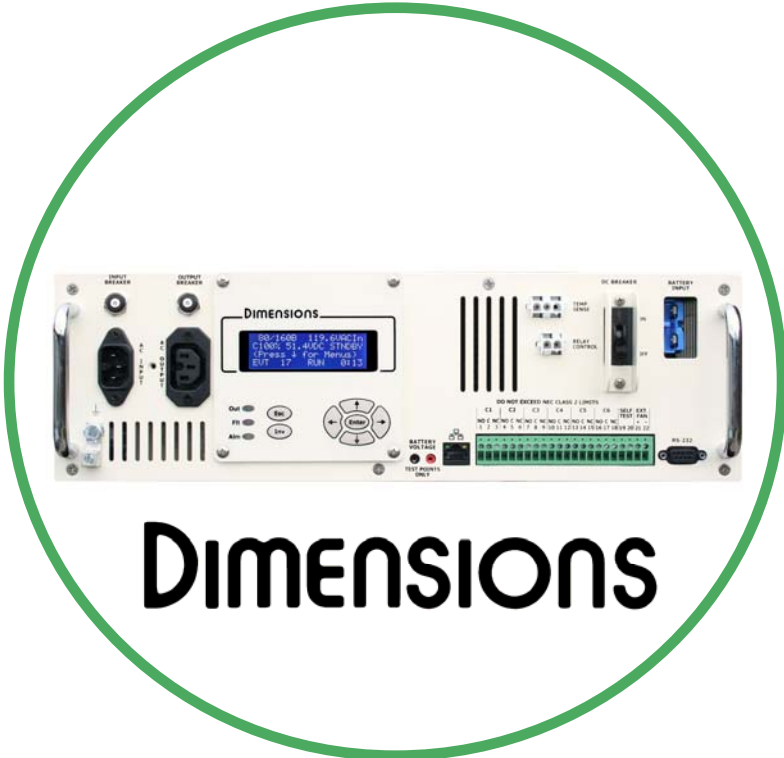


BATTERY BACKUP SYSTEMS



Dimensions



Operation Manual
for Dimensions model 48M18-WBE
122193 (10/06/11 Revision 1.1)

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Introduction

Thank you for purchasing a Dimensions Battery Backup System (BBS) from Sensata Technologies! We think that you will find this product to be extremely reliable and easy to use. We have put a lot of time and resource into this system to make it a product that you will be completely satisfied with.

Please read this manual completely, before installation and operation. Please see the “Installation and Start-Up” manual for detailed installation instructions.

Contact us by phone or email if you need assistance with this product.

We can be reached at:

1-800-553-6418

<http://dimensions.sensata.com>



inverterinfo@sensata.com

1.0 Safety Instructions

Important: Read this manual before installation, it contains important safety, installation, and operating instructions. Save this manual and keep it in a safe place.

1.1 Warning and Danger Symbols:

To reduce the risk of electrical shock and to ensure the safe operation of your Dimensions Battery Backup System (BBS), the following symbols are used throughout the manual.

ATTENTION:  Important operating instructions. Follow them closely.	DANGER:  Risk of personal harm and/or electrocution exists in this area. Use extreme caution.
---------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

1.2 Battery Backup System (BBS) Precautions:

- BBS produce hazardous voltages. To avoid risk of harm or fire, the unit must be properly installed.
- There are no user serviceable parts inside, do not remove the cover.
- The BBS should not be mounted in a location that may be exposed to rain or spray.
- The BBS should not be installed in a zero clearance enclosure.
- Damage to the BBS will occur if correct polarity is not observed when installing the DC input cables.
- Damage to the BBS will occur if an external AC power source is applied to the BBS AC output.
- The BBS contains a circuit breaker and capacitor that may produce a spark. Do not mount in a confined battery or gas compartment.

1.3 Battery Precautions:

Battery Emergency Instructions



If you get splashed with electrolyte from the battery, immediately wash the affected area with water. If electrolyte gets into your eyes, wash your eyes for at least 10 minutes with clean running water or a special neutralizing eye wash solution. Get medical help immediately.

If there is an electrolyte spill, it can be neutralized by using a battery “spill kit” or a solution of 1lb. of baking soda in 1 gallon of water.

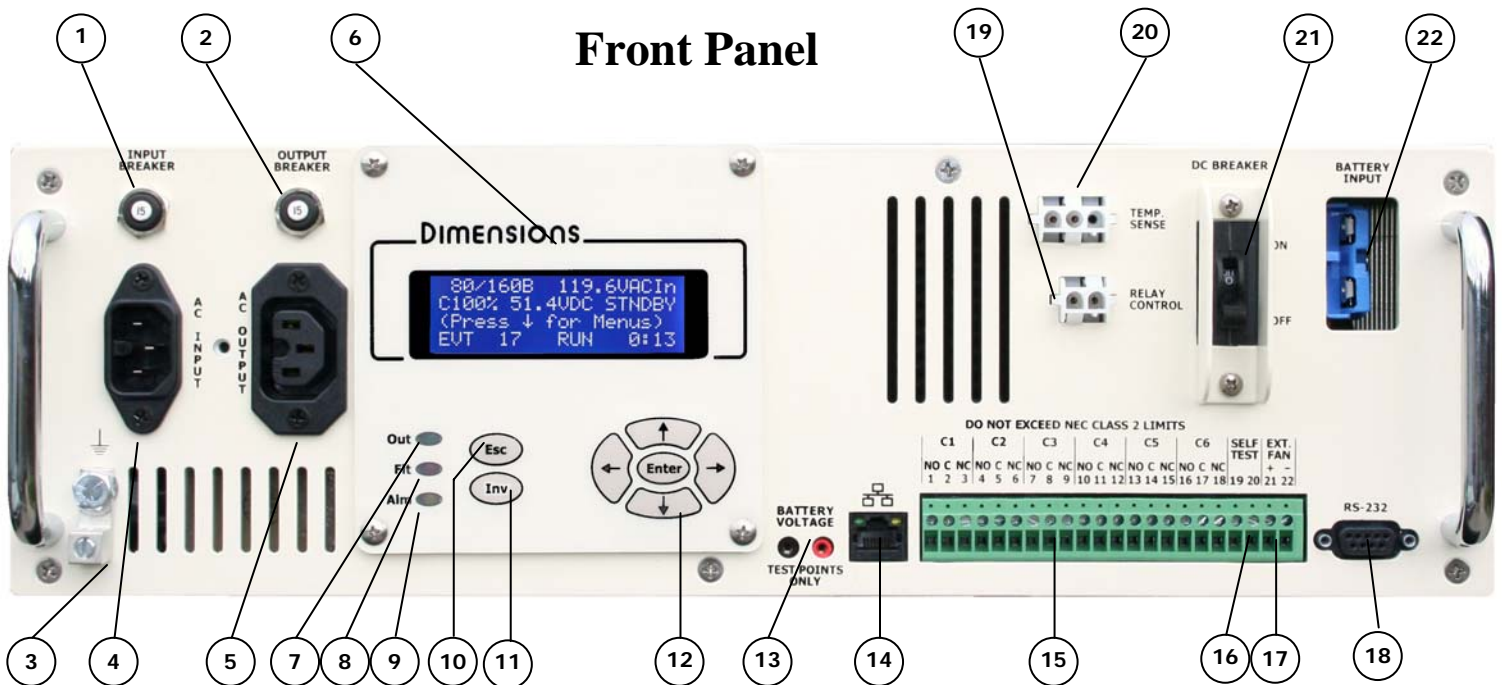
NOTE: Battery installation and service is to be done or supervised by personnel trained in battery safety and precautions.



- **CAUTION:** Working in the vicinity of lead-acid batteries is dangerous. There is a risk of acid exposure.
- **CAUTION:** Batteries generate explosive Hydrogen gases during operation. Never expose the BBS, or the enclosure to open flames or sparks to prevent a fire or explosion.
- **CAUTION:** There is risk of high current discharge from shorting a battery that can cause fire and explosion. Use insulated tools during installation.
- **CAUTION:** Remove all rings, watches, jewelry or other conductive items before working near the batteries.
- **CAUTION:** Dispose of the batteries according to local regulations. Do not incinerate batteries; risk of explosion exists.
- **CAUTION:** Disconnect charging source prior to connecting or disconnecting wires to the battery terminals.
- **CAUTION:** Never let live battery wires touch the BBS, the enclosure, or any metal objects. Fire and/or an explosion could result.
- **CAUTION:** Ensure proper polarity when wiring the batteries to the battery cable assembly. Red wires connect to the (+) Positive post and Black wires to the (-) Negative post. Keep the battery set wires paired to each battery as shown in the installation manual. Incorrect wiring can cause a fire or an explosion.
- **CAUTION:** Ensure proper connections from the cable assembly to the batteries. Do not connect the cable assembly to itself or a battery directly to another battery - or a fire or explosion could result.
- **CAUTION:** Risk of explosion if battery is replaced by an incorrect type. Always replace batteries with the same type, model number, and electrical ratings.
- Inspect the batteries once a year for cracks, leaks or swelling.
- Batteries that are in storage should be charged at least once every three months for best performance and lifetime.

2.0 BBS Physical Description

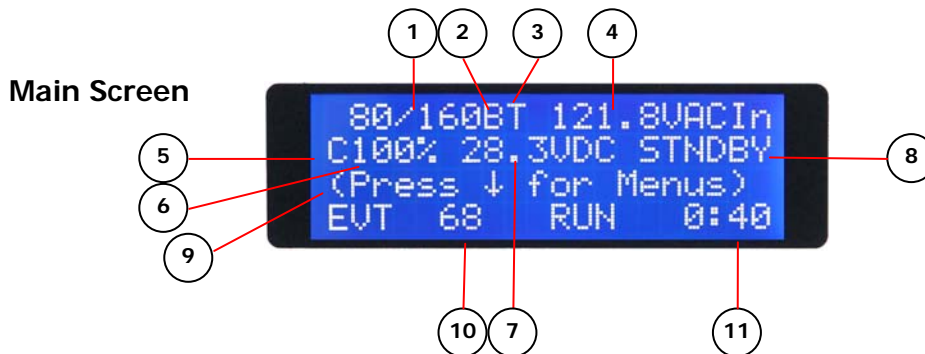
Front Panel



1. **Input Breaker:** This circuit breaker provides input protection.
2. **Output Breaker:** This circuit breaker provides output protection.
3. **Ground Lug:** Connect to chassis ground.
4. **AC Input:** This connects to the Bypass Switch.
5. **AC Output:** This connects to the Bypass Switch.
6. **LCD Panel:** Provides Status and Configuration information. See Page 10 for further description.
7. **Output LED:** Green LED lights to show that the BBS is providing AC output.
8. **Fault LED:** Red LED lights to show that there is a fault condition. See the LCD to see what the “fault” is (PROBE FLT, short circuit, batt. Low cut off, batt. volt. high, output volt. high, bbs temp. high, overload excessive or bbs failure).
9. **Alarm LED:** Yellow LED lights to show that there is an alarm condition. See the LCD to see what the “Alarm” is (temp. low, temp. high, check battery, overload, output volt. low, ac line freq. L or h).
10. **Esc Key:** Used to “escape” out of menu screens and settings.
11. **Inv Key:** Used to turn the inverter function “On” or “Off”.
12. **Navigation Keys:** Use these keys to easily navigate through the menu system.
13. **Battery Voltage Test Points:** Test jacks for measuring the battery voltage at the BBS.
14. **Ethernet Connector:** Connect to your network switch or laptop. Built-in web browser interface.
15. **Programmable Dry Relay Contacts:** These contacts are used to bring the cabinet to “Flash”, send alarms, and other functions.
16. **Self Test Contacts:** Shorting these contacts initiates the self test feature.
17. **Ext. Fan:** Can drive an external 24 VDC fan for cabinet cooling.
18. **RS-232 Port:** Connects to a PC for monitoring and controlling the BBS.
19. **Transfer Relay Connector:** Two-pin connector that connects to the Bypass Switch.
20. **Temp. Comp. Sense Connector:** Three-pin connector that connects to the 9 foot battery temperature compensation sense cable.
21. **DC Breaker:** This circuit breaker provides input protection.
22. **Battery Connector Cable:** Two-pin connector that connects to the battery cable assembly.

2.1 LCD Panel Description:

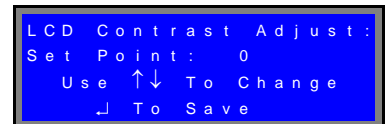
Our menu system makes it easy to get status information and to configure. The most commonly requested status information is readily available on just two screens. See the detail below for more information.



- (1) **Transfer Points:** Currently configured transfer points that are in use. These will change as the “Sense Type” option is changed.
- (2) **Sense Type:** Current transfer point option enabled. “N” = normal, “G” = generator, “B” = Buck/Boost.
- (3) **Time of Day Program:** The “T” will be visible if this program is enabled.
- (4) **AC Input Voltage:** AC input voltage coming from the utility.
- (5) **Charger:** The “C” will be visible when the charger is on.
- (6) **Battery Charge:** The current capacity of the battery.
- (7) **Battery Voltage:** Battery system voltage.
- (8) **BBS Mode:** Mode that the BBS is in. Modes are; “STNDBY”, “BACKUP”, “BOOST1”, “BOOST2”, “BUCK1”, “BUCK2”, “SELF TST”, and “INVOFF”.
- (9) **Information Line:** Prompts for menus. Also displays any relay status, fault and alarm information. Control the speed of the scroll by using the left arrow key to slow down and the right arrow key to speed up.
- (10) **Event Counter:** The number of times that the inverter has come on since the last time the counter was reset. Pressing both the right and left arrow keys simultaneously will reset both the event counter and the run time meter (This will also reset the Buck and Boost meters on the “Main – Sub Screen 2”).
- (11) **Run Time Meter:** The total amount of time the inverter has been on since the meter was last reset. Pressing both the right and left arrow keys simultaneously will reset both the “Backup” event counter and the run time meter (This will also reset the Buck and Boost meters on the “Main – Sub Screen 2”).

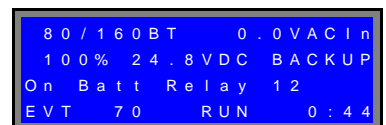
2.2 LCD Contrast Adjustment

The LCD will automatically adjust its contrast by the temperature of its environment. You can adjust this setting by pressing the “Enter” key while at the main screen. Simply press the “Up” key to brighten or the “Down” key to darken and then press enter to save your configuration.



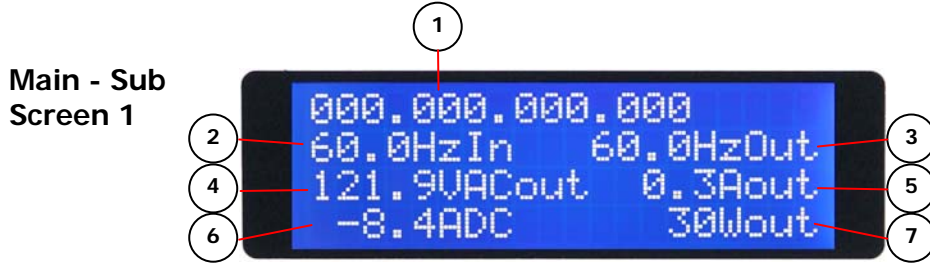
2.3 Dry Contact Relay Information

The third line of the LCD will inform you of the status of energized relays. For example, this screen shot shows that there are two relays energized by the “On Batt” or backup condition. The two relays that are energized are relays C1 and C2 as indicated by the “1” and “2” under the word “BACKUP.”



2.4 Main Sub Screens

Pressing the “Up” arrow will take you to a second status screen



- (1) **IP Address:** This is the currently configured IP address of the BBS.
- (2) **Frequency In:** Frequency of the utility power coming in.
- (3) **Frequency Out:** Frequency of the power coming out of the BBS.
- (4) **Voltage AC Out:** Output voltage of BBS.
- (5) **Amps AC Out:** Output current of BBS.
- (6) **Amps DC:** Shows the current going to and from the batteries (“-“ indicates that the inverter is drawing from the batteries).
- (7) **Watts Out:** Amount of power the BBS is providing to the load.

Pressing the “Up” arrow again will take you to the Buck & Boost Counter screen

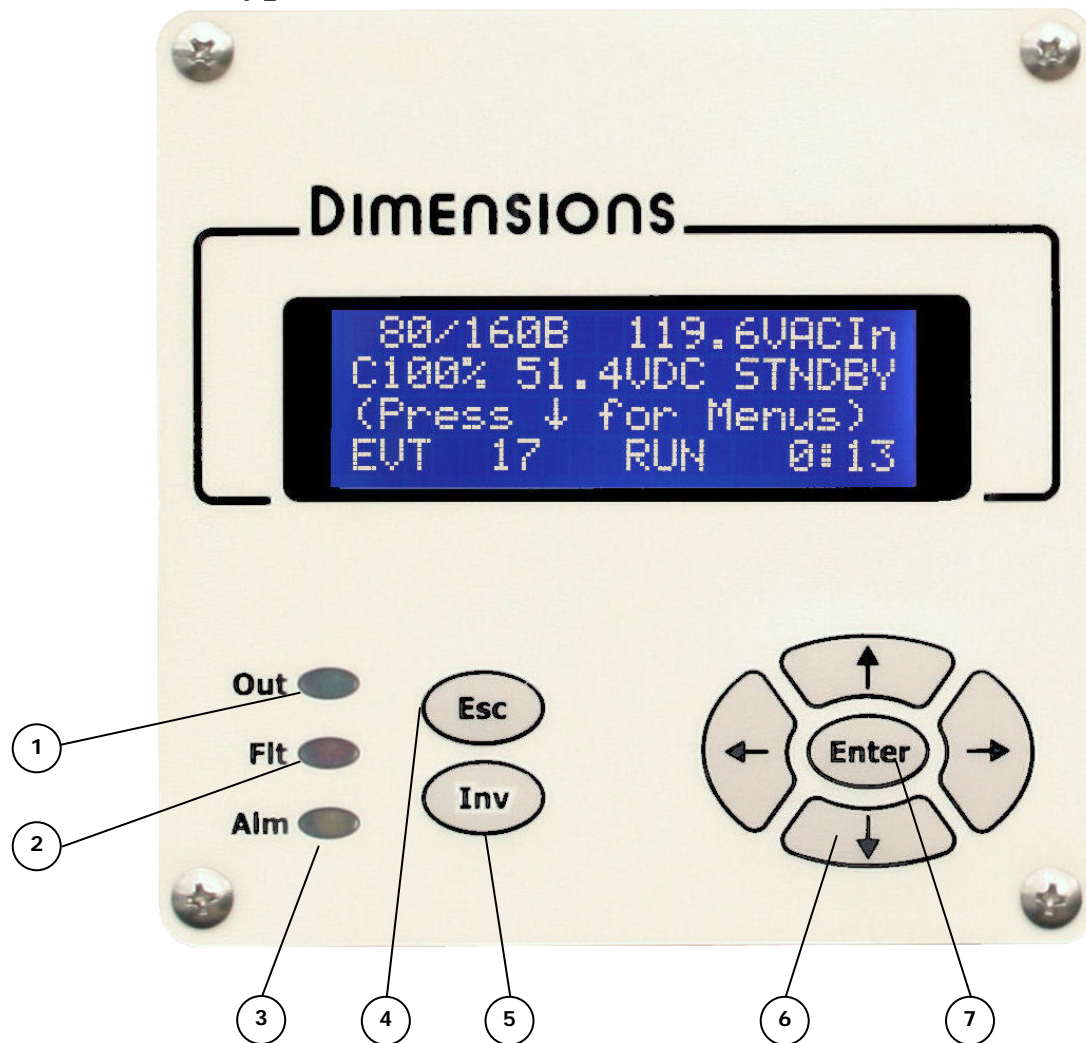


- (1) **Buck Event Counter:** The number of times that the BBS has been in Buck mode since the last time the counter was reset.
- (2) **Buck Run Time Meter:** The total amount of time the BBS has been in Buck mode since the meter was last reset.
- (3) **Boost Event Counter:** The number of times that the BBS has been in Boost mode since the last time the counter was reset.
- (4) **Boost Run Time Meter:** The total amount of time the BBS has been in Boost mode since the meter was last reset.



Pressing both the right and left arrow keys simultaneously will reset all of the event counters and the run time meters (Inverter, Buck, and Boost).

2.5 Keypad and LED's



- (1) **Output LED (Green):** This LED will be on any time the BBS is providing output to the load. The operating modes that this can occur are: “BACKUP”, “BUCK1”, “BUCK2”, “BOOST1”, AND “BOOST2”.
- (2) **Fault LED (Red):** This LED will be on any time that the BBS has detected a “Fault”. Look at the third line of the LCD for information on the fault.
- (3) **Alarm LED (Yellow):** This LED will be on any time that the BBS has detected an “Alarm”. Look at the third line of the LCD for information on the alarm.
- (4) **Esc key:** This key is used to escape from changing settings and to jump to higher menus.
- (5) **Inv key:** By pressing this key you can enable or disable the inverter of the BBS.
- (6) **Navigation keys:** Press these keys to navigate through the menu system. You also use these keys to change values in the “Configuration” and “System” menus.
- (7) **Enter Key:** Pressing the “Enter” key will take you into menus and allow you to change and save settings.



Pressing both the right and left arrow keys simultaneously will reset all of the event counters and the run time meters (Inverter, Buck, and Boost).

3.0 Start-Up

- a) Verify that all connections are properly made to the Bypass Switch and the BBS.
- b) Turn on the “DC Breaker” on the front panel.
- c) The green output LED should now be on. The LCD will display “Backup”.
- d) Switch the Bypass Switch to “BBS” mode. The BBS will remain in “BACKUP” for 30 seconds as it qualifies the line voltage. The BBS will go into “STNDBY” once the line voltage is qualified.
- e) Press down from the main menu and navigate to the “Configuration” menu. Select your battery type so that the correct charge is applied to your battery string. The default setting is for AGM batteries.
 - a. Then proceed to the next screen to enter your battery size and quantity. This helps the battery percent indicator to reflect capacity based on your battery system. The default setting is 79Ah and 4 batteries. You can skip this part of the setup if this is your configuration.
 - b. The battery percent of charge indicator on the LCD will say “Lrn” (for learning) upon the first power up of the BBS with the battery system. It will show the percent of charge once it has learned the charge characteristics of your battery system.



4.0 General Features

The Dimensions Battery Backup System (BBS) was designed with many features. The general features are listed here. For detailed setting information, please see the “Configuration”, “System”, and “Communications” sections below.

4.1 Buck/Boost

The Dimensions BBS is a line-interactive or Automatic Voltage Regulated (AVR) system with Buck/Boost selected as the sense type. Any voltage within 80-160 Vac that is input into the BBS, will be regulated to provide a safe operating voltage for your traffic signal equipment. An absence of power or AC input voltages less than 80Vac or more than 160Vac and the BBS will go to “Backup” mode which will draw power from the batteries to provide power to your intersection.

Our wide operating range of 80-160Vac, will save battery power for the intersections that are prone to brown-outs and over-voltages. There are not any complicated settings for this feature as we set the transfer points as wide as electrically and economically feasible. You can also easily see how many times the system has gone to Buck or Boost by looking at the counters on the Buck/Boost log screen by pushing the “Up” arrow twice from the main screen on the LCD.

4.2 Charger

The charger in the BBS is a 4-stage temperature compensated charger. The stages are; Zero-Start, Bulk, Accept, and Float. The charger also has a built in timer so that after 30 days of continuous float mode, the charger will restart in Bulk mode and cycle. The charger will also operate while in Buck or Boost modes. The “Zero Start” stage will allow the BBS to attempt to charge batteries that were exhausted from an extended outage once the AC power has been restored.

The charger will charge AGM or Gel type batteries. Select your battery type from the “Configuration” menu. Also select your battery size and quantity. This helps the battery percent indicator to reflect capacity based on your battery system. The default setting is AGM, 79Ah and 4 batteries.

The battery percent of charge indicator on the LCD will say “Lrn” (for learning) upon the first power up of the BBS with the battery system. It will show the percent of charge once it has completed the first charge cycle and is in “float” mode.

4.3 Disconnected Battery Test (DBT)

The DBT is used to verify the presence of batteries connected to the system. The BBS performs the test every six hours and as part of the Self Test feature. A failed test will indicate an alarm and the message will be “DBT TEST FAIL.” This alarm is cleared by either a successful test or cycling AC and DC power. *NOTE - This feature only available on models manufactured after January 20th 2010 (SN 313476 and higher).*

4.4 Web Browser Interface

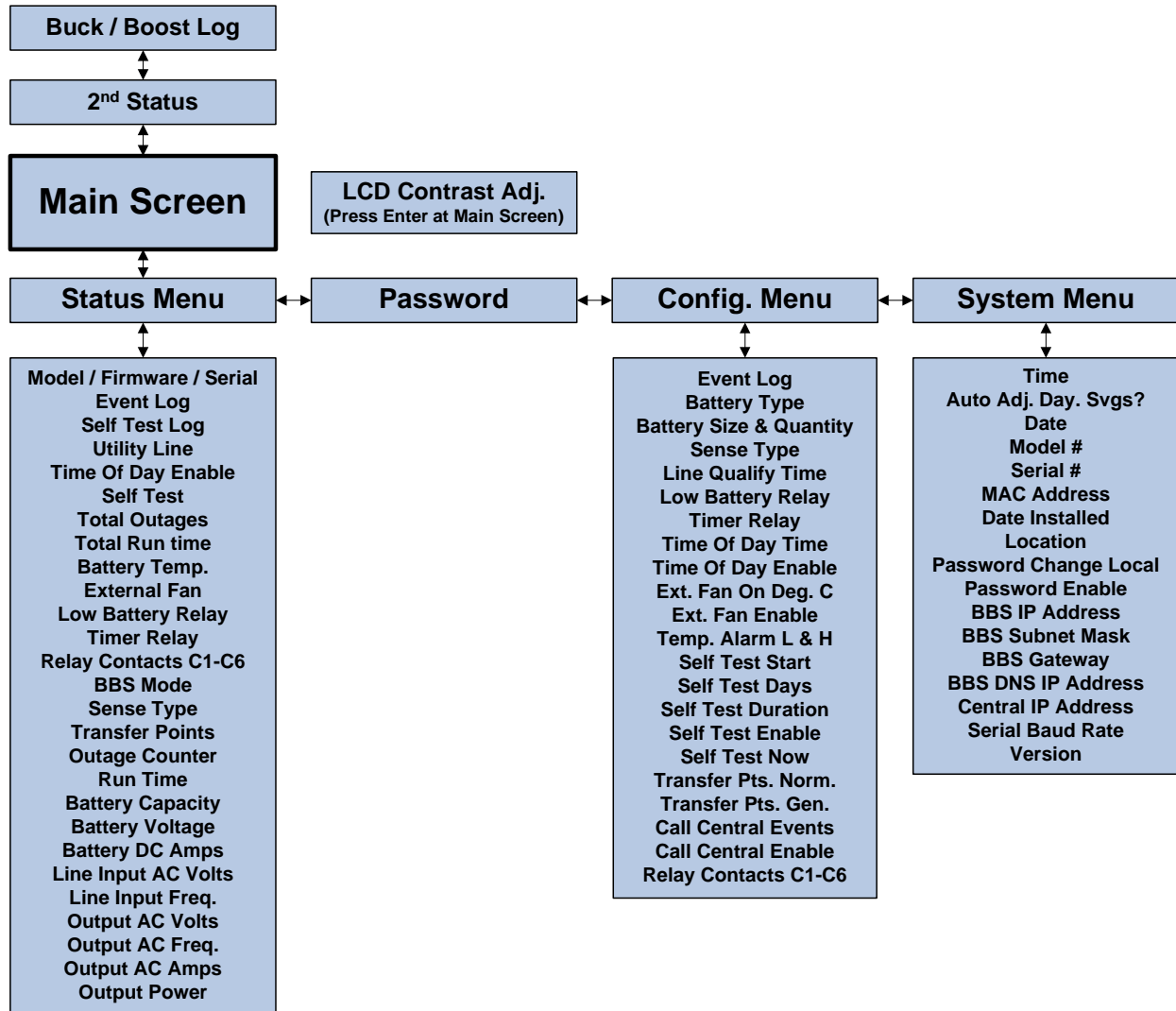
The BBS has a built in web-server which makes obtaining detailed status information and configuration easy. Using your favorite web browser you are able to access this information by entering the user defined BBS IP address into your web browser. See the “Communications” section for detailed connection information.

4.5 Email

The BBS is equipped with email capabilities if your intersections have Ethernet connectivity. You can program up to six email addresses and configure which items will trigger an email to be sent. See the “Communications” section for detailed setup information.

5.0 LCD Menu System

The LCD menu system will allow you to get detailed information and allow you to change settings. The layout is shown below:



6.0 Status Menu

The “Status Menu” contains the status information of the BBS. Most of this information is also obtained on two main status screens (the Main Screen and the Second Status Screen). The items reported are listed in the above table. Scroll down through the “Status Menu” to get to the desired item.

7.0 Configuration Menu (Features and Settings)

The Dimensions Battery Backup System (BBS) is designed to operate right out of the box without making any adjustments. If you would like to alter the settings, please see the items below for detailed information. Most of the settings are in the “Configuration” menu.

7.1 Password Protection

Password protection by default is disabled. If it is enabled in the “System” menu, the default password is “111111”. Enabled password protection will prevent the user from being able to enter the “Configuration” or “System” menus without entering the correct password. This password is different from the web browser password.

```
ENTER PASSWORD
XXXXXXXX
Use ↑↓ to Change
Then Press "↵"
```

7.2 Event Log

The event log stores the last recorded 256 events. Each event is date and time stamped so that you can see the history of the events.

```
EVENT LOG
SAVED EVENTS 141
↑↓ To Scroll Menu
"↵" to See Events
```

7.3 Battery Type

The charger is capable of charging AGM or Gel type batteries. The default setting is for AGM batteries. The battery type is easily changed by pressing “Enter” to toggle the setting.

```
BATTERY TYPE
AGM
↑↓ To Scroll Menu
↵ To TOGGLE
```

7.4 Battery Size & Quantity

The battery capacity percent indication uses this information to more accurately reflect the battery system capacity. Enter the Amp-hour (Ah) size and quantity of the batteries that you are using. The settings are preset for 79Ah and 4 batteries which is the most current configuration.

```
BATTERY SIZE & QTY.:
79Ah #4
↑↓ To Scroll Menu
↵ To Change
```

7.5 Sense Type

The BBS has three user selectable modes of sensing the AC input power. These modes are; “Normal”, “Generator”, and “Buck/Boost”. The factory default setting is “Buck/Boost”. “Normal” and “Generator” modes have user selectable transfer points. These two modes have factory preset settings of 100/130 for “Normal” and 95/134 for “Generator”. The “Buck/Boost” setting is not user adjustable and is factory preset for the widest range possible of 80/160. The sense type is easily changed by pressing “Enter” to toggle the setting.

```
SENSE TYPE:
NORMAL
↑↓ To Scroll Menu
↵ To TOGGLE
```

7.6 Line Qualify Time

The line qualify time is the duration of time that the utility power must be “good” before the BBS will go back to standby mode after being in backup or buck/boost. The default setting is 30 seconds. The range of adjustment is from 1-60 seconds.

```
LINE QUALIFY TIME:
30
↑↓ To Scroll Menu
↵ To Change
```

7.7 Low Battery Relay

The “Low Battery Relay” setting affects any relay that is configured for “Low Battery”. When the BBS is in Backup mode and the capacity of the battery system reaches the set point, any relay that is configured for “Low Battery” will be energized. A dry contact relay programmed for “Low Battery” is typically used to put a cabinet into flash when the battery capacity is low. The range of adjustment is from 0 to 100%. This is adjustable in 5% increments. The default setting is at 40%.

```
LOW BATT. RELAY%:
40
↑↓ To Scroll Menu
↵ To Change
```

7.8 Timer Relay

The timer setting affects any relay that is configured for “Timer”. The timer will start when the BBS enters Backup mode. Once the BBS has been in Backup for the value of the timer, any relay that is configured for “Timer” will be energized. The range of adjustment is from 0-480 minutes. The factory default setting is for 120 minutes.

```
TIMER RELAY :
120
↑↓ To Scroll Menu
┘ To Change
```

7.9 Time Of Day

This program saves battery power for when you need it most. If you have a blackout in the middle of the night, it can bring your cabinet to flash immediately to save battery power. If the power is still out when rush hour occurs, and the time of day program expires (set for when rush hour occurs), the BBS will bring the intersection back to full operation. This is done by the following procedure:

1. Set the start and end time of the program (the time that the intersection should be in flash if there is a blackout). For example: 22:00 – 07:00, any blackout within this period would put the intersection in flash. If there is still a blackout at 07:01, the BBS will bring the cabinet back to full operation by de-energizing the dry contact relay. Set this time in the “Configuration” menu – “Time Of Day Time”.
2. Enable the time of day feature. This is done in the “Configuration” menu – “Time Of Day Enable”.
3. Program one of the dry relay contacts (C1-C6) for “Time Of Day”. This then gets wired to your cabinet.
4. Have your controller programmed to come up into your regular, required startup sequence after flash.



```
TIME OF DAY TIME :
00:30-06:30
↑↓ To Scroll Menu
┘ To Change
```

7.10 External Fan

The BBS is capable of providing power to a 24 VDC cabinet fan. You may select the temperature in Celsius that the fan will turn on. The maximum current output is 2.5 amps. You must also enable this feature on the following screen.

```
FAN ON DEG.C (EXT) :
2.5
↑↓ To Scroll Menu
┘ To Change
```

```
FAN ENABLE :
DISABLED
↑↓ To Scroll Menu
┘ To TOGGLE
```

7.11 Temperature Alarm

This feature allows you to set a low and a high point to monitor the internal temperature of the cabinet. If the set point is reached, the alarm will be triggered which turns on the Alarm LED and also puts a message on the LCD screen, web browser and event log. The ranges of the settings are -40 to +75 degrees C.

```
TEMP. ALARM L & H :
-10L 50H Degrees C
↑↓ To Scroll Menu
┘ To Change
```

7.12 Self Test

The self test feature of the BBS will test the inverter. The test can be programmed so that it automatically occurs on the 1st or on the 1st and 15th of each month. The duration of the test can be set from 1-120 minutes. The test can also be initiated immediately by the keypad, web browser, RS-232 or by shorting the self test terminal block points. To set the BBS for automatic testing you must:

1. Program the self test start time.
2. Program the self test duration. Range is 1-120 minutes.
3. Enable the self test.

```
SELF TEST START :
00:00
↑↓ To Scroll Menu
┘ To Change
```

A report will be generated once the Self Test is complete and can be viewed with any of the interfaces. A failed self test will generate an email if set up for email and the “Fault” box is checked.

How does it work?

1. If the model is DBT capable (*Disconnected Battery Test, This feature only available on models manufactured after January 20th 2010 (SN 313476 and higher).*) the BBS will first check to make sure that the batteries are present. It will abort the test if the DBT fails.
2. The BBS then goes into “SLFTST” mode which means it is essentially in backup and powering the load (intersection). The load must be greater than 100 watts or it will fail the test.
3. Self test has many fail safes. If the utility power were to drop out during the test; the BBS will abort the Self Test and go into Backup. If the load (intersection or other) changes drastically by changing to less than 100 watts, the BBS will abort the test and utility will be restored to the load. If the battery voltage gets so low that the inverter were to go to protective low cut-off; the BBS will end the test and restore utility power.

Notes on Self Test:

- A failed Self Test will cause a fault message to appear. This can only be cleared by either a successful Self Test or a cycling of power (AC & DC).
- The charger must be in “float” in order for the test to begin.
- You can clear the Self Test report log by entering the log and then pressing the left and right keys simultaneously.

Self Test Messages:

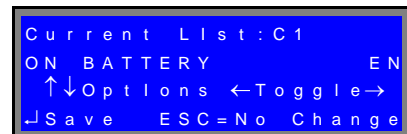
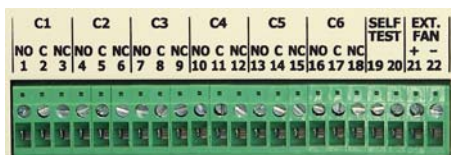
Message	Decription
Self Test Available	Self test can be started at any time
Unavailable NO FLOAT	The test is not available since the charger is not in float
Self Test Running	The test is currently running
Slftst Pass:Log Wait	The test passed and it is creating the report

7.13 Transfer Points

These points are only used if the BBS is taken out of line interactive mode. The transfer points for the “Normal” and “Generator” modes are settable by the user. You can change the lower and upper transfer points. The range of adjustment is 89-135Vac. The return or re-transfer points are automatically adjusted



7.14 Dry Relay Contacts



By configuring the dry contact relays C1-C6, you can bring your cabinet to flash at desired times during Backup and provide alarm and fault information through your controller. There are six programmable relays. The contact rating is 3A/125Vac. Terminal blocks accept 12 to 22 awg wiring, torque is 7 in/lbs. The factory default positions of the relays are:

| C1 – On Battery | C2 – On Battery | C3 – Low Battery | C4 – Low Battery | C5 – Timer | C6 – Timer |

The relays may be programmed to trigger for any combination of the following options:

- On Battery

- Low Battery (set point is adjustable)
- Timer (interval is adjustable)
- Time Of Day
- Alarm
- Fault
- BBS Failure
- Disable/Enable

The third line of the LCD will inform you of the status of energized relays. For example, this screen shot shows that there are two relays energized by the “On Batt” or backup condition. The two relays that are energized are relays C1 and C2 as indicated by the “1” and “2” under the word “BACKUP.”

```

80/160BT    0.0VACIn
100% 24.8VDC BACKUP
On Batt Relay 12
EVT 70    RUN    0:44

```

7.15 Call Central

These configurations are for a possible future enhancement.

8.0 System Menu (Settings)

8.1 Time, Date, and Daylight Savings

Set the time in 24 hour format. Enable the Daylight Savings feature if you would like the BBS to automatically adjust the time for daylight savings.

```

TIME :
10:35:00
↑↓ To Scroll Menu
└─ To Change

```

```

DATE :
11/18/04
↑↓ To Scroll Menu
└─ To Change

```

```

Auto Adj. Day. Svgs?
YES
↑↓ To Scroll Menu
└─ To TOGGLE

```

8.2 Model#, Serial Number, and MAC Address

We set these for you prior to shipment.

```

MODEL# :
24M11-WBE
↑↓ To Scroll Menu

```

```

SERIAL# :
12345678
↑↓ To Scroll Menu
└─ To Change

```

```

MAC Address :
00-50-C2-89-B0-09
↑↓ To Scroll Menu

```

8.3 Date Installed

You can use this to note the date that you installed the BBS at the intersection.

```

DATE INSTALLED :
03/18/09
mm/dd/yy
New: XX/XX/XX

```

8.4 Location

Enter the intersection location.

```

LOCATION :
HWY96 & WHT BEAR PKY
↑↓ To Scroll Menus
└─ To Change

```

8.5 Passwords

Passwords are 6 numbers in length. The default password is “111111”. You can change the password or disable the password feature. Passwords protect access to the “Configuration” and “System” menus.

```

PASSWORD CHG. LOCAL :
↑↓ To Scroll Menu
└─ To Change

```

8.6 Ethernet Settings

The Ethernet port comes with many settings. Contact your IT Administrator to set the Ethernet settings. The settings that you will need to set are listed below:

- BBS IP address
- BBS subnet mask
- BBS gateway
- BBS DNS IP address

8.7 Serial Baud Rate

The serial baud rate for RS-232 communications is adjusted by pressing the “Enter” key. The range of adjustment is from 300 to 115,200 bps.



9.0 Communications ~ Ethernet

The BBS Ethernet port has many options for use. It can be connected to the Ethernet switch in your signal cabinet or it can be connected directly to your computer. You can access it by your favorite web browser for status and configuration. The BBS can also be configured to send email notifications. To set up the BBS for communication you will want to contact your IT Administrator to set the Ethernet settings. The settings that you will need to set are listed below:

- BBS IP address
- BBS subnet mask
- BBS gateway
- BBS DNS IP address

Once you have the settings, input them through the “System” menu. You will then be able to connect the BBS to a network switch on your system. When it is connected to your network, you will be able to access the BBS by entering the IP address of the BBS into a web browser of a computer on the network.

9.1 Password Protection

The web browser by default does not have the password feature enabled. To enable password protection, simply go to the “System” page. Check the “Password Enabled” checkbox. Enter the desired user name and password in the lower left corner of the page. Click “Save Changes”. You will now have to enter your user name and password to access the BBS. User names and passwords are case sensitive and you may use alphanumeric characters for either. *NOTE* - Enabling this protection does not enable password protection on the BBS locally, meaning that you have not enabled the keypad password protection on the BBS. They are separate security systems.

9.2 Direct Connection

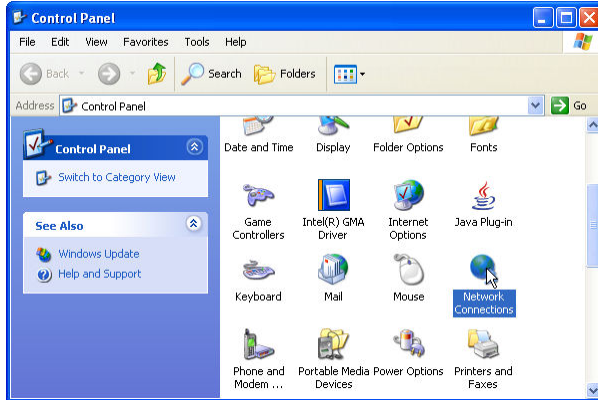
To connect directly to the BBS after you have set the above parameters, you will need to follow one or both of the instructions listed below depending on your computer’s configuration. You will need an Ethernet “crossover cable” for both instructions. Follow instruction set “A” first:

Instruction Set “A”

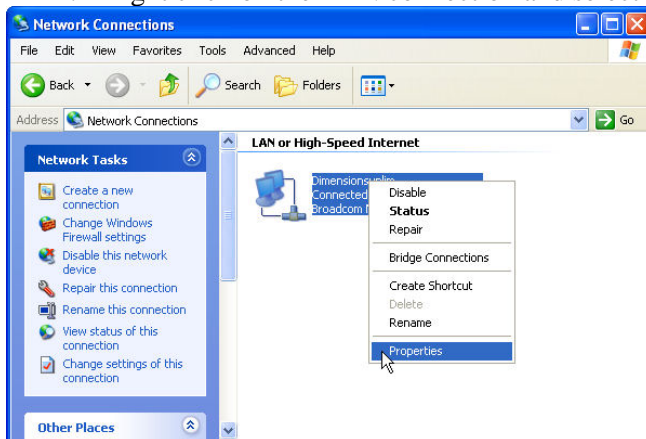
1. Connect the crossover cable to both the BBS and your computer
2. Wait one minute as the two devices negotiate the connection
3. Open a web browser and type in the BBS IP address
4. If the page loads, then you are ready to go – if the page does not load, then follow instruction set “B”

Instruction Set “B”

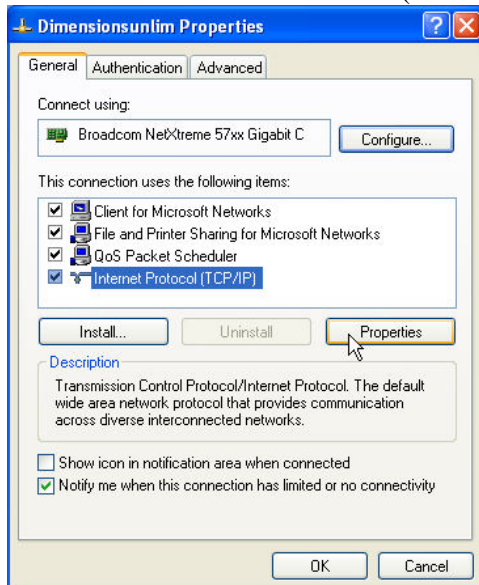
1. Navigate to the “Control Panel” on your PC by clicking “Start” and then click “Control Panel”. Double-click “Network Connections”.



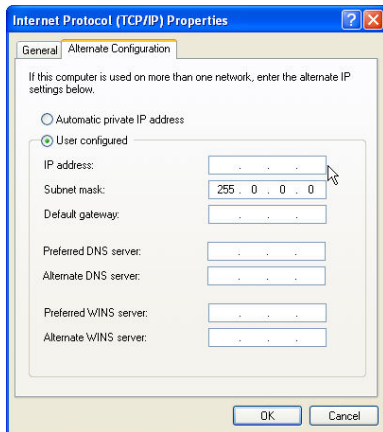
2. Right click on the LAN connection and select “Properties”



3. Select “Internet Protocol (TCP/IP) and then click “Properties”



4. Select the "Alternate Configuration" tab. Click "User configured". Ask your IT Administrator for an IP address that is not being used that you can leave as an alternate setting on your PC. Enter the address in the IP Address and then enter the Subnet mask as shown below. Click "Ok" twice. Disconnect the crossover cable and reconnect.

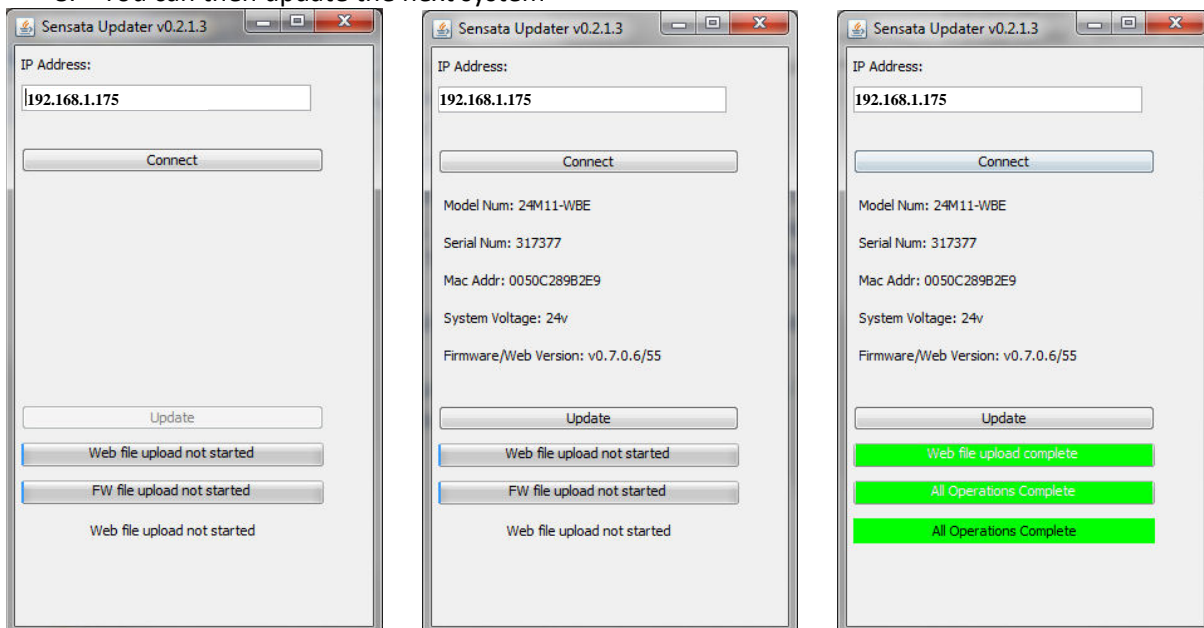


5. Wait one minute as the two devices negotiate the connection
6. Open a web browser and type in the BBS IP address
7. The BBS page should load. If not, check with your IT Administrator.

10.0 System Software Update

The operating system software and the web browser pages are easily uploaded through the Ethernet port. The latest software can be obtained by contacting us. Follow the instructions below to make the update:

1. Save the downloaded files in one folder on your computer
2. Open the folder
3. Double click "updater.jar"
4. Enter the IP address of the BBS system you are going to update. If your BBS system is not on a network – then enter the default IP address of 192.168.1.175
5. Click "Connect", information of the BBS will be displayed (see below screen shots)
6. Click "Update", the two progress bars will show the code being uploaded (web file first and then firmware)
7. The updater will say "All Operations Complete" when done (you can disconnect, the update is complete)
8. You can then update the next system



11.0 Communications ~ RS232

The front panel has a DB-9 female connector. This port allows the BBS system to be monitored and controlled using HyperTerminal (or other terminal emulation software) on a Windows based PC.

11.1 Connecting the RS-232 Port

Connect a standard RS-232 computer cable between the computer's RS-232 port and the BBS unit's RS-232 port.

11.2 Terminal Setup

11.2.1 HyperTerminal Setup

This section gives step-by-step procedures for configuring the HyperTerminal interface. Before proceeding, the user must determine which PC Comm port the BBS is connected to. In this example, Com1 is being used. This will typically be the correct choice for most users and their PC's.

Refer to screen figures 15 through 21:

- 1 From the Windows Start menu go to:
Programs/Accessories/ Communications/HyperTerminal and click the Hyper Terminal entry/icon.
- 2 The **Connection Description** window shown in Figure 15 appears. Enter a name and select an icon for your unit and click **OK**. A sample name appears in Figure 15. When all setup has been completed, this will be the HyperTerminal file name that can be accessed without having to re-initialize the setting.
- 3 The **Connect To** window shown in Figure 16 appears. In the "Connect using" drop-down box select 'COM1' or 'Direct to Com1' and click **OK**.
- 4 The **COM1 Properties** window shown in Figure 17 appears. Set each Port Settings field as shown in Figure 17 and click **OK**.
- 5 The blank terminal interface screen appears as shown in Figure 18. On the File menu go to properties and click once.
- 6 The **'BBS (ADI-24M11 5th & Vine in this case) Properties'** window appears. Click on the **Settings** tab. Fill in the fields as shown in Figure 19. Click the **ASCII Setup** button.
- 7 The BBS (ADI-24M11 5th & Vine in this case) **'ASCII Setup'** window appears. Fill in the fields as shown in Figure 20. Click the **OK** button.
- 8 The **'BBS (ADI-24M11 5th & Vine in this case) Properties'** window reappears (Figure 21). Click the **OK** button.
- 9 HyperTerminal Setup is now finished. The blank terminal interface window reappears as in Figure 18. Press the ENTER key to begin accessing the unit with RS-232 serial communications. The Dimensions BBS interface screen appears as in Figure 21. Go to Section 6.3 to begin using the BBS Communications interface.



FIGURE 15



FIGURE 16
21

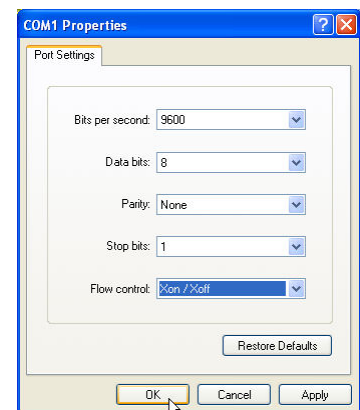


FIGURE 17

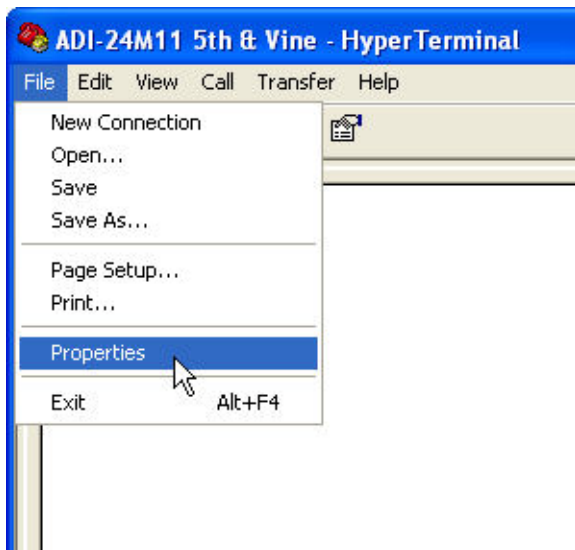


FIGURE 18

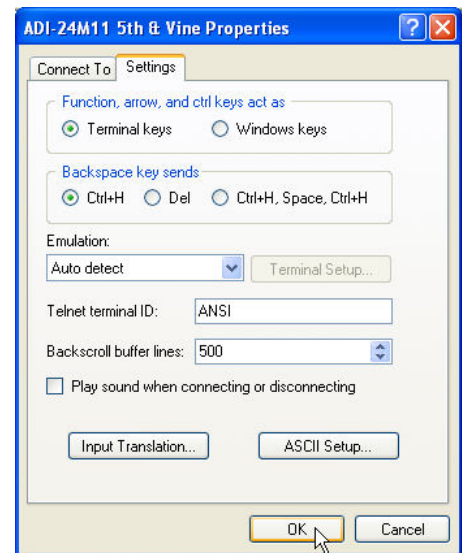


FIGURE 19

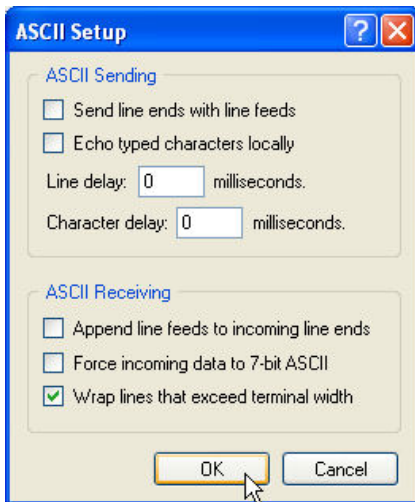


FIGURE 20

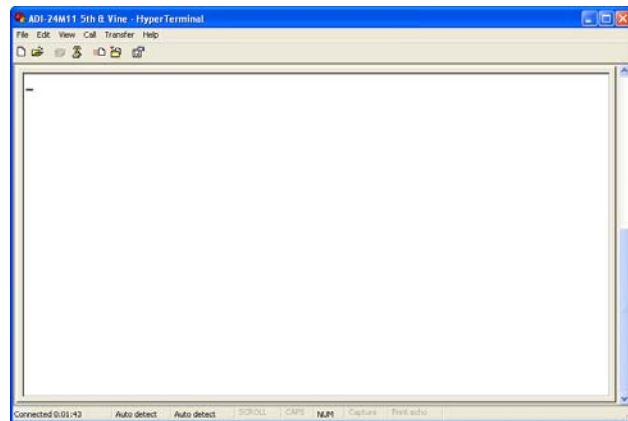


FIGURE 21

11.2.2 HyperTerminal Log File

HyperTerminal is capable of logging the terminal session in a text file for later viewing or data transfer. To initiate a log file use the following steps.

1. From the **Terminal Interface** window click '**Transfer**' menu then click '**Capture Text**'. See Figure 22 below.
2. The '**Capture Text**' window appears see Figure 23 below. Enter a path and file name appropriate for the BBS unit. The example uses a date and intersection to designate the BBS. When finished click

the **Start** button. The communication session will now be logged. The file will be saved automatically upon exit of HyperTerminal.

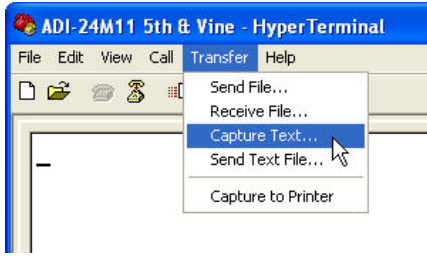


FIGURE 22

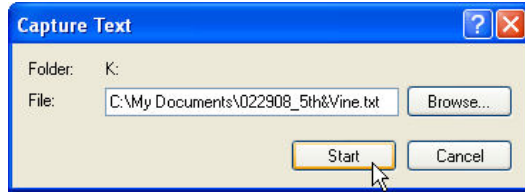


FIGURE 23

11.3 Other Terminal Emulation Setups

If another terminal emulation software package is used, the parameters in Table 4 will be needed to communicate with the BBS unit.

TABLE 4: Terminal Emulation Setting

Emulation Type	VT100 or compatible
Duplex Mode	Half Duplex
Xon/Xoff Flow Control	ON
RTS/CTS Flow Control	OFF
Line Wrap	ON
Screen Scroll	ON
CR Translation	CR
Back Space	N/A
Break Length	N/A
Inquiry	NA
Handshaking	Software
Baud Rate	9600
Data Format	8 Data, No Parity, 1 Stop Bit

11.4 Using the BBS Communication Interface

The Dimensions BBS Communications Interface, for simplicity, is broken down into three menu screens (System Status, Configuration, and System). These menus will allow you to acquire status information, configure the BBS, view/print/save the Event Log, and view/print/save the Self Test Report.

```

BBS 9600 - HyperTerminal
File Edit View Call Transfer Help
[Icons]

SYSTEM STATUS / MAIN MENU
-----
| Sensata Technologies - BBS Interface                                05/13/11 10:35 |
| MODEL: S/N: LOCATION:                                           VER: v0.7.3.19 |
| ALARMS/FAULTS: NO ACTIVE ALARMS/FAULTS                          |
| BBS MODE: STANDBY CHARGER MODE: FLOAT                            |
|------(c) CONFIGURATION (s) SYSTEM (r) REFRESH (e) EVENT LOG-----|
|          (7) RESET ALL COUNTERS (t) SELF TEST REPORT              |
|-----|
| SENSE TYPE: BuckBoost BATT CAP/VOLTS/TEMP:100%/27.0V/24.9C      |
| TRANSFER POINTS: 80/160 LINE INPUT AC: 120.7V / 59.9Hz         |
| OUTAGES CUR/TOT(1=R): 157/157 OUTPUT AC: 120.7V / 60.0Hz / 0.0A |
| RUN TIME CUR/TOT(2=R): 1:36/ 1:36 OUTPUT POWER: 0W             |
| BUCK COUNT CUR/TOT(3=R): 1/ 1 CHARGER DC AMPS: 0.0A            |
| BUCK TIME CUR/TOT(4=R): 0:00/ 0:00 LOW BATT. RLY. : 40%        |
| BOOST COUNT CUR/TOT(5=R): 1/ 1 TIMER RLY. TIME, min.: 120      |
| BOOST TIME CUR/TOT(6=R): 0:00/ 0:00 TOD TIME: DISABLED/00:00-00:06 |
|-----|
| RLY C1: OB OFF RLY C4: LB OFF |
| RLY C2: OB OFF RLY C5: TR OFF |
| RLY C3: LB OFF RLY C6: TR OFF |
|-----|
|==> _

```

Connected 0:03:01 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo

```

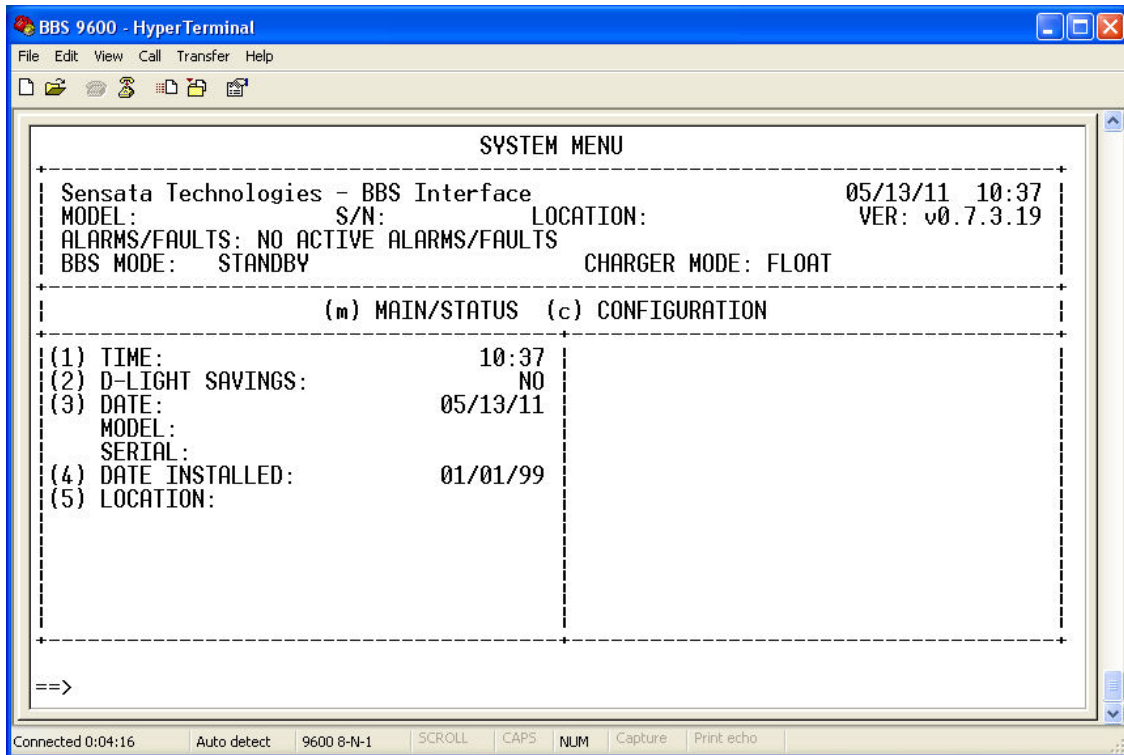
BBS 9600 - HyperTerminal
File Edit View Call Transfer Help
[Icons]

CONFIGURATION MENU
-----
| Sensata Technologies - BBS Interface                                05/13/11 10:36 |
| MODEL: S/N: LOCATION:                                           VER: v0.7.3.19 |
| ALARMS/FAULTS: NO ACTIVE ALARMS/FAULTS                          |
| BBS MODE: STANDBY CHARGER MODE: FLOAT                            |
|------(m) MAIN/STATUS (s) SYSTEM (r) REFRESH (e) EVENT LOG (t) SELF TEST REPORT-----|
|-----|
| (1) BATTERY TYPE AGM (13) SELF TEST: ENABLED                    |
| (2) SENSE TYPE: BuckBoost (14) SELF TEST START: 00:14           |
| (3) LINE QUALIFY TIME: 5 Sec. (15) SELF TEST DAYS: 1st and 15th |
| (4) LOW BATT. RELAY %: 40 (16) SELF TEST DURATION, min.: 1      |
| (5) TIMER RLY. TIME, min.: 120 (17) SELF TEST NOW               |
| (6,7) TIME OF DAY: 00:00-06:00 Self Test Available             |
| (8) TIME OF DAY ENABLE: DISABLED (18,19) TRANSFER PTS. NORM: 100/130 |
| (9) FAN ON DEG. C (EXT.): 25C (20,21) TRANSFER PTS. GEN: 95/134 |
| (10) FAN ENABLE: DISABLED (22) Temp Scale: DegC                |
| (11,12)TEMP. ALARM L/H: -40C/ 75C                               |
|-----|
| (30)RLY C1: OB (30)RLY C4: LB |
| (30)RLY C2: OB (30)RLY C5: TR |
| (30)RLY C3: LB (30)RLY C6: TR |
|-----|
|==>

```

Connected 0:03:45 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo

To make a change in configuration, type in the number of the desired field to change and then press enter. Some fields will toggle their values and others will take you to an entry screen to enter your data.



12.0 Maintenance & Troubleshooting



To prevent current being withdrawn from the batteries that may result in battery damage the DC Breaker ***must be*** switched “Off” if the Manual Bypass Switch is to be in the “Bypass Mode” position for an extended period of time.

12.1 Preventive Maintenance:

12.1.1 BBS Module Maintenance:

- The BBS module was designed to be maintenance-free. There are no user serviceable parts inside the unit.
- Clean the cover of the BBS as needed using a damp cloth or nonabrasive cleanser.



Do not use ACETONE-BASE cleaning solutions. Keep cleaning solutions out of the electrical receptacles on this device.

12.1.2 Battery Maintenance:

- The BBS uses sealed maintenance-free batteries. Proper charging and limited cycling along with a proper battery environment will ensure a long battery life.



Servicing of batteries should be performed or supervised by authorized personnel at least four times a year.



A battery can present a risk of electrical shock and high short circuit current.

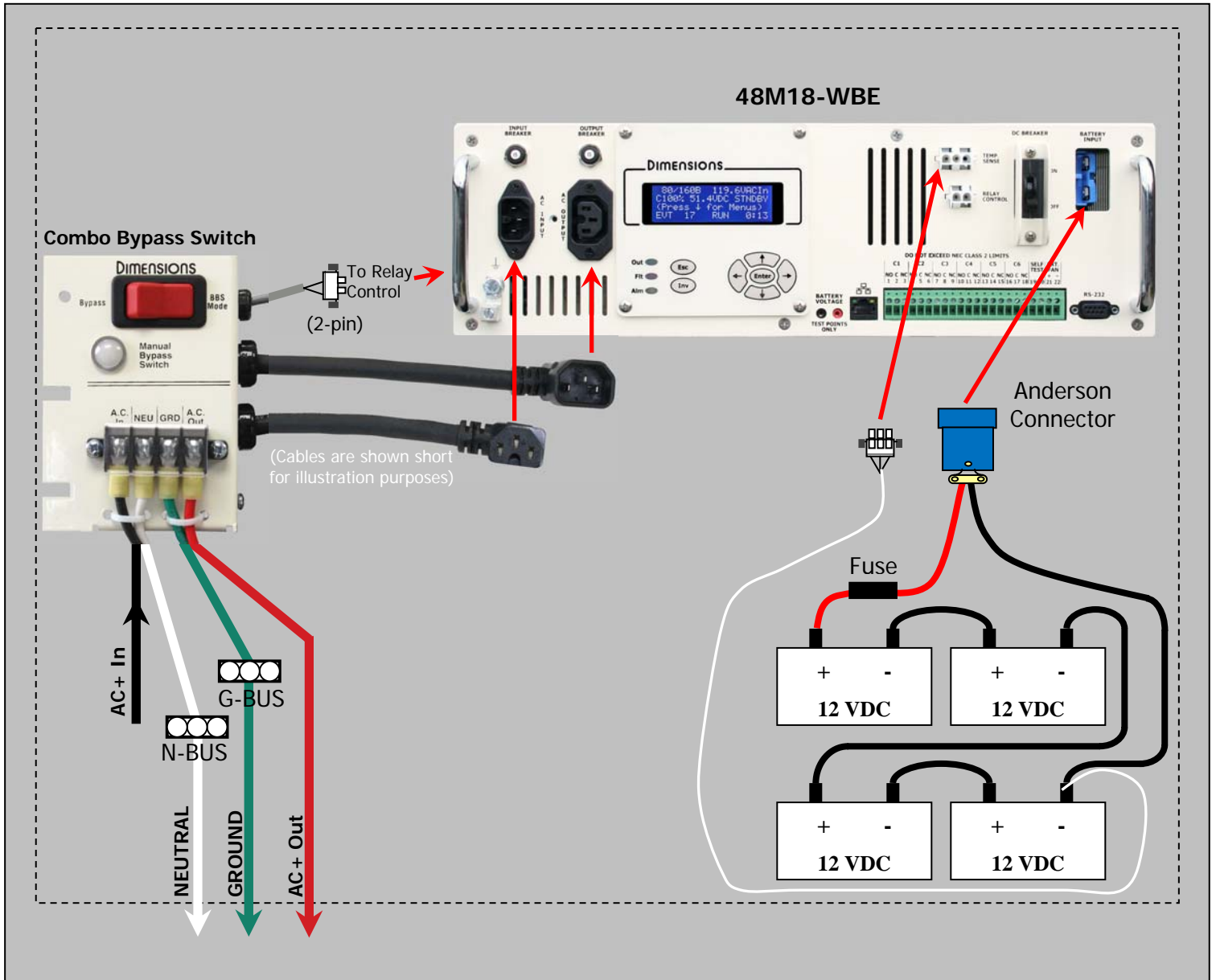
- Before proceeding with maintenance, review battery system drawings.
- Clean and tighten battery connections.
- Replace batteries when conductance tests indicate 30% to 40% deterioration from the original value. Use a battery conductance tester to create a log of the health of your batteries.
- When replacing batteries, use the same model number and type batteries. Batteries should be replaced in complete sets.

12.1.3 Short list of Parts:

- Internal fan is – Mechatronics, part# F1238E24B-FS
- Fan thermostat – Portage Electric Products Inc., (PEPI) part# CR(000+65f).
- Transfer relay (internal) – Tyco (P&B), part# K10P-11D55-12
- Transfer relay (external) – Deltrol Controls, part# 20847-82 (275F 101C 24D)

12.1.4 Overall Wiring Diagram

Overall Wiring Diagram



12.2 Alarms & Faults

Alarm List:

temp. alarm low*	The temperature is equal to or over the preset value.
temp. alarm high*	The temperature is equal to or under the preset value.
check battery*	There is a problem with the battery system.
overload*	The load is drawing more current than the BBS rated power.
output volt. Low*	The inverter output voltage is below 110 volts.
ac line freq. l or h*	The AC Line input frequency is outside of 60Hz +/- 3.0Hz.
dbt test fail*	The disconnected battery test has failed. Check the batteries and cabling. This alarm will clear with a passed test or power cycle.

Fault List:

PROBE FLT – CHGRDISABL*	The temperature compensation cable is disconnected or bad. This will shut down the charger.
SELF TEST FAIL	The Self Test Failed. See log for reason why.
BATT. LOW CUT OFF*	The battery voltage has dropped to the protective low cutoff point.
BATT. VOLT. HIGH	The battery voltage is higher than what is safe for the battery.
OUTPUT VOLT. HIGH	The inverter AC output voltage is over 135 volts.
BBS. TEMP. HIGH*	The BBS internal temperature is too high.
OVERLOAD SHUTDOWN	The inverter is shutting down due to overload
BBS FAILURE	Inverter or Charger failure.

Note: Faults or Alarms with an “*” will self reset after the condition has cleared. Faults and Alarms that do not self reset need to have the power cycled on the BBS (AC&DC).

13. Specifications

GENERAL SPECIFICATIONS	48 Volt, 1800W Series
Output Power (Watts continuous)	1,800 @ 25°C, 1200 @ 74°C
Output Voltage (Pure Sine)	120 VAC regulated
Output Frequency	60 Hz ± 0.05%
Output Current (Amps AC)	Up to 15
Peak Output (Amps AC)	50
Input Voltage (Volts DC)	41-64
Input Current (Amps DC)	Up to 42
Efficiency (Inverter)	Up to 86%
Operating Temperature	-40°C to 74°C (-40°F to 165°F)
Transfer Time (milliseconds)	30 typical
BATTERY CHARGER	
Output Voltage (Volts DC)	Regulated and temp. compensated
Output Current (Amps DC)	Up to 15
Input Current (Amps AC)	Up to 7.6
Charge Time	Less than 10 hours to 80% or greater



“M” CASE
17.2”W x 10”D x 5.25”H, 32 Lbs.
Model # 48M18-WBE

Limited Warranty

SHIPPING TERMS: F.O.B. St. Paul Minnesota. Freight prepaid and billed, subject to prior credit approval.

MINIMUM ORDER: \$50.00 Net Price

LOSS OR DAMAGE: Loss or damage in transit is the responsibility of the carrier. Any claim should be filed with the delivering transport company. Invoice, Bill of Lading and Delivery receipt with damage noted therein must accompany any claims for freight damage. Claims for shortage and lost shipments must be made in writing to Sensata Technologies, St. Paul, MN within 10 days of date of shipment. Claims not reported within this time frame will not be honored.

PRICES: Prices are subject to change without notice. All orders are subject to acceptance at the factory. We reserve the right to invoice prices in effect at time of shipment.

TERMS: Net 30 days with approved credit, credit card or C.O.D.

RETURN GOODS POLICY

No returned materials will be accepted without an accompanying Returned Materials Authorization Number (RMA) from factory. Credit will be issued for returned goods to the original purchaser within 60 days of purchase, provided the inverter is returned to Sensata Technologies unused and not mounted. The amount of credit that will be issued will be at Sensata Technologies discretion based on the condition of the product.

Customer must be in good standing with Sensata Technologies.

Inverters that are discontinued, special-order or used are excluded and will not be eligible for credit.

Customer pays return freight.

PLEASE SHIP FREIGHT PREPAID AUTHORIZED RETURNS TO:

Sensata Technologies / 4467 White Bear Parkway / St. Paul, MN 55110

LIMITED WARRANTY: Sensata Technologies warrants to the original purchaser for use that the goods or any component thereof manufactured by Sensata Technologies will be free from defects in workmanship for a period of 5 years from the date of purchase or contracted length, provided such goods are installed, maintained and used in accordance with Sensata Technologies and the original manufacturer's written instructions.

Components not manufactured by Sensata Technologies, but used within the assembly provided by Sensata Technologies, are subject to the warranty period as specified by the individual manufacturer of said component, provided such goods are installed, maintained and used in accordance with Sensata Technologies and the manufacturer's written instructions.

Sensata Technologies sole liability and the Purchaser's sole remedy for a failure of goods under this limited warranty and for any and all claims arising out of the purchase and use of the goods, shall be limited to the repair or replacement of the goods that do not conform to this warranty. The return of the purchase price in cash is at the sole discretion of Dimensions.

To obtain repair or replacement service under the limited warranty, the purchaser must contact the factory for a Return Material Authorization (RMA). Once obtained, send the Return Material Authorization Number along with the defective part or goods to: Sensata Technologies, 4467 White Bear Parkway, St. Paul, MN 55110, freight prepaid.

THERE ARE NO EXPRESS WARRANTIES COVERING THESE GOODS OTHER THAN AS SET FORTH ABOVE. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO FIVE YEARS FROM DATE OF PURCHASE.

SENSATA TECHNOLOGIES ASSUMES NO LIABILITY IN CONNECTION WITH THE INSTALLATION OR USE OF THE PRODUCT, EXCEPT AS STATED IN THIS LIMITED WARRANTY. SENSATA TECHNOLOGIES WILL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

WARNING: LIMITATIONS ON USE: Sensata Technologies products are not intended for use in connection with Life Support Systems and for Avionic use. Sensata Technologies makes no warranty or representation in connection with their products for such uses.