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# **PanelMate® Mitsubishi Communication Driver Manual**

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Printed in the United States of America.

P/N 01-00453-02



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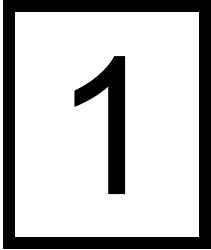
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This center, located in Zurich, Switzerland, provides high-level quality support and product repair services for your PanelMate products. You will receive real-time technical and application support.

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# Introduction



*In this chapter, you will learn:*

- *About driver installation*
- *How to download drivers to a PanelMate unit*
- *The supported memory types*

## Introduction

The Operator Station can be used with programmable controllers in the Mitsubishi Standard A Series (A0J2H, A1, A1N, A1S, A2, A2N, A3, A3N, A3H, A3M, and A73), Extended A Series (A2A, A2A(S1) and A3A), FX Series (FX-16, FX-24, FX-32, FX-48, FX-64, and FX-80), and the FXo Series (FXo-14, FXo-20, and FXo-30). Communication to the A Series PLCs will be through the AJ71C24 Computer Link Module. Communication to the FX and FXo Series will be through an RS232/RS422 converter. Communication to the FXo Series will be through the FX-20P-CADP Universal Adaptor.

**Note:** Check the Cutler-Hammer web site for current information on PanelMate PC connectivity to the Mitsubishi driver.

## Installing Drivers

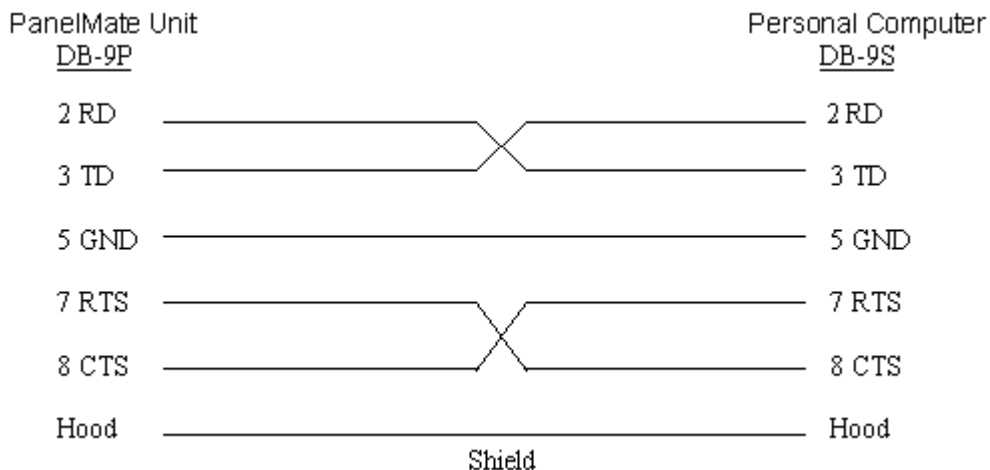
PanelMate Configuration Editor software is installed using a CD-ROM. To install the drivers from the CD-ROM, select the **Install Software** option and then **Install Drivers**. From the dialog box, select the driver you wish to install.

## Downloading Drivers to a PanelMate Unit

- In the VCP Transfer Utility, choose the “Executive” tab and select the proper Executive Firmware to download to the PanelMate unit.
- Click the button labeled “Add to Operation List.”  
**Note:** In order to download to a PanelMate for the first time or to clear the existence of another driver, the PanelMate must first be loaded with Executive Firmware.
- Choose the “Driver” tab.
- Select the appropriate driver to be downloaded to the PanelMate.
- Click the button labeled “Add to Operation List.”
- Place the PanelMate unit in Serial Transfer Mode.
- Connect a serial transfer cable from the correct port on the PC to port 1 on the PanelMate. (See cabling below.)
- Click “Start” at the bottom of the VCP Transfer Utility window.
- **Note:** For a more detailed description of downloading procedures and troubleshooting see *PanelMate Power Series, PowerPro, Pro LT Transfer Utility User’s Guide*.

### Serial Transfer Cables

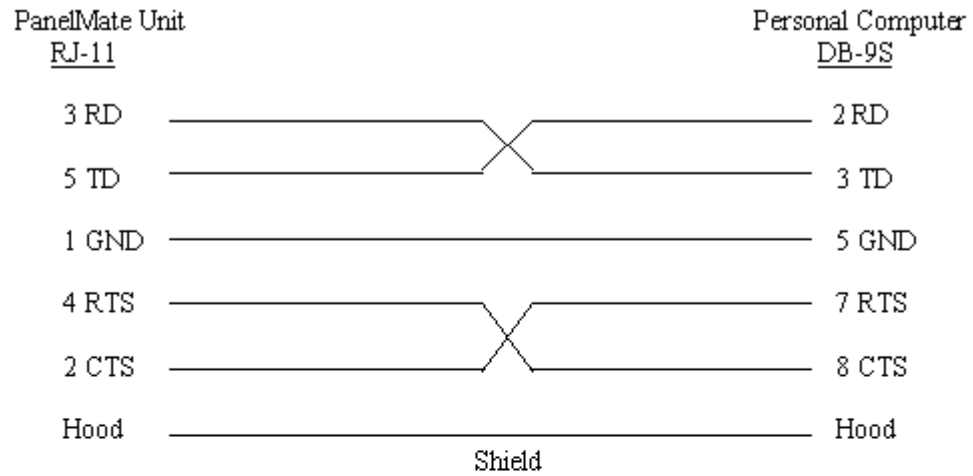
#### Cable P/N 0518



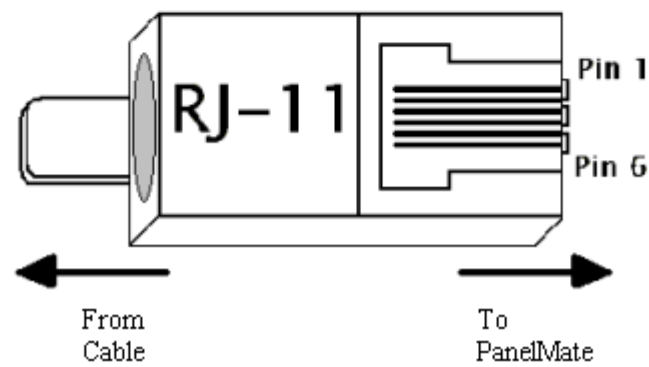


**Cable P/N 0818**

(PanelMate Power Series 1500 and PanelMate 500 only)



RJ-11 pin configuration



## Memory

The following memory types are supported by the Mitsubishi A Series driver:

Memory Type	Memory Address
<b>16-Bit Word</b>	
TN	Timer (present value) Register
CN	Counter (present Value) Register
D	Data Register
W	Link Register
R	File Register
D	Special Register

Memory Type	Memory Address
<b>Bit</b>	
X	Input Relay Device
Y	Output Relay Device
M	Internal Relay Device
L	Latch Relay Device
S	Step Relay Device
B	Link Relay Device
F	Annunciator Device
M	Special Relay Device
TS	Timer (contact) Device
TC	Timer (coil) Device
CS	Counter (contact) Device
CC	Counter (coil) Device

The Mitsubishi FX and FXo Series driver supports the following memory types:

Memory Type	Memory Address
<b>16 Bit Word</b>	
TN	Timer (present value) Register
CN	Counter (present value) Register (16-Bit)
CN	Counter (present value) Register (32-Bit)
D	Data Register
D	Special Register

Memory Type	Memory Address
<b>Bit</b>	
X	Input Relay Device
Y	Output Relay Device
M	Auxiliary Relay Device
M	Special Relay Device
S	State Device
TS	Timer (contact) Device
TC	Timer (coil) Device
CS	Counter (contact) Device
CC	Counter (coil) Device

## Mitsubishi A Series Memory Ranges

The following tables show the word device types supported by the Mitsubishi A Series driver. Link Register addresses are hexadecimal. All other addresses are decimal. These memory types can be referenced as a single bit or 16-bit word.

Model	Timer (Present Value) Register	Counter (Present Value) Register	Data Register
A0J2H	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A1	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A1N	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A1S	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A2	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A2N	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A3	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A3N	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A3H	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A3M	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A73	TN0000-TN0255	CN0000-CN0255	D0000-D1023
A2A	TN000000-TN002047	CN000000-CN001023	D000000-D006143
A2A(S1)	TN000000-TN002047	CN000000-CN001023	D000000-D006143
A3A	TN000000-TN002047	CN000000-CN001023	D000000-D006143

**Note:** Timer and counter registers are read only.

Model	Link Register	File Register	Special Register
A0J2H	W0000-W03FF	R0000-R8191	D9000-D9255
A1	W0000-W03FF	Not Supported	D9000-D9255
A1N	W0000-W03FF	Not Supported	D9000-D9255
A1S	W0000-W03FF	R0000-R4095	D9000-D9255
A2	W0000-W03FF	R0000-R4095	D9000-D9255
A2N	W0000-W03FF	R0000-R4095	D9000-D9255
A3	W0000-W03FF	R0000-R8191	D9000-D9255
A3N	W0000-W03FF	R0000-R8191	D9000-D9255
A3H	W0000-W03FF	R0000-R8191	D9000-D9255
A3M	W0000-W03FF	R0000-R8191	D9000-D9255
A73	W0000-W03FF	R0000-R8191	D9000-D9255
A2A	W000000-W000FFF	R000000-R008191	D009000-D009255
A2A(S1)	W000000-W000FFF	R000000-R008191	D009000-D009255
A3A	W000000-W000FFF	R000000-R008191	D009000-D009255

**Note:** Special registers are read only.

The following tables show the bit device types supported by the Mitsubishi A Series driver. Input, Output, and Link Relay addresses are hexadecimal. All other addresses are decimal. These memory types can be referenced as a single bit or 16-bit word.

Model	Input Device	Output Device	Internal Relay Device
A0J2H	X0000-X01FF	Y0000-Y01FF	M0000-M2047
A1	X0000-X00FF	Y0000-Y00FF	M0000-M2047
A1N	X0000-X00FF	Y0000-Y00FF	M0000-M2047
A1S	X0000-X00FF	Y0000-Y00FF	M0000-M2047
A2	X0000-X01FF	Y0000-Y01FF	M0000-M2047
A2N	X0000-X01FF	Y0000-Y01FF	M0000-M2047
A3	X0000-X07FF	Y0000-Y07FF	M0000-M2047
A3N	X0000-X07FF	Y0000-Y07FF	M0000-M2047
A3H	X0000-X07FF	Y0000-Y07FF	M0000-M2047
A3M	X0000-X07FF	Y0000-Y07FF	M0000-M2047
A73	X0000-X07FF	Y0000-Y07FF	M0000-M2047
A2A	X000000-X0001FF	Y000000-Y0001FF	M000000-M008191
A2A(S1)	X000000-X0003FF	Y000000-Y0003FF	M000000-M008191
A3A	X000000-X0007FF	Y000000-Y0007FF	M000000-M008191

**Note:** Input devices are read only.

Model	Latch Relay	Step Device	Link Relay Device
A0J2H	L0000-L2047	S0000-S2047	B0000-B03FF
A1	L0000-L2047	S0000-S2047	B0000-B03FF
A1N	L0000-L2047	S0000-S2047	B0000-B03FF
A1S	L0000-L2047	S0000-S2047	B0000-B03FF
A2	L0000-L2047	S0000-S2047	B0000-B03FF
A2N	L0000-L2047	S0000-S2047	B0000-B03FF
A3	L0000-L2047	S0000-S2047	B0000-B03FF
A3N	L0000-L2047	S0000-S2047	B0000-B03FF
A3H	L0000-L2047	S0000-S2047	B0000-B03FF
A3M	L0000-L2047	S0000-S2047	B0000-B03FF
A73	L0000-L2047	S0000-S2047	B0000-B03FF
A2A	L000000-L008191	S000000-S008191	B000000-B000FFF
A2A (S1)	L000000-L008191	S000000-S008191	B000000-B000FFF
A3A	L000000-L008191	S000000-S008191	B000000-B000FFF

Model	Annunciator Device	Special Relay Device	Timer (Contact) Device
A0J2H	F0000-F0255	M9008-M9247	TS0000-TS0255
A1	F0000-F0255	M9008-M9247	TS0000-TS0255
A1N	F0000-F0255	M9008-M9247	TS0000-TS0255
A1S	F0000-F0255	M9008-M9247	TS0000-TS0255
A2	F0000-F0255	M9008-M9247	TS0000-TS0255
A2N	F0000-F0255	M9008-M9247	TS0000-TS0255
A3	F0000-F0255	M9008-M9247	TS0000-TS0255
A3N	F0000-F0255	M9008-M9247	TS0000-TS0255
A3H	F0000-F0255	M9008-M9247	TS0000-TS0255
A3M	F0000-F0255	M9008-M9247	TS0000-TS0255

Model	Annunciator Device	Special Relay Device	Timer (Contact) Device
A73	F0000-F0255	M9008-M9247	TS0000-TS0255
A2A	F000000-F002047	M009000-M009255	TS000000-TS002047
A2A (S1)	F000000-F002047	M009000-M009255	TS000000-TS002047
A3A	F000000-F002047	M009000-M009255	TS000000-TS002047

**Note:** Special relay devices are read only.

Special relay devices M9000-M9007 and M9248-M9255 cannot be read directly by the Operator Station for the models shown. However, ladder logic could be written to set and clear readable devices, such as link relay devices based on the status of these specific bits. The Operator Station could then reference the readable devices.

Model	Timer (Coil) Device	Counter (Contact) Device	Contact (Coil) Device
A0J2H	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A1	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A1N	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A1S	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A2	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A2N	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A3	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A3N	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A3H	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A3M	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A73	TC00000-TC0255	CS0000-CS0255	CC0000-CC0255
A2A	TC000000-TC002047	CS000000-CS001023	CC000000-CC001023
A2A (S1)	TC000000-TC002047	CS000000-CS001023	CC000000-CC001023
A3A	TC000000-TC002047	CS000000-CS001023	CC000000-CC001023



## Mitsubishi FX Series Memory Ranges

The following tables show the word device types supported by the Mitsubishi FX Series driver. All addresses are decimal. These memory types can be referenced as a single bit or 16-bit words unless otherwise noted.

Model	Timer (Present Value) Register	Counter (Present Value) Register	Data Register	Special Register
FX-16	TN000-TN255	CN000-CN199 (16-bit) CN200-CN255 (32-bit)	D000-D511	D8000-D8255
FX-24	TN000-TN255	CN000-CN199 (16-bit) CN200-CN255 (32-bit)	D000-D511	D8000-D8255
FX-32	TN000-TN255	CN000-CN199 (16-bit) CN200-CN255 (32-bit)	D000-D511	D8000-D8255
FX-48	TN000-TN255	CN000-CN199 (16-bit) CN200-CN255 (32-bit)	D000-D511	D8000-D8255
FX-64	TN000-TN255	CN000-CN199 (16-bit) CN200-CN255 (32-bit)	D000-D511	D8000-D8255
FX-80	TN000-TN255	CN000-CN199 (16-bit) CN200-CN255 (32-bit)	D000-D511	D8000-D8255

**Note:** The following Special Registers are read only.

D8001-D8012

D8028-D8029

D8040-D8067

D8069-D8070

**Note:** Data Registers using bit references are read only.

The following tables show the bit device types supported by the Mitsubishi FX Series driver. Input Relay and Output Relay addresses are octal. All other addresses are decimal. These memory types can be referenced as a single bit or 16-bit word (must be a multiple of 16).

Model	Input Relay Device	Output Relay Device	Auxiliary Device
FX-16	X000-X177	Y000-Y177	M0000-M1023
FX-24	X000-X177	Y000-Y177	M0000-M1023
FX-32	X000-X177	Y000-Y177	M0000-M1023
FX-48	X000-X177	Y000-Y177	M0000-M1023
FX-64	X000-X177	Y000-Y177	M0000-M1023
FX-80	X000-X177	Y000-Y177	M0000-M1023

**Note:** Input Relay Devices are read only.

Model	Special Relay Device	State Device	Timer (Contact) Device
FX-16	M8000-M8255	S000-S999	TS000-TS255
FX-24	M8000-M8255	S000-S999	TS000-TS255
FX-32	M8000-M8255	S000-S999	TS000-TS255
FX-48	M8000-M8255	S000-S999	TS000-TS255
FX-64	M8000-M8255	S000-S999	TS000-TS255
FX-80	M8000-M8255	S000-S999	TS000-TS255

**Note:** The following Special Relay Devices are read only.

M8000-M8014  
M8020-M8021  
M8029  
M8046  
M8048  
M8060-M8067  
M8072-M8073

**Note:** Word writes to State Device S992 are not allowed.

Model	Timer (Coil) Device	Counter (Contact) Device	Counter (Coil) Device
FX-16	TC000-TC255	CS000-CS255	CC000-CC255
FX-24	TC000-TC255	CS000-CS255	CC000-CC255
FX-32	TC000-TC255	CS000-CS255	CC000-CC255
FX-48	TC000-TC255	CS000-CS255	CC000-CC255
FX-64	TC000-TC255	CS000-CS255	CC000-CC255
FX-80	TC000-TC255	CS000-CS255	CC000-CC255

## Mitsubishi FXo Series Memory Ranges

The following tables show the word device types supported by the Mitsubishi FXo Series driver. All addresses are decimal. These memory types can be referenced as a single bit or 16-bit words unless otherwise noted.

Model	Timer (Present Value) Register	Counter (Present Value) Register	Data Register	Special Register
FXo-14	TN00-TN55	CN00-CN15 (16-bit) CN235-CN249 (32-bit) CN251-CN254 (32-bit)	D00-D31	D8000-D8069
FXo-20	TN00-TN55	CN00-CN15 (16-bit) CN235-CN249 (32-bit) CN251-CN254 (32-bit)	D00-D31	D8000-D8069
FXo-30	TN00-TN55	CN00-CN15 (16-bit) CN235-CN249 (32-bit) CN251-CN254 (32-bit)	D00-D31	D8000-D8069

**Note:** The following Special Registers are read only:

D8001-D8013

D8028-D8029

D8040-D8067

D8069

The following tables show the bit device types supported by the Mitsubishi FXo Series driver. Input Relay and Output Relay addresses are octal. All other addresses are decimal. These memory types can be referenced as a single bit or 16-bit word (must be a multiple of 16).

Model	Input Relay Device	Output Relay Device	Auxiliary Device
FXo-14	X00-X17	Y00-Y15	M000-M511
FXo-20	X00-X17	Y00-Y15	M000-M511
FXo-24	X00-X17	Y00-Y15	M000-M511

**Note:** Input Relay Devices are read only.

**Note:** Word writes to Output Relay Device Y0 are not allowed.

Model	Special Relay Device	State Device	Timer (Contact) Device
FXo-14	M8000-M8254	S00-S63	TS00-TS55
FXo-20	M8000-M8254	S00-S63	TS00-TS55
FXo-30	M8000-M8254	S00-S63	TS00-TS55

**Note:** The following Special Relay Devices are read only.

M8000-M8022

M8029

M8061

M8065-M8067

M8246-M8254

**Note:** Word writes to Timer (Contact) Device TS48 are not allowed

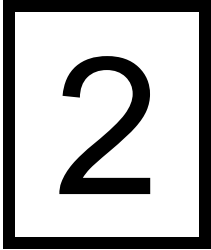
Model	Timer (Coil) Device	Counter (Contact) Device	Counter (Coil) Device
FXo-14	TC00-TC55	CS00-CS15 CS235-CS249 CS251-CS254	CC00-CC15 CC235-CC249 CC251-CC254
FXo-20	TC00-TC55	CS00-CS15 CS235-CS249 CS251-CS254	CC00-CC15 CC235-CC249 CC251-CC254
FXo-30	TC00-TC55	CS00-CS15 CS235-CS249 CS251-CS254	CC00-CC15 CC235-CC249 CC251-CC254

**Note:** Word writes to Timer (Coil) Device TC48 are not allowed.

**Note:** Word writes to Counter (Contact) Devices CS240 are not allowed.

**Note:** Word writes to Counter (Coil) Devices CC240 are not allowed.

# Possible Configurations

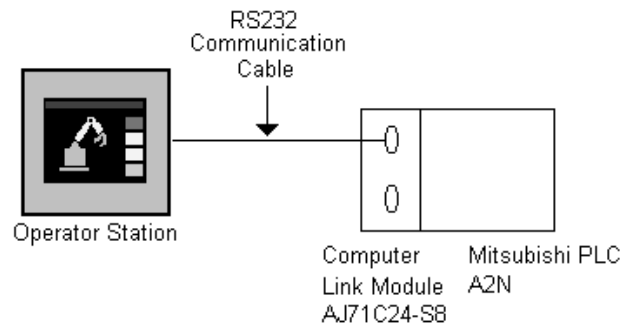


*In this chapter, you will learn:*

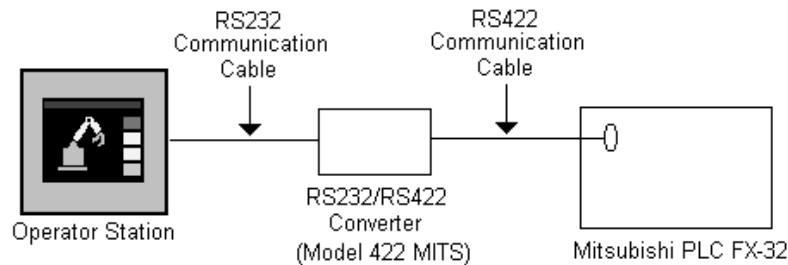
- *How to connect an operator station to Mitsubishi PLCs*

## Direct Connection

Direct connection between an Operator Station and a Mitsubishi A Series processor.

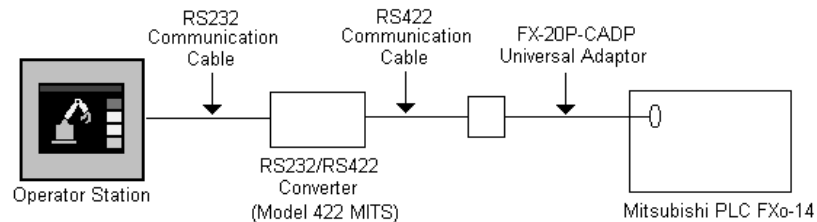


Direct Connection between an Operator Station and a Mitsubishi FX Series processor.



**Note:** An RS422 cable is required. For pinout information, refer to Chapter 3, pages 23 and 24.

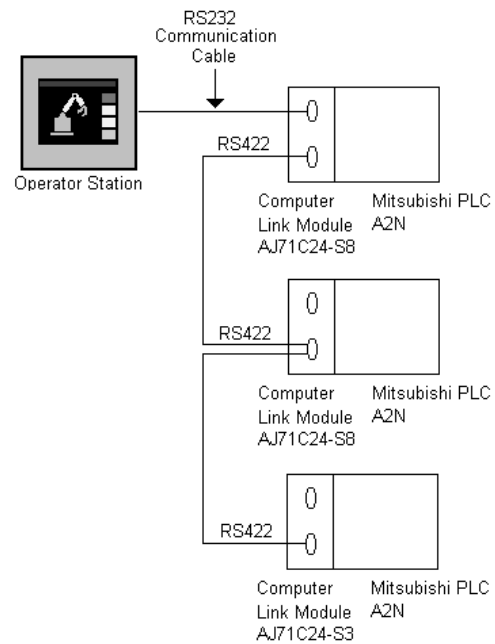
Direct connection between an Operator Station and a Mitsubishi FXo Series processor.



**Note:** An RS422 Cable is required. For pinout information, refer to Chapter 3, pages 23 and 24.

## Network Connection (Mitsubishi A Series Only)

The following figure shows a network consisting of three devices and an Operator Station.



**Note:** You could also use RS422 cabling to connect the Operator Station to the Mitsubishi A Series PLC.



# Cabling

## 3

*In this chapter, you will learn:*

- *The cabling requirements for Mitsubishi PLCs*

## Cable Configurations

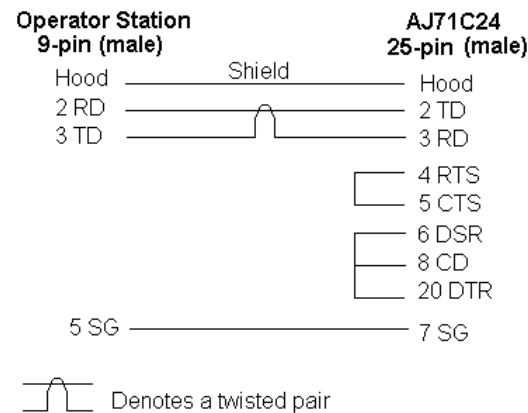
The following figures show the cable configuration between an Operator Station and the AJ71C24 module for the Mitsubishi A Series PLCs. The Mitsubishi A Series driver supports RS232C and RS422 communications. The maximum cable length when using RS232 is 50 feet, while the maximum cable length for RS422 is 4000 feet. RS422 cable must be a twisted double-wire shielded cable.

A 15-foot PLC cable can be purchased from Cutler-Hammer. Contact the Customer Support Group (refer to the Preface) or your local distributor for more information. Refer to the PLC Cabling Cross-Reference List section for cabling catalog numbers.

The Operator Stations that have 9-pin female connectors (DB-9S) must have cables configured with male connectors (DB-9P).

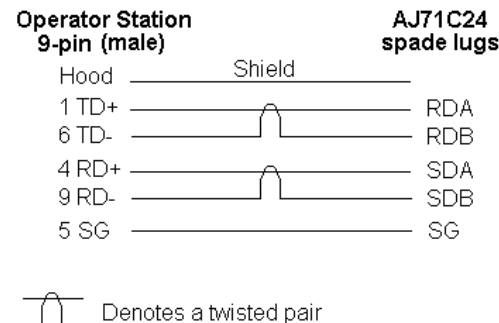
### RS232 Cabling for AJ71C24 Module (Mitsubishi A Series)

**Cable Catalog Number:** MI31 for PanelMate 500, 1500; MI21 for all other PanelMate Power Series and Power Pro Models



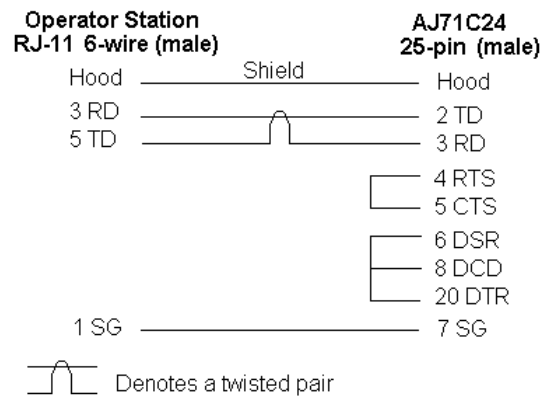
### RS422 Cabling for AJ71C24 Module (Mitsubishi A Series)

**Cable Catalog Number:** MI32 for PanelMate 500, 1500; MI22A for all other PanelMate Power Series and Power Pro Models

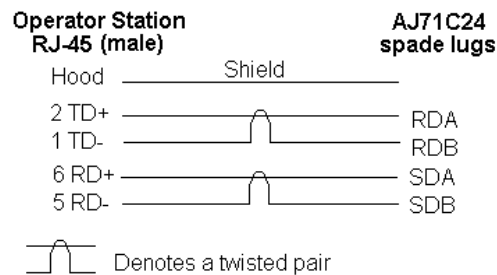


The Operator Stations that have RJ-11 6-wire and RJ-45 modular jacks must have cables configured with male modular connectors.

### RS232 Cabling for AJ71C24 Module (Mitsubishi A Series)



### RS422 Cabling for AJ71C24 Module (Mitsubishi A Series)



The Mitsubishi FX and FXo Series require an RS232/RS422 converter to communicate with an Operator Station. The following figures show the cable configuration between an Operator Station and the RS232/RS422 converter for the Mitsubishi FX and FXo Series PLCs. Note that the Mitsubishi FXo Series has a built-in no-standard port that communicates RS422. To communicate to an Operator Station, you must also use an FX-20P-CADP Universal Adapter that converts the port to a 25-pin port. The maximum cable length when using RS232 is 50 feet, while the maximum cable length for RS422 is 4000 feet. RS422 cable must be a twisted double-wire shielded cable.

The Operator Stations that have 9-pin female connectors (DB-9S) must have cables configured with male connectors (DB-9P).

## RS232/RS422 Converter Cabling for the Mitsubishi FX Series PLCs

Cable Catalog Number: **MI33** for PanelMate 500, 1500; **MI23** for all other PanelMate Power Series and Power Pro Models

Operator Station 9-pin (male)	RS232 side of Converter 25-pin (male)	RS422 side of Converter 25-pin (female)	Mitsubishi FX Series 25-pin (male)
Hood	Shield	Hood	
2 RD	3 TD	R	2
3 TD	2 RD	S	3
7 RTS	4 CTS	2	4
8 CTS	5 RTS	3	5
5 SG	7 SG	2	12
		12	12
		15	15
		16	16
		17	4
		18	18
		20	20

RS232/RS422  
Converter  
Model 422 MITS

 Denotes a twisted pair

## RS232/RS422 Converter Cabling for the Mitsubishi FXo Series PLCs






Operator Station 9-pin (male)	RS232 side of Converter 25-pin (male)	RS422 side of Converter 25-pin (female)	Mitsubishi FXo Series 25-pin (male)
Hood	Shield	Hood	
2 RD	3 TD	R	2
3 TD	2 RD	S	3
7 RTS	4 CTS	2	4
8 CTS	5 RTS	3	15
5 SG	7 SG	2	16
		16	16
		17	4
		20	20

RS232/RS422  
Converter  
Model 422 MITS

 Denotes a twisted pair

The Operator Stations that have RJ-11 6-Wire modular jacks must have cables configured with male modular connectors.

### RS232/RS422 Converter Cabling for the Mitsubishi FX Series PLCs

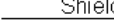




Operator Station RJ-11 6-wire (male)	RS232 side of Converter 25-pin (male)	RS422 side of Converter 25-pin (female)	Mitsubishi FX Series 25-pin (male)
Hood  Shield	Hood	R	2
3 RD 	3 TD	S	3
5 TD 	2 RD	2	4
4 RTS 	4 CTS	3	5
2 CTS 	5 RTS	2	12
1 SG	7 SG	2	15
		16	16
		17	4
		18	18
		20	20

RS232/RS422  
Converter  
Model 422 MITS



Denotes a twisted pair

### RS232/RS422 Converter Cabling for the Mitsubishi FXo Series PLCs

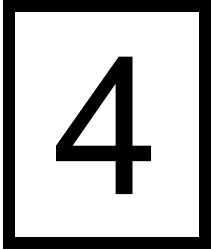
Operator Station RJ-11 6-wire (male)	RS232 side of Converter 25-pin (male)	RS422 side of Converter 25-pin (female)	Mitsubishi FXo Series 25-pin (male)
Hood  Shield	Hood	R	2
3 RD 	3 TD	S	3
5 TD 	2 RD	2	4
4 RTS 	4 CTS	3	15
2 CTS 	5 RTS	2	16
1 SG	7 SG	2	17
		16	4
		17	20
		20	20

RS232/RS422  
Converter  
Model 422 MITS



Denotes a twisted pair

# Communication Parameters



*In this chapter, you will learn:*

- *The different switch settings*

## Standard Communications Parameters

The standard communications parameters for communicating with Mitsubishi A Series PLCs are:

Baud rate	300 through 19200
Data bits	8
Parity	Even
Stop bits	1

**Note:** The settings for parameters, such as baud rate, must match the parameters set for the Operator Station.

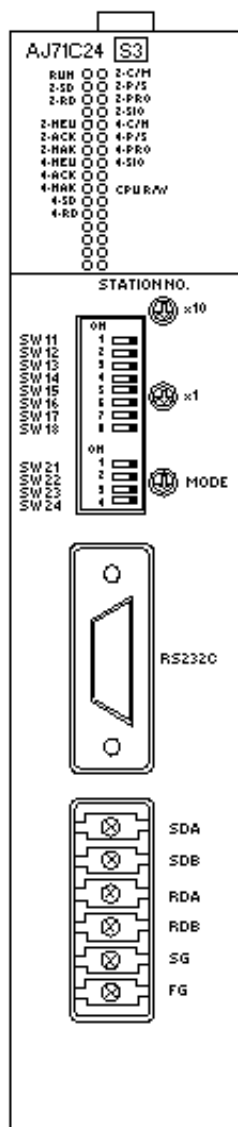
The standard communications parameters for communicating to Mitsubishi FX and FXo Series PLCs are:

Baud rate	9600
Data bits	7
Parity	Even
Stop bits	1

## AJ71C24 Computer Link Module

The AJ71C24 module is the interface between the Operator Station and the Mitsubishi PLCs. It has one RS232C and one RS422 port. Refer to the tables that follow for configuration information.

### AJ71C24-S3 Module





## LED Signals and Descriptions

The following table describes the LED signals on the AJ71C24 module and gives a brief description of their function.

LED	Description
RUN	Normal run
2-SD	RS232C transmitting
2-RD	RS232C receiving
2-NEU	RS232C neutral
2-ACK	RS232 ACK
2-NAK	RS232 NAK
4-NEU	RS422 neutral
4-ACK	RS422 ACK
4-NAK	RS422 NAK
4-SD	RS422 transmission status
4-RD	RS422 received data status
2-C/N	Result of RS232C and PC CPU communications
2-P/S	RS232 parity/sum check error
2-PRO	RS232C protocol error
2-SIO	RS232C SIO error
4-C/N	Result of RS422 and PC CPU communications
4-P/S	RS422 parity/sum check error
4-PRO	RS422 protocol error
4-SIO	RS422 SIO error
CPUR/W	Communications with PC CPU

## Protocol Settings

The station numbers are located below the LEDs and can be set in the range from 0 to 31. Set the X10 station number to the tens digit in the station number and set the X1 switch to the ones digit in the station number. The station number may be set to any value that does not duplicate another station number. Station numbers do not have to be sequential.

The mode setting switch is located below the station numbers and selects the transmission control protocol. The mode setting switch must be set to 1, 5, or A for communications to the Operator Station. Those selections enable Protocol 1. The method of setting the transmission control protocol and the meaning of the switch settings are described in the table below.

Mode Setting Switch Number	Mode Settings		Notes
	RS232C	RS422	
0	Unusable	Unusable	
1	Protocol 1	No Protocol	For connection of computers to RS232C and RS422 individually, or for connection of a printer to the no protocol interface. Both the interfaces work independently.
2	Protocol 2	No Protocol	
3	Protocol 3	No Protocol	
4	Protocol 4	No Protocol	
5	No Protocol	Protocol 1	
6	No Protocol	Protocol 2	
7	No Protocol	Protocol 3	
8	No Protocol	Protocol 4	
9	No Protocol	No Protocol	This mode is used to enable a no protocol computer link with all devices connected to the RS232C and RS422 interfaces. Data transmitted by a computer can be received by all AJ71C24 modules.

Mode Setting Switch Number	Mode Settings		Notes
	RS232C	RS422	
A	Protocol 1	Protocol 1	This mode is used to enable a dedicated protocol computer link with all devices connected to the RS232C & RS422 interfaces. Data transmitted by a computer can be received by the AJ71C24 designated by the send message.*
B	Protocol 2	Protocol 2	
C	Protocol 3	Protocol 3	
D	Protocol 4	Protocol 4	
E	Unusable	Unusable	
F	Module test	Module test	RS232C and RS422 operate independently.

\* When the mode switch is set from 9 to D, the RS232C and the RS422 interfaces operate as if interlocked with each other.

## Dipswitch Settings for the AJ71C24 Module

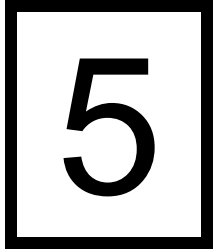
The following table lists and describes the dipswitch setting for the AJ71C24 module.

Switch	Description			ON		OFF		Notes	
SW11	Main channel settings			RS422		RS232C		Valid for modes A to D	
SW12	Data length			8 bits		7 bits		--	
SW13	Baud Rate Transmission Speed Setting	300	600	1200	2400	400	9600	19200	Unusable
SW14		OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW15		OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW16	Parity check			Enabled		Disabled		--	
SW17	Parity setting			Even		Odd		Valid only when parity check enabled is selected	

Switch	Description			ON	OFF	Notes
SW18	Stop bit			2 bits	1 bit	
SW21	Sum check			*Enabled	Disabled	
SW22	Write during RUN			*Enabled	Disabled	
SW23	Send area terminal resistance			Present	Absent	Valid only when
SW24	Receive area terminal resistance			Present	Absent	RS422 is used

\* These setting are not optional and must be set as indicated.

# Word and Bit References



*In this chapter, you will learn:*

- *How to configure word and bit references*

## Word Referencing Method

The general word referencing method is:

[plcname,word#format]

The "plcname" is the name of the designated PLC as listed in the PLC Name and Port Table. The "word" is the reference number (address) of the word or register to be read or written. The "#format" is a code which specifies the format of the data being read or written. The "plcname" and "#format" are optional if you are using the default PLC and do not wish to change the data format, respectively.

The general bit referencing method is:

[plcname,bit]

The "plcname" is the designated PLC as listed in the PLC Name and Port Table. The "bit" is the reference number (address) of the bit, coil, or input to be written or read.

See the "Word and Bit References" topic in the Configuration Software Online Help for a more detailed explanation of word and bit references, including format descriptions.

The Mitsubishi A Series driver is supported on the Operator Station for models A0J2H, A1, A1N, A1S, A2, A2N, A3, A3N, A3H, A3M, A73, A2A, A2A(S1), and A3A. These models use a combination of decimal and hexadecimal addresses. Bit references are from 0 to 15. The Operator Station's format default is S16.

The following list contains the memory types supported by the Mitsubishi A Series driver.

TN	timer (present value) register
CN	counter (present value) register
D	data register
W	link register
R	file register
D	special register
X	input relay device
Y	output relay device
M	internal relay device
L	latch relay device
S	step relay device
B	link relay device
F	annunciator device
M	special relay device
TS	timer (contact) device
TC	timer (coil) device
CS	counter (contact) device
CC	counter (coil) device

The Mitsubishi Series FX and FXo driver is supported on the Operator Station for models FX-16, FX-24, FX-32, FX-48, FX-64, FX-80, FXo-14, FXo-20, and FXo-30. These models use a combination of octal and decimal addresses. Bit references are from 0 to 15. The Operator Station's format default is S16.

The following list contains the memory types supported by the Mitsubishi Series FX and FXo driver.

TN	timer (present value) register
CN	counter (present value) register
D	data register
D	special register
X	input relay device
Y	output relay device
M	auxiliary relay device
M	special relay device
S	state device
TS	timer (contact) device
TC	timer (coil) device
CS	counter (contact) device
CC	counter (coil) device

The following is the format for referencing 16-bit or 32-bit (CN only) words.

[plcname,MMXXXX]

plcname	Optional PLC name found in the PLC Name Table. If left blank, the default name is used.
,	Optional PLC name delimiter.
MM	The word device memory type (e.g., D, W, CN).
XXXX	The word number; maximum of 4 characters; leading zeroes are allowed.

The following is the format for referencing a single bit in a word device.

[plcname, MMXXXX/BB]

plcname	Optional PLC name found in the PLC Name Table. If left blank, the default name is used.
,	Optional PLC name delimiter.
MM	The word device memory type (e.g., D, W, CN).
XXXX	The element number; maximum of 4 characters; leading zeroes are allowed.
/	Bit delimiter character.
BB	Bit number in the range 00-15; leading zeroes is allowed.

**Note:** Single bit references in a word are read only.

The following is the format for referencing bits in a bit device, as a 16-bit word.

[plcname, W:MMXXXX]

plcname	Optional PLC name found in the PLC Name Table. If left blank, the default name is used.
,	Optional PLC name delimiter.
W	Letter designating a 16-bit word.
:	16-bit delimiter character.
MM	The bit device memory type (e.g. X, Y, TC, etc.)
XXXX	The starting bit number; must be a multiple of 16 (e.g., 0, 16, 32, 48, etc. for decimal addressing and 0, 20, 40, 60, etc. for octal addressing).

The following is the format for referencing a single bit in a bit device.

[plcname, MMXXXX]

plcname	Optional PLC name found in the PLC Name Table. If left blank, the default name is used.
,	Optional PLC name delimiter.
MM	The bit device memory type (e.g., X, Y, TC, etc.)
XXXX	The bit number; maximum of 4 characters; leading zeroes are allowed.

The supported Mitsubishi PLC models will allow a maximum of 32 contiguous words per read. The maximum number of unused words before another read is generated is 15 for Mitsubishi A Series PLCs and 31 for the Mitsubishi FX and FXo Series PLCs.

## Examples

The following are examples of valid PLC references that may be assigned in the Operator Station expression fields.

### Mitsubishi A Series

Word References	
Reference	Description
[TN13]	Word 13 is referenced in timer memory
[CN125]	Word 125 is referenced in counter memory
[D3]	Word 3 is referenced in data register memory
[Wff]	Word 255 is referenced in link register memory
[R8002]	Word 8002 is referenced in file register memory
[D9111]	Word 9111 is referenced in special register memory
[W:X1F0]	Word starting at bit 1F0 (496) in input memory
[W:Y0]	Word starting at bit 0 in output memory
[W:M1024]	Word starting at bit 1024 in internal relay memory
[W:L16]	Word starting at bit 16 in latch relay memory
[W:S256]	Word starting at bit 256 in step relay memory
[W:B3F0]	Word starting at bit 3F0 (1008) in link relay memory
[W:F128]	Word starting at bit 128 in annunciator memory
[W:TS240]	Word starting at bit 240 in timer (contact) memory
[W:TC32]	Word starting at bit 32 in timer (coil) memory
[W:CS48]	Word starting at bit 48 in counter (contact) memory
[W:CC64]	Word starting at bit 64 in counter (coil) memory



Bit References	
Reference	Description
[X0003]	Bit 3 is referenced in input memory
[Y7]	Bit 7 is referenced in output memory
[M006555]	Bit 6555 is referenced in internal relay memory
[M999]	Bit 999 is referenced in auxiliary relay memory
[L005444]	Bit 5444 is referenced in latch relay memory
[S008000]	Bit 8000 is referenced in step relay memory
[S63]	Bit 63 is referenced in state relay memory
[B7]	Bit 7 is referenced in link relay memory
[F002007]	Bit 2007 is referenced in annunciator memory
[M009200]	Bit 9200 is referenced in special relay memory
[TS001999]	Bit 1999 is referenced in timer (contact) memory
[TC001888]	Bit 1888 is referenced in timer (coil) memory
[CS001000]	Bit 1000 is referenced in counter (contact) memory
[CC000999]	Bit 999 is referenced in counter (coil) memory
[TN123/13]	Word 123, bit 13 is referenced in timer memory
[CN125/12]	Word 125, bit 12 is referenced in counter memory
[D3/04]	Word 3, bit 4 is referenced in data register memory
[W9b/09]	Word 155, bit 9 is referenced in link register memory
[R8002/02]	Word 8002, bit 2 is referenced in file register memory
[D9111/10]	Word 9111, bit 10 is referenced in special register memory

**Mitsubishi FX Series**

<b>Word References</b>	
<b>Reference</b>	<b>Description</b>
[TN114]	Word 114 is referenced in timer memory
[CN125]	Word 125 is referenced in counter memory
[D3]	Word 3 is referenced in data register memory
[D8111]	Word 8111 is referenced in special register memory
[W:X60]	Word starting at bit 60 (48) is referenced in input relay memory
[W:M16]	Word starting at bit 16 is referenced in auxiliary memory
[W:TC128]	Word starting at bit 128 is referenced in timer (coil) memory
[W:CS80]	Word starting at bit 80 is referenced in counter (contact) memory.
[CN224]	Word 224 (32-bit) is referenced in counter memory.

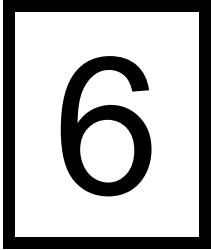
<b>Bit References</b>	
<b>Reference</b>	<b>Description</b>
[X14]	Bit 14 is referenced in input relay memory
[Y7]	Bit 7 is referenced in output relay memory
[M98]	Bit 98 is referenced in auxiliary memory
[M8025]	Bit 8025 is referenced in special relay memory
[S58]	Bit 58 is referenced in state memory
[TS125]	Bit 125 is referenced in timer (contact) memory
[TC87]	Bit 87 is referenced in timer (coil) memory
[CS133]	Bit 133 is referenced in counter (contact) memory
[CC201]	Bit 201 is referenced in counter (coil) memory

**Mitsubishi FXo Series**

<b>Word References</b>	
<b>Reference</b>	<b>Description</b>
[TN18]	Word 13 is referenced in timer memory
[CN246]	Word 246 is referenced in counter memory
[D17]	Word 17 is referenced in data register memory
[D8032]	Word 8032 is referenced in special register memory
[W:Y0]	Word starting at bit 0 is referenced in output relay memory
[W:S20]	Word starting at bit 20 (16) is referenced in state device memory
[W:TS40]	Word starting at bit 40 (32) is referenced in timer (contact) register memory
[W:CC0]	Word starting at bit 0 is referenced in counter (coil) memory.

<b>Bit References</b>	
<b>Reference</b>	<b>Description</b>
[X17]	Bit 17 is referenced in input relay memory
[Y15]	Bit 15 is referenced in output relay memory
[M444]	Bit 444 is referenced in auxiliary memory
[M8024]	Bit 8024 is referenced in special relay memory
[S24]	Bit 24 is referenced in state memory
[TS28]	Bit 28 is referenced in timer (contact) memory
[TC12]	Bit 12 is referenced in timer (coil) memory
[CS253]	Bit 253 is referenced in counter (contact) memory
[CC237]	Bit 237 is referenced in counter (coil) memory

# Maintenance Access



*In this chapter, you will learn:*

- *How to use the Maintenance Template*

## Maintenance Access

The Maintenance Template will access all memory locations supported by the PLC driver as defined in this manual. When running online, you may change the PLC reference. The Maintenance Template is designed to assist you in specifying the PLC reference by scrolling through a list of mnemonics that are used to enter the PLC word reference. When online in the PLC reference change mode, the following list is available.

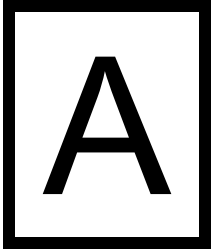
Mitsubishi A Series	“TN”, “CN”, “D”, “W”, “R”, “/”, “X”, “Y”, “M”, “L”, “S”, “B”, “F”, “TS”, “TC”, “CS”, “CC”, “W:”, “A”, “B”, “C”, “D”, “E”, and “F”
Mitsubishi FX Series	“X”, “Y”, “M”, “S”, “TS”, “TC”, “CS”, “CC”, “TN”, “CN”, “D”, “W:”, and “/”

You must enter the correct mnemonics and numeric values and create a legal reference to change a PLC reference.

**Note:** When a new reference is entered on an Operator Station, the Maintenance Template will remain in a paused state until the **Start Monitor** control button or the **Chng** soft function key is pressed. When the **Start Monitor** control button or the **Chng** soft function key is pressed, the Operator Station will parse the reference. (Parsing means checking the syntax and range of the reference to ensure that it is supported by the driver.)

**Note:** A Maintenance Template cannot be used to monitor unsolicited references.

# PLC Cabling Cross-Reference List



*In this chapter, you will learn:*

- *The catalog numbers for PLC cables*

## PLC Cabling Cross-Reference List

If you have a PanelMate Power Series 1500 and you wish to order PLC cables from Cutler-Hammer, use the following catalog numbers:

M131	Mitsubishi A Series PLC cable - AJ71C24 Module (RS232)
M132	Mitsubishi A Series PLC cable - AJ71C24 Module (RS422)
M133	Mitsubishi FX/Fxo Series PLC cable - RS232/RS422 Converter

For all other PanelMate Power Series models, use the following catalog numbers:

M121	Mitsubishi A Series PLC cable - AJ71C24 Module (RS232)
M122	Mitsubishi A Series PLC cable - AJ71C24 Module (RS422)
M123	Mitsubishi FX/Fxo Series PLC cable - RS232/RS422 Converter

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