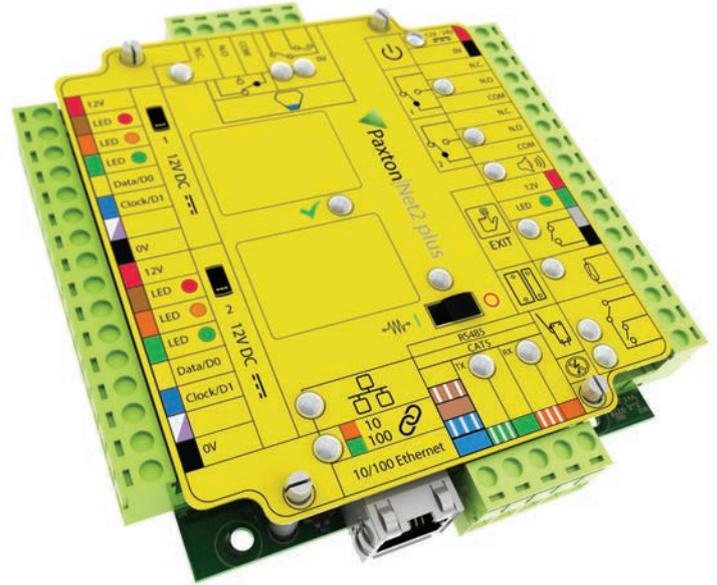# Installing the Net2 RS485 data line

Data line connection

The most common cause of problems, with Net2 installations, is incorrect wiring of the data line. It is extremely important that the following simple rules are followed for each controller on the line and that the line is terminated correctly.

✓ The cable used must be a suitable twisted pair cable; we recommend only CAT5 or CR8723. The cable must be dedicated to Net2; spare cores must not be used for other purposes.

✓ The data line must loop in and out of each controller using the same coloured cores for each unit. CAT5 colour codes are shown on the controller's wiring label. The controllers must be installed in one continuous daisy chain.

✓ Any spare cores and the cable screen must be connected to the network screen terminal. This provides a common 0V reference for all of the controllers on the data line.

✓ Termination resistors (120 ohm) must be linked across both data pairs at the beginning AND end of the data line. This can be done on many units with a switch or jumpers. If not, free resistors are provided with the data converter. If the converter is located at a point along the data line, termination will only be required in the two ACU's at each end of the line.

The 1 km rule

The total length of the data line between termination resistors should not exceed 1 km. If a data run of a greater length is required, an RS485 repeater must be used to break up the data line into two or more sections. Each section of data line is treated an individual data line with a 1 km maximum and termination resistors for each section. Please refer to: AN1087 - How to create multiple data lines and side spurs with a repeater. < http://paxton.info/876 >

Checking the data line

Once connected it is important to check the data line carefully.

Note: any RS485 Converter or ACU connected via TCP/IP needs to be powered down during a data line resistance check. Failing to do this will give false readings. This would normally indicate 0Ohms on the orange pair.

Data line resistance

First disconnect the data cable from the converter (RS232 or TCP/IP).

Using a Multimeter measure the resistance across the White/Green and Green pair at one end of the network. A resistance of between 60 and 80 ohms is normal.

Repeat the test for the White/Orange and Orange pair.

Screen shorts

At one end of the network check the resistance between the screen and one of the data wires. The resistance should be high. This means that the screen is not shorted with this core anywhere along its length.

Screen continuity

At one end of the network, connect the screen to the White/Green wire.

At the other end of the network, use a Multimeter to check that the screen and the White/Green terminal are continuous. If the screens are not continuous then the cable and connections should be checked.

Repeat this test for the other three data wires. If the measured resistance is low then the cable and connections should be checked.