

# PLC COMMUNICATIONS

---



# CHAPTER 6

## In This Chapter...

Introduction.....	6-2
<b>DirectLOGIC PLCs Password Protection .....</b>	<b>6-2</b>
PLC Protocols .....	6-3
<b>PLC Communication Cables &amp; Wiring Diagrams.....</b>	<b>6-5</b>
AutomationDirect PLCs RS-232C Serial.....	6-7
AutomationDirect PLCs RS-422A/RS-485A.....	6-10
<b>DirectLOGIC Universal Isolated Network Adapter, p/n FA-ISOCAN: .....</b>	<b>6-16</b>
<b>DirectLOGIC Universal Converter, p/n F2-UNICON: .....</b>	<b>6-17</b>
RS-422A/RS-485A Multi-Drop Wiring Diagram Examples .....	6-18
Allen-Bradley .....	6-22
GE.....	6-27
GE VersaMax Micro .....	6-27
Mitsubishi.....	6-28
Omron .....	6-30
Modicon Modbus RS-232.....	6-31
Modicon Micro Series.....	6-31
Modicon Modbus with RJ45.....	6-31
Siemens.....	6-32

# Introduction

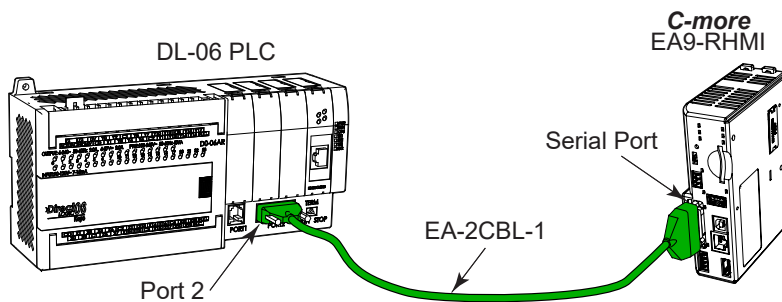
The **C-more** family of HMIs are capable of communicating with a wide variety of Programmable Logic Controllers. **C-more** is capable of communicating over RS232, RS422 and RS485 serial networks as well as Ethernet networks. It communicates with all AutomationDirect PLC's utilizing various protocols. **C-more** also communicates with other brands of PLCs by their different protocols. The table on the next page lists all of the various PLCs and protocols that can be configured. The page after the protocol table lists the various serial communication cables that are available to purchase. The rest of this chapter is devoted to showing the pin-to-pin connections of all the available cables plus wiring diagrams of cables that are not available for purchase. To simplify RS422/RS485 wiring schemes, we have included wiring diagrams showing connections for available terminal connectors such as our ZIPLink Communication Adapter Module, p/n ZL-CMA15, used for example with our DL-06 and D2-260 PLCs.

If you have difficulty determining whether the particular PLC and/or protocol you are using will work with the **C-more** series of HMIs, please contact our technical support group at 770-844-4200

## DirectLOGIC PLCs Password Protection



**NOTE:** Many **DirectLogic** PLCs support multi-level password protection of the ladder program. This allows password protection while not locking the communication port to an operator interface. The multilevel password can be invoked by creating a password with an upper case "A" followed by seven numeric characters (e.g. A1234567). Please refer to the specific PLC user manual for further details.



## PLC Protocols

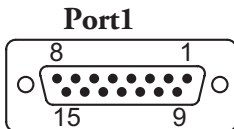
PLC Protocol Table			
Model		Protocols	
AutomationDirect	Productivity Series		Productivity Serial Productivity Ethernet
	Do-more (BRX)	All	Do-more Serial Do-more Ethernet
		All	CLICK Serial
	CLICK	C0-1x series	CLICK Ethernet
		C2-01CPU-x, C2-03CPU-x, All with C2-DCM	CLICK Serial
	CLICK PLUS	All	CLICK Ethernet
		all	K-Sequence <b>Direct</b> NET
	DL05/DL06	H0-ECOM/H0-ECOM100	Modbus (Koyo addressing) <b>Direct</b> LOGIC Ethernet
		all	K-Sequence
	DL105	D2-230	K-Sequence
		D2-240	K-Sequence <b>Direct</b> NET
	DL205	D2-250/D2-250-1/D2-260/D2-262	K-Sequence <b>Direct</b> NET
		D2-240/D2-250-1/D2-260 Using DCM	Modbus (Koyo addressing) <b>Direct</b> NET
		H2-ECOM/H2-ECOM100	Modbus (Koyo addressing) <b>Direct</b> LOGIC Ethernet
		D3-330/330P (Requires the use of a Data Communications Unit)	<b>Direct</b> NET
		D3-340	<b>Direct</b> NET
		D3-350	K-Sequence <b>Direct</b> NET
	DL305	D3-350 DCM	Modbus (Koyo addressing) <b>Direct</b> NET
		D4-430	Modbus (Koyo addressing)
		D4-440	K-Sequence <b>Direct</b> NET
	DL405	D4-450/D4-454	K-Sequence <b>Direct</b> NET
		All with DCM	Modbus (Koyo addressing) <b>Direct</b> NET
		H4-ECOM/H4-ECOM100	Modbus (Koyo addressing) <b>Direct</b> LOGIC Ethernet
		H2-WinPLC (Think & Do) Live V5.2 or later and Studio any version	Think & Do Modbus RTU (serial port)
		H2-WinPLC (Think & Do) Live V5.5.1 or later and Studio V7.2.1 or later	Think & Do Modbus TCP/IP (Ethernet port)
	GS Drives		GS Drives Serial GS Drives TCP/IP (GS-EDRV)
		SOLO Temperature Controllers (models with serial communications)	SOLO Temperature Controller

PLC Protocols (cont'd)

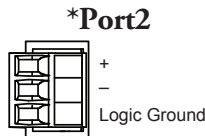
PLC Protocol Table (cont'd)		
Model		Protocols
Allen-Bradley	MicroLogix 1000, 1100, 1200, 1400, 1500, SLC 5-01/02/03	DH485/AIC/AIC+
	MicroLogix 1000, 1100, 1200, 1400 and 1500	DF1 Half Duplex; DF1 Full Duplex
	SLC 5-03/04/05	
	ControlLogix™, CompactLogix™, FlexLogix™	
	PLC-5	DF1 Full Duplex
	ControlLogix, CompactLogix, FlexLogix - Tag Based	DF1 Half Duplex; DF1 Full Duplex
	ControlLogix, CompactLogix, FlexLogix - Generic I/O Messaging	EtherNet/IP Server
	ControlLogix, CompactLogix, FlexLogix - Tag Based	EtherNet/IP Client
	MicroLogix 1100, 1400 and SLC 5/05, via native Ethernet port	
	MicroLogix 1000, 1100, 1200, 1400, 1500, SLC 5-03/04/05, all via ENI adapter	
	Micro 800 Series	Modbus RTU
		Modbus TCP
Micro 800 Series - Tag Based	DF1 Full Duplex	
	EtherNet/IP Client	
GE	90/30, 90/70, Micro 90, VersaMax Micro	SNPX
	90/30, Rx3i	SRTP Ethernet
Mitsubishi	FX Series	FX Direct
	Q02, Q02H, Q06H, Q12H, Q25H	Q CPU
	Q, QnA Serial	QnA Serial
	Q, QnA Ethernet	QnA Ethernet
Modicon	984 CPU, Quantum 113 CPU, AEG Modicon Micro Series 110 CPU: 311-xx, 411-xx, 512-xx, 612-xx	Modbus RTU
	Other devices using Modicon Modbus addressing	Modbus RTU TUModbus TCP/IP
Omron	C200 Adapter, C500	Host Link
	CJ1/CS1 Serial	FINS
	CJ1/CS1 Ethernet	
Siemens	S7-200 CPU, RS-485 Serial	PPI
	S7-200 CPU, S7-300 CPU, S7-400, S7-1200 CPU Ethernet	Ethernet ISO over TCP

# PLC Communication Cables & Wiring Diagrams

Cable Description	Cable Part Number
Communication cable, 15-pin D-shell male to 6-pin RJ12, 9.8ft/3m cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and AutomationDirect PLCs with RJ12 ports.	EA-2CBL
Communication cable, 15-pin D-shell male to 15-pin D-sub HD15 male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and a DL06, D2-250(-1), D2-260 or D2-262 (bottom port) CPU.	EA-2CBL-1
Communication cable, 15-pin D-shell male to 6-pin RJ11, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and a D3-340 CPU top or bottom port.	EA-3CBL
Communication cable, 15-pin D-shell male to 15-pin D-shell male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and a DL405 (top port) CPU.	EA-4CBL-1
Communication cable, 15-pin D-shell male to 25-pin D-shell male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and a D2-DCM, D3-232-DCU, D3-350 (bottom port) or DL405 (bottom port) CPU.	EA-4CBL-2
Communication cable, 15-pin D-shell male to 8-pin mini DIN male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and an Allen-Bradley Micrologix CPU.	EA-MLOGIX-CBL
Communication cable, 15-pin D-shell male to 9-pin D-shell female, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and an Allen-Bradley SLC 5/03, 5/04 or 5/05 CPU with DF-1 port.	EA-SLC-232-CBL
Communication cable, 15-pin D-shell male to 25-pin D-shell male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and an Allen-Bradley PLC-5 CPU with a DF1 port.	EA-PLC5-232-CBL
Communication cable, 15-pin D-shell male to 6-pin RJ45, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and an Allen-Bradley SLC 5/01, 5/02 or 5/03 CPU with a DH485 port cable.	EA-DH485-CBL
Communication cable, 15-pin D-shell male to 15-pin D-shell male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro and GE Fanuc Series 90/30 or 90/70 serial port.	EA-90-30-CBL
Communication cable, 15-pin D-shell male to 25-pin D-shell male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and a Mitsubishi FX Series CPU.	EA-MITSU-CBL
Communication cable, 15-pin D-shell male to 8-pin mini DIN male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and a Mitsubishi FX Series CPU.	EA-MITSU-CBL-1
Communication cable, 15-pin D-shell male to 25-pin D-shell male, 3m/9.8ft cable length. For use with <b>C-more</b> or <b>C-more</b> Micro panel and an Omron C200 or C500 CPU.	EA-OMRON-CBL



D-Sub 15-pin female



RS-485 Serial Communications



**\*NOTE:** All cables for connections at Port 2 are user constructed. Refer to the specifications of the connected device port to construct the cable properly. The connector for Port2, EA9-3TB, is included with your **C-more** panel.

## Cables from *AutomationDirect* (cont'd)

6



Part No. EA-2CBL



Part No. EA-2CBL-1



Part No. EA-4CBL-1



Part No. EA-4CBL-2



Part No. EA-3CBL



Part No. EA-MLOGIX-CBL



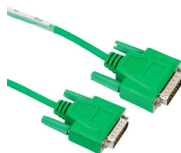
Part No. EA-SLC-232-CBL



Part No. EA-PLC5-232-CBL



Part No. EA-DH485-CBL



Part No. EA-90-30-CBL



Part No. EA-MITSU-CBL



Part No. EA-MITSU-CBL-1



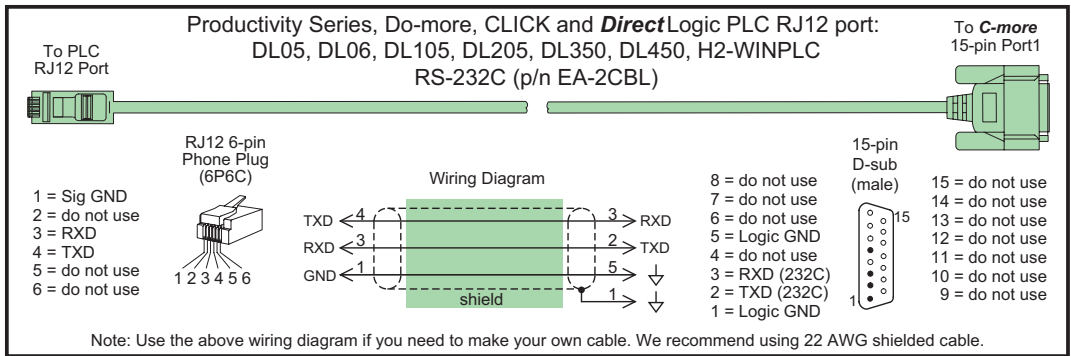
Part No. EA-OMRON-CBL

# PLC Communication Cables & Wiring Diagrams (cont'd)

The following series of wiring diagrams show the connectors and wiring details for the communication cables that are used between the **C-more** HMIs and various PLC controllers. Part numbers are included with the **pre-made cables** that can be purchased from **AutomationDirect**. The information presented will allow users to construct their own cables if so desired.

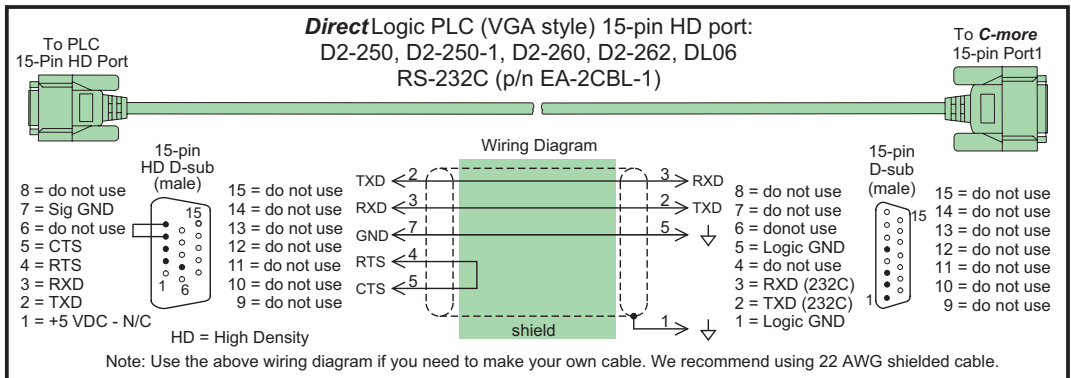
## AutomationDirect PLCs RS-232C Serial

### EA-2CBL



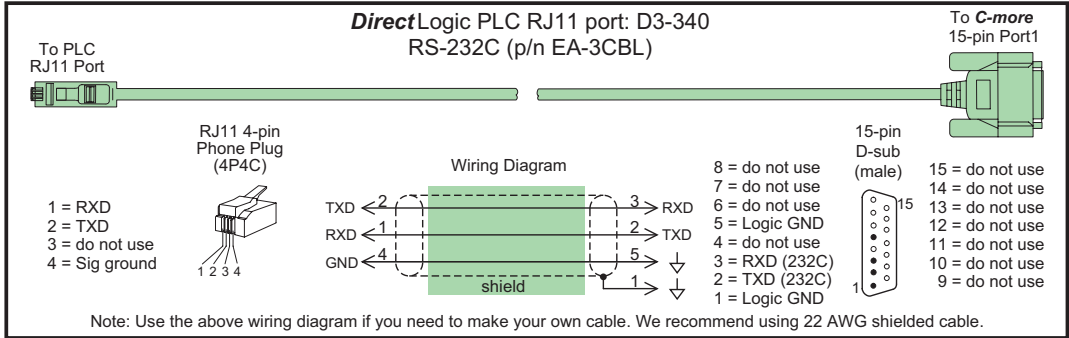
6

### EA-2CBL-1



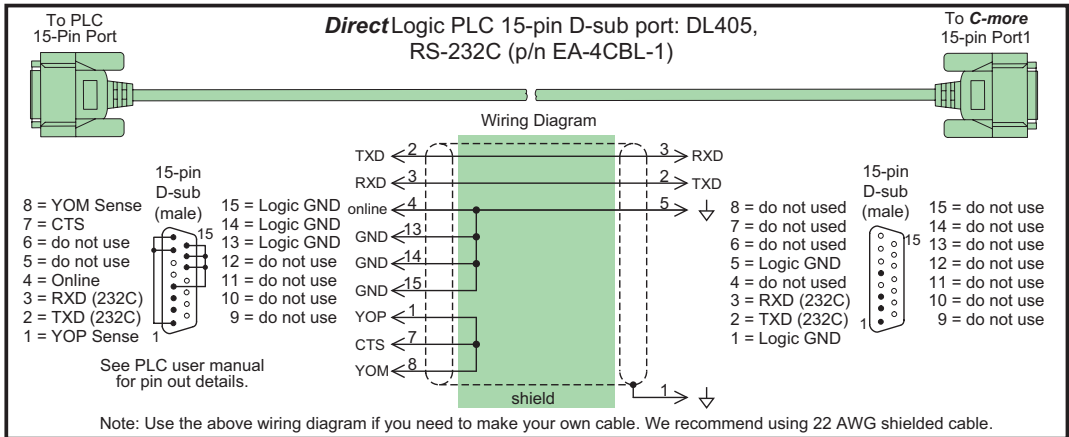
AutomationDirect PLCs RS-232C Serial (cont'd)

**EA-3CBL**



6

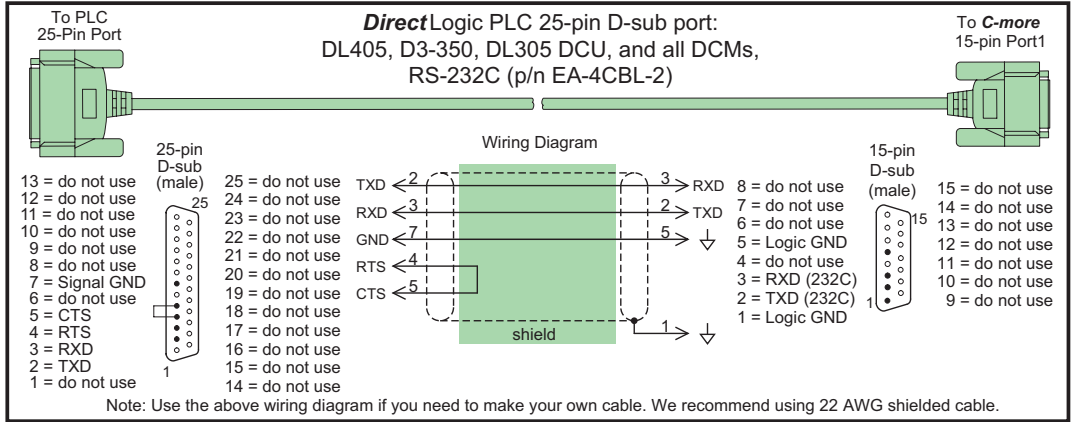
**EA-4CBL-1**





AutomationDirect PLCs RS-232C Serial (cont'd)

**EA-4CBL-2**

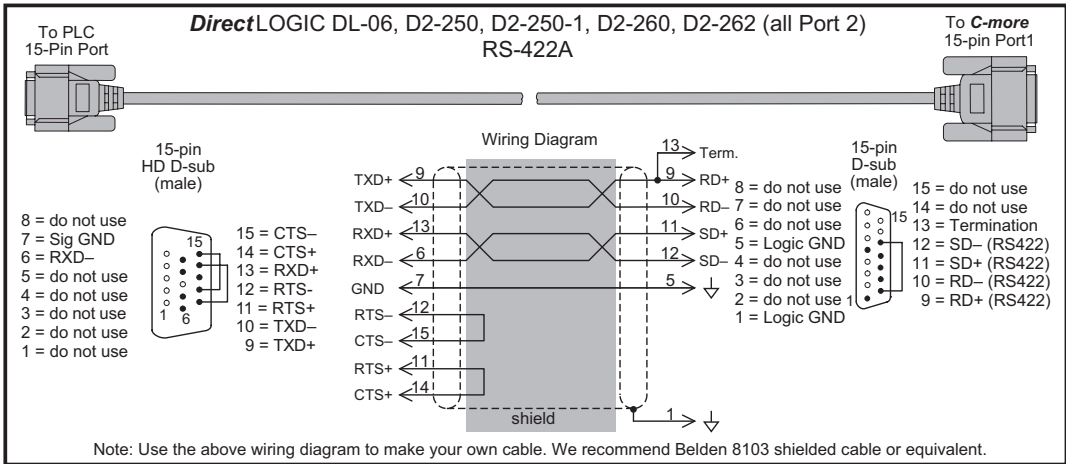


### AutomationDirect PLCs RS-422A/RS-485A

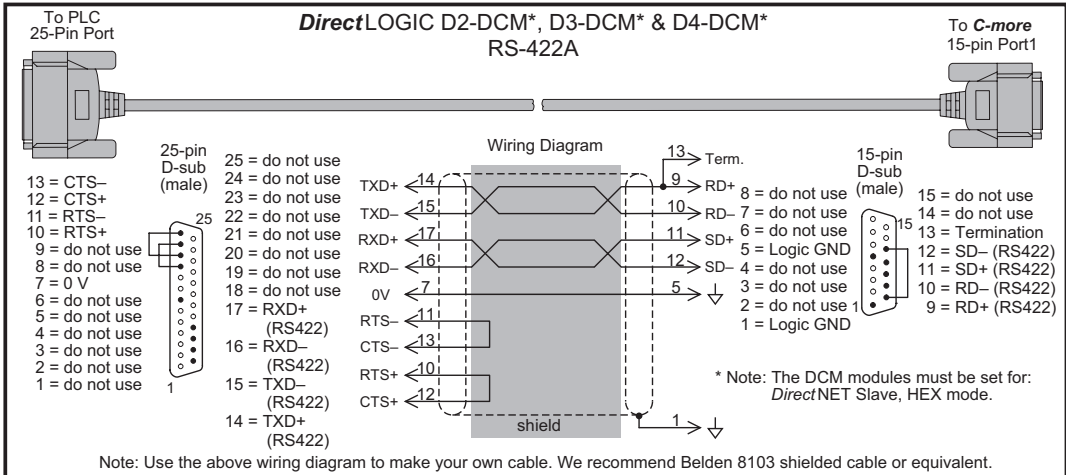
When using the RS-422A/RS-485A capabilities of the *C-more* 15-pin PLC communications Port1, the termination resistor is placed between the **RXD-** and **RXD+** terminals on the PLC side of the connection between the HMI and PLC. The Termination Resistor value is based on the characteristic impedance of the cable being used. To enable the built-in 120 Ohm Termination Resistor, jumper pin **13** to pin **9** (**RXD+**) on the *C-more* 15-pin PLC communications Port1.

### User Constructed

6



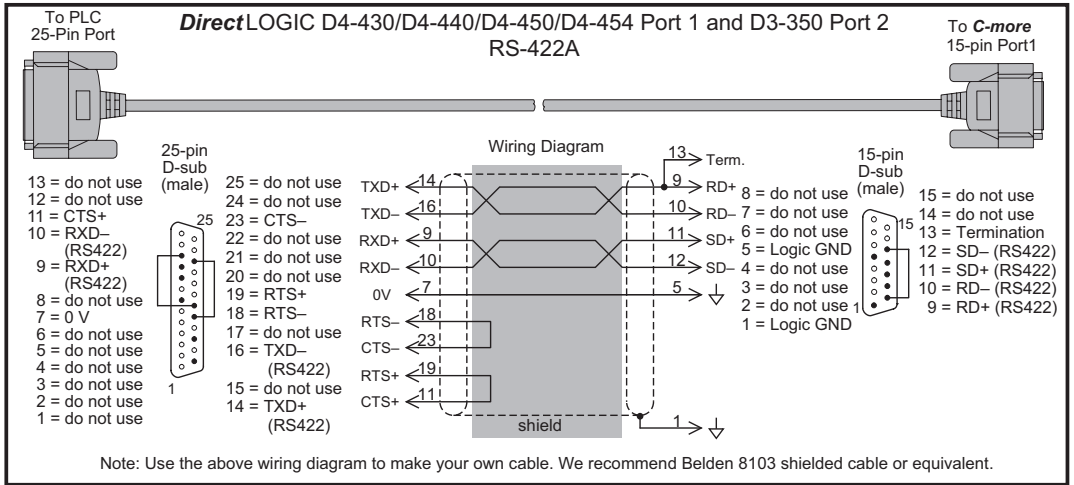
### User Constructed



**NOTE:** The RS-422 wiring diagrams shown above are not for multi-drop networks involving connecting more than one PLC to an HMI. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to an HMI.

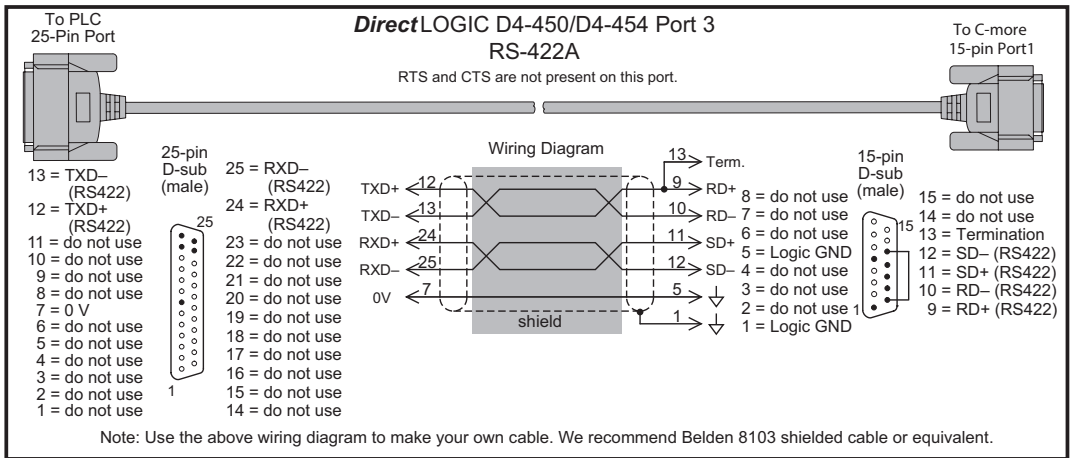
AutomationDirect PLCs RS-422A/RS-485A (cont'd)

User Constructed



6

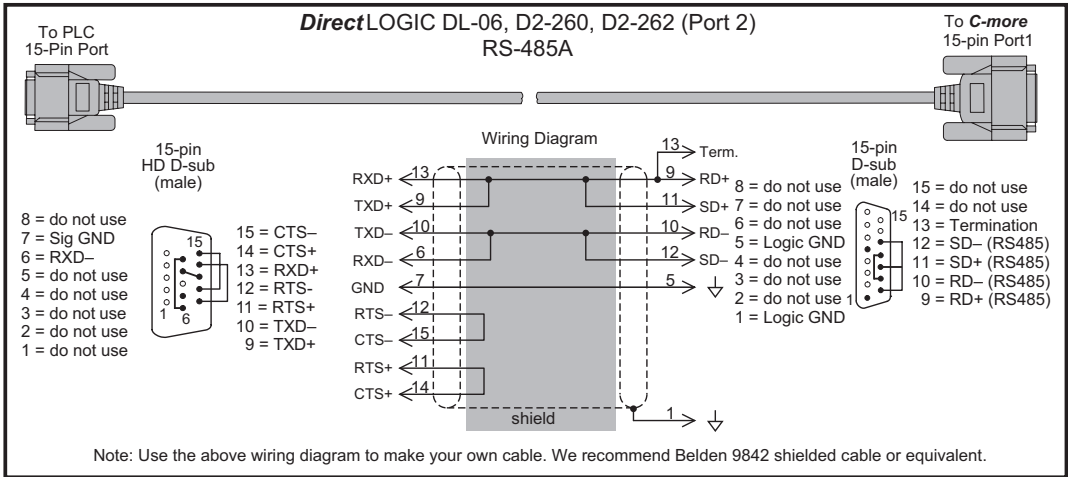
User Constructed



**NOTE:** The RS-422 wiring diagrams shown above are not for multi-drop networks involving connecting more than one PLC to an HMI. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to an HMI.

AutomationDirect PLCs RS-422A/RS-485A (cont'd)

User Constructed



6

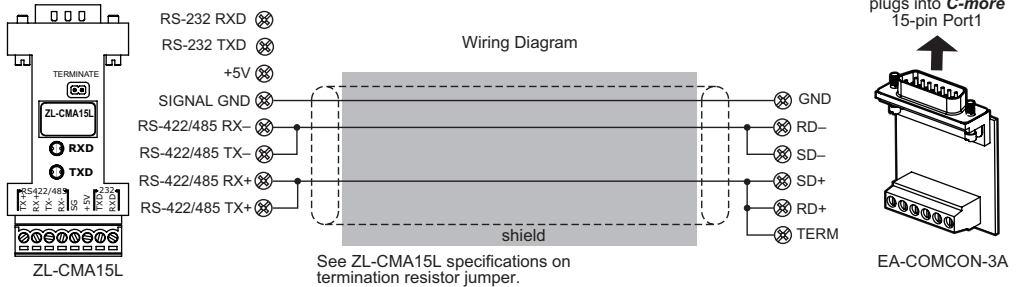


**NOTE:** The RS-485 wiring diagram shown above is not for multi-drop networks involving connecting more than one PLC to an HMI. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to an HMI.

AutomationDirect PLCs RS-422A/RS-485A (cont'd)

User Constructed

**DirectLOGIC ZIPLink ZL-CMA15L Adapter Module to EA-COMCON-3A Terminal Block Adapter**  
RS-485A – PLC D2-260 or DL06 only – Port 2

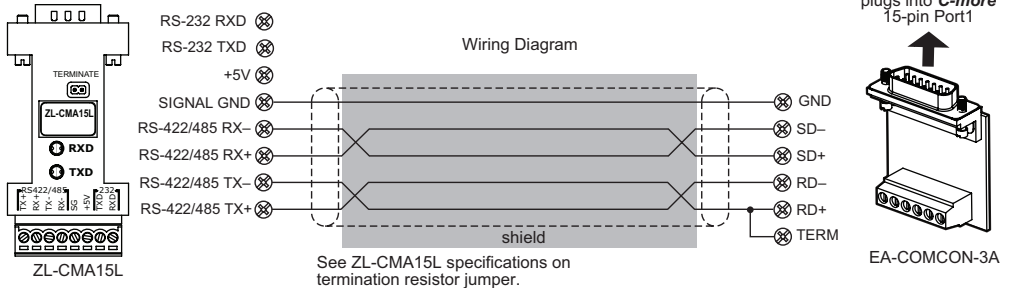


Note: Use the above wiring diagram to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

6

User Constructed

**DirectLOGIC ZIPLink ZL-CMA15L Adapter Module to EA-COMCON-3A Terminal Block Adapter**  
RS-422A – PLC D2-250 (-1), D2-260 or DL06 – Port 2



Note: Use the above wiring diagram to make your own cable. We recommend Belden 9842 shielded cable or equivalent.



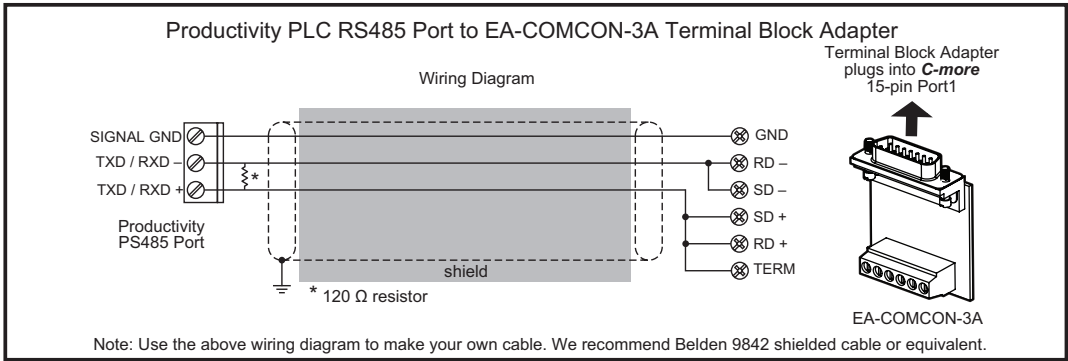
**NOTE:** The RS-422 and RS-485 wiring diagrams shown above are not for multi-drop networks involving connecting more than one PLC to an HMI. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to an HMI.



\* **NOTE:** EA-COMCON-3 will install only on EA9-T6CL, EA9-T6CL-R, EA9-T7CL and EA9-T7CL-R panels

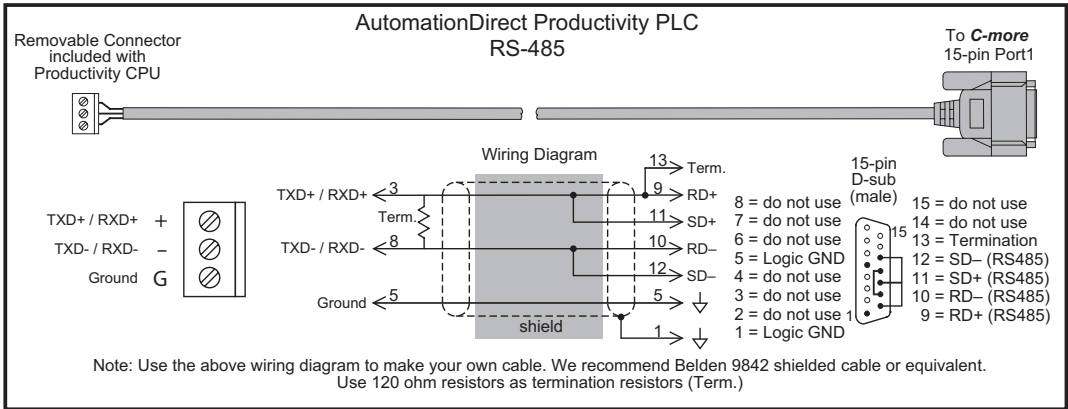
AutomationDirect PLCs RS-422A/RS-485 (cont'd)

User Constructed



6

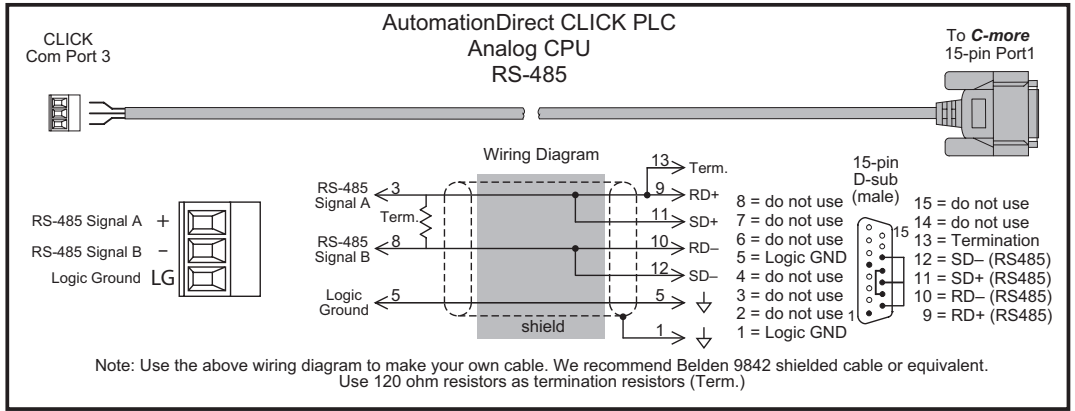
User Constructed



**NOTE:** The RS-422 and RS-485 wiring diagrams shown above are not for multi-drop networks involving connecting more than one PLC to an HMI. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to an HMI.

AutomationDirect PLCs RS-422A/RS-485 (cont'd)

User Constructed

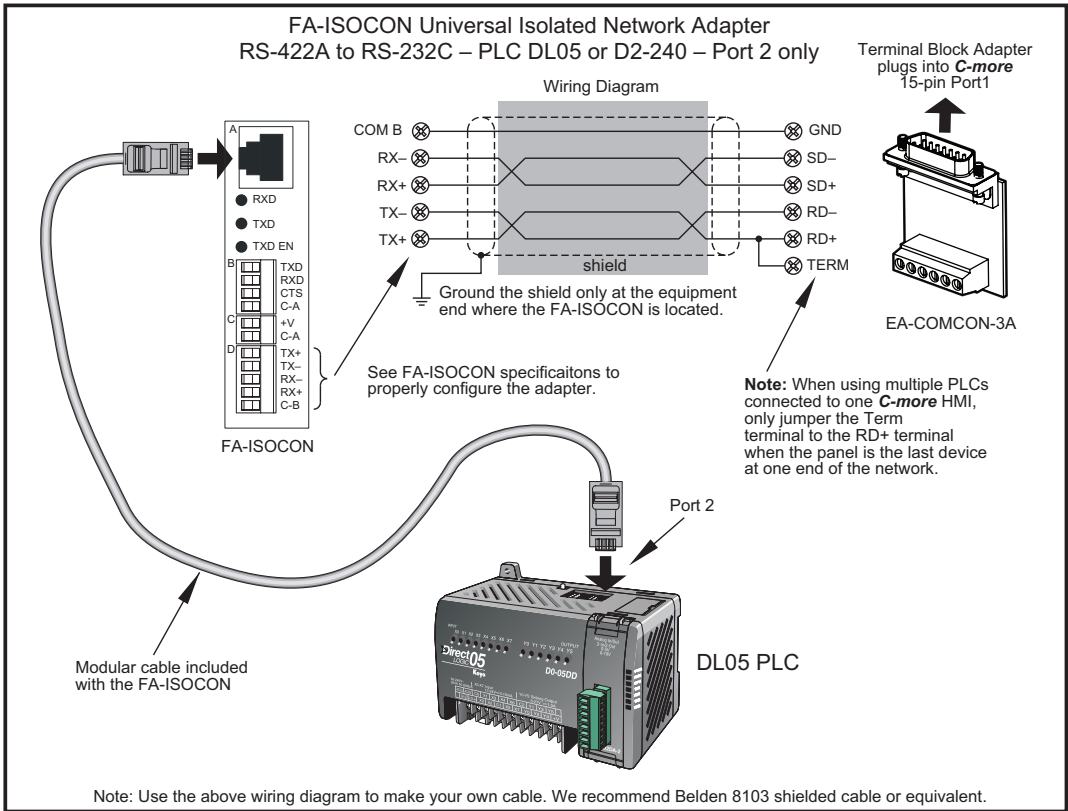


6



**NOTE:** The RS-485 wiring diagram shown above is not for multi-drop networks involving connecting more than one PLC to an HMI. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to an HMI.

**DirectLOGIC Universal Isolated Network Adapter, p/n FA-ISOCON:**



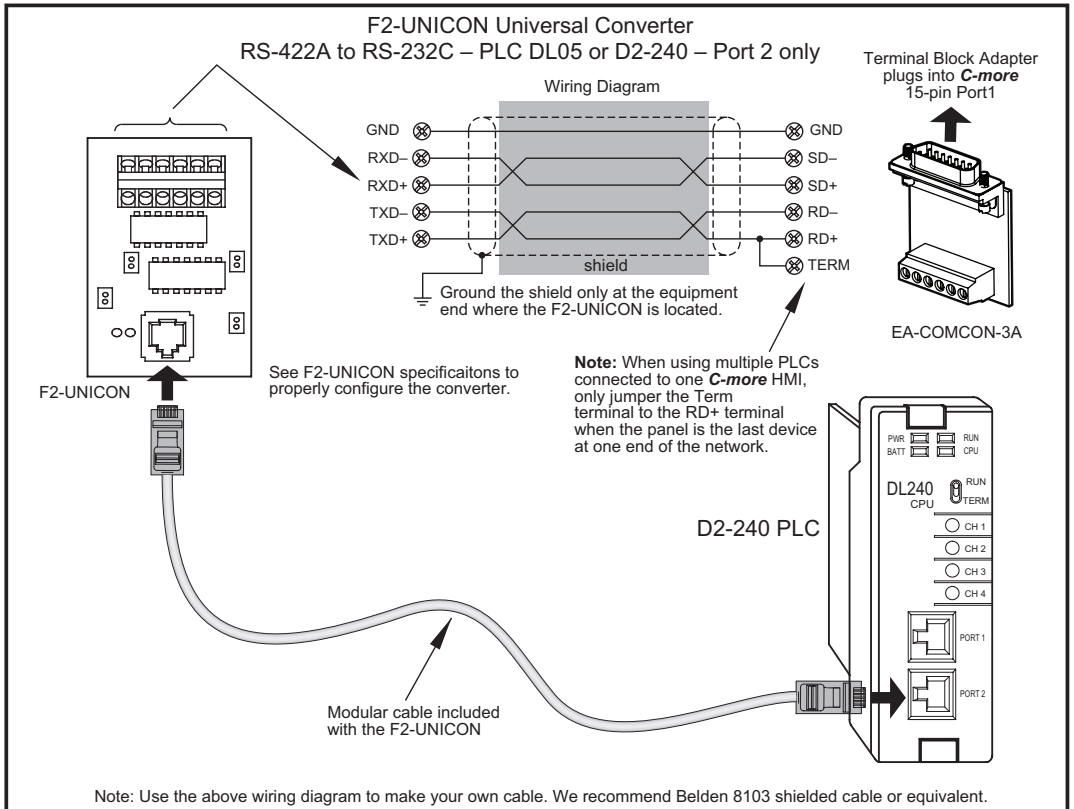
6



**\*\* NOTE:** EA-COMCON-3 will install only on EA9-T6CL, EA9-T6CL-R, EA9-T7CL and EA9-T7CL-R panels



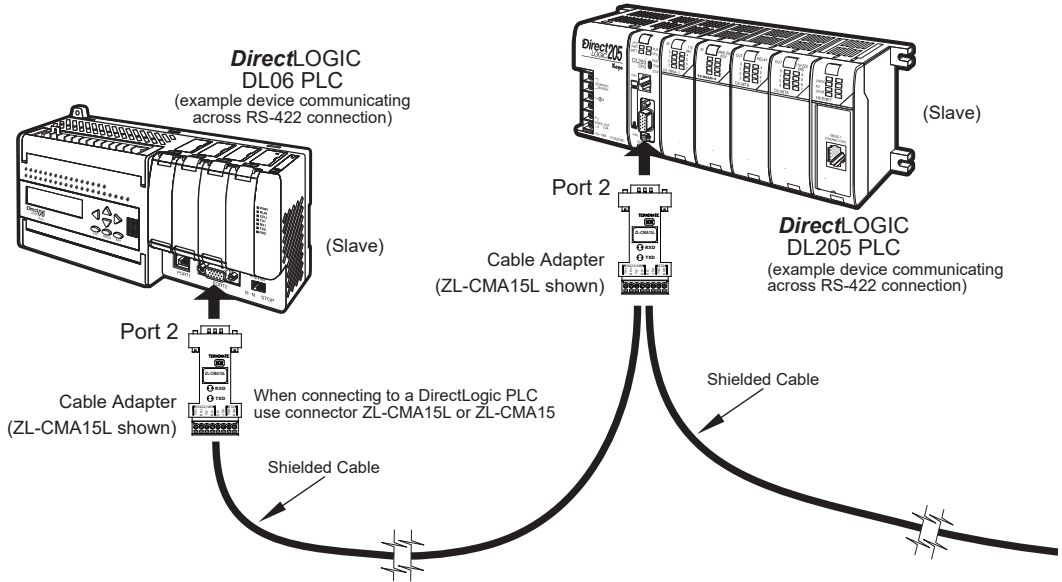
**DirectLOGIC Universal Converter, p/n F2-UNICON:**



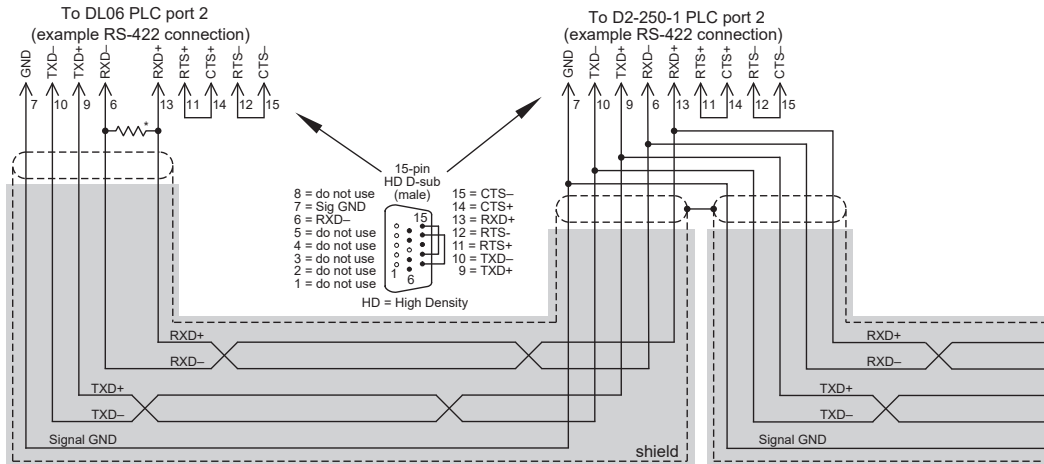
**\* NOTE:** EA-COMCON-3 will install only on EA9-T6CL, EA9-T6CL-R, EA9-T7CL and EA9-T7CL-R panels

## RS-422A/RS-485A Multi-Drop Wiring Diagram Examples

DL06 and DL205 used for illustration purposes



- Notes: 1. We recommend Belden 8103 shielded cable or equivalent.  
 2. Wiring Diagram for this example, ZL-CMA15(L)

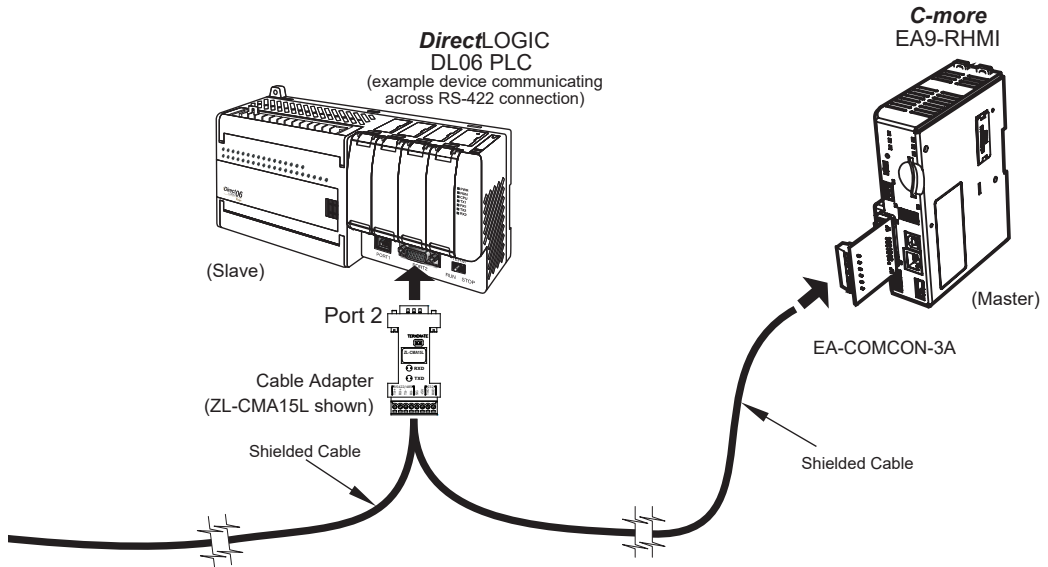


\* Termination resistors required at both ends of the network receive data signals to match the impedance of the cable (between 100 and 500 ohms).

Typical RS-422 Multi-Drop Wiring Diagram  
 using DirectLogic pin numbers to illustrate

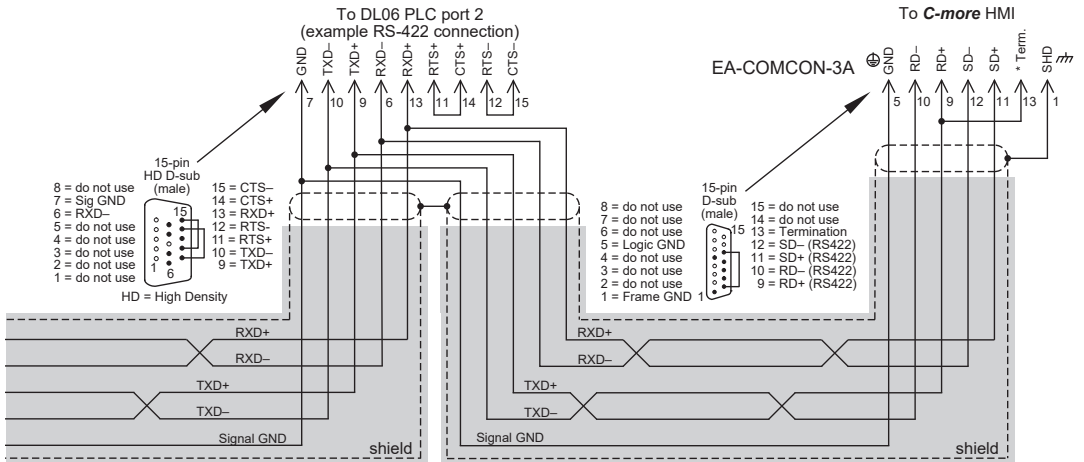
## RS-422A/RS-485A Multi-Drop Wiring Diagram Examples (cont'd)

DL06 and DL205 used for illustration purposes



6

- Notes: 1. We recommend Belden 8103 shielded cable or equivalent.  
2. Wiring Diagram for this example, ZL-CMA15(L)



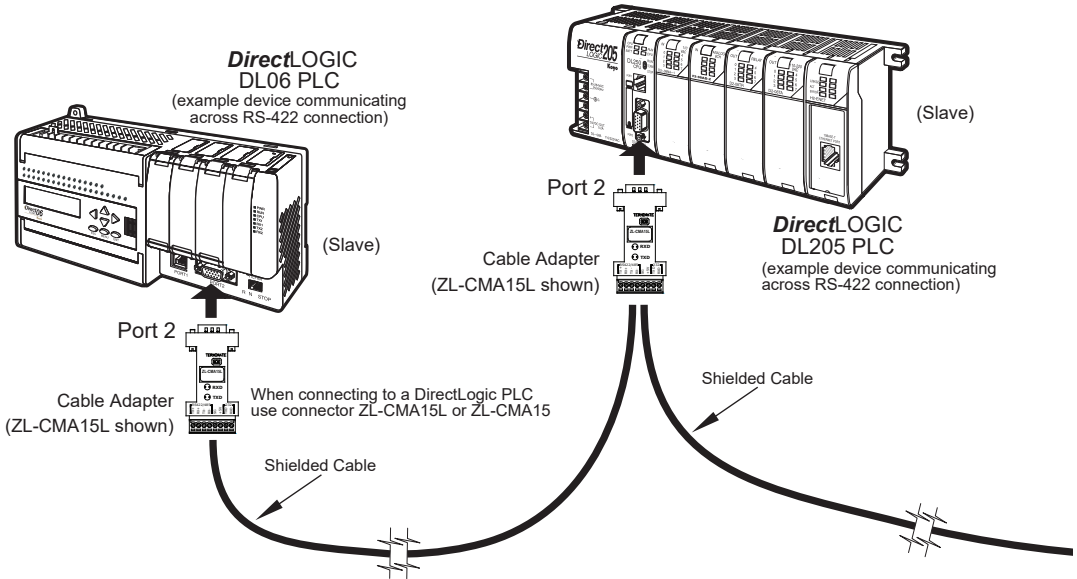
### Typical RS-422 Multi-Drop Wiring Diagram (cont-d)

using DirectLogic pin numbers to illustrate

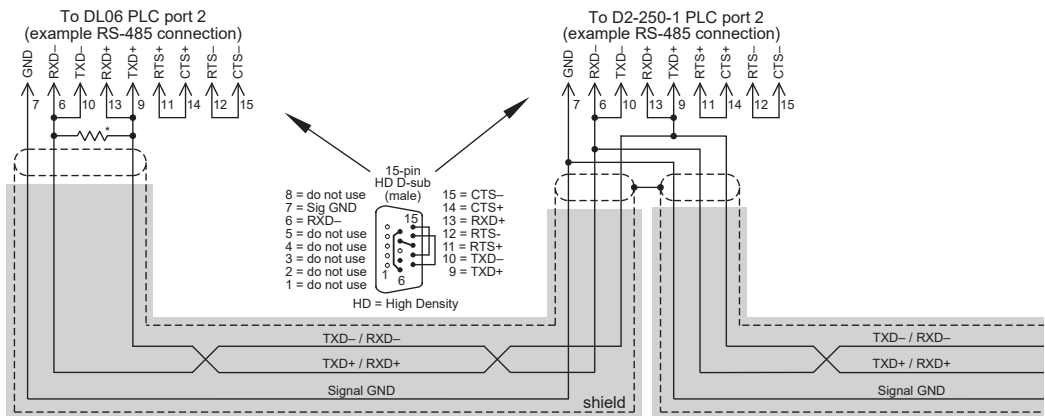
\* Termination resistors required at both ends of the network receive data signals to match the impedance of the cable (between 100 and 500 ohms). Jumper pin 13 to 9 on the C-more HMI 15-pin connector to place the 120Ω internal resistor into the network. If the cable impedance is different, then use an external resistor matched to the cable impedance.

## RS-422A/RS-485A Multi-Drop Wiring Diagram Examples (cont'd)

DL06 and DL205 used for illustration purposes



- Notes: 1. We recommend Belden 9842 shielded cable or equivalent.  
 2. Wiring Diagram for this example, ZL-CMA15(L)

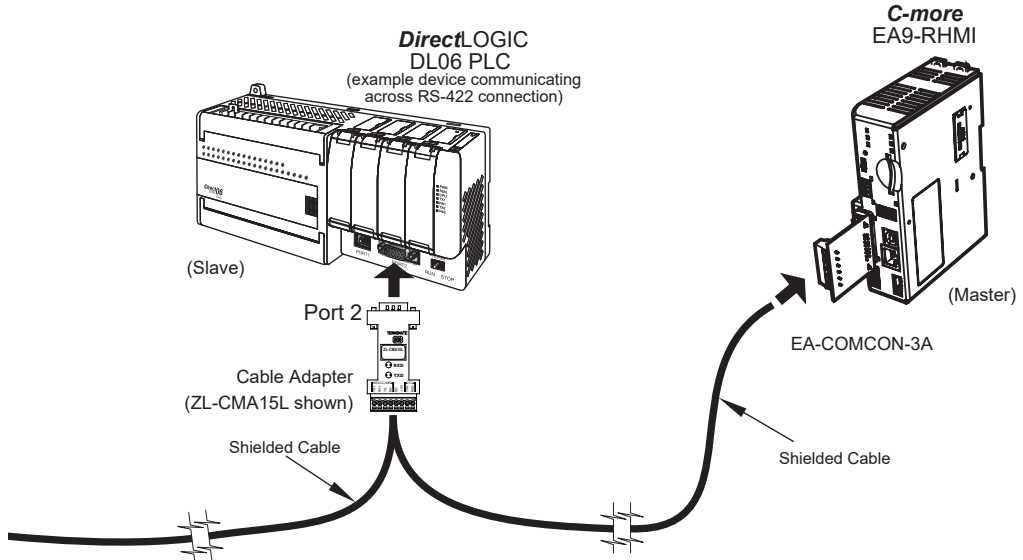


\* Termination resistors required at both ends of the network to match the impedance of the cable (between 100 and 500 ohms).

Typical RS-485 Multi-Drop Wiring Diagram  
 using DirectLogic pin numbers to illustrate

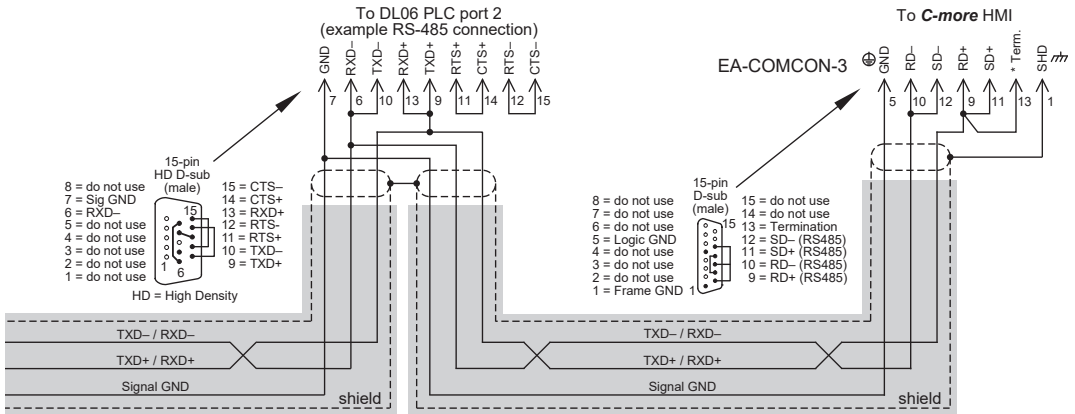
## RS-422A/RS-485A Multi-Drop Wiring Diagram Examples (cont'd)

DL06 and DL205 used for illustration purposes



6

- Notes: 1. We recommend Belden 9842 shielded cable or equivalent.  
2. Wiring Diagram for this example, ZL-CMA15(L)



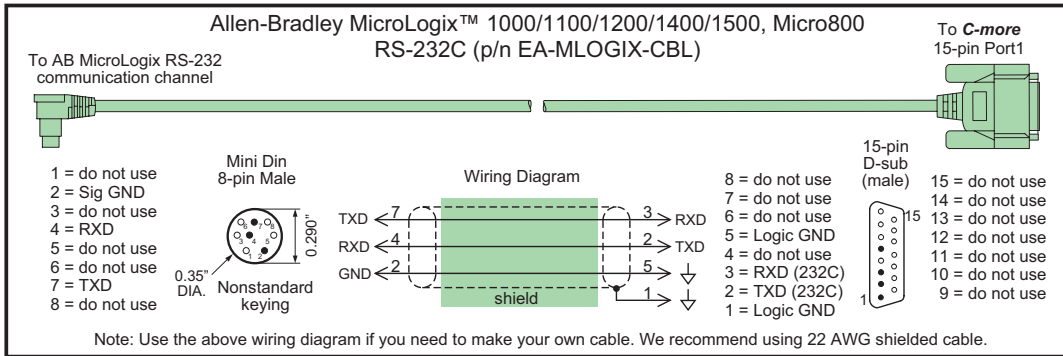
### Typical RS-485 Multi-Drop Wiring Diagram (cont'd)

using DirectLogic pin numbers to illustrate

\* Termination resistors required at both ends of the network receive data signals to match the impedance of the cable (between 100 and 500 ohms). Jumper pin 13 to 9 on the C-more HMI 15-pin connector to place the 120Ω internal resistor into the network. If the cable impedance is different, then use an external resistor matched to the cable impedance.

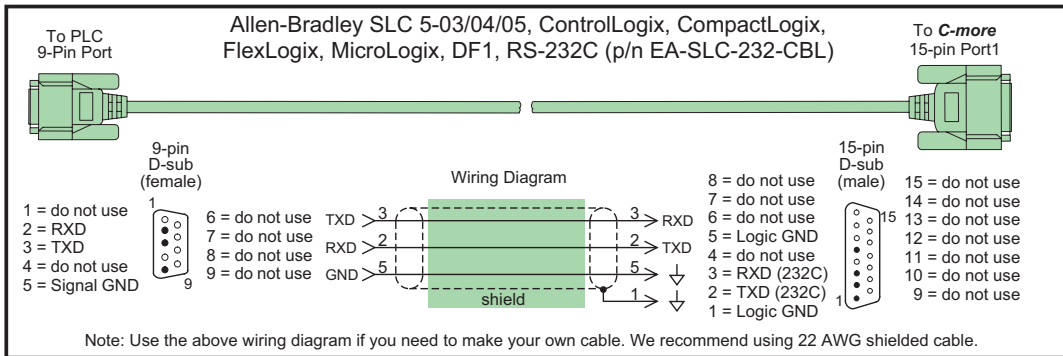
Allen-Bradley

EA-MLOGIX-CBL

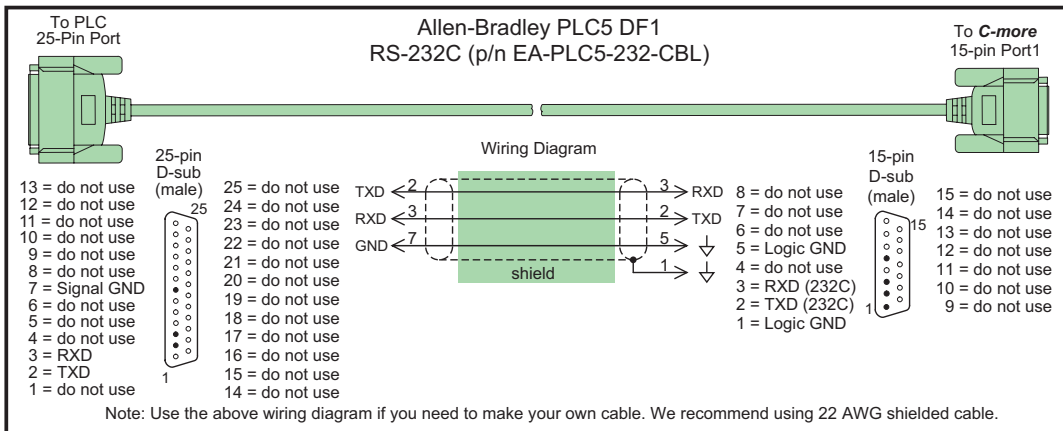


6

EA-SLC-232-CBL

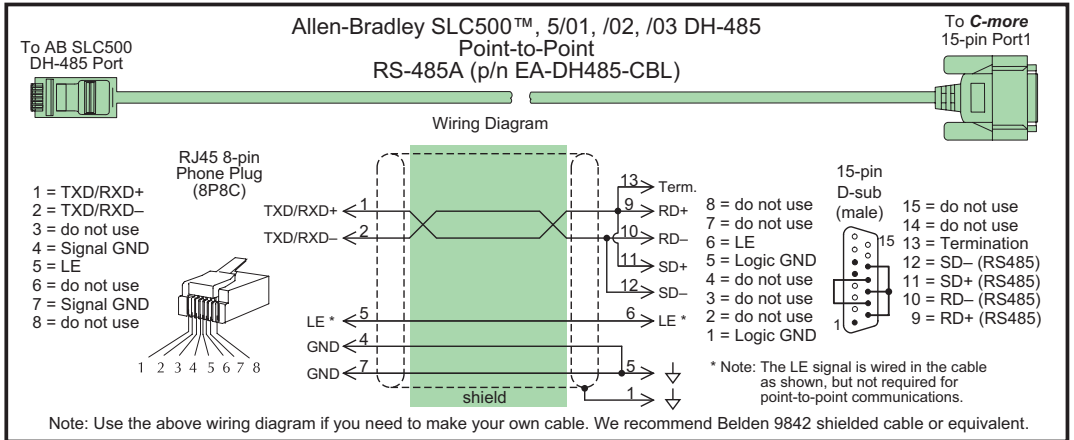


EA-PLC5-232-CBL

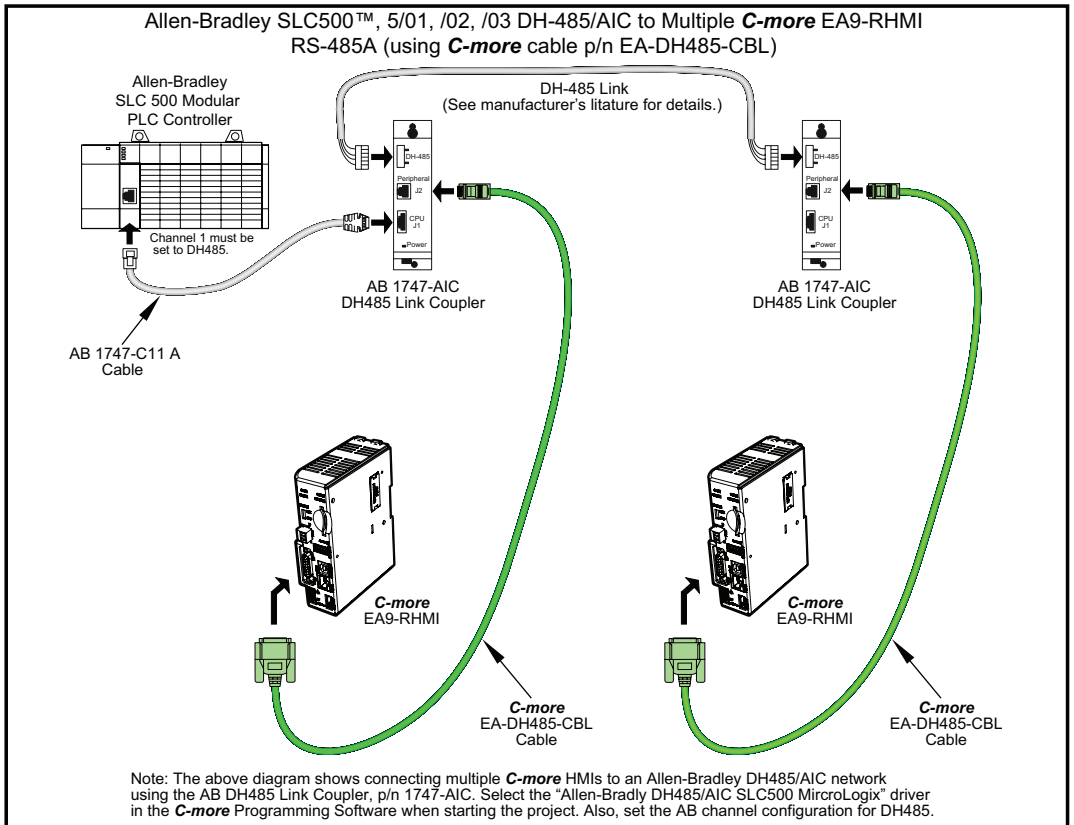


Allen-Bradley (cont'd)

EA-DH485-CBL

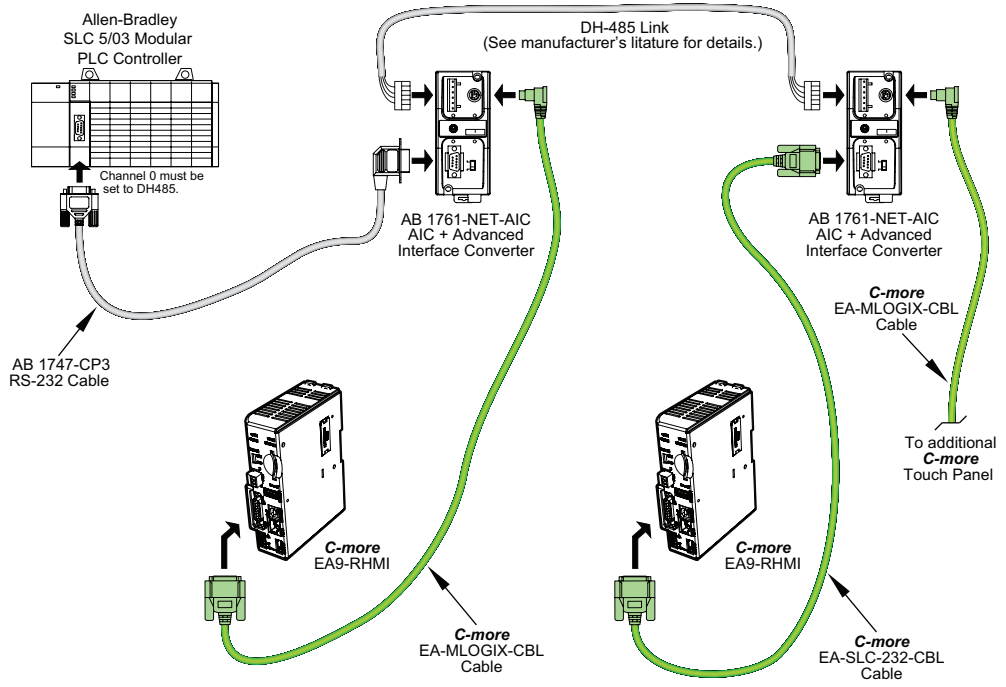


6



Allen-Bradley (cont'd)

Allen-Bradley SLC500™ 5/03 DH-485/AIC to Multiple **C-more** EA9-RHMI  
 (using **C-more** cables p/n EA-MLOGIX-CBL, EA-SLC-232-CBL)

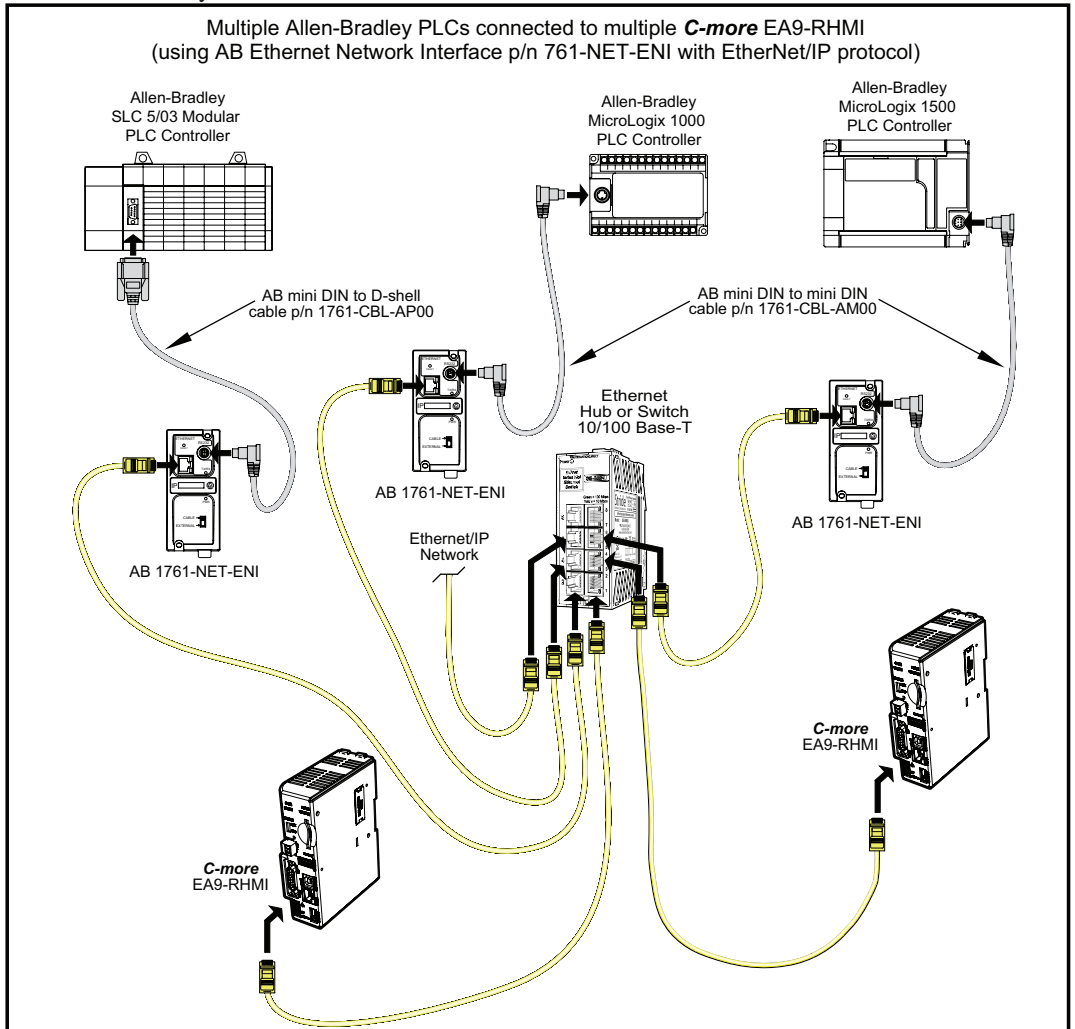


Note: The above diagram shows connecting multiple **C-more** touch HMIs to an Allen-Bradley DH485/AIC network using the AB AIC+ Advanced Interface Converter, p/n 1761-NET-AIC. Select the "Allen-Bradley DH485/AIC SLC500 MicroLogix" driver in the **C-more** Programming Software when starting the project. Also, set the AB channel configuration for DH485.

6

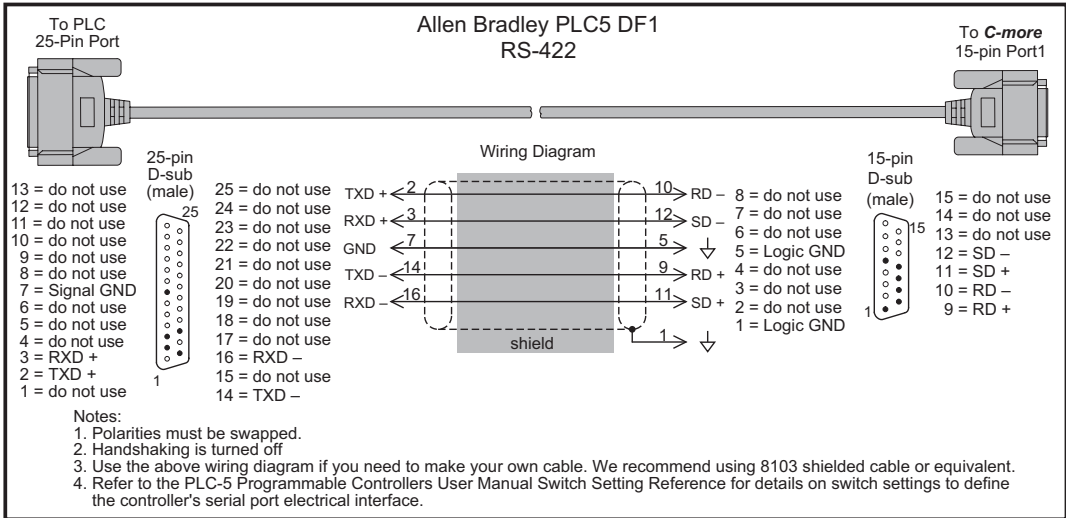


Allen-Bradley (cont'd)



Allen-Bradley (cont'd)

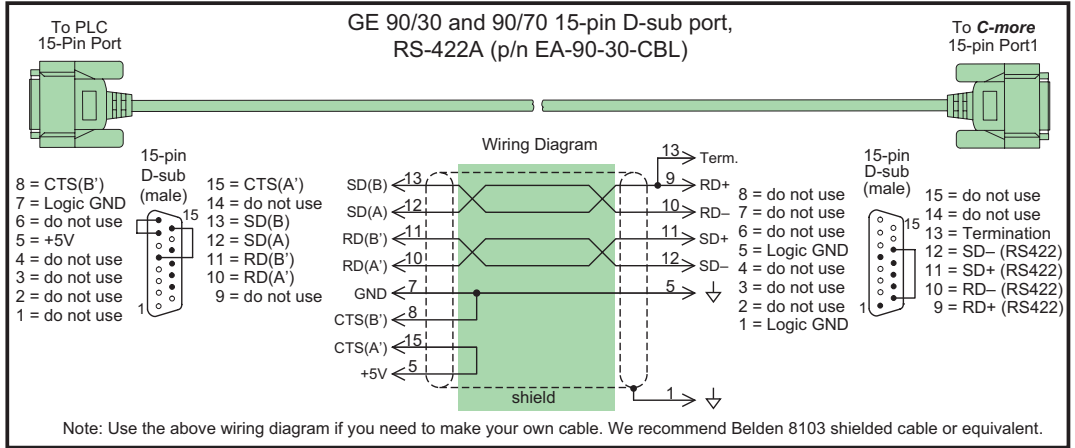
User Constructed



6

GE

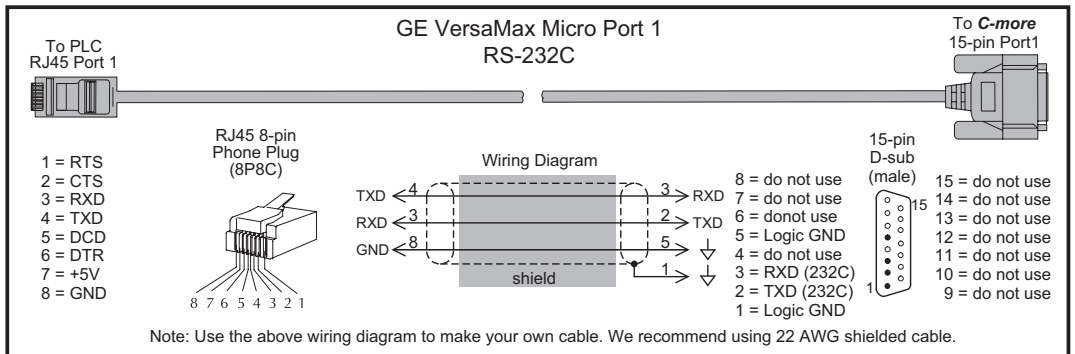
**EA-90-30-CBL**



**6**

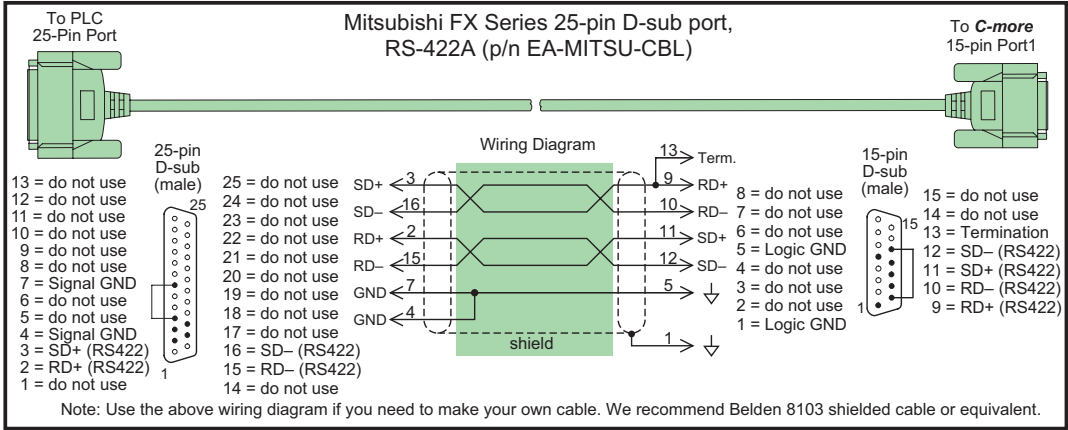
GE VersaMax Micro

**User Constructed**



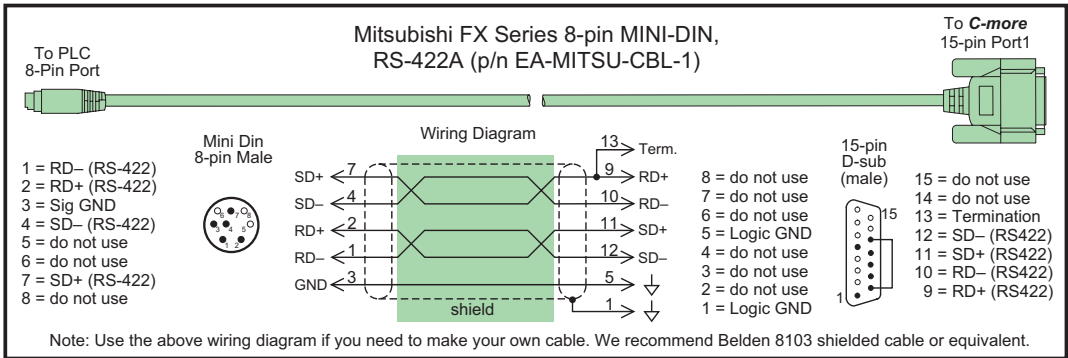
Mitsubishi

EA-MITSU-CBL

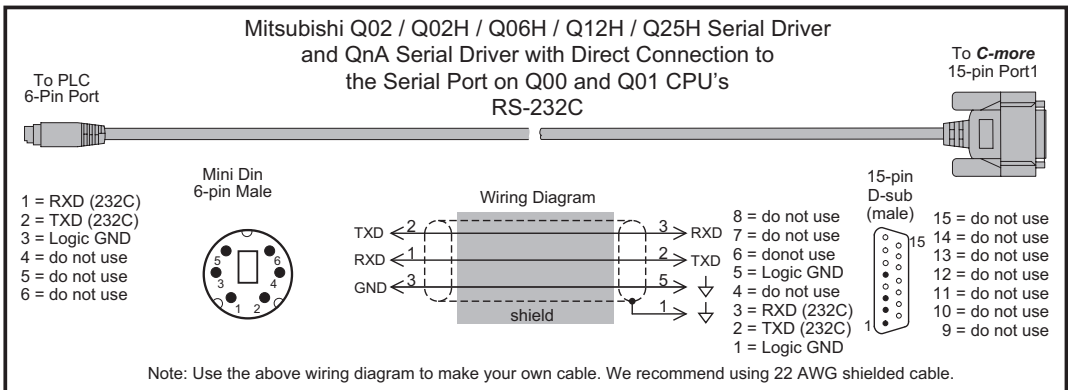


6

EA-MITSU-CBL-1

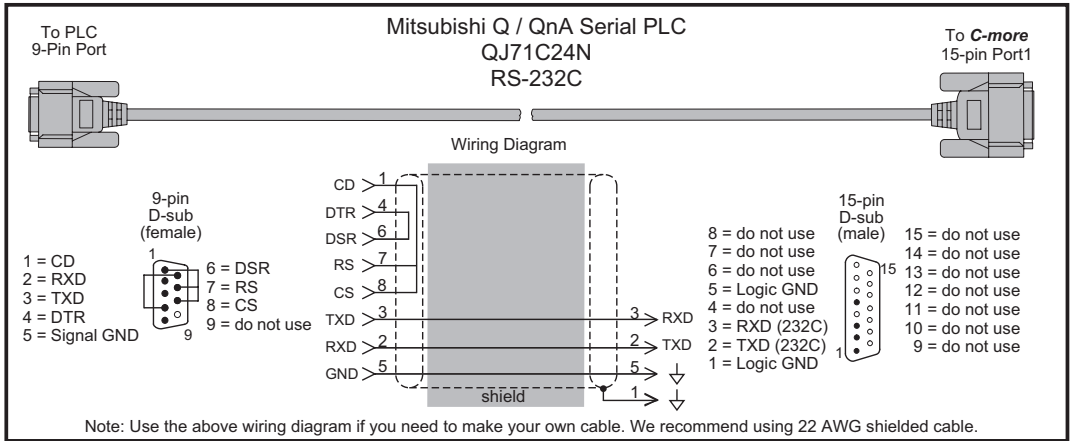


User Constructed



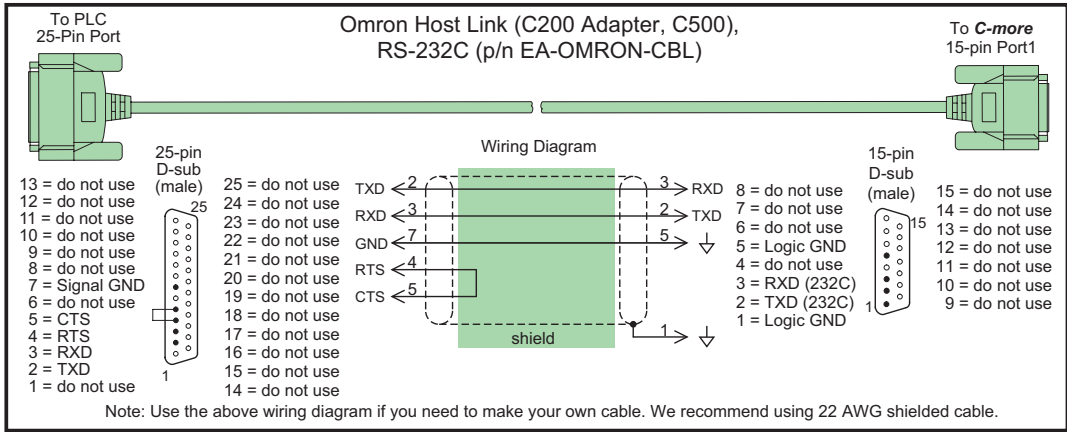
Mitsubishi (cont'd)

User Constructed



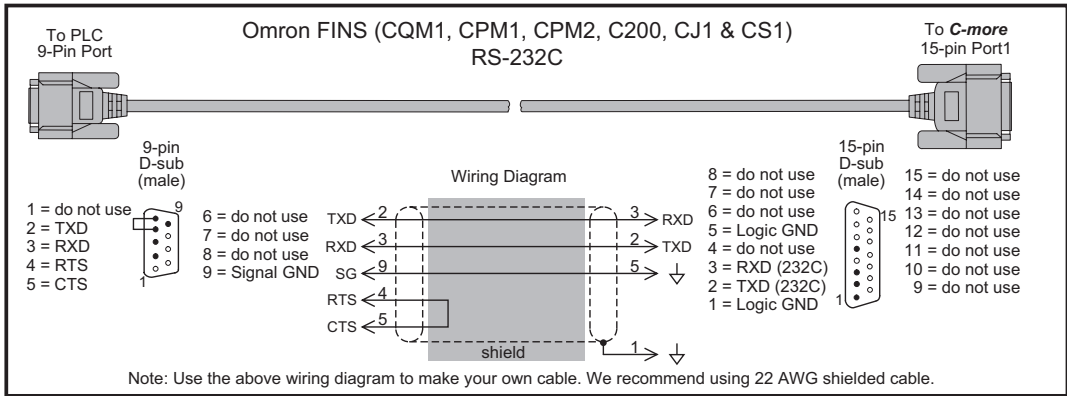
Omron

EA-OMRON-CBL

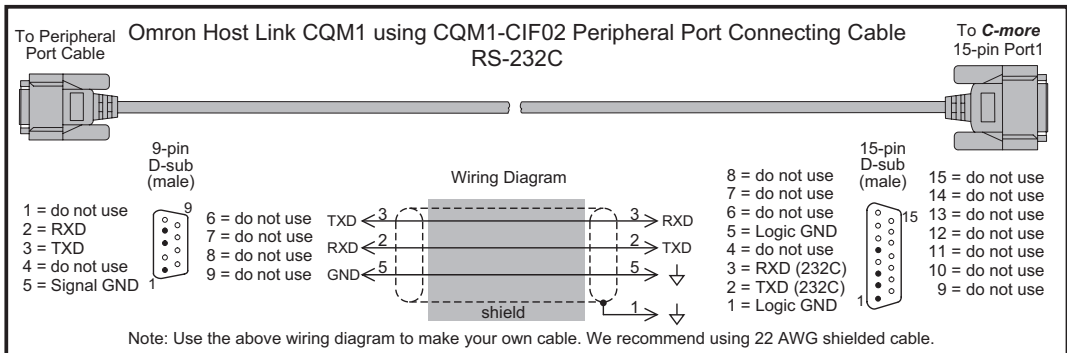


6

User Constructed

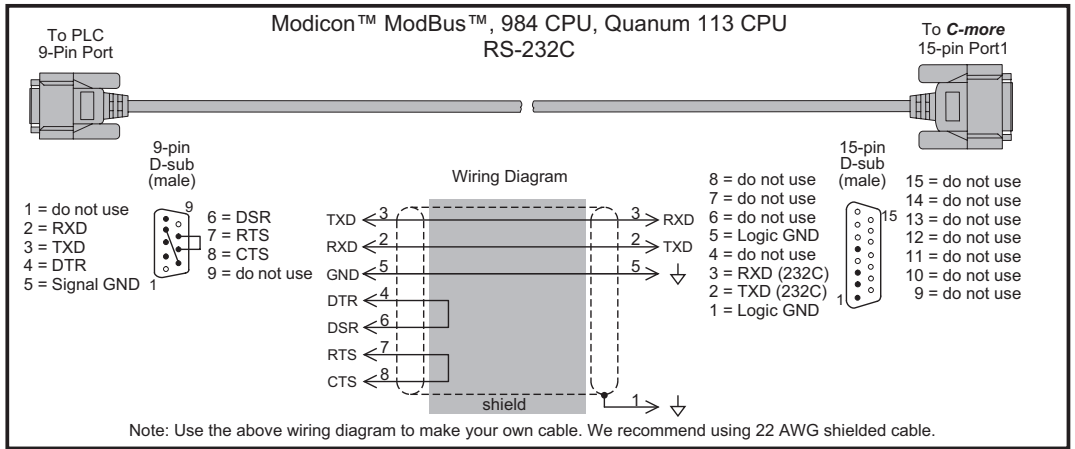


User Constructed



### Modicon Modbus RS-232

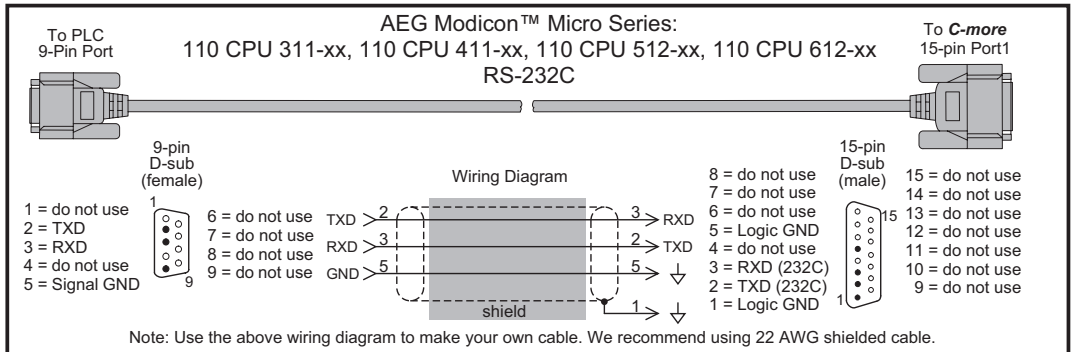
### User Constructed



6

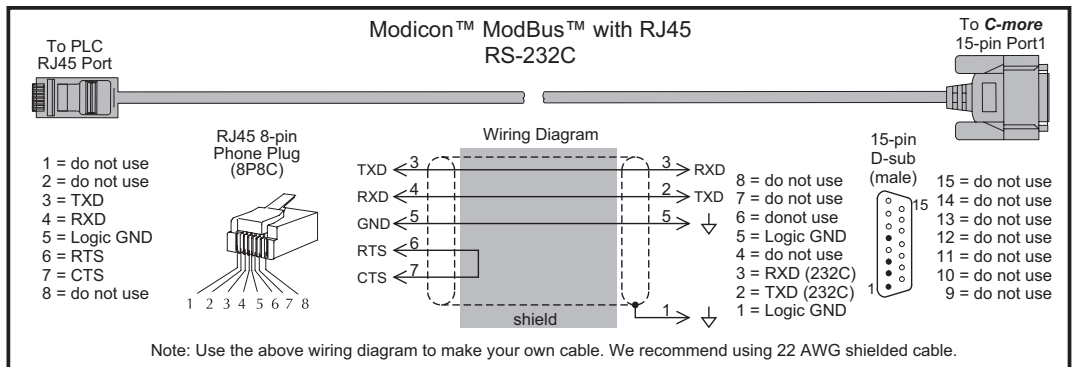
### Modicon Micro Series

### User Constructed



### Modicon Modbus with RJ45

### User Constructed



Siemens

User Constructed

