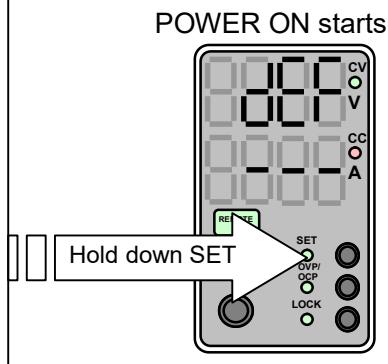
It may not be a failure if any of the following apply. Check again before requesting for repair.

Failure	Items to be confirmed
"The product does not output or the output value is not the desired value."	Are the input voltage and wiring method correct? -----> (See Page6) ? Is outage protection enabled? -----> (See Page21) * In the initial setting, switch ON ⇒ outage protection is enabled.  <<Under local control>> LS terminal pins short-circuited? -----> (See Page22) Are CV and CC volumes turned down completely? ---> (See Page17) Is the OVP setting correct? -----> (See Page19) Is the OCP setting correct? -----> (See Page19) Is LOCK function operating? -----> (See Page20)
"The voltmeter and ammeter indications on the power supply are not correct. / Output is OFF but outputting."	Is there actually output? Measure between output terminals with a voltmeter. Are each sense terminal (+/-) connected? -----> (See Page24) Is the NSC switch turned off? -----> (See Page13) If there is no switch, is the sink current in the startupmenu turned on? Dose the output and voltmeter match even when no load is connected?
"The fuse is blown or the breaker trips."	Did you use replace the case screws with a different type? (The screws may be in contact with the power supply.) Is the trunk capacity for the breaker sufficient?
"The output voltage fluctuates or cannot be controlled."	Is the remote sensing terminal connected properly? -----> (See Page24) Is the CC mode enabled? -----> (See Page16) Is the LOCK function operating? -----> (See Page20) Is the Master/Slave switch set to Slave? -----> (See Page28)
"Operation is not proper."	Isn't the Multi-set function operating? (SET LED is blinking) ---> (See Page30) Isn't the countdown indicated at start/stop of output? -----> (See Page 44) Isn't the pulse sequence function operating? (LOCK LED is blinking) -----> (See Page 131)
"No output or a set output value not produced."	<<On local control>> Is the LS terminal and LS - terminal (common) short ? -----> (See page 22) * If the LS is set to Open, the OUTPUT LED flashes and no output starts.

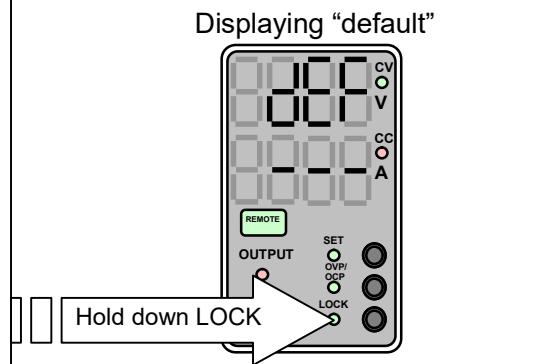
## Restoring to the factory setting

When you become unsure of the setting during use or when normal usage becomes impossible, the unit can be initialized to the factory setting.

1. When turning on the POWER switch of this unit, press and hold down the Preset switch.



2. Press and hold down the LOCK switch while "def" is displayed. This restores the factory setting.



\* If none of the above applies to your failure or the unit does not recover after checking the above, please contact our sales office where you purchased the product.

## Revision History

Rev. No.	Rev. Date	Revision Contents
0.0	2008/07	NEW
0.7	2024/10	Corrected accessories, added explanations, corrected typos







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