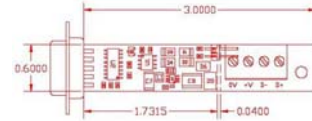**OCS RS-232 to RS485 Serial
Adapter
HE500232485**

Introduction:

The HE500232485 is a compact, lightweight and reliable RS232 to RS485 converter, which provides RS485 half-duplex (2-wire) multi-drop functionality to OCS devices that only support RS232 communications (Mini, OCS100, OCS200). The HE500232485 may also be used to provide RS232 to RS485 conversion for other devices provided they assert RTS handshaking when RS485 transmission is required and that handshake line is connected to the converter's RS232 CTS line.

RS-232 is a point-to-point serial communications standard that defines the electrical and mechanical details of the interface between Data Terminal Equipment (DTE) and Data Communications Equipment (DCE). Compared with newer standards RS-232 is limited in terms of data rate, maximum distance and noise immunity. For longer distances, higher speeds, more noise immunity and the need for multi-drop connections, conversion to RS-485 is recommended.

Connections:
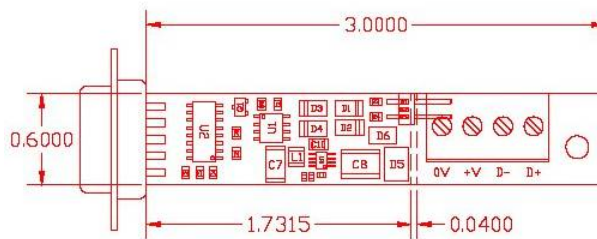
- **RS232 -** direct or through a RS232 cable to a DCE DB9 connector.
- **RS485 -** connect the RS485 data lines to the D+ and D- terminals (observing polarity). Note that the communications common may be connected to the 0V terminal; however, since converter is <u>not</u> isolated, standard practices should be applied to avoid ground loops.
- **Power -** connect 12-24VDC (100mA max) to the V+ and 0V terminals (observing polarity).
- **Termination –** when the pin jumper is installed (board side opposite terminal connections), internal termination resistance (120ohm) is provided.

Cables:

The HE500232485's RS232 connection (DB-9P) is a wired as a DTE configuration, which allows for direct connection to OCS device's RS232 programming/communication ports. If cabling is required between the HE500232485 and an OCS, it must be straight through and pass the CTS handshake signal as well as the data lines.

When connecting the HE500232485 to another DTE device (such as a PC) a 'null modem' or crossover cable is required (which must also pass the DTE device's RTS handshake output to the HE500232485's CTS handshake input)

The RS-232 standard suggests operation is possible at about 20 kbps over distances of 50 feet, depending on grounding and noise considerations. Over short distances, RS-232 is sometimes operated at rates as high as 115.2 kbps. Several hundred feet is possible at data rates of 9600 bps or lower.

For RS484 cabling, it is suggested that 24 AWG twisted pair copper wire with 16pF/ft capacitance be used. Maximum cable length is determined by the combination of cable length (in meters) and data signaling rate (in bps).

RS-485 allows multiple devices (up to 32) to communicate at half-duplex on a single pair of wires, plus a ground wire, at distances up to 1200 meters (4000 feet). Both the length of the network and the number of nodes can easily be extended using a variety of repeater products on the market. Data is transmitted differentially on two wires twisted together, referred to as a "twisted pair."

CSCAPE configuration

To enable an OCS device for use with the HE500232485 converter, an Open function block must be provided that configures the associated OCS port for *Multidrop Half* handshaking. This configuration allows the OCS to drive the HE500232485 converter's CTS (transmit enable) handshake line for transmitting data.

HE500RS232485 DB9P Pin configuration

| DB9P Pin	RS-232 Function	Direction
1	Data carrier detect (DCD)	In *
2	Transmit data (TxD)	Out
3	Receive data (RxD)	In
4	Data terminal ready (DTR)	Out *
5	Ground (Gnd)	—
6	Unused	__
7	Ready to send (RTS)	Out *
8	Clear to send (CTS) (Turns Transmit On)	In
9	Unused	__
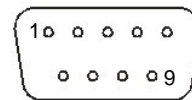
DB9P
Connector

  * Pins 1, 4, 7 Tied Together Internally, and Not Required for Normal Operation

HE500RS232485 4 Pin I-O Header Pin configuration

RS-485 half duplex Pin	RS-485 Function
0V	0VDC (Supply)
+V	12 to 24VDC (Supply) 100mA Max
D-	RS-485 Data -
D+	RS-485 Data +
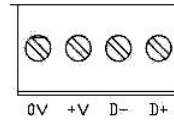
SAFETY

When found on the product, the following symbols specify:

Warning: Consult user documentation.   **Warning:** Electrical Shock Hazard.

> **WARNING: To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.**
>
> **WARNING: To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the power. Be sure to locate fuses as close to the source as possible.**
>
> **WARNING: Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.**
>
> **WARNING: In the event of repeated failure, do <u>not</u> replace the fuse again as a repeated failure indicates a defective condition that will <u>not</u> clear by replacing the fuse.**
>
> **WARNING: Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.**

- All applicable codes and standards need to be followed in the installation of this product.
- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG or larger.

Adhere to the following safety precautions whenever any type of connection is made to the module.

- Connect the green safety (earth) ground first before making any other connections.
- When connecting to electric circuits or pulse-initiating equipment, open their related breakers. Do <u>not</u> make connections to live power lines.
- Make connections to the module first; then connect to the circuit to be monitored.
- Route power wires in a safe manner in accordance with good practice and local codes.
- Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
- Ensure hands, shoes, and floor are dry before making any connection to a power line.
- Make sure the unit is turned OFF before making connection to terminals. Make sure all circuits are de-energized before making connections.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

TECHNICAL SUPPORT

For assistance and manual updates, contact Technical Support at the following locations:

North America: **Europe:**

(317) 916-4274   (+) 353-21-4321-266
www.heapg.com   www.horner-apg.com
techsppt@heapg.com   `   techsupport@hornerirl.ie