Software Operation and Installation

DETROIT DIESEL CORPORATION

mtu

Generator System Monitoring and Control Software for Windows®

Software:

Monitor II

Version 4.0.0 or higher

Applies to:

Digital 550 Generator Set Controller (version 2.10 or higher)

Digital Generator Set Controller

MATS+ Transfer Switch Controller

MATS Transfer Switch Controller

Digital Power Monitor

MP-6194 12/02b

Product Identification Information

Record the product identification numbers in the spaces below immediately after unpacking the products so that the numbers are readily available for future reference. Record field-installed kit numbers after installing the kits.

Monitor II Software Version Number

Record the Monitor II software version number.

Software Version Number _____

Controller Code Version Number

Record the controller's application code version number, if applicable.

Code Version Number _____

Generator Set Identification Numbers

Record the product identification numbers from the generator set nameplate(s).

Model Designation _____

Specification Number _____

Serial Number _____

Accessory Number	Accessory Description

Engine Identification

Record the product identification information from the engine nameplate.

Manufacturer _____

Model Designation _____

Serial Number _____

Transfer Switch Identification Numbers

Record the product identification numbers from the transfer switch nameplate.

Model Designation _____

Serial Number _____

Accessory Number	Accessory Description

Power Monitor Identification Number

Record the product identification number from the power monitor nameplate.

Controller Assembly Number _____

x:in:007:001

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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***.

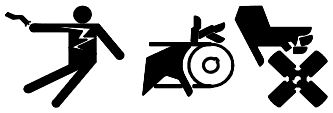
NOTICE

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.

Disconnect all power sources before servicing. Install the barrier after adjustments, maintenance, or servicing.

⚠ 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.

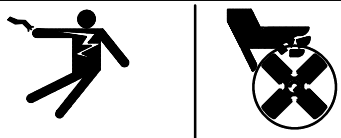
Operate the generator set only when all guards and electrical enclosures are in place.

Servicing the transfer switch controls and accessories within the enclosure. Hazardous voltage can cause severe injury or death. Disconnect the transfer switch controls at the inline connector to deenergize the circuit boards and logic circuitry but allow the transfer switch to continue to supply power to the load. Disconnect all power sources to accessories that are mounted within the enclosure but are not wired through the controls and deenergized by inline connector separation. Test circuits with a voltmeter to verify that they are deenergized before servicing.

Opening the power monitor enclosure. Hazardous voltage can cause severe injury or death. A transfer switch or generator set connected to the power monitor could automatically energize the power monitor or accessories. Disconnect all power sources before opening the enclosure. Move the generator set master switch on the controller to the OFF position and disconnect the battery negative (-) lead before proceeding.

Moving Parts

⚠ 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.

Notice

NOTICE

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

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

Hardware damage. The power monitor 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 Monitor II remote monitoring and control communication software (version 4.0.0) for personal computers running the Windows® operating system. The software allows the operator to communicate with Digital 550 and Digital generator set controllers, MATS and MATS+ automatic transfer switch controllers, and the Digital Power Monitor.

Version 4.0.0 or higher of the Monitor II software is required for Digital 550 generator set controllers that use application code versions 2.10 or higher. Refer to the controller operation manual for instructions to identify the application code version number installed on your controller.

Information in this publication represents data available at the time of print. Distributors can access the latest information through the Literature section of the KOHLER*net*. The manufacturer of DDC/MTU Power Generation products reserves the right to change this literature and the products represented without notice and without any obligation or liability whatsoever.

Use only DDC/MTU Power Generation communications products specified for use with DDC/MTU Power Generation products. The manufacturer of DDC/MTU Power Generation products assumes no responsibility for the use of non-DDC/MTU Power Generation communication products.

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.

List of Related Materials

The software covered by this manual is part of a total control system. Separate manuals provide specific information about setting up each transfer switch, generator set controller, or power monitor to enable remote communications and programming. The manuals also provide information about equipment operating limits, specifications, and functions. The related manual numbers follow.

Controller	Operation/ Installation Manual
Digital 550 generator set controller	MP-6200
Digital generator set controller	MP-5829
MATS controller for model S and SB transfer switches	MP-5569
MATS controller for model RLN/RLS/RTN/RTS transfer switches	MP-5994
MATS+ controller for transfer switches	MP-5664
Digital Power Monitor	MP-5875
Communication kits	TT-847

Controller communications may require additional communication products. See the operation and installation instruction sheet for controller communication kits, TT-847, for additional information.

Consult specification sheets, accessory installation instructions, service bulletins, application notes, drawings, and other applicable literature for additional information on equipment operating limits and specifications. Contact your local distributor or dealer or the equipment manufacturer to obtain applicable literature.

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Service Assistance

For professional advice on generator power requirements and conscientious service, please contact your nearest DDC/MTU Power Generation distributor.

- Consult the Yellow Pages under the heading Generators—Electric
- Visit the DDC/MTU Power Generation website at ddcmtupowergeneration.com
- Look at the labels and stickers on your DDC/MTU Power Generation product or review the appropriate literature or documents included with the product

1.1 Introduction

The Monitor II software allows monitoring and control of generator set controllers, transfer switch controllers, and power monitors using a personal computer (PC) with the Windows® operating system and user interface. Monitor II allows an operator to view the status and change the settings of the following devices:

- Digital 550 generator set controller
- Digital generator set controller
- MATS and MATS+ automatic transfer switch controllers
- Digital Power Monitor

The software allows communication through local direct connections or remote modem connections. Some devices require communication module kits, which provide the necessary communication port. See Appendix B and the communication kit installation instructions for more information on different configurations, communication port locations, communication kit installation, and connections.

1.2 About This Manual

1.2.1 Organization

This manual is divided into six numbered sections:

- **Section 1, Requirements and Installation.** This section explains the system requirements and the communication connections. It also explains how to install the software.
- **Section 2, Setup and Operation.** This section explains how to set up devices and run the program.
- **Section 3, Working Offline (Configuration Mode).** This section explains how to create data windows and build screens while the PC is not connected to a device or a network of devices.
- **Sections 4 through 7.** These sections list and describe the data windows available for each device.

1.2.2 Conventions

This manual uses an arrow (→) to show an item or submenu in a menu. For example, File→New represents selecting New from the File menu.

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.

1.3 Installation Requirements

The Monitor II software requires the following minimum hardware and software:

- 486 or Pentium® processor-based IBM® PC or 100% compatible computer, 66 MHz clock speed
- Operating system: Microsoft® Windows® 98, Windows® XP, Windows NT® Workstation version 4.0, or Windows® 2000 Professional
- 16 MB extended memory
- CD-ROM drive and 5 MB available hard drive space for installation
- VGA resolution video adapter compatible with the operating system
- RS-232 serial COM port labeled between 1 and 256. Must support 1200, 2400, or 9600 baud for the Digital 550 controller; or 2400, 4800, or 9600 baud for the other controllers listed in Section 1.1
- For modem connections, an internal or external modem that supports 1200, 2400, or 9600 baud for the Digital 550 controller; or 2400, 4800, or 9600 baud for the other controllers listed in Section 1.1
- Customer-provided system wiring and/or telephone lines

Additional communications hardware such as RS-232 to RS-485 port converters or modems may be required, depending upon the connection type. See Appendix B.

1.4 Software Installation

1.4.1 Installation

The Monitor II software CD-ROM contains various files that are used by the setup program, setup.exe, 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 Monitor II software in Windows®.

Software Installation Procedure

1. Close all applications.
2. Insert the Monitor II software CD-ROM into the computer'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 setup.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\MonitorII 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 to maintain the integrity of configuration, screen, and modem site information.

1.4.2 Uninstallation

To remove the software from the PC, do not simply delete the software files. Select Settings→Control Panel→Add/Remove Programs from the Start menu. Select the Monitor II group and click on Add/Remove. An uninstallation program runs and deletes installed Monitor II program files from the installation directory.

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2.1 Introduction

A *device* in these instructions is defined as a generator set controller, transfer switch controller, or power monitor that can be monitored and controlled remotely using a personal computer (PC) equipped with Monitor II software.

This section explains how to set up the devices, enter the communication settings, and run the Monitor II software. Sections 2.2 through 2.14 are arranged to provide step-by-step instructions for setting up and using the program. Please follow the sections in the order shown.

2.2 Connect the Hardware

Connect the devices to the PC using cables, modems, and converters as required. See Appendix B for communications hardware requirements and connection instructions. Follow the installation instructions in TT-847, supplied with the communication kits, when required. Record connection information in Appendix D.

2.3 Modem Setup

If modems are used in the communications setup, follow the instructions for your PC's operating system to set up the PC modem connection and the COM port.

Device modems are configured differently than PC modems. Be sure to connect the appropriate modem to the equipment. See TT-847, Installation Instructions, provided with the modem kits.

2.4 Set Up the Devices

The devices can be set to allow monitoring only, monitoring and local programming, or monitoring and remote programming. Remote programming allows the PC operator to change some user-programmable device settings such as time delays, trip points, and other settings.

Three device programming modes are typically available:

Local Programming Mode. The Local programming mode allows programming using the device keypad and display only.

Remote Programming Mode. The Remote programming mode allows programming through a PC connected to the device.

Programming Mode Off. Programming Mode Off prevents programming from either the device keypad or the PC. The device can be monitored but the settings cannot be changed.

Note: The devices allow monitoring at the device display regardless of the online PC connection settings.

The operator must enter the local programming mode at each device in order to enter the communications settings, and then reset the programming mode to allow the PC to either monitor or monitor and control the device.

The following Device Setup Procedure explains how to set each device to communicate with the PC.

Device Setup Procedure

1. To allow changes to the device's communications settings, enable the local programming mode at the device:

   a. On the device keypad, enter the menu containing the programming mode settings. (For the transfer switch controller, use the programming mode switch.) See Figure 2-1 and the device operation manual for instructions.

   b. Set Local Programming to Yes, and the other programming options to No.

Device	Communications Settings	Programming Mode
Digital 550 Generator Set Controller	Menu 13, Communications	Menu 14, Programming Mode
Digital Generator Set Controller	Menu 10, Remote Control	Menu 11, Programming Mode
ATS Controller	Index 13, Remote Control	Programming Mode Switch
Power Monitor	Menu 8, Remote Control	Menu 9, Programming Mode

Figure 2-1 Locations of Communications and Programming-Mode Settings

2. On the device keypad, enter the menu listed in Figure 2-1 for communications settings. Refer to the device operation manual(s) for instructions to change the settings described in the next steps.

3. The 550 controller offers both KBUS and Modbus® protocols. Choose the KBUS protocol. For other devices, proceed to the next step.

4. Choose Yes for the Online setting (or the KBUS Online setting for the 550 controller).

5. Enter the connection type shown in Figure 2-2 for your connection (local single, local area network, remote single, or remote area network).

   The 550 controller can convert RS-232 input signals from the PC into RS-485 output to other devices on the network. To use the 550 controller as a converter, connect it as the first device after the PC and choose either LOCAL LAN CONV or REMOTE LAN CONV under Connection Type in Menu 13.

6. While programming the communications settings for each device, enter the following additional settings: primary port, network address, system ID number, and baud rate.

   a. **Primary Port (550 Controller only).** Choose Yes for the port used to connect to the device(s) or network, RS-232 or RS-485. See Appendix B or the communication kit installation instructions for help identifying the port.

   b. **Network Address.** Enter a unique network address (1–128) for each device on each local area network or remote area network site. Assign addresses from 1 to the number of devices on the network.

      If a network is not used, leave the network address set to the default value of 1.

   c. **System ID.** A system ID number is needed for remote connections. Create a system ID number with a maximum of six digits. Enter this ID number into all devices at each remote modem site (remote single connection or remote area network). The system ID number works like a password that allows only Monitor II software with the correct system ID number to access the devices.

   d. **Baud Rate.** Enter the same baud rate for all devices on a network.

      Note: If their baud rates are not the same, the PC and the connected devices will not be able to communicate.

7. Go back into the programming mode menu. (For the transfer switch controller, use the programming mode switch.) Set the programming mode for each device to the settings shown in Figure 2-3.

   Note: All programming mode settings shown in Figure 2-3 allow the PC to monitor the device.

   a. Set the local programming mode to Yes to allow programming using the device keypad and display only; or

   b. Set the remote programming mode to Yes to allow programming through a PC connected to the device; or

   c. Set the programming mode to Off to prevent programming from either the device keypad or the PC. The device can be monitored but the settings cannot be changed.

Connection Type	Device Settings						
	Online	Local	Local LAN	Local LAN Conv*	Remote	Remote LAN	Remote LAN Conv*
Local Single	Yes	Yes	No	No	No	No	No
Local Area Network		No	Yes	No	No	No	No
Local Area Network with 550 Controller*		No	No	Yes*	No	No	No
Remote Single		No	No	No	Yes	No	No
Remote Area Network		No	No	No	No	Yes	No
Remote Area Network with 550 Controller*		No	No	No	No	No	Yes*

* Digital 550 generator set controller only. The controller can convert RS-232 input from the PC into RS-485 output to other devices in the network if the 550 controller is located within 15 m (50 ft.) of the PC or device modem.

Figure 2-2 Connection Types

Modbus® is a registered trademark of Schneider Electric.

Function	Device Programming Mode		
	Local	Remote	Off
Allow programming at the device only	Yes	No	No
Allow programming from the PC	No	Yes	No
Disable all programming	No	No	Yes

Note: All programming mode settings shown allow remote monitoring using the PC.

Figure 2-3 Programming Mode Settings

2.5 Start Monitor II

Start the Monitor II software by double clicking on the shortcut created during installation or selecting Monitor II from the Start→Programs menu.

The Monitor II program displays a main menu screen when the program starts. See Figure 2-4. The default main menu screen contains no data windows.

The main menu screen displays options at the top of the screen that are familiar to most Windows® program users—a list of named pull-down menus and a toolbar with shortcuts for commonly used functions. The bottom part of the screen is the data window display area. Refer to Appendix C for instructions about working with pull-down menus, toolbars, shortcuts, and Windows® keystrokes.

Startup Screens

The software can load a screen containing selected data windows on startup. After building screens as described later in this section, refer to Section 2.13 for instructions to set the Load Screen on Startup option. A startup screen prompts the operator for connection information before displaying data windows. See Section 2.8 for instructions if the Connection Selection box appears when the software is started.

Figure 2-4 Main Menu Screen

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2.6 Connection Selection Window

This section briefly describes the options available in the Connection Selection window, which appears when Screen→New Screen is selected from the pull-down menus in the main window. See Figure 2-5.

Proceed to Section 2.7 or 2.8 for detailed instructions on the use of the Connection Selection options.

Edit Settings. To change settings for a connection site, select a named site from the left pane and click the Edit Settings button. Edit the modem or local connection information and click OK. See Figure 2-5 and Figure 2-7.

Add Item. To add a new device or network, click the Add Item button and follow the instructions in the setup procedure for either a local or modem connection, as appropriate.

Delete Item. To remove a device or network connection, select the item to be removed from the list and click on the Delete Item button. Then click on OK to apply the change or on Cancel to discard the change without saving.

Note: Screen files identify sites according to their position on the connection selection list, rather than by name or phone number. If a site is deleted, screen files that include the deleted site may connect to a different site on the list. If a screen file causes the program to connect to an incorrect site, delete the screen file using the Windows® Explorer and rebuild the screen. See Section 2.9 for more information about screens.

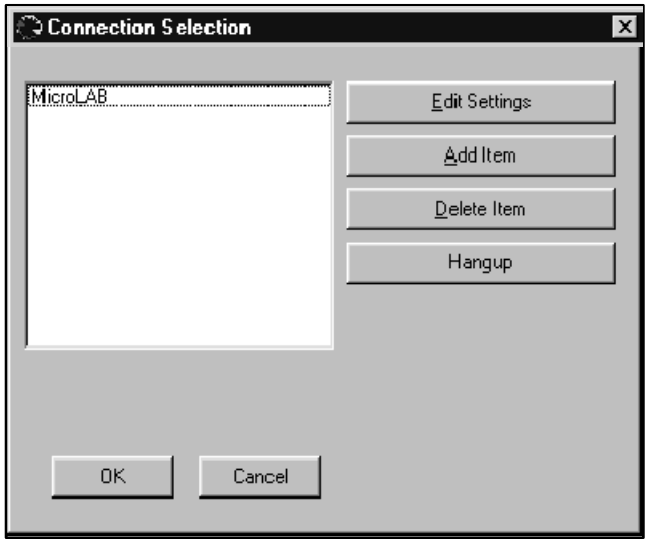

Figure 2-5 Connection Selection Window

Hangup. To disconnect from a connected site, click the Hangup button in the Connection Selection window. (Choosing Screen→Exit will also disconnect.)

2.7 Set Up the Communication Connections

Local connections use RS-232 or RS-485 connections to connect the controller directly to the PC. Use a local connection for a local single connection or a local area network (LAN). See Section 2.7.1.

Remote connections require modems to connect the PC to the controller. Use a remote connection for either a remote single connection or a remote area network. See Section 2.7.2.

Refer to Appendix B for more detailed information about the different types of connections.

2.7.1 Local Connection Setup

Set up the communication connection for a local single connection or a local area network by following the applicable steps in the procedures below.

Local Connection Setup Procedure

1. Open the Options menu and verify that the Configure Mode option is *not* checked. See Figure 2-6.

   Note: The configure mode allows the operator to work offline, disconnected from the device(s). See Section 3 for more information.

2. Select Screen→New Screen. The Connection Selection window shown in Figure 2-5 appears on the screen.

3. To set up a connection for the first time, click on Add Item. The Edit Connection window shown in Figure 2-7 appears.

4. In the Name box, type in a unique name that identifies the device or network.

5. To set up a local connection, click on the Local Connection button.

   a. Use the drop-down list of COM ports to select the port (1–255) that is used to connect the PC to the device.

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b. Use the Baud Rate down arrow to display the baud rates (1200, 2400, 4800, or 9600). Select the baud rate that matches the baud rate of all connected devices.

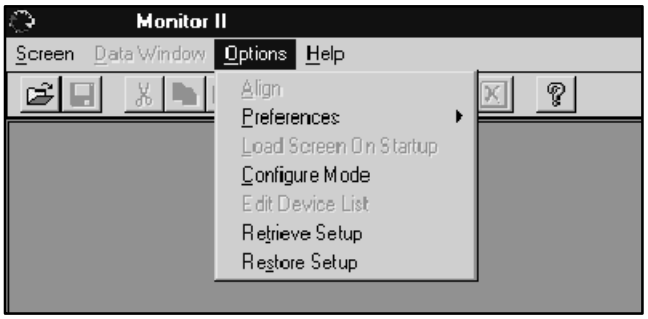


Figure 2-6 Options Menu

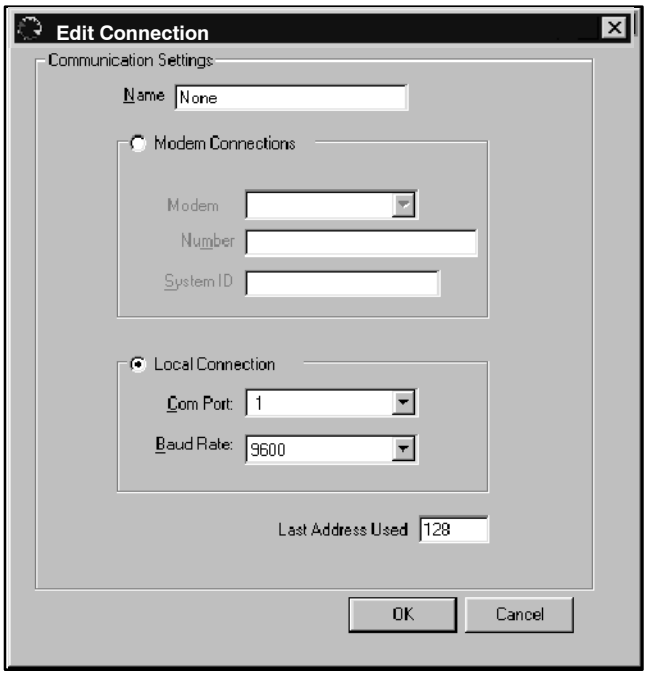


Figure 2-7 Edit Connection Window

c. Enter the highest address used on the local area network at the site. This is the highest network address that you entered into a device in Section 2.4, step 6b. If a Local Area Network (LAN) is not used, enter 0.

Note: For a LAN connection, the software will scan for devices at all addresses from 1 up to the number entered for the last address. For a local single connection, the software assigns address number 1 to the connected device.

d. Click the OK button to exit the dialog box and save the changes for the Local connection. (Click Cancel to discard the changes, if necessary.)

6. Click on OK in the Connection Selection window to connect the PC to the device or local area network. The Scanning for Available Devices window will appear while the system attempts to connect. See Figure 2-8.

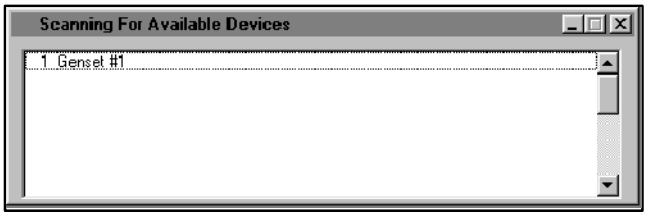


Figure 2-8 Scanning for Available Devices Window

2.7.2 Remote Connection Setup

Set up the communication connection for a remote single connection or a remote area network by following the applicable steps in the procedures below.

Repeat the following procedure for each remote location. Have the system ID number, phone number, maximum address used on the network, and baud rate information for each site on hand when setting up the connections. See Section 2.4.

Modem Connection Setup Procedure

1. Open the Options menu and verify that the Configure Mode option is not checked.

   Note: The configure mode allows the operator to work offline, disconnected from the device(s). See Section 3 for more information.

2. Select Screen→New Screen. The Connection Selection window shown in Figure 2-5 appears on the screen.

3. To set up a connection for the first time, click on Add Item. The Edit Connection window shown in Figure 2-7 appears.

4. In the Name box, type in a unique name that identifies the device or network.

5. Select the Modem Connections button.

   a. Use the drop-down arrow next to the Modem box to display the modem(s) connected to the PC. Click on your modem to select it.

   Note: Only Windows®-supported modems are recognized.

b. Type the complete phone number for the site, including outside line access codes and country codes, if necessary, into the Number box. The phone number may contain spaces or dashes to enhance its readability. Spaces and dashes are ignored by the program when dialing the number.

Note: If the telephone line service includes call waiting or other services that might interfere with or interrupt online connections, prefix the phone number with the codes used to disable these services. For example, *70 is typically used to disable call waiting. Call the telephone service provider to obtain the correct codes.

c. Type the system ID number for the site into the System ID box. This is the system ID that you created in Section 2.4, step 6c.

Note: The system ID number must be the same for all devices at the site. The software will not recognize any device with a different system ID number.

d. Click the OK button to exit the dialog box and save the changes for the modem connection. (Click Cancel to discard the changes, if necessary.)

6. Click on OK in the Connection Selection window to connect the PC to the device or local area network. The Scanning for Available Devices window will appear while the system attempts to connect. See Figure 2-8.

2.7.3 Editing Connection Settings

To change the settings for a previously set-up connection, start by selecting Screen→New Screen as described in the Connection Setup Procedures. Select the connection to be changed from the list in the Connection Selection window, then click on the Edit Settings button. See Figure 2-5. The Edit Connection screen shown in Figure 2-7 appears. Follow the instructions in the Connection Setup Procedures to change any settings, then click on OK to save the changes.

2.8 Connect to the Device(s)

Follow these instructions to connect to the device or network of devices after the connection setup described in Section 2.7 is complete.

Connection Procedure

1. Verify that the software is not in the configuration mode by making sure that Configure Mode in the Options menu is not checked. Click on Configure Mode to remove the checkmark, if necessary. See Figure 2-6.

2. Connect to the device (or devices):

   a. Choose Screen→New Screen to create a new screen or Screen→Open Screen to open a previously saved screen file. See Figure 2-9.

   b. When the Connection Selection dialog box opens, select the site to connect from the list, then click OK. See Figure 2-5.

   Note: Previously saved screens that contain connection information will connect to the site without displaying the Connection Selection dialog box.

   If connecting to a remote site, the program dials the site phone number and connects. It scans for available devices, and briefly displays the address and designation for each device.

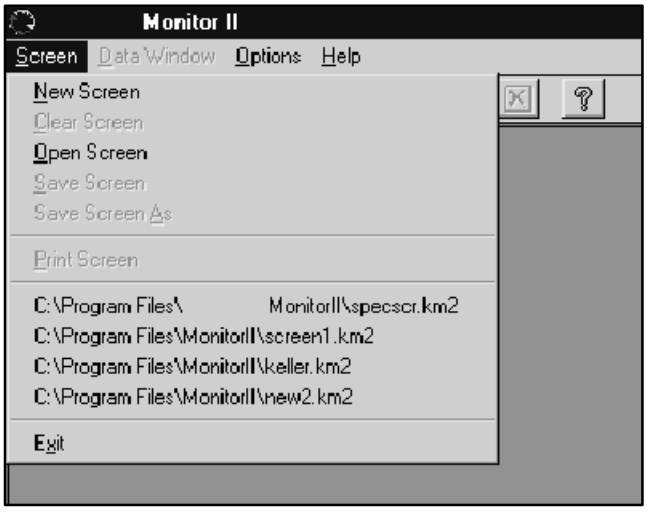


Figure 2-9 Screen Menu

3. After the Scanning for Available Devices window closes, click on the Data Windows pull-down menu. If the system connected successfully, the Add Window option is accessible. Proceed to Section 2.9.

   If the Add Window option is gray and not accessible, the attempt to connect failed. Choose Screen→New Screen and click on the Hangup button. Check the modem setup and connection settings. Refer to the instructions for your PC and operating system.

2.9 Add Data Windows and Build Screens

The Monitor II software uses data windows and screens that allow the operator to monitor and control connected devices with a PC.

- A single data window displays a set of data from one device.
- A screen is a set of one or more data windows from a single site. A site can be a local connection, a local area network, or remote location containing any combination of devices connected through a single phone number.
- A template is a screen that contains data windows for only one device and address. See Section 2.9.10 for instructions to use preprogrammed template files included with the Monitor II software.

Data window information is updated frequently. The baud rate, number of connected devices, and number of open data windows affect the update frequency.

Sections 4 through 7 list the data windows available for different types of devices. See Appendix C for a list of toolbar functions that provide faster alternatives to some of the pull-down menus used in the following instructions. Use the instructions in the following sections to create and position data windows and save them to a screen if desired.

2.9.1 Adding Data Windows

Perform the following steps to add a new data window to the screen.

Add Data Windows Procedure

1. Connect to devices over a local or modem connection (see Section 2.8) or use the configuration mode (see Section 2.3).
2. Select Data Window→Add Window, or left-click on the + button in the toolbar. See Figure 2-10.
3. The software displays available devices and their designations. See Figure 2-11. Local or remote single connections show one device at address 1. Local or remote area network connections show addresses from 1 to the last address used on the network. Select a device from the left side of the screen. Available data windows for each device type are shown in the right pane.
4. Choose data windows from the list on the right by selecting them with the left mouse button. Use the control or shift key as with other Windows® software to select groups of data windows.
5. Click the OK button to add the selected data windows to the screen.
6. Position the data window on the screen as desired by clicking on the title bar and holding the mouse button down while moving the mouse (dragging and dropping).

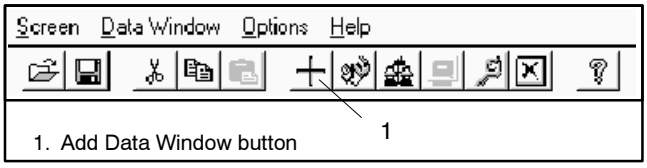


Figure 2-10 Menus and Toolbar

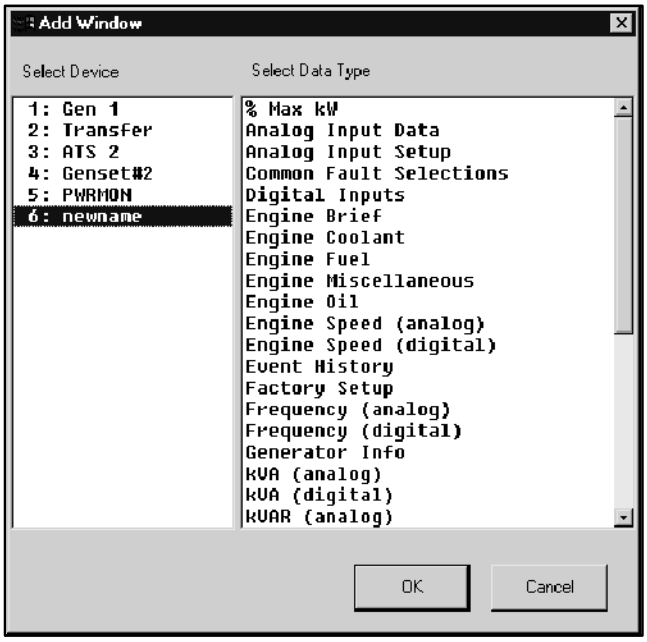


Figure 2-11 Add Window

Windows® is a registered trademark of Microsoft Corporation.

2.9.2 Working with Data Windows

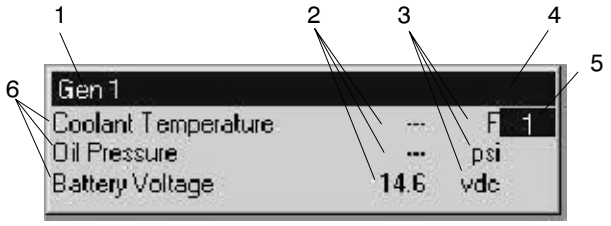
You can copy, cut, paste, and move data windows on the screen. See Figure 2-12 for a typical data window.

Selecting Data Windows. Left-click anywhere on a data window to select it.

Moving Data Windows. To drag and drop a data window, left-click on the title bar, hold the mouse button down, and move the mouse to reposition the data window on the screen.

Aligning Data Windows. Select Options→Align to align data windows to a grid. Use Options→Preferences→Grid Align to change the grid spacing. For best results, start with a spacing of 500, select Options→Align, and observe the results. Adjust the spacing to obtain the desired appearance.

Displaying the Shortcut Menu. Right-click anywhere on the display area to display the shortcut menu, which displays the same information as the Data Window pull-down menu. See Appendix C for a list of options included in the pull-down menu.



1. Device designation
2. Data from the device
3. Units of measurement
4. Title bar
5. Device address
6. Data labels

Figure 2-12 Typical Data Window (Engine Inputs, Digital Generator Set Controller)

Hiding the Title Bar. Left-click on the data window to hide the title bar and select the data window. Left-click on the data window again to reveal the title bar.

Device Designation. The device designation shown in the data window title bar is the name of the individual controller or other connected device. See Section 2.10 for instructions to change the designation.

Changing the Units. Select Options→Preferences and choose English or metric units of measure. This sets the units for all data windows.

Device Address. This is the network address assigned to the device according to the instructions in Section 2.4.

Changing the Address. Select Data Window→Device→Change Address of Current to display the same data for another device. Select the new device from the pop-up window, which displays only devices that are the same type as the current device. For example, if the current device is a Digital generator set controller, only other Digital controllers in the system will be displayed.

Note: The new device must be the same type as the current device.

2.9.3 Choosing Analog or Digital Displays

Some data windows can display either analog scales or digital readouts. Figure 2-13 shows analog and digital displays of the same data.

- Select Data Window→Display to choose between analog or digital displays for some data windows.
- Select Data Window→Display and choose Scaling to change the scales on analog displays. Choose a default range or select the Custom option to create a data range. If selecting the Custom display option, enter the start and end values for the custom range in the dialog box and then click the OK button.

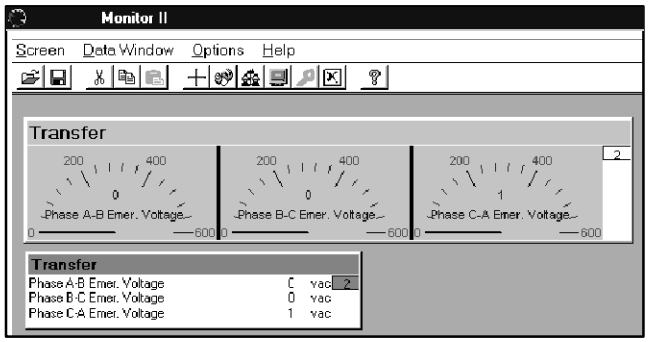


Figure 2-13 Typical Analog and Digital Displays

2.9.4 Copying Data Windows

It is often helpful to copy a data window to compare the same type of data from different devices on the same network.

Copy Data Windows Procedure

1. Select a data window by left-clicking on the data window. Its title bar will appear highlighted.
2. Right-click on the screen outside the data window title bar to display the shortcut menu.
3. Select Data Window→Copy.
4. Right-click on a blank area of the screen to display the Data Window shortcut menu.
5. Select Data Window→Paste.
6. Right-click on the pasted data window to display the Data Window shortcut menu.
7. Select Data Window→Device→Change Address of Current.
8. Select an address from the list.

2.9.5 Deleting Data Windows

To remove a data window from the screen, select the data window and then select Data Window→Delete or right-click with the mouse and select Delete from the shortcut menu.

2.9.6 Saving Screens

After creating a set of data windows on the screen, you can save the screen to a file to use again.

Select 🖫 or Screen→Save to save the set of data windows on the screen to the current screen name. Choose Screen→Save As to rename the screen or save it as either a screen or template file. Save a screen with any combination of data windows as a screen file (.km2 extension). Save a screen with data windows from only one device type (and address) as a template file (.tem extension).

Screen Files are user-defined and can consist of any combination of data windows. Screen filenames have a .km2 extension. Opening a screen file automatically connects to the site if the connection information is included in the screen file (unless the software is in the configure mode).

Note: The device type(s) and address(es) specified in the screen file must match the connected device(s).

If the screen was saved in configuration mode, the program starts the communication connection dialog box, prompting the user to choose a connection site. After connection, the software populates the data windows from the screen file with active data.

2.9.7 Opening Screens

To open a screen, choose Screen→Open and choose either a screen file (.km2 extension) or a template file (.tem extension), or choose a file from the list of recently used files in the Screen drop-down menu. Opening a screen file automatically connects to the site if the connection information (including the phone number and system ID) is included in the screen file (unless the software is in the configure mode).

2.9.8 Clearing Screens

To clear the screen of all data windows, choose Screen→Clear Screen.

2.9.9 Printing Screens

To print the data on the screen, choose Screen→Print Screen. Complete the options in the print dialog box and click the OK button.

Note: The print format does not affect the screen display.

If there is no data from the connected devices, the software prints a blank page.

2.9.10 Using Templates

Template files contain data windows for one device and address. A set of preprogrammed template files is included on the Monitor II software CD-ROM. Template filenames have a .tem extension. To use the preprogrammed templates, copy them from the CD-ROM to the directory on the PC that contains the Monitor II program files (usually C:\Program Files\Monitor II). Then start the Monitor II software, select Screen→Open, and select the template file from the list.

Opening a template file starts the communication connection dialog box, prompting the user to choose a connection site. When a connection is made, the software scans for available devices compatible with the set of data windows in the template file. Click on one device from the list and then on the OK button to select a device. The software automatically changes the address of all data windows from the template file to the selected device and populates data windows with active data from the chosen device.

The template files provided with the software are similar to older versions of the monitor software and correspond to the status, setting, and summary screens.

The user can also create template files. Create, arrange, and customize data windows for one device as desired. Then select Screen→Save Screen As. Click on the down arrow to the right of the Save as type box and choose Template File (*.tem). Type a filename into the File name box. The software will add the .tem extension when it saves the file. Click on the Save button to save the file as a template.

2.10 Enter User-Programmable Settings

User-programmable settings include time delays, trip points, and other settings. When the remote programming mode is enabled at the device, the PC operator can alter the user-programmable settings for the device. Refer to Sections 4 through 7 to identify user-programmable settings for each type of device. Connect to the device before attempting to change settings.

2.10.1 User-Programmable Settings

Use Data Window→Setup to edit device settings and change operating modes. Enable the remote programming mode at the device to allow the settings to be changed through the PC. Select the Monitor II data window that contains the settings to be changed and select Data Window→Setup. The software displays device settings and operation status. Click on the settings and enter the changes as the program allows. Click the OK button to update the device with the new information. See Sections 4 through 7 for more detailed instructions.

See the device operation and installation manual for limits, factory default values, and operation modes.

Note: The software transfers the new settings to the device at the next update. The device then stores the setup information in its own memory. No data is stored in the PC. See Section 2.12 to save device settings to a file on the PC.

2.10.2 Device Designation

Assign a unique name for each device by editing the designation in the device information data window (ATS Information, Generator Info, or Power Monitor Info data windows). Device designations can have a maximum of nine characters. Consider using designations that identify the location, function, or other characteristics that uniquely identify the device.

Select the device information data window and choose Data Window→Setup. Left-click in the box labelled *Designation* and type in the new name. Click on OK to apply the change.

2.10.3 Relay Driver Outputs

The relay driver outputs (RDOs) can control relays connected to fans, lights, or other customer equipment. The relay driver output data window displays the signal source that drives each relay driver output (RDO) and the RDO state (on or off). The controller RDO factory settings are listed in the controller operation manual.

To change RDO settings, select the Relay Driver Output data window. Choose Data Window→Setup or right-click on the data window and choose Setup. In the setup window, double-click on the line for the RDO to be defined. Select the item to define as a relay driver output from the dropdown list in the pop-up window.

See the controller operation manual for information about hardware connections for RDOs.

2.10.4 Software-Controlled RDOs

For the Digital 550 controller, the PC operator can define up to four software-controlled relay driver outputs (SCRDOs). SCRDOs allow the operator to control outputs from a remote site using a PC with either KBUS or Modbus® communications.

Note: Software-controlled RDOs allow the PC operator to turn on outputs from a remote location using a PC. Ensure that no one is working on the generator set before activating outputs.

Refer to Section 4.7 for more information.

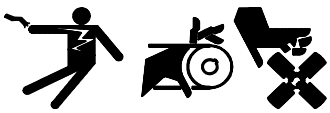
Modbus® is a registered trademark of Schneider Electric.

2.10.5 Engine Start/Stop

The Monitor II program allows the PC operator to start and run a generator set from a remote location. See Section 4.6.1 for the Digital 550 controller or Section 5.5.2 for the Digital controller.

Note: The Engine Start feature allows the PC operator to start and run a generator set that is not visible from the PC location. Use caution to prevent unintended starting of the generator set.

⚠ 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.

2.11 Monitor and Control Devices

Use the data windows to monitor and control the generator sets, transfer switches, and power monitors connected to the PC. See Section 2.9 for instructions for using data windows. See Sections 4 through 7 for descriptions of the data windows available for each type of device.

The software scans the devices and updates the displayed information at regular intervals. The time between updates varies with the number and type of connected devices and is usually a few seconds.

2.12 Save Device Settings

The Retrieve Setup and Restore Setup options allow the PC operator to save programmable device settings to a file and restore them later. Use the retrieve and restore options to save the device settings in case the settings are lost or the device is replaced. Figure 2-14 lists the settings that can be retrieved and restored for each device. The program creates one settings file for one device at a time. Repeat the following procedure for each device that has user-programmable settings.

Device	Retrievable/ Restorable Settings
Digital 550 Generator Set Controller	Analog Inputs Common Faults Digital Inputs Generator Setup Relay Driver Outputs Trip Points Time Delays
Digital Generator Set Controller	Auxiliary Inputs Common Faults Generator Setup Relay Driver Outputs Trip Points Time Delays
ATS Controller	ATS Info Exerciser Load Shed Trip Points Time Delays
Power Monitor	Time Delays

Figure 2-14 Retrievable and Restorable Settings for Each Device

Save Device Settings Procedure

1. Choose Options→Retrieve Setup to save the device settings to a file. The program displays a dialog box listing all connected devices.
2. Click on one device in the displayed list. The program saves the settings for one device at a time.
3. Create a file name for the device settings information, and type it into the window when the software requests it. Use a file name that will help you identify the device later.
4. Click Save. The program displays *Collecting Data* as it saves the settings to the file.
5. Repeat the steps for each device that has user-programmable settings.

Restore Setup reloads the saved settings from the computer files to the devices. Repeat the following procedure for each device. The program identifies the device corresponding to the selected data file and restores the settings to the appropriate device.

Restore Device Settings Procedure

1. Choose Options→Restore Setup. The program displays a list of filenames.
2. Select the file containing the settings for the device.
3. Click Open. The program displays *Restoring Data* as it reloads the device settings.
4. Repeat the steps for each device.

2.13 Save Screens or Template Files

Save the screen as a screen or template file to use again. See Section 2.9. Many different screens and template files can be saved.

To load a screen the next time the software is started, choose Options→Load Screen on Startup while the selected screen is open. The screen that is displayed at the time that the option is checked will automatically open when the software is restarted.

2.14 Disconnect and Exit

Select File→Exit to disconnect from the site and exit Monitor II.

To disconnect without exiting the program, select Screen→New Screen and click on the Hangup button. The Monitor II title bar at the top of the screen will display "Hanging Up..." After disconnecting, select Options→Configure Mode to work offline. See Section 3, Working Offline (Configuration Mode).

3.1 Configuration Mode

Use the configuration mode to select data windows and build screens offline, without connecting to a device or network, if desired.

Enable the configuration mode by selecting Options→Configure Mode at the Monitor II main screen. Click on the Configure Mode option so that the checkmark (✓) appears.

Note: The program does not display live data while the configuration mode is enabled.

3.2 Constructing or Editing a Device List

If possible, connect to the device or network before enabling the configuration mode to allow the software to create a device list. See Section 2.8. The Monitor II software scans the connection to determine which devices are connected to the PC and creates the device list. This is the easiest and most foolproof way to obtain a correct device list. Then disconnect and work in configuration mode to build screens offline.

Note: If all of the connected devices do not appear in the device list, verify that the highest address number has been entered in the Port Settings→Last Address Used box. Also check the other communication settings including the baud rate and system ID. See Sections 2.4 and 2.7.

To disconnect without exiting the program, select Screen→New Screen and click on the Hangup button. The Monitor II title bar at the top of the screen will display "Hanging up..." After disconnecting, close the Connection Selection window by clicking the Cancel button or the X at the top right corner of the window. (Clicking the OK button may reconnect to the site.) Then select Options→Configure Mode to work offline.

Note: If the Monitor II software has connected to the device or network of devices, no editing of the device list is required.

To build a screen before making the connection, first edit the device list.

Create or Edit a Device List Offline Procedure

1. Enable the configuration mode by selecting Options→Configure Mode.
2. Select Options→Edit Device List.
3. Use the drop-down arrows to select the network address and type of each device. For each address on the network, select the device for that address. The network addresses and device types must match the addresses and types of devices at the site.
4. Type the device designation into the box provided to identify the particular device. This designation appears in the data window title bars.

   Note: The device designation will be overwritten by device information after connection to the device.

To change the device designation, edit the designation in the device information data window after connecting to the device or network. See Section 2.10.2.

3.3 Building Screens

After constructing the device list, open a screen or template file, or build a screen by adding and customizing windows as described in Section 2.9. See Sections 4 through 7 for descriptions of the available data windows for each type of device. After adding the desired data windows, save the screen as a screen or template file by selecting Screen→Save Screen As. Choose either a screen or template file type and type a name in the File name box. The Monitor II software adds the .km2 file extension for screens or the .tem extension for templates.

3.4 Using Screens

Disable the configuration mode by selecting Options→Configure Mode and clicking on the Configure Mode option so that the checkmark (✓) does not appear. Open the screen or template file by selecting the file from the list in the Screen drop-down menu or by choosing Screen→Open and selecting the file from the directory where it was saved. The connection selection box opens. Follow the instructions in Section 2.8 to connect to the site. After connection, the software displays the selected screen.

Notes

4.1 Introduction

This section explains the data windows available for Digital 550 generator set controllers. Section 7.2 lists and describes the items found in each data window. More detailed information for some of the items is included in the sections after the table.

Use the table in Section 4.9 as a cross-reference to find the data window locations of specific items. Section 4.10 lists system events, common fault selections, and RDO messages.

Some features are available only for specific engine families and alternators or for switchgear applications. Monitor II version 4.0.0 also contains some features that will be used in future applications. Those features are identified by footnotes when they appear in the following sections.

Note: Monitor II software version 4.0.0 or higher is designed to communicate with 550 controllers running application code versions 2.10 or higher. Earlier versions of Monitor II will not recognize 550 controllers running version 2.10 of the controller application code.

4.2 Data Windows

The following table lists and describes the items found in each data window. A checkmark (✓) in the Setup column indicates a user-programmable setting.

Data Window	Setup	Item	Item Description
% Max kW		% Max kW	The load on the generator set expressed as a percentage of the generator rating.
Analog Input Data		Analog Auxiliary In	The identifying names and scaled values of the analog inputs.
		Battery Voltage	Cranking battery voltage in VDC.
Analog Input Setup (See Section 4.3)	✓	Analog Auxiliary In	Warning Enabled: When enabled, a warning occurs if the analog level remains outside the high or low warning values for the warning time delay (yes or no).
			Shutdown Enabled: When enabled, the generator set shuts down if the analog level falls outside the high or low shutdown values for the shutdown time delay (yes or no).
			Inhibit: The time delay in seconds after crank disconnect when analog input shutdowns or warnings cannot occur.
			Warn Delay: The time delay before a warning. A warning occurs if the analog value remains outside the high or low warning values for this length of time (in seconds).
			Sdwn Delay: The time delay before shutdown. The generator set shuts down if the analog value falls outside the high or low shutdown values for this length of time (in seconds).
			High Warning Value: A warning occurs if the analog value rises above this level for a specified length of time (see Warn Delay).
			Low Warning Value: A warning occurs if the analog value falls below this level for a specified length of time (see Warn Delay).
			Low Sdwn Value: The minimum input value. The generator set shuts down if the analog value falls below this level for a specified length of time (see Sdwn Delay).
			High Sdwn Value: The maximum input value. The generator set shuts down if the input value rises above this level for a specified length of time (see Sdwn Delay).
		Analog Volt Adjust	For switchgear applications. Inhibit time = zero (0). Warnings and shutdowns are disabled.
Common Fault Selections (see Section 4.4)	✓	Common Fault Selections	Yes or No indicates whether a system event signal is selected as a common fault. Any of the system events listed in Section 4.10 except the Defined Common Fault, Genset Param Warning, Genset S/N Warning, and Genset S/N Shutdown can be defined as common faults.

Data Window	Setup	Item	Item Description
Digital Inputs (see Section 4.5)	✓	Delay	The time delay in seconds between the occurrence of the function and the activation of the digital input.
		Description	The identifying name for the digital input D1–D21. Edit the description, a maximum of 20 characters, in setup mode.
		Enabled	When enabled, a warning or shutdown occurs if the digital input is activated (yes or no).
		Function	The function that is associated with the digital input, chosen from the list in Section 4.5.
		Inhibit	The time delay in seconds after crank disconnect when digital input shutdowns or warnings cannot occur.
Engine Brief		Coolant Temperature	The engine coolant temperature in degrees Celsius or Fahrenheit.
		Countdown	Time remaining in the programmed run time. See Run Time in the Operational Setup data window.
		ECM Equipped	Indicates whether the generator set engine uses an engine control module (ECM).
		Engine Speed	The engine speed in RPM.
		Engine Start	The number of times the engine has successfully started.
		Local Battery Volts	The DC voltage input at the generator set controller.
		Oil Pressure	The engine oil pressure in kPa or psi.
		Run Time	Programmed engine start run time.
Engine Coolant (ECM only)		Coolant Level	The coolant level, 0 or 100%.
		Coolant Pressure	The coolant pressure in kPa or psi.
		Coolant Temperature	The coolant temperature in degrees Celsius or Fahrenheit.
Engine Fuel (ECM only)		Fuel Last Run	The amount of fuel consumed since the last reset, in liters or gallons.
		Fuel Pressure	The fuel pressure in kPa or psi.
		Fuel Rate	The fuel consumption rate in liters or gallons per hour.
		Fuel Temperature	The fuel temperature in degrees Celsius or Fahrenheit.
Engine Miscellaneous (ECM only)		Ambient Temperature	The engine ambient temperature in degrees Celsius or Fahrenheit.
		ECM Battery Voltage	The battery voltage according to the engine controller.
		ECM Serial Number	The ECM's serial number.
		Engine Model Number	The engine's model number.
		Engine Serial Number	The engine's serial number.
		Unit #	The ECM unit number.
		Intake Air Temp	For Waukesha engines.
		Intake Air Pressure	For Waukesha engines.
		MDEC Fault Code	For future applications.
Engine Oil (ECM only)		Crankcase pressure	The crankcase pressure in kPa or psi.
		Oil Level	The oil level, 0 or 100%.
		Oil Pressure	The oil pressure in kPa or psi.
		Oil Temperature	The oil temperature in degrees Celsius or Fahrenheit.
Engine Speed		Engine Speed	The engine speed in RPM. Analog or digital display.
Event History		Event History	A history of the 100 most recent events, such as shutdowns, warnings, user-defined messages, or other system events, and the date and time on which they occurred.

Data Window	Setup	Item	Item Description
Factory Setup		Alternator Part Number	The part number of the generator set's alternator.
		Controller Serial No.	The serial number of the generator set's controller.
		Days Operation	The number of days the generator set has been in operation.
		Engine Part Number	The part number of the generator set's engine.
		Final Assembly Clock #	The clock number of the person completing assembly and final test of the generator set.
		Final Assembly Date	The date the generator was assembled and tested.
		Genset Serial Number	The generator set serial number
		Model No.	The generator set model number.
		Serial No.	The generator set serial number entered by the installation technician during controller setup. This number must agree with Genset Serial Number, shown above.
		Spec No.	The generator set specification number.
		Version Number	The version number of the controller's application code.
Frequency		Frequency	The average generator set output frequency in hertz (Hz). Analog or digital display.
Generator Info	✓	Battery Voltage	The battery voltage shown on the nameplate, which is normally set at the factory.
		Control Serial No.	The generator set controller serial number, which is normally set at the factory.
		Designation	Setup window only. An optional unique name that identifies the device and appears on the device list at each address for network connections and on all data windows when the Monitor II software is connected to the device. Enter a description of up to 9 characters in setup mode. **Note:** The Monitor II software does not display the new designation until the operator selects a new screen and the software scans the devices.
		kW Rating	The generator set alternator kilowatt rating shown on the nameplate, which is normally set at the factory.
		Load Description	An optional description of the connected load, such as total building, HVAC, or motors. Enter a description with up to 20 characters in setup mode.
		Location	An optional description of the generator set's location. Enter a description with up to 20 characters in setup mode.
		Model No.	The generator set model number shown on the nameplate, which is normally set at the factory.
		NFPA 110	Whether the controller is set to NFPA 110 default settings (yes or no). See Section 4.7.2.
		Serial No.	The generator set serial number shown on the nameplate, which is normally set at the factory.
		Operating Mode	The generator set operating mode: standby or prime power.
		Single/Three Phase	Electrical system type: single-phase, three-phase wye, or three-phase delta. This setting is normally set at the factory.
		Spec No.	The generator set specification number shown on the nameplate, which is normally set at the factory.
		System Frequency	The generator set frequency shown on the nameplate, which is normally set at the factory.
		System Voltage	The generator set voltage shown on the nameplate, which is normally set at the factory.
kVA		kVA	Total kilovolt-amperes for all lines and individual values for lines L1, L2, and L3. Analog or digital display.
kVAR		kVAR	Total kilovolt-amperes reactive for all lines and individual values for lines L1, L2, and L3. Analog or digital display.
kW		kW	Total kilowatt load for all lines and individual values for lines L1, L2, and L3. Analog or digital display.
Line Current		L1, L2, and L3	The current in amperes through generator set lines L1, L2, and L3. Analog or digital display.

Data Window	Setup	Item	Item Description
Line-Line Voltage		L1–L2 VAC L2–L3 VAC L3–L1 VAC	The AC rms voltage measured from line to line: L1-L2, L2-L3, and L3-L1. Analog or digital display.
Line-Neutral Voltage		L1–L0 VAC L2–L0 VAC L3–L0 VAC	The AC rms voltage measured from each line to neutral: L1-L0, L2-L0, and L3-L0. Analog or digital display.
Operational Summary		Duration of Run	The length of time, in hours, that the generator set ran during its last operation.
		Factory Test Date	The date the generator set completed final factory testing.
		Last Start Date	The date the generator set was last successfully started.
		Last Start time	The time the generator set was last successfully started.
		Loaded/Unloaded	Whether the generator last ran with or without a load.
		Reset Date	The last maintenance record reset date.
		Reset Days of Operation	The number of days the generator set has been in operation since the last maintenance reset.
		Reset kW Hours	The number of kilowatt-hours on the generator set since last reset.
		Reset Number of Starts	The number of successful starts for the generator set since last reset.
		Reset Run Time	The running time of the generator set loaded and unloaded since the last maintenance reset.
		Reset Run Time Loaded	The running time of the generator set with a load since the last maintenance reset.
		Reset Run Time Unloaded	The running time of the generator set without a load since the last maintenance reset.
		Total kW Hours	The number of kilowatt-hours on the generator set.
		Total Number of Starts	The number of successful starts for the generator set.
		Total Run Time	The total running time of the generator set, loaded and unloaded.
		Total Run Time Loaded	The running time of the generator set with a load.
		Total Run Time Unloaded	The running time of the generator set without a load.
Operational Summary Setup Mode (Engine Start Setup)	✓	Run Time	Displays the generator set run time duration (hours:minutes). See Section 4.6. **Note:** This data menu allows the software operator to start and run a generator set. Use extreme care when using this feature to prevent unintended starting of the generator set.
		Reset Maintenance Records	Checkbox to reset maintenance records to the current date and time.
		Start/Stop Engine	Button that allows the PC operator to start or stop the generator set engine from a remote location. (Setup mode only.) See Section 4.6.1 .
		Reset Faults	Button that allows remote reset of the controller after a fault shutdown. **Note:** Always identify and correct the cause of the fault condition before resetting the controller.
Power Factor		Power Factor	Total power factor for all lines and individual values for lines L1, L2, and L3. Analog or digital display.
Relay Driver Outputs	✓	Relay Driver Outputs (RDOs)	Displays the source that drives each of the relay driver outputs (RDOs) and the RDO state (on or off).

Data Window	Setup	Item	Item Description
Time and Date	✓	Date	The date at the generator set location.
		Day	The day of week calculated by the generator set controller from the date.
		Time	The time at the generator set location. The format is Hour:Minute AM/PM.
		System Clock	Button that allows the operator to set the controller clock to the PC's time and date. (Setup mode only.)
Time Delays	✓	Cooldown Temperature Override	Check box forces the generator set engine to run for the entire cooldown time, ignoring the coolant temperature. (Setup mode only.)
		Crank Cycles	The number of engine crank cycles before an overcrank shutdown.
		Crank On	The engine cranking on time, in seconds.
		Crank Pause	The engine cyclic cranking rest time, in seconds.
		Engine Cooldown	The time delay between the engine stop signal (via remote start contacts or a stop engine signal) and the engine stop sequence, in minutes:seconds. **Note:** The engine stops before the end of the cooldown time delay if the coolant temperature reaches the Engine Cooled Temperature, which is set in the generator set personality profile. (Also see Cooldown Temperature Override, below.)
		Engine Start	The time delay, in seconds, between a remote engine start signal (via remote start contacts or a start engine signal) and the engine start sequence.
		Load Shed	The time delay before a load shed output if the load exceeds the load shed trip point, in seconds.
		Overvoltage	The time delay before a fault if the voltage rises above the upper limit, in seconds.
		Starting Aid	The engine starting aid time delay before engine cranking. It allows adjustment to the starting aid on time before engine cranking.
		Undervoltage	The time delay before a fault if the voltage falls below the lower limit, in seconds.
Trip Points	✓	High Battery Voltage	The battery voltage level that causes a high battery voltage warning. The warning is activated if the battery voltage remains above the limit for more than 10 seconds. Shown in DC volts (VDC).
		Load Shed Output	The load level that causes a load shed, shown in percentage of rated kW and in kW.
		Low Battery Voltage	The battery voltage level that causes a low battery voltage warning. The warning is activated if the battery voltage falls below the limit for more than 10 seconds. Shown in DC volts (VDC).
		Overfrequency	The output frequency level that causes an overfrequency shutdown, shown in percentage of rated frequency and in Hz. The unit shuts down if the output frequency remains above the limit for more than 10 seconds.
		Overspeed	The speed that causes an immediate overspeed shutdown. Shown in Hz and RPM.
		Overvoltage	The output voltage level that causes an overvoltage shutdown, shown in percentage of the rated voltage and in volts.
		Underfrequency	The output frequency level that causes an underfrequency shutdown, shown in percentage of rated frequency and in Hz. The unit shuts down if the output frequency falls below the limit for more than 10 seconds.
		Undervoltage	The output voltage level that causes an undervoltage shutdown, shown in percentage of system voltage and in volts.

4.3 Analog Inputs

The Analog Input Setup window allows the operator to enter the descriptions, functions (warning or shutdown), time delays, and trip point values for up to 7 analog inputs. Because the operator can define a variety of inputs, the Monitor II software does not assign units to the trip point values. To display the units in the data window, include them in the description in the first column of the setup window. See Figure 4-1 and the following procedure.

Analog Input Setup Procedure

1. Select Data Window→Add Window or use the add window shortcut key. The software displays the Add Window box.

2. Select the device name for the Digital 550 controller in the first column and Analog Input Setup in the second column. Click on the OK button.

3. Select Data Window→Setup or right-click in the new window and select Setup.

4. Type the analog input description and the units for the warning and shutdown values in the description column. Use a maximum of 20 characters.

5. Enter the shutdown values, warning values, and time delays in the labelled columns for each input. The values must lie within the upper and lower limits shown at the top of each column.

6. Click on the OK button to accept the changes or Cancel to discard them.

The software displays the new descriptions and settings in the Analog Input Setup and Analog Input Data windows at the next update.

Note: Analog input values are scaled (calibrated) only through the controller. The Monitor II software does not have the capability to change analog input calibrations. Refer to the 550 controller operation manual for calibration information.

4.3.1 Factory-Reserved Inputs

Available user inputs are dependent on factory-reserved inputs for specific engine types, engine controls, and paralleling applications. See Figure 4-2 for analog and digital inputs that are not user-selectable.

For switchgear applications, the default assignment for analog auxiliary input number 7 is Analog Volt Adjust. The warning and shutdown functions are disabled. The assignment of this input can be changed by changing the description.

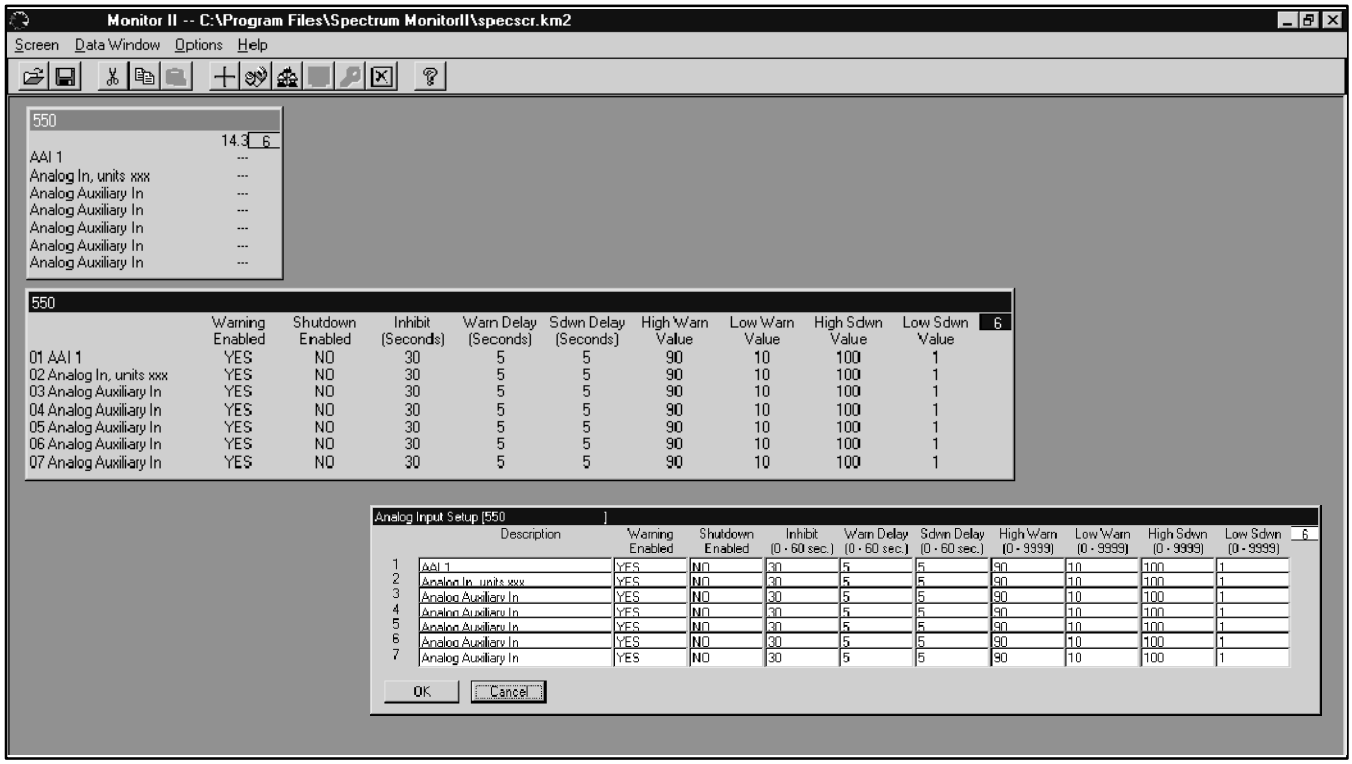


Figure 4-1 Analog Input Setup Data Window with Setup Window

Input Type	Specific Applications				
	ECM Engine	Non-ECM Engine	NFPA 110	Waukesha-Powered	Paralleling Applications
Analog Inputs					
A1	X	Coolant Temp.	X	Coolant Temperature	X
A2	X	Oil Pressure	X	Oil Pressure	X
A3	X	X	X	Intake Air Temp. Warning	X
A4	X	X	X	Oil Temperature Warning	X
A5	X	X	X	X	X
A6	X	X	X	X	X
A7	X	X	X	X	Voltage Adjust*
Digital Inputs					
D1	X	X	Battery Charger Fault	X	X
D2	X	X	Low Fuel Warning	X	X
D3	X	X	Low Coolant Temp.	X	X
D4	X	X	X	X	X
D5	X	X	X	X	Breaker Closed
D6	X	X	X	X	Enable Synch
D7	X	X	X	X	X
D8	X	X	X	X	X
D9	X	X	X	X	X
D10	X	X	X	X	X
D11	X	X	X	AFM Shutdown	X
D12	X	X	X	Deton Warning	X
D13	X	X	X	Deton/Knock Shutdown	X
D14	X	X	Low Coolant Level (with LCL *Switch*)	X	X
D15	X	X	X	X	X
D16	X	X	X	X	X
D17	X	X	X	X	X
D18	X	X	X	X	X
D19	X	X	X	X	X
D20	X	X	Air Damper	X	X
D21	X	X	X	X	X
* Factory-default setting. Can be changed by changing the description.					

Figure 4-2 User Inputs (X) and Factory Reserved Inputs (as shown)

4.4 Common Fault Selections

This data window displays “Yes” next to signals that are part of the Defined Common Fault signal or “No” next to signals that are not. In setup mode, double-click on signals to change between Yes and No. The program sorts the list of signals so that signals that enable the common fault signal (Yes) are displayed first.

Select any of the system event signals except the Defined Common Fault, Genset Param Warning, Genset S/N Warning, and Genset S/N Shutdown as part of the defined common fault signal. See Section 4.10 for a list of system events that can be assigned to the common fault.

Defined common faults can drive the relay driver outputs (RDOs). The Defined Common Fault is the default setting for RDO 18. See Section 4.7.

4.5 Digital Inputs

The Digital Inputs data window displays the description, function, warning and shutdown values, and time delays for up to 21 digital auxiliary inputs. Assign the digital inputs in setup mode.

Note: If the NFPA 110 defaults are enabled, some of the digital inputs cannot be changed. See Figure 4-3.

Digital Input Setup Procedure

1. Choose Add Window→Digital Inputs.
2. Select Data Window→Setup to enter the setup mode.
3. If desired, enter the description in the first column using a maximum of 20 characters.
4. Click in the Enabled column to toggle between Yes to enable the function or No to disable it.
5. Enter the Inhibit and Time Delay values in seconds.
6. Select the function from the drop-down list in the last column. The selections are listed in Figure 4-3.
7. Click OK when finished to apply the changes or Cancel to discard the changes.

Digital Input Selections
AFM Shutdown†
Air Damper ‡
Bat Chgr Fault ‡
Battleswitch
Breaker Closed*
Deton Shutdown†
Deton Warning†
Enable Synch*
Field Over Volts ‡
Ground Fault
High Oil Temp (non-ECM)
Idle Mode Active (ECM only)
Knock Shutdown†
Low Coolant Level (NFPA 110 default)
Low Coolant Temp ‡
Low Fuel Warning ‡
Low Fuel Shutdown†
Remote Reset
Remote Shutdown
Shutdown Type A
Shutdown Type B
Var PF Mode
Voltage Lower
Voltage Raise
Warning
* Switchgear applications only † Waukesha engines only. ‡ NFPA 110 default

Figure 4-3 Digital Input Selections

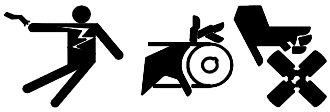
4.6 Operational Summary Setup Mode

The operational summary setup window (also called Engine Start Setup) allows the operator to program a generator set run time, start or stop the generator set, reset the generator set maintenance records, or reset the controller after a fault condition. See the table in Section 4.2 for a list of items included in the data window and then read this section for more information. Also see Figure 4-4.

Open the Operational Summary data window and select Data Window→Setup to enter the operational summary setup mode. The setup mode can also be accessed by right-clicking on the data window to open a pop-up menu and then clicking on Setup.

4.6.1 Engine Start/Stop

⚠ 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.

Note: In setup mode, the Engine Start feature allows the PC operator to start and run a generator set that is not visible from the PC location. Use caution to prevent unintended starting of the generator set or unsafe generator set operation.

In Operational Summary Setup mode, enter the duration of the generator set run in the Run Time setup column in hours:minutes. Then click the Start Engine button to start the generator set. Click the Stop Engine button to stop the test at any time during the run.

To view the time remaining for the generator set run, open the Engine Brief data window. The Countdown shows the time remaining in the programmed generator set run. The Run Time shows the duration of the run that was entered in the operational summary setup window.

4.6.2 Reset Maintenance Records

In Operational Summary Setup mode, click on the Reset Maintenance Records button to set the generator set maintenance records to zero. This resets the run time, operating, days, and number of starts since last maintenance counters to zero.

4.6.3 Reset Faults

In Operational Summary Setup mode, click on the Reset Faults button to reset the controller after correcting a fault condition.

Note: Always determine and correct the cause of a fault condition before resetting the controller. In the case of an “EEPROM WRITE FAILURE” fault message, refer to the 550 controller Operation Manual for more information.

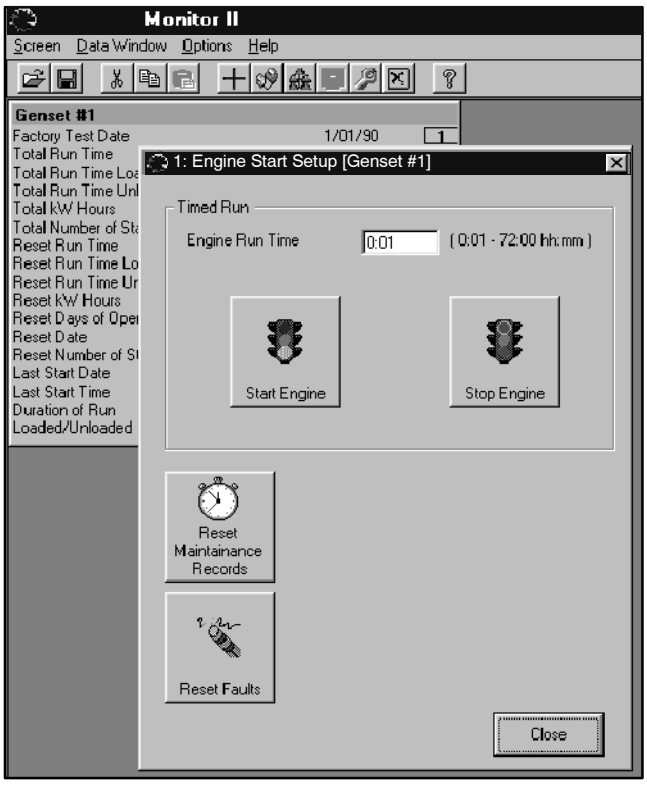


Figure 4-4 Operational Summary Setup Window

4.7 Relay Driver Outputs

The relay driver outputs (RDOs) can control relays connected to fans, lights, or other customer equipment. The relay driver output data window displays the source that drives each RDO and the RDO state (on or off). See Figure 4-5.

Assign any of the system events listed in Section 4.10, any user-defined digital inputs from D01–D21, or any analog inputs from A01–A07 to an RDO. The Defined Common Fault is the default driver for RDO 18. Change the source that drives each RDO in the setup mode. See the controller operation manual for RDO factory settings.

Note: If the NFPA 110 defaults are set, the user cannot change RDOs 1–13, 19, 22, or 23.

RDO Setup Procedure

1. Select the Relay Driver Output data window.
2. Choose Data Window→Setup or right-click on the data window and choose Setup.
3. In the column on the right side of the setup window, double-click on the line for the RDO to define.
4. Select the item to define as an RDO from the dropdown list in the pop-up window.
5. Click OK when finished to apply the changes or Cancel to discard the changes.

See the controller operation manual for information about hardware connections for RDOs.

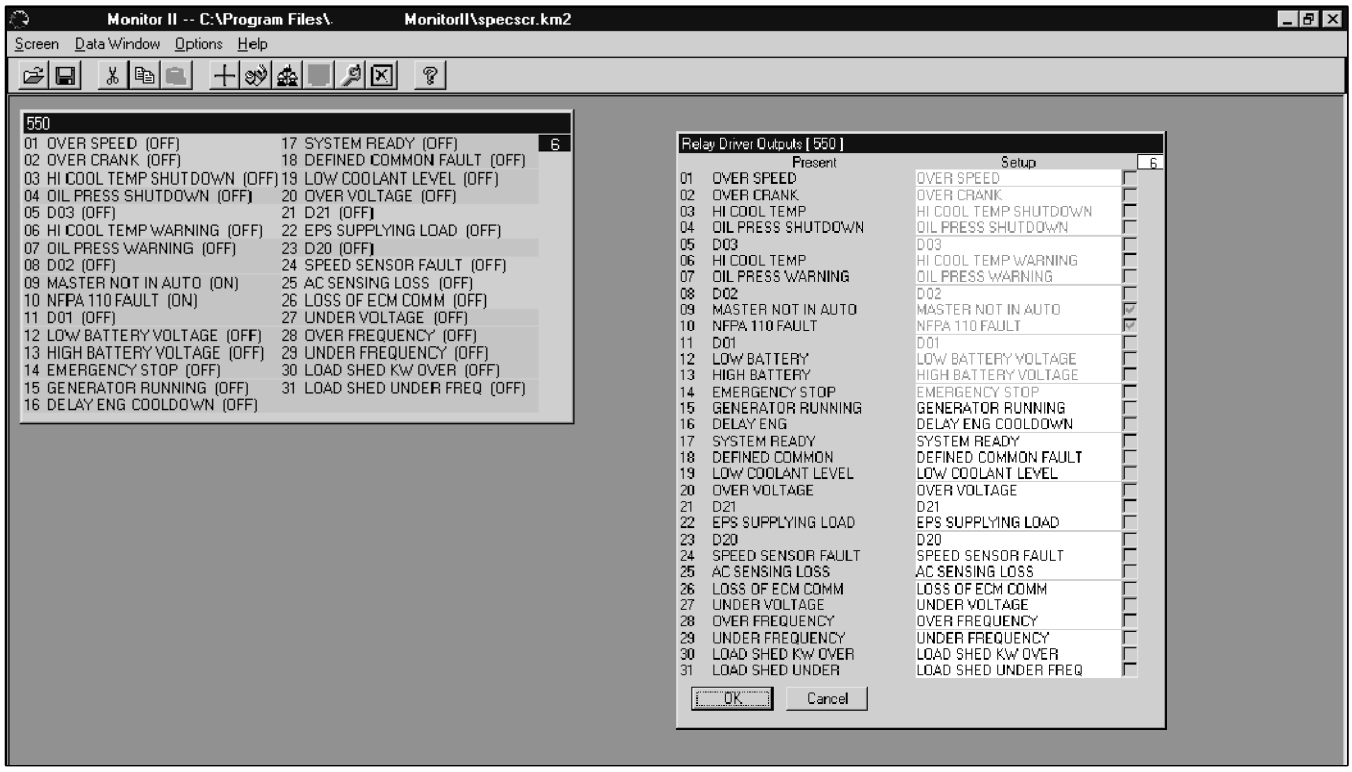


Figure 4-5 Relay Driver Outputs Data Window with Setup Window

4.7.1 Software-Controlled RDOs

The operator can define up to four software-controlled relay driver outputs (SCRDOs). SCRDOs allow the operator to control outputs from a remote site using a PC with either KBUS or Modbus® communications.

Note: SCRDOs allow the computer operator to turn on outputs from a remote location using a personal computer. Be very careful when activating outputs for a system that is not visible from the PC location.

In setup mode, the SCRDOs are displayed as RDO1-4. A checkmark in the small box on the right side of the window indicates that the SCRDO is activated (on). Click in the box to turn the SCRDO on and off.

Note: Activated SCRDOs remain on if communication between the PC and the device is lost.

If communication between the PC and the device is lost, use the controller keypad to deactivate (turn off) activated SCRDOs. Go to Menu 10 and press the right arrow to bring up the “deactivate” prompt. Refer to the controller operation manual for more information about using the controller keypad. SCRDOs cannot be turned on from the controller keypad.

4.7.2 NFPA 110 Defaults

Turn the NFPA 110 defaults on or off through the Generator Info data window. Enter setup mode as described in Section 2.10.1. Choose “Yes” in the NFPA 110 drop-down window to turn the defaults on, or “No” to turn them off. If the NFPA 110 defaults are set, the user cannot change RDOs 1–13, 19, 22, or 23. The NFPA 110 defaults are listed in Figure 4-6.

Note: Some of the NFPA default functions require optional input sensors on some models.

RDO	NFPA 110 Default
01	Overspeed
02	Overcrank
03	High coolant temperature shutdown
04	Oil pressure shutdown
05	Low coolant temperature (ECM only)
06	High coolant temperature warning
07	Oil pressure warning
08	Low fuel*
09	Master switch not in AUTO
10	NFPA 110 common fault
11	Battery charger fault*
12	Low battery voltage
13	High battery voltage
19	Low coolant level
22	Emergency power system supplying load
23	Air damper indicator
* Requires optional input sensors on some models.	

Figure 4-6 NFPA 110 Defaults

4.8 Time and Date

This data window displays generator set time and date information. Change the time and date settings in setup mode.

Time. The time at the generator set location. The format is Hour:Minute AM/PM.

Date. The date at the generator set location. The format is Month/Day/Year.

Day. The day of week calculated by the generator set controller from the date.

Enter the time and date at the generator set’s location. Click AM/PM to change AM/PM. Or, click on the System Clock button to set the time and date from the PC’s system clock.

Note: If the generator set is located in a different time zone than the PC, enter the time at the generator set’s location.

Note: Upon power loss, this information may need to be reset.

4.9 Digital 550 Generator Set Controller Parameter Locations

Use the following table to find the data window locations of individual items.

Item	Data Window
AFM Shutdown	Digital Inputs
Alternator Model Number	Factory Setup
Ambient Temperature	Engine Miscellaneous
Analog Auxiliary In	Analog Input Data
	Analog Input Setup
Analog Volt Adjust	Analog Input Setup
Battery Voltage	Generator Info
Battery Voltage (input)	Analog Input Data
Battleswitch (input)	Digital Inputs
Common Fault Selections	Common Fault Selections
Control Serial No.	Generator Info
Controller Serial No.	Factory Setup
Coolant Level	Engine Coolant
Coolant Pressure	Engine Coolant
Coolant Temperature	Engine Brief
	Engine Coolant
Countdown	Engine Brief
Crank Cycles	Time Delays
Crank On	Time Delays
Crank Pause	Time Delays
Crankcase pressure	Engine Oil
Date	Time and Date
Day	Time and Date
Days Operation	Factory Setup
Designation	Generator Info
Deton Shutdown	Digital Inputs
Deton Warning	Digital Inputs
Duration of Run	Operational Summary
ECM Battery Voltage	Engine Miscellaneous
ECM Equipped	Engine Brief
ECM Serial #	Engine Miscellaneous
Enable Synch	Digital Inputs
Engine Cooldown	Time Delays
Engine Model #	Engine Miscellaneous
Engine Model Number	Factory Setup
Engine Run Time	Operational Summary Setup Mode
Engine Serial #	Engine Miscellaneous
Engine Speed	Engine Brief
	Engine Speed
Engine Start	Time Delays
Engine Starts	Engine Brief
Engine Start (button)	Operational Summary Setup Mode
Event History	Event History
Factory Test Date	Operational Summary
Final Assembly Clock #	Factory Setup
Final Assembly Date	Factory Setup
Frequency	Frequency
Fuel Last Run	Engine Fuel
Fuel Pressure	Engine Fuel
Fuel Rate	Engine Fuel
Fuel Temperature	Engine Fuel
Genset Serial Number	Factory Setup
High Battery Voltage	Trip Points
High Sdwn Value	Analog Input Setup
High Warning Value	Analog Input Setup
Intake Air Pressure	Engine Miscellaneous
Intake Air Temp	Engine Miscellaneous
Knock Shutdown	Digital Inputs
kVA	kVA
kVAR	kVAR
kW	kW
kW Rating	Generator Info
L1, L2, and L3	Line Current
L1-L0 VAC L2-L0 VAC L3-L0 VAC	Line-Neutral Voltage
L1-L2 VAC L2-L3 VAC L3-L1 VAC	Line-Line Voltage
Last Start Date	Operational Summary
Last Start time	Operational Summary
Load	Generator Info
Load Shed	Time Delays
Load Shed Output	Trip Points
Loaded/Unloaded	Operational Summary
Local Battery Volts	Engine Brief
Location	Generator Info
Low Battery Voltage	Trip Points
Low Fuel Shutdown	Digital Inputs
Low Sdwn Value	Analog Input Setup
Low Warning Value	Analog Input Setup
MDEC Fault Code	Engine Miscellaneous
Model No.	Factory Setup
	Generator Info
NFPA 110	Generator Info
Oil Level	Engine Oil
Oil Pressure	Engine Brief
	Engine Oil
Oil Temperature	Engine Oil
Operating Mode	Generator Info
Air Damper Input	Digital Inputs
Battery Charger Fault Input	Digital Inputs
Breaker Closed Input (not user-assignable)	Digital Inputs

Item	Data Window
Field Overvolt Inputs	Digital Inputs
Ground Fault Input	Digital Inputs
High Oil Temp Input (non-ECM)	Digital Inputs
Idle Mode Active Input (ECM-equipped only)	Digital Inputs
Low Coolant Level Input	Digital Inputs
Low Coolant Temp Input (not user-assignable)	Digital Inputs
Low Fuel Input	Digital Inputs
Overfrequency	Trip Points
Override Engine Cooldown	Time Delays (setup only)
Overspeed	Trip Points
Overvoltage	Time Delays
	Trip Points
Power Factor	Power Factor
Relay Driver Outputs (RDOs)	Relay Driver Outputs
Remote Reset Input	Digital Inputs
Remote Shutdown Input	Digital Inputs
Reset Date	Operational Summary
Reset Days of Operation	Operational Summary
Reset Faults (button)	Operational Summary Setup
Reset kW Hours	Operational Summary
Reset Maintenance Records	Operational Summary Setup
Reset Number of Starts	Operational Summary
Reset Run Time	Operational Summary
Reset Run Time Loaded	Operational Summary
Reset Run Time Unloaded	Operational Summary
Run Time	Engine Brief
Sdwn Delay	Analog Input Setup
Serial No.	Factory Setup

Item	Data Window
Serial No.	Generator Info
Shutdown Enabled	Analog Input Setup
Shutdown Type A Input	Digital Inputs
Shutdown Type B Input	Digital Inputs
Single/Three Phase	Generator Info
Spec No.	Factory Setup
	Generator Info
Starting Aid	Time Delays
Start Engine (button)	Operational Summary Setup
Stop Engine (button)	Operational Summary Setup
System Frequency	Generator Info
System Voltage	Generator Info
Time	Time and Date
Total kW hours	Operational Summary
Total Number of starts	Operational Summary
Total Run Time	Operational Summary
Total Run Time Loaded	Operational Summary
Total Run Time Unloaded	Operational Summary
Underfrequency	Trip Points
Undervoltage	Time Delays
	Trip Points
Unit #	Engine Miscellaneous
Var PF Mode Input	Digital Inputs
Version Number	Factory Setup
Voltage Lower Input	Digital Inputs
Voltage Raise Input	Digital Inputs
Warn Delay	Analog Input Setup
Warning Enabled	Analog Input Setup

4.10 System Event, Common Fault, and RDO Message Summary

Selection	System Events and Common Faults	Relay Driver Outputs (RDOs)
A01 through A07 (Analog Auxiliary Inputs 01 through 07)	X	X
AC SENSING LOSS	X	X
AFM REMOTE START (Air-fuel module remote engine start signal)†	X	X
AIR DAMPER CONTROL	X	X
AIR DAMPER INDICATOR	X	X
AIR TEMP SIGNAL LOSS†		X
ALT. PROTECT SHUTDWN	X	X
BATTERY CHARGE FAULT (Battery charger fault)	X	X
BREAKER TRIP*	X	X
CRITICAL OVERVOLTAGE	X	X
D01 through D21 (Digital Auxiliary Inputs 01 through 21)	X	X
DEFINED COMMON FAULT (do not use for common fault)	X	X
DELAY ENG COOLDOWN [Time Delay Engine Cooldown (TDEC)]	X	X
DELAY ENGINE START [Time Delay Engine Start (TDES)]	X	X
EEPROM WRITE FAILURE	X	X
EMERGENCY STOP	X	X
EPS SUPPLYING LOAD (Emergency power system supplying load)	X	X
FUEL VALVE RELAY†		X
GENERATOR RUNNING	X	X
GEN SET PARAM WARNING (not selectable as common fault)	X	
GEN SET S/N WARNING (not selectable as common fault)	X	
GEN SET S/N SHUTDOWN (not selectable as common fault)	X	
GROUND FAULT	X	X
HI COOL TEMP SHUTDOWN (High coolant temperature shutdown)	X	X
HI COOL TEMP WARNING (High coolant temperature warning)	X	X
HI OIL TEMP SHUTDOWN	X	X
HI OIL TEMP WARNING†		X
HIGH AIR TEMP SHUTDOWN†		X
HIGH AIR TEMP WARNING†		X
HIGH BATTERY VOLTAGE	X	X
IN SYNCH*	X	X
INTERNAL FAULT	X	X
LOAD SHED KW OVER (Load shed kW overload)	X	X
LOAD SHED OVERTEMP§		X
LOAD SHED UNDERFREQ (Load shed underfrequency)	X	X
LOCKED ROTOR	X	X
LOSS OF ECM COMM (Engine control module communications loss)	X	X
LOSS OF FIELD SD (Shutdown)*		X
LOW BATTERY VOLTAGE	X	X
LOW COOLANT LEVEL	X	X
LOW COOLANT TEMP SHUTDOWN§		X
LOW COOLANT TEMP WARNING		X
LOW FUEL	X	X
MASTER NOT IN AUTO	X	X

* Switchgear applications
† Waukesha engines only
§ For future applications

Selection	System Events and Common Faults	Relay Driver Outputs (RDOs)
MASTER SWITCH ERROR (Shutdown; master switch is in more than one position or faulty)	X	X
MASTER SWITCH OFF	X	X
MASTER SWITCH OPEN (Shutdown; faulty master switch or connections)	X	X
MDEC BLOCK HEATER CONTROL§		X
MDEC RED ALERT§		X
MDEC YELLOW ALERT§		X
NFPA 110 FAULT	X	X
NO COOL TEMP SIGNAL (Coolant temperature signal loss)	X	X
NO OIL PRESS SIGNAL (Oil pressure signal loss)	X	X
OIL PRESS SHUTDOWN	X	X
OIL PRESS WARNING	X	X
OIL TEMP SIGNAL LOSS †		X
OVERCRANK (Shutdown)	X	X
OVERCURRENT (warning)	X	X
OVERCURRENT PR SD (Overcurrent protective relay shutdown)*	X	X
OVERFREQUENCY (Shutdown)	X	X
OVERPOWER SD (Shutdown)*	X	X
OVERSPEED (Shutdown)	X	X
OVERVOLTAGE (Shutdown)	X	X
PRELUBE RELAY†		X
PROTECTIVE RELAY COMMON*		X
REVERSE POWER SD (Shutdown)*	X	X
SOFTWARE-CONTROLLED 1 through 4 (Software-controlled relay driver outputs. See Section 4.7.1.)		X
SPEED SENSOR FAULT	X	X
STARTING AID	X	X
SYSTEM READY	X	X
UNDERFREQUENCY (Shutdown)	X	X
UNDERVOLTAGE (Shutdown)	X	X
WEAK BATTERY	X	X

* Switchgear applications
† Waukesha engines only
§ For future applications

Figure 4-7 System Events, Common Faults, and RDOs

Notes

5.1 Introduction

This section explains data window information available for Digital generator set controllers. See Section 5.2 for available data windows. More detailed information for some of the items is included in the sections after the table.

5.2 Data Windows

The following table lists and describes the items found in each data window. A checkmark (✓) in the Setup column indicates a user-programmable setting. Enter the setup mode to program new settings by selecting Data Window→Setup or by right-clicking on the data window and selecting Setup.

Data Window	Setup	Item	Item Description
% Max kW		% Max kW	The present kilowatt load on the generator set divided by its kilowatt rating, expressed as a percentage.
Auxiliary Inputs	✓	Auxiliary Inputs 1–4	Displays the identifying name (20 characters maximum) for auxiliary 1, 2, 3, and 4 inputs and indicates whether the auxiliary input causes a warning or a shutdown. In setup mode, edit the identifying name in the setup column and double click to change between Warning and Shutdown.
Common Fault Selections	✓	Common Fault Selections	Displays Yes next to signals that are part of the Defined Common Fault signal, No next to signals that are not. See the list of signals available in Section 5.3.
Engine Inputs		Battery Voltage	The engine starting battery voltage.
		Coolant Temperature	The engine coolant temperature in degrees Celsius or Fahrenheit.
		Oil Pressure	The engine oil pressure in kPa or psi.
Engine Speed		Engine Speed	The engine speed in RPM. Analog or digital display.
Frequency		Frequency	The average generator set output frequency in hertz (Hz). Analog or digital display.
Generator Info	✓	Battery Voltage	The battery voltage shown on the nameplate, which is normally set at the factory.
		Control Serial No.	The generator set controller serial number, which is normally set at the factory. Analog or digital display.
		Designation	Setup window only. An optional unique name that identifies the device and appears on the device list at each address for network connections and on all data windows when the Monitor II software is connected to the device. Enter a description of up to 9 characters in setup mode. **Note:** The Monitor II software does not display the new designation until all devices are scanned after selecting a new screen.
		kW Rating	The generator set alternator kilowatt rating shown on the nameplate, which is normally set at the factory.
		Load	An optional description of the connected load, such as total building, HVAC, or motors. Enter a description with up to 20 characters in setup mode.
		Location	An optional description of the generator set's location. Enter a description with up to 9 characters in setup mode.
		Model No.	The generator set model number shown on the nameplate, which is normally set at the factory.
		Network Address	The network address of the device. Set at the local display and keypad only.
		Serial No.	The generator set serial number shown on the nameplate, which is normally set at the factory.
		Single/Three Phase	Electrical system type: single-phase, three-phase wye, or three-phase delta. This setting is normally set at the factory.

Data Window	Setup	Item	Item Description
Generator Info, continued	✓	Spec No.	The generator set specification number shown on the nameplate, which is normally set at the factory.
		System Frequency	The generator set frequency shown on the nameplate, which is normally set at the factory.
		System Voltage	The generator set voltage shown on the nameplate, which is normally set at the factory.
Generator Shutdown History		Event History	A history of the 4 most recent shutdowns and the date on which they occurred.
Line Current		L1, L2, and L3	The current in amperes through generator set lines L1, L2, and L3. Analog or digital display.
Line-Line Voltage		L1–L2 VAC L2–L3 VAC L3–L1 VAC	The AC rms voltage measured from line to line: L1-L2, L2-L3, and L3-L1. Analog or digital display.
Line-Neutral Voltage		L1–L0 VAC L2–L0 VAC L3–L0 VAC	The AC rms voltage measured from each line to neutral: L1-L0, L2-L0, and L3-L0. Analog or digital display.
Operational Summary		Days of Operation	The number of days the generator set has been in operation since the last maintenance reset.
		Duration of Run	The length of time, in hours, that the generator set ran during its last operation.
		kW Hours	The number of kilowatt-hours on the generator set since last reset.
		Loaded/Unloaded	Whether the generator last ran with or without a load.
		Number of Starts	The number of successful starts for the generator set since last reset.
		Reset Date	The last maintenance record reset date.
		Run Time: Loaded	The running time of the generator set with a load.
		Run Time: Unloaded	The running time of the generator set without a load.
		Start Date	The date the generator set was last successfully started.
		Start Time	The time the generator set was last successfully started.
Power Factor and kW		Power Factor	The power factor of the load.
		Total Kilowatts	The total load in kilowatts.
Relay Driver Outputs	✓	Relay Driver Outputs (RDOs)	Displays the signal source that drives each of the relay driver outputs (RDOs) and the RDO state (on or off). See Section 5.4 for a list of available signals.
Status		Generator Status	Displays the generator set status: Running, Stopped, or Cranking.
		Master Switch	Displays the master switch position: Run, Off/Reset, or Auto.
		Program Mode	Displays the present programming mode: Local, Off, or Remote.
		System Alert	Displays the operating mode of the unit. The message displayed can be any of the signal sources that can enable the common fault signal (see Section 5.3) plus the messages in Section 5.5. See the generator set controller operation and installation manual for more information.
Status (Setup Mode) (see Section 5.5)	✓	Fault Reset	Check box to reset a fault condition. If the controller indicates a fault, reset it before starting the generator set. Click the OK button to start the generator set.
		Run Time	Displays the generator set run time. Enter a new generator set run time in the setup column. **Note:** Note: Click the Stop Engine button to stop the test before the run time completes. The run time setting returns to 00:00/No after the generator set run time elapses.

Data Window	Setup	Item	Item Description
Time and Date	✓	Date	The date at the generator set location. The format is Month/Day/Year. See Section 5.6.
		Day	The day of week calculated by the generator set controller from the date.
		Time	The time at the generator set location. The format is Hour:Minute AM/PM. See Section 5.6.
Time Delays	✓	Auxiliary 1–4	Inhibit: The time delay after engine start before the controller checks the auxiliary input for sensor signals. Delay: The time delay after the controller receives a signal from the auxiliary input before a shutdown or warning occurs.
		Crank Cycles	The number of engine crank cycles before an overcrank shutdown.
		Crank On	The engine cranking on time, in seconds.
		Crank Pause	The engine cyclic cranking rest time, in seconds.
		Engine Cooldown	The time delay between the remote engine start contact opening and the engine stop sequence, in minutes:seconds.
		Engine Start	The time delay between the remote engine start contact closing and the engine start sequence, in seconds.
		Overvoltage	The time delay before a fault if the voltage rises above the upper limit, in seconds.
		Starting Aid	The engine starting aid time delay before engine cranking. The adjustable time delay allows the starting aid to operate before the engine starts to crank.
		Undervoltage	The time delay before a fault if the voltage falls below the lower limit, in seconds.
Time Delays Status		Crank On, Crank Pause, Engine Cooldown, Engine Start, or Starting Aid	End Off: The time delay is running or has not run.
			End On: The time delay has completed timing.
			Run Off: The time delay is not running.
			Run On: The time delay is running.
Trip Points	✓	High Battery Voltage	The battery voltage level that causes a high battery voltage warning. The warning is activated if the battery voltage remains above the limit for more than 10 seconds. Shown in DC volts (VDC).
		Low Battery Voltage	The battery voltage level that causes a low battery voltage warning. The warning is activated if the battery voltage falls below the limit for more than 10 seconds. Shown in DC volts (VDC).
		Overfrequency	The output frequency level that causes an overfrequency shutdown, shown in percentage of rated frequency and in Hz. The unit shuts down if the output frequency remains above the limit for more than 10 seconds.
		Overspeed	The speed that causes an immediate overspeed shutdown. Shown in Hz and RPM.
		Overvoltage	The output voltage level that causes an overvoltage shutdown, shown in percentage of the rated voltage and in volts.
		Underfrequency	The output frequency level that causes an underfrequency shutdown, shown in percentage of rated frequency and in Hz. The unit shuts down if the output frequency falls below the limit for more than 10 seconds.
		Undervoltage	The output voltage level that causes an undervoltage shutdown, shown in percentage of system voltage and in volts.

5.3 Common Fault Selections

This data window displays Yes next to signals that are part of the Defined Common Fault signal, No next to signals that are not.

Available signals include those signals available for the relay driver outputs (see Section 5.4) except the defined common fault signal itself plus the following.

Low Oil Pressure
High Coolant Temperature
Overcrank
Overspeed
Emergency Stop
Not In Auto
System Ready
Low Battery Voltage
Battery Charger Fault
Low Fuel
High Coolant Temperature Warning
Low Oil Pressure Warning
Low Coolant Temperature
Load Shed Underfrequency
Load Shed Excess kW
Auxiliary 1
Auxiliary 2
Auxiliary 3
Auxiliary 4
Locked Rotor
Internal Error
EPS Supplying Load
Speed Sensor Fault
Load Shed
kW Overload
Underfrequency Warning
High Battery Voltage
No Temperature Gauge Signal
No Oil Gauge Signal
Ground Fault Detected
Overcurrent
Engine Cooldown
Engine Start
Generator Running
NFPA 110 Common Alarm
Starting Aid
Weak Battery
Low AC Output
Overfrequency Shutdown

See the controller operation and installation manual for a detailed description of the status and fault messages.

In setup mode, double click on signals to change between Yes and No. The program sorts the list of signals so that signals that enable the common fault signal (Yes) are displayed first. The system limits selected signals enabling the common defined fault to a maximum of 31.

5.4 Relay Driver Outputs

This data window displays the signal source that drives each of the ten relay driver outputs (RDOs) on the generator set controller. RDOs can be driven from any of the following signal sources.

Defined Common Fault
Air Damper
Overvoltage
Undervoltage
Underfrequency Shutdown
Low Coolant Level
High Oil Temperature

See the controller operation and installation manual for a detailed description of the status and fault messages.

Change the signal source that drives each relay driver output in the setup mode.

RDO Setup Procedure

1. Select the Relay Driver Output data window.
2. Choose Data Window→Setup or right click on the data window and choose Setup.
3. Select the item to define as a relay driver output from the drop-down list in the pop-up window.
4. Click OK when finished to apply the changes or Cancel to discard the changes.

5.5 Status

This data window displays generator set status information. See Section 5.2 for a list of items included in the Status window and then read this section for more information.

5.5.1 System Alert Messages

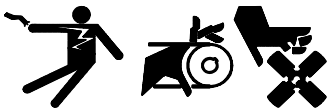
The system alert messages indicate the operating mode of the unit. The message displayed can be any of the signal sources that can enable the common fault signal (see Section 5.3) plus the following messages.

Overvoltage L1–L2
Overvoltage L2–L3
Overvoltage L3–L1
Overvoltage L1–L0
Overvoltage L2–L0
Overvoltage L3–L0
Undervoltage L1–L2
Undervoltage L2–L3
Undervoltage L3–L1
Undervoltage L1–L0
Undervoltage L2–L0
Undervoltage L3–L0
Master Switch Open
Power-Down Error

See the generator set controller operation and installation manual for more information.

5.5.2 Engine Start

⚠ 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.

In setup mode the status data window allows the operator to reset a generator set fault, program a generator set run time, and start the generator set. Right click on the Status data window and choose Setup to access engine start.

Note: In setup mode, this data menu allows the software operator to start and run a generator set in a location that is not within sight of the operator. Use extreme care when using this feature to prevent unintended starting of the generator set.

- **Run Time**. Displays the duration of the generator set run time. Enter a new generator set run time in the setup column.

- **Fault Reset**. Check box to reset a fault condition. If the controller indicates a fault, reset it before starting the generator set.

Click the Ok button to start the generator set.

Note: Click the Stop Engine button to stop the test before the run time completes.

The run time setting returns to 00:00/No after the generator set run time elapses.

5.6 Time and Date

This data window displays generator set time and date information.

- **Time**. The time at the generator set location. The format is Hour:Minute AM/PM.

- **Date**. The date at the generator set location. The format is Month/Day/Year.

- **Day**. The day of week calculated by the generator set controller from the date.

Enter the time and date at the generator set's location in setup mode. Click AM/PM to change AM/PM. Click on the System Clock button to set the time and date from the PC's system clock.

Note: If the generator set is located in a different time zone than the PC, adjust the time and date on the PC to match the time and date at the generator set location.

5.7 Digital Generator Set Controller Data Windows Item Locations

Use the following table to find the data window locations of individual items.

Item	Data Window
% Max kW	% Max kW
Auxiliary 1–4	Time Delays
Auxiliary Inputs 1–4	Auxiliary Inputs
Battery Voltage	Engine Inputs
	Generator Info
Common Fault Selections	Common Fault Selections
Control Serial No.	Generator Info
Coolant Temperature	Engine Inputs
Crank Cycles	Time Delays
Crank On	Time Delays
	Time Delays Status
Crank Pause	Time Delays Status
	Time Delays
Date	Time and Date
Day	Time and Date
Days of Operation	Operational Summary
Designation	Generator Info
Duration of Run	Operational Summary
Engine Cooldown	Time Delays Status
	Time Delays
Engine Speed	Engine Speed
Engine Start	Time Delays Status
	Time Delays
Event History	Generator Shutdown History
Fault Reset	Status (Setup Mode)
Frequency	Frequency
Generator Status	Status
High Battery Voltage	Trip Points
kW Hours	Operational Summary
kW Rating	Generator Info
L1, L2, and L3	Line Current
L1–L0 VAC L2–L0 VAC L3–L0 VAC	Line-neutral Voltage
L1–L2 VAC L2–L3 VAC L3–L1 VAC	Line-line Voltage
Load	Generator Info
Loaded/Unloaded	Operational Summary
Location	Generator Info
Low Battery Voltage	Trip Points
Master Switch	Status
Model No.	Generator Info
Network Address	Generator Info
Number of Starts	Operational Summary
Oil Pressure	Engine Inputs
Overfrequency	Trip Points
Overspeed	Trip Points
Overvoltage	Time Delays
	Trip Points
Power Factor	Power Factor and kW
Program Mode	Status
Relay Driver Outputs (RDOs)	Relay Driver Outputs
Reset Date	Operational Summary
Run Time	Status (Setup Mode)
Run Time: Loaded	Operational Summary
Run Time: Unloaded	Operational Summary
Serial No.	Generator Info
Single/Three Phase	Generator Info
Spec No.	Generator Info
Start Date	Operational Summary
Start time	Operational Summary
Starting Aid	Time Delays
	Time Delays Status
System Alert	Status
System Frequency	Generator Info
System Voltage	Generator Info
Time	Time and Date
Total Kilowatts	Power Factor and kW
Underfrequency	Trip Points
Undervoltage	Time Delays
	Trip Points

6.1 Introduction

This section explains data window information available for MATS and MATS+ ATS controllers. See Section 6.2 for available data windows.

Refer to the ATS controller operation and installation manual for more information about controller operation, recommended settings, and accessories. See the List of Related Materials in the Introduction of this manual.

6.2 Data Windows

The following table lists and describes the items found in each data window. A checkmark (✓) in the Setup column indicates a user-programmable setting. Enter the setup mode to program new settings by selecting Data Window→Setup or by right-clicking on the data window and selecting Setup. An asterisk (*) indicates that the data window or item displays information for both the normal and emergency sources. More detailed information for some of the items is included in the sections after the table.

Data Window	Setup	Item	Item Description
Accessories		List of installed accessories	ATS accessory status, which matches the Accessory Active LEDs on the ATS. On: The accessory is functioning. Off: The accessory has completed its function or has not been called upon to function. Disabled: The accessory is disabled. The enabling shunt/jumper on the controller circuit board is not installed.
ATS Information*	✓	Address	The network address of the unit. (Display only. Set the network address at the controller.)
		Amperage	The ATS power switching device current rating in amperes, which is normally set at the factory.
		ATS SN	The ATS serial number, which is factory set and cannot be changed in setup mode.
		ATS Type	The type of power switching device on the transfer switch, which is factory set and cannot be changed in setup mode. This item is displayed only for the MATS+ controller.
		Branch	An optional description of the switch location by distribution branch, such as service entrance or branch circuit breaker number. Enter a description up to 18 characters long in setup mode.
		Control	The ATS controller serial number, which is factory set and cannot be changed in setup mode.
		Designation	An optional unique name that identifies the device and appears on the device list at each address for network connections and on all data windows when the Monitor II software is connected to the device. Enter a unique description up to 9 characters long in setup mode. **Note:** The Monitor II software does not display the new designation until the operator selects a new screen and the software scans the devices.
		Limits	The system voltage and system frequency limits (Setup Mode only). The limits are factory set and cannot be changed.
		Load	An optional description of the connected load, such as total building, HVAC, or motors. Enter a description up to 20 characters long in setup mode.
		Location	An optional description of the transfer switch's location. Enter a description up to 20 characters long in setup mode.
		Options	The catalog numbers of enabled and installed accessories for reference when servicing the transfer switch, which are normally set at the factory. Each entry is limited to three characters. Enter up to 12 accessories, although more than 12 accessories may be installed. Check the transfer switch nameplate for factory-installed accessories.
		Poles	The number of poles on the ATS power switching device, which is normally set at the factory.
		Single/Three Phase	The ATS phase connection, which is normally set at the factory.
		System Frequency	The ATS frequency rating shown on the nameplate, which is normally set at the factory.

* Displays information for both the normal and emergency sources.

Data Window	Setup	Item	Item Description
ATS Information, continued*	✓	System Voltage	The ATS voltage rating shown on the nameplate, which is normally set at the factory.
ATS Status		Program Switch	The position of the programming mode switch on the transfer switch front panel, Remote, Off, or Local.
		Source Available	Which power sources, Normal and/or Emergency, can accept loads.
		Switch Position	The position of the transfer switch, Normal, Emergency, or Off. The Off position is displayed only for the MATS+ controller.
		System Alert	Displays the operating mode of the unit. The message displayed can be any of the messages listed in Section 6.3. See the ATS controller operation and installation manual for more information.
		Test Switch	The position of the test/operation mode switch and/or the automatic/manual switch, Auto or Not in Auto. See Section 6.3 for more information.
ATS Status (Setup Mode) In setup mode, the ATS status data window allows the operator to exercise the generator set that connects to the ATS engine start contacts. Refer to Section 6.3 for instructions.	✓	BP TDEN	Click the Yes radio button to bypass Time Delay Emergency to Normal (TDEN) during the generator set run.
		BP TDNE	Click the Yes radio button to bypass Time Delay Normal to Emergency (TDNE) during the generator set run.
		Generator Running	Displays Yes if the ATS engine start contact is closed, signaling the generator set to run, No if the ATS engine start contact is open (display only).
		Load Transfer	Click the Yes radio button to run the generator set loaded (the ATS transfers the load to the emergency source) during the generator set run.
		Plant Exerciser	Displays Enabled if the plant exerciser accessory is installed, disabled if it is not installed (display only).
		Plant Exerciser Load/ No Load	Displays Load if the plant exerciser option runs the generator set loaded (the ATS transfers the load to the emergency source). Displays No Load if the plant exerciser option runs the generator set unloaded (the ATS does not transfer the load to the emergency source) (display only).
		Run Time	Displays the generator set run time. Enter a new generator set run time in the setup column. **Note:** In setup mode, this data window allows the operator to start and run a generator set that is not within sight of the operator. Use extreme care when using this feature to prevent unintended starting of the generator set or unexpected transfer of power.
Emergency Frequency		Emergency Frequency	This data window displays the AC frequency in hertz of the emergency source phase A-C, if available.
Emergency Voltage		Emergency Voltage	This data window displays the line-line AC rms voltages of all phases of the emergency source, if available. A single-phase source displays only the voltage on phase A-C.
Exerciser Setup	✓	Change Mode	Click to change the plant exerciser mode. Click on the radio button next to the desired choice. **Note:** All plant exerciser information is lost when the operator selects a different plant exerciser mode.
		Day of Week	The day for each event's pair of exercise runs (Calendar Mode only).
		Exercise Event	The number of the exercise event and whether the event is Enabled or Disabled. (Each event includes 2 runs over 2 weeks' time.)
		First Day of Week	The day for the event's first exercise run (7- or 14-day Mode only).
		First Occurrence	The occurrence number 1–5 of the day for the event's first exercise run (Calendar Mode only).
		Load Transfer	Displays Yes if the plant exerciser option runs the generator set loaded (ATS transfers to the emergency source). Displays No if the plant exerciser option runs the generator set unloaded (the ATS does not transfer the load to the emergency source). (Not user-programmable.)
		Run Time HR:MN	The duration of the event's exercise runs. (Hours and minutes)
		Second Day of Week	The day for the event's second exercise run. If the days are the same, the event contains only one exercise run (7- or 14-day Mode only).
		Second Occurrence	The occurrence number 1–5 of the day for the event's second exercise run. If the days are the same, the event contains only one exercise run (Calendar Mode only).

* Displays information for both the normal and emergency sources.

Data Window	Setup	Item	Item Description
Exerciser Setup, continued	✓	Start Time	The start time for each event's pair of exercise runs.
		Stop Plant Exercise	Click the check box and then click the Ok button to stop the plant exerciser.
		Week 1 or 2	The week of the 14-day period for the exercise event (14-day Mode only).
Features		Inphase Monitor, Phase Sequence, N/E Over/Under V&F, Plant Exerciser, Time Delay Extended, Manual Override, Time Delay Off (MATS+ only)	Displays Enabled or Disabled for each feature or accessory.
Load Shed* (see Section 6.4)	✓	Extended Time Delay (Setup Mode only)	Displays Enabled or Disabled (display only).
		Load Returns	The number of load blocks to return after transfer to the related source.
		Time Before	The length of time before transfer to the related source when all load shed blocks are shed.
		Time After	The length of time after transfer to the related source when the load return sequence begins.
		Time Sequence	The length of time between the return of load blocks.
Normal Frequency		Normal Frequency	This data window displays the AC frequency in hertz of the normal source phase A-C, if available.
Normal Voltage		Normal Voltage	This data window displays the line-line AC rms voltages of all phases of the normal source, if available. A single-phase source displays voltage only on phase A-C.
Operational Summary		Days-Operation	The number of days that the ATS controller has been in operation. (Total and since last reset.)
		Hours-Emer. Source	The number of hours that the emergency source has been available (acceptable). (Total and since last reset.)
		Hours-Not in Normal	The number of hours that the transfer switch has not been in the Normal position. (Total and since last reset.)
		Start Date	The date of last record reset and the date of transfer switch and/or controller installation.
		Switch Transfers	The number of times that the power switching device has operated. (Total and since last reset.)
Phase Sequence		Phase Sequence	This data window displays the phase sequence for each available source (for 3-phase systems only).
Source History		Source History	This data window displays the cause, type, and date of the four most recent source failures. A manual test at the transfer switch records as a source failure. See Section 6.5 for a list of fault messages.
Time and Date	✓	Date	The date at the ATS location. The format is Month/Day/Year.
		Day	The day of week calculated by the ATS controller from the date.
		Time	The time at the ATS location. The format is Hour/Minute AM/PM. In setup mode enter a new time and date. Click AM/PM to change AM/PM. Click on the System Clock button to set the time and date from the PC's system clock. **Note:** If the ATS is located in a different time zone than the PC, enter the time and date to match the time and date at the ATS's location.
Time Delays	✓	Engine Cooldown (TDEC)	The time delay after the ATS transfers back to the Normal position when the ATS opens the engine start contact (min:sec).
		Engine Start (TDES)	The time delay after Normal source failure when the ATS signals the engine to start (min:sec).
		Emergency to Normal (TDEN)	The time delay before the ATS switches from the Emergency to Off or Normal positions (min:sec).

* Displays information for both the normal and emergency sources.

Data Window	Setup	Item	Item Description
Time Delays, continued	✓	Extended time Delay	Displayed as Enabled or Disabled. Enable extended time delays (option KD-100-B or DD-100-B) with a main controller shunt/jumper. This feature cannot be enabled with the software or the local display and keypad. If enabled, time delays can be extended to 99 minutes.
		Normal to Emergency (TDNE)	The time delay after the emergency source is acceptable when the ATS switches from the Normal to Off or Emergency positions (min:sec).
		Off to Emergency (TDOE)	The time delay before the ATS switches from the Off to Emergency positions (min:sec). This item is displayed only for the MATS+ controller.
		Off to Normal (TDON)	The time delay before the ATS switches from the Off to Normal position (min:sec). This item is displayed only for the MATS+ controller.
Time Delays Status		Normal to Emergency (TDNE), Off to Emergency (TDOE), Emergency to Normal (TDEN), Off to Normal (TDON), Engine Cooldown (TDEC), and Extended Time Delay	End Off: The time delay is running or has not run.
			End On: The time delay has completed timing.
			Run Off: The time delay is not running. This item is displayed only for the MATS+ controller.
			Run On: The time delay is running. This item is displayed only for the MATS+ controller.
Transfer Status		Auto/Manual Transfer	The position, Auto or Manual, of the automatic/manual transfer selector switch.
		Duration of Outage	The duration of the most recent normal source outage or test using the system test switch (hours and minutes). Outages of less than one minute do not show on the screen.
		Exercise Time Left	The generator set running time remaining when the generator set is running in plant exerciser or engine start mode (hours and minutes).
		Last Exerciser Date	The date of the most recent plant exerciser run.
		Last Outage	The time and date of the most recent normal source outage or test using the system test switch.
Trip Points See Section 6.6	✓	Overfreq Dropout	The maximum source frequency, expressed as a percentage of the system rated frequency. Above this frequency, the source is considered unavailable.
		Overfreq Pickup	The overfrequency pickup, expressed as a percentage of the rated frequency. After rising above the overfrequency dropout level, the source voltage must drop below this pickup level to be considered available.
		Overvolt Dropout	The maximum source voltage, expressed as a percentage of the rated line-to-line voltage. Above this level, the source is considered unavailable. **Note:** Set over trip points at least 2% higher than under trip points.
		Overvolt Pickup	The overvoltage pickup, expressed as a percentage of the rated line-to-line voltage. After exceeding the overvoltage dropout level, the source voltage must drop below this pickup level to be considered available.
		Underfreq Pickup	The underfrequency pickup, expressed as a percentage of the rated frequency. After falling below the underfrequency dropout level, the source voltage must rise above this pickup level to be considered available.
		Underfreq Dropout	The minimum source frequency, expressed as a percentage of the system rated frequency. Below this frequency, the source is considered unavailable.
		Undervolt Pickup	The undervoltage pickup, expressed as a percentage of the rated line-to-line voltage. After falling below the undervoltage dropout level, the source voltage must rise above this pickup level to be considered available. Displays trip points for the normal and emergency sources.
		Undervolt Dropout	The minimum source voltage, expressed as a percentage of the rated line-to-line voltage. Below this level, the source is considered unavailable.
* Displays information for both the normal and emergency sources.			

6.3 ATS Status Window

See Section 6.2 for a list of items included in the ATS status window and then read this section for more information.

6.3.1 System Alert Messages

System alert messages indicate the operating mode of the unit. The following messages can be displayed. See the ATS controller operation and installation manual for more information.

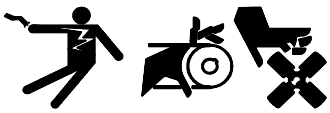
- **None.** The ATS controller and power switching devices are working properly.
- **Aux-Switch Fault.** A power switching device auxiliary switch contact malfunction, wiring fault, or controller fault.
- **Dbl Aux-Sw Fault.** A power switching device auxiliary switch contact malfunction, showing both normal and emergency contacts closed at the same time, or other wiring or controller fault.
- **Transfer Hang.** The power switching device may be binding or not completing a transfer.
- **Power-Down Error.** May indicate a loss of controller settings after a loss of controller power. Recheck settings and reenter as necessary.
- **RAM Error, Memory Error.** An ATS controller random access memory fault after controller powerup. The controller may require replacement.
- **Manual Transfer.** Manual transfer is needed when the automatic/manual selector switch, if equipped, is in the Manual position. Push the Manual Transfer to Normal, Manual Transfer to Emergency, or Manual Transfer to Off pushbutton to initiate transfer.
- **Fault #1, Fault #2.** Displays system faults external to the ATS controller. Connection of the two fault–sensing circuits is optional and may be used to annunciate generator set conditions.
- **Program Switch**. The position (Remote, Off, or Local) of the programming mode switch on the transfer switch front panel.
- **Test Switch**. The position (Auto or Not in Auto) of the test/operation mode switch and/or the automatic/manual switch.

Note: This data window does not show the source of the engine start signal, i.e., plant exerciser, a remote start contact, or engine start signal from the local panel or remote computer.

Note: In setup mode, this data window allows the operator to start and run a generator set that is not within sight of the operator. Use extreme care when using this feature to prevent unintended starting of the generator set or unexpected transfer of power.

6.3.2 Exercising the Generator Set

⚠ 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.

In setup mode the ATS Status data window allows the operator to exercise the generator set that is connected to the ATS engine start contacts. The ATS must have a plant exerciser accessory installed to access the data window setup.

Note: In setup mode, this data menu allows the software operator to start and run a generator set in a location that is not within sight of the operator. Use extreme care when using this feature to prevent unintended starting of the generator set.

Select the ATS Status window and then select Data Window→Setup.

- **Run Time**. Displays the generator set run time. Enter a new generator set run time in the setup column.
- **Load Transfer**. Click the Yes radio button to run the generator set loaded (the ATS transfers the load to the emergency source) during the generator set run.
- **BP TDNE**. Click the Yes radio button to bypass Time Delay Normal to Emergency (TDNE) during the generator set run.
- **BP TDEN**. Click the Yes radio button to bypass Time Delay Emergency to Normal (TDEN) during the generator set run.
- **Plant Exerciser**. Displays Enabled if the plant exerciser accessory is installed, Disabled if it is not installed.
- **Plant Exerciser Load/No Load**. Displays Load if the plant exerciser option runs the generator set loaded (the ATS transfers the load to the emergency source). Displays No Load if the plant exerciser option runs the generator set unloaded (the ATS does not transfer the load to the emergency source).
- **Generator Running**. Displays Yes if the ATS engine start contact is closed, signaling the generator set to run, No if the ATS engine start contact is open.

Click the Ok button to start the generator set.

Note: Click the Stop Engine button to stop the generator set before the run time elapses.

Engine start setup settings return to 00:00/No after the generator set run time elapses or the generator set stops.

6.4 Load Shed

This data window displays load shed settings. The Normal column displays load shed settings for transfer to the normal source. The Emergency column displays load shed settings for transfer to the emergency source.

Change the load shed settings in setup mode.

Load Shed Setup Procedure

1. Select the Load Shed data window.
2. Select Data Window→Setup or right click in the data window and choose Setup.
3. Enter the values for time before and after, time sequence, and load returns in the corresponding boxes. The values entered must fall within the limits shown to the right of each item. Refer to the controller operation and installation manual for more information about load shed settings.
4. Click on OK to apply the changes or Cancel to discard them and return to the previous settings.

Relays on the transfer switch controller provide load return signals to separate load control relays and circuit breakers.

6.5 Source History

This data window displays the cause, type, and date of the four most recent source failures. A manual test at the transfer switch is recorded as a source failure.

The following fault messages are displayed for a three-phase electrical system:

Phase A-B Normal Overvoltage
Phase B-C Normal Overvoltage
Phase C-A Normal Overvoltage
Phase A-B Normal Undervoltage
Phase B-C Normal Undervoltage
Phase C-A Normal Undervoltage
Normal Overfrequency
Normal Underfrequency
Normal Phase Loss
Phase A-B Emergency Overvoltage
Phase B-C Emergency Overvoltage
Phase C-A Emergency Overvoltage
Phase A-B Emergency Undervoltage
Phase B-C Emergency Undervoltage
Phase C-A Emergency Undervoltage

The following fault messages are displayed for a single-phase electrical system:

Emergency Overfrequency
Emergency Underfrequency
Emergency Phase Loss
Normal Overvoltage
Normal Undervoltage
Normal Overfrequency
Normal Underfrequency
Emergency Overvoltage
Emergency Undervoltage
Emergency Overfrequency
Emergency Underfrequency

6.6 Trip Points

This data window displays normal and emergency source pickup and dropout points as percentages of system voltage and frequency. Change the trip point settings in setup mode.

Note: Normal and Emergency Over/Under Voltage and Frequency (accessory 34-J) near the bottom of the data window must show ENABLED in order to enter optional settings. See the controller operation and installation manual for more information.

Trip Point Setup Procedure

1. Select the Trip Point data window.
2. Select Data Window→Setup or right click in the data window and choose Setup.
3. Enter the values for the pickup and dropout settings in the corresponding boxes. The values entered must fall within the limits shown to the right of each item. Refer to the controller operation and installation manual for more information about trip point settings.

Note: Set over trip points higher than under trip points. Maintain at least a 2% difference between dropout and pickup settings.

4. Click on OK to apply the changes or Cancel to discard them and return to the previous settings.

6.7 MATS and MATS+ ATS Controller Item Locations

Use the following table to find the data window locations of individual items.

Item	Data Window
Address	ATS Information
Amperage	ATS Information
ATS SN	ATS Information
ATS Type	ATS Information
Auto/Manual Transfer	Transfer Status
BP TDEN	ATS Status (Setup Mode)
BP TDNE	ATS Status (Setup Mode)
Branch	ATS Information
Change Mode	Exerciser Setup
Control	ATS Information
Date	Time and Date
Day	Time and Date
Day of Week	Exerciser Setup
Days-Operation	Operational Summary
Designation	ATS Information
Duration of Outage	Transfer Status
Emergency Frequency	Emergency Frequency
Emergency to Normal (TDEN)	Time Delays
	Time Delays Status
Emergency Voltage	Emergency Voltage
Engine Cooldown (TDEC)	Time Delays Status
	Time Delays
Engine Start (TDES)	Time Delays
Exercise Event	Exerciser Setup
Exercise Time Left	Transfer Status
Extended Time Delay	Time Delays
	Load Shed
	Time Delays Status
First Day of Week	Exerciser Setup
First Occurrence	Exerciser Setup
Generator Running	ATS Status (Setup Mode)
Hours-Emer. Source	Operational Summary
Hours-Not in Normal	Operational Summary
Inphase Monitor	Features
Last Exerciser Date	Transfer Status
Last Outage	Transfer Status
Limits	ATS Information
List of Installed Accessories	Accessories
Load	ATS Information
Load Returns	Load Shed
Load Transfer	ATS Status (Setup Mode)
	Exerciser Setup
Location	ATS Information
Manual Override	Features
N/E Over/Under V&F	Features
Normal Frequency	Normal Frequency
Phase Sequence	Features

Item	Data Window
Plant Exerciser	Features
Time Delay Extended	Features
Time Delay Off (MATS+ only)	Features
Normal to Emergency (TDNE)	Time Delays
	Time Delays Status
Normal Voltage	Normal Voltage
Off to Emergency (TDOE)	Time Delays Status
	Time Delays
Off to Normal (TDON)	Time Delays Status
	Time Delays
Options	ATS Information
Overfreq Dropout	Trip Points
Overfreq Pickup	Trip Points
Overvolt Dropout	Trip Points
Overvolt Pickup	Trip Points
Phase Sequence	Phase Sequence
Plant Exerciser	ATS Status (Setup Mode)
Plant Exerciser Load/No Load	ATS Status (Setup Mode)
Poles	ATS Information
Program Switch	ATS Status
Run Time	ATS Status (Setup Mode)
Run Time HR:MN	Exerciser Setup
Second Day of Week	Exerciser Setup
Second Occurrence	Exerciser Setup
Single/Three Phase	ATS Information
Source Available	ATS Status
Source History	Source History
Start Date	Operational Summary
Start Time	Exerciser Setup
Stop Plant exercise	Exerciser Setup
Switch Position	ATS Status
Switch Transfers	Operational Summary
System Alert	ATS Status
System Frequency	ATS Information
System Voltage	ATS Information
Test Switch	ATS Status
Time	Time and Date
Time After	Load Shed
Time Before	Load Shed
Time sequence	Load Shed
Underfreq Dropout	Trip Points
Underfreq Pickup	Trip Points
Undervolt Dropout	Trip Points
Undervolt Pickup	Trip Points
Week 1 or 2	Exerciser Setup

7.1 Introduction

This section explains data window information available for power monitors. Refer to the power monitor operation and installation manual for more information about power monitor operation and recommended settings. See the List of Related Materials in the Introduction of this manual.

7.2 Data Windows

The following table lists and describes the items found in each data window. A checkmark (✓) in the Setup column indicates a user-programmable setting. Enter the setup mode to program new settings by selecting Data Window→Setup or by right-clicking on the data window and selecting Setup. An asterisk (*) indicates that the data window or item displays information for both the normal and emergency sources. More detailed information for some of the items is included in the sections after the table.

Data Window	Setup	Item	Item Description
Analog DC Inputs		Analog Input 1	Analog auxiliary DC input 1.
		Analog Input 2	Analog auxiliary DC input 2.
		Power Supply	The power monitor's internal DC power supply voltage.
Frequency		Frequency	The sensed power source frequency in hertz (Hz.)
Line Current		Line Current	The sensed current in amperes through lines L1, L2, and L3.
Line-Line Voltage		Line-Line Voltage	The sensed AC line-line rms voltage on each phase L1-L2, L2-L3, and L3-L1.
Line-Neutral Voltage		Line-Neutral Voltage	The AC line-neutral rms voltage on each phase L1-L0, L2-L0, and L3-L0.
Operational Summary		Operational Summary	The time (hours) in each transfer switch position (Normal, Off, and Emergency) according to contact information from the transfer switch connected to the power monitor.
Power Factor and Total kW		Power Factor	The power factor of the load.
		Total Kilovars	The total load in thousands of volt-amperes-reactive (kVAR).
		Total Kilowatts	The total load in kilowatts (kW).
Power Monitor Info	✓	Analog input 1–2	The present name for each analog auxiliary input. Enter a description of up to 20 characters in the setup mode. The new name appears in menus and screens instead of the default Analog Auxiliary 1 or Analog Auxiliary 2.
		ATS Rating	The transfer switch power switching device current rating, which is normally set at installation.
		Control Serial	The transfer switch controller serial number, which is normally set at installation.
		Designation	An optional unique name that identifies the device and appears on the device list at each address for network connections and on all data windows when the Monitor II software is connected to the device. Enter a description of up to 9 characters in setup mode. **Note:** The Monitor II software does not display the new designation until all devices are scanned after the operator selects a new screen.
		Load	An optional description of the connected load, such as total building, HVAC, or motors. Enter a description of up to 20 characters in setup mode.
		Location	An optional description of the power monitor's location. Enter a description of up to 20 characters in setup mode.
		Model No.	The model number of the transfer switch, 26 characters, which is normally set at installation.

Data Window	Setup	Item	Item Description
Power Monitor Info, continued	✓	Network Address	Displays the network address of the unit. Set at the local display and keypad.
		Single/Three Phase	Electrical system type, 1-phase for single-phase, 3-phase Wye for three-phase wye, or 3-phase Del for three-phase delta. This setting is normally set at installation.
		Serial No.	The transfer switch serial number, which is normally set at installation.
		Spec No.	The specification number for the transfer switch, 16 characters, which is normally set at installation.
		System Frequency	The monitored system frequency, which is normally set at installation.
		System Voltage	The monitored system voltage, which is normally set at installation.
Status		Contactor Position	Displays the transfer switch position as Normal, Off, Emergency, or Undefined according to contact information from the transfer switch connected to the power monitor.
		Program Mode	Displays the present programming mode: Local, Off, or Remote.
		System Alert	Displays the operating mode of the unit. See Section 7.3 for a list of displayed messages. See the power monitor operation and installation manual for more information.
Status (Setup Mode) See Section 7.3	✓	Manual Test	Click the radio button to select a manual test.
		Run Time	Displays the timed test run time.
		Timed Test	Click the radio button to select a timed test. Enter a run time for the timed test.
System History		System History	Displays a history of the four most recent auxiliary warnings or ATS tests and the date on which they occurred.
Time and Date See Section 7.4	✓	Date	The date at the power monitor's location. The format is Month/Day/Year.
		Day	The day of week calculated by the power monitor from the date.
		Time	The time at the power monitor's location. The format is Hour/Minute AM/PM.
Time Delays	✓	Auxiliary 1–6, Names	Displays the names of auxiliary warning contact inputs 1–6 in the left part of the screen under the Present column. Change the names in the Setup column, 20 character limit.
		Auxiliary 1–6, Time Delays	Displays the time delays in minutes:seconds for auxiliary warning inputs 1–6 on the right part of the screen under the Present column. Change the time delays in the Setup column.

7.3 Status

This data window displays power monitor status information. See Section 7.2 for a list of items included in the Status window and then read this section for more information.

7.3.1 System Alert Messages

This data window displays the following system alert messages. See the power monitor operation and installation manual for more information.

Auxiliary 1-6. A system warning condition exists and is caused by auxiliary warning contact input 1-6.

Test Mode Active. The power monitor ATS test mode is active.

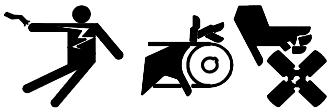
Internal Error. The power monitor has detected an internal memory error.

System Ready. No system warning condition is present.

Power-down Error. The power monitor has detected a power down error.

7.3.2 Manual Test

⚠ 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.

In setup mode the power monitor status data window allows the operator to manually test the transfer switch through a remote contact. Select the Status data window and then select Data Window→Setup.

Note: In setup mode, this data window allows the software to operate a transfer switch and possibly start and run a generator set in a remote location that is not within sight of the operator. Use extreme care when using this feature to prevent unintended starting of the generator set or unexpected transfer of power.

- **Manual Test**. Click the radio button to select a manual test.
- **Timed Test**. Click the radio button to select a timed test. Enter a run time for the timed test.
- **Run Time**. Displays the timed test run time.

Click the Ok button to start the ATS test mode.

Note: Click the Stop Test Mode button to stop the test.

7.4 Time and Date

This data window displays power monitor time and date information.

Note: If the power monitor is located in a different time zone than the PC, enter the time and date to match the time zone at the power monitor's location**.**

In setup mode enter a new time and date. Click AM/PM to change AM/PM. Click on the System Clock button to set the time and date from the PC's system clock. The time and date will require adjustment if the power monitor is in a time zone different from that of the PC.

7.5 Time Delays

This data window displays power monitor time delay information.

Auxiliary 1-6, Names. Displays the names of auxiliary warning contact inputs 1-6 in the left part of the screen under the Present column. Change the names in the Setup column, 20 character limit.

Auxiliary 1-6, Time Delays. Displays the time delays in minutes:seconds for auxiliary warning inputs 1-6 on the right part of the screen under the Present column. Change the time delays in the Setup column.

7.6 Item Locations

Use the following table to find the data window locations of individual items.

Item	Data Window
Analog Input 1	Analog DC Inputs
Analog input 1-2	Power Monitor Info
Analog Input 2	Analog DC Inputs
ATS Rating	Power Monitor Info
Auxiliary 1-6, Names	Time Delays
Auxiliary 1-6, Time Delays	Time Delays
Contactor position	Status
Control Serial	Power Monitor Info
Date	Time and Date
Day	Time and Date
Designation	Power Monitor Info
Frequency	Frequency
Line current	Line Current
Line-Line Voltage	Line-Line Voltage
Line-Neutral Voltage	Line-Neutral Voltage
Load	Power Monitor Info
Location	Power Monitor Info
Manual Test	Status (Setup Mode)
Model No.	Power Monitor Info
Network Address	Power Monitor Info
Operational Summary	Operational Summary
Power Factor	Power Factor and Total kW
Power Supply	Analog DC Inputs
Program mode	Status
Run Time	Status (Setup Mode)
Serial No.	Power Monitor Info
Single/Three phase	Power Monitor Info
Spec no.	Power Monitor Info
System Alert	Status
System Frequency	Power Monitor Info
System History	System History
System Voltage	Power Monitor Info
Time	Time and Date
Timed Test	Status (Setup Mode)
Total Kilovars	Power Factor and Total kW
Total Kilowatts	Power Factor and Total kW

Appendix A Abbreviations

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

A, amp	ampere
ABDC	after bottom dead center
AC	alternating current
A/D	analog to digital
ADC	analog to digital converter
adj.	adjust, adjustment
ADV	advertising dimensional drawing
AHWT	anticipatory high water temperature
AISI	American Iron and Steel Institute
ALOP	anticipatory low oil pressure
alt.	alternator
Al	aluminum
ANSI	American National Standards Institute (formerly American Standards Association, ASA)
AO	anticipatory only
API	American Petroleum Institute
approx.	approximate, approximately
AR	as required, as requested
AS	as supplied, as stated, as suggested
ASE	American Society of Engineers
ASME	American Society of Mechanical Engineers
assy.	assembly
ASTM	American Society for Testing Materials
ATDC	after top dead center
ATS	automatic transfer switch
auto.	automatic
aux.	auxiliary
A/V	audiovisual
avg.	average
AVR	automatic voltage regulator
AWG	American Wire Gauge
AWM	appliance wiring material
bat.	battery
BBDC	before bottom dead center
BC	battery charger, battery charging
BCA	battery charging alternator
BCI	Battery Council International
BDC	before dead center
BHP	brake horsepower
blk.	black (paint color), block (engine)
blk. htr.	block heater
BMEP	brake mean effective pressure
bps	bits per second
br.	brass
BTDC	before top dead center
Btu	British thermal unit
Btu/min.	British thermal units per minute
C	Celsius, centigrade
cal.	calorie
CARB	California Air Resources Board
CB	circuit breaker
cc	cubic centimeter
CCA	cold cranking amps
ccw.	counterclockwise
CEC	Canadian Electrical Code
cert.	certificate, certification, certified
cfh	cubic feet per hour
cfm	cubic feet per minute
CG	center of gravity
CID	cubic inch displacement
CL	centerline
cm	centimeter
CMOS	complementary metal oxide substrate (semiconductor)
cogen.	cogeneration
com	communications (port)
coml	commercial
Coml/Rec	Commercial/Recreational
conn.	connection
cont.	continued
CPVC	chlorinated polyvinyl chloride
crit.	critical
CRT	cathode ray tube
CSA	Canadian Standards Association
CT	current transformer
Cu	copper
cu. in.	cubic inch
cw.	clockwise
CWC	city water-cooled
cyl.	cylinder
D/A	digital to analog
DAC	digital to analog converter
dB	decibel
dBA	decibel (A weighted)
DC	direct current
DCR	direct current resistance
deg., °	degree
dept.	department
dia.	diameter
DI/EO	dual inlet/end outlet
DIN	Deutsches Institut fur Normung e. V. (also Deutsche Industrie Normenausschuss)
DIP	dual inline package
DPDT	double-pole, double-throw
DPST	double-pole, single-throw
DS	disconnect switch
DVR	digital voltage regulator
E, emer.	emergency (power source)
EDI	electronic data interchange
EFR	emergency frequency relay
e.g.	for example *(exempli gratia)*
EG	electronic governor
EGSA	Electrical Generating Systems Association
EIA	Electronic Industries Association
EI/EO	end inlet/end outlet
EMI	electromagnetic interference
emiss.	emission
eng.	engine
EPA	Environmental Protection Agency
EPS	emergency power system
ER	emergency relay
ES	engineering special, engineered special
ESD	electrostatic discharge
est.	estimated
E-Stop	emergency stop
etc.	et cetera (and so forth)
exh.	exhaust
ext.	external
F	Fahrenheit, female
fglass.	fiberglass
FHM	flat head machine (screw)
fl. oz.	fluid ounce
flex.	flexible
freq.	frequency
FS	full scale
ft.	foot, feet
ft. lbs.	foot pounds (torque)
ft./min.	feet per minute
g	gram
ga.	gauge (meters, wire size)
gal.	gallon
gen.	generator
genset	generator set
GFI	ground fault interrupter
GND, ⏚	ground
gov.	governor
gph	gallons per hour
gpm	gallons per minute
gr.	grade, gross
GRD	equipment ground
gr. wt.	gross weight
H x W x D	height by width by depth
HC	hex cap
HCHT	high cylinder head temperature
HD	heavy duty
HET	high exhaust temperature, high engine temperature
hex	hexagon
Hg	mercury (element)
HH	hex head
HHC	hex head cap
HP	horsepower
hr.	hour
HS	heat shrink
hsg.	housing
HVAC	heating, ventilation, and air conditioning
HWT	high water temperature
Hz	hertz (cycles per second)
IC	integrated circuit
ID	inside diameter, identification
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IMS	improved motor starting
in.	inch
in. H_2O	inches of water
in. Hg	inches of mercury
in. lbs.	inch pounds
Inc.	incorporated
ind.	industrial
int.	internal
int./ext.	internal/external
I/O	input/output
IP	iron pipe
ISO	International Organization for Standardization
J	joule
JIS	Japanese Industry Standard

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

Appendix B Communications Hardware and Connections

This section describes the different types of connections that can be used: local or remote, single or network connections. It also specifies the type of hardware required for each type of connection with different devices. Finally, this section provides detailed connection diagrams.

Information for additional DDC/MTU Power Generation devices that may be included in a communications network has been provided in this section for your convenience.

Use only DDC/MTU Power Generation communications products specified for use with DDC/MTU Power Generation products. The manufacturer of DDC/MTU Power Generation products assumes no responsibility for the use of other communication products.

Connection Types

A local connection uses a direct cable connection between the PC and the device(s) being monitored. A remote connection uses a telephone line and modem to connect the PC to the device(s) being monitored. The PC can connect to a single device or a local area network (LAN) of devices (generator set controllers, automatic transfer switch controllers, or power monitors), resulting in four PC connection types: local single, local area network, remote single, and remote area network.

Local Single Connection

Use an RS-232 null modem cable to connect a PC to the RS-232 port on a device (such as a generator set controller) that is located within 15 m (50 ft.) of the PC. See Figure 1. For longer connections, use an RS-232 to RS-485 port converter within 15 m (50 ft.) of the PC. Then use an RS-485 cable to connect to an RS-485 port on a device located up to 1220 m (4000 ft.) away from the converter. See Figure 2.

Local Area Network (LAN)

Use an RS-232 cable, an RS-232 to RS-485 converter, and an RS-485 cable to connect a PC to a local area network (LAN) with as many as 128 devices. See Figure 3.

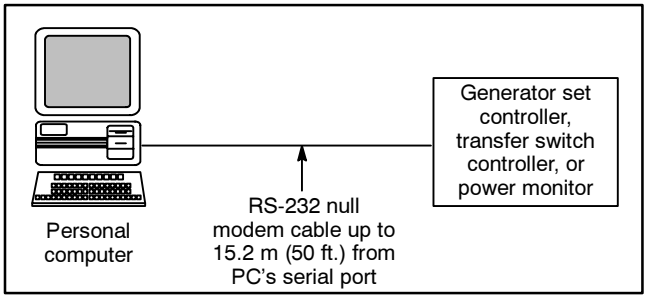


Figure 1 Local Single Connection, up to 15 m (50 ft.)

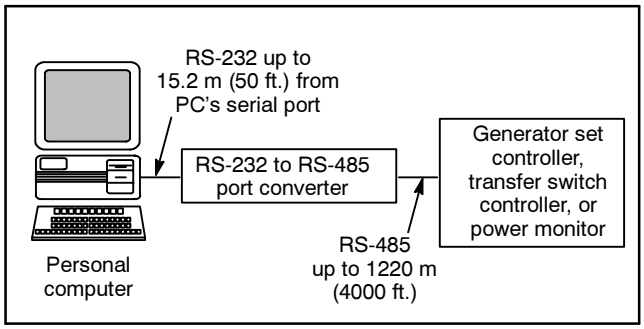


Figure 2 Local Single Connection, up to 1220 m (4000 ft.)

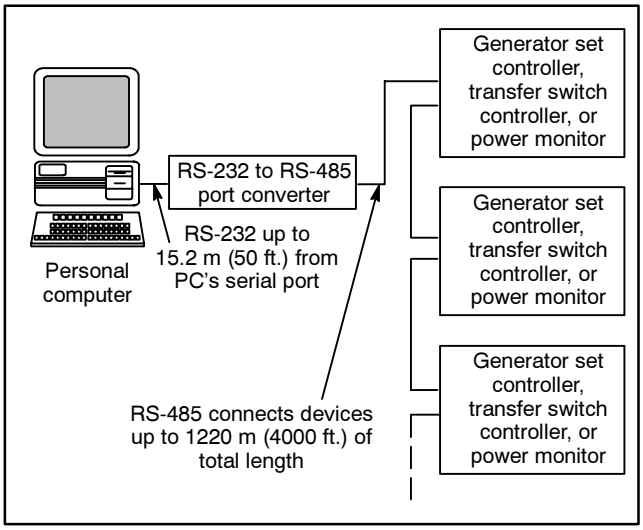


Figure 3 Local Area Network Connection

Remote Single Connection

Use an internal or external modem with the PC and another modem with the device that is being monitored or controlled. The PC communicates with the device using the modems and the telephone network. Locate the PC anywhere a telephone line is available. See Figure 4.

Remote Area Network

Use an internal or external modem with the PC. Use another modem and an RS-232 to RS-485 port converter to connect up to 128 devices to an RS-485 local area network (LAN). The PC communicates with the devices using the modems and the telephone network. Locate the PC anywhere a telephone line is available. See Figure 5.

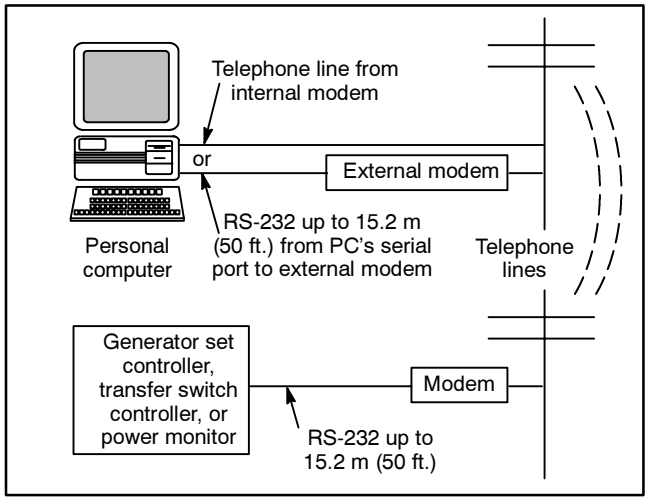


Figure 4 Remote Single Connection

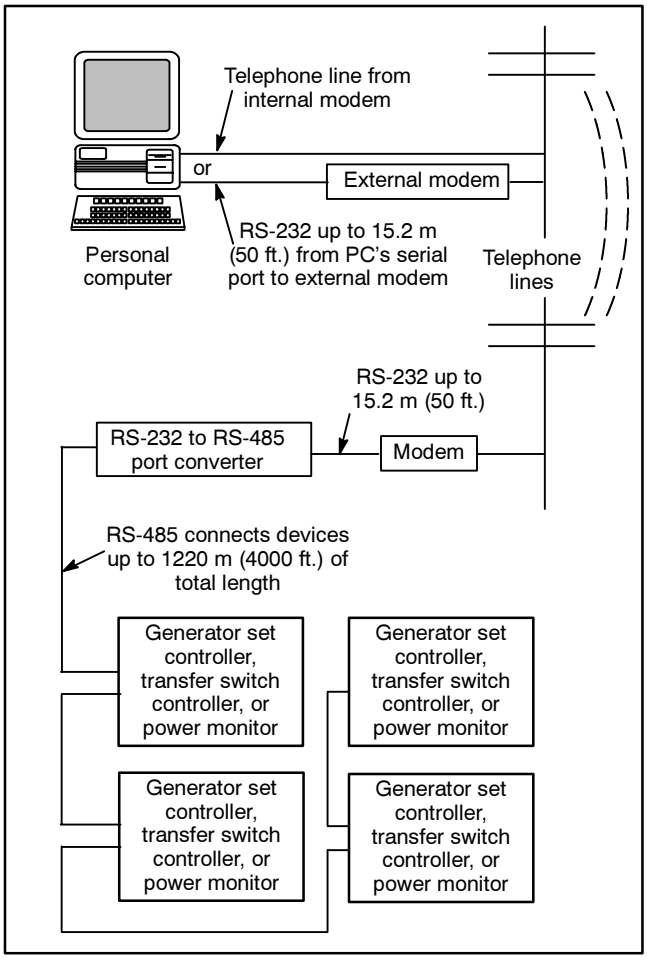


Figure 5 Remote Area Network Connection

Required Communication Hardware Summary, Table 1

Connection Type	Device	Required Communication Modules		Port
		Factory-Installed Modules	Loose Kits	
Local single connection up to 15.2 m (50 ft.) See Figure 1	550 generator set controller	N/A (standard)	N/A	RS-232
	Digital or 340 generator set controller	354197, RS-232	PA-354197-SD	
	ATS controller	DD-51-B or KD-51-B	PA-294867-SD	
	Power monitor	353395, RS-232	PA-353395	
Local single connection up to 1219.2 m (4000 ft.) See Figure 2	550 generator set controller	N/A (standard)	N/A	RS-485
	Digital or 340 generator set controller	354198, RS-485	PA-354198-SD	
	ATS controller	DD-51-A or KD-51-A	PA-294866-SD	
	Power monitor	353396	PA-353396	
Local area network (LAN) See Figure 3	550 generator set controller	N/A (standard)	N/A	RS-485
	Digital or 340 generator set controller	354198, RS-485	PA-354198-SD	
	ATS controller	DD-51-A or KD-51-A	PA-294866-SD	
	Power monitor	353396	PA-353396	
Remote single connection See Figure 4	550 generator set controller	N/A (standard)	N/A	RS-232
	Digital or 340 generator set controller	354197	PA-354197-SD	
	ATS controller	DD-51-B or KD-51-B	PA-294867-SD	
	Power monitor	353395	PA-353395	
Remote area network See Figure 5	550 generator set controller	N/A (standard)	N/A	RS-485
	Digital or 340 generator set controller	354198	PA-354198-SD	
	ATS controller	DD-51-A or KD-51-A	PA-294866-SD	
	Power monitor	353396	PA-353396	

Note: See the connection type figures indicated or the connection diagrams beginning on page A-7 to prevent duplication of hardware for sites with multiple devices or networks.

Required Communication Hardware Summary, Table 2

Connection Type	Device	Port	Required Hardware*		
			RS-232 to RS-485 Converters	Cables	Modems
Local single connection up to 15.2 m (50 ft.) See Figure 1	550 generator set controller	RS-232	N/A	1	N/A
	Digital or 340 generator set controller				
	ATS controller				
	Power monitor				
Local single connection up to 1219.2 m (4000 ft.) See Figure 2	550 generator set controller	RS-485	3 or 4	1 and 2	N/A
	Digital or 340 generator set controller	RS-485			
	ATS controller				
	Power monitor	RS-485	3, 4, or 5	1 and 2	N/A
Local area network (LAN) See Figure 3	550 generator set controller	RS-485	3 or 4†	1 and 2	N/A
	Digital or 340 generator set controller	RS-485	3 or 4		
	ATS controller				
	Power monitor	RS-485	3, 4, or 5	1 and 2	N/A
Remote single connection See Figure 4	550 generator set controller	RS-232	N/A	N/A (Cables are included with the modem kits.)	6, 7, or 8 plus 9 or 10
	Digital or 340 generator set controller				
	ATS controller				
	Power monitor				
Remote area network See Figure 5	550 generator set controller	RS-485	3 or 4†	2	6, 7, or 8 plus 9 or 10
	Digital or 340 generator set controller	RS-485	3 or 4		
	ATS controller				
	Power monitor	RS-485	3, 4, or 5	2	6, 7, or 8 plus 9 or 10

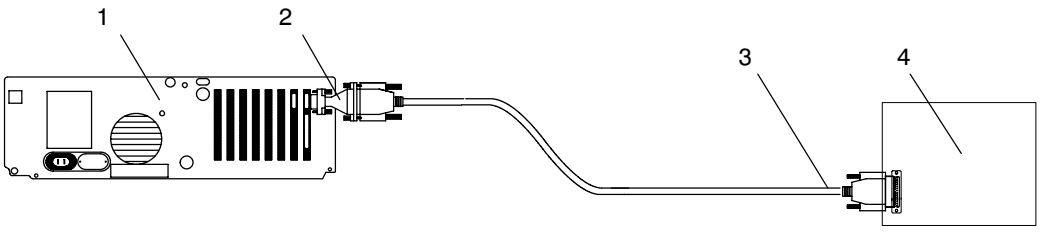
Hardware Key:

1. PA-294992-SD, PC cable connection kit. Includes 3 m (10 ft.) RS-232 cable (294981), null modem cable (GM16657), and connector (294988). Requires customer-supplied RS-232 cable for distances longer than 3 m (10 ft.).
2. Customer-supplied RS-485 cable, Belden #9841 or equivalent
3. PA-352249-SD, external RS-232 to RS-485 converter, 120 V, 60 Hz
4. GM10683-KP1, external RS-232 to RS-485 converter, 220 V, 50 Hz
5. PA-353397-SD, internal RS-232 to RS-485 converter (mounts only in the power monitor)
6. Internal modem on PC
7. RS-232 serial port and PA-294864 or PA-294864-SD, modem for PC side, 120 V, 60 Hz
8. RS-232 serial port and PA-353073 or PA-353073-SD, modem for PC side, 220 V, 50 Hz
9. PA-294865-SD, modem for device side (set to automatically answer calls), 120 V, 60 Hz
10. PA-353074-SD, modem for device side (set to automatically answer calls), 220 V, 50 Hz

* See the connection type figures indicated or the connection diagrams beginning on page A-7 to prevent duplication of hardware for sites with multiple devices or networks.

† If the PC or modem is less than 15.2 m (50 ft.) away from the 550 controller, an external converter is not required. See Figure 9.

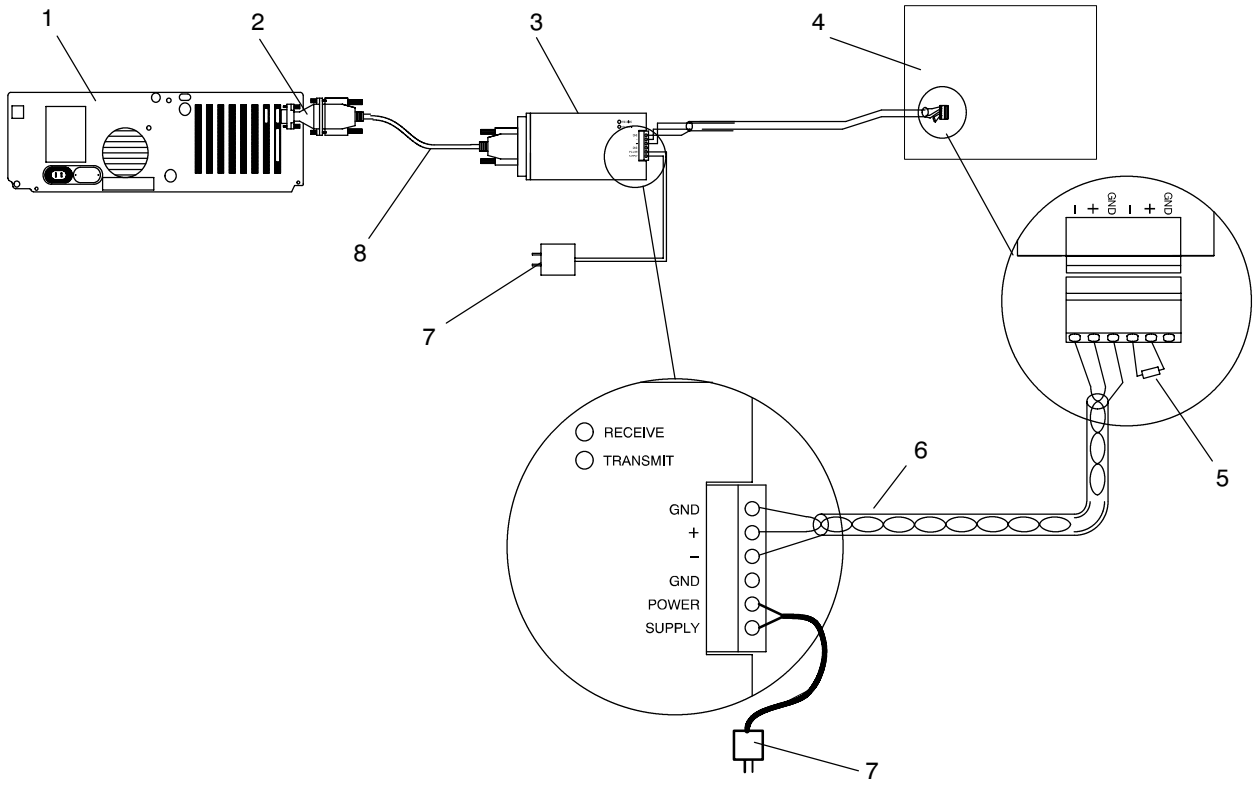
Connection Diagrams



1. PC
2. Use 9-pin female to 25-pin male converter connector 294988 to connect cable 294981 to 9-pin serial ports*
3. 3 m (10 ft.) RS-232 cable (GM16657 for the 550 controller or 294981 for other devices)*
4. Device

* Items included in PA-294992-SD, cable kit for direct PC connection

Figure 6 Local Single Connection Up to 15.2 m (50 ft.)



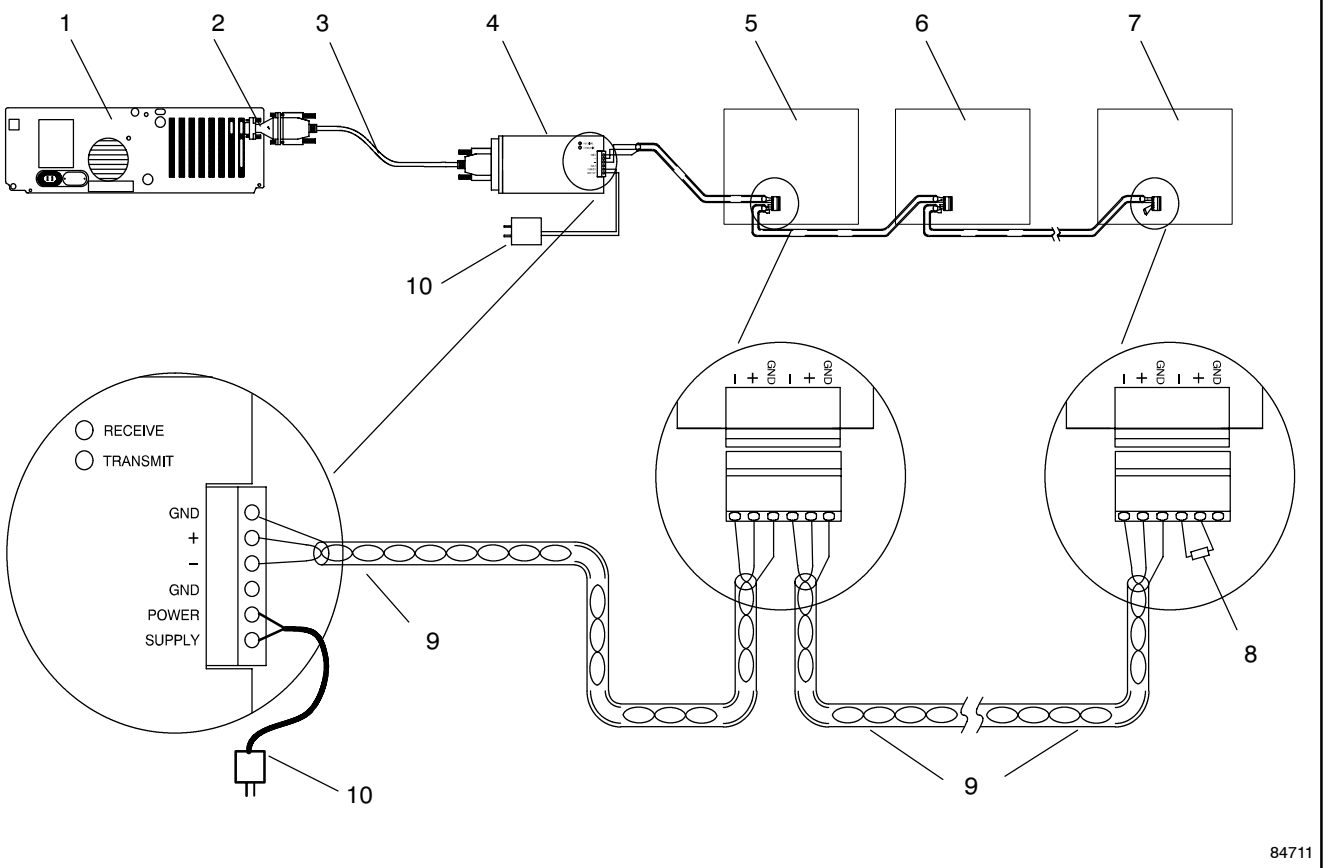
1. PC
2. Use 9-pin female to 25-pin male converter connector 294988 on 9-pin serial ports*
3. RS-232 to RS-485 converter†
4. Device
5. X-6058-27 resistor† (121-ohms); connect + to –
6. Belden #9841 or equivalent; connect + to +, – to –, GND to shield (see Note)
7. AC wall-mounted transformer†
8. 3 m (10 ft.) RS-232 cable 294981*

* Kit PA-294992-SD

† Kit PA-352249-SD, (external) or PA-353397-SD (internal for power monitor)

Note: Use a maximum cable length of 1219.2 m (4000 ft.) from the RS-485 converter to the device. Install communication conductors in raceways, cables, or conduit separate from AC power conductors.

Figure 7 Local Single Connection Up to 1219.2 m (4000 ft.)

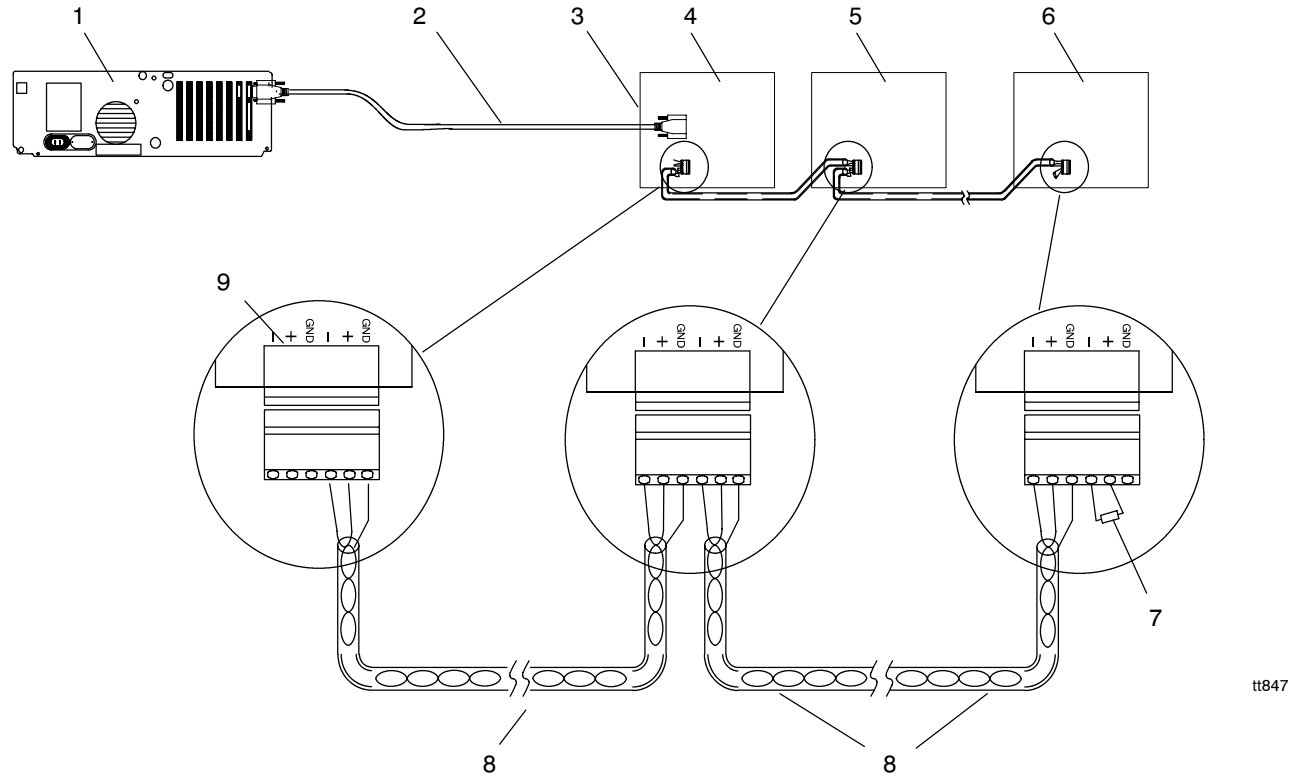


1. PC
2. Use 9-pin female to 25-pin male converter connector 294988 on 9-pin serial ports*
3. 3 m (10 ft.) RS232 cable 294981*
4. External RS-232 to RS-485 converter†
5. 1st device
6. 2nd device
7. Last device
8. X-6058-27 resistor† (121-ohms); connect + to – on last device in network
9. Belden #9841 or equivalent; connect + to +, – to –, GND to shield s (see Note)
10. AC wall-mounted transformer†

* Kit PA-294992-SD
† Kit PA-352249-SD (external) or PA-353397-SD (internal for power monitor)

Note: Use a maximum cable length of 1219.2 m (4000 ft.) from the RS-485 converter to the device. Install communication conductors in raceways, cables, or conduit separate from AC power conductors.

Figure 8 Local Area Network

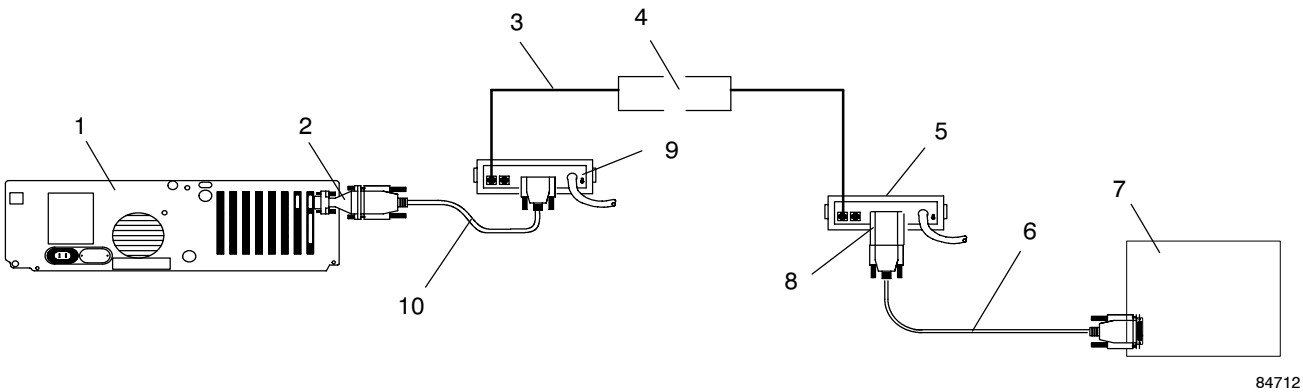


1. PC
2. 3 m (10 ft.) RS232 cable GM16657*
3. 550 controller
4. 1st device
5. 2nd device
6. Last device
7. X-6058-27 resistor (121-ohms); connect + to – on last device in network
8. Belden #9841 or equivalent; connect + to +, – to –, GND to shield (see Note)
9. Use P21 for KBUS connections, P20 for Modbus® connections

* Kit PA-294992-SD

Note: Use a maximum cable length of 1219.2 m (4000 ft.) from the RS-485 converter to the device. Install communication conductors in raceways, cables, or conduit separate from AC power conductors.

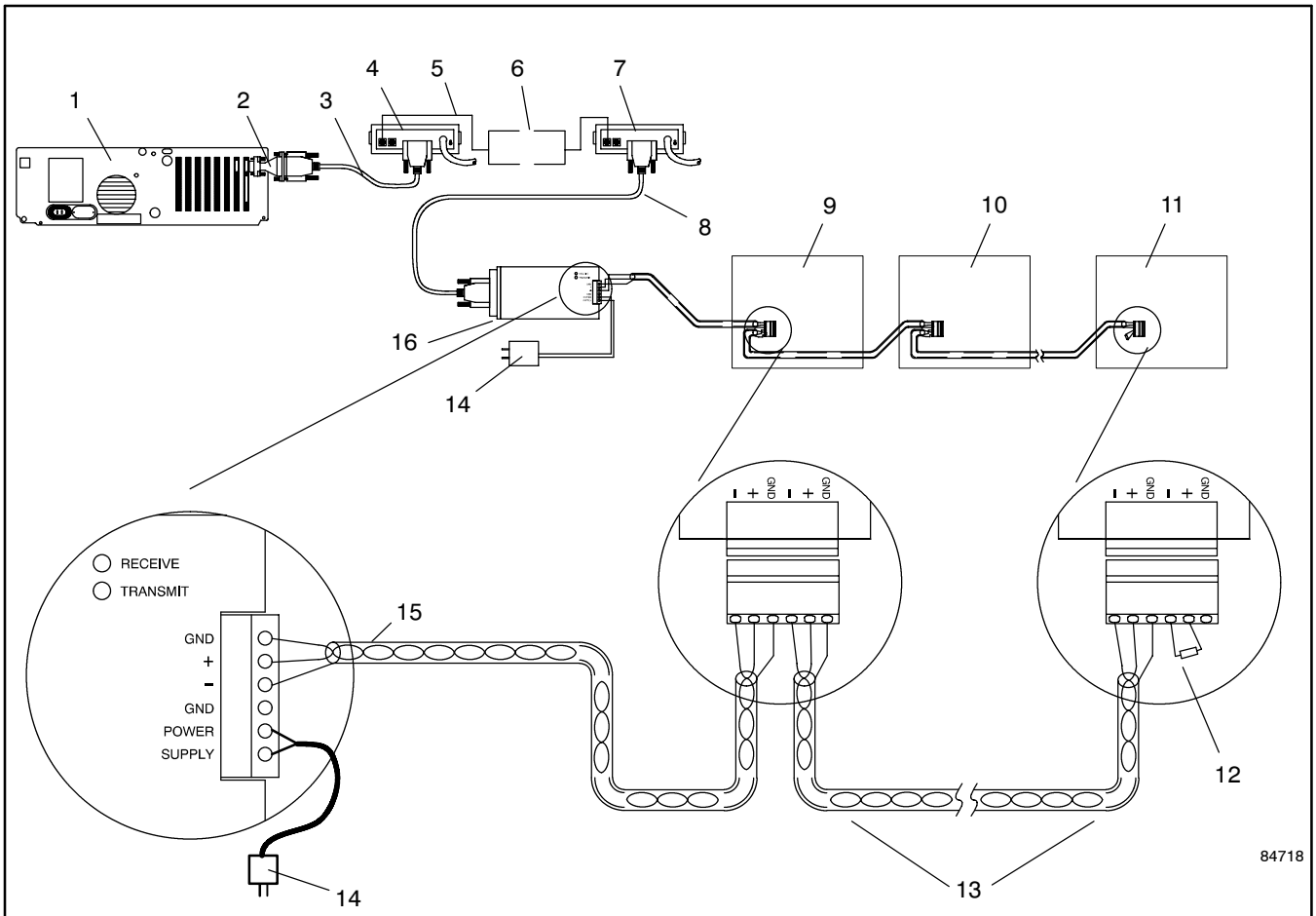
Figure 9 Local Area Network Using the 550 Generator Set Controller as an RS-232 to RS-485 Convertor [maximum 15.2 m (50 ft.) from the PC to the controller]



1. PC
2. Use 9-pin female to 25-pin male converter connector 294988 on 9-pin serial ports*
3. Connect telephone line directly to PC's internal modem's telco jack if not using an external modem
4. Telephone network
5. Device modem 294987‡ or 353071§
6. 3 m (10 ft.) RS-232 cable: GM16658 for the 550 controller, 294982 for all other devices†
7. Device
8. Optical isolator (included in device modem kits)
9. PC modem 294986* or 353072†
10. 3 m (10 ft.) RS-232 cable 294981*

* PA-294864 or PA-294864-SD, modem kit for the PC, 120 V, 60 Hz
† PA-353073 or PA-353073-SD, modem kit for the PC, 220 V 50 Hz
‡ PA-294865 or PA-294865-SD, modem kit for the device, 120 V, 60 Hz
§ PA-353074 or PA-353074-SD, modem kit for the device, 220 V 50 Hz

Figure 10 Remote Single Connection

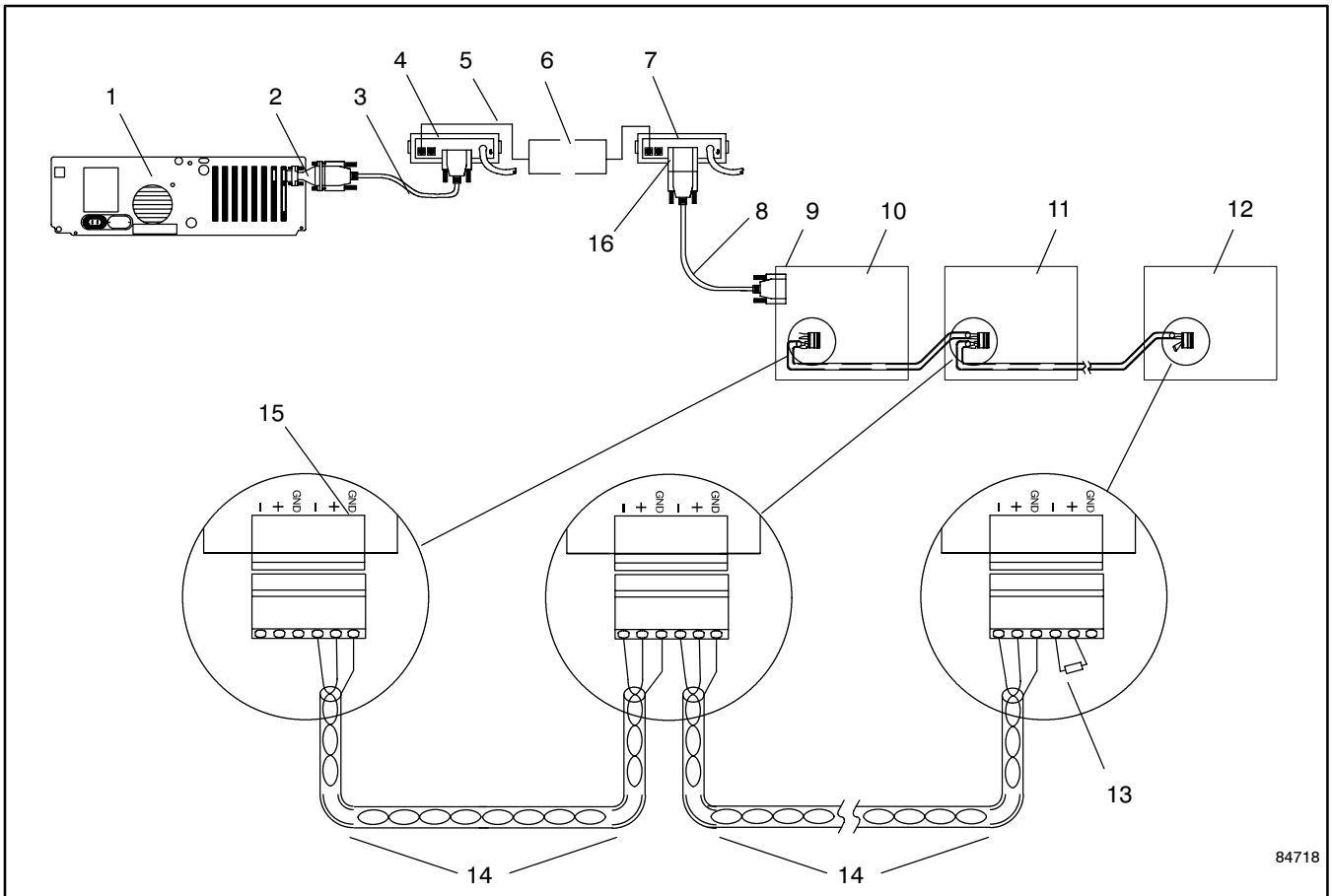


1. PC
2. Use 9-pin female to 25-pin male converter connector 294988 on 9-pin serial ports*
3. 3 m (10 ft.) RS-232 cable 294981*
4. PC modem 294986 (60 Hz)* or 353072 (50 Hz)†
5. Connect telephone line directly to PC's internal modem's telco jack if not using an external modem
6. Telephone network
7. Device modem 294987 (60 Hz)‡ or 353071 (50 Hz)§
8. 3 m (10 ft.) RS-232 cable 294982†
9. 1st device
10. 2nd device
11. Last device
12. X-6058-27 resistor‡ (120-ohms) connect + to – on last device in network
13. Belden #9841 or equivalent **; connect + to +, – to –, GND to shield between devices
14. AC wall-mounted transformer‡
15. Belden #9841 or equivalent **; connect + to +, – to –, GND to shield
16. RS-232 to RS-485 converter‡

* PA-294864 or PA-294864-SD, modem kit for the PC, 120 V, 60 Hz
† PA-353073, modem kit for the PC, 220 V, 50 Hz
‡ PA-294865 or PA-294865-SD, modem kit for the device, 120 V, 60 Hz
§ PA-353074, modem kit for the device, 220 V, 50 Hz
‖ PA-352249 or PA-352249-SD (external converter) or PA-353397 or PA-353397-SD (internal converter for the power monitor)
** Use a maximum cable length of 1219.2 m (4000 ft.) from the RS-485 converter to the last device

Note: Install communication conductors in raceways, cables, or conduit separate from AC power conductors.

Figure 11 Remote Area Network



1. PC
2. Use 9-pin female to 25-pin male converter connector 294988 on 9-pin serial ports*
3. 3 m (10 ft.) RS-232 cable 294981*
4. PC modem 294986 (60 Hz)* or 353072 (50 Hz)†
5. Connect telephone line directly to PC's internal modem's telco jack if not using an external modem
6. Telephone network
7. Device modem 294987 (60 Hz)‡ or 353071 (50 Hz)§
8. 3 m (10 ft.) RS-232 cable GM16658†
9. 550 controller
10. 1st device
11. 2nd device
12. Last device
13. X-6058-27 resistor‡ (120-ohms) connect + to – on last device in network
14. Belden #9841 or equivalent **; connect + to +, – to –, GND to shield between devices
15. Use P21 for KBUS connections, P20 for Modbus® connections
16. Optical isolator (included in device modem kits)

* PA-294864 or PA-294864-SD, modem kit for the PC, 120 V, 60 Hz
† PA-353073, modem kit for the PC, 220 V, 50 Hz
‡ PA-294865 or PA-294865-SD, modem kit for the device, 120 V, 60 Hz
§ PA-353074, modem kit for the device, 220 V, 50 Hz
‖ PA-352249 or PA-352249-SD (external converter) or PA-353397 or PA-353397-SD (internal converter for the power monitor)
** Use a maximum cable length of 1219.2 m (4000 ft.) from the RS-485 converter to the last device

Note: Install communication conductors in raceways, cables, or conduit separate from AC power conductors.

Figure 12 Remote Area Network Using the 550 Generator Set Controller as an RS-232 to RS-485 Convertor [maximum 15.2 m (50 ft.) from the device modem to the 550 Controller]

The Monitor II software uses tools that are familiar to most Windows® program users. This Appendix explains how to work with pull-down menus, toolbars, and Windows® keystrokes in the Monitor II software.

The Monitor II main menu displays a list of named pull-down menus and a toolbar with shortcuts for commonly used functions at the top of the screen. See Figure 13. The bottom part of the screen is the data window display area.

Figure 13 Main Menu Screen

Pull-Down Menus

Pull-down menus are displayed at the top of the main menu screen. See Figure 14.

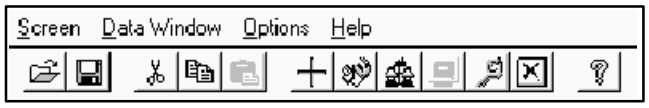


Figure 14 Pull-Down Menus

Click on the following pull-down menus at the top of the main screen to see a list of available options. Click on the option to select it. Options that are not available in the current application are displayed in a lighter color and cannot be selected.

Screen

The Screen menu contains the following options:

New Screen. Select to create a new screen of user-defined data windows.

Clear Screen. Select to clear the screen of all data windows.

Open Screen. Select to open a previously saved screen with a set of data windows.

Save Screen. Select to save the screen configuration.

Save Screen As. Select to save the screen as a screen (.km2) or template (.tem) file, or to rename it.

Print Screen. Select to print information from all data windows on the current screen.

Exit Select to exit the Monitor II software.

The screen menu also lists the filenames for the last four opened or saved screens. Select the filename to open the screen with the specified filename.

Data Window

The Data Window menu contains the following options:

Add Window. Select to add a new data window to the screen.

Device. Select to change the address of data windows. Select an address from a list of valid devices.

- **Change Address of Current.** Select to change the address of the selected data window.
- **Change Address of All.** Select to change the address of all data windows on the screen.

Display. Select to choose between analog and digital displays and scaling of analog displays on data windows that offer the choice.

- **Digital.** Select to change to a digital display.
- **Analog** Select to change to an analog (meter) display.
- **Scaling.** Select to adjust the scaling of an analog display.

Cut. Select to cut the selected data window to the clipboard.

Copy. Select to copy the current data window to the clipboard.

Paste. Select to paste a data window from the clipboard to the screen.

Setup. Select to download programmable data from a device, change data on the screen, and update the device with new data.

Delete. Select to delete the selected data window from the screen.

Options

The Options menu contains the following options:

Align. Select to align all data windows on an X-Y axis grid. Use the Preferences→Align Setting option to change the grid spacing.

Preferences. Select various options.

- **Align Setting.** Select to adjust the grid spacing for data window alignment. Units are in multiples of 100 twips from 100 to 1000. To change, click on the dimension in the dropdown box and press ok. One hundred twips equal 5 printer's points or approximately 1.8 mm (0.07 in.)
- **English.** Select to display measurements in English units.
- **Metric.** Select to display measurements in metric units.

Load Screen on Startup. Check this option to save the current screen and automatically open it the next time the software is started.

Configure Mode. If this option is checked, the software is in the configuration mode. Build a set of data windows without a physical connection in configuration mode. See Section 2.3.

Edit Device List. Select to edit the Device List when in the configuration mode.

Retrieve Setup. Select to download controller settings to a file which can be used to restore controller settings with Restore Setup. See Section 2.12.

Restore Setup. Select to upload settings to the controller from a file previously saved with Retrieve Setup. See Section 2.12.

Help

The Help menu contains the following options:

Help. Select to access online help.

About. Select to display software version information.

Toolbar Functions

Toolbar functions are displayed at the top of the main screen below the pull-down menus. They provide a quicker alternative to using the pull-down menus for some functions. See Figure 15.

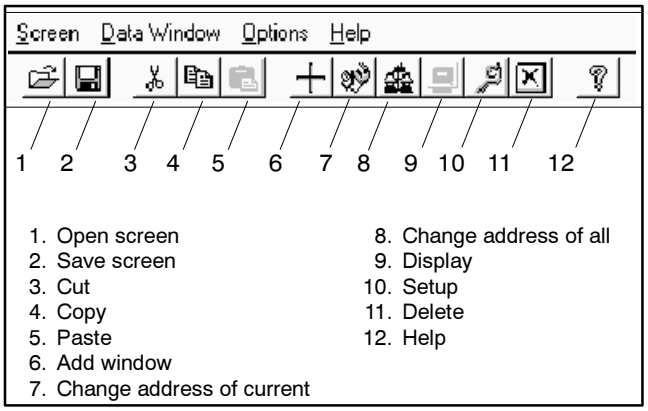


Figure 15 Toolbar Functions

The following toolbar functions are described in the order that they appear on the screen from left to right. Click on the function to select it.

Open Screen. Select to open a screen.

Save Screen. Select to save the current screen.

Cut. Select to cut the selected data window from the screen to the clipboard.

Copy. Select to copy the selected data window from the screen to the clipboard.

Paste. Select to paste a data window previously cut or copied to the clipboard to the screen.

Add Window. Select to add a new data window to the screen.

Change Address of Current. Select to change the address of the selected data window.

Change Address of All. Select to change the address of all data windows on the screen.

Display. Select to switch between digital and analog display modes if available on the selected data window.

Setup. Select to enter the setup mode, if available, for the selected data window.

Delete. Select to delete the selected data window from the screen.

Help. Select to access online help.

Shortcuts (Right-Clicking)

If the computer's mouse has 2 or more buttons, it can be set up to display the Data Window menu when the right mouse button is pressed. In the computer's control panel (select Start→Settings→Control Panel), select Mouse and then Buttons. Assign the right button to Alternate Select.

Note: Changing the mouse button assignments will affect the mouse operation for any other applications installed on the computer.

Positioning the cursor on a data window or in the data display area and pressing the right mouse button (right-clicking) opens a shortcut window on the screen. The window contains all of the items available in the Data Window pull-down menu. Options that are not available in the current application are displayed in a lighter color and cannot be selected.

Windows Keystrokes

The following Windows® keystrokes are available in the Monitor II software.

F1 Displays context-sensitive help for the current operation.

Ctrl X Cuts the selected data window to the clipboard.

Ctrl C Copies the selected data window to the clipboard.

Ctrl V Pastes a data window previously cut or copied to the clipboard to the screen.

Del Deletes the selected data window.

Appendix D Connection Worksheets

Reproduce the following worksheets to record connection information. Use the Connection Worksheet for all connections. Use the Local or Remote Single Connection Worksheet for single-device connections. Use the Local or Remote Area Network Worksheet for network connections.

Connection Worksheet

Site Name	Modem Connection Settings		Port Settings			Location	Time Zone
	Phone Number	System ID Number	COM Port	Baud Rate	Highest Address		

Local or Remote Single Connection Worksheet						
Site Name	Device Type	Designation (9 chars)	Load (20 chars)	Branch (18 chars)	Location (20 chars)	Screen Filenames

Local or Remote Area Network Connection Worksheet for Site Name:

Address	Device Type	Designation (9 chars)	Load (20 chars)	Branch (18 chars)	Location (20 chars)	Screen Filenames

DDC/MTU Power Generation
605 North 8th Street, Suite 501
Sheboygan, Wisconsin 53081 USA
Phone 920-451-0846, Fax 920-451-0843
ddcmtupowergeneration.com

MP-6194 12/02b