

Newmar A/C Electrical Systems 2010 & 2011

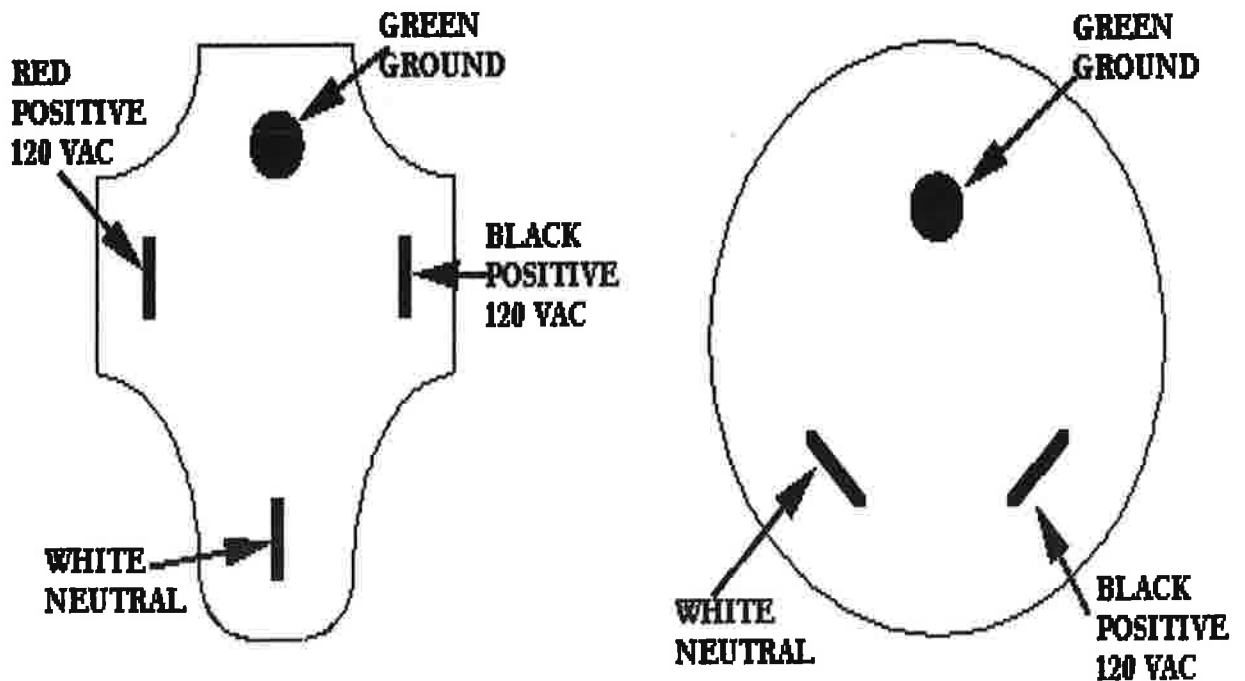
This class is designed to help the R.V. Technician identify and discuss electrical systems and components found in Newmar coaches.

120 V.A.C.

There are three sources of A.C. power available to the R.V.

- Shore power – provided by R.V. Park or home service outlets.
- Generator power
- Inverter

Most R.V. Parks provide 30 amps, 120 vac service at the site. Many parks are providing 50 amps, 240 vac service to accommodate the electrical needs of newer and larger coaches. Shore power is supplied to the coach via power cord. Two sizes of power cord are found on Newmar products, 50 amp and 30 amp cords. The 50 amp cords are made up of four conductor's #8 stranded wire and a molded plug. The 30 amp cords are made up of three conductor's #10 stranded wire and a molded plug.



There are three sizes of power cord adaptors available. These adaptors are necessary when stepping down to use a smaller amperage outlet.

- 50 amp to 30 amp adaptor
- 50 amp to 20 amp adaptor
- 30 amp to 20 amp adaptor

Trouble shooting tips when using adaptors

1. Melted or damaged adaptors

- Internal melting causing poor connection or no connection.

2. Insufficient amperage

- Limited use of appliances
- Tripping of breaker at the post

3. Low voltage

- Caused by use of adaptor and long extension cords or too small wire size extension cords

It is important to educate the customer on the use of adaptors and their affects on the electrical system's capabilities.

Automatic Transfer Switches

All late models Newmar coaches equipped with a generator will have an automatic transfer switch. The transfer switch is located in the electrical compartment and connected to the power cord. Some early models may have a recept that the shore power cord must plug into to connect the generator to the main service panel. Current models ~ when ordering generator prep will have a transfer switch installed.

The 50 amp transfer switch consists of a printed circuit control board, two electromagnetic contact blocks and terminal connecting lugs. The shore power cord is connected to one of the contact blocks and the generator is connected to the other. The generator is always wired into the priority circuit of the transfer switch. The supply leads to the main service panel are also connected to the transfer switch.

When electricity is supplied to the transfer switch “from shore power, generator or both” the control board opens or closes the contactors to select a power supply for the main service panel. The generator circuit is always a priority; a delay of approximately 40 seconds is built into the control board when the generator circuit is energized.

When work is performed or the transfer switch is replaced, always check for proper operation of the transfer switch on shore power and generator power.



Progressive Dynamics, Inc.

507 INDUSTRIAL ROAD

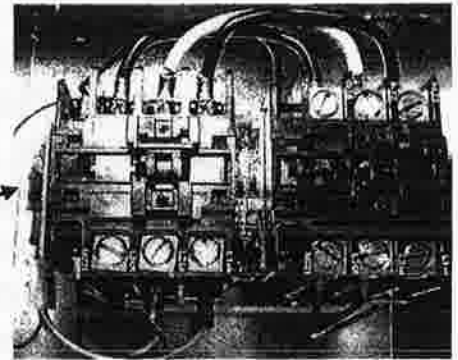
MARSHALL, MI 49068

PHONE: 269-781-4241 FAX: 269-781-7802



5200 SERIES AUTOMATIC TRANSFER SWITCH

NOTE:
GREEN LED "ON" INDICATES THAT
GENERATOR POWER IS AVAILABLE



5200 SERIES AUTOMATIC TRANSFER SWITCH INSTALLATION GUIDE

INTRODUCTION

The 5200 Series Automatic Transfer Switch is designed to automatically switch your RV's AC power from the Shore Power Cord to the Generator. When the RV Shore power cord is connected to the 50-amp outlet in an RV park, power is connected through the Transfer Switch directly to the RV AC Distribution Panel and then to all 120 VAC appliances and outlets. When the RV generator is started, a timing circuit in the 5200 Transfer Switch waits approximately 30-seconds to allow the generator to get up to speed. After this time delay, Shore Power is disconnected and generator power is now fed to the RV AC distribution Panel.

INSTALLATION

DUE TO THE HIGH VOLTAGES ASSOCIATED WITH ITS OPERATION ONLY QUALIFIED SERVICE PERSONNEL SHOULD INSTALL THIS TRANSFER SWITCH! ALL APPLICABLE CODES AND STANDARDS MUST BE MET WHEN INSTALLING THIS DEVICE. SEE WIRING DIAGRAM INSIDE OF THE COVER AND ON BACK OF THIS PAGE.

The 5200 Automatic Transfer Switch can be mounted in any position provided there is room to route the Shore Power, Generator and Distribution Connection wires. The 5200 Transfer Switch is not suitable for outdoor locations and should be mounted inside the RV living quarters or the RV basement. We recommend that the Transfer Switch be mounted as close to the Shore Power and Generator power cords as practical to reduce voltage loss.

!

WARNING: THE 5200 TRANSFER SWITCH IS NOT IGNITION PROTECTED AND SHOULD NOT BE MOUNTED IN THE SAME COMPARTMENT AS THE BATTERIES OR FLAMMABLE MATERIALS SUCH AS GASOLINE. DO NOT MOUNT THE TRANSFER SWITCH IN THE GENERATOR OR LP GAS COMPARTMENT. A FIRE CAUSING PROPERTY DAMAGE SERIOUS INJURY OR DEATH COULD RESULT

LIMITED WARRANTY

Progressive Dynamics, Inc. warrants each 5200 Series Automatic Transfer Switch to be free of defects in materials and workmanship under normal use for a period of 2-years after date of purchase. This warranty is only valid to the original owner within the continental limits of the U.S and Canada. Warranty claims within the first 24-months should be handled by the dealer that handles warranty claims for your RV.

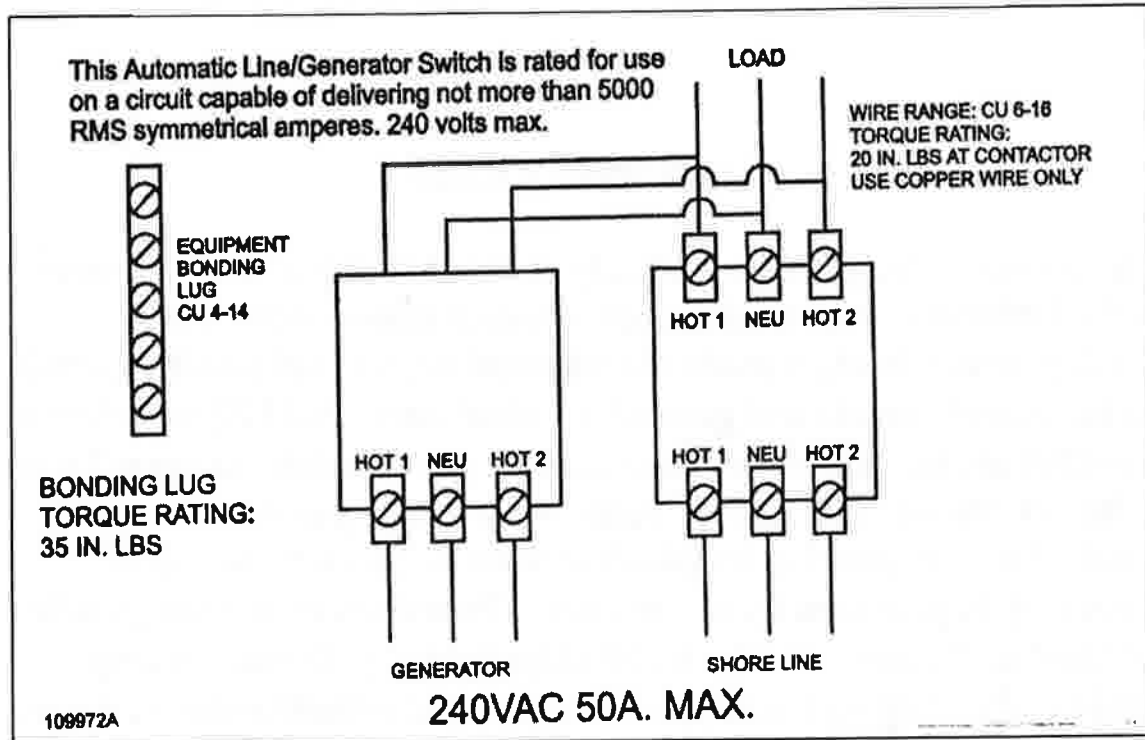
SPECIFICATIONS (subject to change without notice)

Electrical Rating: 120/240 VAC 60 HZ @ 50 amperes.
[70 ohms resistance btwn Hot & Neutral on the Shore Power Connections]
LO-Amp Drop-Out Protected: 90amps
Maximum Generator rating: 12 KW
Enclosure: UL Type 1
Listed: Agency listed for the United States and Canada
Weight: 6lbs ~Dimensions: 7 1/4"L X 6 3/4"W X 4 1/2"H
NOTE: Unit is not ignition protected



See our web site for additional information progressivedyn.com

5200 SERIES WIRING DIAGRAM

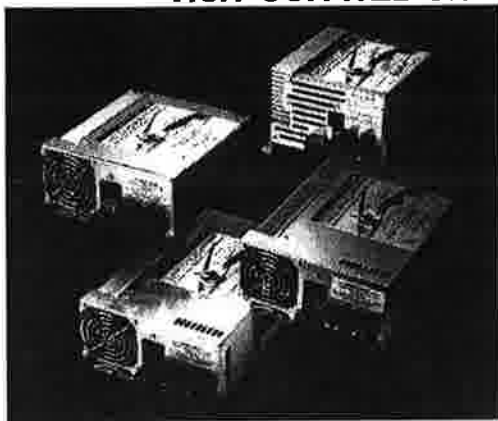


QUICK REFERENCE

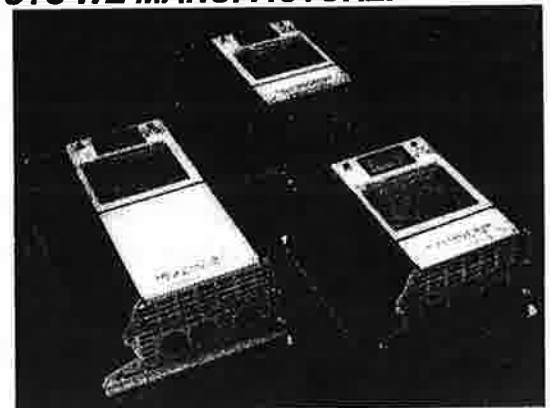
HI-POT PROCEDURE: Connect HOT 1 [or HOT 2] of Shore Line AND NEUTRAL together...then run HiPot from Hot & Neutral to GROUND.

TROUBLE SHOOT: If after initial hook-up, Contactor does not engage...A] Check if MAIN Power is on TIMER Circuit side. B] Remove LOAD Side of ATS, Energize. If Contactor engages, then re-install load side.

VISIT OUR WEB SITE TO SEE OTHER PRODUCTS WE MANUFACTURE.



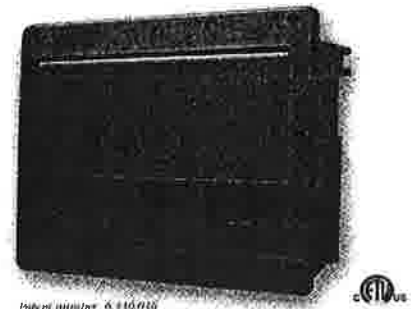
POWER CONVERTERS FOR THE RV INDUSTRY



BATTERY CHARGERS FOR THE MARINE INDUSTRY



30-AMP AC/DC DISTRIBUTION PANELS FOR THE RV INDUSTRY

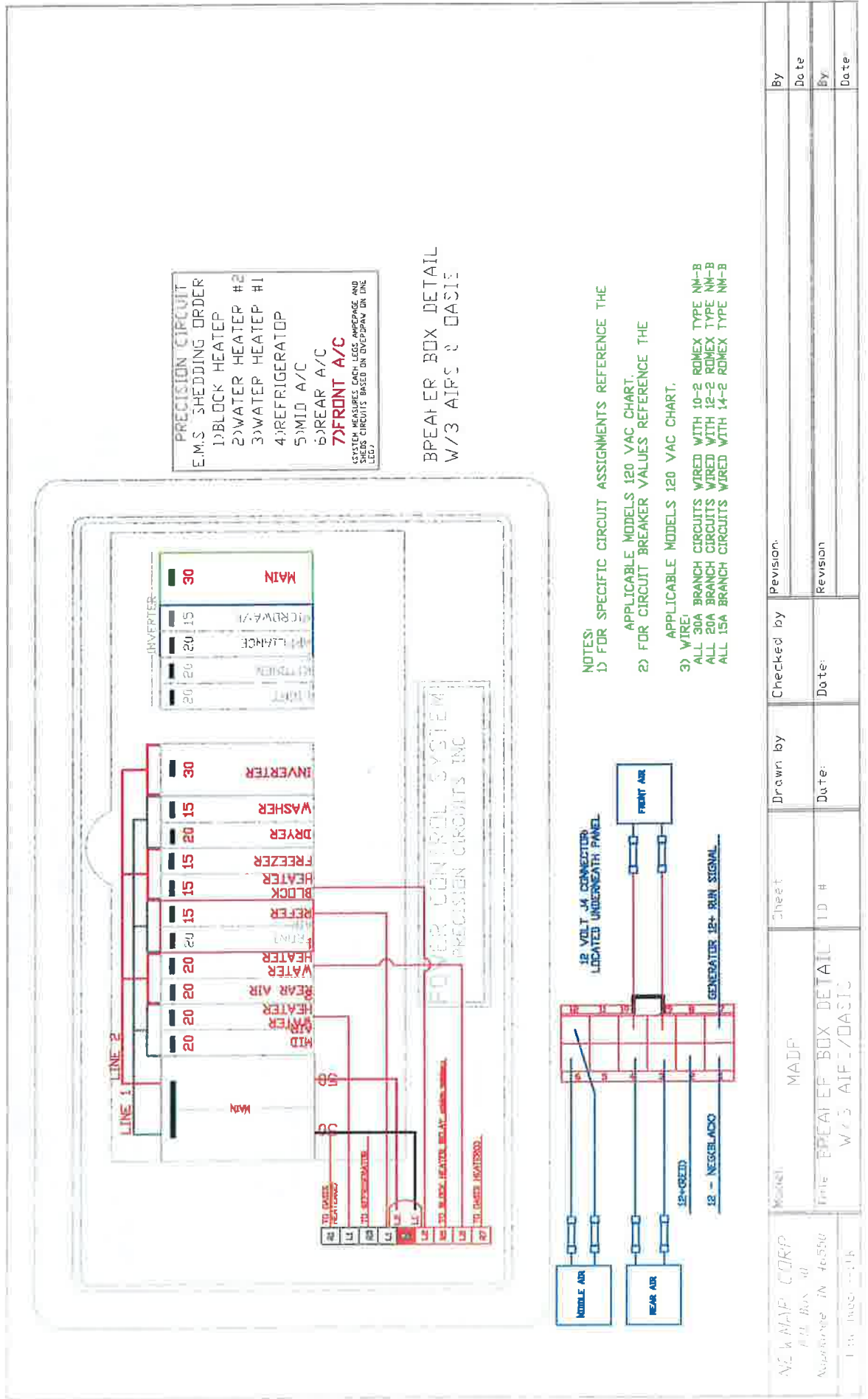


50-AMP AC AND 12-VOLT DC DISTRIBUTION PANELS FOR THE RV INDUSTRY

Main Service Panel

The main service panel is typically located in either the bathroom or the bedroom. It is made up of terminal connections for incoming power leads, a main circuit breaker, several smaller circuit breakers and neutral and ground terminal bars. All 120 vac circuit breakers are located in the main service panel unless equipped with an inverter/converter. These units are also equipped with a sub panel. The sub panel is installed to limit AC power use when electricity is provided by an inverter. Two sizes of service panels are used in Newmar products, 50 amp double pole and 30 amp single pole. Any unit equipped with two air conditioners, or more, must have 50 amp service. Mountain Aire and down if equipped with an EMS System, the main breaker box & sub panel are all in one.

Care should be taken to balance the load placed on 50 amp services. Separating major draw items "12 amp or more" such as air conditioners, water heaters, inverter/converter, ect. Breakers positioned next to each other are on different poles. No more than three large items should be installed on a 30 amp service panel. When installing addition circuits in the service panel be sure to use correct breaker and wire size for the appliance being installed. For units equipped with energy management systems the EMS circuit board is located inside the main service panel.



PRECISION CIRCUIT

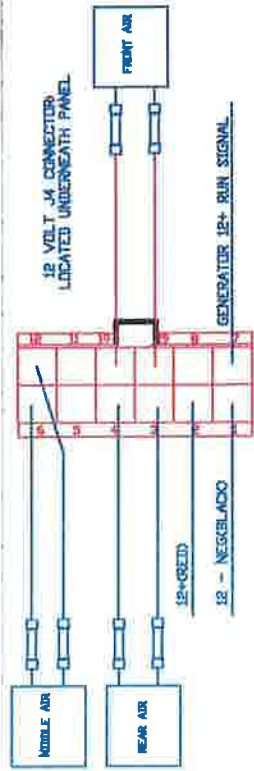
E.M.S. SHEDDING ORDER

- 1) BLOCK HEATER
- 2) WATER HEATER #2
- 3) WATER HEATER #1
- 4) REFRIGERATOR
- 5) MID A/C
- 6) REAR A/C
- 7) FRONT A/C

(SYSTEM MEASURES EACH LEGS AMPERAGE AND TRIPS CIRCUITS BASED ON OVERDRAW ON LINE LEGS)

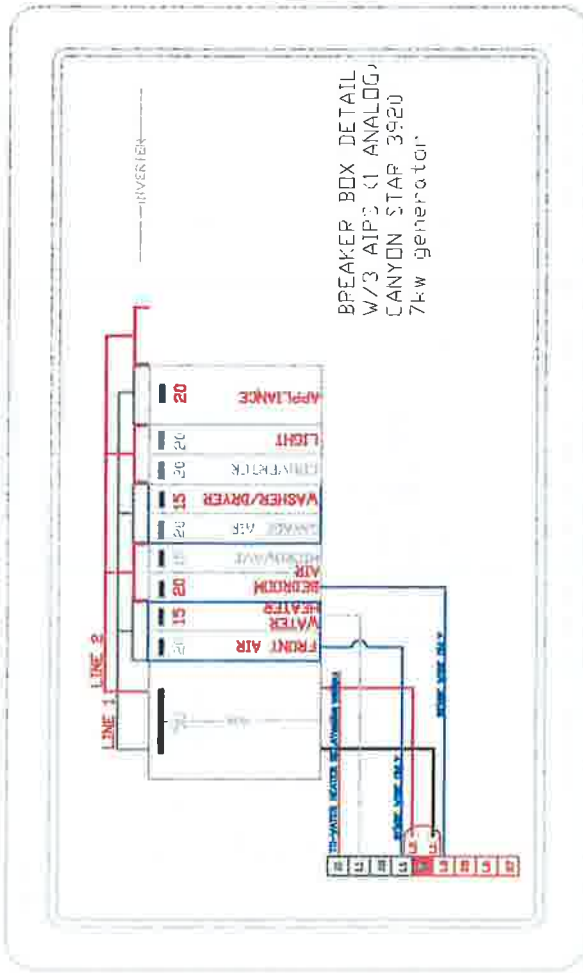
BREAKER BOX DETAIL
W/3 AIRS & BASIC

- NOTES:**
- 1) FOR SPECIFIC CIRCUIT ASSIGNMENTS REFERENCE THE APPLICABLE MODELS 120 VAC CHART.
 - 2) FOR CIRCUIT BREAKER VALUES REFERENCE THE APPLICABLE MODELS 120 VAC CHART.
 - 3) WIRE:
 - ALL 30A BRANCH CIRCUITS WIRED WITH 10-2 ROMEX TYPE NM-B
 - ALL 20A BRANCH CIRCUITS WIRED WITH 12-2 ROMEX TYPE NM-B
 - ALL 15A BRANCH CIRCUITS WIRED WITH 14-2 ROMEX TYPE NM-B



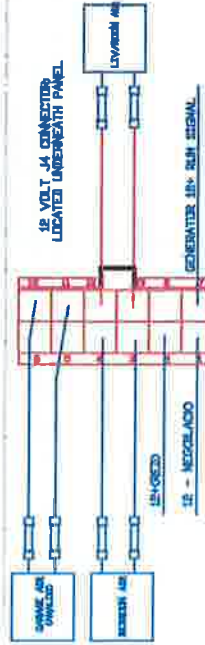
Model MADE File: BREAKER BOX DETAIL W/3 AIRS/DASIC	Sheet ID #	Drawn by Date:	Checked by Date:	Revision Date:	By Date:

NOTES: 1) FOR SPECIFIC CIRCUIT ASSIGNMENTS REFERENCE THE APPLICABLE MODELS 120 VAC CHART. 2) FOR CIRCUIT BREAKER VALUES REFERENCE THE APPLICABLE MODELS 120 VAC CHART. 3) VTBG: ALL 20A BRANCH CIRCUITS WIRED WITH 10-2 ROMEX TYPE NM-B ALL 30A BRANCH CIRCUITS WIRED WITH 12-2 ROMEX TYPE NM-B ALL 15A BRANCH CIRCUITS WIRED WITH 14-2 ROMEX TYPE NM-B



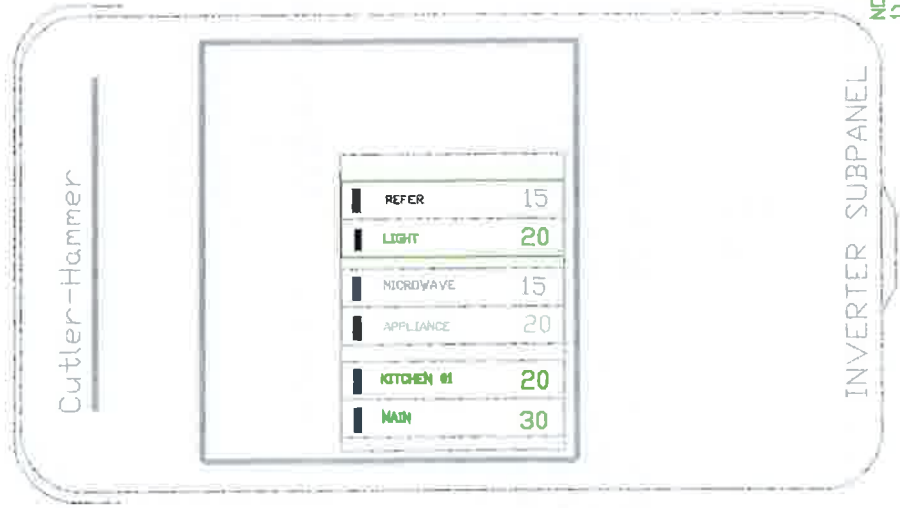
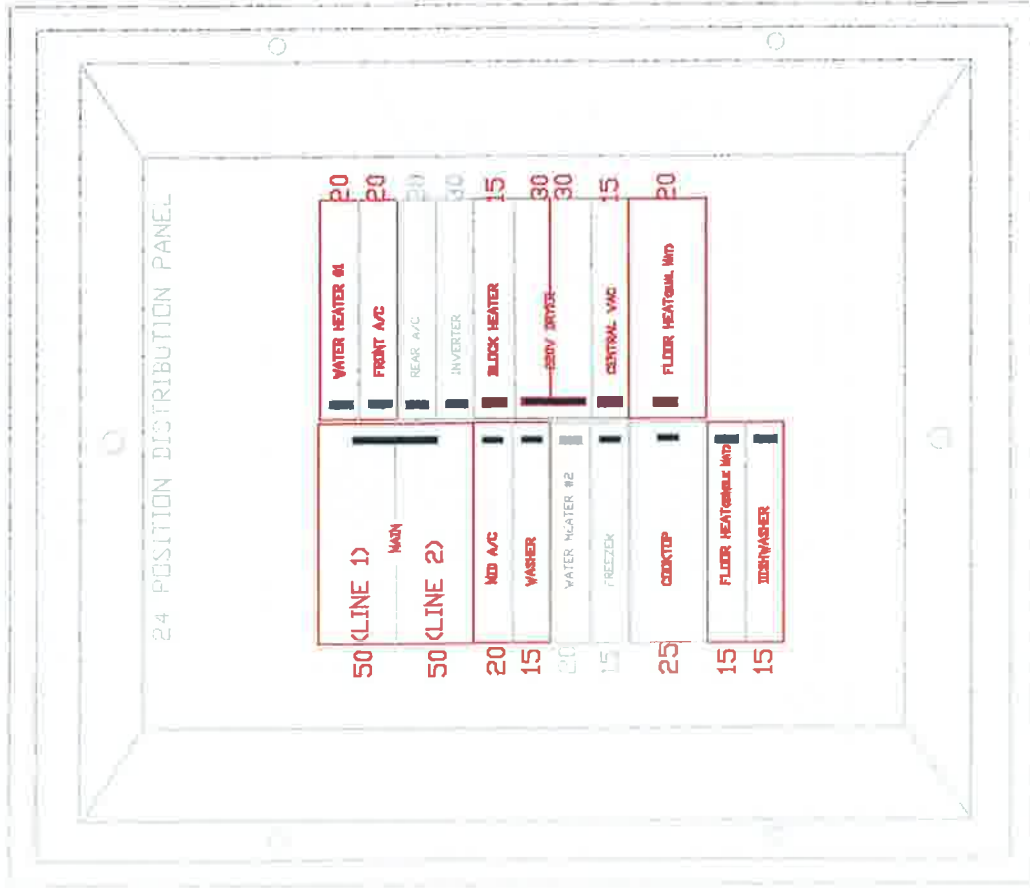
PRECISION CIRCUIT
E.M.S. SCHEDULING ORDER
1 WATER HEATER
2 GARAGE AIR
3 BEDROOM AIR
4 FRONT AIR

BREAKER BOX DETAIL
W/3 AIPS (1 ANALOG)
CANYON STAR 3920
7kW generator



NOTES:
1) FOR SPECIFIC CIRCUIT ASSIGNMENTS REFERENCE THE APPLICABLE MODELS 120 VAC CHART.
2) FOR CIRCUIT BREAKER VALUES REFERENCE THE APPLICABLE MODELS 120 VAC CHART.
3) VTBG: ALL 20A BRANCH CIRCUITS WIRED WITH 10-2 ROMEX TYPE NM-B ALL 30A BRANCH CIRCUITS WIRED WITH 12-2 ROMEX TYPE NM-B ALL 15A BRANCH CIRCUITS WIRED WITH 14-2 ROMEX TYPE NM-B

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Title	BREAKER BOX LAYOUT	Date:	4/6/09	Date	Revision	Date
Sheet	1	ID #				
Notes	7kW GENERATOR					



E-PLEX:
 E.M.S. SHEDDING ORDER
 1) Block Heater
 2) Water Heater
 3) Water Heater
 4) MID A/C
 5) REAR A/C
 6) Front A/C

CIRCUIT BREAKERS ACCORDING TO TOTAL
 AMPERAGE & IS EXCEEDS 100 AMPERES
 WHEN PLACED INTO A 100 AMP SERVICE
 DISCONNECT

- NOTES:**
 1) FOR SPECIFIC CIRCUIT ASSIGNMENTS REFERENCE THE
 APPLICABLE MODELS 120 VAC CHART.
 2) FOR CIRCUIT BREAKER VALUES REFERENCE THE
 APPLICABLE MODELS 120 VAC CHART.
 3) WIRE:
 ALL 30A BRANCH CIRCUITS WIRED WITH 10-2 RHEX TYPE NM
 ALL 20A BRANCH CIRCUITS WIRED WITH 12-2 RHEX TYPE NM
 ALL 15A BRANCH CIRCUITS WIRED WITH 14-2 RHEX TYPE NM

Author: J. M. JONES	Model: EX DP 8 PIG DB	Sheet: 1 OF 1	Drawn by: B. M.	Checked by:	Revision:
Date: 3/9/09	Title: TYPICAL BREAKER BOX DETAIL	15 #	Date: 3/9/09	Date:	Date:
By: J. M. JONES				Revision:	By:
					Date:

BEFORE YOU BLOW YOUR "BREAKER"

Take a few minutes and see how many AMPS you could be using in your RV's 30 or 50 AMP electrical system. It's surprising how fast the AMPS add up, which causes your breaker in your unit or the Campground to "Trip". Knowing the AMPS of all the electrical appliances in your RV can help you manage electrical use and prevent the inconvenience of "WHY DID I BLOW MY BREAKER". This list is the typical appliances used and the average amps required to operate them.

Air Conditioner 15,000 BTU	12.2 amps.	Battery charger	6.2 amps.
Computer & Printer	.07 amps.	Converter	5.5 amps.
Curling Iron	.06 amps.	Electric Coffee Pot	9.0 amps.
Electric Hot Water Heater	12.5 amps.	Food Processor	6.0 amps.
Heating Pad	0.5 amps.	Ice Maker	4.0 amps.
Freezer	6.4 amps.	Hair Dryer	8.0 amps.
Iron	10. amps.	Inverter	16. Amps.
Microwave Oven	12.5 amps.	TV	2.0 amps.
Radio	0.8 amps.	Toaster	8.0 amps.
Washer/Dryer (2 Piece)	16. amps.	Vacuum Cleaner	2.0 amps.
Refrigerator	7.0 amps.	VCR	1.0 amps.
Electric Frying Pan	10. amps.		

As an example, take an average morning - if you start your air conditioner and your hot water heater is on, then you start your coffee pot, make some toast, turn on the TV - you're pulling 55 amps when all appliances are operating at the same time, you are at the maximum. Plus, if you also cook your bacon in the microwave at the same time when everything else is on! **LOOK OUT!** Most RV's have a switch so you can run only the microwave or the water heater at one time. - **BUT SOME RV'S DO NOT HAVE THIS FEATURE.** So now you have a problem!

Most electrical products show how many watts or amps it takes to operate the appliance printed on the product it self or in the instructions. If it shows the watts - divide the watts by 120 (volts) and that gives you the amps. To get the watts - multiply the amps by 120 (volts).

It's worth your time to take an inventory on the "AMPS" each of your electrical appliances uses. Then you can manage your total usage at one time and this greatly reduces the

"WHY DID I LOOSE MY POWER?"

50 AMP Power Control System E.M.S.

Note: Before too much time is spent on repairs, obtain the programming sheet for the EMS.

The 50 amp Power Control System is currently being offered as standard equipment on all Canyon Star Class A Motor Homes and as optional equipment on most other Newmar coaches.

Its function is to provide circuit protection for all 120 VAC loads and as a system of energy management to minimize the over loading and tripping of circuit breakers.

It is made up of a main distribution panel with a self-contained control module and a remote display panel. Remote display panel is typically located in the dash overhead electrical control cabinet. The E.M.S. control module automatically senses the available power being supplied to the coach. The module determines whether it is connected to a 50 amp 240 VAC shore power source or a generator, (has a 12 volt sense wire) and a 120 VAC, but does not know if the power source is 30, 20, or a 15 amp shore power source. Depending on available power it can control seven possible loads. It controls air conditioner loads using low voltage switching and other 120 VAC loads, typically heavy load IE appliances. The EMS will also control the 2012 Magnum inverter charge rate, or may go to invert depending on the charging status, will only reduce the charger when the charger is a float charge.

The 2 main hot wires go through the magnetically coupled current sensor. It will then display the amperage on each line. When the current exceeds the limit on either line, the EMS will start shedding loads, and looks at the current when it shuts a load off so it knows if it has enough current available to turn the load back on.

When the EMS sheds a load, it only looks at one line to see how much of a load was shed. So if the load that was shed is not on the correct line #1 or #2 according to the "Power Control System RV

Data” sheet. The EMS will not know how much was shut off and it will shut something else off. This is why you will not be able to work on a (power control system 50 amp) without the “RV Data” Sheet. The “RV Data” sheet will tell you which line and which relay that item has to be connected to. Also, when the unit has an Oasis System with 2 water heater elements, the #2 water heater element has to be wired to the unlabeled wires on the Oasis, so that it will only shut off 1 element at a time. If you shut off the primary element on the Oasis it will shut off both elements. Then when the EMS turns the water heater back on, both will come on and over load the system. Primary element on the Oasis, to water heater #1.

Note: When adding a Magnum Auto Generator Start...

- 1. The inverter remote panel has to be 2.5 or higher software.**
- 2. Also, the EMS Power Control System 50 amp software has to be 4.0 or higher, (the main board in the breaker box and the EMS Remote Panel.)**

System:

The **POWER CONTROL SYSTEM (PCS)** consists of two major components:

1. **PCS CENTRAL MONITOR PANEL** &
2. **PCS PANELBOARD** for 50amp service.

The **PANELBOARD** may optionally have a subpanel built in.

- a. The **PANELBOARD** also houses the **PCS Control Module**, and has two current sensors



CENTRAL MONITOR PANEL



PANELBOARD (OPTIONAL SUBPANEL)

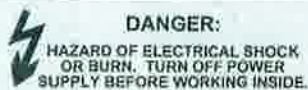
Overview:

The **POWER CONTROL SYSTEM (PCS) PANELBOARD** distributes all the 120VAC power throughout the RV, whether it comes from Shore Power, Generator, or the Inverter. The **PCS CONTROL** monitors the incoming power, and manages the power to reduce Circuit Breaker tripping. It does this by momentarily shedding power to the loads under its control when the owner turns on other more critical appliances in the RV. **PCS** restores power when the owner controlled appliance is turned off. The **PCS CENTRAL MONITOR PANEL** displays the status of Incoming Power, and the Controlled Loads.

When coupled with a Magnum Inverter, **PCS** reduces Battery Charge Rate prior to shedding any loads. Working together, an Inverter Assist feature is available. Normally the Inverter is at rest when Shore Power is available. **PCS** utilizes the Inverter and the Coach Battery Bank to smooth out Peak Load Demands. In other words the Inverter will temporarily provide power to some of the appliances, prior to shedding any loads.

Features:

- Monitor and Manage total RV current to avoid nuisance circuit breaker tripping.
- Manage power no matter what the source:
50-amp Service, Generator, 30-amp Service, 20-amp Service.
- Manage battery charging during high peak demands.
- Provide Inverter-Assist, additional power from battery bank to smooth high peak demands.
- Shed non-critical loads during high peak loads.
- Remote Panel displays Service Type, Load Status, and RV Current & Voltage.
- Generator Soft Start



120/240VAC present inside Panelboard posing potential lethal electrical shock. This equipment should only be serviced by a qualified Service Technician.



Central Monitor Panel:

The **PCS MONITOR** displays pertinent **POWER CONTROL SYSTEM** status information. The UP and DOWN buttons are used to step through each individual Screen of information. Pressing & releasing either the UP or Down button will step to either the Previous or Next Display Screen. Once all the Screens have been seen, the next press of the Button will wrap back around through all the Display Screens once again. The SET Button only functions when the Service Type screen is displayed, to Select between 30A Service and 20A Service.

(Note: 50A Service or Generator Service overrides the SET Button.) If there have not been any key presses for awhile, the **PCS MONITOR** turns off the backlighting to save on power. The first press of any key will only turn on the back lighting.

**Service Type:**

No Service - **PCS** has 12V Battery power to run the electronics, however, it does not sense any 120/240VAC Power.

50-amp Service - **PCS** senses 240/208VAC between L1 and L2 to determine this mode of operation. **PCS** controls the loads so that the current does not exceed L1 limit of 50amps, L2 limit of 50amps, and a combined limit of 100 amps.

30-amp Service - **PCS** senses 0VAC between L1 and L2. **PCS** adds the current of the two sensors and controls the loads so that the current does not exceed 30 amps.

20-amp Service - **PCS** senses 0VAC between L1 and L2, and the owner selects 20A on the Central Monitor Panel. **PCS** adds the current of the two sensors and controls the loads so that the current does not exceed 20 amps.

Generator - **PCS** senses power to the Gen Hour Meter to determine this mode of operation. **PCS** controls the loads so that the current does not exceed the ratings of the installed Generator, for example L1 limit of 35amps, L2 limit of 35amps, and a combined Limit of 63 amps.

**Operation Mode:**

This Screen gives the general information about Load Status.

The First Line shows the Status of the Magnum Battery Charger. It will either be: **BatChargeNormal**, under complete Magnum Control, or **BatChargeReduced**, which means an Owner activated appliance would have caused a circuit breaker to trip but instead the BatCharger Rate has been reduced. Reducing the Battery will be the 1st thing that PCS will attempt in order to reduce overall RV Power. Battery Charge may not be reduced if the Battery is Low, or the Magnum Inverter is on Line 1 Circuit Breaker and the Overload is on Line 2 only.

The Second Line show the Status of the Magnum Inverter. It will either show **InverterNormal**, under complete Magnum Control.

InverterAssist, **PCS** is requesting that the Magnum Inverter assist by temporarily generating 120VAC power from the batteries.

InverterAssist 12A, the end of this line shows the amount of 120VAC current that the Inverter is supplying.

InverterAssistDeny, means the Magnum Inverter can not Assist at this time, for one of many Magnum Inverter reasons, i.e. Battery Low, Over-current, etc. (See Magnum Owner's Manual).

The Last Line shows if any Loads have been Shed to prevent circuit breaker tripping.

Load(s)Shed=7, depending on the model RV, there can be up to 7 Loads that PCS can control.



Load Status:

Where the last Screen gave general information about all the controlled Loads, these next two screens gives detailed information about the status of each Load under PCS control

Load Status	
Water Heater	OFF 11A
Refrigerator	ON 7A
Block Heater	OFF 12A

Washer/Dryer	
A/C #3	ON 15A
A/C #2	ON
A/C #1	ON

Water Heater OFF 11A, indicates that the Water Heater power has been temporarily turned OFF, and the current at the instant the Water Heater was turned off last was 11amps.

Refrigerator ON 7A, indicates that the Refrigerator has power. Again the 7amps of current is NOT the present current draw, but rather the current at the instant the Refrigerator was turned off last.

A/C #2 ON, indicates that the A/C #2 has power. Since there is no current displayed, that only indicates that this load has not been turned OFF even once since the Battery has been reconnected and 12V power applied to PCS. PCS has never had a chance to "Learn" the current. The Current Displayed, is re-learned each and every time that the Load is turned OFF.

Looking at the list, it appears that PCS does not turn off Loads in Order Preference. PCS will always start shedding loads from the top of the list when PCS in 30A or 20A Service. However, in 50A Service, or running on the Generator there are two Main Breaker, Line 1 & Line 2. PCS will only shed loads if there is an overload detected on its associated Line. In other words, if shedding the Load will not help, skip it and move on. If then sometime in the future an overload is detected on the other Line, PCS will start at the top of the list again. The same is true with Magnum Battery Charge Reduction and Inverter Assist. Magnum can only help on the Line it is wired to, so if it will not help to Assist, don't bother.

Power Management:

When the current exceeds the limit, because possibly the owner has turned on the Microwave, the PCS will independently limit the current on each line by performing the following in order: Reduce Magnum Battery Charge Rate, Inverter Assist, Load Shed. (If the Magnum Inverter is wired to the opposite leg, only Load Shedding will occur.

As each appliance is shed, PCS learns the current for that specific appliance, to ensure that there will be sufficient headroom to turn the appliance back on and be under the current limit. To ensure that Air Conditioner compressor pressure is bled, and to reduce quick cycling, there is a 2 minute delay from the time a Load has been shed, to the time power is restored.

Once the total RV current has dropped, for example because an owner operated appliance has been turned off, the PCS will reverse the above procedure, returning power to appliances whose operation was not immediately critical.

Line Status:

PCS not only monitors total RV current but also has two built in Volt Meters, and monitors the voltage on each of the Lines.

Line Status	
L1	121Volts 15Amps
L2	115Volts 25Amps
Both	40Amps

L1 121Volts 15Amps, indicates that Line 1 has 121Voltsrms and is presently drawing 15 amps.

!BrownOut!, if the display indicates Brown Out, the Display will hold the lowest captured voltage that may have occurred while the RV owner is away. Pressing any switch clears the display, and resumes displaying the present readings.

Wiring Status:

Similar to an Outlet Tester that is plugged into outlets in your home to test for proper wiring, PCS monitors the wiring status of the Camp Ground Outlets you may plug into.

Wiring Status Error	
L1=Neutral	L1=L2
L1=Ground	
Neutral=Ground	

WARNING, IF THE DISPLAY EVER INDICATES
WiringStatusError

IMMEDIATELY, unplug the RV from the outlet, and have the outlet inspected by a qualified technician.

The other lines on the Display to the right indicate proper wiring for 50A Service. For 30A Service L1=L2.

Inverter Assist Feature:

PCS works with the **MAGNUM** Energy Inverter/Charger to bring the RV industry a revolutionary new concept. In the past, energy management systems operated when 120VAC was available and inverters operated when 120VAC was not available from either shore power or generator.

The **POWER CONTROL SYSTEM** brings these two worlds together.

First **PCS** will communicate with the **Magnum Inverter/Charger** and reduce Battery Charge Rate during periods of RV high current demands.

While plugged into shore power, or when the generator is running, the **PCS** will allow the RV to have more power than available on the shore power or generator, for short periods of time. When the **PCS** senses that 120VAC power has reached its maximum current, the **PCS** communicates to the **MAGNUM** inverter requesting additional power be generated from the battery. If more demands are put on the RV with additional appliances, or with the RV batteries are low, the **PCS** will shed non-critical loads and avoid nuisance tripping of circuit breakers.

Generator Soft Start:

When the Generator is first turned on, **PCS** will shed all the controlled loads. The loads are sequenced back on. This is done to allow the generator to come up with minimum load, and to reduce the current the Transfer Switch must handle. Note: **PCS** applies the same 2 minute delay to turning loads on is when Power Management Load Shedding occurs.

RV Data Parameters:

The RV manufacturer has full flexibility to set up the RV Data Parameters through a Windows Program and Program Dongle. The following parameters are downloaded into each **PCS** system.

Load Names, Load Shed Order, Load-Relay Association, Generator Size, Inverter Information.

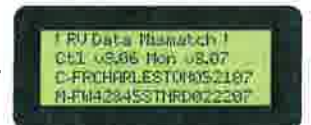
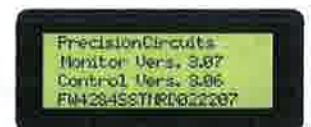
These parameters can not be set or changed by the dealer or owner. Each RV Data Set has a unique 18-character Reference ID, where the first digits are the manufacturer's code, the last digits are the revision date, and the remaining middle characters have some model designation.

RV Data Synchronization:

The RV Data Parameters are stored in both the **PCS CENTRAL MONITOR PANEL** and the **PCS CONTROL**. Should dealer or field replacement of either unit become necessary, a blank unit can be installed and the RV Data will be synchronized or transferred from remaining Unit. During Power-Up the Monitor and Controller check their RV Data and one of four screens can appear.

1. Everything is Synchronized and the Monitor Version, Controller Version, and Ref ID are displayed.
2. RV Data is transferred from Controller to Monitor
3. RV Data is being transferred from Monitor to Controller
4. RV DATA in Monitor and Controller is different and the PCS System can not continue. This can happen for example if a Monitor from one RV is installed in a different model RV.

If for any reason the Controller stops to function, no problem with the Limp Home Feature, all Controlled Loads will continue to operate. Care will have to be used not to turn on too many appliances, overload the system, and trip breakers.



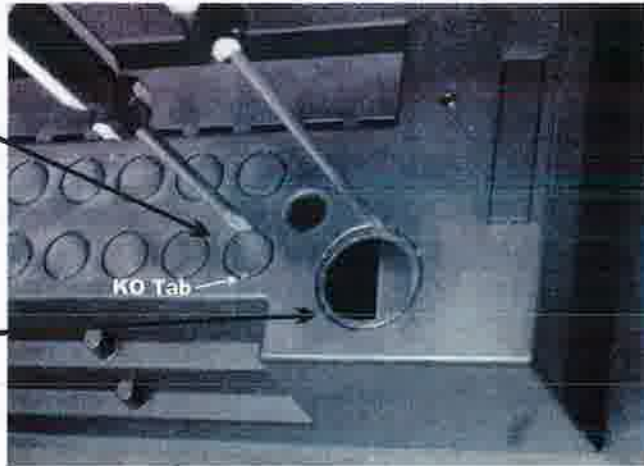
Indoor Panelboard Installation Instructions

CAT. NO. 00-10020-000 PANELBOARD & SUB PANEL

CAT. NO. 00-10020-100 PANELBOARD

Remove Branch KO's

Remove Branch Knock-Out's; place screwdriver as shown and tap end to remove KO. If KO is not completely removed, twist out with pliers.

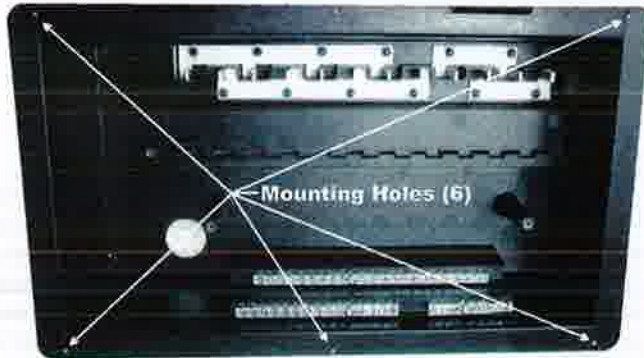


Main wires

Mains must be installed through this opening using a 1" connector. If a 1-1/4" connector is required, remove Knock-Out ring; place screwdriver as shown and tap end to remove KO ring. If KO is not completely removed, twist out with pliers.

Mount Box

Flush mount box into a 15-5/8" X 8-5/8" opening. Remember to leave 17-1/2" X 10-1/2" minimum clearance for the cover. Using six (6) #8 screws (not provided) attach box to wall using the mounting holes shown. Note: Box may be mounted as shown or rotated 90° clockwise.



Wire Main, Branch & optional Sub-Panel Circuits

The following breakers are suitable for MAIN and Branch breakers:

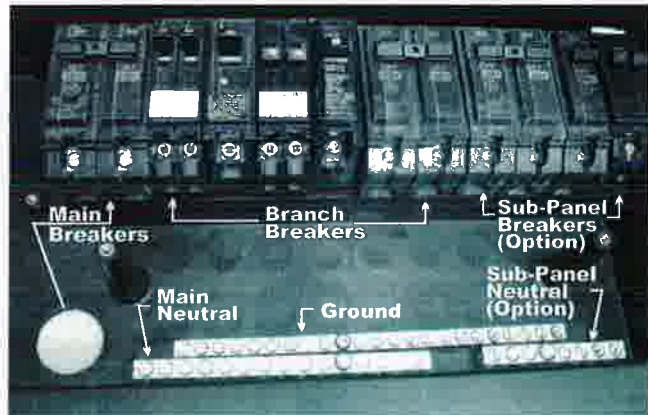
Cutler-Hammer: BR, BD, GFCB, Filler Plate BRFP

Siemens: QP, QT, Filler Plate QF3

GE: THQL

SquareD: HOM, HOMT

Make Certain circuit breakers are in the OFF position prior to installation.



IMPORTANT:

Tighten all electrical connections before energizing. Follow Torque Specifications on the Inside Cover Label.

DANGER:

HAZARD OF ELECTRICAL SHOCK OR BURN. TURN OFF POWER SUPPLY BEFORE WORKING INSIDE.

120/240VAC present inside Panelboard posing potential lethal electrical shock. This equipment should only be serviced by a qualified Service Technician.



Remove Cover Twist-Outs

Twist and remove to create openings for positions where breaker has been installed.



Install Cover

- 1) Slide Cover slots over Box tabs.
- 2) Rotate Cover down to Box
- 3) Screw Cover to Box using two (2) 8-32 X7/16" screws provided.

2) Rotate Cover down to Box

1) Slide Cover slots over Box tabs

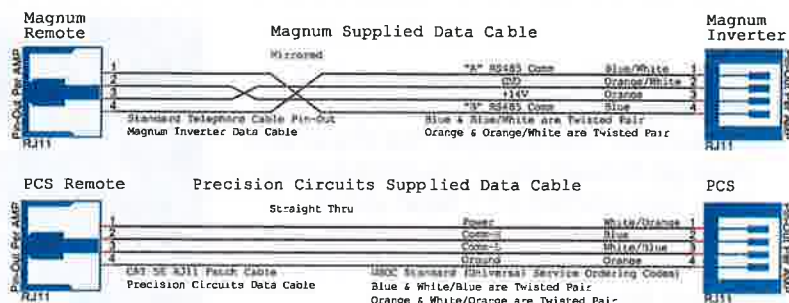
3) Screw Cover to Box



These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to Precision Circuits Inc.

Route Communication Cables

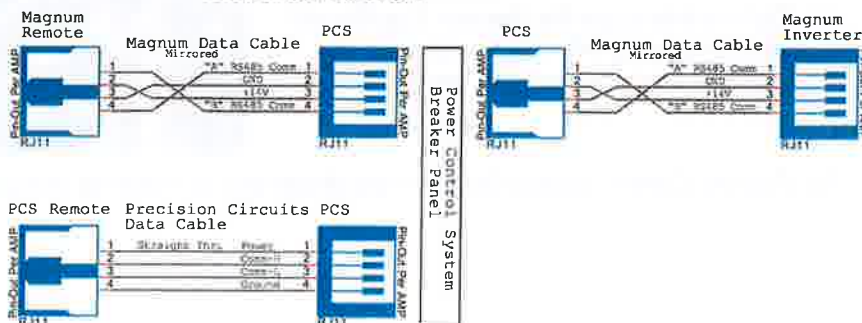
- 1) If only installing the Power Control System, use above wiring diagram.
- 2) If utilizing the optional Inverter Assist feature, use the below wiring diagram.



WIRING IF INSTALLING EITHER UNIT ALONE

WIRING IF INSTALLING BOTH UNITS

Connector wiring and pinout does not change only cables lengths and plug-in locations



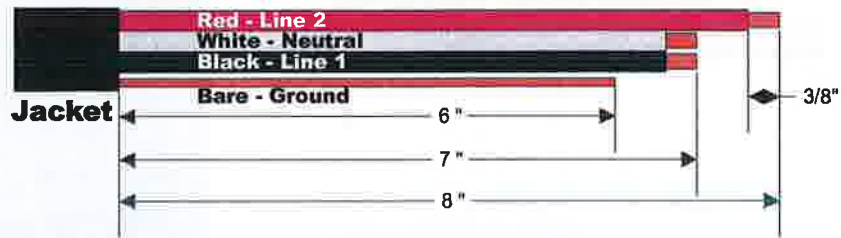
PCS Control Installation Instructions

CAT. NO. 00-10020-500 50AMP PCS CONTROLLER

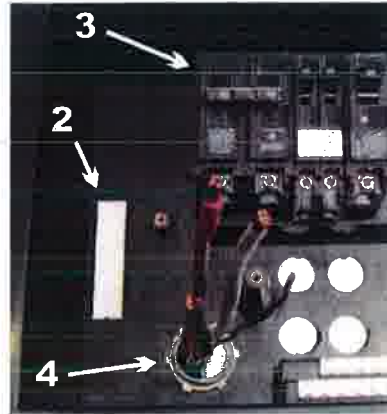
Install only in Power Control System Panelboards CAT. NO's. 00-10020-000, 00-10020-100

Read & follow Panelboard Instructions for complete Installation

- 1) Prepare Main Supply Cable by removing outer Jacket and cutting and stripping wires to lengths shown.



- 2) In the same manner used for the Branch Circuit Knock-outs, remove the rectangular KO to provide access to the 12VDC, and communication connections.
- 3) Install Circuit Breakers into Panel Board.
- 4) Using 1" Connector, (1-1/4" if KO ring is removed) install Main Supply Cable into AC Panel Board knock-out shown, and secure main cable to housing.

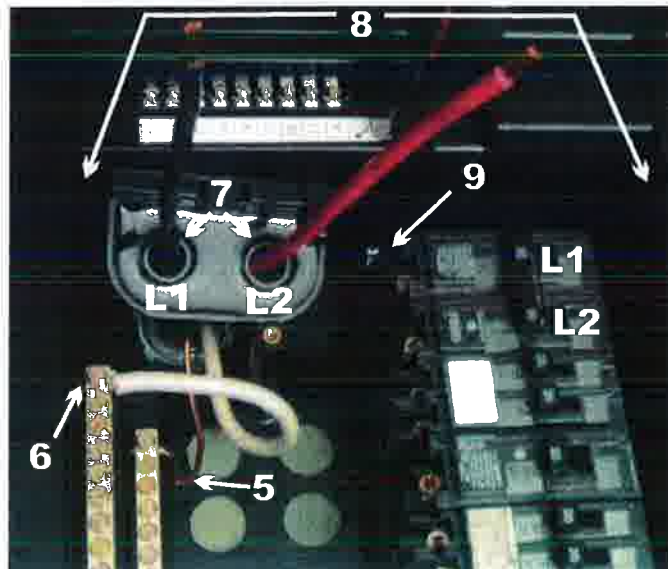


- 5) Bend Ground Wire towards back of box, run along the back, and connect to Ground Block.
- 6) Bend White Neutral Wire towards back of box, run along the back and connect to Neutral Block.

Note: Bend Ground and Neutral wires to clear the Current Sensor Cup for the next step.

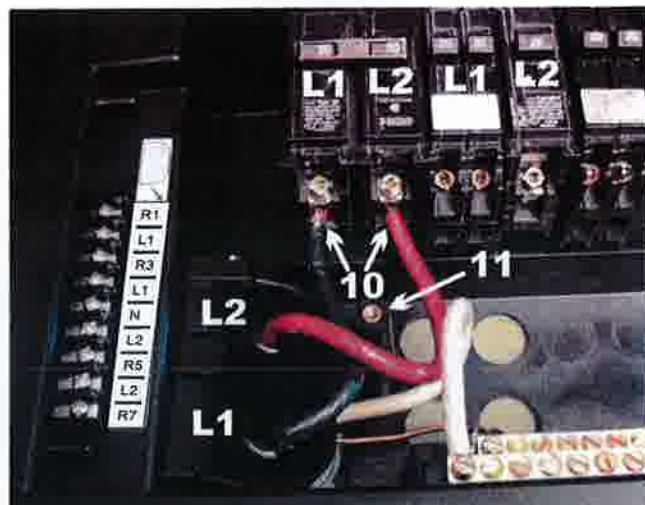
Note: it is critical to maintain L1 & L2 relationship throughout the entire installation. For example, the Black wire must go through the L1 Current Sensor hole, connect to the L1 Main circuit breaker, and the PCS Control L1 screw terminals must be connected to the L1 Branch breakers.

- 7) Slide the Black-Line1 and Red-Line2 wires through Current Sensor Cup holes.
- 8) Continue to slide the Sensor Cup/Barrier Wall assembly into the housing guides, until the Wall touches the back of the box.



- 9) Secure Current Sensor/Barrier Wall Assembly to Housing using 8-32 X 7/16" screw provided.

- 10) Connect Black-Line-1 and Red-Line-2 supply mains to the corresponding circuit breaker.
- 11) Both Black and Red wires should be below the level of plastic post for easier cover attachment.

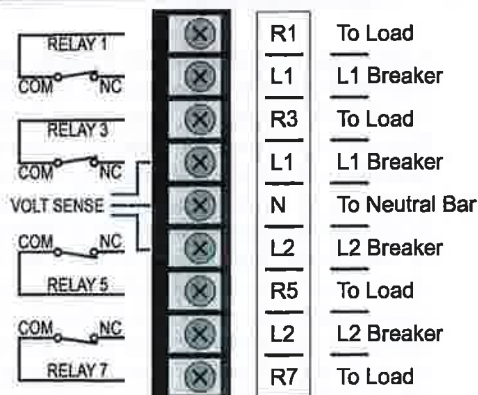


- 12) Wire PCS Control Screw Terminal Block per the diagram.

Screw Terminal Block Torque: 9-in-lbs

Note: The three Voltage Sense terminals must always be wired for proper voltage sensing and operation, even if corresponding relays are not used.

Tip: Things like Water Heater, whose circuit breaker is occasionally turned off, should not be wired to Relay 3 or Relay 5.



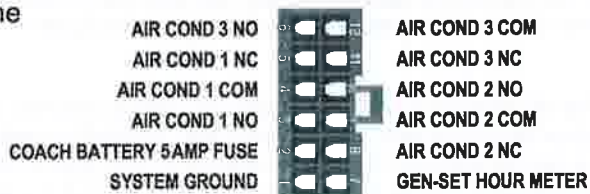
- 13) Make 12VDC connections through the rectangular knock-out located in the back of the box per the diagram on the right and pin-out below.

- 01 GROUND
- 02 COACH BAT
- 03 AIR COND 1 NO
- 04 AIR COND 1 COM
- 05 AIR COND 1 NC
- 06 AIR COND 3 NO
- 07 GEN SET RUN
- 08 AIR COND 2 NC
- 09 AIR COND 2 COM
- 10 AIR COND 2 NO
- 11 AIR COND 3 NC
- 12 AIR COND 3 COM

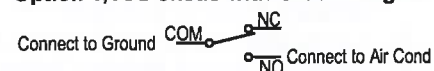
Mating Connector: MOLEX MINI-FIT JR 12-PIN, #39-01-2120
Contact: MOLEX MINI-FIT JR 5556 18-24 AWG, 39-00-0039

Four different Air Condition Compressor wiring options are shown on the right. Relay Contacts are drawn in Non-Shed or Operation Mode.

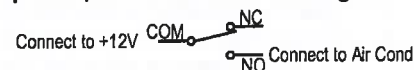
View of connector is from contact insertion side



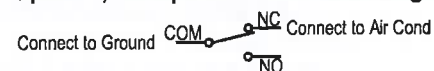
Option 1, A/C sheds with Ground Signal



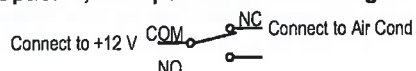
Option 2, A/C sheds with +12V Signal



Option 3, A/C operates with Ground Signal



Option 4, A/C operates with +12V Signal



PRECISION CIRCUITS INC

I/O Modules



00-10024-000



00-10024-100

120V Energy Management features usually found in high end Class A Motor homes are now made affordable for all RV's including Class C and Trailer Market. The Mini-PCS monitors the total AC current of an RV and prevents circuit breaker tripping by momentarily shedding up to four loads. As the owner turns on additional appliances such as a Microwave, Coffee Pot, or Hair Dryer, the Mini-PCS can shed two 120VAC appliances such as the Refrigerator and Water Heater, then if additional reduction in power is required the second air conditioner, and lastly the first air conditioner is shed. As the owner selected appliances are turned off, the Mini-PCS will automatically turn power back on to each of the shed loads in reverse sequence. The Mini-PCS will constantly monitor 120VAC RV power and shed and restore power to the four controlled loads.

Display Panels

00-10025-000



00-10025-100



00-10025-500



The I/O Module is installed inside any circuit breaker panel and fits into a standard 3/4" knock-out hole. The screw terminals are used to make the 120VAC connections. Outside the circuit breaker panel a data cable is connected through the 3/4" knock-out which goes to the Display Panel. The Display Panel has a Data connector and also another connector to control the air conditioner units through low voltage signals.

Key Features:

1. Helps owners who are use to 50amp service, deal with the common situation of camp grounds where only 30amp service is available.
2. Limits total current to 30 amps, when 50amp service is not available.
3. Minimizes Circuit Breaker Tripping.
4. Monitors current draw for entire RV including owner added loads.
5. Learns controlled appliance current draw.
6. Allows 2 air conditioners to run on 30 amp service when other appliances are not in use.
7. I/O Module fits into a standard 3/4" knock-out
Two Relays capable of 120VAC 18 Amp load.
8. 120VAC Sense
I/O Module has built in 120VAC sense circuitry so that it knows when shore power is available and does not draw on the battery when dry camping. No AC wall adaptor or other sensors required.
9. Display Panel has built in relays to control two air conditioners, no other modules required.
10. All relays are normally closed allowing full operation of appliance in case of fault.

MINI POWER CONT. 20L SYSTEM

Operation:

30-amp Service - PCS senses 0VAC between L1 and L2. The I/O Module has a current sensor which monitors the current on the neutral wire. When the current exceeds the 30-amp limit, because possibly the owner has turned on the Microwave, the **MINI-PCS** will limit the current by shedding appliances. Once the total RV current has dropped, for example because an owner operated appliance has been turned off, the **MINI-PCS** will reverse the above procedure, returning power to appliances whose operation was not immediately critical. Appliance shed order is easily determined by the manufacturer by wiring the appliances to the appropriate number relay.

20-amp Service - MINI-PCS senses 0VAC between L1 and L2, and the owner selects 20A on the Remote Display.

MINI-PCS performs the same functions as above except that it limits total current to 20amps.

Generator - MINI-PCS senses power to the

Generator Hour Meter. In this mode **MINI-PCS** assumes enough power is available and goes to sleep. It displays the fact that Gen-Set is running, that all Loads are powered.

50-amp Service - MINI-PCS senses 240VAC between L1 and L2 to determine this mode of operation. In this mode **MINI-PCS** assumes enough power is available and goes to sleep. It displays the fact that 50-amp Service is available and that all Loads are powered.

I/O Module - Features include:

- Current Sensor
- Two 18amp Relays
- Power Line sensing
- Two Screw Terminal configurations available

Remote Display - Features include:

- Displays Service Type
- Displays the Status of the Controlled Appliances
- Custom Load Names available

Specifications:

Part Numbers:	00-10024-000	Mini- PCS I/O Module, w/Vertical Terminals
	00-10024-100	Mini- PCS I/O Module, w/Right Angle Screw Terminals
	00-10025-000	Mini-PCS Display Panel, 3 Loads, W/H, A/C-2, A/C-1
	00-10025-100	Mini-PCS Display Panel, 4 Loads, Refr, W/H, A/C-2, A/C-1
	00-10025-500	Mini-PCS Display Panel, Amp Meter, 4 Loads, Refr, W/H, A/C-2, A/C-1
Service type:	120/240VAC max	
Relays:	(2) DC 16VDC, 1.0A (Display Panel, Thermostat) (2) AC 120VAC, 18A, 1HP (I/O Module)	
Delay:	2 minute minimum off time on all loads	
Environment:	Indoor, Out of direct weather	
Dimensions:	6.25" wide, 3.20" high, 1.0" deep	
Mounting Hole:	5.45" wide, 2.91" high (centered with .15" clearance), .188" mount holes	
	Minimum	Typical
Volts DC	9.0VDC	12.0VDC
Volts AC	90VAC/line	240VAC
Ambient Temperature	-40°C	-85°C

Display Panel Low Voltage Connector:

- 01 AIR COND 1 NC
- 02 AIR COND 1 COM
- 03 NO CONNECT
- 04 AIR COND 2 COM
- 05 AIR COND 2 NO
- 06 AIR COND 1 NO
- 07 GEN SET RUN
- 08 COACH BAT
- 09 GROUND
- 10 AIR COND 2 NC

- AIR COND 2 NO
- AIR COND 2 COM
- NO CONNECT
- AIR COND 1 COM
- AIR COND 1 NC

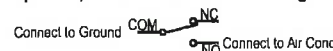


- AIR COND 2 NC
- SYSTEM GROUND
- COACH BATTERY
- GEN-SET HOUR METER
- AIR COND 1 NO

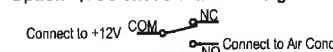
View of connector is from contact insertion side

Four different Air Condition Compressor wiring options are shown above. Relay Contacts are drawn in Non-Shed or Operation Mode.

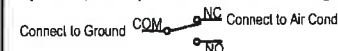
Option 1, A/C sheds with Ground Signal



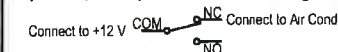
Option 2, A/C sheds with +12V Signal



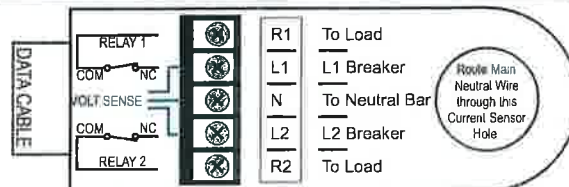
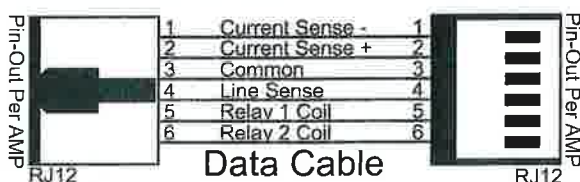
Option 3, A/C operates with Ground Signal



Option 4, A/C operates with +12V Signal



Mating Connector: MOLEX MINI-FIT JR 10-PIN, #39-01-2100
Contact: MOLEX MINI-FIT JR 5556 18-24 AWG, 39-00-0039

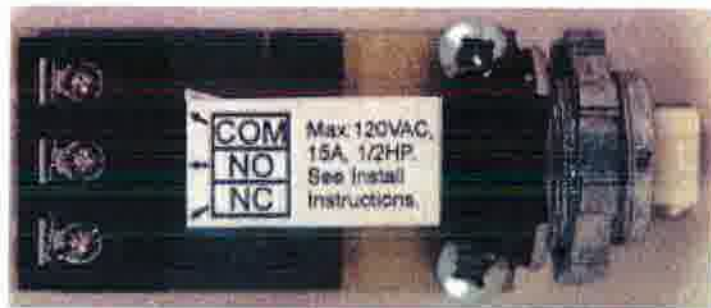


I/O Module Screw Terminal Block Torque: 9-in-lbs

Note: The three Voltage Sense terminals must always be wired for proper Service Type detection, even if corresponding relays are not used.

00-10026-200
15amps 3/4hp

00-10026-200
15amps 1/2hp



00-10026-100
15amps 3/4hp

00-10026-300
15amps 1/2hp



The Relay Module can be used to safely control (on/off) any 120V appliance using 12V signals. The Relay Module is just a simple SPDT relay that has been repackaged, having both Normally Closed (NC) and Normally Open (NO) contacts available through screw terminals. With the Common (COM) and NC contact, connected to a TV, Block Heater or Awning, it can be used as an Ignition Lock-out feature. Using the NO and COM contacts, the Relay module can control a Water Heater.

Key Features:

1. UL Listed.
2. Safe Isolation of 120V and 12V wiring.
3. Can be used in any listed electrical enclosure with a 1/2" knock-out.



Specifications:

Part Numbers:	00-10026-000	15 amps 3/4hp	w/Vertical Terminals
	00-10026-100	15 amps 3/4hp	w/Right Angle Screw Terminals
	00-10026-200	15 amps 1/2hp	w/Vertical Terminals
	00-10026-300	15 amps 1/4hp	w/Right Angle Screw Terminals
	11-10026-000	Available Pigtail for Low Voltage connector	

Environment: Indoor, Out of direct weather

Must be mounted inside listed electrical enclosure

Dimensions: 1-1/8" x 1-1/8" x 2-1/4" inside enclosure

1" x 1" with 1-3/4" clearance to remove connector outside enclosure

Mounting Hole: 1/2" standard electrical knockout

Low Volt connector Amp Mini-Universal Mate-N-Lok #172165-1 (Mating connector)

	Min-Hold	Min-Operate	Typical	Maximum
Relay Coil Volts DC	2.0VDC	9.0VDC	12.0VDC	16.0VDC
Relay Coil Amps DC			0.03amps	0.1amps
Contact Volts AC Rating			120VAC	
NO & NC Contact Rating Model -000, -100			15amps 3/4hp	
NO & NC Contact Rating Model -200, -300			15amps 1/2hp	
Screw Terminals Torque			9-in-lbs	
Screw Terminal Wire Range		22awg		12awg
Ambient Temperature (UL Rated)		-40°C		+60°C

Installation:

1. Install inside any listed electrical enclosure, ensuring that the Screw Terminal side of the Relay Module is inside the enclosure when complete. Also there must be 1/4" clearance from any part of the module to any adjacent metal walls or exposed electrical conductors. (Clearance to the mounting wall is built into the Relay Module itself).

2. Remove 1/2" knock-out in enclosure.

3. Remove the supplied lock-nut, install Relay Module through the knock-out hole; from inside enclosure, and reinstall and tighten the lock-nut.

4. Wire the appliance to be controlled to the Screw Terminal Block, tightening to the proper torque specification.

5. Connect the low voltage wires to the relay coil through the 2 pin connector outside the enclosure.

6. Check wiring and cover the enclosure prior to applying power.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to Precision Circuits Inc.

IMPORTANT:

Tighten all electrical connections before energizing. Follow Torque Specifications above



DANGER:

HAZARD OF ELECTRICAL SHOCK
OR BURN. TURN OFF POWER
SUPPLY BEFORE WORKING INSIDE.

120/240VAC surrounding Relay Module posing potential lethal electrical shock. This equipment should only be serviced by a qualified Service Technician.



PRECISION CIRCUITS INC

5403 Patton Drive Unit 222
Lisle, IL 60532

Tel: 630-515-9100
Fax: 630-515-9101
Cell: 630-240-9832
g.cepynsky@precisioncircuitsinc.com

POWER CONTROL SYSTEM RV DATA

RV REFERENCE INFORMATION

REFERENCE TABLE																		
REFERENCE ID	N	M	R		3	A	C		1	0	K	G	E	N		1	0	1
MANUFACTURER	NEWMAR																	
MODEL	3-A/C 10K Gen																	
DATE	2-1-10 (101 = 10 th year 1 st revision)																	

REFERENCE ID is 18 character alpha numeric

Recommended usage:

1-3 Manufacturer
4-12 Model Name and/or #
13-18 Date

(REFERENCE ID will be critical to Identify Motor Home Data in Field in case of Repair/Replacement)

RV SPECIFIC PARAMETERS

LOAD SHED TABLE																	
Relay #	Relay Type	Relay Voltage	Relay Connector	Line Assoc	Load Name (12 Characters Max)												Shed Order (1-7)
Relay 1	120VAC 1	120VAC	J5-1,2	1	W	a	t	e	r		H	e	a	t		2	2
Relay 2	Air Cond 1	12VDC	J4-3,4,5	2	A	/	C		R	e	a	r					5
Relay 3	120VAC 2	120VAC	J5-3,4	1													None
Relay 4	Air Cond 2	12VDC	J4-8,9,10	1	A	/	C		F	r	o	n	t				6
Relay 5	120VAC 3	120VAC	J5-6,7	2	B	l	o	c	k		H	e	a	t	e	r	1
Relay 6	Air Cond 3	12VDC	J4-6,11,12	1	A	/	C		M	i	d	d	l	e			4
Relay 7	120VAC 4	120VAC	J5-8,9	2	W	a	t	e	r		H	e	a	t		1	3

Note:

- If Load Name does not exist, assume Relay has no load attached, and ignore Shed Order if any.
- Loads will appear on Display in Shed Order 1-7.
- If there is a gap in Shed Order, everything will be shifted to lowest possible number.
- Two relays can not have the same Shed Order #.
- Shed Order number needs to be between the numbers of 1-7.
 - Any Relay can be shed in any order.
 - #1 will be first Load to Shed and last Load to return.
 - Shed Order will be per list above if over-current exists for system.
 - Shed Order may be modified if an over-current condition exists on just one of the L1 or L2 Lines.
 - Next shed-able Load is not shed because the current on it's Line is OK
 - Load is skipped and next shed-able Load associated with the proper Line over-current condition is chosen.
- 120VAC Load association to L1 and L2 is fixed and can not be programmed.

GENERATOR TABLE	
Generator Parameters	Current (Amps)
Model	Onan 10K
Line 1 Circuit Breaker	45
Line 2 Circuit Breaker	45
Combined Max Output Current	83

INVERTER TABLE	
Inverter Parameters	
Model	ME2012
Charger Branch Line (L1 or L2)	L2

PRECISION CIRCUITS INC

5403 Patton Drive Unit 222
Lisle, IL 60532

Tel: 630-515-9100
Fax: 630-515-9101
Cell: 630-240-9832
g.cepynsky@precisioncircuitsinc.com

POWER CONTROL SYSTEM RV DATA

RV REFERENCE INFORMATION

REFERENCE TABLE															
REFERENCE ID	N	M	R	2	A	C	8	K	W	G	E	N	1	0	1
MANUFACTURER	NEWMAR														
MODEL	2-A/C 8KW Gen														
DATE	2-1-10 (101 = 10 th year 1 st revision)														

REFERENCE ID is 18 character alpha numeric

Recommended usage:

1-3 Manufacturer
4-12 Model Name and/or #
13-18 Date

(REFERENCE ID will be critical to Identify Motor Home Data in Field in case of Repair/Replacement)

RV SPECIFIC PARAMETERS

LOAD SHED TABLE														
Relay #	Relay Type	Relay Voltage	Relay Connector	Line Assoc	Load Name (12 Characters Max)									
													Shed Order (1-7)	
Relay 1	120VAC 1	120VAC	J5-1,2	1	W	a	t	e	r	H	e	a	t	2
Relay 2	Air Cond 1	12VDC	J4-3,4,5	2	A	/	C		R	e	a	r		4
Relay 3	120VAC 2	120VAC	J5-3,4	1										None
Relay 4	Air Cond 2	12VDC	J4-8,9,10	1	A	/	C		F	r	o	n	t	5
Relay 5	120VAC 3	120VAC	J5-6,7	2	B									1
Relay 6	Air Cond 3	12VDC	J4-6,11,12	1										None
Relay 7	120VAC 4	120VAC	J5-8,9	2	W	a	t	e	r	H	e	a	t	1

Note:

- If Load Name does not exist, assume Relay has no load attached, and ignore Shed Order if any.
- Loads will appear on Display in Shed Order 1-7.
- If there is a gap in Shed Order, everything will be shifted to lowest possible number.
- Two relays can not have the same Shed Order #.
- Shed Order number needs to be between the numbers of 1-7.
 - Any Relay can be shed in any order.
 - #1 will be first Load to Shed and last Load to return.
 - Shed Order will be per list above if over-current exists for system.
 - Shed Order may be modified if an over-current condition exists on just one of the L1 or L2 Lines.
 - Next shed-able Load is not shed because the current on it's Line is OK
 - Load is skipped and next shed-able Load associated with the proper Line over-current condition is chosen.
- 120VAC Load association to L1 and L2 is fixed and can not be programmed.

GENERATOR TABLE	
Generator Parameters	Current (Amps)
Model	Onan 8K
Line 1 Circuit Breaker	35
Line 2 Circuit Breaker	35
Combined Max Output Current	66

INVERTER TABLE	
Inverter Parameters	
Model	ME2012
Charger Branch Line (L1 or L2)	L2

PRECISION CIRCUITS INC

700 South Road
Lisle, IL 60532-2700

Tel: 630-240-9832
Fax: 630-964-3272
g.cepynsky@PrecisionCircuitsInc.com

POWER CONTROL SYSTEM RV DATA

RV REFERENCE INFORMATION

REFERENCE TABLE																		
REFERENCE ID	N	M	R	0	9	C	A	N	Y	N	S	T	0	3	3	1	0	8
MANUFACTURER	NEWMAR																	
MODEL	2009 CANYON STAR																	
DATE	03-31-08																	

REFERENCE ID is 18 character alpha numeric

Recommended usage:

1-3 Manufacturer
4-12 Model Name and/or #
13-18 Date

(REFERENCE ID will be critical to Identify Motor Home Data in Field in case of Repair/Replacement)

RV SPECIFIC PARAMETERS

LOAD SHED TABLE																	
Relay #	Relay Type	Relay Voltage	Relay Connector	Line Assoc	Load Name (12 Characters Max)												Shed Order (1-7)
Relay 1	120VAC 1	120VAC	J5-1,2	1													
Relay 2	Air Cond 1	12VDC	J4-3,4,5	2	B	e	d	r	o	o	m		A	i	r		3
Relay 3	120VAC 2	120VAC	J5-3,4	1													
Relay 4	Air Cond 2	12VDC	J4-8,9,10	1	L	i	v	/	r	o	o	m		A	i	r	4
Relay 5	120VAC 3	120VAC	J5-6,7	2													
Relay 6	Air Cond 3	12VDC	J4-6,11,12	1	G	a	r	a	g	e		A	i	r			2
Relay 7	120VAC 4	120VAC	J5-8,9	2	W	a	t	e	r		H	e	a	t	e	r	1

Note:

1. If Relay 3, or Relay 5 is not used, power still needs to be connected
2. If Load Name does not exist, assume Relay has no load attached, and ignore Shed Order if any.
3. Loads will appear on Display in Shed Order 1-7.
4. If there is a gap in Shed Order, everything will be shifted to lowest possible number.
5. Two relays can not have the same Shed Order #.
6. Shed Order number needs to be between the numbers of 1-7.
 - a. Any Relay can be shed in any order.
 - b. #1 will be first Load to Shed and last Load to return.
 - c. Shed Order will be per list above if over-current exists for system.
 - d. Shed Order may be modified if an over-current condition exists on just one of the L1 or L2 Lines.
 - i. Next shed-able Load is not shed because the current on it's Line is OK
 - ii. Load is skipped and next shed-able Load associated with the proper Line over-current condition is chosen.
7. 120VAC Load association to L1 and L2 is fixed and can not be programmed.

GENERATOR TABLE	
Generator Parameters	Current (Amps)
Model	Onan 5.5kw (1038)
Line 1 Circuit Breaker	30
Line 2 Circuit Breaker	30
Combined Max Output Current	45

INVERTER TABLE	
Inverter Parameters	
Model	None
Charger Branch Line (L1 or L2)	

Rev 1/22/00

PRECISION CIRCUITS INC

700 South Road
Lisle, IL 60532-2700

Tel: 630-240-98
Fax: 630-964-32
g.cepynsky@PrecisionCircuitsInc.com

POWER CONTROL SYSTEM RV DATA

RV REFERENCE INFORMATION

REFERENCE ID	N M R 3 A C - C S C A
MANUFACTURER	NEWMAR
MODEL	CSCA
DATE	09-13-09

REFERENCE ID is 18 character alpha numeric
Recommended usage:
1-3 Manufacturer
4-12 Model Name and/or #
13-18 Date

(REFERENCE ID will be critical to Identify Motor Home Data in Field in case of Repair/Replacement)

RV SPECIFIC PARAMETERS

Relay	Relay Type	Relay Voltage	Relay Connector	Line Assoc	Load Name (12 Characters Max)	Shed Order (1-7)
Relay 2	Air Cond 1	12VDC	J4-3,4,5	2	B e d r o o m A i r	3
Relay 3	120VAC 2	120VAC	J5-3,4	1		
Relay 4	Air Cond 2	12VDC	J4-8,9,10	1	F r o n t A i r	4
Relay 5	120VAC 3	120VAC	J5-6,7	2		
Relay 6	Air Cond 3	12VDC	J4-6,11,12	1	G a r a g e A i r	2
Relay 7	120VAC 4	120VAC	J5-8,9	2		

Note:

1. If Relay 3, or Relay 5 is not used, power still needs to be connected
2. If Load Name does not exist, assume Relay has no load attached, and ignore Shed Order if any.
3. Loads will appear on Display in Shed Order 1-7.
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 - a. Any Relay can be shed in any order.
 - b. #1 will be first Load to Shed and last Load to return.
 - c. Shed Order will be per list above if over-current exists for system.
 - d. Shed Order may be modified if an over-current condition exists on just one of the L1 or L2 Lines.
 - i. Next shed-able Load is not shed because the current on it's Line is OK
 - ii. Load is skipped and next shed-able Load associated with the proper Line over-current condition is chosen.
7. 120VAC Load association to L1 and L2 is fixed and can not be programmed.

Generator Parameters		Current (Amps)
Model	Onan 7kw	
Line 1 Circuit Breaker	30	
Line 2 Circuit Breaker	30	
Combined Max Output Current	58	

Inverter Parameters	
Model	None
Charger Branch Line (L1 or L2)	L2

Precision Circuits Inc

700 South Road
Lisle, IL 60532-2700

2010 & older Dutch Star with 3 A/C's

Tel: 630-240-9855
Fax: 630-964-3272

Wrong set-up for generator, Dutch Star only gets an 8K gen, but the EMS is set-up for a 10K gen. So the EMS will never shed on the generator. Generator will just shut down.

Power Control System RV Data

RV REFERENCE INFORMATION

REFERENCE TABLE																		
REFERENCE ID	N	M	R	0	9	D	S	3	A	C	W	O	1	0	1	8	0	7
MANUFACTURER	NEWMAR																	
MODEL	2009 DUTCH STAR 3-A/C W OASIS																	
DATE	10-18-07																	

REFERENCE ID is 18 character alpha numeric

Recommended usage:

1-3 Manufacturer

4-12 Model Name and/or #

13-18 Date

(REFERENCE ID will be critical to Identify Motor Home Data in Field in case of Repair/Replacement)

RV SPECIFIC PARAMETERS

LOAD SHED TABLE																	
Relay #	Relay Type	Relay Voltage	Relay Connector	Line Assoc	Load Name (12 Characters Max)												Shed Order (1-7)
Relay 1	120VAC 1	120VAC	J5-1,2	1	W	a	t	e	r		H	e	a	t	e	r	2
Relay 2	Air Cond 1	12VDC	J4-3,4,5	1	A	/	C		#	2							6
Relay 3	120VAC 2	120VAC	J5-3,4	1	R	e	f	r	i	g	e	r	a	t	o	r	4
Relay 4	Air Cond 2	12VDC	J4-8,9,10	2	A	/	C		#	1							7
Relay 5	120VAC 3	120VAC	J5-6,7	2	B	l	o	c	k		H	e	a	t	e	r	1
Relay 6	Air Cond 3	12VDC	J4-6,11,12	2	A	/	C		#	3							5
Relay 7	120VAC 4	120VAC	J5-8,9	2	W	a	t	e	r		H	e	a	t	e	r	1

Note:

1. If Load Name does not exist, assume Relay has no load attached, and ignore Shed Order if any.
2. Loads will appear on Display in Shed Order 1-7.
3. If there is a gap in Shed Order, everything will be shifted to lowest possible number.
4. Two relays can not have the same Shed Order #.
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 - d. Shed Order may be modified if an over-current condition exists on just one of the L1 or L2 Lines.
 - i. Next shed-able Load is not shed because the current on it's Line is OK
 - ii. Load is skipped and next shed-able Load associated with the proper Line over-current condition is chosen.
6. 120VAC Load association to L1 and L2 is fixed and can not be programmed.

GENERATOR TABLE	
Generator Parameters	Current (Amps)
Model	Onan 10K
Line 1 Circuit Breaker	45
Line 2 Circuit Breaker	45
Combined Max Output Current	83

INVERTER TABLE	
Inverter Parameters	
Model	ME2012
Charger Branch Line (L1 or L2)	L2

Only has an 8K generator, 66 amp max output.

Converters

All Newmar R.V.'s are equipped with a converter or an Inverter/Converter combination. Converters are used to convert 120 VAC into 12 VDC. Converters supply the coach with 12 VDC power to operate 12 VDC appliances, equipment and to charge the coaches' batteries. Newmar uses three sizes of converters, 45, 55 and 75 amp models. Units that require more power may have two 45 amp converters totaling 90 amps. Whenever changing a converter use the same size converter. The wiring and mini breakers in the coach may not be of adequate size to handle a larger converter.

Trouble shooting tips for converters

1. Over heating

- Caused by cooling fan malfunction or inadequate ventilation. Over heating may cause damage to the converter.

2. Frequency interference

- Lines or static on television or radio due to converter damage or malfunction

Inverter/Converter

Many Newmar R.V.'s are equipped with inverter/converter combination units. These units serve as a three-stage battery charger and an inverter to supply 120 vac to selected circuits. Units equipped with inverter/converter combinations will also be equipped with a 120 vac sub panel. The sub panel is located next to the main service panel, or if the unit has an EMS. MA and down the main and sub panel are all in one. The sub panel is used to

limit the circuits powered by the invertors. This is necessary to avoid rapidly draining the coach battery while inverting or overloading the inverter. AC current is supplied to the inverter/converter by a 30 amp breaker in the main service panel. When 120 vac is present, the inverter/converter allows AC power to pass through the unit and feed the sub panel. The inverter/converter uses a built in transfer switch to accomplish this. When AC power is not present, the inverter “when turned on” will invert DC voltage from the coach battery to AC voltage and feed the sub panel. DC power is supplied directly from the coach battery bank. A 300 amp fuse link is in line on the positive lead from the batteries, this fuse link is located in the battery compartment approximately 18 inches from the battery connection. Inverter/converters are equipped with a built in service breaker. The inverter/converter can be controlled by a panel on the unit or by remote panel. The remote panel is typically located in the dash overhead control cabinet. The remote panel is used to control the inverter and battery charging functions, and monitors these functions. The remote is also used to access menu and set up modes.

Note: If a remote panel is plugged into the inverter, the remote panel takes priority.

Inverter/Converter Trouble Shooting Tips

1. Overheating

- Caused by cooling fan failure
- Improper ventilation
- Causing damage or malfunction of the unit.

2. Irregular operation of equipment

- Digital clocks and some electronic equipment may not function properly due to modified sine wave. This is normal.

400 and 600-Watt Inverters

These units are inverter only. They are used to invert DC power to AC power. They are typically used to power entertainment equipment “TV, VCR, DVD, etc.”

And are usually found in a storage compartment. They may or may not have a remote on/off switch located inside the coach.

These units have a transfer switch built into the unit to allow AC power to pass through when present. AC power is provided to the unit from an outlet in the storage compartment. DC power is provided to the inverter from mini breakers located in the coaches’ electrical compartment. These units have built-in circuit breaker usually 7.5 amps and have limited power capabilities.

Inverter trouble shooting tips

1. Overheating from improper ventilation causing damage or malfunction of the unit.
2. Breaker Tripping due to over loading of circuit.
 - Re-set breaker on the front of the inverter.

Note: XA-FW’s do have a 1200 watt inverter/converter option, so the inverter is also the battery charger, it is a 70 amp charger built in.

- Make sure you install the correct model in the XA-FW.

Electrical

120v Service - Common Circuits

- | | | | |
|-----|--------------------------|-----------------|----------------|
| 1. | Air Conditioner | 12-2 wire | 20 amp breaker |
| 2. | Microwave..... | 14-2 wire | 15 amp breaker |
| 3. | Water Heater..... | 14-2 wire | 15 amp breaker |
| 4. | Light Line..... | 14-2 wire | 15 amp breaker |
| 5. | Appliance Line | 12-2 wire | 20 amp breaker |
| 6. | Washer/Dryer (1 pc)..... | 12-2 wire | 20 amp breaker |
| 7. | Washer..... | 14-2 wire | 15 amp breaker |
| 8. | Dryer..... | 12-2 wire | 20 amp breaker |
| 9. | Magnum 2012 Inverter | | |
| | Power going to | 10-2 wire | 30 amp breaker |
| | Power coming from..... | 10-2 wire | 30 amp breaker |
| 10. | Appliance line | | |
| | Aire Series..... | 12-2 wire | 20 amp breaker |
| | Star Series | 14-2 wire | 15 amp breaker |
| 11. | Kitchen Circuit | | |
| | Aire Series Only..... | 12-2 wire | 20 amp breaker |
| 12. | Converter | 12-2 wire | 20 amp breaker |

Also, most optional features (such as heat pads, block heaters, dish washers, etc.) will have their own breaker.

Where the Wires Run - Rules of Thumb

1. Circuits, which can be connected from a standing position on the ground outside of the unit, are generally wired horizontally through the side wall.
2. Circuits, which cannot be connected from a standing position on the ground outside of the unit, are generally wired horizontally through the roof wrap of the unit to the others running horizontally across the roof.
3. Power line from power cord to breaker box runs through the floor on most towables.

Newmar Corporation Electrical Service Policy

The following policy is being followed by Newmar Corporation to determine the type of electrical service the unit will receive.

1. Any unit with 2 air conditioners must have a 50 ampere service.
2. No 30 ampere service will have more than 3 major draw items (12 or more ampere draw).
3. The following list shows the various appliances used and their ampere draw.

Air Conditioner	14 amps	1680 watts
Microwave oven	13 amps	1560 watts
Water Heater	12 amps	1440 watts
Dryer	12 amps	1440 watts
Washer	9.8	1176 watts
Food Center	3.3 amps	396 watts
Icemaker	2.5 amps	300 watts
Refrigerator	2.5 amps	300 watts
Dishwasher	11.5 amps	
TV	1 amp	
VCR	0.15 amps	
Freezer6 amps	
Trace 2012 Inverter	22 amps (at 100 DC amp charge rate)	
Trace 2512 Inverter	27 amps (at 130 DC amp charge rate)	
Magnum Inverter MS2012	15 amps (at 100 DC amp charge rate)	
Magnum Inverter MS2812	18 amps (at 125 DC amp charge rate)	
Converter	6.3 amps (variable, up to 18 amps on start up)	