2000~6000W Front End Power System

RKP-1U Rack System

■ Features :

- Universal AC input / Full range
- Holds up to 3 power modules
- Active current sharing up to 6000W(3 unit) in one 19" rack, 3 rack max. can be operated in parallel (up to 9 units)
- PMBus serial interface
- IEC320-C20 or terminal block input
- Front-end & rectifier applications
- Stackable for system expansion
- Low profile: 1U height, 19" rack mount
- Hot swappable modules
- Output voltage trimming function
- 3 years warranty

■ Description :

RCP-2000 rack power system is an advanced 19" rack-mounted power system containing up to 3 hot-swappable RCP-2000 rectifiers and can deliver up to 6000W in the single rack. Up to 3 racks can be stacked to provide expanded total system capability up to 18,000W that are especially suitable for the application of servers, information technology equipment, networking, telecommunications, and wide range of industrial applications using distributed power architecture Note.8. Equipped with PMBus communication protocol, RCP-2000 rack system can be controlled or monitored by external device such as monitoring unit (RCP-CMU-1) or PC.

■SELECTION GUIDE

Rack: RKP-1U I - CMU1

- CMU1: With RKP-CMU1
- —: Without RKP-CMU1
- I: AC Inlet (IEC320-C20)
- T: Terminal block

Whole System: RKP-6K1U I - CMU1 - 12

- 12: Output voltage
- CMU1: With RKP-CMU1
- —: Without RKP-CMU1
- I: AC Inlet (IEC320-C20)
- T: Terminal block

SPECIFICATION - Rack System

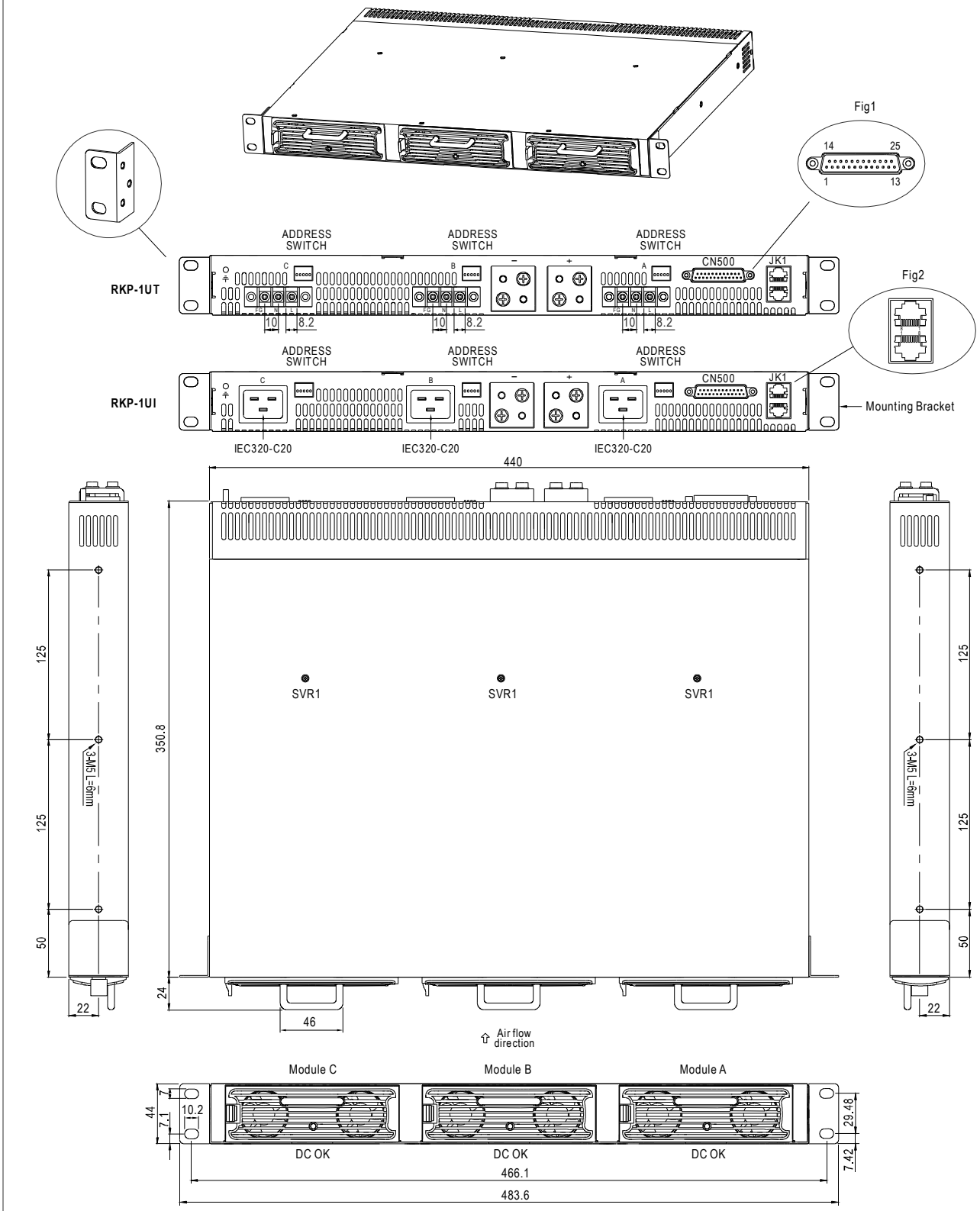
MODEL		RKP-6K1U□-12	RKP-6K1U□-24	RKP-6K1U□-48
OUTPUT	MODULE	RCP-2000-12	RCP-2000-24	RCP-2000-48
	RACK	RKP-1UI or RKP-1UT		
	OUTPUT VOLTAGE	12V	24V	48V
	MAX. OUTPUT CURRENT	300A	240A	126A
	MAX. OUTPUT POWER Note.6	3600W	5760W	6048W
INPUT	VOLTAGE RANGE Note.5	90 ~ 264VAC 127 ~ 370VDC		
	FREQUENCY RANGE	47 ~ 63Hz		
	AC CURRENT (Typ.)FOR EACH UNIT	13A/115VAC 7A/230VAC	16A/115VAC 11A/230VAC	16A/115VAC 11A/230VAC
	LEAKAGE CURRENT	<3.5mA / 230VAC		
FUNCTION	AUXILIARY POWER	5V @ 0.3A, 12V @ 0.8A		
	REMOTE ON/OFF CONTROL	By electrical signal or dry contact ON:short OFF:open		
	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.5V. "Local Sense"should be connected in order to get the correct output voltage if the "Remote Sense"is not used		
	DC OK SIGNAL	The isolated TTL signal out, refer to function manual		
	AC FAIL SIGNAL	The isolated TTL signal out, refer to function manual		
	OUTPUT VOLTAGE TRIM	Adjustment of output voltage, possible between 90 ~ 110% of rated output		
	OVER TEMP WARNING	Logic " High" for over temperature warning, refer to function manual, isolated signal		
	FAN FAIL SIGNAL	The isolated TTL signal out, refer to function manual		
ENVIRONMENT	WORKING TEMP.	-40 ~ +70℃ (Refer to "Derating Curve")		
	WORKING HUMIDITY	20 ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-40 ~ +85℃, 10 ~ 95% RH		
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)		
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes		
SAFETY & EMC (Note 4)	SAFETY STANDARDS	UL60950-1, TUV EN60950-1 approved		
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.7KVDC		
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH		
	EMC EMISSION	Compliance to EN55022 (CISPR22) Conduction Class B, Radiation Class A ; EN61000-3-2,-3		
	EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, EN61000-6-2 (EN50082-2), heavy industry level, criteria A		
OTHERS	DIMENSION	Rack 483.6*350.8*44(L*W*H)		
	PACKING	14.1Kg; 1pcs/14.1Kg/2.67CUFT		

NOTE

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives.
5. Derating may be needed under low input voltages. Please check the static characteristics for more details.
6. Output of all the RCP-2000 modules are connected in parallel in the rack.
7. Under parallel operation of more than one rack connecting together, ripple of the output voltage may be higher than the SPEC at light load condition. It will go back to normal ripple level once the output load is more than 10%.
8. Because of component tolerance, there is a possibility that some of units connected in parallel will reach an overcurrent limit then overloading the other units when operating at full load condition. If overload conditions happen in parallel usage, it is suggested that derate the total output current by 10%.

■ Mechanical Specification (Rack System)

Case No. 959A Unit:mm



■ CN500 Pin No. Assignment

Connector Pin No. Assignment(CN500) : D-Type Right Angle 25 positions

Pin No.	Assignment	Pin No.	Assignment	Pin No.	Assignment	Pin No.	Assignment	Pin No.	Assignment
1	ON/OFF-A	6	FAN FAIL-A	11	T-ALARM-B	16	ON/OFF-C	21	FAN FAIL-C
2	AC-OK-A	7	ON/OFF-B	12	FAN FAIL-B	17	AC-OK-C	22	+S
3	DC-OK-A	8	AC-OK-B	13	+5V-AUX	18	DC-OK-C	23	-S
4	PV-A	9	DC-OK-B	14	+12V-AUX	19	PV-C	24	+V
5	T-ALARM-A	10	PV-B	15	GND-AUX	20	T-ALARM-C	25	-V

■ JK1 Pin No. Assignment

Connector Pin No. Assignment(CN) : RJ45 8 positions

Pin No.	Assignment	Pin No.	Assignment	Pin No.	Assignment
1	DA	4	CONTROL	7	SCL
2	DB	5	NC	8	GND-AUX
3	-V	6	SDA		

■ CN500 IN/OUT Connector pins function description

Pin No.	Function	Description
1,7,16	ON/OFF	Each unit can separately turn the output on and off by electrical signal or dry contact between ON/OFF A,B,C(pin 1,7,16) and +5V-AUX(pin 13). Short: ON, Open:OFF. (Note.2)
2,8,17	AC-OK	Low : When the input voltage is ≧87Vrms. High : when the input voltage in ≦75Vrms. (Note.2)
3,9,18	DC-OK	High : When the Vout ≦80±5%. Low : When Vout ≧80±5%. (Note.2)
4,10,19	PV	Connection for output voltage trimming. The voltage can be trimmed within its defined range. (Note.1)
5,11,20	T-ALARM	High : When the internal temperature (TSW1 or TSW2 open) exceeds the limit of temperature alarm. Low : When the internal temperature (TSW1 or TSW2 short) under the limit temperature. (Note.2)
6,12,21	FAN FAIL	High : When the internal fan fail. Low : When the internal fan is normal. (Note.2)
13	+5V-AUX	Auxiliary voltage output, 4.5 ~ 5.5V, referenced to GND-AUX (pin 15). The maximum load current is 0.3A. This output has the built-in "Oring diodes" and is not controlled by the remote ON/OFF control.
14	+12V-AUX	Auxiliary voltage output, 10.8 ~ 13.2V, referenced to GND-AUX (pin 15). The maximum load current is 0.8A. This output has the built-in "Oring diodes" and is not controlled by the remote ON/OFF control.
15	GND-AUX	Auxiliary voltage output GND. The signal return is isolated from the output terminals (+V & -V).
22	+S	Positive sensing. The +S signal should be connected to the positive terminal of the load. The +S and -S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V.
23	-S	Negative sensing. The -S signal should be connected to the negative terminal of the load. The -S and +S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V.
24	+V	Positive output voltage. For local sense use only, can't be connected directly to the load.
25	-V	Negative output voltage. For local sense use only, can't be connected directly to the load.

■ JK1 IN/OUT Connector pins function description

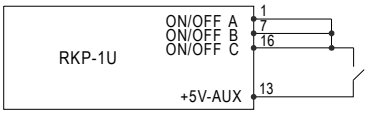
Pin No.	Function	Description
1,2	DA,DB	Differential digital signal for parallel control. (Note.1)
3	-V	Negative output voltage. For parallel control, can't be connected directly to the load.
4	CONTROL	Remote ON/OFF control pin used in the PMBus interface. (Note.2)
5	NC	Not use.
6	SDA	Serial Data used in the PMBus interface. (Note.2)
7	SCL	Serial Clock used in the PMBus interface. (Note.2)
8	GND-AUX	Auxiliary voltage output GND. The signal return is isolated from the output terminals (+V & -V).

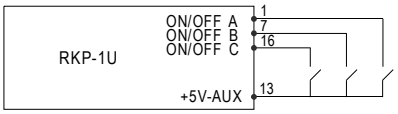
Note.1: Non-isolated signal, referenced to the output terminals (-V).
Note.2: Isolated signal, referenced to GND-AUX.

■ Function Manual

1. Remote ON/OFF Control

The PSU can be turned ON/OFF together or separately by using the "Remote ON/OFF" function.



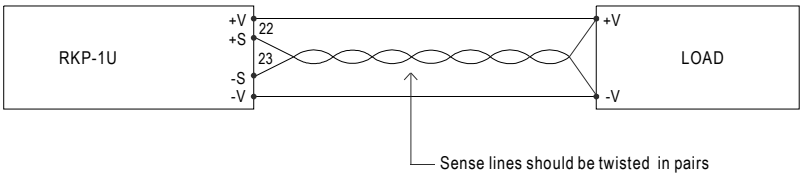


Between ON/OFF and +5V-AUX	Output
SW Open	OFF
SW Short	ON

2. Voltage Drop Compensation

2.1 Remote Sense

The remote sense compensates voltage drop on the load wiring up to 0.5V.



2.2 Local Sense

Notice : The +S,-S have to be connected to the +V,-V terminals locally in order to get the correct output voltage if the remote sensing is not used.

3. Output Voltage TRIM

(1)Connecting an external DC source between PV(4,10,19) and -V(25) on CN500 that is shown in Fig. 3.1.

(2)Adjustment of output voltage is possible between 90~110%(Typ.) of the rated output which is shown in Fig. 3.2. Reducing output current is required when the output voltage is trimmed up.

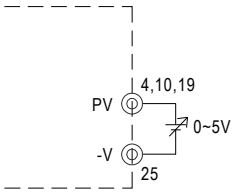
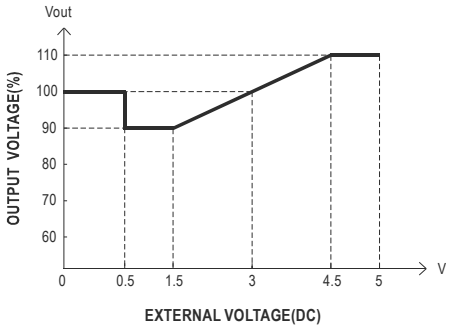


Fig. 3.1 Add on 0~5V external voltage



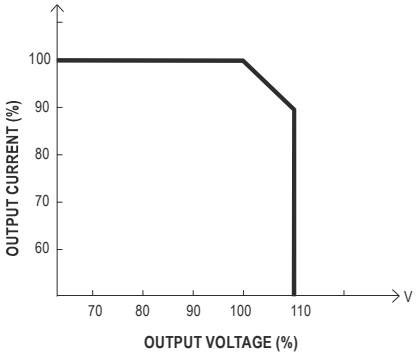


Fig. 3.2 Output voltage trimming

4. Front Panel Indicators & Corresponding Signal at Function Pins

Function	LED	Description	* Signal	PSU Output
AC-OK	GREEN	When input voltage ≧ 87V	0 ~ 0.5V	ON
AC-NG	RED	When input voltage ≦ 75V	4.5 ~ 5.5V	OFF
DC-OK	GREEN	When output voltage ≧ 80% ± 5% of Vo rated.	0 ~ 0.5V	ON
DC-NG	RED	When output voltage ≦ 80% ± 5% of Vo rated.	4.5 ~ 5.5V	ON
T-OK	GREEN	When the internal temperature (TSW1 & TSW2 short) is within safe limit	0 ~ 0.5V	ON
T-ALARM	RED	When the internal temperature (TSW1 or TSW2 open) exceeds the limit of temperature alarm	4.5 ~ 5.5V	OFF

*Signal between function pin and "GND-AUX".

5.PMBus communication interface

5.1 Interface specification

RCP-2000 support PMBus Rev.1.1 with maximum 100kHz bus speed.

5.2 Device Address (A0~A4)

MSB						LSB
1	0	A4	A3	A2	A1	A0

The device address can be defined by using DIP switch and shows below. The DIP switch down position is logic "1" and up position is logic "0".

Module No.	DIP switch position				
	1	2	3	4	5
0	ON	ON	ON	ON	ON
1	OFF	ON	ON	ON	ON
2	ON	OFF	ON	ON	ON
3	OFF	OFF	ON	ON	ON
4	ON	ON	OFF	ON	ON
5	OFF	ON	OFF	ON	ON
6	ON	OFF	OFF	ON	ON
7	OFF	OFF	OFF	ON	ON
8	ON	ON	ON	OFF	ON
9	OFF	ON	ON	OFF	ON
10	ON	OFF	ON	OFF	ON
11	OFF	OFF	ON	OFF	ON
12	ON	ON	OFF	OFF	ON
13	OFF	ON	OFF	OFF	ON
14	ON	OFF	OFF	OFF	ON
15	OFF	OFF	OFF	OFF	ON

Module No.	DIP switch position				
	1	2	3	4	5
16	ON	ON	ON	ON	OFF
17	OFF	ON	ON	ON	OFF
18	ON	OFF	ON	ON	OFF
19	OFF	OFF	ON	ON	OFF
20	ON	ON	OFF	ON	OFF
21	OFF	ON	OFF	ON	OFF
22	ON	OFF	OFF	ON	OFF
23	OFF	OFF	OFF	ON	OFF
24	ON	ON	ON	OFF	OFF
25	OFF	ON	ON	OFF	OFF
26	ON	OFF	ON	OFF	OFF
27	OFF	OFF	ON	OFF	OFF
28	ON	ON	OFF	OFF	OFF
29	OFF	ON	OFF	OFF	OFF
30	ON	OFF	OFF	OFF	OFF
31	OFF	OFF	OFF	OFF	OFF

5.3 Command Summary (ref. to PMBus Rev.1.1)

Command Code	Command Name	Transaction Type	# of data Bytes	Description
01h	OPERATION	R/W Byte	1	Remote ON/OFF control
02h	ON_OFF_CONFIG	Read Byte	1	ON/OFF function configuration
19h	CAPABILITY	Read Byte	1	Capabilities of a PMBus device
20h	VOUT_MODE	R Byte	1	Define data format for output voltage (format: Linear, N= -9)
21h	VOUT_COMMAND	R Word	2	Output voltage setting value (format: Linear, N= -9)
22h	VOUT_TRIM	R/W Word	2	Output voltage trimming value (format: Linear, N= -9)
46h	IOUT_OC_FAULT_LIMIT	R/W Word	2	Output overcurrent setting value
47h	IOUT_OC_FAULT_RESPONSE	R Byte	1	Define protection and response when an output overcurrent fault occurred
79h	STATUS_WORD	R Word	2	Summary status reporting
7Ah	STATUS_VOUT	R Byte	1	Output voltage status reporting
7Bh	STATUS_IOUT	R Byte	1	Output current status reporting
7Ch	STATUS_INPUT	R Byte	1	AC inpit voltage statusreporting
7Dh	STATUS_TEMPERATURE	R Byte	1	Temperature status reporting

Command Code	Command Name	Transaction Type	# of data Bytes	Description
80h	STATUS_MFR_SPECIFIC	R Byte	1	Manufacture specific status reporting
81h	STATUS_FANS_1_2	R Byte	1	Fan1 and 2 status reporting
88h	READ_VIN	R Word	2	AC input voltage reading value (format: Linear, N=-1)
8Bh	READ_VOUT	R Word	2	Output voltage reading value (format: Linear, N= -9)
8Ch	READ_IOUT	R Word	2	Output current reading value (format: Linear, N= -3)
8Dh	READ_TEMPERATURE_1	R Word	2	Temperature 1 reading value (format: Linear, N= -3)
90h	READ_FAN_SPEED_1	R Word	2	Fan speed 1 reading value (format: Linear, N= 4)
91h	READ_FAN_SPEED_2	R Word	2	Fan speed 2 reading value (format: Linear, N= 4)
98h	PMBUS_REVISION	R Byte	1	The compliant revision of the PMBus (default: 11h for Rev. 1.1)
99h	MFR_ID	Block Read	12	Manufacturer's name
9Ah	MFR_MODEL	Block Read	12	Manufacturer's model name
9Bh	MFR_REVISION	Block Read	6	Firmware revision
9Ch	MFR_LOCATION	Block R/W	3	Manufacturer's factory location
9Dh	MFR_DATE	Block R/W	6	Manufacture date. (format: YYMMDD)
9Eh	MFR_SERIAL	Block R/W	12	Product serial number