



131 Eisenhower Lane N., Lombard, IL 60148
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100 Amp Smart Energy Management System

00-00997-000

Intellitec's Smart Energy Management System - 100 Amp (Smart EMS) is designed to be used in RV's equipped with 50 Amp electrical service. The System provides control of loads at **all** levels of input power. It senses when the coach is connected to a 50 Amp service and monitors the current being drawn on both lines of the 50 Amp service. It will automatically control the loads to keep the total current to a value less than, or equal to, the 50 Amps available on each line. When an inverter is connected to the system, and the maximum current is being approached, the **100 Amp EMS** will back down the charging rate of the inverter. If the limit of current is reached, the inverter could be told to provide power for short periods of time to boost the amount of power available above the power service.

When 50 Amp service isn't available, and the coach is connected to a smaller service, such as 30 or 20 Amps, the system will automatically control the loads to keep the total current draw to less than or equal to the available service.

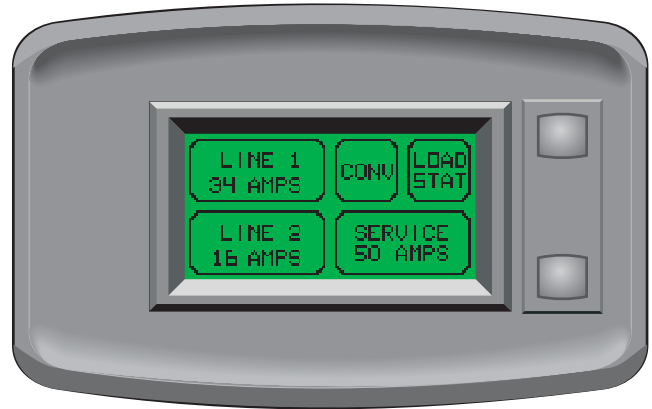
The Smart EMS automatically "learns" the amount of current drawn by each of the controlled loads as it turns them on and off. In this way, it automatically adapts to differing loads or loads whose current changes with line voltage or temperature.

FEATURES

- Limits total current to available line capacity
- Minimizes circuit breaker tripping
- Eliminates manual appliance select switches.
- Senses current of owner added loads.
- Owner selectable 50, 30, or 20 Amp operation
- Protects air conditioners with 2 minute restart delay.
- "Learns" controlled appliance current draw.
- Remote panel with Load Status indicators
- Two digital AC line amp meters.
- Communicates with the inverter to maximize appliance usage
- Controls up to three air conditioners
- Installer Programmable Options

SMART EMS OPERATION

In larger RV's, there are times when the available electrical power is not enough to furnish all the loads in the coach. It is then that an energy management system is needed. The Smart EMS controls certain electrical loads to limit the peak demand, thereby



100 Amp EMS Display Panel
P/N 00-00949-000

almost eliminating nuisance circuit breaker tripping.

Large appliances, such as air conditioners, water heater, washer/dryer, coffee maker, etc., whose use can be temporarily postponed, are automatically controlled. Temporarily postponing their use leaves enough power to operate the "on demand" appliances, such as the microwave, hair dryer, or toaster.

Smart EMS turns off each controlled appliance when the total current in the RV exceeds the available power. It will restore appliance power when the total current drops below a level that allows it to operate again.

INVERTER COMMUNICATIONS OPTION

The **Smart EMS 100 Amp** is capable of communicating with a number of inverters. This communication allows the **Smart EMS 100 Amp** to reduce the charging current of the inverter to allow more current for other appliances. If the limit of current is exceeded, the unit "tells" the inverter to operate the appliances connected to it, as long as there is enough battery power.

100 Amp EMS Display Panel**P/N 00-00949-000**

The remote monitor panel includes a graphics touch panel display to provide all the information on the system. This unit is programmable by the installer to be able to display the names of the loads controlled by the system. The default screen shows the amount of current being drawn from both lines of the 240 volt service. (See Fig. 1)

Line Status

Figure 1

If the coach is plugged into 30 or 20 Amp service, the screen will indicate "30 Amps". By pressing the "SERVICE" button the user can select 20 Amp service and the screen will indicate the system is in that mode. If the generator is running, that will be indicated on the display,

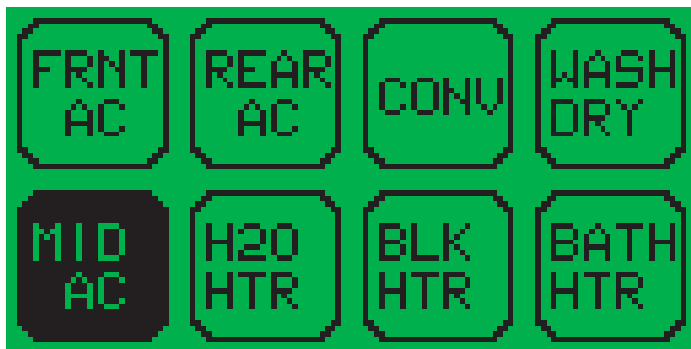


Figure 2

Load Status

To view the load status, the user touches the "LOAD STAT" button. The screen will display the on/off status of the eight loads. If the EMS has them on, they appear as positive print. If the EMS has shed them, they appear in negative print. (See figure 2)

Load Current

Touching any of the load buttons on the "LOAD STATUS" screen will display the current that is

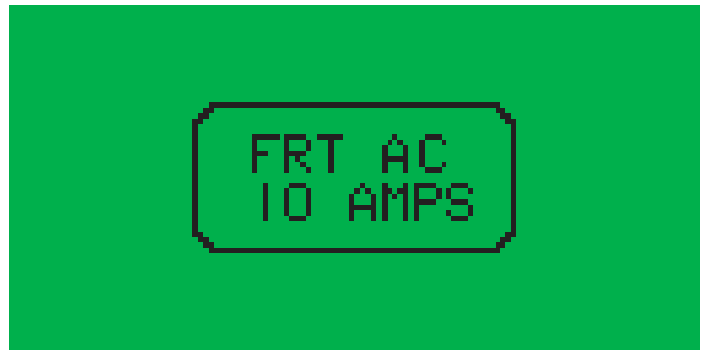


Figure 3

memorized for that load. After a few seconds, the display will revert back to the "LOAD STATUS" screen allowing the selection of another load.

If no other buttons are pressed the screen will revert back to the "LINE STATUS" screen. (See Figure 3)

PMC Switch Panel

This display panel also be used as a switch panel for either of Intellitec's Multi-point Switching or PMC Systems. To get to the switch panel display, the user presses either of the two mechanical buttons to the right of the display. This will scroll the display to show groups of switch functions. The switch functions can be organized together for convenience such as living area lighting on one screen and so on. When the load associated with that switch is on, the name will be displayed as a positive image and if it is off, it will show as a negative image.



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HOW DOES IT WORK?

The **Smart EMS - 100 Amp** senses that the coach is connected to a 50 Amp source by measuring the line to line voltage. This is normally 240 volts. When the coach is plugged into 50 Amp service, the system will measure the total current drawn on each leg of the service and control the loads to keep the total to less than 50 amps. If the coach is "dog-boned down" to connect to a smaller service, the line to line voltage will be zero. When it senses the smaller service, it automatically takes control of loads to either 30 amps, or if customer selected, 20 amp service. These loads are typically those whose function can be postponed until there is enough power available to operate them.

When the shore cord is first plugged in, **Smart EMS - 100 Amp** turns on power to the controlled loads, in order, as long as the total current doesn't exceed the service capacity. This happens within seconds, so it is transparent to the owner. If the total current exceeds service capacity, the **Smart EMS - 100 Amp** senses this over-load and turns off the next controlled load in order. The system notes the amount of current "decrease" and puts that amount in memory as the amount of current that appliance was drawing. The system continues to monitor the total current and when it drops to a level that is the amount of the controlled load, it will turn that load back on. At least two minutes must have passed before power will be re-applied.

In this way, the actual current of the specific appliance operating at that particular line voltage, temperature, and load will be learned and used by the system. This current will be "re-learned" each time the controlled load is turned off. This assures that the system will operate the appliances when the exact amount of power is available and will not unnecessarily cycle the appliances. A receptacle can also be one of the controlled loads, and **Smart EMS - 100 Amp** will learn what the owner plugs in.

The monitor panel offers a digital display of the total current being drawn on both legs of the service if available, or the single line when connected to 30 or 20 amp service. The monitor panel also provides status indication of which appliances have power applied to them. This panel keeps the owner informed as to how much current is being drawn, and helps them understand how current is being drawn by each appliance.

When an inverter is connected to the system, the **Smart EMS - 100 Amp** will control the amount of charging current drawn by the inverter to allow more current for other appliances. This will only be done if the battery is charged to a safe level. If the current exceeds the limit of the line supply, the **Smart EMS - 100 Amp** will "tell" the inverter to turn on for short periods to supply the loads connected to it.

There are a number of installer-programmable features available on the **Smart EMS - 100 Amp**. These include the following:

- Whether the unit should manage loads when the generator is supplying power
- The maximum current available from the generator
- Whether the generator is a single or dual input unit
- The shed order for the loads
- The third air conditioner option (the third air conditioner is not allowed to operate on 30 or 20 amp service)
- Will the **Smart EMS - 100 Amp** be communicating with an inverter

SPECIFICATIONS

Part Number:	00-00997-000 100 Amp EMS Distribution Panel 00-01XXX-100 100 Amp EMS Display Panel
Ambient Temperature Range:	-40C to +85C
Operating Environment:	Out of direct weather
Delay before reapplying power:	Two minutes (all loads)



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Maximum Controllable Loads: Eight, OEM selectable from six relays
Relay Rating: (3) DC or Thermostat - 1.0 A, 24VDC
(5) AC - 1 HP, 15A, 120 VAC 60 HZ
U.S. Patents: 4499385, 4617472

INSTALLATION Smart EMS - 50 Amp is designed to be mounted in a standard Cutler Hammer circuit breaker box, model number X-X-X-X, inside of the RV. The Smart EMS - 1000 Amp uses existing holes in this box for mounting.