



# UT-501-EN

## Industrial RS-232 to RS-485/422

### Port-powered Opto-isolated Converter

#### User Manual

## I. Overview

UT-501-EN industrial grade port-powered opto-isolated interface converter, compatible with RS-232C, RS-422, RS-485 standards, capable of converting single-port RS-232 signals to balanced differential RS-422 or RS-485 signals, with built-in opto-isolator, capable of providing up to 2500Vrms isolation voltage, with fast transient voltage suppression protector. This protector is designed to protect the RS-422/RS-485 interface with today's advanced TVS (TRANSIENT VOLTAGE SUPPRESSOR) transient voltage suppressor. Under normal conditions, the TVS tube is highly resistive, and when the two ends of the TVS tube are subjected to an instantaneous high-energy shock, it can reduce the impedance of its two ends at a very high rate, absorbing a large The voltage at both ends is clamped at a predetermined value to protect the circuit components behind from damage due to transient high-voltage shock. This protector can effectively suppress lightning (LIGHTNING) and ESD, providing 600W of lightning surge protection power per line, as well as surge voltages and transient over-voltages generated by various causes on the line, and the extremely small inter-pole capacitance ensures high-speed transmission of the RS-422/RS-485 interface. The RS-232 interface end is connected to the compatible RS-232C standard interface through a DB9 female connector, and the RS-422 and RS-485 ends are the outputs through the ten-position terminal block. The converter is equipped with zero-latency automatic transceiver, unique I/O circuitry automatically controls the data flow direction without any handshaking signal (such as RTS, DTR, etc.), and no jumper setting is required to achieve full-duplex (RS-422) and half-duplex (RS-485) mode conversion, plug-and-play. Ensure that it is suitable for all existing communication software and interface hardware, no need to make any software modification to the previous RS-232 based working mode. UT-501-EN industrial grade port-powered opto-isolated interface converter can provide reliable connection for point-to-point and point-to-multipoint communication, point-to-multipoint allows 32 RS-422 or RS-485 interface devices per converter, with data communication rate 300-115.2Kbps, with power indicator and data flow indicator to indicate the fault situation, support communication mode RS-232 to RS-422, RS-232 to RS-485 conversion.

## II. Performance Parameter

- ◎ Interface characteristics: interface compatible with EIA/TIA RS-232C, RS-485/RS-422 standard
- ◎ Electrical interface: RS-232 interface input DB9 female connector, RS-422/RS-485 interface ten terminal blocks for the output
- ◎ Protection level: RS-232 interface +/-15KV ESD protection, RS-422, RS-485 interface 600W per port of lightning surge protection.
- ◎ Isolation: isolation voltage 2500Vrms 500DC continuous
- ◎ Working mode: asynchronous half-duplex or asynchronous full-duplex
- ◎ Signal indication: three signal indicators power (PWR), transmit (TXD), receive (RXD)
- ◎ Transmission medium: twisted pair or shielded wire
- ◎ Transmission rate: 115.2Kbps to 300M  
38.4Kbps to 600M  
9600 BPS to 1.2KM
- ◎ Dimension: 117mm × 80mm × 25mm
- ◎ Operating temperature: -25 ~ 70°C
- ◎ Relative humidity: 5 ~ 95%
- ◎ Transmission distance: 0-1200m (115200bps-9600bps)

## III. Performance Parameter

DB 9 Female (PIN)	RS-232C Interface signal
1	GND
2	Receive data SIN (RXD)
3	Transmit data SOUT (TXD)
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

RS-485/RS-422 output signal and terminal pin assignment

Terminal block (PIN)	Output signal	RS-422 full-duplex wiring	RS-485 half-duplex wiring
1	T/R+	Transmit (A+)	RS-485(A+)
2	T/R-	Transmit (B-)	RS-485(B-)
3	RXD+	Receive (A+)	/
4	RXD-	Receive (B-)	/
5	GND	GND	GND
6	N/A	/	/
7	N/A	/	/
8	N/A	/	/
9	VCC	/	/
10	GND	GND	GND

## IV. Hardware Installation and Application

Please read the user manual before installing UT-501 port-powered opto-isolated interface converter, connect the communication cable to the RS-232 port and the corresponding power supply to the power port. T/R+T/R- represents transmitting and receiving A+/B-, RXD+/ RXD- represents receiving A+/B-, VCC represents input or output power, GND represents common ground, point-to-point, point-to-multipoint, half-duplex communication connects two wires T/R+, T/R-, point-to-point, point-to-multipoint, full-duplex communication connects 4 wires T/R+, T/R-, RXD+, RXD-.

UT-501 port-powered Interface Converter supports the following 4 communication methods:

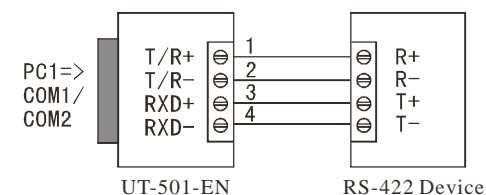
1. Point-to-point/four-wire full duplex
2. Point-to-multipoint/four-wire full duplex
3. Point-to-point/two-wire half-duplex
4. Point-to-multipoint/two-wire half-duplex

When the converter is wired as full duplex or half duplex, a matching resistor (120 Ohm 1/4W) needs to be connected at the end of the line in order to prevent signal reflection and interference

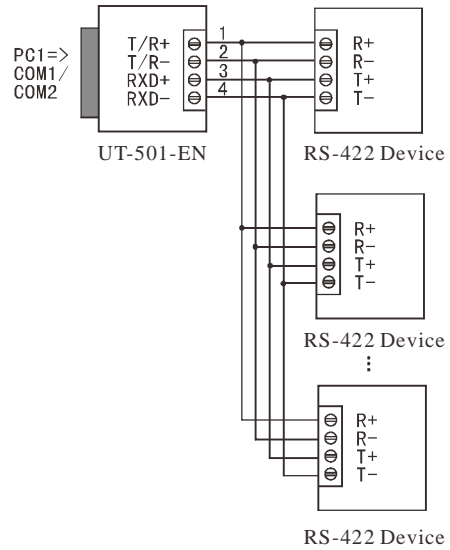
## V. Communication connection diagram

RS-232 to RS-422 conversion

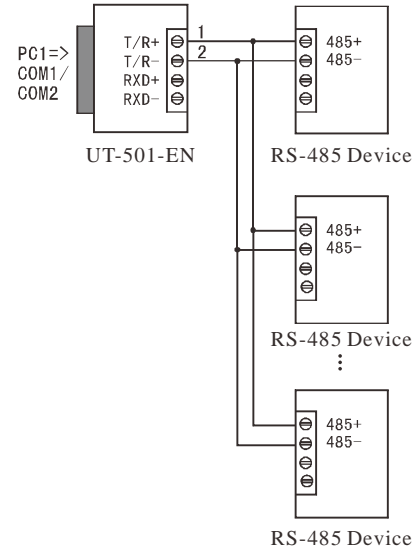
1. RS-422 point-to-point 4-line full duplex communication



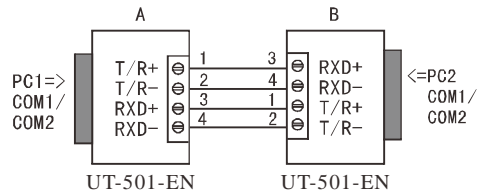
## 2. RS-485 point-to-multipoint /2-line half duplex



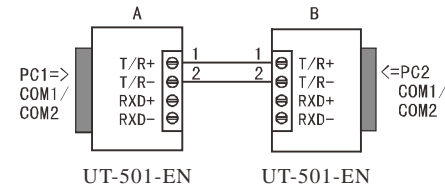
## 2. RS-485 point-to-multipoint /2-line half duplex



## 3. Half-duplex communication connections between UT-501-EN interfaces

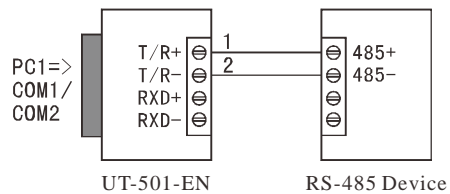


## 3. Half-duplex communication connections between UT-501-EN interfaces



## Conversion from RS-232 to RS-485

### 1. RS-485 point-to-point /2-line half duplex



## VI. Trouble shooting

### 6.1. Data communication failure

- Check if the RS-232 interface is wired correctly
- Check whether the RS-485/RS-422 output interface is wired correctly
- Check whether the power supply is normal
- Check whether the terminals are well connected
- Observe whether the receiving indicator flashes when receiving
- Observe whether the transmitting indicator flashes when transmitting

### 6.2 Data loss or error

- Check whether the data rate and format are consistent at both ends of the data communication equipment