

# Actisense<sup>®</sup>

Award Winning NMEA Specialists



Product Catalogue

[www.actisense.com](http://www.actisense.com)

# Welcome

Actisense® aim to be the installer's product of choice by making navigation safer with the most reliable boat electronic systems.

Our range of products are developed to industry standards and to a high level of quality and technical sophistication.

With our excellent Customer and Technical Support, we offer the products and service you'd expect from an industry leading brand.

We take great pride in our intelligent design and exacting manufacturing standards, ensuring the products we develop are the products you want and need.



Our in-house Research and Development Team have created a range of innovative, intelligent products that meet and exceed the NMEA standards.

We also have a highly skilled and qualified Technical Support Team on hand to ensure the best possible all round service during and after the purchase of your Actisense product.

Our collaborations with other leading manufacturers and participation on NMEA committees means we are well placed to lead the industry with our advanced product designs.

Phil Whitehurst, C.E.O

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# NMEA 0183 Range

You can be assured our NMEA 0183 product range is built to last. Our robust, high quality, intelligent designs surpass the NMEA 0183 specifications.

Actisense NMEA interfaces enable users to get the most out of their instruments and on-board PCs.

All of our NMEA 0183 products use our OPTO-isolation technology to protect both the NMEA 'Talker' device and the Actisense product from ground loops and power spikes. They also feature high quality screw connectors to make wiring up quick and simple.

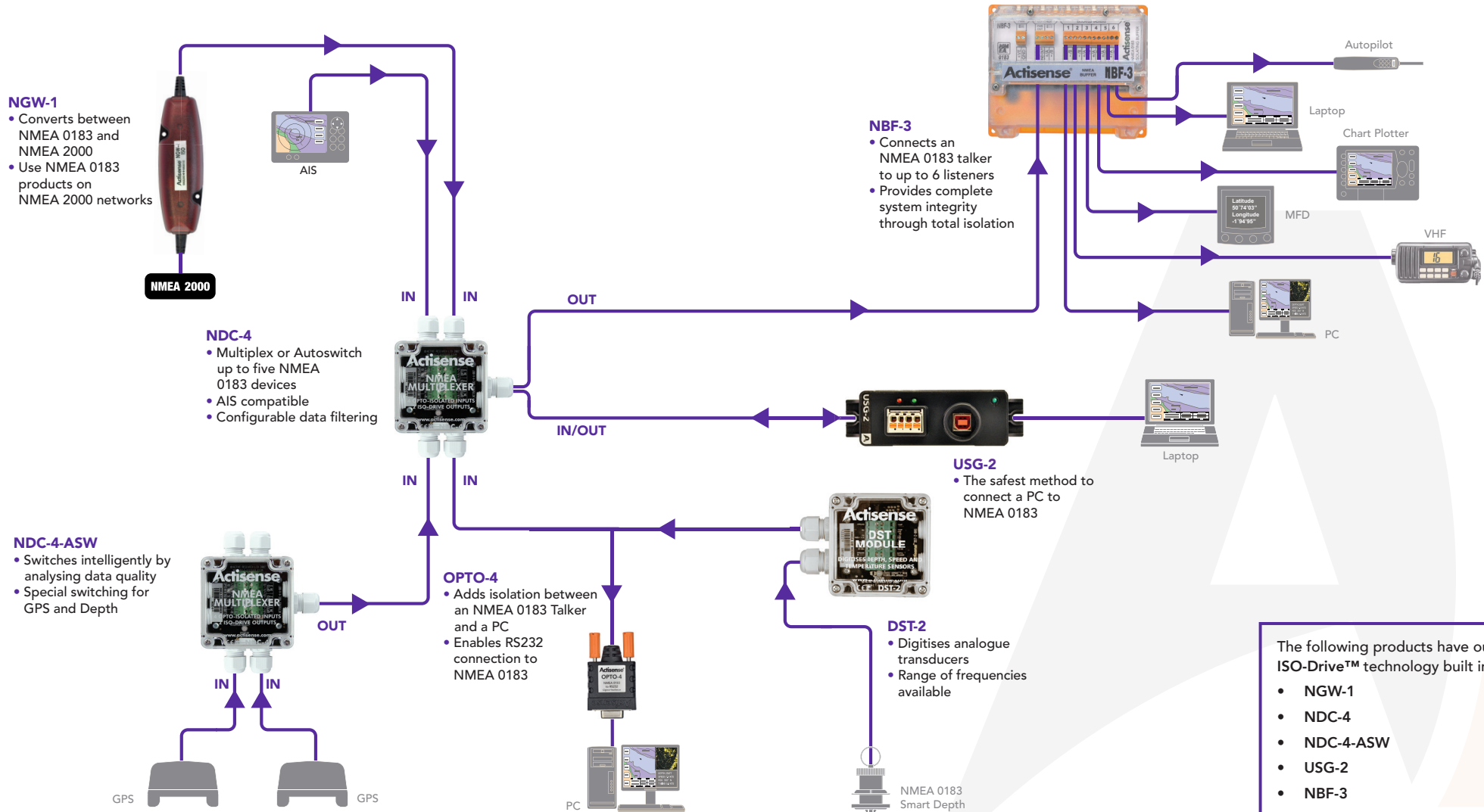
## What is NMEA 0183?

NMEA 0183 is the original protocol for sharing data between marine electronic products and forms the foundation for defining electrical signalling, data protocol and sentence formats in the Marine Industry, making it possible to create a data bus to share information between devices from different manufacturers. Devices on the data bus are either 'Talkers', 'Listeners' or both and most operate at the default rate of 4800 baud.



# Actisense® NMEA 0183 Network Diagram

## Build your NMEA 0183 network with Actisense products



The following products have our ISO-Drive™ technology built in:

- NGW-1
- NDC-4
- NDC-4-ASW
- USG-2
- NBF-3

# NDC-4 NMEA Multiplexer

Part Numbers: NDC-4  
NDC-4-USB  
NDC-4-ASW  
NDC-4-AIS  
NDC-4-AIS-USB

Flexible multiplexing, with preconfigured versions for Autoswitching or AIS operation.

The NDC-4 provides complete access to all NMEA 0183 data sources, configurable filters to remove unwanted data, as well as enabling an on-board PC to read and add to the combined data stream.

The NDC-4 and NDC-4-USB allow up to five OPTO-isolated NMEA 0183 sources to be multiplexed into a single stream\*.

Separate ISO-Drive™ outputs allow two different downstream Talker baud rates to be created.

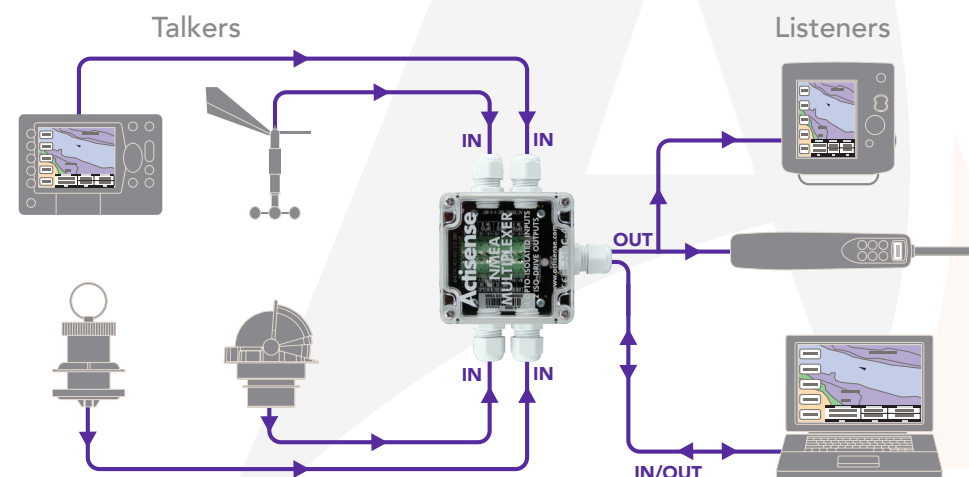
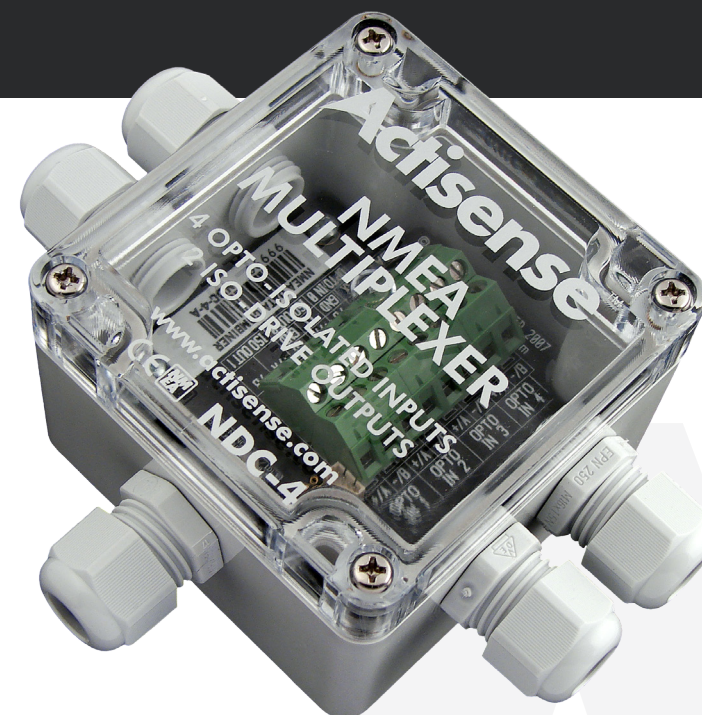
Factory pre-configured versions enable the NDC-4 to be used out of the box for AIS operation (NDC-4-AIS) or as an Autoswitch (NDC-4-ASW).

## Benefits

- Combine up to five NMEA 0183 data sources into one stream
- Filter unwanted data
- Change data to a different baud rate
- Preconfigured versions for AIS and Autoswitch operation
- Connect to a PC with optional USB Kit.

## Features

- Five OPTO-isolated inputs
- Two ISO-Drive™ outputs
- Intelligent multiplexing software
- Flexible NMEA filtering
- Configurable baud rates and port priorities
- PC configuration software
- AIS compatible
- Up to 115200 baud
- 1500V isolation on inputs & outputs



\*Four inputs on the USB version, as the USB interface acts as the fifth channel, overriding the fifth OPTO input.

# NBF-3 NMEA Buffer

Safely drive up to six NMEA Listeners, with power distribution for the connected Talker.

The NBF-3 NMEA Buffer isolates and buffers NMEA 0183 data, with the power to drive multiple devices.

Able to distribute up to six identical, amplified streams of data from one source. The NMEA signals are buffered to ensure that each Listener receives the data at the required voltage levels, providing consistent data quality.

Isolation on the input and outputs ensures the protection of the source Talker device and Listening devices.

ISO-Drive™ technology on the outputs and OPTO-isolation on the input enables you to connect the NBF-3 with complete peace of mind.

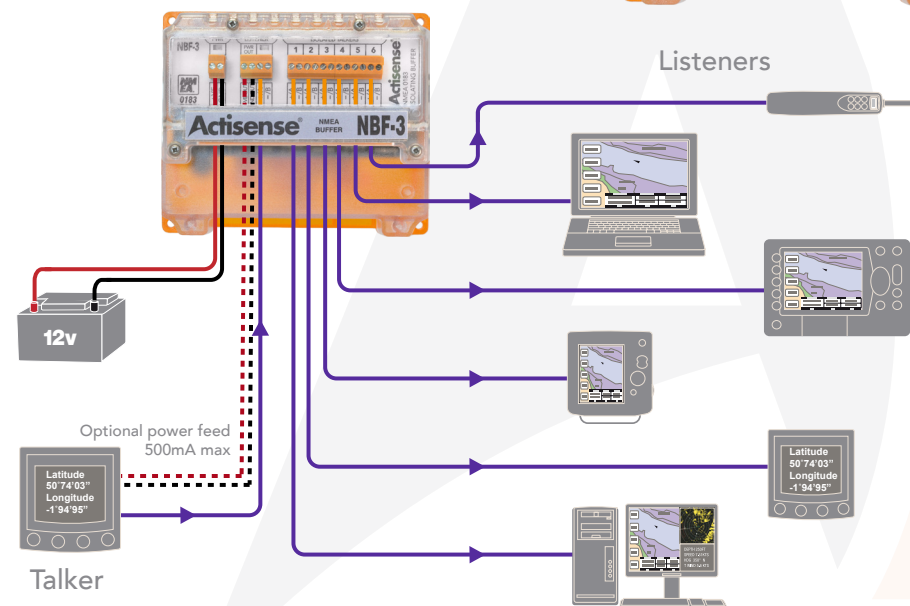
The NBF-3 has the addition of power distribution for the NMEA Talker. By having power and data from the same source, cabling requirements are reduced and installation is made simpler.

## Benefits

- AIS compatible
- Protects connected devices
- Simple installation
- Can be used to isolate between two PC systems

## Features

- One OPTO-isolated input
- Six ISO-Drive™ outputs
- Compatible with RS422, RS232 and RS485 connections
- Pluggable screw terminals
- Power and input indicator LEDs
- Power feed for single cable installations to the NMEA Talker
- DIN Rail mountable
- Up to 115200 baud
- 1500V isolation on inputs & outputs



# USG-2

## USB to Serial Gateway

The USG-2 ensures safety and reliability when connecting a PC to your NMEA 0183 network.

The USG-2 converts a USB port into a bi-directional serial port suitable for connecting to a marine standard NMEA 0183 data bus.

It provides a far safer connection when compared to standard USB to serial converters.

Electrical isolation is provided by the ISO-Drive™ output and OPTO-isolated input making installation simple and free from ground loops.

The input uses the Actisense OPTO-isolation circuitry to protect any connected equipment from the most common system faults. The input can receive very low level signals that are often too small to be received by a PC serial port.

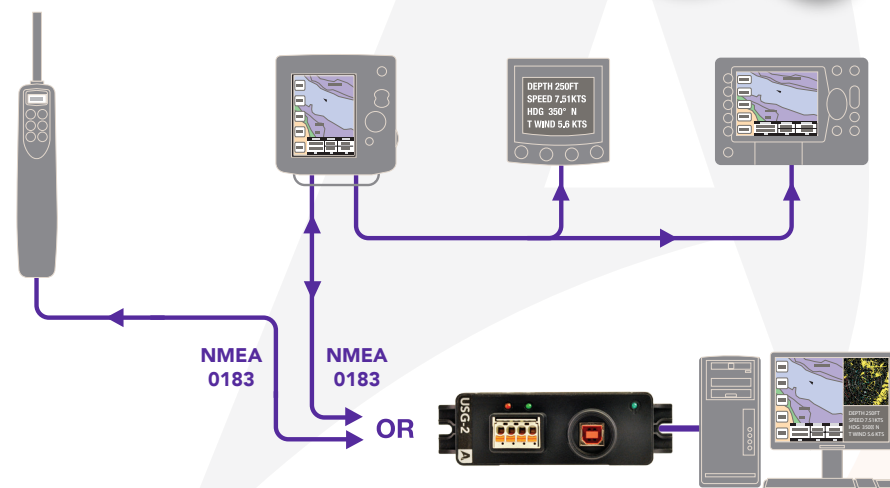
The USG-2 is the *safest* way to connect a boat's data network to an on-board PC.

### Benefits

- Inputs & outputs protected against over voltage, ESD & short circuits
- Simple installation
- Protects PC from damage
- Eliminates ground loops

### Features

- NMEA 0183, RS422 & RS232 compatible
- ISO-Drive™ technology
- Isolated input (2500V)
- Isolated output (1500V)
- Encapsulated electronics
- High retention USB socket
- Diagnostic & power LEDs
- Baud rates from 300 to 230400 bps
- Bulkhead mount, with optional DIN rail mount kit
- Pluggable screwless connector with locking latch & strain relief



# DST-2

## Active DST Module

Part Number: DST-2-150  
DST-2-170  
DST-2-200

Breathe new digital life into transducers, with digital signal processing technology.

The DST-2 digitises depth, speed and temperature transducer signals into NMEA 0183 data to deliver best-in-class seabed tracking.

It works with NMEA 0183 compatible devices, such as chart plotters, radars or an on-board PC. In addition, it can be calibrated via a PC to match various sensors and installations.

The DST-2 can be used with new or existing transducer installations. When used with an existing transducer the DST-2 can provide a secondary depth sounder as a back up to a new sonar system.

### Benefits

- Use with most NMEA 0183 displays
- Can be calibrated
- Trip data available with speed transducers
- Designed to replace outdated stand-alone echo sounders
- General survey firmware available

### Features

Range of transducer frequencies available

Flash upgradeable 'future proof' design

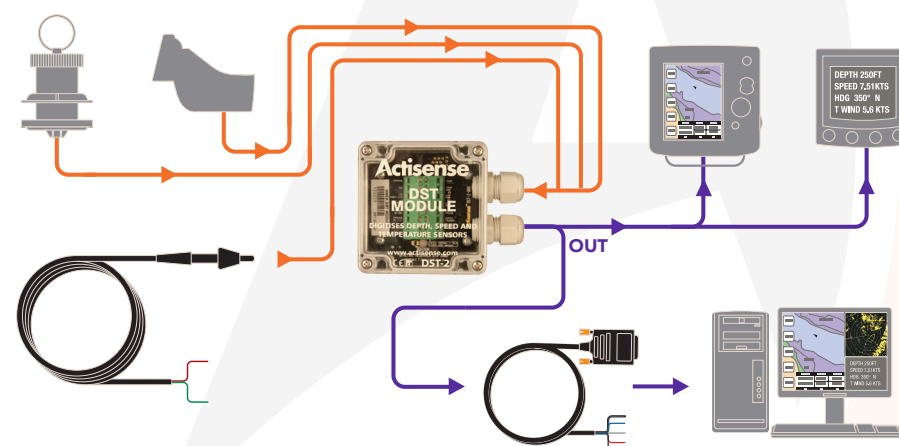
Generates the echo sounders 'ping' and analyses the returned signal

Digitises analogue signals into NMEA 0183 data



Analogue to NMEA 0183

Listeners





# OPTO-4

## NMEA to RS232 Opto-isolator

### Isolate an RS232 (PC) port to protect against ground loops.

The OPTO-4 provides a safe and low cost way of connecting an NMEA 0183 system to a PC or any other device with a standard RS232 9-pin port.

As a bi-directional NMEA 0183 to RS232 interface cable, the OPTO-4 utilises OPTO-isolation to protect the PC input and spike protection for the PC output, providing comprehensive isolation of PC hardware when connecting to an NMEA 0183 bus.

If isolation in both directions is required, the Actisense USG-2 offers bi-directional isolation in a USB to RS422 (NMEA 0183) form (see page 12).

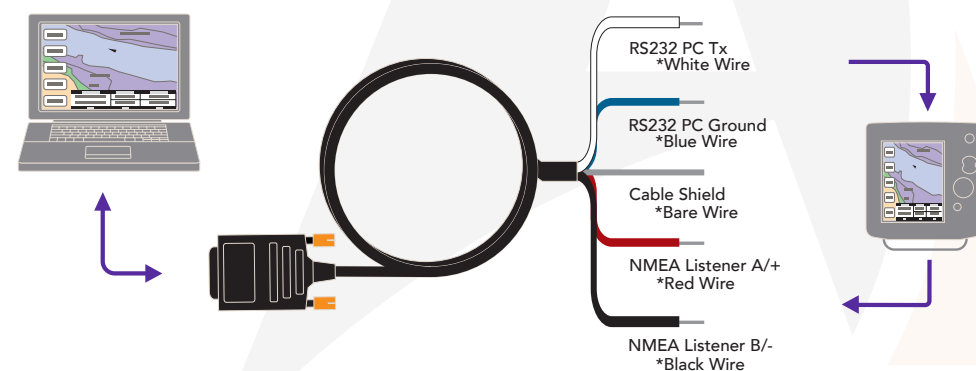
The Actisense design integrates an over-moulded case for excellent water resistance and a small footprint for installation into tight spaces.

### Benefits

- Protects PC from damage
- Water resistant cable.

### Features

- One OPTO-isolated input
- One NMEA output
- Up to 115200 baud
- Port powered
- Shielded cable and case



# Product Accessories



**PC-USB**  
USB to DB9 Female RS232 cable  
(non-isolated)



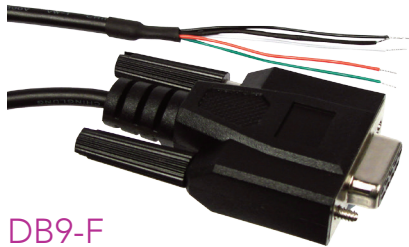
**DIN-KIT-1**  
DIN rail mounting kit for use with NBF-3  
and EMU-1.



**BLANKING PLUG-20**  
Use to replace unused cable glands on the  
NDC-4, NBF-2 and QNB-1. Sold in  
quantities of 20.



**NDC-4-USBKIT**  
USB cable to convert an NDC-4 to an  
NDC-4-USB (non-isolated)



**DB9-F**  
9 pin, D type moulded cable assembly



**DIN-KIT-2**  
DIN rail mounting kit for use with USG-2.



**A2K-COVER-20-F**  
**A2K-COVER-20-M**  
Covers for NMEA 2000 Micro connectors,  
female and male versions available



**GROMMET-5**  
Provides strain relief and splash proofing when  
using custom cables on the NGW-1 and NGT-1.

## What is OPTO-Isolation?

Ground loops are very easy to create in an NMEA 0183 environment without even knowing about it and can wreak havoc with NMEA 0183 devices. OPTO-isolation (also referred to as optical isolation) is a way of creating a physical barrier to the flow of electrical current to prevent ground loops from happening. Electrical energy is converted to light and transmitted over a small gap where it is converted back to electrical energy using an electronic circuit.

# NMEA 2000® Range

The simplicity of installing and configuring an NMEA 2000® network can reduce costs, with power and data shared on a single cable.

Actisense have been working with the NMEA to develop the NMEA 2000® standard before it was officially released. This makes Actisense a go to authority for NMEA 2000®, our products are at the heart of the standard and its continued development.

Actisense NMEA 2000® products are NMEA certified so you can relax knowing you have Actisense onboard.

We have developed a range of products to make the transition from NMEA 0183 to NMEA 2000® as smooth as possible.

Our Research and Development team have created a range of interfaces to connect directly to and diagnose an NMEA 2000® network. They have also developed the EMU-1 which is our first analogue sensor interface for NMEA 2000®.

## What is NMEA 2000®?

NMEA 2000® is the most recent standard for marine electronics and has been designed by the NMEA to solve the problems created by NMEA 0183, making for a safer and more reliable marine electronics environment that is easier to use. It has a bandwidth of 250,000 Baud, which is 50 times greater than NMEA 0183 allowing a far greater amount of data transfer.

NMEA Devices can be powered directly from the network cable, only high powered devices will require their own isolated power supply.

Devices can be plugged into the network quickly and easily using DeviceNet 'plug & play' connectivity.

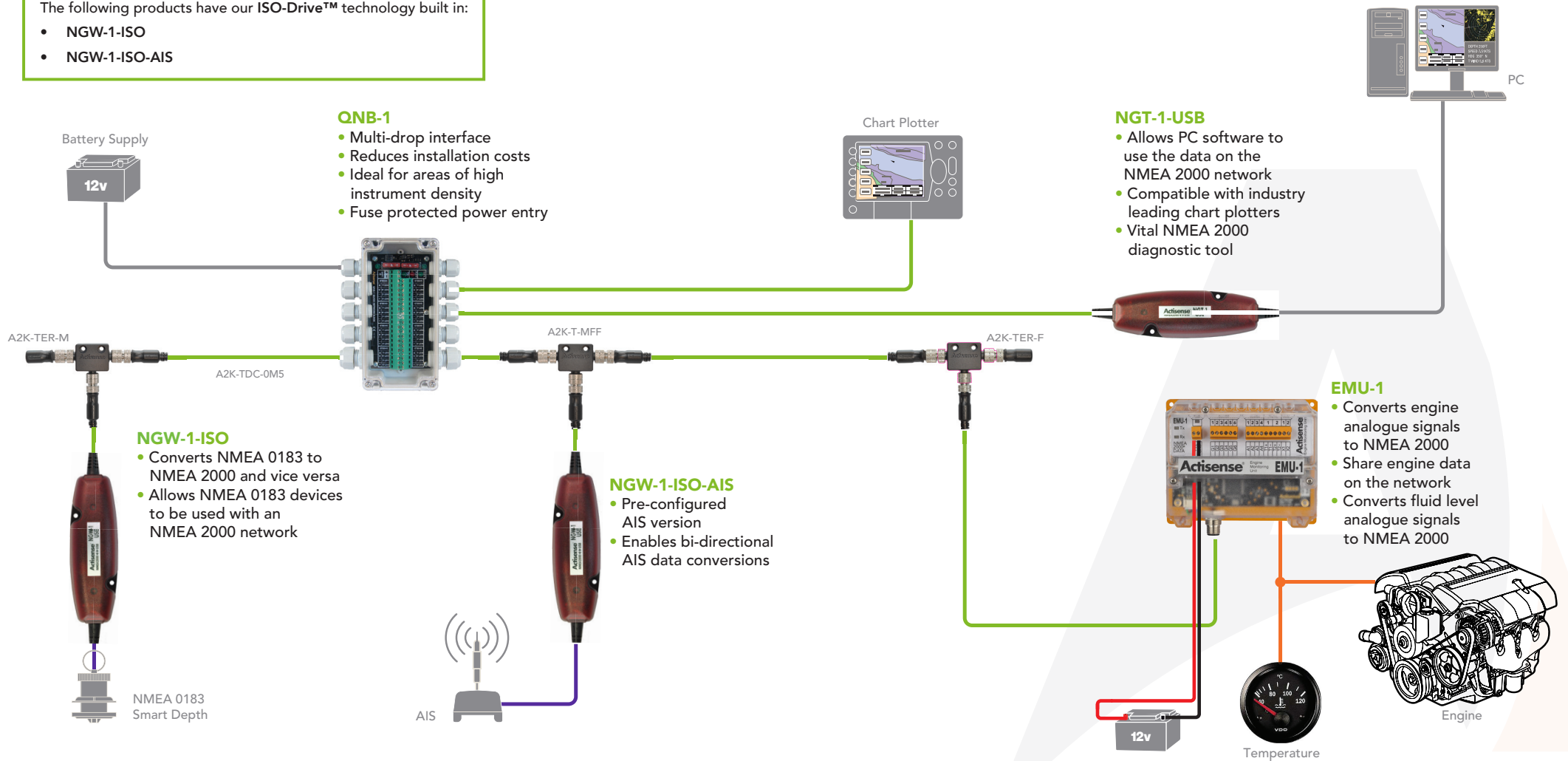


# Actisense® NMEA 2000® Network Diagram

## Building your NMEA 2000 network with Actisense products

The following products have our ISO-Drive™ technology built in:

- NGW-1-ISO
- NGW-1-ISO-AIS



# EMU-1

## Engine Monitoring Unit

Part Number: EMU-1

### Share engine information on the NMEA 2000® bus.

The EMU-1 enables the sharing of engine data throughout the NMEA 2000® bus. It digitises analogue engine sensors, enabling all NMEA 2000® display devices to monitor the connected engine(s) on a vessel.

Each EMU-1 can be configured to suit the engine it is working with, offering a flexible solution for multiple engine makes and models. Capable of reading a wide range of engine parameters, the EMU-1 will report how the engine is operating and share the information across the network.

### Features

Enables analogue signals to be converted to NMEA 2000® messages

Convert signals from two engines (that share a common ground) with a single EMU-1

Six gauge/parameter inputs

Four alarm inputs

Two additional auxiliary inputs

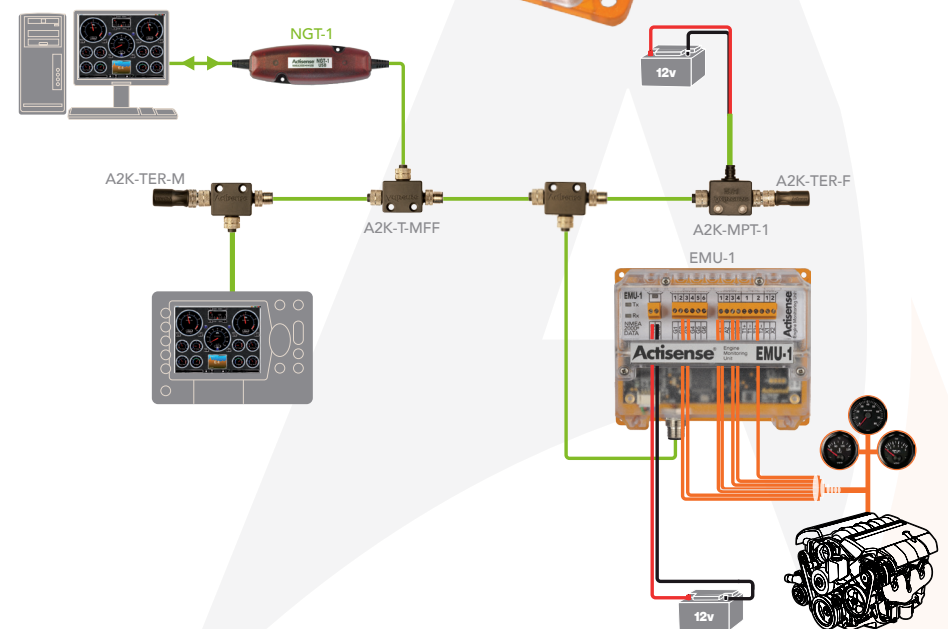
Customised case

Two Tach inputs

Wide power compatibility of 9 to 35 Vdc

### Benefits

- No need to change an existing engine
- Easy installation
- Easy to configure to suit the connected engine
- Connect signals from fluid level gauges (that share a common ground with the engine) to NMEA 2000®
- Optional DIN rail mounting kit available
- Total engine hours are logged by the monitoring of engine Tach (RPM) input



# NGT-1

## NMEA 2000® to PC Interface

Part Number: NGT-1-USB  
NGT-1-ISO

Interface your PC to the NMEA 2000® bus with a functional firewall gateway.

The NGT-1 is an intelligent NMEA 2000® gateway able to precisely transfer messages to and from the NMEA 2000® bus.

The firewall feature enforces the NMEA 2000® bus rules, so software manufacturers can create compliant software at a fraction of the direct certification costs.

The supporting Actisense Software Development Kit (SDK) helps to reduce the required development time.

The diagnostic NMEA Reader software allows viewing of NMEA 2000® messages with configuration options, enabling the set-up of all Actisense products on the NMEA 2000® bus.

### Benefits

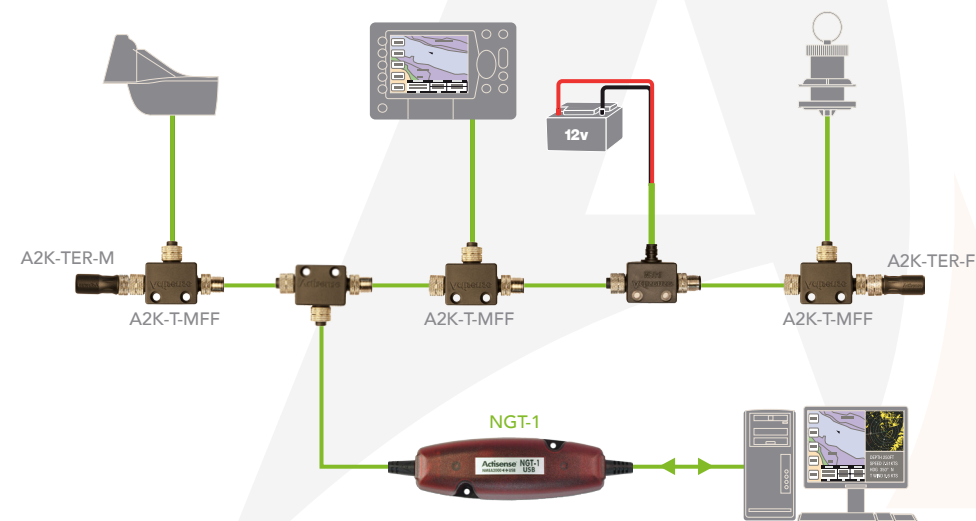
- Provides a rule-enforcing firewall between the PC and NMEA 2000® bus
- Configure and flash-update Actisense products on the NMEA 2000® bus
- Use with our FREE NMEA Reader to help diagnose network problems (see page 34)
- Sends and receives pure NMEA 2000® data (no conversions are applied)

### Features

- Vital NMEA 2000® diagnostic tool
- USB version – isolated USB input/output
- ISO version – OPTO-isolated input and ISO-Drive™ output
- Up to 115,200 baud data transfer rate
- 1500V isolation on both input & output

### Professional Invitation

Actisense welcomes enquiries from software manufacturers who would like to incorporate NMEA 2000® and the NGT-1 into their software.



# NGW-1 NMEA 2000® Gateway

Part Number: NGW-1-ISO  
NGW-1-USB  
NGW-1-ISO-AIS

Hook up to NMEA 2000® whilst keeping currently installed NMEA 0183 devices.

The NGW-1 provides an uncomplicated way to link between a boat's data networks and converts NMEA 0183 data into NMEA 2000® data and vice-versa.

Multiple NGW-1 units can be used to multiplex numerous NMEA 0183 devices onto the NMEA 2000® network, using the network as a means of combining and transferring all data from one place to another.

## Benefits

- Upgrade your NMEA 0183 equipment to NMEA 2000®
- Allow NMEA 0183 devices to receive vital data from the NMEA 2000® bus
- Use the NMEA 2000® bus to multiplex several NMEA 0183 signals together
- Configure using NMEA Reader

## Features

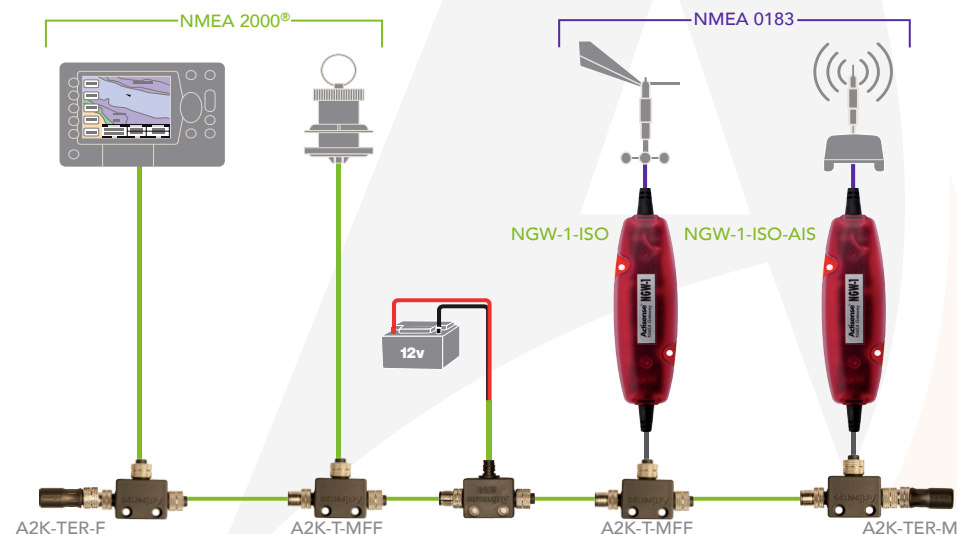
One OPTO-isolated input      One ISO-Drive™ output      Up to 115,200 baud

## Integrate seamlessly with Raymarine® products

The STNG-A06045 adaptor cable enables users to integrate Raymarine SeaTalk<sup>NG</sup> products into the standard configured NMEA 2000® bus and vice-versa. Currently only available when purchased with an Actisense NMEA 2000® Gateway product.



A pre-configured version is available for AIS conversions (NGW-1-ISO-AIS).



# QNB-1

## Quick Network Block

Part Number: QNB-1  
QNB-1-PMW

### Fault-free, NMEA 2000® backbone connections.

The QNB-1 and QNB-1-PMW provide alternatives to multiple connectors, reducing the cost of an NMEA 2000® cable installation. Perfectly suited to areas of high instrument density, as six drops can be connected.

The LEDs provide information for the installer during set up and to indicate the presence of data, power status, power reversal and to show whether the fuses are intact.

The QNB-1-PMW version is fitted with six standard NMEA 2000® M12 (micro) female connectors allowing 'plug and play' connections for quick and easy installation.

### Benefits

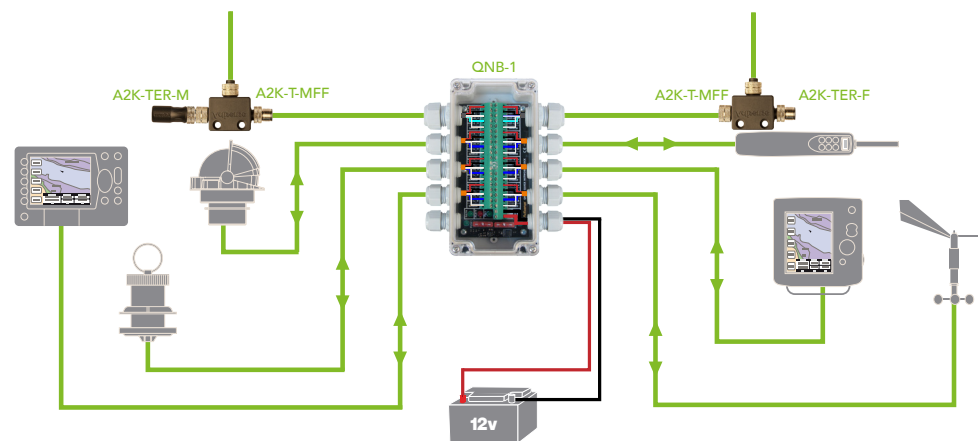
- One unit provides six NMEA 2000® drop connections
- Power feed is fuse protected
- Simple installation on Mini and Micro networks

### Features

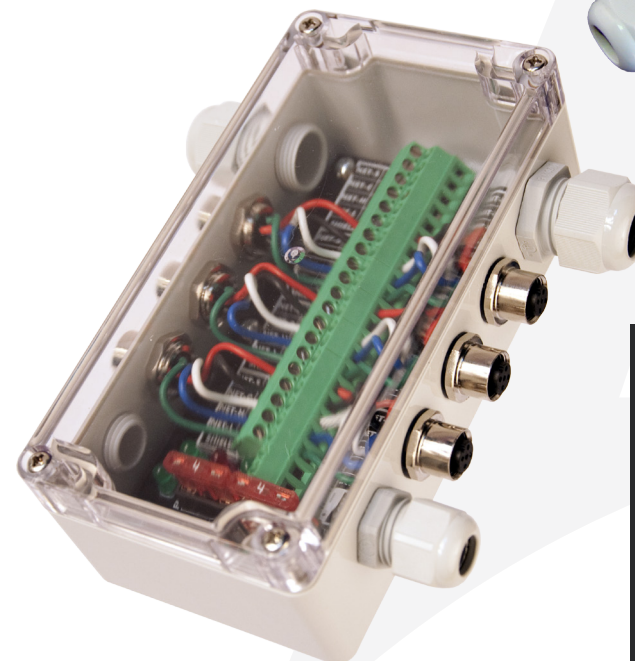
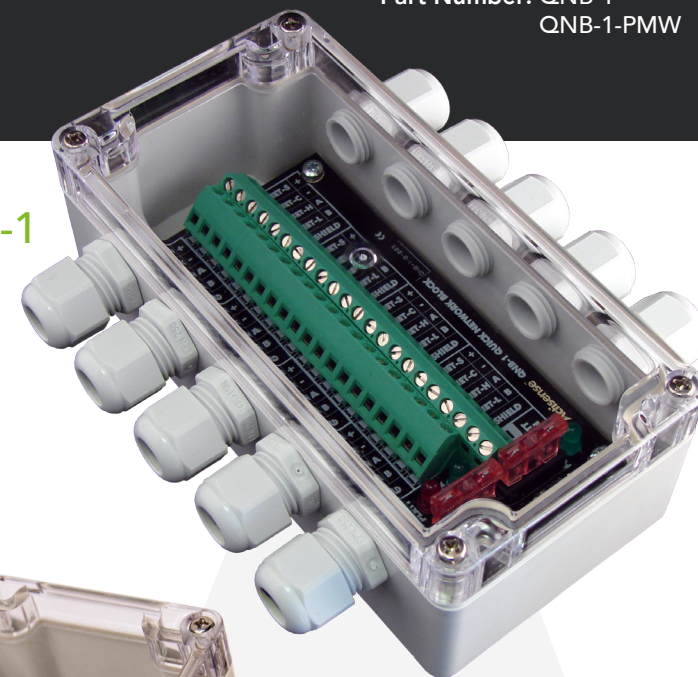
NMEA 2000® barrier strip connections

Backbone connections for both Mini and Micro cable

Four power LEDs & one data LED



QNB-1



QNB-1-PMW

### Accessory



### BLANKING PLUG

Use to replace unused cable glands on the NDC-4 and QNB-1



# Actisense® Software

At Actisense we develop software tools to enable users to configure their system and to view and diagnose any potential network problems quickly and easily.

NMEA Reader is a vital diagnostic tool that allows you to view and record information from NMEA 2000® or NMEA 0183 networks.

EBL Reader allows ".ebl" log files recorded by NMEA Reader to be viewed and analysed, helping users diagnose network issues and connection problems.

Actisense are continuously updating and releasing new tools to help users get the most out of their Actisense products.

## ActisenseComms SDK Access

For further information about the ActisenseComms SDK please visit the website [www.actisense.com](http://www.actisense.com)

Please contact the Support Team at the following e-mail address [support@actisense.com](mailto:support@actisense.com), to discuss your project requirements and obtain the passwords necessary to access the files.

## How to get your software

Actisense software is completely FREE, just visit the website

[www.actisense.com](http://www.actisense.com)

A solution for Mac and Linux developers is available but will require an NDA to be signed.



## NMEA Reader

The NMEA Reader PC software allows NGT-1 owners to view NMEA 2000® data directly from the NMEA 2000® network, helping users to identify potential problems.

It breaks down the unreadable binary NMEA 2000® messages into easy to read parameter values. You can also display NMEA 0183 information, either through the USG-2 (see page12) or any other safe connection to a PC.

This powerful diagnostic tool helps the user to understand and identify exactly which devices are active on the NMEA 2000® network (providing the details of each one) and what data they are sending.

## EBL Reader

The EBL Reader utility software allows EBL log files recorded by NMEA Reader to be viewed.

These recorded data files enable basic diagnostics and analysis of NMEA 2000® and NMEA 0183 networks to be performed.

Log files can be analysed by the installer and also sent to Actisense support to aide a support ticket.

### Features

Receives and displays NMEA 2000® messages

Receives and displays NMEA 0183 sentences

Provides detailed information on the currently selected message

View multiple connections simultaneously

Record log files of received data as EBL files for viewing with EBL Reader at a later date

Access configuration options for both the NGT-1 and NGW-1 devices

### Features

Displays log files saved by NMEA Reader of time-stamped NMEA 0183 sentences or NMEA 2000® messages

Provides detailed information on currently selected message

Displays text files of NMEA 0183 sentences

## Actisense Toolkit

Actisense has developed the Toolkit to respond to many highly demanded features from its customers.

All the devices on an NMEA 2000 network can be viewed in the Toolkit, meaning the user can quickly identify what installed devices are operational on the NMEA 2000 network (and potentially those that are not). Other useful product information can also be viewed such as installed firmware version to help easily identify if a device is up to date.

NMEA data can be recorded for analysis using EBL Reader. A future update to Toolkit will support a live data view making the Actisense Toolkit an 'all-in-one' configuration and diagnostics utility. Until this update is available, the Actisense NMEA Reader is to be used for viewing live data.

### Features

View all operational NMEA 2000® network devices and their device properties

Record NMEA 2000® data for later analysis in EBL Reader

Configure EMU-1

Read configuration data back from EMU-1

Save EMU-1 configurations for use later

Update & downgrade EMU-1 firmware

Change the Device and System instances of any NMEA 2000® device

# A2K NMEA 2000® Networking



Our range of NMEA 2000® Micro connectors and cables has been designed using our specialist NMEA knowledge.

The 'A2K' range is developed alongside our other products to ensure optimum performance and 100% compatibility is maintained.

This specialist range of products work seamlessly together with other manufacturer's products that use DeviceNet standards.

## What is DeviceNet?

DeviceNet is the standard adopted by the NMEA for the cables and connectors (referred to as the 'physical layer') used for NMEA 2000 networking. The DeviceNet standard was already in use in automotive and agricultural industries when adopted by the NMEA and is proven to be very robust.



# A2K Product Range



## Power T (Micro)

- 3m UL Certified cable
- Part number:  
A2K-MPT-1



## Bulk Cable Reel 100m (Micro)

- Part numbers:  
A2K-BULK-100M



## Starter Kit (Micro)

- Contents:  
1 x A2K-MPT-1  
1 x A2K-TER-F  
1 x A2K-TER-M  
2 x A2K-T-MFF  
1 x A2K-TDC-2M
- Part numbers:  
A2K-KIT-1



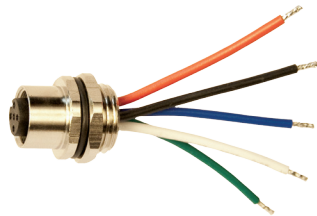
## Dual Ended Cable Assemblies (Micro)

- Part numbers:  
A2K-TDC-0M25  
A2K-TDC-0M5  
A2K-TDC-1M  
A2K-TDC-2M  
A2K-TDC-3M  
A2K-TDC-4M  
A2K-TDC-5M  
A2K-TDC-6M  
A2K-TDC-8M  
A2K-TDC-10M



## Terminators (Micro)

- Male & Female connections
- Part numbers:  
A2K-TER-F  
A2K-TER-M



## Panel Mount Connections (Micro)

- Male & Female connections, waterproof seals
- Part numbers:  
A2K-PMW-F  
A2K-PMW-M



## T Piece (Micro)

- 2 Female and 1 Male connector
- Part number:  
A2K-T-MFF



## Gender Changer Cable (Micro)

- Female to Female and Male to Male connectors
- Part numbers:  
A2K-GCF-0M25  
A2K-GCM-0M25



## Field Fit Connectors

Straight & right angled Male or Female field fit connectors (Micro).

- Part numbers:  
A2K-FFC-SF  
A2K-FFC-SM  
A2K-FFC-RF  
A2K-FFC-RM



## 4 Way Multidrop T Piece (Micro)

- Part number:  
A2K-4WT

# Commercial Products

Actisense products have always been developed to be robust and highly reliable. This same standard of design and build quality is being used to produce a product range aimed specifically at the larger vessel and commercial market.

Using the same knowledge and technical expertise we have applied to our NMEA 0183 and NMEA 2000® product ranges, we have now developed the Actisense Pro Range. The Pro products offer the same high quality and intelligent design expected from Actisense on a larger scale.

Pro products offer increased flexibility, with more inputs and outputs. Our OPTO-Isolation technology and ISODrive™ are built in as standard. The introduction of Ethernet and on-board web server enables easy browser based configuration. This makes our Pro Range some of the most adaptable products available today.

## What is ISO-Drive™?

ISO-Drive™ technology is unique to our products and ensures each 'Talker' output is protected. ISO-Drive™ provides an isolated output, making installation simple and free from ground loops. This substantially reduces the risk of damage and hazards in connected equipment.

The ISO-Drive™ output is compatible with all connection types (RS422, RS485 & RS232), making for easy installation of an NMEA 0183 data bus system.

Outputs are separately isolated from each other and the input (Listener) circuit and can 'float' safely up to 1500 volts D.C from system ground.



# PRO-BUF-1

## Professional NMEA 0183 Intelligent Buffer

Part Number: PRO-BUF-1-BAS-R  
PRO-BUF-1-BAS-S



Introducing the Actisense® Professional NMEA 0183 Buffer (PRO-BUF-1), the first product in the new Actisense PRO Range.

PRO-BUF-1 enables safe connection of all devices with industry leading isolation preventing hazardous ground loops. Two NMEA 0183 inputs, twelve NMEA 0183 outputs, a bi-directional serial port and an Ethernet port, the PRO-BUF-1 is a perfect solution for large networks on commercial shipping and leisure vessels.

Designed to suit the majority of NMEA 0183 systems and ready to go 'out of the box' by simply hard-wiring the two mode inputs as required which can drastically reduce installation time with no complicated setup required.

Configurable via the web browser based configuration tool, allowing customisation of the PRO-BUF-1. As the configuration tool is web based it is compatible across all popular Operating Systems so there are no compatibility issues.

### Features

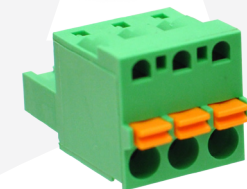
- 2 x NMEA 0183 OPTO-isolated inputs
- 12 x NMEA 0183 ISO-Drive™ isolated outputs
- 1 x bi-directional isolated serial port
- 1 x Ethernet port
- 1 x Alarm output (N/O and N/C contacts).
- Pre-defined modes of operation.
- User Configuration Mode
- Diagnostic LEDs (power, data in/out & alarm)
- Designed for 12 and 24 Volt supply
- 2 part pluggable connector system supports both screw and screwless terminals
- Isolation to battery supply
- Browser based configuration tool
- Automatic baud rate matching on inputs
- Independently configurable outputs
- Future proof through easily upgraded firmware



Connector types:



R - Screw Terminals



S - Screwless Terminals

Product Code	Description
PRO-BUF-1-BAS-R	Standard configuration with pluggable screw terminals
PRO-BUF-1-BAS-S	Standard configuration with pluggable screwless terminals

All features are preliminary and may change without notice.

# Actisense®

t: +44 (0)1202 746682

e: [sales@actisense.com](mailto:sales@actisense.com)

[www.actisense.com](http://www.actisense.com)

Award Winning NMEA Specialists

