

GE
Entellisys™ Low Voltage Switchgear

System Administrator Manual



DEH-230

Warnings, Cautions, and Notes as used in this publication

Warnings

WARNING! Warning notices are used in this publication to emphasize that hazardous voltages, currents, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

Warning notices are also used for situations in which inattention or lack of equipment knowledge could cause either personal injury or damage to equipment.

Cautions

CAUTION: Caution notices are used for situations in which equipment might be damaged if care is not taken.

Notes

NOTE: Notes call attention to information that is especially significant to understanding and operating the equipment.

This document is based on information available at the time of its publication. While efforts have been made to ensure accuracy, the information contained herein does not cover all details or variations in hardware and software, nor does it provide for every possible contingency in connection with installation, operation, and maintenance. Features may be described in here that are not present in all hardware and software systems. GE Consumer & Industrial assumes no obligation of notice to holders of this document with respect to changes subsequently made.

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How to contact us

Please have your Entellisys System Summary # and Sub # ready when calling. This information can be found on the Entellisys HMI on the **System Health** screen by clicking the **Job Info** button.

Post Sales Service

GE Switchgear

510 Agency Road

West Burlington, IA 52655

Phone (toll free): 1-888-437-3765

Additional information:

www.entellisys.com/support

For Option Upgrades and CPU Replacement needs only, e-mail us at entellisys.lvs.pss@ge.com.

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14 Administrator access to the operating system

The Entellisys™ Low Voltage Switchgear system requires a System Administrator for oversight of critical functions. Those critical functions are described in this guide.

Chapter 1 provides an overview of the roles and responsibilities.

The following chapters describe how to perform the functions, in detail.

1.1 Security Champion

The most important role of the System Administrator is to control the access to the system. There are several forms of access:

- HMI Login Access: Entellisys provides programmable permissions and passwords. The System Administrator determines who needs what permissions and assigns login names and passwords.
- Modbus® Settings and Control Access.
- Remote Access to the Switchgear over a company network.

Security Reminders

- Limit the access level handed out to only the required permissions.
- Stress the importance of keeping passwords secret.
- If you believe passwords have been compromised, change them immediately.
- Always log out before leaving the local HMI, or leave the system logged in as Guest. Alternatively, the switchgear can be configured to automatically log out after a time period. (For details, on the **Main Menu**, click **User Settings**, and then click **HMI Preferences**.)

1.1.1 System Maintenance

The System Administrator is also responsible for system maintenance as described in this document.

Pre-programming settings prior to switchgear arrival

Entellisis provides a method for users to work on the system settings before the switchgear arrives. Once the gear is installed and control power is applied, the saved settings can be written to the system.

To pre-program Settings, the “Entellisis Remote HMI – User Interactive version” must be purchased. GE will ship the Remote HMI software, System Administrator Manual (this manual), and a System Archive when the switchgear ships from the factory.

The following steps should be performed to begin pre-programming:

- **Step 1:** Install the “Entellisis Remote HMI – User Interactive version” software.
See [Installing and configuring remote HMI software on page 25](#) for instructions.
- **Step 2:** Install the System Archive provided by GE.
See [Restoring an archive on page 38](#) for instructions.
- **Step 3:** Change to Offline Mode.
See [Offline mode on page 29](#) for instructions and for offline mode capabilities.
- **Step 4:** Set User Settings.
See DEH-231 Entellisis Low Voltage Switchgear System User Manual.
- **Step 5:** Install and Commission the Switchgear.
See [Commissioning the switchgear on page 11](#) for instructions.
- **Step 6:** Configure the System for Remote Communications.
See [Configuring the switchgear for remote communications on page 21](#) for instructions.
- **Step 7:** Write saved Settings to System.
See [Writing settings to a live system on page 33](#) for instructions.

Commissioning the switchgear

Installing and starting up the switchgear is an important event for the System Administrator. The following steps must be followed when commissioning the switchgear.

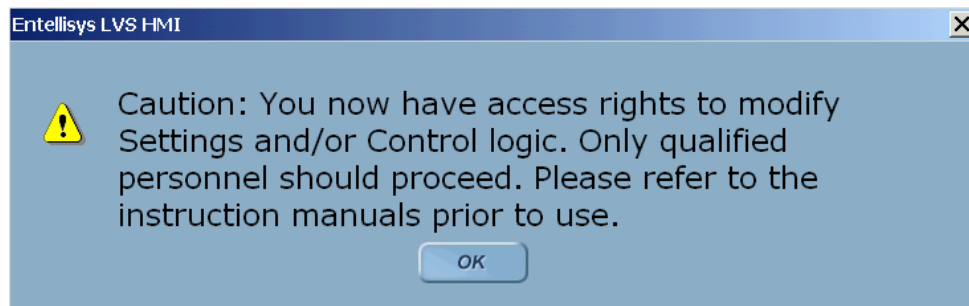
- **Step 1:** Reset Passwords.
See [Passwords on page 13](#).
- **Step 2:** Set User Settings.
See DEH-231 Entellisys Low Voltage Switchgear System User Manual.
- **Step 3:** Set Local HMI flags.
See [Local HMI on page 17](#).
- **Step 4:** Set System Time Synchronization.
See [Time synchronization on page 19](#).
- **Step 5:** Configure System for Remote Communications.
See [Configuring the switchgear for remote communications on page 21](#).

4.1 HMI permissions and passwords

The Entellisys HMI requires a login name and password. This login sets the permissible actions for the session. Each user's permissions are programmable to provide flexibility. Only the Administrator can set permissions, login names, and passwords.

CAUTION: Enabling Group Permissions for features that allow the changing of settings and/or access to control functions must be restricted to accounts for qualified personnel only. As a reminder, users with such privileges will be presented with the following screen upon initial login:

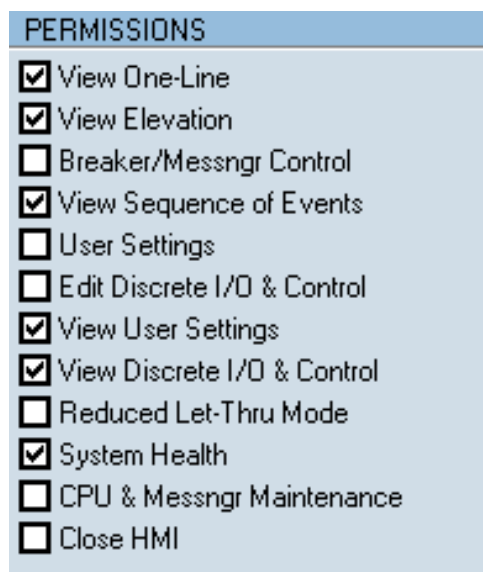
Figure 4-1 Initial login Caution screen



4.1.1 Setting HMI login permissions and passwords

A **Group** defines the permission categories for a type or group of users. By default, Administrator, Operator, and Guest groups are defined with preset permissions as examples. Additional groups may be created with programmable permissions.

Figure 4-2 Programmable permissions screen



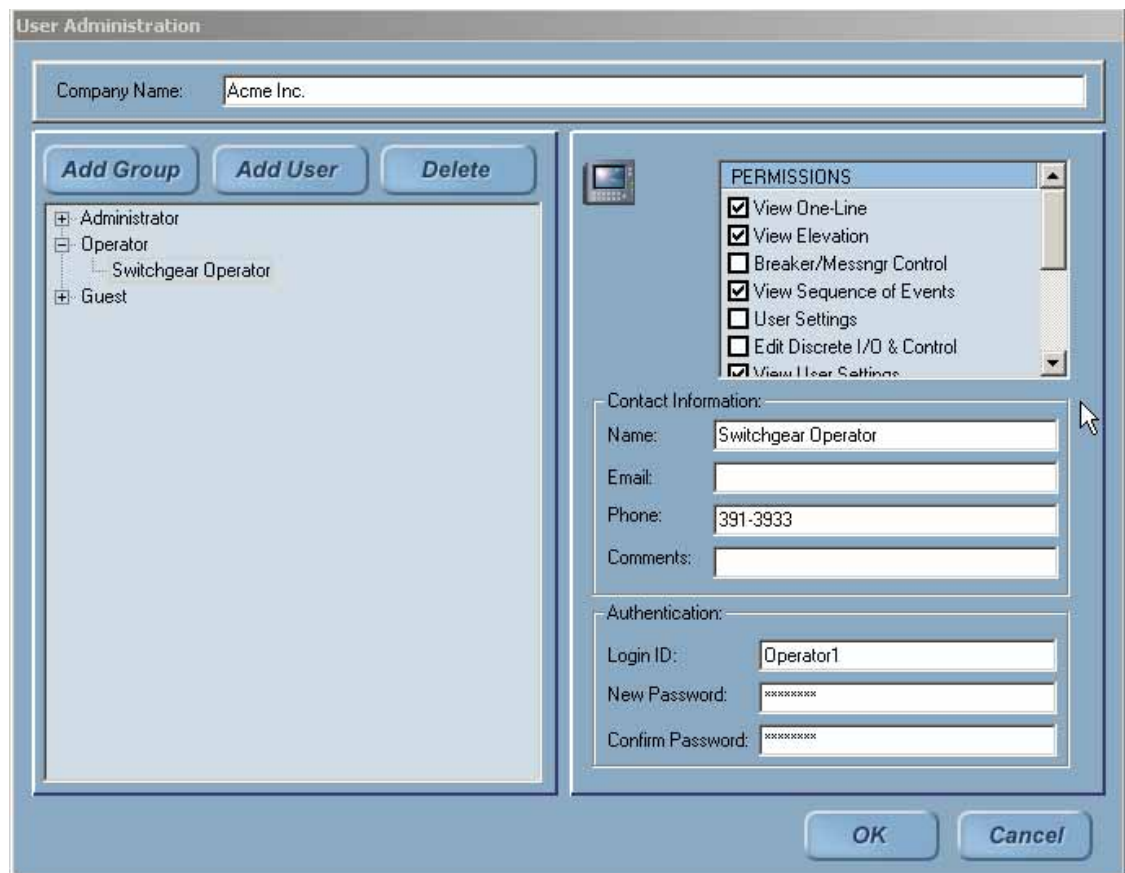
Once Groups are established, individual **Users** can be created. Users can have individual login names and passwords.

Passwords consist of 3-20 alphanumeric characters. Both login names and passwords are case-insensitive.

NOTE: There are three predefined Groups that cannot be modified. Beneath those Groups are two Users that are fixed and cannot be modified. The passwords for all can be changed. The predefined groups and users are:

Group: Administrator	User: Administrator
Group: Operator	User: <not defined>
Group: Guest	User: Guest

Figure 4-3 User Administration screen in the HMI



To set permissions for a user Group

1. On the **Main Menu**, click the **User Administration** button. Only Administrators can access User Administration. For all others, the button will not appear on the Main Menu.
2. Click the desired user group to edit or click the **Add Group** button to define a new type of user.
3. Change the **permissions** by selecting the appropriate check boxes in the permission list.
 - User will be granted this permission.
 - User will not have this permission.
4. Change the **permissions** by selecting the appropriate check boxes in the permission list.

To change a password

1. On the **Main Menu**, click the **User Administration** button. Only Administrators can access User Administration. For all others, the button will not appear on the Main Menu.
2. Select the desired **user group** on the left-side pane. Expand the group by clicking the + symbol and click a **user name**.
3. Enter the new password in the **New Password** field.
4. Confirm your password by re-entering the new password in the **Confirm Password** field. Click **OK** to save your new password (or click **Cancel** to exit).
5. In the right-side pane you can see "Permission", "Contact Information", and "Authentication" details.

To verify the password change:

1. On the **Main Menu**, click the **Change Users** icon in upper right-hand corner.

Figure 4-4 Change Users icon



2. Enter the user name in the **Login** field.
3. Enter the new password in the **password** field.
4. Click **Go**. If successful, the Main Menu will display.

4.1.2 Resetting forgotten HMI passwords

Administrators have access permission to change passwords for all users in all groups.

NOTE: It is very important for the System Administrator to keep the Administrator password in a safe location. Losing the Administrator password will require a GE Field Service visit to reset it.

GE offers an optional service to store the Administrator password at the request of customers. In the event the password is lost, GE can provide the password to the customer over the phone, without requiring a site visit.

Contact GE Post Sales Service for help (see [How to contact us on page 2](#)).

4.2 Modbus® security

4.2.1 Control and settings passwords

The CPUs require extra passwords to change settings (i.e., Short Time pickup delay setting) and to send commands (i.e., Open Breaker command). These passwords apply to all clients that access the Entellisis system through Modbus communications including the Entellisis HMI, SCADA, or Building Automation, etc.

NOTE: The system ships with default CPU Modbus Settings and Command passwords. The System Administrator should change these passwords for added security.

The HMI can be configured to transparently send the passwords whenever needed or it can be configured to require all users to re-enter the password when the action is attempted.

Figure 4-5 Modbus Security screen in the HMI

The screenshot shows the 'Modbus Security' screen in the HMI. The screen is titled 'Maintenance' and has several tabs: Options, Replace CPU, Zone Configuration, Backup/Restore Archive, Breaker Names, Modbus Security (selected), Settings File, Accessories, CPU Firmware, and Upgrade Options. The screen is divided into two main sections: 'Commands' and 'Settings'. Each section has two columns for CPU A and CPU B. The 'Commands' section has fields for 'Command Password', 'Encrypted Password' (1709472037), 'New Password', and 'Confirm New Password', with a 'Change' button and a checked 'Auto send' checkbox. The 'Settings' section has fields for 'Setting Password', 'Encrypted Password' (52721957), 'New Password', and 'Confirm New Password', with a 'Change' button and a checked 'Auto send' checkbox. At the bottom left, there is a checked 'Local HMI' checkbox. At the bottom right, there are 'Help', 'OK', and 'Cancel' buttons.

To change the Settings and/or Command passwords

1. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
2. Click the **Modbus Security** tab. The Modbus Security screen has options to change both CPU A and CPU B Command and Settings passwords.

NOTE: It is recommended that the passwords in CPU A and CPU B be set to the same value.

3. Enter the new commands password in the **New Password** field.
4. Re-enter the password in the **Confirm Password** field.
5. Click the **Change** button to download the password.
6. Select the desired **Auto Send** option.
 - Indicates the Auto Send option will transparently send the password each time a command is sent to the CPU.
 - Disables the Auto Send option. The user will be prompted to enter the password (for the CPU that is currently the default) each time a command is sent.

NOTE: For added security, it is recommended the Auto Send option be disabled. This will require an additional password to be entered each time a command is performed.

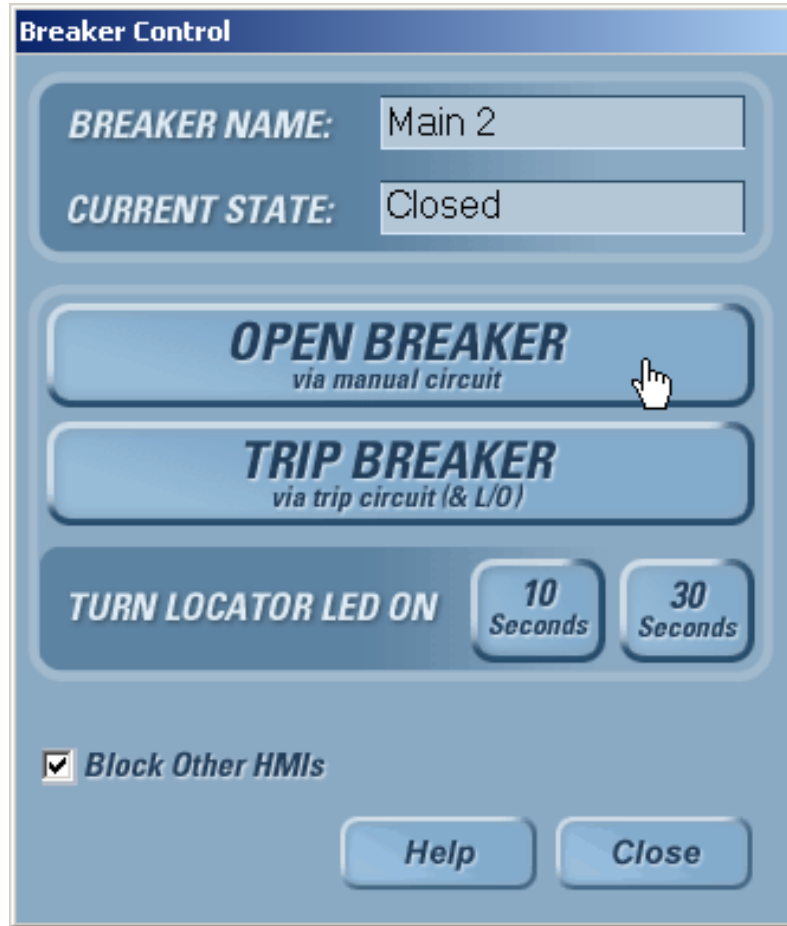
4.2.2 Local HMI

An Entellisis system may have multiple HMI stations running. There are some functions that should be performed by one HMI only. The "Local HMI" flag is provided to designate one HMI for special functions.

The "Local HMI" flag affects the following functions:

- E-mail on Alarms is only sent from the HMI with the Local HMI flag set.
- Time Synchronization is only performed by the HMI with the Local HMI flag is set.
- "Block other HMIs" can be enabled/disabled only by the HMI with the Local HMI flag set. This allows a user on the Local HMI to block all other HMIs from issuing control commands (i.e., Breaker Open), which may be desired during maintenance. For details on circuit breaker control, see DEH-231 Entellisis Low Voltage Switchgear System User Manual, Chapter 3, Basic Control.

Figure 4-6 Breaker Control screen



- The CPU reserves a communication port for the HMI with the Local HMI flag set. The CPUs can support up to 8 simultaneous communication ports for Modbus clients. Once the limit is exceeded, clients will be blocked until a port is free. The Local HMI flag has special ports reserved for its use to prevent other clients from locking it out.

NOTE: All In-Gear and Near-Gear Touchscreen HMIs should have the “Local HMI” set.

To set an HMI as a local HMI

1. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
2. Click the **Modbus Security** tab.
3. Select the **Local HMI** check box as shown in Figure 4-5.
4. Click the **OK** button to save changes (or click **Cancel** to cancel changes).

5 Time synchronization

In the Entellisys System, time is recorded when events occur for diagnostic purposes. Events are generated from both the HMI and the CPU components and the time stamps used are derived from time set in the component.

One HMI in the system will be configured to synchronize time with the CPUs. Periodically, the HMI will synchronize time to ensure the time in the two CPUs is consistent.

Time synchronization configuration is done by GE during the system start up.

NOTE: The System Administrator should periodically check the date and time set on all local HMIs to ensure the event time stamps are accurate. It is especially important on the HMI configured to time synch the CPUs.

5.0.1 Setting time in the HMI

To set time, log into the HMI Operating System with Administrator access (see [Administrator access to the operating system on page 61.](#)) Double-click the **Clock** icon on the taskbar to set date, time, and time zone. Restart the computer to revert to normal run mode with limited OS access.

Configuring the switchgear for remote communications

The following is recommended to Configure the Entellisys Low Voltage Switchgear System for remote communications:

Step 1: Acquire static IP addresses compatible on the company network.

NOTE: Entellisys components are not DHCP-compatible.

The number of IP addresses required depends on the number of HMIs. The following number of IP addresses is required:

- CPU A
- CPU B
- All In-Gear HMIs
- All Near-Gear HMIs
- All Remote HMIs

NOTE: Additional IP addresses might be required to configure a VPN/firewall appliance if one is installed.

The subnet mask must be compatible with the network segment on which each device resides. Gateway IP depends on the company network and needs to be acquired from the Network Administrator.

Step 2: Reset the CPU IP Addresses.

See [Setting IP addresses for remote communication on page 22](#).

Step 3: Reset the local HMI IP Addresses.

See [Setting IP addresses for remote communication on page 22](#).

Step 4: Verify communication between the local HMIs and CPUs.

See [Setting IP addresses for remote communication on page 22](#).

Step 5: Install and Configure a network security device such as a VPN/Firewall appliance. See [Network security/VPN device on page 24](#).

Step 6: Connect the Entellisys system to the company network via the VPN/Firewall appliance in the switchgear.

Step 7: Verify communication between local HMI(s) and CPUs.

See [Setting IP addresses for remote communication on page 22](#).

Step 8: Install Remote HMIs.

See [Installing and configuring remote HMI software on page 25](#).

Step 9: Verify communication between Remote HMI and CPUs.

See Chapter 5.2. [dk: there is no section 5.2?]

6.1 Setting IP addresses for remote communication

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6.1.1 HMI IP address

To change the HMI IP address

1. For the HMI touchscreen computer, login to the Operating System as Administrator. See [Administrator access to the operating system on page 61](#) for details.
2. Open the **Control Panel**, and then open the **Network Connections** dialog box.
3. Double-click the **Local Area Connection 1**.
4. In the **TCP/IP Properties** tab, set the new Local HMI IP address. Set the subnet mask to a value compatible with the segment on which it resides.

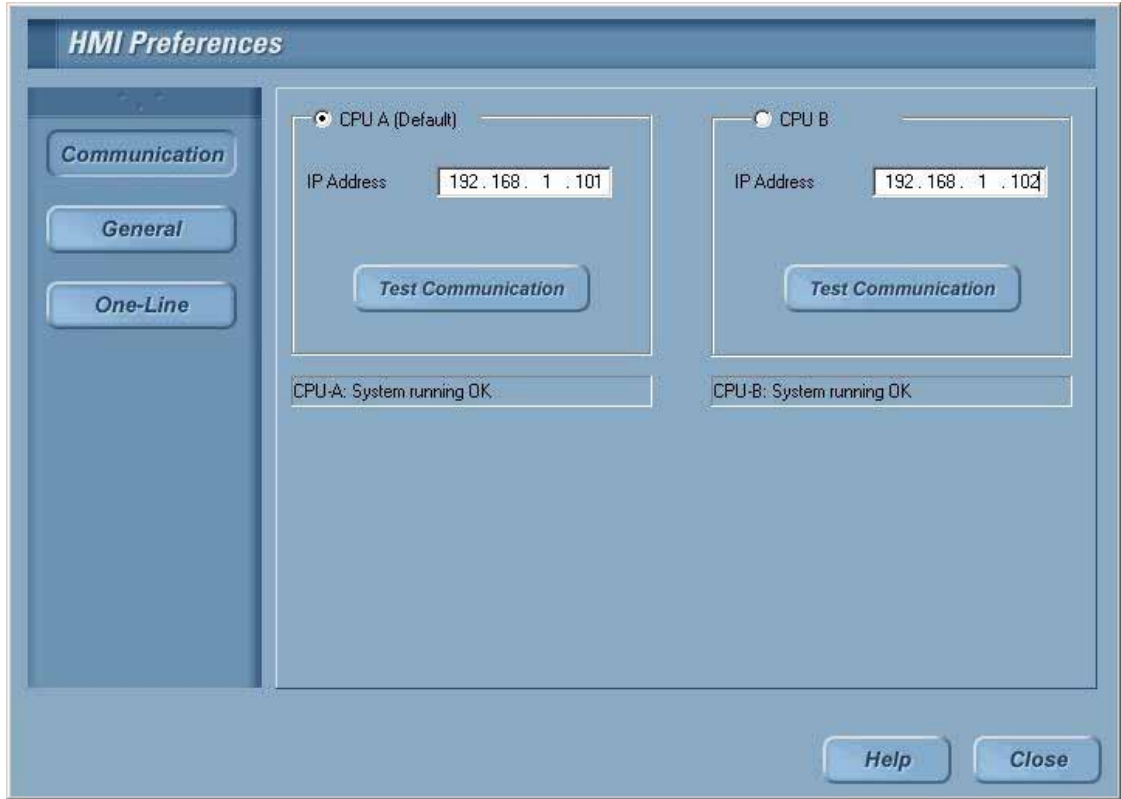
By default the subnet mask is set to 255.255.255.0. The default touchscreen HMI IP address is 192.168.1.1 as delivered. The default IP address for each additional touchscreen HMI is incremented by 1 in the right-most address.

6.1.2 CPU IP address

To change the CPU IP addresses

1. On the **Main Menu**, click **User Settings**.
2. Click **HMI Preferences**.
3. Click **Communication**.
4. Select either **CPU A** or **CPU B** by clicking the appropriate button.
5. Enter the new IP address. The IP address format is X.X.X.X where X is from 0 to 255.

Figure 6-1 Set CPU IP Addresses screen



6

6. Click the **Test Communication** button to verify the communication status with the new IP address. It will take a few seconds to establish communication with the CPU.
7. In unable to connect, a dialog box will display. Click the **Retry** button to test communication again or click **Cancel** to exit.
8. The Communication status with the new IP address will display below the IP address edit dialog box.

For example:

“CPU A: System Running OK” – Communication with new IP address is success.

“CPU B: System Unavailable” – Failed to communicate with new IP address.

6.2 Network security/VPN device

NOTE: GE recommends that your Entellisys Low Voltage Switchgear system be equipped with a VPN/Firewall device if it is connected to a LAN that is also used for other purposes. Failure to do so could result in unauthorized access to the control and settings functions of the circuit breakers.

In addition to the standard username and password administrative functions for Entellisys, accessibility to control functions and parameter settings must be considered from the network point of view. The provisions for securing the network on which Entellisys communicates to HMI Control Stations and other SCADA systems depends greatly on how the network over which they communicate is configured.

- In-Gear HMI only – In this configuration, there is no network access external to the switchgear and therefore no implications for network security.
- In-Gear and Near-Gear HMIs – The implications for network security depend on the accessibility of the network the Near-Gear HMI uses to reach the main switchgear instrumentation compartment.
- In-Gear, Near-Gear, Remote HMIs, and SCADA system access – The implications for network security depend on the accessibility of the network the Near-Gear HMI uses to reach the main switchgear assembly.

GE provides a mechanical mounting assembly compatible with Juniper Networks NetScreen-5GT VPN/Firewall Appliance. Since configuration of the device is mostly dependent on the specific network architecture of the facility in which it is installed, please consult the NetScreen documentation for assistance in configuring this device, or contact your local IT department or network service provider.

As a minimum, GE recommends that the VPN/Firewall appliance be configured to only permit communications between the devices in the switchgear instrument compartment and the external devices that are intended to communicate with them.

Contact GE Post Sales Service for the latest VPN/Firewall appliance application guide. See [How to contact us on page 2](#).

Installing and configuring remote HMI software

Entellisys Remote HMI software allows users to access the switchgear system from any desktop computer.

There are two versions of Remote HMI software:

- User Interactive version: provides programmable permission levels for all users from full “Administrator” access to view-only “Guest” privileges.
- Viewer version: limited to view-only “Guest” privileges. Login name and passwords are fixed.

The following steps are required to install and configure the Entellisys Low Voltage Switchgear – Remote HMI software:

Step 1: Review computer requirements

Please verify the target computer meets the requirements before proceeding:

OS	Microsoft Windows 2000, Service Pack 3, required
Processor	Pentium III 1 GHz and 133 MHz processor bus, minimum
Memory	256 MB RAM, minimum
Storage device	Hard disk drive 20 GB, minimum
Screen resolution	1024x768 in 256 colors, preferred
USB port	One port required (USB 1.0 or 2.0)

Step 2: Install and launch the HMI program

Insert the “Entellisys Remote HMI” CD and run the install program. Follow the onscreen installation wizard. Click **Finish** to complete the installation.

To start the Entellisys Remote HMI application, point to **Start**, select **Programs**, and then double-click **Entellisys LVS HMI**.

Step 3: Activate the software with a code from GE

The first time the Remote HMI program is launched, a window will display requesting an Activation code.

Figure 7-1 Remote HMI License Activation window

Remote HMI software User Interactive

Site code: 590FE503 MID: D569-850C-2481-FOEB

Days left: N/A Uses left: N/A

Enter application

Unlock application Activation code: _____

Remove license New Site code: _____

Transfer license

Application status: LOCKED

Cancel Continue >>

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To obtain an Activation code, call GE at:

GE Switchgear – Post Sales Service
510 Agency Road, West Burlington, IA 52655
Phone (toll free): 1-888-437-3765

Please have the following information ready:

Entellisys System Identifier: Summary#, Sub#
HMI Type: User Interactive or Viewer, on the blue title bar in Figure 7-1
SITE CODE: from the activation window in Figure 7-1
MID CODE: from the activation window in Figure 7-1

GE will verify that unused licenses of the desired version are available and will provide an Activation code for the software. Type in the Activation code and click **Continue**.

An example Activation code follows:

D11C8284-F54A0910-03D20031-B1ACADFA

Step 4: Login

Enter a valid login name and password (case insensitive).

NOTE: You must enter the default login names and passwords, since at this point in the installation the programmable permissions and passwords have not been assigned.

Login	Password
Guest	Default password is "Guest"
Administrator	Default password is "gestart"

If successful, the Main Menu will display.

NOTE: The System Administrator must reassign these default passwords as soon as possible to maintain controlled access.

Step 5: Set IP addresses, verify system communication

See [HMI IP address on page 22](#).

NOTE: Once this step is performed, the Remote HMI is communicating with the live system. You must complete the next step to get the proper screens and configuration.

Step 6: Update HMI with Shared Files

During the Remote HMI installation, generic files are loaded. The custom system files corresponding to a particular system must be obtained for proper screens and configuration. Otherwise blank online, elevation, and control panel screens will be shown, the advanced protection configuration and zone settings will not be shown, and other maintenance configuration will not be set.

Entellisys provides a way for the System Administrator to easily distribute these files from a properly configured HMI to other HMIs.

See [Viewing and comparing settings files on page 31](#) for details.

NOTE: When installing a Remote HMI prior to the switchgear arrival, this step cannot be performed. In this situation, a System Archive must be installed. See [Restoring an archive on page 38](#) for instructions.

8

Settings files and offline system configuration

All system settings are recorded locally in "Settings" files. These files are updated each time a setting is modified and automatically updated every 30 minutes.

NOTE: Both CPUs must have the same configuration and settings at all times, otherwise unpredictable system behavior could occur. Every 30 minutes the system compares the settings between the CPUs. If a mismatch in settings between CPUs does occur, an event will be generated. A mismatch should be corrected immediately.

8.1 Offline mode

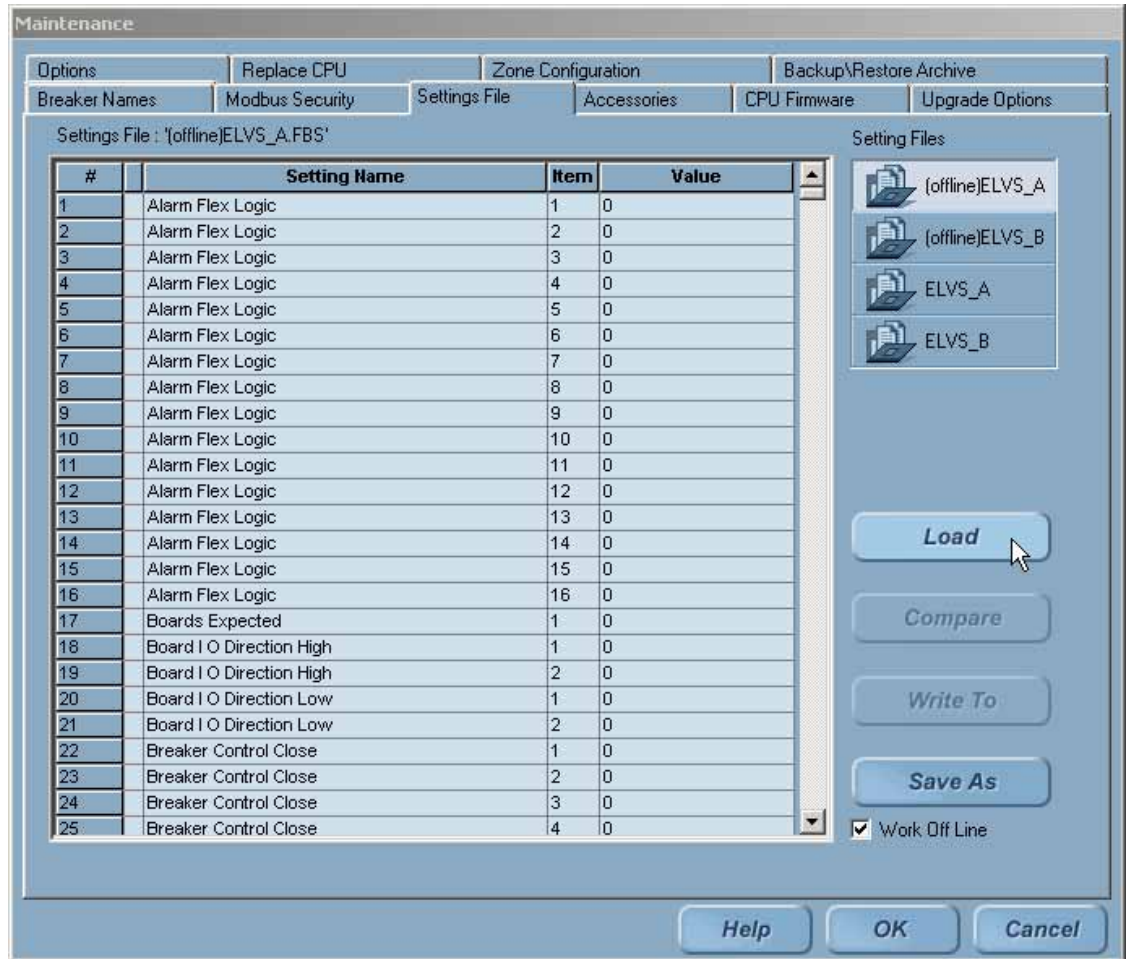
The HMI has a special offline mode. Offline mode disconnects the HMI from a live system and allows users to modify and save settings. Later, once reconnected to a live system, these saved settings can be written to the system.

The following operations are permitted in offline mode:

- User Settings activities
- Maintenance activities
- User Administration

Another convenience offline mode provides is the ability to work on protection settings prior to the arrival of the switchgear. See [Commissioning the switchgear on page 11](#) for more details.

Figure 8-1 Settings File screen



To enable or disable offline mode

1. On the **Main Menu**, click the **Maintenance** button. The button will only display if Maintenance access is allowed with the current login permissions.
2. On the **Maintenance** screen, click the **Settings File** tab.
3. Select the **Work Offline** check box to change to offline mode. This can be found in the lower right-hand corner in Figure X (chapter 2.1). [dk: no section 2.1?]
 - HMI will go into offline mode and disconnect from the live system.
 - HMI will connect to the live system.

An icon on the bottom-right screen displays to indicate that the application is in offline mode.

Figure 8-2 Offline mode icon



The first time offline mode is enabled, a new set of settings files will be created as follows: **Offline(ELVS_A).fbs** and **Offline(ELVS_B).fbs**.

4. Click **Load** to ensure the desired files are loaded for offline work. If the Load button is grayed out, the highlighted file is already loaded.

NOTE: If the state of the offline settings files is unknown, it is recommended to reset the offline settings files to the current settings. See Chapter 2.4. [dk: there is no section 2.4?]

Changes made during offline mode

- User Settings and Maintenance changes are automatically saved to the active settings file loaded.
- User Administration changes can be viewed under User Administration only.

8.2 Viewing and comparing settings files

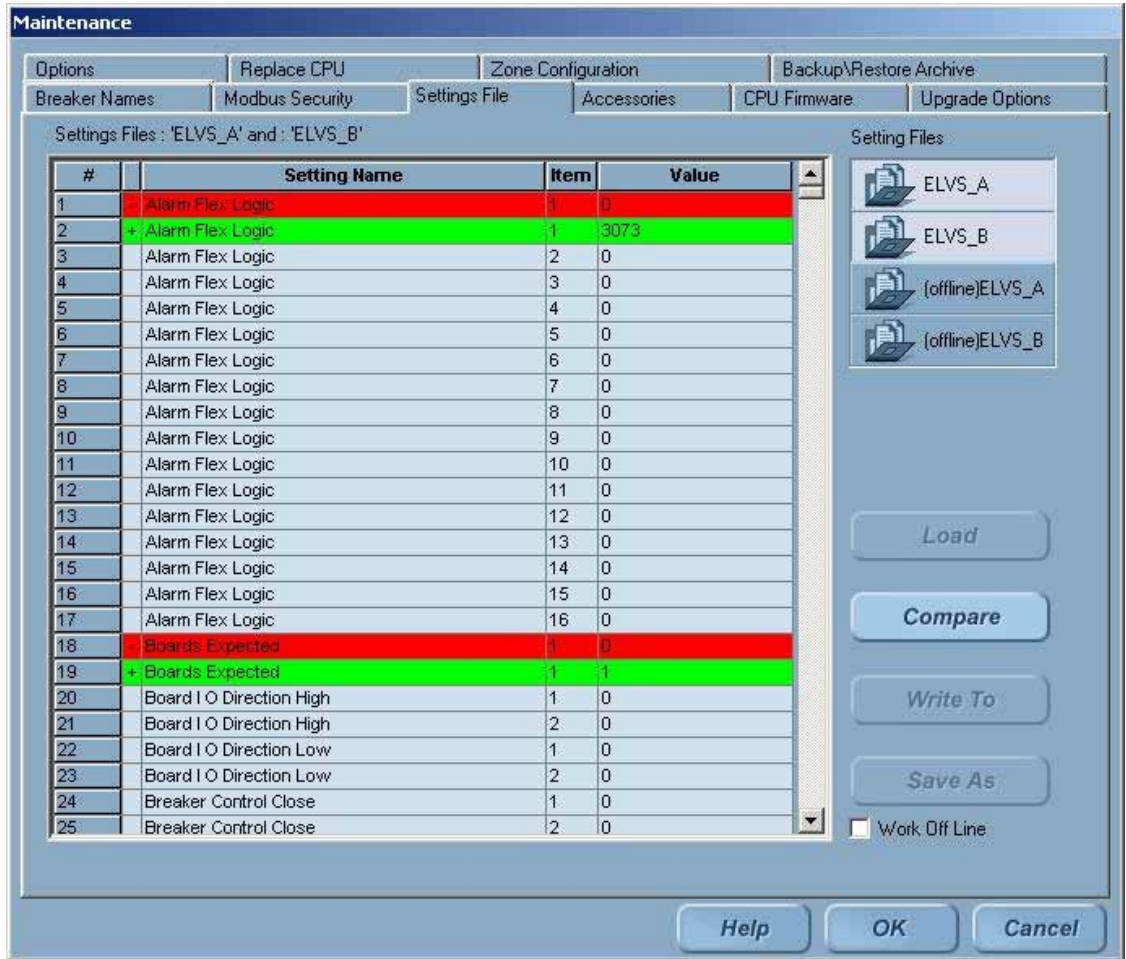
The HMI can display the settings associated with a particular settings file. To view any settings file, click the filename in the right-side pane, click **Load**, and the settings will display.

As mentioned in Chapter 2, it is important to keep the settings in both CPUs consistent. The HMI can compare two settings files and highlight differences.

To compare two settings files

1. On the **Main Menu**, click the **Maintenance** button. The button will only display if Maintenance access is allowed with the current login permissions.
2. On the **Maintenance** screen, click the **Settings File** tab.
3. Select two files to compare (e.g., **ELVS_A** and **ELVS_B**). To select two files, hold down the **Shift** key and click both file buttons. Once two files are selected the compare button will be enabled.
4. Click the **Compare** button. The differences between the two files will be highlighted.

Figure 8-3 Settings file compare screen



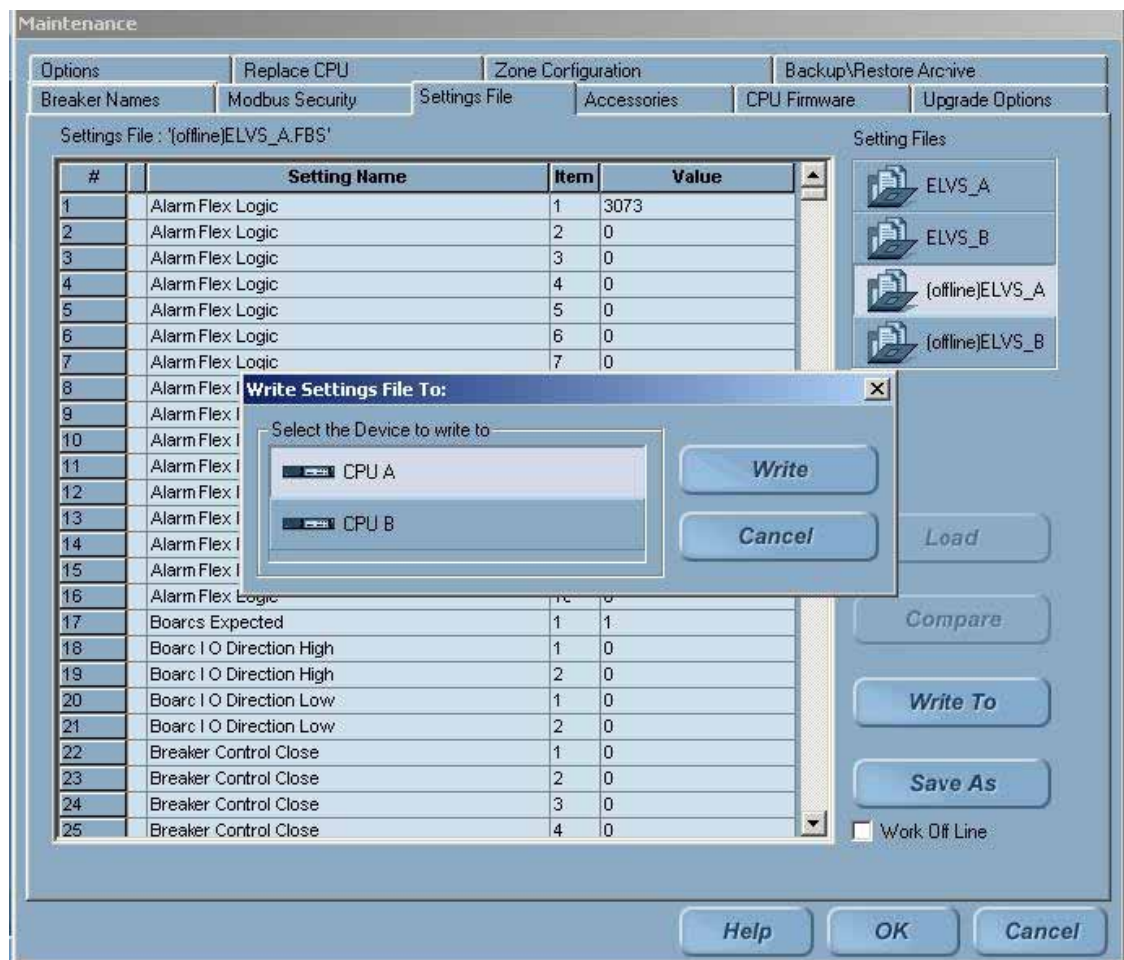
8

8.3 Writing settings to a live system

To make the offline settings permanent in the live system

1. On the **Main Menu**, click the **Maintenance** button. The button will only display if access is allowed with the current login permissions.
2. On the **Maintenance** screen, click the **Settings File** tab.
3. Verify the HMI is connected to the system (clear the **Work Off Line** check box).
4. Select the offline settings to download. Once selected, the settings values will display on the screen.
5. Click **Write To**. The screen in Figure 8-4 will display.

Figure 8-4 Write Settings screen



6. Select the CPU name to download.

A Red CPU indicates that it is not currently communicating and cannot be written.

NOTE: It is recommended that users only perform Write To when both CPUs are communicating to avoid a mismatch in settings when the second CPU starts communicating.

7. Click the **Write** button to send the settings to the selected CPU.
 8. Repeat steps 5 to 7 for the second CPU.
-

8.4 Resetting the offline settings files to the current settings

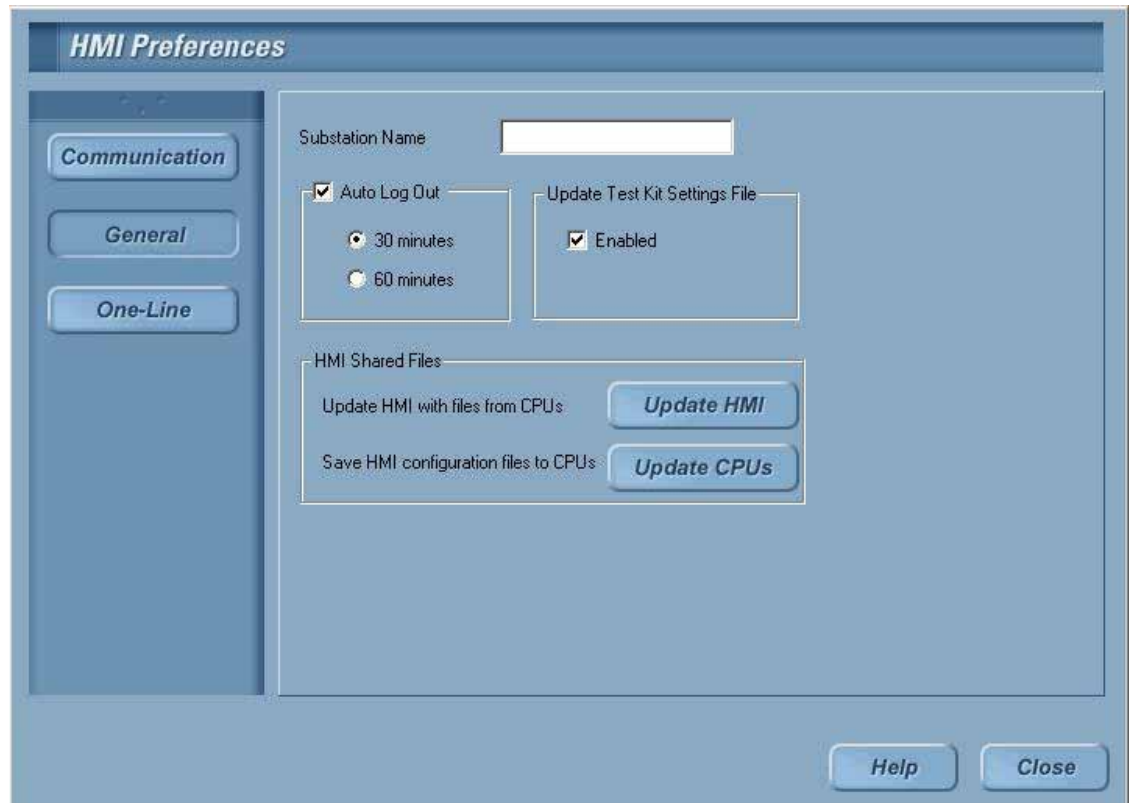
It may be desired to reset the offline settings files to the current settings.

To copy current settings to the offline settings files

1. On the **Maintenance** screen, click the **Settings File** tab, and then select the settings to copy.
2. Click the **Write To** button.
3. Select the offline files as the device to write to.
4. Click the **Write** button.

The HMI provides a tool for the System Administrator to distribute files across all HMIs.

Figure 9-1 HMI Shared Files screen



9.1 Publishing shared files

Publishing shared files should be done whenever the following changes and needs to be distributed:

- Online, Elevation, or Control Panel screens
- Alarm configuration
- Circuit breakers are added to the system or circuit breaker maintenance is updated
- Advanced protection zones, tiers, or topologies change

To publish shared files for other HMIs to retrieve

1. On the **Main Menu**, click **User Settings**.
2. Click **HMI Preferences**.
3. In the **HMI Preferences** dialog box, click **General**.
4. In the **HMI Shared File** dialog box, click the **Update CPUs** button. Only the Administrator will have access perform this task. The button will be grayed out if the current session does not have Administrator permissions.

9.2 Updating an HMI with shared files

To obtain the custom files an Administrator has published

1. On the **Main Menu**, click **User Settings**.
2. Click **HMI Preferences**.
3. In the **HMI Preferences** dialog box, click **General**.
4. Click **Update HMI**.
5. Click **Yes** in the confirmation dialog box to proceed by loading the shared files. (Or click **No** to cancel the operation.)
6. Once the file transfer is complete, a list of transferred file names is displayed. Click **OK** to complete the process.

10 System archives

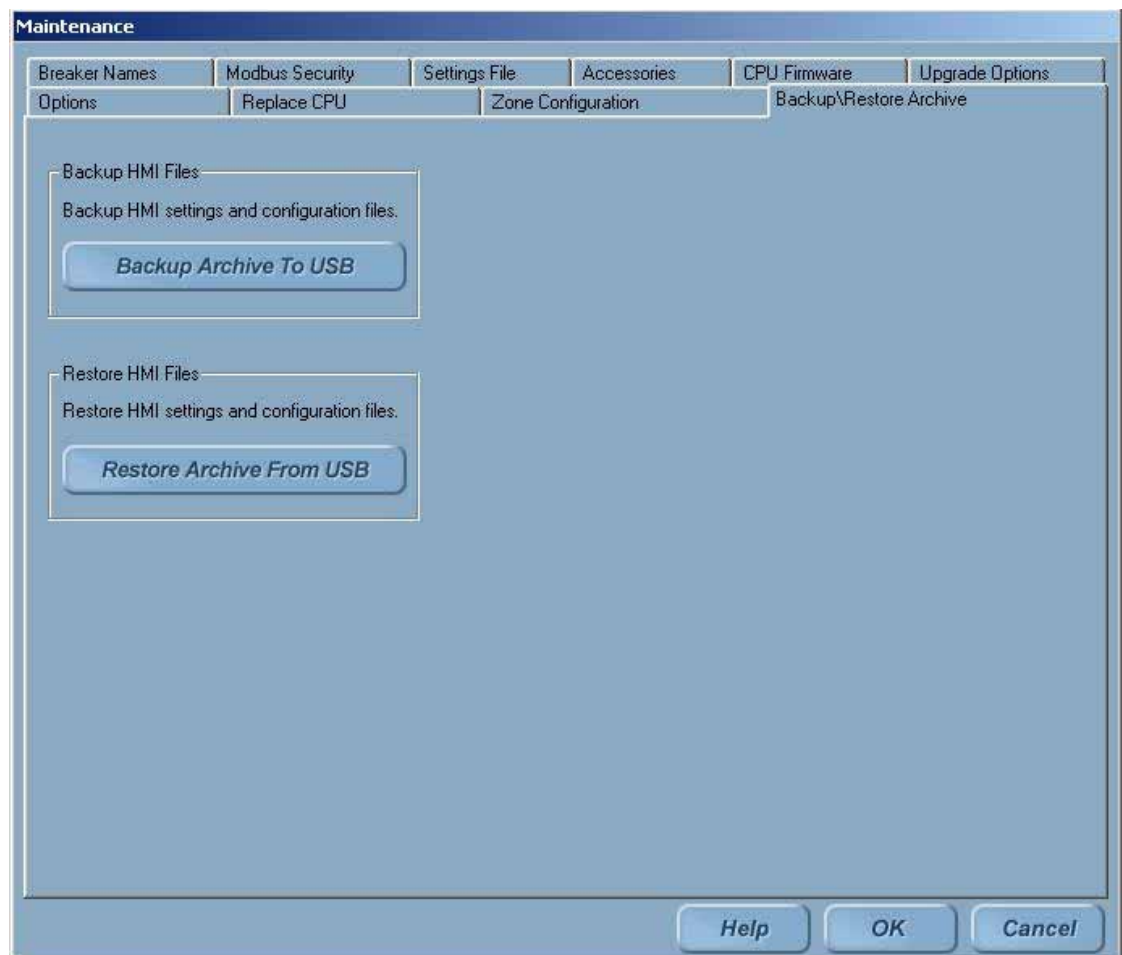
A System Archive is a snapshot of the system's custom screens, configuration, and optionally the event logs, fault reports, and waveforms. The archive is used to reconfigure a system, putting it back to a known state. It is important to have a valid System Archive at all times.

An archive is created and shipped to the System Administrator when the switchgear ships from the factory. The archive may be installed in a Remote HMI application allowing users to pre-program protection settings prior to the switchgear arrival.

Archives are recommended at the following events:

- At switchgear startup, once the system settings have been programmed and tested.
- Periodically throughout the life of the switchgear – for example prior to summer shutdown each year.

Figure 10-1 Archive screen



10.1 Restoring an archive

To install or restore an archive from a USB flash memory device

1. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
2. Click the **Backup/Restore Archive** tab.
3. Click **Restore Archive From USB**. The system will search for an active USB drive. If not found, a dialog box stating "Can't find any USB drive" will display.
4. Select the directory where the Archive is located. An example of an Archive Directory is as follows: ELVSArchive_12212004_180230. The directory name contains the date and time the archive was taken.
5. Once a valid Archive directory is selected, the Restore button will be enabled. Click the **Restore** button.
6. A confirmation dialog box will display. Click **Yes** to proceed.
7. The Archive is now restored. Click the **Close** button to exit. The system will automatically eject the USB device.
8. Next, a dialog box will prompt you to restart the system. The system must be restarted for the new settings to take effect.

The following files are restored in the process:

- Setting Files
- Multipoint Configuration and Breaker Settings
- One Line, Elevation Files, and Control Panel screen files
- Event Logs (optional)
- Fault Reports (optional)
- Waveforms (optional)

10.2 Creating an archive

To create an archive and save it to a USB flash memory device

1. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
2. Click the **Backup/Restore Archive** tab.
3. Click the **Backup Archive to USB** button.
4. Select the files to backup in the **Archive Files Selection** dialog box as in Figure 10-2.

NOTE: The log files may be very large in size and are not required to recreate a system. It is recommended to clear all three log files.

Figure 10-2 Archive File Selection screen



5. Once the desired files are selected, click **OK** to proceed (or click **Cancel** to exit).
6. Insert the USB flash memory device into the USB port.
7. Select the USB drive. Once a valid drive is selected, the Backup button is automatically enabled.
8. Select the folder where you want the archive to be created.
9. Click the **Backup** button. A subfolder with the current date and time stamp is automatically created. On successful completion of the backup, a message will display: "Backup has been taken in the following directory <subfolder name>. Please Close the dialog".

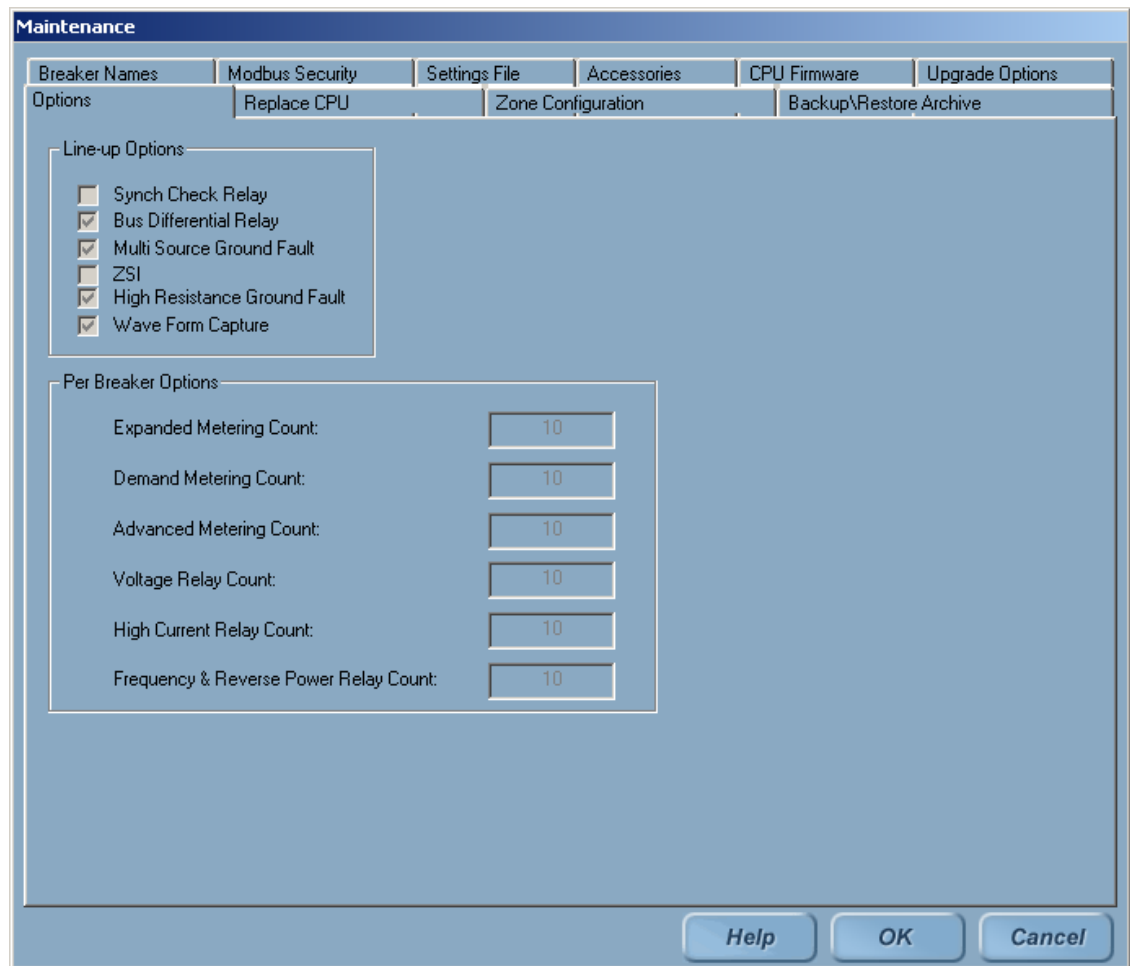
11 Feature options

The Entellisys Low Voltage Switchgear system has many features available through software upgrades.

11.1 Viewing installed options

1. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
2. Click the **Options** tab to view current installed software options as shown in Figure 11-1.

Figure 11-1 Installed Options screen



11.2 Upgrading options

The process for upgrading features is as follows:

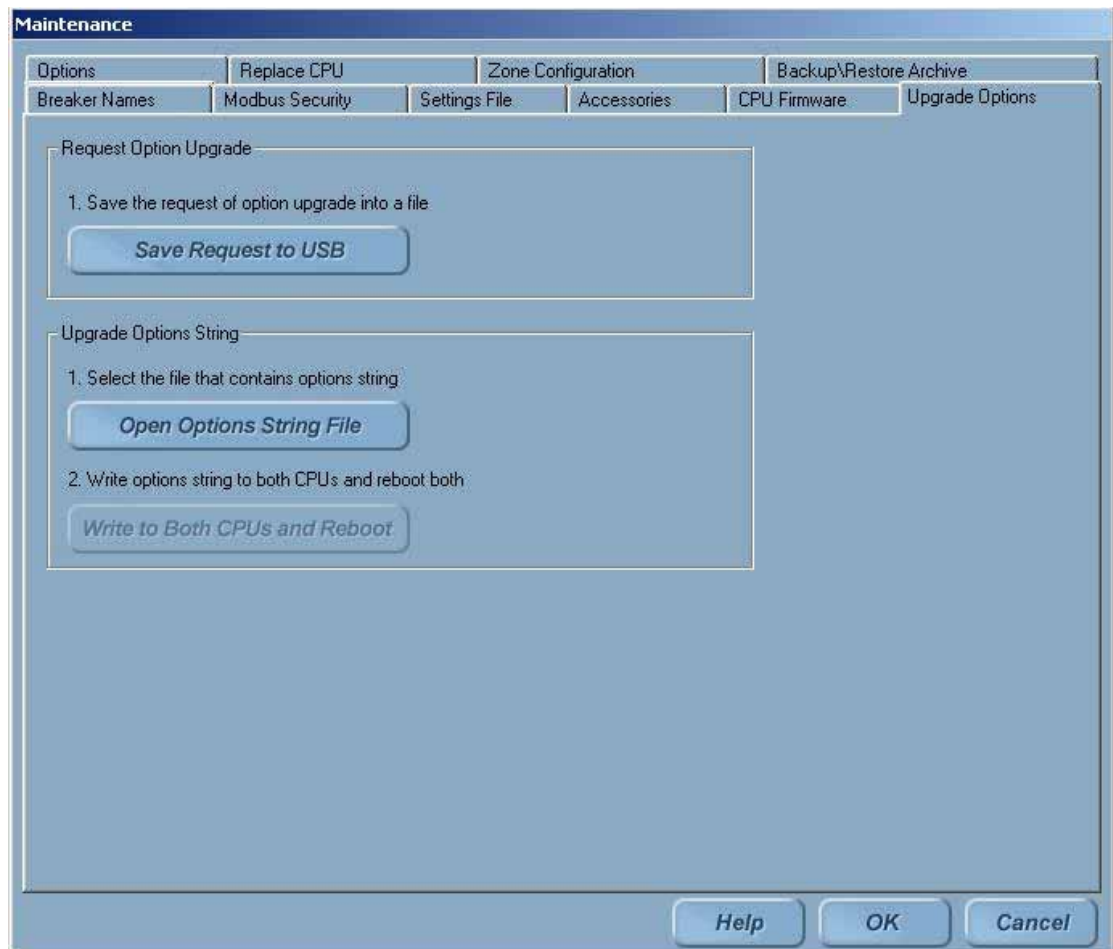
Step 1: Request an Upgrade through HMI

The Administrator must make a request at the HMI. The HMI saves required information (*.dat file) to a USB flash memory device and must be sent to GE for creating a new encrypted “option string” which contains all existing and newly purchased features.

To request an upgrade

1. Insert the USB device into the HMI USB port. For Touchscreen HMIs, this port is accessed from the front of the switchgear, behind the small door in the bottom right corner of the HMI.
2. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
3. Click the **Upgrade Options** tab, as shown in Figure 11-1.

Figure 11-1 Upgrade Options screen



4. In the “Request Option Upgrade” group, click the **Save Request To USB** button.
5. Select a valid USB drive. Once a valid drive is selected, the Save button is automatically enabled.
6. Enter a File Name in the dialog box.
7. Click the **Save** button. A message will confirm the “Option String successfully saved into file (directory path).” Acknowledge the message dialog box.

Step 2: Send Request to GE with Data from USB

To place order, contact GE Post Sales Support (see [How to contact us on page 2](#)).

GE will request the following information:

- Entellisys System Identifier: Summary#, Sub#
- HMI Upgrade request information saved on the USB flash memory device (*.dat file)
- New options requested

Some features are simple to add, and can be upgraded by the System Administrator. Other features require more programming and potentially onsite installation/testing to ensure system performance. This will be explained when the order is placed.

Step 3: Get new Option String from GE

GE will either mail or e-mail the new option string (*.dat file). Copy the new option string to a USB flash memory device.

Step 4: Install the Upgrade

Follow the procedure below to install the feature upgrade option string:

1. Insert the USB flash device into a USB port. For Touchscreen HMIs, this port is accessed from the front of the switchgear, behind the small door in the bottom right corner of the HMI.
2. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
3. Click the **Open Options String File** button in the **Upgrade Option String** group.
4. In the "Browse CPU Option File" dialog box, select the Option string file (file extension is .dat).
5. Click **Open**. A dialog box stating "Option String successfully read" will display. Acknowledge the dialog box.
6. After successful reading of the option string, the Write to Both CPUs and Reboot button will automatically be enabled. Click the **Write to Both CPUs and Reboot** button. A confirmation message will display stating that "After Option string loading started, you can't abort it. Are you sure you want to proceed it".
7. Click **Yes** to proceed (or click **No** to cancel option upgrade). The "Loading Option String" status will display.
8. Verify the feature upgrades are installed. On the **Maintenance** screen, click the **Options** tab. Select the **Line-up Options** and **Per Breaker Options** items.

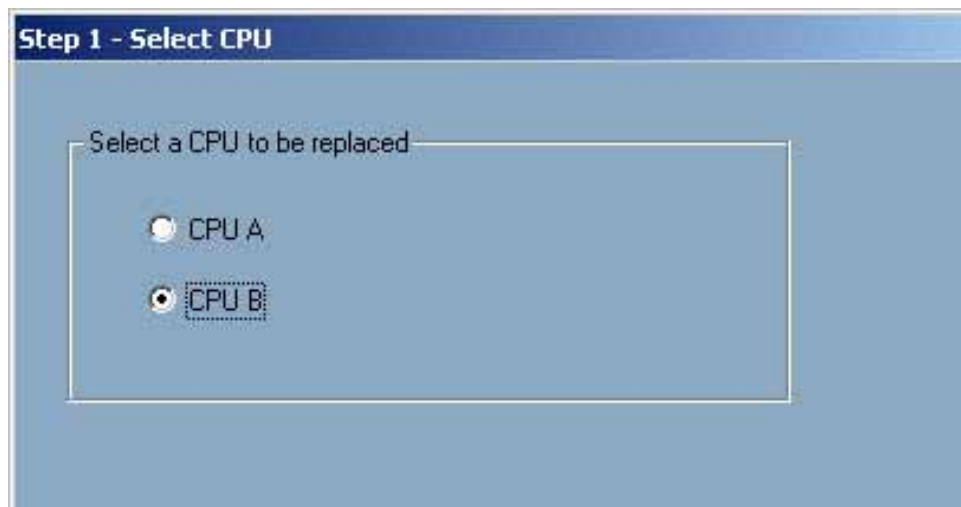
Preparing and configuring a replacement CPU

NOTE: This procedure discusses the steps to be performed within the HMI when replacing a CPU. The actual mechanical replacement procedure is located in the DEH-234 Entellisys Low Voltage Switchgear Device Replacement Guide, Chapter 1, "Replacing a CPU chassis". Please read these instructions thoroughly prior to beginning the replacement.

12.1 Part I – Preparation for replacement of a CPU

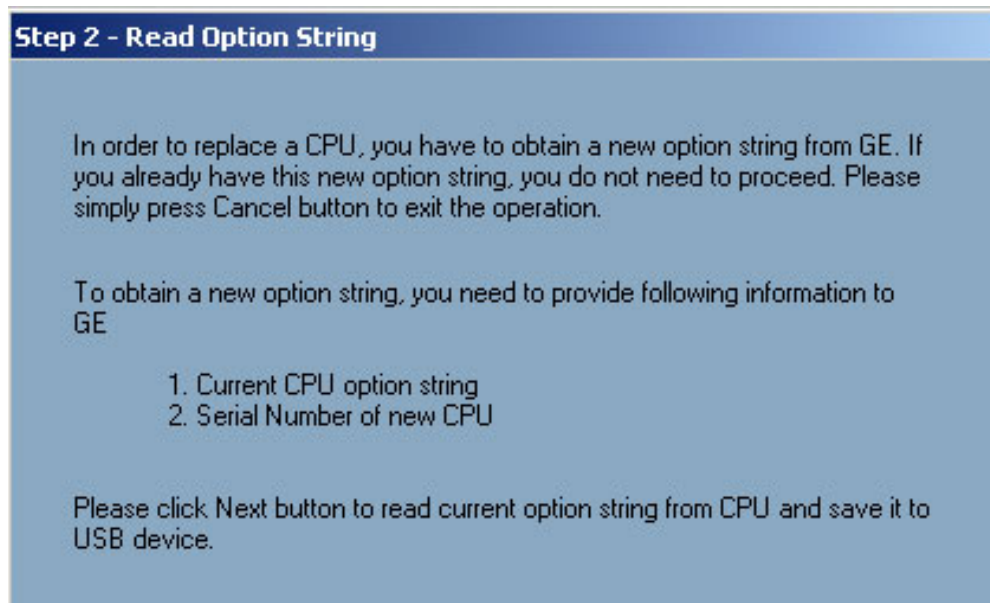
- On the **Maintenance** screen, click the **Replace CPU** tab. Click **Perform Preparation**. This will bring up the **Step 1 – Select CPU** dialog box. Select which CPU is to be replaced.

Figure 12-1 Step 1 – Select CPU dialog box



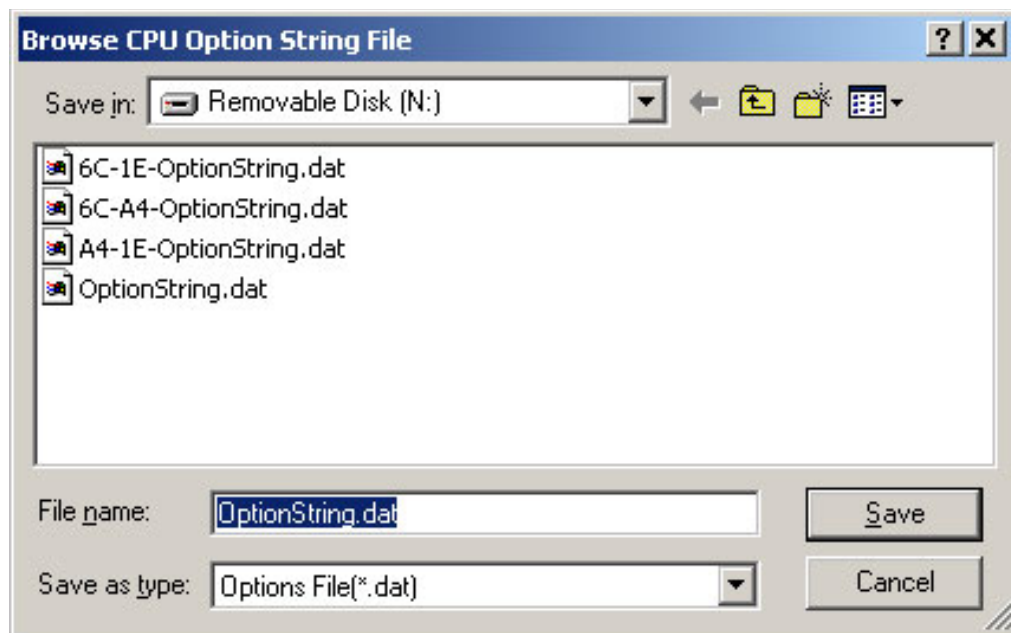
- After clicking **Next**, the following instructions will display:

Figure 12-2 Read Option String dialog box



- Save the old Option String to the memory stick and click **Next**:

Figure 12-3 Browse CPU Option String File dialog box



- The rest of the instructions for preparing for the replacement are shown on the screens for steps 3 and 4 of the preparation dialog box:

Figure 12-4 Step 3 – CPU Serial Number dialog box

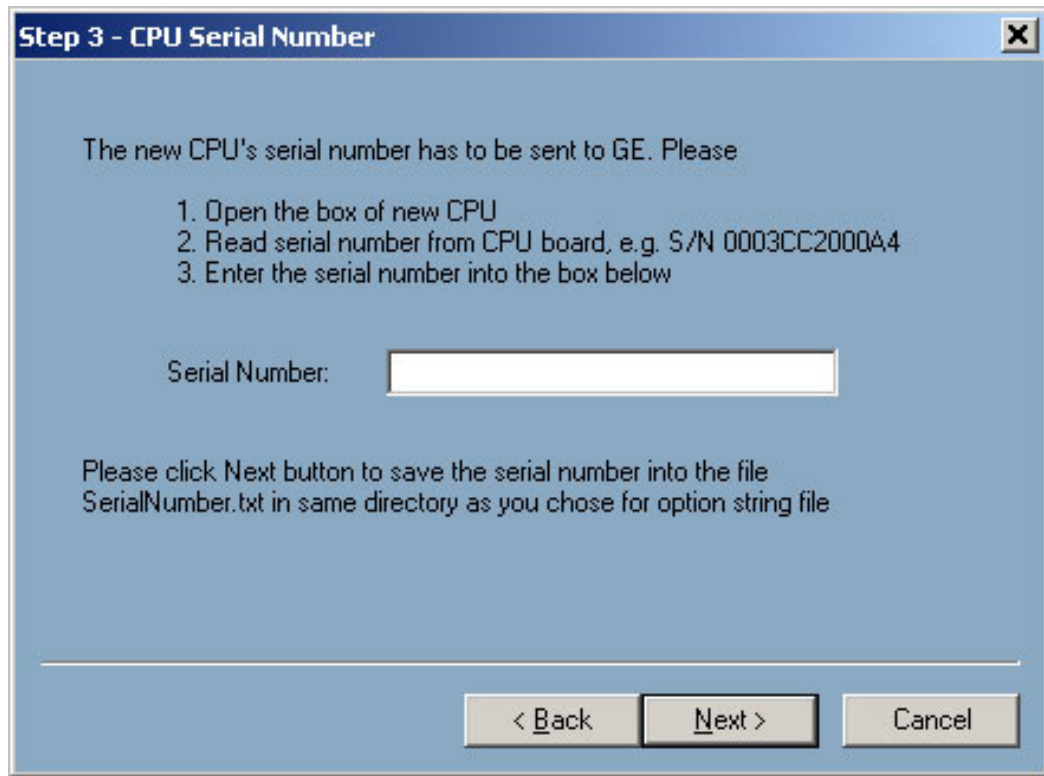
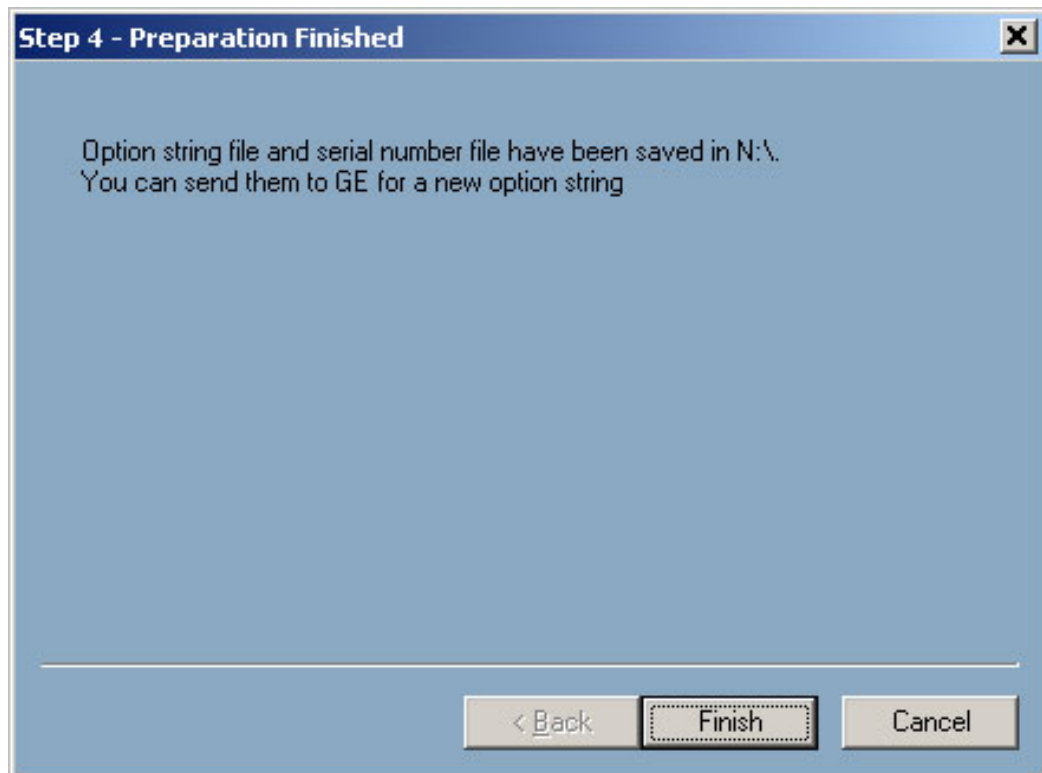


Figure 12-5 Step 4 – Preparation Finished dialog box

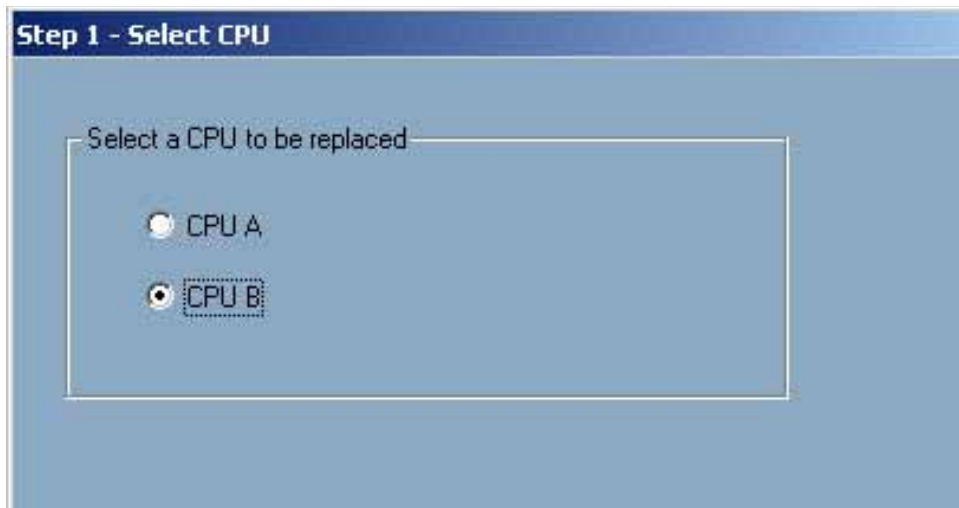


12.2 Part II – Replacing the CPU

On the **Replace CPU** tab in the **Maintenance** dialog box, click **Perform Replacement** to begin the CPU replacement wizard. This wizard assists in replacing the CPU and modifying the IP Address Configuration, Firmware, Option String, Settings, and CPU Commission options.

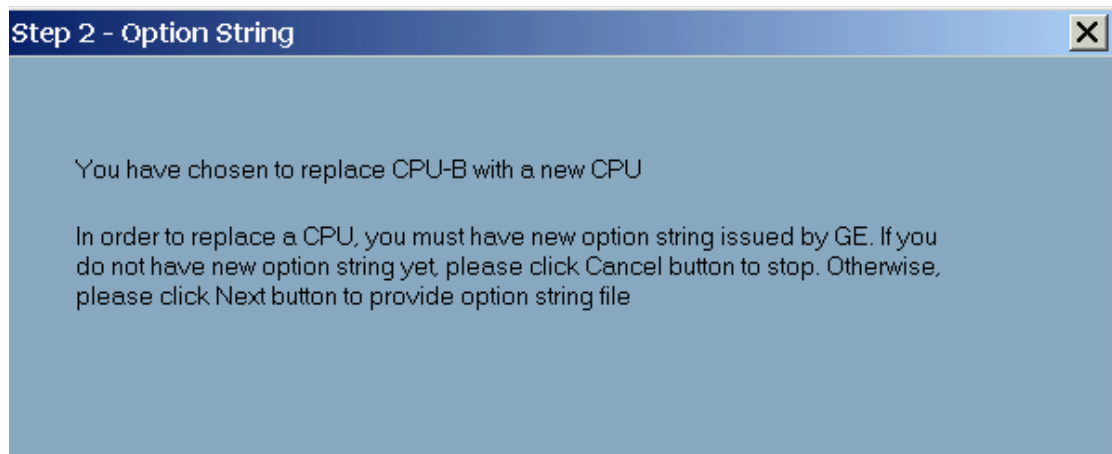
- The **Step 1 – Select CPU** dialog box displays again to confirm which CPU is to be replaced:

Figure 12-6 Step 1 – Select CPU dialog box



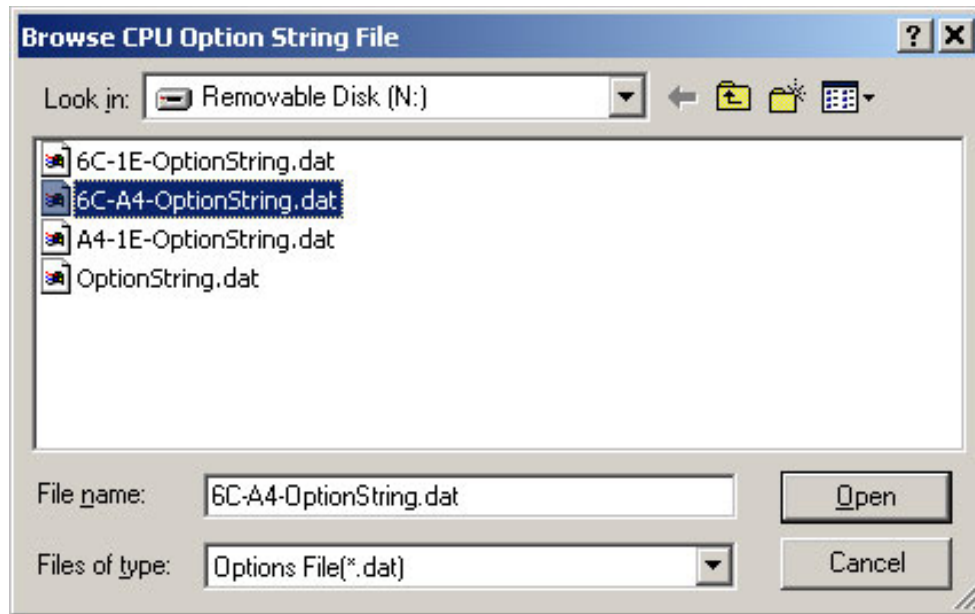
- After clicking **Next**, The following dialog box reminder will display:

Figure 12-7 Step 2 – Option String dialog box



- The CPU Option String file dialog box opens. Select the CPU Option String obtained from GE for the CPU being replaced:

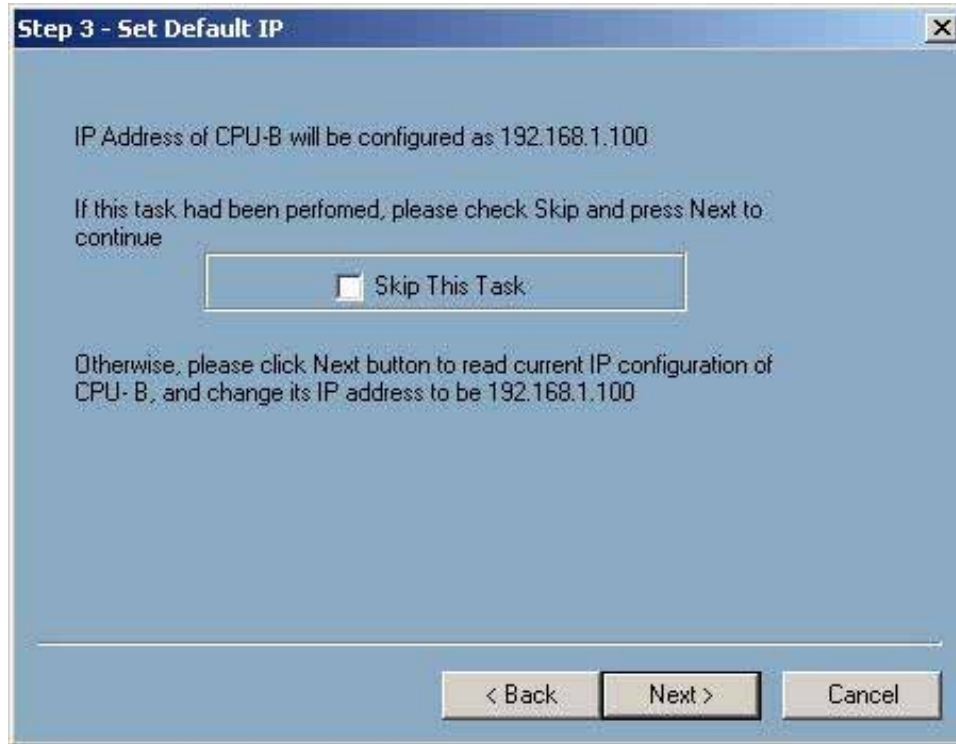
Figure 12-8 Browse CPU Option String File dialog box



- After selecting the option string, the **Step 3 – Set Default IP** dialog box will display as shown below. This will change the configured address within the HMI to the default address of a new CPU in preparation for communicating with it in **Step 4**.

NOTE: If the IP Address of the CPU has already been set to the default IP address, select **Skip This Task** and click **Next**. Otherwise, click **Next**. The current IP configuration will be stored before it is changed.

Figure 12-9 Step 3 – Set Default IP dialog box

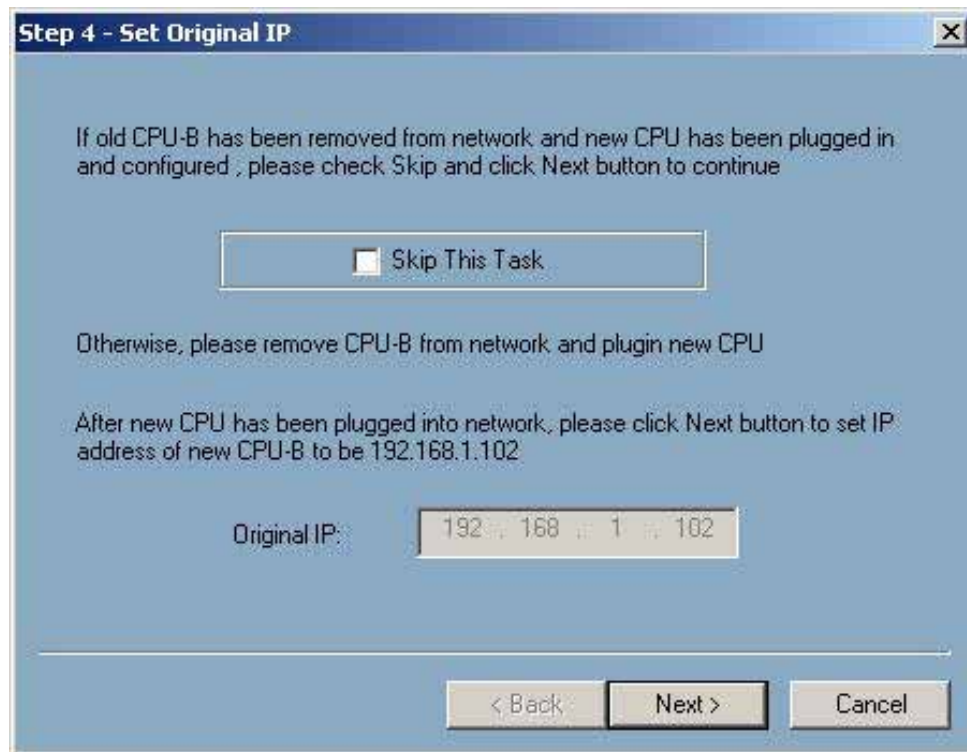


- A series of messages will display confirming the status of changes as they are being made.

NOTE: After performing this step the CPU may be powered down and physically swapped out. Please refer to DEH-234 Entellisys Low Voltage Switchgear Device Replacement Guide, Chapter 1, "Replacing a CPU chassis", for this procedure prior to proceeding to the next section.

- Apply power to the new CPU and allow 2 minutes for the device to self-initialize prior to performing **Step 4**. If the new CPU is known to already have an IP address as specified in the **Step 4** dialog box, select the **Skip This Task** check box prior to clicking **Next**. Otherwise, leave the check box cleared and just click **Next**.

Figure 12-10 Step 4 – Set Original IP dialog box



- A confirmation dialog box will display asking for confirmation that the old CPU has been replaced and the new CPU is installed and has been powered on for at least 2 minutes.

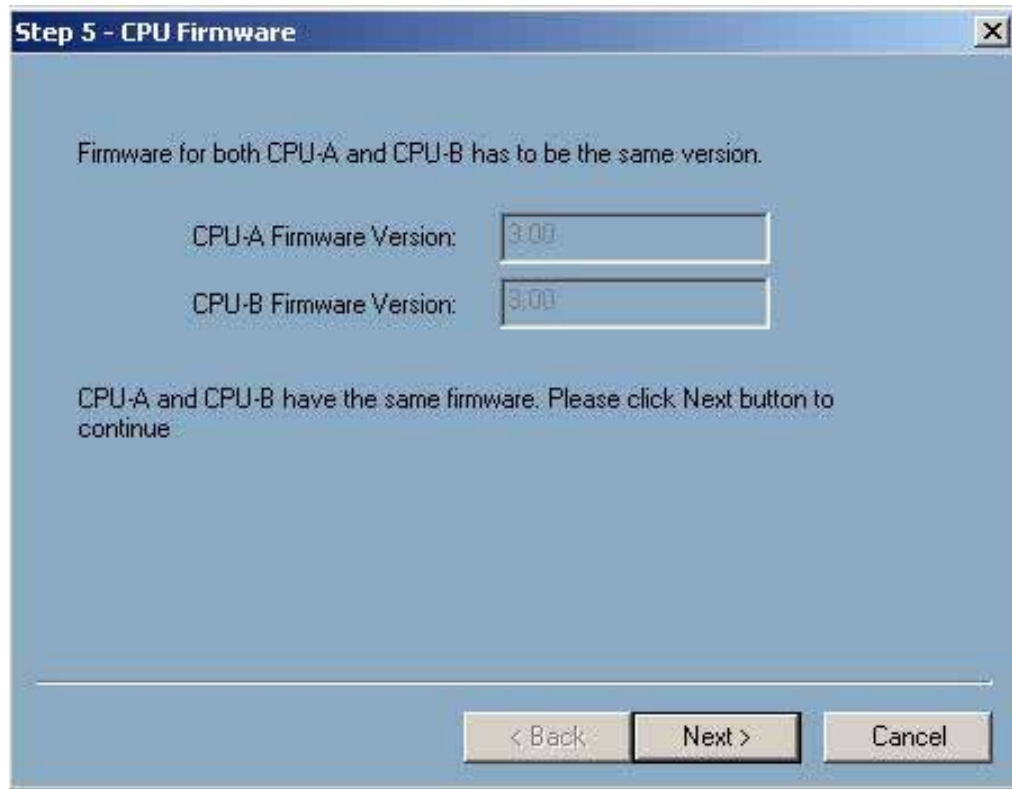
Figure 12-11 Entellisys LVS HMI dialog box



- Several progress messages will display prior to the **Step 5** dialog box as shown below. In this step, the HMI will read the firmware versions of each CPU and verify that they match.

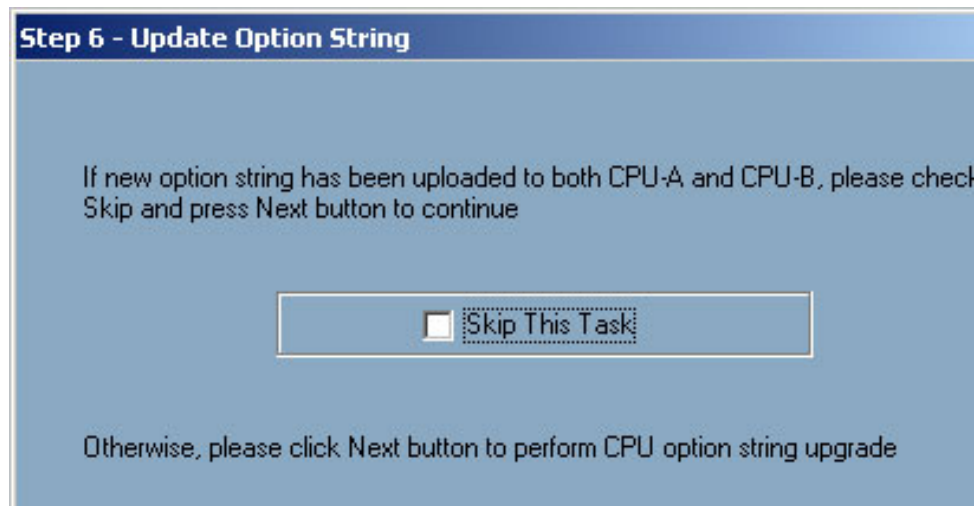
NOTE: If for some reason there is a mismatch in the version number, exit out of the procedure by clicking **Cancel** and restart the procedure from the beginning of this section.

Figure 12-12 Step 5 - CPU Firmware dialog box



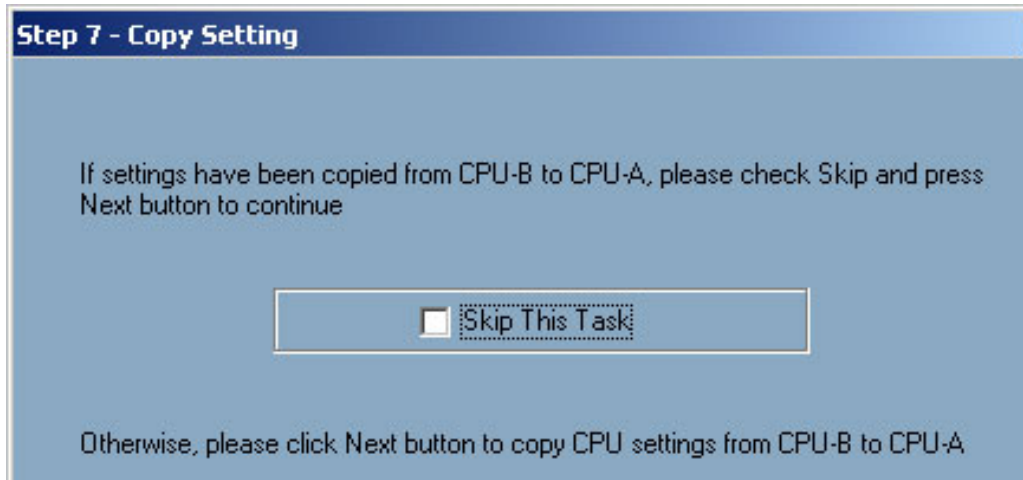
- Click **Next** to proceed to **Step 6**. Click **Next** to update the option string. This task may be skipped by selecting the check box if the new CPU is known to already have the correct option string.

Figure 12-13 Step 6 - Update Option String dialog box



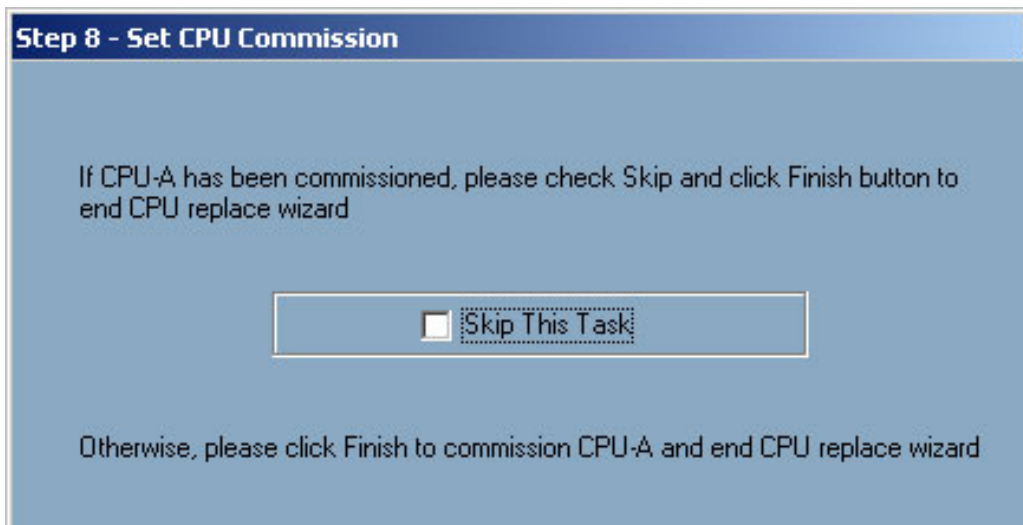
- The option string will be written to the CPUs, after which they will automatically reboot. After the reboot is complete, the dialog box for **Step 7** will display to update the settings to the new unit. The option to skip the task is available if this has already been done.

Figure 12-14 Step 7 - Copy Setting dialog box



- Finally, the dialog box for **Step 8** will display. Commissioning the new CPU will activate all of the relaying and protection algorithms in the unit. Click the **Finish** button to complete the process.

Figure 12-15 Step 8 - Set CPU Commission dialog box



13 Other maintenance functions

13.1 Viewing and updating circuit breaker names

The HMI provides a tool to change the circuit breaker names corresponding to their location in the switchgear.

To change the circuit breaker names

1. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
2. Click the **Breaker Names** tab. A table will display as shown as in Figure 13-1.

Figure 13-1 Breaker Names screen

Breaker ID	Breaker Name	Short Name	Compartment#
1	Main 1	M1	101B
2	Main 2	M2	103B
3	Tie 1	T1	102B
4	MCC Feeder	F1	101C
5	Pump Feeder	F2	101D
6	Chiller Feeder	F3	103C

- **Breaker ID:** Unique identifier for the circuit breaker. This is set by GE and cannot be changed.
- **Breaker Name:** Unique name given to a circuit breaker (16 alphanumeric characters). This may be set in the factory if information is provided from the customer. Otherwise, it should be updated for ease of use with selection boxes.
- **Short Name:** Unique short name given to a circuit breaker (8 alphanumeric characters). This field is currently not used.

- **Compartment#:** Unique identifier for the location of the circuit breaker in the switchgear. The Compartment# is set by the factory upon shipment to the customer and cannot be changed. It is often included on nameplates on the switchgear.
3. Click the **Save** button to keep changes (or click **Cancel** to exit the screen without saving).

NOTE: Changes to circuit breaker names will not be reflected on the custom Online screen. Contact GE Post Sales Support for details about updating to the Online screen (see [How to contact us on page 2](#)).

13.2 Viewing and updating circuit breaker accessories

The HMI displays the circuit breaker status for each circuit breaker in the system. To display the proper circuit breaker status, the installed accessories must be known.

The following is affected by the installed accessories:

- Breaker Racking Position status is available only if the position switch accessory is installed.
- Electrically Locked Out status is available only if either the Bell-Alarm or Network Interlock accessory is present.
- Closing Spring Status is available only if the Electric Operated accessory is present.

Additionally, the Breaker Control relies on the electric operated circuit breaker accessory. The remote control functions will be limited by the presence of the electrically operated accessory.

The following functions in the HMI Breaker Control are affected:

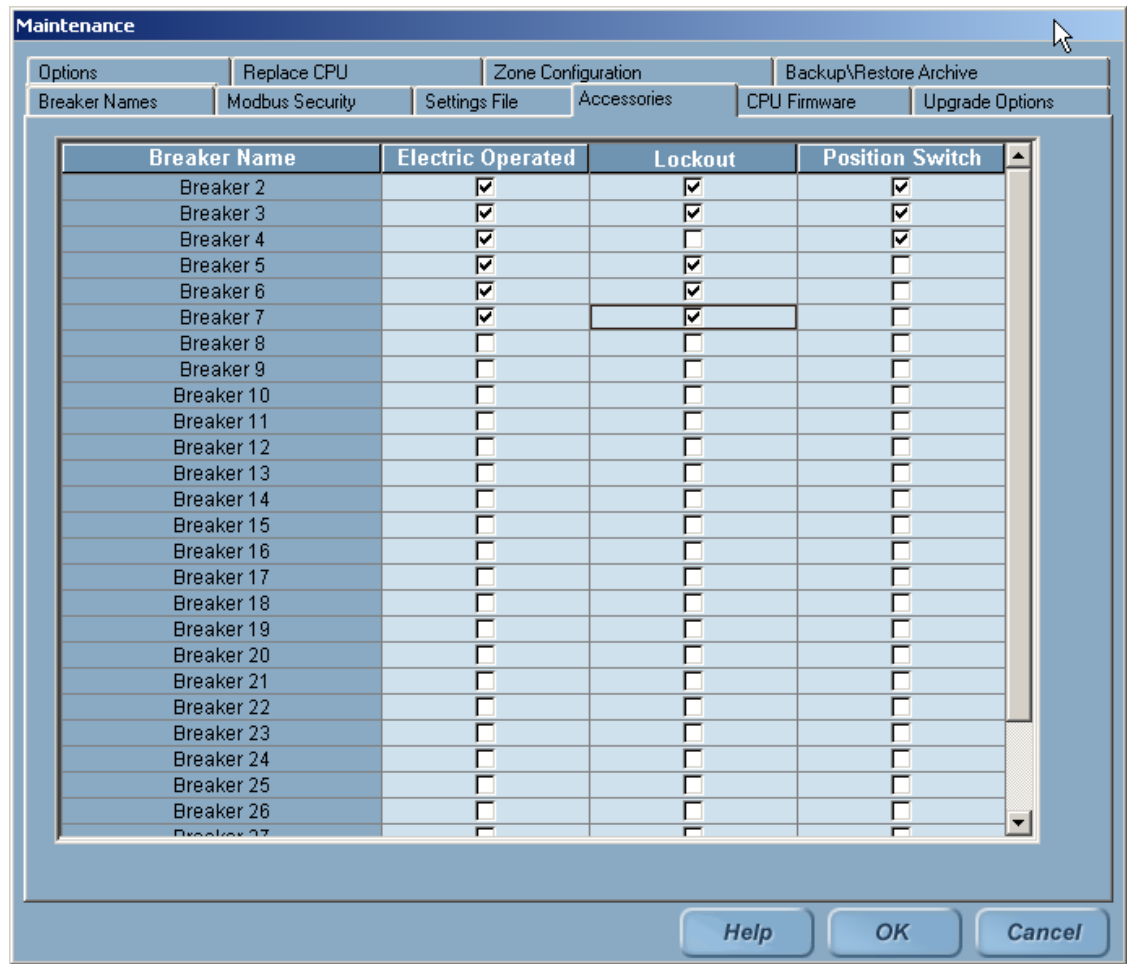
- Open Breaker function is displayed only if the electrical operated accessory is present.
- Close Breaker function is displayed only if the electrical operated accessory is present.
- Trip Breaker is NOT affected.

GE configures the proper circuit breaker accessories upon shipment of the switchgear. However, if the accessories change or if different circuit breakers are exchanged, the accessories must be updated, otherwise the status might not be correct.

To view or change the circuit breaker accessories

1. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
2. Click the **Accessories** tab. A table will display as shown as in Figure 13-2.

Figure 13-2 Breaker Accessories screen



- **Breaker Name:** Unique name given to a circuit breaker.
 - **Electric Operated:** Accessory allows the circuit breaker to be opened, closed, and charged remotely. The check box should be selected if this accessory is present.
 - **LockOut:** Circuit breaker contains either a bell alarm lockout accessory to prevent reclosing after tripping, or a network interlock accessory to prevent closing during automatic throw over. The check box should be selected if this accessory is present.
 - **Position Switch:** Circuit breaker contains an accessory that provides remote monitoring of the position of the circuit breaker during rack-in and rack-out. The check box should be selected if this accessory is present.
3. Click the **Save** button to keep changes (or click **Cancel** to exit the screen without saving).

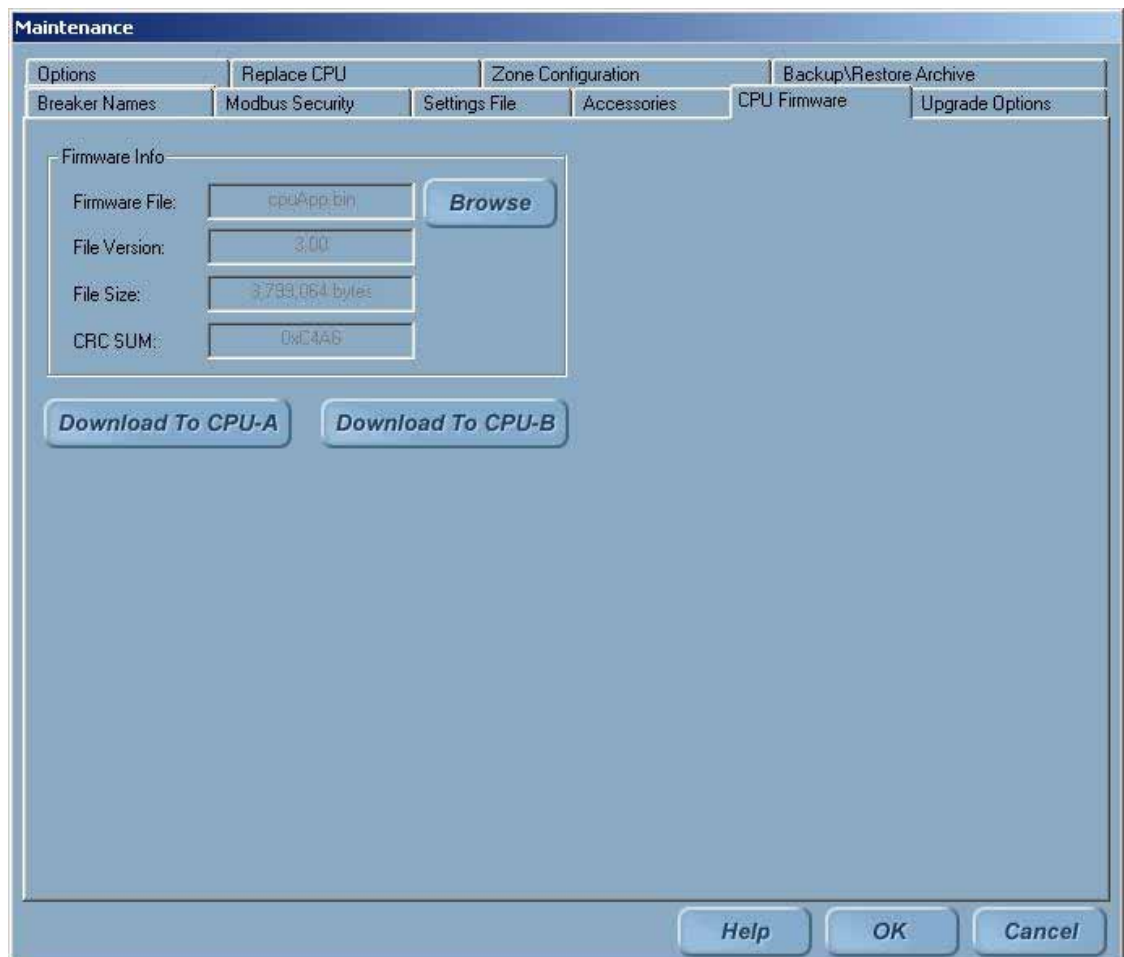
13.3 Installing CPU firmware

The HMI provides a tool to upgrade software (or firmware) in the CPUs.

CAUTION: Downloading new firmware to a CPU will erase all previous settings in the unit. See [Writing settings to a live system on page 33](#) for instructions on restoring CPU settings.

NOTE: Both CPUs must have the same firmware version loaded.

Figure 13-3 CPU Firmware Download screen



To download new firmware to the CPUs

1. On the **Main Menu**, click the **Maintenance** button. The button will only be displayed if access is allowed with the current login permissions.
2. Click the **CPU Firmware** tab.
3. Click the **Browse** button to select a CPU firmware file.
4. Locate the CPU firmware file and click the **Open** button.
5. If the selected file is valid, the Firmware Info will display and **Download to CPU A** and **Download to CPU B** buttons will be enabled. Click the corresponding button for the CPU to download the firmware.

13.4 Viewing zone configuration

The Zone Configuration screen gives an overview of the global zone configuration and also for each protection function (Multi Source Ground Fault, Bus Differential, and Zone Selective Interlock).

See DEH-231 Entellisys Low Voltage Switchgear System User Manual, Chapter 6 (Zones, buses, and topologies) for details.

Administrator access to the operating system

Each Entellisys Touchscreen HMI computer has been configured to prevent direct access to the computer's operating system. Special user permissions are required to exit the HMI application. If exited, the only function allowed is to restart the computer.

For special cases when access to the computer is required, there is a way for the Entellisys System Administrator to logon to the operating system as an Administrator. This will give the user full access to the computer. It is strongly recommended that the System Administrator limit knowledge of this ability to prevent unauthorized access.

Steps to get Administrator access to the operating system of an HMI Touchscreen Computer:

1. Press **Ctrl+Alt+Delete**. A Windows Security dialog box will display.
2. Press the **Logoff** button.
3. Constantly press the **Shift** key until the login dialog box "**Login On Windows as**" displays.
4. Enter User Name as "Administrator".
5. Enter Password as "gestart".
6. Press the **OK** button.

CAUTION: The system should never be left unattended in this state since unauthorized access could result in damage to the computer image requiring a new image to be loaded. Always restart the computer to revert to the default state.

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