ALPHA ESS TECHNICAL NOTICE

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Relevant to Models	All Models

DO NOT USE SCOTCHLOKS - USE WAGO TERMINALS

In the event that the CT cables provided are not long enough, or if extending or joining a data cable, ensure that any additional cables are:

a) Reliably connected with low resistance.
b) Appropriately sized to reduce the impedance over long runs

CT Cables, for example, can be extended by cutting the CT wires and running multi-core cable (multiple-core, shielded, twisted pair cable is recommended) for the length of the extension required. Re-connect the cut ends of the CT wires to the extension cable using *reliable* connectors and always be sure that CT or data cables do not run next to AC cables, which can distort the signal.

Lever-type connectors of the appropriate size are good examples of reliable connectors, as are screw connectors. Never use push-in glue capsule connectors such as Scotchloks as these often cause problems with unreliable connections, particularly over longer periods in environments that get hot. On paper, the datasheets of Scotchloks show that they should perform without issue, but time and time again these have been the point of failure for CT extensions and for data cable extensions (eg the RS485 comms cables)

Examples of approved and non-approved connectors for CT extensions and RS485 cable joiners can be seen in Figure 1. It is always best to use a **Ferrule** before connecting very thin gauge wire into any terminal blocks/ connectors.

Figure 1 - Approved and Non-Approved CT Extension example connectors

THE EFFECTS OF USING POOR CONNECTION

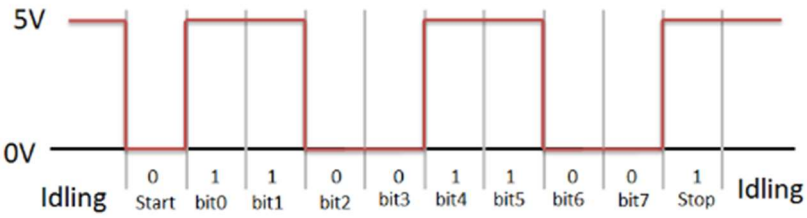

Figure 2 – RS485 Voltage levels

A meter (ACR10R/DTSU666) transmits data as 1's or 0's. In RS485 communications, this is achieved by sending a signal with a 5V DC differential. This results in a relatively moderate amount of data transfer but is really, really reliable. 5V represents a "1" and 0 V represents a "0". Thus, the change between 5V and 0V sends a data stream of ones and zeros to be interpreted by the receiver. (See figure 2)

Poor connections cause high resistance, which results in voltage drop across that connection. When the voltage drops across the connection, you don't get the full 5V

transmitting through to the receiver. Readings will have a lower magnitude so instead of seeing a 5V reading this may come across to the meter as a 2Volt or 3Volt reading. This will mean the meter will have trouble differentiating between a 1 and a 0, leading to inaccurate readings.

However, by using good quality connections we can reduce the amount of voltage drop, maintaining a cleaner data signal.

On a CT, high resistance joints are even worse. Changing the resistance of the CT circuit will lead to an error in the Power calculation for that CT. In other words, you will get a value in the meter, but it will be wrong. 2500W of Solar may be calculated at 2300W simply because of a bad connection or a long extension using Cat6 cable instead of upgrading to a .75mm wire for the extension. Resistance is the enemy of accurate data.