

# OR-485 - Opto-Isolated Converter/Repeater

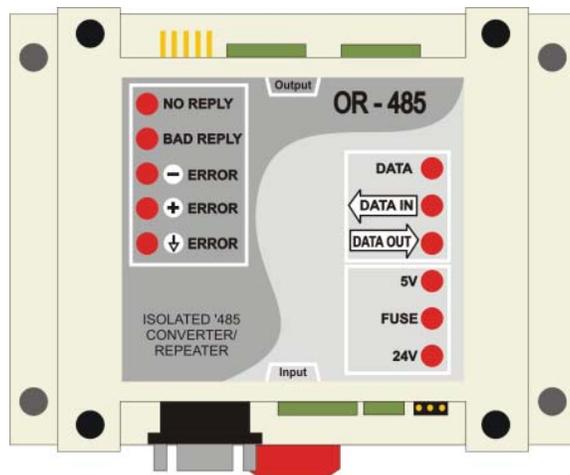
## Description

The OR-485 is an externally powered isolated converter/repeater with added diagnostic features. There are two input ports which can be jumper selected; one for PC (RS232), the other one is for upper level RS485 bus (RS485). Available are isolated, half-duplex, RS485 output ports to connect to the network. The OR-485 has the capability to detect common wiring mistakes on the output side and report them using MODBUS protocol or LED status.

Input: RS-232 or RS485 (jumper selected)  
Output: Isolated RS485

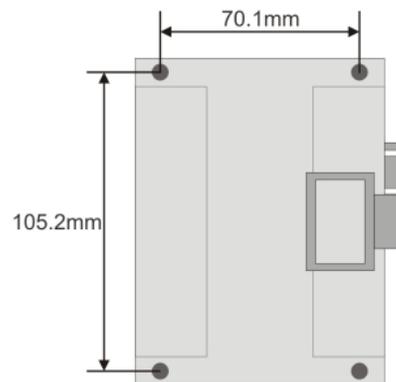
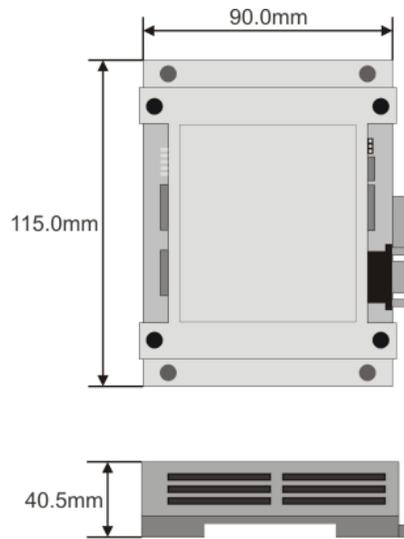
### Highlight:

- RS485 BUS Diagnostic Function
- MODBUS Communication Protocol
- 2 Baudrate Settings: 9600bps and 19200bps
- Diagnostic Waveform Display
- Communication Status Display
- Isolated Power Supply and Opto Isolated Communication
- In-Circuit Serial Programming™ (ICSP™)



## Specification

|                         |                                 |
|-------------------------|---------------------------------|
| Supply Voltage          | 12~24VDC ±20%                   |
| Power Consumption       | 80mA at 24VDC                   |
| Power Supply Protection | Polarity Inversion              |
| Dimensions              | 40.5mm H x 90.0mm W x 115.0mm D |
|                         | 1.59" x 3.54" x 4.53"           |
| Ambient Temperature     |                                 |
| Operation               | 10-50°C (50-99°F)               |
| Storage                 | 2-50°C (35-120°F)               |
| Material Enclosure      | Fire-Proof Plastic              |
| Enclosure rating        | IP31                            |
| Colour                  | Gray                            |
| Weight                  | 180g                            |



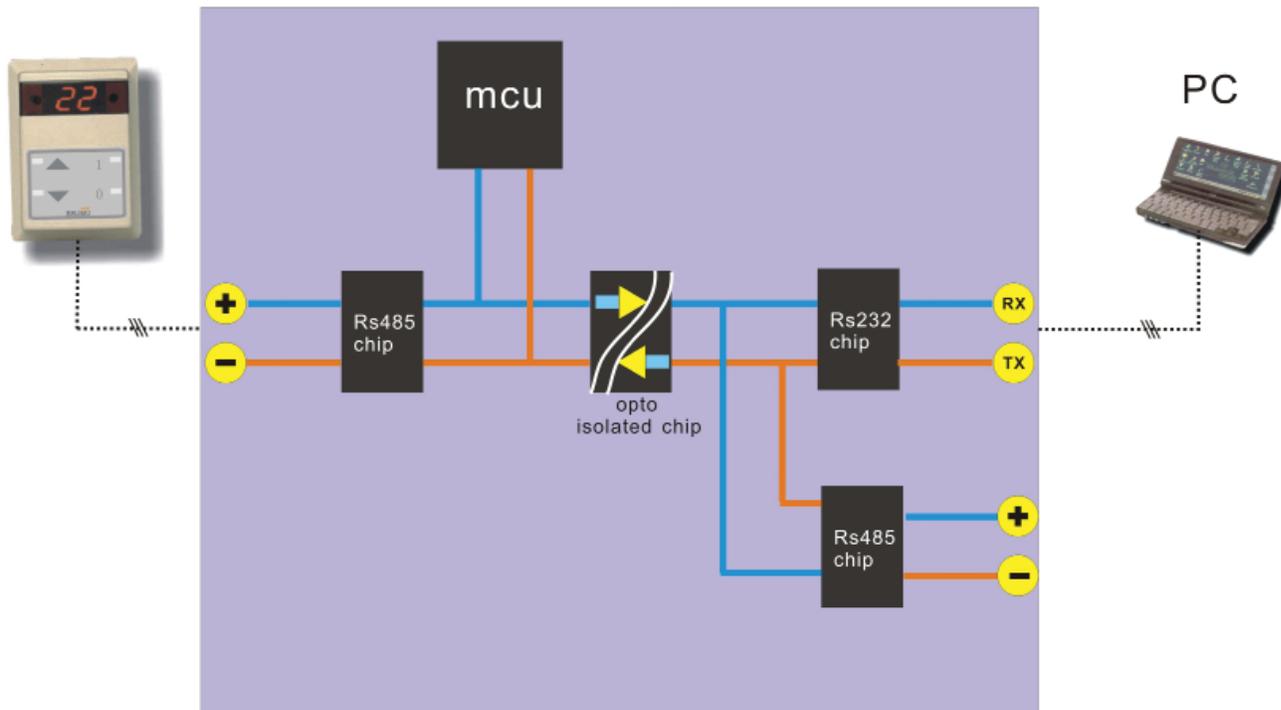
# OR-485 - Opto-Isolated Converter/Repeater

## Structure

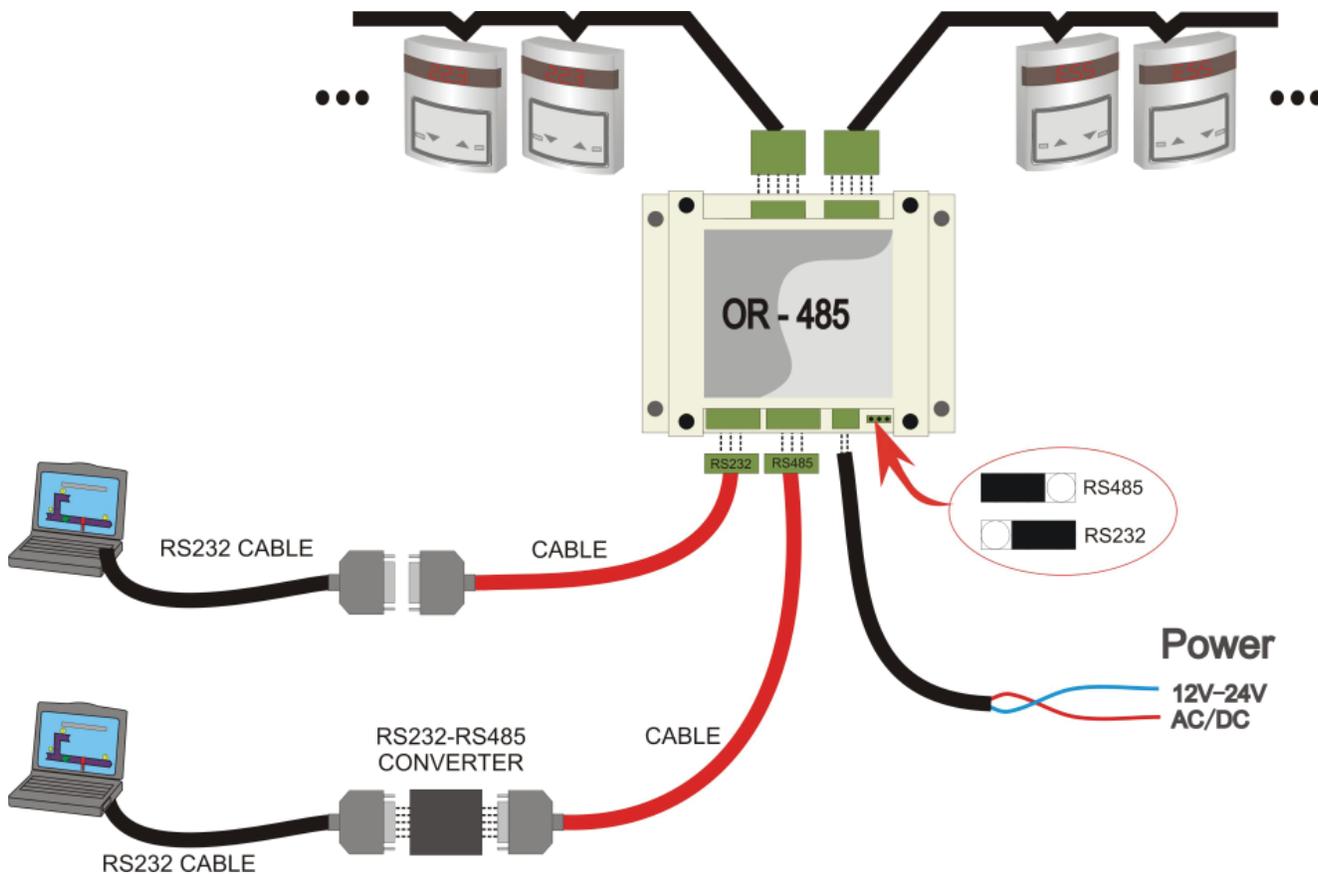
Thermostat

OR-485 Repeater

PC



## Wiring Diagram



## Diagnose and Displaying Waveform

The OR - 485 can detect the RS485-bus signal and analyze 3 channels( A, B, GND) voltage. Then it will judge it as “normal” or “error” and display the error information to the LED on the panel at the same time. There are many records in the MCU, and the computer can read them through standard MODBUS commands. For example if a computer sends a command (enable retrieving waveform), OR - 485 will sample the data once. When this process finished, it will enable a flag (indicating that the data is Waveform Ready). The computer can then generate the waveform when it finds the flag has been enabled.

## Networking Capabilities

The OR - 485 can connect directly to the computer, and the computer also communicates with any thermostat on the RS485 BUS through this device, it could be used like a repeater on the RS485 BUS.

The system use standard Modbus communication protocol. There are several records for the application that can be used for the communication with the computer software.

### General Purpose Record List

**Note:** When using the Modbus Poll software, addressing should be set to “Protocol Addresses (Base 0)” under the “Display” menu.

| Address | Bytes | Range   | Defaults | Description                                |
|---------|-------|---------|----------|--|
| 0 to 3  | 4     | -       | -        | Serial Number, 4 byte value, Read-only     |
| 4 - 5   | 2     | -       | -        | Software Version – 2 byte value, Read-only |
| 6       | 1     | 0 - 255 | 46       | ADDRESS. Modbus device address             |
| 7       | 1     | 0 - 255 | -        | Product Model                              |
| 8       | 1     | 0 - 255 | -        | Hardware Revision                          |
| 17-99   |       |         |          | Blank, for future use                      |

### System Application Record List

| Address   | Bytes | Range    | Defaults | Description  |
|-----------|-------|----------|----------|--|
| 100 - 134 | 70    | 0 - 1024 | 0        | Channel A Waveform Sample Data, Read only, 1024 = 5V, 0 = 0V   |
| 135 - 169 | 70    | 0 - 1024 | 0        | Channel B Waveform Sample Data, Read only, 1024 = 5V, 0 = 0V   |
| 170       | 1     | 0 , 1    | 0        | Channel A Sample Ready State, 1 is ok , 0 is not ready, Read only  |
| 171       | 1     | 0 , 1    | 0        | Channel B Sample Ready State, 1 is ok , 0 is not ready, Read only  |
| 172       | 1     | 0 , 1    | 0        | Channel A Start Sample Data, 1 is enable, 0 is disable   |
| 173       | 1     | 0 , 1    | 0        | Channel B Start Sample Data, 1 is enable, 0 is disable   |
| 174       | 1     | 10 - 15  | 15       | RS485 bus state, 10 GND error, 11 channel a error, 12 channel b error, 13 communication error, no input data from RS485 bus, 15 bus state is normal, read only |
| 175       | 1     | 96, 192  | 192      | Baud rate setting, 96 is 9600, 192 is 19200  |

Notes: \*Byte format: start + 9 bits data + stop = 11 bits \*Baud rate: 19200

Example to start a data capture :

1. Enable the channel flag to select the channel for capture ( write the register address 172 or 173), only one can be active at a time
2. Read the channel state and wait till the data is ready, ( register address 170 or 171 will show a ‘1’ value when the data capture is complete)
3. Read the captured data from the storage registers (100-134 or 135 - 169). The voltage is 1024 for full scale, 5V
4. If you are using the Modbus tool MBPoll, the menu item under ‘display’ should be set to ‘protocol address 0’, as opposed to “PLC address 1”