
Quick Installation Guide

Marine Pro.

RIO 216 I/O Expansion Unit



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Quick Installation Guide

for

RIO 216 – I/O Expansion Unit

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### Revision history:

| Rev. | Date     | Description                                                              |
|------|----------|--------------------------------------------------------------------------|
| 1.0  | Nov.2013 | Initial realised revision                                                |
| 1.1  | 18.11.15 | Minor updates                                                            |
| 1.2  | 19.11.25 | Updated/added Communication wiring for DCU 210E and link for Modbus list |

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For updated information, please contact your local distributor.

## Document Information

### About this manual

This manual has been published primarily for professionals and qualified personnel.

The user of this material is assumed to have basic knowledge in marine systems, and must be able to carry out related electrical work.

Work on the low-voltage circuit should only be carried out by qualified and experienced personnel.

Installation or work on the shore power equipment *must only* be carried out by electricians authorized to work with such installations.

### Responsibilities

It is the *sole responsibility of the installer* to ensure that the installation work is carried out in a satisfactorily manner, that it is operationally in good order, that the approved material and accessories are used and that the installation meet all applicable rules and regulations.

**Note!** Auto-Maskin continuously upgrades its products and reserves the right to make changes and improvements without prior notice.

All information in this manual is based upon information at the time of printing.

### Ordering information

The Marine Pro covers a wide range of compatible products within both the 200- and 400 Series. Please visit our web site for more information.

<http://auto-maskin.com/marine/>

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## Installation of the RIO 216

This chapter covers installation of the RIO 216

### Introduction

The RIO 216 is an I/O expansion module providing 16 digital inputs. Using the two-wire J1939 interface, it communicates its measured data to a DCU in the Auto-Maskin Marine Pro range.

The unit can also be used standalone and communicate its data to J1939 compatible devices.

### Operating Conditions

|                        |               |
|------------------------|---------------|
| Operating Temperature: | -40 to +70 °C |
|------------------------|---------------|

### Wiring

The RIO 216 has these main connections

- 24VDC Power Supply
- Communication to the DCU
- Digital Inputs

### Power Supply

#### DC Power Supply

On the RIO 216, connect a DC power supply to pin 6 (positive) and pin 5 (negative) on the Grey Receptacle.

#### Ground

On the RIO 216, connect ground to pin 4 on the Grey Receptacle.

#### Power Supply Fuse

The RIO 216 module shall be protected with an external 2A fuse on the supply line.

#### Wire Requirement

Supply wires shall have a minimum area of 1 mm<sup>2</sup> (~17 AWG) with a rating of 70°C or better.

## Communication to the DCU

The RIO 216 comes preconfigured to communicate with the DCU 410/408 or DCU 210/208 in the Auto-Maskin Marine Pro range.

It can be used together with other RIO expansion modules.

**Note!** The RIO 216 shall be connected to the DCU J1939 interface

**Note!** You can only have one RIO 216 connected to your system. Two units are only supported by the DCU 410/408 with the CANopen port configured to J1939

## Communication Wiring

Connect the two wires in the shielded communication cable as follows:

### The 400/E Series

| DCU 410/408 wire terminals (COM 4) | RIO 216 wire terminals (Grey Receptacle) |
|------------------------------------|------------------------------------------|
| 49 (GnD)                           | 3                                        |
| 50 (L)                             | 2                                        |
| 51 (H)                             | 1                                        |

| DCU 410/408 wire terminals (COM 5) | RIO 216 wire terminals (Grey Receptacle) |
|------------------------------------|------------------------------------------|
| 46 (GnD)                           | 3                                        |
| 47 (L)                             | 2                                        |
| 48 (H)                             | 1                                        |

**Note!** Only supported if CANopen is configured to J1939

### The 200E Series

| DCU 210E/208E wire terminals (CAN 1) | RIO 216 wire terminals (Grey Receptacle) |
|--------------------------------------|------------------------------------------|
| C1.9 (Shield)                        | 3                                        |
| C1.8 (L)                             | 2                                        |
| C1.7 (H)                             | 1                                        |

| DCU 210E/208E wire terminals (CAN 2) (if not configured as I/O) | RIO 216 wire terminals (Grey Receptacle) |
|-----------------------------------------------------------------|------------------------------------------|
| C2.12 (Shield)                                                  | 3                                        |
| C2.11 (L)                                                       | 2                                        |
| C2.10 (H)                                                       | 1                                        |

### The 200 Series (Classic)

| DCU 210/208 wire terminals | RIO 216 wire terminals (Grey Receptacle) |
|----------------------------|------------------------------------------|
| 25 (GnD)                   | 3                                        |
| 26 (L)                     | 2                                        |
| 27 (H)                     | 1                                        |

## Communication bus termination resistor

**Note!** Do not skip this section!

A 120 ohm (1/4 W) termination resistor shall be connected in both ends of the J1939 bus.

When the bus is properly connected, the measured impedance between bus terminals 2 and 3 shall be 60 ohm (+/- 5 ohm).

# Marine Pro.

## Is the DCU communicating with the RIO 216?

This can be verified in the DCU web server or user interface under the Troubleshooting menu. Look J1939 under the Communication section.

**Note!** The J1939 troubleshooting may not indicate communication to the RIO 216 as other devices on the J1939 bus will show activity.

## Modbus Reference

The RIO 216 is not directly addressed, but is available through the DCU J939 Modbus section as J939 “Auxiliary IO Number 1” (SPN 702) – “Auxiliary IO Number 16” (SPN 716).

For the DCU Modbus I/O list, go to <https://docs.google.com/spreadsheets/d/1yE8VU858j559ICNR-3cQeg9R78ncSFoczq0p0T2rU6o/edit?gid=1446206566#gid=1446206566>

## Configuration

The RIO 216 comes preconfigured to transmit J1939 PGN 0xFED9.

The DCU must be configured using the web interface in order to read the status of the digital inputs from the RIO 216.

## Configuration using the DCU Web Server

Enter the J1939 section in the DCU web server. Enter each channel’s SPN# and apply the desired configuration.

### Auxiliary IO Number 1 (PGN: 0xfed9, SPN: 701)

#### Copy

Copy configuration from:

#### Configure

##### assign custom name

English Used:

##### General

Channel Use:

Event:

Input State:

Delay Before Event [sec]:

Requires Running Engine:

Requires In Gear:

Use As Additional Run:

## Pin and Channel layout

| RIO 216 Pin # | Digital input # | J1939 SPN# |
|---------------|-----------------|------------|
| 7 (Grey)      | 1               | 701        |
| 8 (Grey)      | 2               | 702        |
| 9 (Grey)      | 3               | 703        |
| 10 (Grey)     | 4               | 704        |
| 11 (Grey)     | 5               | 705        |
| 12 (Grey)     | 6               | 706        |
| 1 (Black)     | 7               | 707        |
| 2 (Black)     | 8               | 708        |
| 3 (Black)     | 9               | 709        |
| 4 (Black)     | 10              | 710        |
| 5 (Black)     | 11              | 711        |
| 6 (Black)     | 12              | 712        |
| 7 (Black)     | 13              | 713        |
| 8 (Black)     | 14              | 714        |
| 9 (Black)     | 15              | 715        |
| 10 (Black)    | 16              | 716        |

## Pin Layout

The following tables illustrate the pin layout for the two RIO 216 Deutsch connectors.

| Grey Receptacle |                    |
|-----------------|--------------------|
| Pin #           | Pin #              |
| 6 POWER +       | 7 Digital Input 1  |
| 5 POWER -       | 8 Digital Input 2  |
| 4 GND           | 9 Digital Input 3  |
| 3 CAN_SHIELD    | 10 Digital Input 4 |
| 2 CAN_L         | 11 Digital Input 5 |
| 1 CAN_H         | 12 Digital Input 6 |

| Black Receptacle   |                     |
|--------------------|---------------------|
| Pin #              | Pin #               |
| 6 Digital Input 12 | 7 Digital Input 13  |
| 5 Digital Input 11 | 8 Digital Input 14  |
| 4 Digital Input 10 | 9 Digital Input 15  |
| 3 Digital Input 9  | 10 Digital Input 16 |
| 2 Digital Input 8  | 11 N/C              |
| 1 Digital Input 7  | 12 N/C              |