

**Summit
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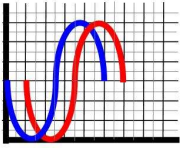
SOLAR CATHODIC PROTECTION SYSTEM

CENTRAL CONTROL UNIT



INSTALLATION, OPERATION AND MAINTENANCE MANUAL

WARNING!!! THIS EQUIPMENT CONTAINS STATICS SENSITIVE PARTS. INSTALLATION AND OPERATION SHOULD ONLY BE ATTEMPTED BY QUALIFIED PERSONNEL



A. SITE SELECTION CONSIDERATION

The following should be considered for site selection

1. Avoid congested areas of electrical or mechanical heat producing equipment.
2. Avoid direct exposure of control panel to rain or water. It is recommended that a canopy be placed on the control panel to avoid direct exposure to rain.
3. Site selection should allow full accessibility to the control panel and allow doors to open fully

B. MOUNTING AND WIRING

1. The Central Control Panel is designed for vertical mounting using bolts on framework provided and must be mounted securely with minimum 5/16" diameter screws, anchor bolts, or machine bolts.
2. Cable entry into the unit will be through suitable (25mm) cable entry glands from the anterior/ bottom side of the unit..
3. All wiring must comply to the National Electrical Codes and all existing local codes.
4. Local electrical codes may require all wiring to be installed in approved conduit.
5. Wire sizes must comply to the National Electrical Code.
6. The control unit must be grounded.

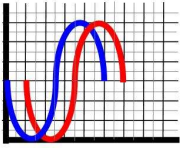
Operating and Maintenance Instructions

Operating personnel should observe the following before attempting to operate or adjust the control unit: Do not attempt to operate the system until proper inspection and installation confirmation have been completed.

1. Do not exceed D.C. / load ratings of the system. Operating the system at higher than nameplate ratings will result in eventual failure of the system.
This system was originally designed to operate on 48 volts D.C. at 30 amps.
2. If overload protection circuit breakers trip repeatedly, investigate and eliminate cause before attempting further operation of the system.

Our Central Control Unit has been fully inspected and carefully tested at the time of shipment. Instances where damage has resulted from shipping, handling, storage or installation are rare but possible. As a result, the following routine checks of your system are recommended:

1. **VISUAL INSPECTION.** Inspect unit for possible damage that may have resulted in shipping, handling, or installation. If damage exists, do not attempt operation until repairs have been completed.
2. **CONNECTIONS.** Make sure all internal electrical connections in the system are strong and tight.



SYSTEM COMPONENTS AND OPERATION

The Central Control Unit (see figure 1) basically consists of three sections, namely:

- (1) Solar Charge Controllers
- (2) DC – DC Down Converter.
- (3) System Protective Devices.

The Central Control Unit is a standalone system that integrates and works with solar PV Panels, Battery Bank, and Cathodic Protection Groundbed. Therefore electrical connections are made from the unit to solar panel array, battery bank and the groundbed.

The main functions of the Central control Unit is as follows:

- 1- To monitor and use the DC output from the solar panels to charge the battery bank and ensure that the battery charge is maintained within acceptable range, thereby enhancing battery life.
- 2- To Convert the DC power of the battery bank to lower and constant values suitable for supply to the groundbed for cathodic protection.
- 3- To ensure that all internal components of the unit as well as externally connected solar panels, batteries, and groundbed circuits are protected from lightening and surges. This is achieved by a cascade of high energy surge suppressors, circuit breakers and fuses.

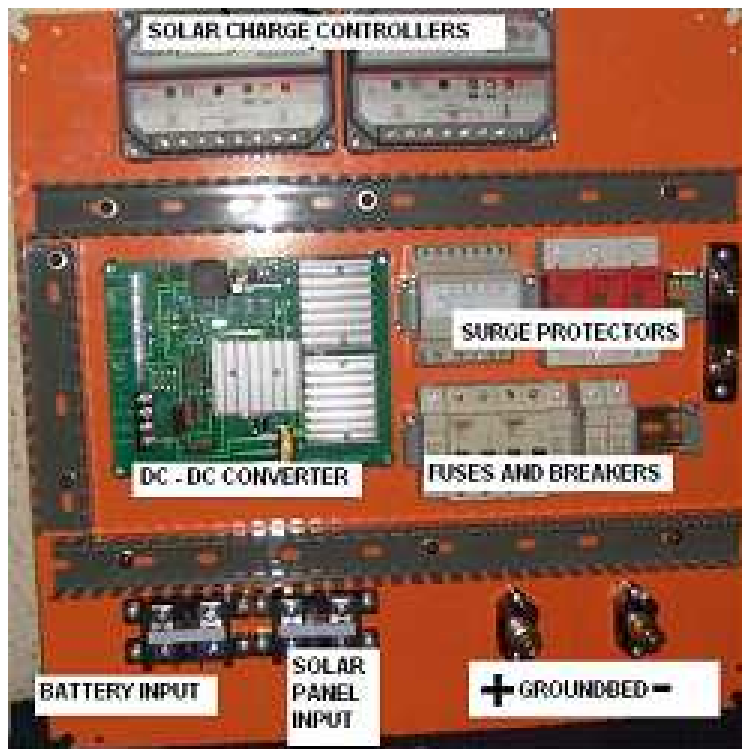
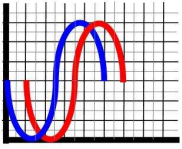


Figure 1: Electronic components in Control Unit



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The Central Control Unit is housed in an enclosure with double door (see figures 2a and b). The first outer door has a Perspex glass to enable user or operator to see and take readings on the analog voltage and current meters which are installed on the second (inner) door. Mounted also on the inner door are Power control switch, interrupter switch, and the output adjustment knob.

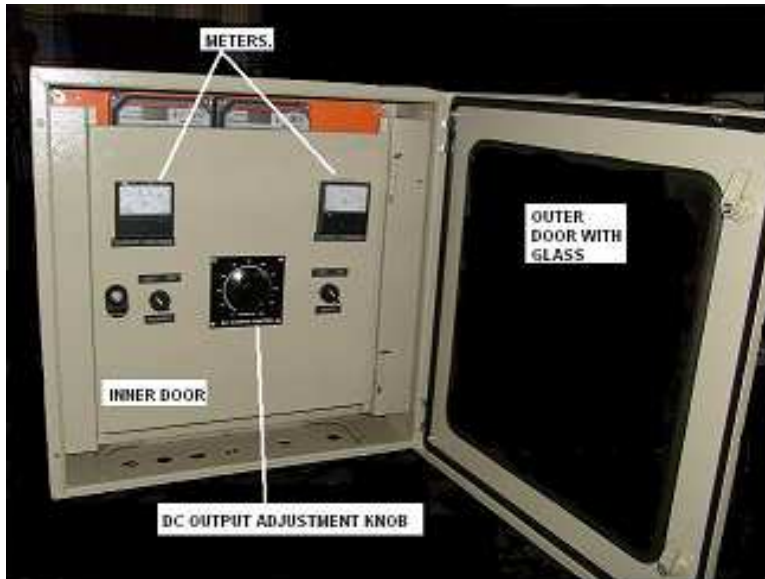


Figure 2a: Control Unit enclosure with double door.

The inner door covers the electronic components shown in figure 1 above.

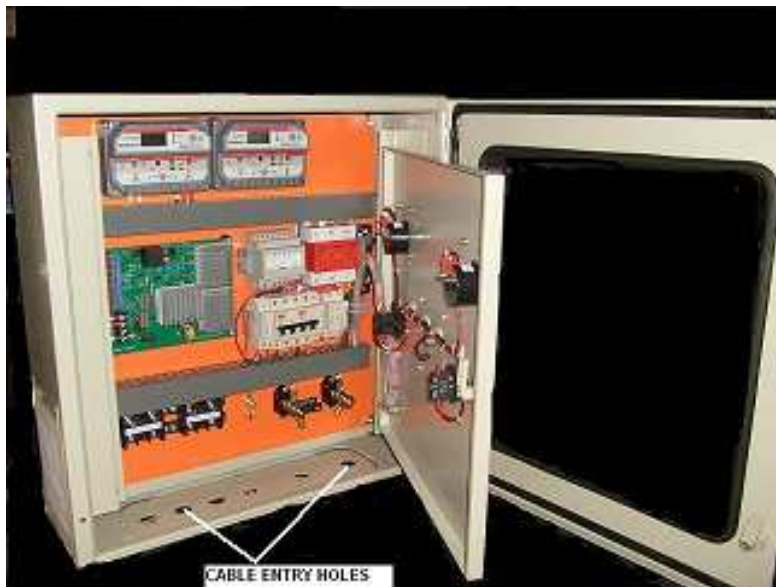
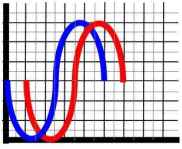


Figure 2b: Control Unit enclosure with the two doors open



Plexiglass Door & Inner Door Enclosure

Construction

- Body manufactured in 1.2mm sheet steel.till 800H then 1.5mm.
- door in 1.2 sheet steel up to 800H,1.5mm for heigh>800
- 1.5mm sheet steel mounting plate.till 800H then 2.0mm
- 3mm transparent plexiglass sheet.

Finish

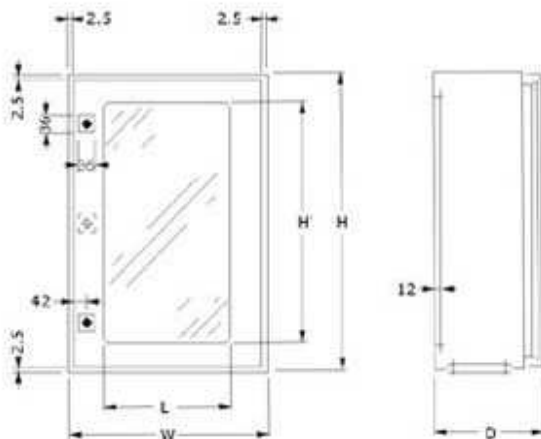
- SUNSHINE standard cycle thermosetting epoxy polyester powder coating.
- Case and door RAL 7032 textured finish.
- Mounting plate in zinc coated

Protection degree

Supply includes:

- Mounting plate.
- Gland plate and gasket
- Package with hardware for earth connection and screws to mount all components
- Locking system.

For plexiglass door box



For inner door box

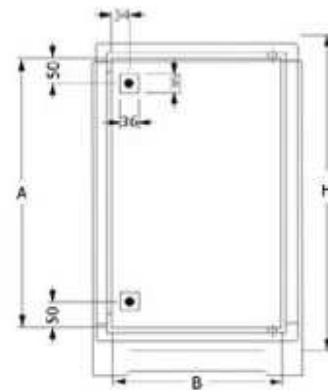


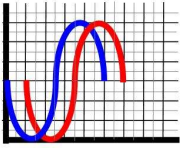
Figure 3

References and details of enclosures

model	H	W	D	B	A	L	H
STIP6 620	600	600	200	450	450	520	520

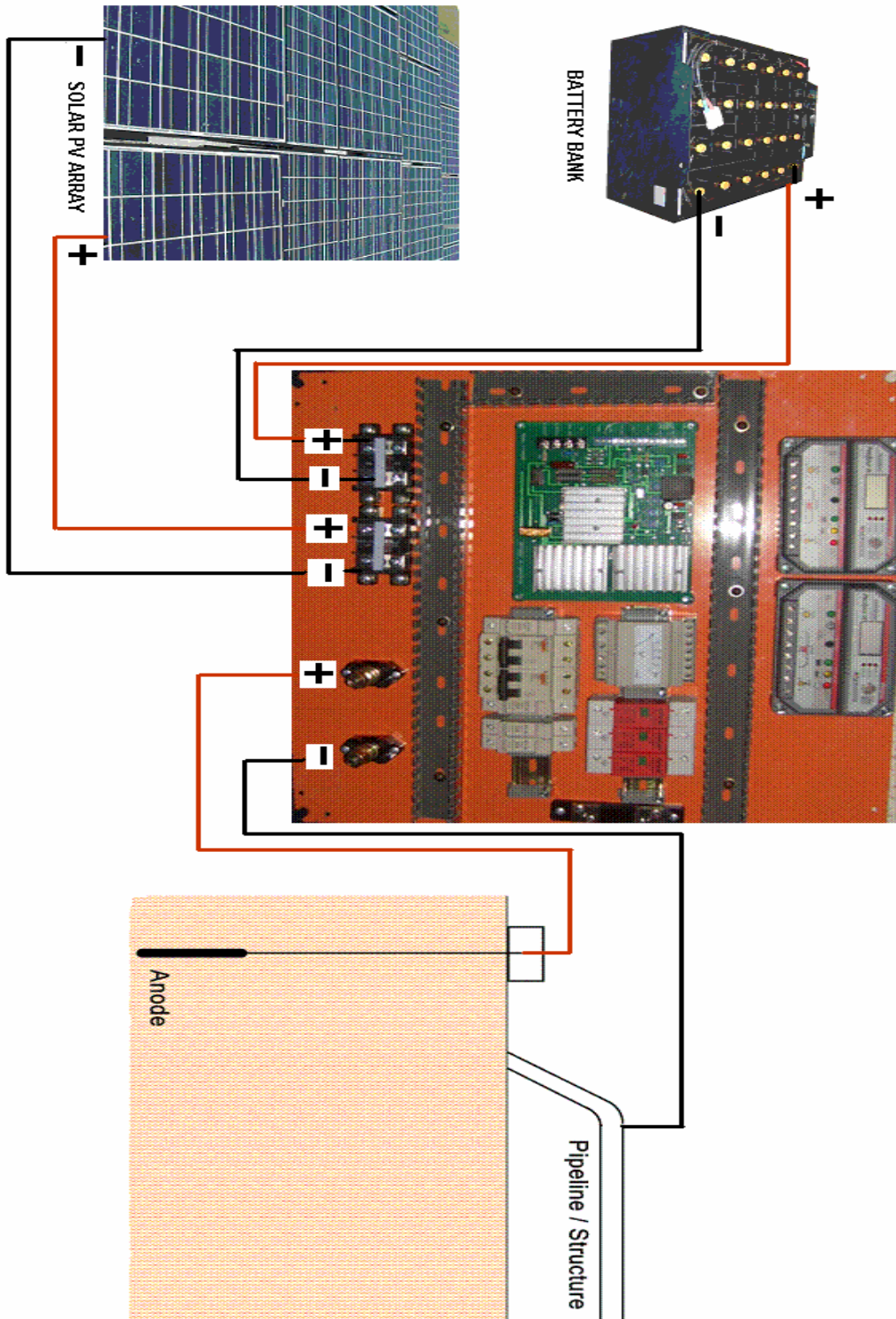
(a) Mechanical Installation: Control unit is designed for vertical mounting as mentioned in B above (Mounting and Wiring). The enclosure has 4 mounting holes at the corners.

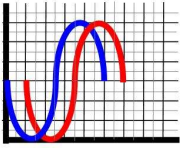
(b) Electrical Installation: Control unit is easy to install as only six cables are terminated in it. See figure 5 below for electrical wiring.



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Below is the recommended steps for electrical wiring.

(a) Make sure that all concrete and mechanical framework are installed before mounting the Control Unit. The mechanical framework carries the solar panels and forms a support for vertical installation of control unit.

(b) Make sure the PV and load currents will not exceed the nameplate ratings of the controller being installed. Make sure that all fuses are removed and all breakers are switched off before commencing wiring. Also ensure that the power and interrupter switches are off and the output adjustment knob is set at minimum, zero position.

(c) It is recommended that the electrical connections be made in order or sequence from 1 to 4 below

(1) Connect the **BATTERY** first. Use care that bare wires do not touch the metal case of the control unit. Use 16mm red and black cables respectively for positive and negative wiring with suitable cable lugs through the 25mm cable entry gland.

(2) Connect the **SOLAR (PV) ARRAY** next. Use care that bare wires do not touch the metal case of the control unit. Use 16mm red and black cables respectively for positive and negative wiring with suitable cable lugs through the 25mm cable entry gland.

(3) Connect the **LOAD (GROUNDBED AND STRUCTURE)** last. Cables, glands and lugs sizing is determined by the installer of the groundbed.

(4) Carefully insert all the fuses and turn on all circuit breakers.

(d) The system is now ready to be tested and commissioned.

(c) Testing and Commissioning.

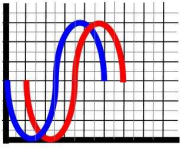
The testing and commissioning procedure for the system is as follows:

(1) Go through the electrical wiring again to make sure there are no mistakes in cable terminations. If confirmed okay continue to 2 below.

(2) Open the first (outer) door of the enclosure to have access to the switches and control knob.

(3) Switch on the power switch. Gradually adjust (turn clockwise direction) the output control knob and observe changes in output voltage as shown on the voltage meter. Also observe any changes in current reading as indicated on the current meter. Use half cell electrode to observe the pipeline / structure potential in order to determine the best position of the output control knob. The system is now in use.

(4) For output interruption, the DC-DC converter has an inbuilt output interrupter for taking off on readings. The timer is preset to 12 seconds on and 4 seconds off and can be adjusted to user specification, by varying potentiometers on the converter circuit board (see figure 5 below). To start output interruption, switch on the timer switch on the panel. The voltage and current meters deflect to indicate the on and off states of the output (groundbed and structure) circuit.



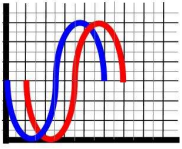
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INTERRUPTER TIMER ADJUSTMENT POTS



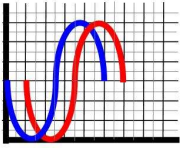
Figure 5: DC-DC Down Converter



TROUBLESHOOTING

Summit Systems Ltd products undergo rigorous and uncompromising tests before they are sold or installed. Only experienced electrical personnel should attempt location and repair of electrical difficulties, should they occur. Some symptoms of elementary trouble and the possible remedy are as follows:

FAULT	POSSIBLE CAUSES	REMEDY
No power indication on control unit when power is switched on.	Fuse in control panel is broken Voltage and Current meters are faulty Battery has been disconnected by LVD (low voltage disconnect) in charge controller	Check and confirm power supply to control panel, fuse, voltage and current meter.
Power indication on panel, when switched on, but no output current when output is adjusted.	Electronic circuit board (DC-DC Converter) is faulty.	Check the circuit board and replace if faulty.
Voltage meter reads, but current meter does not read.	Current meter is faulty There is an open circuit in the output / groundbed circuit. Output fuse is bad / broken	Check output fuses and replace if faulty. Check current meter and replace if faulty. Check the cable link to groundbed or structure and ensure they continuous and properly terminated.
Battery bank level too low	Solar Charge regulator is faulty Circuit breakers are faulty	Confirm and replace regulators if faulty Confirm and replace breakers if faulty



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LIMITED WARRANTY

This equipment designed and assembled by Summit Systems Ltd is warranted against defects in design, workmanship or materials, unless otherwise specified, for one year from the date of installation. The obligation of Summit Systems Ltd is limited to the adjustment, repair or replacement at its factory of the equipment, or part thereof which shall be found defective upon examination after being returned with transportation charges prepaid. Summit Systems Ltd warrants this product and its operation only. There is no other warranty or liability implied or expressed for the use or mis-use of this equipment.

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