

E-Plex® Energy Management System for RVs

Introduction :

For too long, energy management within motor coaches has been complicated and disjointed.



Generators, inverters, batteries, power distribution, circuit protection and load shedding have been managed independently with limited, if any, integration. Owners have been forced to manage this complexity and to accept that energy management on the road is complex. Today, ED&D Technologies offers a better way!

E-Plex is a revolutionary solution that utilizes next generation technologies to achieve worry-free, “set it and forget it” energy management. E-Plex offers a sophisticated user interface with the “look and feel” of a premium control system but at a fraction of the cost. Additionally, Patented E-Plex technologies allow for reduction of wiring and weight.

E-Plex is a product with a simple goal: To deliver sophisticated energy management solutions that reduce complexity, reduce cost and improve end-user experience.

Features :

• Energy Management System

- ☒ Monitor - Status of power from shore or generator.
- ☒ Control - Shed load(s) based on overall amperage.

• Generator

- ☒ Monitor - Hourmeter, fault codes, clock.
- ☒ Control - Provide generator status and start/stop control.
Auto-Start based on battery voltage and air conditioner request, quiet time settings.

• Tank Sensor

- ☒ Monitor - Level status of fresh water, gray water, & black water tanks.
- ☒ Control - Turn pumps on/off (Optional).

• Inverter Control

- ☒ Monitor - Status, output, current monitoring.
- ☒ Control - Selection of inverter settings.

Benefits :

- Consolidated monitoring and control in a single, attractive interface, for all critical coach functions.
- Integrated, intelligent energy management, set it and forget it.
- Grow as you go architecture. Easily expand to include lighting control, HVAC management or Audio/Video.

powered by
E-PLEX



COST

E-Plex utilizes a next-generation, low-cost infrastructure designed to supply power and data over simple, inexpensive wires. Hardware and connections are extremely low-cost. An E-Plex system is not burdened with excess cost and is therefore dramatically less expensive than alternatives.

INTEGRATION

From the ground up, E-Plex has been designed with an open architecture that can integrate numerous, separate systems into a seamless solution. E-Plex offers not just energy management solutions but also HVAC, lighting and audio/video integration.

DESIGN & INSTALLATION

E-Logic is a software design aid that makes deploying E-Plex a snap. With just two wires, an E-Plex installation is too easy. E-Plex dramatically reduces the cost typically associated with the design and installation process.

ENERGY MANAGEMENT

Long after the novelty of other systems will have worn off, E-Plex will be offering a definitive payback given its ability to reduce overall energy consumption. Being green and saving money never felt this good!

SOPHISTICATION

All consumers are anxious to get the most for their investment. While premium systems offer undeniable appeal, few can justify the cost. E-Plex is the first technology to offer sophisticated, intuitive control systems at a price that the motor coach market can afford. Why spend more when E-Plex offers so much for so much less!

SERVICE & SUPPORT

ED&D offers design support, training and service that is second to none. Web-based tools support troubleshooting and diagnostics once the system is deployed into the dealer network.

PROVEN TECHNOLOGY

The E-Plex technology was originally developed and deployed in the nuclear power plant industry. The technology has been at work, around the world for over a decade. In the building control, marine and motorcoach industries, E-Plex has revolutionized the way complex automation and control systems are deployed.

General Requirements :

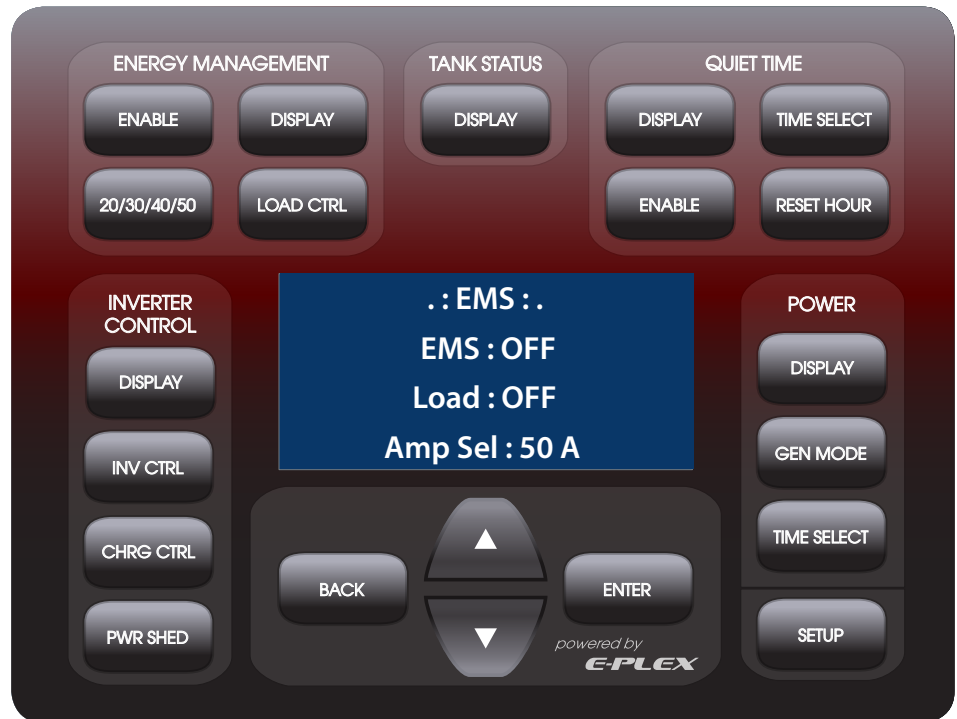
- 12VDC power supply.

General Installation :

- Supply positive 12VDC to terminal labeled +12/24V₁, supply negative (ground) to any of the 5 terminals labeled GND on the 400ECM.

General Navigation :

- **Touch Buttons:**
Up Arrow, Down Arrow, Enter and Back, used to scroll through and select various system options.

**Energy Management System (EMS) :****• Functions :**

EMS Enable, Load Enable, and Shore Amperage Selection.

• Touch Buttons :

Display, Enable, 20/30/40/50, and Load Ctrl.

• Button Descriptions :

- ✘ The Enable EMS button toggles the state of whether or not the EMS is active.
- ✘ The Display button will indicate the status of the EMS with either a "OFF" or "ON" label.
- ✘ The Load Ctrl button will enable the managed load status which will be indicated on the display with either a "OFF", "ON", or "SHED".
- ✘ The 20/30/40/50 button will toggle between selecting a 20A, 30A, 40A, or 50A service to manage the load with.

• Summary :

When the EMS is active and the load is active it will shed when the current draw exceeds the selected amperage. The state of these functions is stored and will be remembered even if the power to the 400ECM is disrupted.

Power :

• Functions :

Power, Gen Mode, L1 Voltage, L2 Voltage, L1 Current, and L2 Current.

• Touch Buttons :

Display, Gen Mode, Time Select, Up Arrow and Down Arrow.

• Descriptions :

- ✘ The Power page includes details about the source of AC power to the system and will display “OFF”, “SHORE”, or “GEN”.
- ✘ When the voltage of L1 is less than 90VAC it will display “OFF”.
- ✘ If L1 is greater than 90V it will display “SHORE”. If the generator is turned on it will display “GEN”.
- ✘ The Gen Mode button will toggle between generator “OFF”, “AUTO”, or “ON” which will display on the screen. The L1/L2 Voltage and Current readings are based off the values measured with the 336PFM.
- ✘ A way to simulate these readings is also provided if the 336PFM is not found in the system.
- ✘ Pressing the Time Select button will indicate which reading is currently selected and enable the Up and Down arrows to increase or decrease these values.

```

.: Power :.
Power : OFF
Gen Mode : OFF
L1 Volt : ##### V
L2 Volt : ##### V
L1 Amp : ##### A
L2 Amp : ##### A
    
```

Tanks :

• Functions :

Fresh, Gray and Black tank levels.

• Touch Buttons :

Display.

• Descriptions :

- ✘ The Tanks page displays the level of the 3 tanks in the system. If the 318PFTG for each tank is not found in the system a default simulated value is displayed on the screen.

```

.: Tanks :.
Fresh : ##### G
Gray : ##### G
Black : ##### G
    
```

Quiet Time :

• Functions :

Clock, Quiet Time Start, and Quiet Time Stop.

• Touch Buttons :

Display, Time Select, Enable, Up Arrow and Down Arrows.

• Descriptions :

- ✘ The Clock will display the current time. It is backed up with a battery so that the time will still read correctly if power is not available for extended periods of time.
- ✘ The Quiet Start Time and Quiet Stop Time can be adjusted so that the generator will not come on during quiet time.
- ✘ These settings are also remembered if power is removed from the system.
- ✘ The quiet time enable button will automatically force the generator into auto mode from this page.

```

.: Quiet Time :.
Clock : ## : 00 AM
Qt Start : ## : 00 AM
Qt Stop : ## : 00 AM
    
```

Installer Setup :**• Functions :**

Generator Runtime, Battery Type, Battery Bank Size.

• Touch Buttons :

Logo, Up Arrow, Down Arrow, Enter, Time Select.

• Descriptions :

- ✘ The Installer Setup page is intended to be available only for service technicians. The page is selected by pressing and holding the Powered by E-Plex logo (below the tank display status button) for 5 seconds.
- ✘ Once in the page, the runtime in hours of how long the generator has been active is displayed.
- ✘ If the generator is replaced the service technician can then press and hold the Reset Hour button for 5 seconds to reset the runtime counter on the generator.
- ✘ The battery types are also displayed and should be matched to the setting of the inverter for proper charge calculations.
- ✘ The battery bank and type can be selected by pressing the Time Select button and then pressing the enter button to toggle the possible types.
- ✘ Bat Type will display either "Sealed" or "Wet". Bat Bank will display either ">400 hrs" or "<400 hrs".
- ✘ These settings will be remembered in the event of power loss.

. : Instlr Setup : .

Gen Hour : ####

Bat Type : Sealed

Bat Bank : >400Hrs

Inverter :**• Functions :**

Inverter Control, Charge Control, External Power Shed.

• Touch Buttons :

Display, Inv Ctrl, Chrg Ctrl and Pwr Shed.

• Descriptions :

- ✘ The Inverter page lists information pertaining to the inverter. It lists the amount of current flowing into or out of the Inverter (Bat Chg) and can be used to determine whether the batteries are being drained (positive values) or charged (negative values).
- ✘ The voltage of the battery is displayed (Chg Lvl) and can be used for determining the charge mode of the inverter.
- ✘ The Inv Stat is toggled by the Inv Ctrl button and will display "Off", "Invert", or "Chg Off".
- ✘ When the Inverter is Off, the power to the Inverter Control Panel is disconnected.
- ✘ The power used by the inverter is calculated and displayed in watts (W). (In order for this to display without any hardware the L1 voltage needs to be simulated on the previously mentioned power page.)
- ✘ The charge mode can be displayed based on the charge level and type/size of battery selected in the factory setup page.
- ✘ For demonstration purposes the button Chrg Ctrl will select all the different possible modes and display "Bulk", "Accept", "Float", and "Cond".
- ✘ The Pwr Shed button will select between external AC power or rely on the inverter drawing from the batteries by switching the contacts on a 149CT30 relay. When the 149CT30 is active the inverter will automatically transfer to external power.
- ✘ This allows the system to determine if enough shore service is available to run the house loads from the external AC or to switch off and run the house loads from the batteries.

. : Inverter : .

Bat Chg : - ###ADC

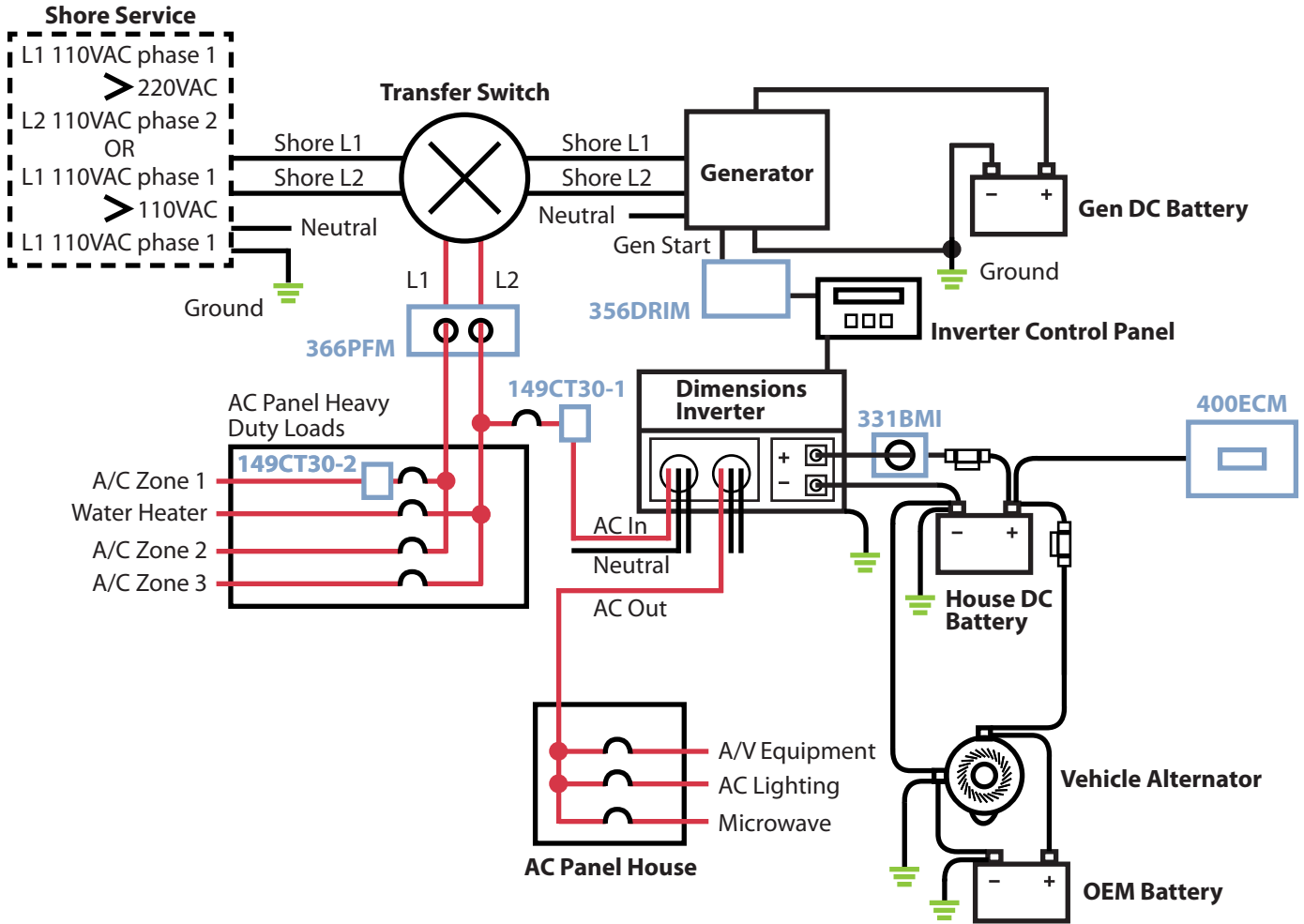
Chr Lvl : ##.# VDC

Inv Stat : Off

Inv Load : #### W

Chg Mode : Bulk

ELECTRICAL DIAGRAM



BILL OF MATERIALS (BOM)



149CT30

The 149CT30 is a 30 amp relay for turning ON/OFF individual circuits.



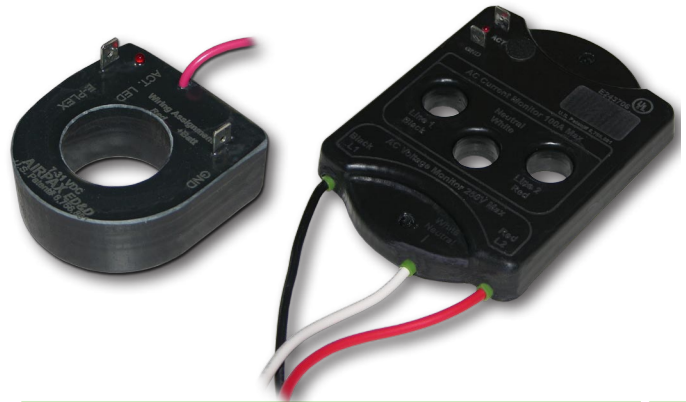
400ECM

Master controller, provides full system control, with master programming, diagnostics, and troubleshooting.



356DRIM

The 356DRIM (dual input relay module) has two relay outputs for DC power control and four digital inputs which are programmable, active high/low with dual color status indicators.



331BMI & 336PFM

The 331BMI delivers energy monitoring for DC power systems, while the 336PFM provides energy monitoring for AC power systems.

OPTIONAL MODULES TO CONSIDER



350LCD

10.5" color touch screen display. Allows for monitoring and controlling of different key subsystems, all from one location.

The 350LCD can double as a video display for inputs from TV, satellite, cable, VCR, DVD, DVR, video game consoles, security cameras and any other video source that supports RCA and S-Video capability.



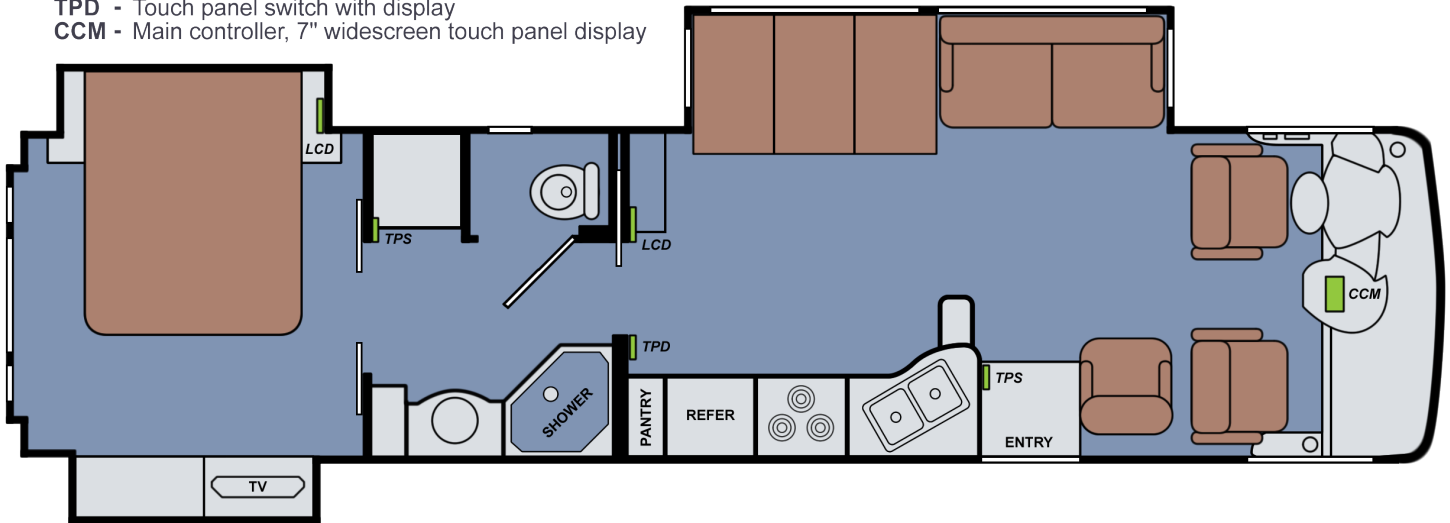
367TPD & 416TPS

The size of a light switch, the 416TPS (touch panel switch) provides on/off and dimming controls for lighting and equipment, with 6 LEDs and an EL backlight.

Similar to the 416TPS, the 367TPD provides on/off and dimming controls for lighting and equipment, with the addition of a four-digit LED display.

WHAT ELSE CAN E-PLEX DO ?

- LCD - 10" touchscreen display
- TPS - Touch panel switch
- TPD - Touch panel switch with display
- CCM - Main controller, 7" widescreen touch panel display



In addition to energy management, E-Plex offers a wide array of solutions for full coach management. A variety of user interfaces can be distributed throughout the coach (as shown above) to provide the owner access to and control of systems and equipment such as lighting, generator, inverter, tank monitoring, audio/video, HVAC and security.



Power: Worry-free management of all energy sources is what E-Plex does best. At a glance, monitor total AC current draw, voltage, and frequency as well as the charged state of batteries.



HVAC: Integration of single or multi-zone HVAC systems is easy via E-Plex. Monitor multiple room temperatures, control set points and adjust modes from any user interface in the coach.



Lighting : Manage all exterior and interior lights from either a single touch screen or from various smaller touch pads distributed throughout the coach. All lighting can be individually dimmable. At a touch of a single button, lighting presets allow owners to define “moods” for dining or entertaining. With E-Plex, via a touch of a button, blinds and lighting can operate in unison for a “movie theater mode”.



Audio / Video : Integration of the E-Plex audio/video switch brings an entirely new element of flexibility to the E-Plex experience. The switch allows for 4 x 4 connections and switching. The same touch screens used throughout the coach can also provide selection of video sources (satellite, DVD, etc), play/pause of DVDs and volume control via an infrared interface. E-Plex 10” displays allow for integration of security cameras, back-up cameras and GPS systems.



Tanks : Fresh, gray and black water tanks can all be monitored with E-Plex. Monitor tanks levels via the same E-Plex touch panels that are used in the bathroom for lighting control. Turn water pumps on/off at the sink. With E-Plex the data becomes available where you desire it.



Miscellaneous : Whether a slide out, awning or retractable steps, E-Plex can manage any load requiring AC Power or DC power. Integration of the various functions of a Coach into a consolidated control station is our specialty. Establish “quite time” settings, enable screen saver modes, night viewing modes, setting the time of day clock and controlling multimedia power setting are all within grasp of an E-Plex installation.

ED&D Technologies
20 West Broadway
Oviedo, FL 32765
TEL : 407-359-8171 • FAX : 407-359-8170
www.edd-tech.com