

**NEW**

Ultra Compact DC Power Supply

# Palmtop size Variable DC Power Supply

## R4K-36 series

2 to 40V/0.1 to 4A/0.2 to 36W

Weight : 500g



- ▶ Ultra compact, lightweight design that fit in the palm of your hand.
- ▶ There are models that can control the output current at 0.1mA increment.
- ▶ Excellent quietness is achieved by natural air-cooling system.

# Ultra Compact DC Power Supply

## R4K-36 series



R4K-36 series is ultra-compact, high-performance DC power supply that achieves sufficient output of 36W in the "palm-sized". There are models that can set and output the current at the 0.1mA increment, so the best power supply for applications which require quite precise control of current such as evaluation test of LED or EL lamps. All models include the four-digit output voltage/current meter, and digital interfaces as standard equipment. These strong points allow you to use R4K-36 for the usage such as various quality tests and the production line of electronic components.

# We pursue usability !

- Compact and light weight space saving design
- Unique low noise power conversion technology for research application
- Multiple units operation with master/slave and digital interface
- Very quiet due to the adopting natural air-cooling system without cooling fan. Suitable for applications requiring the quietness.

## New Functions

- 4-digit meter
- High resolution D/A, A/D converter integrated
- Digital Interface is also available.
- Programmable waveform with pulse and ramp sequence function without external signal.
- Output voltage and output current can be set speedily.

When setting output voltage and output current by rotary encoder on front panel, every time fine switch is pressed, setting digit on digital display will be switched. In case, setting small output value or change setting value widely, setting can be done speedily. (Fine switch cannot be used when output value is set by remotely.)

# Ultra compact !

You can realize how small it is with comparison to a mouse.



## Lineup

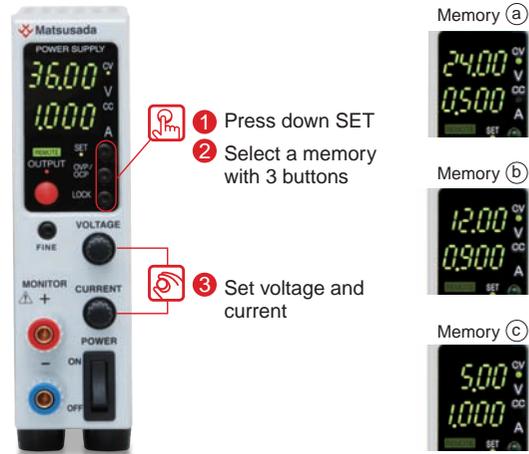
\*1 : The minimum setting unit of the instrument panel. With remote controlling, more detailed settings are available. (=> Refer to P.5 "Various Digital Control Functions")  
 \*2 : -L(230V) option ( »P.9)

Output voltage (V)	Output current (A)	Output Power (W)	MODEL	Ripple		Minimum setting unit *1		AC input			Weight (typ)
				(mVrms)	(mArms)	Output voltage (mV)	Output current (mA)	Input voltage	Input current (typ)		
									at AC in 115 V	at AC*2 in 230 V	
0 to 2	0 to 0.1	0.2	R4K2-0.1	1	1	1	0.1	115 V ±10%*2 230 V ±10% 50/60 Hz single phase	0.1 A	0.05 A	500 g
0 to 36	0 to 0.1	3.6	R4K36-0.1	2	1	10	0.1		0.5 A	0.25 A	
0 to 8	0 to 3	24	R4K8-3	4	4	1	1		1 A	0.5 A	
0 to 6	0 to 4		R4K6-4	5	8	1	1		1 A	0.5 A	
0 to 40	0 to 0.6		R4K40-0.6	3	1	10	0.1		1 A	0.5 A	
0 to 36	0 to 1	36	R4K36-1	5	5	10	1		1 A	0.5 A	
0 to 18	0 to 2		R4K18-2	5	5	10	1		1 A	0.5 A	

# FUNCTIONS

## Multi Setting Function

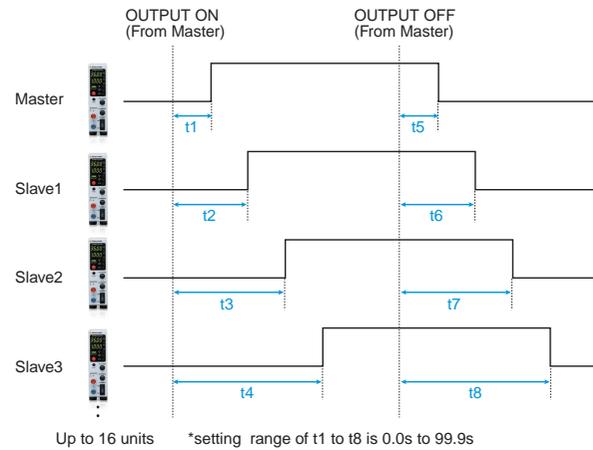
Function to memorize 3 different voltage and current settings in addition to standard preset function. No need to adjust the output when different setting, and convenient function for production inspection process or testing which require frequent data sampling.



## Delay Trigger Function

In case -LUs1, -LRmf option is selected, only one unit of R4K-36 series can be used.

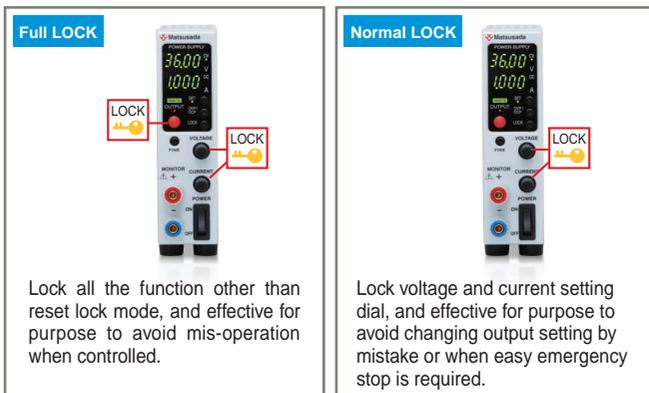
Function to delay the OUTPUT ON/OFF time (\*1). It is possible to use in case single unit of R4K-36 series is used, and also when connecting several Matsusada power supplies (\*2) using master/slave connection terminal (\*3) and output voltage/output current are set individually, delay trigger function can be used. (\*4)



- \*1: This function is not allowed to use together with all the sequence operations in -LDe Option with Pulse sequence function, Ramp function, and Master follow function (see page 09).
- \*2: Can be connected up to 16pcs.
- \*3: R4K-80 series, RK-80 series, RK series and REK series. Detail catalog for each model is available. Please contact nearby sales office.
- \*4: Only for slave-local. In case of slave remote control, exact same model of power supply need to be used. Also, in case of slave-local, each output voltage and current can be set individually. In case of slave-remote, output voltage and current can be set with one-control function which each slave unit follows the master unit setting.

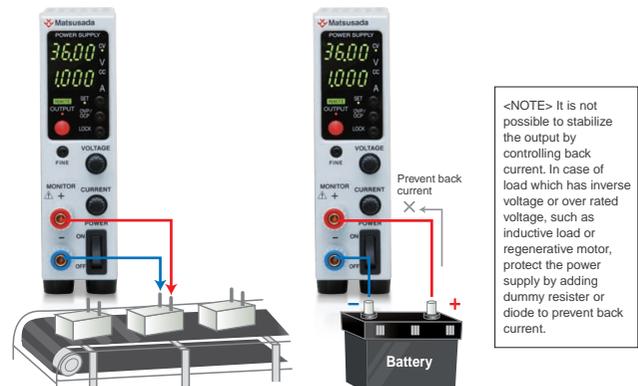
## Two Mode Lock Function

Function to select two different lock functions for two different purposes. "Full Lock" locks all the function on front panel, and "Normal Lock" locks all the function except for ON/OFF. "Full Lock" mode shall be good in case mis-operation have to be completely avoided, and "Normal Lock" mode shall be good in case to avoid mis-operation but secure the way for emergency stop of power supply. You can select the best mode according to your level of "Security", (in both modes, emergency stop is possible with Power Switch.)

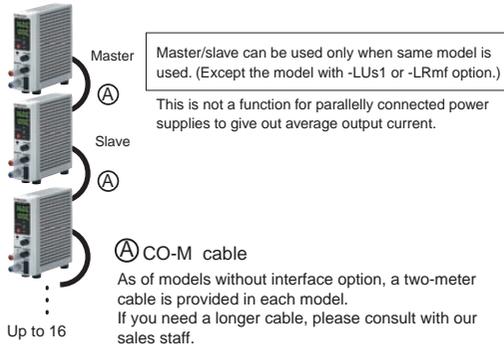


## Sink Current/Sink Current Prevention Function

R4K-36 series features function to sink current, and enable to decrease the voltage quickly when turning off the output or when control the voltage down, which increase the safety of operation. In case burn-in tests such as aging test are conducted one after another in short interval, connectors can be attached or removed quickly and go for the workexchange. which increases the efficiency of process after the output OFF operation. On the contrary by using sink current prevention function, it is possible to prevent voltage drop on the load by decreasing the current flow from load to power supply when turning off the power supply or when decrease the output voltage.



## Master/Slave Control



## Various Digital Control Functions

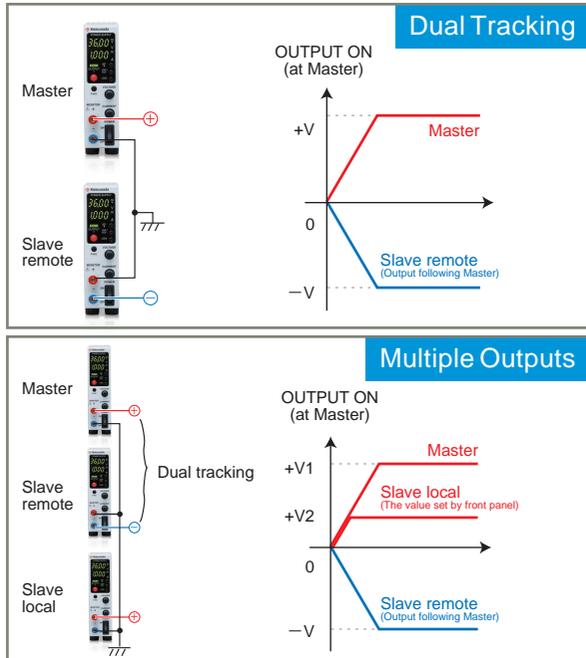
<b>Control function</b>	Output ON/OFF setting	
	Status output (fault/output/OVP/OC/OT/ACF/reversible sense connection)	
	Maximum 16 units digital control	
<b>Write function</b>	Collective control function for multiple units	
	Output voltage setting/ Output current setting	Percent mode (100.00%), *voltage current value mode (maximum rated voltage and current value)
	OVP setting/OCP setting	Percent mode (100.0%), voltage current value mode (over voltage/over current protection value)
<b>Reading function</b>	Output voltage reading/ Output current reading	Percent mode (100.00%), *voltage current value mode (maximum rated voltage and current value)
	Output voltage setting/ Output current setting	Percent mode (100.00%), *voltage current value mode (maximum rated voltage and current value)
	OVP setting/OCP setting	Percent mode (100.0%), voltage current value mode (over voltage/over current protection value)

\* Minimum value of each model is same as minimum display of front panel meter.

## Dual Tracking, Multiple Outputs

Dual tracking control, which enables both positive and negative outputs simultaneously in master/slave operation, is possible. Multi outputs and various versatile operations are also possible by combining above dual tracking control and slave local mode. Positive and negative output (+V, -V) of dual tracking control and set output voltage of slave local mode can be output simultaneously by turning on the master unit.

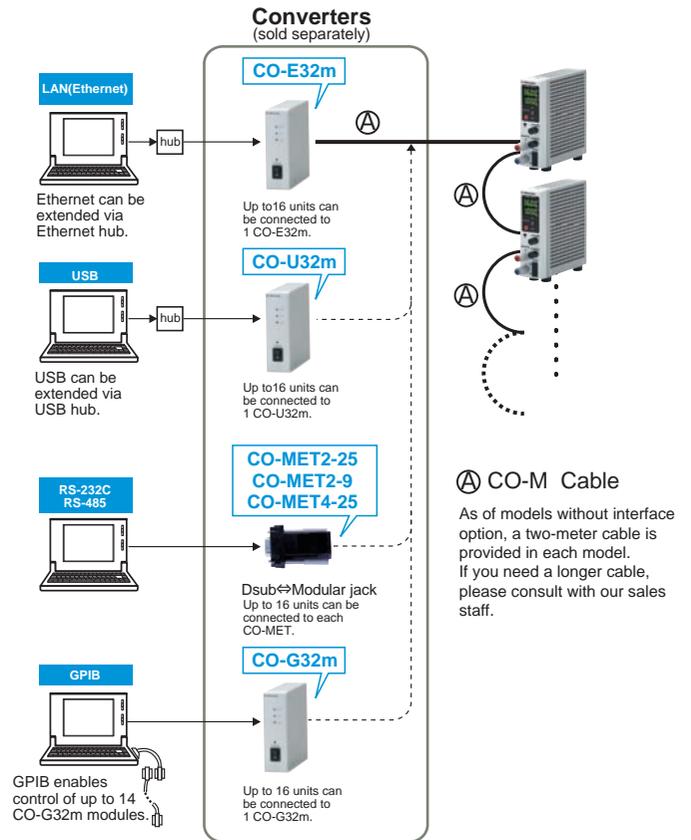
\*Please refer to P.10 for connection details.



## Digital Interface

Digital control of USB/Ethernet\*/RS-232C/RS485/GPIB and one-control on master/slave operation.

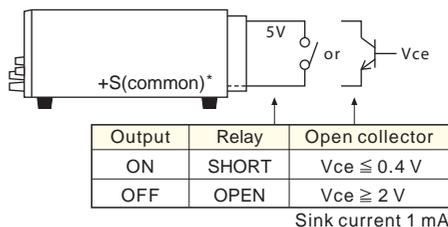
\*Ethernet is a registered trademark of Xerox Corporation.



## Remote Control Functions

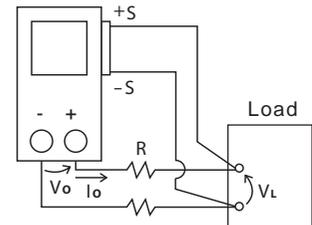
### Remote switch ON/OFF

\* +S is common. So external control voltage shall be input with +S as reference. Otherwise it can cause failure.

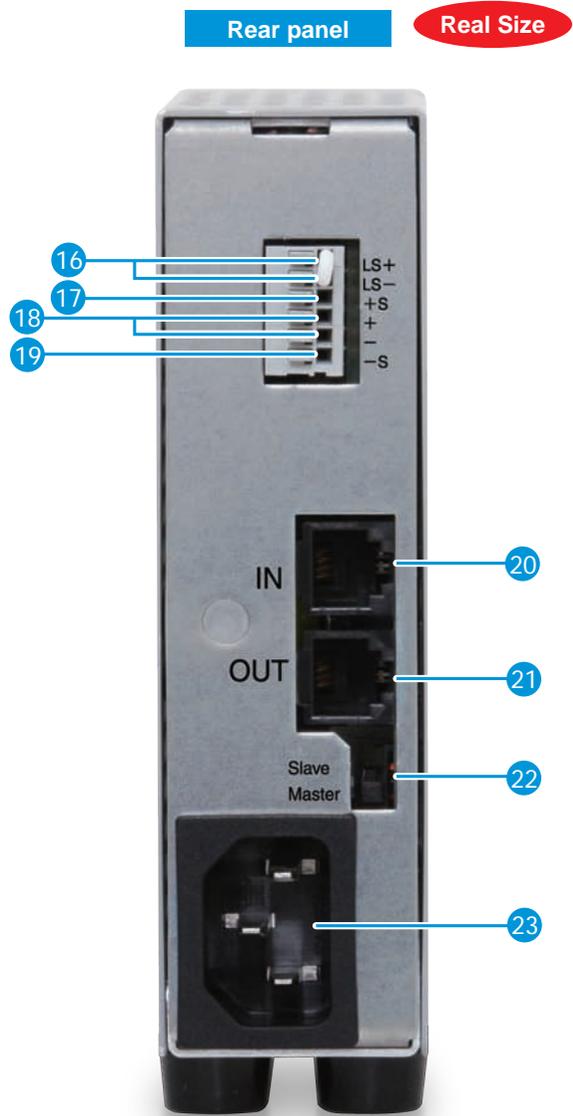
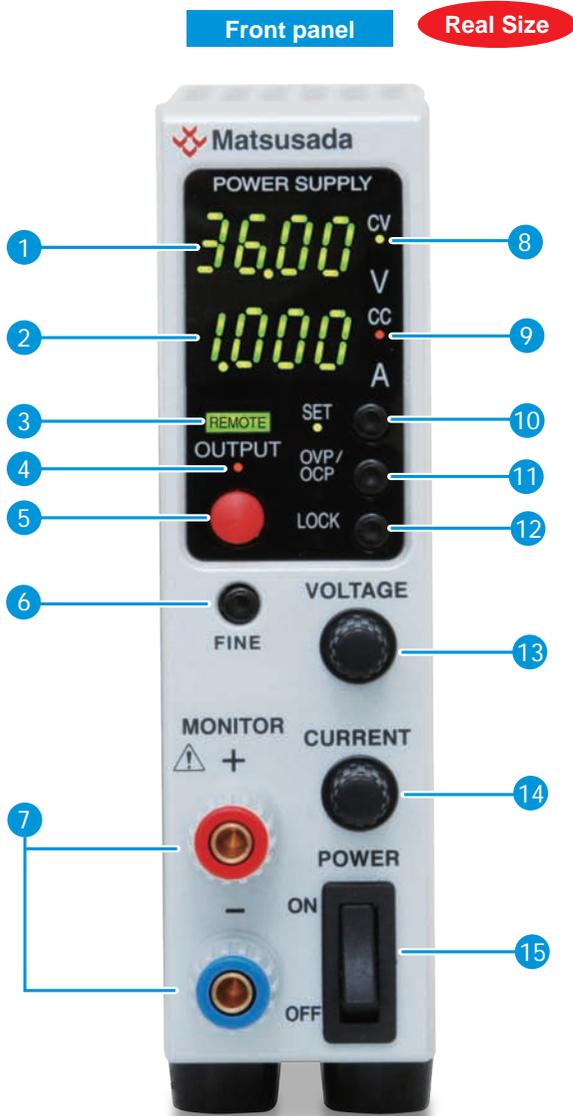


### Remote sensing

Compensate the voltage drop ( $V_0 - V_L$ ) due to resistance of output lead or drop of stability by contact resistance. (maximum 0.5 V)



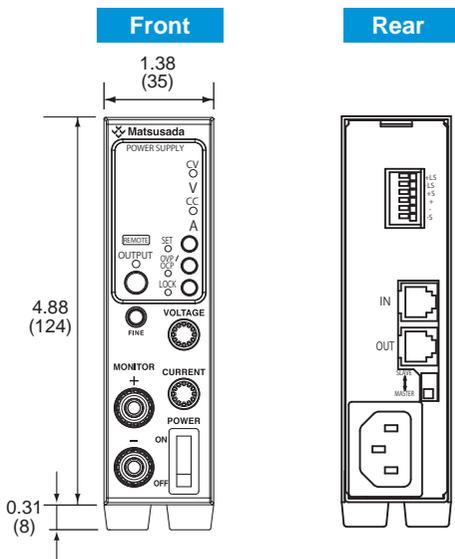
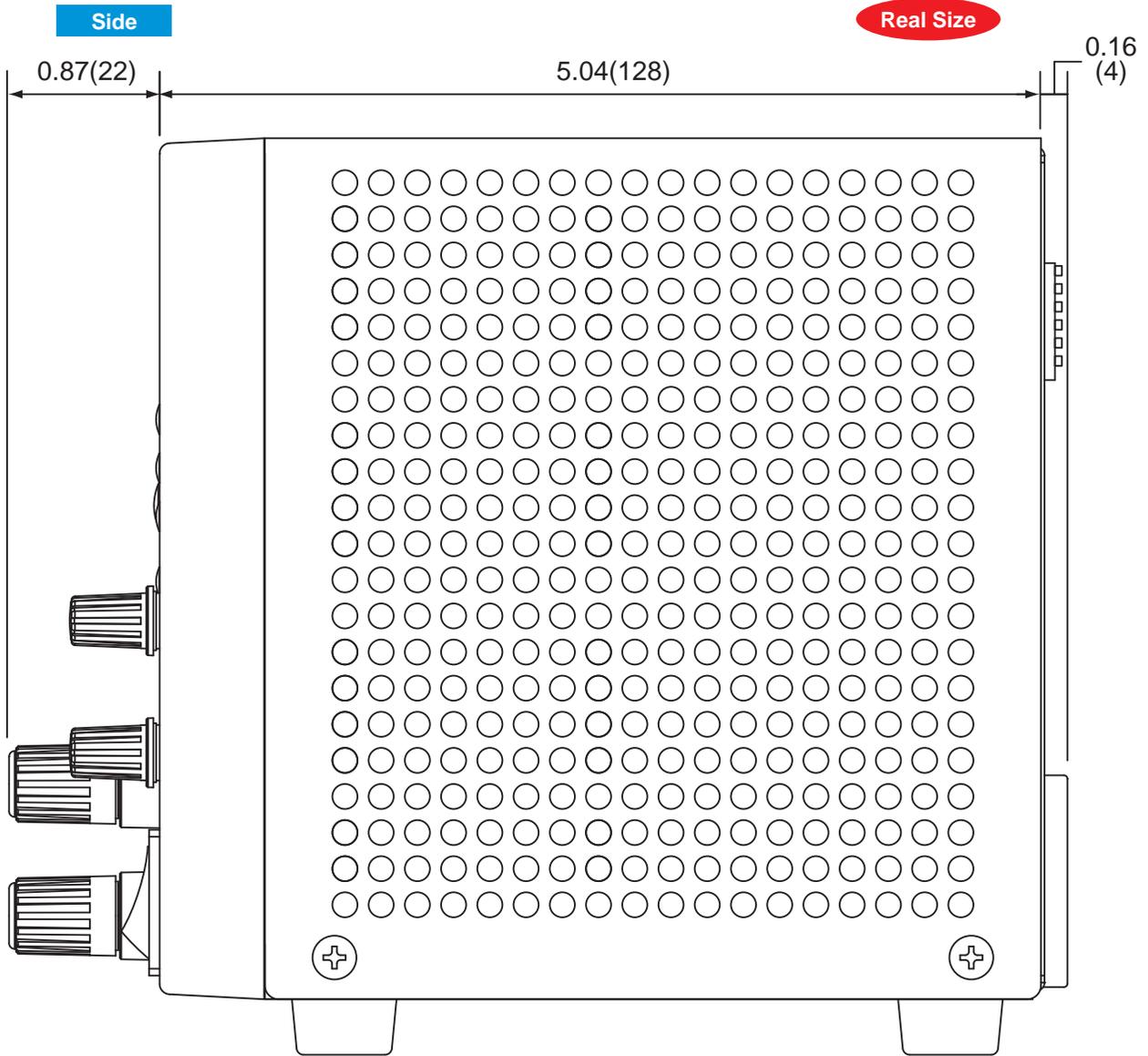
# Functions



- 1 Output voltage and OVP setting display
- 2 Output current and OCP setting display
- 3 Remote programming display  
Light up when output voltage/current control in remote mode.
- 4 Output display  
Light up when output is on.
- 5 OUTPUT ON/OFF switch  
Used to turn output ON/OFF at local mode as well as to reset the protection functions.
- 6 FINE switch  
Switching setting digit when setting output voltage and current.
- 7 Monitor terminal and Output terminal (M6)
- 8 Constant voltage operation mode display
- 9 Constant current operation mode display
- 10 Output PRESET switch
- 11 OVP/OCP switch

- 12 LOCK switch
- 13 OUTPUT voltage (OVP setting dial)
- 14 OUTPUT current (OCP setting dial)
- 15 Power ON/OFF switch  
This has priority over all operations for safety reason
- 16 Remote output ON/OFF switch
- 17 +Sense
- 18 OUTPUT terminal (up to 3 A)
- 19 -Sense
- 20 Digital interface IN (as well as Master/Slave and Delay trigger function)
- 21 Digital interface OUT (as well as Master/Slave and Delay trigger function)
- 22 Master/Slave selector switch
- 23 AC inlet

# Dimensions inch (mm)



## AC input cable

<p><b>CABLE TYPE 1</b> 125 V/10 A (Standard)</p>	
<p><b>CABLE TYPE 3</b> 250 V/10 A for -L(230V) option</p>	
<p><b>CABLE TYPE 4</b> 250 V/10 A (Sold separately)</p>	

## Specifications

<b>Output Control</b>	CV Mode: By rotary encoder on front panel CC Mode: By rotary encoder on front panel
<b>Stability</b>	0.05% of maximum output voltage/8 Hr
<b>Temperature coeff.</b>	±0.01%/°C (CV), ±0.02%/°C (CC)
<b>Lock Function</b>	Lock function locks the output voltage and current setting
<b>Output Display *</b>	Voltage: 4-digit digital meter (Accuracy: ±0.2% of Reading and ± 4 digits) Accuracy of preset value: ±0.2% Setting ± 4 mV in R4K2-0.1, R4K8-3, R4K6-4 ±0.2% Setting ± 40 mV in R4K36-0.1, R4K40-0.6, R4K36-1, R4K18-2 Current: 4-digit digital meter (Accuracy: ± 0.4% of Reading and ± 5 digits) Accuracy of preset value: ±0.4% Setting ± 0.5 mA in R4K2-0.1, R4K36-0.1, R4K40-0.6 ±0.4% Setting ± 5 mA in R4K8-3, R4K6-4, R4K36-1, R4K18-2  * At 1 to 100% of rated output.
<b>Protections</b>	Over voltage protection (OVP): Cut off the output at set value Setting range: appx. 5% to 110% of rated maximum voltage Setting: By front panel rotary encoder Reset: By OUTPUT ON/OFF switch or remote switch (manual control) Over current protection (OCP): Cut off the output at set value Setting range: appx. 5% to 110% of rated maximum current Setting: By front panel rotary encoder Reset: By OUTPUT ON/OFF switch or remote switch (manual control) Over temperature protection (OTP): Cut off output at abnormal temperature. Reset(after temperature go down to normal): OUTPUT ON/OFF switch or Remote switch (manual control) Input brownout (ACF)-Blackout protection: Output is cut off when input voltage decreased. Reset (when normal voltage value or recovery from blackout) : Manual recovery by OUTPUT ON/OFF switch or Remote switch for blackout protection : Automatic recovery when blackout protection is canceled
<b>Other Functions</b>	Remote sense reverse connection Remote switch ON / OFF (TTL or external relay), Remote sensing Delay trigger: Individual setting of ON delay and OFF delay (0.0 sec to 99.9 sec) Multi setting function: Voltage and current memory "a", "b" and "c" setting in addition to standard voltage and current preset
<b>Operation Temp.</b>	0°C to +40°C
<b>Storage Temp.</b>	-20°C to +70°C
<b>Storage humidity</b>	20% to 80%, no condensing
<b>Dielectric voltage</b>	Between input power supply and output terminal: AC1000 V 1 min. Between input power supply and chassis: AC1000 V 1 min.
<b>Isolation voltage</b>	±250 Vdc (Positive or Negative terminal grounding)
<b>Accessories</b>	AC Input cable 2.5 m single phase 3-pin type (1) Instruction manual (1) CO-M cable 2 m (1) (without -LUs1, -LRmf option) Ground plate (1)

For safer operation, connect ground plate to output terminal.



# Options

## -Llc: Output current accumulation function

Accumulate the output current and display its value (up to 100 Ah). Accumulated value is stored even when output is off. Also, accumulated value which stop the output can be set preliminarily, it is very suitable to the application such as controlling plating solution.

※ Please consider the location of usage. High humidity environment can be the cause of failure and corrosion.

## -LUs1: USB interface board \*1 \*2 \*3

Enable digital control with USB. One power supply can be connected per one USB port which computer equipped. In case USB port which computer equipped is not enough, please use USB hub. However, depending on USB hub, it may not work correctly.

OS: Microsoft Windows XP/Vista/7/8/10

(Both 32-bit version and 64-bit version are available.)

Microsoft Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

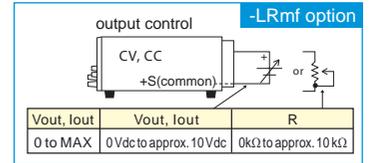
## -L(Mc0.5) \*3: Communication cable length change

## -L(Mc0.15) \*3: Communication cable length change

Change length of CO-M cable to 0.5, 0.15-meter long.

## -LRmf: Remote multi function \*1 \*3

It is possible to control output voltage and output current by external voltage or external resistance. (+S is common. So external control voltage) shall be input with +S as reference.



## -LWo: Universal input Coming soon

100 Vac to 240 Vac 50/60 Hz single phase.

Use appropriate AC input cable. Attached AC input cable is only for 100 V input.

## -LH: Higher isolation voltage

This option make the isolation voltage to be  $\pm 1$  kV, which enable extended capability of series operation.

## -L(200V): 200Vac $\pm 10\%$ input

## -L(230V): 230Vac $\pm 10\%$ input

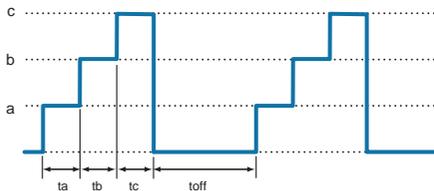
Refer Lineup (page3) for input current.

Note \*1 When these options are selected, standard digital interface will not be equipped. Also, these options cannot be equipped together.  
 \*2 For detailed specification of USB and digital interface, please refer data sheet of CO/USB series.  
 \*3 -LUs1 or -LRmf option cannot be equipped together with -L(Mc0.15) and -L(Mc0.5) option.

## -LDe: Pulse/Ramp sequence, Master follow function above output control, between A to D is available.

### A Pulse Sequence

According to the combination with Multi Setting Function, the sequence operation is available by using the voltage and current settings stored respectively in Memory a, b, and c. Also, setting the number of operations is provided, let alone continuous operation. As the set time of Memory a, b, c or off is set to 0.0, the output control has a great variety of operations such as continuous operation in both of Memory a and b or among Memory b, c, and off. Thus, the function is ideal especially for product evaluation tests.

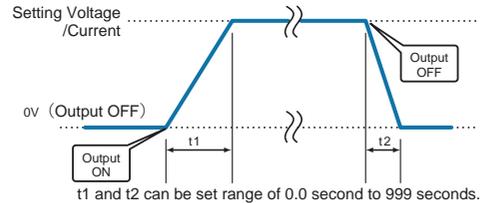


ta, tb, tc, and toff can be set respectively with the range of 0.0 second, 1.0 seconds to 99.9 hours.

### B Ramp

In this function, the ramp operation is available within the voltage and current settings (or up to 0 V/0 A starting the said values). It is excellent for increasing or decreasing the voltage and current values gradually. The function can also effectively reduce the load damage caused by overshooting.

\*The ramp operation can be set with a range among "both settings of voltage and current value", "voltage setting only", and "current setting only".



t1 and t2 can be set range of 0.0 second to 999 seconds.

### C Combination of Pulse and Ramp Sequence

Features of pulse sequence operation and ramp operation can be combined for more convenient operation. In combination with Multi Setting Function, the sequence operation is available by using the voltage and current settings stored respectively in Memory a, b, and c.

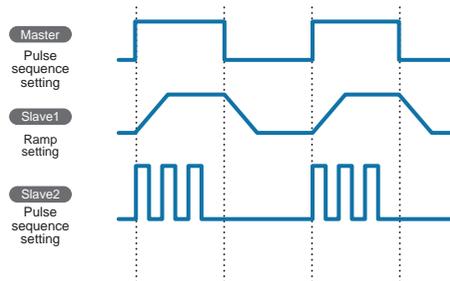
Besides setting continuous operation, a specific number of settings is provided. This function allows the voltage or current value to use repeatedly by increasing or decreasing gradually to three different settings, which is really useful for various purposes.



t1 to t4 can be set range of 0 to 999 seconds.  
 ta, tb, tc and toff can be set range of 0.0 second to 99.9 hours.

### D Master follow

During the pulse sequence and ramp operations in master/slave control, the output signal will be sent to the slave machine. As the result, the slave machine can have different output status to the master machine. (Master follow function cannot be used with -LUs1 option.)



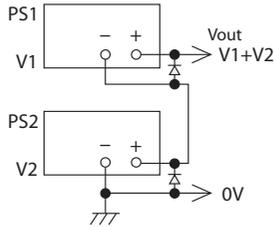
Note The operation accuracy of the timer when sequencing is 0.5%. Be careful when you use it by the long-term running operation.

When ordering, suffix the above option number to the model number. <e.g.>R4K36-1-LDcHlcUs1(200V), R4K18-2LDcH(Mc0.5)(200V) alphabetical, AC input order

## Operation example

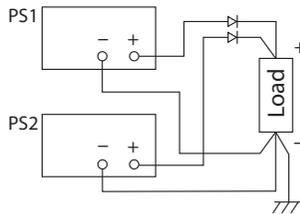
In R4K-36 series, the output voltage and current can be increased by connecting the same models in series or parallel operation. As to the control, the use of local control or digital master/slave control is recommended. The common of the external input control connector is connected to +output of the power supply. So, do not connect it to any common of other power supplies.

### Series operation



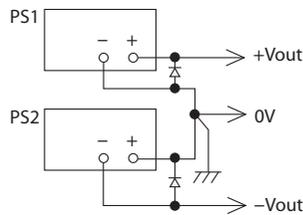
The total output voltage can be up to 250 V. Series operation is not available for the total output voltage exceeding 250 V. In that case, the output current comes to the one of the smallest power supply.

### Parallel operation



Please use the same voltage setting for parallel operation. The output current comes to the sum of each current. In order to prevent damages, please ensure to have the maximum level of OVP of the power supply.

### Split operation



Positive and negative outputs are available respectively.

## R4K-36 series Accessory Kit

\*Power supply is not included in the accessories.

Various accessories are available for convenient use of the unit.

### **NEW** R4K-36QC



Special designed case to bind 5-unit of R4K-36 series. Power ON/OFF switch will be consolidated, and also AC input line on rear panel will be bundled to one. Also, handle on the top makes easy to carry.

- Accessories**
- One set of translator for AC cable of five R4K-36
  - Input AC cable 2.5 m single phase (3-pin type) (1)
  - Instruction manual (1)
  - CO-M cable 2 m (1), 0.5 m (4)

\* R4K-36 series is sold separately.

\* The unit is not included in the case, and install it yourself. When you want to purchase the case equipped with the R4K-36 series, please consult with our sales representatives.

\* Make sure to use the unit in a place where the ambient temperature is within the operating temperature range so as to properly maintain the operating temperature inside the unit (see page 08). (The service life of power supplies is generally shortened by half whenever the ambient temperature increases by 10 degrees.) Therefore, it is your responsibility to confirm the temperature at operation.

\* The input voltage of R4K-36QC is 115 Vac. When you want five units of R4K-36 series with -L(200 V) or -L(230 V) option placed in a case for use, please specify the model number as R4K-36QC-L(230V) to order.

## Rack mount holder [RMO series]

- Up to 10 units can be installed in the rack holder for a 19-inch cabinet, and each unit is easily attached and detached.
- It is suitably designed for system operation.
- A forced-air cooling fan is built-in.



## Power Supply stand

For one unit operation...





# TECHNICAL NOTE

## Connection Operation

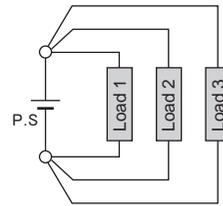
### ■ Connection of load

- Please use a short lead wire that is sufficiently thick for the connection.
- Please use PVC electric cable (105°C) that can fully tolerate the voltage used. It is necessary to consider current capacity, length limit of output wire by sensing (0.5 V / lead) and so on for wiring with load. Please refer to the following diagram to determine the thickness of cable.

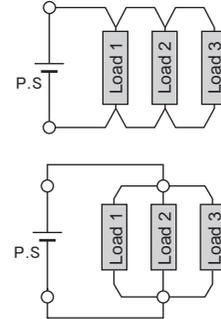
AWG	mm <sup>2</sup>	Max current (A)
18	1.1	2
16	1.3	7
14	2.1	11
12	3.3	18
10	5.3	23
8	8.4	39
6	13	67

### ■ Parallel connection of load

#### ○ Good example



#### ✗ Bad example



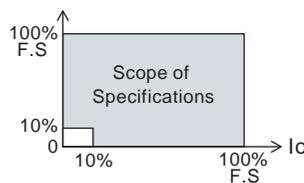
A power supply has no direct branching, but the load is branched using cables.

## Specifications Definitions

The following definitions shall basically take precedence. In case there is any specific definition described in other parts of the brochure, the definition has higher priority than the following ones. The specification in this brochure indicates the value at rated power output (full scale) shown after a two-hour warm up.

#### Scope of Specifications

The following specifications are applied within a range of 10 to 100% of the rated output.  
(●Ripple ●Stability ●Variations)  
(●Temperature coefficient)



#### Ripple

Displays rms including high-frequency noise

#### Preset

The preset value does not accurately show the actual status of output. When accurate setting is required, actually output with no load and set the voltage. Also, set the current setting to the desired value by outputting with the output terminal shorted and gradually increasing current.

## When selecting DC power supply

### ► Important Notice

Products on this catalog have been manufactured with consideration of safety as DC power supply, however please follow instruction manual for operation and make sure to ground the ground terminal for your safety.

Products on this catalog have been manufactured on the precondition that they are used in ground electric potential or within the range of the above series operation. Please contact our sales staff when using the product for floating of high electric potential, etc.

Products on this catalog are manufactured with consideration for protection against load discharge. However for specific experiment or continuous discharge such as sputtering, product may need discharge resistance between power supply and load or could not be used at all. Please consult with our sales staff in advance.

We recommend that you contact our sales staff with your requirement before choosing a product so that you can get the best product and the safety as high-voltage equipment is assured.

