

UGE-4K Off-Grid Controller

OWNER'S MANUAL



CONTENTS

INTRODUCTION	3
PARTS LIST	4
SPECIFICATIONS	5
SAFETY INSTRUCTIONS.....	6-7
INSTALLATION	8
<i>MOUNTING GUIDE</i>	9
WIRING DIAGRAM	10
CONTROLLER INTERFACE	11
WIRING INSTRUCTIONS	14
SYSTEM START-UP	15
OPERATION & MAINTENANCE	16
DIVERSION LOAD OPERATION.....	17
LCD DISPLAY	18
NOTES.....	19
TECHNICAL SUPPORT	Back

INTRODUCTION

Dear UGE-4K Owner,

Congratulations on purchasing your Urban Green Energy (UGE) 4kW rated Vertical Axis Wind Turbine (VAWT) and Off Grid Controller and welcome to our family.

Enclosed in this manual is information regarding installation, operation and maintenance of the controller. Please read through the manual in its entirety before installing and using your turbine and controller. Under certain circumstances this information may not be fully comprehensive and additional instruction or information may be required in order to successfully and safely complete the installation.

These installation and maintenance instructions contain important information for the safe installation and maintenance of the UGE-4K off grid controller. Designed for use with the UGE-4K VAWT, the function of the controller is to take the variable 3-phase AC output from the permanent magnet generator in the wind turbine and convert it to a stable 48V DC output to charge a battery bank. The controller also manages the turbine so that it performs safely and optimally.

The controller should only be installed by qualified personnel such as an employee of a UGE distributor or a certified electrician. Yearly maintenance checks should be performed by qualified personnel. The owner should retain a copy of this manual for reference and to give to future maintenance personnel.

This manual should be used in conjunction with turbine installation manual, and the UGE Electrical Supplement. These manuals can be found on the website of the tower and electronics suppliers respectively or can be provided by your UGE distributor.

We would like to hear from you with any questions or comments that you have. Please contact us during working hours (Monday-Friday 9:00am to 6:00 pm - US Eastern Time) at:

Telephone: +1 (917) 720-5685

Website: www.urbangreenenergy.com

Email: techsupport@urbangreenenergy.com

Sincerely,

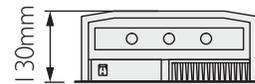
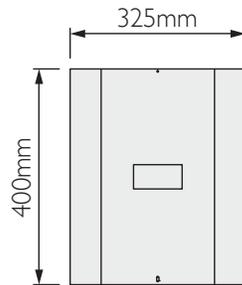


PARTS LIST

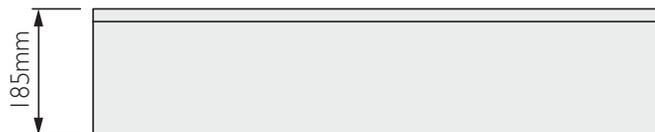
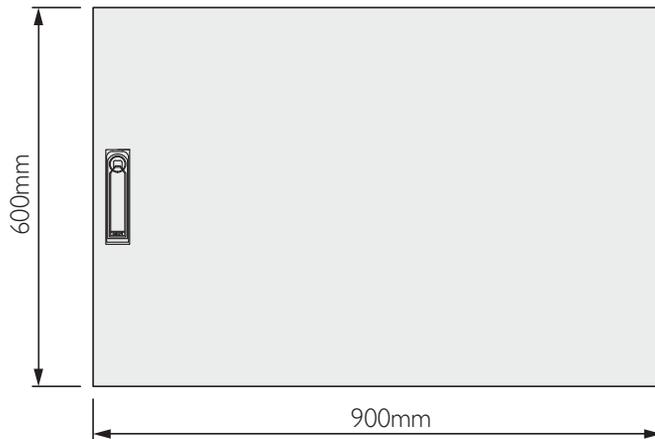
Check the Charge Controller and Parts

Please check all the parts based on the following instructions when receiving the package. Contact your local dealer if any part is missing.

x1 Controller



x1 Diversion Load



x3 Cable Gland



SPECIFICATIONS

Output Voltage	48V
Input Voltage Range (line to line voltage)	50-230Vrms
Charge Start/Stop Voltage (line to line voltage)	50Vrms/45Vrms
Rated Input Current	20A
Maximum Charge Efficiency/MPPT Efficiency	>85%/>90%
Standby Consumption	<5W
Floating Charge Voltage	55.2Vdc ± 1V
Over-charge Protection	57.6V ± 1V
Discharge Stop Voltage	46Vdc ± 1V
Battery Sleep Mode Voltage	40Vdc ± 1V
Max. Charge Current	62.5A
Load Connection	Dry Contact, Can turn on a DC/AC inverter.
User Interface	LCD status indicators
Operating Temperature	-20°C~40°C
Controller	
Dimension (L × W × H) mm	400 × 325 × 130
Weight	15kg
IP Grade	IP43
Diversion Load	
Dimension (L × W × H) mm	900 × 600 × 185
Weight	38kg
IP Grade	IP43

SAFETY INSTRUCTIONS

The charge controller shall be installed and operated in accordance with the instructions in this User Manual. The following conventions are used in this guide:



WARNING

Warnings identify conditions that could cause personal injury, loss of life, or serious damage to the unit or other equipment.



CAUTION

Warnings identify conditions or practices that could cause personal injury or damage to the unit.

-  **1. The UGE-4K-OGC and supported diversion load should be installed indoors or a dry place that avoids direct sunlight, rain and snow and has good ventilation. Do not leave anything heavy on top of the controller.**
-  **2. Keep the controller and battery away from flammables and items that can conduct electricity.**
-  **3. Always use the controller with the supported diversion loads.**
-  **4. The diversion load cannot be covered by other items and cannot be placed within 300 mm (1 ft) of any flammable, heat sensitive, and/or explosive items.**
-  **5. If the controller or turbine behaves abnormally, use the safety brake to stop the wind turbine and disconnect the controller from battery. Do not start the controller until you have contacted UGE tech support and the observed issue is resolved.**
-  **6. When the wind speed is high, the temperature of the Diversion Load will be high.**
-  **7. If the wind turbine is allowed to spin at high speeds without electrical resistance, such as when the electronics are not completely and properly installed, the turbine may be “free-spinning” which can lead to extremely dangerous operation. ALLOWING YOUR WIND TURBINE TO FREE SPIN WILL VOID YOUR WARRANTY. Make sure that unless the turbine is fully operational, it is completely stopped either through electrical or mechanical means.**
-  **8. Check the appearance of the charge controller before installation. Contact your local dealer if any obvious damage is found.**

SAFETY INSTRUCTIONS

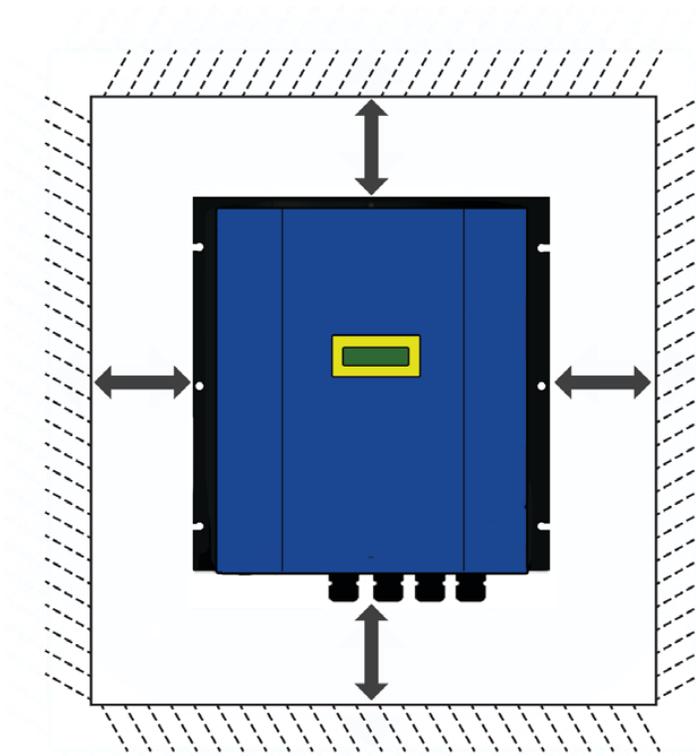
-  **9. The weight of this controller is around 15kg. Always treat the charge controller with caution during transportation and installation.**
-  **10. Do not install the controller in gusty weather conditions.**
-  **11. The controller should be mounted vertically against the wall. Do not mount the controller on an angle (see page 9).**
-  **12. This controller is for use with the UGE-4K wind turbine only.**
-  **13. Connect the wires by following the wiring instructions on page 12.**
-  **14. Follow the wire sizing guide provided in the wire connection diagram (see page 13).**
-  **15. It could damage the controller permanently if the controller and battery are not wired properly, e.g. connecting the positive and negative polarities reversely.**
-  **16. Wires must be secured tightly to terminals to prevent causing a short or open circuit.**
-  **17. Ground the shell of this machine properly to avoid electrical shock.**
-  **18. Check whether the battery voltage is within the normal range before starting the controller.**
-  **19. Do not connect the controller to batteries that will operate in voltage outside the battery voltage range defined on the specification table, page 5.**
-  **20. Do not remove the warranty and/or serial number labels.**
-  **21. Keep this manual for your future reference.**

INSTALLATION

Step 1

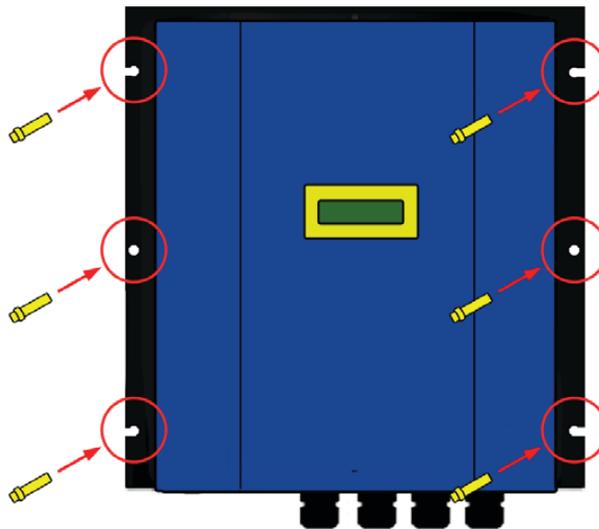
Check the installation location

- minimum 20cm (8") clear space around the machine is required for heat dissipation



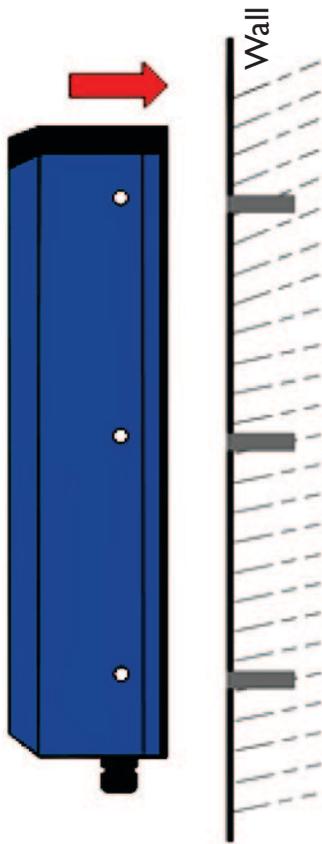
Step 2

Mount the charge controller



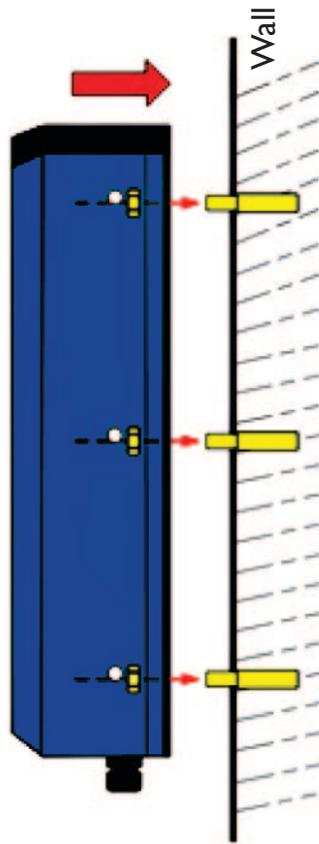
INSTALLATION

Mounting Guide



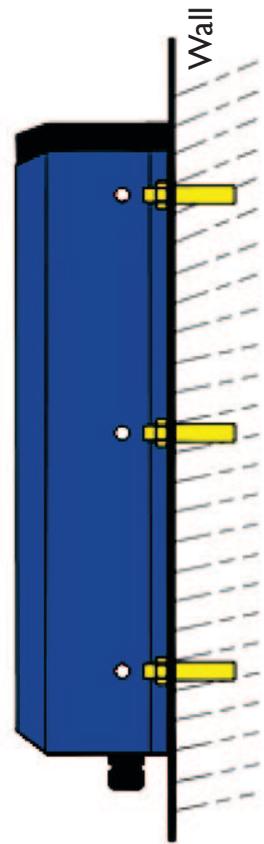
Step 2.1

Put the controller against the wall and mark the locations for drilling (6 holes).



Step 2.2

Drill 6 holes and place anchors into those holes.



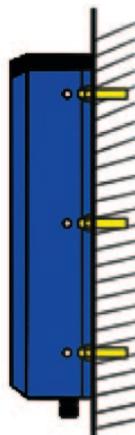
Step 2.3

Fasten screws and secure the controller.

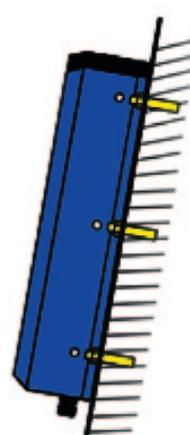


CAUTION

The mounting method in **C** is prohibited.



A



B



C

WIRING DIAGRAM

Electrical System Overview

Detailed wiring diagrams are available from the UGE website or your UGE distributor.

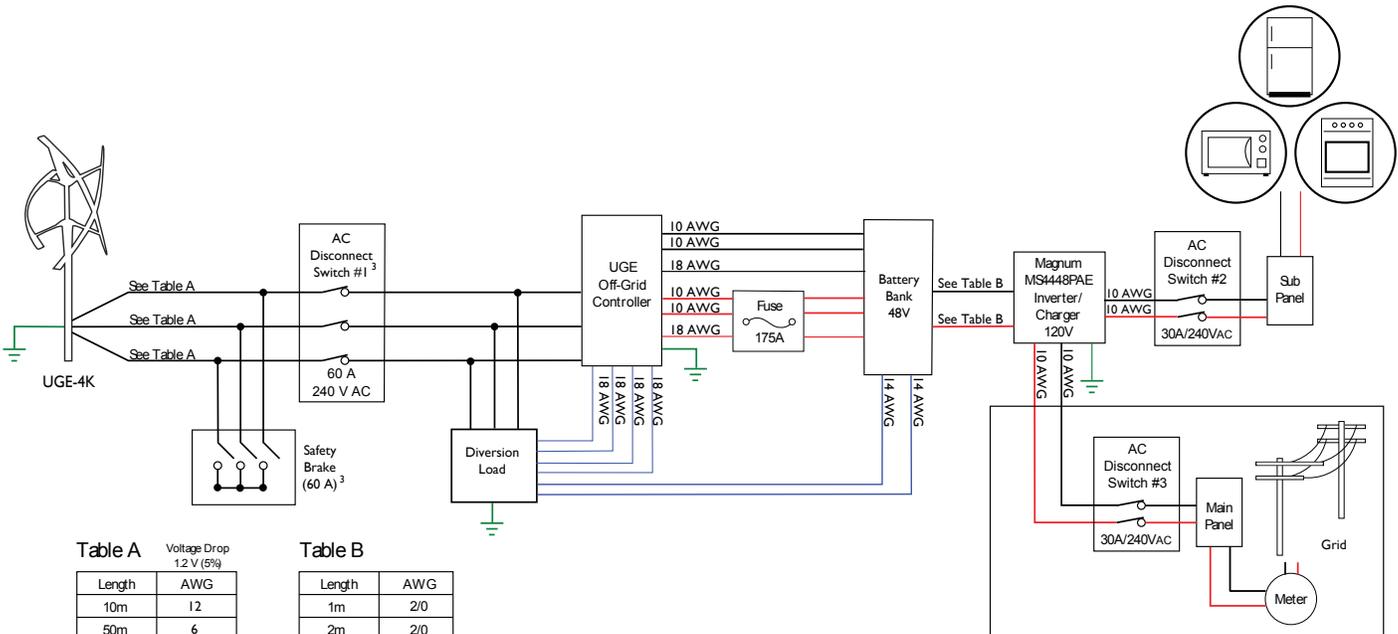


Table A Voltage Drop
1.2 V (5%)

Length	AWG
10m	12
50m	6
100m	4
150m	2

Table B

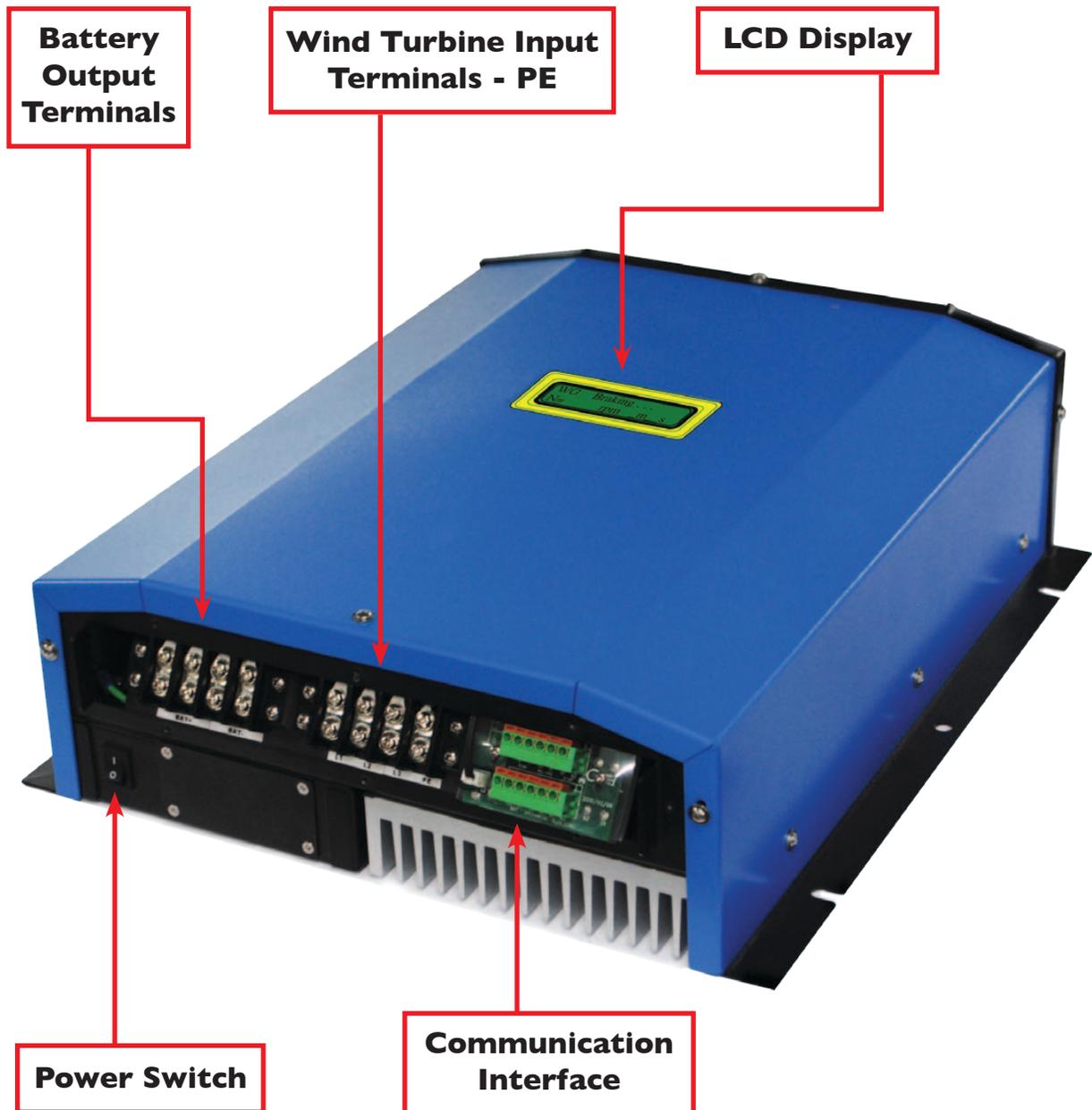
Length	AWG
1m	2/0
2m	2/0
3m	4/0
5m	4/0x2

Notes:

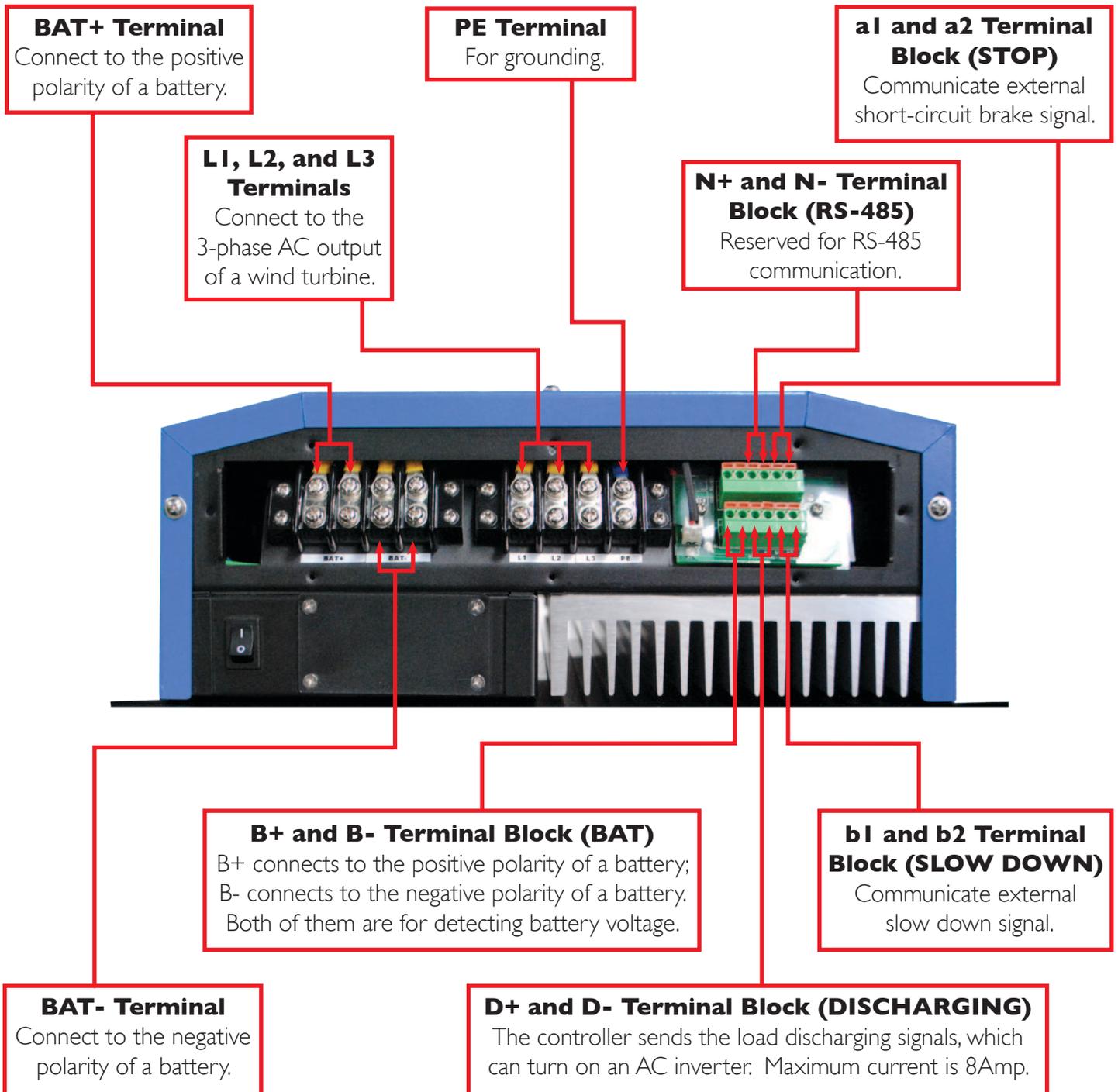
- ¹ Wire gauge recommendations based on NEC 310.16 for THHW copper wire below 100'F
(A certified electrician shall verify wire gauge meets local electrical code)
- ² Each grounded component shall have its own ground wire and connect at a common earth ground
- ³ AC disconnect switch #1 and the safety break should be nonfusible

INSTALLATION

Controller Interface

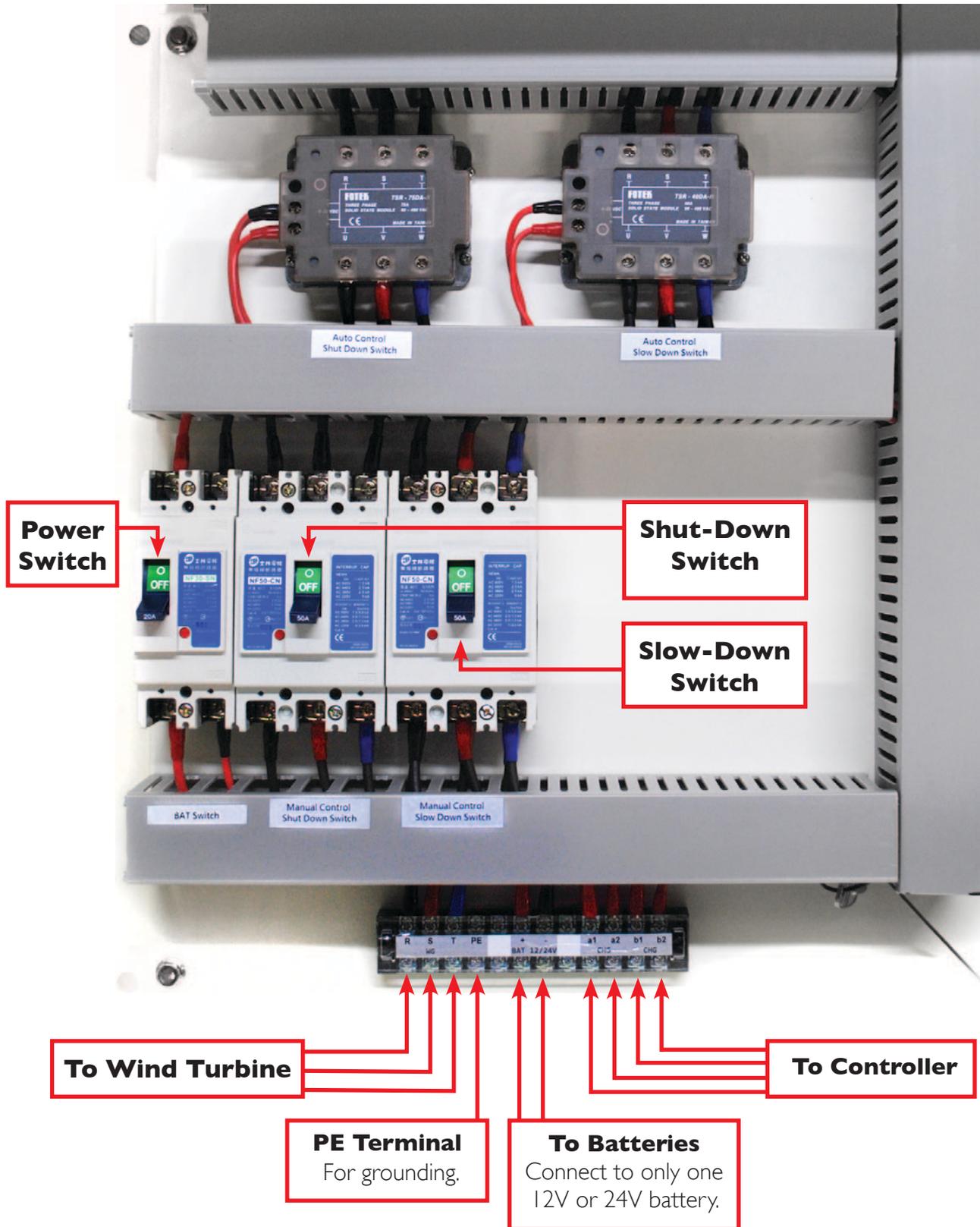


INSTALLATION



INSTALLATION

Diversion Load



WIRING INSTRUCTIONS

 ***This machine includes components carrying high voltage electricity that could potentially cause serious personal injury or even loss of life. The controller shall only be installed by a qualified professional such as a licensed Electrician or UGE distributor. The wiring of the controller shall meet the requirements of the NEC or the local electrical code.***

 ***Before starting installation, please make sure the input and output power both are shut down to avoid electrical shock.***

 ***Do not mount the controller above the diversion load, since the heat may damage the controller.***

1. Connect the output of your wind turbine to L1, L2, L3 terminals with 14AWG wires. Make sure the wind turbine is fully shut down during wiring.

 ***Correct polarity must be observed when connecting the battery cables to the controller.***

 ***Use caution when connecting the battery leads to avoid shorting them together.***

2. Connect BAT(+) lines, 10AWG*2 in RED, to the positive polarity of a battery and BAT(+) terminal. Battery lines should be shorter than 5 meters. (16' – 0")

3. Connect BAT(-) lines, 10AWG*2 in BLACK, to the negative polarity of a battery and BAT(-) terminal. Adding a no fuse breaker (NFB) to the battery circuit is highly recommended.

4. Connect the positive battery detection line, 18AWG in RED to B+ socket and the positive polarity of a battery.

5. Connect the negative battery detection line, 18AWG in BLACK, to B- socket and the negative polarity of a battery. The circuit for battery detection must be independent.

 ***DO NOT share the same circuit with other wires.***

6. Connect the black brake signal lines to b1 and b2 and the resistor brake disc and red brake signal lines, a1 and a2, to the short-circuit brake disc – please see the following chart.

7. Connect the discharge control lines, 14AWG*2 in Orange, from the on/off switch of an AC inverter to D+ and D- sockets.

SYSTEM START-UP

1. Engage the safety brake to stop the wind turbine.



2. Check the battery voltage and make sure that the battery detection lines are wired properly.

3. Turn on the battery switch.

4. Turn on the charge controller.

5. Check whether there is LCD initializing message. Make sure that the battery is operating normally.

6. Put AC disconnect #1 in the "On" position. Disengage the safety brake of the wind turbine.

7. Observe whether the LCD display MPPT charging, if the wind is enough for cut-in.

8. Check the LCD display. Make sure that the system displays no error messages and is operating normally.

OPERATION & MAINTENANCE

- I. The controller includes the following safety protections to ensure safe and reliable operation of the wind turbine system:
 - a. Wind Turbine Over-speed Protection: when the wind turbine is over-speed, the controller will start to dump exceeding power to external resistor(s) to slow down the speed. If the speed is still too high, the controller will trigger a short circuit brake.
 - b. Input Over-voltage Protection: when the input voltage is too high, the controller will start to dump exceeding power to resistor(s) to slow down the wind turbine.
 - c. Output Over-power Protection: when the output current is too high, the controller will start to dump exceeding power to resistor(s) to slow down the wind turbine.
 - d. Battery Over-charge Protection: when the battery voltage is higher than the floating charge voltage, the controller will start to dump exceeding power to resistor(s) to slow down the wind turbine. In other words, the controller will stop the MPPT function and enter a battery protection mode to protect the battery when the battery is full.
 - e. High Voltage Protection: the controller can protect itself from being damaged by certain high voltage pulse, such as a lightning strike.
2. The charge controller requires little maintenance if it is used properly. Please periodically clean the controller surface with a cloth. In addition, please keep the wind turbine, generator, and battery in a good condition to ensure the whole system can function well.
3. Check the operating status of the controller and diversion load box regularly. Please pay attention to the warning messages and follow the instructions labeled on the charge controller.
4. Contact UGE Technical Support if the controller display does not function normally. See back cover for Technical Support contact information. Do not try to repair the controller by yourself.



This machine includes components carrying high voltage electricity that could potentially cause serious personal injury or even loss of life. Only a qualified professional such as a licensed Electrician or UGE distributor should repair or replace parts.



The safety brake must be applied before all maintenance procedures with the turbine. Allowing the turbine to free spin without a brake can cause severe damage to the turbine, and will void the warranty.

Keep this manual for your future reference.

DIVERSION LOAD OPERATION

Standard Operation

1. Normal Setup:

Power Switch: **On**

Manual Shut-Down Switch: **Off**

Manual Slow-Down Switch: **Off**

2. Manual shut-down procedure:

Step 1: Power Switch: **On**

Step 2: Manual Slow-Down Switch (S3) = **On** (Slow down first)

Step 3: Manual Shut-Down Switch (S2) = **On** (Shut down)

Switch Configurations

1. Power Switch:

On: Standard Operating Mode: The diversion load is on.

Off: The diversion load will shut down. Should not be in this position during normal operation.

2. Manual Slow-Down Switch:

On: The wind turbine will slow down.

Off: The Wind Charge Controller will control the braking signal automatically.

3. Manual Shut-Down Switch:

On: The wind turbine will stop spinning immediately.

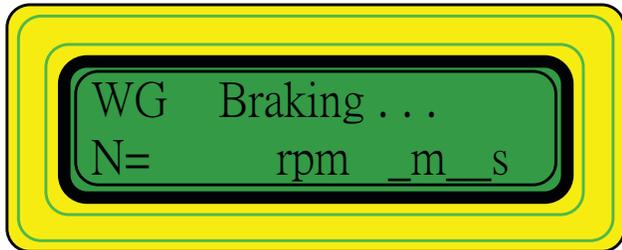
 **If the wind turbine is spinning, please engage the Slow-Down Switch first.**

Off: The Wind Charge Controller will control the braking signal automatically.

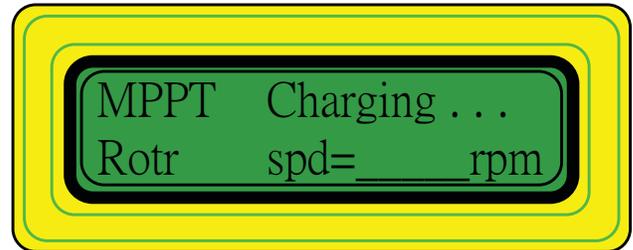
4. Advanced independent braking feature:

As a backup safety feature, the control box can slow the wind turbine on its own.

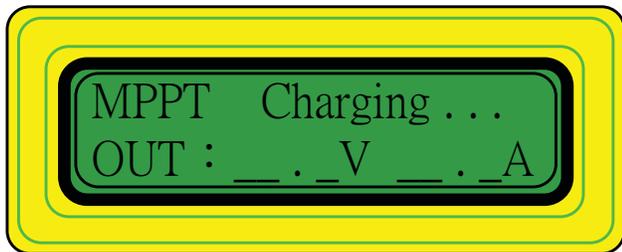
LCD DISPLAY



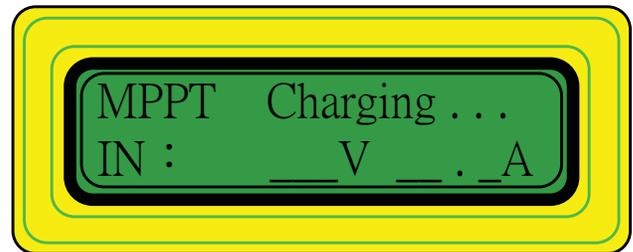
Braking Status



R.P.M. of the Wind Generator



Output Voltage and Current



Input Voltage and Current

NOTES



TECHNICAL SUPPORT

If your product requires troubleshooting or warranty service, contact your merchant. If you are unable to contact your merchant, or the merchant is unable to provide service, contact UGE directly at:

Urban Green Energy

**330 West 38th Street
Suite 1103
New York, NY 10018**

Tech. Support Phone: +1 (917) 720-5685
Email: techsupport@urbangreenenergy.com

This manual is an adaptation of the Power General WCHG-483000 installation manual for this product and is meant to be used as a guideline only. For specific details, refer to the Power General manual. A certified electrician or the project electrician is responsible for verifying that the controller installation meets local electrical code. UGE provides this manual as a guideline and is not responsible for any errors which may occur due to the use of this manual.