INSTALLATION INSTRUCTIONS

Original Issue Date: **5/03**
Model: **Transfer Switches with the Programmable ATS Controller**
Market: **ATS**
Subject: **Connection Hardware Kits for Surveyor Software**

Kit Number	Kit Description
GM29508-KP1	PC to External Modem, 60 Hz
GM29508-KP2	PC to External Modem, 50 Hz
GM29509-KP1	Device Modem, 60 Hz
GM29509-KP2	Device Modem, 50 Hz

Introduction

These instructions explain how to connect a programmable ATS controller to a personal computer (PC) running the Surveyor program. The Surveyor progam requires connection through the ATS controller's Modbus® RS-485 terminals. The ATS controller can be connected directly to the PC through a local connection or using modems for remote communication.

Note: Do not use these kits for connecting the ATS to a PC to run the Setup Program. The Setup Program requires connections through an RS-232 serial port. See the Setup Program Operation and Installation Manual for connection instructions.

The Surveyor Program allows remote monitoring of up to 247 automatic transfer switches equipped with the programmable ATS controller. The program also allows remote adjustment of selected settings, including time delays, voltage and frequency trip points, and exerciser settings. Refer to the Surveyor Program Operation and Installation Manual, included with the software kit, for instructions to install and run the program on your personal computer.

The Surveyor software kits include the software CD-ROM, a dongle (or hardware key), an RS-232 to RS-485 converter, and a Surveyor Program Operation and Installation Manual. Refer to the detailed connection diagrams in these instructions or the Software Manual to install the hardware key and the converter.

The hardware key, or dongle, included with the Surveyor Software kit must be installed on the PC in order to run the program. Only the hardware keys included with the software kits will allow operation of the Surveyor software. Keys obtained from any other source will not work. Two versions of the hardware key are available: a USB-port version and a parallel-port version. The parallel-port version allows the connection of another device (a printer, for example) to the PC's parallel port, if necessary. Choose the software kit with the appropriate type of key for your PC.

Remote connections require a PC modem and a device modem. The PC to External Modem kits include a PC modem, 25-pin to 9-pin converter, and cable to connect the modem to your personal computer. The PC to external modem kit is not required if the PC has an internal modem.

The Device Modem kits include a device modem, null converter, and 25-pin to 9-pin converter for connection to the transfer switch or transfer switch network. Use one device modem kit for all remote connections, 50 or 60 Hz to suit the application. Use the RS-232 to RS-485 converter, included in the Surveyor software kit, with the device modem. Refer to the detailed connection diagrams in these instructions.

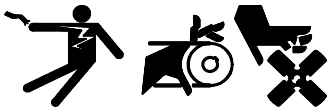
Note: The device modem is configured differently than the PC modem. A device modem must be connected to the ATS or ATS network for remote communications.

Read the entire installation procedure and compare the kit parts with the parts list at the end of this publication before beginning installation.

Safety Precautions

Observe the following safety precautions while installing the kit.

⚠ 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.

⚠ DANGER

Hazardous voltage.
Will cause severe injury or death.

Disconnect all power sources before opening the enclosure.

⚠ DANGER

Hazardous voltage.
Will cause severe injury or death.

Only authorized personnel should open the enclosure.

Grounding electrical equipment. Hazardous voltage can cause severe injury or death. Electrocution is possible whenever electricity is present. Open the main circuit breakers of all power sources before servicing the equipment. Configure the installation to electrically ground the generator set, transfer switch, and related equipment and electrical circuits to comply with applicable codes and standards. Never contact electrical leads or appliances when standing in water or on wet ground because these conditions increase the risk of electrocution.

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

Servicing the transfer switch. Hazardous voltage can cause severe injury or death. Deenergize all power sources before servicing. Open the main circuit breakers of all transfer switch power sources and disable all generator sets as follows: (1) Move all generator set master controller switches to the OFF position. (2) Disconnect power to all battery chargers. (3) Disconnect all battery cables, negative (-) leads first. Reconnect negative (-) leads last when reconnecting the battery cables after servicing. Follow these precautions to prevent the starting of generator sets by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer. Before servicing any components inside the enclosure: (1) Remove all jewelry. (2) Stand on a dry, approved electrically insulated mat. (3) Test circuits with a voltmeter to verify that they are deenergized.

Installation Procedure

1. Remove the generator set from service.

1.1 Place the generator set master switch in the OFF position.

1.2 Disconnect the power to the battery charger, if equipped.

1.3 Disconnect the generator set engine starting battery(ies), negative (-) lead first.

2. Disconnect power to the transfer switch.

2.1 Open switches or circuit breakers to the transfer switch Normal and Emergency power sources.

2.2 Open the transfer switch enclosure to access the controller.

2.3 Remove the controller cover to access terminal strip TB1. See Figure 1.

3. Connect the hardware.

3.1 Refer to the connection diagrams in Figure 9 through Figure 11. Identify the appropriate diagram for the application: local single connection, local area network, or remote connection.

3.2 Connect the hardware as shown in the appropriate connection diagram.

3.2.1 Use Belden #9841 or equivalent shielded twisted-pair cable to connect the transfer switches as shown on the diagram. Install the RS-232 to RS-485 converter as shown on the diagram. Figure 2 shows the converter.

3.2.2 Install the hardware key into the USB port or the parallel (printer) port. Figure 3 shows the hardware keys. Figure 4 shows typical computer ports and the labels used for serial and USB ports.

3.2.3 If a remote connection is used, connect the PC and device modems as shown in the diagram.

3.3 Refer to the External Modems Section for more information about the PC and device modems.

4. Reconnect power to the transfer switch.

4.1 Replace the ATS controller cover.

4.2 Close and secure the transfer switch enclosure.

4.3 Reconnect power by closing the Normal and Emergency source circuit breakers or switches.

5. Restore the generator set to service.

5.1 Check that the generator set master switch is in the OFF position.

5.2 Reconnect the generator set engine starting battery, negative (–) lead last.

5.3 Reconnect power to the battery charger, if equipped.

1. Terminal strip TB1 with RS-485 connections

Figure 1 ATS Controller (cover removed)

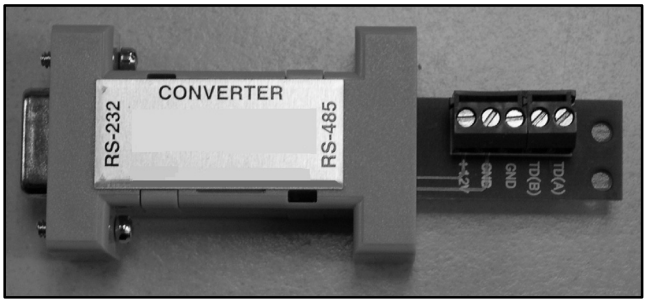
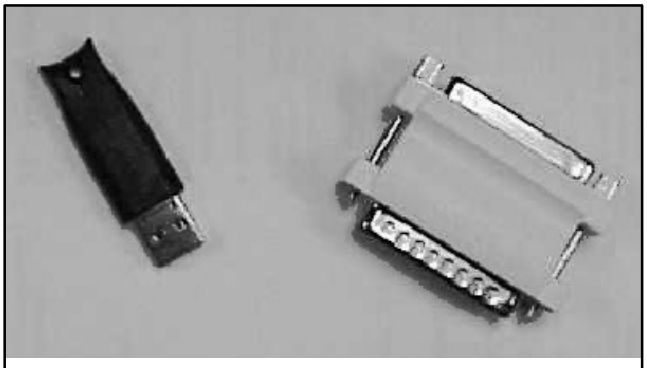
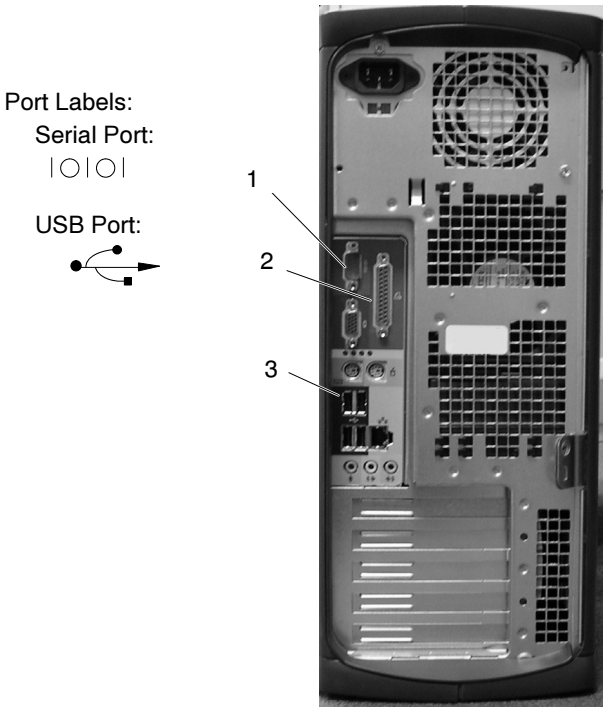


Figure 2 RS-232 to RS-485 Converter



USB Parallel

Figure 3 Hardware Keys (Dongles)



1. Serial (RS-232) port
2. Parallel (printer) port
3. USB ports

Figure 4 Typical Computer Ports and Labels

External Modems

An external modem connects an RS-232 line to a telephone line. Figure 8 shows a typical external modem. The modem requires a telephone line and AC power supply. See Figure 5 for modem power supply requirements.

Locate external modems in an interior area in the building or with equivalent protection from environmental conditions. If a standard wall outlet is provided within an ATS or power monitor, the modem can be placed at the bottom of the enclosure.

When all connections are made and power is available, place the power switch on front of the modem in the ON position. The modem's front panel LEDs should light as shown in Figure 6 when there is no communication activity. Adjust the volume control located on the side of the modem if desired.

Device modems are the same as PC modems except the device modems are set up to automatically answer calls.

The factory configures and programs the modems before shipment. Further adjustment or programming should not be necessary. In the case of operation problems or to identify device and PC modems, check the DIP switch settings in Figure 7. Adjust the DIP switch settings if needed, disconnect the RS-232 line and telephone lines, and turn the power off and then on again. If the LED indicators do not match the LED status shown in Figure 6, replace the modem.

Modem	Power Supply
PC Modem 294986	120 VAC/60 Hz
PC Modem 353072	220 VAC/50 Hz
Device Modem 294987	120 VAC/60 Hz
Device Modem 353071	220 VAC/50 Hz

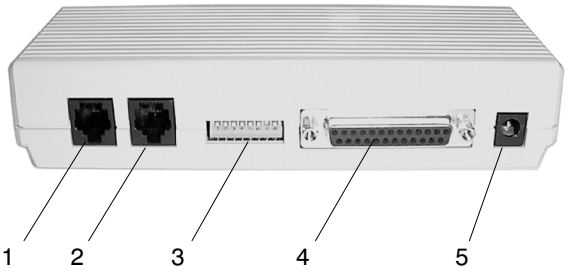
Figure 5 Modem Power Requirements

	Front Panel LED						
Modem	**AA**	**CD**	**RD**	**SD**	**TR**	**CS**	**ARQ/ FAX**
PC Modem (294986 or 353072)	off	on	off	off	on	on	off
Device Modem (294987 or 353071)	on	on	off	off	on	on	off

Figure 6 Idle LED Status

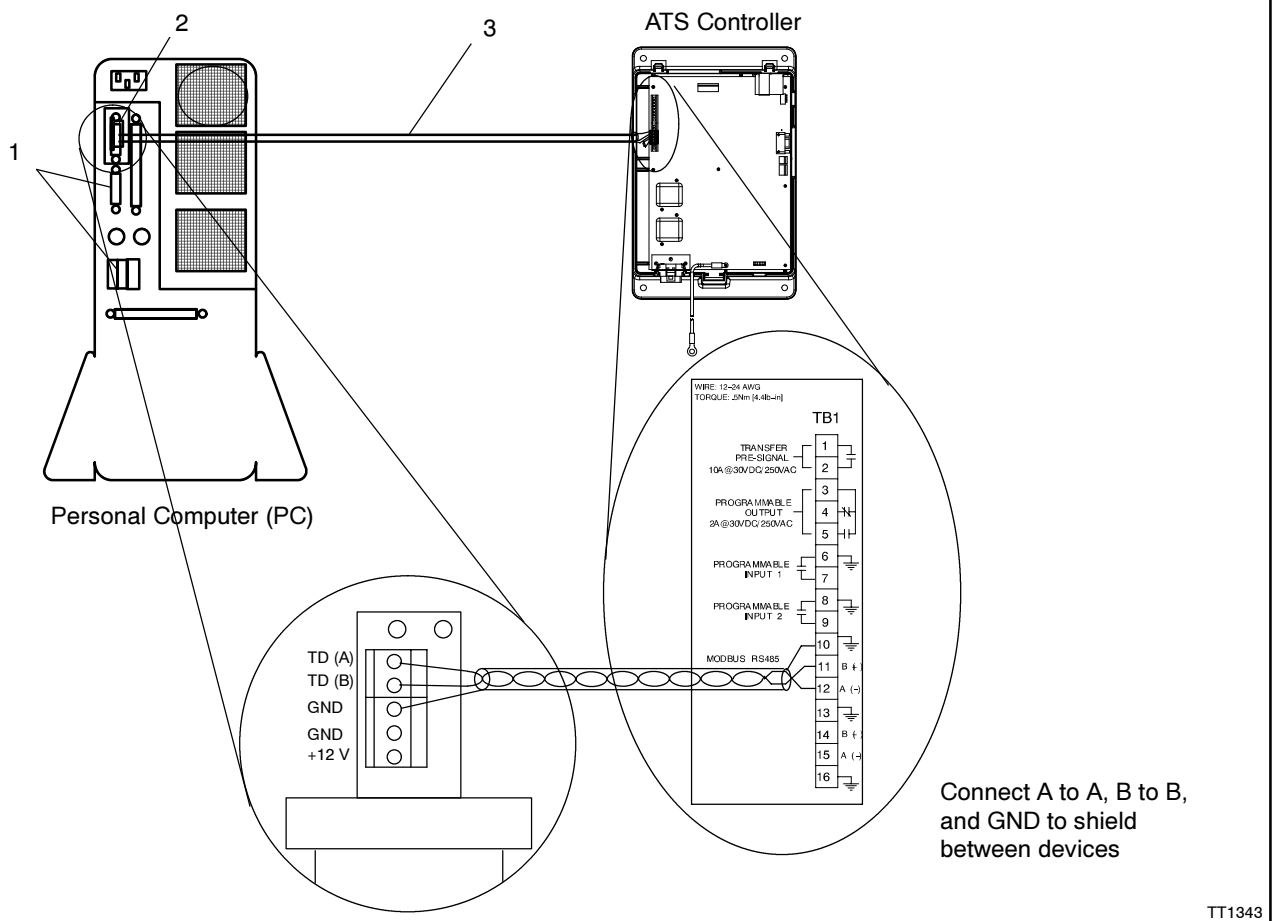
	Switch Position							
Modem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PC Modem (294986 or 353072)	↓	↓	↓	↓	↓	↓	↑	↓
Device Modem (294987 or 353071)	↓	↓	↓	↓	↑	↓	↑	↓

Figure 7 Default Modem DIP Switch Settings



1. Telco jack, connects to telephone line
2. Telephone jack, optionally connects to telephone
3. DIP switches
4. RS-232 port
5. AC adapter jack

Figure 8 External Modem (typical), Rear View



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

1. Hardware key (dongle) GM29224 (parallel) or GM29225 (USB), included in software kit. Connect to the PC's parallel port or USB port. Parallel port dongles allow the connection of a printer or other device to the dongle.
2. RS-232 to RS-485 converter GM29361, included in software kit. Connect to the PC's serial port. Do not connect to the +12V terminal on the converter. (The converter is powered through the PC's serial port.)
3. Twisted-pair shielded cable, Belden #9841 or equivalent, customer-supplied. Connect terminal A to terminal A and terminal B to terminal B. Connect the cable shield to the GND terminals. Use a maximum cable length of 1219.2 m (4000 ft.) from the RS-485 converter to the last transfer switch.

Figure 9 Local Single Connection Up to 1219.2 m (4000 ft.)

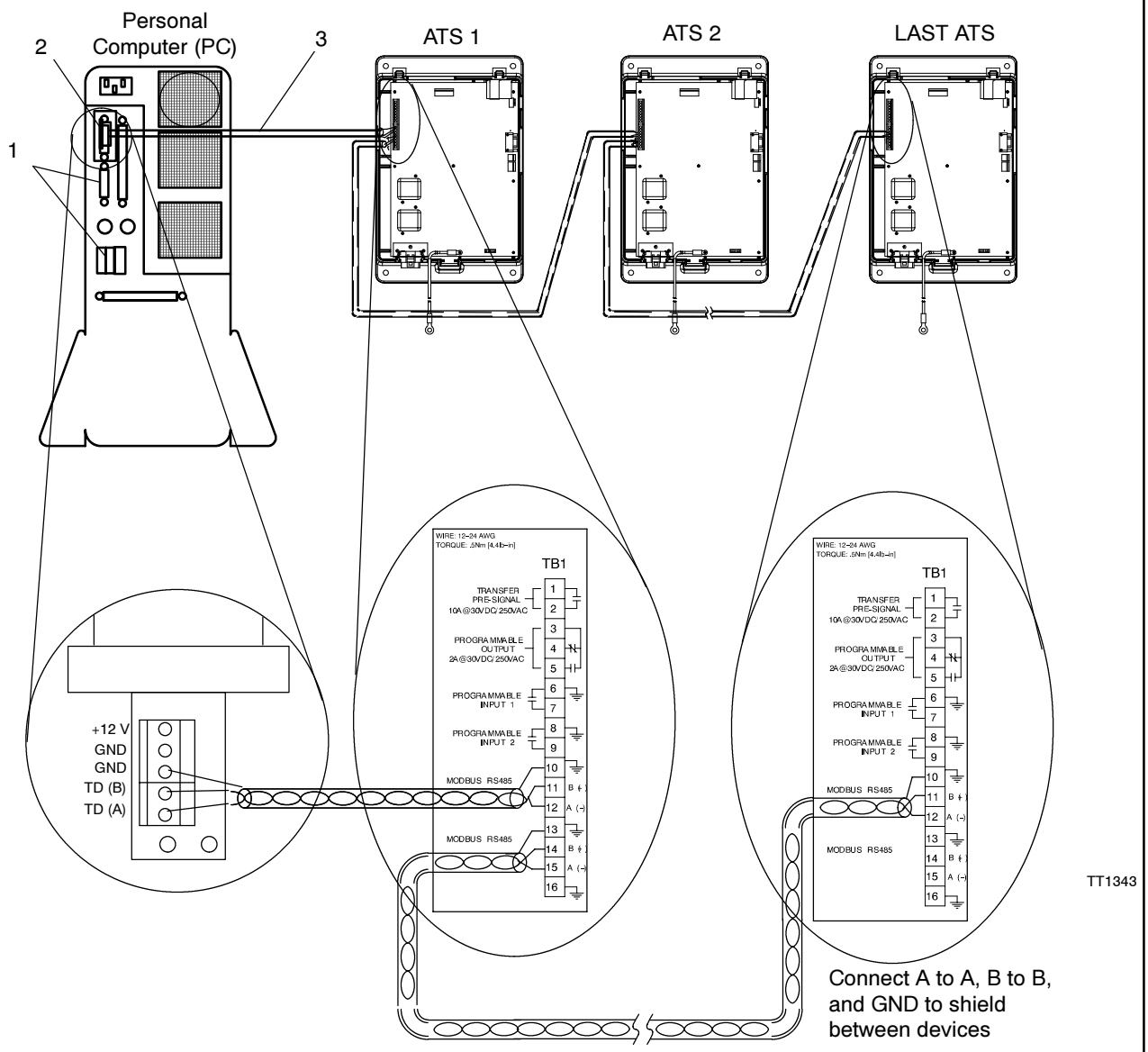


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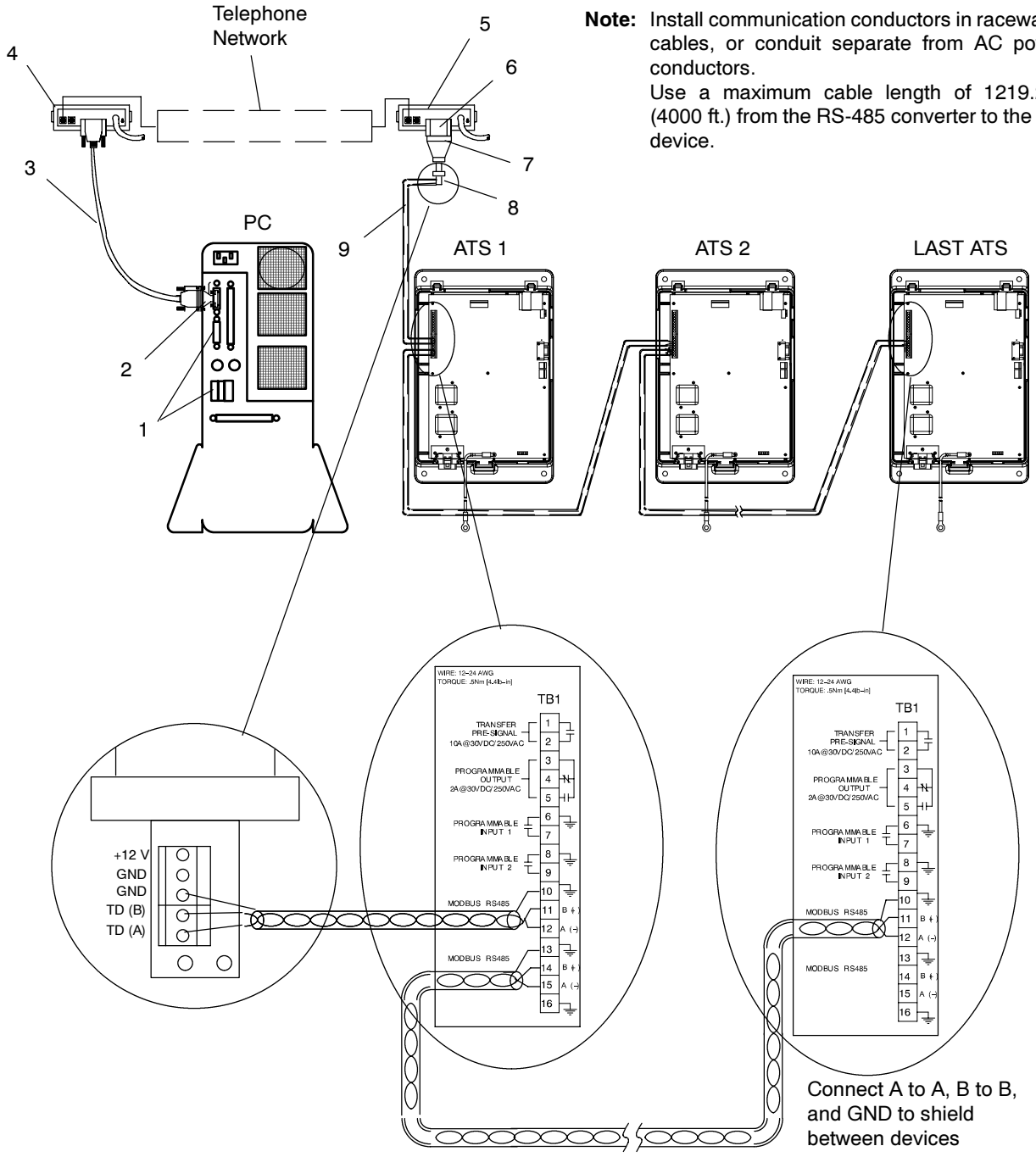
Figure 10 Local Area Network



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

1. Hardware key (dongle), GM29224 (parallel) or GM 29225 (USB); included in software kit. Connect to the PC's parallel port or USB port. Parallel port dongles allow the connection of a printer or other device to the dongle.
2. Connector 294988 (9-pin female to 25-pin male converter). Use on 9-pin serial ports.
3. RS-232 cable GM29362
4. PC Modem 294986 (60 Hz) or 353072 (50 Hz). Connect telephone line directly to PC's internal modem's Telco jack if not using an external modem.
5. Device modem 294987 (60 Hz) or 353071 (50 Hz)
6. Null converter GM29363
7. 9-pin to 25-pin connector GM29364
8. RS-232 to RS-485 converter GM29361. Included in software kit. Do not connect to the +12V terminal on the converter. (The converter is powered through the PC's serial port.)
9. Twisted-pair shielded cable, Belden #9841 or equivalent, customer-supplied . Connect terminal A to terminal A and terminal B to terminal B. Connect the cable shield to the GND terminals. Use a maximum cable length of 1220 m (4000 ft.) from the RS-485 converter to the last transfer switch.

Figure 11 Remote Area Network

Parts Lists

PC to External Modem Kit, 60 Hz

Kit: GM29508-KP1		
Qty.	**Description**	**Part Number**
1	Connector	294988
1	Cable	GM29362
1	Modem	294986
1	Installation Instructions	TT-1349

Device Modem Kit, 60 Hz

Kit: GM29509-KP1		
Qty.	**Description**	**Part Number**
1	Modem	294987
1	Null modem	GM29363
1	Connector	GM29364
1	Installation Instructions	TT-1349

PC to External Modem Kit, 50 Hz

Kit: GM29508-KP2		
Qty.	**Description**	**Part Number**
1	Connector	294988
1	Cable	GM29362
1	Modem	353072
1	Installation Instructions	TT-1349

Device Modem Kit, 50 Hz

Kit: GM29509-KP2		
Qty.	**Description**	**Part Number**
1	Modem	353071
1	Null modem	GM29363
1	Connector	GM29364
1	Installation Instructions	TT-1349