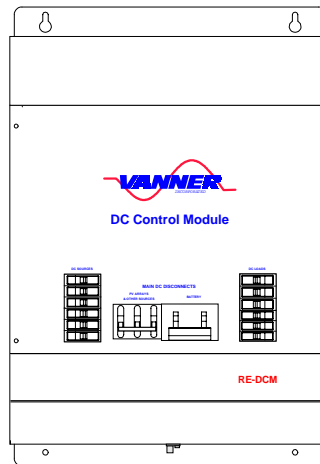




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## **RE SERIES**

### ***Renewable Energy DC Control Module Owner's/Installation Manual***



**Model  
RE-DCM**

#D910273-A  
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**Notes:**

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## 1 INTRODUCTION

Thank you for purchasing a Vanner RE-4500 Renewable Energy Inverter System. We are confident that you will be satisfied with its performance and its many features. With proper installation and care, you can look forward to years of service from this high performance product.

“**RE-DCM**” stands for **Renewable Energy System DC Control Module**.

The *RE Series* DC Control Module is a control system designed to incorporate the DC breaker, wiring, and switching needs for connecting the RE-4500 to Solar Arrays, Battery Banks, or other DC sources.

This document will describe the operation, technical specifications and installation procedures of the RE-DCM and accessories offered in this product family. We suggest that you acquaint yourself with the RE-4500 inverter/charger and other optional accessories before proceeding with this manual. If you require additional information please contact your dealer, or contact us directly at 1-800-227-6937 (800 AC POWER).

**WARNING:** Before you install and use your *RE-DCM*, be sure to read and save these safety instructions.

**WARNING:** The RE-DCM is not designed to be a part of Life Supporting or Life Sustaining Equipment. If the Unit is to be used in such an application, please contact Vanner Inc. at 1-800-ACPOWER.

The **RE SERIES** product line is designed to meet the requirements of a variety of applications.



### ***SAVE THESE INSTRUCTIONS!***



**Please note your model and serial number here for future reference.**

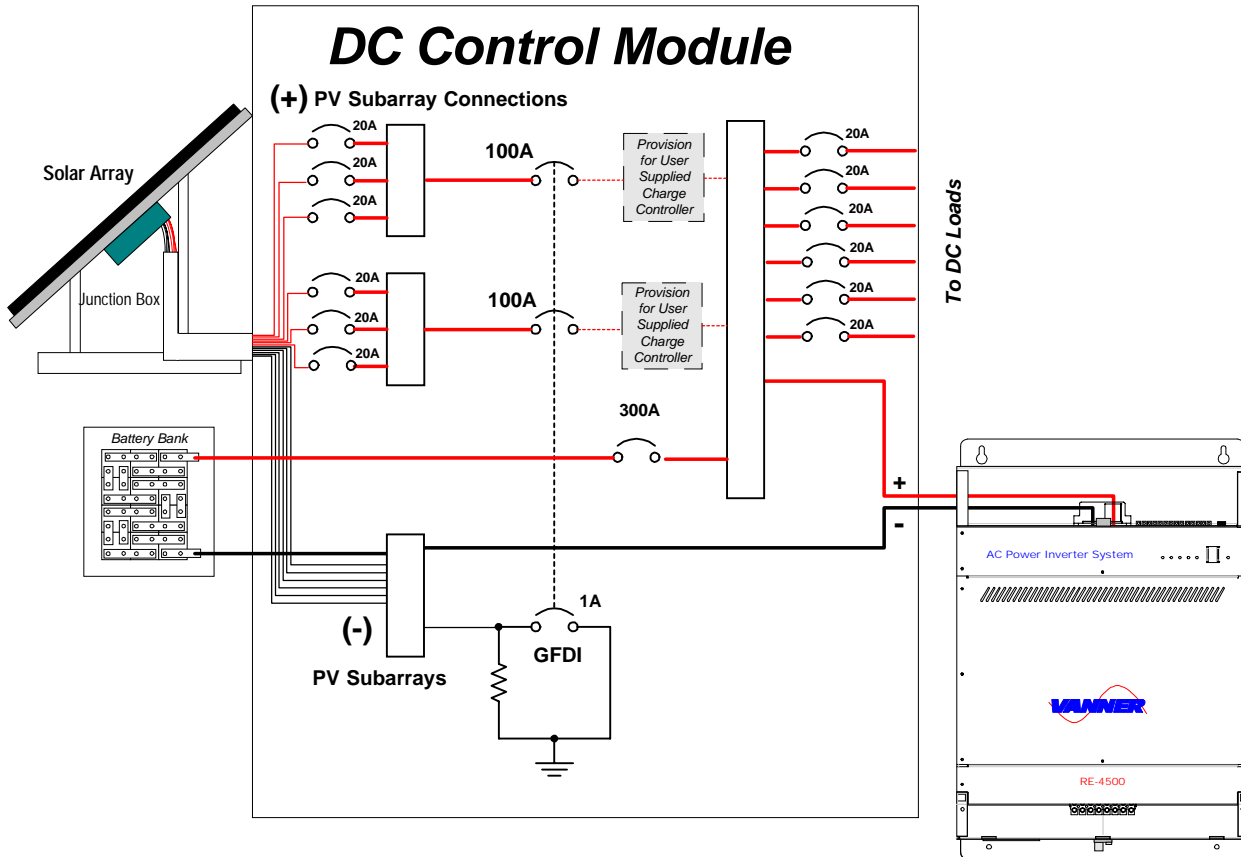
Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_ Date of Installation \_\_\_\_\_

This document describes the operation, technical specifications and installation procedures for the RE-DCM DC Control Module System. If you require additional information please contact your dealer or contact Vanner at 1-800-AC POWER (1-800-227-6937).

## 2 Specifications and Features

The block diagram shows the components of the RE-DCM system.

F 1 Figure 2.0-1 DC Control Module





## Specifications and Features

**T 1 Table 2.0-1 RE-DCM DC Control Module Specifications**

<b>DC Power Ratings</b>	
Rated Output Watts (-40 to +25°C)	7200 Watts
DC Sources Up to Six (6) 20 amp sources – PV Arrays One (1) 300 amp source - Battery	120 Amps 300 Amps
DC Loads Up to Six (6) 20 amp loads	120 Amps
DC Input Wiring Method	Circuit Breaker Terminals
DC Output Wiring Method	5/16" Dia. ring terminals or optional mechanical compression blocks (Vanner P/N D08421)
<b>System</b>	
Ambient Operating Temperature	-40° to +40°C (-40 to +104°F)
Enclosure	Painted Aluminum for Wall Mounting
Dimensions	29½ H x 20½ W x 9¼ D
Unit Weight	39 pounds

## 2.1 Standard Features

1. Includes most requirements for DC Sources, DC loads, and disconnects in a convenient assembly.
2. Eliminates “box clutter” caused by normal integration of DC switching and distribution products.
3. Standard stud distance mounting holes allow easy mechanical integration.
4. Entry/exit knockouts allow easy integration (no conduit required) to interface to RE-4500 and RE-ACM.

## 2.2 Parts and Accessories

<b>Part Number</b>	<b>Name</b>	<b>Description</b>
RE-4500	Inverter/Charger	Includes the Grid Tied Inverter Charger electronics. This intelligent system provides grid-tied Interactive power from a DC Source. This system also provides power to charge the system’s Batteries to provide AC power when Solar or Utility is not available.
RE-ACM	AC Control Module	Includes most requirements AC Power distribution disconnects, and charge control in a convenient assembly.



### 3 SAFETY INSTRUCTIONS

 **Warning Labels Please READ ME** 

 **SAVE THESE SAFETY INSTRUCTIONS!** 

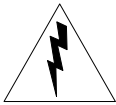
It should be noted that hazardous voltages are associated with this product. This unit has connections to DC at lethal amperages and voltages.

Installation should only be done by qualified personnel and in compliance with local regulations and codes.

Special care must be taken in working around the RE-DCM System in order to avoid hazardous voltages and currents.

Note: In order to reduce the risk of damage to personnel or equipment, please read all instructions in this manual, particularly warnings noted by the following symbols.

These symbols are used to note procedures that if not closely followed could lead to loss of life or damage to equipment or property due to electrocution.



**Electrocution Hazard Exists**



**Fire Hazard Exists**



**A Potential Dangerous Condition**

### 3.1 SAFETY INSTRUCTIONS



**Before you install and use your RE-DCM,  
Read and save these safety instructions!**



This manual contains important safety and operating instructions for the Vanner Incorporated RE-DCM as prescribed by Underwriters Laboratories (UL). The RE system is listed as compliant with UL 1741 Power Conditioning Units for use in Residential Photovoltaic Power Systems.



1. Read owners manual BEFORE wiring or powering up.













2. This equipment employs components that tend to produce arcs and sparks. To prevent fire or explosion, DO NOT install in confined areas or compartments that contain batteries or flammable gases and materials.




3. Improper use of this product may result in risk of electrical shock.

### 3.2 General Precautions

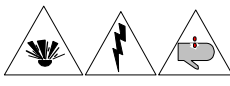


1.  Do not expose the DC Control Module to direct water spray, rain, or snow.
2. Since this RE-DCM is designed to mount next to the RE-4500, do not install the RE-DCM and RE-4500 inverter in a zero clearance compartment. This may result in overheating or diminished performance of the total RE System.
3.   To avoid the risk of fire, electrical shock, or injury to persons, do not use attachments not recommended or sold by Vanner Incorporated.
4.  Vanner recommends that all DC electrical wiring be performed by a licensed electrician or a qualified technician to ensure compliance with all applicable national and local wiring regulations.

5.  To avoid a risk of fire and/or electrical shock, always verify wiring connections are in good electrical condition. All external conductors must use proper wire size to avoid dangerous overheating or diminished performance.
6.  If the DC Control Module has been dropped or damaged in any way, do not operate the DCM until it has been verified to be safe by a qualified technician.
7.  To reduce the risk of electrical shock, always disconnect the DC connections using the code required DC disconnects.
8.  The DCM must be properly grounded in accordance with local and national codes and ordinances before operation. For most installations, the negative (ground) conductor should be bonded to the grounding system at one and only one point in the system.
9.  It should be noted that only qualified service personnel should attempt to wire the DCM to the RE-4500, and/or the DC Sources.
10.  Always use service disconnects to break the circuit before attempting any kind of servicing of the RE-DCM. DO NOT attempt to service the unit while still actively connected to a power source of any kind.







### 3.3 Explosive Gas Precautions

1.  This equipment contains components, which tend to produce arcs or sparks. To prevent fire or explosion, do not install in compartments containing batteries or flammable materials, or in locations that require ignition protected equipment. This includes any space containing batteries or gasoline-powered machinery, fuel tanks, or joints, fittings, or other connections between components of the fuel system. Likewise, Lead Acid Batteries produce explosive vapors which can be dangerous.



### 3.4 Battery Precautions

1.  Always have someone within range of your voice to come to your aid when you work near a lead-acid battery.
2.  Have close access to plenty of fresh water and soap in case battery acid contacts skin, clothing, or eyes.
3.  Always wear complete eye protection and clothing protection. Avoid touching eyes while working near batteries.

## Important Safety Precautions

4.  If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 20 minutes. Get medical attention immediately.
5.  NEVER smoke or allow a spark or flame near a battery. Gases produced by batteries are explosive.
6.  Be careful when working with metal tools around batteries. Potentials exist for sparks or short-circuit of the battery or other electrical part which could cause an explosion.
7.  Before attempting any sort of wiring for the DC supply to the Inverter, turnoff the DC disconnect associated with the Batteries. For Safety, ALWAYS check the operation of the disconnect with a voltmeter!!.
8.   In addition to the lethal current associated with the batteries, care must be taken to avoid any potential problems or explosions from the batteries. ALWAYS comply with the battery manufacturer's and local code requirements/guidelines for the installed battery system.

### 3.5 Solar Panel

1.  Before attempting any sort of wiring for the DC supply(s) to the DCM, turnoff the DC disconnect associated with the Solar Arrays (if available at the junction boxes). Verify the proper operation of the disconnect through the use of a Volt meter on the output of the disconnect. Failure to do so could result in death.
2.  The solar arrays will generate lethal currents even if not exposed to bright sunlight. It is important to make certain that the service disconnect is utilized to remove the lethal potential from the terminals.

### 3.6 Code Compliance

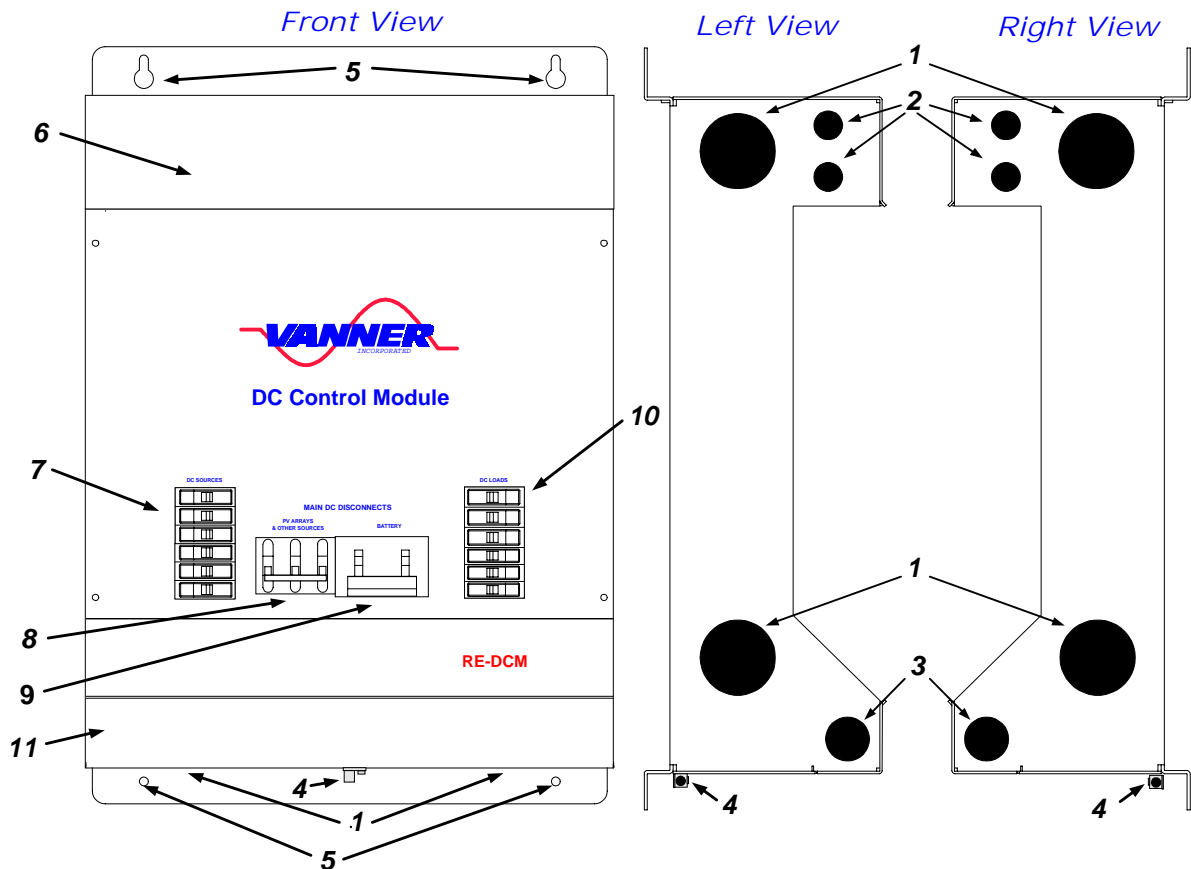
Vanner Model RE-DCM is listed by Underwriter's Laboratory to meet UL listing 1741 for Photovoltaic Systems, and complies with IEEE 929 and the National Electric Code Article 690, Solar Photovoltaic Systems.

#### 4 COMPONENT IDENTIFICATION

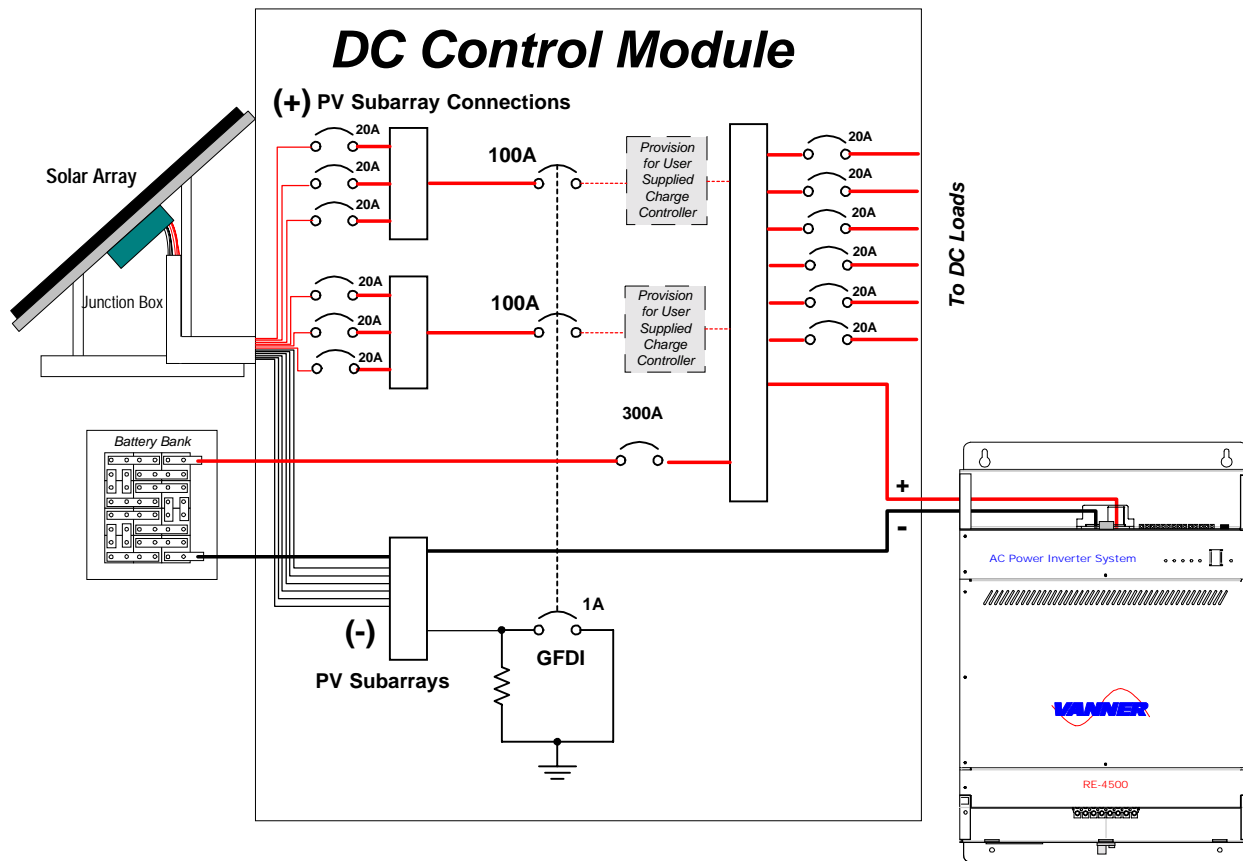
This section will give the reader an idea as to location and description of various features of the RE-DCM.

Note that at the top of the unit is a raceway with terminations for connecting DC and Control Signals, and at the bottom of the unit is a raceway for the routing and termination of AC power lines.

F 2 Figure 4.0-1 DC Control Module Front and Side View



F 3 Figure 4.0-2 DC Control Module Schematic



**(1) Knockout Entry/Exit for High Current DC Wiring**

These knockouts provide for the routing and termination of high capacity DC cables from batteries or Solar panels and to the RE-4500 Inverter/Charger and RE24-ACM. This knockout is a standard size 2.914" to accommodate 2 1/2" conduit.

**(2) Knockout Entry/Exit for Low Current DC Wiring and Control Wiring**

These knockouts provide for the routing and termination of low capacity DC wiring and Control Wiring. These knockouts also provide access (from either the right side or left side of the unit) to the DC Wiring Raceway. This knockout is a standard size 1.115" to accommodate 3/4" conduit.

**(3) Knockout Entry/Exit for AC Wiring and Raceway**

This knockout provides for the routing and termination of AC Wiring from the Grid and to the AC load to be powered from the RE-4500 Inverter/Charger.

This knockout also matches up with the AC knockout on Vanner systems such as the RE-4500 and the AC Control Panel (RE24-ACM). This knockout is a standard size 1.701" to accommodate 1 1/4 " conduit.

**(4) Chassis Ground Tie Point**

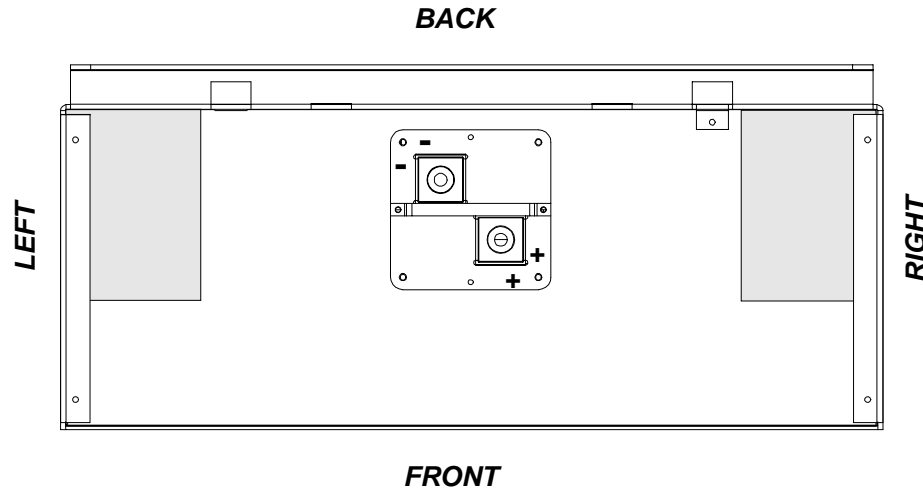
This compression terminal provides a tie point for tying the chassis to a common chassis ground.

### (5) Mounting Bolt Slots

### (6) DC Raceway

This raceway provides a method of routing DC cables through the DCM to connect to the RE-4500 Inverter/Charger or the RE-ACM AC Control Module.

### F 4 Figure 4.0-3 DC Raceway Terminations



### (7) PV Array Circuit Breakers

These Circuit Breakers select whether the PV Arrays are connected to the RE-DCM. There are 6 (6) 20 amp circuit breakers in this array.

### (8) DC Source (Solar) Breakers

This set of breakers is for connecting the combined solar sources to the RE-4500. It consists of two (2) 100 amp breakers and 1 (1) 1 amp GFDI.

### (9) Battery Circuit Breakers

This set of breakers is for connecting the Battery bank to the RE-4500. It has a rating of 300 amps.

### (10) DC Load Breakers

This set of breakers is for connecting the Auxiliary DC loads to the RE-DCM. It consists of six (6) 20 amp breakers.

### (11) AC Raceway

This raceway provides a method of routing AC cables through the DCM to connect the RE-ACM to the RE-4500 Inverter/Charger, to the utility, to the generator, and to the AC loads.

## 5 INSTALLATION and START-UP

This section will provide the user with information to install the RE-DCM into a power system.

### 5.1 Installation and Start-up

This installation procedure is to provide a method for installation of the RE-DCM. Please refer also to the RE-4500 Owners Manual for information on installing the Inverter.

#### 5.1.1 Unpacking the DCM

1. Inspect the shipping container and equipment for loose or damaged parts. If any damage is found, immediately notify the freight carrier.

#### 5.1.2 RE-DCM and other Module Installation Considerations

1. Mounting: Locate a secure, dry, flat vertical surface large enough to mount the DCM (and other modules if used – RE4500 Inverter/Charger and ACM). The location should be as close to the battery as possible, usually within six feet, but not in the same compartment and should provide adequate ventilation while the inverter is operating. The location must be clean, dry and free of dripping water, or other moisture contamination.
2. Cooling Fan Clearance consideration for the Inverter: If the RE-DCM is to be mounted next to the RE-4500, the mounting location must allow unobstructed airflow for cooling the RE-4500 Inverter. Remember to take this into account when mounting the DCM. Allow a minimum clearance of 12 inches (30.48 cm) on bottom and sides of the RE-4500. The Cooling Fan is a thermostatically controlled exhaust fan. Air is drawn into the inverter from the intake vents and exhausted by the fan. Obstruction of the fan exhaust or the intake vents will diminish the inverter output capacity due to overheating.
3. The wiring of your RE-DCM installation should conform to the National Electric Code (NEC) and any other state or local codes in effect at the time of installation. These codes have been written for your protection and their requirements should be followed.
4. Route the AC output wiring from the Inverter/Utility/Generator with as much physical separation as possible from low voltage wiring such as audio and video signal wires, and the Input DC wiring. This is accommodated in the system through the physical separation of the AC and DC wiring raceways.
5. To conform to local and national electrical codes, proper installation of strain reliefs and/or conduit is important. If strain reliefs are used, tighten the strain relief cable clamps to keep the wire from moving around in the entry/exit port.

#### 5.1.3 DC Wiring Considerations

1. **A DC FUSE IS REQUIRED** to properly protect the system in case the battery cables are connected backward (reverse polarity). Use a Vanner Part Number 04095 Very Fast Acting 400 amp fuse.
2. The wiring of your RE system installation should conform to the National Electric Code (NEC) and any other state or local codes in effect at the time of installation. These codes have been written for your protection and their requirements should be followed. Article 551 of the NEC requires any DC cable from a battery and solar panel, which measures longer than 18 inches along its length, be protected by a fuse.

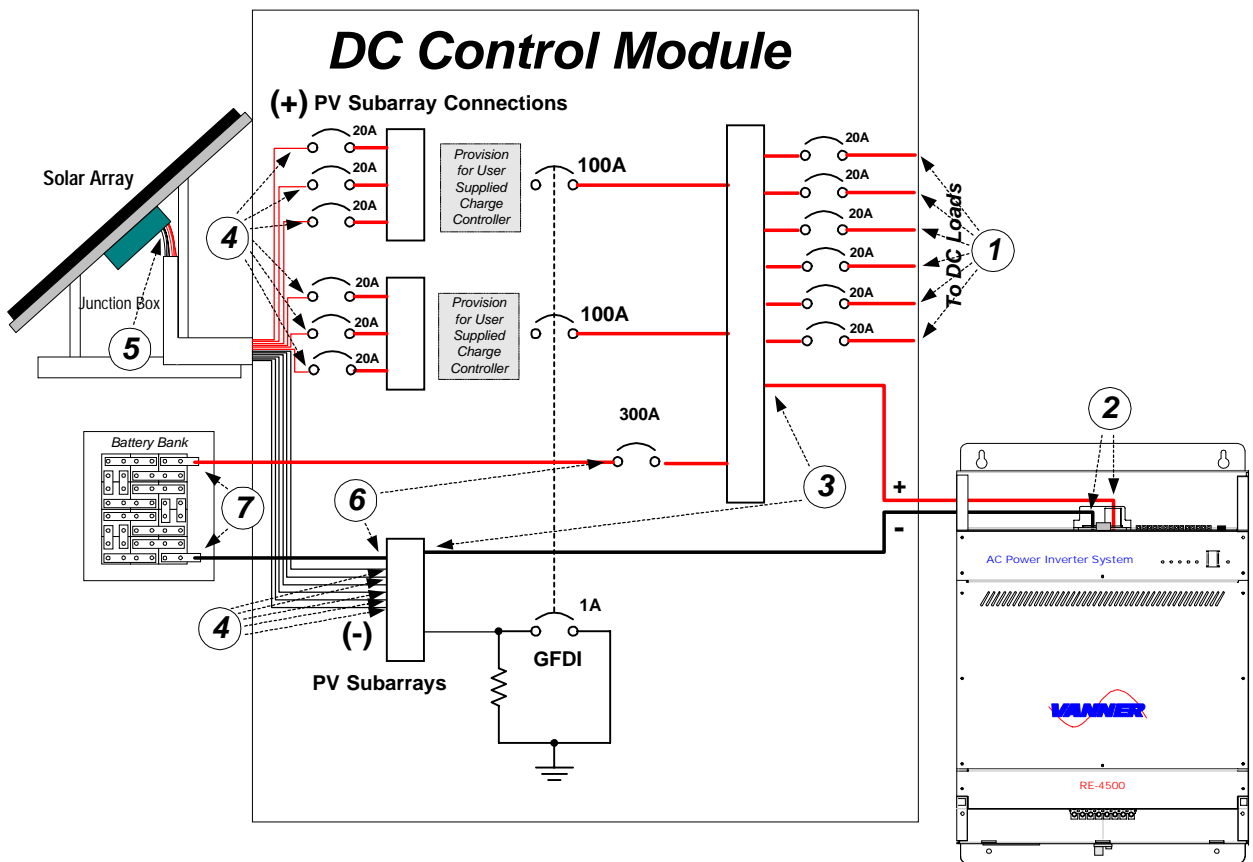




**WARNING**

This Diagram is for informational purposes ONLY!!! Please refer to National and Local Electrical Wiring codes to insure compliance and safety!

F 5 Figure 5.1.3-1 DCM Wiring Procedure





**It is important to disconnect ALL DC sources to avoid electric shock!**

**Place all breakers and disconnects on the RE-DCM in the OFF position.**

**DC Voltage is extremely dangerous and contact with DC Currents can lead to injury, damage to property, and death!**

**Use the DC disconnect to insure that ALL potentials are disabled.**



3. Route the DC positive and negative cables as close together as possible and use cable ties to keep them together. This reduces electromagnetic radiation that could interfere with sensitive electronics.
4. If passing through steel or other ferrous metal walls, the DC input cables need to pass through the same hole to prevent causing a transformer effect. If two holes are required, cut a slot to connect the two holes to prevent heating of the ferrous metal.
5. **Proper DC cable size for the Battery and Inverter connection is critical** for the performance and safe operation of the inverter system. It is recommended by Vanner that the installer use 4/0 AWG wire for the battery, RE-DCM, and Inverter connections to minimize losses to less than ½ volt over the length of the cable. This wire needs to be rated for 90°C.
6. **Proper DC cable sizing is critical for the Solar Connections and DC Loads** also to insure best performance and safe operation of the RE system. It is recommended that all DC wiring to the Solar Array be done with 10 AWG 90°C wire (12 AWG minimum). Keep wires as short as possible to minimize losses over the wire and to minimize hazard of fire. Make certain that the wiring conforms to National and Local Electric Codes.
7. All DC cables should be as short as possible to minimize losses.



**Before proceeding with the DC wiring, verify that the DC Disconnects and Circuit Breakers are OFF and that the Inverter is OFF. If this precaution is not taken, serious or fatal electrical shock may occur!**

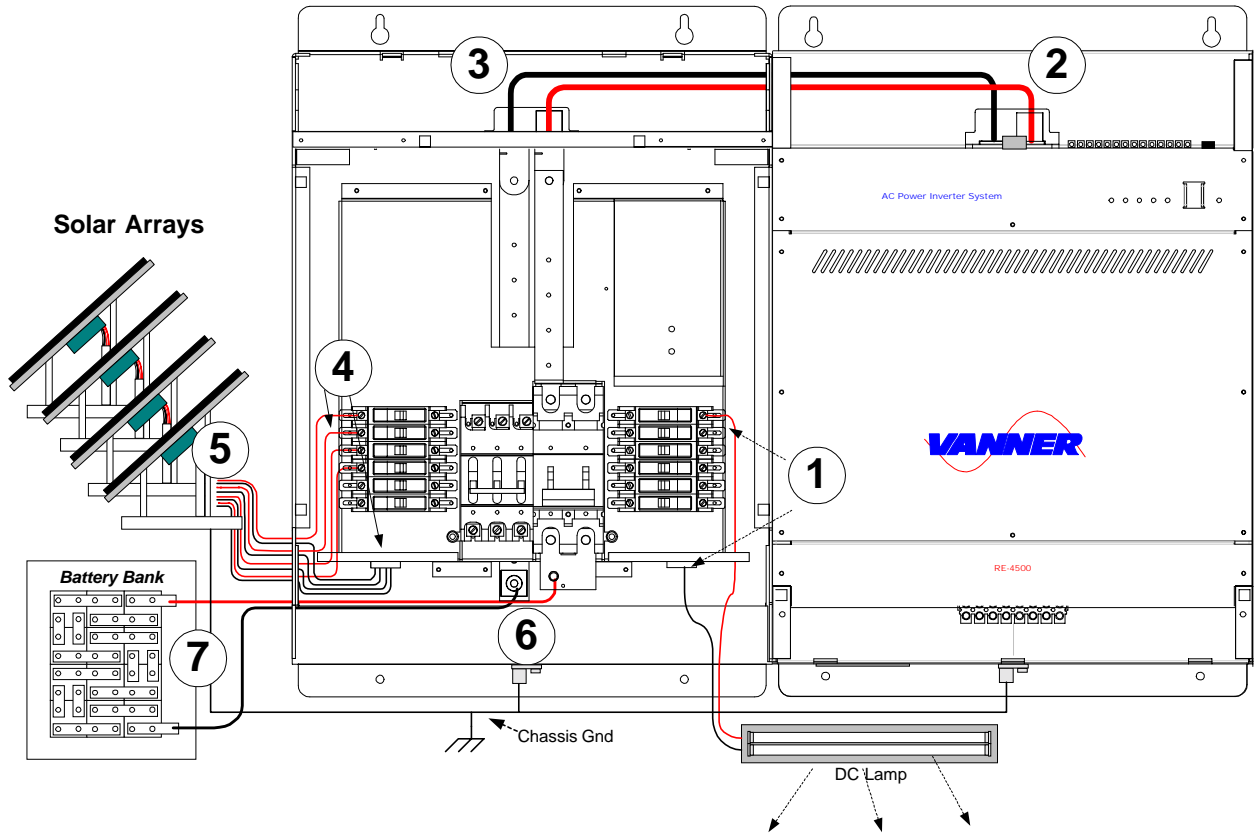
**Note:** It is recommended that all DC Battery and Inverter wiring be done with 4/0 AWG 90°C wire. Make certain that the wiring conforms to National and Local Electric Codes.

All of the DCM's electrical connections are labeled.

Place ALL Disconnects on the DCM and Service Disconnects in the OFF position to avoid electrical shock.

Remove the access covers to the DC raceway and front panel.

**F 6 Figure 5.1.3-2 DCM DC Source and RE DC Connections**



**Chassis Ground :** Use the Chassis Ground compression fitting to ground the chassis using 10 gauge wire. . Connect the chassis ground wire to the compression fitting and torque the bolt to 75 inch pounds. Re-torque after 30 days.

**5.1.4 DC Wiring Installation Procedure**

For the proper wiring procedure, please refer to Figure 5.1.3-1 and 5.1.3-2. These drawings show the proper installation procedure to minimize shock hazard. The reader should note the numbers to show the order of installation to minimize shock hazard.

**5.1.4.1 DC Load Wiring Procedure (1)**

The first step is to connect any DC Loads to the RE-DCM using the smaller DC knockouts (item 2) shown in Figure 4.0-1. The following procedure defines the connections.

1. Place ALL Disconnects/Circuit Breakers on the RE-DCM and Service Disconnects in the OFF position to avoid electrical shock.
2. Remove the Front Panel from the RE-DCM to expose the DC Load Terminations (Item 1, Figure 5.1.3-2) on the right side of the DCM. The Positive leads connect to the circuit breakers (should be in the OFF position), and the negative lead should then connect to the connection strip shown below the DC Load Breakers.
3. When connecting the DC Load leads, be careful to observe polarity while using 10 AWG 90°C wire (recommended for best performance - 12 AWG 90°C minimum). Connect the positive and ground to the appropriate terminals and torque each of the DC terminal screws to 15 inch pounds. Re-torque after 30 days.
4. Make certain to route the DC load wires through the appropriate knockout, and run in conduit or utilizing proper strain reliefs. Protect cables with loom and use grommets or other appropriate means where cables may contact hard, sharp edges.
5. Repeat the above procedures for each load, making certain that no more than a 20 amp load is dedicated to each breaker.
6. Inspect the DC cable compartment to be sure no copper wire fragments are present after tightening cables.
7. Verify DC wiring installation. Verify that all connections are tight.

### 5.1.4.2 RE-DCM to Inverter Wiring Procedure (2 and 3)



**It is important to disconnect ALL DC sources and place all breakers and disconnects in the OFF position to avoid electric shock!**

**DC Voltage is extremely dangerous and contact with DC Currents can lead to injury, damage to property, and death!**

**Use the DC disconnects to insure that ALL potentials are disabled.**



1. The DC wiring raceway (Figure 5.1.4.2-1) is located on the top of the RE-DCM. The DC cables may enter the RE-DCM through left or right side openings to the raceway. Bolts are provided for connecting 5/16 diameter ring terminals to the DC Output Contacts.
2. The DC power connections to the inverter require that 5/16" Dia. ring terminals be used for connection to the RE-DCM unless the optional mechanical compression blocks (Vanner P/N D08421) are used. A list of suitable terminals, as well as the tools required to crimp them, are shown in Table 5.1.4.2-1.

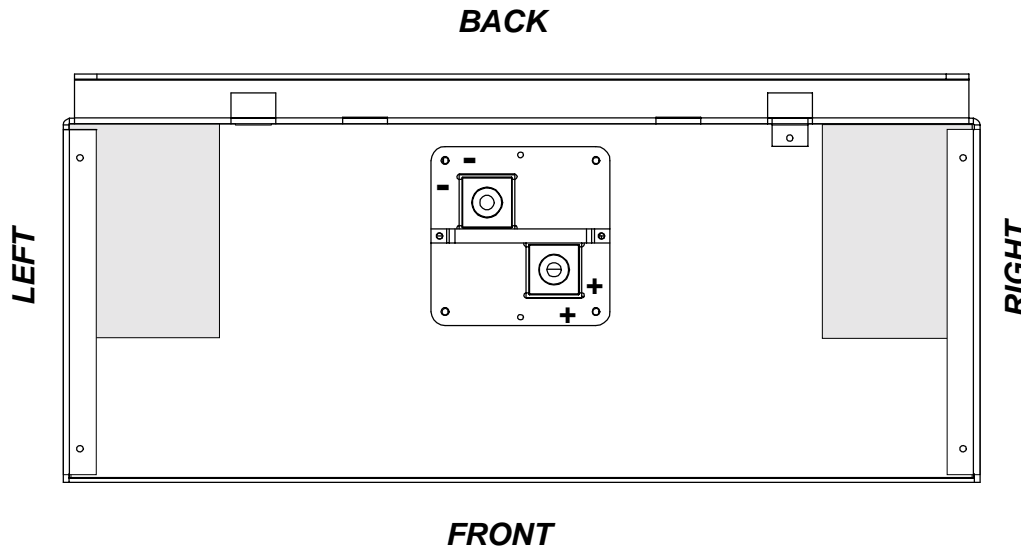
**T 2 Table 5.1.4.2-1 Ring Terminals for 4/0 DC Cables**

**UL Listed Ring Terminals for 4/0 DC Cables**

Molex Part Number	Size	Model	Crimping Tool Part Numbers
L-395-56	5/16" DIA.	Versacrimp	DLHH, PPD LH, SKT-840*
L-995-56		Nylacrimp	

\*This tool is for crimping Versacrimp style terminals only.

**F 7 Figure 5.1.4.2-1 DC Raceway Terminations**



**5.1.4.3 Solar Termination Wiring Procedure (4 and 5)**



**Before proceeding with the DC wiring, verify that the inverter is OFF. Serious or fatal electrical shock may occur.**

**Note:** It is recommended that all DC wiring to the Solar Array be done with 10 AWG 90°C wire (12 AWG minimum). Keep wires as short as possible to minimize losses over the wire and to minimize hazard of fire. Make certain that the wiring conforms to National and Local Electric Codes.



**Before proceeding with the DC wiring, verify that the Disconnects, Circuit Breakers, and Inverter are OFF. Serious or fatal electrical shock may occur.**



**It should be noted that the RE-DCM enclosure is not grounded and should be when required by Section 690-41, 690-42, and 690-43 of NEC/NFPA 70-1999.**



**It should be noted that the Solar Array Chassis Ground must be tied to the RE-DCM Chassis Ground Point, and then tied to the Residential Earth Ground Rod in accordance with Code.**

All of the RE-DCM's electrical connections are labeled.

1. Remove the Front Panel from the DCM to expose the Solar Array terminals on the Solar Array breakers (4) and the associated Ground termination strip located below the breakers.
2. Verify that the Solar Panel cables are disconnected from the DC Source.
3. Connect to the DC Solar Termination terminals (Item 4 of Figure 5.1.3-2), while observing polarity using 10 AWG 90°C wire (recommended for best performance - 12 AWG 90°C minimum).
4. Insert DC source cables through the entry/exit ports and into the circuit breaker terminals and the negative termination strip below the breakers. Torque each of the DC terminal screws to 15 inch pounds. Re-torque after 30 days.
5. Inspect the DC cable compartment to be sure no copper wire fragments are present after tightening cables.
6. Route the positive DC input wires to the Solar Panel junction boxes. Protect cables with loom and use grommets or other appropriate means where cables may contact hard, sharp edges.
7. Repeat for each of the solar arrays making certain that no more than 20 amps is supplied to each breaker.
8. Verify DC wiring installation. Verify that all connections are tight and secure all wiring.
9. Re-connect any disconnections made at the Solar Array Junction Boxes, or (making certain to maintain correct polarity) connect to the appropriate terminals in the junction box at the solar array.

Re-connect any disconnections made at the Solar Array Junction Boxes.

**5.1.4.4 Battery Wiring Procedure (6 and 7)**

1. Select an accessible location for the DC Fuse. The location should be within 18” of the battery and accessible for visual inspection and replacement. If possible, locate the fuse so the last DC connection can safely be made at the fuse.
2. Remove the cover plate on the front panel of the RE-DCM to expose the positive and negative DC connections (Item 6 in Figure 5.1.3-2).
3. Prepare DC cable ends.
4. Verify that the DC cables are still disconnected from the Battery Bank. Insert DC cables through the entry exit port and route to the Battery Connections near the Battery Disconnect and Breaker. Torque DC cable mounting bolts to 105 inch pounds. Re-torque after 30 days. Inspect the DC cable compartment to be sure no copper wire fragments are present after tightening cables.
5. Route the negative DC cable to the DC source disconnect. Verify cable polarity before proceeding.



**If the cables are reversed, the fuse will be blown and the RE-4500 connected to the RE-DCM can be damaged.**



6. Route the positive DC input cable to the DC disconnect.. Protect cables with loom and use grommets or other appropriate means where cables may contact hard, sharp edges. If possible, make the last DC connection at the disconnect to avoid causing a spark at the battery.
7. Verify DC wiring installation. Verify that all connections are tight. Secure all wiring and replace the DC Raceway cover.

**5.1.4.5 Customer Supplied Charge Controller Installation**

Provisions have been made in the RE-DCM for the integration of UL listed Charge Controllers. These charge controllers may be wired into the output bus from the PV Array Circuit Breakers, and prior to the DC Source breakers.



**Use only UL listed charge controllers of the appropriate capacity for the DCM.**



## **5.2 Final Inspection**

1. Verify AC and DC wiring installations. Verify that all connections are tight. Secure all wiring and replace the AC Raceway cover.
2. Inspect AC and DC raceways to verify that no scrap or loose wire is present before securing the AC Raceway cover.
3. Secure the front panel, AC, and DC raceway covers.

## **5.3 RE-DCM Startup**

This section covers the start up of the RE-DCM. It is assumed that the RE-4500 Inverter has been fully installed at this time. If it has not, please complete the installation of the RE-4500 by following the instructions in your RE-4500 Installation Manual.

1. Make certain that the RE-4500 power switch is in the "Off" position.
2. Place Service disconnects external to the RE-DCM in the "On" position.
3. Remove the Front Panel of the RE-DCM, along with the DC Raceway.
4. If the solar array is providing power, verify that a DC voltage is present on the inputs to the PV Circuit Breakers.
5. Throw each of the breakers and make certain that each is providing the same DC Voltage at the output terminals of the PV Circuit Breakers.
6. Check to see that the PV DC Voltage is present on the Input to the PV DC Breaker (bottom terminals).
7. Engage the Main PV Breaker and verify that voltage is present on the output of the breaker.
8. Verify the operation of your UL listed charge controller according to your Owner's/Installation Manual for the Charge Controller.
9. Turn the Solar main Breaker Off.
10. Turn the Battery Disconnect to the "On" position and verify that the output DC voltage is present on the Input terminals to the RE-4500 Inverter.
11. Re-install the Front Panel of the RE-DCM, along with the AC Raceway and DC Raceway covers.
12. Proceed to the check out of the RE-4500 following the checkout in the RE-4500 Owners Manual.





## **6 Preventive Maintenance and Trouble Shooting Procedures**

### *Preventive Maintenance*

For continued reliability and safety, a monthly maintenance program should be implemented to include the following:

1. Check to insure that all wiring connections are tight, secure and corrosion free.
2. Examine connectors, indicators and switches for cracks and breaks.
3. Examine any surfaces that are discolored or deformed due to excessive heat.

### *Trouble Shooting Procedures*

The following are the most common questions heard by Vanner service professionals. If your situation does not apply to the following categories, please contact your local Vanner Inc. Service Center or the Vanner Inc. Customer Service Department: 1-800-AC-POWER (1-800-227-6937). Please have your model and serial number available when consulting customer service.

## 7 APPENDIX

### 7.1 Warranty

#### NORTH AMERICAN LIMITED WARRANTY

Vanner Inc., doing business as The Vanner Inc., referred to herein as Vanner, warrants that this product is free from defects in materials and workmanship for a period of two (2) years from date of installation or two and one half (2 1/2) years from date of manufacture, whichever is less if and only if the following requirements are complied with:

1. The product is installed and checked out properly according to all guidelines, instructions, and checkout procedures set forth in the product Installation and Operating Manual.
2. The installer records all checkout data required and completes, signs, and returns the warranty registration card to Vanner within ten (10) days after installation.
3. The product was purchased after January 1, 2000.

Vanner does not warrant its products against any and all defects when: defect is a result of material or workmanship not provided by Vanner; normal wear and tear, or defects caused by misuse or use in contrary to instructions supplied, neglect, accident, reversed polarity, unauthorized repairs and/or replacements.

Vanner does not manufacture this product for use in a life supporting or life sustaining role. Please contact Vanner if you have any questions along this line.

All warranties of merchantability and fitness for a particular purpose: written or oral, expressed or implied, shall extend only for a period of two (2) years from date of installation or two and one half (2 1/2) years from date of manufacture, whichever is first. There are no other warranties that extend beyond those described on the face of this warranty. Some states do not allow limitation on how long an implied warranty lasts, so the above limitations may not apply to you.

Vanner does not undertake responsibility to any purchaser of its product for any undertaking, representation, or warranty made by any dealers or distributors selling its products beyond those herein expressed unless expressed in writing by an officer of Vanner.

Vanner does not assume responsibility for incidental or consequential damages, including, but not limited to, responsibility for loss of use of this product, removal or replacement labor, loss of time, inconvenience, expense for telephone calls, shipping expense, loss or damage to property, or loss of revenue. Some states do not allow the exclusion or limitation of incidental or consequential damages, so these limitations may not apply to you.

Vanner reserves the right to repair, replace, or allow credit for any material returned under this warranty. Any damage caused by the customer will be charged or deducted from the allowance.

All warranty work will be performed at Vanner's factory, by authorized Vanner distributors, by Vanner installers/technicians, or a Vanner authorized repair facility utilizing a valid Warranty Authorization Number (WAN) prior to repair. Products shall be delivered to Vanner's facility, freight prepaid and fully insured. Products repaired under warranty, or replacement parts or products will be returned to North American location prepaid via same transportation means and level of service as received, unless directed otherwise. Prepaid freight policy does not apply to locations outside North America.

## **7.2 Application Notes**

Please refer to the Vanner Incorporated Web site for Application notes at:

<http://www.vanner.com>

## **7.3 Applicable Documents**

National Electric Code 2001

NEC Article 690

UL-1741

IEEE-929

<sup>1</sup> G.A. Kern, R.H.Bonn, J. Ginn, S. Gonzalez *Results of Sandia National Laboratories Grid-Tied Inverter Testing*, July 1998



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