

# MODELS

CA-285

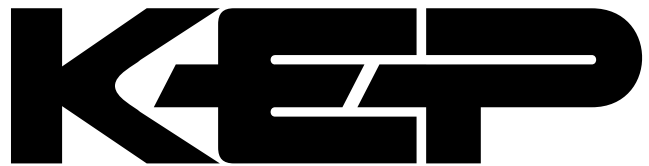
## **CA-285**

**RS-422/RS-485 to RS-232  
*Interface Converter***

Installation & Operating Instructions



<http://www.kep.com>



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## Proprietary Notice

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## WARNING

This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling\* procedures must be observed during the removal, installation, or handling of internal circuit boards or devices.

### \*Handling Procedure

1. Power to unit must be removed.
2. Personnel must be grounded, via wrist strap or other safe, suitable means, before any printed circuit board or other internal device is installed, removed or adjusted.
3. Printed circuit boards must be transported in a conductive bag or other conductive container. Boards must not be removed from protective enclosure until the immediate time of installation. Removed boards must be placed immediately in protective container for transport, storage, or return to factory.

### Comments

This instrument is not unique in its content of EDS (electrostatic discharge sensitive) components. Most modern electronic designs contain components that utilize metal oxide technology (NMOS, CMOS, etc.). Experience has proven that even small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure.

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## **SAFETY INSTRUCTIONS**

**The following instructions must be observed.**

- This instrument was designed and is checked in accordance with regulations in force EN 60950 (“Safety of information technology equipment, including electrical business equipment”).  
A hazardous situation may occur if this instrument is not used for its intended purpose or is used incorrectly. Please note operating instructions provided in this manual.
- The instrument must be installed, operated and maintained by personnel who have been properly trained. Personnel must read and understand this manual prior to installation and operation of the instrument.
- The manufacturer assumes no liability for damage caused by incorrect use of the instrument or for modifications or changes made to the instrument.

### **Technical Improvements**

- The manufacturer reserves the right to modify technical data without prior notice.

# DESCRIPTION & SPECIFICATIONS

## 1.0 General Description

### DESCRIPTION:

The CA-285 is a unique interface converter that can be configured by the user to convert either RS-422 or RS-485 to RS-232. When operating in RS-485 mode, the CA-285 has an "intelligent" mode which provides control of the RS-485 line.

When configured to operate as an RS-232 to RS-422 interface converter, the CA-285 converts full duplex data, Td and Rd, between RS-232 and RS-422.

As an RS-232 to RS-485 converter, the unit can be configured for either 2 or 4-wire operation. In either mode, the CA-285 allows control of the transmitter so that multi-dropped operation can be accommodated. The CA-285 can be configured to control its data flow in one of two ways. The first is via the use of RTS, pin 4, of the RS-232 port. In this case, the RS-485 transmitter will turn ON when RTS is turned on. When RTS is OFF, the CA-285 is in the receive mode. In the 4-wire mode, the receiver is always on. The second method of controlling the RS-485 transmitter is to turn it on when Td data is applied to the RS-232 port.

The receiver also operates differently depending on whether the mode is 2 or 4-wire. In the 2-wire mode, when no data is received by the RS-232 receiver, the RS-485 receiver is switched ON. When data is detected for transmission, the receiver is switched OFF. In the 4-wire mode, the RS-485 receiver is constantly ON while the transmitter is switched as required. The CA-285 is equipped with a five position dip switch that is used to select the following:

RS-422 mode: 4-wire  
RS-485 mode: 2-wire  
RS-485 mode: 4-wire  
RS-485 mode: controlled by RTS  
RS-485 mode: controlled by data  
220 ohm terminator: in or out

The CA-285 is also equipped with a DTE/DCE switch to allow reversing pins 2 and 3 on the RS-232 interface. Td and Rd LED indicators help verify operation.

## 2.0 Specifications

### 2.1 Interface

Columns to EIA RS-232, RS-422 and RS-485 specifications.

### 2.2 Connectors

2.2.1 Model CA 285 RS-232: DB25M.  
RS-242/RS-485; 5 position terminal block

### 2.3 Data Rate

2.3.1 Model CA 285 : 0 to 64 KBPS

### 2.4 Switches

DTE/DCE switch for reversing TD & RD. 5 position dip switch: set RS-485 to 2 or 4 wire, RS-422 and termination.

### 2.5 Indicators

Model CA 285 : TD and RD LED's

### 2.7 Power

115VAC 0 60 Hz (220 VAC (D 50 Hz optional).

### 2.8 Size

Model CA 285 : 2" W x 3.5" L x 0.875" H  
(50.8mm x 88.9mm x 22.2mm)

### 2.9 Environment

0° to 50° C, 5% to 95% relative humidity.

# Installation

## 3.0 Installation

The Model CA 285 is designed to interface RS-232 with either RS422 4 wire, RS-485 4 wire or RS-485 2 wire. In addition the RS-485 mode can be set to have its transmitter enable by RTS or can be set to sense when data is being transmitted by the RS-232 device. The user also has the ability to enable a 220 Ohm terminator when the CA 285 is configured in the 2 wire mode. To set the dip switches select the option from the chart below.

Mode	TD Control SW1	RTS Control SW2	220W Term SW3	2 Wire Mode SW4	4 Wire Mode SW5
1. RS-422	OFF	OFF	OFF	OFF	ON
2. RS-485 4 Wire Transmitter enabled by RTS	OFF	ON	OFF	OFF	ON
3. RS-485 4 Wire Transmitter enabled by TD	ON	OFF	OFF	OFF	ON
4. RS-485 2 Wire Transmitter enabled by RTS	OFF	ON	X	ON	OFF
5. RS-485 2 Wire Transmitter enabled by TD	ON	OFF	X	ON	OFF

ON = Closed          OFF = Open

The terminator should only be selected for use in RS-485 2 wire options.

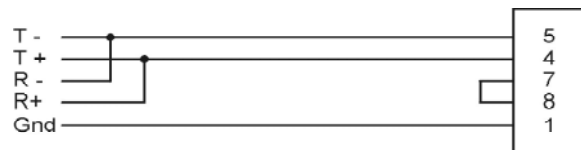
In addition to the requirements to set the 5 position dip switch, the user must also determine if the MODEL CA 285 will look like a DCE or a DTE device. When configured as a DCE the CA 285 will connect to a DTE device such as a PC or terminal. When set as DTE the CA 285 will connect to a DCE device such as a modem.

Application Example for RS-485 2 wire.

### Dip Switches

DTE/DCE	DCE
1.	Closed
2.	Open
3.	Closed
4.	Closed
5.	Open

### Connection Diagram



# Operation & Troubleshooting

## 4.0 Operation

RS-422 - When the Model CA 285 is configured as an RS-232 to RS-422 converter it will perform full duplex conversion of the TD and RD signals. The RS-422 equipment is connected to the CA 285 through the 5 position terminal block marked G, R-, R +, T-, and T +. The R + and R- are the receiver inputs into the CA 285 and T+ and T- are the transmitter outputs.

When connecting the CA 285 to other RS-422 equipment, the T+ and T- should be one twisted pair while R+ and R- should be another. The G connection is connected to Pin 1, Frame Ground, on the RS-232 port.

RS-485 - In the 4 wire mode the Model CA 285 has its receiver always ON and the transmitter can be controlled in one of two ways. The first is the transmitter can be enabled when the RTS (or CTS) is enabled or goes high. The second method is to turn the Transmitter ON when data is applied to the CA 285 from the RS-232 device. Connection to the CA 285 is made to the terminal block with T+ and T- being the transmit pair and R+ and R- the receive pair. When operating in the 4 wire mode T+ and T- should be one twisted pair and R + and R- another twisted pair.

The RS-485 two wire mode uses 1 twisted pair to transmit and receive. The CA 285 will normally be in the receive mode or waiting for data from the RS-485 equipment. When the CA 285 wants to transmit it uses RTS or waits for data from the RS-232 to enable its transmitters, depending on the mode it is set for. The CA 285 uses the T+ and T- for its connections to the RS-485 device.

## 5.0 Troubleshooting

The following is a list of possible problems that may arise during the installation and solutions to these problems:

1. The data being received is garbled?
  - a) The DTE/DCE switch is not set properly (see section 3).
  - b) The equipment that the Model CA 285 is connected to does not have the communication parameters set the same.
  - c) T + and T- are reversed going to R + and R-. On the Model 285 look at the RD LED, if it is ON continuously then the leads are reversed.
  - d) One of the four wires is broken
  - e) Wires are not paired properly : T+ and T- should be one twisted pair and R + and R- are the other pair.
  - f) Termination resistance missing.
2. No data is being received.
  - a) Customer equipment not connected to the CA 285 .
  - b) The DTE/DCE switches are not set properly (see section 3).
  - b) One or more wires between the modems are open.
  - c) Link connection exceeds maximum specified distance.
  - e) Termination resistance missing.

If the unit is believed to be defective, operation can be verified if one of the devices to which the modem is attached is capable of operating in a full duplex mode (such as a terminal or a PC using communications package such as Procomm). Connect the CA 285 to the terminal through the RS-232 connector and make the following loopback connections at the analog interface.

T+ to R+ and T- to R-

If the CA-285 is functioning correctly, any data entered on the keyboard should appear on the screen.



## 6.0 RS-232 Pin Number Assignments

Pin	EIA	CCITT	Name	
2	BA	103	Transmit Data	*
3	BB	104	Receive Data	*
4	CA	105	Request to Send	**
5	CB	106	Clear to Send	**
6	CC	107	Data Set Ready	***
7	AB	102	Signal Ground	Gnd
8	CF	109	Data Carrier Detect	***
20	CD	108.2	Data Terminal Ready	***

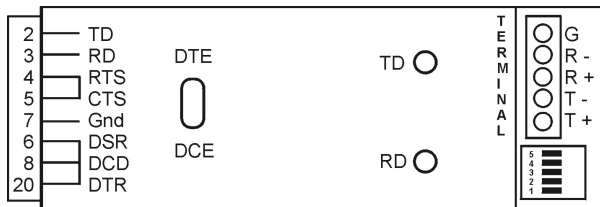
\*These signals can be reversed using the selector switch.

\*\* , \*\*\* Connected together.

## 7.0 Power

### 7.1 Model CA 285

The Model CA 285 is powered by a small, wall mounted transformer that supplies 9 VAC @ 500 mA. The transformer must be connected to the Model CA 285, through the 3.5mm connector located on the side of the unit, before plugging the transformer into the wall.



We hope you will be pleased with our product. If you have any questions concerning our warranty, repair, modification or returned goods process, please contact your local distributor.

**WARRANTY**

This product is warranted against defects in materials and workmanship for a period of two (2) years from the date of shipment to Buyer.

The Warranty is limited to repair or replacment of the defective unit at the option of the manufacturer. This warranty is void if the product has been altered, misused, dismantled, or otherwise abused.

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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**DECODING PART NUMBER**

**SAMPLE: CA-285**

**Series** \_\_\_\_\_

CA-285 RS-422/485 to RS-232 Communication Adaptor