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.

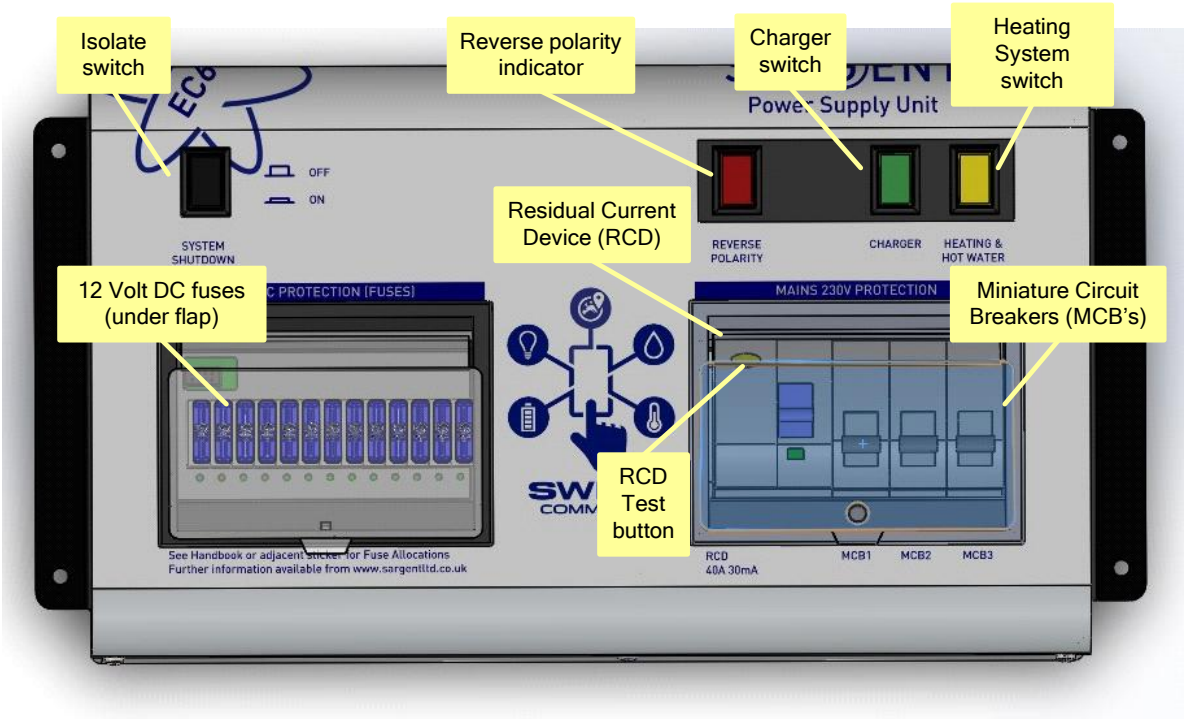
The system has a number of key components that you will need to be familiar with before attempting to use the system, these are:

- The EC601, EC602 & EC651 Power Supply Unit (PSU) - a combined mains consumer unit and 12V controller located in the bed box or upper locker.
- The EC620 Control Panel (CP) - a remotely located user control panel used to turn circuits on and off and to display battery, water tank and other system information. This panel uses simple straightforward controls and reliable data communication to the PSU.
- The PX300 Intelligent Battery charger 300W.
- 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 EC600 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 elsewhere in this manual.

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

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

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

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

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

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

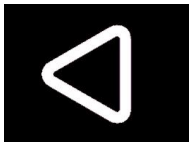
H) **Check operation of equipment**. It is now safe to operate the 12V and 230V equipment.

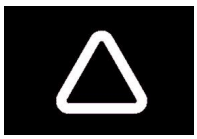
2.4 Control Panel - Component Layout

Your control panel will have an appearance as below, but depending on your type of vehicle (caravan or motorhome) the control panel features will vary. Not all features are present in all vehicles.

EC600 Control Panel

2.5 Control Panel Operation

	**Power Button.** Press the power button to turn the leisure power on. Press the button again to turn the power off. The adjacent LED will illuminate when the power is on, the screen backlight will turn on and system information will be shown on the LCD display. To avoid night time nuisance the LED and backlight will be turned off after a preset time, see note below.
	**Menu Navigation Up Button**. Use the menu up and down buttons to scroll through the various functions. The menu operates on a continuous loop arrangement so you can go up or down to reach all menu items. It is recommended to start in the down direction.
	**Menu Navigation Select Button**. Use the select button make a selection or to change a value or setting. This button is also used to select the display or toggle the display information on many menu items.
	**Menu Navigation Down Button**. Use the menu up and down buttons to scroll through the various functions. The menu operates on a continuous loop arrangement so you can go up or down to reach all menu items. It is recommended to start in the down direction.



Menu Tree

- **Leisure battery**, the leisure battery voltage and charging or discharging current is displayed. Use the select button to toggle the display, with voltage on the main display whilst current (in or out of the battery is shown on the bar-graph and vice versa, current on the main display and voltage on the bar-graph.
- **Vehicle battery,** when connected the vehicle battery voltage and charging or discharging current is displayed. Use the select button to toggle the display, with voltage on the main display whilst current (in or out of the battery is shown on the bar-graph and vice-versa, current on the main display and voltage on the bar-graph.
- **Solar Power,** the charging current from the solar panel along with the voltage of the battery it is charging is displayed. Use the select button to toggle the display, with voltage on the main display whilst current is shown on the bar-graph and vice-versa, current on the main display and voltage on the bar-graph.
- **Select Battery,** press the select button toggles between the Leisure and Vehicle batteries as the power source (or battery to be charged). The selected battery is shown in the header area.
- **Tank-Fill on/off,** (Caravan Only) Turn tank fill on to start the external water pump and to start transferring water from the external water container to the internal water tank. Tank filling will stop when the onboard tank is full or if more than 7 minutes have elapsed.
- **Tank Heaters on/off,** (Motorhome Only) this feature enables or disables the automatic Fresh & Waste water tank frost protection system. Tank heating will start when the tank level is 25% or higher and the external temperature is under 2 degrees C.
- **AC Limit,** the AC current limiter, when enabled, 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. Use the select button to set the limit or to turn the feature off. The AC Limit icon in the header indicated that a limit is set and will flash if the limiter is active. For this feature to work correctly the Heating setting must be set to Timer so that the EC600 system can control the heating system.
- **Temperature & Humidity,** Pressing the select button scrolls through the internal temperature, internal humidity & external temperature readings. Please note that due to the location of the internal temperature sensor there may be slight differences to the temperature shown on the heating system. Further details can be found in section 3.18.
- **Dimmer %,** this display shows the lighting dimming level and is adjusted in 5% increments. The display commences where the level was last set. Press the select button to increase the level up to 100% and then back down again to 5%. Pressing the dimming button on the control panel immediately shows this dimming value.
- **Heater Settings,** this sub menu allow the heater controls and associated settings to be adjusted. A full explanation of the controls can be found in the heater section.
- **Air Conditioning Settings,** this sub menu allow the optional air-conditioning controls and associated settings to be adjusted. A full explanation of the controls can be found in the aircon section.
- **Fridge Settings,** this sub menu allow the fridge controls and associated settings to be adjusted. A full explanation of the controls can be found in the fridge section.
- **System Settings,** this sub menu allows a number of system features to be configured like the Clock, Date, Key beep, Backlight time, LED time, Tank Alarms, Bluetooth Pairing etc.

	**Pump Button.** With the power on, press the pump button to turn the water pump on. Press the button again to turn the pump off. The adjacent LED will illuminate when the pump is on and the level of the water tank will be shown on the screen.
	**Interior Lights Button.** With the power on, press the lights button to turn the main lighting supply on or off.
	**Light Dimming Button.** With the power on, press the dimmer button to turn the dimmed lighting on or off. Press the select button to adjust the dimmer level (the menu automatically changes to the adjustment screen). The last setting is remembered.
	**Awning Light Button**. With the power on, press the awning light button to turn the awning light on or off. The Adjacent LED will illuminate when the awning light is on. The awning light may also be controlled by the caravan alarm system or the motorhome locking system.

Note, display illumination. The LCD back light will illuminate for the pre-set time (default time is 30 seconds) adjustable between 5 and 120 seconds. Setting the timer to 0 seconds will force the backlight to be permanently on. The illumination of the blue LED's adjacent to the power, pump & awning light buttons can be configured in the same way as the backlight. The screen will wake up if your hand is placed near the panel or if a button is pressed.

2.6 Operation while driving

The EC600 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.

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.

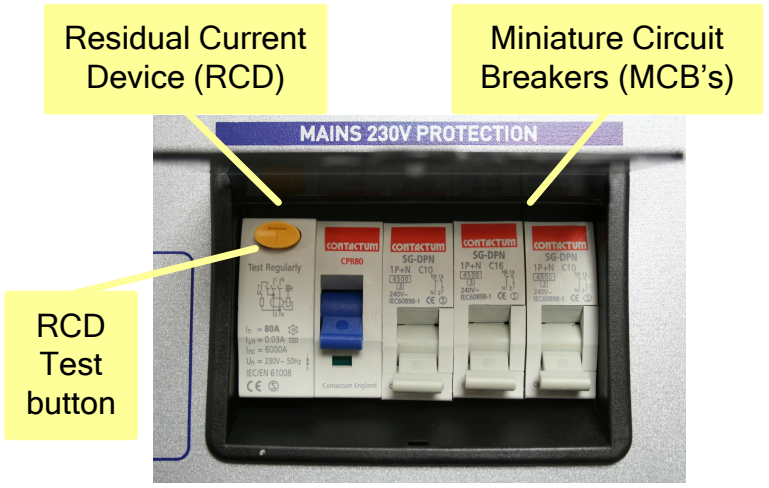
On motorhomes if / when fitted, designated 12V sockets, en-route reading lights and en-route heating will remain operational while the engine is running.

With the engine running the screen will show ENGINE RUNNING, the leisure and vehicle battery icons will be displayed to indicate they are being charged and the charging voltage will be show in the main display.

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.

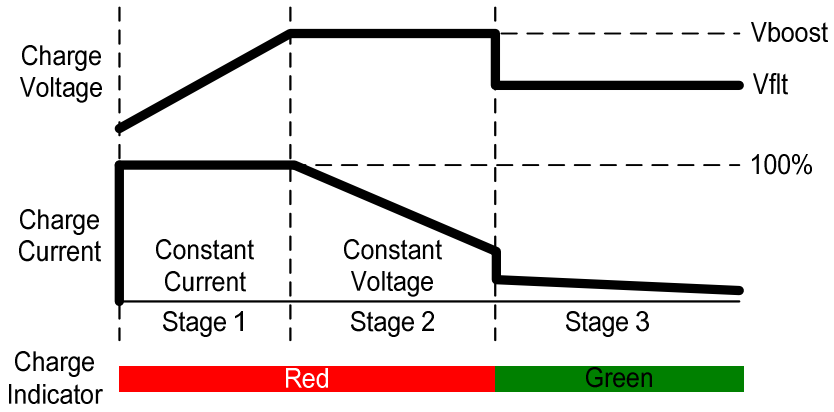
3.3 Battery Charger

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 EC600 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 / Alde Heating
3	10 Amps	Red	12V Sockets / TV Amplifier / Radio (Caravans Only)
4	10 Amps	Red	Extractor Fans / Truma Heating / Whale Space Heater
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	5 Amps	Tan	Lighting, Entry Light & Dim Channel 2
9	10 Amps	Red	Spare Outputs / Marker Lights / (En-Route Sockets & Lights Motorhome Only)
10	10 Amps	Red	Auxiliary / Awning Light / Electric Step (Motorhomes Only)
11	20 Amps	Yellow	Fridge 12V (Motorhome Only)
12	15 Amps	Blue	Towing 12V (Motorhome Only)
13	15 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.

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

Fuse	Rating	Fuse Colour	Description
Battery 1	20 Amps	Yellow	Fuse remotely located near battery 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 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 Solar Charge Management

The EC601/602/651 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 multi-function display by selecting the Solar 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.

3.7 Smart Charging

The EC651 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.

3.8 Water Pump Operation

The EC620 control panel pump button operates the internal water pump drawing water from an internal tank if fitted, or an external container when no internal tank is fitted.

The system incorporates an automatic tank fill feature (Caravan only). When turned on this will automatically fill the onboard water tank from the external container and will switch off automatically when full. To enable tank fill, select 'Tank-fill on' on the control panel. 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%.

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 select 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 select button.

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

3.9 Water Tank Heaters (frost protection) Operation

The EC651 (Motorhome only) features the ability to switch on water tank heater to provide frost protection for the fresh and waste tanks. The tank heater symbol is displayed on the control panel when this feature is enabled. The tank heaters will only operate if there is over 25% in the relevant water tank and the external temperature sensor detects that the temperature falls below 2 degrees C. If the temperature rises above this level the heaters will be switched off but the feature will remain on.

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

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

3.10 AC Current Limiter Operation

The EC600 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, 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. A warning that the limit has been reached is displayed on the control panel.

Setting the value to OFF will disable this feature.

The Swift Command App can be used to adjust this feature.

3.11 Lighting & Dimming Operation

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

The awning light 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.

3.12 Heating Controls

There are a number of heating systems that can be controlled by the EC600. The system will be preconfigured by the manufacturer or supplying dealer. The following menu items are only available in Timer control mode, and 3 examples are shown for the different heating system variants.

Scroll to the Heating Settings and press select to set or adjust the following items:

ALDE 3020		
Menu Item	Description	
Control	Set to MANUAL to use the controls supplied by the heating appliance manufacturer Set to TIMER to control the appliance by the control panel with the settings below Set to APP control the appliance by the Swift Command app	
The following menu items are only available when in Timer control mode		
Electric	Set the electric element to OFF, 1KW, 2KW or 3KW	
Gas	Set gas heating ON or OFF	
Timer 1	Set the timer 1 event time This setting adjusts in 15 minute increments and uses the 24 hour clock	Example 07:30
T1 Heating	Set the timer 1 heating temperature This setting can be off, or 5 through to 30 degrees C	Example 22 deg C
T1 H/Water	Set the timer 1 hot water temperature This setting can be OFF, NORML or BOOST	Example Boost
The menu now repeats for timer 2 through to timer 4		

Exit settings?	When timer 4 is completed the exit settings item is reached. Press the select button to exit and save the settings.

The timer example above will set the heating to 22 degrees C and the hot water to boost at 7:30 in the morning.

TRUMA Combi CP+		
Menu Item	Description	
Control	Set to MANUAL to use the controls supplied by the heating appliance manufacturer Set to TIMER to control the appliance by the control panel with the settings below Set to APP control the appliance by the Swift Command app	
The following menu items are only available when in Timer control mode		
Energy	Set the energy selection to GAS, MIX1, MIX2, EL1 or EL2. See the heater user manual for a description of these settings.	
Timer 1	Set the timer 1 event time This setting adjusts in 15 minute increments and uses the 24 hour clock	Example 07:30
T1 Heating	Set the timer 1 heating temperature This setting can be off, or 5 through to 30 degrees C	Example 22 deg C
T1 H/Water	Set the timer 1 hot water temperature This setting can be OFF, ECO or HOT	Example Eco
The menu now repeats for timer 2 through to timer 4		
Exit settings?	When timer 4 is completed the exit settings item is reached. Press the select button to exit and save the settings.	

The timer example above will set the heating to 22 degrees C and the hot water to eco at 7:30 in the morning.

WHALE		
Menu Item	Description	
Control	Set to MANUAL to use the controls supplied by the heating appliance manufacturer Set to TIMER to control the appliance by the control panel with the settings below Set to APP control the appliance by the Swift Command app	
The following menu items are only available when in Timer control mode		
WH Energy	Set the energy setting to OFF, GAS, EL1, EL2, MIX1 or MIX2. See the water heater user manual for a description of these settings.	
AH Energy	Set the energy setting to OFF, FAN, GAS, EL1, EL2 or EL3. See the air heater user manual for a description of these settings.	
Timer 1	Set the timer 1 event time This setting adjusts in 15 minute increments and uses the 24 hour clock	Example 07:30
T1 Heating	Set the timer 1 heating temperature This setting can be off, or 5 through to 30 degrees C	Example 22 deg C
T1 H/Water	Set the timer 1 hot water temperature	Example On

	This setting can be OFF or ON	
The menu now repeats for timer 2 through to timer 4		
Exit settings?	When timer 4 is completed the exit settings item is reached. Press the select button to exit and save the settings.	

The timer example above will set the heating to 22 degrees C and the hot water on at 7:30 in the morning.

3.13 Refrigerator Controls

The main refrigerator settings can be set / controlled by the EC620 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.

At the EC620 control panel scroll to the Fridge Settings and press select to set or adjust the following items:

Dometic Refrigerators / Fridge Freezers	
Menu Item	Description
Mode	Set the required operating mode. Available options are; OFF AUTO GAS 12V DC 230VAC The default setting when the system is first turned on is OFF.
Setting	Set the required cooling setting. Available options are; 1 (minimum) 2 3 (middle) 4 5 (maximum) The default setting when the system is first turned on is 1.
Status	The status display shows the temperature state of the fridge, with the Optimal position being the ideal. If the fridge is too warm increase the setting to reduce the temperature. If the fridge is too cold reduce the setting accordingly. Note that the fridge will take time to react so please allow sufficient time for the status to change after changing a setting. The possible statuses are; Too Cold {suggest reducing the setting} Cold (--) {suggest reducing the setting} Cold (-) Optimal Warm (+) Warm (++) {suggest increasing the setting} Too Warm {suggest increasing the setting}

When viewing the Fridge Settings menu item the large digit on the screen shows the current cooling setting (1 to 5).

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

3.14 Air-conditioning

If your vehicle has been fitted with a compatible air-conditioning unit then the settings can be set / controlled by the EC620 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.

At the EC620 control panel scroll to the Aircon Settings and press select to set or adjust the related settings.

Dometic Freshjet 2200 Air-conditioner	
Menu Item	Description
Mode	Set the required operating mode. Available options are; OFF AUTO DRY COOL FAN IFEEL HEAT The default setting when the system is first turned on is OFF.
Lights	Set the required lighting mode. Available options are; OFF ON DIMMED Select the dimmed setting to allow the lights to be controlled with the vehicle dimmable lighting.
Fan Speed	Some operating modes allow manual control of the fan speed. Available options are; In COOL or HEAT modes the fan can be set to LOW, MEDium, HIGH, MAXimum or AUTOmatic. In FAN only mode the fan can bet set to LOW, MEDium, HIGH or MAXimum. In AUTO, DRY or IFEEL modes the fan speed is automatically controlled so cannot be adjusted.
Temp	Set the required target temperature. The available settings are 16 through to 31 degrees Celsius.

For information in using the air-conditioning from the Swift Command app, please see the Swift Command User Guide.

3.15 Other Controls

The main control panel can display the software version number of both the Control Panel and the PSU. On the EC620 scroll to the 'Sargent EC620' menu item and press the select button to display software information.

3.16 Electric Step Operation

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

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

3.17 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.

3.18 Temperature Readings

The EC600 Temperature sensor measures the 'core' temperature of the vehicle, and provides a figure for information only. The same sensor also measures humidity, providing a figure (also for information only) from within that bed box or storage area.

It is hoped that the temperature information is a particularly useful figure, for instance when checking on the vehicle 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 storage area temperature below the bed.

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.

Heat from other items in the vehicle (in particular components from the heating system itself) will have a bearing on the reading displayed by the Swift Command system. Ventilation is also present in the majority of bed / storage areas, and air entering or passing through this area will also have an effect on the temperatures and humidity levels displayed.

3.19 Bluetooth Pairing

Using the control panel, access the System Settings menu and then scroll to the Bluetooth pairing section. Press the select button to start pairing, the power button LED will flash to indicate the pairing mode. You can now pair your device to the system following the devices instructions to add a Bluetooth item. Pairing remains on for 1 minute and is then turned off automatically.

Note: 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.

3.20 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 triangle will be displayed in the control panel header area.

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 30 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 30 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 30 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 30 second audible beep. If no action taken after 30 seconds then the system will switch the power off to prevent severe discharge of the battery
	Note: This is an emergency cut off level to protect the battery from severe	

	damage. You should not rely on this cut off level during normal operation, but manage your power consumption to a discharge level of 11.5V or above. This cut off only applies to power drawn from the battery by the leisure equipment that is controlled by the control panel power switch; it will not protect the battery from discharge by permanently connected equipment.	
Leisure battery voltage high	With control panel power on or off and leisure battery is selected (as active battery) and the voltage level rises above 15V	Message on screen and repeated beeps from the control panel. The power is automatically turned off. The beeping will not stop until the fault is cleared.
Vehicle battery warnings	If the vehicle battery is selected instead of the leisure battery, then similar warnings to those described above are applied to the vehicle battery. The vehicle battery low warning level is 10.9V	
Engine running	When the engine is started the system power will be turned off	Message on screen, Leisure & Vehicle battery symbols indicating both batteries are connected for charging. The charging voltage is also shown on screen.
Step extended	Step extended and engine started	Message on screen and warning buzzer
	Step jammed or obstructed	
Mains lead (hook-up cable) still connected / plugged in	When the engine is started and the mains cable is still plugged in and the charger is switched on	Message on screen and repeated beeps from the control panel. The beeping will not stop until the hook-up lead is removed.
Heating system	When set to control the heating system, the EC620 control panel will show related heating system warnings	Message on screen and 30 second audible beep. Additional descriptive information is available when using the Swift Command App.
Refrigerator / Fridge Freezer	When set to control the refrigerator, the EC620 control panel will show related warnings	Message on screen and 30 second audible beep. Additional descriptive information is available when using the Swift Command App.

3.21 Common Fault Table

Fault	Possible Cause	Proposed Fix
No 230 volt output from PSU	Connecting lead between the site and Leisure Vehicle not connected	Check and connect lead as per 2.3C
	RCD switched off	Reset RCD as per 2.3D
	RCD not operating correctly	Check supply polarity; if the RCD continues to fail contact your Dealer as there is probably an equipment or wiring fault.
	MCB switched off	Reset MCB by switching OFF (down position) then back ON (up position), if the MCB continues to fail contact your Dealer as there is probably an equipment or wiring fault.
	No or deficient supply from site	Contact site Warden for assistance.
	Other fault	Contact your Dealer.

Fault	Possible Cause	Proposed Fix
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.
Control Panel Problems	Control Panel has no display	Check batteries and fuses, turn PSU isolate switch and charger switch on and ensure mains supply is connected. Check control panel connecting lead at PSU and behind Control Panel. Contact your Dealer.
	12V Power turns off	Battery protect feature has operated to protect the Vehicle battery and or the Leisure battery. See 3.4C Over voltage protection has been activated, the control panel will display a warning. A number of things can cause this but the most common is the solar panel, it is worth checking the regulator is connected correctly and operating within the correct parameters. Engine has been started, all equipment has been disconnected to meet EMC requirements. See 2.6
	Control Panel locked / erratic function	Observe control panel handling instructions. Control panel software may have crashed. Reboot control panel by turning off the PSU isolate switch. Wait 30 seconds then turn the switch back on. Check with your dealer that your system has the latest software installed, as an update may be available.
No 12 volt output from PSU	No 230V supply	Check all above.
	Charger not switched on	Turn charger switch on, switch will illuminate.
	Battery not connected and / or charged	Install charged battery as per 3.4
	Power button on control panel not switched to on	Turn power on at control panel.
	Battery flat / Battery fuse blown	Recharge battery, check fuses, check charging voltage is present at battery.
	Fuse blown	Check all fuses are intact and the correct value fuse is installed as per fuse table.
	Equipment switched off / unplugged	Check equipment is switched on and connected to the 12V supply.
	Other fault	Contact your Dealer.
Pump not working	Fuse blown	Replace fuse with correct value as per fuse table.
	Pump turned off	Turn pump on by pressing the pump button at the control panel.
	Setting incorrect	Both the internal and external pump feeds are controlled from the control panel. To alter the setting of the pump switch see section 3.8 Ensure the setting matches your desired requirement.
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	Bluetooth not paired	Using System Settings menu, select Bluetooth Pair option.

Fault	Possible Cause	Proposed Fix
not working	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.

3.22 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, EC651, EC620, EC630 & PX300 Control Equipment

Outline Specification		
INPUT 230V	230 Volts / 0 to 16 Amps	+ / - 10%
OUTPUT 230V	RCD protected, 2 x MCB outputs of 10A & 1 x MCB output of 16A Separate switched channels for heating system and charger	
INPUT 12V	2 x 20A battery inputs via 2 x 4 way connectors	
SOLAR INPUT	1 X Dedicated solar panel input capable of supporting 10A of solar power input (typically 180 to 200W) via a 2 way connector	Check the solar panel rating plate to ensure the maximum current is <= 10A
OUTPUT 12V	25A total output via multiple switched channels protected by 13 fused outputs	
Integrated CHARGER	Input 220-240 Volts AC +/- 10%, Frequency 50 Hz +/- 6%, Current 3A max. DC Output 13.6 to 14.4 Volts nominal, Current 25 Amps max (300 Watts).	
Signal INPUT	4 x Fresh water level, 4 x Waste water level, 1 x Engine running, plus multiple vehicle connections, sensor inputs for temperature & humidity	Fresh water negative sensed Waste water negative sensed
Data IN / OUT	CANBUS Data communication and power to Control Panel via 6 way connector CI-Bus Data communication to CI-Bus enabled devices via RJ11/12 connector	
IP rating	IP31	
Operating temperature	Ambient 0 to 35° Celsius Charger case temperature with full load 65° C Max	Automatic shutdown and restart if overheated / overloaded
Dimensions		
EC601 & EC651 PSU	Overall size (HxWxD) 180 x 305 x 135mm Clearances 75mm above, 50mm left & right	Weight 3.8 Kg
EC620 Control Panel	Overall size (HxWxD) 93 x 180 x 32mm Cut-out size (HxW) 82 x 165mm	Fixing centres 166mm X 26MM Weight 150 g
EC630 Comms Module	Overall size (HxWxD) 55 x 116 x 85mm	Weight 550g
EC640 Sensor	Overall size (HxWxD) 60 x 27 x 14mm	Weight 80g

5.2 Approvals

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

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

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

Electro Magnetic Compatibility (EMC) directive 2004/108/EC Certificate CE20071224-1

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

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

5.3 Declaration of Conformity

Equipment: Leisure Power Control System *Model name:* EC601, EC602, EC651, EC620, EC630 & PX300

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

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

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