
Installation Manual

Marine Pro.

RIO 425

AC Generator Interface



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Installation Manual

for

RIO 425 – AC Generator Interface

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| 1.0  | 12.08.2019 | Initial Release Revision (Upgraded from former QIG ver. 1) |
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## 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.

# Marine Pro.

## Installation of the RIO 425

This chapter covers installation of the RIO 425.

### 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.

### Operating Conditions

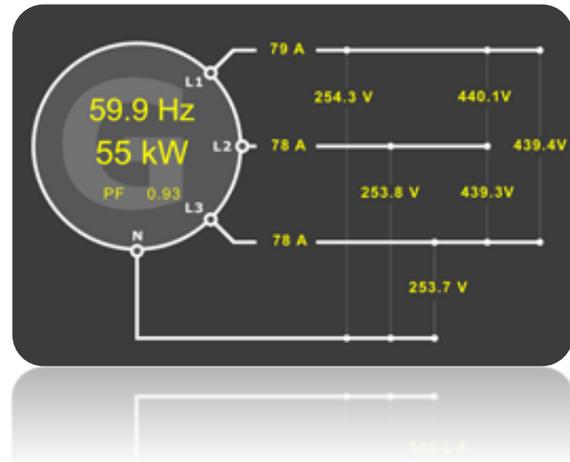
|                        |                                     |
|------------------------|-------------------------------------|
| Operating Temperature: | -10 °C/ +50 °C                      |
| Relative Humidity:     | 5 to 95 % RH (without condensation) |

### 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.



### Power Supply

#### AC or DC Power Supply

The RIO 425 can operate with either AC or DC power supply.

#### AC Power Supply

On the RIO 425, connect an AC power supply to terminals 14 and 15.

The supply shall be in the range 85 – 265 VAC (+10%/–15%).

#### DC Power Supply

On the RIO 425, connect a DC power supply to terminals 14 (positive) and 15 (0V).

The supply shall be in the range 95 – 300 VDC (+10%/–15%).

## Power Supply Fuse

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

## Wire Requirement

Supply wires shall have a minimum area of 1mm<sup>2</sup> (~17 AWG).

## Communication to the DCU

The RIO 425 comes preconfigured to communicate with the DCU 410(E)/408(E) or DCU 210(E)/208(E) in the Auto-Maskin Marine Pro range. It can be used together with other RIO expansion modules on the same RIO link.

**Note!** 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 410(E)/408(E) | DCU 210E/208E | DCU 210/208 |
|---------|-------------------|---------------|-------------|
| S (⊥)   | 57 (⊥)            |               | 22 (⊥)      |
| B (L)   | 58 (L)            | C1-5 (L)      | 23 (L)      |
| A (H)   | 59 (H)            | C1-6 (H)      | 24 (H)      |

**Note!** 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

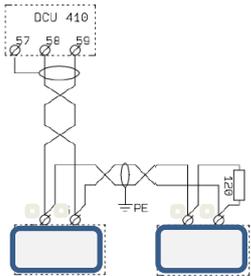
**Note!** Do not skip this section!

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).

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## Is the DCU communicating with the RIO 425?

This can be verified in the DCU web server or user interface under the Troubleshooting menu. See the **RIO 425** section.

There is a **comm LED** indication on the RIO 425 that flashes when communicating.

## Modbus Reference

To access the RIO 425 Modbus I/O list, go to [200/400 Series Communication List](#)

### Modbus RTU Channel Specification

| Parameter  | Value  |
|------------|--------|
| Physical   | RS-485 |
| Baud rate  | 19200  |
| Start bits | 1      |
| Data bits  | 8      |
| Stop bits  | 1      |
| Parity     | Even   |
| Address    | 25     |

## Generator Voltage Interface

Connect the generator voltage interface as follows:

| Generator phase | RIO 425 terminal |
|-----------------|------------------|
| N               | 13               |
| L1              | 12               |
| L2              | 11               |
| L3              | 10               |

## Wire requirement

Wires shall have a minimum area of 1.0 mm<sup>2</sup> (16 AWG).

## Generator Current Interface

Connect the generator current interface as follows:

| Phase | Current transformer | RIO 425 terminal |
|-------|---------------------|------------------|
| L1    | S1                  | 1                |
|       | S2                  | 2                |
| L2    | S1                  | 3                |
|       | S2                  | 4                |
| L3    | S1                  | 5                |
|       | S2                  | 6                |

## Wire requirement

The wire area shall be minimum 2.5 mm<sup>2</sup> (12 AWG).

## 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.

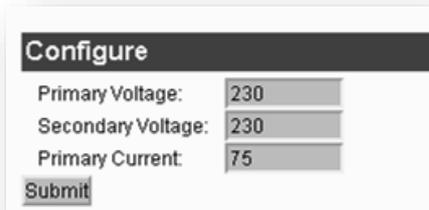
If no such DCU is available, the RIO 425 can be configured using the user interface on the front of the unit.

**Note!** 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.

## 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  |
| <input type="button" value="Submit"/> |     |

## Configuration using the user interface

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

### Initiate Configuration

To initiate the configuration, press and hold the **SETUP** button for 5 seconds.

### Voltage Transformer Primary value

**Note!** 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.

The display shows **set PriU** followed by six digits; these allow the setting of the transformer voltage primary value.

To write or change the voltage transformer primary value, repeatedly press the **max** key to increase the value of the flashing digit.

When the required value is reached, move on to the following digit by pressing **min**.

When the last digit has been changed or verified, press **min** to move back to the first digit, allowing the previously set values to be changed again.

To save the data and proceed, press  $\updownarrow$ .

### Voltage Transformer Secondary value

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

The display will show **set SecU** followed by three digits; these allow the setting of the secondary transformer voltage.

To write or change the voltage transformer secondary value, repeatedly press the **max** key to increase the value of the flashing digit.

When the required value is reached, move on to the following digit by pressing **min**.

When the last digit has been changed or verified, press **min** to move back to the first digit, allowing the previously set values to be changed again.

To save the data and proceed, press  $\updownarrow$ .

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## Current Transformer Primary value

The current transformer primary value should be as noted on the current transformer(s) in use.

The display shows **set PriA** followed by five digits; these allow the setting of the current transformer primary value.

To write or change the current transformer primary value, repeatedly press the **max** key to increase the value of the flashing digit.

When the required value is reached, move on to the following digit by pressing **min**.

When the last digit has been changed or verified, press **min** to move back to the first digit, allowing the previously set values to be changed again.

To save the data and proceed, press **↕**.

## Current Transformer Secondary value

**Note!** 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.

To select one of the two display measurement options, press the **max** key. The two available options will toggle.

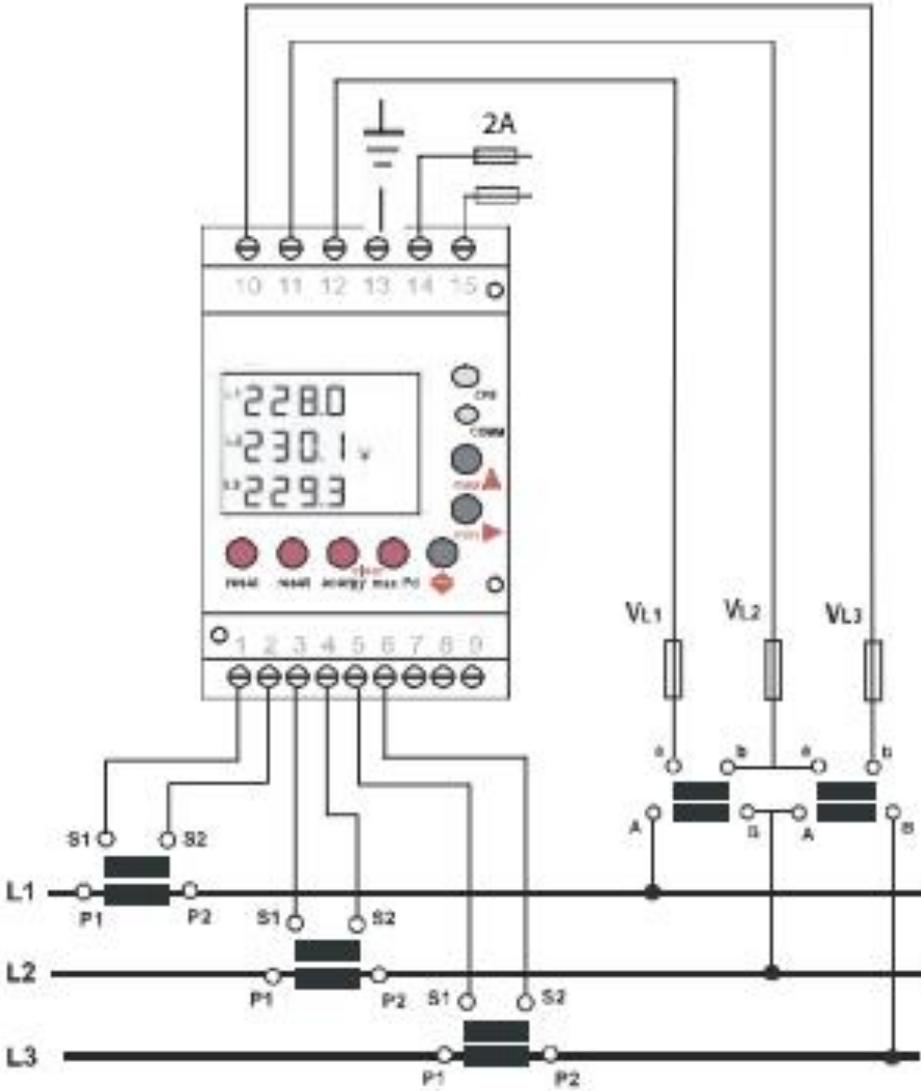
To save the new transformer ratio, press **↕**.

# Schematic

This schematic shows a typical installation of the RIO 425.

**Note!** The voltage transformer may or may not be necessary. Consult the RIO 425 datasheet for supply voltage range.

The RIO link communication interface is not shown on the schematic.  
The 3-pin communication interface connector is on the underside of the module.



## Appendix

### Setup RIO 425 communication parameters

The RIO 425 comes ready configured. If however, there is a need to verify the parameters, then follow this procedure.

#### Enter Communication setup

- On the RIO 425, press the **Reset** button, then immediately long-press the **Set-up** button. The display shall say **Set Prot Bus**.
- Press the ⇅ button to proceed.

#### Predefined communication parameters

Next, the screen shall display **Set Cdef [yes/no]**.

- Make sure to select **Yes** using the ↑ button.
- Press ⇅ to proceed.

#### Peripheral number

Next, the screen shall display **Set nPer [0..255]**.

- Make sure the value is set to **25**, using the ↑ and ⇒ button.
- Press ⇅ to proceed.

#### Transmission speed

Next, the screen shall display **Set baud [1200..19200]**.

- Make sure the value is set to **19200**, using the ↑ button.
- Press ⇅ to proceed.

#### Parity

Next, the screen displays **Set Pari [no/even/odd]**.

- Make sure the value is set to **Even**, using the ↑ or button.
- Press ⇅ to proceed.

#### Data bits

Next, the screen shall display **Set Bits [7/8]**.

- Make sure the value is set to **8**, using the ↑ button.
- Press ⇅ to proceed.

#### Stop bits

Next, the screen shall display **Set Stop [1/2]**.

- Make sure the value is set to **1**, using the ↑ button.
- Press ⇅ to proceed.
- Press ⇅ again to save and quit.