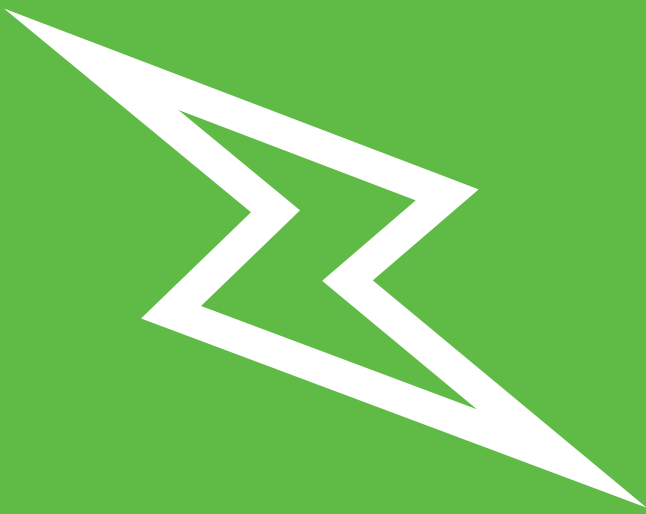

ELECTRICAL SYSTEM & EQUIPMENT



GenFree welfare cabins are fitted with a SOLARFlow™ electrical system which harvests energy from solar panels to charge lithium ion batteries. All electrical items run from solar/battery power alone.

5

5 USING THE ELECTRICAL SYSTEM

Your cabin is fitted with a highly energy-efficient SOLARFlow™ electrical system. Energy generated by the unit's solar panels is stored in the 5.12kVA lithium ion batteries and used to power all the electrical items in the cabin. These include PIR-sensor 24V lighting inside and out; low-power 3-pin plug sockets for computers etc.; kettle; microwave; optional fridge; instant hot water units; low-power hot air hand dryers; USB charging points; and the UV water sterilisation system.

SOLARFlow™

In Section 5, we explain how to use all the various electrical items and appliances in your cabin.

SOLARTrack WALL DISPLAY AND WARNING SYSTEM



In all GenFree and Deep Green cabins there is a display screen on the wall of the Canteen which links to the remote online SOLARTrack™ monitoring system. This display screen gives information about your cabin. Screens may appear differently depending on how/when they were configured but information will always include battery level, amount of solar power currently being generated, amount of power currently being consumed, plus water, fuel and waste tank levels.



In many GenFree and Deep Green cabins, there is also a warning system connected to this screen. If this is activated, the most common reasons why the cabin is not functioning correctly - E-Stop pressed; low fuel; rams activated etc. - will be flagged as Warnings on the main Display Screen. The Warning will flash up in red with instructions of what to do next. If any problems occur with your cabin, please check this screen first to see if there is any Warning flagged. If no Warning is flagged and the problem persists, please consult Section 9 of this manual - Diagnostics.

5.1 E-STOP ISOLATOR SWITCH



For the electrics in the GenFree cabin to work, the E-STOP must be in the open ON position. If the E-STOP is pressed in, then twist clockwise to release.



CAUTION

Before towing, the E-STOP must be in the OFF position to completely isolate all electrics and make sure the external PIR-sensor lights do not activate while on the road causing a hazard to other drivers.



NOTE

If the E-stop is pressed the whole cabin is isolated but the cabin telemetry, the solar chargers and external powered charger will still operate. The E-stop is only to be pressed in an Emergency, for transporting the unit and when the unit is in storage.

5.2 PIR-SENSOR CONTROLLED ELECTRICS



To save energy and increase the efficiency of this solar-powered unit, the electrics are controlled by motion-sensor and when no movement is detected in the cabin, all electrics and heaters will switch themselves off after 10 minutes.

The exceptions are the remote monitoring SOLARTrack system which constantly feeds data from the cabin to the online portal, and the Drying Room heater which will remain on for 4 hours unless switched off manually.

5.3 USING THE ELECTRICAL EQUIPMENT

Your GenFree welfare cabin is equipped with various items of electrical equipment. Here we explain how to use each one in conjunction with the SOLARFlow™ electrical system.



NOTE

ELECTRICAL PRIORITY SYSTEM

In order to make sure this generator-free cabin can power all items via the inverter, the 230V appliances are run with the following hierarchy:

1. INSTANT HOT WASH – TOILET – FEMALE
2. INSTANT HOT WASH – TOILET – MALE
3. INSTANT HOT WASH – CANTEEN
4. KETTLE/MICROWAVE

When a higher-priority appliance is operating, lower priority items are not available. As soon as higher priority item is turned off, lower priority items start to function again.

5.3.1 24V LED LIGHTING



The cabin is fitted as standard with 24V LED ceiling lights which run off battery power.

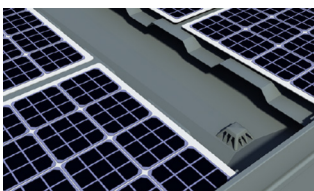
All 24V LED ceiling lights in the Canteen, Office, Toilets and Drying areas are operated via PIR sensor so there is no need to switch on, they will come on automatically as someone enters the room and switch off again after they leave. If you are sitting still and the lights go out, simply make a movement and the sensor will detect it and the lights will come back on again. If lights aren't working, check the E-STOP is not press in.



There are also exterior PIR-sensor activated 24V LED lights above the Canteen, Office and Toilet doors to improve visibility in low light conditions on site and help avoid trip hazards which come on when someone steps near the cabin. As well as a PIR-sensor, these lights incorporate a daylight-sensor so will only operate in dark or low-light conditions.

In order that these lights do not come on while transporting the cabin and cause a road hazard, it is essential to press in the E-STOP button to the OFF position before the cabin is moved.

5.3.2 WATER STERILISATION SYSTEM



In order to protect the planet's water resources, this cabin incorporates a patented rain water harvesting and grey water recycling system, Waste Management Pro™. Rain water is harvested from the roof, sieved for debris and fine particles before being sterilised.



NOTE

For more information on the water sterilisation system, see section 7.2.



LED UV sterilisation. Your cabin is fitted with an LED UV sterilisation unit. This functions completely automatically and you do not need to turn on an isolator.



Micron sterilisation filter. This sterilises water passing between the fresh water tank and the hot wash units. These filters are located under the desk in the office in the 20ft and 24ft units. In the 12ft and 16ft units, they are located under the sinks in the toilets. The micron filter cartridge should be changed every 12 months. For more details, refer to the manufacturer's instructions.



The rain water drain should be checked regularly for obstructions such as fallen leaves or other debris. Clear any obstructions and dispose of them.



The particle filter found should also be cleaned and the filter replaced regularly by an authorised service engineer. Depending on model, this is located either in the Drying room, the toilet cubicle or under the sink in the toilet.

5.3.3 CANTEEN & TOILETS HOT WATER HAND WASH & LOW POWER HAND DRYER



To operate the instant hot water hand wash unit, the cabin electrics must be ON (E-STOP released). Make sure the water heater isolator is also switched on. This is located on the wall near the unit.

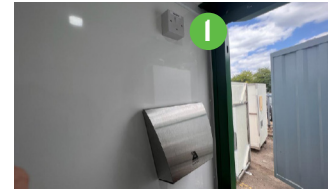


The water for the hand wash sinks comes from the main fresh water tank. After being sterilised it passes to the instant hot wash unit where it is heated on demand. To start the unit, turn the dial to the required temperature. The water is heated instantly and starts to flow. The temperature of the water can be controlled by turning the dial from 1 – Cool to 10 – Hot.

CAUTION: To avoid scalding, always set temperature low to start.



If water does not come out of the taps when pressed, check the water tank level using the gauge in the Canteen. If it is low, fill the water tank (see Section 6.2).



Toilet cubicles are fitted with low-power hands-free electric hand dryers for hygiene and convenience. To operate the hand dryer, simply place your hands beneath the air outlet and hot air will flow. The hand dryer isolator [1] must be in the ON position for the hand dryer to function.

5.3.4 KITCHEN APPLIANCES



The unit's food preparation area is supplied as standard with a 1500W kettle to make hot drinks and a 700W microwave for hot food preparation. To use these, main cabin electrics must be ON (E-Stop released). These items all have individual wired isolators - make sure these are also in the ON position.



For reasons of energy efficiency in this unit, the kettle and microwave are operated individually. Before using either one, make sure power is directed correctly using the selector switch [1].

5.3.5 USB CHARGING POINTS



24V USB charging points are provided in the Canteen and Office (if applicable) to enable mobile phones, tablets and notebooks to be charged from the cabin's batteries. The E-STOP must be in the ON position to use.

In the Canteen and the Office, these USB sockets are found in the plug sockets.

5.3.6 LOW POWER 500W 230V 3-PIN PLUG SOCKETS



The welfare cabin is fitted with low power 500W 3-pin plug sockets in the Canteen and Office (if applicable). These can power 230V devices that do not have a large power consumption, such as laptops, printers and IT equipment only.

These sockets are not designed to be used for heaters, site plant or other high power electrical items. Maximum 500W.

In the Canteen, double 3-pin sockets (if available) are located in the wall below the bench seating. If the unit has an Office, there are double sockets in the wall near the desk.

5.4 USING THE HEATER

This welfare cabin is fitted with a low-consumption air-blown heater that runs on HVO biofuel using 0.25 litres per hour to function. This provides heat for the Canteen, Office (if applicable) and Drying area (if applicable). Fuel for the heater is fed automatically from the main cabin fuel tank. The heater will run on HVO biofuel or white diesel. Please follow these instructions on how to operate.



The controls to operate the Heater are located in the Canteen in the wall below the bench seat. If the unit has an Office, another heater switch is located in there. Press the switch until the green light shows and the heater will run for a set time or until the cabin is vacated. To restart, press the switch again. NOTE: The E-STOP switch must be ON for the heater to function.



To operate the heater in the Drying Room (if applicable), press the dedicated Drying Room heater switch. The Drying Room heater will now operate for 4 hours or until switched off manually. Make sure the Heat Direction Knob (see right) is pulled OUT to divert heat to the Drying Room. Unless turned OFF manually, this will run for four hours then switch off automatically. To restart, turn on again.



In units with a Drying Room, the warm air from the heating system can be directed either to the Canteen and Office areas or to the Drying Room. To direct heat to Canteen and Office make sure the knob is pushed IN. To send heat to the Drying Room, pull the knob OUT.

CAUTION

There must always be fuel in the fuel tank before starting the heater or it may be damaged. Check fuel regularly. NOTE: To protect heater, cabin electrics will stop working if fuel runs too low. Add fuel and electrics will start operating again.

NOTE

Be aware that the Canteen and Office heaters are controlled by motion sensor and will switch off 10 minutes after the cabin is vacated.

5.5 ELECTRICAL INSTALLATIONS

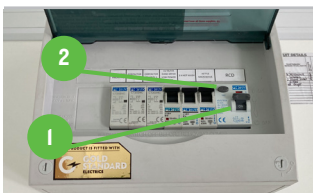
5.5.1 FUSE BOX (230V DC DISTRIBUTION)



The RCD board will be located on the wall in the Canteen or the Office. It will contain a RCD Main switch and Test button, and individual MCBs to protect the electrical circuits for the vehicle.

NOTE

The RCD board function should always be checked when a unit is delivered to site. It should also be checked periodically every six months even if the cabin has not been moved.



TEST PROCEDURE - To test the Main RCD open the cover and ensure the RCD paddle [1] is in the "ON" position. Press the TEST button [2], the paddle will move to the down "OFF" position and power will be cut to all circuits. If this does not happen the RCD is faulty and the electrical system should not be used until rectified by qualified personnel. To reset the RCD or any MCB push the paddles to the "ON" position.

5.5.2 LITHIUM ION BATTERIES



Your cabin is fitted with high-performance 200Ah 5.12kVA lithium ion batteries located beneath the bench seating in the Canteen. The batteries supply electricity for the 24V and 230V electrical items.

The battery compartment is locked to make sure unauthorised staff do not touch the batteries.

5.5.3 SOLAR PANELS AND INVERTOR



On the roof and sides of the cabin, there are banks of flexible solar panels which generate energy to charge the battery. This is done by means of Solar Panel Chargers. The isolator switches for the Solar Panel Chargers are located beneath the bench seating in the Canteen area.

These should be in the ON position at all times. If OFF, the solar panels cannot charge the battery.



To ensure optimum solar energy capture, make sure the unit is positioned with its tow hitch facing south with as much full direct sunlight as possible. Do not position in dark or shaded areas such as under trees, inside buildings, under bridges etc.

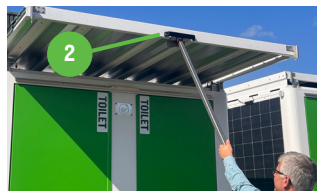


In order to ensure that the solar panels are generating as much energy as they can, it is essential to regularly clean the solar panels using a soft damp cloth or brush to remove any debris or film of dust or dirt. Do not use hard brushes or cleaning products. If solar panels are covered with a film of dirt, they will not be able to generate energy.



While cleaning the roof solar panels, especially if using water, always close the rain water valve so dirty cleaning water does not enter the fresh water tank. Locate the red valve in Drying Room or Toilet. Turn it to the correct position so water from the roof is prevented from entering the tank and instead flows through the downpipe away to the ground beneath the cabin. When finished, remember to turn the valve back to allow rain water to again enter the tank.

5.5.4 HOW TO EXTEND SOLAR PANELS ON ROOF



After the cabin is lowered to the ground, the extendable solar array may be deployed. To extend it, release the two spring bolts [1] on either side of the roof panel, then use the centre handle [2] to pull out. Make sure tray is pulled out to its full extent. CAUTION: Before towing, the solar tray must always be pushed back into the closed position and secured with the two spring bolts.

5.6 BATTERY CHARGE PROTECTION SYSTEM

As this GenFree cabin does not have a generator available to recharge the battery when there is no sunlight available to do so, the battery charge level is protected by an automated programmed system. This system isolates various electrical items automatically in priority order as the battery charge drops in order to ensure the battery level never drops to a critical point. When battery level drops to:

60% Power sockets with USB turn off if battery State of Charge (SOC) is at or below 60%. Generally these work only when there is someone in the canteen.

40% Kettle and Microwave turn off if battery State of Charge (SOC) is at or below 40%. Normally these work only when there is someone in the canteen.

30% Instant Hot Washes and Hand Dryers turn off if battery SOC is at or below 30%. Normally these work only when there is someone in the Canteen/Toilet.

Hydraulic power pack will not function - if activation button is pressed and battery SOC is below 30% then the power pack will not run. If the button is pressed and during the 5 minute activation time the battery SOC drops below 30% the power pack will still run unless the battery SOC drops below 15%. When the hydraulics are activated, all other electrics in the cabin are isolated.

20% Heater turns off when battery SOC is at or below 20%. Normally this is controlled by PIR-sensor.

External LED lights turn off if it is at or below 20%. These are PIR operated and only work if it is dark. Turn off for transport by pressing the E-Stop.

Display Screen turns off if the battery SOC is at or below 20%– this shows the status of the electrical system within the cabin and the tank levels.

Fresh water pump turns off if battery SOC is at or below 20%. This will also not operate if water tank is empty or waste water tank level is at or above 95%.

Grey water pump turns off if battery SOC is at or below 20%. This will not operate if freshwater tank is empty or the waste water tank level is at or above 85%.

15% If the battery SOC drops below 15% then the whole cabin is isolated and no appliances, lights or pumps will operate.