Simple Guide to your Newmar PCS EMS

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Applies To:

2013+ Newmar Dutchstar /c EMS}
2015+ Newmar Ventana /c EMS

Basics

The coaches identified above use a Magnum inverter and an Energy Management System (EMS) from Precision Circuits Inc. (PCS). The PCS EMS acts as a remote to the Magnum inverter, controlling several functions. This control method is not support or documented by Magnum but does a very good job under the right circumstances. There are also circumstances that it does a poor job. I am going to detail both in this document.

PCS Setup

The PCS knows the power input based on the selection on the control panel. When plugging into a 30amp service, you must ensure that 30amp is displayed in the PCS power input. The same signal is detected for 15/20/30amp, so this requires the user to properly select the input.

PCS control features for Magnum Charger

Based on the available power, PCS monitors all power usage in the coach. When power demands are exceeded, the first operation it will perform is to reduce the charger rate. If the Magnum reports a low battery, based on your setup of the magnum controller, PCS will not reduce the charger rate. The rate will be reduced from the preferred setpoint (30amp should be your default) all the way down to 5 amps, in 5amp increments. The controller for Magnum allows finer control, but with the PCS EMS, you do not need to manually adjust.

PANEL DISPLAYS:

BAT CHARGER: NORMAL	Charging allowed at max rate specified in Magnum. Actual charging information will be displayed on the magnum.
BAT CHARGER: REDUCED	This is the first stage of energy management for high power consumption. The charger is reduced. View the magnum controller to see the actual charger state, as it could be in disabled state or in a lower amp rate.

PCS control features for Magnum Inverter

The electrical breaker box has a subpanel built in for the inverter loads. Common items include the electrical outlets in the basement, slide-out outlets, refrigerator, microwave, and bedroom/bathroom outlets.

If the PCS determines that you are exceeding 85-95% of the max load for the service you have, it will enable inverter assist. This feature will power the microwave from the inverter, while your Air conditioner and other loads remain powered by the shore power.

When this feature is enabled, the charger is disabled. You are no longer charging your batteries, but rather inverting to power your sub panel using battery power.

The inverter process will continue until it reaches the low battery condition set in your Magnum. Inverter assist will then disable, and charger control will be resumed.

PANEL DISPLAYS

INVERTER: ASSIST	Power to subpanel being supplied by inverter. Displays amps being supplied.
INVERTER: NORMAL	Ready to assist, but inverter not engaged
INVERTER: LOW BATTERY	Magnum reports low battery. Will not engage inverter assist

Important note: *You are limited to 30amp total usage on all of these outlets. This amperage is easily exceeded even with 50AMP service and will cause havoc if you don't understand what is going on. A load such as Microwave under full load, refrigerator, and central vac will cause the 30amp cb on the inverter to trip, regardless of inverter being used or not. It will also trigger inverter assist, and faults. More on this later.*

PCS Load Shedding

The final stage in power management is load shedding. The PCS manages up to 7 loads. The specific loads managed are displayed on the PCS Load Status screen. The order the loads are displayed are the order in which the loads are turned off. Common items are engine block heater, water heater elements, air conditioners.

LOAD STATUS DISPLAY

ON	Load is enabled. No recent shedding events exist, so no load data is displayed
ON 15A	Load is enabled. Recently load was shed with 15A measured
OFF 15A	Load is disabled. Recovered approx. 15A of available service

ORDER OF POWER SHEDDING EVENTS

The PCS will manage power loads in the following order:

1) Battery Charger Control
2) Inverter Assist
3) Load Shedding

EVERYDAY USAGE OF PCS

When powering up the coach, it is very important that you verify the proper AC load. When using the generator or 50amp service, this is automatic, as 208-240v is detected between L1 and L2. When 50amp shore service is detected, load shedding will not happen. When the generator is in use, power shedding is still enabled.

The generator size should be setup to properly match what you have installed. On a 10KW generator, the PCS will show 83amps for line service, and will provide protection of up to 45amps per line. If yours in not set properly, a dealer must fix this.

When 0 volt is detected between L1 and L2, the PCS will automatically set to 30amps. You must manually override this for 20/15amps depending on your connection.

To change your input, use the UP/DOWN buttons on the PCS panel until you get to the **POWER SERVICE** screen. On this screen the power source will display the amps of your power source. Press the **SET** button until the proper source is shown. This function only works when using 30/20/15amp. Generator and 50amp cannot be modified.

15amp Storage Scenario

When storing your coach on 15amp power, it is imperative that you have first configured your magnum charger properly for your battery size and type. See my document **Simple Guide to Battery Life in Your RV** for these settings. Your charger rate can be left @ 30amp or reduced to 5amp. My recommendation is to leave it set to 30amp and watch how the PCS panel controls the loads.

You must turn off water heater elements, air conditioners, floor heaters, and any other non-essential AC loads. It is common to see the inverter assist kick in when you have too many 120v loads. Look for things like DVR, tablet chargers, lights, etc. Your residential refrigerator will be pulling 4-7amps, the charger will pull 1-4amps for conversion of 12v, and other loads quickly add up.

Revisions

Revision 0.01: Draft Release August 30, 2020
Revision 0.02: Explained what PCS/EMS acronyms are. Thanks Dutch Star Don!