

# IQ SENSORNET MIQ/CR3; DIQ/CR3

**IQ SENSORNET COMBI OUTPUT MODULE**



a xylem brand



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# 1 Overview

## 1.1 How to use this component operating manual

### Structure of the IQ SENSORNET operating manual

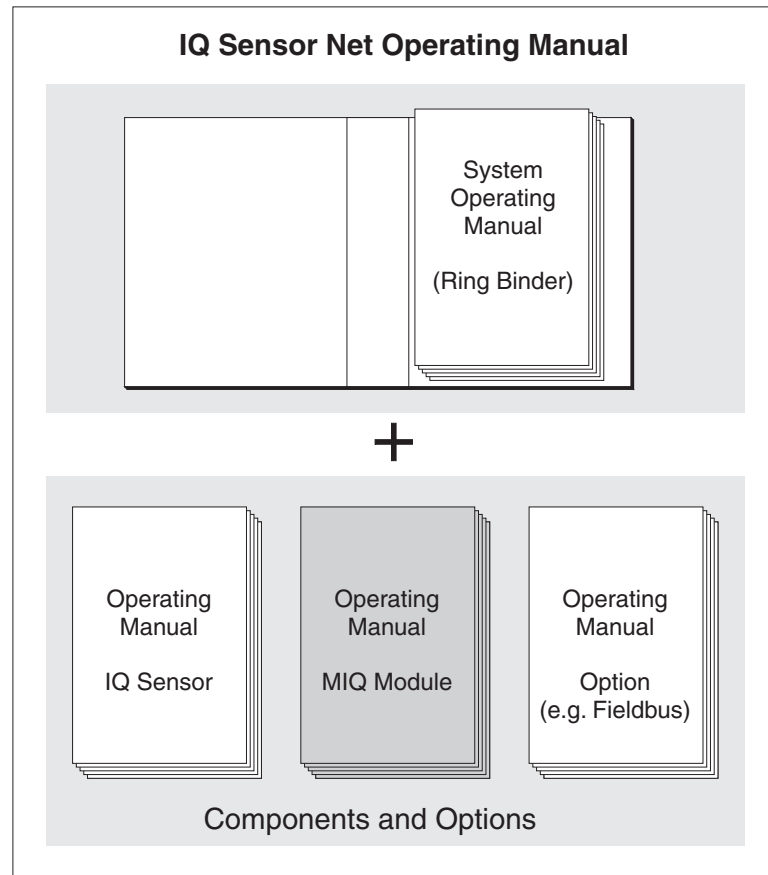


Fig. 1-1 Structure of the IQ SENSORNET operating manual

The IQ SENSORNET operating manual has a modular structure like the IQ SENSORNET itself. It consists of a system operating manual and the operating manuals of all the components used.

Please file this component operating manual into the ring binder of the system operating manual.

## 1.2 Features of the combi output module

**General characteristics** The combi output module has three current outputs and three relay outputs. You can link current outputs and relay outputs to sensors. The linked current outputs and relay outputs can, for example, be used to monitor sensors or to output measurement data. Unlinked relay outputs can be used for general monitoring functions.

With the standard MIQ module housing, the combi output module has the same characteristics as all MIQ modules regarding stability, leakproofness and weather resistance. It also provides the same wide variety of installation options (stacked mounting, canopy mounting, tophat rail mounting, etc.).

**Instrument types** The MIQ/CR3 and DIQ/CR3 combi output modules differ in their compatibility with the individual IQ SENSORNET system families.

System	Compatible combi output module
2020 XT, 2020 3G	MIQ/CR3
182, 28X	DIQ/CR3

**Terminal strip** The combi output module has the following electrical connections on the terminal strip inside the housing:

- 3 x relay contact
- 3 x current output
- 2 x SENSORNET connection

## 2 Safety instructions

### 2.1 Safety information

#### 2.1.1 Safety information in the operating manual

This operating manual provides important information on the safe operation of the product. Read this operating manual thoroughly and make yourself familiar with the product before putting it into operation or working with it. The operating manual must be kept in the vicinity of the product so you can always find the information you need.

Important safety instructions are highlighted in this operating manual. They are indicated by the warning symbol (triangle) in the left column. The signal word (e.g. "CAUTION") indicates the level of danger:

**WARNING**

indicates a possibly dangerous situation that can lead to serious (irreversible) injury or death if the safety instruction is not followed.

**CAUTION**

indicates a possibly dangerous situation that can lead to slight (reversible) injury if the safety instruction is not followed.

**NOTE**

*indicates a situation where goods might be damaged if the actions mentioned are not taken.*

#### 2.1.2 Safety signs on the product

Note all labels, information signs and safety symbols on the product. A warning symbol (triangle) without text refers to safety information in this operating manual.

#### 2.1.3 Further documents providing safety information

The following documents provide additional information, which you should observe for your safety when working with the measuring system:

- Operating manuals of other components of the IQ SENSORNET system (power supply modules, accessories)
- Safety datasheets of calibration and maintenance equipment (e.g. cleaning solutions).

## 2.2 Safe operation

### 2.2.1 Authorized use

The authorized use of the MIQ/CR3; DIQ/CR3 consists of providing relay and current outputs in the IQ SENSORNET. Only the operation according to the instructions and technical specifications given in this operating manual is authorized (see chapter 6 TECHNICAL DATA). Any other use is considered unauthorized.

### 2.2.2 Requirements for safe operation

Note the following points for safe operation:

- The product may only be operated according to the authorized use specified above.
- The product may only be operated under the environmental conditions mentioned in this operating manual.
- The product may only be supplied with power by the energy sources mentioned in this operating manual.
- The product may only be opened if this is explicitly described in this operating manual (example: connecting electrical lines to the terminal strip).

### 2.2.3 Unauthorized use

The product must not be put into operation if:

- it is visibly damaged (e.g. after being transported)
- it was stored under adverse conditions for a lengthy period of time (storing conditions, see chapter 6 TECHNICAL DATA).

## 2.3 User qualification

<b>Target group</b>	The IQ SENSORNET system was developed for online analysis. Some maintenance activities, e.g. changing the membrane caps in D.O. sensors, require the safe handling of chemicals. Thus, we assume that the maintenance personnel is familiar with the necessary precautions to take when dealing with chemicals as a result of their professional training and experience.
<b>Special user qualifications</b>	The following installation activities may only be performed by a qualified electrician: <ul style="list-style-type: none"><li>● Connection of the MIQ/CR3; DIQ/CR3 to the power supply.</li><li>● Connection of external, line voltage-carrying circuits to relay contacts (see module manual of the relay output module).</li></ul>



## 3 Installation

### 3.1 Scope of delivery

- MIQ module
- Accessory set, including:
  - 4 x cable glands (clamping range 4.5-10 mm) with seals and blind plugs
  - 4 x ISO blind nuts M4 with suitable cheese-head screws and plain washers
  - 2 x countersunk screws M3x6 to close the module lid (+ 2 replacement screws)
  - 1 x contact base with fixing screws
- Accessory kit, including
  - 1 x extension M16x1.5 to M20x1.5 with O-ring
  - 1 x cable gland
- Operating manual.

### 3.2 Basic principles of installation

#### 3.2.1 Requirements of the measurement location

The measurement location must meet the environmental conditions specified in section 6.1 GENERAL DATA.

#### Controlled environmental conditions

Work on the open instrument (e.g. during mounting, installation, maintenance) may only be carried out under controlled environmental conditions:

Temperature	+ 5 °C ... + 40 °C (+ 41 ... +104 °F)
Relative humidity	≤ 80 %

### 3.3 Safety requirements on the electrical installation

Electrical equipment (e.g. motors, contactors, cables, lines, relays) must meet the following requirements:

- Conformity with national regulations (e.g. NEC, VDE and IEC)
- Suitability for the electrical conditions at the installation site
  - Maximum operating voltage
  - Maximum operating current
- Suitability for the environmental conditions at the installation site

- Temperature resistance (minimum and maximum temperature)
- Stability against UV light when used outdoors
- Protection against water and dust (Nema or IP protection class).
- Suitable fusing of the electrical circuit
  - Overcurrent fuses (in accordance with the technical data of the device input or output)
  - Overvoltage class II surge limiters
- Suitable disconnecting device (e. g. switch or circuit breaker) for the mains supply of permanently mounted equipment with separate mains connection
  - in compliance with the following regulations
    - IEC 60947-1
    - IEC 60947-3
  - in the vicinity of the equipment (recommendation)
- Flame-resistant (cables and lines), in compliance with the following regulations
  - UL 2556 VW-1 (for USA, Canada)
  - IEC 60332-1-2 (outside of USA, Canada)

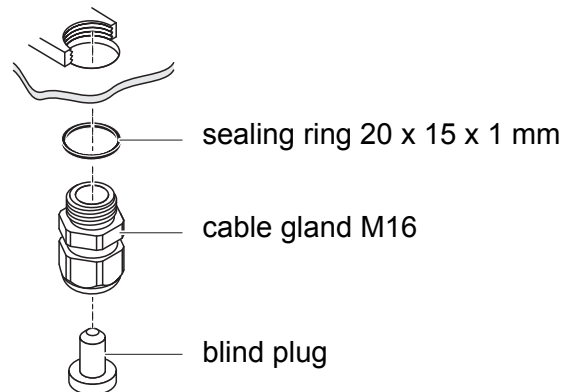
### 3.4 Installation in the IQ SENSORNET

The IQ SENSORNET provides a number of options for integrating the combi output module mechanically and electrically in the system (stacked mounting, distributed mounting, etc.). The various types of installation are described in detail in the INSTALLATION chapter of the system operating manual.

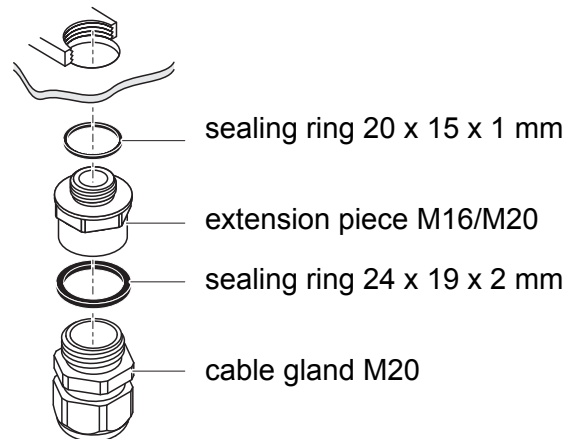
### 3.5 Electrical connections: General instructions

**Cable glands** All electric cables are fed from below via prepared openings in the enclosure of the module. Cable glands with different clamping ranges are included with the module to provide sealing between the cable and enclosure as well as for strain relief. Select the matching cable gland for the respective cable diameter:

- **Small**, clamping range 4.5 to 10 mm. This cable gland is suitable for all IQ SENSOR NET sensor cables.



- **Large**, clamping range 7 to 13 mm. This cable gland is required for cable sheaths with an outside diameter of more than 10 mm and is screwed into the enclosure via an extension piece.



If necessary, you can order more large cable glands in a set of 4 pieces (Model EW/1, Order No. 480 051).

### General installation instructions

Observe the following points when attaching connecting wires to the terminal strip

- Shorten all wires to be used to the length required for the installation
- Always fit all the ends of the wires with wire end sleeves before connecting them to the terminal strip
- Any wires that are not used and project into the enclosure must be cut off as closely as possible to the cable gland.
- Screw a small cable gland with sealing ring into each remaining free opening and close it with a blind plug.

**WARNING**

No free wires are allowed to project into the housing. Otherwise, there is a danger that areas safe to contact could come into contact with dangerous voltages. Always cut off any wires that are not in use as closely as possible to the cable gland.

### 3.6 Connections to the relay and current outputs

**WARNING**

If external electrical circuits that are subject to the danger of physical contact are incorrectly connected to the relay contacts, there may be a danger of life threatening electric shock. Electrical circuits are regarded to be subject to the danger of physical contact when there are voltages higher than the Safety Extra Low Voltage (SELV).

Pay attention to the following points during installation:

- Electrical circuits subject to the danger of physical contact must only be connected by a qualified electrician.
- Electrical circuits subject to the danger of physical contact must only be connected when they are voltage-free.
- The terminal strip of the MIQ/CR3; DIQ/CR3 output module has two segments for relay outputs with three relay connections each (R1-R3 and R4-R6).  
If electrical circuits subject to the danger of physical contact are switched with a relay, no circuit that is not subject to this danger (e. g. the MIQ/CHV module) may be operated in the same output segment of the MIQ/CR3; DIQ/CR3. For such applications use the second output segment of the MIQ/CR3; DIQ/CR3.
- Switching voltages and switching currents on the relay contacts must not exceed the values specified in chapter 6 TECHNICAL DATA. Protect electrical circuits against currents that are too high with an electrical fuse.
- Only single-phase consumers can be switched with the relays. Under no circumstances must multiphase consumers be switched with the aid of several relays (example three-phase current driven pumps). Always switch multiphase consumers via a protective relay.
- The MIQ/CR3; DIQ/CR3 may only be opened after the installation if all external voltages have been previously switched off.

- Materials required**
- Wire end sleeves, suitable for the connecting wires, with suitable crimping tool
  - 4 x screwed cable gland with sealing ring (scope of delivery of the combi output module).

- Tools**
- Cable stripping knife
  - Wire stripper
  - Phillips screw driver
  - Small screw driver

### Connecting lines to the terminal strip

- 1 | Open the module.

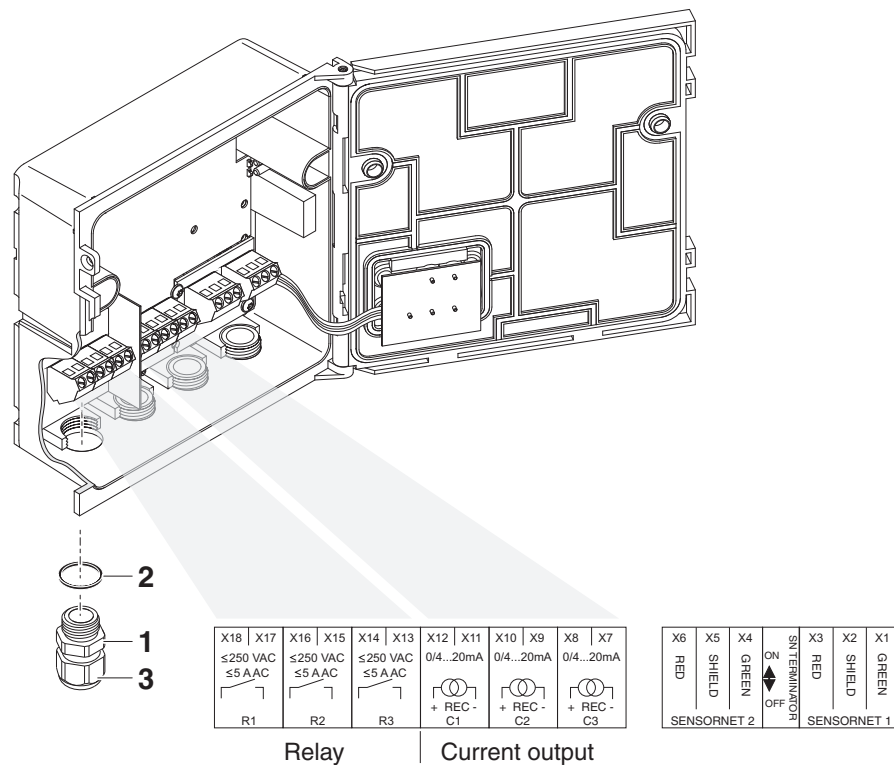


Fig. 3-1 Terminal strip with the relay and current connections

- 2 | Screw the cable gland (pos. 1 in Fig. 3-1) with the sealing ring (pos. 2) into the module housing.
- 3 | Loosen the coupling ring (pos. 3 in Fig. 3-1).
- 4 | Feed the line through the cable gland in the module housing.

- 
- 5 | Connect the wires to the terminal strip. While doing so, pay attention to the specifications on the label located under the terminal strip.
  - 6 | Tighten the coupling ring (pos. 3 in Fig. 3-1).
- 

**WARNING**

**No free wires are allowed to project into the housing. Otherwise, there is a danger that areas safe to contact could come into contact with dangerous voltages. Always cut off any wires that are not in use as closely as possible to the cable gland.**

- 7 | Close the module.

## 4 Settings

The combi output module has three relays outputs and three current outputs.

- Relay outputs operate as openers or closers.
- Current outputs provide a current that depends on the measured value.

On the IQ SENSORNET terminal, you can

- assign names to the outputs (with the 184 XT, 2020 XT, 28x and 2020 3G system only).
- link outputs with sensors
- delete links of outputs with sensors
- adjust outputs
- check the condition of the outputs

### Functions of current and relay outputs

#### Relay output

- *System monitoring*
- *Sensor monitoring*
- *Limit indicator*
- *Frequency controller*
- *Pulse-width contr.*
- *Cleaning*
- *Sensor-controlled*
- *Manual control*
- *Alarm contact* (with the 184 XT, 2020 XT, 28x und 2020 3G system only)

#### Current output

- *Recorder*
- *PID controller*
- *Fixed current value*



The following informations are given in the system operating manual for your IQ SENSORNET system:

- general operating principles
- Basic information on how to use relay outputs
- Settings for the outputs

## **5 Maintenance and cleaning**

### **5.1 Maintenance**

The combi output module does not require any special maintenance work. The general maintenance of IQ SENSORNET components is described in the IQ SENSORNET system operating manual.

### **5.2 Cleaning**

The cleaning of IQ SENSORNET components is described in the IQ SENSORNET system operating manual.



## 6 Technical data

### 6.1 General data

#### Dimensions

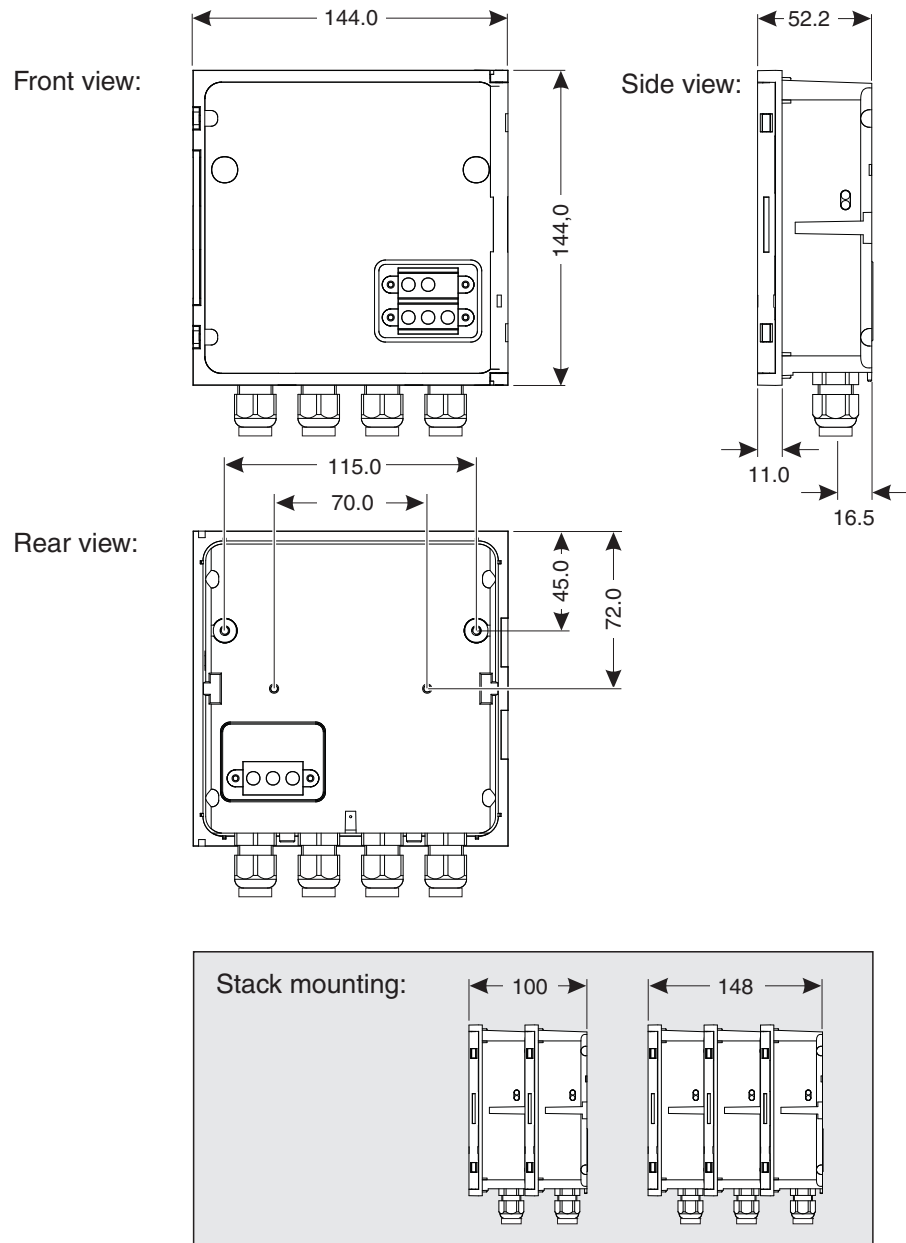


Fig. 6-1 Dimension drawing of MIQ module (dimensions in mm)

<b>Mechanical structure</b>	Maximum number of MIQ modules in a module stack	3
	Enclosure material	Polycarbonate with 20 % glass fiber

	Weight	Approx. 0.5 kg
	Type of protection	IP 66 (not suitable for direct conduit connection).
<b>Cable glands</b>	Suitable for cable sheath diameter	4.5 - 10 mm or 9.0 - 13 mm
<b>Ambient conditions</b>	Temperature	
	Mounting/installation/maintenance	+ 5 °C ... + 40 °C (+ 41 ... +104 °F)
	Operation	- 20 °C ... + 55 °C (- 4 ... + 131 °F)
	Storage	- 25 °C ... + 65 °C (- 13 ... + 149 °F)
	Relative humidity	
	Mounting/installation/maintenance	≤ 80 %
	Yearly average	≤ 90 %
	Dew formation	Possible
	Site altitude	Max. 2000 m above sea level
<b>Meter safety</b>	Applicable norms	<ul style="list-style-type: none"> <li>- EN 61010-1</li> <li>- UL 61010-1</li> <li>- CAN/CSA C22.2#61010-1</li> </ul>
<b>EMC product and system characteristics</b>	EN 61326	EMC requirements for electrical resources for control technology and laboratory use <ul style="list-style-type: none"> <li>- Resources for industrial areas, intended for indispensable operation</li> <li>- Interference emission limits for resources of class A</li> </ul>
	System lightning protection	Noticeably extended qualitative and quantitative protective characteristics as opposed to EN 61326
	FCC, class A	

## 6.2 MIQ/CR3; DIQ/CR3

<b>Electrical data</b>	Nominal voltage	Max. 24 VDC via the IQ SENSORNET (for details, see the TECHNICAL DATA chapter of the IQ SENSORNET system operating manual)
	Power consumption	MIQ/CR3: 3 W DIQ/CR3: 2,3 W
	Protective class	II
	Overvoltage category	II
<b>Terminal connections</b>	IQ SENSORNET connections	2 Additional connectable SENSORNET terminator (terminating resistor)
	Number of relay contacts	3
	Number of current outputs	3
	Terminal type	Screw-type terminal strip, accessible by opening the lid
	Terminal ranges	Solid wires: 0.2 ... 4.0 mm <sup>2</sup> AWG 24 ... 12 Flexible wires: 0.2 ... 2.5 mm <sup>2</sup>
	Line cross-section of cables carrying mains voltage	Europe: 1.5 ... 4.0 mm <sup>2</sup> USA: AWG 14 ... 12
	Cable feeds	4 cable glands M16 x 1.5 on the underside of the module

<b>Relays</b>	Output	Physically separated from the IQ SENSORNET
	Max. switching voltage	250 VAC or 24 VDC
	Max. switching current	5 A (AC and DC)
	Installation requirements	Fuse rating on the operator side: Maximum 5 A
	Relay functions	<ul style="list-style-type: none"> <li>– <i>System monitoring</i></li> <li>– <i>Sensor monitoring</i></li> <li>– <i>Limit indicator</i></li> <li>– <i>Frequency controller</i></li> <li>– <i>Pulse-width contr.</i></li> <li>– <i>Cleaning</i></li> <li>– <i>Sensor-controlled</i></li> <li>– <i>Manual control</i></li> <li>– <i>Alarm contact (MIQ/CR3 only)</i></li> </ul>

<b>Current outputs</b>	Output	Physically separated from the IQ SENSORNET
	Output current	Can be switched between 0 - 20 mA and 4 - 20 mA In the case of errors, can be set to: 0 ... 21 mA
	Max. initial output voltage	15 V, in the case of missing or incorrect burden
	Max. load	500 $\Omega$
	Accuracy	0.3 % $\pm$ 50 $\mu$ A
	Functions	Programmable as: <ul style="list-style-type: none"> <li>– Analog output</li> <li>– PID controller</li> <li>– Output with fixed current value (for test purposes)</li> </ul>

## 7 Indexes

### 7.1 Explanation of the messages

In this chapter you will find a list with all the message codes and corresponding message texts that may occur in the log book of the IQ SENSORNET system for the MIQ/CR3 output module.



Information about

- Contents and structure of the log book and
- Structure of the message code

can be found in the LOG BOOK chapter of the IQ SENSORNET system operating manual.



All message codes of the MIQ/CR3; DIQ/CR3 output module end with the number "411".

#### 7.1.1 Error messages

<b>Message code</b>	<b>Message text</b>
EA4411	<i>Current output range undercut</i> * Check process * Check settings and, if necessary, change them
EA5411	<i>Current output range exceeded</i> * Check process * Check settings and, if necessary, change them
EI3411	<i>Burden resistor too large (&gt; 500 Ohm) or current loop interrupted</i> * Check burden, terminal connections and connection lines

#### 7.1.2 Info messages

The MIQ/CR3 or DIQ/CR3 output module does not send any info messages.



## 8 Contact Information

### 8.1 Ordering & Technical Support

Telephone: (800) 897-4151  
(937) 767-7241  
Monday through Friday, 8:00 AM to 5:00 PM ET

Fax: (937) 767-1058

Email: [info@ysi.com](mailto:info@ysi.com)

Mail: YSI Incorporated  
1725 Brannum Lane  
Yellow Springs, OH 45387  
USA

Internet: [www.ysi.com](http://www.ysi.com)

When placing an order please have the following information available:

YSI account number (if available)	Name and Phone Number
Model number or brief description	Billing and shipping address
Quantity	Purchase Order or Credit Card

### 8.2 Service Information

YSI has authorized service centers throughout the United States and Internationally. For the nearest service center information, please visit [www.ysi.com](http://www.ysi.com) and click 'Support' or contact YSI Technical Support directly at 800-897-4151.

When returning a product for service, include the Product Return form with cleaning certification. The form must be completely filled out for an YSI Service Center to accept the instrument for service. The Product Return form may be downloaded at [www.ysi.com](http://www.ysi.com) and clicking on the 'Support' tab.







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- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

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