Installation Manual

Marine Pro.
400 Series

RIO 425 AC Generator Interface, P/N 1500443

auto
MASKIN

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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

Revision	Date	Description
1.0	August 12, 2019	Initial issue.
2.0	December 10, 2020	Manual updated to new RIO 425 part.
2.1	July 1, 2021	New picture RIO 425

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.

3 Installation of the RIO 425

This chapter covers installation of the RIO 425.

3.1 Introduction

The RIO 425 is a generator interface. The module can be connected at the generator, or close to the generator.

Using the two-wire data 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 on the inbuilt Modbus interface.

3.2 I/O
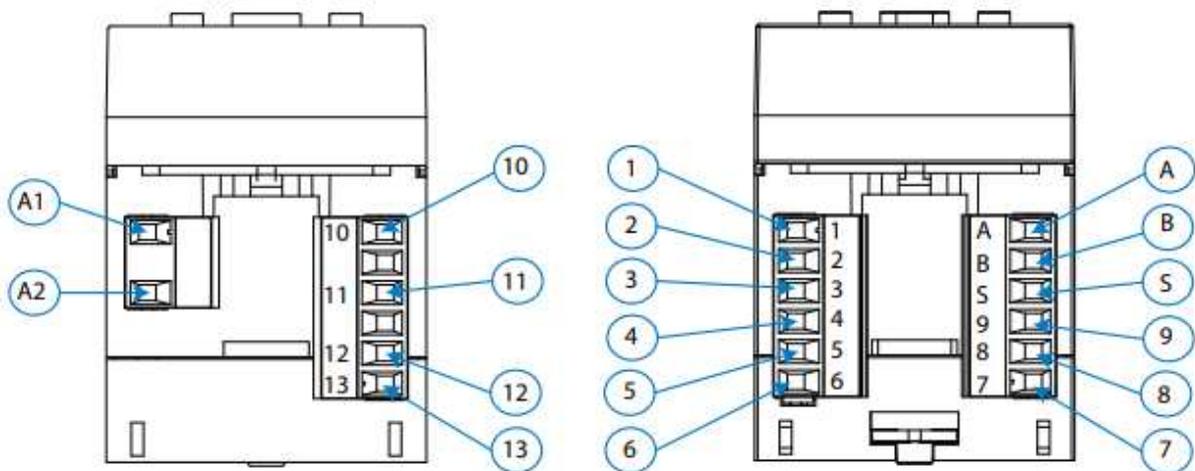
Device Terminals	
A1: Power Supply	**4:** S2, current input L2
A2: Power Supply	**5:** S1, current input L3
10: VL1, voltage input L1	**6:** S2, current input L3
11: VL2, voltage input L2	**A:** A+, RS-485
12: VL2, voltage input L3	**B:** B-, RS-485
13: N, Neutral voltage input	**S:** S, GND for RS-485 and digital inputs

1: S1, current input L1	**9:** I1, Digital input 1 or selection rate
2: S2, current input L1	**8:** O1, Digital output 1
3: S1, current input L2	**7:** CO, Common digital outputs

3.3 Operating Conditions

Operating Temperature:	-5 °C/ +45 °C
Relative Humidity:	5 to 95 % RH (without condensation)

3.4 Wiring

The RIO 425 has these main connections

- AC Power Supply
- Communication to the DCU
- Generator voltage interface
- Generator current interface

When properly connected and communicating to the DCU on the RIO link, the DCU will automatically detect the RIO 425 and add an instrument page similar to the one below.

3.4.1 Power Supply

On the RIO 425, connect an AC power supply to terminals A1 and A2.

The supply shall be in the range 100 – 240 VAC (+/- 10%).

Power Supply Fuse

The RIO 425 module shall be protected with an external 2 A fuse on the supply line.

Wire Requirement

Supply wires shall have a minimum area of 1mm^2 (~17 AWG).

3.4.2 Communication to the DCU

The RIO 425 comes preconfigured to communicate with the DCU 410E/408E or DCU 210E/208E in the Auto-Maskin Marine Pro range.

It can be used together with other RIO expansion modules on the same RIO link.

(!) Only one RIO 425 can be used on a RIO link.

Communication Wiring

Depending on the DCU model connect the wires in the shielded communication cable to the terminals as shown in the table below:

RIO 425	DCU 410E / DCU 408E	DCU 210E / DCU 208E
S (Shield)	57 (Shield)	
B (L)	58 (L)	C1.5 (L)
A (H)	59 (H)	C1.6 (H)

(!) Do **not** connect the cable shield at both ends.

To minimize the effect of external noise it is recommended to use twisted pair wires.

Communication Bus Termination Resistor

The 120 ohm (1/4 W) termination resistor shall be connected at the last RIO unit (furthest away from the DCU) in the RIO link chain.

If the RIO 425 is the only unit on the RIO link, then the termination resistor shall be connected at the RIO 425.

Connect the resistor directly across terminals A and B on the RIO 425.

If the RIO 425 is not the last RIO unit on the link, then the termination resistor shall not be connected to the RIO 425, but at the last RIO unit on the RIO link.
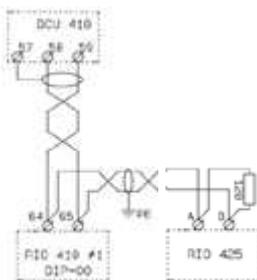
If there are several units attached to the link add the 120 Ohm resistor together with the last unit on the bus.

The DCU has an inbuilt termination resistor at its end.

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

<u>Wire Requirement</u>

Wires shall have a minimum area of 1.0 mm^2 (16 AWG).

3.4.3 Generator Current Interface

Connect the generator current interface as follows:

Phase	Current Transformer	RIO 425 Terminal
L1	S1 S2	1 2
L2	S1 S2	3 4
L3	S1 S2	5 6

If only one phase is to be monitored, it is sufficient to connect the desired phase terminals.

<u>Wire Requirement</u>

The wire area shall be minimum 2.5 mm^2 (12 AWG).

3.5 Configuration

The RIO 425 can be configured from the web server on a DCU in the Auto-Maskin Marine Pro range. This is the easiest and preferred method.

If no such DCU is available, the RIO 425 can be configured using the user interface on the front of the unit.

⊘ The current transformer ratio is pre-configured to 5:1. It is possible to change this ratio to 1:1, but only using the RIO 425 user interface.

3.5.1 Configuration from the DCU Web Server

Log into the DCU, and then select **Home** and then **RIO 425**.

Set the desired values and press the **Submit** button.

Configure

Primary Voltage:	230
Secondary Voltage:	230
Primary Current:	75

Submit
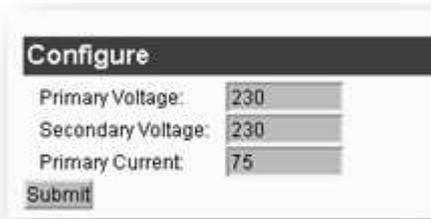
3.5.2 Configuration using the RIO 425 User Interface

The RIO 425 can be configured using the small push buttons and display on the front of the unit.

Initiate Configuration

To enter the configuration menu press the ☰ key for 3 seconds.

If the 🔓 icon appears on the configuration screen, the configuration parameters can be edited.

If the 🔒 icon appears, the configuration of the unit will be locked with a password. If the configuration is locked the user must enter the password to unlock.

Press the ☰ key to modify the value of the flashing digit.

When the desired value is shown on the screen, use the ⊘ and ⊘ keys to move the edit cursor.

To validate the password, press the ⊘ key if you are on the last digit or the ⊘ key if you are on the first digit.

Default password: **1234**

The configuration parameters can be modified after entering the correct password.

Voltage Transformer Primary value

⊘ This value shall conform to the phase-phase voltage in the installation. The setting is important even if there is no voltage transformer in the installation.

```
SEt
Pri U
prog  00001
```

Press the ☰ key to modify the value of the flashing digit.

When the desired value is shown on the screen, use the ⊙> and <⊙ keys to move the edit cursor.

To validate the value, press the ☰ key for 3 seconds; the **prog** icon will stop flashing.

If the value entered by the user is out of the range of programming values, the programmed value will be deleted and the system will restore it to the last saved value.

Maximum programming value: 99999
Minimum programming value: 1
Voltage ratio ≤ 1000
Voltage ratio x Current ratio ≤ 300000

① The ratio is the relation between the primary and the secondary.

Press key ⊙> to access the next programming step.

Voltage Transformer Secondary value

① If there is no voltage transformer in the installation, then the secondary value shall be equal to the primary value.

```
SEt
SEcU
prog  001
```

Press the ☰ key to modify the value of the flashing digit.

When the desired value is shown on the screen, use the ⟩ and ⟨ keys to move the edit cursor.

To validate the value, press the ☰ key for 3 seconds; the **prog** icon will stop flashing.

If the value entered by the user is out of the range of programming values, the programmed value will be deleted and the system will restore it to the last saved value.

Maximum programming value: 999
Minimum programming value: 1
Voltage ratio ≤ 1000
Voltage ratio x Current ratio ≤ 300000

Press key ⟩ to access the next programming step.

Current Transformer Primary value

Press the ☰ key to modify the value of the flashing digit.

When the desired value is shown on the screen, use the ⟩ and ⟨ keys to move the edit cursor.

To validate the value, press the ☰ key for 3 seconds; the **prog** icon will stop flashing.

If the value entered by the user is out of the range of programming values, the programmed value will be deleted and the system will restore it to the last saved value.

Maximum programming value: 10000
Minimum programming value: 1
Voltage ratio x Current ratio ≤ 300000

⊙ The ratio is the relation between the primary and the secondary.

Press key ⟩ to access the next programming step.

Current Transformer Secondary value

> ⚠ The RIO 425 comes preset to a transformer ratio of 5:1, meaning the secondary current varies up to 5A. If necessary, the ratio can be changed to 1:1.

```
 SEt
 SEcA
prog
      5
```

Voltage ratio x Current ratio ≤ 300000.

Use the ☰ key to browse the available options: **1A** or **5A**.

To validate the value, press the ☰ key for 3 seconds; the **prog** icon will stop flashing.

Press key ⊗ to access the next programming step.