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.

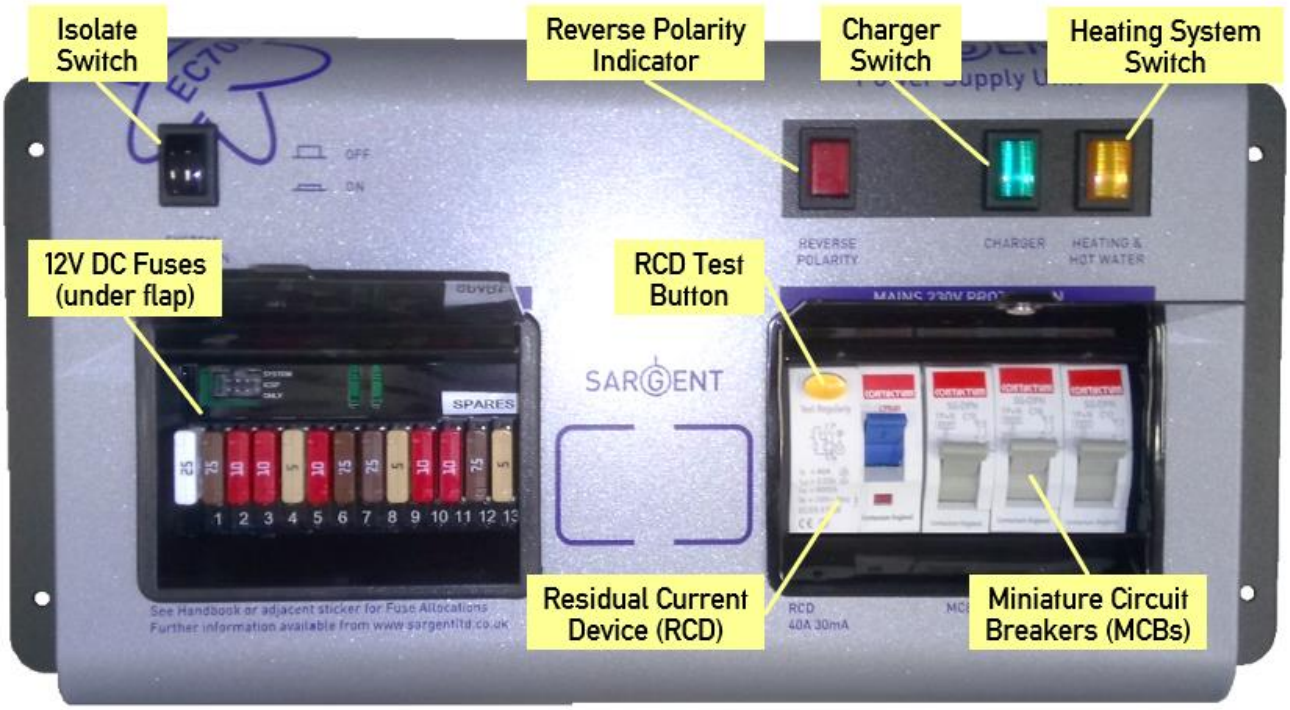
The system has a number of key components that you will need to be familiar with before attempting to use the system, these are:

- The EC700 Power Supply Unit (PSU) - a combined mains consumer unit and 12V controller located in the bed box or upper locker.
- The EC970 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 a graphical touchscreen with 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 usually 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 Auto-Sleepers Locate (AS Monitor) 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 Leisure Vehicle 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 in section 3.2.

B) **Switch the PSU Battery Charger / 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 3.1.

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 3.1.

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 3.2.

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

2.4 Operation while driving

The power control system is designed to shutdown parts of the system while the engine is running. This is to meet Electro Magnetic Compatibility (EMC) regulations and to ensure the safe operation of the motorhome. With the engine running the screen will show a warning ‘ENGINE RUNNING’.

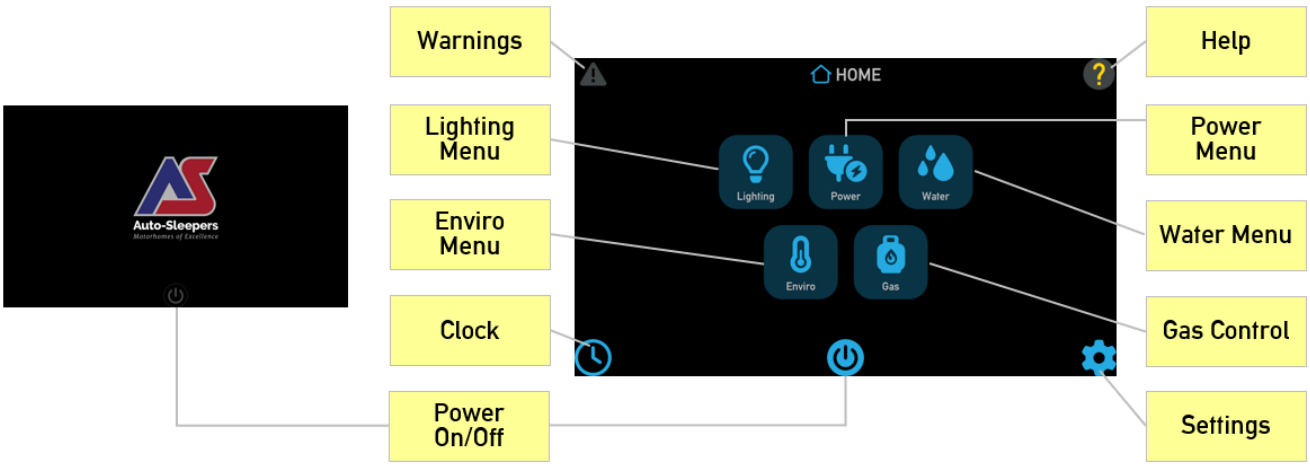
Please ensure the system shutdown switch on the PSU is in the on (button in) position before driving (see 2.2). This will ensure the electronic system is active and will therefore be able to control the charging process, supply the refrigerator and monitor other system circuits.

If / when fitted, designated 12V sockets, enroute reading lights and enroute heating will remain operational while the engine is running.

2.5 Control Panel - 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.

EC970 Control Panel



2.6 Control Panel – Key Features

Power On/Off Button - After activating the PSU by pressing the System Shutdown Button the display will beep twice and show the Auto-Sleepers start-up logo. To activate power to all circuits, press the power on/off button, the panel will beep once. To turn the power off and enter standby mode, press the power button again. Note: If the display has been inactive for some time, the backlight will be switched off to save power. Simply tap the screen to restore normal brightness.

Lighting Menu - Press the lighting button to show the lighting control screen. Here you can turn on / off or adjust the dimmable lighting levels.

Power Menu - Press the power button to show the power information and control screen. Here you can view leisure/vehicle battery condition, and check battery charger and solar charger currents.

Water Menu - Press the water button to show the water tank information and control screen. Here you can view tank levels and control related features.

Environmental Menu - Press the enviro button to show the internal and external temperature in degrees Celsius. Also shown is the internal relative humidity.

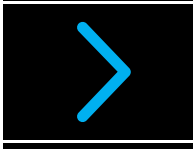
Gas Button – Press the gas button to enable or disable the gas supply.

Warnings Button - The system incorporates a number of warnings, for example if the battery becomes low. When a warning is active a warning box will appear along with an audible beeping sound. Until the warning has been fully cleared, the warning indicator will remain Red. Press the indicator to view any active warnings.

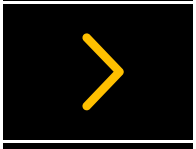
Help Button - Press the help button to display the context sensitive help screens. These will provide more detail about how to use the currently selected screen.

Clock Button - Press the clock button to display the current time in 24hr format. This screen also provides a quick summary of the leisure battery and fresh water tank status.

Settings Button - Press the settings button to show the general settings screen. Here you can set the date & time, screen brightness, screen on-time, key beep etc. Press the home button to return to the main screen.



Advance button - Pressing this button will advance to the next main section, for example to move between Lighting, Power, Water and Enviro screens

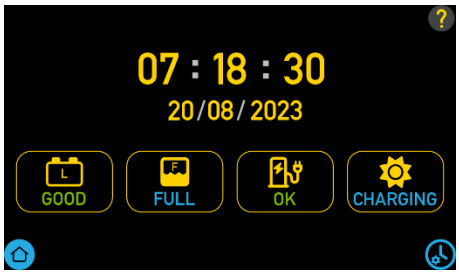


Next Button - Pressing this button moves to the next screen within a section, for example to move between Leisure and Vehicle battery screens

Home – Pressing this button will go back to the Main Menu screen

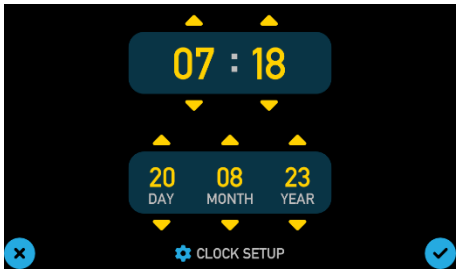
2.7 Clock / Status Screen

Clock screen - This screen not only displays the current time and date but also provides status tiles for the main services in the vehicle such as leisure battery, fresh water tank, 230V mains and solar charging



	**Leisure Battery** – The charge status is shown GOOD – No charge required FAIR – Charge recommended POOR – Charge immediately CHARGING – Charger is switched on DISCONNECTED – No battery detected
	**Fresh Water (if fitted)** - The water tank level is shown FULL – 100% GOOD – 50% to 99% LOW – 25% to 49% EMPTY – less than 25%
	**230V Mains** – The mains supply status is shown OK – Mains current normal HIGH – Mains current over 75% capacity LIMITING – Current limiting activated INACTIVE – Mains 230V power off
	**Solar Charging (if fitted)** – The solar panel charging status is shown CHARGING – Battery charging from solar INACTIVE – Not charging or panel not fitted
	**Clock Setup** – Press this button to access the clock setup screen

Clock setup – Use this screen to set the current time and date



	Set Time/Date – Use the up / down arrows to set the required time and date
	Confirm settings – Use the tick to confirm the settings or cross to cancel the settings

Note, the clock has a power backup, which can retain the clock settings for a number of weeks. If the vehicle has been stored for longer than this with no 12-volt power, the clock may need to be reset.

2.8 Environmental Readings

The EC970 system uses two sensors to measure internal temperature/humidity and external temperature. The combined internal temperature and humidity sensor is furniture mounted within the motorhome, and the external sensor is mounted below the motorhome floor. The figures displayed are for information only, and it is hoped the information will be useful, for example when checking temperatures remotely during cold weather.

	Internal – The internal temperature and humidity is shown along with a bargraph
	External – The external temperature is shown along with a bargraph

2.9 Water System Operation

The EC970 control panel pump button operates the internal water pump drawing water from an on-board tank if fitted, or an external container when no tank is fitted.

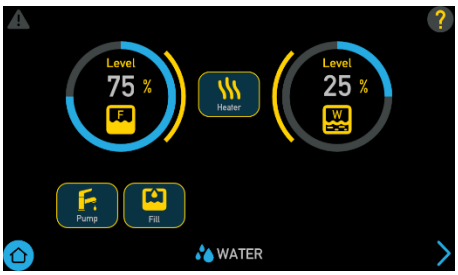
The water tanks (fresh & waste) incorporate a level warning feature to warn the user when the fresh water level drops below 25% or when the waste water level reaches 100%. These warnings can be enabled / disabled from the *User Settings* screen

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 bell icon.

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 bell icon.

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.

Fresh/Waste Water Tank screen - Here you can view the on-board fresh and waste water tank levels and control water tank related features.



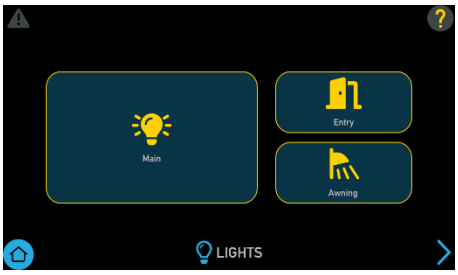
Pump	**Pump Button** - Press this button to turn the water pump on. Press the button again to turn the pump off. The button will illuminate when the pump is on.
Fill	**Fill Button (if fitted)** - Press the tank fill button to turn on / off the filling of the on-board water tank from the external water container. The pump will turn off automatically when the on-board tank is full or after 7 minutes have elapsed.
Heater	**Tank Heaters (if fitted)** - Press this button to turn on / off the water tank heaters.

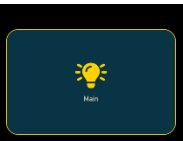
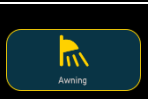
2.10 Lighting Operation

The main interior lighting can be switched on or off from the control panel

The entry and awning lights can be switched on / off from the control panel or by the lock and unlock system (dependant on system setting being set to do so)

Lighting screen - Here you can turn lighting within the vehicle on / off



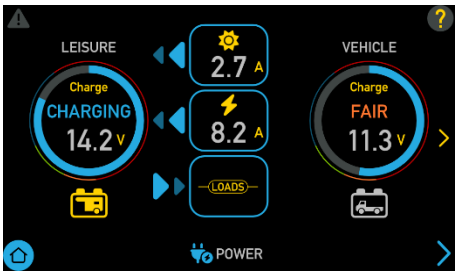
	**Main Lights** - Press to turn the main interior lighting on or off.
	**Entry Light** – Press to turn the entry door lighting on or off
	**Awning Light** – Press to turn the awning light on or off

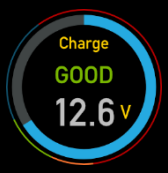
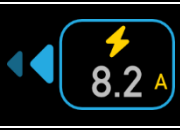
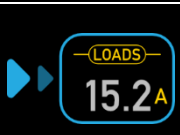
2.11 Power Management

The status of the leisure and vehicle batteries can be viewed on the control panel display by selecting the Power menu. Pressing the *Next Button* will switch between 12V battery power and 230V mains power

The EC700 PSU incorporates a built-in solar charge management feature, which will monitor the input from a separate solar panel and regulator if fitted. The current produced from the solar regulator is displayed along with an indication of which battery is being charged. 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.

Power screen (12V) - Here you can view battery levels, along with charger and solar current.



	**Selected Battery** - Use the select battery button to choose which battery you wish to use or charge with the 230V charger.
	**Battery Condition** – the battery voltage will be displayed and the battery condition described as below, GOOD – No charge required FAIR – Charge recommended POOR – Charge immediately CHARGING – Charger is switched on DISCONNECTED – No battery detected
	**Mains Charger Current** – If the mains charger is providing charge, the current will be shown along with an arrow indicating which battery is being charged
	**Solar Charger Current** – If the solar panel is providing charge, the current will be shown along with an arrow indicating which battery is being charged
	**Appliance Loads** – An arrow will show when the selected battery is supplying power to the loads. If the mains charger is switched off, the load current will also be shown.

2.12 Smart 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.

Note: If the vehicle battery is isolated using the Fiat ignition key isolator or similar, some smart charging functionality will be lost, and the available charge will be directed to the leisure battery.

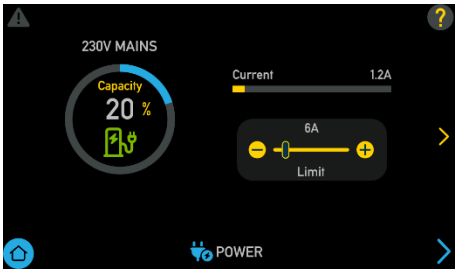
2.13 AC Current Limiter Operation

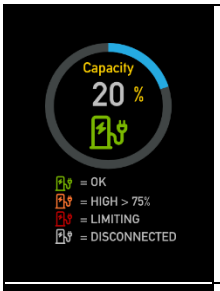
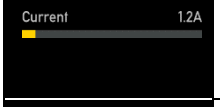
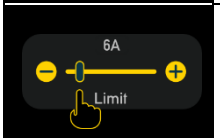
The power control system features a 230V current monitoring system which allows the mains hook up current to be displayed on the control panel. The resolution of this reading is 0.5A. A current limit can be set based on the available site hook-up supply. The capacity value and the dial shows how much of the available AC power is currently being used, to help manage power and avoid tripping of the site post.

This feature is particularly useful when abroad on a low current supply.

Setting the value to OFF will disable this feature.

Power screen (230V) - Here you can view the 230V current and set the 230V current limiter.



	**AC Capacity** - A dial shows the percentage of available AC current being used. An indicator also shows the limit status Green=OK, Orange >75%, Red=Over Limit Note: If the limit setting is OFF, the capacity will be based on the maximum site supply of 16Amps being available.
	**AC Current** – The bar graph shows the 230V AC current being used by the vehicle (from the site hook-up)
	**Set Limit** - To set a limit, either press the (+) or (-) buttons or drag the slider until the required limit level is reached.

2.14 Electric Step Operation

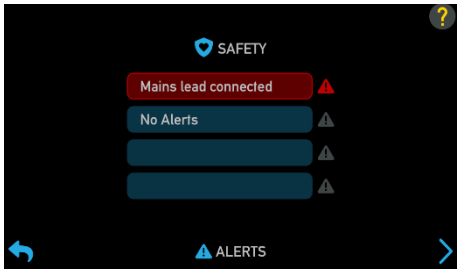
On vehicles fitted with an electric step, this is operated by a button near the entry door. Press and release the button to move the step in or out. One press of the button will move the step out; a further press will move the step in again.

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.

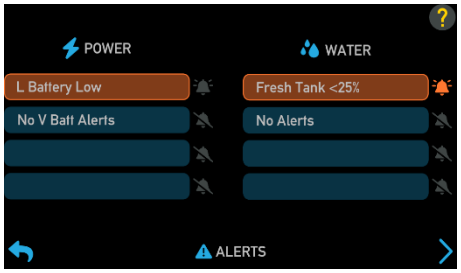
2.15 System Warnings

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

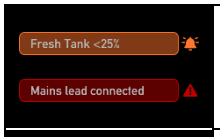
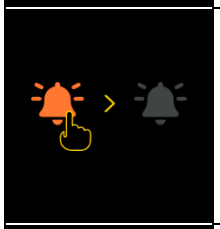
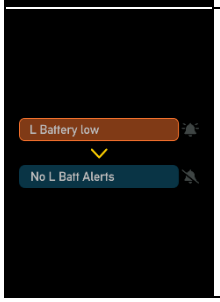
Warning screens - When a warning is active a warning screen will appear on the control panel screen containing a description of the warning along with an audible beeping sound.



Example safety warnings



Example Power / Water warnings

	**Active Warning** – If a warning becomes active, it will be highlighted (Orange for power/water alerts and Red for safety alerts)
	**Muting a warning** – To mute the warning sound, press the bell icon next to the alert. The icon will then become Grey and the sounder will stop. Note that safety warnings can only be muted by correcting the cause e.g. removing mains lead whilst engine is running
	**Clearing a warning** – The warning will remain highlighted until it is fully cleared, for example by re-filling the water tank or re-charging the battery

Warning	When	Type
Fresh water level low Fresh Tank <25%	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 Waste Tank 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 L Battery 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.
Leisure battery voltage very low L Battery Very Low	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 L Battery Too 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 stating ‘engine running’.

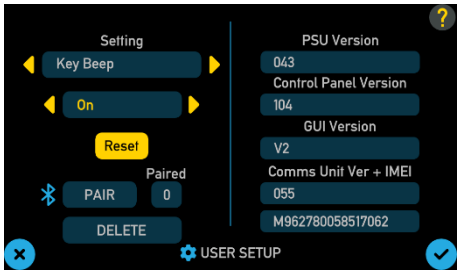
		
Step extended 	Step extended and engine started	Message on screen and warning buzzer
	Step jammed or obstructed	
Mains lead (hook-up cable) still connected / plugged in 	When the engine is started and the mains cable is still plugged in and the charger is switched on	Message on screen and repeated beeps from the control panel. The beeping will not stop until the hook-up lead is removed.

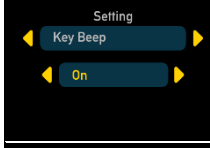
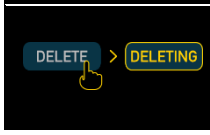
2.16 User Settings & Bluetooth Pairing

The EC970 control panel has a number of user settings, which can be accessed by pressing the User Settings button. This screen also displays the software version number of the PSU, Control Panel and the communicator / tracking unit details, if a Sargent EC660 Communication Unit is fitted.

The Bluetooth pairing process is covered below, should you have an EC660 Communication Unit fitted. Further help with Bluetooth pairing is available in the form of a help video which can be viewed on the Sargent website in the Support Information section.

User Settings screen - Here you can set the key beeps, screen brightness, screen on time etc.



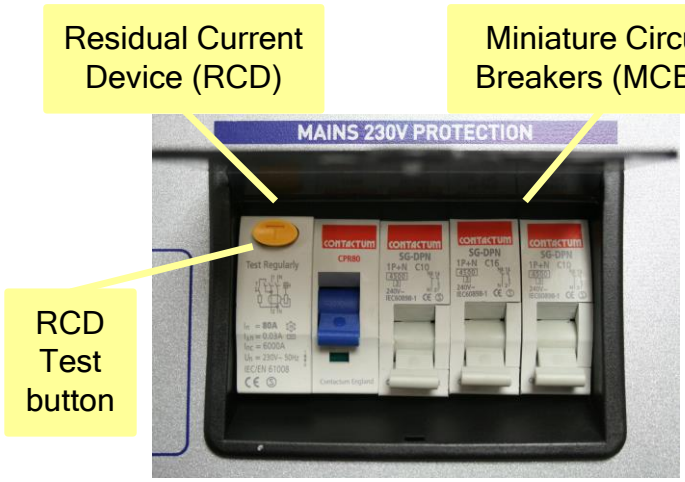
	**Settings** – Use the arrows to select the setting to adjust, then adjust the setting below as required. Once all required settings have been made, press *Tick Button* to confirm (see table below for more detail).
	**Reset** – Press the *Reset Button* then press *Tick Button* to reset setting to factory defaults.
	Press the *Pair Button* to start pairing with your compatible Bluetooth device. The button will change to show PAIRING when pairing is active. You can now pair your device to the system, following the devices instructions. Once paired correctly the *Paired* box will increment by one e.g., from '0' to '1' Pairing remains active for 1 minute and is then turned off automatically.
	Press the Delete Button to delete any Bluetooth pairings from the system. The button will change to show DELETING until the pairings have been deleted.

Section	Possible Settings	Description
Key Beep	On / Off	Turn the key beep sound on or off
LCD Brightness	10% to 100%	Adjust screen brightness
Backlight Time	30 seconds to 90 minutes	Adjust time before screen backlight goes off
Water Alarms	On / Off	Turn the water alarms beep sound on or off
Lighting Mode	None / Lights / Lights & Dimmer	Sets lighting behaviour when control panel is switched on, None – Lights stay off Lights – Lights come on Lights & Dimmer – Not used

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 (Sockets), Yellow (Heater)	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 generators. 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.

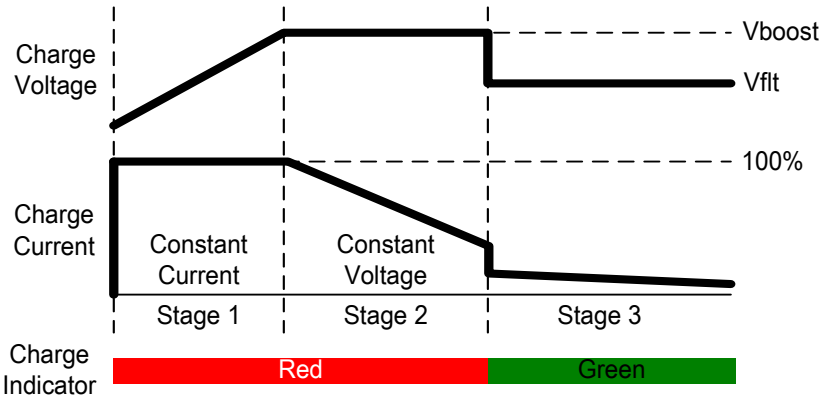
3.3 Battery Charger

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 180 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 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.

Note: If a tracking solution is fitted with an active Thatcham subscription, it is advised to inform the tracking call centre before removing the battery, to avoid an unnecessary security call.

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 power control 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 mute the warning, press the bell icon. 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 & Dimmer1
8	7.5 Amps	Brown	Lights Main & Dimmer2
9	5 Amps	Tan	Awning / Entry Light
10	10 Amps	Red	En route / Electric Step
11	15 Amps	Blue	Compressor Fridge (if fitted)
12	7.5 Amps	Brown	Spare
13	5 Amps	Tan	Spare
14	10 Amps	Red	Solar fuse / Poly fuse (Rear fitting)

Note: Fuses (2-13) 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.

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 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

Fault	Possible Cause	Proposed Fix
	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.
	Another 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.
	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 generators. 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 2.4
	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

Fault	Possible Cause	Proposed Fix
	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.
	Another 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.

3.7 Technical Support

If you require technical support on Sargent products then please visit the Support Customer Support site at https://sargent.zohodesk.eu/portal/en/home In the Knowledge Base you can view product documentation and search frequently asked questions and in the Ticket section you can raise a ticket to request help from the support team.

3.8 Updates

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

4 Remote Access & Control

4.1 Auto-Sleepers Locate (AS Monitor) 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. https://www.asmonitor.co.uk

4.2 Auto-Sleepers Locate (AS Monitor) Thatcham Category 6 Tracking

The EC700 system includes a built-in tracking and communication unit (when fitted) that is Thatcham Category S7 approved, provides European coverage and is ready for use, all you need to do is purchase a tracking subscription by visiting the Auto-Sleepers Locate (AS Monitor) section of the Auto-Sleepers website. The tracker may reduce your annual insurance premiums and provides extra peace of mind. Log it to your Auto-Sleepers Locate (AS Monitor) account for more details.

4.3 Auto-Sleepers Locate (AS Monitor) SIM Coverage & Usage information

The tracking and communication unit contains a Mobile SIM with a 36-month contract which commences upon activation at the Dealership when the vehicle is linked to your account (for the first owner).

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.

5 Technical Data & Approvals

5.1 Equipment – EC700PSU, EC970, EC660 & PX300

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
EC970 Control Panel	Overall size (HxWxD) 122 x 190 x 25mm Cut-out size (HxW) 115 x 181mm	Fixing via hidden spring clips Weight 290g
EC660 Comms Module	Overall size (HxWxD) 42 x 120 89mm	Weight 400g
EC640 Sensor	Overall size (HxWxD) 60 x 27 x 14mm	Weight 10g

5.2 Approvals

Power Supply Unit: Automotive Electro Magnetic Compatibility (EMC) to ECE Reg10.06, Type approval number E11 10 R 06 12228

Control Panel: Automotive Electro Magnetic Compatibility (EMC) to ECE Reg10.06, Type approval number E11 10 R 06 12232

System: BSEN 1648-1, BS EN1648-2 compliant, BS 7671: 2018 compliant

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

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

Battery Charger: BS EN 60335-1/2.29, 2014/35/EU, BS 2014/35/EU, IEC61000-3.2/3:2018.1

Low Voltage Directive: 2014/35/EU, BS 2014/35/EU, TUV-014900-A1, EN55022, Class B, EN55024/ Level 2

5.3 Declaration of Conformity

Equipment: Leisure Power Control System *Model name:* EC700PSU, EC940, EC660 & 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: 26/01/24			

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