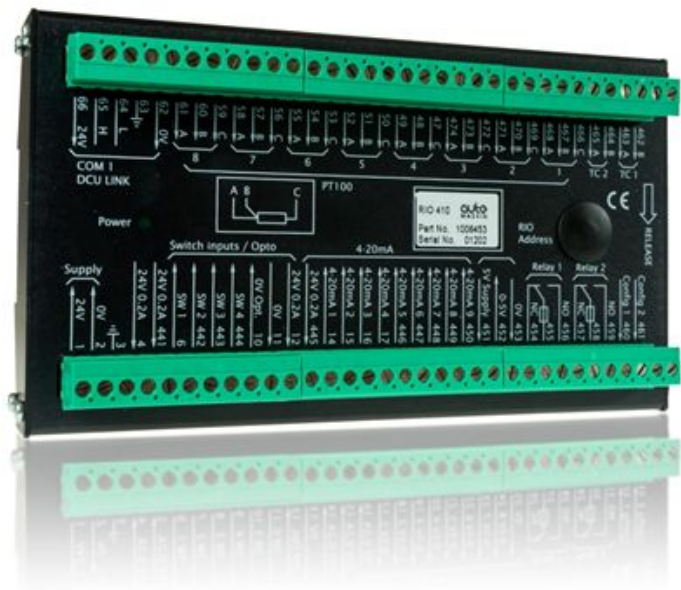# Installation Manual

Marine Pro.

400 Series / 200 Series

RIO 410 Remote I/O Unit, P/N 1006453
RIO 210 Remote I/O Unit, P/N 1006462

auto
MASKIN

Table of contents

1 Preface

1.1 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.

1.2 Responsibilities

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

🛈 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. For updated information, please contact your local distributor.

The crossed-out wheeled bin symbol indicates that the item should be disposed of separately. The item should be handed in for recycling in accordance with local environmental regulations for waste disposal.

By separating a marked item, you will help reduce the volume of waste sent to incinerators or land-fill and minimize any potential negative impact on human health and the environment.

1.3 Revisions

Installation Manual revision: **May 2020**

2 Ordering Information

The Marine Pro covers a wide range of compatible products within both the 200 and 400 Series. Please visit our website for more information.
http://auto-maskin.com/marine/

3 Installation

This chapter covers the installation of the RIO 410 and RIO 210.

3.1 General

The RIO 410 and RIO 210 are remote I/O expansion units. They are designed to be used together with the Marine Pro family.

They can be installed separate from the DCU or in the same cabinet. Maximum distance to the DCU is 1000 meter. The RIO units are intended to be mounted on a DIN rail.

The desired I/O shall be wired to the input / output channels on the RIO.

The two-wire RIO Link shall be established between the DCU and the RIO.

3.1.1 Power LED

The Power LED is lit when the unit has power.

The LED will flash if the voltage drops below 21 V.

3.2 Wiring

The RIO has these main connections

- Power Supply
- I/O Connections
- Communication

3.2.1 Power Supply

On the RIO 410/210, connect 24 VDC power supply to terminal 1 and 2. Connect terminal 3 to shield.

Ⓘ Power supply wires shall have a minimum area of 0.5 mm^2.

3.2.2 I/O Connections

Connect the sensors and switches to the respective sections on the RIO.

3.2.3 Communication

All connected sensor I/O is available on a Modbus RTU communication link.

The communication link can be connected to a Marine Pro DCU Engine Controller, and the sensor information can be read by an external unit using the DCU communication interface.

Modbus Reference

To access the RIO 410/210 Modbus I/O list, see the Auto-Maskin 200/400 Series Communication List (https://goo.gl/MP7EQM) available from Auto-Maskin web page.

Modbus RTU Communication Specification

Physical interface	RS-485
Baudrate	19200
Start bits	1
Stop bits	1
Parity	Even

RIO Modbus Address

The RIO 410/210 can have four different addresses; meaning up to four units can be used on the same Modbus network. This can be a mix of RIO 410 and RIO 210.

Make sure *all* units on the Modbus link have unique Modbus addresses.

DIP setting	RIO 410 Modbus Address	RIO 210 Modbus Address
00	10 (default)	40 (default)
01	11	41
10	12	42
11	13	43

The DCU only supports RIO 210 with Modbus Address 40.

The DIP switches are located under the rubber cap on the front of the RIO unit.

Connect to DCU Engine Controller

If connecting to a DCU, wire as follows:

RIO 410 / RIO 210	DCU 410E / DCU 408E	DCU 210E / DCU 208E
63 (Shield)	57 (Shield)	N/A
64 (L)	58 (L)	C1.5 (L)
65 (H)	59 (H)	C1.6 (H)
66 (24 V)	5 (24 V)	N/A
62 (0 V)	6 (0V)	N/A

When used with the DCU 200 Series, connect the same power supply to the RIO 410/210 as used to supply the DCU 200 Series.

Terminator Resistor

The 120 ohm terminator resistor shall be connected at the last RIO unit (furthest away from the DCU) in the RIO link chain.

If the RIO 410/210 is the only unit on the RIO link, the terminator resistor shall be connected at this RIO 410/210. If so, connect the resistor directly across terminal 64 (L) and 65 (H) on the RIO 410/210.

There shall be *one* terminator resistor only on the RIO link. The DCU has a built-in terminator resistor at its end, so no terminator resistor shall be added on the DCU side.

Is the DCU communicating with the RIO?

This can be verified in the DCU web interface under the following section:

Home –> Troubleshooting -> DCU -> Communication.

Locate the RIO 410/210 line.

DCU Configuration

When properly connected, the DCU will find the RIO automatically (plug and play). However, the DCU configuration shall be updated to include the connected RIO.

If the RIO is not detected at a later stage because of a fault, then the DCU will indicate this with a warning.

If a RIO is removed from the application, then it must be manually removed from the configuration, otherwise the DCU will keep looking for it and indicate with a warning.

3.3 Configuration

All RIO channels are configured using the DCU Engine Controller web interface. The RIO does not store any I/O configuration internally.

Additional configuration information of the RIO can be found in the DCU Configuration Manual.

4 Schematic

In the drawing below "RIO 410" can be either RIO 410 or RIO 210, and "DCU 410" can be any DCU in the Marine Pro family.

RIO LINK - CONNECTIONS

DCU 410

57 58 59

64 65 PE 64 65 PE 64 65 PE 64 65 PE A B 120

RIO 410 #1
DIP=00

RIO 410 #2
DIP=01

RIO 410 #3
DIP=10

RIO 410 #4
DIP=11

RIO 425