



AC Power Supply

*Video Multiprocessing Gateway, 6-slot
VMG-6*

Installation and Setup Guide

RGB Networks, Inc.
390 West Java Drive
Sunnyvale, CA 94089
Support Tel: 877-RGB-NETW
Fax: (408) 701-2710
www.rgbnetworks.com

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VMG-6 AC Power Supply Installation & Setup Guide document history

Doc. Part Number	HW Part Number	Release Date	Changes
250-0051-01 Rev K1	ACPOWERSUPPLY	12/21/2009	Customer-specific installation
250-0051-01 Rev K2	ACPOWERSUPPLY	12/30/2009	Removed customer-specific references
250-0051-01 Rev A	VMG-6-ACPWRSPPLY-2PEM VMG-6-2ACPWRSPPLY-2PEM	07/12/2010	Expanded user guide to include PEM redundancy and dual AC power redundancy. Production release.

Document Conventions

[Table A](#) provides an easy way to recognize important information in the text.

Table A. Document conventions

When you see:	It means:
	Note: Indicated by the icon shown at left, this points out information that may not be part of the text but provide tips and other helpful advice.
	Caution: Indicated by the icon on the left, this provides an alert to an action that may have undesirable consequences if the instructions are not followed correctly. Cautions also indicate that failure to follow guidelines could cause damage to equipment or loss of data.
	Warning! Indicated by the icon on the left, shows that failure to take the necessary precautions or to follow guidelines could cause harm to equipment and personnel.

Clicking any blue link takes you to the item to which the link refers.

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Installation

RGB Networks has partnered with Cherokee International to deliver an AC to DC power distribution solution for cable operators wishing to connect the 6-slot Video Multiprocessing Gateway (VMG-6) to an AC power source.

This guide provides two solutions for installing and connecting the AC power supply to the VMG-6 chassis in a standard 19-inch rack:

1. Power Entry Module (PEM) redundancy with one AC power supply chassis ([Figure 1](#)).
2. Full redundancy with dual PEMs and dual AC power supply chassis ([Figure 2](#)).

In This Chapter:

- “Site Preparation,” next.
- “Warnings” on page 6.
- “Unpacking” on page 6.
- “PEM Redundancy Installation” on page 7.
- “Full Redundancy Installation” on page 13.

Figure 1 shows a diagram of the PEM redundancy solution.

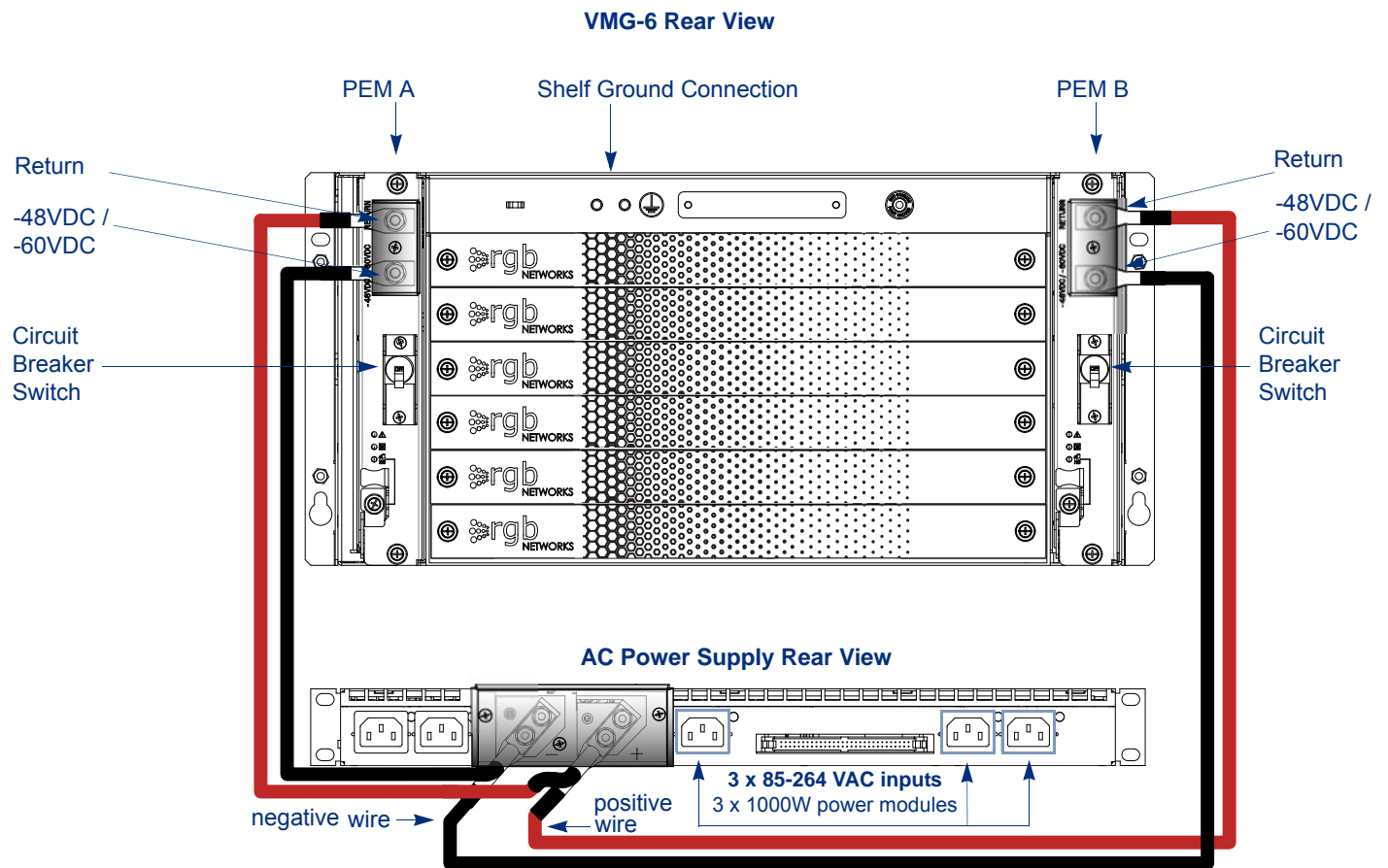


Figure 1. VMG-6 with AC Power Supply - PEM Redundancy

Figure 2 shows a diagram of the Full redundancy solution.

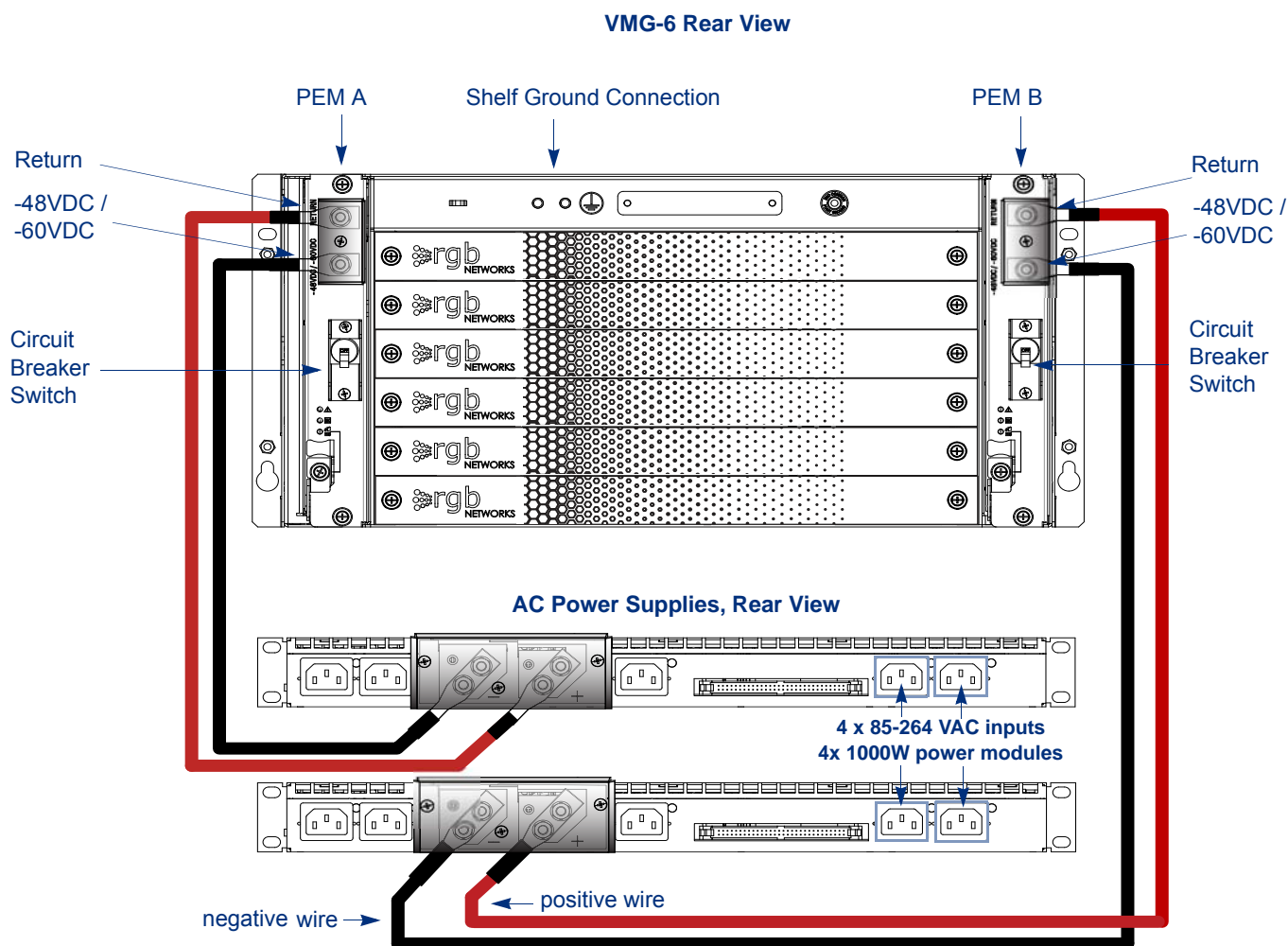


Figure 2. VMG-6 with AC Power Supplies - Full Redundancy

Site Preparation

Be sure that you have the required items listed below before you begin installation of each AC power supply.

Included in Packaging

Confirm that the following items have been included in the AC power supply packaging:

For PEM Redundancy

- One Cherokee AC Power Supply mating rack, which includes:
 - Three (3) Cherokee AC power modules of 1000W each, pre-installed in the mating rack;
 - Three (3) AC power cables;
- Two (2) sets of #4 AWG DC wires with flat and 45°-angle lugs; four (4) wires total.

For Full Redundancy

- Two (2) Cherokee AC Power Supply mating racks, each of which includes:
 - Two (2) Cherokee AC power modules of 1000W each, pre-installed in the mating rack; four (4) modules total;
 - Two (2) AC power cables; four (4) cables total.
- Two (2) sets of #4 AWG DC wires with flat-angle lugs; four (4) wires total.

Required Tools / Accessories

The following items have not been included in your shipment and will be needed for installation:

- Four (4) chassis rack mount screws for each AC power supply.
- Flat-head screwdriver.
- Number 1 Phillips-head screwdriver.
- 10 mm wrench (for the nuts on the AC power supply).
- 7/16 wrench (for the nuts on the PEM of the VMG-6).

Site Space Requirements

This equipment is only intended for use in a Restricted Access Location.

Choose a site that is dry, clean, well-ventilated and air-conditioned, where the ambient temperature is between 5° C and 45° C (41° F and 113° F).

A 15A Listed circuit breaker shall be provided in the building installation for overcurrent/short circuit backup protection. One 15A circuit should be made available for each power cord set.

The AC power supply relies on the building installation's safety measures for protection against short-circuit, overcurrent, and earth (grounding) fault. Precaution must be taken to ensure these protective devices are in place prior to installation, and that they are properly rated to protect the system.

- Keep tools and chassis components off the floor and away from foot traffic.

- Clear the area of possible hazards, such as wet floors, ungrounded power cables, and missing safety grounds.
- Keep the area around the chassis free from dust and foreign conductive material.

Rack Requirements

1. Elevated Operating Ambient – If installed in a closed or multi-rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (TMA) specified by the manufacturer.
2. Reduced Air Flow – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. Mechanical Loading – Mounting of the equipment in the rack should be in such a way as to ensure an even mechanical load in the equipment rack.
4. Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. When connecting equipment to a supply circuit, proper consideration should be taken to avoid overloading the supply circuits.
5. Reliable Earthing – Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Each AC power supply can be installed in 19" equipment racks. The rack must be accessible from the front and rear for installation. Ensure that the rack is constructed to support the weight and dimensions of the chassis.



Note: *If installing the AC power supply chassis into a rack that is already partially populated, 1RU of space is required for each AC power supply chassis.*

Warnings



Warning! *A qualified service person is required for proper installation of DC connections.*



Warning! *Hazardous voltage! Before working, ensure that the power connection cables are disconnected from power. When the system is powered on, do **NOT** touch the power terminals.*



Warning! *Danger of electrostatic discharge. Static electricity can harm delicate components inside each AC power supply. An ESD wrist strap must be worn before unpacking or exchanging any part or electric component.*



Warning! *Avoid electric overload. To avoid electrical hazard, do not make connections to terminals outside the specified voltage range for each AC power supply.*



Warning! *Remove jewelry (rings, watches, etc.) before working on equipment that is connected to power lines.*



Warning! *This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.*

Unpacking



Caution: *When opening the shipping carton, use caution to avoid AC power supply damage.*

Consider the following when unpacking and storing each AC power supply:

- Leave the device packed until it is needed for installation.
- After unpacking the device, save and store the packaging material in case the unit needs to be returned.
- If the packaging is damaged and possible unit damage is present, report to the shipper and analyze the damage.

PEM Redundancy Installation

For PEM redundancy, you will need 1 RU of space to install the AC power supply chassis.

Prior to Installing the AC power supply

- Install the VMG-6 chassis (allowing 5RU of rack space) according to the instructions and parameters in *Chapter 3, Physical Installation* of the latest *VMG-6 Hardware Setup Guide*.
- Do *not* connect DC power to the VMG-6.
- Do *not* turn on the circuit breaker to the VMG-6 before completing all the steps below.

Installing the AC power supply

1. Verify there are 3 AC power cords each with the appropriate plug for your country and 2 sets of #4 AWG DC positive and negative wires in the packaging:

Note: For PEM Redundancy installations, the #4 AWG DC wires are shipped as follows:

- 1 pair of double-holed flat lugs coupled with 1 pair of single-holed flat lugs.
- 1 pair of double-holed 45° angle lugs coupled with 1 pair of single-holed flat lugs.

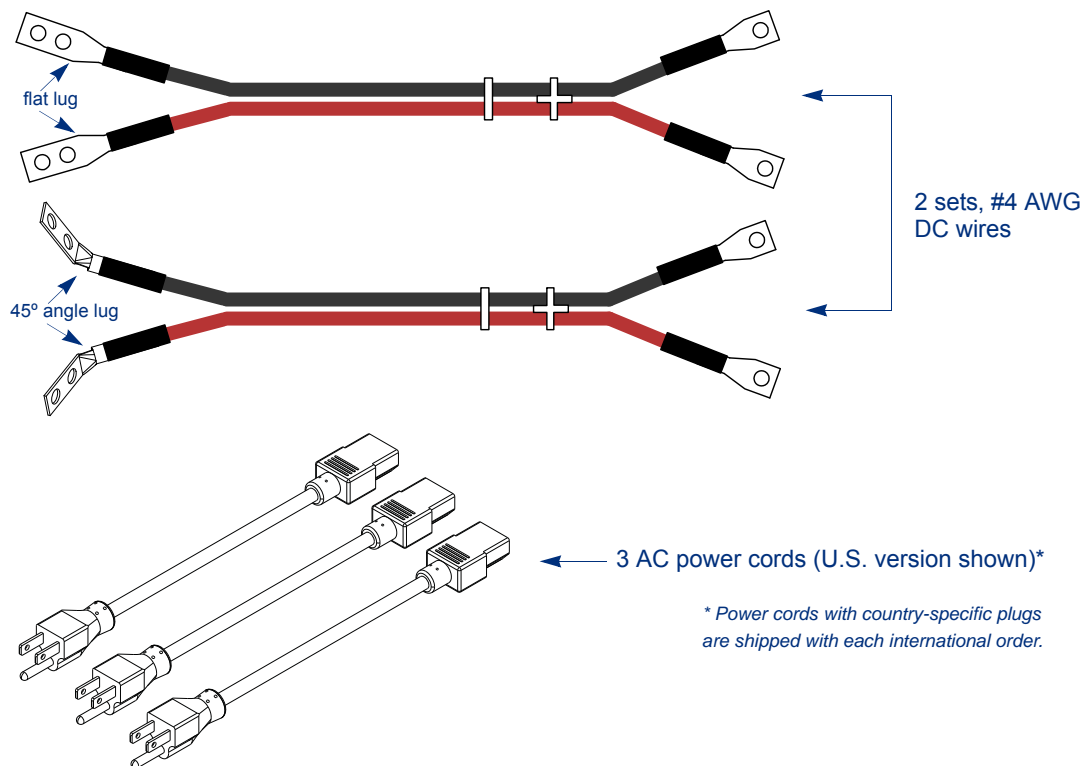


Figure 3. AC power supply packaging

2. Verify the 3 x 1000W power modules are installed and properly seated and screwed down (no more than 3 threads) in the AC power supply unit.

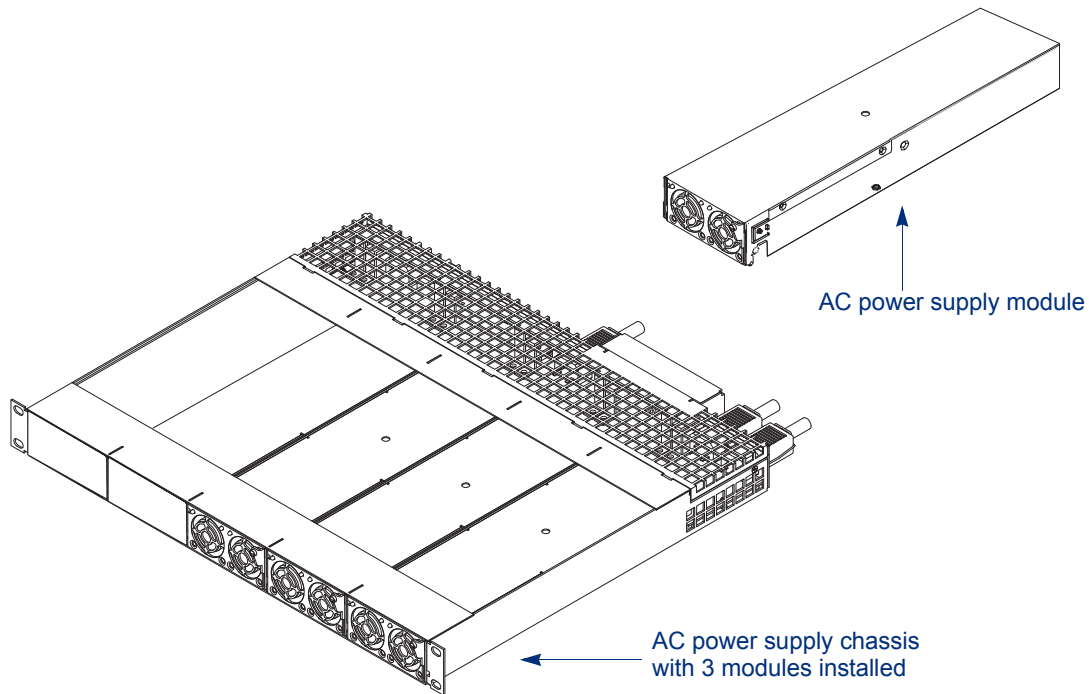


Figure 4. AC power supply unit with modules

3. Insert the AC power supply with installed modules in the rack either directly below or directly above the VMG-6 chassis. (This guide shows and recommends installation of the AC power supply *below* the VMG-6 chassis).



Note: The power supply modules are mounted from the front of the AC power supply chassis.

4. Using four (4) rack mount screws, secure the AC power supply into the rack, tightening each screw incrementally until all four are evenly snug-tight.
5. Remove the safety terminal cover from the left and right Power Entry Module (PEM-A and PEM-B) of the VMG-6.

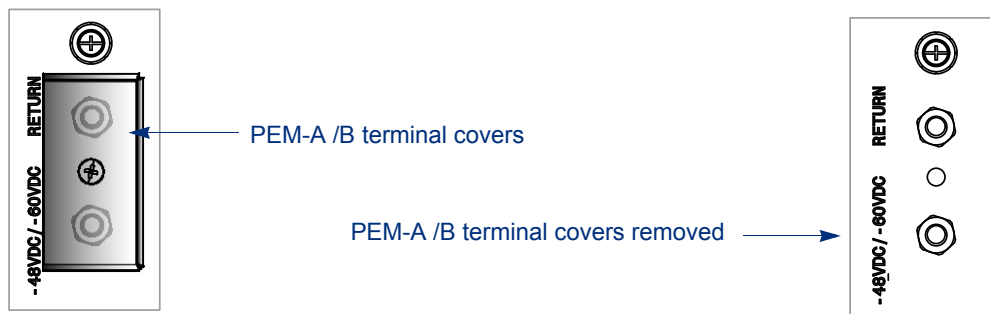


Figure 5. Terminal Covers - PEM-A and B

6. Remove the nuts with built-in star washers from the 4 DC connectors of PEM-A and PEM-B, leaving the nut with the flat washer in place on both connectors.

7. Remove the safety terminal cover from the rear of the AC power supply.

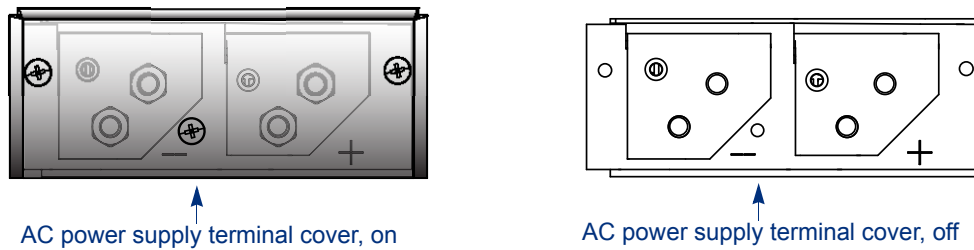


Figure 6. Terminal Cover - AC power supply

8. Remove the nuts and lock washers from the 4 DC connectors of the AC power supply.
9. Place one set of the single-holed wiring pair of DC terminals over the DC connector of PEM-A on the VMG-6, and the nut with attached star washer over both connectors (Figure 7). Use a 7/16 wrench to torque the bolt to 6.8N-m (5 foot pounds).

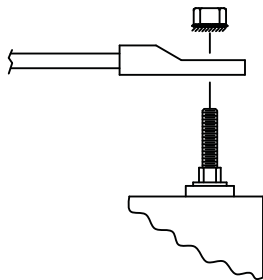


Figure 7. PEM-A / B DC connector assembly

10. Place the other set of the single-holed wiring pair of DC terminals over the DC connector of PEM-B, and the nut with attached star washer over both connectors (Figure 7). Use a 7/16 wrench to torque the bolt to 6.8N-m (5 foot pounds).
11. Replace the safety terminal cover of PEM-A and PEM-B over the DC connectors (now with DC wires installed) with the open side out, in the direction of the wires. Use a Phillips-head screwdriver to tighten the screws of the terminal cover.

The wiring will look similar to Figure 8:

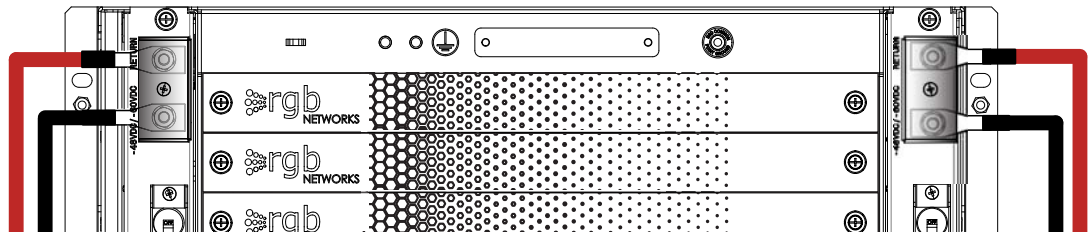


Figure 8. DC wires connected to PEM-A and PEM-B



Note: Be sure to connect the wires according to the polarities shown in Figure 1.

12. Using one of the two sets of #4 AWG wiring pairs, place one negative, flat-angled lug (Figure 9) over the negative (left side) set of 2 DC connectors on the AC power supply (Figure 6).

13. From the same set of #4 AWG wires, place the positive, double-holed flat-angled lug (Figure 9) over the positive (right side) set of 2 DC connectors on the AC power supply (Figure 6).

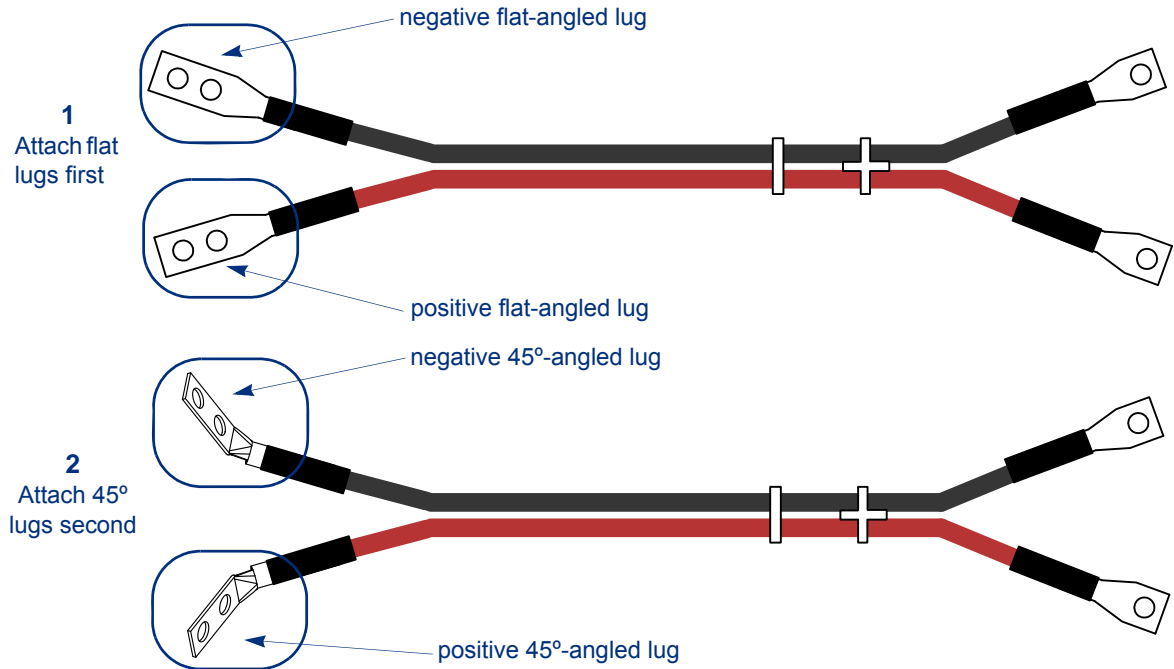


Figure 9. #4 AWG wire set, flat and 45°-angled lugs

14. Place the second set of 45°-angle lugs over the 4 (2 sets of 2) DC connectors of the AC power supply.
15. Place the 2 sets of DC wires (flat-angled and 45°-angled) such that both sets of wires exit in the same downward direction as seen in Figure 10 below.

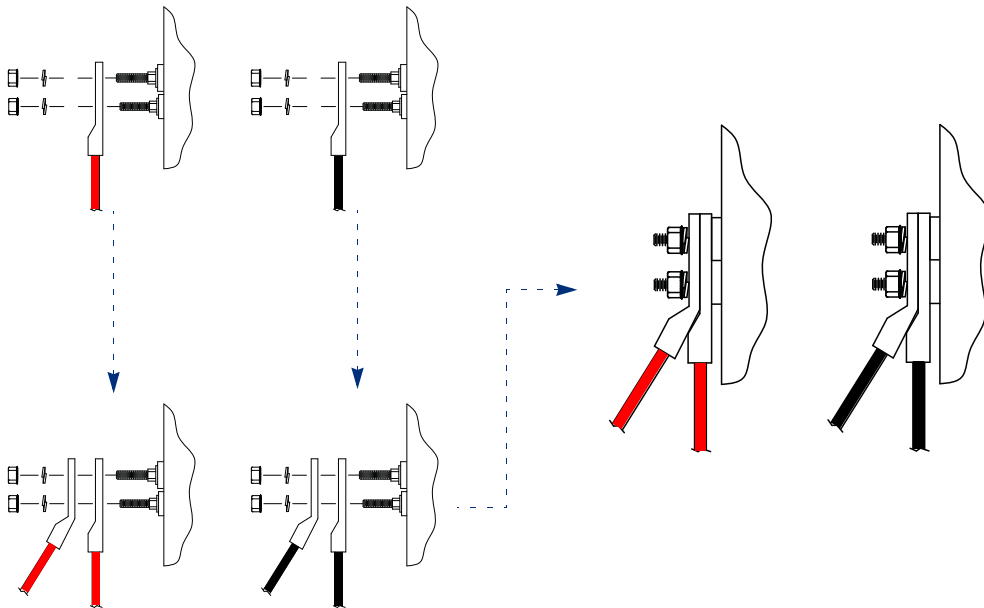


Figure 10. AC Power Supply, DC connector assembly- PEM Redundancy

16. Place the lock washer, then the nut over each connector. Use a 10mm wrench to torque the bolts to 6.8N-m (5 foot pounds).
17. Replace the safety terminal cover of AC power supply over the DC connectors (now with DC wires installed). Use a Phillips-head screwdriver to tighten the screws of the terminal cover.

The wiring will look similar to [Figure 11](#):

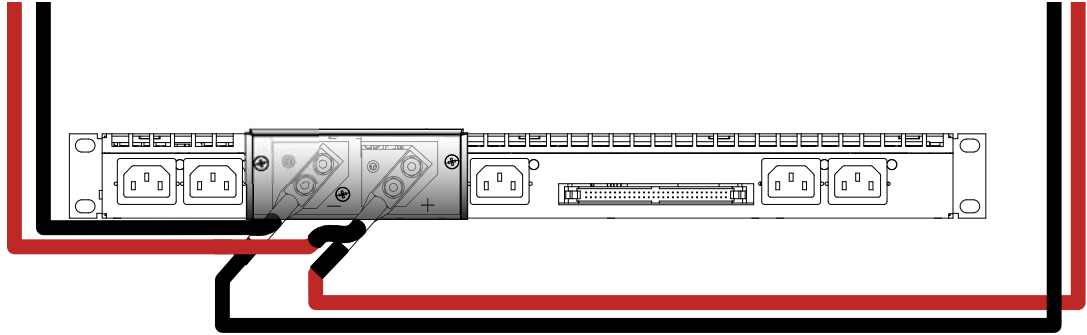


Figure 11. DC wires connected to AC power supply



Note: Be sure to connect the wires according to the polarities shown in [Figure 1](#).

18. Connect the three (3) female ends of the AC power cords to the AC connectors on the back of the power supply, making sure they align with installed power modules.



Note: For U.S configuration for AC redundancy, each cord set (NEMA 5-15 male end) should be plugged into its own dedicated 15 or 20 Amp AC Mains Circuit.



Warning! Each power supply module can draw up to 12.8 amps of current at full load. If more than one power supply module is plugged into the same circuit, it may cause the AC main breaker to trip.



Note: For installation outside of the United States, installation must comply with local facility codes and regulations. It is recommended that each power supply have its own dedicated AC Mains Circuit of at least 15 Amps.

19. When all wires are connected, the units will look similar to [Figure 1](#).
20. Turn on the VMG-6 circuit breakers for PEM-A and PEM-B.
21. Plug the three (3) male ends of the AC power cords to an appropriate power supply.

22. Verify that all three AC modules on the front of the AC power supply each have two green LEDs illuminated: one for AC and one for DC:

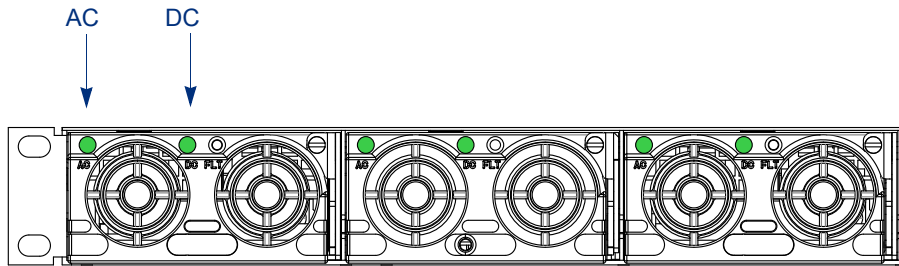


Figure 12. AC power supply chassis, front view, PEM redundancy

The AC power supply should power on the VMG-6.

23. Verify the **OK** LED on PEM-A and PEM-B of the VMG-6 is green as shown in [Figure 13](#).

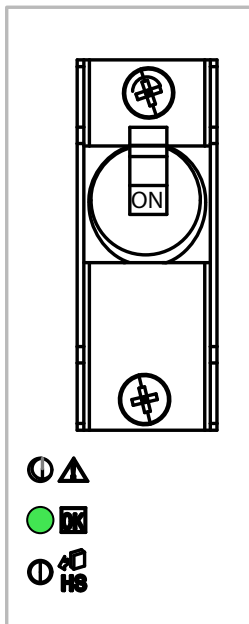


Figure 13. PEM-A / B 'OK' LED

Full Redundancy Installation

For full redundancy, you will need 2 RU of space to install both AC power supply chassis.

Prior to Installing the AC power supply

- Install the VMG-6 chassis (allowing 5RU of rack space) according to the instructions and parameters in *Chapter 3, Physical Installation* of the latest *VMG-6 Hardware Setup Guide*.
- Do *not* connect DC power to the VMG-6.
- Do *not* turn on the circuit breaker to the VMG-6 before completing all the steps below.

Installing the AC power supply

1. Verify there are 4 AC power cords each with the appropriate plug for your country, and 2 sets of #4 AWG DC positive and negative wires in the packaging:

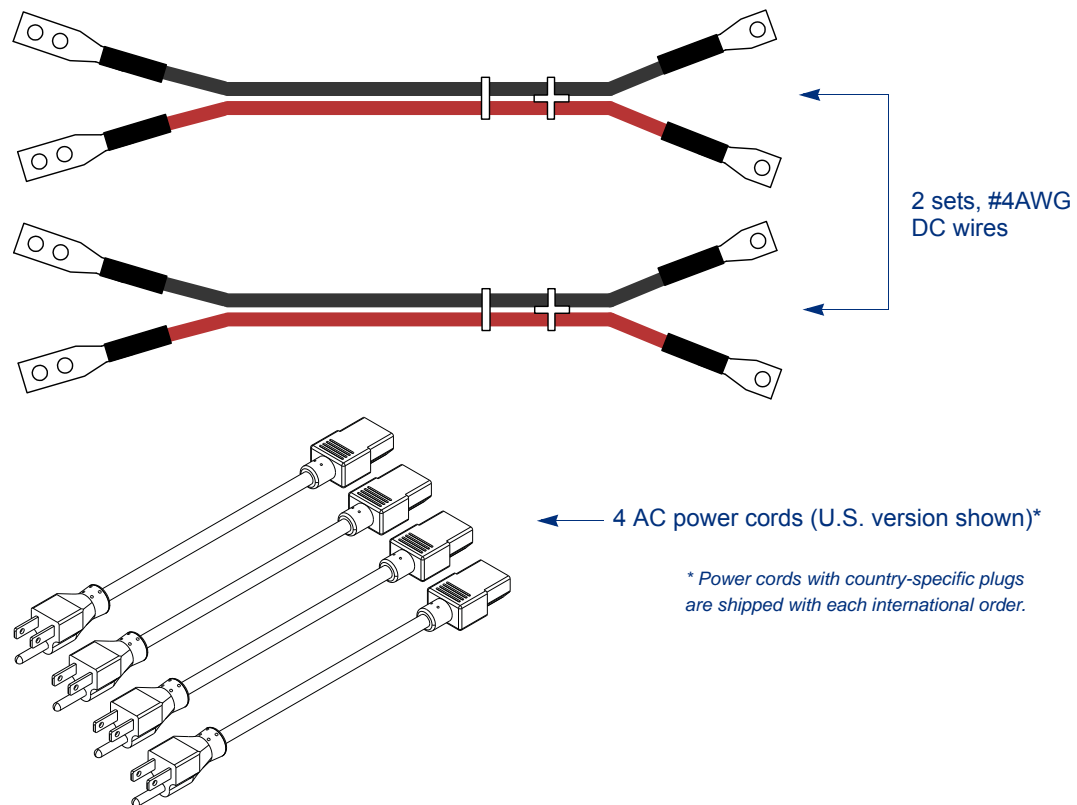


Figure 14. AC power supply packaging

2. Verify the 2 x 1000W power modules for each AC power supply (4 total) are installed, properly seated, and screwed down (no more than 3 threads) in the AC power supply unit.

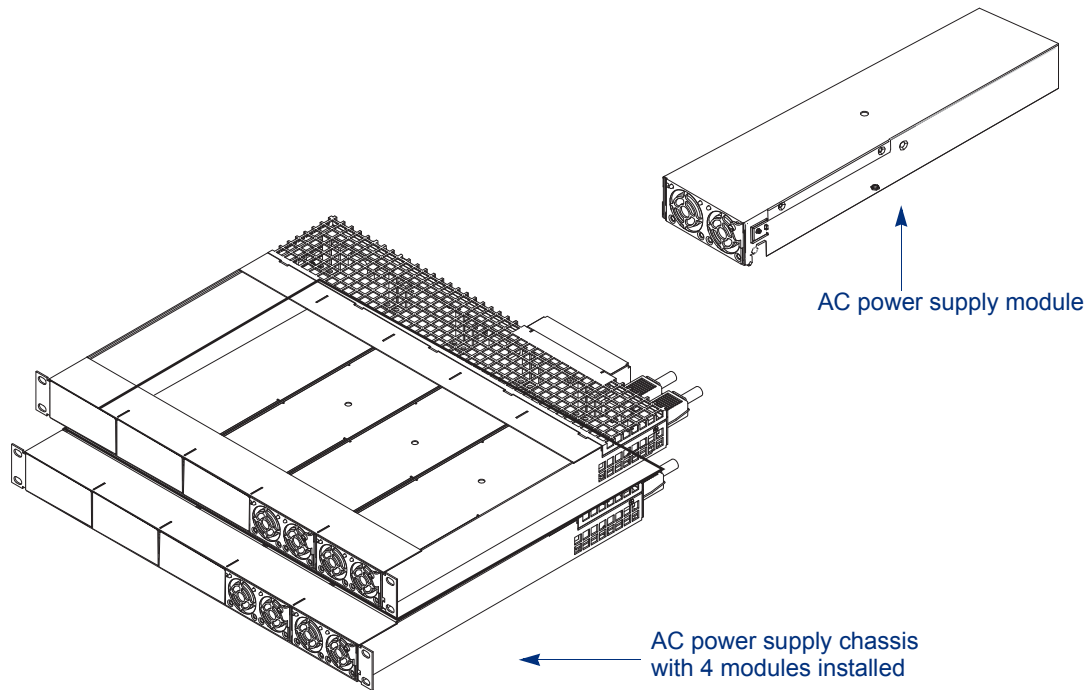


Figure 15. AC power supply unit with modules

3. Insert the AC power supply with installed modules in the rack either directly below or directly above the VMG-6 chassis. (This guide shows and recommends installation of the AC power supply *below* the VMG-6 chassis).



Note: The power supply modules are mounted from the front of the AC power supply chassis.

4. Using eight (8) rack mount screws, secure both AC power supply chassis into the rack, tightening each screw incrementally until all eight are evenly snug-tight.
5. Remove the safety terminal cover from the left and right Power Entry Module (PEM-A and PEM-B) of the VMG-6.

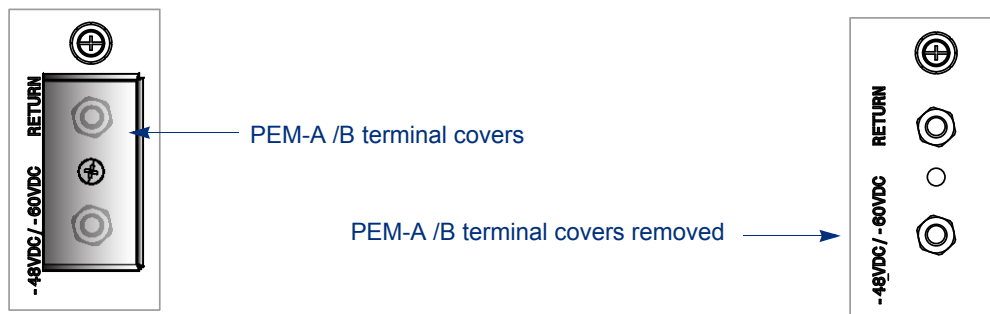


Figure 16. Terminal Covers - PEM-A and B

6. Remove the nuts with built-in star washers from the 4 DC connectors of PEM-A and PEM-B, leaving the nut with the flat washer in place on both connectors.

7. Remove the safety terminal cover from the rear of each AC power supply.

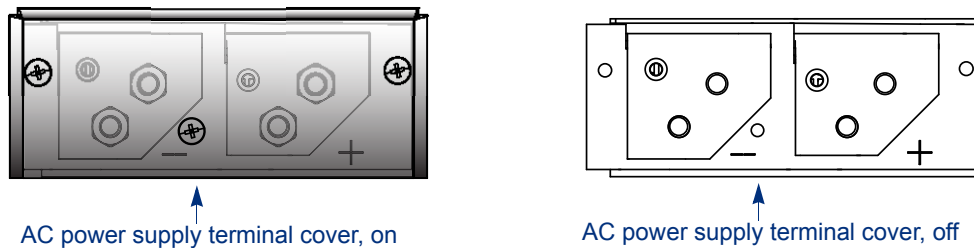


Figure 17. Terminal Cover - AC power supply

8. Remove the nuts and lock washers from the 4 DC connectors of each AC power supply.
9. Place one set of the single-holed wiring pair of DC terminals over the DC connector of PEM-A, and the nut with attached star washer over the connector (Figure 7). Use a 7/16 wrench to torque the bolt to 6.8N-m (5 foot pounds).

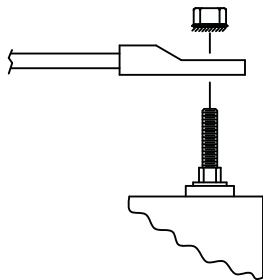


Figure 18. PEM-A / B DC connector assembly

10. Place the other set of the single-holed wiring pair of DC terminals over the DC connector of PEM-B, and the nut with attached star washer over the connector (Figure 18). Use a 7/16 wrench to torque the bolt to 6.8N-m (5 foot pounds).
11. Replace the safety terminal cover of PEM-A and PEM-B over the DC connectors (now with DC wires installed) with the open side out, in the direction of the wires. Use a Phillips-head screwdriver to tighten the screws of the terminal cover.

The wiring will look similar to Figure 19:

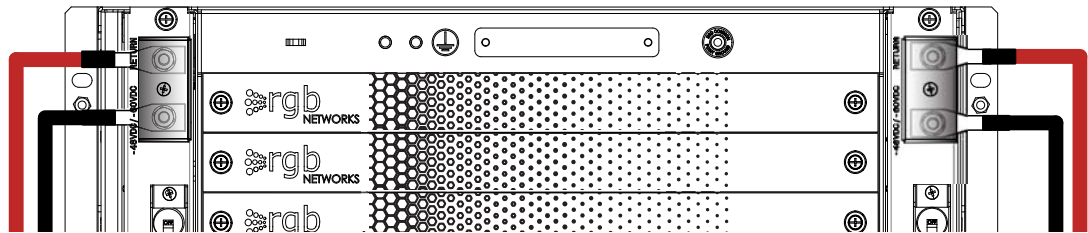


Figure 19. DC wires connected to PEM-A and PEM-B



Note: Be sure to connect the wires according to the polarities shown in Figure 2.

12. Place the first set of double-holed wiring pair of DC wires over the 4 (2 sets of 2) DC connectors of the first AC power supply.

13. Place the second set of double-holed wiring pair of DC wires over the 4 (2 sets of 2) DC connectors of the second AC power supply, as seen in [Figure 21](#) below.

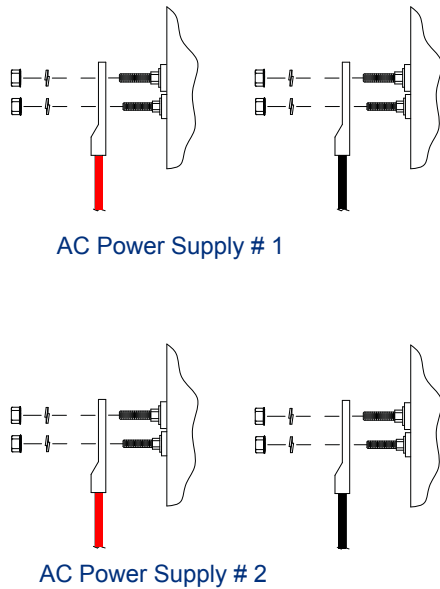


Figure 20. AC Power Supply, DC connector assembly - Full Redundancy

14. Place the lock washer, then the nut over each connector. Use a 10mm wrench to torque the bolts to 6.8N-m (5 foot pounds).
15. Replace the safety terminal cover of AC power supply over the DC connectors (now with DC wires installed). Use a Phillips-head screwdriver to tighten the screws of the terminal cover.

The wiring will look similar to [Figure 21](#):

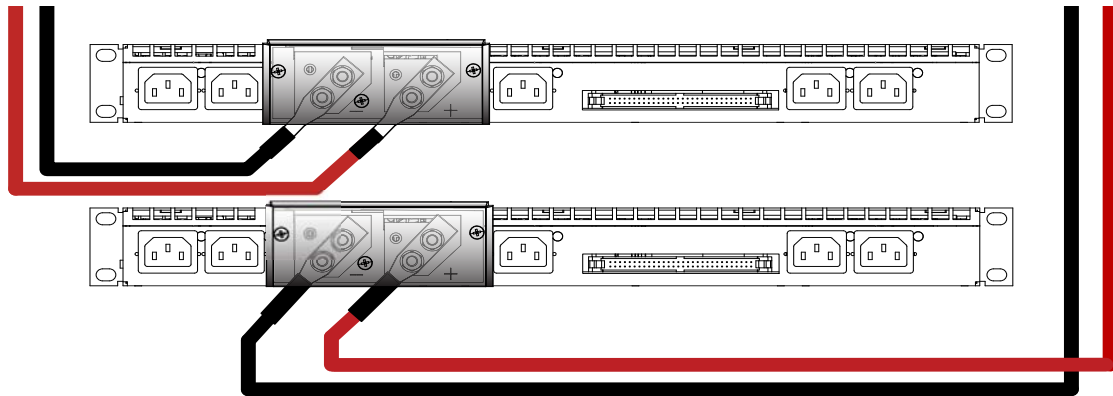


Figure 21. DC wires connected to each AC power supply



Note: Be sure to connect the wires according to the polarities shown in [Figure 2](#).

16. Connect the three (4) female ends of the AC power cords to the AC connectors on the back of the each power supply, making sure they align with installed power modules.



Note: For U.S. configuration for AC redundancy, each cord set (NEMA 5-15 male end) should be plugged into its own dedicated 15 or 20 Amp AC Mains Circuit.



Warning! Each power supply module can draw up to 12.8 amps of current at full load. If more than one power supply module is plugged into the same circuit, it may cause the AC main breaker to trip.



Note: For installation outside of the United States, installation must comply with local facility codes and regulations. It is recommended that each power supply have its own dedicated AC Mains Circuit of at least 15 Amps.

17. When all wires are connected, the units will look similar to [Figure 2](#).
18. Turn on the VMG-6 circuit breakers for PEM-A and PEM-B.
19. Plug the four (4) male ends of the AC power cords to an appropriate power supply.
20. Verify that all four AC modules on the front of the AC power supply each have two green LEDs illuminated: one for AC and one for DC:

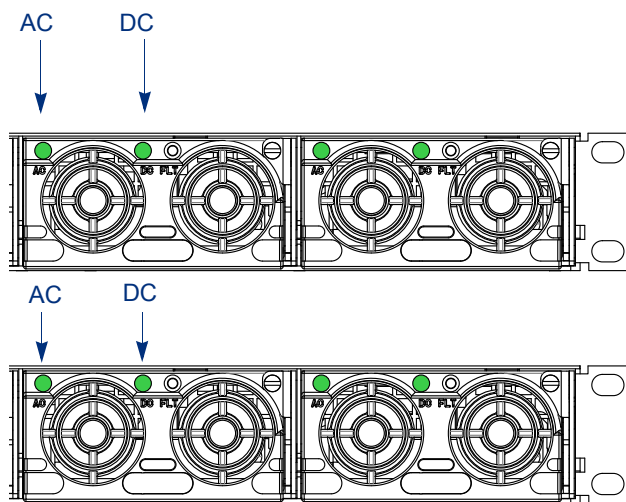


Figure 22. AC power supply chassis, front view, full redundancy

The AC power supply should power on the VMG-6.

21. Verify the **OK** LEDs on PEM-A and PEM-B of the VMG-6 are green as shown in [Figure 22](#).

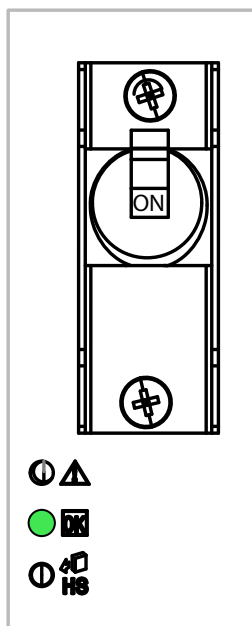


Figure 23. PEM-A / B 'OK' LED

Specifications

The following chapter provides specification information for the Cherokee power supply module, part number: CAR1248FP.

In This Chapter:

- “Input Specifications,” next.
- “Output Specifications” on page 20.
- “Safety Aspects” on page 20.

Power Module Specifications

Input Specifications

Table 1. Input Specifications

Variable	Description
Input Voltage	Range: 85-264 VAC
Input Frequency	Range: 47-63 Hz
Under-Voltage	The power supply switches off when mains voltage goes beyond the specified range. When active, the green LED is switched OFF on the front panel to generate a specific alarm. Turn off \leq 80 VAC
Maximum Input Current	12.75A (full load, V_{in} = 100VAC)
Power Factor	0.99 typical at nominal line and full load
Efficiency	85% typical at 90 VAC
Input Fuse	Two fuses (line and neutral) - 20A & 250 VAC, Type 3AB Axial
Inrush Current	Max 40A pk (measured at 25° for all line conditions typical duration 10ms)
Input Leakage Current	3mArms (250VAC & 60 Hz)
Hold-up Time	20ms at 1000W (typical) @ 90 VAC input

Output Specifications

Table 2. Output Specifications

Variable	Description
Output Voltage	Nominal output: +48 V _{out} , ±0.5%
Output Current (nominal)	20.8A @ +48V nom for low line operation (90VAC)
Current Limit	The unit is self-protected via constant current limit characteristic between the range of 110% - 130% of I _{out} nominal
Short Circuit	hiccup mode protection, self-resetting upon clearance of the fault condition.
Output Power	1000 W at low line* operation (90 VAC). *Unit derates below 90 VAC (input) to 900W

Safety Aspects

Table 3. Safety Aspects

Variable	Description
Applicable Standards	IEC 950 (per EN 60950) CSA C22.2-950 UL 1950 CE Mark (LVC)

Additional Information

In This Chapter:

- “Cherokee Power Supply and Module Documentation,” next.
- “Contacting RGB Networks Customer Support” on page 22.

Cherokee Power Supply and Module Documentation

For additional information such as specifications and functional design of the Cherokee AC power supply and its modules, [log in to RGB’s Customer Portal and search](#) for the following terms:

VMG AC Power Supply Specification

-and-

VMG AC Power Module Specification

Contacting RGB Networks Customer Support

If you have any questions or problems with this installation, please contact RGB Networks Customer Support:

Before you contact Customer Support, have the following information handy:

- Serial number of the AC power supply.
- A clear description of the problem.
- Steps to reproduce the problem, if applicable.

Customers who purchased their product directly from RGB Networks, or have purchased extended product support directly from RGB Networks should contact Customer Support via one of the following methods:

Table 4. Contacting Customer Support

Method	Details
Phone	+1 (877) RGB-NETW (877-742- 6389) or +1 (408) 701-2800
Customer Portal	http://support.rgbnetworks.com
Email	support@rgbnetworks.com

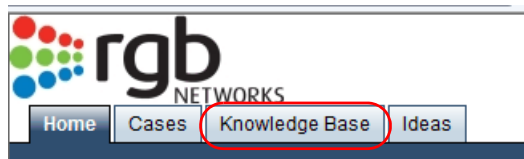
Searching the RGB Customer Portal

To search the RGB Customer Portal for a specific document or solution, proceed as follows:

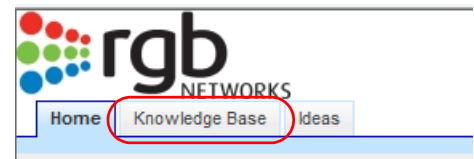
1. Log in to the [RGB Customer Portal](http://support.rgbnetworks.com) site.

Figure 24. RGB Customer Portal home page

2. From the Customer Portal homepage, click on the **Knowledge Base** tab:



Direct Customers - RGB Customer Portal home



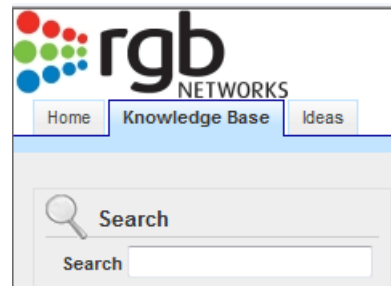
Resellers - RGB Customer Portal home

Figure 25. Customer Portal home page - Direct and Reseller

3. From the **Knowledge Base** homepage, enter the desired search term in the **Search** box and tap the [Enter] key:



Direct Customers - Knowledge Base search



Resellers - Knowledge Base search

Figure 26. Knowledge Base search - Direct and Reseller

