2000W Rack Mountable Front End Rectifier

RCP-2000 series

Dimension					
L	*	W	*	H	
295	*	127	*	41 (1U)	mm
11.6	*	5	*	1.61 (1U)	inch

User's Manual

PMBus Power Management. Defined.

Parallel PFC c UL us UL62368-1 BS EN/EN62368-1 EAC TPTC004 CB IEC62368-1 CE UKCA

Industrial Automate Telecom Network EV

Features

- Universal AC input / Full range
  (Withstand 300VAC surge input for 5 seconds)
- Built-in active PFC function
- High efficiency up to 92%
- Forced air cooling by built-in DC fan
- Output voltage programmable
- Built-in OR-ing FET, support hot swap (hot plug)
- Active current sharing up to 6000W for one 19" rack shelf
- Built-in I^2C interface, PMBus protocol
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Optional conformal coating
- 5 years warranty

Applications

- Industrial automation
- Distributed power architecture system
- Wireless/telecommunication solution
- Redundant power system
- Electric vehicle charger system
- Constant current source system

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

Description

RCP-2000 is a 2KW single output rack mountable front end AC/DC power supply with a 1U low profile and a high power density up to 25W/inch^3. This series operates for 90~264VAC input voltage and offers the models with the DC output mostly demanded from the industry. Each model is cooled by the built-in DC fan with fan speed control, working for the temperature up to 70℃. RCP-2000 provides vast design flexibility by equipping various built-in functions such as the PMBus communication protocol, output programming, active current sharing (up to 18000W via three 19" rack shelves, RKP-1U), remote control, auxiliary power, alarm signal, external control/monitor via the control model RKP-CMU1, etc. Maximum number that can be monitored by master controller in communication shall be 9 power supplies.

Model Encoding / Order Information

RCP - 2000 - 24

- 24 — Output voltage
- 2000 — Output wattage
- RCP — Series name

※ Note 1: 19" rack shelf, RKP-1U, available. Details available on http://www.meanwell.com/

※ Note 2: Control/Monitor unit, RKP-CMU1, available. Details available on http://www.meanwell.com/

SPECIFICATION

MODEL		RCP-2000-12	RCP-2000-24	RCP-2000-48
OUTPUT	DC VOLTAGE	12V	24V	48V
	RATED CURRENT	100A	80A	42A
	CURRENT RANGE	0 ~ 100A	0 ~ 80A	0 ~ 42A
	RATED POWER	1200W	1920W	2016W
	RIPPLE & NOISE (max.) Note.2	150mVp-p	200mVp-p	300mVp-p
	VOLTAGE ADJ. RANGE	10.5 ~ 14V	21 ~ 28V	42 ~ 56V
	VOLTAGE TOLERANCE Note.4	±2.0%	±1.0%	±1.0%
	LINE REGULATION	±1.0%	±0.5%	±0.5%
	LOAD REGULATION	±1.0%	±0.5%	±0.5%
	SETUP, RISE TIME	1500ms, 60ms/230VAC at full load		
	HOLD UP TIME (Typ.)	16ms/230VAC at 75% load	10ms/230VAC at full load	
INPUT	VOLTAGE RANGE Note.5,6	90 ~ 264VAC	127 ~ 320VDC	
	FREQUENCY RANGE	47 ~ 63Hz		
	POWER FACTOR (Typ.)	0.98/230VAC at full load		
	EFFICIENCY (Typ.)	86%	90.5%	92%
	AC CURRENT (Typ.)	13A/115VAC 7A/230VAC	16A/115VAC 10A/230VAC	16A/115VAC 10A/230VAC
	INRUSH CURRENT (Typ.)	COLD START 50A		
	LEAKAGE CURRENT	<1.1mA / 230VAC		
PROTECTION	OVERLOAD	105 ~ 125% rated output power		
		Protection type : Constant current limiting, unit will shut down o/p voltage after 5 sec. re-power on to recover		
	OVER VOLTAGE	14.7 ~ 17.5V	29.5 ~ 35V	57.6 ~ 67.2V
		Protection type : Shut down o/p voltage, re-power on to recover		
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down		
FUNCTION	AUXILIARY POWER	5V @ 0.3A, 12V @ 0.8A		
	REMOTE ON-OFF CONTROL	Please refer to the Function Manual		
	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.5V		
	OUTPUT VOLTAGE PROGRAMMABLE	Adjustment of output voltage is allowable to 90 ~ 110% of nominal output voltage. Please refer to the Function Manual.		
	DC OK SIGNAL	The isolated TTL signal out, Please refer to the Installation Manual		
	AC OK SIGNAL	The isolated TTL signal out, Please refer to the Installation Manual		
	OVER TEMP WARNING	Logic " High" for over temperature warning, Please refer to the Installation Manual, isolated signal		
	FAN FAIL SIGNAL	The isolated TTL signal out, Please refer to the Installation Manual		
ENVIRONMENT	WORKING TEMP.	-35 ~ +70℃ (Refer to "Derating Curve")		
	WORKING HUMIDITY	20 ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-40 ~ +85℃, 10 ~ 95% RH non-condensing		
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)		
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes		
SAFETY & EMC (Note 7)	SAFETY STANDARDS	UL62368-1, CSA C22.2 No. 62368-1, TUV BS EN/EN62368-1, EAC TP TC 004 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	**Parameter**	**Standard**	**Test Level / Note**
		Conducted	BS EN/EN55032 (CISPR32)	Class B
		Radiated	BS EN/EN55032 (CISPR32)	Class A
		Harmonic Current	BS EN/EN61000-3-2	-----
		Voltage Flicker	BS EN/EN61000-3-3	-----
	EMC IMMUNITY	BS EN/EN55035, BS EN/EN61000-6-2		
		Parameter	**Standard**	**Test Level / Note**
		ESD	BS EN/EN61000-4-2	Level 3, 8KV air ; Level 2, 4KV contact
		Radiated	BS EN/EN61000-4-3	Level 3
		EFT / Burst	BS EN/EN61000-4-4	Level 3
		Surge	BS EN/EN61000-4-5	Level 4, 4KV/Line-Earth ; Level 3, 2KV/Line-Line
		Conducted	BS EN/EN61000-4-6	Level 3
		Magnetic Field	BS EN/EN61000-4-8	Level 4
		Voltage Dips and Interruptions	BS EN/EN61000-4-11	>95% dip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods
OTHERS	MTBF	444.9K hrs min. Telcordia SR-332 (Bellcore) ; 37.4K hrs min. MIL-HDBK-217F (25℃)		
	DIMENSION	295*127*41mm (L*W*H)		
	PACKING	2Kg; 6pcs/13Kg/1.04CUFT		

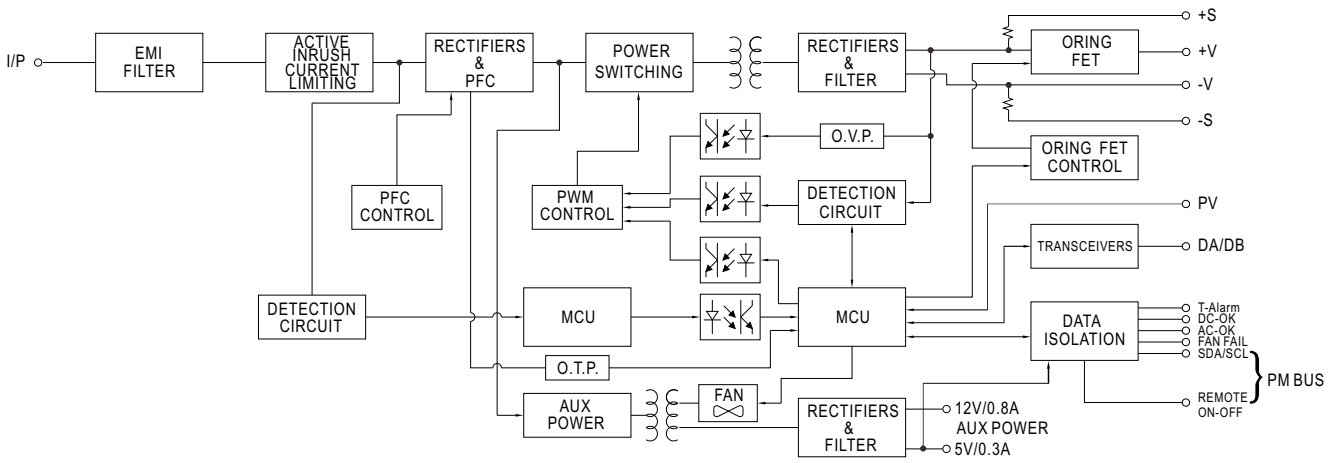
NOTE

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. 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%.
4. Tolerance : includes set up tolerance, line regulation and load regulation.
5. Derating may be needed under low input voltages. Please check the static characteristics for more details.
6. Please contact MEANWELL for 320~370VDC application.
7. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 720mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on http://www.meanwell.com)
8. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

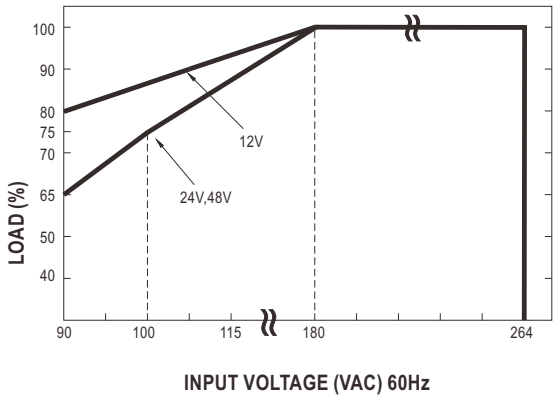
※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

Block Diagram

PFC fosc : 110KHz
PWM fosc : 90KHz



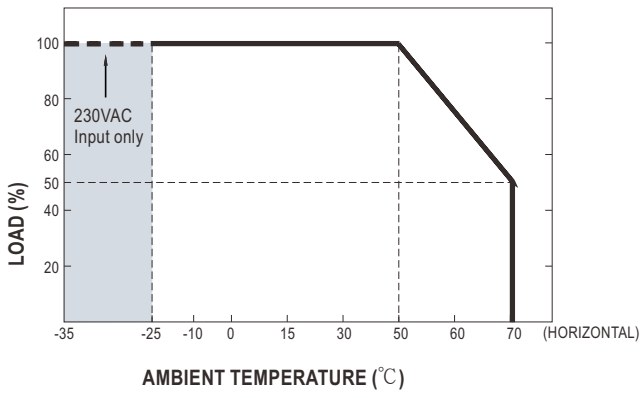
Static Characteristics



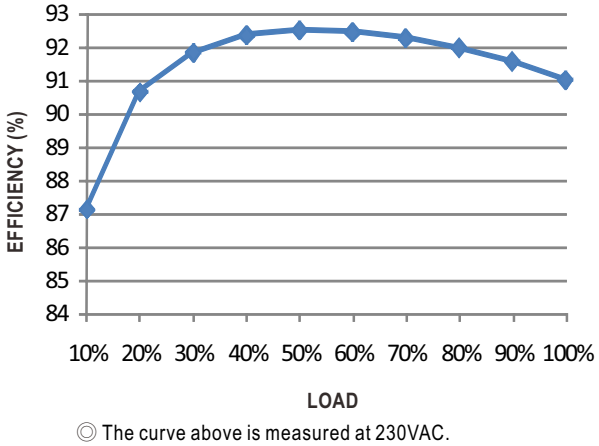
Derating Loads vs Input Voltage

INPUT \ MODEL	12V	24V	48V
180~264VAC	1200W 100A	1920W 80A	2016W 42A
115VAC	1080W 90A	1632W 68A	1713.6W 35.7A
100VAC	1020W 85A	1440W 60A	1512W 31.5A
90VAC	960W 80A	1248W 52A	1310.4W 27.3A

Derating Curve



Efficiency vs Load (48V Model)



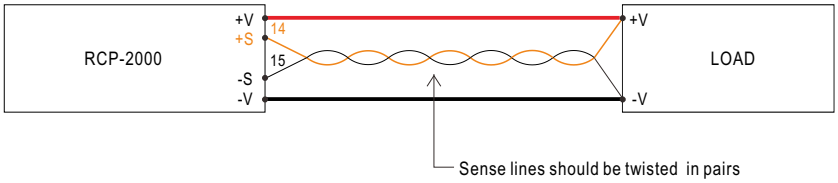
◎ The curve above is measured at 230VAC.

■ Function Manual

1. Voltage Drop Compensation

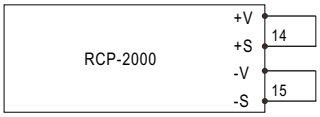
1.1 Remote Sense

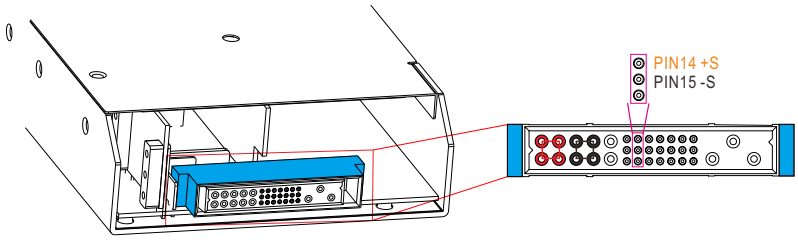
※ The Remote Sense compensates voltage drop on the load wiring up to 0.5V



1.2 Local Sense

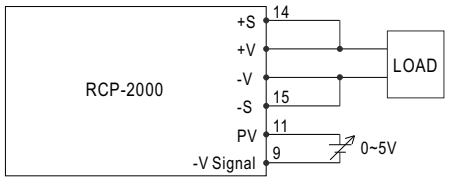
※ The +S,-S have to be connected to the *+V(signal)*,*-V(signal)*, respectively, as the following diagram, in order to get the correct output voltage if Remote Sense is not used.



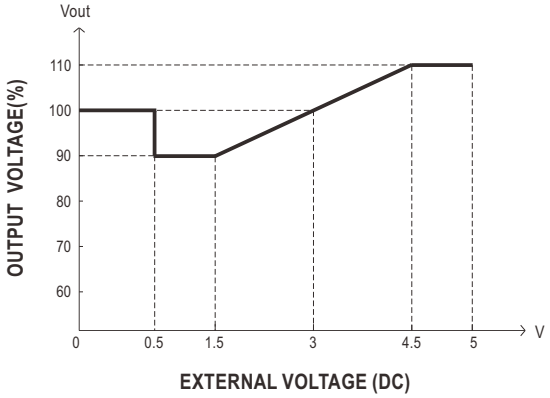


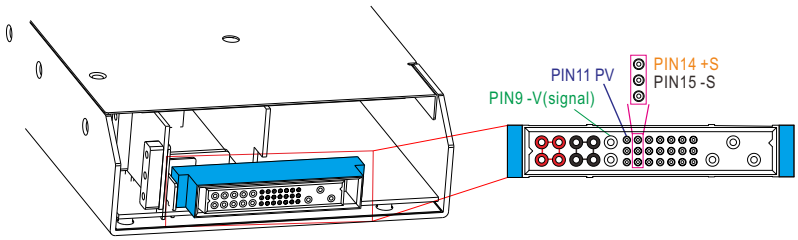
2. Output Voltage Programming (or, PV / remote voltage programming / remote adjust / margin programming / dynamic voltage trim)

※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed to 90~110% of the nominal voltage by applying EXTERNAL VOLTAGE.



◎ +S & +V, -S & -V also need to be connected on CN501

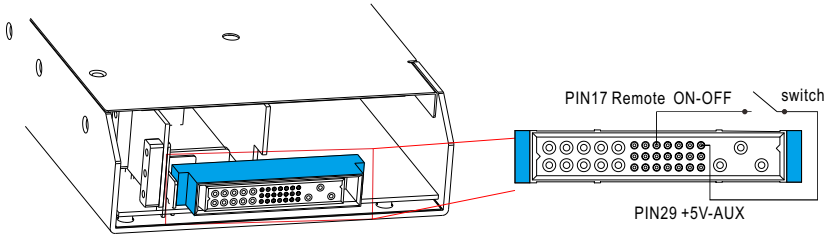




3. Remote ON-OFF Control

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

Between *Remote ON-OFF* and *+5V-AUX*	Power Supply Status
Switch Short	ON
Switch Open	OFF

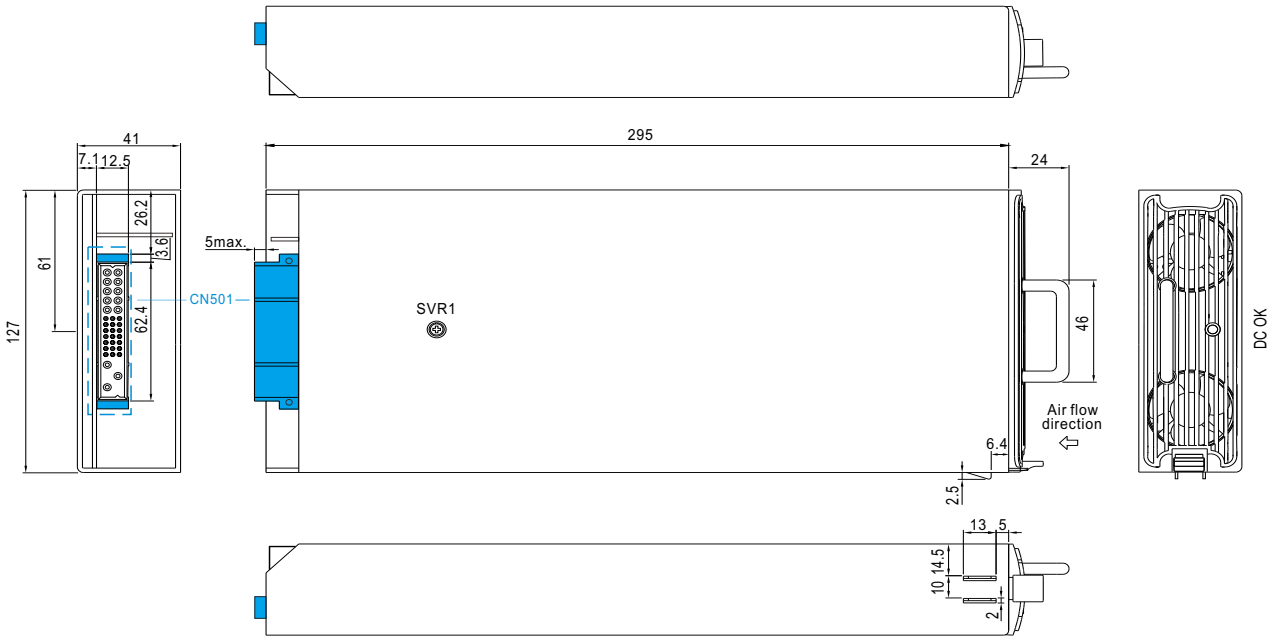


4.PMBus Communication Interface

※ RCP-2000 supports PMBus Rev. 1.1 with maximum 100KHz bus speed, allowing information reading, status monitoring and output trimming. For details, please refer to the Installation Manual.

■ Mechanical Specification

Case No. 974A Unit:mm

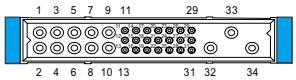


※ LED Status Indicators & Corresponding Signal at Function Pins

Function	LED	Description	* Signal	Power Supply
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".

※ Input / Output Connector Pin No. Assignment(CN501) : Positronic PCIM34W13M400A1



Mating Housing	Positronic PCIM34W13F400A1

Pin No.	Function	Description
1,2,3,4	+V	Positive output terminal.
5,6,7,8	-V	Negative output terminal.
9	-V(Signal)	Negative output voltage signal. For local sense only ; it cannot be connected directly to the load.
10	+V(Signal)	Positive output voltage signal. For local sense only ; it cannot be connected directly to the load.
11	PV	Connection for output voltage programming. (Note.1)
12,13	DA,DB	Differential digital signal for parallel control. (Note.1)
14	+S	Positive sensing for remote sense.
15	-S	Negative sensing for remote sense.
16,18,19, 20,21	A0,A1,A2, A3,A4	PMBus interface address lines. (Note.1)
17	Remote ON-OFF	The unit can turn the output on and off by electrical signal or dry contact between *Remote ON-OFF* and *+5V-AUX*. (Note.2) Short (4.5 ~ 5.5V) : Power ON ; Open (0 ~ 0.5V) : Power OFF ; The maximum input voltage is 5.5V.
22	NC	Retain for future use.
23	SDA	Serial Data used in the PMBus interface. (Note.2)
24	SCL	Serial Clock used in the PMBus interface. (Note.2)
25	AC-OK	Low (0 ~ 0.5V) : When the input voltage is ≧87Vrms. High (4.5 ~ 5.5V) : When the input voltage in ≦75Vrms . The maximum sourcing current is 10mA and only for output. (Note.2)
26	$\overline{\text{DC-OK}}$	High (4.5 ~ 5.5V) : When the Vout ≦80%±5%. Low (0 ~ 0.5V) : When Vout ≧80%±5%. The maximum sourcing current is 10mA and only for output. (Note.2)
27	T-ALARM	High (4.5 ~ 5.5V) : When the internal temperature (TSW1 or TSW2 open) exceeds the limit of temperature alarm. Low (0 ~ 0.5V) : When the internal temperature (TSW1 or TSW2 short) under the limit temperature. The maximum sourcing current is 10mA and only for output(Note.2)
28	FAN-FAIL	High (4.5 ~ 5.5V) : When the internal fan fail. Low (0 ~ 0.5V) : When the internal fan is normal. The maximum sourcing current is 10mA and only for output(Note.2)
29	+5V-AUX	Auxiliary voltage output, 4.5~5.5V, referenced to *GND-AUX (pin 31)*. 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.
30	+12V-AUX	Auxiliary voltage output, 10.8~13.2V, referenced to *GND-AUX (pin 31)*. 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.
31	GND-AUX	Auxiliary voltage output GND. The signal return is isolated from the output terminals (+V & -V).
32	FG	AC Ground connection.
33	AC/L	AC Line connection.
34	AC/N	AC Neutral connection.

Note1: Non-isolated signal, referenced to *-V(signal)*.
Note2: Isolated signal, referenced to *GND-AUX*.