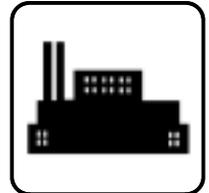


Software Operation and Installation

Automatic Transfer Switches



Models:

MPAC Setup Program

Applies to:

MPAC-1000™ Transfer Switch Controllers

KOHLER[®]
POWER SYSTEMS

ISO 9001
KOHLER
POWER SYSTEMS
NATIONALLY REGISTERED

TP-6135 4/02

Product Identification Information

Software Version Number

Record the software version number.

Software Version Number _____

x.in:007:001a

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Safety Precautions and Instructions

IMPORTANT SAFETY INSTRUCTIONS. Electromechanical equipment, including generator sets, transfer switches, switchgear, and accessories, can cause bodily harm and pose life-threatening danger when improperly installed, operated, or maintained. To prevent accidents be aware of potential dangers and act safely. Read and follow all safety precautions and instructions. **SAVE THESE INSTRUCTIONS.**

This manual has several types of safety precautions and instructions: Danger, Warning, Caution, and Notice.

DANGER

Danger indicates the presence of a hazard that **will cause severe personal injury, death, or substantial property damage.**

WARNING

Warning indicates the presence of a hazard that **can cause severe personal injury, death, or substantial property damage.**

CAUTION

Caution indicates the presence of a hazard that **will or can cause minor personal injury or property damage.**

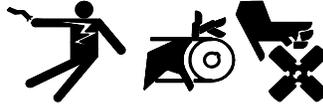
NOTICE

Notice communicates installation, operation, or maintenance information that is safety related but not hazard related.

Safety decals affixed to the equipment in prominent places alert the operator or service technician to potential hazards and explain how to act safely. The decals are shown throughout this publication to improve operator recognition. Replace missing or damaged decals.

Accidental Starting

WARNING



Accidental starting.
Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. **Accidental starting can cause severe injury or death.** Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

Hazardous Voltage/ Electrical Shock

DANGER



Hazardous voltage.
Will cause severe injury or death.

Disconnect all power sources before opening the enclosure.

DANGER



Hazardous voltage.
Will cause severe injury or death.

Only authorized personnel should open the enclosure.

WARNING



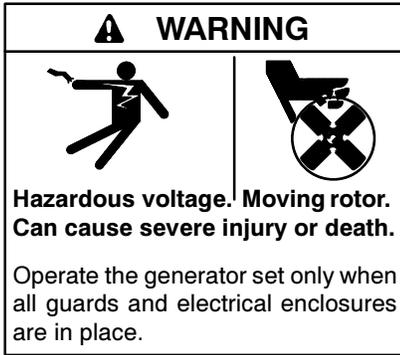
Hazardous voltage. Moving rotor.
Can cause severe injury or death.

Operate the generator set only when all guards and electrical enclosures are in place.

Short circuits. Hazardous voltage/current can cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment.

Testing live electrical circuits. Hazardous voltage or current can cause severe injury or death. Have trained and qualified personnel take diagnostic measurements of live circuits. Use adequately rated test equipment with electrically insulated probes and follow the instructions of the test equipment manufacturer when performing voltage tests. Observe the following precautions when performing voltage tests: (1) Remove all jewelry. (2) Stand on a dry, approved electrically insulated mat. (3) Do not touch the enclosure or components inside the enclosure. (4) Be prepared for the system to operate automatically. (600 volts and under)

Moving Parts



Notice

NOTICE

Hardware damage. The transfer switch may use both American Standard and metric hardware. Use the correct size tools to prevent rounding of the bolt heads and nuts.

NOTICE

Electrostatic discharge damage. Electrostatic discharge (ESD) damages electronic circuit boards. Prevent electrostatic discharge damage by wearing an approved grounding wrist strap when handling electronic circuit boards or integrated circuits. An approved grounding wrist strap provides a high resistance (about 1 megohm), *not a direct short*, to ground.

This manual covers the installation and operation of the MPAC Setup Program for personal computers running the Windows® operating system.

Information in this publication represents data available at the time of print. Kohler Co. reserves the right to change this literature and the products represented without notice and without any obligation or liability whatsoever.

Read this manual and carefully follow all procedures and safety precautions to ensure proper equipment operation and to avoid bodily injury. Read and follow the Safety Precautions and Instructions section at the

beginning of this manual. Keep this manual with the equipment for future reference.

The software covered by this manual is part of a total control system. Separate manuals provide specific information about transfer switch operating limits, specifications, and functions. The related manual numbers follow.

Manual	Part Number
Model KCT, KCP Operation and Installation Manual	TP-6126
Model KBT, KBP Bypass/Isolation Switch Operation and Installation Manual	TP-6128

Service Assistance

For professional advice on generator power requirements and conscientious service, please contact your nearest Kohler distributor or dealer.

- Consult the Yellow Pages under the heading Generators—Electric
- Visit the Kohler Power Systems website at KohlerPowerSystems.com
- Look at the labels and stickers on your Kohler product or review the appropriate literature or documents included with the product
- Call toll free in the US and Canada 1-800-544-2444
- Outside the US and Canada, call the nearest regional office

Africa, Europe, Middle East

London Regional Office
Langley, Slough, England
Phone: (44) 1753-580-771
Fax: (44) 1753-580-036

Asia Pacific

Power Systems Asia Pacific Regional Office
Singapore, Republic of Singapore
Phone: (65) 264-6422
Fax: (65) 264-6455

China

North China Regional Office, Beijing
Phone: (86) 10 6518 7950
(86) 10 6518 7951
(86) 10 6518 7952
Fax: (86) 10 6518 7955

East China Regional Office, Shanghai
Phone: (86) 21 6288 0500
Fax: (86) 21 6288 0550

India, Bangladesh, Sri Lanka

India Regional Office
Bangalore, India
Phone: (91) 80 3366208
(91) 80 3366231
Fax: (91) 80 3315972

Japan, Korea

North Asia Regional Office
Tokyo, Japan
Phone: (813) 3440-4515
Fax: (813) 3440-2727

Latin America

Latin America Regional Office
Lakeland, Florida, USA
Phone: (863) 619-7568
Fax: (863) 701-7131

X:in:008:001a

Notes

Section 1 Requirements and Installation

1.1 Introduction

The MPAC Setup Program allows viewing and adjustment of the system parameters of a transfer switch equipped with the MPAC-1000™ programmable transfer switch controller. Use the software to:

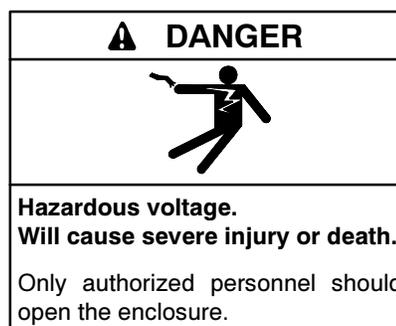
- View and adjust:
 - Source parameters
 - Time delays
 - Voltage and frequency trip points
 - Exerciser settings
 - Date and time
 - Other settings
- View:
 - System status
 - DIP switch settings
 - Event history
 - Maintenance records
- Start and stop a system test, exercise, or peak shave sequence
- Transfer to the OFF position (programmed-transition models only)
- Assign programmable inputs and outputs
- Toggle Modbus®-controlled relay outputs

1.2 System Requirements

The minimum system requirements to run the program are:

- 133MHz or higher Intel® Pentium®-compatible CPU
- 32 MB RAM
- CD-ROM drive and 75 MB hard drive space available for installation
- 800 x 600 or better color monitor
- Microsoft Windows® 95, Windows® 98, Windows NT® 4.0, Windows® 2000*, or Windows XP® operating system with Internet Explorer version 4.0 or higher
- Serial port configured as COM 1-16
- Null-modem cable (included with the software kit)

1.3 Hardware Connections



Short circuits. Hazardous voltage/current can cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment.

* We are aware of problems with certain computers running Windows® 2000 and communicating through serial ports. These particular computers have internally simulated serial ports using USB inputs instead of true serial ports. Microsoft Windows® 2000 Service Pack III, to be released in the near future, will reportedly address this problem. The use of a serial adapter card to connect the PC to the ATS controller has been shown to correct this problem (the Socket™ PCMCIA Serial Adapter card is one example).

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Windows®, Windows NT®, and Windows XP® are registered trademarks of Microsoft Corporation.
Intel® and Pentium® are registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

1.3.1 Serial Port Connection

Use a serial port connection to connect a personal computer (PC) running the setup software to the ATS controller.

Use a null modem cable (Kohler part number GM16657, included with the software kit) to connect the PC to the ATS controller. Connect the cable to one of the PC's serial ports and note the port number to enter into the software communication settings as directed in Section 2.6.3, Program Options. Open the ATS enclosure door and connect the other end of the cable to the controller's serial port, P6, shown in Figure 1-1.

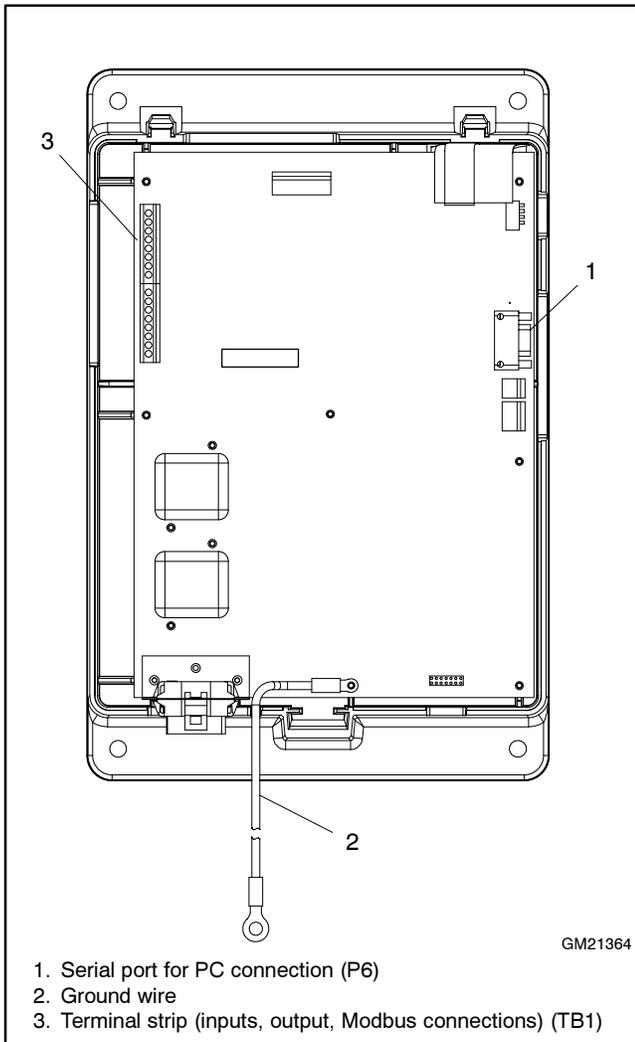


Figure 1-1 ATS Controller Connections

1.3.2 Modbus Connections

To install the transfer switch in a Modbus network, use 12-24 AWG twisted-pair cable (Belden cable #9841 or equivalent) to connect to either set of Modbus terminals on the ATS main logic board terminal strip TB1 shown in Figure 1-2. Connect the shield to ground as shown in Figure 1-2. Tighten the connections to 0.5 Nm (4.4 in. lb.).

Note: Contact Kohler Co. for information about Modbus® communication protocol.

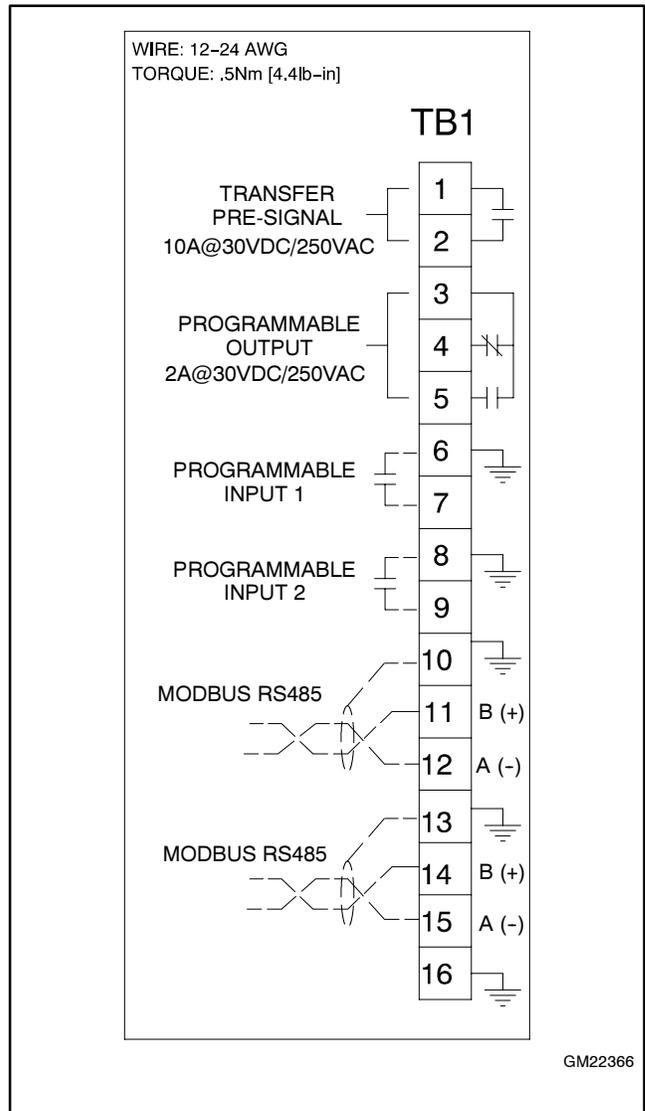


Figure 1-2 Terminal Strip TB1 Connections

1.4 Software Installation

For simplicity, this manual and the software assumes that the PC has the CD-ROM drive installed as the D: drive and the hard drive installed as the C: drive. If your drive locations are different, type in the correct drive letter for your PC hard drive or CD-ROM drive when applicable during software installation or operation.

1.4.1 Installation

The Setup Program software CD-ROM contains various files that are used by the setup program to install the software on the PC. The setup program automatically installs a shortcut to run the program from the *Start* menu.

Follow the steps below to install the Setup Program in Windows®.

Software Installation Procedure

1. Close all applications.
2. Insert the Setup Program software CD-ROM into the PC's CD-ROM drive, the D: drive on most systems.
3. Open Windows® Explorer and double-click on the CD-ROM drive.
4. Double click on the *SetupProgK.exe* file to install the program.
5. The setup program reminds you to close all applications. Close other applications and click the *OK* button.

6. Click on the *Change Directory* box to change the installation directory, if desired. The setup program creates and installs the main software files into the C:\Program Files\SetupProgK directory unless an alternate location is provided.
7. Click on the computer icon to begin the installation process.
8. Enter information into the dialog box to change the locations of the program group and shortcut, if desired. Click the *Continue* button to begin copying the files.
9. Click the *OK* button after the setup is completed.
10. Remove the CD-ROM and store it in a safe location away from excessive heat, direct sunlight, and moisture.

When the program runs, it generates other files in the installation directory that the program uses to store system information.

Perform regular backups of the installation directory.

1.4.2 Uninstallation

To remove the software from the PC, select *Settings>Control Panel>Add/Remove Programs* from the Start menu. Select the *SetupProgK* group and click on *Add/Remove*. An uninstallation program runs and deletes installed Setup Program files from the installation directory.

Note: Do not simply delete the software files.

Notes

Section 2 Software Operation

2.1 Introduction

This section provides general instructions for working with the Setup Program tools and windows. Detailed descriptions of the individual display and setup windows are given in Section 3, Setup Software Windows.

2.2 Getting Started

This section explains the procedure to start the Setup Program and use it to display and change transfer switch settings. Sections 2.3 through 2.10 give more detailed descriptions of toolbar functions and commands.

1. Start the program by clicking on the *Start* button at the lower left corner of the personal computer (PC) screen and selecting *Programs>MPAC Setup Program*.
2. Log in when prompted by entering the user name and password. The default user name and password are shown in Figure 2-1.

Note: User names and passwords are case sensitive.

Note: Change the user name and password to prevent unauthorized personnel from using the program to change system settings.
3. From the menu toolbar at the top of the screen, select *Tools*. Scroll down to the last item in the list and select *Options*. Enter the number of the PC's communication port that is connected to the controller into the data box labeled *COM Port*. Type the number into the box or use the up and down arrows to select it. See Section 2.6.3, Program Options.
4. From the menu toolbar at the top of the screen, select *Connection*. Scroll down to highlight *Connect* and click on it to connect the PC to the transfer switch controller. Check that the icon in the lower right corner of the PC screen shows that the PC is connected to the ATS controller. See Section 2.11, System Tray.

User Name	ATS
Password	T340

Figure 2-1 Default Login Name and Password

5. From the menu toolbar at the top of the screen, select *Window*. Scroll down to highlight *New Window* and click. Use the cursor to select a window from the list displayed on the screen and click to select that window. The selected display window will appear on the screen.

Note: See Section 3, Setup Software Windows, for descriptions of data windows.
6. To change settings:
 - a. Create the display window that shows the setting you want to change or click on it if it is already displayed on the screen.
 - b. Select *Window>Setup* from the Menu toolbar at the top of the screen. The setup window will appear.
 - c. Each adjustable parameter uses either a radio button, a check box, or a data entry box to change the setting. Click on the radio buttons or check boxes to change selected settings. The acceptable range of values is listed next to most data entry boxes; use the drop-down arrows to select a new setting or click in the box and type in a new value within the acceptable range. Refer to the appropriate sections following this procedure for more detailed instructions for each window and setting.
 - d. Click on *OK* or press the *Enter* key to apply the changes. Click on *Cancel* to discard the changes.
 - e. Watch the display window for the updated settings. The update time will vary with the number of windows displayed on the screen and the scan rate (see Section 2.6.3).
7. Arrange the windows on the screen by using *Window>Cascade Windows*, if desired, or by dragging and dropping windows.
8. Save screens and settings if desired for future use. See Section 2.8.1, Save and Open Screen, and Section 2.8.2, Save and Restore Setup, for instructions.
9. When finished, choose *Connection>Disconnect* to disconnect the PC from the controller.
10. Choose *File>Exit* to exit and close the Setup Program.

2.3 Login

At startup, the program displays the login window shown in Figure 2-2. Enter the user name and password and click on the *OK* button.

The default password is T340. Change the user name and password to prevent unauthorized personnel from using the program to view system information or change system settings.

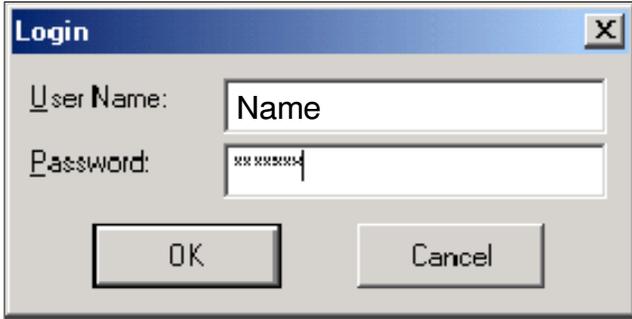


Figure 2-2 Login Screen

2.4 Main Window

After login, the program displays the Main window shown in Figure 2-3. Use the buttons at the upper right corner to resize, minimize, or maximize the main window.

Use the pull-down menus at the top of the main window to access the commands shown in the following sections.

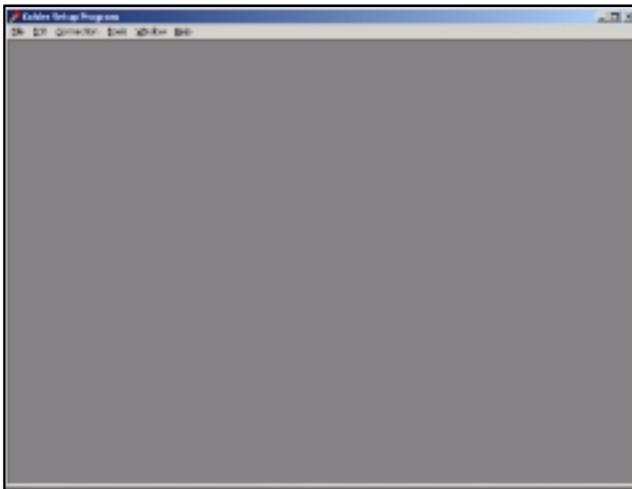


Figure 2-3 Main Window

2.5 Connection Menu

The *Connect* command attempts to open the communication port and establish communications with a connected controller. See Section 2.6.3, Program Options, to set the number of the PC's communication port. See Figure 2-4.

The *Disconnect* command closes the communication port. Be sure to disconnect before exiting the setup program.



Figure 2-4 Connection Menu

2.6 Tools Menu

Use the *Tools* menu to change the software user name and password and to set the PC's communication settings. See Figure 2-5.

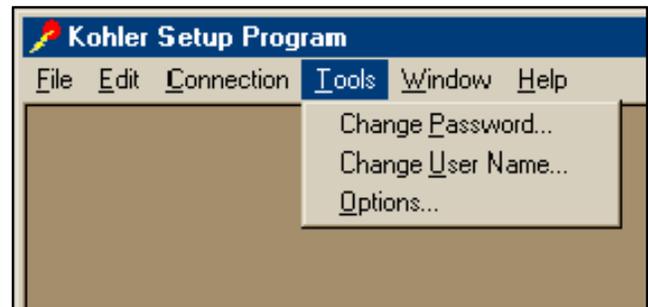


Figure 2-5 Tools Menu

2.6.1 Change Password

This window allows the user to change the password. See Figure 2-6. The window displays the name of the user logged on to the program. Type in the old password, the new password, and the new password a second time for confirmation. To ensure confidentiality, the passwords do not appear on the screen. Click on the *OK* button to enter the new password. Click on the

Cancel button to discard the changes and keep the old password.

Note: Passwords and user names are case sensitive. Check the *Caps Lock* key when typing passwords.



Figure 2-6 Change Password

2.6.2 Change User Name

Use this window to change the user name of the person who is logged in. See Figure 2-7. The window displays the current user name near the top. Type in the new user name and type it again in the second box to confirm it. The new names appear on the screen as they are typed. Click on *OK* to accept the new user names, or *Cancel* to discard the change and keep the old user name.

The program verifies that the new names match before accepting the change.

Note: Passwords and user names are case sensitive.



Figure 2-7 Change User Name

2.6.3 Options

Enter the number of the PC's communication port that is connected to the controller. Type the number into the box or use the up and down arrows to select it. See

Figure 2-8. If you are uncertain of the COM port number, select COM Port numbers and try to connect until connection is established. (See Section 2.5, Connection Menu, and Section 2.11, System Tray.)

The scan rate affects the time required to update settings and display windows. However, the update time is more strongly affected by the number of windows displayed on the screen. Recommended scan rates are 200–300 milliseconds. Faster scan rates (less than 200 milliseconds) may cause data loss and are not recommended.

Click on the *OK* button to apply the changes.

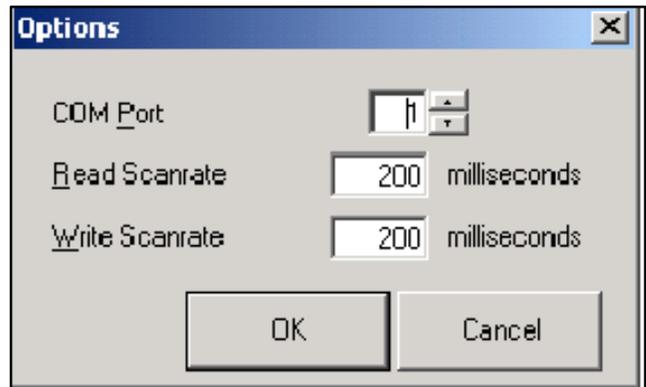


Figure 2-8 Options

2.7 Window Menu

Use the *Window* menu to create new windows, select a window, enter the setup screen for an existing window, arrange windows on the screen, and delete windows. This section gives general instructions for creating display and setup windows. Refer to Section 3, Setup Software Windows, for detailed descriptions of the contents and use of each window. See Figure 2-9.

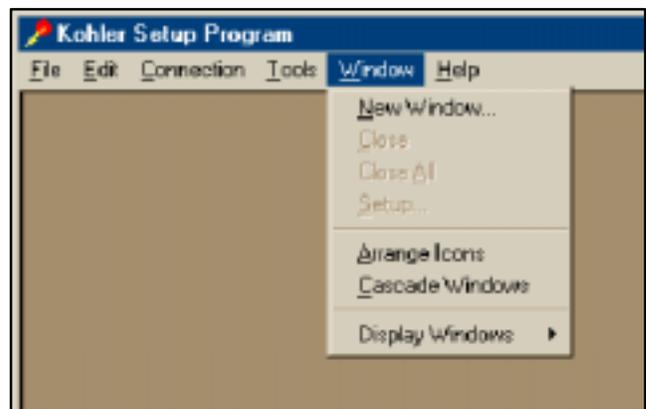


Figure 2-9 Window Menu

2.7.1 New Window

Select *Window>New Window...* from the main window pull-down menus. The program displays the Add Window form shown in Figure 2-10. The list box displays all available windows. Display a window on the user screen by selecting it from the list and then clicking *OK*. Select multiple items from the list by holding down the control (*Ctrl*) key and clicking on each item. Select blocks of items by clicking on the first item, then holding down the *Shift* key while clicking on the last item in the block.

Windows that have already been added to the user screen do not appear on the list. If all windows have been added to the user screen, the list is empty.

Click on *Cancel* or the **X** button at the upper right corner of the form to return to the main window.

See Section 3, Setup Software Windows, for detailed instructions for the different windows.

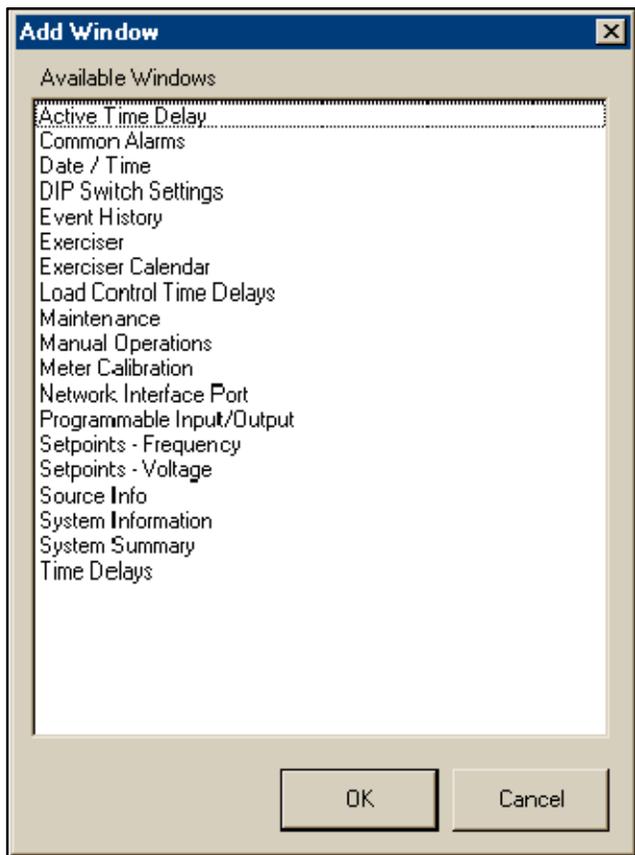


Figure 2-10 Add Window Form

2.7.2 Setup

The setup window allows you to change user-adjustable settings within the window. For example, the Source Info setup window allows you to change the system

voltage, frequency, number of phases, and expected phase rotation for each source.

Note: You must select the Display window for a function before you can open the Setup window.

First select the display window for the ATS function that you want to work with. Then choose *Window>Setup* or double-click on the active display window to open the setup window for that function.

Working with Setup Windows

The setup windows use several methods to enter system information and settings. This section gives general instructions about how to use the different methods to enter information.

Radio Buttons. A radio button appears as an open circle. Position the cursor inside the open circle and left-click to select the desired option. The selected radio button has a dark dot in the center. Radio buttons allow the selection of only one of the options in a set. Selecting one radio button in a set of options deselects, or turns off, all of the other options.

Check Boxes. Check boxes are open rectangular boxes. A selected check box contains a check mark. Position the cursor inside the box and click to select or deselect the option. Check boxes allow the selection of any or all of the options in the set. Selecting one option with a check box will not deselect the other options in a set.

Data Entry Boxes. Data entry boxes allow you to type in text or numerical data from the keyboard. Position the cursor inside the box, left-click, and type in the new information. If the box already contains information, double-click to highlight the text before typing the new information. Some items show the acceptable range of settings after the data entry box. Verify that the data you enter falls within the range shown. If the setting does not fall within the acceptable range, the system will not enter the change.

Drop-Down Arrows. A drop-down arrow appears as a down arrow in a box at the end of a line. Position the cursor on the down arrow and click to display a selection list. Click on an item in the list to select it. The selected item appears in the box next to the arrow.

Up and Down Arrows. Up and down arrows appear in boxes after a data entry box containing a numerical setting. Click on the up arrow to increase the number or the down arrow to decrease the number. You can also double-click inside the data box and type in the setting directly, provided it falls within the acceptable range.

OK and Cancel Buttons. The *OK* and *Cancel* buttons appear at the bottom of each window. The software does not enter changes until the *OK* button is clicked. Make changes to the selections or data entry boxes, and then click on *OK* to accept the changes and enter them into the system. If the *OK* box is highlighted on the screen, pressing the *Enter* key will also enter the changes. Click on *Cancel* to discard the changes without entering them into the system.

Confirmation Boxes. Clicking on *OK* to enter some changes prompts a confirmation box to appear on the screen before the system enters the changes. Double check your selections and their effect on the system before clicking on *OK* to confirm the changes.

2.7.3 Arrange Icons

Minimizing windows by clicking on the *_* symbol in the upper right corner of the window reduces the window to an icon. Select *Window>Arrange Icons* to arrange the icons neatly at the bottom of the main window.

2.7.4 Cascade Windows

Choose *Window>Cascade Windows* to arrange the windows on the screen. The *Cascade Windows* command is enabled only when two or more display windows are on the screen.

2.7.5 Display Windows

Choose *Windows>Display Windows* to see a list of all windows that have been created on the screen. Select a window from the list to bring it to the top and activate it.

2.8 File Menu

The file menu includes the following options:

- Open Screen
- Save Screen
- Save Screen As
- Restore Setup
- Save Setup
- Exit

See Figure 2-11.



Figure 2-11 File Menu

2.8.1 Save Screen and Open Screen

A layout of data windows can be saved to a file for reuse. After creating the desired display windows and arranging them on the PC screen, use the following procedure to save the layout. Use the *Save Screen As* command to create a new file or *Save Screen* to update an existing Screen file.

Note: The *Save Screen* command does not save system settings (source parameters, time delay settings, etc.). Use the *Save Setup* command to save system settings. See Section 2.8.2, Save and Restore Setup.

Procedure to Save a Screen to a File

1. Select *File>Save Screen As* from the menu bar as shown in Figure 2-11.
2. A dialogue box appears. See Figure 2-12. Type in a filename for the screen file. Choose a unique name that identifies the file for future reference. Screen files use the extension *.scn*. Do not type the filename extension; the program appends the extension to the filename automatically.
3. Click on the *Save* button.

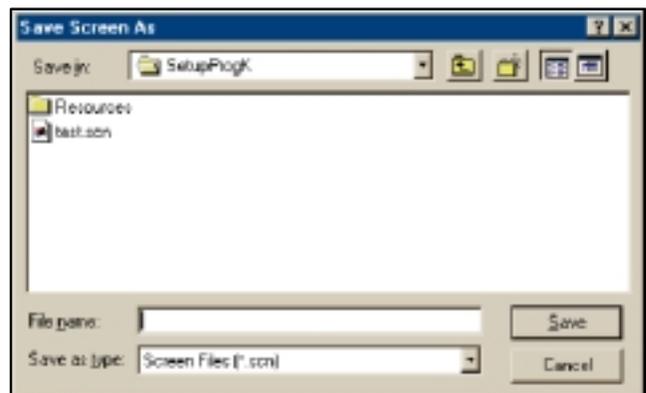


Figure 2-12 Save Screen

The *Open Screen* command opens a file containing previously created display windows.

Select *File>Open Screen* and then select the appropriate file from the list on the screen. Use the drop-down arrows to change directories if the file is located in a different directory than the one displayed in the *Look in:* box. With the file selected, click on the *Open* button. The saved screens appear in the programs main window when the file opens.

2.8.2 Save and Restore Setup

Save Setup saves system settings (time delays, pickup and dropout settings, etc.) to a file for future reference or restoration. Here are some examples of how these commands may be used:

- To save the system settings from each controller in a separate file on the computer or on a disk for future reference and troubleshooting
- To save the system settings before running tests and diagnostics on the controller
- To save the system settings from one ATS controller to load onto another ATS controller of the same type
- To save settings for two modes of operation for the controller, such as Normal Operation and Test Settings where the Test Settings use different time delays and exercise run times than the Normal Operation mode

Note: The ATS controller's system settings are not lost during power outages.

Saving the settings immediately after the system setup is completed or updated is strongly recommended. If the controller requires replacement or updated application software in the future, the settings file can be used to restore the operating settings quickly and accurately.

Procedure to Save System Settings to a File

1. Use the display and setup windows to enter all of the desired system settings including source parameters, voltage and frequency pickup and dropout settings, time delays, programmable input/output assignments, exerciser settings, and other adjustable settings.

2. Select *File>Save Setup* from the menu bar as shown in Figure 2-11.
3. A dialogue box appears on the screen. See Figure 2-13. Type in a filename for the settings file. Choose a unique name that identifies the system for future reference. Settings file use the extension *.sdf*. Do not type the filename extension; the program appends the extension to the filename automatically.
4. The program displays the default directory where the settings file will be saved. Use the drop-down arrow to the right of the box to choose a different file location or click *OK* to save the file to the default location shown.

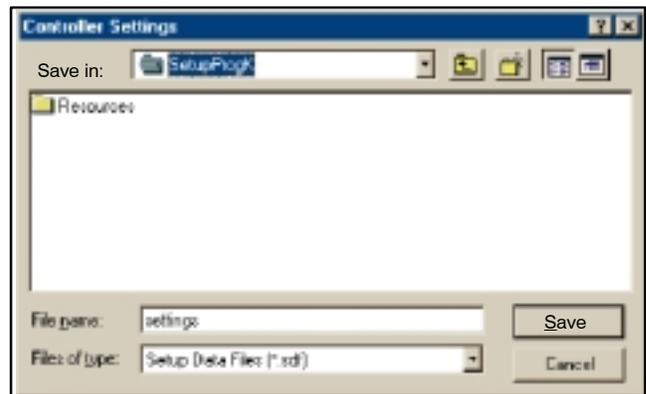


Figure 2-13 Save Setup Screen

Procedure to Restore System Settings from a File

1. Select *File>Restore Setup* from the menu bar.
2. Click on the file containing the appropriate settings from the list on the screen to select it.
3. Click the *Open* button. The program changes the system settings to the values stored in the file.

2.8.3 Exit

Use the *File>Exit* command to exit the Setup Program after disconnecting from the ATS (see Section 2.5, Connection Menu). The program may prompt the operator to save the screen if the layout has been changed since the last time it was saved.

2.9 Edit Menu

The *Edit* menu allows the user to cut, copy, and paste selected text. See Figure 2-14. With some systems, the *Edit* commands can be accessed by clicking the right mouse button while the setup window is active. This function depends on the PC mouse properties.

The *Cut* and *Copy* commands are enabled only when text that can be cut or copied is selected. The *Paste* command is only enabled when there is text on the clipboard that is available to paste.

2.10 Help Menu

Choose *Help>About...* for information about the software such as the version number and copyright information. See Figure 2-15. (*Help Topics* option is not available at the time of manual printing.)

The *About...* box displays the software name, version number, build date, and copyright information. See Figure 2-16. Click on the *OK* button to close the window. Click on the *System Info* button to launch the Microsoft® system information application if it is available on your PC.

2.11 System Tray

An icon in the box at the lower right corner of the screen indicates whether the PC is connected to the controller. See Figure 2-17. A green icon indicates that the PC is connected to and communicating with the controller. A red icon indicates that the devices are not connected. Check the null modem cable and the selected COM port (see Section 2.6.3, Options) if there are connection problems.

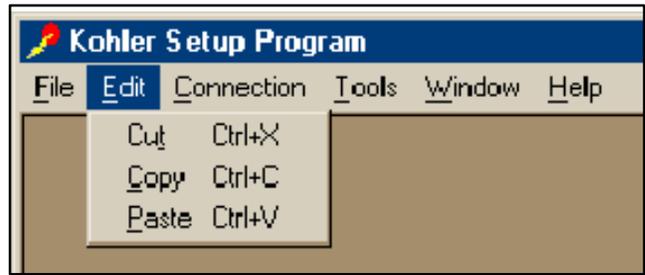


Figure 2-14 Edit Menu

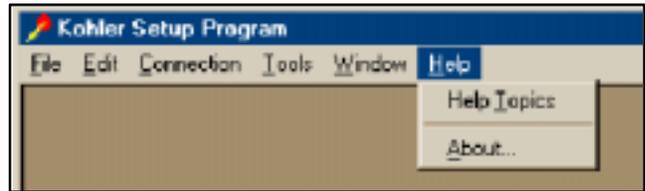


Figure 2-15 Help Menu



Figure 2-16 About Box

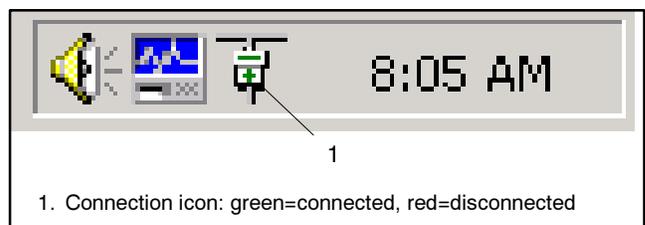


Figure 2-17 System Tray

2.12 Messages

Message windows indicate problems with user names or passwords as typed. Click on *OK* to remove the message box and then try again. Possible messages include:

- **Login.** See Figure 2-18. The user name or password is incorrect. User names and passwords are case sensitive. Check the spelling of the user name and password and verify that the *Caps Lock* on the keyboard is not activated before retyping. This message also appears if the user tries to enter an old user name/password combination.
- **Change Password.** See Figure 2-19. The new passwords typed do not match. Check the spelling and capitalization of the new password carefully, and then retype it in both boxes of the Change Password window.

Note: Passwords are case sensitive. Check the *Caps Lock* key before typing the password.

- **Change User Name.** See Figure 2-20. The new user names typed do not match. Check the spelling of the new user name and retype it.
- **Save Screen.** See Figure 2-21. The message shown in Figure 2-21 appears at exit if any display windows have been added or removed. The *Save Screen* command allow the display windows to be saved and reopened rather than recreating the windows individually at each use of the program. Select *Yes* to save, *No* to exit without saving, or *Cancel* to cancel the exit command and return to the program. See Section 2.8.1, *Save and Open Screen*, for more information about saving screens.



Figure 2-18 Login



Figure 2-19 Change Password



Figure 2-20 Change User Name

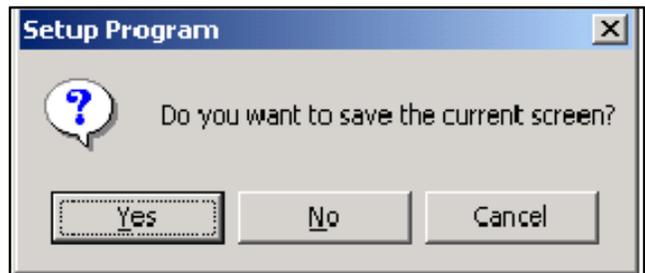


Figure 2-21 Save Screen

Section 3 Setup Software Windows

3.1 Introduction

This section describes display and setup windows. Select *Window>New Window* and select an item from the list to create a display window. Double-click on an active display window or choose *Window>Setup* to create the setup window. Refer to Section 2.7, Window Menu, for more information about creating and working with setup windows.

A summary table in Section 3.21, Network Interface Port, lists all of the items contained in each window, and indicates whether each item is included in both the display and setup windows. Use the table as a guide to identify the location of individual settings, time delays, or other parameters.

3.2 Date/Time Windows

View and set the controller's time and date settings, or set the controller's clock to match the personal computer's (PC) clock.

3.2.1 Date/Time Display

The Date/Time display shows the controller's time and date settings. The controller's settings do not necessarily match those of the PC. See Figure 3-1.

3.2.2 Date/Time Setup

Use the drop-down arrow to display a date list and click on a date from the list to select it, or select *Today* at the bottom of the calendar. Another way to enter the date is to select the date, month, and year one item at a time and type the current information into the date box. See Figure 3-2. Click on the *OK* button or press *Enter* to enter the settings. The clock does not reset until *OK* is entered.

Use the up and down arrows to set the time or click the *System Clock* button to set the controller's clock to match the PC's time.

3.2.3 Daylight Saving Time

To set the system to automatically reset the clock for Daylight Saving Time, click in the box so that a check mark appears. Enter the dates to set the clock ahead in the spring and back in the fall. Use the drop-down arrows to bring up a calendar or type the dates into the

box in the same way as described for setting the current date.

Note: In succeeding years, the controller will reset the clock on the day of the week according to the date set for the first year. For example, if April 7, 2002 is entered, the clock will reset on the first Sunday in April, 2003, and succeeding years.

The clock resets at 2 a.m. If an exercise is scheduled to begin between 2 and 3 a.m. on the day that the time changes, that exercise run will be missed.

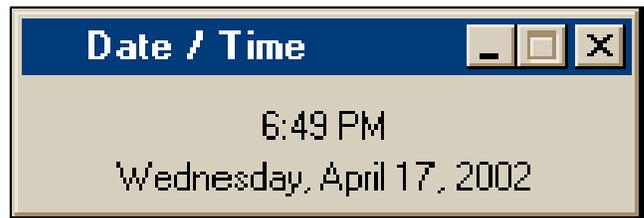


Figure 3-1 Date/Time Display

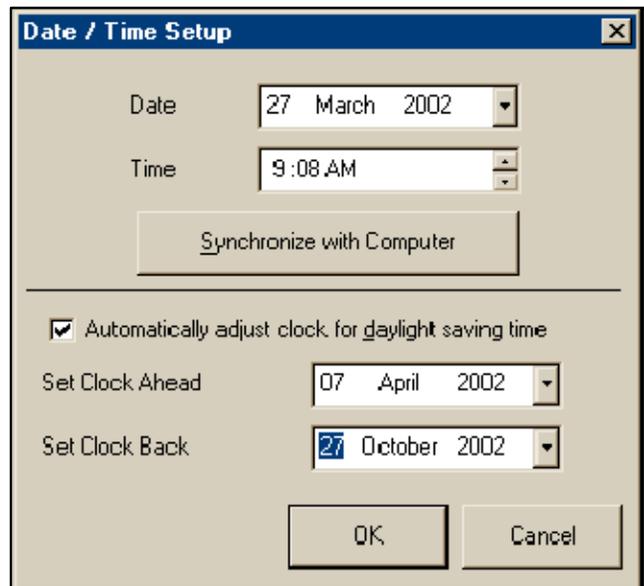


Figure 3-2 Date/Time Setup

3.3 Source Information

The software provides source voltage, frequency, and phase information for Source N and Source E.

The controller senses voltages on all phases of both sources over a range of 110 to 600 VAC with an accuracy of $\pm 2\%$. The controller senses frequency on both sources with an accuracy of $\pm 2\%$.

3.3.1 Source Info Display

The Source Info display window shows the following information for each source. See Figure 3-3. Single-phase systems will display only the single-phase parameters shown in Figure 3-4.

- Measured voltage
- Measured frequency
- Number of phases
- Expected phase rotation
- Actual phase rotation
- Nominal system voltage
- Nominal system frequency

3.3.2 Source Info Setup

The Source Info setup window (see Figure 3-5) allows you to change the following user-adjustable settings for each source:

- Nominal (rated) voltage
- Nominal (rated) frequency
- Expected rotation (ABC or CBA)
- Number of phases (1 or 3)

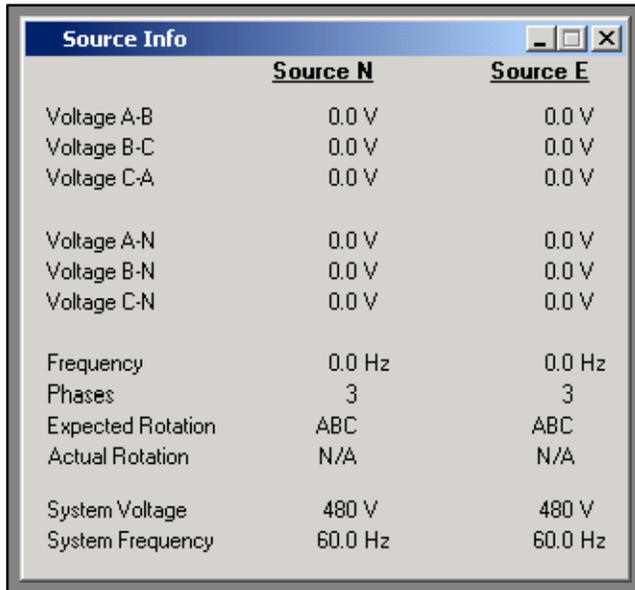


Figure 3-3 Source Info Display, Three-Phase Source

Single- or Three-Phase Operation

Sources can be either single-phase or three-phase. Single-phase systems will display only the single-phase parameters as shown in Figure 3-4.

Phase Rotation (Three-Phase Systems)

The default phase rotation setting is ABC. The system phase rotation setting must match the source phase rotation; if it does not, use the setup software to change the phase rotation setting to match the source phase rotation, ABC or CBA.

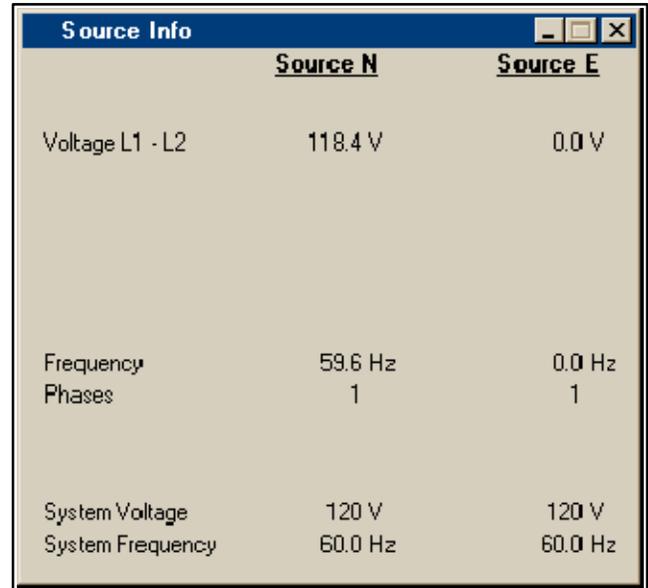


Figure 3-4 Source Info Display, Single-Phase Source

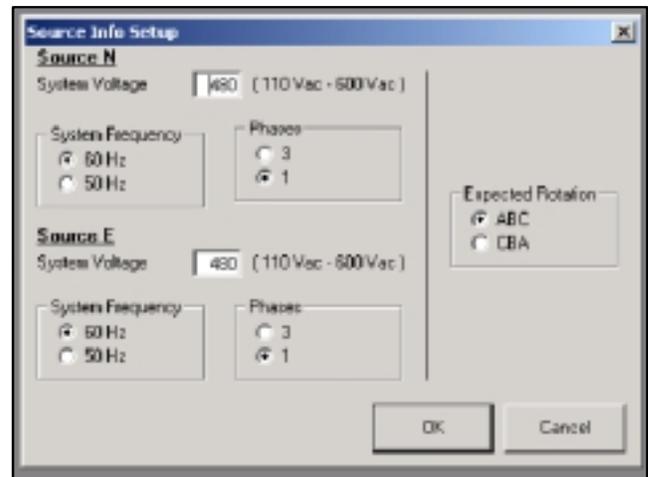


Figure 3-5 Source Info Setup

3.4 Setpoints, Frequency

The controller senses frequency on both sources with an accuracy of $\pm 2\%$. The Frequency Setpoints display window shows the setpoints in percent of the nominal or the pickup value, and also shows the resulting setting in Hz. Figure 3-6 shows the frequency setpoints display window with the factory default settings.

A fault occurs if the frequency of either source falls outside the dropout or pickup settings for a length of time longer than the frequency dropout time. If the fault occurs on the active source, the system attempts to transfer the load to the alternate source.

3.4.1 Display

The display window shows the pickup and dropout settings as percentages of the nominal or pickup frequency as indicated. The resulting values in Hz are displayed in the column on the right.

The frequency dropout time is displayed in seconds.

3.4.2 Setup

Open the setup window to change the overfrequency pickup and dropout settings, the underfrequency pickup and dropout settings, and the frequency dropout time for each source. The adjustment range is shown to the right of each data box. The values shown in Figure 3-7 are the factory default settings.

Click on the data box to be changed and type in the new value, in percent of nominal or pickup frequency as indicated to the right of the box. The resulting frequency will be displayed in the last column. Click on *OK* to apply the new settings or *Cancel* to discard the changes.

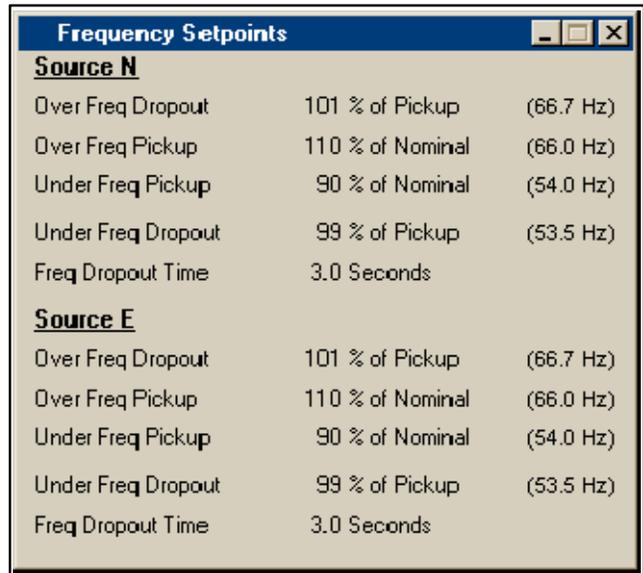


Figure 3-6 Frequency Setpoints Display (default settings shown)

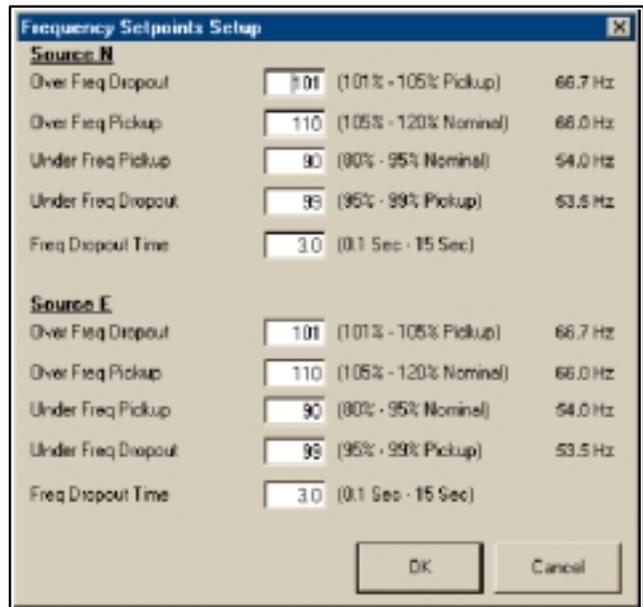


Figure 3-7 Frequency Setpoints Setup (default settings shown)

3.5 Setpoints, Voltage

A fault occurs when the voltage of either source falls outside the dropout or pickup settings for a length of time longer than the debounce time. If the fault occurs on the active source, the system attempts to transfer the load to the alternate source. The debounce time prevents nuisance transfers caused by brief voltage spikes and dips.

3.5.1 Display

Figure 3-8 shows the voltage setpoints display window with the factory default settings. The display window shows the pickup and dropout settings as percentages of the nominal dropout or pickup voltage as indicated. The resulting voltages are shown in the column on the right.

The voltage debounce time is displayed in seconds.

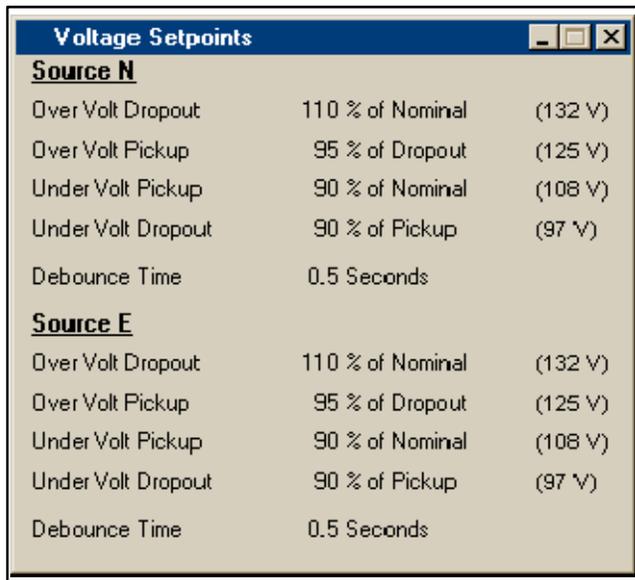


Figure 3-8 Voltage Setpoints Display (default settings shown)

3.5.2 Setup

Open the Setup window to change the overvoltage pickup and dropout settings, the undervoltage pickup and dropout settings, and the debounce time for each source. The adjustment range is shown to the right of each data box. The values shown in Figure 3-9 are the factory default settings.

Click on the data box to be changed and type in the new value, in percent of nominal, pickup, or dropout voltage as indicated to the right of the box. The resulting voltage will be displayed in the last column. Click on *OK* to apply the new settings or *Cancel* to discard the changes.

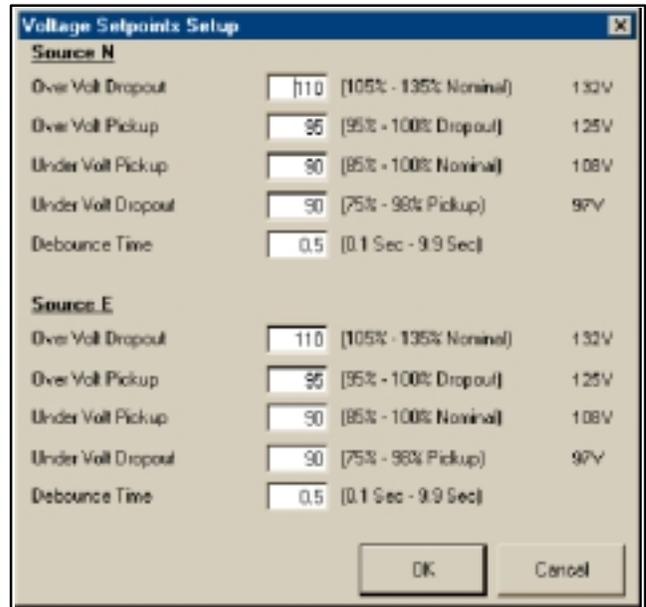


Figure 3-9 Voltage Setpoints Setup (default settings shown)

3.6 System Information

The System Information windows include load descriptions, ATS information, and software version numbers.

3.6.1 System Information Display

The Source Information Display window (see Figure 3-10) lists the following items:

- System designation
- System location
- Load branch
- Load description
- ATS serial number
- ATS contactor serial number
- ATS Controller serial number
- Software version numbers
- I/O module software version numbers

3.6.2 System Information Setup

The System Information Setup window (see Figure 3-11) allows changes to the following information:

- System designation
- System location
- Load branch
- Load description

The serial numbers for the transfer switch, contactor, and controller are entered at the factory. Software version numbers are read from the hardware and cannot be changed with the setup software.

Type in unique descriptions to clearly identify the system, location, and connected loads. Descriptions are limited to 20 alphanumeric characters, including spaces.

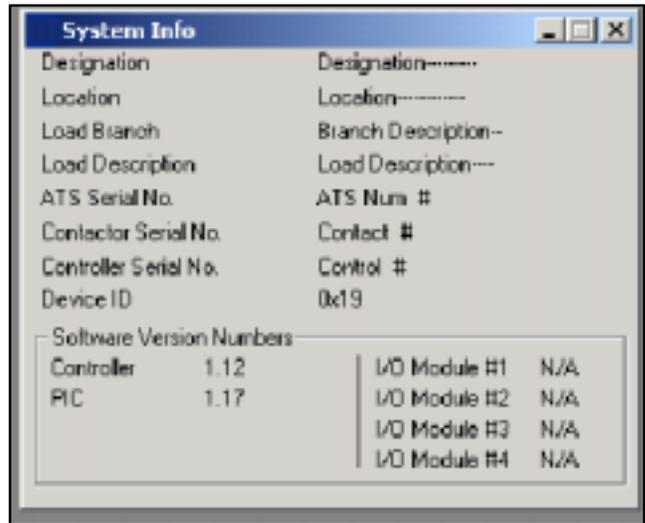


Figure 3-10 System Info Display

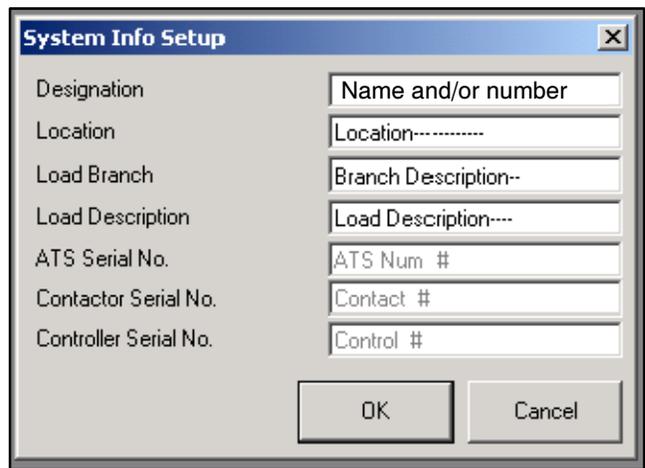


Figure 3-11 System Info Setup

3.7 System Summary

The system summary windows include various system settings affecting the overall setup of the ATS.

3.7.1 System Summary Display

The Display window shows the transfer switch status. See Figure 3-12.

System State may indicate System Ready or a fault condition such as Failure to Acquire Standby. The controller obtains the system state from the hardware. Figure 3-13 lists some typical System State messages.

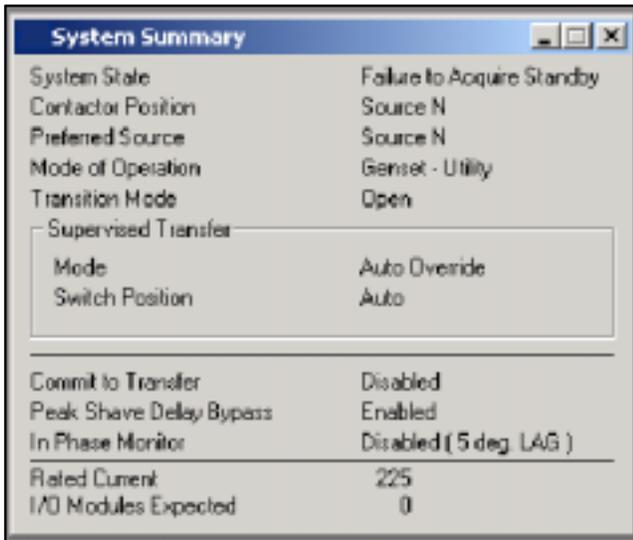


Figure 3-12 System Summary Display

System State Message	Notes
System Ready	Ready, no fault conditions
Failure to Acquire Standby	See the transfer switch operation and installation manual.
Failure to Transfer	
I/O Module Comms Lost	See Section 3.12.4, Programmable Outputs.
I/O Module Not Found	
I/O Module Not Installed	
Aux. Switch Fault	See the transfer switch operation and installation manual.
Aux. Switch Open	
Low Battery on Standby Source	Low battery on the standby generator set.
Common Alarm	See Section 3.15, Common Alarms.

Figure 3-13 Typical System State Messages

3.7.2 System Summary Setup

The setup window allows you to change the following settings (see Figure 3-14):

- Mode of operation: generator set to utility, utility to utility, or generator set to generator set
- Transition mode: open or programmed
- Rated current
- Number of input/output modules installed
- Commit to transfer: yes (selected) or no (not selected)
- Peak shave delay bypass: yes (selected) or no (not selected)
- In-phase monitor: disable or enable and set the leading or lagging angle

The controller obtains the contactor position, preferred source, and supervised transfer switch position from the hardware. These values cannot be changed through the software.

The supervised transfer mode is factory-set and cannot be changed in the field. Refer to TP-6126, ATS operation and installation manual, for information about automatic and non-automatic switches.

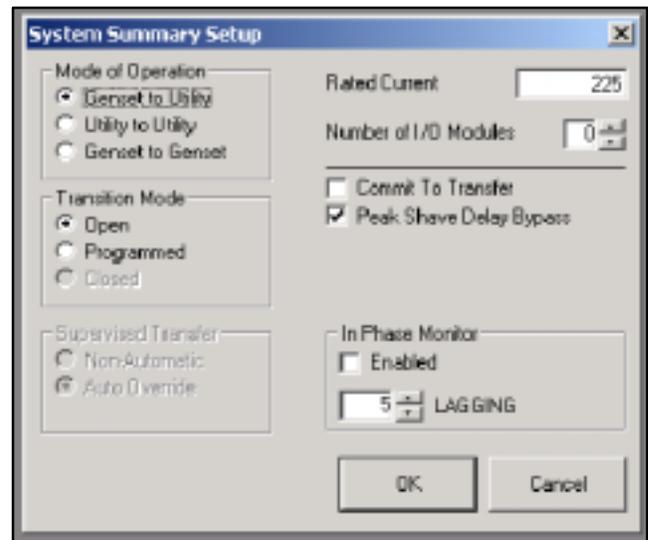


Figure 3-14 System Summary Setup

Mode of Operation

The system operates in any one of three modes, which are defined by the power sources. The three modes of operation are:

- Generator Set-to-Utility Mode
- Utility-to-Utility Mode
- Generator Set-to-Generator Set Mode

The transfer switch is factory-set for the generator set-to-utility mode of operation. This mode uses one generator set, which is connected to the Emergency side of the contactor (Source E), and one engine start relay. The engine start relay connections are located on the contactor on 30–400 amp units, and on the customer-connection terminal block on larger units (see TP-6126). The engine start contact is assigned to the connected generator set and does not change assignment when the preferred source switch position is changed. In this mode, if the preferred source switch is set to Source E, then the system operates the generator set indefinitely, transferring to utility power only if the generator set fails.

Change the mode to generator set-generator set or utility-utility if necessary. The generator set-generator set mode uses two generator sets and requires the assignment of a second engine start output. Use the Programmable Input/Output setup window to assign one of the main logic board terminal strip or I/O module outputs to Start Source N Generator, and connect the engine start leads for the Source N generator set to the corresponding terminals on the terminal strip or I/O module terminals. See the ATS operation and installation manual for connection instructions. The programmed engine start output remains tied to the Source N generator set regardless of the position of the preferred source switch.

The utility-utility mode is designed for to use utility power for both Source N and Source E. This mode does not use the engine start outputs.

Transition Mode

The transition mode, open or programmed, must match the transfer switch model. Models KCT and KBT are open-transition switches. Models KCP and KBP are programmed-transition switches.

Programmed Transition. A programmed-transition transfer switch provides an off period between disconnecting the load and transferring it to the other power source. The adjustable time-off period allows residual voltages in the load circuits to decay before connecting to the second source. During the off period,

the ATS main contacts are open and neither source powers the load.

Programmed-transition model transfer switches require a programmed-transition contactor and a programmed-transition interface board (PTIB). The off-to-standby and off-to-preferred time delays control the length of the off period. The *End Time Delay* button and *Remote Bypass* command do not override the off-to-Standby and off-to-preferred time delays.

Use the system configuration software to change the programmed-transition settings.

Rated Current

Type in the nominal (rated) current for the system, 1–4000 Amps.

Number of I/O Modules

Enter the number of input/output modules that are installed on the system, 0–4. A fault is generated if the number of I/O modules expected does not match the number of modules installed.

Commit to Transfer

Selecting *Commit to Transfer* ensures that the ATS completes a transfer sequence to a valid standby source once initiated. When this parameter is selected, the pre-transfer load control signal operates as if the preferred source failed.

If *Commit to Transfer* is not selected, the ATS will not transfer to the standby source if the preferred source is lost but returns before the transfer sequence is complete.

Peak Shave Delay Bypass

The *Peak Shave Delay Bypass* operates during the Peak Shave/Area Protection transfer sequence. The bypass ignores the engine start and standby-to-preferred time delays so that the ATS transfers immediately back to the preferred source when the peak shave/area protection signal is removed. The peak shave delay bypass has no effect on the load control, programmed-transition, or preferred-to-standby time delays. See the ATS Operation/Installation manual for more information about the Peak Shave/Area Protection sequence of operation.

A check in the box indicates that the peak shave delay bypass is selected. The bypass is selected by default; click in the check box to deactivate the bypass if desired.

In-Phase Monitor

The *In-Phase Monitor* operates when both sources are available, such as when transferring from the standby back to the preferred source. The in-phase monitor assures that transfer occurs when the phase angles of the two sources match within a set range (see Transfer Angle, below), the source frequencies differ no more than 2 Hz, and both source voltages are within 70% of the expected line voltage.

Note: Programmed-transition switches do not use the in-phase monitor option.

The OFF position LED on the user interface panel flashes at 2 Hz when the in-phase monitor is operating.

Use the system software to select and set up the in-phase monitor.

Transfer Angle. The in-phase monitor allows transfer only if the difference between the source phase angles is less than or equal to the transfer angle. The transfer angle is adjustable from -20 to 20 degrees. The factory setting is 0 (zero) degrees. The phase angle measuring accuracy is $\pm 5^\circ$. Use the system configuration software to adjust the transfer angle.

Transition Time. The in-phase monitor continues to monitor and try to synch until the transfer is successful. There is no time-out period. If the source voltages or frequencies are out of range, the system waits for both sources to stabilize and then tries to synch.

3.8 DIP Switch Settings

The DIP switch settings window (see Figure 3-15) displays the positions of the controller's DIP switches:

- Maintenance Switch: Transfer Inhibited (displayed in red) or Permitted
- Test: Loaded or Unloaded
- Exercise: Inhibited or Permitted
- Manual Exercise: 1 Week or 2 week
- Exercise: Loaded or Unloaded

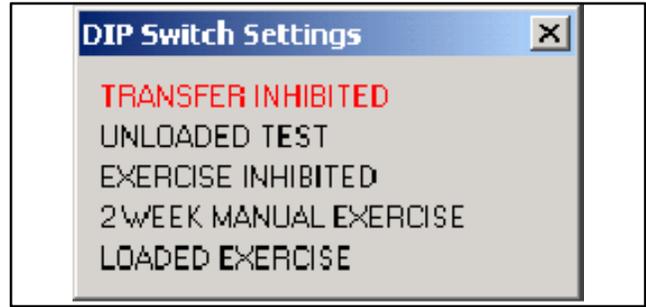


Figure 3-15 DIP Switch Settings

3.9 Active Time Delay

The Active Time Delay window displays the name of the time delay that is currently being executed, the amount of time remaining for that delay, and the percent time elapsed. The bar shows the progression of the time delay as it runs. See Figure 3-16.

Clicking on the *End Time Delay* button ends only the active time delay. Subsequent programmed time delays will start and run until completion or until the *End Time Delay* button is activated for each delay.

The *End Time Delay* button will not end an exercise or a programmed-transition (off-to-standby or off-to-preferred) time delay.

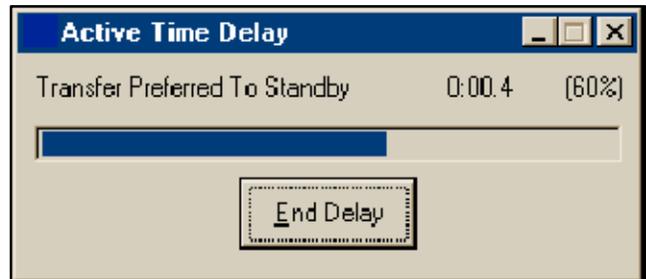


Figure 3-16 Active Time Delay Display

3.10 Time Delays

View and set the ATS time delays.

3.10.1 Time Delay Display Window

The Time Delay Display window (see Figure 3-17) includes the following ATS delays:

- Engine Start
- Engine Cooldown
- Preferred to Standby
- Standby to Preferred
- Acquire Standby Source
- In-phase Monitor Synchronization Output

For programmed-transition models, the following additional time delays are shown:

- Off to Standby
- Off to Preferred

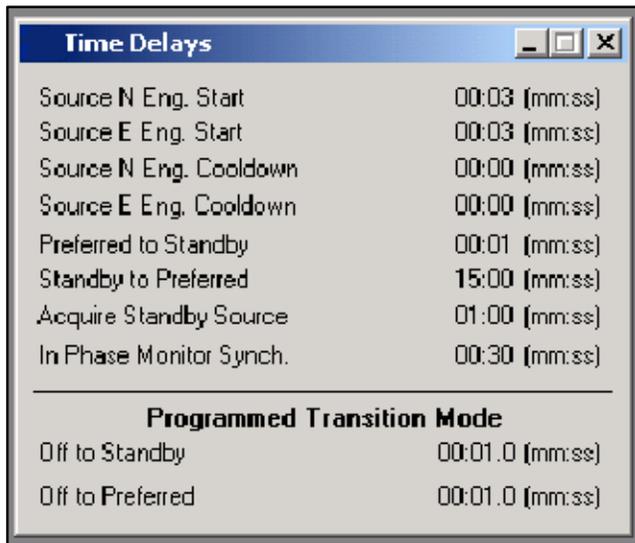


Figure 3-17 Time Delays Display

3.10.2 Time Delay Setup Window

The Time Delay Setup window (see Figure 3-18) allows the user to change the following ATS delays:

- Engine Start
- Preferred to Standby
- Standby to Preferred
- Engine Cooldown
- Acquire Standby Source
- Inphase Monitor Output

For programmed-transition models, the setup window allows the following additional time delays to be set:

- Off to Standby
- Off to Preferred

To change the length of a time delay, double-click inside the data entry box and type in the new setting in minutes:seconds. Verify that the new setting falls within the range shown after the data entry box. Values outside the range will not be accepted. Click on the *OK* button or press the *Enter* key to enter the change.

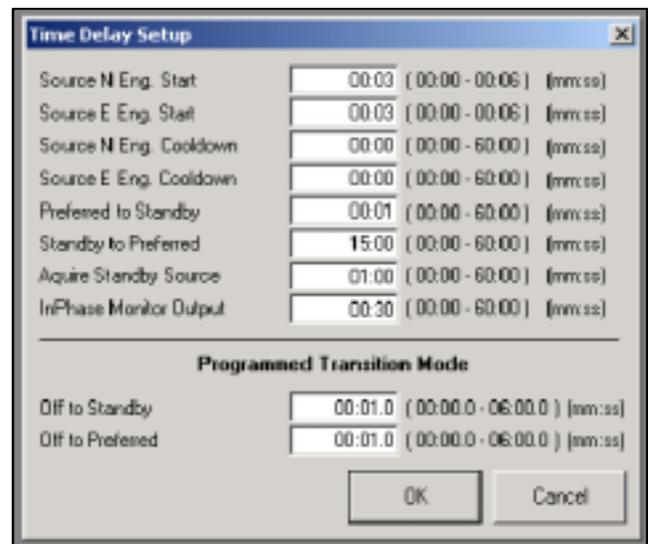


Figure 3-18 Time Delay Setup

3.10.3 Time Delays

The table in Figure 3-20 lists system time delays and their factory settings. Use the system configuration software to adjust the time delays within the ranges shown in the table. Refer to the software operation instructions.

3.11 Load Control Time Delays

Use the Load Control Time Delay windows to view and adjust the time delays for the load control outputs on the controller's main logic board and on the optional input/output modules. See Section 3.12, Programmable Input/ Output, to assign load control outputs to the I/O modules. Figure 3-19 shows the Display window. Use Figure 3-20 for time delay descriptions.

Two time delay settings apply to each output: the load disconnect time before transfer and the reconnect time after transfer. These time delays allow selected loads to be disconnected and reconnected in steps rather than all at once.

3.11.1 Display

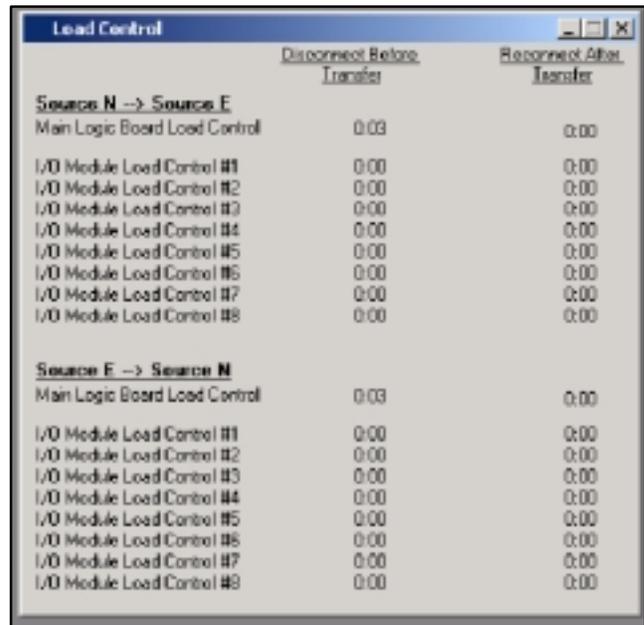


Figure 3-19 Load Control Time Delay Display

Time Delay	Default	Adjustment Range	Description
Source N Engine start	3 sec.	0-6 sec.	Delay between the loss of Source E and the activation of the Source N engine start command.
Source E Engine start	3 sec.		Delay between the loss of Source N and the activation of the Source E engine start command.
Source N Engine cooldown	0 min.	0-60 min.	Delay between transfer to Source E and the deactivation of the Source N engine start signal. Allows the generator set to run without load to cool the engine.
Source E Engine cooldown	0 min.		Delay between transfer to Source N and the deactivation of the Source E engine start signal. Allows the generator set to run without load to cool the engine.
Preferred to standby	1 sec.		Delay between the controller's detection of an available standby source and the transfer to that source. Can be set to allow time for the standby source to stabilize before transfer. (The controller remains powered as long as either source is available.)
Standby to preferred	15 min.		Delay between the controller's detection of an available preferred source and the transfer to that source. Allows stabilization of the preferred source before transfer.
Acquire standby source	1 min.		Time allowed for the generator set to start during an exercise period. If the generator set does not start during this time period, a generator fault is logged and the exercise cycle continues.
In-phase monitor synch output	3 sec.		Delay between the start of the in-phase monitor synch cycle and the activation of the synchronization command output. See Section 3.7.2, System Summary Setup.
Off to standby (programmed-transition only)	1 sec.		Time in the off position before transfer to the standby source. Programmed transition models only.
Off to preferred (programmed-transition only)	1 sec.		Time in the off position before transfer to the preferred source. Programmed transition models only.

Figure 3-20 Time Delays

3.11.2 Setup

Use the Setup window to set the duration of each load control time delay before and after transfer. Enter a time

between 0 seconds and 60 minutes into each data entry box. See Figure 3-21.

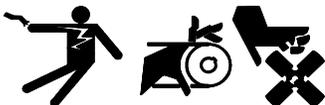
	Disconnect Before Transfer		Reconnect After Transfer	
Source N --> Source E				
Main Logic Board Load Control	0:03	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #1	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #2	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #3	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #4	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #5	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #6	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #7	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #8	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
Source E --> Source N				
Main Logic Board Load Control	0:03	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #1	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #2	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #3	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #4	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #5	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #6	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #7	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)
I/O Module Load Control #8	0:00	(00:00 - 60:00)	0:00	(00:00 - 60:00)

Figure 3-21 Load Control Time Delay Setup

3.12 Programmable Input/Output

View and assign main logic board and programmable (I/O) module input and output functions. Refer to the transfer switch Operation and Installation Manual for I/O connection instructions.

⚠ WARNING



**Accidental starting.
Can cause severe injury or death.**

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

3.12.1 I/O Display Window

The Programmable Input/Output window shows which inputs and output functions are assigned to the controller main logic board terminal strip input and output terminals and to the I/O Module input and output terminals.

The main logic board inputs and outputs are assigned to the factory default settings shown in Figure 3-22 at shipment. The I/O module inputs and outputs are undefined at shipment and must be assigned after installation.

Bypass/isolation switches have only one programmable input available for reassignment on the main logic board. Programmable input 1 is used for a safety interlock circuit on bypass/isolation switches and is not available for customer use.

The I/O module address identifies the I/O board and must match the address DIP switch settings on the I/O board.

3.12.2 I/O Setup Window

Use the Programmable I/O Setup Window to assign input and output functions to the main logic board and I/O module input and output terminals. See Figure 3-23.

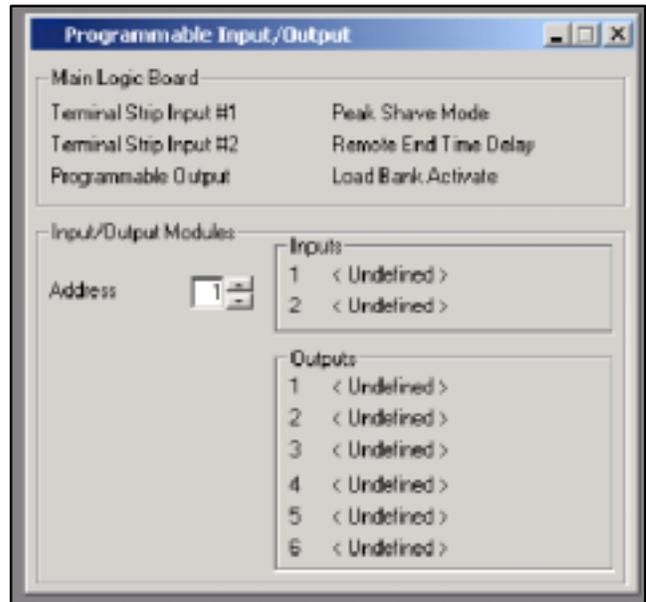


Figure 3-22 Programmable Input/Output Display

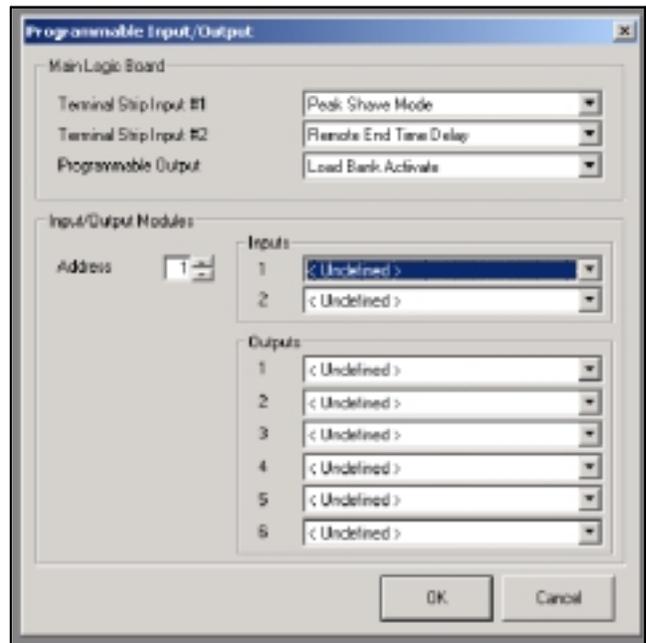


Figure 3-23 Programmable Input/Output Setup

The main logic board provides 2 programmable inputs and 1 programmable output. Use the Setup window to assign functions to the following controller main logic board inputs and output:

- Terminal strip Input 1 (See note.)
- Terminal strip Input 2
- Programmable output

Note: Terminal strip input 1 is available for field-connection and assignment on standard switches only. On bypass/isolation switches, terminal strip Input 1 is factory-assigned and connected to the Bypass Contactor Disable function. *Do not change the assignment of MLB input #1 on bypass/isolation switches!*

Each I/O module provides 2 programmable inputs and 6 programmable outputs. As many as 4 I/O modules can be added to the ATS, for total of 10 programmable inputs (9 for bypass/isolation switches) and 25 programmable outputs. Use the dropdown arrows to select a function for each input or output. Use the up and down arrows to move to the next I/O module and assign functions for that board.

Click on the *OK* button to accept the I/O assignments or *Cancel* to discard the changes.

Note: Be sure to select the address of the I/O module before assigning I/O module inputs and outputs. The address resets to 1 each time the *OK* button is clicked.

The same input or output function can be assigned to multiple locations on either the controller board or any attached I/O module. Inputs or outputs assigned the same function will operate together.

3.12.3 Programmable Inputs

The available input functions are listed in Figure 3-24 and described in more detail after the table.

Battery Low Fault
Peak Shave
Inhibit Transfer
Remote Bypass
Remote Test
Forced Transfer to OFF
Remote Common Fault
Bypass Contactor Disable (factory-set for bypass switches <i>only</i>)

Figure 3-24 Programmable Inputs

Battery Low Fault. Indicates that a low battery signal (contact closure) has been received from an external device. The Service Required LED illuminates steadily and the system records an event in the Event Log.

Peak Shave Active. Starts the generator set and transfers to the standby source. The system attempts to transfer to the preferred source when the input is removed or the connected source fails. Ignores the Time Delay Engine Start and standby-to-preferred time delays if the peak shave delay bypass is selected (see Section 3.7.2).

Inhibit Transfer. When activated, this input prevents all transfers and causes the Not-in-Auto LED to flash. This input has the same effect as the Maintenance DIP switch.

Remote Bypass. This input functions the same way as the *End Time Delay* button on the user interface, ending any time delay that is operating when the input is activated except for the programmed transition off-to-preferred and off-to-standby time delays. If more than one time delay is programmed, a separate input signal must be sent to end each time delay.

Remote Test. This input has the same effect as pressing the *Test* button on the User Interface. It initiates a system test, which simulates a preferred source failure and tests the transfer switch operation. If a system test is running, this input will stop the test. To stop tests initiated by this input, either deactivate the input or press the *Test* button on the user interface.

Forced Transfer to OFF Position. (Programmed transition units only.) Bypasses all time delays and immediately moves the contactor from Source E to the OFF position. The ATS will proceed to transfer to Source N if it is available. When this input is removed, the system transfers to the preferred source if it is available. If the preferred source is not available but the standby source is available, the system transfers to the standby source.

Remote Common Fault. Any common fault input causes the Service Required LED to flash.

Bypass Contactor Switch Disable. This input disables the transfer switch on bypass/isolation switches while the contactor is being inserted or removed. This input is used only on bypass/isolation switches. It is factory-assigned to programmable input 1 on the main logic board (MLB) terminal strip (TB1 terminals 6 and 7). *Do not reassign MLB input 1 on bypass isolation switches!*

3.12.4 Programmable Outputs

Programmable monitoring, control, and fault detection outputs are available through the MLB terminal strip on the controller or through the programmable input/output (I/O) modules. The table in Figure 3-25 lists the available programmable outputs.

Not-in-Auto. Any of the following conditions triggers the Not-in-Auto output:

- The maintenance switch is activated, preventing automatic transfer.
- Forced transfer to OFF is activated (programmed-transition models only).
- The Supervised Transfer Control switch is in the Manual position (non-automatic switches).

Load Control Active. Any of the following conditions triggers the Load Control Active output:

- A pre- or post-transfer signal is active.
- Programmable load control outputs are active.
- Peak shave/area protection is engaged.

Load Bank Control. This output allows the application of a load bank to the generator set during the exercise period if the exerciser is not set to transfer the actual load.

The controller deactivates the load bank control and transfers to the standby source if the preferred source is lost during an exercise period.

Start Source N Generator. Use this engine start output signal for systems that use a generator set for Source N (Normal Source). This output is always assigned to the same generator set regardless of the preferred source selector switch position.

Peak Shave/Area Protection Active. Indicates that the system is running on the standby source as a result of a peak shave command.

Non-Emergency Transfer. Active during peak shave, loaded exercise, and loaded test sequences.

Synchronization Output Command. The synchronization output command provides a contact closure after the in-phase monitor synch output time delay to indicate that the synch output time delay has expired.

Programmable Output	Type
Preferred Source Available	Monitor
Standby Source Available	Monitor
Contactors Preferred Selected	Monitor
Contactors Standby Selected	Monitor
Contactors in OFF position*	Monitor
Contactors Source N Selected	Monitor
Contactors Source E Selected	Monitor
Not in Auto	Monitor
Load Control Active	Monitor
Low Backup Battery Indicator	Monitor
Exerciser Active	Monitor
Test Active	Monitor
Peak Shave/Area Protection Active	Monitor
Non-Emergency Transfer	Monitor
Load Bank Control	Control
Start Source N Generator	Control
Start Source E Generator	Control
Synchronization Output Command	Control
Common Alarm	Fault
Undervoltage Source N	Fault
Overvoltage Source N	Fault
Loss of Phase Source N	Fault
Phase Rotation Error Source N	Fault
Overfrequency Source N	Fault
Underfrequency Source N	Fault
Undervoltage Source E	Fault
Overvoltage Source E	Fault
Loss of Phase Source E	Fault
Phase Rotation Error Source E	Fault
Overfrequency Source E	Fault
Underfrequency Source E	Fault
Failure to Acquire Standby Source	Fault
I/O Module Lost	Fault
I/O Module Not Found	Fault
I/O Module Not Installed	Fault
Failure to Transfer	Fault
Auxiliary Switch Fault	Fault
Auxiliary Switch Open	Fault
Load Shed Control Output	Control
Software-Controlled Relay Driver Output #1 †	Control
Software-Controlled Relay Driver Output #2 †	Control
Software-Controlled Relay Driver Output #3 †	Control
Software-Controlled Relay Driver Output #4 †	Control
* Programmed-transition switches only	
† Abbreviated SCRDO #1-4	

Figure 3-25 Available Programmable Outputs

Load Control Outputs. The load control output allows controlled disconnection of selected loads before transfer and reconnection in steps after transfer. The Load Control Time Delays determine the disconnect time before transfer and reconnect time after transfer. If one source is lost, the outputs are activated immediately and then deactivated after the reconnect time delays. Set the disconnect time before transfer and reconnect time after transfer through the Load Control Time Delay window. The times are adjustable from 1 second to 60 minutes. See Section 3.11, Load Control Time Delays, for information about setting the load control time delays.

Select up to nine sequential load control outputs, 0–8. Load control output 0 is always assigned to the main logic board pre-transfer signal output (TB1 terminals 1 and 2). Outputs 0–8 can be assigned to any position on an I/O module board or to the programmable output on the controller board terminal strip. The same function can be assigned to more than one output.

Modbus®-Controlled Relay Driver Outputs (SCRDOs). Use these outputs to transmit signals from a Modbus® master through the ATS controller (acting as a Modbus slave) to connected equipment. Contact Kohler Co. for Modbus communications protocol information.

I/O Module Not Found. If the system does not detect an I/O module at an expected address, the Service Required LED flashes and the software logs the message *I/O Module Not Found*. Check that the number of I/O modules installed matches the number expected by the setup program. Check that the I/O modules are connected and the address DIP switches are set correctly. Check the diagnostic LED to verify that the module is receiving power and communicating with the controller.

I/O Module Not Installed. If the software detects an I/O module that is connected but not expected by the setup program, the Service Required LED flashes and the software logs the message *I/O Module Not Installed*. The system ignores the board if it does not find the setup definition. Check that the number of I/O modules expected in the Setup Program matches the number of modules installed on the transfer switch. Check that the I/O module address DIP switches are set correctly. Check the diagnostic LED.

I/O Module Communications Lost. If communication to an I/O module that was previously installed and working is lost, the Service Required LED flashes and the software logs the message *I/O Module Communications Lost*. Check the I/O module connections and diagnostic LED.

Common Alarm. The common alarm output is activated when any of the fault conditions assigned in the Common Alarms window occurs. See Section 3.15, Common Alarms, for more information about assigning common alarms.

3.13 Exerciser

View and adjust the plant exerciser settings that are not directly related to the Calendar mode.

⚠ WARNING



**Accidental starting.
Can cause severe injury or death.**

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

3.13.1 Exerciser Display Window

The plant exerciser display window (see Figure 3-26) displays the following:

- Exerciser Mode: Manual Mode, Calendar Mode, or Calendar Mode with Override
- Warnings Window:
 - EXERCISE INHIBITED: displays in red if the Exercise Inhibit DIP switch is set to the ON position
 - TRANSFER INHIBITED: displays in red if the Transfer Inhibit DIP switch is set to the ON position
- Manual Exercise:
 - Next Run Date
 - Next Run Time
 - Period
 - Loaded/Unloaded
 - Run Time

The period, 1 week or 2 weeks, determines how often the exerciser runs. The run time shows the duration of each exercise run. The 1 week/2 week period and loaded/unloaded exercise are set by DIP switches on the controller's main logic board. See the ATS operation and installation manual for more information about DIP switches.



Figure 3-26 Exercise Display

3.13.2 Exerciser Setup Window

Use the plant exerciser setup window (see Figure 3-27) to set or adjust the following:

- Exerciser Mode: Manual Mode, Calendar Mode, or Calendar Mode with Override
- Manual Exercise:
 - Next Run Date
 - Next Run Time
 - Period
 - Loaded/Unloaded
 - Run Time

The *Manual Exercise Disable* and *Set/End* buttons allow control of the manual exerciser through the software. Selecting the *Disable* button clears the manual exercise settings. Clicking on the *Push to Set/End* button when the exerciser is in manual mode has the same effect as pressing the *Exercise* button on the ATS user interface, starting or ending an exercise run.

Use the *Calendar Mode* or *Calendar Mode with Override* buttons in the exercise setup window to enter the exerciser Calendar mode. Refer to Section 3.14, Exercise Calendar, for more information about the Calendar and Calendar with Override modes.

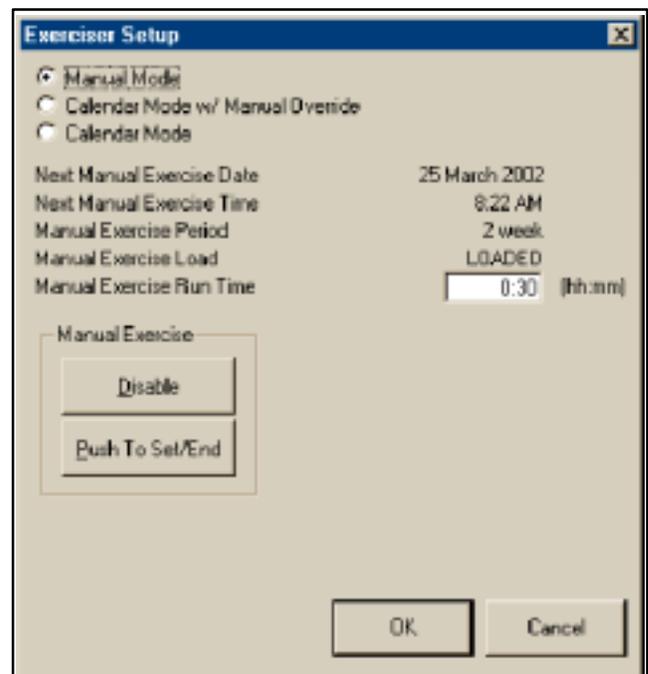


Figure 3-27 Exercise Setup

3.14 Exercise Calendar

The calendar provides a method to schedule the exerciser that is more flexible than using the 1 week/2 week DIP switch on the transfer switch's main logic board. Use the calendar mode to plan up to 21 exercise events that repeat daily, weekly, or monthly, and choose whether each event runs with or without load.

Use the *Calendar Mode* or *Calendar Mode with Override* buttons in the Exercise Setup window to enter the exerciser Calendar modes.

The Calendar Mode and Calendar Mode with Override settings override the 1 week/2 week and loaded/unloaded DIP switch settings.

Exercise Button Function in Calendar Modes

- **Calendar Mode.** In Calendar mode, pressing the *Exercise* button does not change the exercise mode or settings. The Exercise LED flashes quickly for two seconds if the *Exercise* button is pressed when the system is in Calendar Mode.
- **Calendar Mode with Override.** In Calendar Mode with Override, pressing and holding the *Exercise* button on the ATS user interface until the Exercise LED flashes overrides and disables the calendar settings. The calendar settings are saved for future use, but the exerciser runs in manual mode until reset to Calendar Mode or Calendar Mode with Override through the software.

3.14.1 Calendar Display Window

The Calendar Display Window (see Figure 3-28) shows the following plant exerciser information. If an exercise event is disabled, the line is grayed out.

- Event No.
- Start Date
- Start Time
- Run Time
- Loaded or Unloaded
- Exercise period/Interval

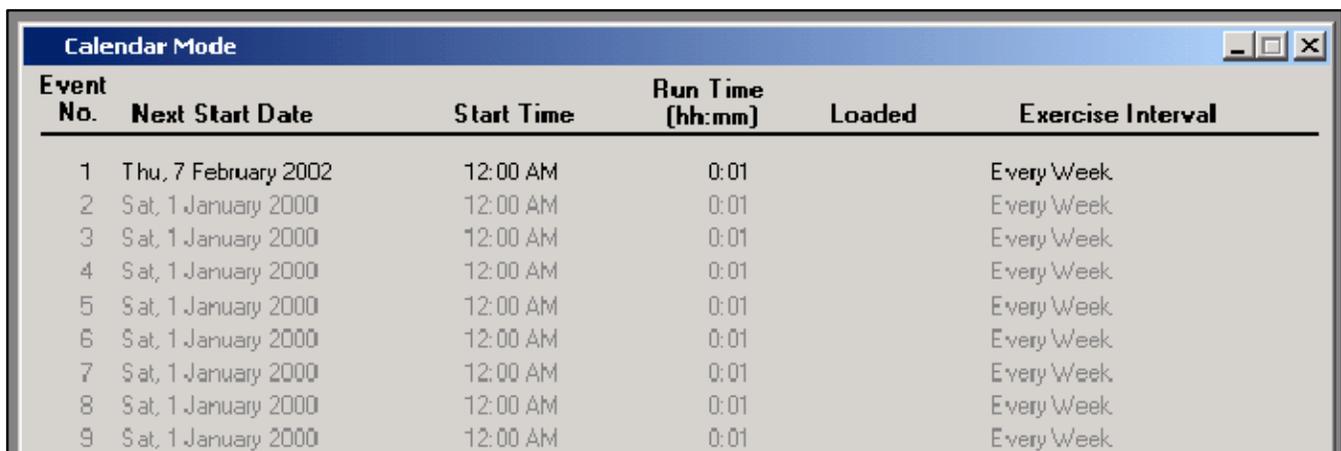
3.14.2 Calendar Setup Window

Use the setup window to set up to 21 exerciser run times, intervals, repeat rates, and loaded/unloaded condition. See Figure 3-29 for the Calendar Setup window.

Enabled or Disabled. Clicking on this box so that the check mark disappears disables that scheduled exercise event so that it does not run. The event remains on the calendar so that it can be enabled again at a later time.

Start Date. There are several ways to select the start date. Clicking on the month or year reveals up and down arrows that allow you to step up or down to the desired month or year. Selecting the drop-down arrow to right of the data entry box brings up a calendar. Click on the red circle at the bottom to select the current day or use the arrow buttons at the top of the calendar to step to the desired month and then click on the desired start date.

Start Time. Click on the hour, minute, or AM/PM so that the desired section is highlighted on the screen. Then use the arrows to step to the desired hour, minute, or AM/PM setting or type in the setting from the keyboard.



Event No.	Next Start Date	Start Time	Run Time (hh:mm)	Loaded	Exercise Interval
1	Thu, 7 February 2002	12:00 AM	0:01		Every Week
2	Sat, 1 January 2000	12:00 AM	0:01		Every Week
3	Sat, 1 January 2000	12:00 AM	0:01		Every Week
4	Sat, 1 January 2000	12:00 AM	0:01		Every Week
5	Sat, 1 January 2000	12:00 AM	0:01		Every Week
6	Sat, 1 January 2000	12:00 AM	0:01		Every Week
7	Sat, 1 January 2000	12:00 AM	0:01		Every Week
8	Sat, 1 January 2000	12:00 AM	0:01		Every Week
9	Sat, 1 January 2000	12:00 AM	0:01		Every Week

Figure 3-28 Calendar Mode Display

Run Time. This setting determines the duration of the exercise run. Run times over 60 minutes will be automatically converted to hours:minutes. The maximum run time is 24 hours.

Loaded or Unloaded. A check in the box in the Loaded column indicates a loaded exercise. If the box is not checked, the exercise will start and run the generator set without transferring the load. Click on the box to select or deselect it. This setting overrides the loaded/unloaded DIP switch setting on the main logic board.

Interval. (daily, weekly, monthly, or the same day every month) This setting overrides the 1 week/2 week DIP switch setting on the controller's main logic board. This setting works with the repeat rate to set the time interval between exercise runs.

The Day of Month selection allows you to set the exerciser to run on the same day every month. For example, the exerciser can be set to run the first Sunday of every month. Use caution with the Day of Month selection. For example, selecting Day of Month on the 5th Friday of the month will cause the exerciser to run only during months that have five Fridays.

Repeat Rate. The repeat rate and interval set the time interval between exercise runs. For example, if *Day* is selected in the interval column, and 5 is entered as the repeat rate, then the exercise will repeat every 5 days. Double-click inside the Repeat Rate data box to highlight the contents, then type in a number between 1 and 12. Attempts to enter a number outside the acceptable range cause the box to turn red. Values outside the acceptable range are not accepted by the program.

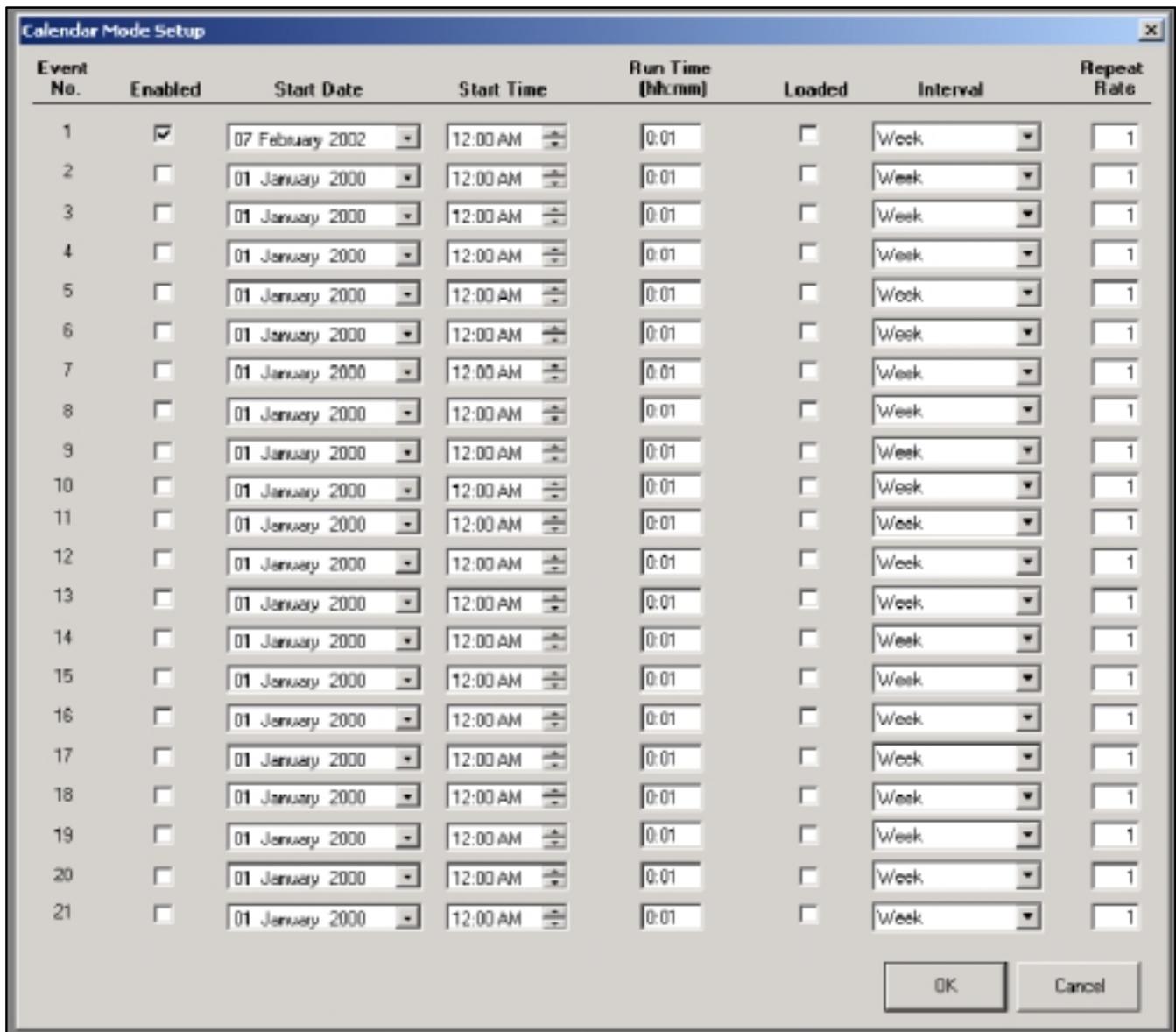


Figure 3-29 Calendar Mode Setup

3.15 Common Alarms

Use the Common Alarms windows to assign and view the events assigned to the controller's common alarm. Any fault condition assigned to the Common Alarm triggers the Common Alarm programmable output. See Section 3.12.4, Programmable Outputs, for more information about programmable outputs.

3.15.1 Common Alarms Display Window

This window displays the events that are assigned to the controller's common alarm. See Figure 3-30 for an example of the Common Alarms Display window with a number of assigned events.

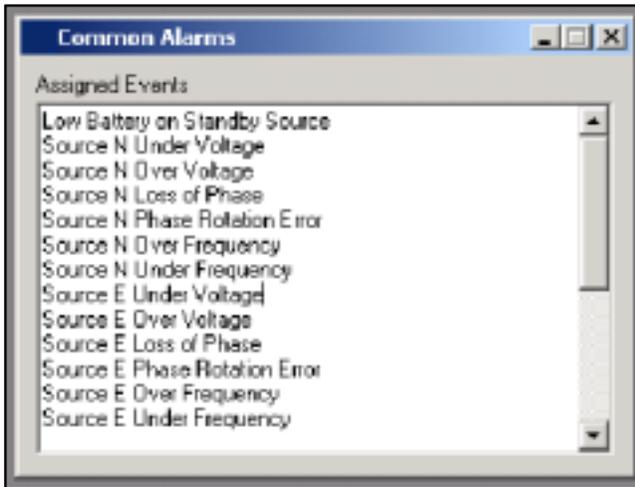


Figure 3-30 Common Alarms Display

3.15.2 Common Alarm Setup Window

The common alarms setup window displays a list of all events that can be assigned as common alarms. See Figure 3-31. Select an event from the list and click on the *Add* button to assign it as a common alarm. The event will move from the *Available* window to the *Assigned* window. Use the *Remove* button to remove an assigned event.

To assign or remove a block of events, click on the first event in the list, then hold down the *Shift* key and click on the last event in the block. To select several individual events, hold down the control (*Ctrl*) key while clicking on each event. Use the *Add* or *Remove* key to move all of the highlighted events.

Refer to Figure 3-32 for a typical list of events that can be assigned as common alarms.

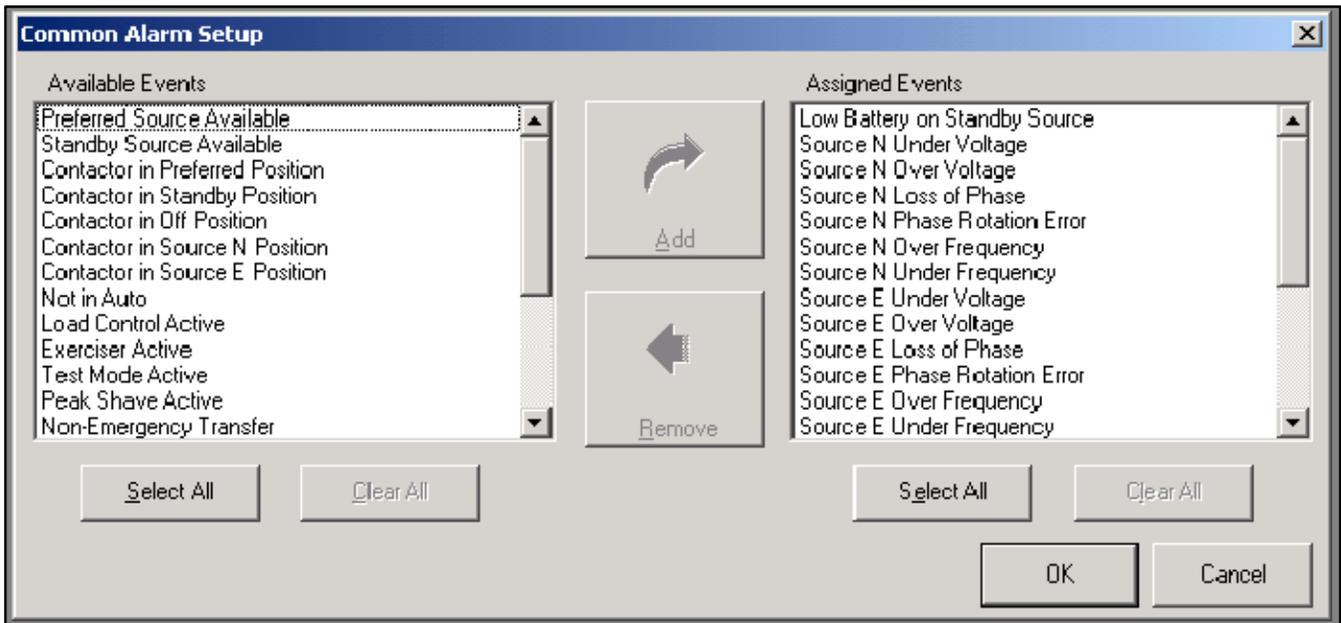


Figure 3-31 Common Alarm Setup

Preferred Source Available	Source N Undervoltage
Contactora in Preferred Position	Source N Overvoltage
Contactora in Standby Position	Source N Loss of Phase
Contactora in Off Position	Source N Phase Rotation Error
Contactora in Source N Position	Source N Overfrequency
Contactora in Source E Position	Source N Underfrequency
Not in Auto	Source E Undervoltage
Load Control Active	Source E Overvoltage
Exerciser Started	Source E Loss of Phase
Test Mode Active	Source E Phase Rotation Error
Peak Shave Active	Source E Overfrequency
Non-Emergency Transfer	Source E Underfrequency
Load Bank Activate	Failure to Acquire Standby
In-Phase Monitor Waiting for Synch	Failure to Transfer
Modbus-controlled RDO #1	I/O Module Comms Lost
Modbus-controlled RDO #2	I/O Module Not Found
Modbus-controlled RDO #3	I/O Module Not Installed
Modbus-controlled RDO #4	Aux. Switch Fault
System Ready	Aux. Switch Open
Source N Available	Remote Common Alarm
Source E Available	Critical (immediate) Service Required
Low Battery on Standby Source	Non-Critical Service Required

Figure 3-32 Typical Common Alarms

3.16 Event History

View, save, and clear the controller's event log. The Event History window displays the time, date, and duration of the last loss of the preferred source. The window also displays all events in the controller's event log, with the time, date, and up to two other parameters associated with the event. The window displays up to 100 events. See Figure 3-33.

The message *EEPROM Access Warning* may appear in the event log. If the EEPROM warning message appears repeatedly, call for service.

Press the *Save History* button to save the event log in an ASCII text file. The system allows the user to select the location to save the file.

The system logs up to 100 time- and date-stamped events and faults. Press the *Clear History* button to empty the log. If events have been added since the last time the log was saved, the program asks for confirmation before clearing the log.

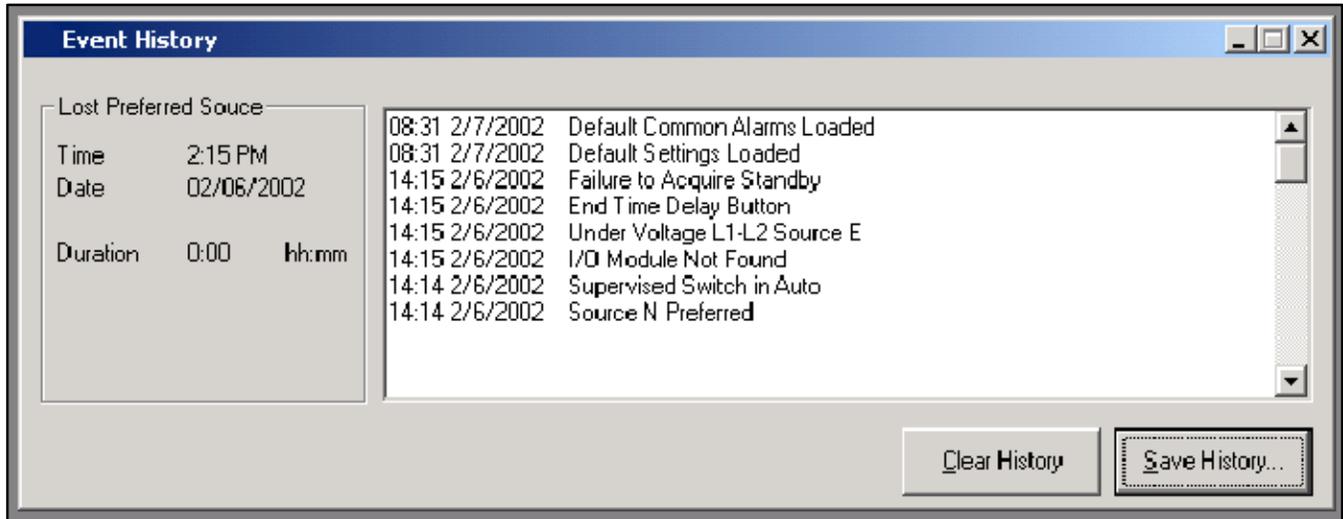


Figure 3-33 Event History Display

3.17 Maintenance

3.17.1 Maintenance Display Window

The Maintenance Display window shows the totals and the maintenance records since the last maintenance reset for the items listed in Figure 3-36. Figure 3-34 shows the Display window.

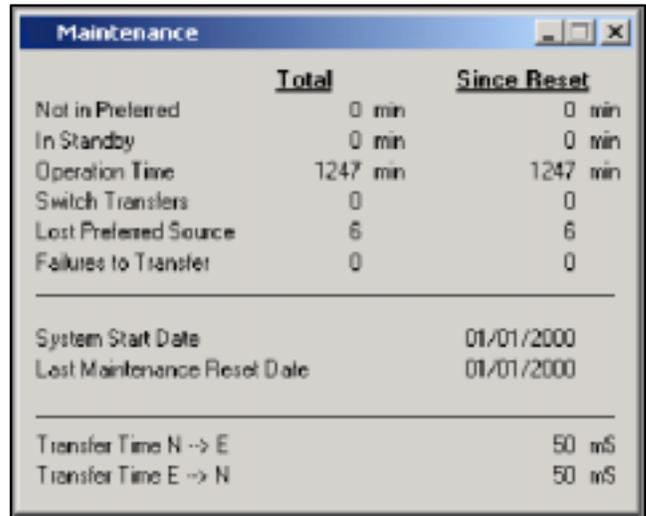
3.17.2 Maintenance Setup Window

The Maintenance Setup window contains software buttons that allow you to reset the maintenance records and reload the factory default controller settings. See Figure 3-35.

Reload Defaults resets all of the system parameters, including system voltage and frequency settings, voltage and frequency pickup and dropout setpoints, time delays, input and output assignments, exerciser settings and schedules, and any other settings that have been changed since receipt of the unit. All settings will need to be checked and reset after selecting the *Reload Defaults* button.

Use the *Reset Maintenance Records* button after servicing the switch to update the maintenance records shown in the maintenance display window. See Figure 3-36.

Buttons that appear gray on the setup screen are not accessible.



	Total	Since Reset
Not in Preferred	0 min	0 min
In Standby	0 min	0 min
Operation Time	1247 min	1247 min
Switch Transfers	0	0
Lost Preferred Source	6	6
Failures to Transfer	0	0
System Start Date		01/01/2000
Last Maintenance Reset Date		01/01/2000
Transfer Time N -> E		50 mS
Transfer Time E -> N		50 mS

Figure 3-34 Maintenance Display

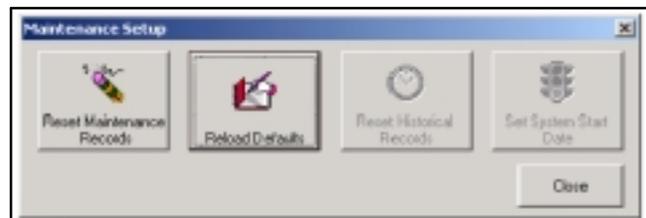


Figure 3-35 Maintenance Setup

Historical Data Types		
Item	Units	Description
Time in Operation	Minutes	Minutes the switch has been under power since leaving the factory
In Standby	Minutes	Minutes the switch operated in the Emergency position
Hours Not in Preferred	Minutes	Minutes the switch operated in any position other than the preferred position
Switch Transfers	N/A	Number of transfers the switch has completed
Failure to Transfer	N/A	The number of time that the contactor failed to transfer when commanded
Lost Preferred Source	N/A	Number of times the switch has lost the preferred power source
System Startup Date	N/A	The date the system was first started on site
Last Maintenance Reset Date	N/A	Date of last maintenance record reset
Transfer time N to E	mS	Milliseconds (not adjustable)
Transfer time E to N	mS	Milliseconds (not adjustable)

Figure 3-36 Maintenance Records

3.18 Manual Operation

The Manual Operation window (see Figure 3-37) includes the following items:

- Peak Shave Start and Stop buttons
- System Test Start and Stop buttons
- Programmed-Transition Transfer to OFF button
- Modbus® Controlled Relay Outputs

There is no setup function for the Manual Operation window.

Manual transfer operations are inhibited if the Maintenance DIP switch is set to inhibit transfer.

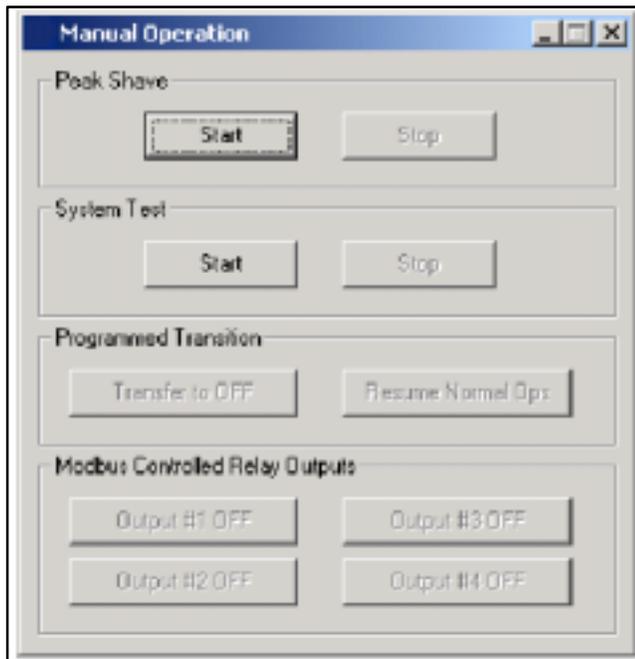
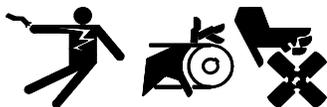


Figure 3-37 Manual Operation

⚠ WARNING



Accidental starting. Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

Peak Shave. Select the *Start* button to activate the peak shave function and initiate peak shave operation. The ATS starts the standby generator set and transfers the load to the standby source until the peak shave input is deactivated through the software. Refer to the transfer switch operation and installation manual for more information about the Peak Shave sequence of operation.

Note: A peak shave input signal overrides the software buttons.

Test. Use the software buttons to start or end a system test. The *Test* button on the user interface remains functional, so that a test started by the software can be ended by pressing the *Test* button on the user interface, and a test started by pressing the button on the user interface can be ended by clicking on the *Stop* button in the software.

Note: A test input signal overrides the software buttons.

Programmed Transition. The programmed-transition buttons are disabled if the transfer switch is not a programmed-transition model. Select the *Transfer to OFF* button to force the transfer switch from the Emergency (Source E) position to the OFF position. The switch then transfers to Source N if it is available. The *Transfer to OFF* button does not function when the transfer switch is in the normal (Source N) position.

Note: A forced transfer to OFF input signal overrides the software buttons.

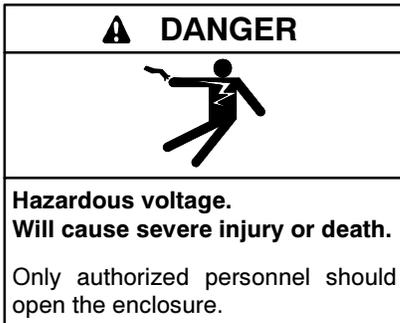
Select the *Resume Normal Ops* button to end the *Transfer to OFF* function. The ATS will transfer to the preferred source, if available, according to the controller settings.

Refer to the ATS operation and installation manual for more information about the Forced Transfer to OFF (load shed) sequence of operation.

Modbus®-Controlled Relay Outputs. The buttons allow activation of Modbus®-controlled outputs assigned to the programmable outputs on the Main Logic Board or I/O Modules. The button displays *Output OFF* when the output is off. Clicking on the button activates the output. The button displays *Output ON*. Click on it again to deactivate the output.

3.19 Meter Calibration

The transfer switch controls are calibrated at the factory and should not require recalibration in the field. However, if recalibration is necessary, use the meter calibration window. See Figure 3-38 and Figure 3-39.



Testing live electrical circuits. Hazardous voltage or current can cause severe injury or death. Have trained and qualified personnel take diagnostic measurements of live circuits. Use adequately rated test equipment with electrically insulated probes and follow the instructions of the test equipment manufacturer when performing voltage tests. Observe the following precautions when performing voltage tests: (1) Remove all jewelry. (2) Stand on a dry, approved electrically insulated mat. (3) Do not touch the enclosure or components inside the enclosure. (4) Be prepared for the system to operate automatically. *(600 volts and under)*

Use a voltmeter to measure the voltages across each circuit shown, enter the measured values in the

appropriate data entry box, and click on *Apply* to calibrate the controller’s voltage measurements.

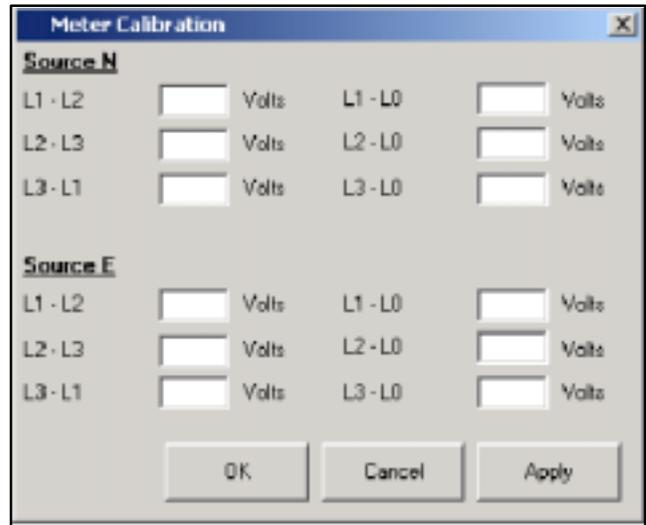


Figure 3-38 Meter Calibration, Three-Phase Units

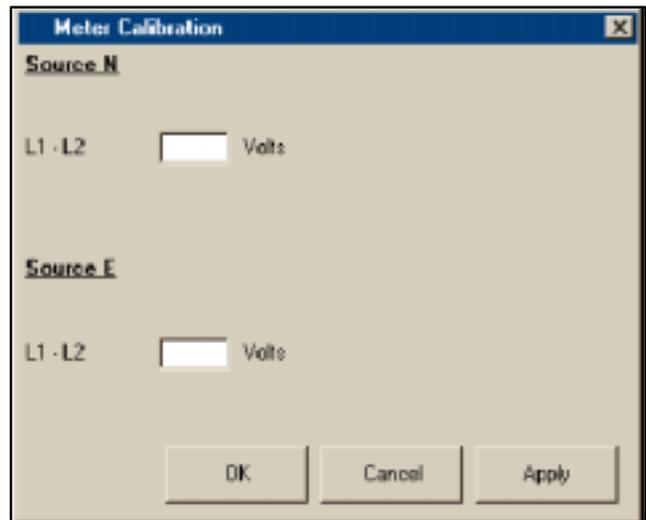


Figure 3-39 Meter Calibration, Single-Phase Units

3.20 Network Interface Port

View and set the address, baud rate, and parity of the Modbus® network interface port to match the other devices in the network. See Figure 3-40. This window does not display or change the settings of the Modbus® setup slave port.

The ATS operation and installation manual contains instructions and cable recommendations for making Modbus® connections to the transfer switch.

3.20.1 Network Interface Port Display Window

View the address and baud rate of the Modbus® network interface port.

3.20.2 Network Interface Port Setup Window

Set up the Modbus® network interface port to communicate with the other devices in the network. See Figure 3-41.

Choose a unique network address for each device in the network. Type in the address or use the up and down

arrows. Choose the baud rate from the drop-down list. Allowable baud rates are 9600 and 19200 baud. Select the baud rate to match the other devices on the network.

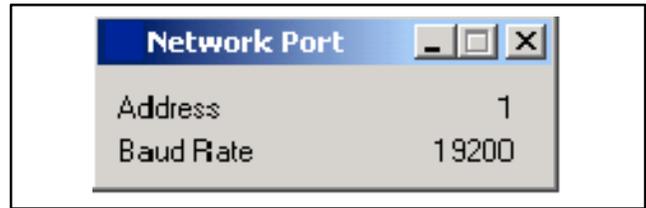


Figure 3-40 Network Interface Port

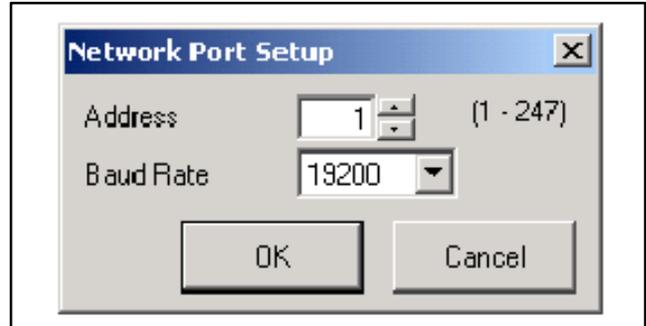


Figure 3-41 Network Interface Port Setup

3.21 Software Window Summary

Window	Display	Setup	Item	Notes
Source Info	✓		Voltage A-B	Actual voltages, three-phase systems
	✓		Voltage B-C	
	✓		Voltage C-A	
	✓		Voltage A-N	
	✓		Voltage B-N	
	✓		Voltage C-N	
	✓		Voltage L1-L2	Actual voltage, single-phase systems
	✓		Frequency	Actual frequency
	✓		Actual Rotation	Three-phase systems
	✓	✓	Phases	Number of phases detected
	✓	✓	Expected Rotation	ABC or CBA
	✓	✓	System Voltage	Nominal
	✓	✓	System Frequency	Nominal
Setpoints-Frequency	✓	✓	Underfreq Dropout	See Section 3.4, Setpoints-Frequency
	✓	✓	Underfreq Pickup	
	✓	✓	Overfreq Dropout	
	✓	✓	Overfreq Pickup	
	✓	✓	Freq Dropout Time	
Setpoints-Voltage	✓	✓	Undervoltage Dropout	See Section 3.5, Setpoints-Voltage
	✓	✓	Undervoltage Pickup	
	✓	✓	Overvoltage Dropout	
	✓	✓	Overvoltage Pickup	
	✓	✓	Voltage Debounce Time	
System Information	✓	✓	Designation	Enter unique description to identify the transfer switch and loads
	✓	✓	Location	
	✓	✓	Load Branch	
	✓	✓	Load Description	
	✓		ATS Serial No.	Factory-set, not accessible in the field
	✓		Contactactor Serial No.	
	✓		Controller Serial No.	
	✓		Device ID	
✓		Software Version Nos.		
System Summary	✓		System State	See Section 3.7, System Summary
	✓		Contactactor Position	N, E, or OFF (programmed-transition only)
	✓		Preferred Source	N or E
	✓	✓	Mode of Operation	Generator Set to Utility, Utility to Utility, or Generator Set to Generator Set
	✓	✓	Transition Mode	Open or Programmed-Transition
	✓		Supervised Transfer Mode	Automatic Override or Non-Automatic
	✓		Supervised Transfer Switch Position	Auto or Manual
	✓	✓	Commit to Transfer	Enabled or Disabled
	✓	✓	Peak Shave Delay Bypass	Enabled or Disabled
	✓	✓	In-Phase Monitor	Enabled or Disabled
	✓	✓	In-Phase Monitor Transfer Angle	-20 to 20 degrees, leading or lagging
	✓	✓	Rated Current	Amps
	✓	✓	Number of I/O Modules Expected	Maximum of 4

Window	Display	Setup	Item	Notes	
Active Time Delay	✓		Name of active time delay	See Section 3.9, Active Time Delay	
	✓		Time remaining, seconds		
	✓		Percent time delay elapsed		
	✓		Elapsed time graphic display		
	✓		End Delay		Button ends an active time delay Does not end programmed-transition time delays or an exercise run See Section 3.9, Active Time Delay
Time Delays	✓	✓	Source N Engine Start	See Section 3.10, Time Delays	
	✓	✓	Source E Engine Start		
	✓	✓	Preferred to Standby		
	✓	✓	Standby to Preferred		
	✓	✓	Source N Engine Cooldown		
	✓	✓	Source E Engine Cooldown		
	✓	✓	Acquire Standby Source		
	✓	✓	In-Phase Monitor Synch		
	✓	✓	Off to Standby		Programmed Transition Models only
	✓	✓	Off to Preferred		Programmed Transition Models only
Load Control Time Delays	✓	✓	Main Logic Board Load Control	Separate time delays for disconnect before transfer and reconnect after transfer	
	✓	✓	I/O Module Load Control #1-8	Separate time delays for transfers from Source N to E and from Source E to N	
Programmable Input/Output	✓	✓	Terminal Strip Input #1	Main Logic Board	
	✓	✓	Terminal Strip Input #2		
	✓	✓	Programmable Output		
	✓	✓	I/O Module Address	Input/Output Modules	
	✓	✓	Input Event #1		
	✓	✓	Input Event #2		
	✓	✓	Outputs 1-6		
Exerciser	✓	✓	Manual Mode	Select exerciser mode	
	✓	✓	Calendar Mode with Override	Select button in setup window to enter Calendar Mode with Override	
	✓	✓	Calendar Mode	Select button in setup window to enter Calendar Mode	
	✓		Exercise Inhibited	Displays if the Inhibit Exercise DIP switch is activated	
	✓		Transfer Inhibited	Displays if the Inhibit Transfer DIP switch is activated	
	✓	✓	Next Manual Exercise Start Date	See Section 3.13	
	✓	✓	Next Manual Exercise Start Time		
	✓	✓	Manual Exercise Period		
	✓	✓	Manual Exercise Loaded/Unloaded	DIP switch setting	
	✓	✓	Manual Exercise Run Time	Hrs:min.	
		✓	Manual Exercise Disable	Button	
		✓	Push to Set/End	Button allows remote start/stop of exercise run	
Exerciser Calendar	✓		Event Number	See Section 3.13, Exerciser	
	✓	✓	Next Start Date		
	✓	✓	Start Time		
	✓	✓	Run Time (hr:min)		
	✓	✓	Loaded (Unloaded)		
	✓	✓	Exercise Interval		
		✓	Repeat Rate		

Window	Display	Setup	Item	Notes
Event History	✓		Lost Preferred Source	Displays time, date, and duration of last occurrence
	✓		Other Events	Displays up to 100 events
	✓		Clear History	Button
	✓		Save History	Button
Common Alarms	✓	✓	Assigned Events	Lists events that are assigned as common faults
		✓	Available Events	Use setup to choose common faults from a list of all available events
DIP Switch Settings	✓		Transfer Inhibited (Red)/Permitted (Black)	Displays the positions of the controller DIP switches
	✓		Loaded/Unloaded Test	
	✓		Exercise Inhibited/Permitted	
	✓		1 Week/2 Week Manual Exercise	
	✓		Loaded/Unloaded Exercise	
Date/Time	✓	✓	Date	Does not necessarily match the PC's date Can synch with PC Daylight Savings Time feature available
	✓	✓	Time	Does not necessarily match the PC clock Can synch with PC
		✓	System Clock	Select button to set time and date to match the PC system clock
		✓	Daylight Saving Time	Check box to select DST and date boxes to set clock ahead and back
Network Interface Port	✓	✓	Address	Use to set up the Modbus® network port, not the Modbus setup port
	✓	✓	Baud Rate	
Maintenance Records	✓		Not in Preferred	Hours, total and since last reset
	✓		In Standby	
	✓		Operation Time	Total and since last reset
	✓		Switch Transfers	
	✓		Lost Preferred Source	
	✓		Failures to Transfer	
	✓		System Start Date	
	✓		Last Maintenance Reset Date	Factory setting
	✓		Transfer Time N to E	Factory setting
	✓		Transfer Time E to N	
	✓	Reset Maintenance Records	Button resets the maintenance history and date of last maintenance	
	✓	Reload Defaults	Resets all system settings—Use with caution!	
Meter Calibration			Voltages	Measure and enter voltages for Source N and Source E
Manual Operation	✓		Peak Shave	Start and Stop buttons Disabled if transfer inhibit DIP switch is set to ON
	✓		System Test	Start and Stop buttons Disabled if transfer inhibit DIP switch is set to ON
	✓		Programmed Transition	Transfer to Off and Resume Normal Ops Buttons Disabled in standard-transition models or if transfer inhibit DIP switch is set to ON
	✓		Modbus® -Controlled Relay Outputs	Buttons 1 through 4 to toggle relay outputs on or off

Figure 3-42 Window Summary

Appendix A Abbreviations

The following list contains abbreviations that may appear in this publication.

A, amp	ampere	cfm	cubic feet per minute	exh.	exhaust
ABDC	after bottom dead center	CG	center of gravity	ext.	external
AC	alternating current	CID	cubic inch displacement	F	Fahrenheit, female
A/D	analog to digital	CL	centerline	fglass.	fiberglass
ADC	analog to digital converter	cm	centimeter	FHM	flat head machine (screw)
adj.	adjust, adjustment	CMOS	complementary metal oxide substrate (semiconductor)	fl. oz.	fluid ounce
ADV	advertising dimensional drawing	cogen.	cogeneration	flex.	flexible
AHWT	anticipatory high water temperature	com	communications (port)	freq.	frequency
AISI	American Iron and Steel Institute	coml	commercial	FS	full scale
ALOP	anticipatory low oil pressure	Coml/Rec	Commercial/Recreational	ft.	foot, feet
alt.	alternator	conn.	connection	ft. lbs.	foot pounds (torque)
Al	aluminum	cont.	continued	ft./min.	feet per minute
ANSI	American National Standards Institute (formerly American Standards Association, ASA)	CPVC	chlorinated polyvinyl chloride	g	gram
AO	anticipatory only	crit.	critical	ga.	gauge (meters, wire size)
API	American Petroleum Institute	CRT	cathode ray tube	gal.	gallon
approx.	approximate, approximately	CSA	Canadian Standards Association	gen.	generator
AR	as required, as requested	CT	current transformer	genset	generator set
AS	as supplied, as stated, as suggested	Cu	copper	GFI	ground fault interrupter
ASE	American Society of Engineers	cu. in.	cubic inch	GND, 	ground
ASME	American Society of Mechanical Engineers	cw.	clockwise	gov.	governor
assy.	assembly	CWC	city water-cooled	gph	gallons per hour
ASTM	American Society for Testing Materials	cyl.	cylinder	gpm	gallons per minute
ATDC	after top dead center	D/A	digital to analog	gr.	grade, gross
ATS	automatic transfer switch	DAC	digital to analog converter	GRD	equipment ground
auto.	automatic	dB	decibel	gr. wt.	gross weight
aux.	auxiliary	dBA	decibel (A weighted)	H x W x D	height by width by depth
A/V	audiovisual	DC	direct current	HC	hex cap
avg.	average	DCR	direct current resistance	HCHT	high cylinder head temperature
AVR	automatic voltage regulator	deg., °	degree	HD	heavy duty
AWG	American Wire Gauge	dept.	department	HET	high exhaust temperature, high engine temperature
AWM	appliance wiring material	dia.	diameter	hex	hexagon
bat.	battery	DI/EO	dual inlet/end outlet	Hg	mercury (element)
BBDC	before bottom dead center	DIN	Deutsches Institut für Normung e. V. (also Deutsche Industrie Normenausschuss)	HH	hex head
BC	battery charger, battery charging	DIP	dual inline package	HHC	hex head cap
BCA	battery charging alternator	DPDT	double-pole, double-throw	HP	horsepower
BCI	Battery Council International	DPST	double-pole, single-throw	hr.	hour
BDC	before dead center	DS	disconnect switch	HS	heat shrink
BHP	brake horsepower	DVR	digital voltage regulator	hsg.	housing
blk.	black (paint color), block (engine)	E, emer.	emergency (power source)	HVAC	heating, ventilation, and air conditioning
blk. htr.	block heater	EDI	electronic data interchange	HWT	high water temperature
BMEP	brake mean effective pressure	EFR	emergency frequency relay	Hz	hertz (cycles per second)
bps	bits per second	e.g.	for example (<i>exempli gratia</i>)	IC	integrated circuit
br.	brass	EG	electronic governor	ID	inside diameter, identification
BTDC	before top dead center	EGSA	Electrical Generating Systems Association	IEC	International Electrotechnical Commission
Btu	British thermal unit	EIA	Electronic Industries Association	IEEE	Institute of Electrical and Electronics Engineers
Btu/min.	British thermal units per minute	EI/EO	end inlet/end outlet	IMS	improved motor starting
C	Celsius, centigrade	EMI	electromagnetic interference	in.	inch
cal.	calorie	emiss.	emission	in. H ₂ O	inches of water
CARB	California Air Resources Board	eng.	engine	in. Hg	inches of mercury
CB	circuit breaker	EPA	Environmental Protection Agency	in. lbs.	inch pounds
cc	cubic centimeter	EPS	emergency power system	Inc.	incorporated
CCA	cold cranking amps	ER	emergency relay	ind.	industrial
ccw.	counterclockwise	ES	engineering special, engineered special	int.	internal
CEC	Canadian Electrical Code	ESD	electrostatic discharge	int./ext.	internal/external
cert.	certificate, certification, certified	est.	estimated	I/O	input/output
cfh	cubic feet per hour	E-Stop	emergency stop	IP	iron pipe
		etc.	et cetera (and so forth)	ISO	International Organization for Standardization
				J	joule
				JIS	Japanese Industry Standard

k	kilo (1000)	MTBF	mean time between failure	RHM	round head machine (screw)
K	kelvin	MTBO	mean time between overhauls	rly.	relay
kA	kiloampere	mtg.	mounting	rms	root mean square
KB	kilobyte (2 ¹⁰ bytes)	MW	megawatt	rnd.	round
kg	kilogram	mW	milliwatt	ROM	read only memory
kg/cm ²	kilograms per square centimeter	μF	microfarad	rot.	rotate, rotating
kgm	kilogram-meter	N, norm.	normal (power source)	rpm	revolutions per minute
kg/m ³	kilograms per cubic meter	NA	not available, not applicable	RS	right side
kHz	kilohertz	nat. gas	natural gas	RTV	room temperature vulcanization
kJ	kilojoule	NBS	National Bureau of Standards	SAE	Society of Automotive Engineers
km	kilometer	NC	normally closed	scfm	standard cubic feet per minute
kOhm, kΩ	kilo-ohm	NEC	National Electrical Code	SCR	silicon controlled rectifier
kPa	kilopascal	NEMA	National Electrical Manufacturers Association	s, sec.	second
kph	kilometers per hour	NFPA	National Fire Protection Association	SI	<i>Système international d'unités</i> , International System of Units
kV	kilovolt	Nm	newton meter	SI/EO	side in/end out
kVA	kilovolt ampere	NO	normally open	sil.	silencer
kVAR	kilovolt ampere reactive	no., nos.	number, numbers	SN	serial number
kW	kilowatt	NPS	National Pipe, Straight	SPDT	single-pole, double-throw
kWh	kilowatt-hour	NPSC	National Pipe, Straight-coupling	SPST	single-pole, single-throw
kWm	kilowatt mechanical	NPT	National Standard taper pipe thread per general use	spec, specs	specification(s)
L	liter	NPTF	National Pipe, Taper-Fine	sq.	square
LAN	local area network	NR	not required, normal relay	sq. cm	square centimeter
L x W x H	length by width by height	ns	nanosecond	sq. in.	square inch
lb.	pound, pounds	OC	overcrank	SS	stainless steel
lbm/ft ³	pounds mass per cubic feet	OD	outside diameter	std.	standard
LCB	line circuit breaker	OEM	original equipment manufacturer	stl.	steel
LCD	liquid crystal display	OF	overfrequency	tach.	tachometer
ld. shd.	load shed	opt.	option, optional	TD	time delay
LED	light emitting diode	OS	oversize, overspeed	TDC	top dead center
Lph	liters per hour	OSHA	Occupational Safety and Health Administration	TDEC	time delay engine cooldown
Lpm	liters per minute	OV	overvoltage	TDEN	time delay emergency to normal
LOP	low oil pressure	oz.	ounce	TDES	time delay engine start
LP	liquefied petroleum	p., pp.	page, pages	TDNE	time delay normal to emergency
LPG	liquefied petroleum gas	PC	personal computer	TDOE	time delay off to emergency
LS	left side	PCB	printed circuit board	TDON	time delay off to normal
L _{wa}	sound power level, A weighted	pF	picofarad	temp.	temperature
LWL	low water level	PF	power factor	term.	terminal
LWT	low water temperature	ph., ∅	phase	TIF	telephone influence factor
m	meter, milli (1/1000)	PHC	Phillips head crimplite (screw)	TIR	total indicator reading
M	mega (10 ⁶ when used with SI units), male	PHH	Phillips hex head (screw)	tol.	tolerance
m ³	cubic meter	PHM	pan head machine (screw)	turbo.	turbocharger
m ³ /min.	cubic meters per minute	PLC	programmable logic control	typ.	typical (same in multiple locations)
mA	milliampere	PMG	permanent-magnet generator	UF	underfrequency
man.	manual	pot	potentiometer, potential	UHF	ultrahigh frequency
max.	maximum	ppm	parts per million	UL	Underwriter's Laboratories, Inc.
MB	megabyte (2 ²⁰ bytes)	PROM	programmable read-only memory	UNC	unified coarse thread (was NC)
MCM	one thousand circular mils	psi	pounds per square inch	UNF	unified fine thread (was NF)
MCCB	molded-case circuit breaker	pt.	pint	univ.	universal
meggar	megohmmeter	PTC	positive temperature coefficient	US	undersize, underspeed
MHz	megahertz	PTO	power takeoff	UV	ultraviolet, undervoltage
mi.	mile	PVC	polyvinyl chloride	V	volt
mil	one one-thousandth of an inch	qt.	quart, quarts	VAC	volts alternating current
min.	minimum, minute	qty.	quantity	VAR	voltampere reactive
misc.	miscellaneous	R	replacement (emergency) power source	VDC	volts direct current
MJ	megajoule	rad.	radiator, radius	VFD	vacuum fluorescent display
mJ	millijoule	RAM	random access memory	VGA	video graphics adapter
mm	millimeter	RDO	relay driver output	VHF	very high frequency
mOhm, mΩ	milliohm	ref.	reference	W	watt
MOhm, MΩ	megohm	rem.	remote	WCR	withstand and closing rating
MOV	metal oxide varistor	Res/Coml	Residential/Commercial	w/	with
MPa	megapascal	RFI	radio frequency interference	w/o	without
mpg	miles per gallon	RH	round head	wt.	weight
mph	miles per hour			xfmr	transformer
MS	military standard				
m/sec.	meters per second				

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