EC700 Power Control System

1 Introduction

This section of the handbook will guide you through the operation of the electrical system. All details are correct at the time of going to press. Please also see the online version which will include any later updates or amendments.

Further technical details are contained in section 3 or in the supporting technical manual available from www.sargentltd.co.uk

For the safe operation of all electrical equipment within your motorhome it is important that you read and fully understand these instructions. If you are unsure of any point please contact your dealer / distributor for advice before use.

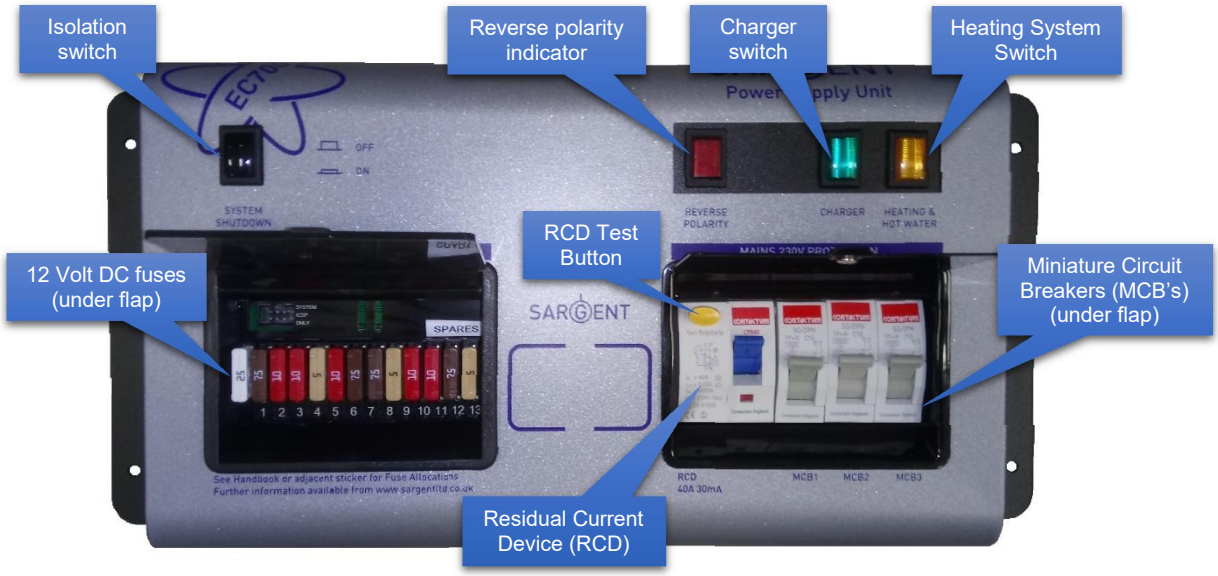
The system has a number of key components that you will need to be familiar with before attempting to use the system, these are:

- The EC700 Power Supply Unit (PSU) - a combined mains consumer unit and 12V controller located in the bed box or upper locker.
- The EC700 Control Panel (CP) - a remotely located user control panel used to turn circuits on and off and to display battery, water tank and other system information. This panel uses simple straightforward controls and reliable data communication to the PSU.
- The PX300 Intelligent Battery charger 300W. - A separate, air cooled 300 Watt multi-stage power converter unit that charges the batteries and provides 12V DC power.
- The EM40 Vehicle Interface Unit - This small unit is located at floor level behind the drivers' seat. The unit houses fuses for the fridge, vehicle battery, radio and other systems. It also provides connections for the optional tow bar harness.

2 Using the System

2.1 Power Supply Unit - Component Layout

The PSU is located in the front offside upper locker and similar locations



2.2 Activating the System

The EC700 system has a shutdown feature that can be used when the vehicle is in storage. This allows the leisure electronics to be turned off when not required to save battery power. When in the off state the alarm and tracking system supplies are still active, all other supplies are turned off.

Before using the system please ensure the system shutdown switch is in the on position (button in) the system is now active.

Note: if you plan to use the My Auto-Trail remote features the system needs to be active.

2.3 Connecting to the Mains 230V supply and Safety checks

For your safety it is IMPORTANT that you follow these connections instructions each time your Leisure Vehicle is connected to a mains supply. This section assumes that the system is complete and that a Leisure battery has been installed (see 3.4).

A) **Ensure suitability of the Mains Supply**. Your motorhome should only be connected to an approved supply that meets the requirements of BS7671 or relevant harmonised standards. In most cases the site warden will hold information regarding suitability of supply. If using a generator you also need to comply with the requirements / instructions supplied with the generator. Please note that some electronic generators may not be compatible with your leisure system. Further generator operational information is contained elsewhere in this manual.

B) **Switch the PSU internal Power Converter OFF**. Locate the green 'Charger' power switch on the PSU and ensure the switch is in the off position (button out) before connection to the mains supply.

C) **Connect the Hook-up Lead**. Firstly connect the supplied hook-up lead (orange cable with blue connectors) to the Leisure Vehicle and then connect to the mains supply.

D) **Check Residual Current Device operation**. Locate the RCD within the PSU and ensure the RCD is switched on (lever in up position). Press the 'Test' button and confirm that the RCD turns off (lever in down position). Switch the RCD back to the on position (lever in up position). If the test button failed to operate the RCD see section 3.18.

E) **Check Miniature Circuit Breakers**. Locate the MCB's within the PSU (adjacent to the RCD) and ensure they are all in the on (up) position. If any MCB's fail to 'latch' in the on position see section 3.18.

F) **Turn the PSU ON.** Locate the black 'Shutdown' button and ensure it is in the on position (press button in). Locate the green 'Charger' switch on the PSU and turn to the on position (press button in). The charger switch will illuminate when turned on.

G) **Check correct Polarity**. Locate the 'Reverse polarity' indicator on the PSU and ensure that the indicator is NOT illuminated. If the indicator is illuminated see section 3.18.

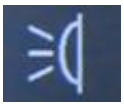
H) **Check operation of equipment**. It is now safe to operate the 12V and 230V equipment.

2.4 Control Panel - Component Layout

Your control panel will have an appearance as below, but depending on your vehicle specification the control panel features will vary. Not all features are present in all vehicles.

2.5 Control Panel Operation

2.5.1 Home Screen

	**Power Button** – pressing this button switches on power at the PSU and enables the water pump(s) and lights to be switched on and off. When on the button will be back lit blue. The power button can also automatically turn some of the lights on when it is switched from off to on (these can be selected on the lighting settings screen, see section 2.5.5 for details).
	**Pump Button** – pressing this button switches the pumps on and off. When on the button will be back lit blue.
	**Water Levels** – Pressing this button takes you to the water levels screen, allowing you to view the water levels in the fresh and waste tanks (where fitted).
	**Power Levels** – Pressing this button takes you to the power levels screen, allowing you to view: battery voltages, active battery current, ac current and solar current.
	**Main Lights** – Pressing this button toggles the mains light on and off, When on the button will be back lit blue.
	**Awning lights** – Pressing this button toggles the awning / entry lights on and off, When on the button will be back lit blue.
	**Dimmed Lights** – Pressing this button toggles the dimmed lights on and off Pressing and holding the dimmed lights button will change the dimming level while held. The dimmed lights brightness level can also be changed in the lighting settings menu (see section 2.5.5 for full details).
	**Settings** – Pressing this button takes you to the first settings screen (power settings), from there the other settings screens can be accessed (power settings, lighting settings, screen settings, time & date)

Screen Wake – after a period of inactivity (the default time is five minutes) the screen will power down and the backlight will switch off to help conserve power. Simply touch the screen in any place to wake the screen.

The screen time out time can be changed on the screen settings screen (see section 2.5.6 for full details)

Top bar – the top bar displays the external temperature, relative humidity, internal temperature, ac plugging status, solar charging status, and frost warning status. On other screens humidity is replaced by the clock.

	The lighting symbol is displayed when AC mains power is connected to the system.
	The solar active symbol is displayed when enough current is being generated by the solar panel to put charge into the battery (i.e. solar current greater than 100mA)
	The frost warning symbol is displayed when the external temperature is below 2°C

2.5.2 Water levels screen

The fresh water level is shown on the left of the screen, whilst the waste water level is shown on the right.

Please Note: that the levels on the screen will update more frequently if the pumps are switched on.

An audible warning will sound for up to 60 seconds and a warning message will display on screen, if the fresh water level falls below 25% or if the waste is full.

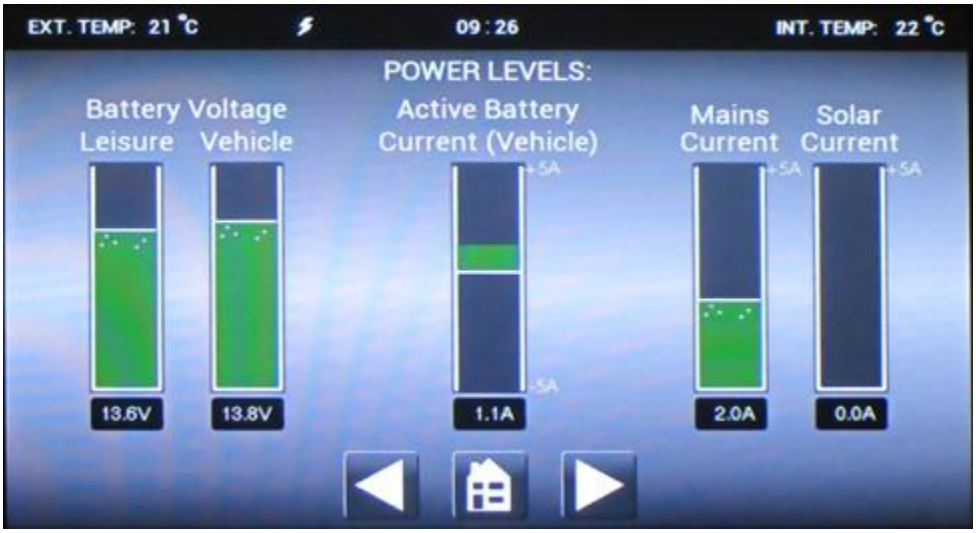
Pressing the ok button on the warning message will snooze the warning until power is switched off and back on again.

The water level warnings can be disabled on the screen settings screen, see section 2.5.6 for details

Levels screens navigation:

	Left arrow – switches between the water and power levels screen.
	Home – returns you to the home screen.
	Right arrow – switches between the water and power levels screen.

2.5.3 Power levels screen



The power levels screen shows the voltage of leisure and vehicle batteries, the current of on the active battery, the mains current draw and the solar current.

The active battery is selected on the power settings screen section 2.5.4. The active battery current shows if the battery is being charged or discharged. On the screen shown above the battery is being charged as the current is on the positive scale. If the battery was being discharged the current would be shown on the negative scale.

2.5.4 Power settings screen

Settings screen navigation:

	Left arrow – takes you to the previous settings screen.
	Home – returns you to the home screen.
	Right arrow – takes you to the next settings screen.

	**Leisure battery** – when selected the button is back lit blue, when not selected the button is back lit grey.
	**Vehicle battery** – when selected the button is back lit blue, when not selected the button is back lit grey.
	**Smart battery charging** – smart charging monitors the leisure and vehicle battery voltages and automatically changes the battery being charged to ensure both batteries are optimally charged. When selected the button is back lit blue, when not selected the button is back lit grey.
	**Tank Fill** – pressing this start the automatic filling of the fresh water tank, the filling process will automatically stop when the tank sensors detect it is full or after 7 minutes of filling whichever occurs sooner. The button will be back lit blue while filling.
	**Tank Heaters** – This button will be back lit blue when active. This doesn't mean that the tank heaters will be switched on. The tank heaters will only be on while the external temperature is below 2°C and if there is over 25% of water in the tank.

Active battery select – The battery highlighted in blue is the active battery, this is the battery being charged by mains (when plugged in) and the battery that is being used by the system. Pressing the smart battery charging button switches smart charging on and off, the button is lit blue while on.

Solar battery select – the battery highlighted in blue is the battery that the solar charging is being directed too. Pressing the smart battery charging button switches the solar smart charging on and off, the button is lit blue while on.

2.5.5 Lighting settings screen

Lights to be automatically be switched on with power:

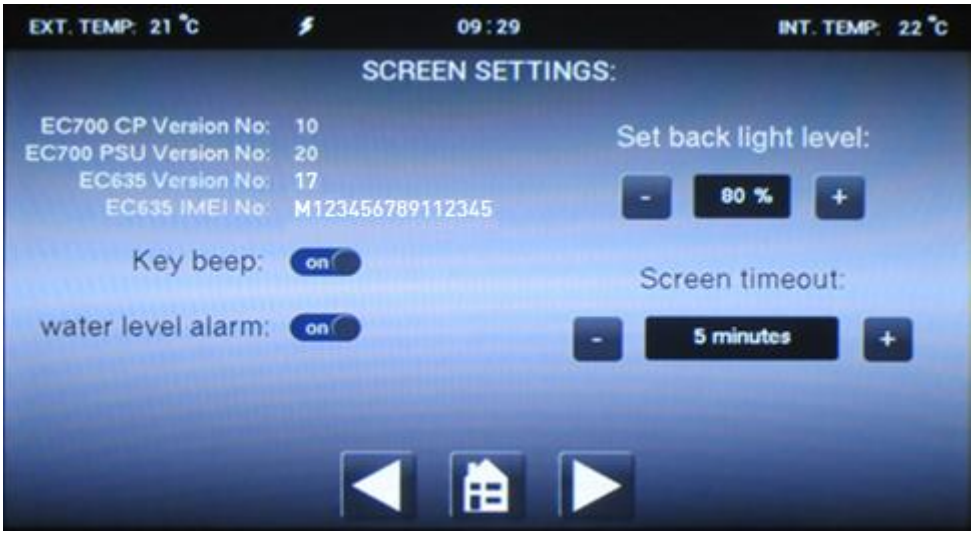
On the left side of the screen the lights to be switch on with the power button are shown.

Pressing the toggle button next to each selects which lights will be switch on when the power button is pressed from off to on.

Set dimming level:

In addition to holding the dimmed lights button the dimming level can be adjusted in 5% steps by pressing the '–' button to reduce the lighting level and the '+' button to increase the lighting level.

2.5.6 Settings screen



Software version information:

The screen displays all of the software version information for each part of the system: control panel, power supply unit, EC365 communication module. As well as the unique EC635 IMEI number.

Key beep – pressing the key beep toggle button switches the keypress beep off and on.

Water level alarms – pressing the water level alarm toggle button switches the water level alarms on and off.

Screen back light level – pressing the '–' button decreases the back light brightness, while pressing the '+' button increases the brightness

Screen time out – pressing the '–' button decreases the screen time out time, while pressing the '+' button increases the screen time out time.

2.5.7 Time & date settings screen

The time and date can be changed using the plus '+' and minus '–' keys, the changes to the time and date are saved when the screen is exited using the navigations keys.

2.6 Operation while driving

The EC700 system is designed to shutdown parts of the system while the engine is running. This is to meet Electromagnetic Compatibility (EMC) regulations and to ensure the safe operation of the motorhome.

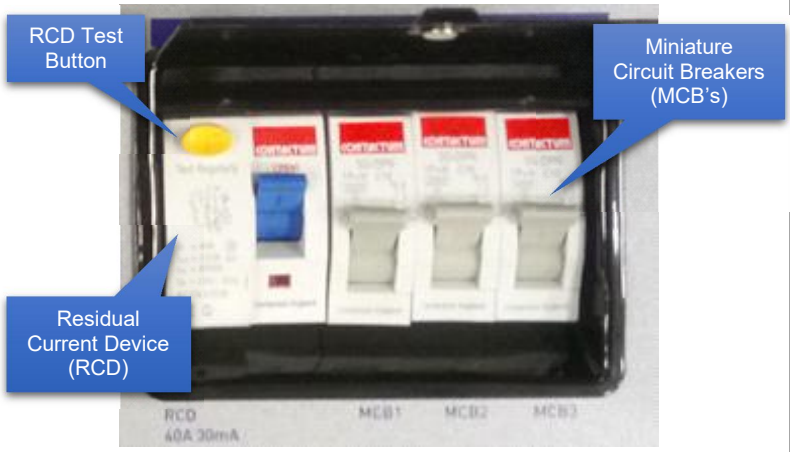
Please ensure the system shutdown switch on the PSU is in the on (button in) position before driving (see 2.2). This will ensure the electronic system is active and will therefore be able to control the charging process, supply the refrigerator and monitor other system circuits.

Where fitted; designated 12V sockets, en-route reading lights and en-route heating will remain operational while the engine is running.

3 System Technical Information

The following section provides further technical information relating to the electrical system. You can also access the supporting technical manual from www.sargentltd.co.uk

3.1 Residual Current Device & Miniature Circuit Breakers



The Residual Current Device (RCD) is basically provided to protect the user from lethal electric shock. The RCD will turn off (trip) if the current flowing in the live conductor does not fully return down the neutral conductor, i.e. some current is passing through a person down to earth or through a faulty appliance.

To ensure the RCD is working correctly, the test button should be operated each time the vehicle is connected to the mains supply (see section 2.3)

The Miniature Circuit Breakers (MCB's) operate in a similar way to traditional fuses and are provided to protect the wiring installation from overload or short circuit. If an overload occurs the MCB will switch off the supply. If this occurs you should investigate the cause of the fault before switching the MCB back on.

The following table shows the rating and circuit allocation for the three MCB's

MCB	Rating	Output Wire Colour	Description
1	10 Amps	White	230V Sockets
2	16 Amps	White (Yellow for heaters)	Extra 230V Sockets / Heating System
3	10 Amps	Black (Fridge / Water heater/ charger) blue (Aircon)	Fridge / Separate Water Heater / Charger / Aircon

3.2 Generator Usage

Caution should be used before connecting a generator to your motorhome.

WARNING

Never start or stop the generator while electrical loads are connected and switched on. Start the engine, let it stabilise and then connect the electrical load. When stopping the generator, disconnect the electrical load and let engine stabilise before switching off.

Whilst some generators use electronic inverter technology, others use a more basic principle to generate the 230V supply. Preference should be to choose a generator which produces a consistent sinusoidal wave form with accurate voltage control.

The Reverse Polarity warning light on the PSU may illuminate when using a Generator. This is a normal side effect when using some types of generator. Instead of connecting the neutral conductor to earth, some generators centre tap the earth connection making both neutral and live conductors 110V above earth. This 110V difference causes the neon polarity indicator to illuminate.

In most cases it is safe to use a generator, but please consult the generator handbook for further information.

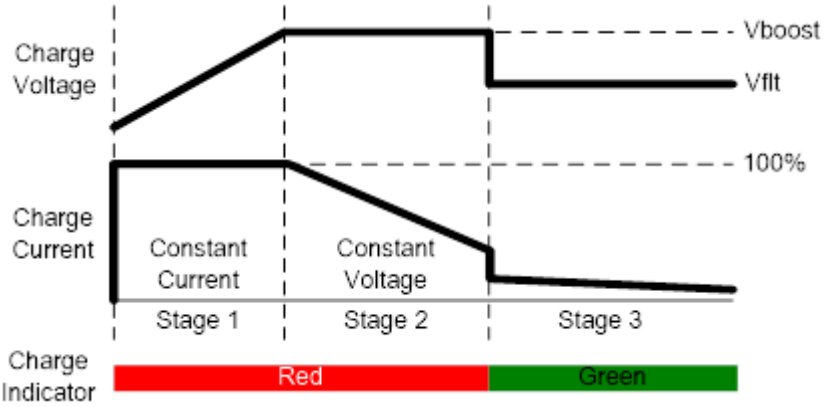
3.3 Battery Charger

The system incorporates an intelligent three-stage battery charger.

During stage 1 the battery voltage is increased gradually while the current is limited to start the charging process and protect the battery. At stage 2 the voltage rises to 14.4V to deliver the bulk charge to the battery. When the battery is charged, the voltage is decreased at stage 3 to 13.6V to deliver a float charge to maintain the battery in the fully charged state. The charger can be left switched on continuously as required.

The battery charger / power converter also provides power to the leisure equipment when the mains supply is connected. This module supplies DC to the leisure equipment up to a maximum of 25 Amps (300 Watts), therefore the available power is distributed between the leisure load and the battery, with the leisure load taking priority as per the following example:

Leisure load	Available power for battery charging
5A	20A
10A	15A
15A	10A
20A	5A



WARNING

Under heavy loads the Battery Charger case may become hot. ALWAYS ensure the ventilation slots have a clear flow of air. Do not place combustible materials against / adjacent to the charger.

3.4 Leisure Battery

A) Type / Selection

For optimum performance and safety it is essential that only a proprietary brand LEISURE battery is used and it is suggested to select a battery from the NCC Verified Battery Scheme with a typical capacity of 75 to 120 Ah (Ampere / hours). Depending on the prospective use of the vehicle the correct type should be selected (A, B or C). A normal car battery is NOT suitable. This battery should always be connected when the system is in use.

The PSU is configured to work with standard lead acid leisure batteries, and in most cases is also compatible with the latest range of Absorbed Glass Matt (AGM) batteries. The system is also suitable for Lithium batteries with built-in Battery Management Systems BMS). Before fitting non-standard batteries please check that the charging profile described in 3.3 is suitable for the type of battery by referring to the battery documentation or battery manufacturer.

Some vehicle installations can cater for two leisure batteries connected in parallel. In these cases it is recommended that two identical batteries are used.

The battery feed is fitted with an inline fuse between the battery and the electrical harness, and is usually located immediately outside the battery compartment or within 500mm of the battery. The maximum rating of this fuse is 20A per battery. If a single battery is fitted to a motorhome, this fuse could be up to 40A, however if two batteries are fitted each battery should be fused at a maximum of 20A.

B) Installation & Removal

Always disconnect the 230V mains supply and turn the PSU green charger switch to the off position (button out) before removing or installing the battery.

When connecting the battery, ensure that the correct polarity is observed (black is negative [-] and red is positive [+]) and that the terminals are securely fastened. Crocodile clips must not be used.

WARNING

Explosive gases may be present at the battery. Take care to prevent flames and sparks in the vicinity of the battery and do not smoke.

C) Operation / Servicing

Under normal circumstances it should not be necessary to remove the battery other than for routine inspection of the terminals and “topping up” of the battery fluid where applicable. Please see instructions supplied with the battery.

Note: Do not over discharge the battery. One of the most common causes of battery failure is when the battery is discharged below the recommended level of approximately 10V. Discharging a battery below this figure can cause permanent damage to one or more of the cells within the battery.

To prevent over discharge, the EC700 system incorporates a battery protect circuit that warns the users and then disconnects the batteries when they fall below set values.

If a warning is active a beep will be emitted by the control panel and information will be shown on the screen. To cancel the warning, press the ok button on the pop up window. These warnings will not be repeated unless the power switch is turned off and on again. This is to ensure the warning does not become a nuisance.

Battery	Voltage cut off	Action after cut off	Notes
Vehicle	10.9V	Battery selection is changed from Vehicle battery to Leisure battery. If the leisure battery is below 9V then a further warning will occur (see below).	This cut off level is designed to protect the vehicle battery from over discharge. The 10.9V level ensures there is sufficient power in the battery to run the vehicle electronics and start the vehicle. This cut off only applies to power drawn from the battery by the leisure equipment; it will not protect the battery if you leave vehicle circuits switched on, such as the road lights.
Leisure	9V	Power is turned off	This is an emergency cut off level to protect the battery from severe damage. You should not rely on this cut off level during normal operation, but manage your power consumption to a discharge level of about 11.5V. This cut off only applies to power drawn from the battery by the leisure equipment that is controlled by the control panel power switch; it will not protect the battery from discharge by permanently connected equipment.

3.5 12 Volt DC Fuses

WARNING

When replacing fuses always replace a fuse with the correct value. NEVER replace with a higher value / rating as this could damage the wiring harness. If a replacement fuse 'blows' do not keep replacing the fuse as you could damage the wiring harness. Please investigate the fault and contact your dealer.

The following table shows the fuse allocation for the 13 fuses fitted to the PSU. Please note that fuses are dependent on PSU versions, so not all fuses may be present.

Fuse	Rating	Fuse Colour	Description
1	25 Amps	White	Charger
2	7.5 Amps	Brown	Permanent 12V
3	10 Amps	Red	12V Sockets
4	10 Amps	Red	Fans
5	5 Amps	Tan	Appliances
6	10 Amps	Red	Pumps
7	7.5 Amps	Brown	Lights Main & Dimmer 1
8	7.5 Amps	Brown	Lights Main & Dimmer 2
9	5 Amps	Tan	Awning / Entry light
10	10 Amps	Red	En Route / Entry Light
11	10 Amps	Red	Spare
12	7.5 Amps	Brown	Spare
13	5 Amps	Tan	Spare
14	10 Amps	Red	Solar Fuse / Polyfuse (Rear Fitting)

Note: Fuses (2-10) have a Red LED below them which provides indication that the fuse has blown. The charger fuse has a green LED which Indicates that the charger is working.

The following table shows details of the fuse(s) located at the Leisure battery. See also 3.4A

Fuse	Rating	Fuse Colour	Description
Battery 1	20 Amps	Yellow	Fuse remotely located near battery
Battery 2	20 Amps	Yellow	Fuse remotely located near battery 2 (where fitted)

The following table shows details of the fuse(s) located at the EM40 Interface Unit

Fuse	Rating	Fuse Colour	Description
1			Spare location
2	5 Amps	Tan	Marker Lights
3	20 Amps	Yellow	Tow Bar +
4	20 Amps	Yellow	Vehicle Battery
5			Spare location
6	20 Amps	Yellow	Fridge +
7	20 Amps	Yellow	Tow Bar D+
8	20 Amps	Yellow	Fridge D+

3.6 Solar Charge Management

The EC700 PSU incorporates a built-in solar charge management feature, which will monitor the input from a separate solar panel and regulator. The Solar Active symbol will be displayed on the control panel when there is an amount of energy available to charge the battery. In a motorhome, depending on the charge state of the batteries, the solar power will be directed to the required battery and continuously monitored to ensure optimum operation.

3.7 Mains Charging

The EC700 PSU incorporates a smart charge feature, which monitors both leisure and vehicle batteries and automatically adjusts and directs the charger power (and solar power if a solar panel is installed) to maintain the leisure and vehicle batteries at an optimal level.

3.8 Water Pump Operation

The EC700 control panel pump button operates the internal water pump drawing water from an internal tank if fitted, or an external container when no internal tank is fitted.

The water tanks (fresh & waste) incorporate a level warning feature to warn the user when the fresh water level drops below 25% or when the waste water level reaches 100%.

If the water pump power is turned on and the fresh water level drops to below 25% a warning beep will be heard and a message will be displayed on the control panel. To cancel the warning, press the ok button.

If the water pump power is turned on and the waste water level rises to full (100%) a warning beep will be heard and a message will be displayed on the control panel. To cancel the warning, press the ok button.

These warnings will not be repeated unless the water pump power switch is turned off and on again. This is to ensure the warning does not become a nuisance.

3.9 Water Tank Heaters (frost protection) Operation

The EC700 features the ability to switch on water tank heater to provide frost protection for the fresh and waste tanks. The tank heater symbol on the power settings screen of control panel is lit up blue when this feature is enabled. The tank heaters will only operate if there is over 25% in the relevant water tank

and the external temperature sensor detects that the temperature falls below 2 degrees C. If the temperature rises above this level the heaters will be switched off but the feature will remain on.

If the tank heaters are turned on before starting a journey, when the engine is started the tank heaters will remain on for the duration of the journey. When the engine is stopped the tank heaters will remain on for a further 15 minutes. If the engine is restarted within this 15 minute period the tank heaters will remain on, again for the duration of the journey.

When the engine is stopped the tank heaters will turn off after a 15 minute period. To turn them back on you will need to turn the control panel on and then tank heaters on.

3.10 Lighting & Dimming Operation

The system contains a dimming channel for groups of lights which can be controlled by the dimmer button. Some motorhome models also feature an additional furniture mounted dimming control.

The awning light can again be controlled by a number of items, the local switch adjacent to the entry door, the control panel awning light button and the lock and unlock system (dependant on system setting being set to do so). Each item can toggle the light on and off.

3.11 Electric Step Operation

On vehicles fitted with an electric step, this is operated by a button near the entry door. Press and release the button to move the step in or out. One press of the button will move the step out; a further press will move the step in again.

If the engine is started the step will move in automatically, after a short warning buzzer. If this operation fails due to an obstacle a buzzer will sound continuously to warn that the step is still out, and therefore requires your attention.

3.12 Temperature Readings

The EC700 Temperature sensor measures the ‘core’ temperature of the vehicle, and provides a figure for information only. The same sensor also measures humidity, providing a figure (also for information only) from within that area.

It is hoped that the temperature information is a particularly useful figure, for instance when checking on the vehicle remotely during cold weather.

Heat from other items in the vehicle (in particular components from the heating system itself) will have a bearing on the reading displayed by the My Auto-Trail system. Ventilation is also present, and air entering or passing through this area will also have an effect on the temperatures and humidity levels displayed.

3.13 System Warnings

The system incorporates a number of warnings that are active at specific times. These are summarised below, and also covered by relevant sections of this manual.

When a warning is active a warning pop up will be displayed on the screen describing the problem(s).

Warning	When	Type
Fresh water level low	With pump turned on and fresh water level low (less than 25% full) Only available when an on-board tank is fitted	Message on screen and 60 second audible beep
Waste water level full	With pump turned on and waste water level full. Only available when an on-board tank is fitted	Message on screen and 60 second audible beep
Leisure battery voltage low	With control panel power on and leisure battery selected (as active battery) and the voltage level falls below 10V	Message on screen and 60 second audible beep.

	With control panel power on and leisure battery selected (as active battery) and the voltage level is below 9V	Message on screen and 60 second audible beep. If no action taken after 30 seconds then the system will switch the power off to prevent severe discharge of the battery
	Note: This is an emergency cut off level to protect the battery from severe damage. You should not rely on this cut off level during normal operation, but manage your power consumption to a discharge level of 11.5V or above. This cut off only applies to power drawn from the battery by the leisure equipment that is controlled by the control panel power switch; it will not protect the battery from discharge by permanently connected equipment.	
Leisure battery voltage high	With control panel power on or off and leisure battery is selected (as active battery) and the voltage level rises above 15V	Message on screen and repeated beeps from the control panel. The power is automatically turned off. The beeping will not stop until the fault is cleared.
Vehicle battery warnings	If the vehicle battery is selected instead of the leisure battery, then similar warnings to those described above are applied to the vehicle battery. The vehicle battery low warning level is 10.9V	
Engine running	When the engine is started the system power will be turned off	Message on screen, Leisure & Vehicle battery symbols indicating both batteries are connected for charging. The charging voltage is also shown on screen.
Step extended	Step extended and engine started	Message on screen and warning buzzer
	Step jammed or obstructed	
Mains lead (hook-up cable) still connected / plugged in	When the engine is started and the mains cable is still plugged in and the charger is switched on	Message on screen and repeated beeps from the control panel. The beeping will not stop until the hook-up lead is removed.

3.14 Common Fault Table

Fault	Possible Cause	Proposed Fix
No 230 volt output from PSU	Connecting lead between the site and Leisure Vehicle not connected	Check and connect lead as per 2.3C
	RCD switched off	Reset RCD as per 2.3D
	RCD not operating correctly	Check supply polarity; if the RCD continues to fail contact your Dealer as there is probably an equipment or wiring fault.
	MCB switched off	Reset MCB by switching OFF (down position) then back ON (up position), if the MCB continues to fail contact your Dealer as there is probably an equipment or wiring fault.
	No or deficient supply from site	Contact site Warden for assistance.
	Other fault	Contact your Dealer.
Reverse Polarity light is illuminated on PSU	Mains Supply reversed?	The reverse polarity light is designed to illuminate when the Live and Neutral supply has been reversed / crossed over. If the light illuminates there is a problem with the site supply or the cable connecting the supply to your vehicle. The light is designed to work on UK electrical supplies (where the neutral conductor is connected to earth at the substation). If you are using your vehicle outside the UK this light may illuminate when no fault exists. In these cases consult the site warden for advice.

Fault	Possible Cause	Proposed Fix
	Generator being used	'The Reverse Polarity warning light is on when using my Generator'. This is a normal side effect when using some types of generator. Instead of connecting the neutral conductor to earth, some generators centre tap the earth connection making both neutral and live conductors 110V above earth. This 110V difference causes the neon polarity indicator to illuminate. In most cases it is still safe to use the generator, but please consult the generator handbook for further information.
Control Panel Problems	Control Panel has no display	Check batteries and fuses, turn PSU isolate switch and charger switch on and ensure mains supply is connected. Check control panel connecting lead at PSU and behind Control Panel. Contact your Dealer.
	12V Power turns off	Battery protect feature has operated to protect the Vehicle battery and or the Leisure battery. See 3.4C Over voltage protection has been activated, the control panel will display a warning. A number of things can cause this but the most common is the solar panel, it is worth checking the regulator is connected correctly and operating within the correct parameters. Engine has been started, all equipment has been disconnected to meet EMC requirements. See 2.6
	Control Panel locked / erratic function	Observe control panel handling instructions. Control panel software may have crashed. Reboot control panel by turning off the PSU isolate switch. Wait 30 seconds then turn the switch back on. Check with your dealer that your system has the latest software installed, as an update may be available.
No 12 volt output from PSU	No 230V supply	Check all above.
	Charger not switched on	Turn charger switch on, switch will illuminate.
	Battery not connected and / or charged	Install charged battery as per 3.4
	Power button on control panel not switched to on	Turn power on at control panel.
	Battery flat / Battery fuse blown	Recharge battery, check fuses, check charging voltage is present at battery.
	Fuse blown	Check all fuses are intact and the correct value fuse is installed as per fuse table.
	Equipment switched off / unplugged	Check equipment is switched on and connected to the 12V supply.
	Other fault	Contact your Dealer.
Pump not working	Fuse blown	Replace fuse with correct value as per fuse table.
	Pump turned off	Turn pump on by pressing the pump button at the control panel.
Lights not working	Fuse/s blown	Replace fuse with correct value as per fuse table.
	Lights turned off	Turn Lights on by pressing the lights button, use dimmer at the control panel.

3.15 Contact details

Sargent Electrical Services Limited provide a technical help line during office hours. Please contact 01482 678981 if you require technical help. For out of hours support please refer to the support section of the Sargent web site www.sargentltd.co.uk

4 Remote Access & Control

4.1 My Auto-Trail Web usage & Description

Here you can update and amend your details, look at location information and history, review system information and historical data as well as changing some system options and settings.

4.2 My Auto-Trail SIM Coverage & Usage information

The EC700 system contains a Mobile SIM with a 36 month contract which commences upon activation at the Dealership when your vehicle is linked to your account.

Below is a list of the countries covered by the SIM under a fair usage policy, a complete list is available at request.

Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Netherlands, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

For vehicles shipping direct to Australia or New Zealand a special world-wide SIM is fitted at the Auto-Trail factory. Please note that if a UK specification vehicle is shipped to these countries the remote features will not operate.

4.3 My Auto-Trail Thatcham Category 6 Tracking

The EC700 system has a built in tracking and communication unit that is Thatcham Category 6 approved, provides European coverage and is ready for use, all you need to do is purchase a tracking subscription by visiting the My Auto-Trail section of the Auto-Trail website. The tracker may reduce your annual insurance premiums and provides extra peace of mind for just £95 per year.

4.4 Replacement parts

The Control panel contains a small lithium battery to maintain the clock when no other energy supplies are available this will last in excess of 5 years under normal conditions. The battery is a CR2032 3.0V

The EC635 Communication module contains a special backup battery pack which should last in excess of 3 years under normal conditions. The pack part number is 16308 available from Sargent.

4.5 Updates

From time to time there may be updates to the system firmware; these updates will be done at service intervals by your dealership.

5 Technical Data & Approvals

5.1 Equipment – EC700, PX300 & EC635 Control Equipment

Outline Specification		
INPUT 230V	230 Volts / 0 to 16 Amps	+ / - 10%
OUTPUT 230V	RCD protected, 2 x MCB outputs of 10A & 1 x MCB output of 16A Separate switched channels for heating system and charger	
INPUT 12V	2 x 20A battery inputs via 2 x 4 way connectors	
SOLAR INPUT	1 X Dedicated solar panel input capable of supporting 10A of solar power input (typically 180 to 200W) via a 2 way connector	Check the solar panel rating plate to ensure the maximum current is <= 10A
OUTPUT 12V	25A total output via multiple switched channels protected by 13 fused outputs	

Integrated CHARGER	Input 220-240 Volts AC +/- 10%, Frequency 50 Hz +/- 6%, Current 3A max. DC Output 13.6 to 14.4 Volts nominal, Current 25 Amps max (300 Watts).	
Signal INPUT	4 x Fresh water level, 4 x Waste water level, 1 x Engine running, plus multiple vehicle connections, sensor inputs for temperature & humidity	Fresh water negative sensed Waste water negative sensed
Data IN / OUT	CANBUS Data communication and power to Control Panel via 6 way connector CI-Bus Data communication to CI-Bus enabled devices via RJ11/12 connector	
IP rating	IP31	
Operating temperature	Ambient 0 to 35° Celsius Charger case temperature with full load 65° C Max	Automatic shutdown and restart if overheated / overloaded
Dimensions		
EC700 PSU	Overall size (HxWxD) 180 x 305 x 135mm Clearances 75mm above, 50mm left & right	Weight 3.8 Kg
EC700 Control Panel	Overall size (HxWxD) 23 x 206 x 115mm	Weight 325g
EC635 Comms Module	Overall size (HxWxD) 55 x 116 x 85mm	Weight 550g
EC640 Sensor	Overall size (HxWxD) 60 x 27 x 14mm	Weight 80g

5.2 Approvals

System: BSEN 1648-1, BSEN1648-2 compliant, BS7671: 2008 compliant

Residual Current Device: RCD 40A 30mA trip to BS EN 61008

Miniature Circuit Breakers: MCB's type C 6000A breaking capacity to BSEN 60898

Electro Magnetic Compatibility (EMC) directive 2014/30/EU

Integrated Charger: BS EN 60335-1/2.29, 2006/95EC, IEC61000-3.2/3:1995, 1.

Low Voltage Directive: 2006/95EC TUV-014900-A1, EN55022, Class B, EN55024/ Level 2

5.3 Declaration of Conformity

Equipment: Leisure Power Control System *Model name:* EC700PSU, EC700CP, EC635, PX300

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced approvals. The unit complies with all essential requirements of the Directives.

Signed	Name	Position	Manufacturer
	I L Sargent	Technical Director	Sargent Electrical Services Ltd Unit 35, Tokenspire Business Park Woodmansey, Beverley East Yorkshire, United Kingdom
Date:			

Whilst every effort has been made to ensure the accuracy and completeness of this document, no guarantee is given against errors or omissions. This document may be updated / improved over time therefore please check with your dealer / supplier for update information or visit www.sargentltd.co.uk