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 Leisure Vehicle 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.

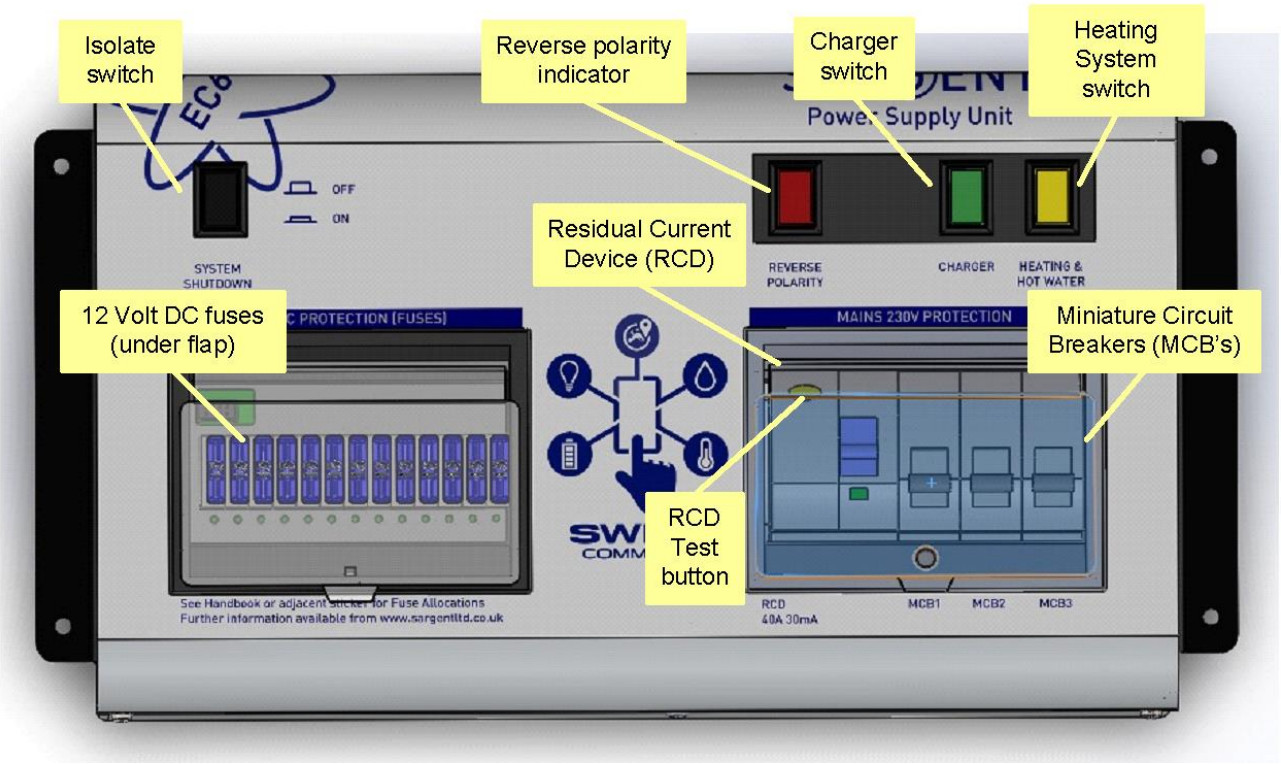
The system has a number of key components that you will need to be familiar with before attempting to use the system, these are:

- The EC601, EC602, EC652 or EC653 Power Supply Unit (PSU) - a combined mains consumer unit and 12V controller usually located in a storage area (lower bed box, wardrobe or similar).
- The EC800 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.
- The C44+ Road Light Fuse Box - This small unit, which is unique to caravans, is located in the front bed box. The unit houses fuses for the road lighting circuits and supplies from the tow vehicle, and also has connectors for the optional alarm system and Automatic Trailer Control (ATC) unit.

2 Using the System

2.1 Power Supply Unit - Component Layout

The PSU is located in the front offside bed box area in caravans, and in similar locations in motorhomes.



2.2 Activating the System

The 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 Swift Command 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 caravan or 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.

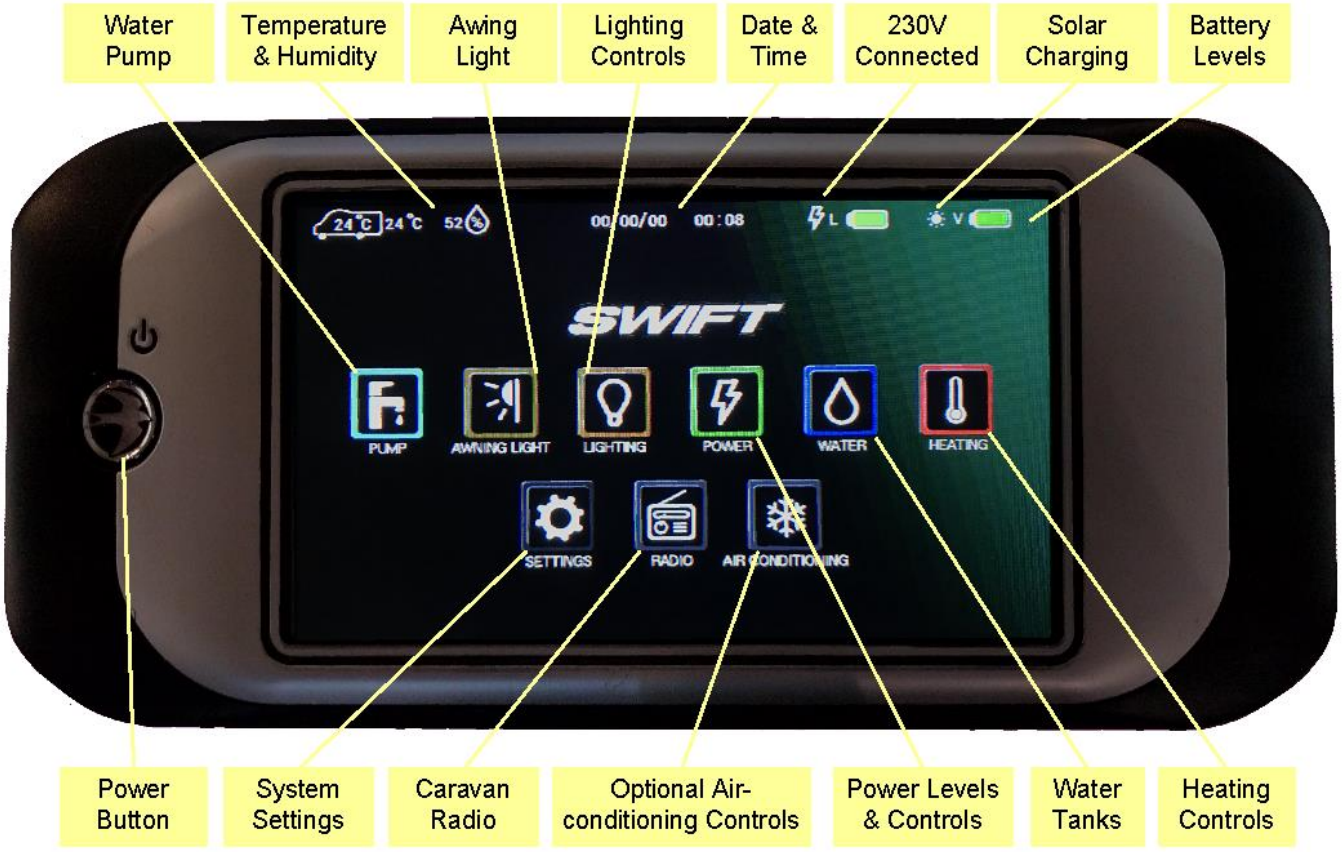
On motorhomes if / when fitted, designated 12V sockets, en-route reading lights and en-route heating will remain operational while the engine is running.

Some caravans may also be specified with en-route heating which will also 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 type of vehicle (caravan or motorhome) the control panel features will vary. Not all features are present in all vehicles.

EC800 Control Panel



2.6 Control Panel – Key Features

Power Button. Press the 'Swift' power button to turn the leisure power on, the panel will beep twice and show the Swift start-up logo. The control panel screen will illuminate when the power is on, but the screen will go to sleep after a pre-determined time. Pressing the power button or touching the screen while the screen is asleep will wake the screen without turning the power on or off. To turn the power off press and hold the power button to turn the power off, the panel will beep once.

Pump Button. Press the pump button to turn the water pump on. Press the button again to turn the pump off. The button border will illuminate when the pump is on. To view the water tank levels and other controls press the water button.

Awning Light Button. Press the awning light button to turn the awning light on or off. The border of the button will illuminate when the awning light is on. Note the awning light may also be controlled by the caravan alarm system or the motorhome locking system.

Lighting Button. Press the lighting button to show the lighting control screen. Here you can turn on / off or adjust the dimmable lighting levels. Press the home button to return to the main screen.

Power Button. Press the power button to show the power information and control screen. Here you can view battery levels, view charger and solar current and press the more button (right arrow) to view 230V current. Press the home button to return to the main screen.

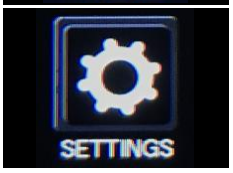
Water Button. Press the water button to show the water tank information and control screen. Here you can view tank levels and control related features. Press the home button to return to the main screen.

Heating Button. Press the heating button to show the heating control screen. Here you can control the heating system, select energy and temperature and by pressing the more button (right arrow) you can set related timers. Press the home button to return to the main screen.

Radio Button. In caravans, press the radio button to show the radio control screen. Depending on specification you can select FM radio, DAB radio or Aux input. Use the buttons on screen to scan, tune or adjust the volume. Press the more button (right arrow) to access the audio settings. Use the additional slider controls to adjust the levels. Press the home button to return to the main screen.

Air-Conditioning Button. Press the Aircon button to show the aircon control screen. Here you can select the operating mode, set the target temperature and adjust the fan speed. Press the home button to return to the main screen.
Note: this button will only be visible if a CI-Bus equipped air conditioner is installed, connected and enabled within the system.

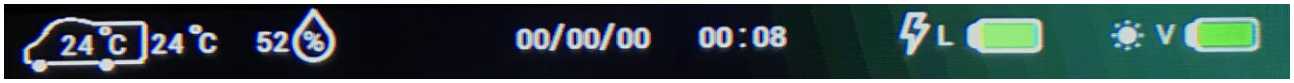
Fridge Button. Press the fridge button to show the fridge control screen. Here you can select the operating mode, set the cooling setting and view the temperature status. Press the home button to return to the main screen.
Note: This button will only be visible if a CI-Bus equipped fridge is installed, connected and enabled within the system.



Settings Button. Press the settings button to show the general settings screen. Here you can set the date & time, screen brightness and screen on time. There are also buttons on this screen to pair a Bluetooth device, delete Bluetooth devices, or turn the key beep on / off. Press the home button to return to the main screen.

2.7 Control Panel 'Header' Information

At the top of the control panel screen there is a header or information bar which remains visible on all screens. This is designed to provide quick reference information available at all times.



Internal and external temperature in degrees Celsius. The internal temperature is shown inside the vehicle symbol.	Relative humidity, range 1 to 100%	Current date	Current time	Leisure battery status. Green = good, Orange = fair, Red = poor. Lightning symbol indicates charging from the 230V battery charger. When a battery is not being charged a % remaining figure will be displayed. This figure is calculated from the battery voltage and therefore should be used for guidance only.	Vehicle battery status. Green = good, Orange = fair, Red = poor. Sun symbol indicates charging from the solar panel.

2.8 Temperature Readings

The EC800 system uses two sensors to measure internal temperature and humidity, and external temperature. The combined internal temperature and humidity sensor is furniture mounted within the (caravan / motorhome), and the external sensor is mounted below the (caravan / 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.

For vehicles fitted with Alde or Truma heating systems, this sensor is not used to control the heating temperature as it is measured above the door by the Alde or Truma room sensor. The readings on the heating system may vary relative to the one shown on the EC800 control panel.

For vehicles fitted with a Whale heating system, the sensor is used to control the heating temperature as this system does not have its own sensor.

2.9 Water System Operation

The EC800 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 system incorporates an automatic tank fill feature (caravan only). When turned on this will automatically fill the on-board water tank from the external container and will switch off automatically when full. To enable tank fill, select 'Fill Tank' on' on the control panel Water screen. To ensure the external pump is not damaged if the external tank runs dry, the pump runs for a maximum of 7 minutes.

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 on the control panel water 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 confirm 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 confirm 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.

Water Tank screen (Caravan). Here you can view the on-board water tank level and control water tank related features.

Fill Tank	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.
Level Alerts	Press the level alerts button turn on / off the water tank empty warning.
Frost Alerts	Press the frost alerts button turn on / off the frost warning.

2.10 Water Tank Heaters (frost protection) Operation

The EC652/653 (motorhome only) features the ability to switch on water tank heater to provide frost protection for the fresh and waste tanks. 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 use the tank heaters button on the water screen.

Water Tank screen (Motorhome). Here you can view the on-board water tank levels and control water tank related features.

Tank Heaters	Press the tank heaters button to turn on / off the water tank heaters.
Level Alerts	Press the level alerts button turn on / off the water tank empty / full warnings.
Frost Alerts	Press the frost alerts button turn on / off the frost warnings.
Empty Fresh	Press this button to empty the fresh water tank (the press is followed by a confirm button to avoid accidental operation)
Empty Waste	Press this button to empty the waste water tank (the press is followed by a confirm button to avoid accidental operation)

Note: Tank valves are normally closed and will automatically close if the power is switched off or if they have been open for more than 10 minutes.

Note: When either tank is emptying the level gauge and the related button will flash. Press the empty button again and confirm if you wish to cancel the emptying process.

2.11 Lighting & Dimming Operation

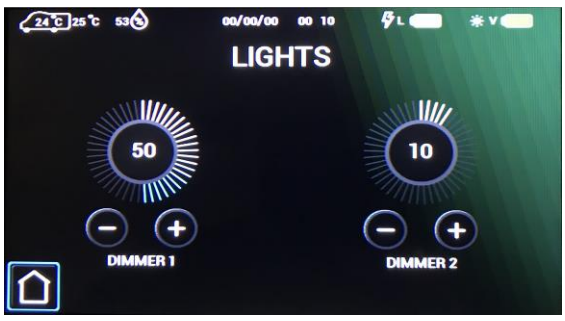
The system contains up to two dimming channels for groups of lights which can be dimmed, turned on and turned off by this screen, and can also be turned on and off by furniture mounted switches.

The awning light on a caravan can be controlled by a number of items within the caravan, the local switch adjacent to the entry door (if fitted), the alarm system lighting button, the control panel awning light button and the App. Each item can toggle the light on or off.

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

The Swift Command App can be used to both configure and adjust the lighting and dimming.

Lighting screen. Here you can turn on / off or adjust the dimmable lighting levels.

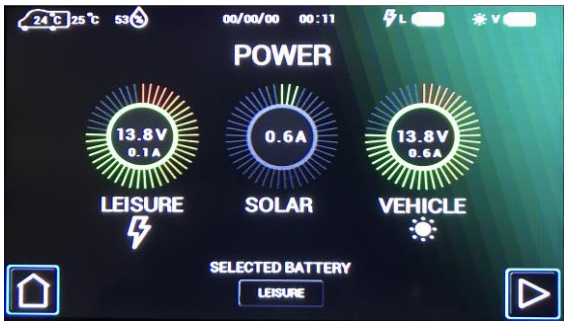


On / Off	Press the centre of either dial to turn the dimmer channel on or off. In the off state the centre of the dial shows the word OFF. In the on state the level value is shown.
Up / Down	Press the (+) or (-) buttons to increase or decrease the dimming level.

2.12 Solar Charge Management

The EC601/602/652/653 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. The voltage and current produced from the regulator can be viewed on the control panel display by selecting the Power menu item. 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.

Power screen (12V). Here you can view battery levels, view charger and solar current and press the more button (right arrow) to view 230V current.



Motorhome example

Caravan Example

Selected Battery	Use the selected battery button to select which battery you wish to use or charge with the 230V charger. In caravans the vehicle battery will only be available when the caravan is plugged into the car.
230V Charging	If a battery is being charged by the 230V charger a 'lightning' symbol will be shown below the dial and adjacent to the relevant battery in the header area.
Solar Charging	If a battery is being charged by the solar panel a 'sun' symbol will be shown below the dial and adjacent to the relevant battery in the header area.
Leisure Dial	The leisure dial shows the voltage of the leisure battery. Press the centre of the dial to change to showing the leisure battery current (+ positive value is charging and - negative value is discharging)
Vehicle Dial	The vehicle dial shows the voltage of the vehicle battery. Press the centre of the dial to change to showing the vehicle battery current (+ positive value is charging and - negative value is discharging)
Solar Dial	The solar dial shows the current being supplied to the system from the solar panel (if fitted).

2.13 Smart Charging

The EC653/653 PSU (motorhome only) 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.

2.14 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 setting can be activated which if reached will switch off the electric elements in the heating system (and air-conditioning if fitted and enabled), until such time as the current drops and the elements will be switched back on. An example of this is if a kettle was to be operated whilst the heating was on and the current limit was reached then the heater electric element would be temporarily switched off, when the kettle had boiled then the heater element would be switched back on automatically.

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 Current	The dial on the left shows the 230V AC current being used by the vehicle (from the site hook-up).
Set Limit	Press the centre of the dial to turn the AC current limiter on or off. Press the (+) or (-) buttons to increase or decrease the limit level. When on, the system will monitor the incoming AC current and if the set limit is reached the 230V heating element within the heating system will be temporarily turned off until the current falls below the set limit.

Note: for this feature to work correctly the Heating mode must be set to Timer so that the system can control the heating appliance.

2.15 Heating Controls

There are a number of heating systems that can be controlled by the power control system. The system will be preconfigured by the manufacturer or supplying dealer. The related control panel screens are shown below.

Heating screen. Here you can control the heating system, select energy and temperature and by pressing the more button (right arrow) you can set related timers.

Mode	Set the mode to Manual to use the controls supplied by the heating appliance manufacturer. Set the mode to Timer to control the appliance by the EC800 control panel. Note: The mode will automatically change to App when you control the appliance by the Swift Command app.
Status **Temp** **Water**	The status box shows you which timer is currently active, and the temp and water boxes show the target room temperature and water heater setting for the active timer.
Override	When operating in timer mode you can temporarily 'override' the timer room temperature by using the override feature. Press the centre of the dial to turn the override on / off. Press the (+) or (-) buttons to increase or decrease the required temperature.

Note: You can also override the room temperature by making a change using the appliance control panel (Alde & Truma only). If you make a change the override will automatically activate. The override temperature will continue until the next timer event time.

Truma CP+ Energy	The energy, gas or electric setting will vary depending on the appliance type. For Truma Combi+ heating, press the energy button to step through the available settings. Gas is indicated by the flame symbol and electric indicated by the lightning symbol. Possible combinations are GAS, MIX1, MIX2, EL1 or EL2. One electric symbol=1KW and two=2KW.

Alde 3020 Gas / Electric	For Alde 3020 heating system press the gas button to enable or disable the use of gas. Press the electric button to step through the available electric settings. Gas is indicated by the flame symbol and electric indicated by the lightning symbol. Possible combinations are electric OFF, 1KW, 2KW or 3KW and gas ON or OFF. One electric symbol=1KW, two=2KW and three=3KW.

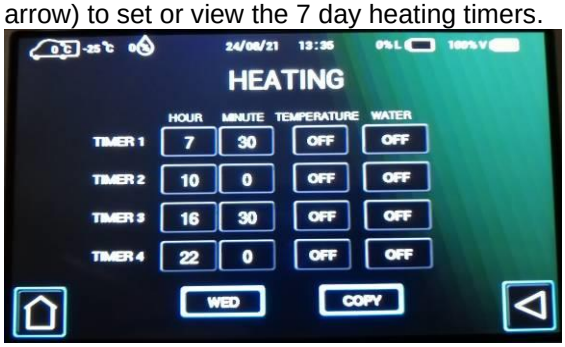
Whale Air Heater & Water Heater	For Whale air and water heating press the air or water energy buttons to select the required energy source for the relevant appliance. Gas is indicated by the flame symbol and electric indicated by the lightning symbol. You can select a mix of gas and electric for the water heater. Possible combinations for the water heater are OFF, GAS, EL1, EL2, MIX1 or MIX2 and for the air heater are OFF, FAN, GAS, EL1, EL2 or EL3. See the Whale user manual for power ratings for each setting.

Note: Changes made on the EC800 control panel may not be accepted on the heating controller immediately if the controller has been recently used and still has its backlight on. Please try to use one controller at a time.

Heating timer screen. On the heating screen with TIMER selected, press the more button (right arrow) to set or view the daily heating timers.

Timer	Press on the hour or minute value to change the setting. Timers should be set in order during the day (Timer 1 the earliest and Timer 4 the latest) and use the 24-hour clock.
Temperature	Press the temperature values to change the setting. Each press will increment the value from Off, then 5 degrees through to 30 degrees Celsius.
Water	Press the water values to change the setting. Each press will step through the available setting, which vary by appliance type. For Truma CP+ available settings are Off, Eco or Hot. For Alde 3020 available settings are Off, Normal or Boost. For Whale available settings are Off or On.

Heating 7 day timer screen. On the heating screen with TIMER x7 selected, press the more button (right arrow) to set or view the 7 day heating timers.



Day	Press the button next to copy to change the timer settings for each day. When leaving and re-entering this screen the day will default back to the current day.
Copy	Press Copy to copy the timer settings of the selected day to the next day. i.e. Wednesday's timer settings would be copied to Thursday's timers.

Note: to use these timer settings the Heating mode must be set to Timer or Timer x7 so that the system can control the heating appliance.

2.16 Refrigerator Controls

This section is only relevant when a CI-Bus equipped fridge is installed, connected and enabled within the system.

The main refrigerator settings can be set / controlled by the EC800 control panel or the Swift Command app. These controls work in parallel with the ones on the fridge control panel, so the settings can be changed by either method.

The related control panel screens are shown below.

For information in using the fridge from the Swift Command app, please see the Swift Command User Guide.

Fridge screen. Here you can select the operating mode, set the cooling setting and view the temperature status.

Mode	Press mode button to select the required operating mode. Select off to turn the fridge off.
Setting	Use the setting (+) or (-) buttons to increase or decrease the cooling setting. 1 is low and 5 is maximum.
Temperature	The temperature status display shows the temperature state of the fridge, with the optimal (central) position being the ideal. If the fridge is too warm increase the cooling setting to reduce the temperature. If the fridge is too cold, reduce the cooling setting accordingly.

Note that the fridge will take time to react to a setting change so please allow sufficient time for the status to update after changing a setting or adding food.

2.17 Air-conditioning

If your vehicle has been fitted with a compatible air-conditioning unit then the settings can be set / controlled by the EC800 control panel, the air-conditioner infrared remote control or the Swift Command app. The unit must be turned on with its power switch before it can be controlled.

The related control panel screens are shown below. For information in using the air-conditioning from the Swift Command app, please see the Swift Command User Guide.

Air-conditioning screen. Here you can select the operating mode, set the target temperature and adjust the fan speed.

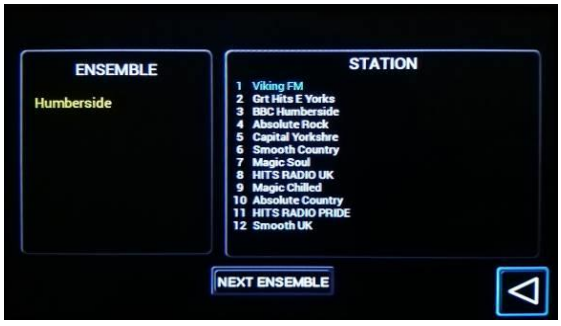
Lights	Press the lights button to control the LED light built into the air-conditioning unit. Select on or off to turn the light on or off, or select dimmed to allow the light to be controlled with other dimmable lighting in the vehicle.
Mode	Press mode button to select the required operating mode. Select off to turn the air-conditioner off. Note that available modes vary according to the model of air-conditioner fitted.
Temperature	Use the temperature setting (+) or (-) buttons to increase or decrease the temperature setting. Available settings range from 5 degrees to 30 degrees Celsius.
Fan Speed	Use the fan speed setting (+) or (-) buttons to increase or decrease the fan setting. Note that available settings vary according to the model of air-conditioner fitted.

2.18 Caravan Radio

Radio screen. Here you can select the radio mode, scan for stations, tune or adjust the volume.

Mode	Press the mode button to select the required radio mode, available choices vary by specification and include FM, DAB, Aux 3.5mm input or Off. Select Off to turn the radio off.
Scan	Press the (<) or (>) buttons to scan forward for the next station or to scan backwards for the previous station.
Tune	Press the (+) or (-) buttons to increase or decrease tuned frequency.

Note: Aux can be used when a device is connected to the radio module using the 3.5mm jack plug, either on the side of the radio module or on the binnacle at the front of the caravan (depends on model specification). Set the device volume to a mid-setting and then adjust on the EC800 control panel. If the sound level is too low increase the device volume, or if the sound is distorting reduce the level.



Volume	Press the (+) or (-) buttons to increase or decrease the volume level. Press on the centre of the dial to mute the volume, press again to restore the volume level.
Preset	The 5 pre-set buttons are used to store and retrieve your favourite stations. To store a station, firstly scan or tune to the required station, then press and hold the pre-set number until you hear a beep. To retrieve a station simply press the required pre-set button.
DAB Channel List	When using the DAB radio, the channels are grouped into ensembles. You can scan for channels within an ensemble by pressing the (<) or (>) button. You can also press on the central channel information window to show a full list of ensembles and their channels. Press the next ensemble button to scan for channels in the next available ensemble. You can select an ensemble by pressing on it in the left side list. You can select a station by pressing on it in the right side list. Press the < button to return to the radio screen.

Note: DAB reception may be temporarily interrupted by poor signal or when using electrically 'noisy' equipment or appliances (for instance hob ignition).

Audio screen. On the radio screen press the more button (right arrow) to access the audio settings. Use the additional slider controls to adjust the levels.

Tone	Use the slider bars to adjust the treble, middle or bass levels.
Loudness	Use the loudness slider to further adjust some audio frequencies to suit requirements.
Balance	Use the balance slider to adjust the levels between the left and right speakers.
Fader	For installations with 4 speakers, use the fader slider to adjust the levels between the front and rear speakers.

2.19 Bluetooth Pairing & Other Controls

The EC800 control panel can display the software version number of the Control Panel, the PSU and the communicator / tracking unit. Press the settings button to view the setting screen which contains the related information.

The Bluetooth pairing process is covered below. 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.

General settings screen. Here you can set the date & time, screen brightness and screen on time.

Time, Date & Day	Press the (+) or (-) buttons above or below each item to adjust the value. Note that the system uses the 24-hour clock.
Screen settings	Press on the screen brightness button to adjust the screen backlight level. Press on the screen timeout button to select the time that the screen will stay illuminated for after a press or touch.
Bluetooth Pair	Press the pair button to start pairing with your compatible Bluetooth device. The pair button border will illuminate when pairing is active. You can now pair your device to the system following the devices instructions. Pairing remains active for 1 minute and is then turned off automatically.
Bluetooth Delete	Press the delete button to delete any Bluetooth pairings from the system.
Key Beep	Use the key beep button to turn on / off the beep sound when a button is pressed.
Night Mode	The active hours for night mode are from 10pm to 8am. When night mode is active and between the active hours, the key beep is turned off, the screen brightness is set to 20% and minor alerts will not alarm but will show on the screen. Major alerts will still sound. When night mode is active and outside of active hours the previous settings for the key beep and screen brightness are restored.

Note that setting changes are saved when you press the home button to return to the main screen.

2.20 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.

2.21 AL-KO ATC Operation

On caravans fitted with Al-Ko Automatic Traction Control, the Swift Command App can be used to monitor the status of the ATC from within your tow vehicle. More information on this can be found within the Swift Command App and the associated user guide.

Note: if using the Swift Command app to monitor the ATC whilst driving the phone or device must be placed in a suitable holder and setup before driving. At all times ensure you obey the legal requirements for using mobile devices in vehicles.

2.22 System Warnings

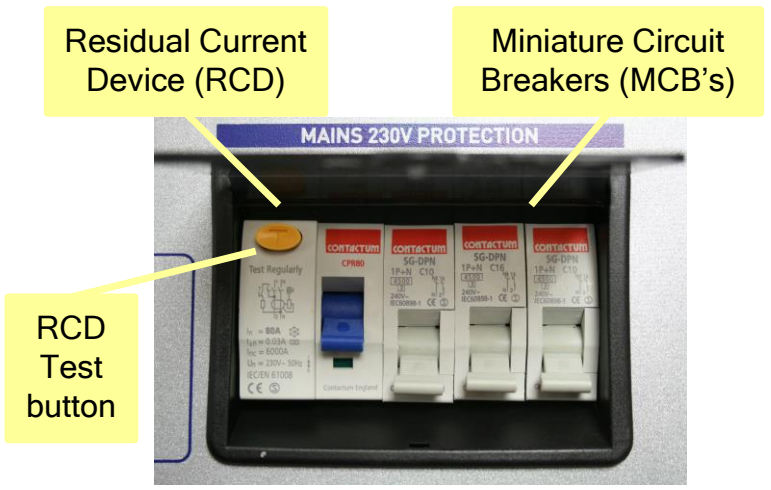
The system incorporates a number of warnings that are active at specific times. These are summarised below, and also covered by relevant sections of this manual. When a warning is active a warning box will appear on the control panel screen containing a description of the warning along with an audible beeping sound.

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 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.
Heating system	When set to control the heating system, the EC800 control panel will show related heating system warnings, which will include the error number and error description	Message on screen and 60 second audible beep. Additional descriptive information is available when using the Swift Command App.
Refrigerator / Fridge Freezer	When set to control the refrigerator, the EC800 control panel will show related warnings which will include the error number and error description	Message on screen and 60 second audible beep. Additional descriptive information is available when using the Swift Command App.

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 heater)	Extra 230V Sockets / Heating System
3	10 Amps	Black (Blue for Whale water heater)	Fridge / Charger / Auxiliary devices / Whale Water Heater

3.2 Generator Usage

Caution should be used before connecting a generator to your caravan or 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.

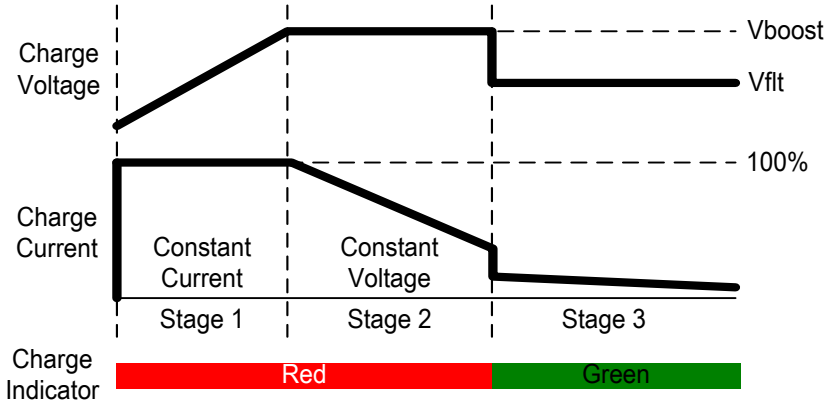
3.3 Battery Charger

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 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 cancel the warning, press the select button. 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 dependant 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 / Alarm / Fridge Electronics
3	10 Amps	Red	12V Sockets / TV Amplifier / Radio (Caravans Only)
4	10 Amps	Red	Extractor Fans
5	5 Amps	Tan	Appliances / Hob Ignition / Toilet / Whale Water Heater
6	10 Amps	Red	Water Pumps / Tank Heaters (Motorhomes Only)
7	7.5 Amps	Brown	Lighting, Main Lights & Dim Channel 1
8	7.5 Amps	Tan	Lighting, Entry Light & Dim Channel 2
9	10 Amps	Red	Alde Heating, Truma Heating, Whale Air Heater, Motorhome Marker Lights, Motorhome En-Route Sockets & Lights
10	10 Amps	Red	Auxiliary / Awning Light / Electric Step (Motorhomes Only)
11	15 / 20 Amps	Yellow	Fridge 12V (Motorhome Only)
12	15 Amps	Blue	Towing 12V (Motorhome Only)
13	15 / 20 Amps	Blue	Fridge D+ (Motorhome Only)

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. Fuses 11 and 13 are 15A for under counter fridges and 20A for fridge freezers.

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 on a Caravan
Battery 2	20 Amps	Yellow	Fuse remotely located near battery 2 (where fitted) on a caravan
Battery 1	40 Amps	Orange	Fuse remotely located near battery on a Motorhome
Battery 2	40 Amps	Orange	Fuse remotely located near battery 2 (where fitted) on a Motorhome

The following table shows details of the fuse(s) located at the C44 Road Light fuse box (caravans only)

Fuse	Rating	Fuse Colour	Description
1	20 Amps	Yellow	Fridge Supply
2	5 Amps	Tan	Left Hand Tail Lights
3	5 Amps	Tan	Right Hand Indicators
4	5 Amps	Tan	Fog Lights
5	-	-	Spare location
6	20 Amps	Yellow	Car Battery Supply
7	5 Amps	Tan	Right Hand Tail Lights
8	5 Amps	Tan	Left Hand Indicators
9	7.5 Amps	Brown	Stop Lights
10	5 Amps	Tan	Reverse Lights

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
	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 sub station). 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 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.

Fault	Possible Cause	Proposed Fix
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
	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.
Communications not working	Bluetooth not paired	Using System Settings menu, select Bluetooth Pair option.
	Bluetooth not active on Device	Ensure that the handheld device has Bluetooth switched on and that the device supports the Bluetooth 4 standard (BLE).
	Bluetooth out of range	Ensure the handheld device is within 7M of the middle of the caravan / motorhome.

3.7 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 hour support please refer to the support section of the Sargent web site www.sargentltd.co.uk

4 Remote Access & Control

4.1 Swift Command App

The Swift Command app can be down loaded from the Apple App Store or the Android Play store.

A separate Swift Command User Guide is available which covers the operation of the app.

Before you can use the App with your caravan or motorhome you will need to create an account and sign up to the free communication service. This is a simple process and will be explained further by your dealer at the vehicle handover. Additional information is available at www.swiftcommand.co.uk

4.2 Swift Command Web usage & Description

In addition to the mobile App, you can also use the same account and login details to access the Swift Command web site.

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.

4.3 Swift Command SIM Coverage & Usage information

The EC600 system contains Mobile SIM with 36-month contract, which commences upon activation at the Dealership when your vehicle is linked to your customer.

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 Swift factory. Please note that if a UK specification vehicle is shipped to these countries the remote features will not operate.

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 EC630 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 – EC601, EC602, EC652, EC653, EC800, EC635 & 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		
EC601, EC602, EC652 & EC653 PSU	Overall size (HxWxD) 180 x 305 x 135mm Clearances 75mm above, 50mm left & right	Weight 3.8 Kg
EC800 Control Panel	Overall size (HxWxD) 125 x 279 x 25mm Cut-out size (HxW) 108 x 173mm + switch area	Fixing centres 250mm X 74mm Weight 380g
EC635 Comms Module	Overall size (HxWxD) 55 x 116 x 85mm	Weight 550g
EC840 Sensor	Overall size (HxWxD) 20 x 35 x 38mm	Weight 10g

5.2 Approvals

System: BS EN 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

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

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

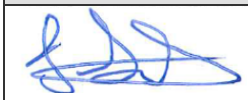
Low Voltage Directive: 2014/35/EU, BS 2014/35/EU, TUV-014900-A1, EN55022, Class B, EN55024/ Level 2

UK CA UK NI CE

5.3 Declaration of Conformity

Equipment: Leisure Power Control System *Model name:* EC601, EC602, EC652, EC653, EC800, 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:24/08/21			

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