

CALVI

Calvi Submersible Pump Kit Installation Manual

Version 1.1—updated March 2013

CONTENTS

Introduction	3	Operating Instructions	8
Safety and Installer Responsibilities	4	Controller Operation	8
Technical Specifications	4	Sensor Operation	8
Key Components	5	Wiring the Controller	9
Calvi 200 Submersible Pump Kit	5	Wiring Diagram - Plug & Play Kit	10
PoleLock SLP Framing System	5	Warranty Against Defects	11
Daqo (DQ085P) Solar Panels	5	Consumer Guarantees	12
Installation Procedure	6-7	Contact Details	12
Troubleshooting	7		

INTRODUCTION

Calvi solar water pumping systems are high quality products suitable for a wide variety of agricultural and remote water pumping applications including drinking water supply, livestock watering and smaller irrigation uses.

The Calvi 200 pumping system delivers water economically, cleanly and reliably and is backed by a comprehensive 1-year warranty.



WARNING

Indicates a hazardous situation which, if not avoided, can result in death or serious injury or moderate injury.



CAUTION

Indicates a hazardous condition which, if not avoided, can result in minor or moderate injury.

All systems are fully compliant with:

AS/NZS 1170.2: 2011

Wind actions

AS/NZS 4509.1: 2009

Stand-alone power systems -
Safety and installation

AS/NZS 4509.2: 2010

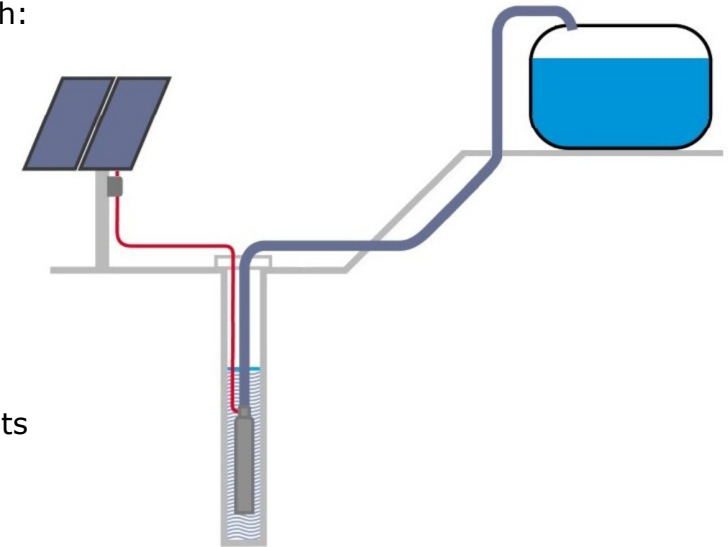
Stand-alone power systems -
System design

AS/NZS 5033: 2012

Installation and safety requirements
for photovoltaic (PV) arrays

AS/NZS 3000: 2007

Electrical installations



Calvi pumping systems have been specifically designed to pump water efficiently using solar power.

Each solar water pumping system consists of solar modules, pole mounted solar panel frame, MPPT controller, DC isolator, sensors and associated cables providing the user with an easy to install solution.

Alternatively, the pump, controller and sensors can be purchased as a separate kit allowing the installer to use their own choice of solar panels.

SAFETY AND INSTALLER RESPONSIBILITIES

It is critically important that the safety practices are observed when installing the Calvi submersible pumping kits.

- Do not roughly handle any components in the pumping kit.
- Do not bring any components into contact with sharp or heavy objects.
- Do not modify any components in any way. The exchange of bolts, drilling of holes, bending or any other physical changes not described in standard installation procedure may void the warranty.
- It is the installer's responsibility to verify the suitability of the site of which the pumping kit is to be installed. Installation in unsuitable areas will void the warranty, and could result in death or serious injury.



WARNING

Indicates a hazardous situation which, if not avoided, can result in death or serious injury or moderate injury.

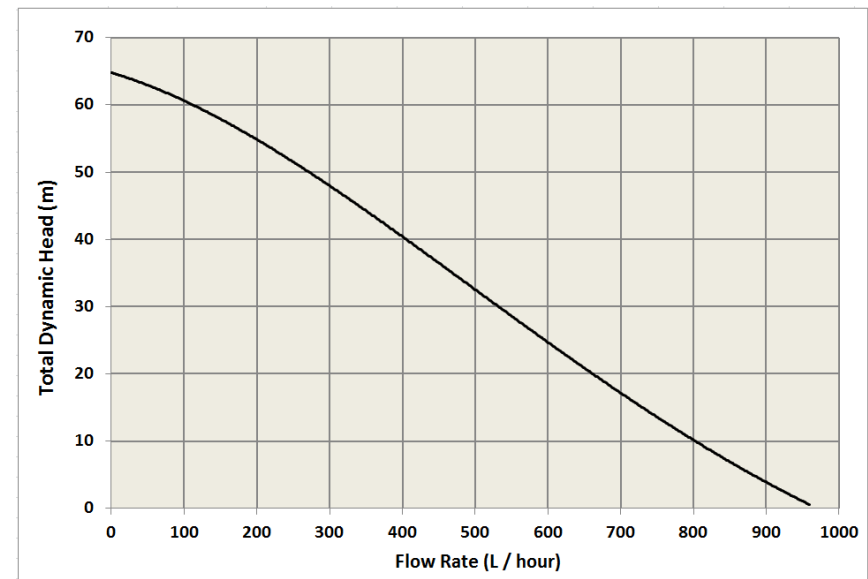


CAUTION

Indicates a hazardous condition which, if not avoided, can result in minor or moderate injury.

TECHNICAL SPECIFICATIONS

Pump		Calvi 200
Nom. pump diam.	(inches)	3
Pump outlet diam.	(inches)	1
Max. total dynamic head	(m)	65
Max. flow rate	(L/hour)	960
Nom. DC voltage	(V)	36
Nom. motor power	(W)	200
Recom. PV power	(W)	260
Panel configuration (in kit)		3xDaqo85



KEY COMPONENTS

Calvi 200 Submersible Pump Kit

- Designed to transfer water efficiently and reliably from water sources such as a bores, dams, rivers or creeks.
- Plug & play design ensures complete package is easy to assemble and eliminates the need for an electrician.
- 3-inch pump allows for flow rates of up to 960 litres/hour and is capable of providing a total dynamic head of up to 65 metres.
- Highly efficient oil filled helical rotor design.
- High and/or low water level sensors to protect the unit from pumping dry bores or full water storage.
- Comprehensive 1 year warranty provides the customer with complete peace of mind.

PoleLock SLP Framing System

- Panels can be mounted in wind regions A and B (most of Australia — non cyclonic regions).
- Suitable for terrain categories 2, 3 & 4 (from sites with few obstructions to built up areas).
- Appropriate for level or near level ground.
- Fully compliant with AS/NZS 1170.2:2011 – Wind actions.
- Australian manufactured and backed by a 10-year warranty.
- Installation information can be found at sunlock.com.au

Daqo DQ085P Solar Panels

- High quality and efficient poly-crystalline solar modules.
- Compliant with IEC 61215 / 61730.
- Certified by TUV, UL/CUL, CEC and Golden Sun.
- Guaranteed positive tolerances of 0 – 3% ensures power output reliability.
- 10 year limited product warranty as well as a 25-year limited power warranty.
- See www.dqsolar.com for details.

INSTALLATION PROCEDURE

1. Digging the post hole

- Ensure the location is suitable for a pole mounted solar installation and no buildings / trees are shading the modules.
- Dig the hole in undisturbed, natural ground. The footing for the pole mounted frame needs to satisfy either:

- ◇ 450mm diameter pier – 1400mm depth
- ◇ 600mm diameter pier – 1200mm depth

Refer to the PoleLock installation manual for further details at www.sunlock.com.au

2. Cementing the post

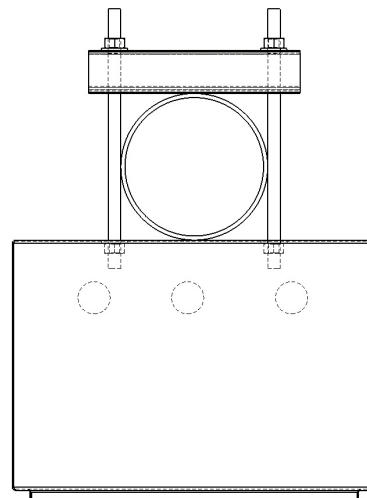
- Drill a hole in the base of the mounting pole, insert an M12 bolt / rod and fasten.

The pole mounted frame requires a 100 DN DuraGal pole (114.3mm outer diameter / 4.5mm wall thickness).

- Place the pole into the hole ensuring that the pole sits on a 100mm base of gravel.
- Fill with required amount of 25 MPa concrete.
- Ensure that the pole is orientated plumb and let the concrete set.

3. Install the controller enclosure to the pole

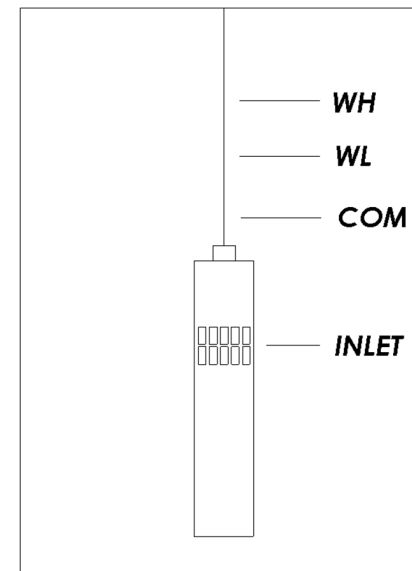
- Using the supplied brackets, fasten the enclosure to the pole ensuring that the enclosure is mounted at an appropriate height.



4. Attaching accessories to the pump

- Thread the fitting / pipe onto the head of the submersible pump ensuring a tight fit. Ensure Teflon tape is wrapped around the fitting.

- Attach a rope through the eyelets on the pump.
- Fasten each of the low water sensors to the poly pipe / pump body in the correct position (see below).
- Tape together all ropes, pipes and sensors to prevent fouling.



5. Lowering pump assembly into the bore

- Carefully lower the pump assembly into the bore ensuring no parts catch on the inside of the bore casing.

6. Assembling framing to the mounting pole

Follow the instructions in the PoleLock installation manual ensuring that the frame is set to the desired inclination angle for the given site.

7. Mounting solar panels to the framing

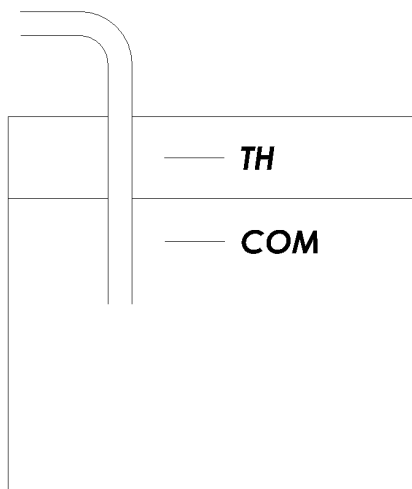
Ensure that the concrete has set prior to installation.

- Install each of the modules onto the PoleLock frame with the supplied clamps. Each modules junction box should be positioned directly adjacent to each other ensuring that the cables have enough length to connect to each other in series.

INSTALLATION PROCEDURE

8. Wiring the cabling between the panels, controller assembly and pump assembly.

- Using the supplied MC4 extension cables, connect the panels and controller assembly following the wiring diagram.
- Fasten each of the high water sensors to the poly pipe length in the tank (see below). Ensure that each sensor faces downwards to prevent water pooling in the sensor body.



- Ensure that the system is properly connected prior to the DC isolator being switched ON.
- Bury all cabling running between the pole mounted frame, bore and water storage tank and infill with soil.

TROUBLESHOOTING

Symptom	Possible Cause	Correction Measure
No / limited Water flow	Low voltage	Check solar array for shading / orientation
	Clogged pump filter	Raise pump from bore and check for blockages
	Excessive pump depth	Ensure pump is within correct operating depth
	Restriction in hose	Ensure hose isn't kinked or pinched
	Leaking hose fittings	Check the condition of the hose fittings / clamps and replace if necessary
	Worn helical rotor	Install supplied spare pump rotor
No water flow	Loose electrical connections	Check the system is wired according to the wiring diagram Check the condition of all connectors / cables
	No power to the controller	Switch the DC isolator to the ON position
	Storage tank is full	Check water storage level
	Lack of water in the bore	Check low level water sensor

For further troubleshooting assistance, contact Apollo Energy on 1300 855 484 or sales@apolloenergy.com.au

CONTROLLER OPERATION

After power is provided to the controller and the switch is turned on, the POWER light will illuminate.

The RUN light will turn green and the pump will begin to start pumping water.

If an error is detected in the system, the ERROR light will illuminate and the pump will cease to operate.

POWER-DIRECT

- NO POWER IS SUPPLIED TO THE CONTROLLER
- POWER IS SUPPLIED TO THE CONTROLLER

MOTOR-RUNNING

- PUMP ISN'T RUNNING
- PUMP IS RUNNING

MPPT-CHECK

- FOUND MAXIMUM POWER POINT
- SEARCHING FOR MAXIMUM POWER POINT

ERROR-CURRENT

- CURRENT IS WITHIN LIMITS
- OVER CURRENT WARNING

ERROR-VOLTAGE

- VOLTAGE IS WITHIN LIMITS
- OVER / UNDER VOLTAGE WARNING

TANK-FULL

- NORMAL WATER LEVEL - PUMP IS RUNNING
- HIGH WATER LEVEL - PUMP HAS STOPPED

WELL-LOW

- NORMAL WATER LEVEL - PUMP IS RUNNING
- LOW WATER LEVEL - PUMP HAS STOPPED

SENSOR OPERATION

Low water level sensor

When the water level in the bore drops below the WL sensor, the WELL-LOW light will illuminate and the system will automatically stop working to prevent any damage to the pump.

Once the water level rises above the WL sensor, the WELL-LOW light will flash intermittently and the system will delay the restarting of the pump to ensure there is sufficient water in the bore.

The system will immediately begin pumping after the water level rises above the WH sensor.

High water level sensor

When the water level in the storage tank rises above the TH sensor, the TANK-FULL light will illuminate and the system will automatically stop working to prevent overflow.

The system will begin pumping again after the water level drops below the TH sensor.

NOTE: The level sensor/s can be removed from the system if there is no need to monitor the water levels.

WIRING THE CONTROLLER

To wire up the controller, follow these required steps:

1. Wiring the pump cables

3 cables are attached to the pump body (labelled as U,V & W).

Ensure that the length of the cables suits the required pump depth needed prior to wiring.

If, the cables require lengthening, ensure that each of the joins are properly soldered and enclosed in a water-proof heat shrink prior to installation.

Thread each of the cables through a gland in the controller box, and secure to each of the respective labelled connections on the controller (see wiring diagram).

2. Wiring the sensor cables

The low water sensor requires 3 sensor cables (COM, WL & WH) and the high water sensor requires 2 sensor cables (COM & TH).

Extend each sensor cable to the required length, ensuring that each of the joins are properly soldered and enclosed in a water-proof heat shrink prior to installation.

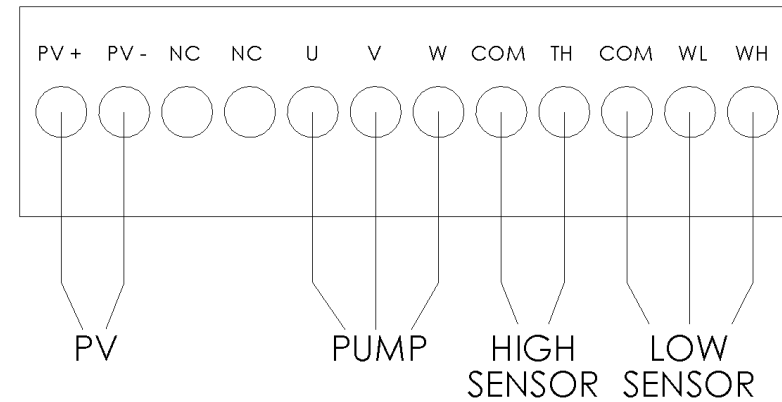
Thread each of the cables through a gland in the controller box, and secure to each of the respective labelled connections on the controller (see wiring diagram).

3. Wiring the PV power cables

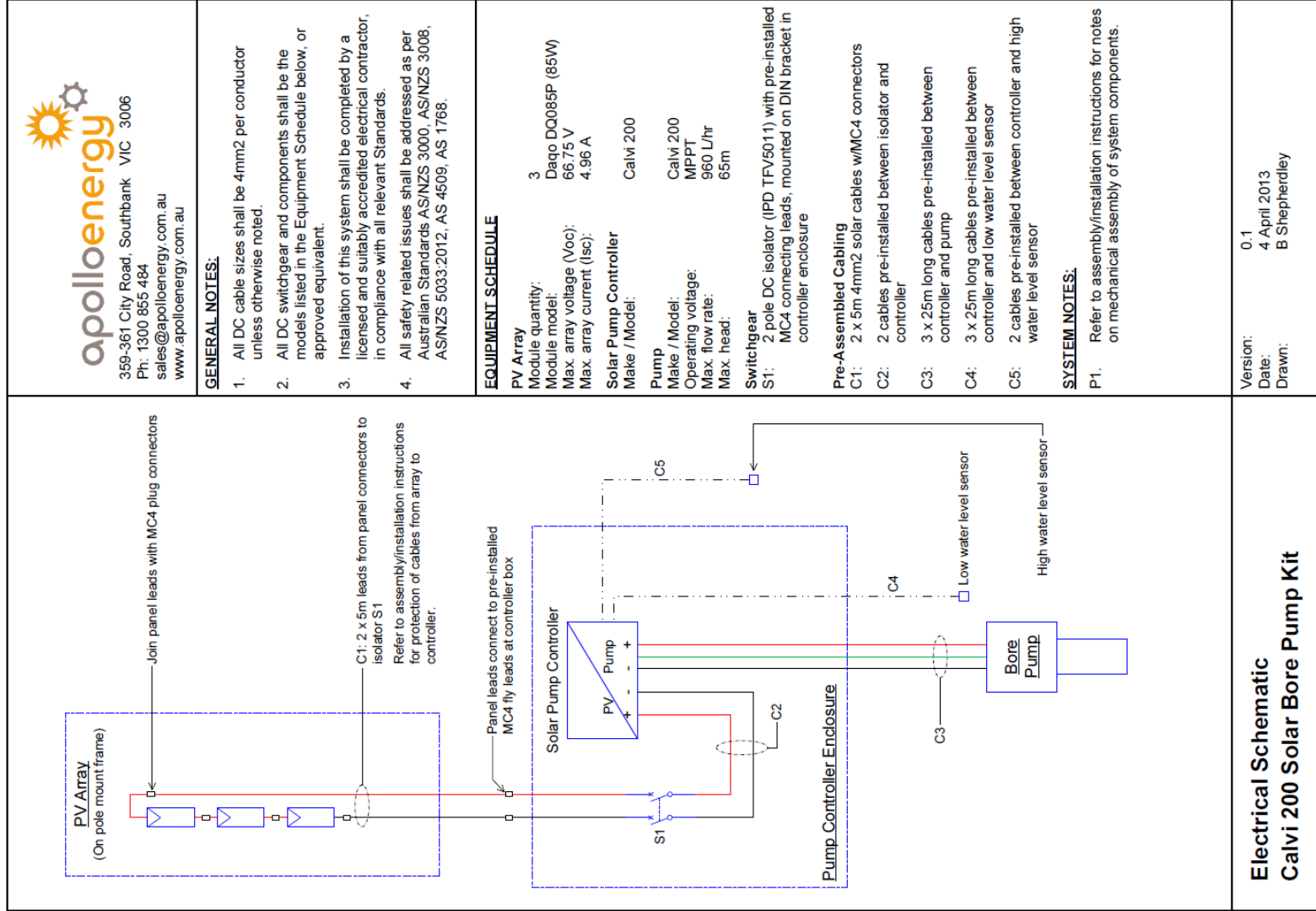
It is advised that the system be installed with a DC isolator between the PV array and the controller and that it is switched in the OFF position prior to installation.

Also, ensure that the toggle switch on the controller is switched in the OFF position and the panels are disconnected / shaded prior to wiring.

Make sure that the power cables are sized accordingly to the solar array. Thread each of the cables (PV+ & PV-) through a gland in the controller box, and secure to each of the respective labelled connections on the controller (see wiring diagram).



WIRING DIAGRAM—PLUG & PLAY KIT



WARRANTY AGAINST DEFECTS

Energy Matters Pty Ltd (trading as Energy Matters and Apollo Energy) (**Energy Matters**) is the manufacturer of its Calvi solar water pumping system (the Calvi System).

Energy Matters warrants, on the terms set out below, that the Calvi System will be free from defects in materials and workmanship for a period of 1 year from the date on which the Calvi System is purchased from Energy Matters (**Warranty against Defects**).

Transferability

Our Warranty against Defects is only provided to the original purchaser of the Calvi System from Energy Matters (**Purchaser**) or, where the Purchaser is an installer or builder who on-supplies the Calvi System to another party, to that other party (**End-User**). Our Warranty against Defects is not otherwise transferable.

Making a claim

If you believe that the Calvi System is defective and you are an End-User, you may either make a claim against the installer from whom you purchased the Calvi System or you may make a claim against us directly.

In order to make a claim against us, you must post, fax or email us a notice, using the contact details set out below. In your notice you must provide:

- details of why you believe the Calvi System is defective;
- a copy of your invoice, receipt or any other document which provides proof of purchase;

- details of how we should contact you.

Remedies

If we determine that the Calvi System is defective and the defect is not a major failure then, if possible, we will try to repair the defective Calvi System. If this is not possible, we will provide a replacement Calvi System at our expense.

If we determine that the Calvi System is defective and the defect is a major failure then you have the option of:

- rejecting the Calvi System and obtaining a refund;
- rejecting the Calvi System and obtaining a replacement Calvi System at our expense;
- keeping the Calvi System and receiving compensation for the difference between the actual value of Calvi System and the amount paid for the Calvi 3DS System.

All return freight costs incurred during the warranty process are to be paid by the customer.

Your obligations

In order to have the benefit of our Warranty against Defects:

- if you are a Purchaser, you must have paid all amounts owed by you to Energy Matters in relation to the purchase of the Calvi System;

- you must have complied with all reasonable instructions of Energy Matters (whether written or verbal) in relation to the transport, installation, care, repair and use of the Calvi System;
- you must not have misused, neglected, damaged or modified the Calvi System.

Exclusions

Our Warranty against Defects does not include:

- damage caused to the Calvi System during shipment or storage of the Calvi System by a party other than Energy Matters;
- damage caused to the Calvi System during installation by a party other than Energy Matters;
- damage caused by 'Acts of God', vermin, animals or pests or by other causes or acts outside Energy Matters' reasonable control; or
- normal wear and tear, including normal weathering.

Jurisdiction

Our Warranty against Defects is to be construed in accordance with the laws of Victoria and any disputes will be determined by the exclusive jurisdiction of the courts of Victoria.

CONSUMER GUARANTEES

In addition to our Warranty against Defects, the Calvi System also comes with guarantees that cannot be excluded under the Australian Consumer Law (**Consumer Guarantees**).

In the event that the Calvi System fails to satisfy a Consumer Guarantee, 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 Calvi System repaired or replaced if the Calvi System fails to be of acceptable quality and the failure does not amount to a major failure.

Please note that in addition to the rights and remedies set out in this document, you may also have other rights and remedies available to you under the law.

CONTACT DETAILS

Energy Matters Pty Ltd (trading as Energy Matters and Apollo Energy)

Address: 359-361 City Road
Southbank, VIC, 3006

Postal Address: PO Box 5265
South Melbourne, VIC, 3205

Sales and Service: 133 SUN (133 786)
(local call from anywhere in Australia)

International: +61 3 9697 1900

Fax: +61 3 9697 1919

Email: sales@energymatters.com.au