

# SERIAL COMMUNICATION ADAPTERS

## Instruction Manual



[www.bindicator.com](http://www.bindicator.com)

150 Venture Blvd  
Spartanburg SC 29306  
Tel.: (800)778-9242 • Fax: (864)574-8063  
Email: [sales@bindicator.com](mailto:sales@bindicator.com)

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## **SAFETY INFORMATION**



**CAUTION:** Read complete instructions prior to installation and operation of the equipment.



**WARNING:** Risk of electric shock.



**WARNING**

Hazardous voltages could exist on serial communication wiring networks. Installation and service should be performed only by trained service personnel.

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**SPECIFICATIONS**

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**RS-485 Serial Adapter**

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<b>COMPATIBILITY</b>	EIA-485
<b>CONNECTORS</b>	Removable screw terminal connector and RJ11 (adapter to meter)
<b>CABLE</b>	6' (1.8 m) standard Cat5e cable provided with adapter
<b>DISTANCE</b>	Adapter to PRD1000 meter: 6' (1.8 m) max; Adapter to computer: 3,937' (1,200 m) max
<b>POWER</b>	Powered by PRD1000 meter M-Link connection
<b>STATUS INDICATION</b>	Separate LEDs for Power (P), Transmit (TX), and Receive (RX)

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**USB Serial Adapter**

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<b>COMPATIBILITY</b>	USB 1.1, USB 2.0
<b>CONNECTORS</b>	RJ45, and USB Type B
<b>CABLE</b>	One 6' (1.8 m) standard Cat5e cable and one 3.28' (1.0 m) USB A-B Male cable provided with adapter
<b>DISTANCE</b>	Adapter to PRD1000 meter: 6' (1.8 m) max. USB connection: 10' (3 m) max
<b>DRIVER</b>	Windows 98/SE, ME, 2000, Server 2003/2008, XP 32/64-Bit, Vista 32/64-Bit, Windows 7 32/64-Bit
<b>POWER</b>	USB Port
<b>STATUS INDICATION</b>	Separate LEDs for Power (P), Transmit (TX), and Receive (RX)

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## **SERIAL COMMUNICATIONS OVERVIEW**

RS-485 is a standard interface approved by the Electronic Industries Alliance (EIA) for connecting serial devices. In EIA terms, the device (e.g. meter) that connects to the interface is called a Data Communications Equipment (DCE) and the device to which it connects (e.g. the computer) is called a Data Terminal Equipment (DTE).

Line drivers and receivers are used to exchange data between two or more points (nodes) on a serial communications network. Reliable data communications can be difficult in the presence of induced noise, ground level differences, and other hazards associated with installation of a network. The differential data transmission of RS-485 offers superior performance in most applications. Differential signals can help nullify the effects of ground shifts and induced noise signals that can appear as common mode voltages on a network.

RS-485 allows multiple drivers and receivers on the same two-wire or four-wire system. The RS-485 standard specifies up to 32 drivers and 32 receivers on a single bus, but with the introduction of "automatic" repeaters and high-impedance drivers/receivers, this number can be extended to hundreds of points (nodes) on a network.

The cabling used for an RS-485 serial communications network should always be a high quality cable such as Belden 8162 or Alpha 6203C. A two-wire system requires two twisted pairs, and a four-wire system requires three twisted pairs (the extra twisted pair is needed for the signal ground).

## RS-485 SERIAL ADAPTER



### Description

The RS-485 serial adapter converts the serial output of the PRD1000 meter to balanced, full or half-duplex RS-485 signals.

The RS-485 serial adapter has a removable screw terminal connector for the RS-485 terminals which includes Transmit Data (DO) and (/DO), Receive Data (DI) and (/DI), and Signal Ground. The adapter is provided by the PRD1000 meter M-Link connection.

Baud rates are adjustable and handled by the PRD1000 (see the PRD1000 Instruction Manual for more details).

The RS-485 serial adapter has three diagnostic LEDs: a Power (P) LED to show when the adapter is powered properly, a Transmit Data (TX) LED to show when the adapter is sending data out from the PC side, and a Receive Data (RX) LED to show when the adapter is receiving data from the PRD1000 meter.

## Installation

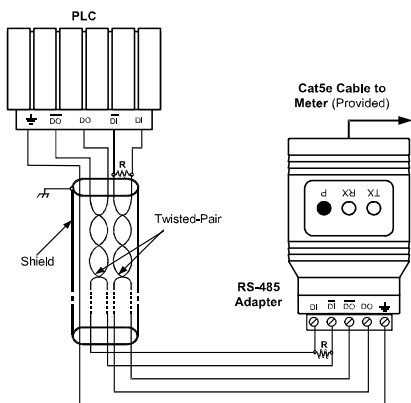
Figure 1 shows the connection of a PRD1000 meter to a single-point full-duplex RS-485 device using the RS-485 serial adapter. The adapter has an RJ45 connector to connect the Cat5e cable and a screw terminal connector to connect to the RS-485 network. Figure 2 shows the connection of several PRD1000 meters with RS-485 serial adapters to a multi-point half-duplex RS-485 network.

### PRD1000 Serial Communication Address (SERIAL)

When using more than one meter in a multi-drop or multi-point mode, each meter must be provided with its own unique address. For the PRD1000 meter the address may be programmed from 001 to 247. The PRD1000 meter is factory set to address 001.

To change the PRD1000 meter address:

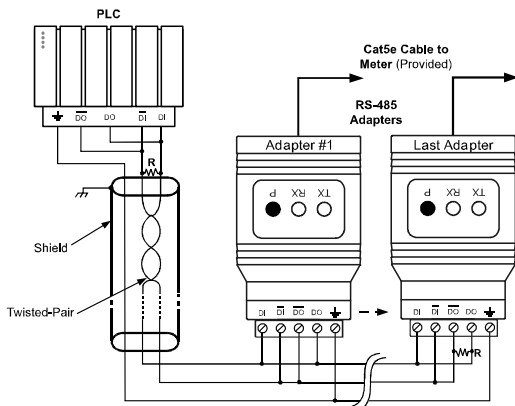
1. Press and hold the **Menu** button for three seconds to access Advanced Features menu of the meter.
2. Press **Up** arrow until Serial (SERIAL) menu is displayed and press **Enter**, ADDR E5 is displayed.
3. Press **Enter** to change meter address using **Right** and **Up** arrow buttons. Press **Enter** to accept.
4. Press **Menu** button to exit and return to Run Mode.



**Figure 1. RS-422 or RS-485 Wiring**

**Notes:**

1. Termination resistors are optional and values depend on the cable length and characteristic impedance. Consult the cable manufacturer for recommendations.
2. Use shielded cable, twisted-pairs plus ground. Connect ground shield only at one location.



**Figure 2. RS-485 Two-Wire Multi-Drop Wiring**

**Notes:**



1. Termination resistors are optional and values depend on the cable length and characteristic impedance. Consult the cable manufacturer for recommendations.
2. Use shielded cable, twisted-pair plus ground. Connect ground shield only at one location.



### Connections

A Cat5e cable is provided to connect the PRD1000 meter to the RS-485 serial adapter.

Figure 3 details the wiring connections from the RS-485 serial adapter to a full-duplex RS-485 four-wire network device.

RS-485 serial adapter to RS-422/485 Serial Converter Con- nections	
RS-485 Serial Converter	RS-485 Adapter
	
$\overline{\text{DO}}$	$\overline{\text{DI}}$
DO	DI
$\overline{\text{DI}}$	$\overline{\text{DO}}$
DI	DO

**Figure 3. Connections for RS-485 Adapter to Serial Converter**

If the RS-485 device configured for a two-wire network then the requirement to externally wire the DO to the DI and the /DO to the /DI on the RS-485 serial adapter screw terminal connector is needed.

## USB SERIAL ADAPTER



### Description

The USB Serial Adapter allows for direct connection of a PRD1000 meter to the USB port of a PC.

### Installation

Figure 22 shows the connection of a PRD1000 meter to a PC using a USB Serial Adapter.

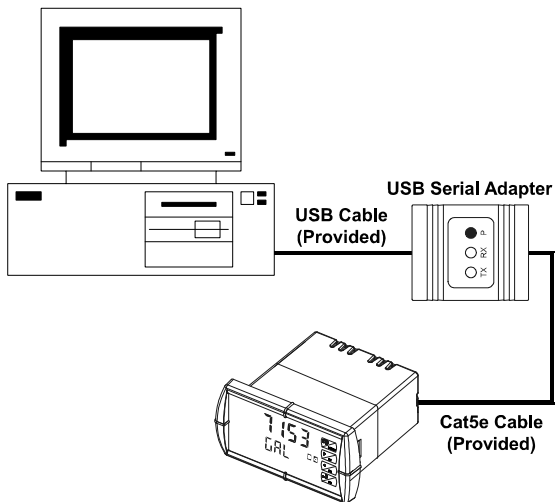


Figure 22. USB Adapter Connections

## TROUBLESHOOTING

Symptom	Check/Action
Power LED is off	RS-485 serial adapter: 1. Check modular cable connection 2. Check power to meter USB serial adapter: 1. Check USB connections 2. Try different USB port 3. Check USB port with other device
Meter not communicating with Bindicator PRD1000 Display Software or other programs	Check: 1. Serial adapter and cable 2. Serial protocol selected 3. Meter address and baud rate 4. Software address and baud rate
If only the TX (or DATA IN) data status LED is flashing when serial communications attempted	Check: 1. Serial adapter and cable 2. Serial protocol selected 3. Meter address and baud rate 4. Software address and baud rate
If both data status LEDs (TX and RX) are off when trying to communicate	Remove all unnecessary cables and meters. Try getting the system to work with only one meter (to ease troubleshooting) and then expand the system one device at a time.
Communications slow	Increase the baud rate
Random communication errors	Decrease the baud rate
Other symptoms not described above	Call Technical Support for assistance.



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Email: [sales@bindicator.com](mailto:sales@bindicator.com)

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