

# TD0200AX Technical Data

## RS232 to RS485 CONVERTER with isolation and differential "power" termination

Part No.: DAS-PMB-RS232/485-01A - Male DB25



### Description:

The RS232 to RS485 converter is used to convert between full duplex RS232 and half duplex multi-drop RS485 networks. The six diagnostic LEDs support rapid network setup and troubleshooting. The rugged metal enclosure and DIN rail mounting option makes this unit particularly suitable for industrial applications. All configuration options are internal and factory set. High speed isolation circuitry allows operation from 0 to 250kbaud. Line direction is controlled by RTS. This unit also features differential or "power" termination to eliminate the indeterminate condition that would arise in an undriven RS485 network and prevent noise from being received as unwanted data.

Half-duplex communications permit communication in two directions but only one direction at a time. Multi-drop refers to a network topology where three or more nodes are connected to the same physical medium.

RS485, half-duplex networks typically operate correctly to more than 1 kilometer at speeds of up to 100Kbits/sec. As speed increases, cable length must be decreased.

### Features:

- Industrial grade
- Optical isolation between the RS232 and RS485: up to 2,000V
- Power source: external power supply (9VDC, 200mA) or interface powered from the RS485 network
- Data rate: up to 100Kb/sec. through an under 4,000 ft. (1.2 Km) transmission line
- DTE/DCE device setting is internally selected at factory
- Supports multi-drop connections
- 2-Wire half duplex communications
- Differentially terminated
- Weight: 100g
- Enclosure: metal
- AC adapter accepting 110V, 60Hz input and providing 9VDC, 200mA output available (optional)

## Technical Specifications:

Operating conditions	-20 to +85°C (-4 to 185°F) 0 to 93% relative humidity
Operating voltage (power supply requirement)	External power supply: 9-12VDC, 200mA (AC adapter supplied as an option) or interface powered from the network
Electrical connections	RS232 side: DB25 male RS485 side: 2 Data, 2 power and 1 shield screw terminations (22-12 AWG wire) External power supply: Connect 9VDC to pins 4+, 5- on the RS485 side screw terminal or the network interface power to pins 9+, 10- on the RS232 DB-25.
Dimensions	99.20 x 26.34 x 69.99 mm (W x H x D) 3.91 x 1.03 x 2.75 inches

## Troubleshooting:

### Primary Power

The primary power LED should be illuminated solid green. 9VDC can be supplied from the RS485 connector PIN 4+, PIN 5– or through the RS232 connector PIN 9+, PIN 10-. Ensure that no conflict exists in the host RS232 interface. The unit is polarity protected preventing damage to the device if the DC supply is reverse connected. If an AC power cube adapter is used and has been plugged in for 30 minutes or more, confirm that it is warm but not hot. When 9VDC is applied and the LED does not illuminate this indicates that the device's internal power supply circuit is damaged. If in rare cases, the primary power lamp is off but the isolated network power lamp is illuminated green, this indicates the Primary Power LED has failed. Normal operation of the device can continue.

### Isolated Power

The isolated power LED should be illuminated solid green. This lamp indicates the isolated power supply that powers the RS485 portion of the converter circuit is operational. When the isolated power lamp is off but the network transmit lamp continues to illuminate during normal operation, it indicates isolated power LED failure. This will not interfere with continued normal operation of the device. A slight pulsation of this lamp may be detected during normal operation. If the pulsation becomes excessive this will indicate an overburdened network due to excessive termination or a short circuit.

### Network Transmit

This LED will be illuminated when the RS485 driver is active and driving the network. In a multi-drop network, only one unit should be driving the line at any given time. If this light is illuminated it is impossible to receive data from the network.

### Direction, Receive Data, Transmit Data

Under conventional quiescent conditions, all three of these lamps will be illuminated green. The sequence of events would be as follows: the RS485 network is passive, some device chooses to transmit and asserts its RTS, this will cause the direction LED to change to red and the network transmit LED to illuminate red. The data lamp beside the direction lamp will then flash red as data is transmitted onto the RS485 network. The RTS lamp will next return to red and the network transmit lamp will turn off. The other data LED would then begin blinking red as data is received from the network. This is the most common scenario but other scenarios are possible.

## User Configuration:

The industrial network converter has all configuration jumpers set internally. The device should be ordered from the factory in a pre-configured state. In the event that changes are required, the following jumpers allow the configuration of the RS232 RTS transmit polarity, the default transmitter state, and the RS323 interface DTE/DCE configuration. The digital signal ground may also be connected to frame ground, and termination.

**RTS transmit polarity** - Conventionally the assertion of RTS is used to place the RS485 transmitter in transmit mode. Assertion of RTS means +V. Ensure that jumper 9 is placed between pins 2 and 3 for conventional operation. Placing the Jumper between pins 1 and 2 will cause the RS485 transmitter to be active when RTS is deasserted/-v/inactive.

**Failsafe (Termination)** - Conventionally this jumper will always be placed opposite to the transmit polarity jumper. It determines what will happen if the RS232 host is disconnected from the converter. Conventionally the RS485 transmitter should be disabled when the RS232 host is disconnected. To test this jumper, power up the system and disconnect the RS232 connect – the network transmit LED should be off. For failsafe, the shunts are placed between pins 1 and 2 of jumper J6 (ON termination). To select OFF termination, the shunts are placed between pins 2 and 3 of jumper J6.

**DTE/DCE** - This is configured using jumpers J1-Network Transmit Data, J4 – Network Receive Data and J5 Network Direction Control. These jumpers would normally be used as a group and all would be between pins 1 and 2 or 2 and 3. No damage will occur if these pins are installed incorrectly. To determine which setting is correct for your application, power the system up and try the shunts in both positions. One of the positions should yield the illumination of all three RS232 lamps -Direction and both data LEDs. When the shunts are between Pins 1 and 2 of J1,J4, and J5 RS232 data will be received on pin 2 and transmitted on pin 3 of the RS232 DB25 connector. Network direction control will be provided by pin 4 of the RS232 DB25 connector. When the shunts are placed between pins 2 and 3 of J1,J4, and J5 RS232 data will be received on pin 3 and transmitted on pin 2 of the RS232 DB25 connector. Network direction control will be provided by pin 5 of the RS232 DB25 connector.

**Digital Ground – Shield** - This jumper would normally not be supplied and rarely used. In some cases, noise rejection performance can be improved by hard grounding the digital logic. This is rare and other issues should be examined first.

### Terminology:

**RTS** – Request To Send

**+V** for and RS232 +V will be around 8 to 12 volts for an older technology system, and probably closer to 5 volts on a newer system. The RS232 standard will accept anything over approx. 2 Volts as an assertion.

**-V** for and RS232 -V will be around -8 to -12 volts for an older technology system, and probably closer to -5 volts on a newer system. The RS232 standard will accept anything under approx. 0 Volts as a deassertion.

**LED** – Light Emitting Diode – a small solid state light source

## Ordering Part Number:

### DAS-PMB-RS232/485-01A - Male DB25

Specify the termination setting (ON or OFF) and the DTE/DCE settings (setting 1 or 2), when ordering.

<u>DTE/DCE Settings</u>	<u>RS232 DB25 Connector Pin outs</u>
Setting 1	RS232 data is received on pin 2 RS232 data is transmitted on pin 3 Network direction control is provided by pin 4
Setting 2	RS232 data is received on pin 3 RS232 data is transmitted on pin 2 Network direction control is provided by pin 5

Specifications are subject to update without notice.

Form: TD0200AX-9/28/00