## Introduction

RS-485 is a 3 wire interface consisting of a ground and a shielded twisted pair that is used to transmit data. This application note shows the keypad wiring when using the RGO-7747 controller.

NOTE: It is important that the proper cable is used (such as Belden 8103). When shielded cable is used then it is very important that ONLY ONE END of the shield (drain) is grounded! Otherwise a ground loop will be created resulting in noise and possible data corruption. The other shield should simply be cut at the same place the jacket is cut and not electrically connected to anything. It is recommended to use heat shrink over the shield on the non-connected end.

At the RGO the connections should be made as follows:
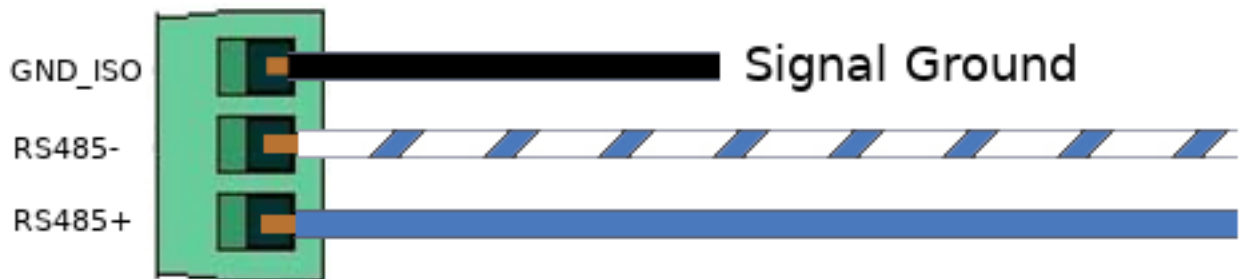
There is no need to install a terminating resistor at the RGO. If the RGO is the terminal connection then a built-in terminating resistor (120Ω) can be enabled in software.

The signal ground should be electrically the same ground as the power supply of the keypad as well as the shield of the RS-485 cable.

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At the keypad side the wiring should be as follows:
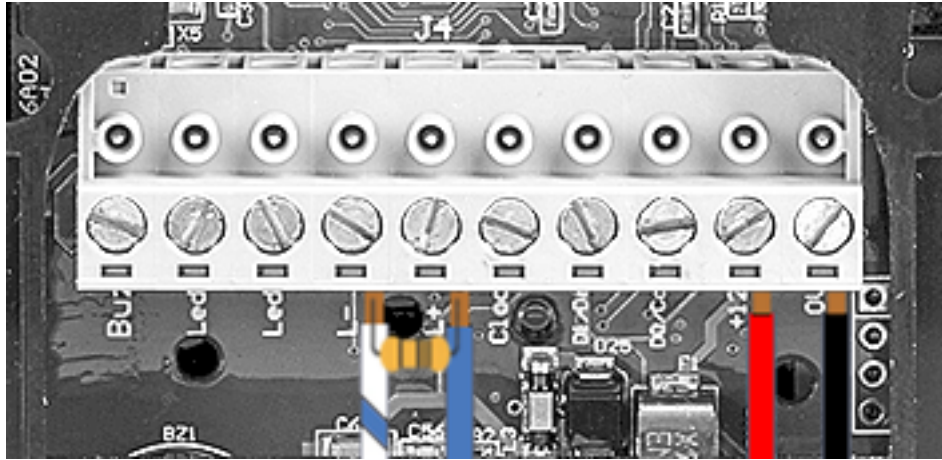
It is important to note that a terminator resistor (typically 120Ω) should be installed in parallel across the data leads of the keypad (L- and L+) if this is connection terminates the network. This terminator resistor should be as close to the terminal block as possible. If possible the terminating resistor should be protected by heat shrink.

NOTE: The polarity of the L+ and L- terminals is important. L+ must go to the RS485+ signal on the RGO-7747 and L- must go to RS485- on the RGO-7747 side.

In extremely (electrically) noisy environments it may be necessary to bias the RS-485 network to avoid data corruption. This biasing can be either done externally or enabled via software on the RGO-7747.

IMPORTANT: Consider that if the power supply is distant from the keypad there will be a voltage drop across the cable powering the keypad. If necessary use a voltage drop calculator to ensure the correct wire gauge is used. It is recommended to budget 0.35A for the current draw of the keypad.

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