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Issue 2.00

Serial Opto Isolator

OPTO-4

Quick Start Guide

Actisense
Award Winning NMEA Specialists

Important Notices

The device to which this manual relates complies with the Electromagnetic Compatibility requirements according to EN60945. The unit should always be used in conjunction with appropriately approved, shielded cable and connectors as per NMEA 0400 to ensure compliance. A declaration of conformity is available for download at www.actisense.com.

If the device to which this manual relates is to be installed within five metres of a compass, please refer to the 'Compass Safe Distance' section in the 'Technical Specifications' table.

Fair Use Statement

Product Registration

Please register your product via the online form at:
http://www.actisense.com/product-registration/

Your product package includes a unit serial number. The serial number is six digits long and can be found below the barcode on the label. Your registration will assist Actisense Support to link your product to your details, simplifying any future assistance you may require.

Product Disposal

Please dispose of this product in accordance with the WEEE Directive.
The product should be taken to a registered establishment for the disposal of electronic equipment.

Technical Accuracy

To the best of our knowledge the information contained in this document was correct at the time it was produced. Active Research Ltd cannot accept liability for any inaccuracies or omissions.

The products described in this manual and the specifications thereof may be changed without prior notice. Active Research Ltd cannot accept any liability for differences between the product and this document. To check for updated information and specifications please check actisense.com.

Active Research Ltd will not be liable for infringement of copyright, industrial property rights, or other rights of a third party caused by the use of information or drawings described in this manual.

Product Guarantee

This product comes with a three year 'return to base' guarantee. If you suspect that the unit is faulty please refer to the Troubleshooting Section of the User Manual before contacting support.

It is a requirement of the guarantee that all installations of electronic equipment follow the NMEA 0400 specification. Any connection to a battery or power supply must meet the mandatory essential safety requirements that may be imposed by local regulatory agencies.

Introduction & Features

The Actisense EMU-1 is a specialised analogue to NMEA 2000 Gateway which converts data from analogue engine gauges/ senders into NMEA 2000 data. Please refer to the FAQs for gauge/sender compatibility details.
The EMU-1 can monitor vital engine parameters such as temperature, pressure RPM and fluid levels from up to two engines.

The EMU-1 has a PC based configuration tool that allows the settings inside the EMU-1 to be changed to best suit the engine it is working with, making it a flexible solution for many engine makes and models. An Actisense PC to NMEA 2000 Gateway (NGT-1) is required to configure the EMU-1.

Installation Guide

This guide provides the most important information for the OPTO-4 and its installation.

Actisense recommends users visit the OPTO-4 product page, www.actisense.com/OPTO-4 for the latest user manual, software and resources.

Overview

The NMEA 0183 specification from version 2.0 onwards requires an RS422 style “differential” connection. The input of a Listener should be electrically isolated to protect equipment and wiring against the risk of ground loop damage which is common in a marine environment. On a standard PC the RS232 input is not isolated and is not differential. The OPTO-4 allows a differential NMEA 0183 device to correctly connect to a PC and provide electrical isolation between them.

Powering the OPTO-4

The OPTO-4 takes power from the RS232 TX line and the handshaking lines RTS and DTR. In most installations especially when connecting to a PC, no external power supply is required.

In systems that cannot provide power on the handshaking lines, a DC power supply can be used instead. In this instance use a male 9-pin D-type connector to connect to the OPTO-4 pins.
For the majority of installations that require external power, only positive power is needed.
- Connect positive power (9V to 15V) to pin 7
- Connect the power ground to pin 5
- Connect the power ground to pin 4

For some installations both positive and negative supplies may be required.
- Connect positive power (9V to 15V) to pin 7
- Connect the power ground to pin 5
- Connect negative power (9V to 15V) to pin 4

Note that connecting an external power supply may create a ground loop between the RS232 device and the power supply. Ensure that the supply ground is at the same potential as the RS232 device ground before connecting.

Connecting to a PC

The OPTO-4 has a female 9-pin D-type connector for connecting to a standard RS232 PC serial port, by simply plugging the OPTO-4 into the serial port of the PC.
Connecting a Talker to the PC
For NMEA 0183 version 2.0 or later:
- Connect the OPTO-4 Red wire to the NMEA 0183 Talker A/+.
- Connect the OPTO-4 Black wire to the NMEA 0183 Talker B/-.

For RS422 or RS485 type devices that are not specifically NMEA 0183, connect as above.

For RS232 devices, whether NMEA 0183 or not:
- Connect the OPTO-4 Red wire to the Talker RS232 Tx or +ve data.
- Connect the OPTO-4 Black wire to the Talker ground.

Connecting a Listener to the PC

For NMEA 0183 version 2.0 or later (Listener must have an isolated input):
- Connect the OPTO-4 White wire to the Listener A/+.
- Connect the OPTO-4 Blue wire to the Listener B/-.

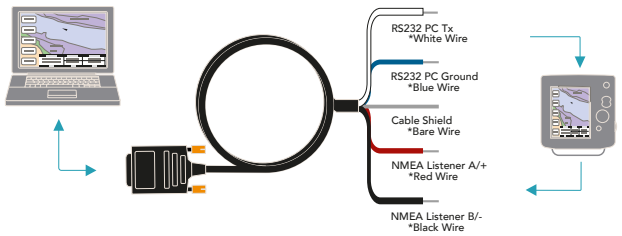
Listeners that use ground for the –ve data line, such as RS232 or older NMEA 0183 V1 devices, the OPTO-4 may not be suitable. There is no isolation between the RS232 port and the Blue wire.
Connecting the Blue wire to the ground of the Listener will be connecting it to the ground of the PC. Connecting the OPTO-4 Blue and Black wires together will negate the OPTO-4 isolation.

Connecting to an RS232 Port (non PC)

The connections and power options are the same when connecting to a standard RS232, 9-pin D-type connector. Refer to the sections regarding
connecting to a PC.

Connecting a Serial to USB Converter Cable
Connecting to a USB to Serial converter cable is the same as connecting to a standard RS232 PC serial port. See section ‘Connectiong to a PC’ replacing all instances of PC with the converter cable. Note that not all converter cables will provide power on the handshaking lines, see ‘Powering the OPTO-4’.

Connection Diagram



DB9 Pin Out Table

DB9 Pin Number	Function
Pin 1	No Connection
Pin 2	PC Rx / OPTO-4 Tx
Pin 3	PC Tx / OPTO-4 Rx
Pin 4	PC DTR / OPTO-4 Power
Pin 5	GND
Pin 6	No Connection
Pin 7	PC RTS / OPTO-4 Power
Pin 8	No Connection

NMEA 0183 Wiring Diagram

OPTO-4 Wire Colour	Function (connects to)
Red	OPTO-4 Listener Rx A/+ (Talker Tx A/+ or Data)
Black	OPTO-4 Listener Rx B/- (Talker Tx B/- or Ground)
Bare	Shield
White	OPTO-4 Talker Tx A/+ (Listener Rx A/+ or Data)
Blue	OPTO-4 Talker Tx B/- (Listener Rx B/-)