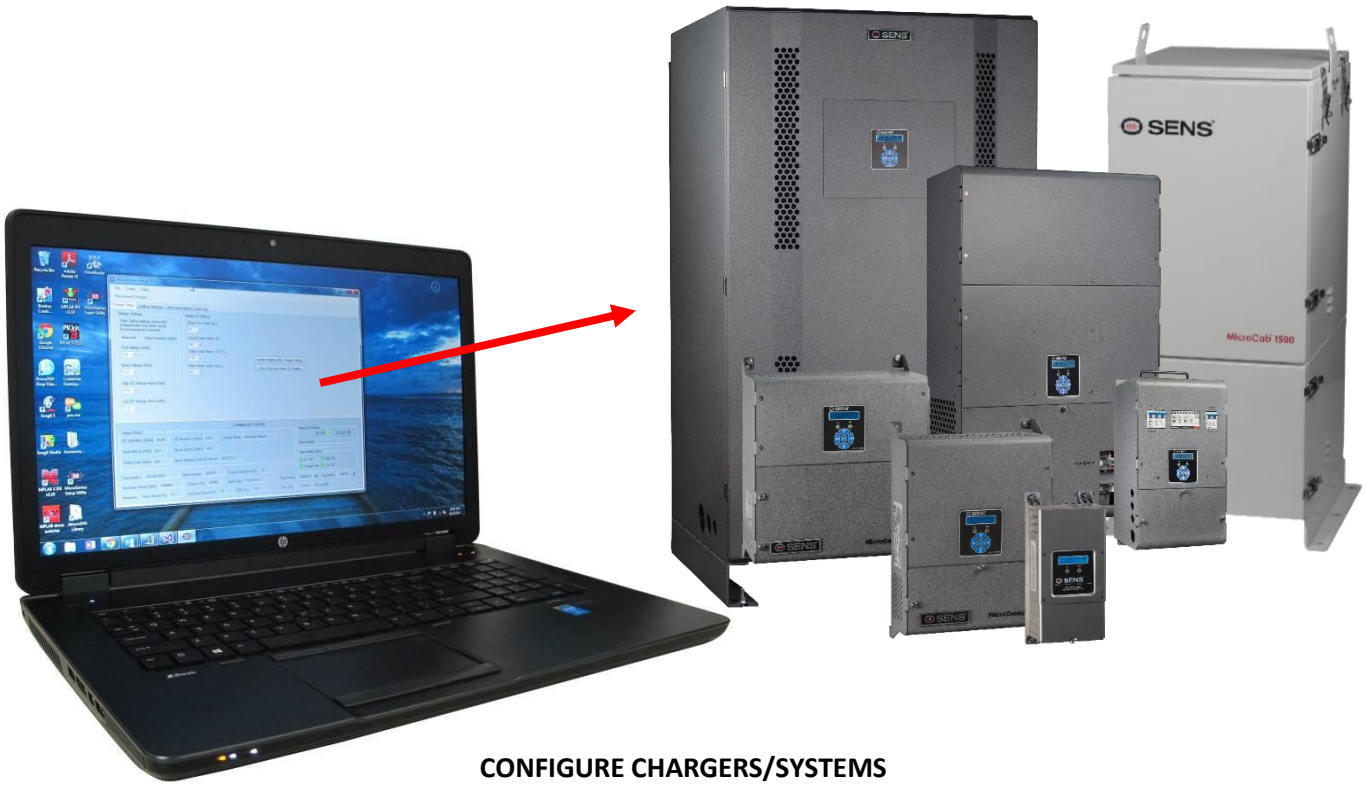
SENS Setup Utility

For SENS MicroGenius®, EnerGenius® and MicroCab™



CONFIGURE CHARGERS/SYSTEMS
WITH CUSTOM SETTINGS

Operation Manual

SENS Part Number: 101325
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Installation or service questions?
Call SENS between 8 a.m. and 5 p.m. (Mountain Time),
Monday through Friday, or visit our website.

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1 DESCRIPTION

Use the *SENS Setup Utility* to configure MicroGenius®, MicroCab™, EnerGenius® DC and SuperTorque™ 8Z products with custom settings. Custom configuration enables users to update firmware or customize output voltage, alarms, temperature compensation, boost time limit, current limit settings, Modbus communications and more.

All chargers/systems equipped with a front panel keypad require the *SENS Setup Utility* only to configure alarm relay assignments and update firmware. All other settings are adjustable using the keypad.

The *SENS Setup Utility* software operates on a Windows 7 or newer PC with a USB port (MicroGenius, MicroCab) or an Ethernet connection (EnerGenius DC).

2 SETUP

2.1. Copy Files

The *SENS Setup Utility* software is provided on the SENS website (www.sens-usa.com) in the "Download Center." Copy all downloaded files to a Windows 7 or newer PC.

2.2. Install Utility

Install the *SENS Setup Utility* by double-clicking the *SENS Setup Utility* installer file.

2.3. Install USB Driver

If not automatically installed, install the USB driver located at C:\Program Files (x86)\Stored Energy Systems\SENS Setup Utility\DriverSetup (or similar link depending on computer). See Appendix A for instructions to install driver.

2.4. Connect to the Charger

Communication between a computer and the charger/system using the *SENS Setup Utility* requires connection of a SENSbus Adapter or a network cable.

2.4.1. SENSbus Adapter

Connect using the SENSbus Adapter for legacy MicroGenius 2, legacy MicroGenius S2/S4 and MicroCab units that do not include the TCP/IP option. Connect the provided USB cable from the USB port on a PC to the SENSbus Adapter port labeled "USB." Connect the provided network cable from the SENSbus Adapter RJ-45 port labeled "SENSbus" to the RJ-45 connector on the charger/system (see specific product user manual for connection location).

2.4.2. USB

Connect using a USB cable for MicroGenius 2, MicroGenius S2/S4, 8Z, IQ and MicroCab units that include the integrated USB option. Connect the provided USB cable from the USB port on a PC to the port labeled "USB" on the charger/system (see specific product user manual for connection location).

2.4.3. Ethernet/Network Cable

Connect using a network cable for EnerGenius DC units. Connect a network cable from a PC to the RJ-45 connector on the charger/system (see specific product user manual for connection location).

2.5. Remove Jumpers —*for stand-alone chargers without keypads only*

When configuring a stand-alone charger (charger without a keypad and not part of a system), remove all output configuration jumpers from the main circuit board to enable PROGRAM MODE. In PROGRAM MODE the charger output is determined by values programmed in the charger using the *SENS Setup Utility*. If the charger has not been previously programmed, removing all jumpers will result in an error state until programming is complete.

2.6. Connect Charger/System

Launch the *SENS Setup Utility*. Select *USB* to connect when using the SENSbus Adapter or USB. The utility will automatically find a connected SENSbus Adapter and begin communicating with a charger/system. Select *SENSNET* to connect when using Ethernet and a network cable. Enter the IP address of the desired device to begin communicating. Search for chargers on your network using the *Search* button. Select *SIMULATE* to simulate a connection. Simulating a connection allows saving custom settings files to load to a charger/system at a later date.

3 OPERATING INSTRUCTIONS

3.1. Programmable Parameters

Use the *SENS Setup Utility* to program the parameters listed in Table 1. The charger/system will immediately begin using custom programmed values upon saving to the charger/system. See specific product user manual for parameter definitions. Adjustments of most settings are prohibited on the SuperTorque 8Z product to ensure proper operation.

NOTE: For stand-alone charger without keypad, user must remove circuit board output jumpers to enable programmed parameters. SENS recommends retaining the jumpers to return to factory defaults if desired.

Table 1 – Programmable Parameters

Parameter	Utility Menu	Adjustment Range/Details
Battery Type	Battery (DC) Settings/Basic	Select FLA (flooded lead-acid) for GENSET and Non-GENSET applications, NICD (nickel-cadmium), VRLA (valve regulated lead-acid), AGM (absorbed glass mat), ultracapacitor or power supply. Select “Custom” to fully customize a unique battery type.
Number of Cells	Battery (DC) Settings/Basic	Number of cells times volts per cell must not exceed other limits
Float Voltage	Battery (DC) Settings/Basic	Must be same or less than Boost setting. Option to configure as volts/cell or total voltage.
Boost voltage	Battery (DC) Settings/Basic	Must be same or greater than Float, must not be greater than 166% of Float setting
Temp Compensation slope	Battery (DC) Settings/Basic	0 to -0.30%V/°C
Auto Boost Timeout*	Battery (DC) Settings/Basic	1-100 hours
Auto Boost Delay	Battery (DC) Settings/Basic	0-5 minutes
Limit Current	Battery (DC) Settings/Basic	Check to enable current limiting using the Channel Current Limit, See Channel Current Limit below.
Channel Current Limit	Battery (DC) Settings/Basic	Set to maximum desired charger/system current for selected channel. Settings lower than maximum available installed charger current will limit current to enable redundancy, e.g. if two 15A modules are included in a system, set to 15A for N+1 redundancy. Settings greater than maximum available installed charger current will result in setup errors. Set to 0 to turn off redundancy, to remove setup checks for missing charger modules and to allow full current (no limit).

Parameter	Utility Menu	Adjustment Range/Details
Startup Voltage	Battery (DC) Settings/Basic	Set a minimum DC terminal voltage threshold required before charger DC output is enabled and charger produces output voltage. The FORCE STARTUP button may be pressed to manually enable charger output below this setting. Set to 0V to disable startup voltage function and to enable the charger at any DC voltage.
Minimum Boost Hold	Battery (DC) Settings/NiZn	Minimum minutes required for Boost mode. Applicable to NiZn batteries only. Requires factory-provided security code to adjust.
Maximum Boost Hold	Battery (DC) Settings/NiZn	Maximum minutes allowed for Boost mode. Applicable to NiZn batteries only. Requires factory-provided security code to adjust.
Batt Discharge Voltage	Battery (DC) Settings/Alarms	Must be between Low DC setting and 98% of Float setting or Eco-Float setting when HELIX is active. Option to configure as volts/cell or total voltage.
Low DC Voltage	Battery (DC) Settings/Alarms	Must be greater than End Discharge setting and less than Battery Discharging setting. Option to configure as volts/cell or total voltage.
Batt End Discharge Voltage	Battery (DC) Settings/Alarms	Must be less than Low DC setting. Option to configure as volts/cell or total voltage.
Low Crank Voltage	Battery (DC) Settings/Alarms	6V to 98% of Float setting, must be at least 2% less than Float setting. Option to configure as volts/cell or total voltage.
Low Current Alarm	Battery (DC) Settings/Alarms	0-50% of nominal current in amps, zero indicates alarm is disabled
High DC Voltage	Battery (DC) Settings/Alarms	Must be greater than Boost setting by 2% of Float setting, must be less than 40% higher than Boost setting. Option to configure as volts/cell or total voltage.
Over Voltage Shutdown	Battery (DC) Settings/Alarms	Must be greater than High DC setting. Option to configure as volts/cell or total voltage.
Ground Fault Trip	Battery (DC) Settings/Alarms	0-5000uA, zero indicates ground fault alarm is disabled
Alarm Delay *	Battery (DC) Settings/Alarms	5-60 seconds
Periodic Boost Interval**	Battery (DC) Settings/Periodic Boost	1-180 days, available on select products only
Periodic Boost Duration**	Battery (DC) Settings/Periodic Boost	1-100 hours
Low Battery Temperature	Battery (DC) Settings/Battery Settings	Minimum battery temperature alarm setpoint
High Battery Temperature	Battery (DC) Settings/Battery Settings	Maximum battery temperature alarm setpoint

Parameter	Utility Menu	Adjustment Range/Details
Shutdown Temperature	Battery (DC) Settings/Battery Settings	Maximum battery temperature alarm setpoint at which charger will power off
High Battery Room Temp	Battery (DC) Settings/Battery Settings	Maximum battery room temperature alarm setpoint
Battery Check Voltage	Battery (DC) Settings /Battery Settings	Must be greater than Battery End Discharge setting and less than 98% of Float setting. Option to configure as volts/cell or total voltage.
Check Interval	Battery (DC) Settings /Battery Settings	1 hour to 90 days, zero indicates battery check is disabled
Check Duration	Battery (DC) Settings /Battery Settings	1-60 minutes
Commission Voltage**	Battery (DC) Settings /Commission	Float voltage to charger maximum, must be greater than or equal to Float setting
Commission Current**	Battery (DC) Settings /Commission	5-100% of nominal current in amps
Commission Duration**	Battery (DC) Settings /Commission	1-120 hours, zero indicates commissioning is disabled
Keypad Access Level	Unit/Access	Select *Passive* for read-only status, *Monitor* for read-only status and menus, *Normal* to access/adjust values in most menus, *Advanced* to access/adjust all values
Mute Keypad Clicks	Unit/Access	Enable to mute/silence clicks when pressing keys
IP Setting Method	Unit/Coms	Select *Custom* to set static IP address or *Automatic* for an automatically assigned (DHCP) IP address
IPv4 Address	Unit/Coms	Set desired static IP address
Gateway Address	Unit/Coms	Set network gateway address
Subnet Mask	Unit/Coms	Set network subnet mask
ECU Instance *	Unit/J1939	0-7
Vehicle System Instance *	Unit/J1939	0-15
Function Instance *	Unit/J1939	0-31
Address *	Unit/J1939	1-250, dynamically assigned as necessary
Industry Group *	Unit/J1939	0-7
BCH Default *	Unit/J1939	1 or 2, zero indicates J1939 is disabled (could be due to removed BCH/ADDR jumper on circuit board)
Message Delay	Unit/J1939	0-60 seconds, 0 or 1 sends a message every 1 second
Baud Rate *	Unit/ Coms/Modbus RS485	230.4 Kbps maximum
Parity *	Unit/ Coms/Modbus RS485	None, even or odd

Parameter	Utility Menu	Adjustment Range/Details
Mode *	Unit/ Coms/Modbus RS485	RTUor TCP/IP (available on select products only)
Slave Address *	Unit/ Coms/Modbus RS485	1-255
Write Access	Unit/Coms/ Modbus RS485	Enable/disable write access via Modbus RS-485
Modbus RS485 Enabled	Unit/ Coms/Modbus RS485	Enable Modbus RS-485. Only one RS-485 protocol is allowed at a time.
Apply License Key	Unit/Coms/Modbus RS-485	Enter optional license key to enable Modbus RS-485 communications. No key necessary if field is not present.
Slave Address	Unit/ Coms/Modbus TCP/IP	1-255
Write Access	Unit/ Coms/Modbus TCP/IP	Enable/disable write access via Modbus TCP/IP
Max Connections	Unit/Coms/Modbus TCP/IP	Set max number of Modbus TCP/IP connections
Apply License Key	Unit/Coms/Modbus TCP/IP	Enter optional license key to enable Modbus TCP/IP communications
Source Address	Unit/ Coms/DNP3 RS485	Set source address
Destination Address	Unit/ Coms/DNP3 RS485	Set destination address
DNP RS485 Enabled	Unit/ Coms/DNP3 RS485	Enable DNP3 RS-485. Only one RS-485 protocol is allowed at a time.
Baud Rate	Unit/ Coms/DNP3 RS485	230.4 Kbps maximum
Parity	Unit/ Coms/DNP3 RS485	None, even or odd
Configuration File	Unit/ Coms/DNP3 RS485	Set to factory default DNP3 configuration or select one of two custom configurations. Use SENS DNP3 Config Tool to generate custom configuration file.
Apply License Key	Unit/ Coms/DNP3 RS485	Enter optional license key to enable Modbus TCP/IP communications
Source Address	Unit/ Coms/DNP3 TCP	Set source address
Destination Address	Unit/ Coms/DNP3 TCP	Set destination address
DNP TCP Enabled	Unit/ Coms/DNP3 TCP	Enable DNP3 TCP/IP
DNP3 Port	Unit/ Coms/DNP3 TCP	Set port

Parameter	Utility Menu	Adjustment Range/Details
Configuration File	Unit/ Coms/DNP3 TCP	Set to factory default DNP3 configuration or select one of two custom configurations. Use SENS DNP3 Config Tool to generate custom configuration file.
Apply License Key	Unit/ Coms/DNP3 TCP	Enter optional license key to enable Modbus TCP/IP communications
AC Max Voltage	AC Settings	Maximum VAC alarm setpoint
AC Min Voltage	AC Settings	Minimum VAC alarm setpoint
AC High Frequency	AC Settings	51-80 Hz
AC Low Frequency	AC Settings	30-59 Hz
Number of Phases	AC Settings	1 or 3
AC Alarm Delay	AC Settings	5-60 seconds

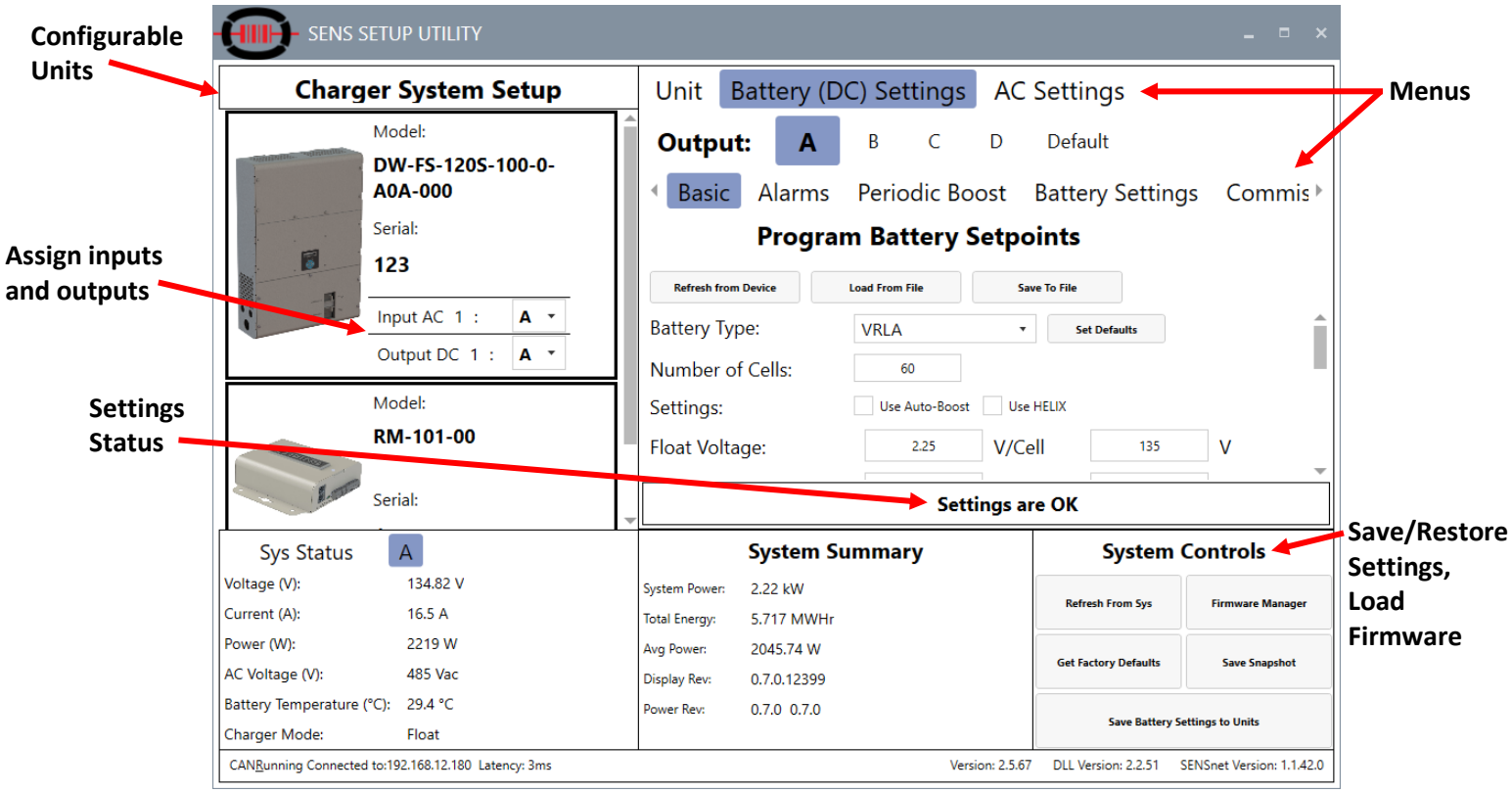
*Setting adjustment will affect stand-alone charger regardless of whether charger jumpers are in place or not. Example: changing the current limit percentage will lower the current in all modes including the programmed mode, jumper defaults, and factory default mode.

**Update firmware on chargers with Power PCA revision 1.5.0 or lower to enable configuration of Periodic Boost and Commissioning.

3.2. Utility Overview

Units communicating with the *SENS Setup Utility* are displayed along the left side of the utility under *Charger System Setup*. Stand-alone chargers (charger without a keypad and not part of a system) are displayed individually when multiple chargers are connected in parallel. Click on a specific unit icon in the list to configure that unit. Menus for various categories of configuration are displayed across the top. Click a menu heading to display settings under each menu.

Figure 1 – Main Screen



3.3. Assign Modules

For each item listed in *Charger System Setup* assign charger modules to a specific output. Assign each module to output A, B, C or D when modules are used in a system (e.g. MicroGenius 2 chargers used as

modules in MicroCab or S2/S4 charger systems). Stand-alone MicroGenius modules are assigned to *Default* when charger is not part of a system.

3.4. Settings Status

The Setting Status bar indicates that settings are incorrect, in conflict with each other or acceptable. Specific information regarding setting errors is displayed.

3.5. Unit/System Controls

Save/restore settings or load firmware updates.

3.5.1. Refresh From Device/Sys

Load/populate the *SENS Setup Utility* with values from the connected unit(s).

3.5.2. Firmware Manager

Update firmware on all devices in a system (e.g. all power and optional alarms/communications accessory circuit boards) except the optional communications protocol circuit board. Update the communications protocol circuit board using the board webpage. See specific product user manual for details.

3.5.3. Get Factory Defaults

Load/populate the *SENS Setup Utility* with default values originally configured in the unit at the SENS factory. Press the *SAVE SETTINGS TO DEVICE/SAVE BATTERY SETTINGS TO UNITS* button to save settings to the unit. The unit will immediately begin using factory default values.

3.5.4. Save Settings To Device/Save Battery Settings to Units

Save values displayed in the *SENS Setup Utility* to the unit(s).

3.5.5. Save Snapshot

Save a "snapshot" of unit/system configuration for troubleshooting purposes. Provide the snapshot file to SENS Customer Service for help in solving issues.

3.6. Load/Save Files

3.6.1. Load From File

From various menus, load/populate the *SENS Setup Utility* with settings from a file stored on the PC. Saved settings files will have a custom file extension (e.g. ".uGXBatSet" for DC output settings). Use this option to deploy custom settings to a fleet of chargers/systems.

3.6.2. Save To File

From various menus, save settings displayed in the *SENS Setup Utility* to a file for later use. Saved settings files will have a custom file extension. Use this option to create and deploy settings to a fleet of chargers/systems.

3.7. Battery (DC) Settings Menu

Configure settings related to battery type and output charging behavior. Configuration changes made in this section will affect all units in a system of units. Submenus exist to configure basic settings, boost behavior, battery check and battery commissioning. Press the *SAVE BATTERY SETTINGS TO UNITS* button under *SYSTEM CONTROLS* to save settings to the unit(s). Units will immediately begin using custom programmed values (remove jumpers from stand-alone chargers without keypads to enable PROGRAM MODE for setting changes to take affect).

3.7.1. Basic Menu

Configure basic output settings. Select defaults based on the battery type selected by pressing the *SET DEFAULTS* button. See Table 1 for adjustment details.

3.7.2. NiZn Menu

Configure settings specific to the SuperTorque 8Z product and NiZn batteries only. Requires factory-provided security code to adjust.

3.7.3. Alarms Menu

Configure alarm setpoints and initiate the Crank Analyzer. See Table 1 for adjustment details. See specific product user manual for alarm definitions.

3.7.3.1. Crank Analyzer

Press the *CRANK ANALYZER* button to open the analyzer window. The Crank Analyzer is used with genset applications and displays the number of engine cranks detected as well as the total number of cranks where the battery voltage was lower than the configured *Low Crank Voltage* threshold (see *Alarms* menu to configure *Low Crank Voltage* and *Low Crank Alarm Delay* alarm settings). Details for the previous four engine crank events and a graph displaying battery voltage over time are displayed in the Crank Analyzer.

Press the RESET CRANK DETECTION to reset all crank data and a Low Crank alarm. Data is typically reset after replacing batteries. Press the RESET CRANK ALARM to only reset a Low Crank alarm and keep crank data. The Low Crank alarm may also be reset by removing and replacing both AC and DC power to the unit.

3.7.4. Periodic Boost Menu

Configure periodic boost values, reset periodic boost interval and start/stop periodic boost charging. See Table 1 for adjustment details.

3.7.5. Battery Settings Menu

Configure battery temperature alarms setpoints and battery check settings. Reset the battery check interval and start/stop a battery check. See Table 1 for adjustment details.

3.7.6. Commission Menu

Configure commissioning values and initiate Commissioning Mode. See Table 1 for adjustment details. See Application Note 26 for detailed commissioning instructions. Press the *RUN COMMISSIONING CHARGE* button to engage Commissioning Mode (remove jumpers from stand-alone chargers without keypads to enable PROGRAM MODE for commissioning to begin).

3.8. Unit Menu

Configure settings related to alarm relay assignments, communications and Customer Service support. Configuration changes made in this section will affect only the unit selected in the *Device(s) in Unit* list. Press the *SAVE SETTINGS TO DEVICE* button under *UNIT CONTROLS* to save settings to the unit. The unit will immediately begin using custom programmed values (remove jumpers from stand-alone chargers without keypads to enable PROGRAM MODE for setting changes to take affect).

3.8.1. Relays Menu

Revise factory default relay assignments by custom assigning alarms to relays when Form-C contact relays are included with charger/system. For additional information on how to create custom alarms and assign them to relays, contact SENS Customer Service.

3.8.2. Coms Menu

Configure J1939, Modbus and DNP3 communications and TCP/IP network values (for models including network capability). Select the *Use Extended Functions* checkbox to enable receiving extended J1939 data from the unit at the J1939 master. See Table 1 for adjustment details and the product user manual for additional setup details.

3.8.3. Service Menu

Access Customer Service and support related settings. Under the *SERVICE* menu, click on a specific device under the *Device(s) in Unit* list to display further menu items. Click on menu headings to access device status, display active alarms, update firmware, test alarm relays, force the unit to restart or run the Crank Analyzer (see section 3.7.1.1).

3.8.3.1. Relay Test

For units equipped with the alarms/communications circuit board, select the *Relay Test* menu to force alarm relays into open or closed states to ensure the relays are operating.

3.8.3.2. Alarm Test

Simulate/set alarms for testing purposes. Force alarms on, force alarms off or return to actual state. Forced alarm state times out after 5 minutes.

3.8.3.3. Tools

3.8.3.3.1. Switch to Unit or System Display

For units equipped with the alarms/communications circuit board, select *MONITORING UNIT* or *MONITORING SYSTEM* to toggle between displaying single unit or system (for a system with multiple chargers) values on the unit's LCD.

3.8.3.3.2. Update Firmware

Select to update unit firmware on all devices except the optional communications protocol circuit board. Updated firmware ".SENsF" files are available on the SENS website (www.sens-usa.com/support/download-center/). Firmware is separated into one file for each device (e.g. one file each for the power and optional alarms/communications accessory circuit boards) and firmware is updated independently for each device using this menu. To update independently, click on a specific device under the *Device(s) in Unit* list and then press the *UPDATE FIRMWARE* button under the *TOOLS* menu. Select the appropriate ".SENsF" firmware file and wait for firmware update to complete. Repeat steps to update firmware on other devices. To update firmware to all devices at once, press the *FIRMWARE MANAGER* button from the main *Battery (DC) Settings* screen.

3.8.3.3.3. Force Restart

Restart the device selected under the *Device(s) in Unit* list.

3.8.3.3.4. Change Unit Serial

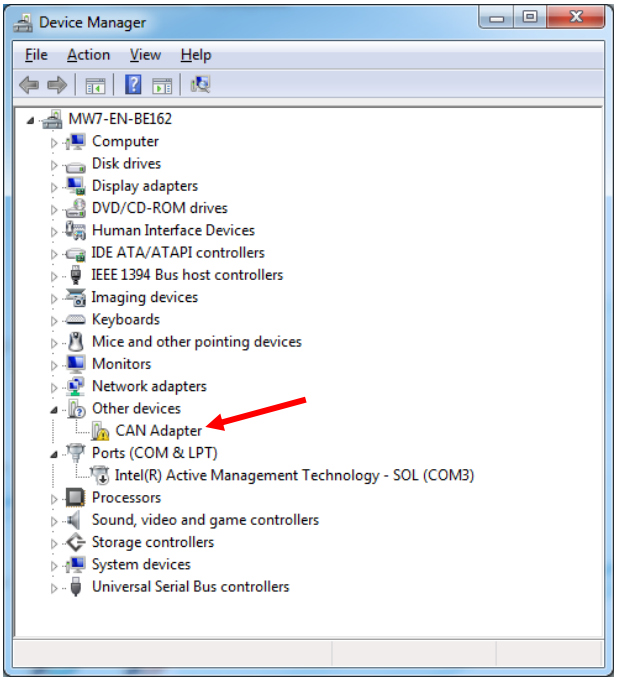
Change the unit serial number of the device selected under the *Device(s) in Unit* list. The unit serial number is the overall serial number assigned to all devices in a system to tie those devices together as one unit.

3.9. AC Settings

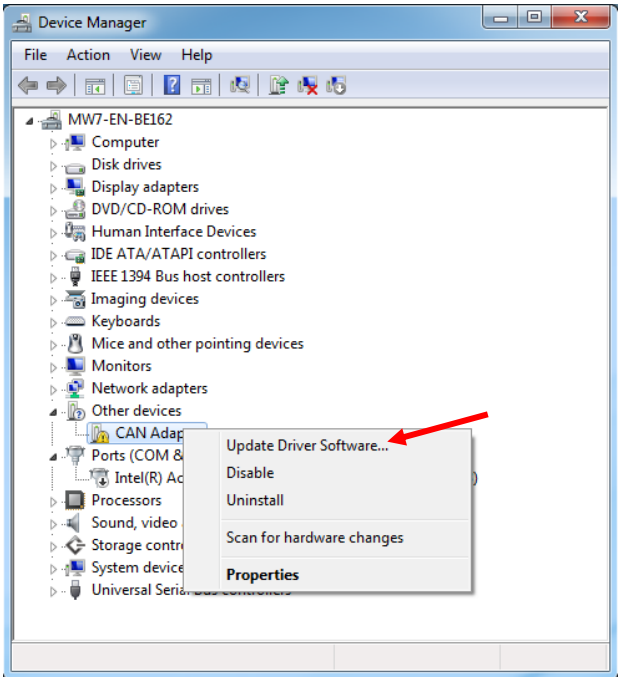
Configure AC input voltage alarm setpoints. Configuration changes made in this section will affect all units in a system of units. See Table 1 for adjustment details.

APPENDIX A – INSTALLING USB DRIVER FOR SENSBUS ADAPTER

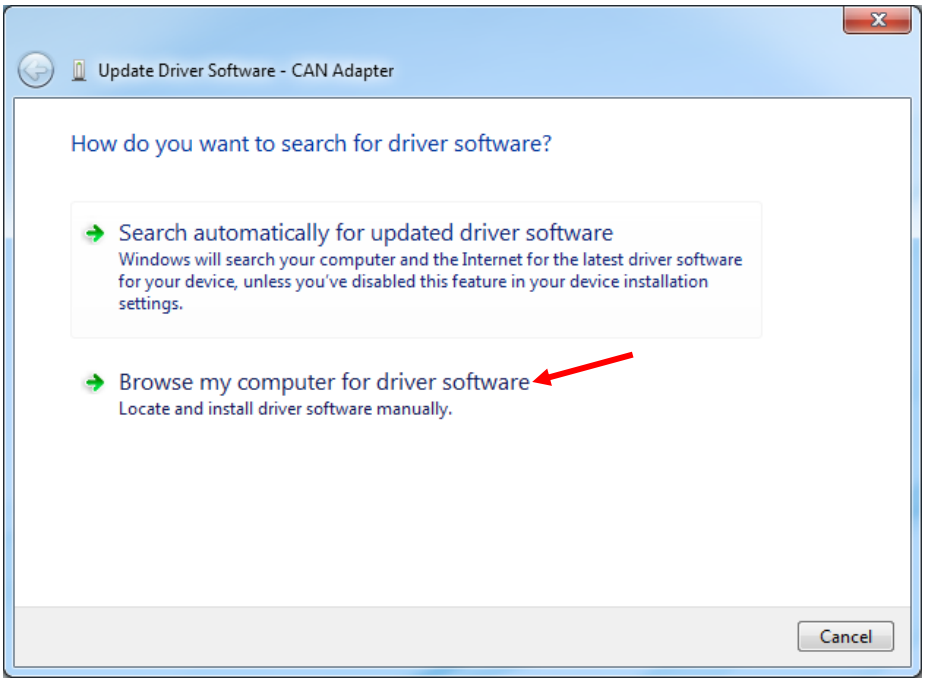
1. Open computer Device Manager to view devices. Note the “CAN Adapter” device.



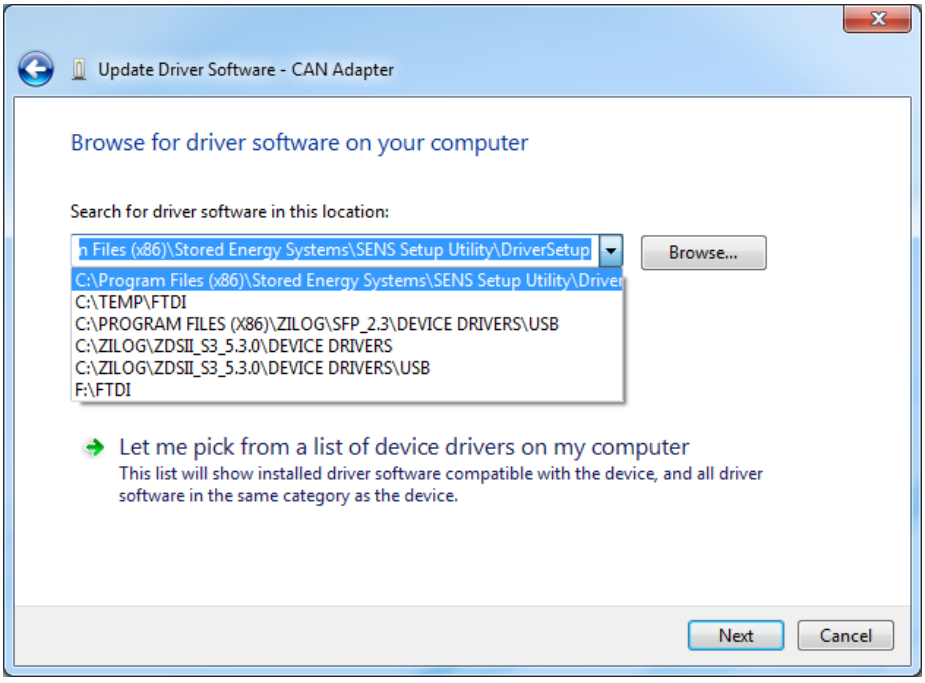
2. Right-click on “CAN Adapter” and select to “Update Driver Software…”



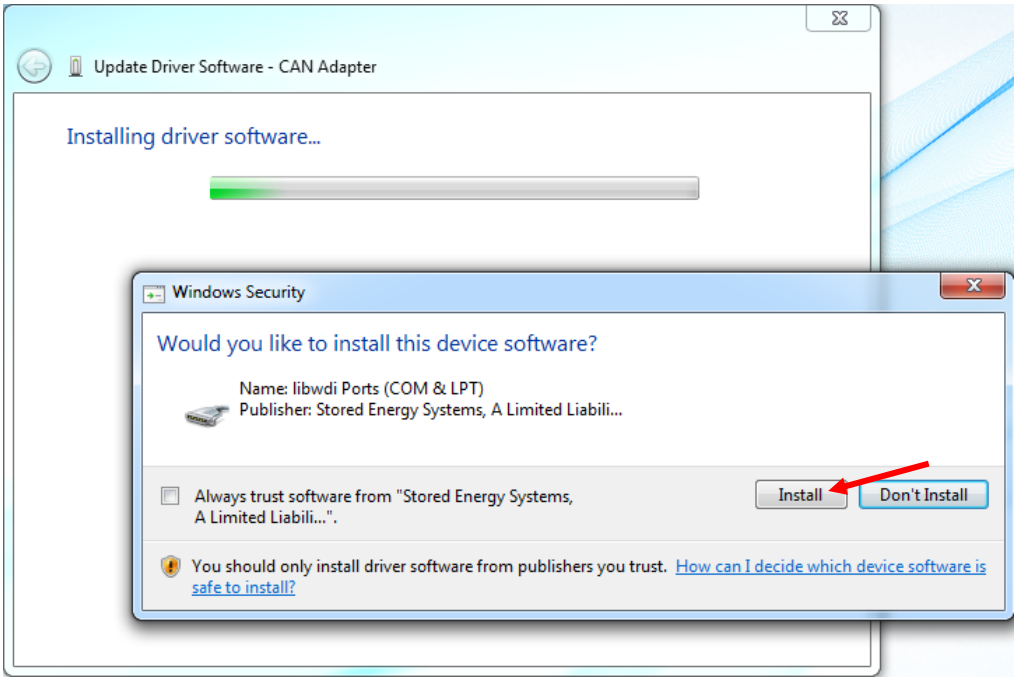
3. Select to browse for driver software.



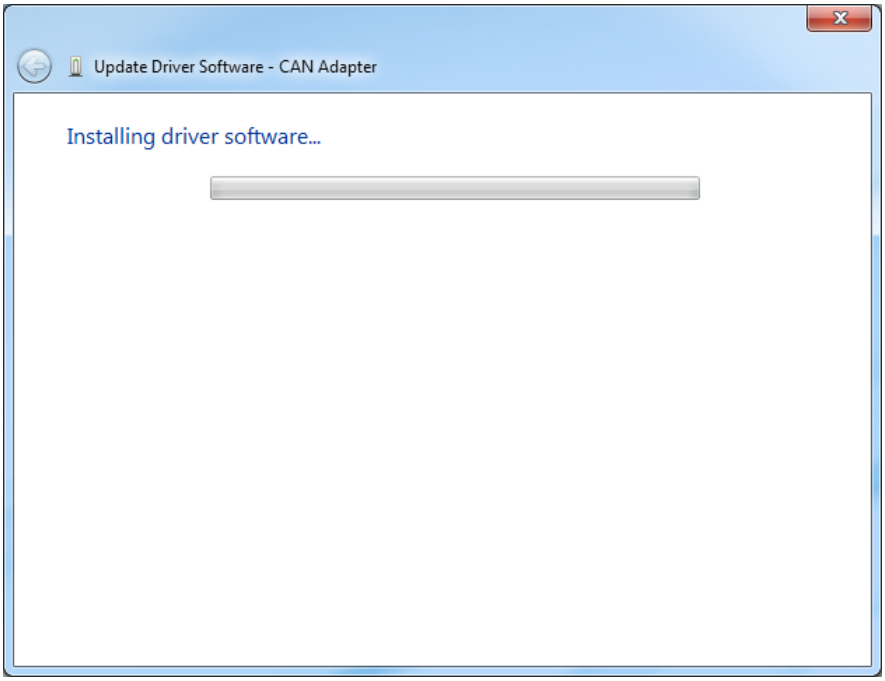
4. Select the "DriverSetup" folder at "C:\Program Files (x86)\Stored Energy Systems\SENS Setup Utility\DriverSetup."



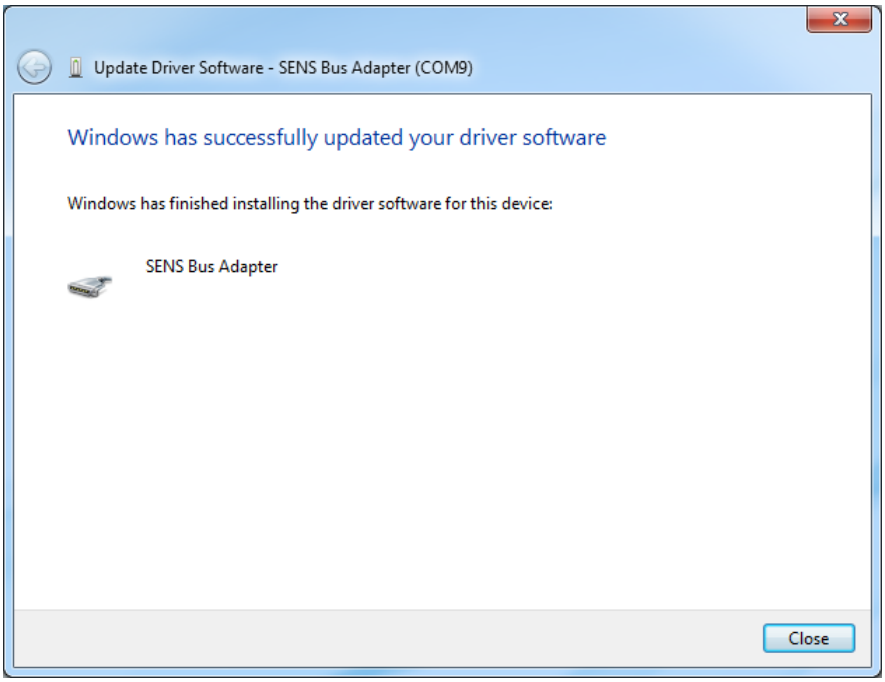
5. Select to install the device software.



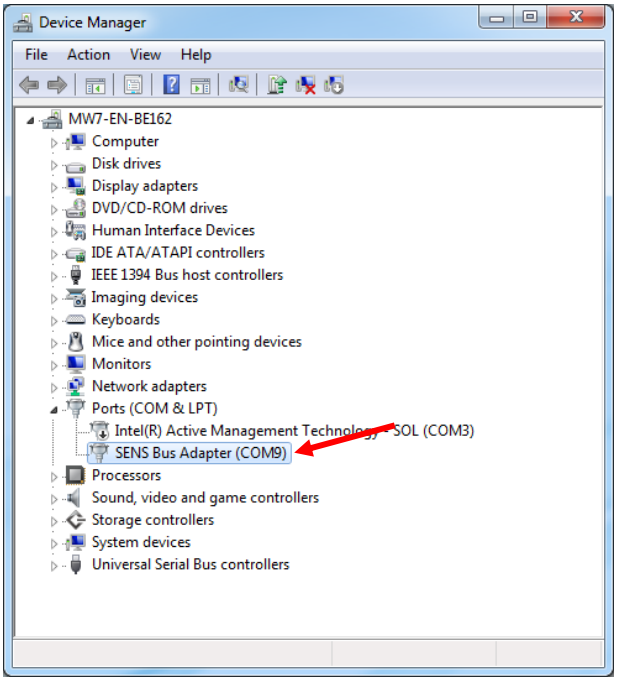
6. Wait for installation to complete.



7. Verify successful installation.



8. Note device successfully installed.



APPENDIX B – INSTALLING USB DRIVER FOR CHARGER WITH ON-BOARD USB

1. Open computer Device Manager to view devices
2. Identify the USB connection and select to “Update Driver Software…”
3. Select to search automatically for updated driver software
4. If unable to automatically download, download the USB driver at https://ftdichip.com/drivers/vcp-drivers/. Download the VCP drivers, see image below.