



# PRO-CHARGE

# DC TO DC BATTERY CHARGER

## 25 Amp, 3 Stage Switchmode



### **WARNING: This is a HIGH current device.**

It is the installers responsibility to ensure all cabling meets the requirements as stipulated on page 6 of this installation manual to ensure a SAFE installation, particularly when upgrading with a higher capacity unit. Failure to comply with the supplied installation instructions will void the warranty.

P/No. PDC25



**CAUTION: Surface may become hot during operation.  
Avoid direct contact to prevent burns.**

## **WARNINGS**

- Explosive gases may escape from the battery during charging. Prevent flames and sparks and provide adequate ventilation.
- Before charging, read the instructions.
- Do not attempt to charge non-rechargeable batteries.
- Never charge a frozen battery.
- Corrosive substances may escape from the battery during charging and damage delicate surfaces. Store and charge in a suitable area.
- This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely.
- Young children should be supervised to ensure that they do not play with the appliance.
- Fit fuses as close to the batteries as possible to protect the cable in case of short circuit.

## **FEATURES**

The PDC25 DC-DC charger is purposely designed for charging **12V** auxiliary batteries from 12-24V vehicles. It includes all the features needed to maintain the auxiliary battery to its optimum condition and to prolong the battery life.

### **SWITCHMODE TECHNOLOGY**

The PDC25 converts your vehicle's 12VDC/24VDC alternator power to the required voltage level allowing your batteries to be fully charged, prolonging battery life and reliability. With the latest synchronous switching technology, efficiency of PDC25 exceeds 94% at full load condition.

### **DUAL INPUT OPERATION**

Allows two energy sources to power the PDC25 simultaneously. Solar input takes precedence if solar and alternator inputs are present. When solar input cannot provide enough energy to the load, the PDC25 will draw power from solar and the alternator simultaneously.

### **SOLAR MPPT**

The PDC25 utilises sophisticated MPPT (Maximum Power Point Tracking) solar regulator technology. MPPT maximises the power generated from the solar panels to the auxiliary battery.

### **SUPERIOR 3 STAGE CHARGING**

Using high speed microcontroller and proprietary charging algorithm, the PDC25 delivers a sophisticated 3 stage charging process resulting in a faster and more powerful charge, ideal for deep cycle batteries. The first stage, bulk (constant current), charges the battery faster while the second stage, absorption (constant voltage), ensures the battery is thoroughly charged. The final stage, float, maintains the battery at a safe voltage allowing it to be maintained and ready for use indefinitely.

## **MULTI-CHEMISTRY SUPPORT**

The PDC25 supports Lithium, AGM, WET and CALCIUM batteries. If the calcium battery mode is selected, periodic equalisation will be provided to the calcium battery for removing acid stratification.

## **IGNITION CONNECTION**

The ignition connection activates the lower input voltage operation to suit vehicles with smart (variable voltage) alternators. For vehicles without a smart alternator, no ignition wire sensing is required.

## **VOLTAGE DROP COMPENSATION**

The PDC25 overcomes the problem of voltage drop associated with long cables commonly used with input and auxiliary battery installations. By 'stepping up' the dropped voltage using switch mode technology, the PDC25 delivers a full three stage charge to your auxiliary battery.

## **TEMPERATURE COMPENSATION**

The PDC25 is supplied with a 2 metre temperature sensor. The sensor monitors the battery temperature and adjusts (compensates) the charger's output to prevent overcharging. This is ideal for batteries used in warmer climates or environments.

## **REMOTE CHARGER STATUS INDICATION**

A pink wire is provided for driving an external panel mount LED indicator (Eg Narva P/No. 62090BL) to show the status of the charger. It shows whether the auxiliary battery is on charge (Solid Colour) or the charger is in a fault condition (Flashing).

## **PROTECTIVE FEATURES**

### **Spark-Free Protection**

The PDC25 will not start charging the battery (no output) unless the load is securely connected. It prevents the output leads from sparking due to accidental short circuit making the charger safer to use around batteries.

### **Reverse Connection Protection**

Reverse connection on input and output terminals does not damage PDC25 internal circuit. The PDC25 detects reverse connection condition and indicates whether input or output connection is reversed.

### **Over and Under Voltage Protection**

The charger will automatically shut down if there is an over voltage or under voltage problem.

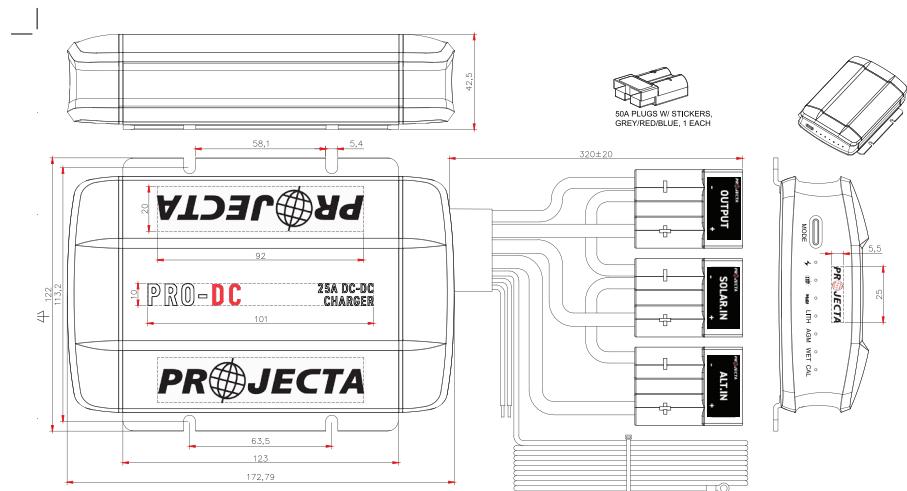
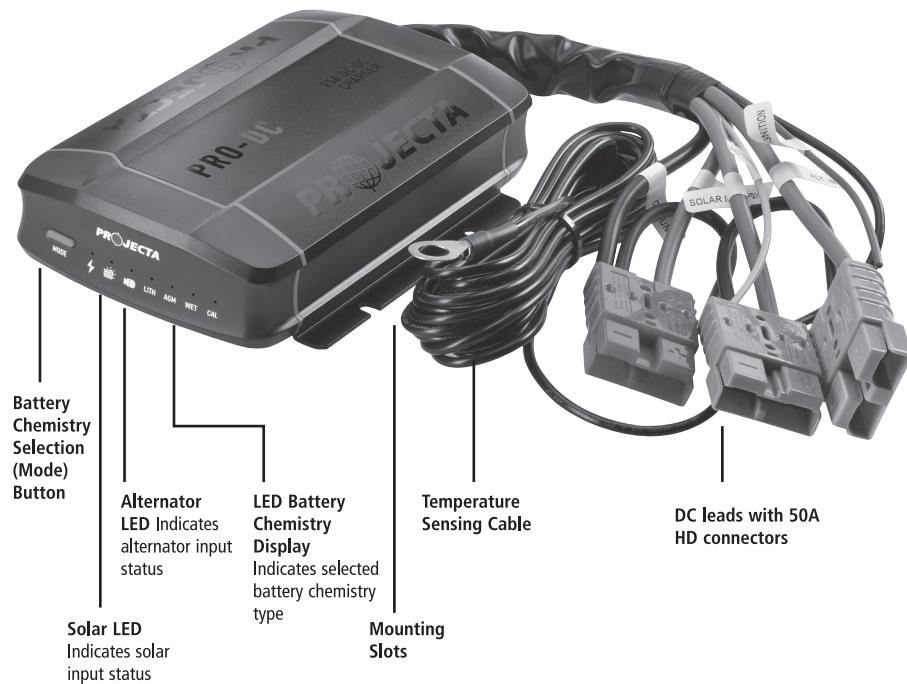
### **Over Temperature Protection**

The charger will lower its output current if the temperature of the unit begins to overheat.

## SPECIFICATIONS

Operating Conditions			
Alternator Input Voltage	11.9 – 32Vdc		
Maximum Solar Input Voltage	28Vdc		
Maximum Input Current	40A		
Input Current (No Load)	20mA		
Back Drain on Auxiliary Battery	9.5 – 10.5mA		
External LED Output – Constant Current	4 mA		
Maximum Output Current	Input 9–11Vdc: Input 11V-32dc:	20A 25A	
Input Fuse Rating	50A (Not supplied)		
Output Fuse Rating	50A (Not supplied)		
Maximum Output Power	385W		
Solar Input Turn On Voltage	11V		
Size	173 x 122 x 42.5 mm		
Weight	920g		
Operating Temperature (Derated from 55°C)	-10 to +80°C (Ambient Temperature)		
Charge Control			
Charge Type	3 Stage		
Bulk *20A at 9-11Vdc, 25A at 11-32Vdc	*Constant Current up to:		
	LITH	AGM	WET
	14.2V	14.4V	14.7V
Absorption	CALCIUM		
	LITH	AGM	WET
	14.2V	14.4V	14.7V
Float	CALCIUM		
	LITH	AGM	WET
	14.2V	14.4V	14.7V
Equalisation (Calcium mode and periodic use only)	Keep Constant Voltage at 13.7V		
	3.8A Constant Current Charge up to 16V then hold for 1 hour (5 hour timeout)		
Battery Range			
Battery Capacity	75-300Ah		
Type of Batteries Supported	LITHIUM, AGM, WET & CALCIUM		
Operating Mode			
	12V Vehicle		24V Vehicle
VSR Mode – Default (Ignition Override Not Connected)	Turn on 13.4-20V	Turn off <12.8V	Turn on 26.8-32V
Low Voltage Mode – Ignition Override cable connected to ignition switch (ignition on)	Turn on 12.2-20V	Turn off <11.9V	Turn on 24.4-32V
Standards			
EMC	C-Tick, CISPR 11, ECE R10		
IP Rating	IP67		

## PRODUCT OVERVIEW



## INSTALLATION

### MOUNTING

The rugged design of the PDC25 affords it to be mounted wherever best suits the application. By using advanced potting technology the unit is resistant to shock, vibration, dust and water allowing for under-bonnet or in-vehicle installation. Clever 'side extrusions' incorporated within the enclosure allow the unit to be mounted to flat surfaces as close to the auxiliary battery as possible. It is advisable however to keep the charger as far away as possible from exhausts, turbos or any other high temperate components to ensure improved performance.

### WIRING

To make sound electrical connections, battery cables will need to be made to the correct length. Cable lugs should be crimped or soldered to the stripped battery cable and then protected with the supplied heatshrink. Butt splices should be used for cable extension.

Minimal cable size for wiring up to 12m:

	Cable Size
Alternator Input Cable (Red)	8mm <sup>2</sup> (8 B&S)
Solar Input Cable (Green)	8mm <sup>2</sup> (8 B&S)
Output Cable (Brown)	8mm <sup>2</sup> (8 B&S)
Common Ground (Black)	8mm <sup>2</sup> (8 B&S)
Ignition Override (Blue)	1-1.5mm <sup>2</sup>
External LED (Pink)	1-1.5mm <sup>2</sup>

Beyond 12m increase cable size as required. Contact Technical Support for assistance on **1800 422 422**.

1. Disconnect the negative battery cable (Earth) from the vehicle's starting battery or disconnect power to the trailer. Note: To prevent the loss of vehicle electronic memories, radio presets & security codes, it is recommended that an "Electrical System Memory Protector" be used.
2. Connect the Auxiliary Battery positive (+) terminal to the Output Cable (brown colour) from PDC25. Fit a 50A fuse to the cable as close as possible to the Auxiliary Battery positive (+) terminal.
3. Connect the Auxiliary Battery negative (-) terminal to the PDC25 Common Ground cable (black colour). Alternatively connect both Auxiliary Battery negative (-) terminals and PDC25 Common Ground cable to vehicle chassis ground.
4. Connect the Starter Battery positive (+) terminal to the PDC25 Alternator Input cable (red colour). Fit a 50A fuse to the cable as close as possible to the Starter Battery positive (+) terminal.
5. If your vehicle has a fixed voltage or temperature compensating alternator installed, leave the Ignition Override cable (blue colour) disconnected and taped.

If your vehicle has a smart (variable voltage) alternator installed, the Ignition Override cable must be connected to the vehicle's ignition. The PDC25 will only operate when the vehicle's ignition is turned on (may take up to two minutes to start charging). Fit a 1-2A fuse to the cable as close as possible to the vehicle's ignition.

However, if solar panels are connected to PDC25, the PDC25 will operate and only draw power from solar panels (assuming vehicle's ignition is turned off). Consult the vehicle manufacturer for type of alternator installed in your vehicle.

- When 12V solar panels are present, connect the solar panel positive terminal (+) to the PDC25 Solar Input cable (green colour). Fit a fuse to the cable as close as possible to the Solar Panel positive (+) terminal (refer to the table below for fuse size).

**Note: No Solar Controller is required with PDC25. If using portable solar panels that include a solar controller, the controller will need to be bypassed.**

Then, connect the Solar Panel negative (-) terminal to the PDC25 Common Ground cable (black colour). Alternatively connect both Solar Panel negative (-) terminals and PDC25 Common Ground cable to vehicle chassis ground.

Solar Panel Size	Fuse Size
120W	15A
160W	15A
200W	20A
240W	30A
360W	50A

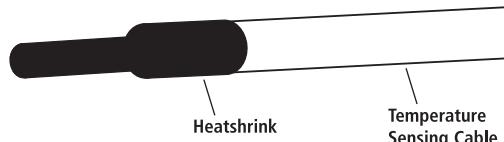
- The external LED wire provides 4mA constant current output. It can power an LED panel mount indicator with or without an internal resistor.

Leave External LED cable open if you do not need the external LED indication. If external LED indication is required, connect the positive (+) terminal of a LED Indicator to the External LED cable.

Then, connect the negative terminal of LED Indicator to the vehicle chassis ground.

- Cut/remove Temperature Sensing cable if temperature compensated battery charging is not needed. Use supplied heatshrink to insulate the open end of Temperature Sensing cable.

If temperature compensated charging is required, attach the ring terminal of the Temperature Sensing cable to the auxiliary battery negative terminal. For best results, attach the ring terminal to the auxiliary battery plastic surface with thermal conductive adhesive such as 3M T8820 or equivalent.



## SELECTION OF AUXILIARY BATTERY TYPE

Press the Mode button on the front panel until one of the Battery Chemistry LEDs is flashing (indicating the current chemistry selection), then repeatedly press the Mode button until the desired Battery Chemistry LED is flashing. There are 4 battery chemistries available: Gel, AGM, Wet and Calcium. After you release the button, your selection is entered and saved. Your selection will be restored automatically even after the PDC25 is fully disconnected and reconnected. The default Battery Chemistry is AGM.

### Charging profile for each selection:

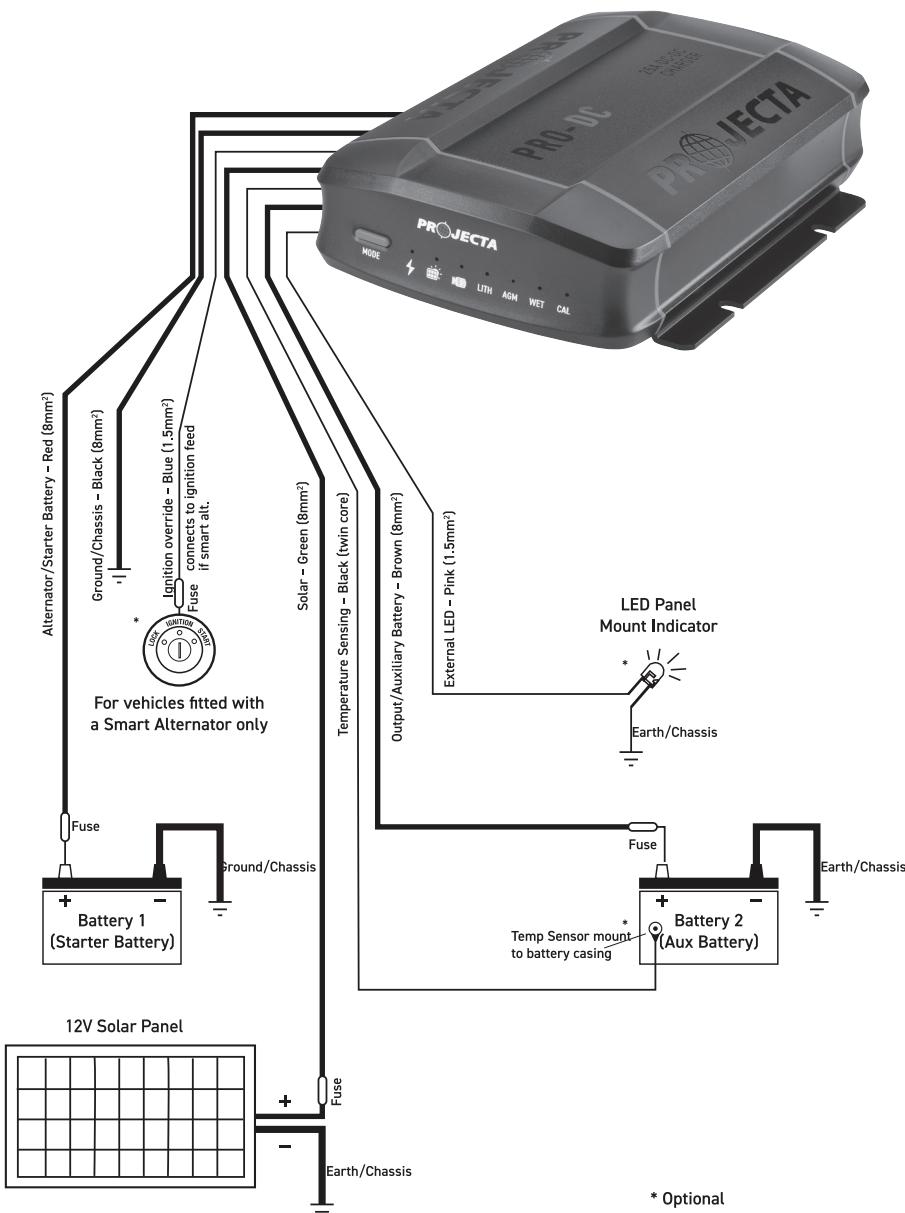
Bulk *20A at 9-11Vdc, 25A at 11-32Vdc	*Constant Current up to:			
	LITH 14.2V	AGM 14.4V	WET 14.7V	CALCIUM 14.7V
Absorption	Constant Voltage until current drop to 3.8A			
	LITH 14.2V	AGM 14.4V	WET 14.7V	CALCIUM 14.7V
Float	Keep Constant Voltage at 13.7V			
Equalisation (Calcium mode Only)	3.8A Constant Current Charge up to 16V then hold for 1 hour (5 hour timeout)			

Calcium Chemistry mode is good for charging Optima batteries or deeply discharged calcium-calcium lead acid batteries (e.g Delkor DC31).

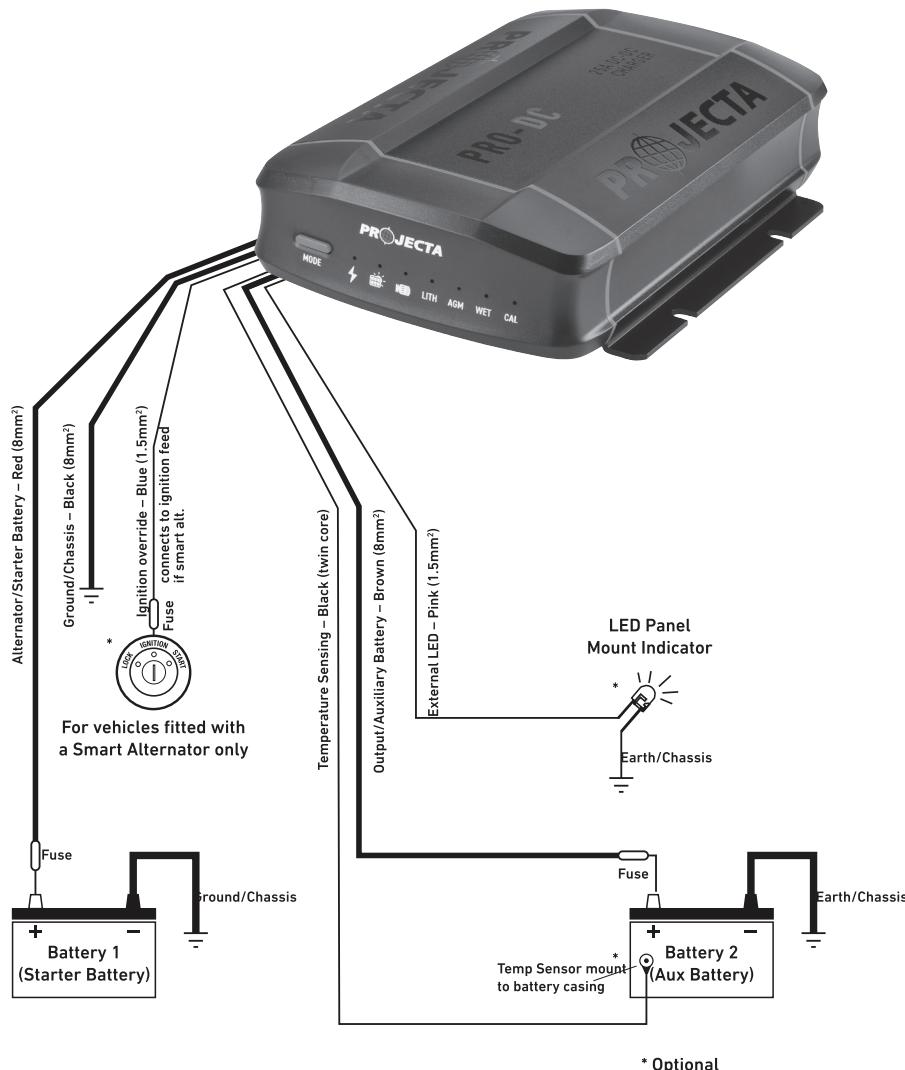
Please consult the battery manufacturer if you are unsure of your battery's chemistry.

## TYPICAL WIRING INSTALLATION

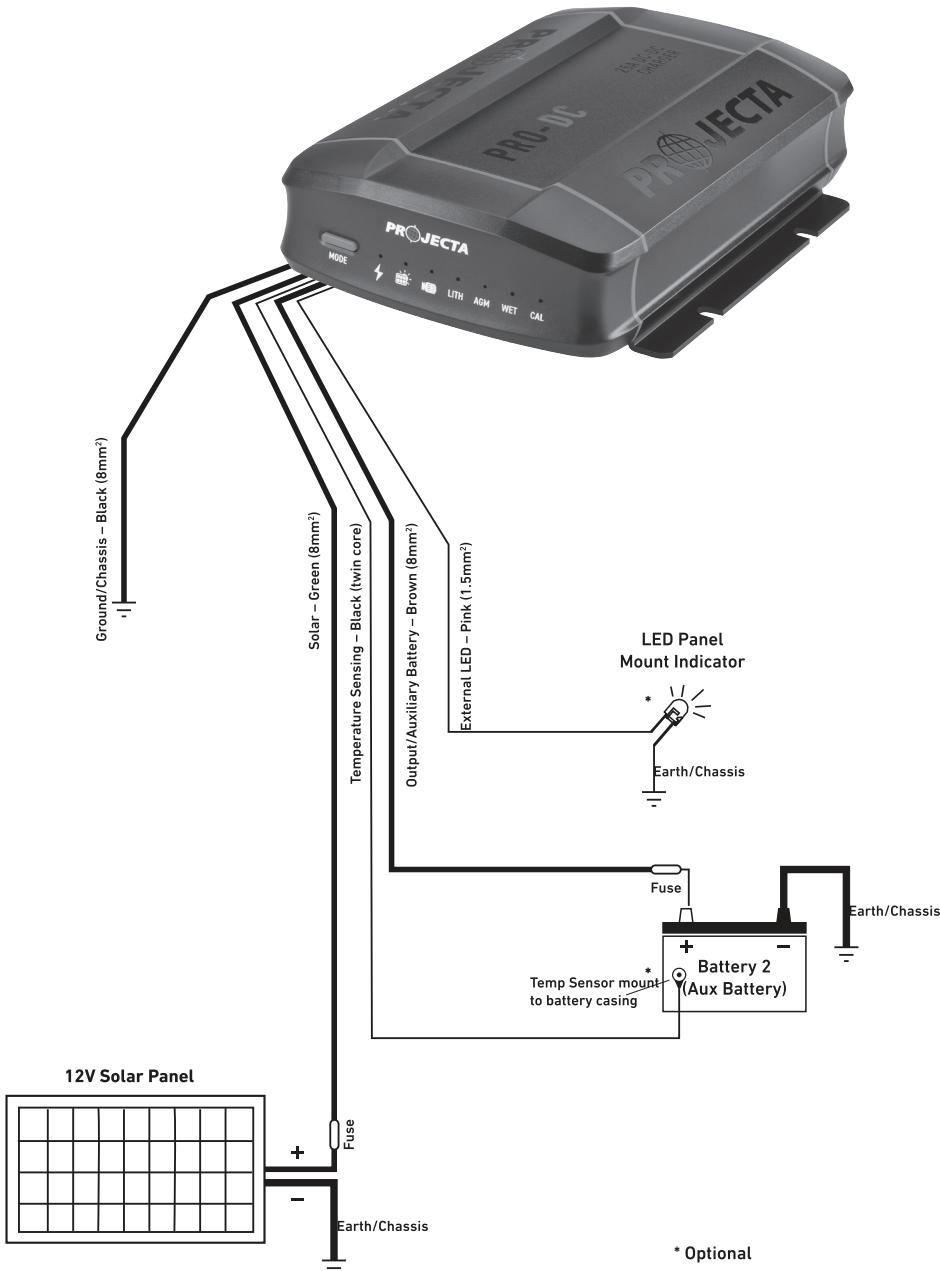
### 1. Full System



## 2. Alternator/Starter Battery Input Only



### 3. Solar Battery Input Only



## HOW TO READ LED DISPLAY



### LED Charge Indicators

Charging LED	Battery Type LED	Charging Stage
GREEN Flashing	Solid BLUE	Bulk Charge
GREEN Flashing	BLUE Flashing	Absorption Charge
Solid GREEN	BLUE Flashing	Equalization Charge
Solid GREEN	Solid BLUE	Float Charge

### Power Saving Mode Indicators

Alternator LED	Solar LED	Battery Type LED	Operating condition
Flashing every 8-10s	Off	Flashing every 8-10s	Unit on power saving mode, Input is out of operation range
Off	Flashes every 8-10s	Flashing every 8-10s	Unit on power saving mode, Input is out of operation range
Flashing every 8-10s	Flashing every 8-10s	Flashing every 8-10s	Unit on power saving mode, Input is out of operation range

### Fault LED Indicators

Charging LED	Solar LED	Alternator LED	Battery Type LED	Fault	Remedy
Solid RED				The unit is faulty	Check if there is any output current from the unit
Amber Flashing				Bulking charging time out	Auxiliary battery may be faulty or heavy load is connected to the battery for long time
Solid RED			BLUE Flashing	Output battery is reversely Connected	Check output cable connection
RED Flashing			BLUE Flashing	Overvoltage is detected at output	Check auxiliary battery voltage
Solid AMBER			BLUE Flashing	Output open circuit or dead Battery	Check auxiliary battery voltage & cable connections
	Solid RED			Solar Input is reversely connected	Check Solar input connection
	RED Flashing			Overvoltage is detected at Solar Input	Check solar panel open circuit voltage
		Solid RED		Alternator Input is reversely connected	Check Alternator input connection
		RED Flashing		Overvoltage is detected at Alterantor	Check vehicle battery voltage

## FREQUENTLY ASKED QUESTIONS

### Q. Is the PDC25 waterproof?

A. The Projecta PDC25 is designed to be dust and weather proof. Normal use including river crossings and light engine washing will not pose any problems. Direct high pressure washing of the PDC25 unit may cause some water damage and **will not** be covered under warranty.

### Q. Why do the positive cables from the batteries need to be fused?

A. High Capacity batteries can produce large amounts of power and are capable of melting cable insulation and catching fire in the case of a short circuit. Each positive (+) cable connected to the battery must be protected by a fuse located in close proximity to the battery.

### Q. Is the charger safe to use with modern 'electronic' vehicles?

A. The Projecta PDC25 has been designed to work with all vehicles, including new vehicles with EFI and computer management systems. The charger utilises sophisticated electronics that ensures complete safety for you and your vehicle.

### Q. How do I know if the battery is charged?

A. When Charging LED is in Solid Green and one of the Battery types LED is in Solid Blue, it indicates the auxiliary battery is fully charged (refer to page 12).

### Q. I have connected the charger properly but the 'INPUT LED' does not come on?

A. Check the cable size. The PDC25 is designed to power on and charge from an input source as little as 9V. If small size cables are used for wiring, the voltage might drop below 9V when PDC25 is attempting to start up. Please refer to Installation – wiring section for recommended cable size.

### Q. I have connected the charger properly but the 'OUTPUT LED' does not come on?

A. In some cases batteries can be discharged to the point where they have very little or no voltage. This can occur if a small amount of power is used for a long time, for example a map reading light is left on for a week or more. The PDC25 is designed to charge an auxiliary battery from as little as 5 Volts. If the voltage is lower than 5 Volts use a pair of booster cables to connect between two batteries to provide more than 5 Volts to the battery being charged. The PDC25 can then start to charge the battery and the booster cables can be removed.

### Q. Why does the 'FULLY CHARGED' LED come on straight away?

A. There are three possible reasons why the 'FULLY CHARGED' LED may come on straight away.

1. The battery is fully charged.
2. The battery has taken a surface charge.
3. The battery has a faulty cell.

**Q. What is Surface Charge?**

A. Batteries unused or left discharged for some time build up a resistance to being recharged. When the charger is first connected, these batteries will take a surface charge, and the 'FULLY CHARGED' LED will illuminate within a short period of time. The battery however is not fully charged. The charger is voltage sensitive and cannot differentiate between a surface charge and a fully charged battery. After a few hours the battery may start to accept some charge but most batteries with this condition may not recover.

**Q. What is a Faulty Cell?**

A. 12 Volt batteries contain 6 cells and one faulty cell is enough to ruin your battery. If after twelve hours of charging your battery is still accepting charge, you should test the cells using a hydrometer. If one reading is lower than the rest it indicates a faulty cell. It is pointless to continue charging; the battery needs replacing.

**Q. Why is there no output at the charger's terminals?**

A. The charger incorporates short circuit protection that makes it much safer to use. For this reason the charger will only output power when properly connected to a battery. To check if the charger is functioning, follow the instructions to connect and operate the charger as normal on a flat battery. While the battery is charging measure the battery voltage with a volt or multi-meter. Charging can be confirmed if the voltage is increasing (within the voltage parameters set out in the specifications).

## **NOTES**

# **WARRANTY STATEMENT**

## **Applicable only to product sold in Australia**

Brown & Watson International Pty Ltd of 1500 Ferntree Gully Road, Knoxfield, Vic., telephone (03) 9730 6000, fax (03) 9730 6050, warrants that all products described in its current catalogue (save and except for all bulbs and lenses whether made of glass or some other substance) will under normal use and service be free of failures in material and workmanship for a period of three (3) year (unless this period has been extended as indicated elsewhere) from the date of the original purchase by the consumer as marked on the invoice. This warranty does not cover ordinary wear and tear, abuse, alteration of products or damage caused by the consumer.

To make a warranty claim the consumer must deliver the product at their cost to the original place of purchase or to any other place which may be nominated by either BWI or the retailer from where the product was bought in order that a warranty assessment may be performed. The consumer must also deliver the original invoice evidencing the date and place of purchase together with an explanation in writing as to the nature of the claim.

In the event that the claim is determined to be for a minor failure of the product then BWI reserves the right to repair or replace it at its discretion. In the event that a major failure is determined the consumer will be entitled to a replacement or a refund as well as compensation for any other reasonably foreseeable loss or damage.

This warranty is in addition to any other rights or remedies that the consumer may have under State or Federal legislation.

## **IMPORTANT NOTE**

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

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