

## Sungrow clarification on the use of RS-485 cables on Sungrow equipment

### **Disclaimer**

*The material in this document has been prepared by Sungrow Australia Group Pty. Ltd. ABN 76 168 258 679 and is intended as a guideline to assist solar installers for troubleshooting. It is not a statement or advice on any of the Electrical or Solar Industry standards or guidelines. Please observe all OH&S regulations when working on Sungrow equipment.*

### **Overview:**

Sungrow uses RS485 protocol to communicate between devices in the Sungrow system.

The RS485 protocol for data transmission is a serial, balanced communication system between two or more devices, and can communicate up to a distance of up to 1200m, providing the correct cable is used.

For RS485 communication to work effectively, the correct RS485 specification cable must always be used.

Non-RS485 specification cables i.e. Cat6 may produce mixed results.

### **RS485 cable specification:**

Shielded twisted pair.

Depending on the length of cable run, the following conductor sizes should be used:

Up to 300m: 22 - 20 AWG

Up to 1200m: 20 – 16 AWG

Impedance: 100 – 130 Ohm

Capacitance between conductors: < 100 pF/m

Capacitance between conductor and shield < 200 pF/m

120 Ohm Terminator – A 120 Ohm termination resistor may be connected across the A and B wiring if necessary.

***Twisted pair:***

The pair MUST always be twisted as this reduces losses, balances data signal across the pair, and helps shield from EM interference.

***Shielding:***

Although not always necessary as the twisted pair provides some shielding, it is however recommended, especially over longer cable runs (see below), or where there may be RF or EM interference.

***Rated voltage:***

The RS485 cable must be rated to at least the same voltage as the enclosure it is installed in (Refer AS/NZS3000)

***Conduits/Ducting:***

The RS485 cable cannot be installed in the same conduit/duct as power cables (Refer AS/NZS3000)

***Terminations:***

All Sungrow RS485 cables should be correctly terminated with the appropriate bootlace ferrule or RJ45 where required.

***Cable length consideration:***

For short cable lengths (up to 10m), unshielded twisted pair cable over 22 AWG can be used. However, if there are any reasons where there could be EM interference etc, then shielded cable should be used.

For cable runs over 10m, please follow the above RS485 cable specification.

Where the installer uses the RS485 cables provided by Sungrow, or uses cable compliant with the RS485 specification, and the cable has been installed correctly and is not damaged, Sungrow will accept responsibility for data communication in the Sungrow equipment.

**Where other cables are used:**

It is entirely possible that 'Non-specification' data cables (i.e. Cat 6, flex etc) can be used and may work effectively, but Sungrow cannot guarantee the performance or correct operation of their equipment in these cases.

Where other cables are used, Sungrow cannot accept responsibility for data transmission/losses along those cables, and installers use this cable at their own risk.

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**An analogy to help illustrate the difference:**

*When the TV industry moved from analogue to digital, the antenna required a higher standard of Co-ax cable because the data resolution was much higher.*

*The old standard was RG-58 which was suitable for analogue signals.*

*However, as HD TV requires a higher quality signal, RG-6 or RG-11 Coaxial cable needs to be used, otherwise the signal quality will suffer, and pixelation/dropouts are likely to occur.*

*In other words, the incorrect cable will cause data transmission problems.*

*In the same way, using incorrect cable for on an RS485 system will suffer the same degradation of signal, and can result in communication issues.*

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**RS485 Cable manufacturer reference:**

There are a number of RS485 cable manufacturers who all have technical specification on their cable. For further information, please visit some of the web sites:

Belden Cable: [RS-485 Cable \(belden.com\)](http://belden.com)

Maxim Integrated: [RS-485 Cable Specification Guide | Maxim Integrated](#)

Lapp Cables: [serial-rs485-cable - LAPP Australia](#)

Further RS485 information here: <https://en.wikipedia.org/wiki/RS-485>

The RS485 cable supplied by Sungrow is 20 AWG unshielded twisted pair, and is rated at 300V

*\* Please always adhere to Australian standards and guidelines for cable installation.*



If the issue persists after following above procedures, please take photos testing on site and contact Sungrow Service Department on 1800 786 476 or email to [service@sungrowpower.com.au](mailto:service@sungrowpower.com.au), Monday- Friday 9am - 5pm (AEDT).