Introduction

The Merlin CigsFLEX module is a truly flexible peel and stick PV module manufactured specifically for the leisure vehicle market. Our powerful, lightweight and flexible module is ideal for direct application onto moterhome and caravan roofs.

Packaging
Modules will be shipped to retail customers rolled up in cardboard boxes. Boxes should be kept upright and stacked no more than 2 boxes high. DO NOT use and sharp objects to open the packaging.

Safety

Disclaimer of Liability
This document does not constitute a guarantee, expressed or implied. Merlin Equipment does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with installation, operation, use or maintenance of the PV modules. No responsibility is assumed by Merlin Equipment for any infringement of patents or other rights of third parties that may result from use of PV module. Merlin Equipment reserves the right to make changes to the product, specifications or installation manual without prior notice. All the information described in this manual is the intellectual property of Merlin Equipment.

General Safety
The following guidelines are to be followed to ensure the safe storage, handling and installation of the Merlin modules. Failure to follow these instructions may result in serious bodily injury, damage to the equipment or property. Failure to follow these instructions may invalidate the Merlin Equipment warranty. Electrical and mechanical installation of the Merlin CigsFLEX system should be carried out by a qualified vehicle technician. Merlin Equipment has a network of authorised installers across the UK. For details of the nearest authorised installer please contact sales@merlinequipment.com The installation must comply with the administrative and technical provisions of the respective country in which it is used. National regulations and law must be observed. Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, fuse sizes, and size of controls connected to the PV output. When the modules are connected in series, voltage is cumulative. When the modules are connected in parallel, current is cumulative, this will result in higher currents or voltages being present in a multi module system. The solar module generates electricity and is hazardous when exposed to light even in very low light conditions; always treat the module as live. Avoid contact with any live parts and ensure all live circuits have been isolated before making or breaking any connection. Before installing the modules, we recommend you cover the front of the module to prevent any electricity
being produced.

DO NOT shade part of the module surface from the sunlight for a long time. A shaded cell may become hot and will cause a drop in generated power and could cause failure.

DO NOT artificially concentrate sunlight on the module.

ALWAYS use the correct tools when installing the module including insulated tools and appropriate personal protective equipment (PPE).

TURN OFF charge controllers and circuit breakers immediately, should a problem occur.

Safety

Keep the CigsFLEX modules packed in the carton until installation.

Static may be present in the module, e.g after friction of the modules over the surfaces (electrostatic loading). This can discharge through the edge on the module, to avoid discomfort always handle modules with polymeric gloves (e.g nitrile or nitrole coated knitted gloves)

Do NOT place the modules directly on top of each other.

The front surface of the module is susceptible to scratching, avoid scraping with sharp edges.

Do NOT place or allow hard objects to fall onto the modules.

Do NOT cause the module to flex or twist excessively. A bending radius in excess of 225mm can damage the module.

Mechanical Installation

READ CAREFULLY AND STRICTLY OBSERVE THE ASSEMBLY INSTRUCTIONS BEFORE STARTING WORK.

Do NOT install the modules in wet or wind conditions to avoid risk of personal injury or damage to propery.

When working at height follow all national guidlines. Always use appropriate safety equipment.

The modules are designed to be applied on a subtlety curved structure such as those found on the bulkhead of a moterhome. They are not intended to be abpplied to sharp curves.

Do NOT apply paint, adhesives or solvents to the top surface of the module. Keep all electrical contacts clean and dry.

Do NOT cut, drill, penetrate or modify the modules in anyway. Cutting the modules will result in exposed conductors and will void the warranty and could result in injury.

Merlin CigsFlex panels have a minimum shelf life of one year prior to installation when stored at 24C.

Leave all protective packing on the module until they have been installed on the roof.

Modules should be installed in a location where the wind uplift is at its minimum.

The ambient temperature at the time of installation should be between 4 °C and 40°C.

If the temperature is greater than 40°C, the polymer release liner may be difficult to remove from the adhesive backing and the adhesive may exceed the adhesvie application temperature. If the temperature is lower than 4 °C the module may not adhere to the roof structre.

Before applying the module to the roof, ensure they are stored in a dry and cool location to avoid issues with adhesion to the roof.

Modules should only be applied to a dry, clean roof prepared as per this manual. Do not apply on a wet/damp roof.

Mechanical Installation

Bonding Merlin CIGSflex module to the roof of a moterhome or a caravan.
The bonding and application guidelines listed below are provided as an outline only and apply only to the application of the module onto polymeric moterhome or caravan roofs.

Failure to follow these guidlines when installing the modules on the roof could invalidate the warranty. For full warranty details please consult the warranty documentation.

We recommend that all roofs are cleaned prior to application of the solar panel. The roof should be cleaned using warm water and proprietary cleaners. Please ensure the roof is fully dry before beginning the installation process.

Once the roof surface is dry, use a pencil or a marker pen to mark out the four corners of the panel. To ensure the panel is mounted squarely on the roof, measure the distance from each corner of the panel to the edge of the vehicle roof. We suggest the location such that the module junction boxes are as close as possible to any trunking or service ducting within the vehicle. We would also strongly advise against installing the panel with its leading edge in position A (figure 1) which is the area of maximum aerodynamic uplift/peel force when the vehicle is in motion. Moving the panel backwards from this point to position B is strongly advised. Ensure any curved surface the module is fitted to has a radius greater than 225mm (Please note the maximum diameter of a rolled module must be greater than 450mm).

Figure 1

Mechanical Installation

Preparing the Roof
WARNING: Ensure that when preparing the roof you do so in a well-ventilated area away from naked flame and always use the safety gloves provided.

Before applying the activator to the desired location on the roof, we advise that firstly you test a small area of the roof to ensure that the activator has no adverse impact on the roof structure. Once you are satisfied that there has been no adverse impact, clean the area where the module is going to be located using the activator. Ensure you extend the clean area to 10cm beyond the perimeter of the module (figure 2).

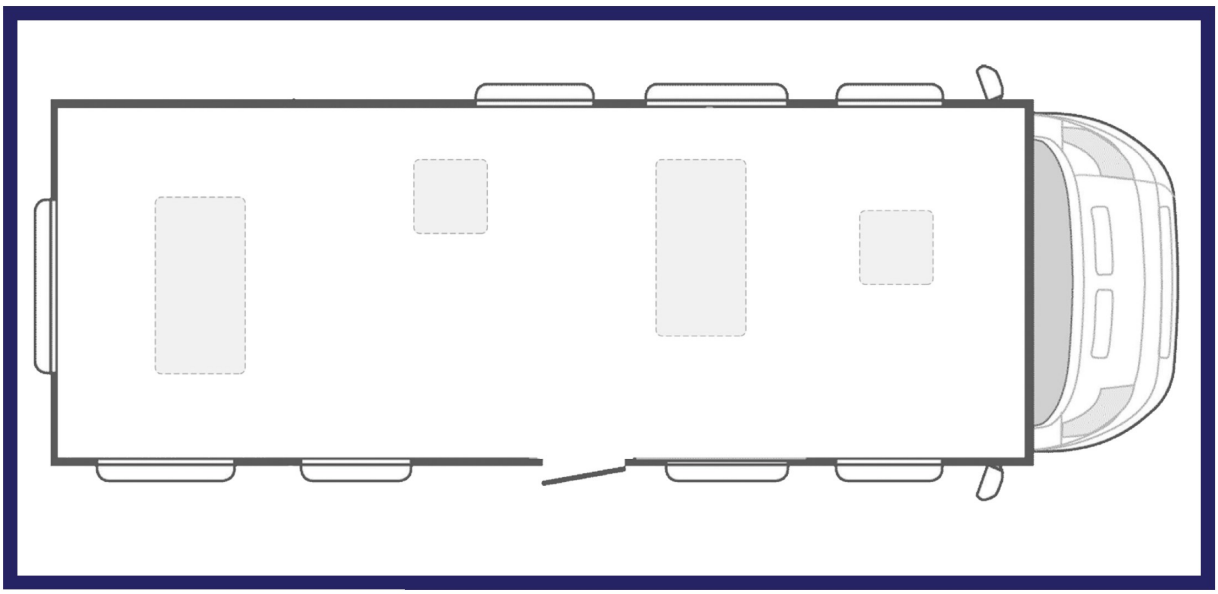

Figure 2

After cleaning the roof and applying the activator, lay the panel in position ensuring the release liner is still in place and secure it to the roof using tape leaving one end of the panel free for at least the end half of the module (figures 3 & 4). Only when you are fully satisfied with the position of the module proceed to the next stage.
IMPORTANT NOTE: Extreme care should be taken before beginning to lay the module. Once you begin the laying of the module you are committed to its positioning which cannot be later changed.

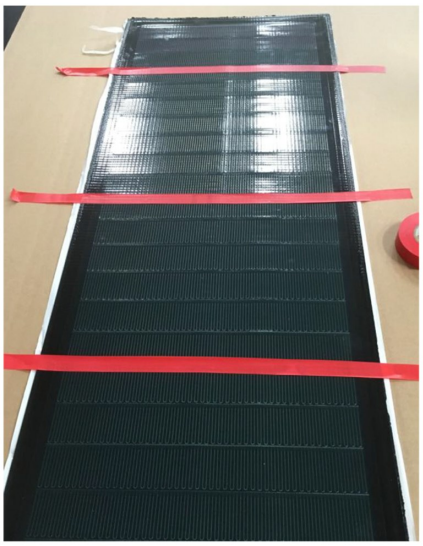

Figure 3

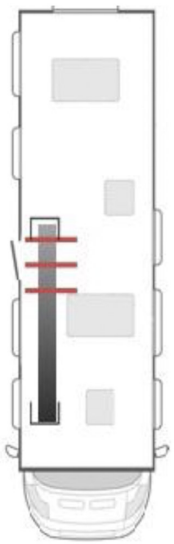

Figure 4

Mechanical Installation

Laying the panel

Bend back the connector end of the module and carefully peel back a single section of 300mm of the white backing and fold it back over the still protected area (figure 5). Carefully lay down this exposed section of the black adhesive adhering it to the roof, ensure the module alignment does not change. Press down firmly using a dry cloth to ensure that the adhesive backing makes full and even contact with the vehicle roof. (figure 6)

Figure 5

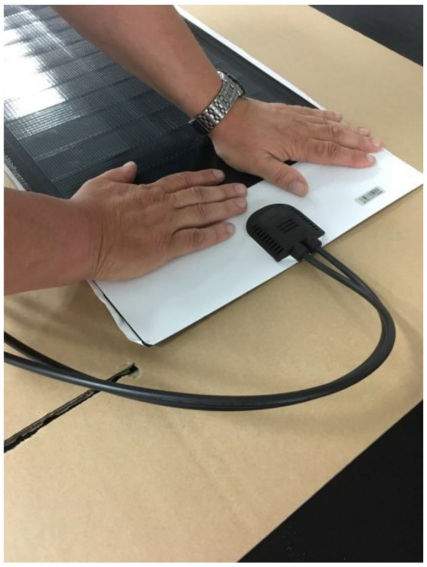

Figure 6

Now the module is secure by one end remove the tape and lift the other end of the module and roll back ensuring you do not crease the module. Find the folded back section of the release liner (figure 7) and carefully pull back the release liner laying down the module as you proceed. Press down using a dry cloth as you go working towards the free end of the module (figure 8). When the module has been applied to the roof, use a clean and dry soft cloth to work along the entire panel to ensure all parts ofthe panel are in full contact with the roof surface.

Figure 7

Figure 8

Electrical Installation

Installing the Cabling
Prior to finally connecting the module, ensure all connectors and cabling is in good working order. Ensure the connector plugs properly secured and no cuts to the cable insulation. Do not install the module if any components or parts supplied by Merlin are not in good working condition.

IMPORTANT NOTE: Do not connect the leads to the solar module. This must be done later in the installation process.

You will need to install the cabling which will connect the module to the solar charge controller. Once you've decided on the location of the cable entry point, you will need to drill through the vehicle roof. Merlin recommend that this is done from within the vehicle and where possible by utilising the cable service/trunking to avoid miss drilling (See figure 4). These service points are usually be found in the overhead lockers in most caravans and motorhomes. A 10mm clearance hole will be required to accommodate the two connection leads.

IMPORTANT NOTE: If in doubt about the positioning of the holes or the suitability of the roof for drilling check with the vehicle supplier.

The connection leads are provided in two colours. The RED lead has a female connector; this will connect to the male + (positive) plug of the module.

Each module has two junction boxes marked (+) for positive and (-) for negative. Connect the RED lead to the positive (+) terminal and the black lead to the (-) terminal.

Feed the cable tails through the two glands fitted in the supplied roof entry cowl non-plugged end first.

DO NOT tighten the glands on the cable until the installation is complete. Ensure you leave 'free play' in the cable to connect to the module and thread the tails through the 10mm hole you have previously drilled.

Position the Entry Gland Cowl
Once you've fed a sufficient length of the connection cables through the roof you now need to apply a generous bead of the sealant into the hole and cables.

Apply a bead of sealant to the bottom of the entry gland cowl.

Position the roof entry gland cowl in the desired location and then gently slide the connection cables through the glands. Ensure the remaining portion of free cable is sufficient to reach the module plugs.

Once you are satisfied that all is in the correct order, place the roof entry cowl over the tail lead entry point.

It is important to ensure that the roof entry gland maintains good contact with the roof surface. Firmly press the roof entry box down and fasten in position using masking tape and/or weight if necessary.

Once all the above steps are complete, whilst holding the entry gland cowl, securely, tighten the entry glands (do not over tighten) on the entry cowl and remove all tape and 'holding down' implements.

Electrical installation

Wiring diagram for single module:

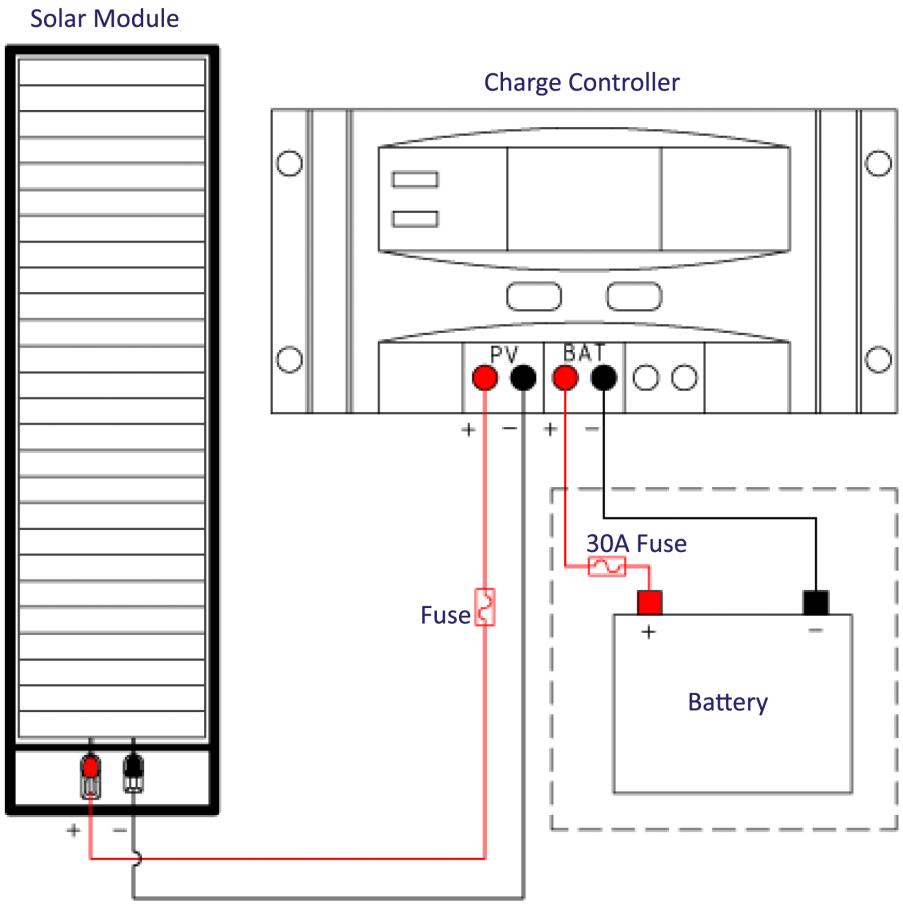

Figure 9

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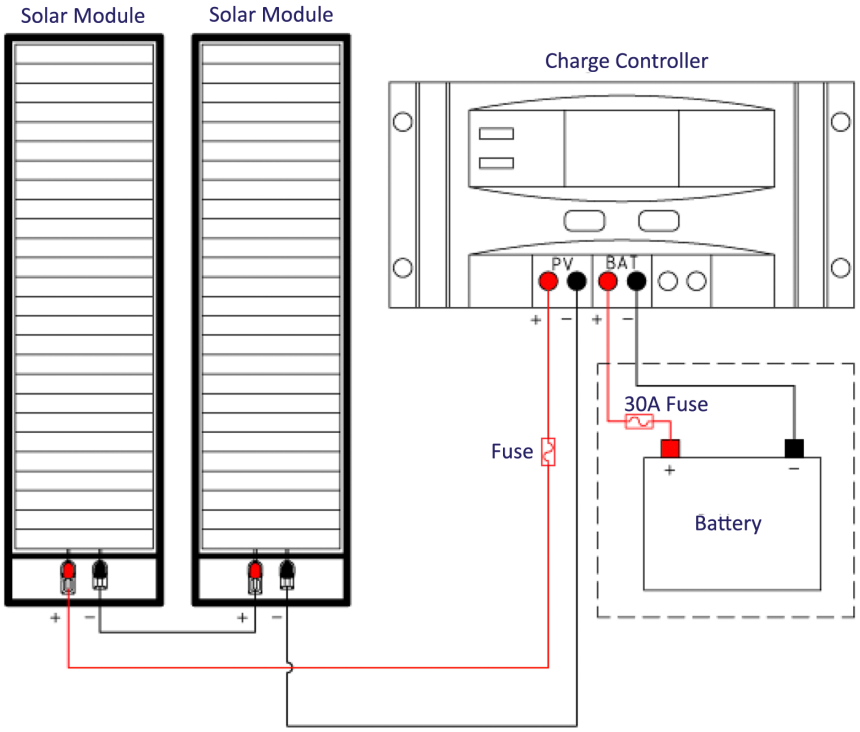
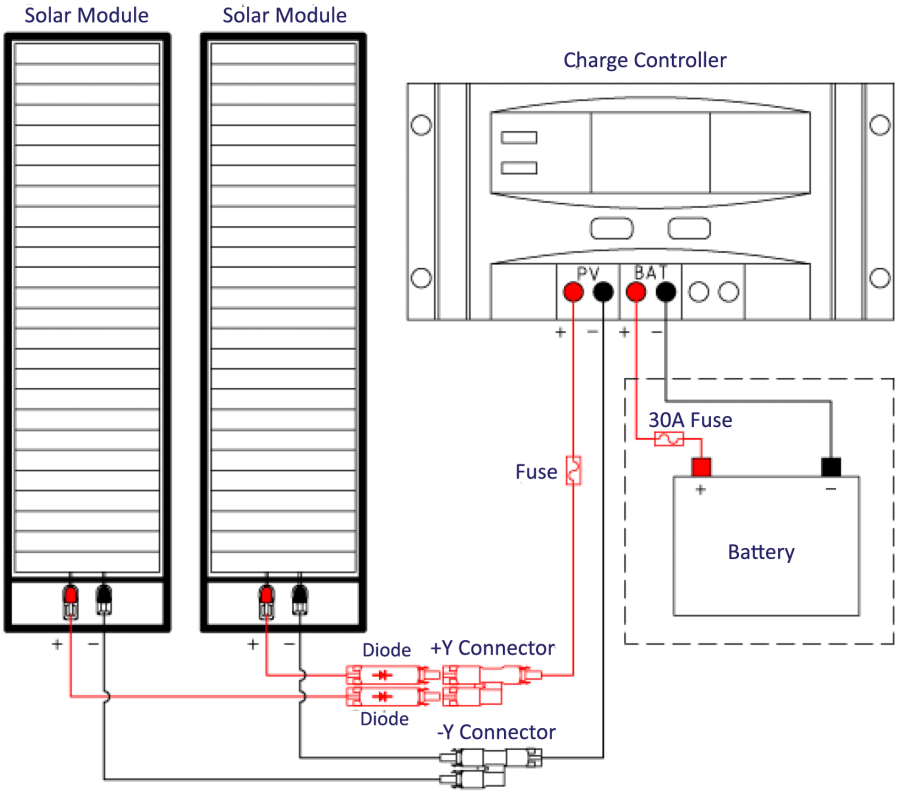
Electrical installation

Installation wiring diagram for double module series connection system.



Installation wiring diagram for double module parallel connection system.



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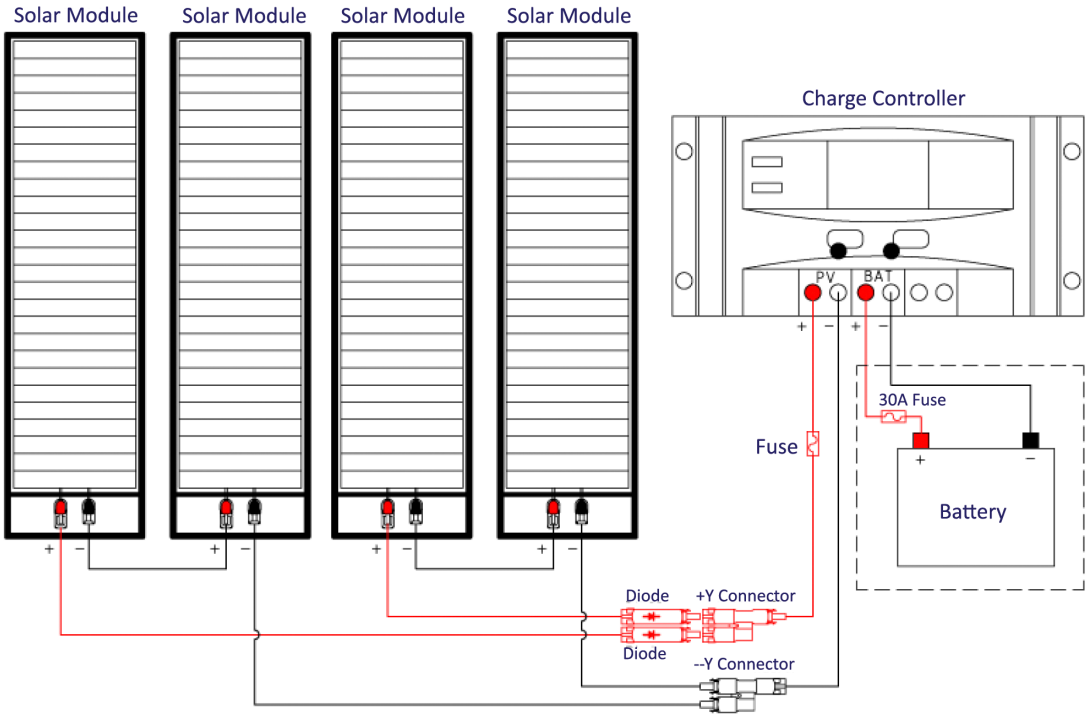
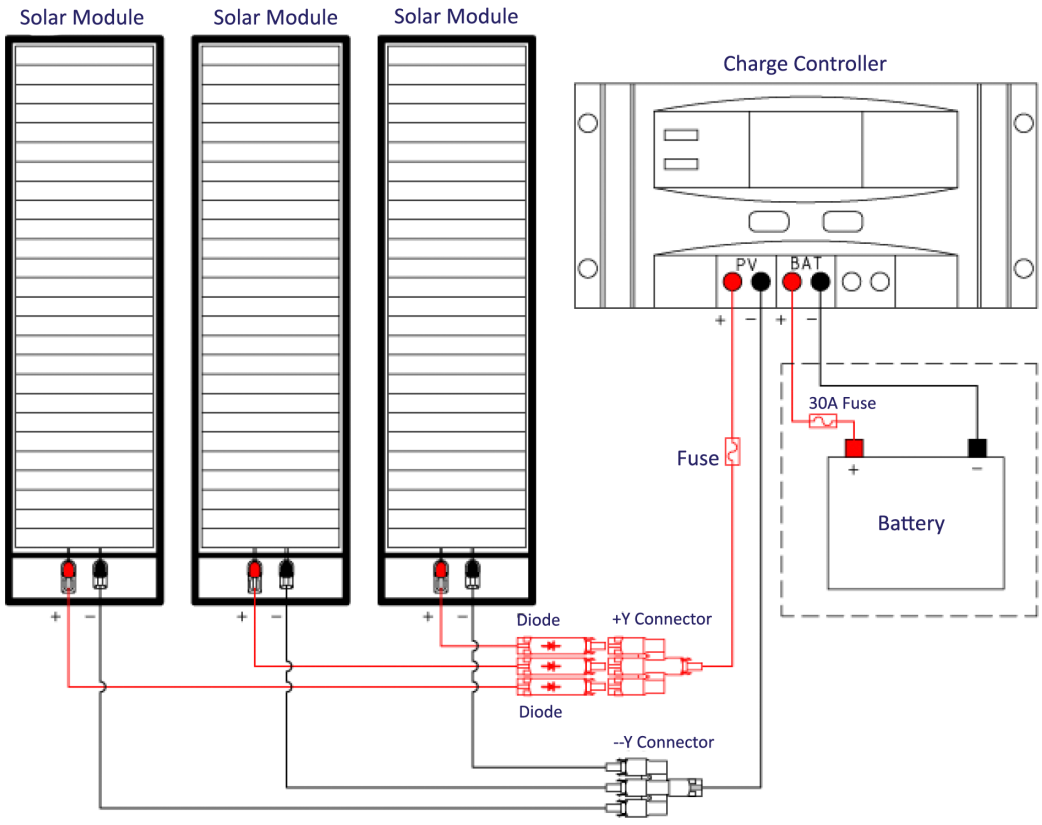
Electrical installation

Installation wiring diagram for four module series-parallel connection systems.



Installation wiring diagram for four module series-parallel connection systems.



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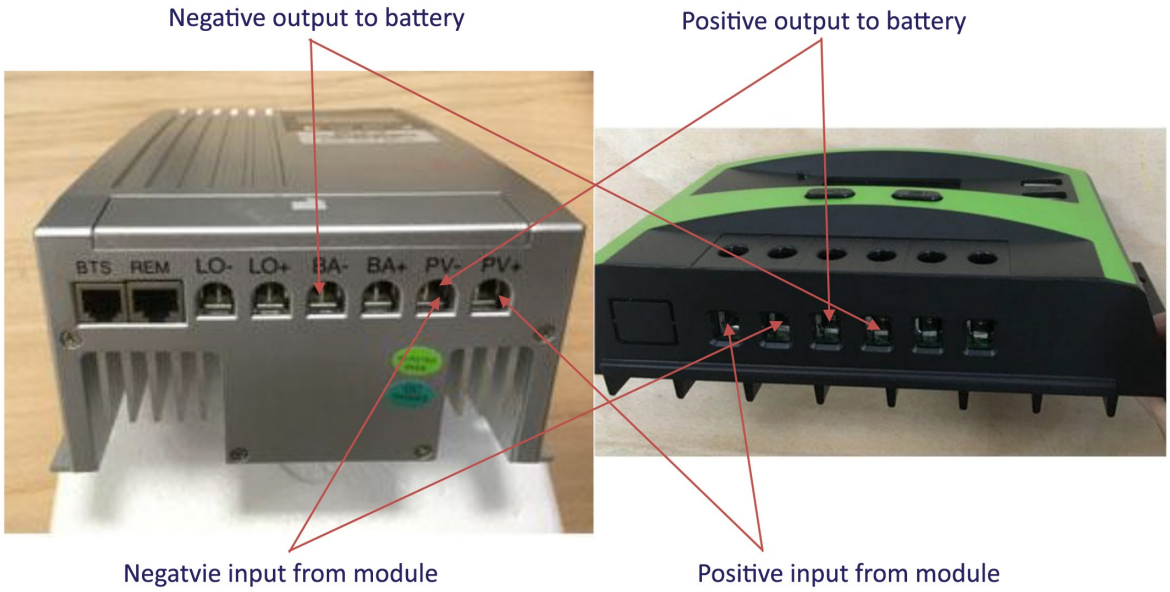
Electrical installation

Installing the Charge Controller
Choose a suitable position in the vehicle to mount the charge controller. This should be away from combustible, materials with suitable air flow to allow cooling.

When a suitable position for the charge controller has been identified mount the controller to the vehicle securely using suitable fixing.

Route the cables from the roof of the vehicle to the location of the charge controller . an in-line fuse should be connected to the positive (red) connection cable see figure 9. Connect the cables to the correct input terminals (red+ ve, black - ve) ensuring that all securing screws are tight.



Connecting to the Battery
The Merlin CigsFLEX must be connected to the leisure battery system only and must never be connected to the main vehicle battery.

The connection to the vehicle leisure battery is outside the scope of these instructions. Connection should be carried out by a qualified vehicle technician.

When connecting the charge controller to the vehicle ensure you use the correct polarity. The connection leads should be of sufficient cross section to carry the charging current (Note: longer cables will require a larger cross section). If the connection is directly to the leisure battery the connection cable should be protected by a suitability rated fuse positioned as close to the battery as possible on the positive battery lead.

Connecting the Solar Modules
Now finally on the roof of the vehicle connect the module connectors to the cable leads you have installed into the vehicle. Plug the red connection cable to the positive (+ve) plug on the solar module and the black connection cable to the negative (-ve) plug to energise the system.

WARNING: The system is now energised and hazardous voltages may be present.

Use an appropriate cable management method to ensure all cables and plugs on the roof are fully secure and unable to move or vibrate when the vehicle is in motion.

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Maintenance

Maintenance of Merlin CigsFLEX Solar Modules
Keeping Merlin CIGS panels clean and unsoiled is critical to achieving maximum power output. Whilst rain will clean off dust and soil, we recommend owners inspect and clean the modules regularly, particularly after visiting desert, urban and rural locations.

Obeserve all safety guidelines when when working at height.

Be cautious when on moterhome/caravan roof. Roof surfaces can be extremely slippery when wet.

DO NOT walk on the surface of the module.

Wear protective gloves when cleaning the module.

When cleaning the panel use a clean, damp, soft, non-abrasive micro-fibre cloth or sponge to wipe soil and dust off the module. Wipe with a gentle motion, and do not use excessive force.

Visually inspect the module, wiring and connections for any visible signs of damage.

DO NOT spray high pressue water firectly onto the panel, junction boxes or wiring as it will damage the module and will void the warranty.

DO NOT use solvents or acetone when cleaning the module.

DO NOT use brushes and power cleaners on the module.

DO NOT use brushes and power cleaners on the module.

DO NOT use automatic car / van cleaners (car washes).

DO NOT attempt to repair solar modules or charge controller in the event of failure contact sales@merlinequipment.com.

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