

Alex *Solar*

the world's

LEADING SOLAR borehole system



GENERATION ONE 3PHASE SOLAR PUMP CONTROLLER INSTALLATION MANUAL

Manufactured & supplied by	HH Electrical t/a Alex Pumps
Physical Address	Boknesstrand Eastern Cape South Africa
Postal Address	P.O. Box 146 Alexandria 6185
Tel/Fax	046 654 0109
Email	hhelec@vodamail.co.za
Web	www.alex solar.co.za

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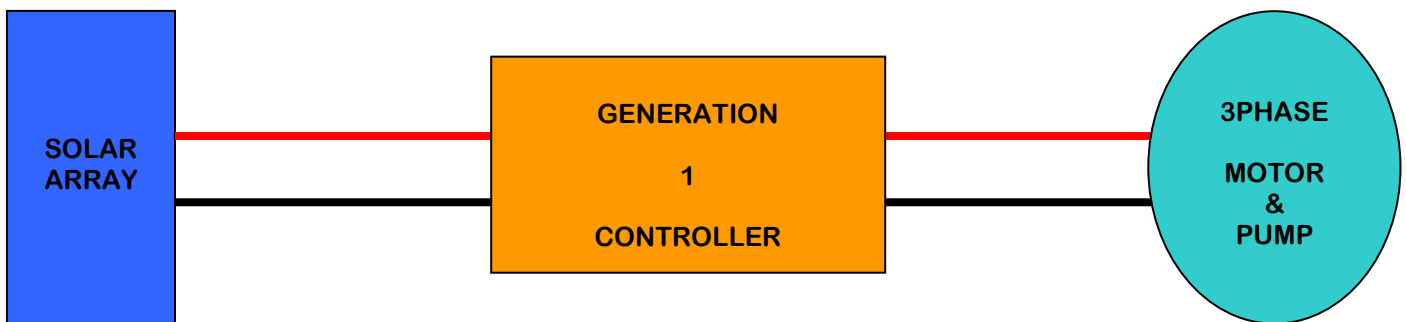
DESCRIPTION OF WORKS:

Solar panels supply power to your G1 Solar Pump Controller. The Controller is fitted with power tracking and speed control. This complete system drive's borehole pumps and application for different pressure pumps and ordinary 3 phase systems without the use of any battery back-up or battery use in operation.

The above system works with:

- Solar power only;
- AC input only;
- or sharing both solar power and AC input but prioritising solar power.

Image 1: Basic setup



PRECAUTIONS

DANGER

- Hazard of electric shock explosion or arc flash.
- Read and understand this manual before installation
- Installation adjustment repair and maintenance must be performed by qualified professional personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment
- Do not touch any parts inside the panel with voltage present because some parts contain high voltage.

BEFORE WORKING ON THE CONTROLLER

- Before working on the unit parts of electrical panel, solar panels or 3phase pump, switch off the main circuit breaker inside the panel and wait 5 minutes for the DC capacitors to discharge.

WARNING

- Solar panel voltage open voltage can reach values up to 800V DC.
- Install and close all covers.
- Failure to follow these instructions will result in death or serious injury.
- Any changes made to the parameter settings must be performed by qualified personnel.
- Do not install or operate damaged equipment or equipment that appears to be damaged.

- Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel.
- No responsibility is assumed by HH Electrical for any consequences arising out of the use of this product.
- **Do not run this controller without load**

HOW THE SOLAR PUMP WORKS

- In the morning and in the afternoon, the inverter will decide if there is enough power to drive the pump.
- This will happen automatically in time periods between 6-10 minutes.
- During the day, if there are clouds, it will drop the speed of the pump and increase again as the clouds disappear.
- Too many clouds will stop the pump but on the auto time period check for enough power to let the pump run again.
- The controller will do all the decisions in auto mode.
- NB!!! An AC input is available to do power sharing where the controller will first use all the solar power and then the rest out of the AC input.

STEPS FOR SETTING UP THE G1 3PHASE SOLAR PUMP

1. Install solar panels as per you manual received do not plug panels into each other
2. Mount your controller under your solar panels and connect only the positive and negative wire to the circuit breaker inside the controller (MAKE SURE NO WATER "RAIN" CAN REACH THE CONTROLLER)
3. Connect your motor to the controller to check direction
4. Plug solar panels into each other
5. Switch circuit breaker on and push manual start to check direction of motor. the motor must turn anti clockwise (looking from the top of the shaft).if not swop any 2 of the motor wire's around.
6. Switch circuit breaker of. Disconnect motor wires. install motor, pump etc to borehole
7. Re-connect motor wiring and manually start the pump before the water will reach the top
8. Your installation is now complete. Enjoy your solar water.

EARTHING

1. Make sure all metal parts are earthed to the common earth inside the controller.
2. All earthings must be done according to electrical standards.
3. Check all mechanical and electrical connections before starting

SPECIFICATIONS – SOLAR CONTROLLER

Inverter output	Drive rating
Inverter efficiency	97.5%
Ac amps	Drive rating
Ac voltage	Drive rating
dc voltage for 3Phase 220v motor	Max: 400V DC open circuit Min: 283V DC full load
dc voltage for 3Phase 400v motor	Max: 800V DC open circuit Min: 537V DC full load
24v dc controls	100ma
Frequency/ voltage control	Auto
Motor thermal protection	Yes
Current limit	Yes
Dry run protection	Yes
Auto sleep	Yes
Auto wake up	Yes
Power tracking	Yes

Soft start	Yes
Soft stop	Yes
Winter pumping hours	+/- 5.5 hours
Average pumping hours yearly	+/- 6.75 hours
Automatic restart	Yes
Motor phase loss protection	Yes
Inverter overheating protection	Yes
Motor overload protection	Yes
Under voltage	Auto stop
Lcd display	Yes
Carry in warranty	1 year
Low idle current	Yes
Emc filter	Yes
Waterproof Enclosure	Yes

FAULTS WHICH CANNOT BE RESET AUTOMATICALLY

The cause of the fault must be removed before resetting by switching off and then on again.

FAULT	PROBABLE CAUSE	REMEDY
B L F Brake sequence	<ul style="list-style-type: none"> · Brake release current not reach · Brake engage frequency bEn = nO (not adjusted) when brake logic blC is assigned. 	<ul style="list-style-type: none"> · Check the drive/motor connection · Check the motor windings. · Check the lbr setting in the FUn- menu
C r F Capacitor load circuit	<ul style="list-style-type: none"> · Load relay control fault or Charging resistor damaged 	<ul style="list-style-type: none"> · Replace the drive
E E F EEPROM fault	<ul style="list-style-type: none"> · Internal memory fault 	<ul style="list-style-type: none"> · Check the environment (electromagnetic Compatibility) · Replace the drive
I n F Internal fault	<ul style="list-style-type: none"> · Short-circuit on the 10 v power supply · Internal fault 	<ul style="list-style-type: none"> · Check the circuits connected to the 10 V · Check the wiring of inputs AI1 and AI2 and The connection to the connection to the RJ45 connector. · Check the environment (electromagnetic Compatibility) · Replace the drive
O C F Overcurrent	<ul style="list-style-type: none"> · Incorrect parameters in the Set- And drC- menus · Inertia or load too high · Mechanical blockage 	<ul style="list-style-type: none"> · Check the Set- and drC- parameters · Check the size of the motor/drive/load. · Check the state of the mechanism.
S C F Motor short-circuit	<ul style="list-style-type: none"> · Short-circuit or earthing at the Drive output · Significant earth leakage current at the drive output when several motors are connected in parallel 	<ul style="list-style-type: none"> · Check the cables connecting the drive to the motor, and the motor insulation · Reduce the switching frequency. · Connect chokes in series with the motor
S O F Overspeed	<ul style="list-style-type: none"> · Instability or · Driving load too high 	<ul style="list-style-type: none"> · Check the motor, gain and stability parameters. · Add a braking resistor · Check the size of the motor/drive/load
t n F	<ul style="list-style-type: none"> · Special motor or motor whose power is not suitable for the drive · Motor not connected to the drive 	<ul style="list-style-type: none"> · Use the L or the P ratio · Check the presence of the motor during auto-tuning. · If a downstream contactor is being used, Close it during auto-tuning.

FAULTS – CAUSES – SOLUTIONS

Faults which can be reset with the automatic restart function, after the cause has disappeared. These faults can also be reset by switching the drive off and on again or via a logic input (rSF parameter in the FLT-menu)

FAULT	PROBABLE CAUSE	REMEDY
C O F CANopen fault	<ul style="list-style-type: none"> · Interruption in communication on · The CANopen bus 	<ul style="list-style-type: none"> · Check the communication bus. · Please refer to the product-specific documentation
E P F External fault	<ul style="list-style-type: none"> · According to user 	<ul style="list-style-type: none"> · According to user
L F F Loss of 4-20mA	<ul style="list-style-type: none"> · Loss of the 4-20 mA reference on Input AI3 	<ul style="list-style-type: none"> · Check the connection on input AI3
O b F Overvoltage during deceleration	<ul style="list-style-type: none"> · Braking too sudden or · driving load 	<ul style="list-style-type: none"> · Increase the deceleration time · Install a braking resistor if necessary. · Activate the brA function if it is compatible with the application.
O H F Drive overheated	<ul style="list-style-type: none"> · Drive temperature too high 	<ul style="list-style-type: none"> · Check the motor load, the drive ventilation and the environment. Wait for the drive to cool down before restarting.
O L F Motor overload	<ul style="list-style-type: none"> · Triggered by excessive motor current · Incorrect value of parameter rSC 	<ul style="list-style-type: none"> · Check the lth setting (motor thermal protection) check the motor load. Wait for the drive to cool down before restarting. · Measure rSC again
O P F Motor phase loss	<ul style="list-style-type: none"> · Loss of phase at drive output · Downstream contactor open · Motor not connected or motor power to low · Instantaneous instability in the motor current 	<ul style="list-style-type: none"> · Check the connections from the drive to the motor · If a downstream contactor is being used, set OPL · Test on a low power motor or without a motor : In factory settings mode, motor phase loss detection is active (OPL = YES) To check the drive in a test or maintenance environment without having to switch to a motor with the same rating as the drive (particularly useful in the case of high power drives), deactivate motor phase loss detection (OPL = no). · Check and optimize the UFr, UnS and nCr parameters and perform auto-tuning with tUn
O S F Overvoltage	<ul style="list-style-type: none"> · Line voltage too high · Disturbed line supply 	<ul style="list-style-type: none"> · Check the line voltage
P H F Line phase failure	<ul style="list-style-type: none"> · Drive incorrectly supplied or a fuse blown · Failure of one phase · 3-phase ATV31 used on a single phase line supply 	<ul style="list-style-type: none"> · Check the power connection and the fuses. · Reset · Use a 3-phase line supply · Disable the fault by setting IPL = nO

	<ul style="list-style-type: none"> · Unbalanced load: This protection only operates with the drive on load. 	
S L F Modbus fault	<ul style="list-style-type: none"> · Interruption in communication on the modbus bus · Remote terminal enabled (LCC= YES) and terminal disconnected. 	<ul style="list-style-type: none"> · Check the communication bus. · Please refer to the product-specific documentation · Check the link with the remote terminal

Faults which can be reset as soon as their cause disappears

Fault	Probable cause	Remedy
C F F Configuration fault	<ul style="list-style-type: none"> · The current configuration is inconsistent. 	<ul style="list-style-type: none"> · Return to factory settings or call up the backup configuration, if it is valid. See the FCS parameter in the I-O, drC-, CtL- or Fun-menu.
C F I Configuration fault via Serial link	<ul style="list-style-type: none"> · Invalid configuration The configuration loaded in the drive via the serial link is inconsistent. 	<ul style="list-style-type: none"> · Check the configuration loaded previously. · Load a consistent configuration.
U S F Undervoltage	<ul style="list-style-type: none"> · Line supply too low · Transient voltage dip · Damaged load resistor 	<ul style="list-style-type: none"> · Check the voltage and the voltage Parameter USF trip threshold. · Replace the drive.

EXAMPLE OF SOLAR PUMP INSTALLATION

