



Installation Instructions

DH485/RS-232C Interface Module

(Catalog Number 1747-KE)

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Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout these installation instructions we use notes to make you aware of safety considerations:

ATTENTION



Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention statements help you to:

- identify a hazard
- avoid the hazard
- recognize the consequences

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

For More Information

Related Publications

For	Refer to this Document	Pub. No.
A more detailed description on how to install and use your RTD/Resistance Input Module.	DH485/RS-232C Interface Module User Manual	1747-6.12
A more detailed description on how to install and use your modular SLC 500 system.	SLC 500™ Modular Hardware Style Installation and Operation Manual	1747-6.2
A more detailed description on how to install and use your fixed SLC 500 system.	SLC 500™ Fixed Hardware Style Installation and Operation Manual	1747-6.21
A reference manual that contains status file data, instruction set, and troubleshooting information.	SLC 500™ and MicroLogix™ 1000 Instruction Set Reference Manual	1747-6.15

How to Get More Information

If you would like a manual, you can:

- download a free electronic version from the internet at **www.theautomationbookstore.com**
- purchase a printed manual by:
 - contacting your local distributor or Rockwell Automation representative
 - visiting **www.theautomationbookstore.com** and placing your order
 - calling **1.800.963.9548** (USA/Canada) or **001.330.725.1547** (Outside USA/Canada)

Hazardous Location Considerations

This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D or non-hazardous locations only. The following WARNING statement applies to use in hazardous locations.

WARNING**EXPLOSION HAZARD**

- Substitution of components may impair suitability for Class I, Division 2.
 - Do not replace components or disconnect equipment unless power has been switched off.
 - Do not connect or disconnect components unless power has been switched off.
 - All wiring must comply with N.E.C. article 501-4(b).
-

Environnements dangereux

Cet équipement est conçu pour être utilisé dans des environnements de Classe 1, Division 2, Groupes A, B, C, D ou non dangereux. La mise en garde suivante s'applique à une utilisation dans des environnements dangereux.

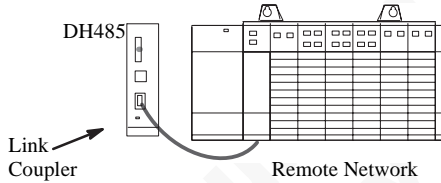
MISE EN**DANGER D'EXPLOSION**

- La substitution de composants peut rendre cet équipement impropre à une utilisation en environnement de Classe 1, Division 2.
 - Ne pas remplacer de composants ou déconnecter l'équipement sans s'être assuré que l'alimentation est coupée.
 - Ne pas connecter ou déconnecter des composants sans s'être assuré que l'alimentation est coupée.
-

Interface Module Overview

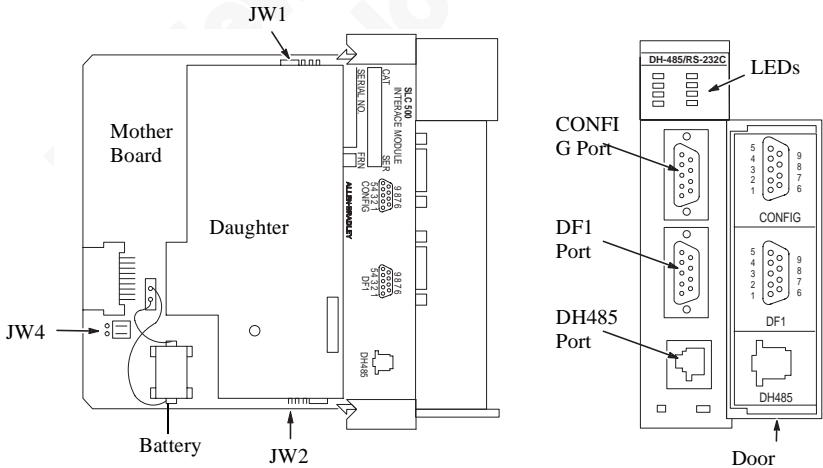
The DH485/RS-232C Interface Module, catalog number 1747-KE, is a communication interface module that acts as a bridge between DH485 networks and devices requiring DF1 protocol. The DF1 port on the interface module can be configured for RS-232/423, RS-422, or RS-485 devices.

Residing in an SLC 500 chassis, the module is ideally used as an interface module, linking remote DH485 networks via a modem to a central host.



Hardware Features

The following illustration displays the main hardware features.



Communication Ports

CONFIG - used to configure the module with an ASCII terminal. This serial port accommodates RS-232/423, RS-422, and RS-485 communication interfaces. The CONFIG port is capable of operating at 300, 600, 1200, 2400, 4800, 9600, and 19200 baud. It is electrically isolated to 500V dc.

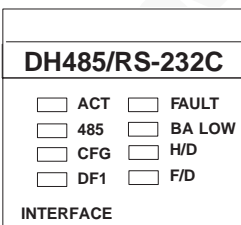
DF1 - used to interface the module to a modem or other user devices using DF1 protocol. This serial port accommodates RS-232/423, RS-422, and RS-485 communication interfaces. The DF1 port is capable of operating at 300, 600, 1200, 2400, 4800, 9600, and 19200 baud. It is electrically isolated to 500V dc.

DH485 - used to interface the module with the DH485 network. This port is not isolated and cannot directly drive a multi-node DH485 network. You must use a 1747-AIC link coupler to connect this port to a DH485 network that includes multiple SLC 500 processors.

The catalog number 1747-C11 or catalog number 1747-C13 cables can connect the interface module's DH485 port to a 1747-AIC link coupler. The catalog number 1747-C13 cable can also connect the module's DH485 port directly to a single SLC processor.

LEDs

There are eight LEDs on the front of the module. These LEDs are used for module diagnostics and operator interface. Shown below are the LEDs and their descriptions.



LED	Color	Status	Indication
ACT	Green	ON ⁽¹⁾	The module is receiving power from the backplane, is configured properly, and is in Run mode.
		Flashing	The module requires configuration or is being configured.
		OFF	The module is not receiving power from the backplane. A fault condition exists.
485	Green	ON	The DH485 port is active on the network.
		OFF	The DH485 port is not active on the network or the module is in Configuration mode.
CFG	Green	Flashing	The CONFIG port is transmitting or receiving signals.
		OFF	The CONFIG port is not transmitting or receiving signals.
DF1	Green	Flashing	The DF1 port is transmitting or receiving signals. (The flashing may occur so rapidly that the LED appears to be on.)
		OFF	The DF1 port is not transmitting or receiving signal,s or the module is in Configuration mode.
FAULT	Red	ON	A system problem was detected during diagnostics. Cycle power to reset. If LED remains on, contact your Allen-Bradley representative.
		OFF	No system problems are detected during diagnostics.
BA LOW	Red	ON	The voltage of the battery that backs up configuration RAM is low. A new battery is needed.
		OFF	The voltage of the battery that backs up configuration RAM is at an acceptable level.
H/D	Amber	ON	The module is configured for Half-Duplex DF1 protocol (local or remote).
		OFF	The module is not configured for Half-Duplex DF1 protocol.
F/D	Amber	ON	The module is configured for Full-Duplex DF1 protocol.
		OFF	The module is not configured for Full-Duplex DF1 protocol.

(1) Indicates normal operation after the module has been configured.

Jumpers

JW1 allows you to select the communication interface for the CONFIG port. See page 11.

JW2 allows you to select the communication interface for the DF1 port. See page 12.

JW4 allows you to select the functionality and mode of the interface module. The horizontal or vertical orientation of the jumper determines the module's functionality.

The position of the jumper determines the module's mode (Configuration or Run), and thus, which method is used to configure the module (ASCII terminal or backplane communications). See page 10.

Using a Modem with Your Interface Module

The module can be connected to most types of dial-up networks or direct connect modems.

IMPORTANT

Some modems are designed to respond to the DTR signal by answering the phone whether it is ringing or not. Since the module asserts DTR at all times (except during the hang-up sequence), the phone appears to be busy at all times. Do not use the interface module with any type of modem that answers the phone as soon as DTR is asserted.

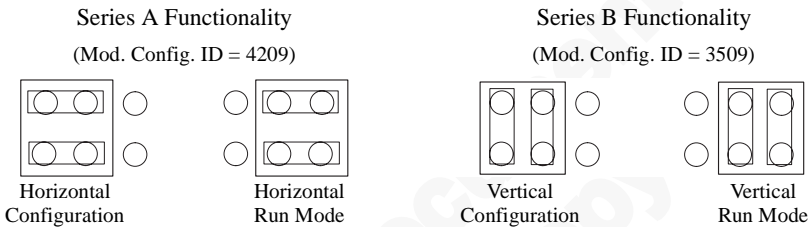
The types of modems you can use are:

- **Manual** - typically acoustically coupled modems. A person on each end of the phone line establishes the connection. They then insert the handsets into an acoustic coupler to complete the connection.
- **DTE Controlled Answer** - these unattended modems are attached directly to the phone lines. The interface module acts as the Data Terminal Equipment (DTE), which controls the modem via the DTR, DSR, and DCD signals. The module incorporates time-outs and tests to properly operate these types of modems.
- **Auto Answer** - These modems have self-contained time-outs and tests. They can answer and hang up the phone automatically. The module has no means of controlling an auto-dial modem, but it can be used in conjunction with a separate auto-dialer.
- **Direct Connect** - These modems connect to a dedicated, leased phone line and remain active at all times.

Choosing the Module's Functionality

Your series B interface module has the ability to function as a series A interface module. This feature may be important to you if you are replacing a series A module with a series B module.

The module's functionality depends on the placement of the JW4 jumper. Horizontal placement of the jumper gives the module functionality equivalent to a series A interface module, while vertical placement of the jumper accesses the added functionality of a series B interface module.



Setting the Module's Functionality

Setting the module's mode depends on which method you want to use to configure the module. You can configure the module using:

- an ASCII terminal
- backplane communications

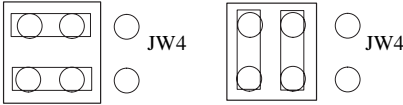
IMPORTANT

You can only use backplane communications if you selected series B functionality for the module.

If Configuring with an ASCII Terminal

Configuration of the interface module with an ASCII terminal is allowed only when the JW4 jumper is in Configuration mode. Place the module in the Configuration mode that corresponds to the functionality you chose for the interface module, as shown below.

For Series A Functionality For Series B Functionality

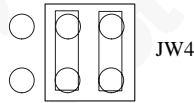


Horizontal Configuration

Vertical Configuration

If Configuring Through the Backplane

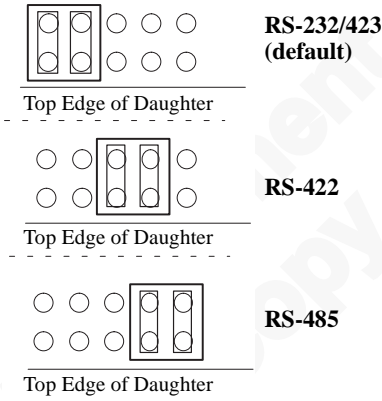
Reading and writing configuration data through the backplane is allowed only for series B interface modules, and then only when the JW4 jumper is in the vertical Run mode position. Place the module in vertical Run mode as shown below.



Configuring the CONFIG Port

Jumper JW1 selects the following electrical interface for the CONFIG port:

- RS-232/423 (default)
- RS-422
- RS-485



ATTENTION

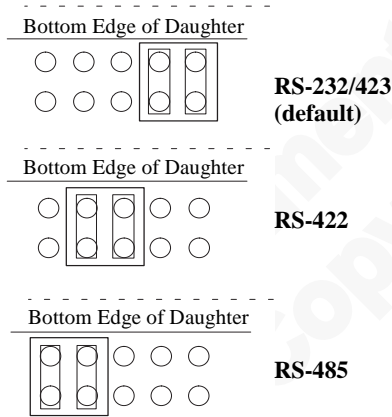


All other jumper settings are invalid and may cause damage to the module.

Configuring the DF1 Port

Jumper JW2 selects the following electrical interface for the DF1 port:

- RS-232/423 (default)
- RS-422
- RS-485



ATTENTION



All other jumper settings are invalid and may cause damage to the module.

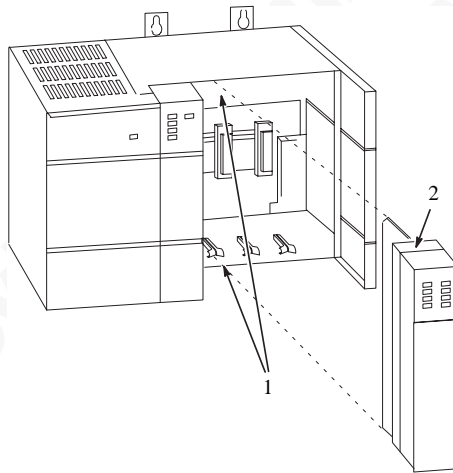
Installing the Module

ATTENTION



Do not install or remove the 1747-KE module from the SLC 500 chassis until all power dissipates from the SLC 500 power supply (approximately 10 seconds).

1. Align the full-sized module circuit board with the chassis card guide. The first slot (slot 0) of the first chassis is reserved for the processor.
2. Slide the module into the chassis until the top and bottom latches are latched. To remove the module, press the releases at the top and bottom of the module and slide it out.



Connect Cable to CONFIG or DF1 Ports

The CONFIG and DF1 ports communicate to user devices through RS-232/423, RS-422, and RS-485 communication modes. The communication mode is selected by setting jumpers JW1 and JW2 as described on pages 11 and 12.

IMPORTANT

The following table and cable drawings assume the peripheral devices have conventional pin assignments. Check the documentation for your device to verify that the signals conform to those shown.

Use these pin assignments to construct communication cables for the CONFIG and DF1 ports. These connectors must be wired to correspond to the selected communication mode.

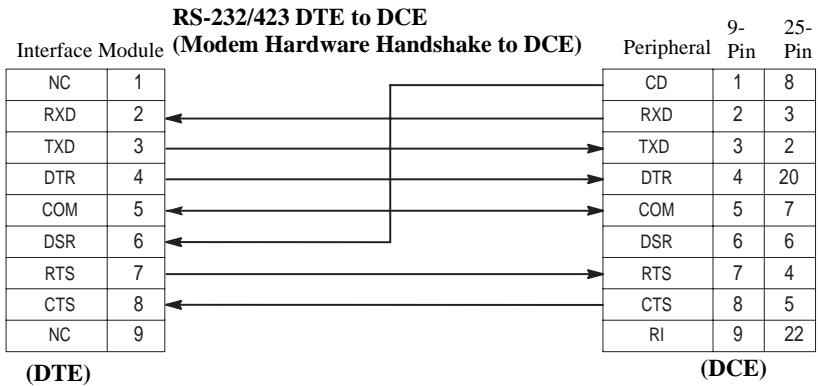
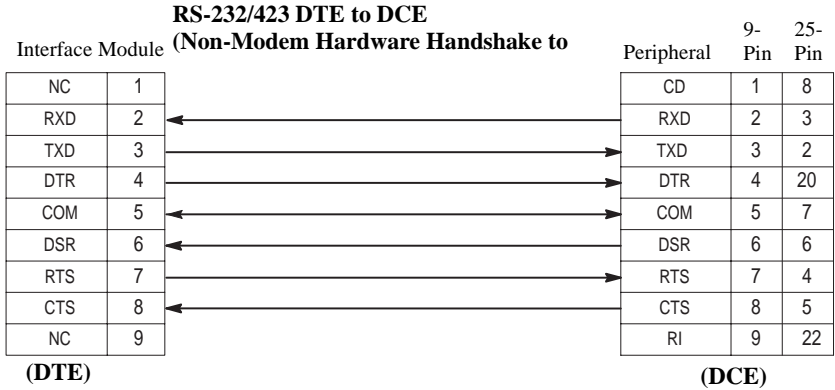
Pin for Interface Module	RS-232/423 Signal	RS-422 Signal	RS-485 Signal	IBM AT Standard RS-232/423		
				Signal	25-pin Pin	9-pin Pin
1	(1)	TXD-	TRXD-	DCD or CD	8	1
2	RXD	RXD-	(3)	RXD	3	2
3	TXD	(2)	(2)	TXD	2	3
4	DTR	(2)	(2)	DTR	20	4
5	COM	COM	COM	COM	7	5
6	DSR	RXD+	(3)	DSR	6	6
7	RTS	(2)	(2)	RTS	4	7
8	CTS	(2)	(2)	CTS	5	8
9	(1)	TXD+	TRXD+	RI	22	9

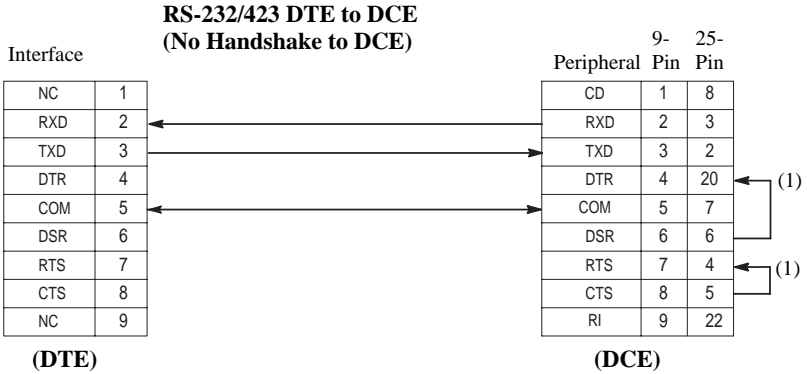
- (1) In RS-423 mode, these pins are still connected to their RS-422 loads. Do not use these pins in RS-423 mode.
- (2) In RS-422 and RS-485 modes these pins are connected to their RS-423 drivers and receivers. Do not use these pins in either RS-422 or RS-485 modes.
- (3) In RS-485 mode, these pins are still connected to their RS-422 receivers. Do not use these pins in RS-485 mode.

IMPORTANT

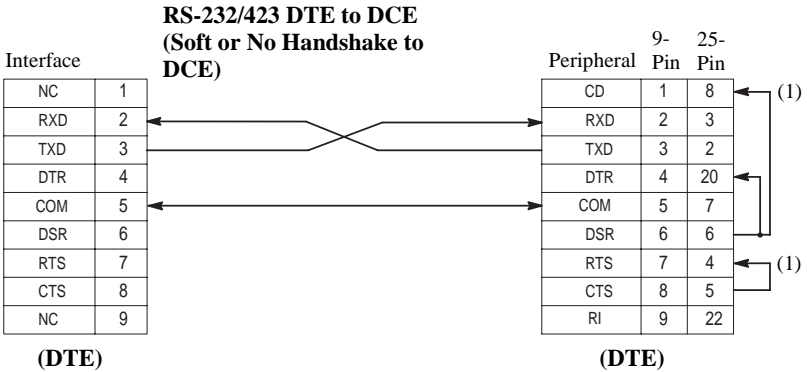
The signal names on a DCE device are viewed from a DTE perspective. For example, TXD is a DTE output and also a DCE input.

The following illustrations show wiring diagrams for the RS-232/423, RS-422, and RS-485 communications.

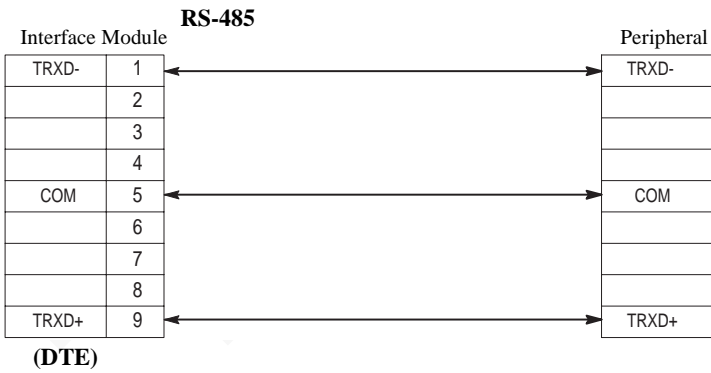
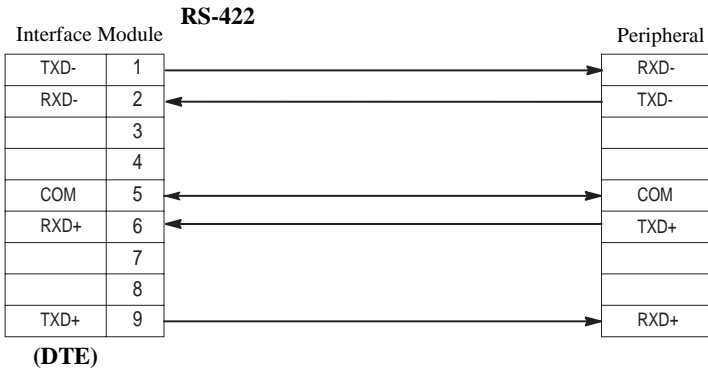




(1) Connect DSR to DTR and CTS to RTS when using devices that cannot disable their hardware handshaking.



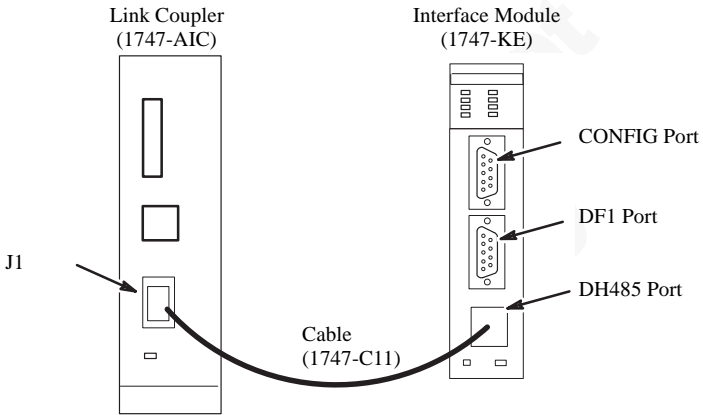
(1) Connect DSR to DTR and CD, and CTS to RTS when using devices that cannot disable their hardware handshaking.



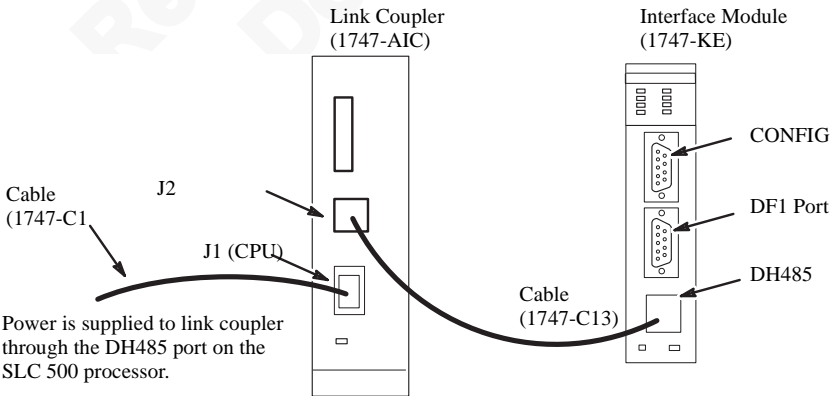
Connect Cable to DH485 Port

The DH485 port can communicate to user devices through the DH485 Communication mode. Use a 1747-C10, 1747-C11, or 1747-C13 interface cable to connect the module to a link coupler interfaced with the DH485 network.

If you use the 1747-C10 or 1747-C11 cable, it connects between the DH485 port on the module and the J1 (CPU) connector on the link coupler. Power for the link coupler comes from the interface module.



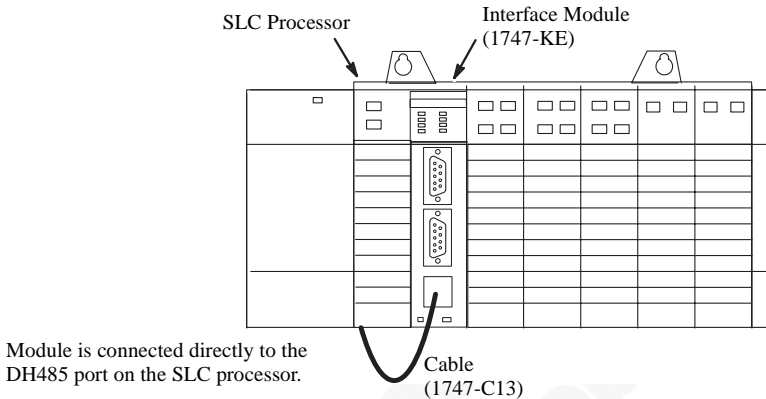
If you use the 1747-C13 cable, connect it between the DH485 port on the module and the J2 (Peripheral) connector on the link coupler. Power for the link coupler must be provided from some other source.



OR

Power is supplied to link coupler by an external power source.

The 1747-C13 cable can also connect the module's DH485 port directly to a single SLC processor, fixed processor, or SLC 5/01, 5/02, or 5/03 processor. It connects the DH485 port on the module to the DH485 port on the SLC 500 processor.



Complete the Installation Process

1. Configure your module using an ASCII terminal or the SLC backplane. Refer to the *DH485/RS-232C Interface Module User Manual*, publication number 1747-6.12 for detailed instructions on configuring your module.

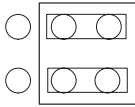
ATTENTION



Do not install or remove the 1747-KE module from the SLC 500 chassis until all power dissipates from the SLC 500 power supply (approximately 10 seconds).

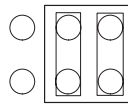
2. If you configured your module using an ASCII terminal, place the module into Run mode. Follow the steps below:
 - A. Remove the module from the chassis. The removal is reverse of the installation procedure.
 - B. Place your module in Run mode using JW4, as shown below.

Series A Functionality
(Module Configuration ID=4209)



Horizontal Run Mode

Series B Functionality
(Module Configuration ID=3509)



Vertical Run Mode

- C. Re-insert the module into the chassis.

IMPORTANT Make sure you have JW4 positioned for the Run mode that corresponds to the functionality you've chosen for your module.

3. Connect the DF1 cable to the DF1 port.
4. Connect the DH485 cable to the DH485 port.
5. Insert the cable tie in the slots and secure the cable.
6. Cover all unused slots with the Card Slot Filler, catalog number 1746-N2.
7. Turn on power to the SLC 500 chassis.
8. Verify that the LEDs on the module indicate normal operation per the LED table on page 6.

Specifications

Power Consumption

Voltage	Current Required
5V dc	.150 A
24V dc	.040 A ⁽¹⁾ ⁽²⁾

- (1) If the 1747-AIC Link Coupler is connected to the 1747-KE module with a 1747-C11 cable, then the link coupler draws its power (0.085 A at 24V dc) through the module. Add this to the listed current requirements for the 1747-KE module.
- (2) If the 1747-AIC Link Coupler is connected to the 1747-KE module with a 1747-C13 cable, then power for the link coupler comes from either an SLC 500 processor or an external power supply. Refer to the documentation provided with the link coupler. Module current requirements remain as listed.

IMPORTANT

The 1747-KE module requires both 5V dc and 24V dc power from the SLC backplane. The power consumption of the module must be taken into consideration when planning your SLC 500 system. Refer to the documentation supplied with your SLC 500 fixed or modular controller for additional information on power supplies and current requirements.

Environmental Conditions

Condition	Range
Operating temperature	0°C to 60°C (32°F to 140°F)
Storage temperature	-40°C to 85°C (-40°F to 185°F)
Relative humidity	5% to 95% (non-condensing)
Certification	<ul style="list-style-type: none"> • C-UL certified • C-UL Class 1, Division 2 Groups A, B, C, D certified • UL listed • CE compliant for all applicable directives

Port Isolation

Port	Isolation	Isolation Voltage
CONFIG	Backplane to Port	500V dc
DF1	Backplane to Port	500V dc
CONFIG and DF1	CONFIG to DF1	500V dc

IMPORTANT The DH485 Port is not isolated.

Real Time Clock/Calendar Accuracy

Specification	Range
Accuracy	±1 minute/month at +25 C
	+0, -6 minutes/month at +60°C

Maximum Communication Distances

Communication Rate (bps)	Maximum Distance Allowed in meters (feet)			
	RS-232	RS-423	RS-422	RS-485
300	15 (50)	1230 (4000)	1230 (4000)	1230 (4000)
600	15 (50)	920 (3000)	1230 (4000)	1230 (4000)
1200	15 (50)	770 (2500)	1230 (4000)	1230 (4000)
2400	15 (50)	502 (1650)	1230 (4000)	1230 (4000)
4800	15 (50)	245 (800)	1230 (4000)	1230 (4000)
9600	15 (50)	120 (400)	1230 (4000)	1230 (4000)
19200	15 (50)	60 (200)	1230 (4000)	1230 (4000)

IMPORTANT When communicating in RS-232 mode, use the RS-423 jumper settings.

When communicating in RS-423 mode, use RS-423 or compatible receivers.

Notes:

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