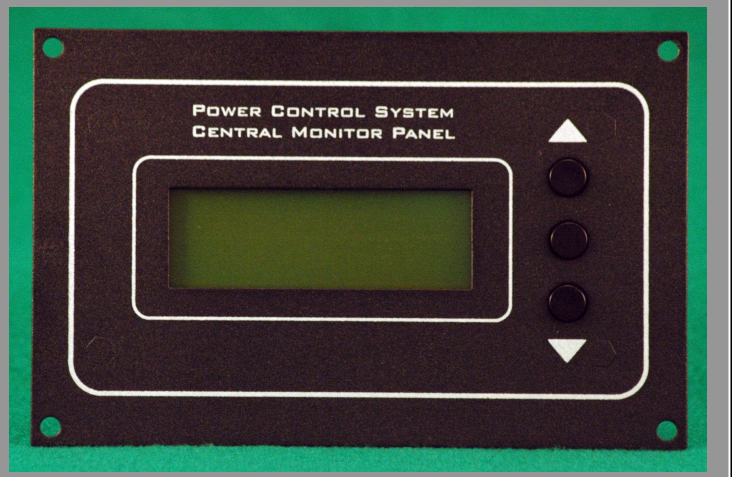
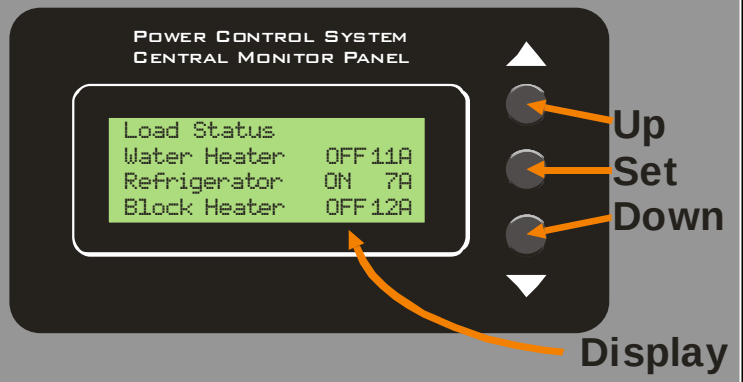
Central Monitor Panel

PRECISION CIRCUITS INC

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.

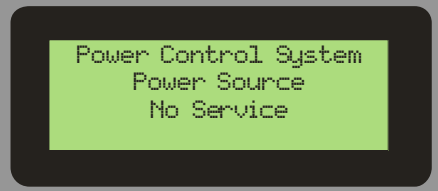


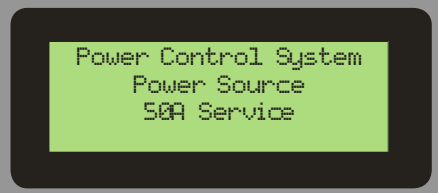


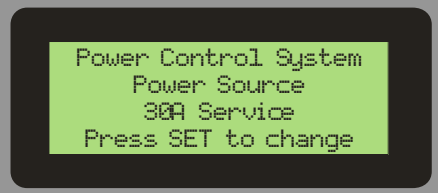
Central Monitor Panel

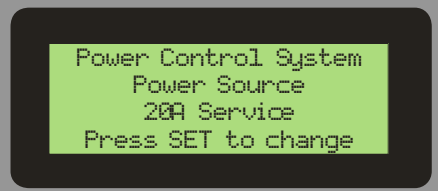
PRECISION CIRCUITS INC

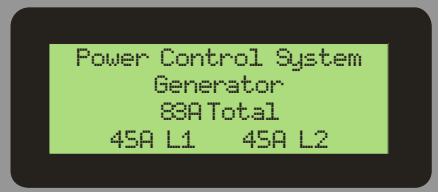
- Service Type:
- No Service - PCS has 12V Battery power to run the electronics, however, it does not sense any 120/240VAC Power.
- 50-amp Service - PCS senses 240/208VAC between L1 and L2 to determine this mode of operation. PCS controls the loads so that the current does not exceed L1 limit of 50amps, 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.





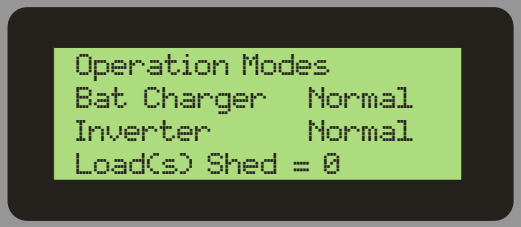






Central Monitor Panel

PRECISION CIRCUITS INC



- 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 `Bat Charger` 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 shows the Status of the Magnum Inverter.
  - It will either show `InverterNormal`, under complete Magnum Control, or
  - `InverterAssist`, PCS is requesting that the Magnum Inverter assist by temporarily generating 120VAC power from the batteries.

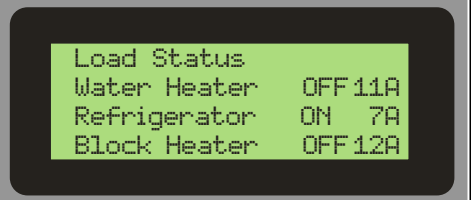
- `InverterAssist 12A`, the end of this line shows the amount of 120VAC current that the Inverter is supplying. `InverterAssistDeny`, means the Magnum Inverter can not Assist at this time, for one of many Magnum Inverter reasons, i.e. Battery Low, Over-current, etc. (See Magnum Owner's Manual).

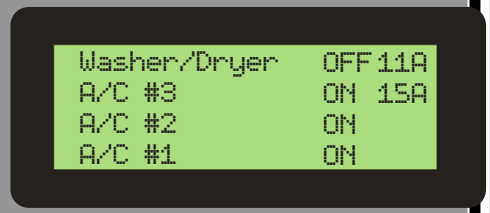
- The Last Line shows if any Loads have been Shed to prevent circuit breaker tripping. `Load(s)Shed=7`, depending on the model RV, there can be up to 7 Loads that PCS can control.

Central Monitor Panel

PRECISION CIRCUITS INC

- 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
- `WaterHeater 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.





Central Monitor Panel

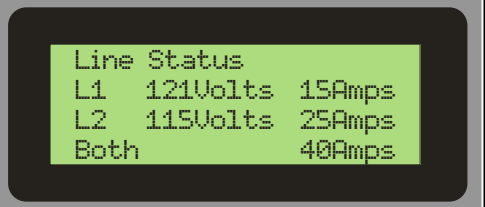
PRECISION CIRCUITS INC

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.
- `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.

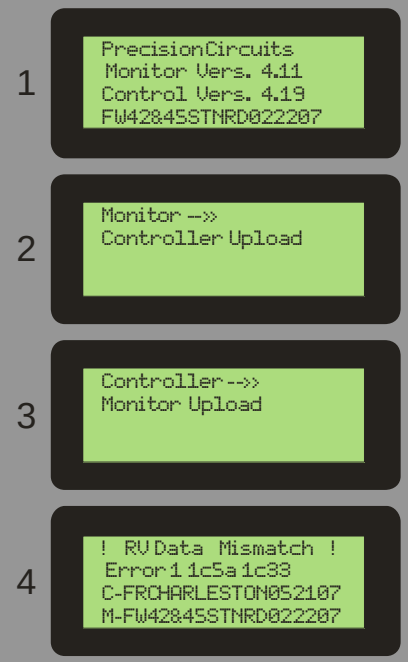


Central Monitor Panel

PRECISION CIRCUITS INC

- 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.

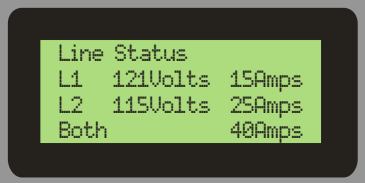


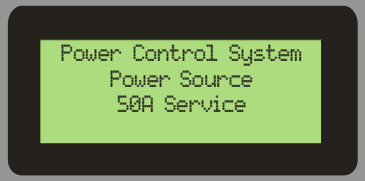
Power Control System

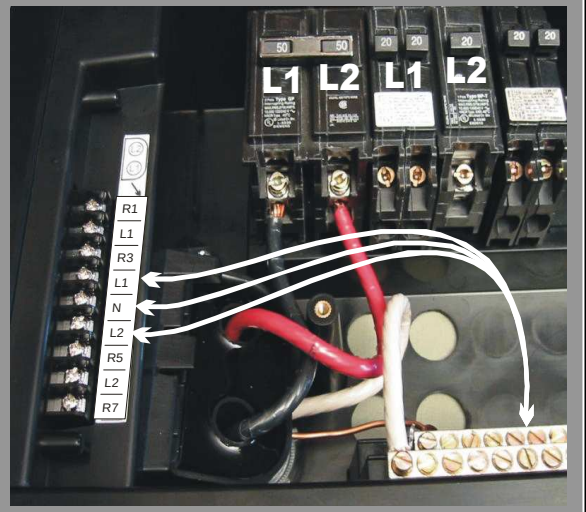
PRECISION CIRCUITS INC

- Trouble Shooting:
- If Incorrect Voltage Displayed

  Using pictorial below, using a Voltmeter, take three measurements from the Ground Bar to each of the three center screws labeled L1, N, L2.
  - L1 to Ground should be close to 120V
  - L2 to Ground should be close to 120V
  - Neutral to Ground should be close to 0V
- If not check to make sure all circuit breakers are on and that L1 screw terminal is wired to L1 Breaker, L2 screw terminal is wired to an L2 Breaker, and that there is a wire from N to the Neutral Bar.
- Next take a reading from L1 to L2 screw Terminal on the 9-screw terminal block. If 240V, the display should read 50A Service. If close to 0V, the display should read 30A or 20A Service.
- If System displays 50A Service when plugged into 30A Service.
  1. Make Sure all Circuit Breakers are on.
  2. Check Voltage between L1 and L2 DIRECLTY ON PCS Module, should be 0Vac.
- If System displays 30A Service when plugged into 50A Service.
  1. Check Voltage between L1 and L2 DIRECLTY ON PCS Module, should be 240Vac.
     - Shore Power Receptacle improperly wired
     - L1 & L2 terminals are NOT wired to different phase breakers in the Panelboard.
- If System never displays Current.
  1. Check that Neutral wire routed through the Mini-PCS I/O Module Current Sensor.
  2. Check Data Cable.
- If System display Current Reads 99. Probably hit by lightning.







Power Control System

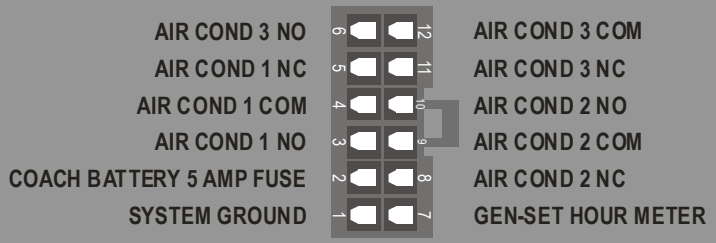
PRECISION CIRCUITS INC

Trouble Shooting

- If System does not recognize when the Generator is running
  1. Check for 12Vdc on Pin 7 of 12 Pin connector located at the rear of the Panelboard (Gen-Set Hour Meter).

- If Air Conditioner compressors not working. Check RV wiring:
  1. Unplug 12 Pin Low Voltage connector at Rear of the Panelboard.
     - If compressor is wired to NO pins, compressor should be working.
     - If wired to NC pins, short the NC and COM wires to operate the compressor.

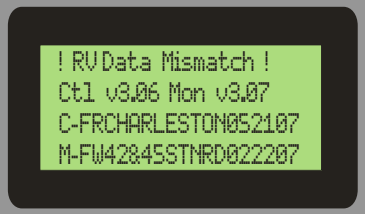
View of connector is from contact insertion side



Power Control System

PRECISION CIRCUITS INC

- Trouble Shooting:



- If Central Monitor Has Error Message "RV Data Mismatch“
  Both the Monitor and Control have "RV Data" stored in them. RV Data is the information which tells the system how the RV is wired, Load Shed Sequence, and Generator size. Should either unit ever fail, the system was designed so that a blank unit can be installed and the RV Data is transferred to the blank unit.
- Every time the System powers up, due to the Coach Bat being reconnected, the two components verify each others RV Data to see if the other is blank, and to ensure that both match. If this error occurs the system stops any power management, and allows power to all loads. It will remain in this lock-up state until 12Volt power is removed and re-applied.
- Warning: Unplugging and reconnecting the Monitor Panel does NOT correct this problem it only masks the situation until Battery Power is re-applied.
- If RV Data Mismatch error occurs, it is important to note the RV Data ID displayed on the bottom two lines.
  - The 3rd line shows the RV Data in the "C"ontrol.
  - The 4th line shows the RV Data in the "M"onitor.
- If the RV Data is different on the two lines either the Monitor or Control or Both need to be exchanged. This usually only can occur if someone swaps Monitors from RV to RV.
- If the Control has the correct RV DATA, then a blank, or non-programmed Monitor can be installed and the Control will teach it the RV Data.
- If the Monitor has the correct RV Data, then the Control needs to be replaced with a Blank Control, and the Monitor will teach it the RV Data.
- If both are wrong, then both will have to be replaced, and the factory will have to ship at least one of the units programmed with the appropriate RV DATA.
  If the RV Data is "Default Data" on both lines. This means that the RV was never programmed at the factory. A programmed Central Monitor must be installed.
- It is important to note that great care should be taken to install a Central Monitor which exactly matches this specific RV. Once the Monitor is installed, it will teach the control the RV Data, and this process can not be undone, requiring the Control to be removed.
- If RV Data Mismatch occurs and the 3rd line and 4th line show the same RV Data ID, try charging the Battery and then Disconnecting and Connecting Battery Power to Reset the PCS System.

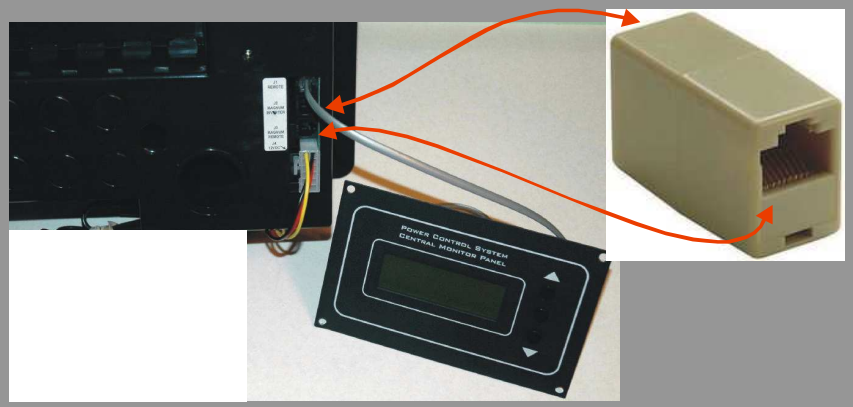
Power Control System

PRECISION CIRCUITS INC

Trouble Shooting - Separating Magnum & Precision Circuit Inc Systems

- This procedure separates the Magnum Inverter, Remote, & AGS, from the Precision Circuits Power Control System.
- Only two features are lost with this configuration.
- 1. Battery Charger reduction, where the Charger is temporarily reduced during a shore power overload condition.
- 2. Inverter Assist, where the Inverter would come on during shore power overload condition to provide additional power.
-
- Procedure:
- 1. Unplug telecom type cable from J3 (Magnum Remote), the plug closest to the White connector, and plug it into one side of the coupler.
- 2. Unplug telecom type cable from J2, (Magnum Inverter) and plug it into the other side of the coupler.
- 3. Leave J1 telecom type cable going to the Central Monitor panel in place.

- Note: Removing the telecom cable going to the Magnum AGS will eliminate Auto Generator Start Feature.



In-Line Modular Coupler
(Reverse Configuration
for extending voice lines)