MidNite Solar Clipper Instructions

The MNCLIPPER works with the MidNite Solar Classic MPPT Charge Controller to provide the highest level of performance and protection possible.

Features:

- Helps protect turbine from overspeed.
- Braking feature included.
- Convenient switching between run / turbine Stop.
- Settable voltage threshold for clipping.
- 50 Amp pass-through.
- D.C. or Three Phase AC models with heavy duty three phase bridge rectifier.
- AC model Converts three phase AC input to D.C. for the Classic.
- Durable powdercoated chassis.
- MNSPD Surge protective devices (optional) can be added for protection against surges.
- Available in 1.5 and 4.0 KW models.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS - These instructions contain important safety and operating instructions for the MidNite Solar MNClipper.

If you do not fully understand any of the concepts, terminology, or hazards outlined in these instructions, please refer installation to a qualified dealer, electrician or installer. These instructions are not meant to be a complete explanation of a renewable energy system.

GENERAL PRECAUTIONS

If service or repair should become necessary, contact MidNite Solar Inc. Improper servicing may result in a risk of shock, or fire.
To reduce these risks, disconnect all wiring before attempting any maintenance or cleaning. Turning off the inverter will not reduce these risks.
Do not work alone. Someone should be in the range of your voice or close enough to come to your aid when you work with or near electrical equipment.
Remove rings, bracelets, necklaces, watches etc. when working with batteries or other electrical equipment. Power from RE sources makes a very effective arc welder with dire consequences if one of the welded pieces is on your person.

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Disclaimer
Unless specifically agreed to in writing, MidNite Solar Inc.
(a) Makes no warranty as to the accuracy, sufficiency or suitability of any technical or other information provided in its manuals or other documentation.
(b) Assumes no responsibility or liability for loss or damage whether direct, indirect, consequential or incidental, which might arise out of use of such information. The use of any such information will be entirely at the user's risk.

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Theory of operation:

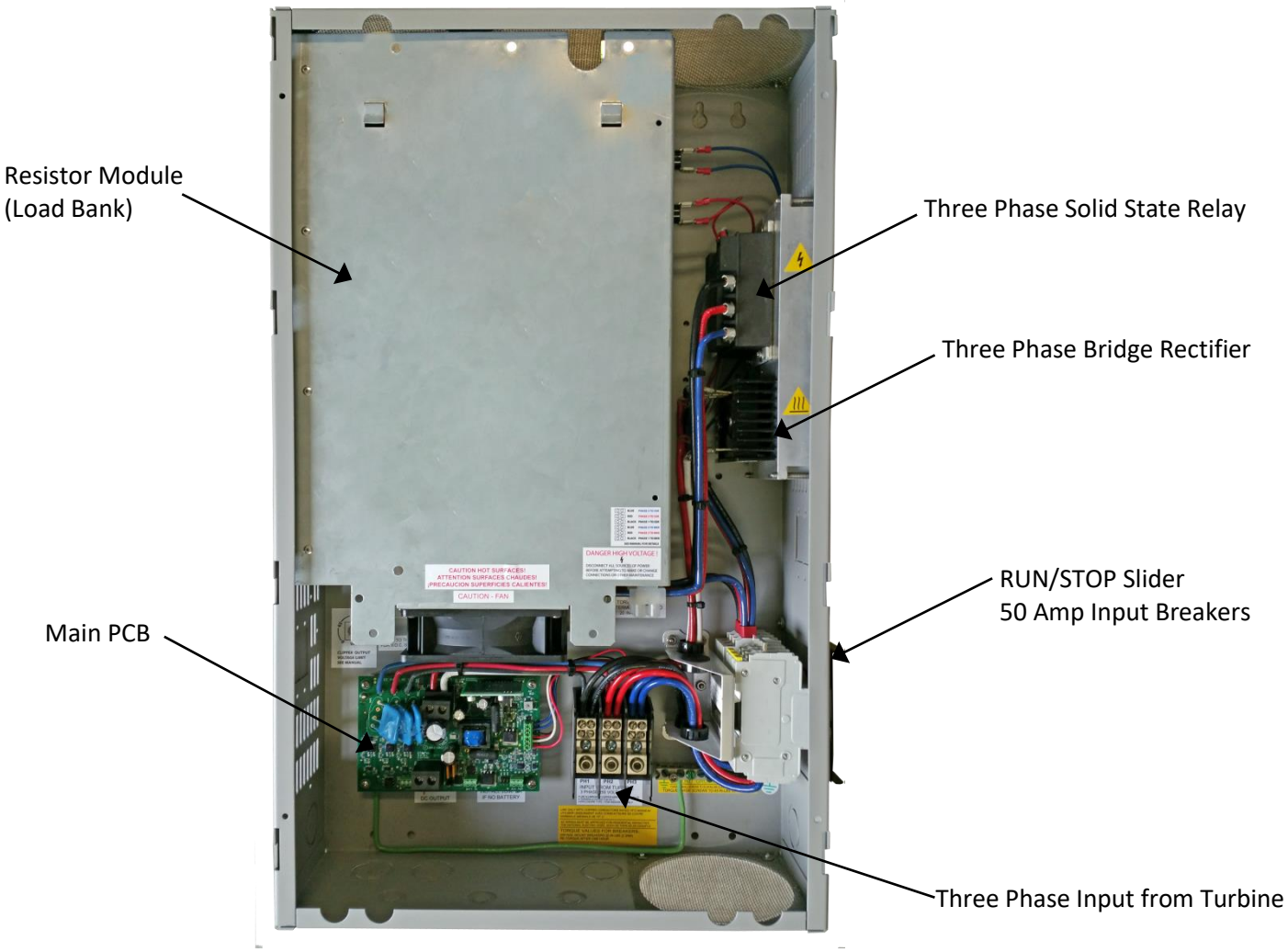
The Classic charge controller uses its AUX output to control the Clipper. As the batteries become charged and loads lessen the voltage will rise. When the voltage reaches pre-set levels, the Classic will send a pulse width modulated signal to the Clipper. This signal will engage the load resistors as needed to load down the input to a safe level. The Clipper also has a built in Self Powered user adjustable emergency fail safe max voltage setting. This will allow the clipper to keep the turbine under control if communications are lost with the Classic.

Caution:

Parts of the Clipper get hot during normal operation and high voltage is present at many locations. Do not touch any internal components of the Clipper until all power has been removed and the Clipper has had time to cool down.

The internal fan is temperature controlled and may run anytime that power is applied.

AC Clipper Major Components



Caution:

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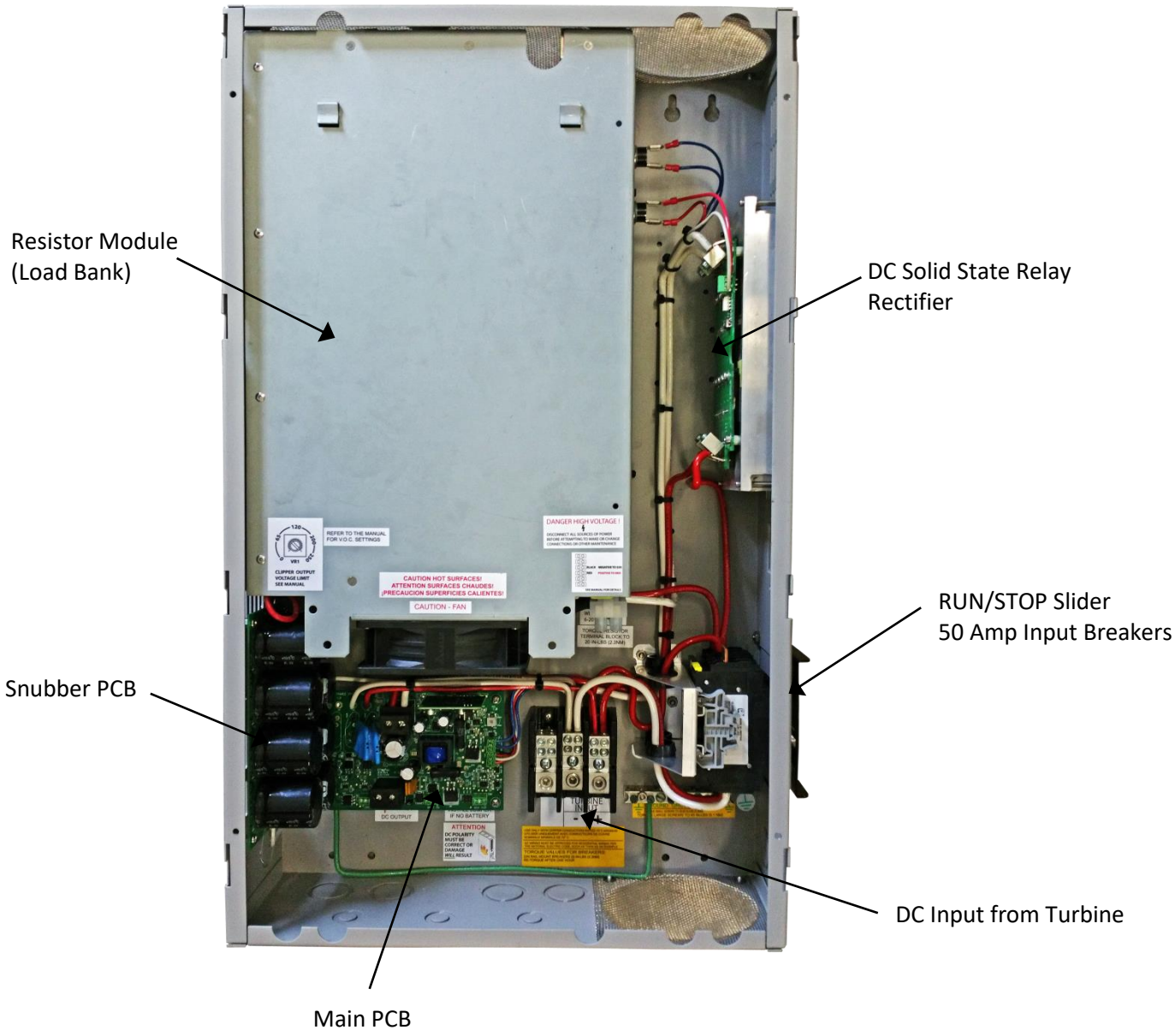
DC Clipper Major Components



INSTALLATION:

Mounting the MNClipper:
Mounting the MNClipper is not a difficult task but a little planning now can save a lot of grief later. It is recommended that you read and fully understand all the installation instructions and safety precautions before proceeding.

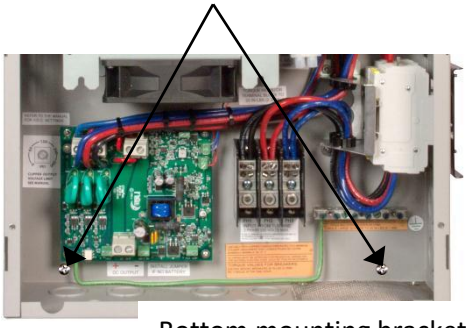
Parts Included are:
1 - MNClipper
2 - Mounting brackets
4 - 6mm Threadforming screws
1 - Instruction manual

Tools required for mounting the MNClipper are:
#2 Phillips screwdriver, stud finder and a level. A drill may be required to drill pilot holes.

The Clipper has a type 1 enclosure and should be installed only in a protected dry indoor location with adequate ventilation on all sides. The air exiting the exhaust of the Clipper will be hot when the Clipper is slowing the turbine. A minimum of 8” of clearance on the sides and bottom and 24” above the Clipper are recommended. The Clipper is somewhat heavy it is a good idea to be sure that the mounting surface can handle the weight. Also ensure that the mounting surface is heat resistant.

Remove the 4 screws on the Clipper door and set aside to reinstall later.
Locate the two mounting brackets included with the MNClipper. The narrower side of the mounting bracket with the smaller holes goes towards the MNClipper with the other side towards the mounting surface. The top and bottom brackets are identical.

First, install the bottom mounting bracket onto the Clipper using two of the included M6 threadforming screws.



Bottom mounting bracket shown installed.

Next, partially screw the remaining two M6 threadforming screws into the two holes on the narrower side of the top mounting bracket that line up with the keyhole slots on the upper back of the Clipper. The screws should be left just far enough out to allow the chassis to slide down into the keyhole slot.

Use a level and hold the top mounting bracket on the wall in a horizontal position and mark on the wall where the mounting screw holes will be placed. The mounting brackets are designed to line up with 16" centers.
If required, drill pilot holes using a #10 (0.193" diameter) drill bit.
Drill appropriately sized holes for heavy duty anchors (sold separately) when installing on non-wood surfaces.

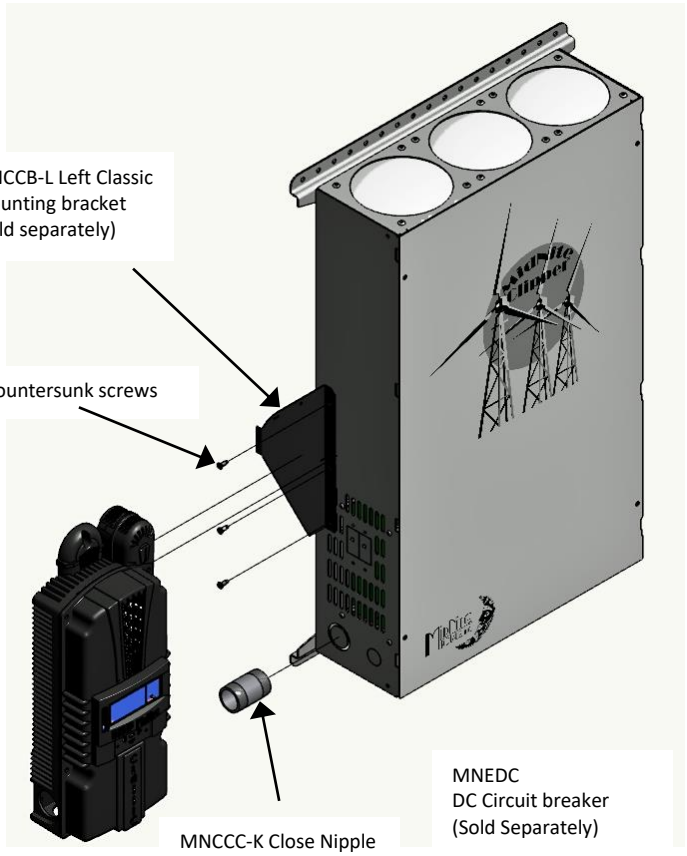
Secure the top mounting bracket to the wall using three ¼ X 1½ hex-head lag bolts (not included). Make sure that the outer two lag bolts are securely fastened into a stud. If mounting to other than a wood wall or surface, use appropriate screws and anchors as required. It is the installer's responsibility to ensure the adequacy of the wall mounting.

Lift the Clipper and place the keyhole slots (located on the upper back of the Clipper) directly over the mounting screws on the upper mounting bracket on the wall and lower into place.

Tighten the top mounting screws to secure the Clipper to the mounting bracket.

Secure the bottom mounting bracket to the wall using three ¼ X 1½ hex-head lag bolts (not included).
Be sure to observe NEC mounting height requirements.

Mounting a Classic charge controller:



With an MNCCB-L Left side mounting bracket (Sold separately) and three countersunk screws secure the MNCCB-L bracket to the side of the Clipper.
Required screws are included with the MNCCB-L.

Install the MNCCC-K conduit nipple on the lower knockout on the Clipper.

Remove the four screws on the face of the Classic and remove the cover. Caution – the MNGP cable connects the front of the Classic to the back and is fairly short. Carefully move the cover away just a little and disconnect the cable. Set the face aside for now.

Position the Classic on the bracket and secure with screws. Install the nuts on the conduit nipple to secure it in place. Three nuts are supplied with the MNCCC-K. One is used as a spacer. After all wiring to the Classic is complete, reconnect the MNGP cable and re-install the cover.
Circuit breakers are required on the input and output of the Classic Charge Controller.
MNEDC DC Circuit breakers are ideal for this.
See page 8 for breaker knockout location.

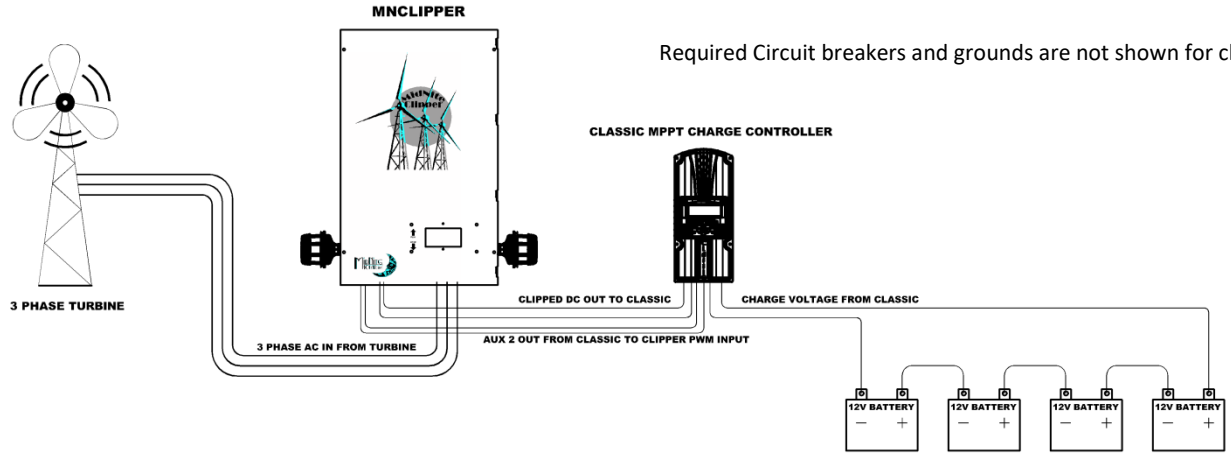
Refer to the Classic installation manual for further details including sizing of input and output breakers.

Wiring the Clipper:

Do not alter factory pre-wired connections!

Typical three phase system with Classic and Clipper
(Shown with optional equipment)

Required Circuit breakers and grounds are not shown for clarity.



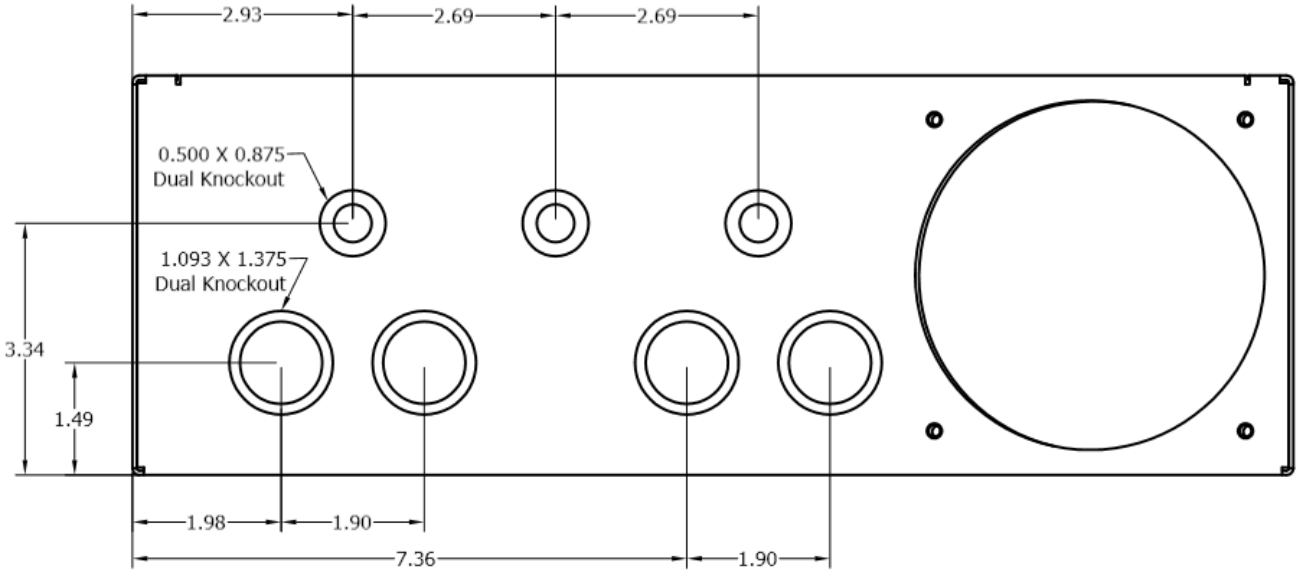
The Clipper is a complex device and should only be installed by an experienced installer!
The wiring diagrams beginning on page 16 show the various configurations of the Clipper. The wiring inside the dashed lines shows the connections in from the turbine and out to the charge controller.
Be sure to comply with all local and national code requirements including National Electrical Code ANSI/NFPA 70. Use Class 1 wiring methods for field wiring connections to terminals of a Class 2 circuit. Use only 14-2/0 gauge AWM wire. Select the wire gauge used based on the protection provided by the circuit breakers/fuses.

On the following pages are drawings of knockout locations and more detailed wiring information.

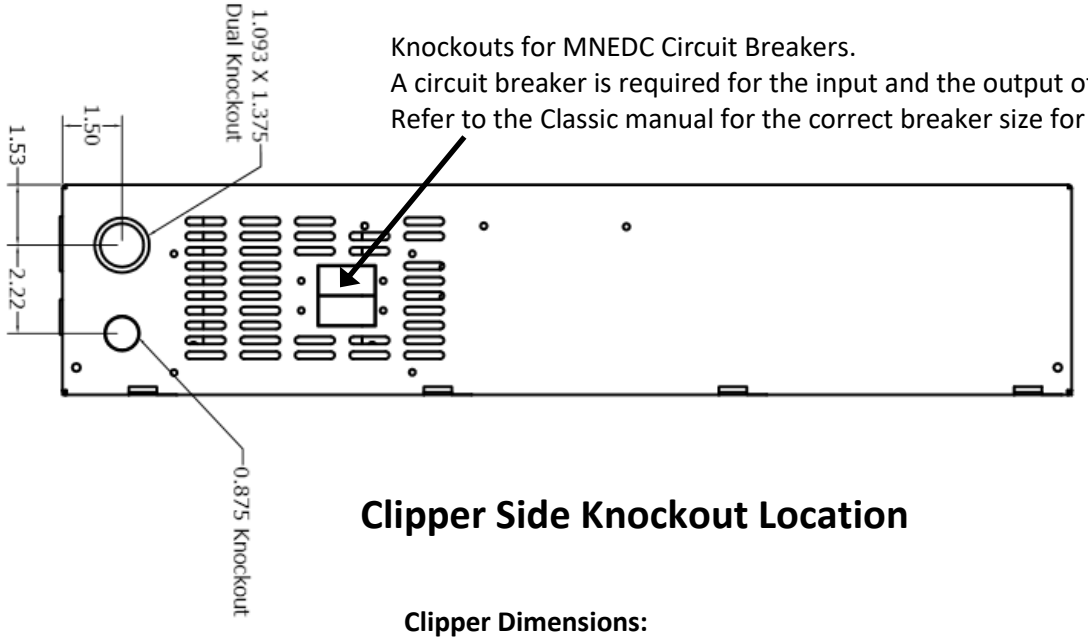
Below are the torque values for the ground busbar and various circuit breakers.

Ground Busbar Torque Values
Large Busbar Screws 18 - 10 AWG 35 In Lbs.
Large Busbar Screws 8 AWG 40 In Lbs.
Large Busbar Screws 6 - 4 AWG 45 In Lbs.
Large Busbar Screws 3-1/0 AWG 50 In Lbs.

Breaker Torque Values
MNDC-GFP63 Breaker 20 In-Lbs (2.3NM)
MNDC-GFP80 Breaker 30 In-Lbs (3.4NM)
MNDC-GFP100-Dual Breaker 30 In-Lbs (3.4NM)
MNDC-GFP50-300 Breaker 20 In-Lbs (2.3NM)
MNEDC5 to MNEDC100 Breaker 30 In-Lbs (3.4NM)
MNEDC60-300, MNEDC80-300 Breaker 30 In-Lbs (3.4NM)



Clipper Bottom Knockout Location



Knockouts for MNEDC Circuit Breakers.
A circuit breaker is required for the input and the output of the Classic.
Refer to the Classic manual for the correct breaker size for your system.

Clipper Side Knockout Location

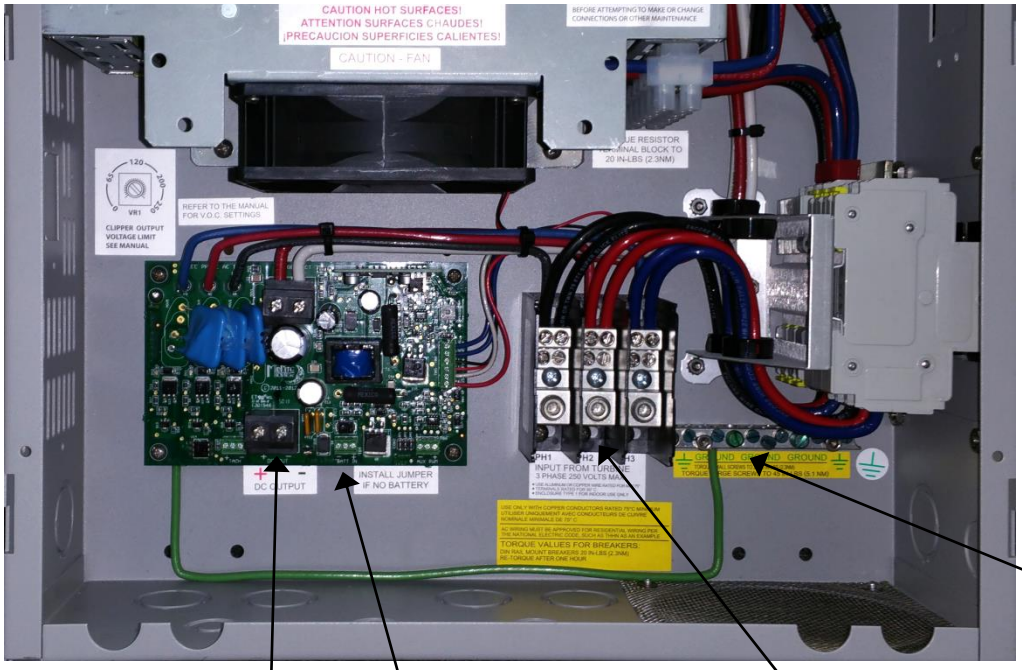
Clipper Dimensions:

25.411 Tall X 15.41 Wide
26.961 Tall including mounting brackets

Shipping Weight 55 lbs.

AC Clippers:

Connect phases 1, 2 and 3 (Phase order 1,2,3, is interchangeable) from the turbine to the corresponding lugs on the large terminal block at the lower right of the Clipper. Knockouts are located on the sides and bottom of the Clipper for wire entry/exit. Be sure to use appropriate grommets / conduit hubs to protect wiring from chafing.



Ground Busbar

Tachometer connections are not active at this time.

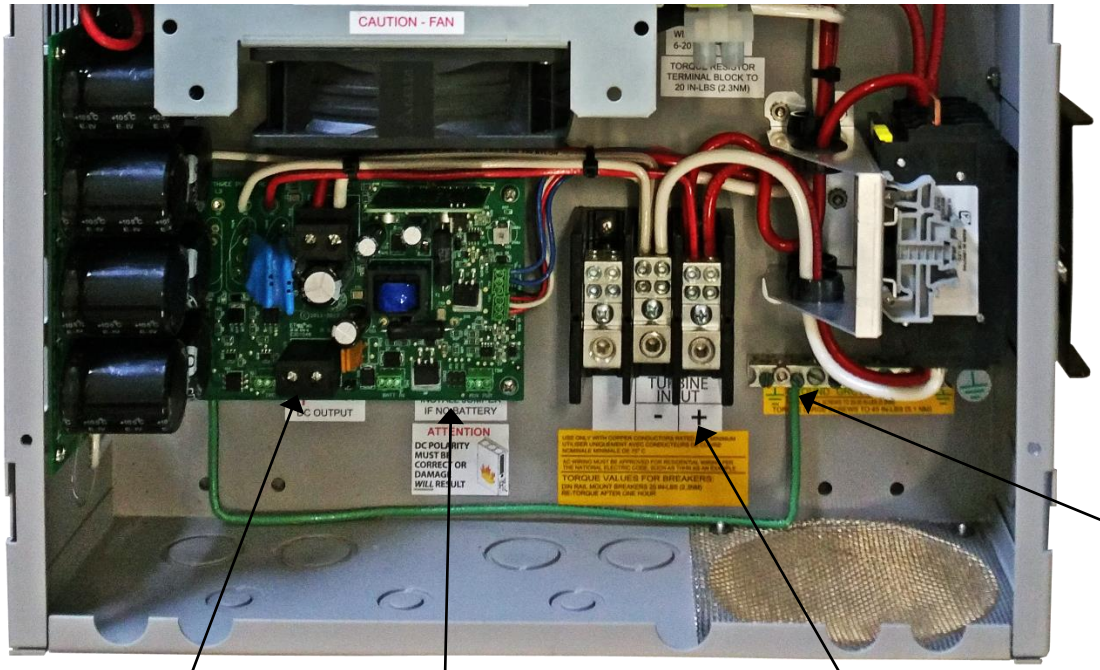
Do not remove JP4 (Battery jumper)

Three phase input from turbine
Terminal block accepts 2/0-14 AWG wire. Be sure to use a heavy enough gauge wire to carry all the current from the turbine

Connect the positive and negative outputs from the Clipper PCB Terminal block TB3 to the charge controller positive and negative inputs (refer to the documentation that came with your charge controller).
Observe proper polarity. *Severe* damage could result from improper wiring. Knockouts are located on the sides and bottom of the Clipper. See Page 8 for knockout locations and sizes.
The terminal block accepts 6-20 AWG wire. Be sure to use a heavy enough gauge wire to carry all the current from the turbine.
Connect the ground from the ground terminal busbar to earth ground.

TB3
Connect DC output to charge controller here.
Terminal block accepts 6-20 AWG wire.
Observe polarity.

DC Clippers:
Connect the turbine's DC output to the corresponding lugs Positive and negative on the large terminal block at the lower right of the Clipper. Knockouts are located on the sides and bottom of the Clipper for wire entry/exit. Be sure to use appropriate grommets / conduit hubs to protect wiring from chafing.



Ground Busbar

Do not remove JP4 (Battery jumper)

DC input from turbine
Terminal block accepts 2/0-14 AWG wire. Be sure to use a heavy enough gauge wire to carry all the current from the turbine

Connect the positive and negative outputs from the Clipper PCB Terminal block TB3 to the charge controller positive and negative inputs (refer to the documentation that came with your charge controller).
Observe proper polarity. *Severe* damage could result from improper wiring. Knockouts are located on the sides and bottom of the Clipper. See Page 8 for knockout locations and sizes.
The terminal block accepts 6-20 AWG wire. Be sure to use a heavy enough gauge wire to carry all the current from the turbine.
Connect the ground from the ground terminal busbar to earth ground.

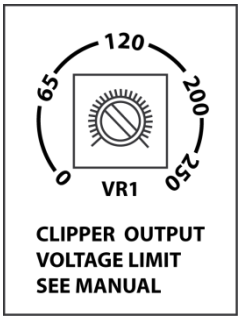
TB3
Connect DC output to charge controller here.
Terminal block accepts 6-20 AWG wire.

Clipper set-up and Clipping Voltage:

Before operating the Clipper for the first time it is necessary to set the desired upper voltage limit (Fail-Safe Clipping Voltage). The clipping voltage is determined by what your charge controller can safely allow. The Classic charge controller is available in 150, 200 and 250 volt versions. Most other controllers have considerably lower limits. Refer to the manufacturer's specification for your controller.

Using the Classic Charge Controller to control the Clipper: See page 12 and refer to the documentation that came with your Classic for details on how to set the Clipping Voltage. It is still necessary to set the upper limit on the trimpot (VR1) as a fail-safe. The fail-safe circuit is powered by the turbine output and operates independent of the Classic PWM control.

Open the clipper door and locate the trimpot (VR1) at the upper right side of the PCB located at the bottom of the Clipper. A small slotted screwdriver is required to make adjustments to the clipping level. The control is marked with approximate values. When setting the voltage turn the control until the arrow is pointing at the desired clipping voltage from 0 to 250 volts.



Output voltage adjustment trimpot (VR1)

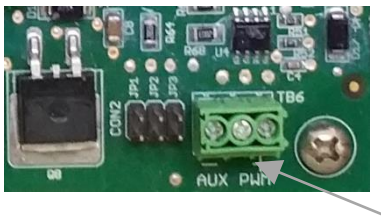
PRODUCT SPECIFICATIONS

	MNCLIP1.5KAC	MNCLIP4.0KAC	MNCLIP1.5KDC	MNCLIP4.0KDC
Enclosure Rating	INDOOR	INDOOR	INDOOR	INDOOR
Enclosure Material	Powder coated steel	Powder coated steel	Powder coated steel	Powder coated steel
Continuous Wattage	1,500 Continuous Watts	4,000 Continuous Watts	1,500 Continuous Watts	4,000 Continuous Watts
Input	3 Phase AC	3 Phase AC	DC	DC
Output	Clipped to 250 volts DC or less	Clipped to 250 volts DC or less	Clipped to 250 volts DC or less	Clipped to 250 volts DC or less
Stop Switch Included	YES	YES	YES	YES
Wire Range For Input	6 to 2/0 AWG (1.63 to 9.27mm)	6 to 2/0 AWG (1.63 to 9.27mm)	6 to 2/0 AWG (1.63 to 9.27mm)	6 to 2/0 AWG (1.63 to 9.27mm)
Wire Range For Output	14 to 6 AWG (1.63 to 4.11mm)	14 to 6 AWG (1.63 to 4.11mm)	14 to 6 AWG (1.63 to 4.11mm)	14 to 6 AWG (1.63 to 4.11mm)
Self Powered From Turbine	YES	YES	YES	YES
Stop Switch Amperage	50 Amps	50 Amps	50 Amps	50 Amps
Communicates With Classic	YES	YES	YES	YES
Standard Resistance Values Available	0.8 and 2.0 ohms per phase	0.4, 1.0, 1.6 and 4.0 Ohms per phase	2.4 Ohms	3.0, 4.8 and 12 Ohms
Classic & Required Breaker Can Be Mounted to the Clipper	Requires MNCCB-L charge controller bracket and breakers. (Not Included)	Requires MNCCB-L charge controller bracket and breakers. (Not Included)	Requires MNCCB-L charge controller bracket and breakers. (Not Included)	Requires MNCCB-L charge controller bracket and breakers. (Not Included)
SPD Ready	YES	YES	YES	YES
Listing	NONE	NONE	NONE	NONE

Controlling the Clipper with a Classic Charge Controller.

The Classic charge controller has a PWM (Pulse Width Modulation) output that can be used to control the Clipper's output voltage. This will provide very precise control of the power being produced. Refer to the "**Configuring Auxiliary Input/Output**" section in the Classic manual for settings and connections for the Classic.
To use this feature it will be necessary to run two wires from the Classic AUX2 output to the terminal block TB6 on the Clipper PCB. 18 ga twisted pair is recommended to reduce noise.

For the Clipper to function properly and efficiently, the Classic needs to be programmed with turbine specific data such as the maximum input regulation voltage and a 16 step wind curve. The Classic watches the current and changes the voltage according to this wind curve. There are several wind curves available in the Classic for some of the more common turbines but a custom curve may need to be developed for your turbine.



TB6 AUX PWM
Input used for external control of the Clipper.

To configure the Classic's Aux ports:

- Push the Main Menu button
- Scroll left or right to highlight "AUX" and push the Enter button.

Scroll left or right to highlight the relay you wish to change. Select **AUX 2**, then push the upper right soft key labeled for "**SETUP**". Scroll up or down to change the function of the relay. Select the right soft key to set the parameters of the function. Use the Up/Down arrow keys to scroll to **Clipper Control**. When finished push the **ENTER** button to save the changes. Press the upper right soft key for **VOLTS** options. Scroll to the right to select **AUX2**. Using the Up/Down arrow keys, select your Clipper type, AC or DC. The **VOLTS** and **WIDTH** settings are not changed at this time. Press **ENTER** to save the changes. Press the upper right soft key to select **MAX V.** Using the Up/Down arrow keys, select the maximum input voltage to the Classic. This is typically the voltage found on step 16 of the wind curve or 10 volts below the maximum input voltage of your Classic model. Press **ENTER** to save the changes, then press the **Menu Back** button 3 times to view the main Aux Screen. This screen shows both **Aux1** and **Aux2** functions and verify that **Aux2** shows **Clipper Control.**

Press the **Menu Back** button 2 more times until the word **CHARGE** appears. Scroll to the right to highlight **MODE** and press **Enter.** Scroll to the right to highlight **FUNCTION** then scroll up or down to **WIND TRACK**. Press **ENTER** to save this setting, then press the upper right soft key for **Graph**. Press the upper left soft key for **MEM**. Scroll up to memory location 10 and above to select one of the preprogrammed wind curves. Press the upper right soft key for **RECALL.** Then press **ENTER** to save this curve in memory. Press the **Menu Back** button once, scroll to **ON** and press **ENTER** to turn the Mode on. If your turbine is not listed, you will need to contact Tech Support for assistance with making a custom wind curve. This mode is intended to control the MidNite Clipper. It will send out a PWM signal whenever the controller is loading the turbine. This will happen when the battery is full or close to it.

Parallel Clippers:

On larger turbines two Clippers may be used in parallel for greater capacity.
When used with 1 or 2 Classic charge controllers the AUX2 output from the Master Classic is connected to the AUX PWM inputs of both Clippers. The AC or DC Inputs are applied to the inputs of both Clippers. You cannot however mix AC and DC Clippers.
Important! Parallel resistances reduce the total resistance. Example: Two Clippers of two ohms each are paralleled. In that case the total resistance is one ohm. Be sure to consider this when designing your system and selecting Clipper resistance values.

Operating the Clipper:

Once the Clipper is installed and wired in, all that is left to do is to push the slider on the Clipper door to the "RUN" position. The Clipper will now maintain a safe voltage input to the charge controller as well as slow the turbine in high wind to increase turbine life and protect from damage.
The first few times that the Clipper operates you may notice a hot smell. This is normal and will fade quickly with use.

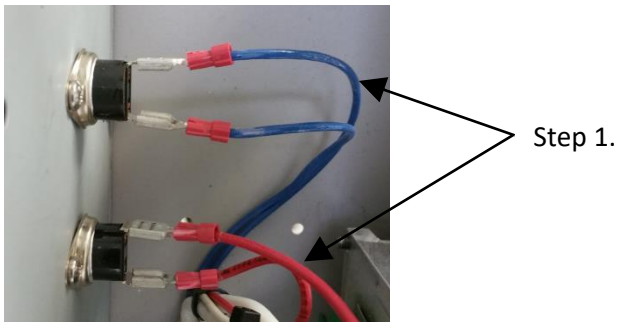
Exchanging the Resistor Module:

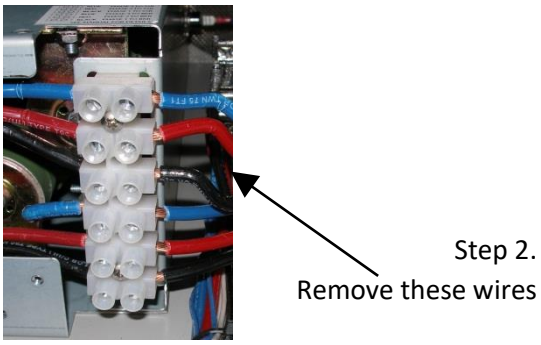
The Clipper comes with a replaceable diversion load. The diversion load is a resistor module available with different resistor values and configurations to provide a variety of possible loads. To replace/exchange the resistor module first remove all power to the Clipper and allow it to cool.

AC Models:

AC models come with the load resistors for each phase wired either in series or parallel, there are also multiple values for resistors. The replacement module may be any one of these. Verify that the new module is of the desired type and resistance before beginning installation.

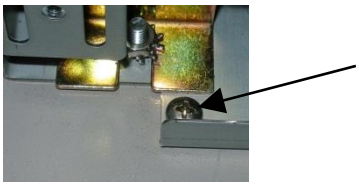
Step 1. Remove the two wires to each of the temperature sensors on the side of the resistor module. Remove the terminals by pulling on the red handles. Do not pull on the wires.





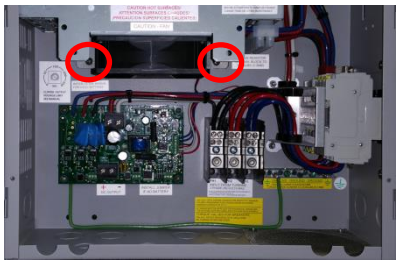
Step 2. Remove the six wires from the terminal block at the base of the resistor module. Do not remove the wires that go inside the module. Make note of the order of the wires. They can be marked to be sure they get re-wired correctly.

Step 3. Remove the two screws at the base of the resistor module and set aside to use with the new module. Lift the module gently upward and to the right to remove the module's mounting tabs from the slots on the Clipper chassis and remove the old module.



Remove the two screws at the bottom of the resistor module.

Step 3.



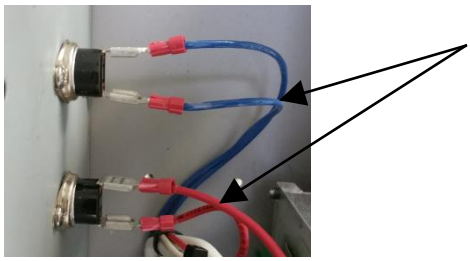
Step 4. Position the new module in the Clipper chassis with the terminal block toward the middle of the Clipper and slide the mounting tabs into position. Secure the module with the screws removed in **Step 3**.

Step 5. Replace the wires removed in **steps 1 & 2** in the same positions that they were removed from. Make sure to torque the wires in the terminal block to 20 in-lbs. Also be sure to reconnect the wires to the temperature sensors (at the upper right of the resistor module) that they came from. If the fan runs continuously when cold this is an indication that the wires are going to the wrong sensors.

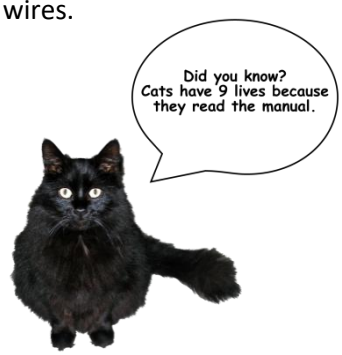
DC Models:

DC models come prewired to provide various loads. Verify that the new module is of the desired resistance before beginning installation.

Step 1. Remove the two wires to each of the temperature sensors on the side of the resistor module. Remove the terminals by pulling on the red handles. Do not pull on the wires.



Step 1.



Step 2. Remove the four wires from the terminal block at the base of the resistor module.
Make a note of where each wire came from.
Do not remove the wires that go inside the module.

Step 3. Remove the two screws at the base of the resistor module and set aside to use with the new module.
Lift the module gently upward to remove the module's mounting tabs from the slots on the Clipper chassis.

Step 4. Position the new module in the Clipper chassis with the terminal block toward the middle of the Clipper and slide the mounting tabs into position. Secure the module with the screws removed in **Step 3**.

Step 5. Replace the wires removed in **steps 1 & 2** in the same positions that they were removed from. If the fan runs continuously when cold this is an indication that the wires are going to the wrong sensors.
Make sure to torque the wires in the terminal block to 20 in-lbs.

To verify proper Clipper operation:

In low wind go to the Classics Aux 2 menu and turn it to Manual ON. Open the clipper door and see if the green LED on the relay is lit. If it is then continue to step 2, if not we need to look at the PWM wiring between the Classic and the Clipper.

With a moderate or lower wind, turn Aux 2 on manually and see if the turbine slows to a crawl. If so, then try it at a higher wind speed. If the turbine slows but does not drop to around 10 rpm or so, the clipper is working but there is either a programming issue or too high of a resistor value in the clipper.

Troubleshooting

If the turbine appears to have the brake on and is turning slowly in moderate to high wind:
• Confirm that the brake slider is in the RUN position.

If the slider is in the RUN position:
• Look for a green LED on the SSR.
If the LED is on, the Classic may be programmed incorrectly and AUX 2 has the Clipper engaged.

If the light is off:
• Turn the wind input breaker to the Classic off.
If the turbine spins up, then this is likely a Classic issue. Refer to the Classic manual for further troubleshooting

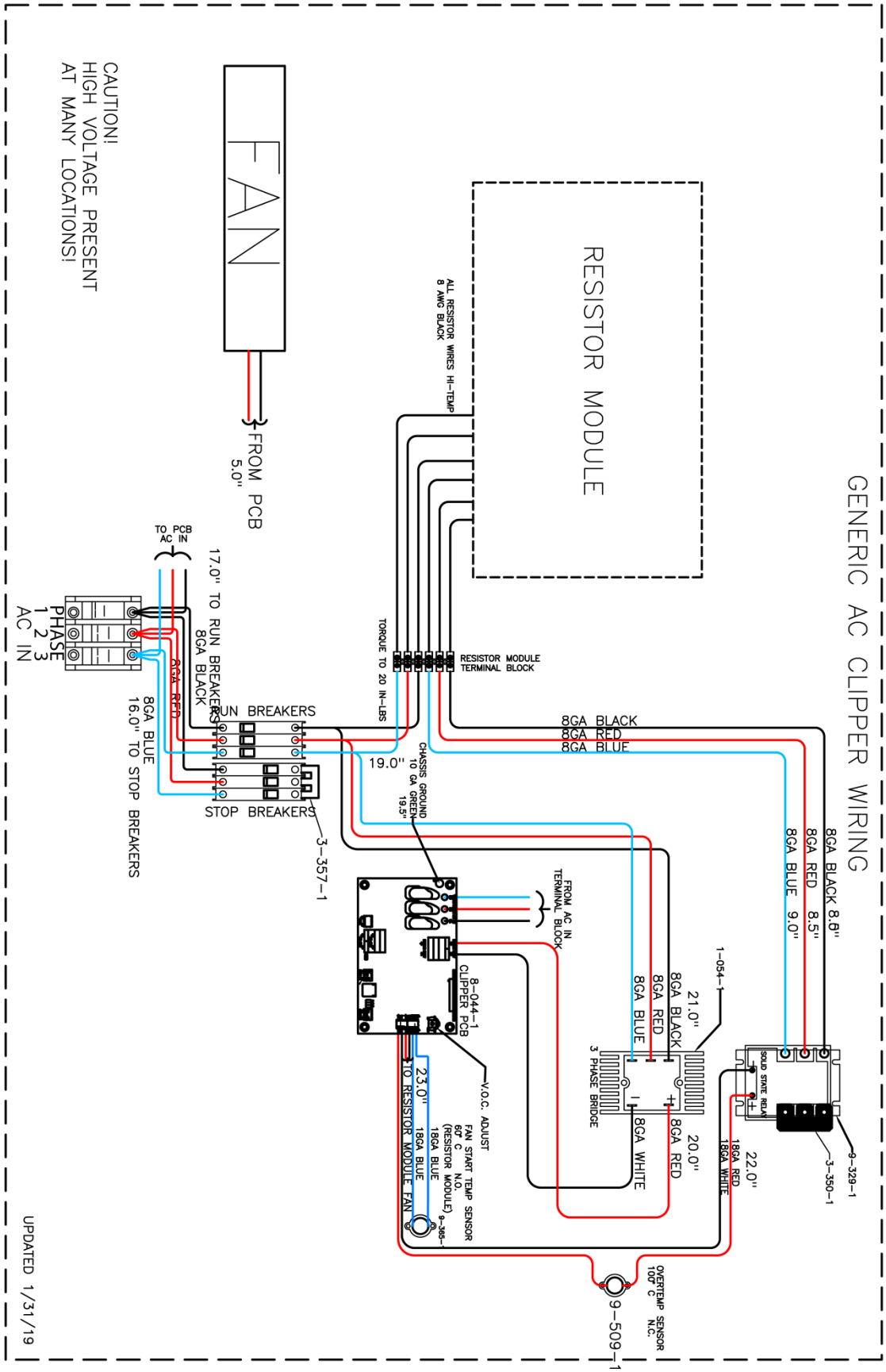
If the turbine is still stalled:
• Remove the brake slider plate and turn breakers to the off position to disconnect the turbine input.
If turbine does not spin up then this is not a Clipper issue. Check the turbine and associated wiring for faults.

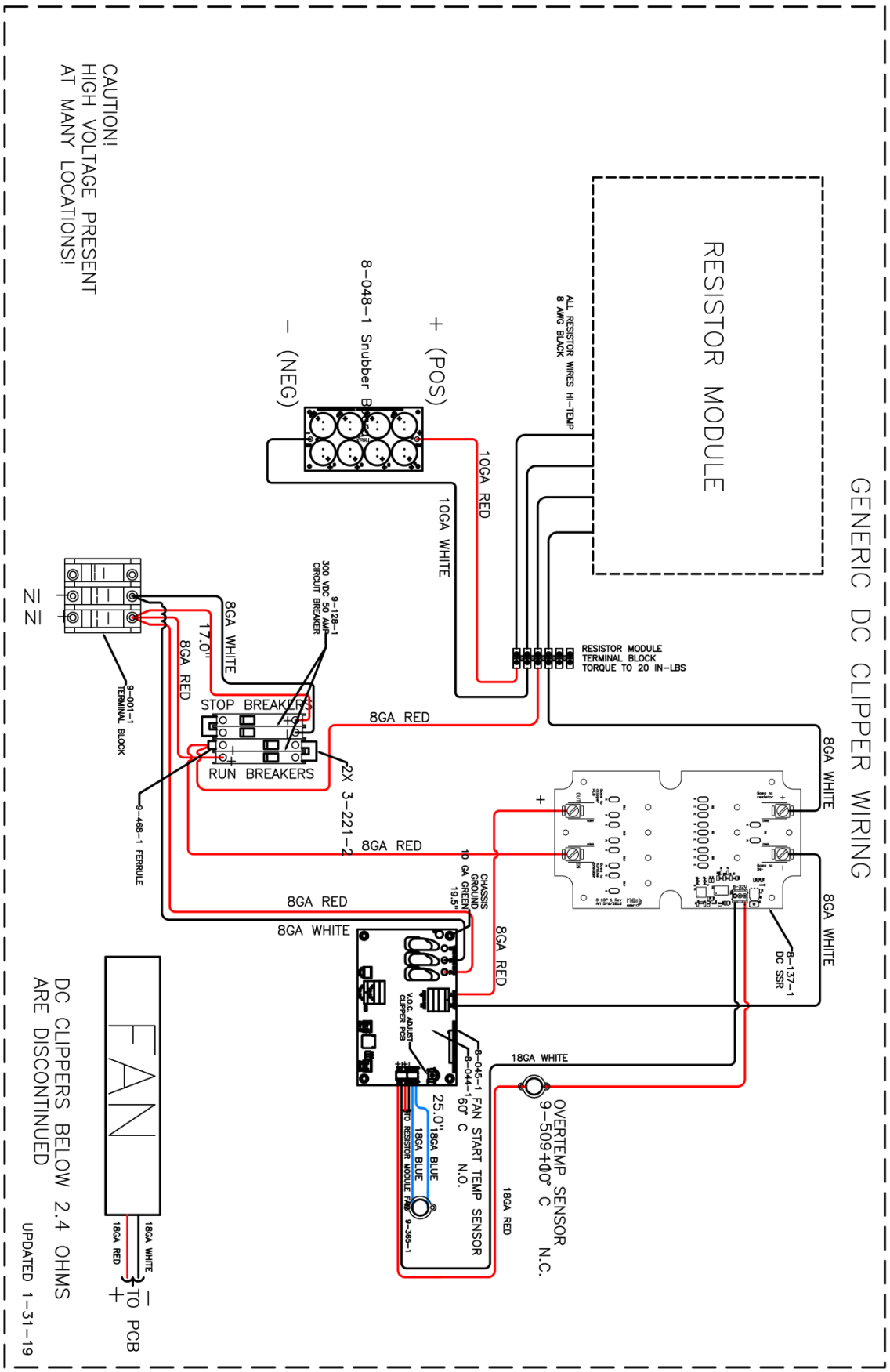
If the turbine does spin up when unhooked from the Clipper:
• Look for a jumper installed on the pins to the left of the PWM input terminal block and remove them if present (Not the little single jumper over by the DC out terminal block, that should be there)

If there are no jumpers installed then check the SSR for a short:
•Remove the brake slider plate and turn both breakers to the off position to disconnect the turbine input. Then use an ohm meter to look for 0 ohms of resistance across the 2 large screw heads on the SSR

If the SSR checks out OK and / or the turbine does not spin up when the SSR wire is removed (breakers all off):
• Check for shorted wiring in the resistor can by tracing the positive lead back out of the resistor can back towards the breakers and disconnect it from the system.
If the turbine spins up then there is an issue in the resistor can.

If not:
• Hook the resistor wire back up and remove the 2 DC wires on top of the circuit board.
If the turbine spins up, the problem is likely a defective control board.


GENERIC AC CLIPPER WIRING
RESISTOR MODULE
FAN
CAUTION!
HIGH VOLTAGE PRESENT
AT MANY LOCATIONS!
FROM PCB
5.0"
ALL RESISTOR WIRES HI-TEMP
8 AWG BLACK
RESISTOR MODULE
TERMINAL BLOCK
TORQUE TO 20 IN-LBS
TO PCB
AC IN
PHASE
1 2 3
AC IN
17.0" TO RUN BREAKERS
8GA BLACK
8GA RED
16.0" TO STOP BREAKERS
8GA BLUE
RUN BREAKERS
STOP BREAKERS
3-357-1
19.0"
CHASSIS GROUND
10 GA GREEN
19.5"
8GA BLACK
8GA RED
8GA BLUE
FROM AC IN
TERMINAL BLOCK
8-044-1
CLIPPER PCB
V.O.C. ADJUST
FAN START TEMP SENSOR
60° C
N.O.
(RESISTOR MODULE)
9-385-1
18GA BLUE
23.0"
18GA BLUE
TO RESISTOR MODULE FAN
1-054-1
21.0"
8GA BLACK
8GA RED
8GA BLUE
3 PHASE BRIDGE
8GA WHITE
20.0"
8GA RED
SOLID STATE RELAY
22.0"
18GA RED
18GA WHITE
8GA BLACK 8.6"
8GA RED 8.5"
8GA BLUE 9.0"
3-350-1
9-329-1
OVERTEMP SENSOR
100° C
N.C.
9-509-1
UPDATED 1/31/19

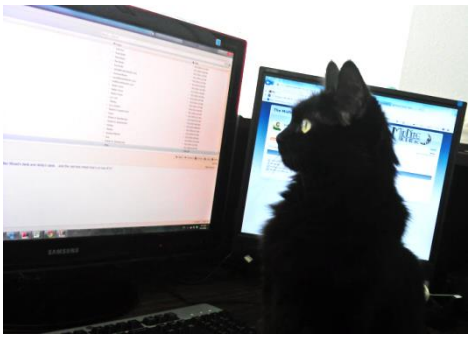

GENERIC DC CLIPPER WIRING
RESISTOR MODULE
ALL RESISTOR WIRES HI-TEMP 8 AWG BLACK
8-048-1 Snubber Board
+ (POS)
– (NEG)
10GA RED
10GA WHITE
RESISTOR MODULE TERMINAL BLOCK TORQUE TO 20 IN-LBS
8GA WHITE
8GA RED
9-128-1 300 VDC 50 AMP CIRCUIT BREAKER
9-001-1 TERMINAL BLOCK
17.0"
STOP BREAKERS
RUN BREAKERS
2X 3-221-2
9-468-1 FERRULE
CHASSIS GROUND 10 GA GREEN 19.5"
8-137-1 DC SSR
V.O.C. ADJUST CLIPPER PCB
8-045-1 8-044-1 FAN START TEMP SENSOR 60° C N.O.
25.0' 18GA BLUE
18GA BLUE
TO RESISTOR MODULE FAN 9-385-1
18GA WHITE
OVERTEMP SENSOR 9-509-100° C N.C.
18GA RED
FAN
18GA RED
18GA WHITE
TO PCB
CAUTION!
HIGH VOLTAGE PRESENT
AT MANY LOCATIONS!
DC CLIPPERS BELOW 2.4 OHMS
ARE DISCONTINUED
UPDATED 1-31-19

PLEASE DO NOT CONSIDER THIS LIST A GUARANTEE. PLEASE CALL RYAN OR ROY TO VERIFY YOUR PARTICULAR NEEDS BEFORE ORDERING AS EACH SYSTEM IS DIFFERENT

Turbine Make and model	Stator	Bat Voltage	Clipper required	Classic model	Clipper Model	Pwr curve in Classic	Notes
Bergey XL1	24v	any	NA	NA	NA	NA	Old DC model, To low of a voltage to MPPT
Bergey XL1	24MS	12v	No	250		No	will current limit and be noisy see next line
Bergey XL1	24MS	12v	Yes	150	MNCLIPAC1.5K15.0	No	
Bergey XL1	24MS	24v	No	250		No	will current limit and be noisy see next line
Bergey XL1	24MS	24v	Yes	150	MNCLIPAC1.5K15.0	No	
Bergey XL1	24MS	48v	NA		NA	NA	to low on voltage
Bergey XL.1	48MS	12v	No	250		No	will current limit and be noisy see next line
Bergey XL1	48MS	12v	yes	150	MNCLIPAC1.5K15.0	No	
Bergey XL1	48MS	24v	no	250		Yes	will current limit and be noisy see next line
Bergey XL1	48MS	24v	yes	250	MNCLIPAC1.5K15.0	Yes	
Bergey XL1	48MS	48v	no	250		Yes	Will be noisy see next line
Bergey XL1	48MS	48v	yes	250	MNCLIPAC1.5K15.0	Yes	
Whisper 900/ H40 / Whisper 100	12v	12v	Yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	24v	12v	yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	24v	24v	yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	36v	12v	yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	36v	24v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	36v	36v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	48v	12v	yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	48v	24v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	48v	36v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	48v	48v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	HV	12v	yes	250	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	HV	24v	yes	250	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	HV	36v	yes	250	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 900 / H40 / Whisper 100	HV	48v	yes	250	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	12v	12v	Yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	24v	12v	yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	24v	24v	yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	36v	12v	yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	36v	24v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	36v	36v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	48v	12v	yes	150	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	48v	24v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	48v	36v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	48v	48v	yes	200	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	HV	12v	yes	250	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	HV	24v	yes	250	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	HV	36v	yes	250	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 1000 / H80 / Whisper 200	HV	48v	yes	250	MNCLIPAC1.5K2.0	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	12v	12v	Yes	150	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	24v	12v	yes	150	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	24v	24v	yes	150	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	36v	12v	yes	150	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	36v	24v	yes	200	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	36v	36v	yes	200	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	48v	12v	yes	250	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	48v	24v	yes	250	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	48v	36v	yes	250	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	48v	48v	yes	250	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	HV	12v	yes	250	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	HV	24v	yes	250	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	HV	36v	yes	250	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Whisper 3000 / Whisper 175 / Whisper 500	HV	48v	yes	250	MNCLIP4KAC1.6	No	Whisper is not real easy but this should work
Kestrel e160i	12v	12v	Probably	150	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	24v	12v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	24v	24v	yes	200	MNCLIP1.5KDC2.4	No	Not a good match for MPPT
Kestrel e160i	36v	12v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	36v	24v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	36v	36v	yes	200	MNCLIP1.5KDC2.4	No	Not a good match for MPPT
Kestrel e160i	48v	12v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	48v	24v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	48v	36v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	48v	48v	yes	200	MNCLIP1.5KDC2.4	No	Not a good match for MPPT
Kestrel e160i	110v	12v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	110v	24v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	110v	36v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	110v	48v	yes	200	MNCLIP1.5KDC2.4	No	DC no blade pitch
Kestrel e160i	200v	NA	NA	NA	NA	NA	

Kestrel e230i	12v	12v	NO	200		No	DC With blade pitch
Kestrel e230i	24v	12v	NO	200		No	DC With blade pitch
Kestrel e230i	24v	24v	NO	200		No	Not a good match for MPPT
Kestrel e230i	36v	12v	NO	200		No	DC With blade pitch
Kestrel e230i	36v	24v	NO	200		No	DC With blade pitch
Kestrel e230i	36v	36v	NO	200		No	Not a good match for MPPT
Kestrel e230i	48v	12v	NO	200		Yes	DC With blade pitch
Kestrel e230i	48v	24v	NO	200		Yes	DC With blade pitch
Kestrel e230i	48v	36v	NO	200		No	DC With blade pitch
Kestrel e230i	48v	48v	NO	200		Yes	Not a good match for MPPT
Kestrel e230i	110v	12v	Yes	200	MNCLIP1.5KDC2.4	Yes	DC With blade pitch
Kestrel e230i	110v	24v	Yes	200	MNCLIP1.5KDC2.4	Yes	DC With blade pitch
Kestrel e230i	110v	36v	Yes	200	MNCLIP1.5KDC2.4	No	DC With blade pitch
Kestrel e230i	110v	48v	Yes	200	MNCLIP1.5KDC2.4	Yes	DC With blade pitch
Kestrel e230i	200v	NA	NA	NA	NA	NA	
Kestrel e300i	12v	12v	NO	200		No	Not a good match for MPPT
Kestrel e300i	24v	12v	NO	200		No	DC With blade pitch
Kestrel e300i	24v	24v	NO	200		No	Not a good match for MPPT
Kestrel e300i	36v	12v	NO	200		No	DC With blade pitch
Kestrel e300i	36v	24v	NO	200		No	DC With blade pitch
Kestrel e300i	36v	36v	NO	200		No	Not a good match for MPPT
Kestrel e300i	48v	12v	NO	200		Yes	DC With blade pitch
Kestrel e300i	48v	24v	NO	200		Yes	DC With blade pitch
Kestrel e300i	48v	36v	NO	200		No	DC With blade pitch
Kestrel e300i	48v	48v	NO	200		Yes	Not a good match for MPPT
Kestrel e300i	110v	12v	Yes	200	MNCLIP1.5KDC2.4	Yes	DC With blade pitch
Kestrel e300i	110v	24v	Yes	200	MNCLIP1.5KDC2.4	Yes	DC With blade pitch
Kestrel e300i	110v	36v	Yes	200	MNCLIP1.5KDC2.4	No	DC With blade pitch
Kestrel e300i	110v	48v	Yes	200	MNCLIP1.5KDC2.4	Yes	DC With blade pitch
Kestrel e300i	200v	NA	NA	NA	NA	NA	
Kestrel e400i	48v	12v	No	200		Yes	DC With blade pitch
Kestrel e400i	48v	24v	No	200		Yes	DC With blade pitch
Kestrel e400i	48v	36v	No	200		No	DC With blade pitch
Kestrel e400i	48v	48v	No	200		Yes	Not a good match for MPPT
Kestrel e400i	110v	12v	Yes	150	MNCLIP4KDC1.3	Yes	DC With blade pitch
Kestrel e400i	110v	24v	Yes	150	MNCLIP4KDC1.3	Yes	DC With blade pitch
Kestrel e400i	110v	36v	Yes	150	MNCLIP4KDC1.3	No	DC With blade pitch
Kestrel e400i	110v	48v	Yes	200	MNCLIP4KDC1.3	Yes	DC With blade pitch
Kestrel e400i	250v	NA	NA	NA	NA	NA	
Dairyland Windpower DWP320		24v	yes	150	Chris supplies	Yes	
Dairyland Windpower DWP320		12v	yes	150	Chris supplies	Yes	
WindMax HY2000	48v	24v	yes	150	MNCLIP4KAC1.6	Yes	
WindMax HY2000	48v	48v	yes	200	MNCLIP4KAC1.6	Yes	
Other Power 10ft	12v	12v	yes	150	MNCLIP4KAC1.6	no	Home built so things can vary a lot
Other Power 10ft	24v	12v	yes	150	MNCLIP4KAC1.6	no	Home built so things can vary a lot
Other Power 10ft	24v	24v	yes	150	MNCLIP4KAC1.6	no	Home built so things can vary a lot
Other Power 10ft	48v	12v	yes	150	MNCLIP4KAC1.6	no	Home built so things can vary a lot
Other Power 10ft	48v	24v	yes	150	MNCLIP4KAC1.6	no	Home built so things can vary a lot
Other Power 10ft	48v	48v	yes	150	MNCLIP4KAC1.6	no	Home built so things can vary a lot

Rev 2.0 11-09-2018



MIDNITE SOLAR INC. LIMITED WARRANTY
MidNite Solar Power electronics, sheet metal enclosures and accessories

MidNite Solar Inc. warrants to the original customer that its products shall be free from defects in materials and workmanship. This warranty will be valid for a period of five (5) years for all products except the MNBRAT Charge Controller along with the MNBIRDHOUSE1 batteries, these will be two (2) years. MidNite Solar will not warranty third party inverter components used in MidNite's pre-wired systems. Those components are warranted by the original manufacturer.

MidNite Solar offers an extended warranty for all the Classic MPPT charge controllers. Six months prior to the end of the warranty period customers can ship their Classic back to MidNite Solar with a check for $147 dollars plus shipping and we will replace any wearable parts and do a general tune-up. This will extend the warranty by 2 additional years.

At its option, MidNite Solar will repair or replace at no charge any MidNite product that proves to be defective within such warranty period. This warranty shall not apply if the MidNite Solar product has been damaged by unreasonable use, accident, negligence, service or modification by anyone other than MidNite Solar, or by any other causes unrelated to materials and workmanship. The original consumer purchaser must retain original purchase receipt for proof of purchase as a condition precedent to warranty coverage. To receive in-warranty service, the defective product must be received no later than two (2) weeks after the end of the warranty period. The product must be accompanied by proof of purchase and Return Material Authorization (RMA) number issued by MidNite Solar. For an RMA number contact MidNite Solar Inc., 19115 62nd Ave NE, Arlington, WA 98223 (360) 403-7207. Purchasers must prepay all delivery costs or shipping charges to return any defective MidNite Solar product under this warranty policy. Except for the warranty that the products are made in accordance with, the specifications therefore supplied or agreed to by customer:

MIDNITE SOLAR MAKES NO WARRANTY EXPRESSED OR IMPLIED, AND ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE FOREGOING WARRANTY IS HEREBY DISCLAIMED BY MIDNITE SOLAR AND EXCLUDED FROM ANY AGREEMENT MADE BY ACCEPTANCE OF ANY ORDER PURSUANT TO THIS QUOTATION. MIDNITE SOLAR WILL NOT BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES, LOSS OR EXPENSE ARISING IN CONNECTION WITH THE USE OF OR THE INABILITY TO USE ITS GOODS FOR ANY PURPOSE WHATSOEVER. MIDNITE SOLAR'S MAXIMUM LIABILITY SHALL NOT IN ANY CASE EXCEED THE CONTRACT PRICE FOR THE GOODS CLAIMED TO BE DEFECTIVE OR UNSUITABLE.

Products will be considered accepted by customer unless written notice to the contrary is given to MidNite Solar within ten (10) days of such delivery to customer. MIDNITE SOLAR is not responsible for loss or damage to products owned by customer and located on MIDNITE SOLAR'S premises caused by fire or other casualties beyond MIDNITE SOLAR's control. This warranty is in lieu of all other warranties expressed or implied.

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