Matsusada Precision

Ultra compact / Bench-top power supply

R4K-80 Series

NEW

Ultra Slim DC Power Supply

Width : Only 1.38” / Output Power : 80W

R4K-80 series

16V to 320V / 0.5A to 10A / 80W

www.matsusada.com

R4K-80 series

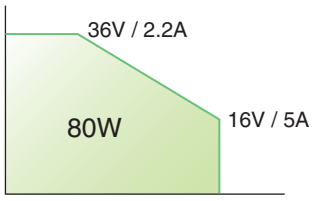
Ultra Slim Sophisticated Bench-top Power Supply

R4K-80 series is higher performance DC variable power supply. 4-digit digital meter and high resolution D/A, A/D converters are added newly for more precise setting and reading. Needless to say, the innovative compact size, variable range feature and high operability are remaining same as conventional RK-80 series. R4K-80 series is the best suitable DC power supply for a variety of applications from laboratory experiment to line productions.

New user-friendly functions

New and useful functions and stylish front panel design!

■ Useful new feature of variable setting range



Set voltage /current value within 80W, then turn on output

*Not automatic range change which can output 80W all the time. Resetting is required.

Quick access to functions needed

No.1 Preset setting is automatically displayed when output is off.

No.2 OCP is added for more safety operation.

No.3 Quick lock with one touch action. Two selectable lock options.

R4K-80 series

More useful !

- Compact and light weight space saving design
- Very quiet due to the adopting naturally-cooled system without cooling fan.
- For wider output range
  R4K-80L : 16V / 10A
  R4K-80 : 36V / 5A
  R4K-80M :110V / 1.3A
  R4K-80H : 320V / 0.5A
- Unique low noise power conversion technology for research application
- Power factor correction and universal input
- Multiple units operation with master / slave and digital interface

Useful NEW 5 Additional Functions

- **4-digit digital meter** (output voltage and current)
- **High resolution D/A, A/D converter integrated**
  As 1 click of rotary encoder is 1 count, fine setting is possible
- **Digital interface as standard function**
  Digital interface shall make the data logging and automatic measurement easier.
  ⋆Conversion adapters suitable for RS-232C, RS-485 or GPIB is separately required.
- **Various waveform with pulse and ramp sequence function at will**
  With pulse / ramp sequence function(optional) various test pattern can be set without personal computer.
- **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 cannnot be used when output value is set by remotely.)

Lineup

⋆1 : Value at local control. More precise setting can be available with remote digital control. Please see P.5 “Various Digital Control Functions”.
⋆2 : When 115VAC maximum output

Output voltage (V)	Output current (A)	Output Power(W)	MODEL	Ripple		Minimum setting unit *1		AC Input				Weight (typ)
				(mVrms)	(mArms)	Output voltage	Output current	Input Voltage	Input Current (typ)		Power factor (typ)	
									AC in 115V	AC in 230V		
0 to 16	0 to 10	80	R4K-80L	5	10	10mV	10mA	85 to 264VAC 47 to 63Hz Single phase	1A	0.5A	0.99 *2	1kg
0 to 36	0 to 5		R4K-80	5	5		1mA					
0 to 110	0 to 1.3		R4K-80M	10	2	100mV	1mA					
0 to 320	0 to 0.5		R4K-80H	20	1		0.1mA					

FUNCTIONS

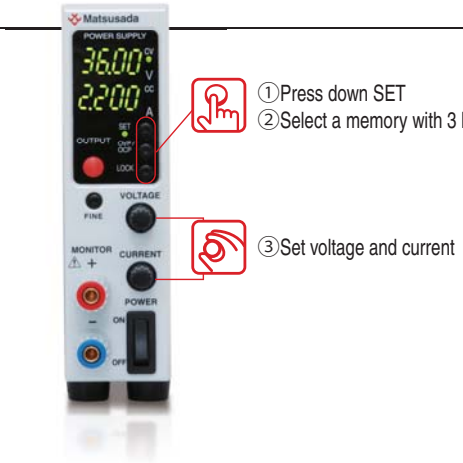
Multi Setting Function

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 taking.

Memory ⓐ

Memory ⓑ

Memory ⓒ

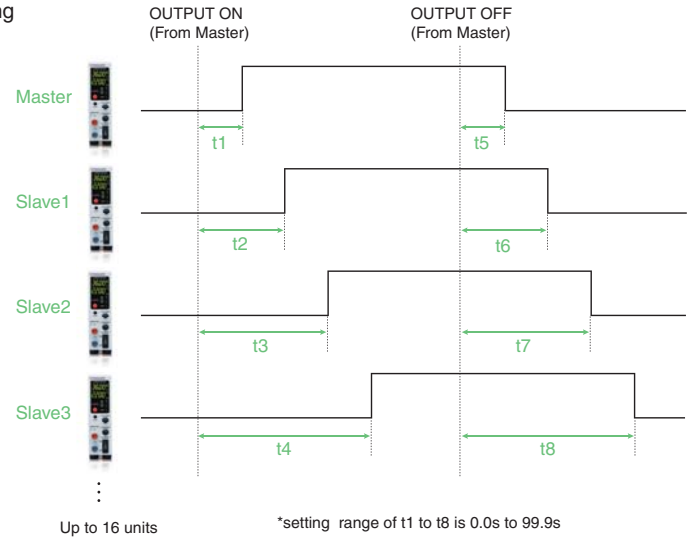


Delay Trigger Function

In case -LUs1,-LGob or -LEt option is selected, only one unit of R4K-80 series can be used.

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

*1 : R4K-36 series, RK-80 series, RK series and REK series. Detail catalog for each model is available. Please contact nearby sales office.
*2 : Can be connected up to 16 units.
*3 : 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.



Up to 16 units

*setting range of t1 to t8 is 0.0s to 99.9s

Two Mode Lock Function

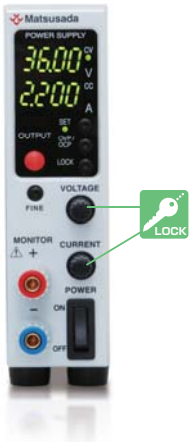
Function to select two different lock functions for two different purpose."Full Lock" locks all the function on front panel, and "Normal Lock" locks all the function except for ON/OFF. "Full Lock" mode shall be good in case mis-operation have to be completely avoided, and "Normal Lock" mode shall be 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.)

Full LOCK

Lock all the function other than reset lock mode, and effective for purpose to avoid mis-operation when controlled.

Normal LOCK

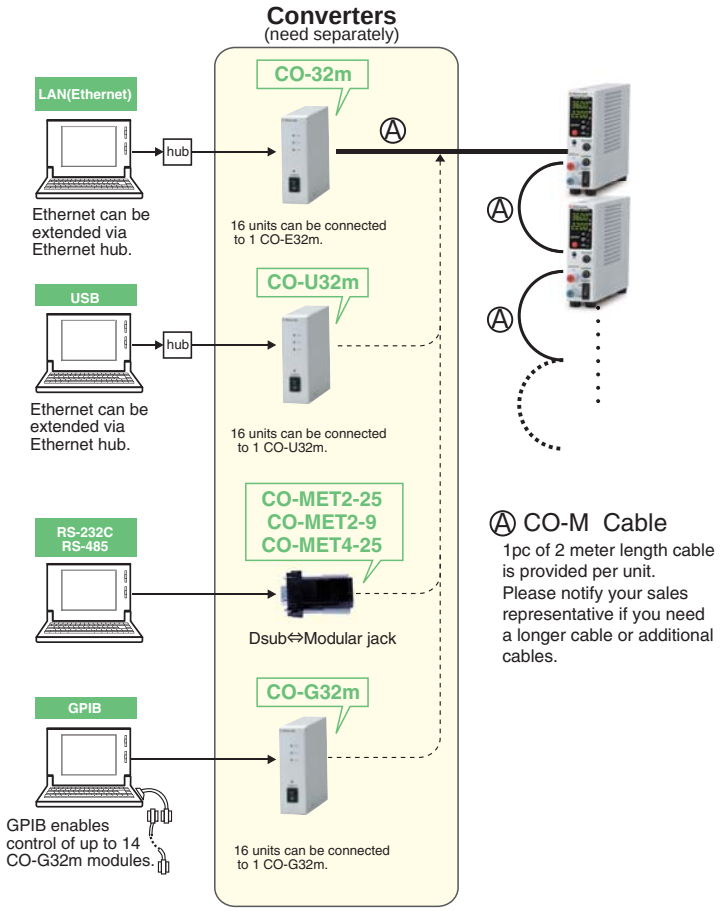
Lock voltage and current setting dial, and effective for purpose to avoid changing output setting by mistake or when easy emergency stop is required.



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.



Ⓐ CO-M Cable

1pc of 2 meter length cable is provided per unit. Please notify your sales representative if you need a longer cable or additional cables.

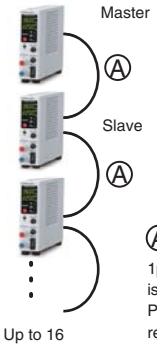
-LGob option will be needed if it will be used under specific condition. Please see P.8 for detail.

Various Digital Control Functions

Control function	Output ON / OFF setting	
	Status output (fault / output / OVP / OCP / OTP / ACF / reversible sense connection)	
	Maximum 16 units(-LGob option models : 32 units)digital control	
	One control function for multiple units	
Write function	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 (maximum over voltage / over current protection value)
Reading function	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 (maximum over voltage / over current protection value)

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

Master/Slave Control



Master-slave can be used only when same model is used. (Except the model with -LUs1 or -LEt option.)

This is not a function for parallelly connected power supplies to give out average output current.

Ⓐ CO-M cable

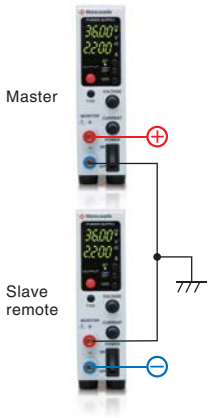
1pc of 2 meter length cable is provided per unit. Please notify your sales representative if you need a longer cable or additional cables.

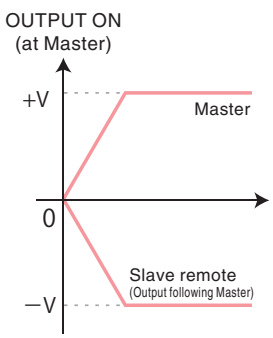
Dual Tracking, Multiple Outputs

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.

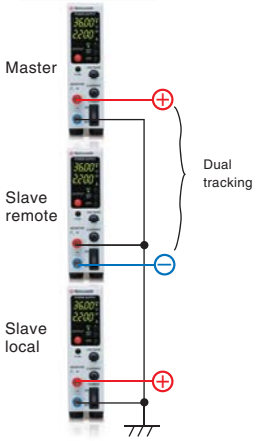
*Please refer to P.10 for detail connection.

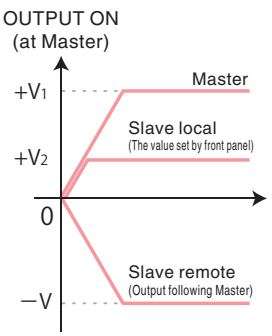
Dual Tracking





Multiple Outputs



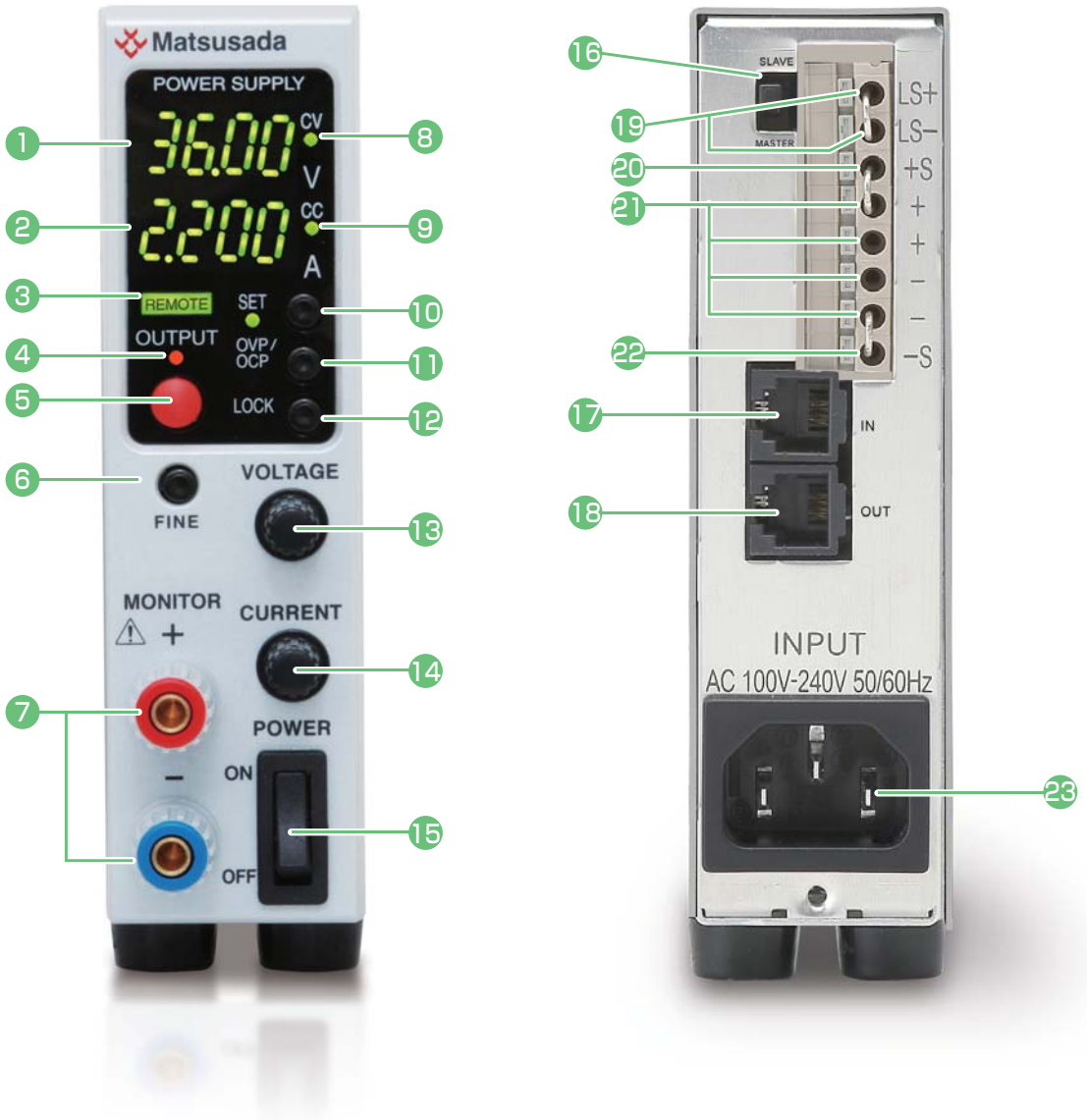


Functions

Front panel

Rear panel

Real size



1. Output voltage and OVP setting display
2. Output current and OCP setting display
   (mA for R4K-80H)
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
   To be used to turn output on / off when local mode as well resetting protection functions.
6. FINE switch
   To alter the digit of a setting for setting up output voltage and current.
7. Monitor terminal
8. Constant voltage operation mode display
9. Constant current operation mode display
10. 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. Master / Slave change switch
17. Digital interface IN For Master / Slave function too
18. Digital interface OUT For Master / Slave function too
19. Remote output ON/OFF switch
20. +Sense
21. OUTPUT terminal
22. −Sense
23. AC inlet

Specifications

Output Control	CV Mode : By rotary encoder on front panel CC Mode : By rotary encoder on front panel
Output Function	Wide output range, automatic limit setting at 80W for voltage and current In CV mode output current drop down when output power is more than 84.05W In CC mode output voltage drop down when output power is more than 84.05W
Lock Function	Lock function locks the output voltage and current setting
Output Display *1	Voltage : 4-digit digital meter. Accuracy is ±0.2% rdg ±4 digits Accuracy of preset setting is ±0.2% Setting ±40mV *2 Current : 4-digit digital meter. Accuracy is ±0.4% rdg ±5 digits Accuracy of preset setting is ±0.4% Setting ±5mV *2
Temp. coeff.	±0.01% / °C(CV mode), ±0.02% / °C(CC mode)
Protections	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 inside temperature. Reset(after temperature get down to normal temperature) : 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 switch or remote switch for blackout protection(re-output protection function). Automatic recovery when blackout protection is canceled. Sense reverse connection
Other Functions	Remote switch ON / OFF(TTL or external relay), Remotesensing Delay trigger : Individual setting of ON delay and OFF delay (0.0 to 99.9sec) Multi setting function : Voltage and current memory "a", "b" and "c" setting in addition to standard voltage and current preset
OperationTemp.	0°C to +40°C
Storage Temp.	-20°C to +70°C
Storage humidity	20% to 80% RH (no condensation)
Isolation voltage	16V, 36V output models : ±250Vdc / 110V, 320V output models : ±500Vdc (Positive or Negative terminal grounding)
Leakage current	0.5 / 1mA typ(ACIN 100V / 200V 60Hz)
Dielectric voltage	Between input power supply and output terminal : AC1500V 1min. Between input power supply and chassis : AC1500V 1min. Between output terminal and chassis : DC500V 1min.
Accessories	AC Input cable 2.5m single phase 3-pin type(1), Instruction manual(1), Ground plate(1)

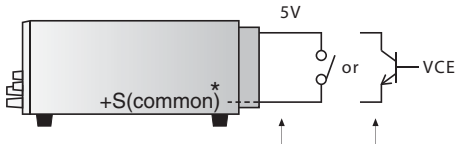
For safer operation,connect ground plate to output terminal.

*1 : At 1% to 100% of rated output.
*2 : The accuracy of the preset value varies according to rated output value of each product. Refer to the following table.

Voltage	Accuracy of preset value	Current	Accuracy of preset value
up to 9V	±0.2%setting±4mV	up to 999mA	±0.4%setting±0.5mA
10V to 99V	±0.2%setting±40mV	1A to 9A	±0.4%setting±5mA
more than 100V	±0.2%setting±400mV	10A to 99A	±0.4%setting±50mA

Remote Functions

Remote switch ON/OFF

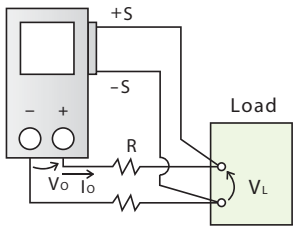


Output	Relay	Open collector
ON	SHORT	$V_{CE} \leqq 0.4V$
OFF	OPEN	$V_{CE} \geqq 2V$

Sink current 1mA

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

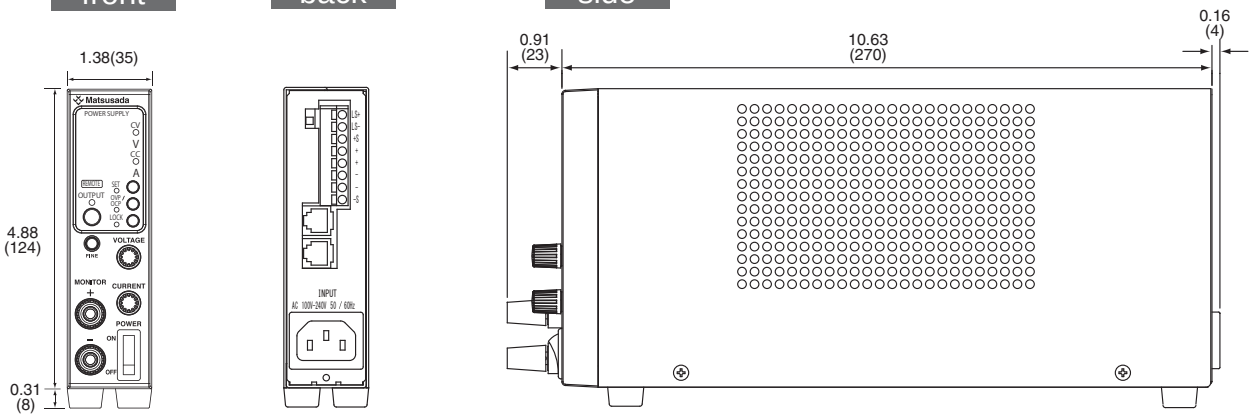
Remote sensing



Compensate the voltage drop (V0-VL) due to resistance of output lead or drop of stability by contact resistance. (maximum 0.5V)

Dimensions inch(mm)

front back side

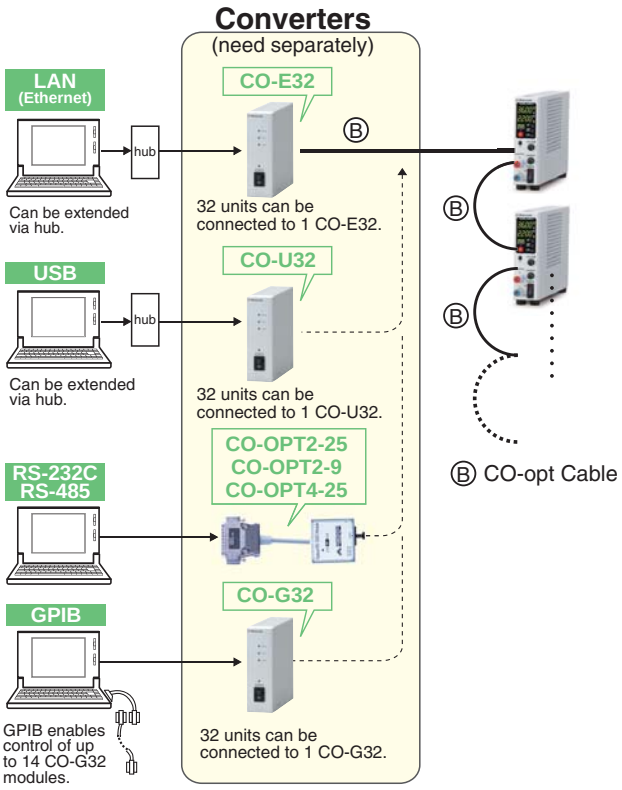


Options

-LGob : Optical Interface Board *1 *2

-LGob : Optical interface board + optical cable 2m
-LGob(Fc5) : Optical interface board + optical cable 5m
-LGob(Fc10) : Optical interface board + optical cable 10m
-LGob(Fc20) : Optical interface board + optical cable 20m
-LGob(Fc40) : Optical interface board + optical cable 40m

Optical communication offers insulation control. It is to prevent malfunction such as transient phenomenon by surge, lightning induction, and exogenous noise.



Select the -LGob option when using power supply following environmental condition
Factories which has a lot of noise
(ex.)in case of using power supplies and loads near motors and coils.
In case using power supply with high voltage floating(more than 250V)
The length between power supply and controller unit(PC or PLC) is more than 2-meter

-LIc : Output current accumulation function *3

Accumulate the output current and display its value(up to 100Ah).
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.

-LUs1 : USB Interface Board *1 *2 *4

When controlling several R4K-80 power supplies via USB, a USB hub will be required between the PC and R4K-80 power supplies.

-LEt : LAN(Ethernet) Interface Board *1 *2 *4

When controlling several R4K-80 power supplies via Ethernet, a hub will be required between the PC and R4K-80 power supplies.

(Ethernet is a registered trademark of Xerox Corporation.)

-L(Mc0.5), -L(Mc0.15) : Communication cable length change *1 *2 *5

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

-LH : Higher isolation voltage

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

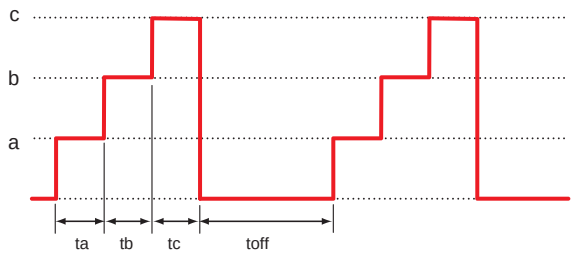
*1 These options cannot be selected together. Only one of each can be selected.
*2 If you select these options, standard digital interface will not be equipped. Also, please see the CO series catalog for detail of function of digital interface function.
*3 Please consider the location of usage. High humidity environment can be the cause of failure and corrosion.
*4 Master / slave function is not available.
*5 -L(Mc0.5) or -L(Mc0.15) option cannot be selected with -LGob, -LUs1 or -LEt option.

-LDe: Pulse Ramp Sequence

Below output control, between A to D is available

A. PULSE SEQUENCE

Using the stored voltage and current setting in each memory of a, b and c and multi set function, sequence operation is possible. The setting of repetition to say nothing of a continuous driving can be set. Various different operations, such as repetition of memory a and b or b ,c and off, are possible by setting the set time of memory a, b, c, and/or off to be 0.0. Thus, it makes this model suitable for evaluation test or other applications.

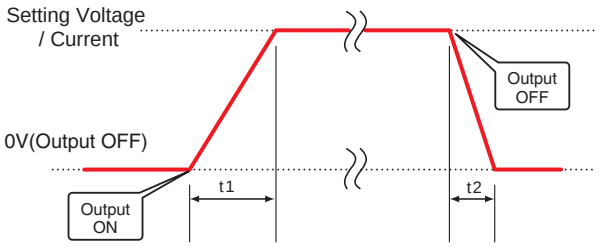


ta, tb, tc and toff can be set with range 1.0s to 99.9h respectively.

B. RAMP SEQUENCE

This function controls the ramping up and down the voltage and current to the set value (or from set voltage and current value to 0V/0A). It is convenient to increase(decrease) the voltage and current value slowly.

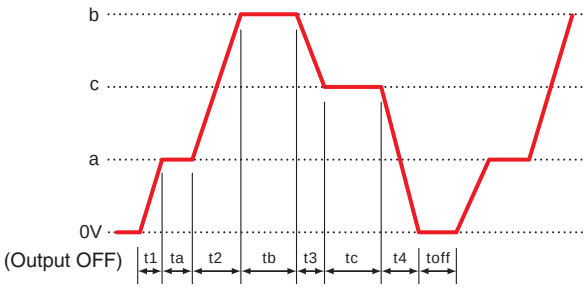
*The Ramp sequence can be selected from [both set voltage and current], [only set voltage], and [only set current].



t1 and t2 can be set with range 0 to 999s respectively.

C. COMBINATION OFPULSE and RAMPSEQUENCE

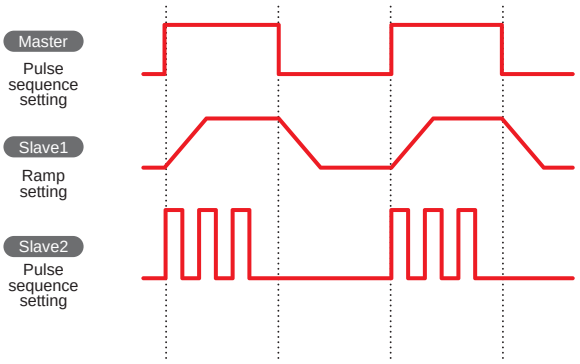
Features of pulse sequence operation and ramp sequence operation can be combined for more convenient operation. In addition, by adding multi set function, sequence operation can be operated using stored voltage and current settings in each memory. The setting of repetition to say nothing of a continuous driving can be set. For example it is possible to slowly ramp up and down the voltage and current to the three different settings, and so, it is useful on various scenes.



t1, t2, t3 and t4 can be set with range 0 to 999s respectively.
ta, tb, tc and toff can be set with range 0.0s to 99.9h respectively.

D. MASTER FOLLOW

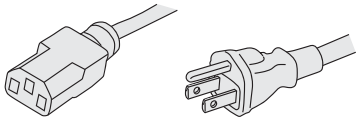
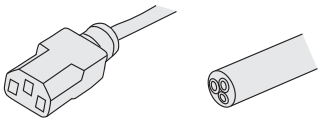
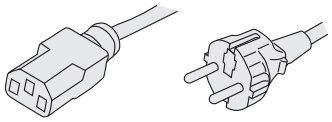
When the pulse sequence operation and the ramp work master-slave, the output signal to the slave unit is transmitted. The slave unit can be output in an output status different from the master unit.
（Master follow function cannot be used with -LUs1 or -LEt option.）



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

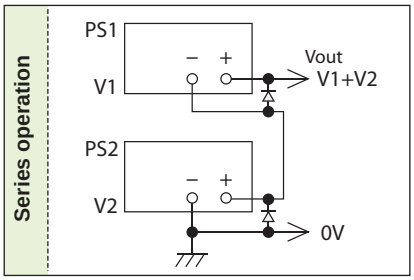
When ordering, suffix the above option number to the model number. <e.g.>R4K-80-LDeGobHIc, R4K-80L-LDeHIcUs1

AC Input Cable

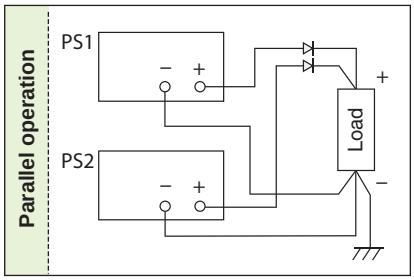
CABLE TYPE 1 (standard)	CABLE TYPE 3 (separate)	CABLE TYPE 4 (separate)
125V / 10A	250V / 10A	250V / 10A
		

Series Operation · Parallel Operation

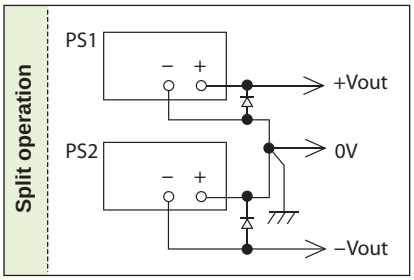
R4K-80 power supply of same model number can be connected in series or parallel to increase output voltage or current.
In that case, local control or the control in the digital master slave is recommended.
Because the common of the outside input / output control connector (TB1) is connected to the positive output, please do not connect common more than two.



Total output voltage is to be up to 250V. Therefore for models with output voltage of over 250V, series operation cannot be conducted. Output current is to be the smallest current of those.



Please keep all the settings of voltage the same. Output current will be the summation of each current. Please keep OVP level of power supply maximum to prevent any damage.



+output and –output are available.

Accessory Kit

Various accessories are available for convenient use of the unit.

Stand

For one unit operation...

Binder

For the applications which require 2 to 6 units combination. Dual, triple and quad multiple operation is possible.

*Cooling fan is needed for more than 3 units combination.

Rack mount holder

[RMO series]

- 10 Units/1 rack holder, and can be placed in a cabinet. Easy to take one unit out.
- Best suitable for a system operation.
- With fan unit.

*Power supply is not included in the accessories.

TECHNICAL NOTE

Connection · Operation

Connection of load

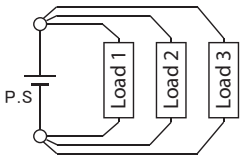
· Please use a short lead wire that is sufficiently thick for the connection.

· 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 (0.5V/lead) and so on for wiring with load. Please refer to the following diagram to determine the thickness of cable.

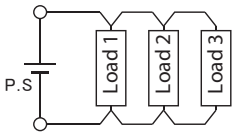
AWG	mm2	Max current(A)
18	1.1	2
16	1.3	7
14	2.1	11
12	3.3	18
10	5.3	23
8	8.4	39
6	13	67

Parallel connection of load

Good example



Bad example

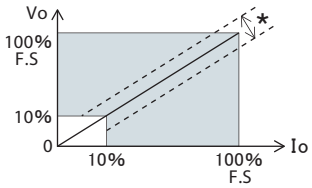


Definition of specifications

Specifications in this catalog, except otherwise specified, refer to values when maximum rating output (full scale★) after 2-hour warm up.

Applicable scope of specifications

"F.S × catalog value(★)" is applied for ripple, stability, regulations and temperature coefficient, and "value if F.S × ±0.5%(★)" is applied for high-voltage output linearity, monitor linearity and display linearity, both in the range of 10% to 100% of maximum rating output.



Ripple

Indication is in rms that includes high-frequency noise.

Preset

Preset value does not show the actual output status accurately. If you need an accurate setting, conduct actual output without load and set a voltage. Also for setting current, conduct output after shorting the output terminal and gradually raise current before setting at a desired value.

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.

FAX

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Customer Inquiry Sheet (R4K-80 series)

Please copy this page and above fax number after filling out form below.

■ I would like

☐ A quotation ☐ An explanation of product ☐ A demonststration ☐ To purchase

☐ Other ( )

■ Give us your requirement / comment

■ Please fill in below.

Address:	
Company:	
Dept.:	Title:
Name:	
Tel:	Fax:
E-mail:	

Warranty

We warrant that products contained in this catalog (hereinafter, the “Products”) are free from defects in material and workmanship under normal use for a period of one (1) year from the date of shipment thereof. However, the warranty period for X-ray detectors and X-ray source shall be either one (1) year from the date of shipment or 1,000 hours, whichever shorter.The above warranty shall not apply to any Product which, at our sole judgment, has been:i)Repaired or altered by persons unauthorized by us; or ii)Connected, installed, adjusted or used otherwise than in accordance with the instructions furnished by us (including being used in an inappropriate installation environment, such as in corrosive gas, high temperature and humidity). We are not liable for any loss, damage or failure of the Products after the shipment thereof caused by external factors such as disasters.If any Product is showed to be defective as satisfactory to us, we, at our sole discretion, repair or replace such defective Products at no cost to the purchaser.We assume no liability to the purchaser or any third party for special, incidental, consequential, or other damages resulting from a breach of the foregoing warranty. This warranty excludes any and all other warranties not set forth herein, express or implied, including without limitation the implied warranties of merchant-ability or fitness for a particular purpose. The Products are not designed and produced for such applications as requiring extremely high reliability and safety, or involving human lives (such as nuclear power, aerospace, social infrastructure facility, medical equipment, etc.). The use under such environment is not covered by this warranty and may require additional design and manufac-turing processes. Regarding RoHS compliance, Matsusada Precision Inc. does not intentionally use objectionable substances in the products listed within this catalog. Matsusada Precision Inc. manufactures products using components which, according to our suppliers, are “RoHS compliant parts”. However, Matsusada Precision does not analyze each and every unit to confirm. Therefore, there may be some customized products which do not comply to RoHS. Please contact your nearby sales office for confirmation.

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