

PC-OPTO-1 Install / wiring guide

The NMEA signals

The NMEA 0183 system v2.0 and later uses a "differential" signalling scheme, whereby two wires are used to transmit the NMEA data. These connections will be labelled as either NMEA "A" and "B" or NMEA "+" and "-" respectively, depending on the instrument and manufacturer.

When connecting between different manufacturers, there can be some confusion, but it is simple and easy to remember: NMEA "A" connects to NMEA "+" and NMEA "B" connects to NMEA "-".

The different NMEA standards

The NMEA 0183 specification has slowly evolved over the years, so connecting one device to another is not always a straightforward matter. The earlier versions of NMEA 0183 (before v2.0, as detailed above), used slightly different connection methods and signal levels: the instruments had just one "NMEA" data line ('Tx' or 'Out'), and used the ground as the other line - similar to the way a computer serial port works. This connection method is referred to as "single ended" instead of the "differential" method used by NMEA 0183 v2.0 devices.

The data format is largely the same between both systems, with v2.0 adding some extra sentence strings, and removing older (redundant) sentence strings from the specification. The situation is further complicated, as many manufacturers still use the old ("single ended") method of connection because it is much cheaper to implement.

So how can a newer type NMEA device be connected to an older type device?

Care is needed – it is possible to damage or overload the output of a newer differential device if it is incorrectly connected to an older device. This is because the older devices used ground as the return, whereas the newer devices actually drive the NMEA "-/B" line between 5v and 0v.

Thus, connecting this output to ground will result in high currents being drawn by the driver instrument, resulting in potential overheating and damage to the driver circuits.

To connect a new type differential device to an old type single-ended system, connect the NMEA "+/A" output from the differential driver to the single-ended NMEA "Rx" or "In" input of the device. Leave the NMEA "-/B" output floating. Connect the ground line of the differential output device to the ground of the single-ended device. This provides the required data signal return current path.

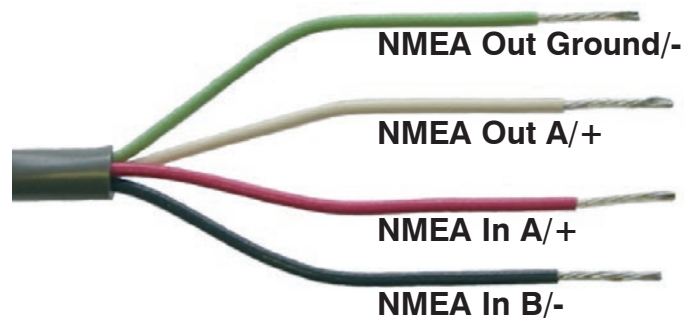
If not using the OPTO-1 with a PC standard 9-pin D-type serial port

As the OPTO-1 cable derives its power supply from the PC serial port, an alternative power supply must be connected thus: Ground to pin 5, and +ve Power to pin 7. If a negative power supply is also available, connect this -ve Power to pin 4.

The negative power supply should not be vital to the cable's operation, if no such supply is available. However, it should be noted that the maximum length of cable the OPTO-1 can successfully drive is greatly reduced as a result.

Wiring diagram

All connections below are as seen from the PC's point of view (e.g. 'NMEA in' means NMEA data into the PC, and 'NMEA out' means NMEA data out of the PC).



Active Research Limited
Unit 5, Wessex Trade Centre
Ringwood Road, Poole
Dorset UK BH12 3PF

t: +44 (0)1202 746682
f: +44 (0)1202 746683
e: sales@actisense.com
www.actisense.com

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