

USB Protocol Converter

Industrial Grade USB to RS-232/RS-485 (Part No: 5012-0017)

User Guide

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Foreword

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Cautions and Notes

The following symbols are used in this guide:



CAUTION! This indicates an important operating instruction that should be followed to avoid any potential damage to hardware or property, loss of data, or personal injury.



NOTE. This indicates important information to help you make the best use of this product.

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1. Introduction

Thank you for purchasing this product. The USB Protocol Converter allows a PC to receive RS485 or RS232 communication signals from all ACUs or DIGIgarde readers via a USB port.

When installed correctly this high quality protocol converter will provide many years of reliable operation. Please follow these instructions to ensure that the product is installed and commissioned correctly.

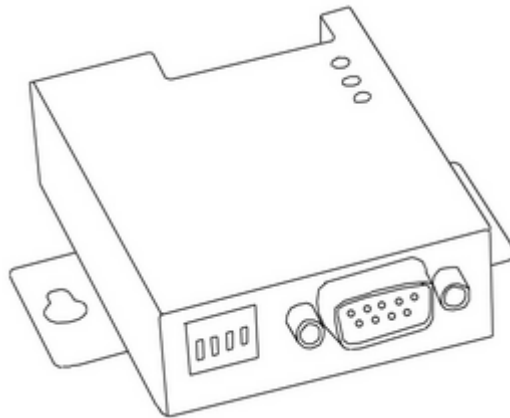


Figure 1 Protocol converter

1.1 Technical Specification

Power Supply	Self-powered from USB port
Current Consumption	500 mA maximum
Receive Buffer	384 bytes
Transmit Buffer	128 bytes
Data Rate	300 bps to 921.6 Kbps
Dimensions	81 mm x 76 mm x 23 mm

1.2 DIP Switch Settings

The row of 4 DIP switches on the front of the units sets the communication mode. These should be set correctly before operation.

Mode of Operation		SW1	SW2	SW3	SW4
RS232	Standard RS-232 Mode	OFF	ON	ON	ON
RS485	Full Duplex (4-Wire)	ON	OFF	ON	ON
	Half Duplex (2-Wire), without Echo	ON	OFF	OFF	OFF

* For RS485 communications it may be necessary to apply termination.

1.3 Terminal Block Connection

The unit features a 6-Way terminal block connector. Under normal circumstances, all communications connections are made to this connector.

Terminal Block Pin Number	Signal Pinout Function		
	RS-232	RS-485 Half Duplex (2-Wire)	RS-485 Full Duplex (4-Wire)
1	DCD	Data – (A)	Tx – (A)
2	RxD	Data + (B)	Tx + (B)
3	TxD	Not used	Rx + (B)
4	DTR	Not used	Rx – (A)
5	+5 V	+5 V	+5 V
6	GND	GND	GND

1.4 9-Way D-type Connection

The unit features a 9-Way D-Type Male Connector. In certain configurations, and if preferred, connection can be made to this.

9-Way D-Type Pin Number	Signal Pinout Function	
	RS-232	RS-485 Half Duplex
1	DCD	Data – (A)
2	RxD	Data + (B)
3	TxD	Not used
4	DTR	Not used
5	GND	GND
6	DSR	Not used
7	RTS	Not used
8	CTS	Not used
9	RI	Not used

2. Software Installation



NOTE. In the case of Microsoft Windows 2000, Windows XP and Windows 7 it is necessary to have FULL administrator privileges to be able to install any new drivers on the operating system.

2.1 Connecting to your PC

Plug the cable provided into the type-B socket on the Protocol Converter and then connect the other end (type-A) into an available host USB socket on the PC.

The PC will automatically detect the connection of the protocol converter and display the *Found New Hardware Wizard*.



Figure 2 The Found New Hardware wizard

2.2 Driver Installation

1. Select **Install from a list or specific location (Advanced)**.
2. Click on the **Next>** button.
3. Insert the CD-ROM supplied with the protocol converter into the CD-ROM driver of the PC.
4. Check the box **Search removable media (floppy, CD-ROM...)**
5. Click on the **Next>** button.
6. The Wizard will now search for the driver on the CD-ROM and install it. When the installation of the driver has completed, click on the **Finish** button.
7. The *Found New Hardware Wizard* will be displayed again. Repeat the above steps to complete the installation.
8. When the installation is complete, reboot the PC.

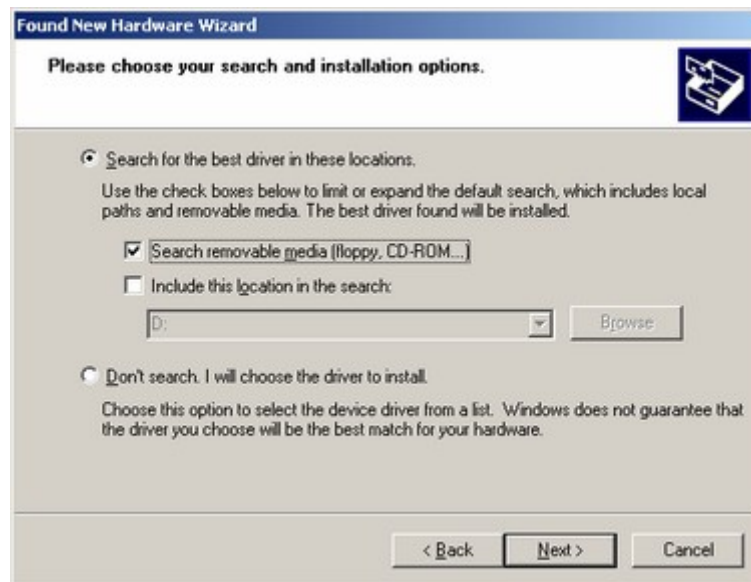


Figure 3 Choosing installation options

2.3 Testing and Configuring the Driver

To check the installation:

1. Select **Start > Control Panel > System** (in Windows 7, **System and Security**).
2. Click on **Device Manager**.
3. Expand the tree for **Ports (COM & LPT)**. You should see an entry for *USB Serial Port (COMX)*, where X is the communication port number that has been allocated to it. Make a note of this number.

2.3.1 Changing Port Number

Should you need to change the Communication Port number of the device, open *Device Manager* as described above and then:

1. Select the **USB Serial Port** in the *Ports (COM & LPT)* tree, right-click on it and select **Properties**
2. Select the **Port Settings** tab and click on the **Advanced...** button
3. From the drop-down list select the desired **Communications Port** number and click on **OK**.
4. Check in *Device Manager* that the port number has changed.

3. Use with Access Control Units

You can use the Protocol Converter to connect a PC to EX series ACUs. The converter can accept connections by:

- RS485, 4-wire (EX series)
- RS485, 2-wire (EX series or MICROgarde units)

3.1 RS485 4 wire

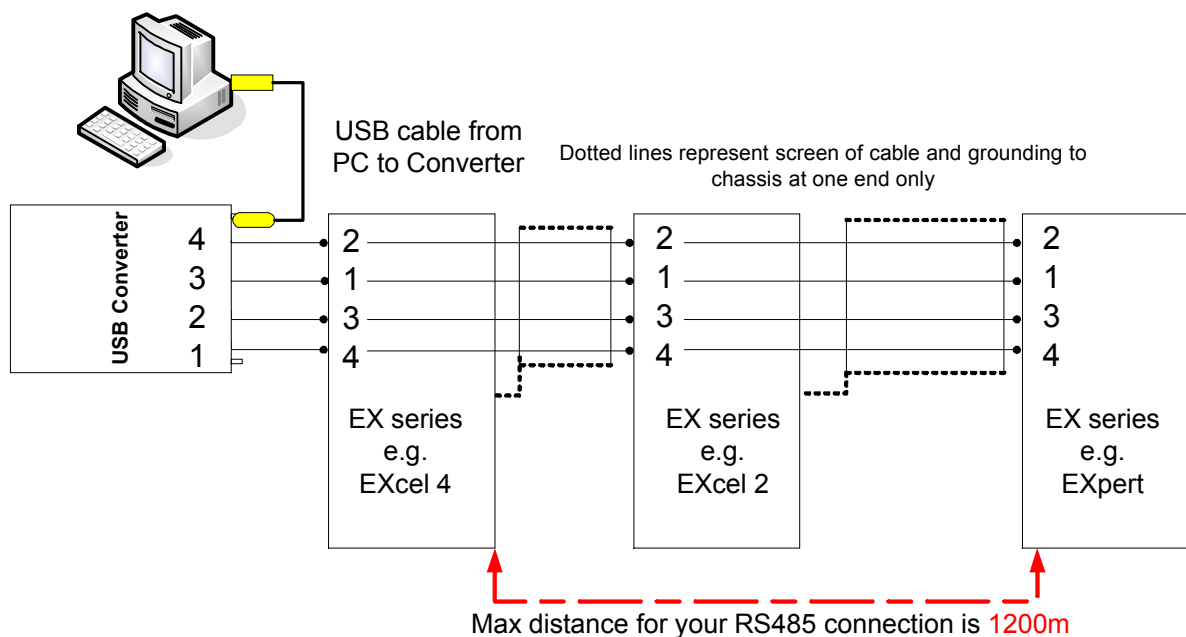


Figure 4 Using the USB converter with 4-wire RS485

1. Open up the cabinet removing the 2 small cross screws located either side of the converter and set the internal jumpers for the correct termination settings, as follows:

Jumper	J 1 -2	J 3-4	J 5-6	J 7-8	J 9-10	J 11-12	J 13-14
LINK	ON	ON	ON	ON	ON	ON	OFF

2. Refit the cover.
3. Set the rear external row of 4 dip switches to

SW1	SW2	SW3	SW4
ON	OFF	ON	ON

4. Connect to the EX series ACU's as shown in Table 1.

Table 1 RS485-4-wire connections to EX series ACU units

USB Converter terminal	RS485 4 WIRE To terminals on Expert, EXcel	Continuation of daisy chain to terminals on any other EX series controllers	Terminals on S series S2/S4
1	4	4	57
2	3	3	56
3	1	1	60
4	2	2	59
5	Not used		
6	Not used		

3.2 RS485 2 wire

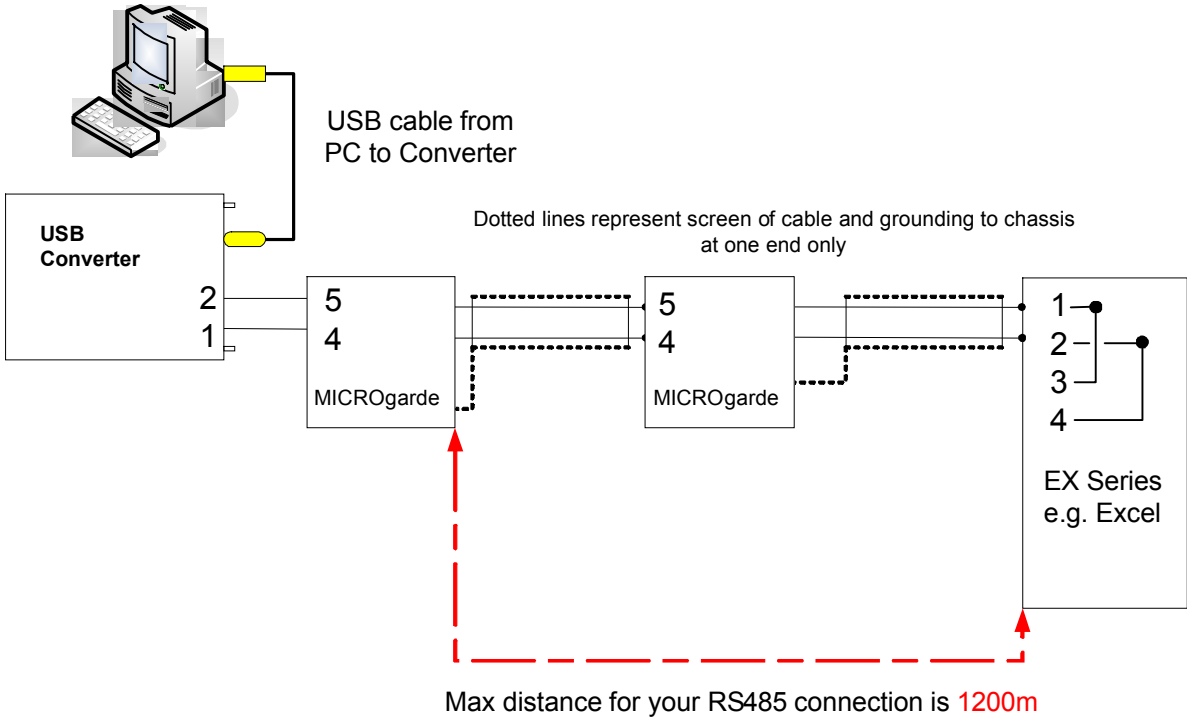


Figure 5 Using the USB converter with 2-wire RS485

By default, the USB converter comes with all internal jumpers set to OFF, the best configuration for RS485 2 wire, so you do not need to open the USB cabinet.

For TERMINATION for RS485 2 wire:

1. Put the 2 dip switches that are situated on the PCB of the **FIRST** MICROgarde in the communications line for termination.
2. If you are **ONLY** using EX series controllers then use a 120 ohm resistor at the beginning of the RS485 line and another at the end, across the data+ and data – (terminal pins 1 and 2).
3. Set the rear external row of 4 dip switches to:

SW1	SW2	SW3	SW4
ON	OFF	OFF	OFF

4. Connect to the EX series ACU's as shown in Table 2.

Table 2 RS485 2-wire connections to ACU units

USB Converter terminal	RS485 2 WIRE to MG terminal	Continuation of daisy chain to terminals on MG series controllers	Continuation of daisy chain to terminals on EXpert or Excel series controllers
1	4	4	2
2	5	5	1
3	Not used	Not used	3 link to 1
4	Not used	Not used	4 link to 2
5	Not used	Not used	
6	Not used	Not used	

4. Use with DIGIgarde Units

You can use the Protocol Converter to connect a PC to DIGIgarde units. The converter can accept connections by:

- RS485, 4-wire
- RS485, 2-wire
- RS232 (using the 9-pin terminal block)



NOTE. We do **NOT** recommend the use of CAT 5 cable. However, if you do use CAT5 cable you may be able to avoid problems by using both wires in a twisted pair to double up each signal wire.

4.1 Using RS485 4-wire

1. Open up the cabinet removing the 2 small cross screws located either side of the converter.
2. Set the internal jumpers for the correct termination settings, as follows:

Jumper	J 1-2	J 3-4	J 5-6	J 7-8	J 9-10	J 11-12	J 13-14
LINK	OFF	ON	ON	ON	ON	ON	OFF

3. Refit the cover.
4. Set the rear external row of 4 dip switches to

SW1	SW2	SW3	SW4
ON	OFF	ON	ON

5. Connect to the DIGIgardes as shown in Table 3:

Table 3 RS485 4-wire connections to DIGIgarde units

Converter terminal	RS485 4-WIRE DIGIgardes	RS485 4-WIRE DIGIgarde Smart, DIGIgarde PLUS
1 TX- (A)	Purple RX-	RS485 RxB
2 TX+ (B)	Orange RX+	RS485 RxA
3 RX+(B)	Cyan TX+	RS485 TxA
4 RX- (A)	Pink TX-	RS485 TxB
5	Not used	Not Used
6	Not used	Not Used

4.2 Using RS485 2-wire



NOTES. For DIGIgardes using RS485 2-wire connections there are limitations on distance and the number of readers. The following instructions are for guidance only. Maximum operating distances may vary as they are dependent on the cable type and number of readers.

It is important to terminate the line correctly and balance the line.

We do **NOT** recommend CAT 5, 6 & 7 cables.

1. Ensure the Internal Jumpers of the USB converter are in the default OFF position.
2. In the event of poor communications install Termination Resistors.
TWO 120 ohm Resistors are required for termination one at each END of LINE across data + and data- : So wire across Data + and Data – at the Converter across terminal PIN 1 and PIN 2, and the second resistor across the END of the Communication LINE.
3. Set the rear external row of 4 dip switches for Half Duplex 2-wire without Echo:

SW1	SW2	SW3	SW4
ON	OFF	OFF	OFF

4. Connect to the DIGIgardes as shown in Table 4:

Table 4 RS485 2-wire connections to DIGIgarde units

Converter terminal	RS485 2 WIRE DIGIgarde	RS485 2 WIRE DIGIgarde Smart & DIGIgarde PLUS
1 Data – (A)	Purple (RX-) and Pink (TX-) twist together	RS485 RxB (connect RS485 RxB and RS485 TxB together)
2 Data + (B)	Cyan (TX+), Orange (RX+) twist together	RS485 RxA (connect RS485 RxA and RS485 TxA together)
3	Not used	Not used
4	Not used	Not used
5	Not used	Not used
6	Not used	Not used

4.3 Using RS232 from the Terminal Block

By default, the USB converter comes with all internal jumpers set to OFF, the best configuration for RS232, so you do not need to open the USB cabinet to alter the jumper settings.

1. Set the rear external row of 4 dip switches for RS232 mode:

SW1	SW2	SW3	SW4
OFF	ON	ON	ON

2. Connect to the DIGIgardes as shown in Table 5:

Table 5 RS232 connections to DIGIgarde units

Converter terminal	RS232 to DIGIgardes coloured wiring	RS232 to DIGIgarde Smart & DIGIgarde PLUS
1		
2 RX	Green (TX)	RS232 Tx
3 TX	Brown (RX)	RS232 Rx
4		
5		
6 GROUND	GREY (Ground)	RS232 0V

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