



INSTALLATION AND COMMISSIONING GUIDE



CAN bus-based I/O module, CIO 208 8 relays

- Mounting
- Terminals and wiring
- Commissioning, using the utility software



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1. Introduction

1.1 Warnings, legal information and safety

1.1.1 Warnings and notes

Throughout this document, a number of warnings and notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted as follows in order to separate them from the general text.

Warnings



DANGER!

This highlights dangerous situations. If the guidelines are not followed, these situations could result in death, serious personal injury, and equipment damage or destruction.



CAUTION

This highlights potentially dangerous situations. If the guidelines are not followed, these situations could result in personal injury or damaged equipment.

Notes



INFO

Notes provide general information, which will be helpful for the reader to bear in mind.

1.1.2 Legal information and disclaimer

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the engine/generator etc. controlled by the specific extension, the company responsible for the installation or the operation of the extension must be contacted.



DANGER!

The CIO module is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

1.1.3 Safety issues

Installing and operating the CIO module may imply work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.



DANGER!

Be aware of the hazardous live currents and voltages. Do not touch any live inputs as this could lead to injury or death.

1.2 About the installation and commissioning guide

1.2.1 General purpose

This installation and commissioning guide mainly includes general product and hardware information, mounting instructions, terminal strip descriptions, I/O lists and limits, wiring descriptions and how to produce translations for the CIO module through the USW.

The general purpose of this document is to give the user important information to be used in the installation of the unit.



DANGER!

Please make sure to read this document before starting to work with the CIO module and the controller. Failure to do this could result in human injury or damage to the equipment.

1.2.2 Intended users

This installation and commissioning guide is mainly intended for the person responsible for the design and installation. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information in the document.

1.2.3 Contents and overall structure

This document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page.

2. Installation, mounting and wiring

2.1 Installation

2.1.1 Installation

The CIO module is delivered in a sturdy carton to prevent shipping damage. When you receive a system, check the part number against that of the requisition and packaging list for agreement. Inspect for damage, and if there is evidence of such, immediately file a claim with the carrier and notify the regional DEIF sales office, your sales representative or a sales representative at DEIF's head office in Skive, Denmark.

If the unit is not installed immediately, store it in the original shipping package in a moisture and dust free environment.

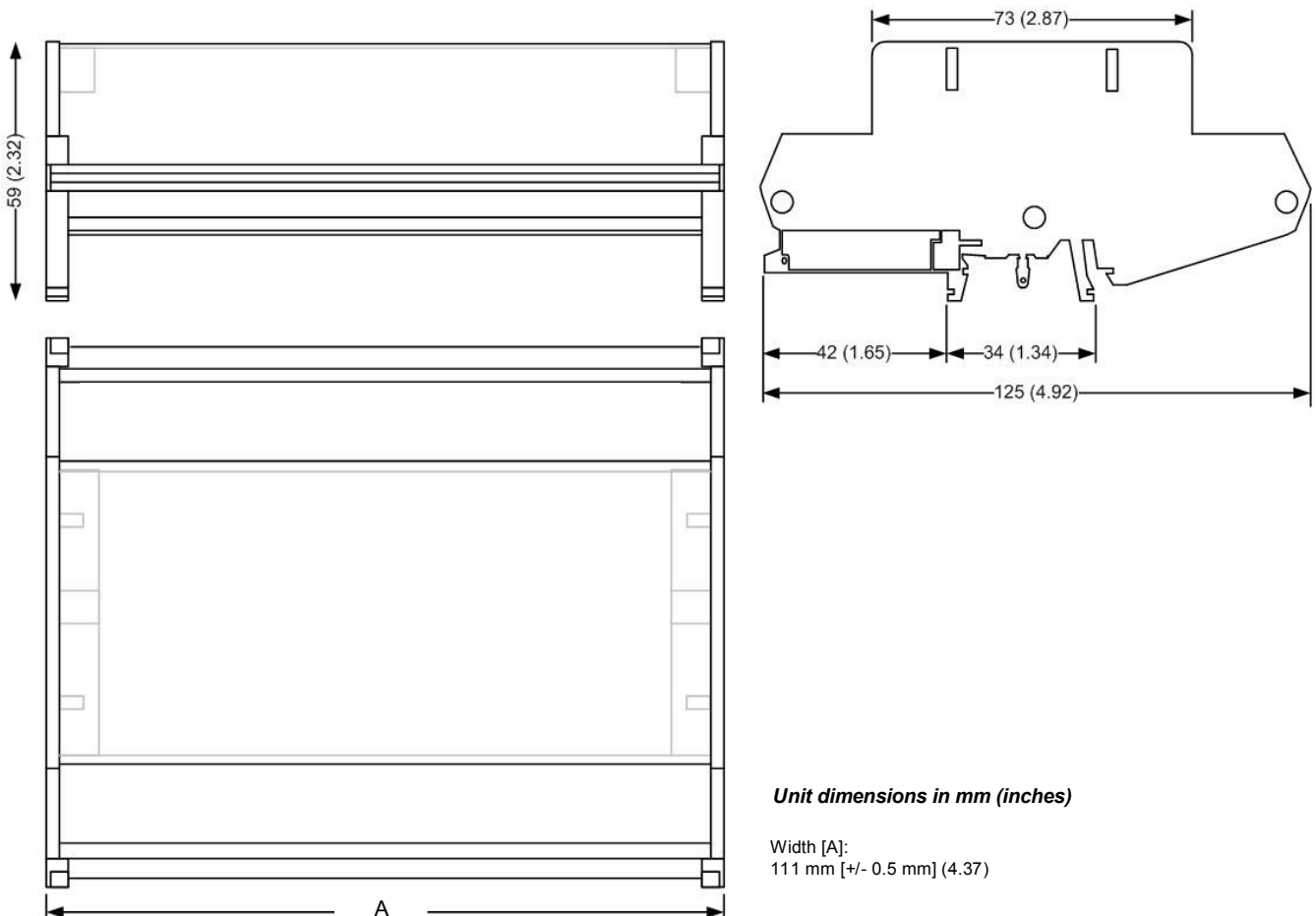
2.2 Mounting

2.2.1 Mounting the CIO modules

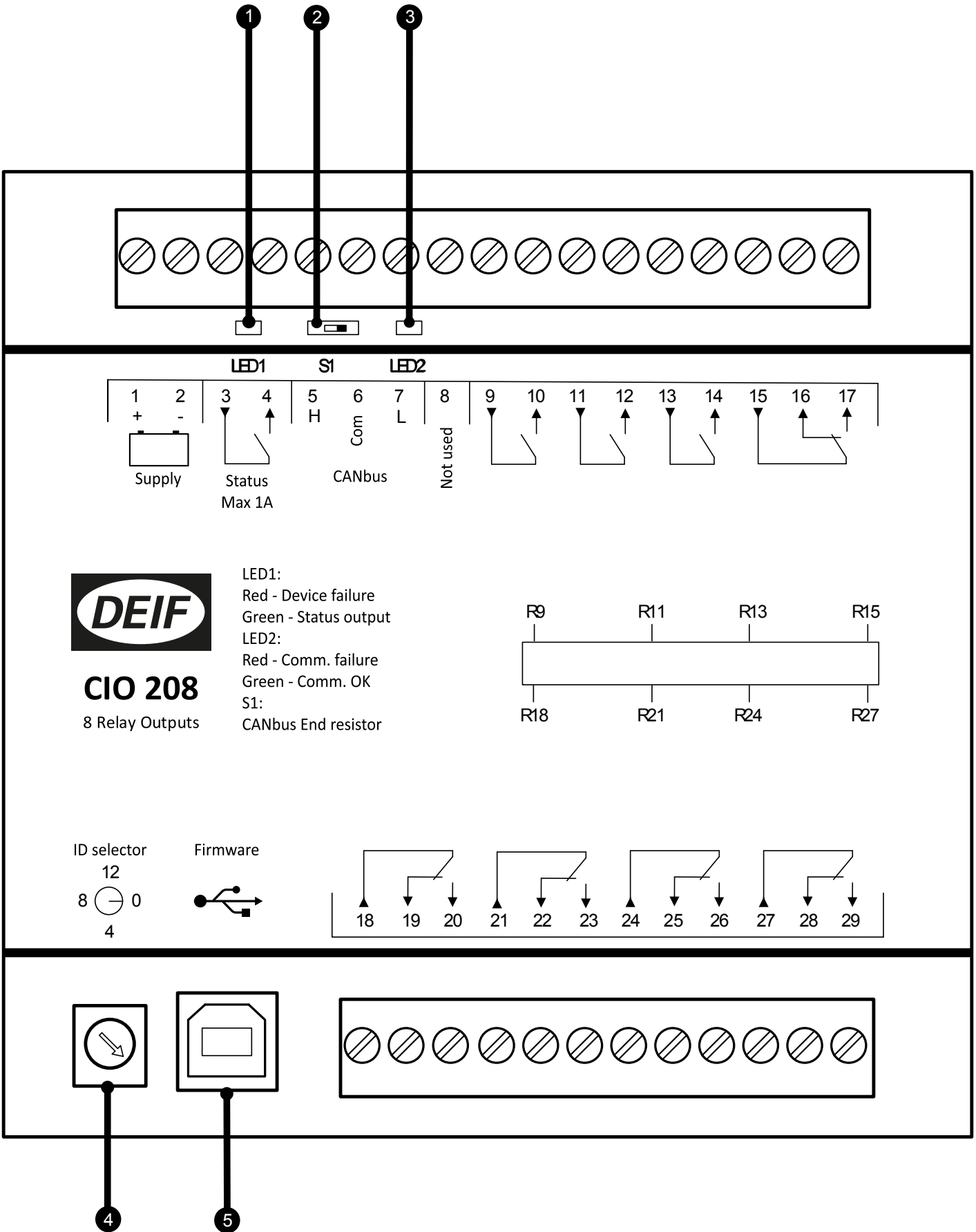
The CIO module is designed for mounting in a closed cabinet on a DIN rail. The module can be mounted on either a TS35 or G-type rail. The unit must be mounted where the ambient temperature does not exceed the range -40 to +70 °C.

2.2.2 Dimensions

The CIO 116 and CIO 208 modules have the following dimensions:



2.3 Common functions



1. LED1 (Status LED)

LED1 indicates the operation status of the module, and the status output of this LED is located at terminal 3-4.

Set up as either status or configurable relay:

Set up as status relay

LED colour	Description
Green	Status is OK, the relay is closed.
Red constant	The CIO module is not working correctly, the relay is open.
Red flashing	ID 0 is selected, relay is open.

Set up as configurable relay

LED colour	Description
Green	Status is OK, the relay is closed.
Turned off/no light	Status is OK, the relay is open.
Red constant	The CIO module is not working correctly, the relay is open.
Red flashing	ID 0 is selected, relay is open.
Yellow	The relay is closed, status is not OK.

2. Terminal resistor

The CIO module has a built-in 120 ohm end-termination for the CAN bus line which can be activated via the switch (S1) located at terminal 5. See the section "CAN bus" in "Wiring and terminals" for more information and to see when to activate the switch.

3. LED2 (CAN bus LED)

LED2 indicates the status of the CAN bus communication to the host controller. This LED is located at terminal 7.

LED colour	Description
Green constant	Communication to the controller is working correctly.
Red constant	No CAN bus communication detected.
Red 2 flashes	CAN bus communication detected, but no CIO-specific communication
Red flashing	CIO communication detected, but not to this module.

4. ID selector

The ID selector is used to give CIO modules of the same type different IDs.

CIO 116 can use IDs from 1 to 15

CIO 208 can use IDs from 1 to 15

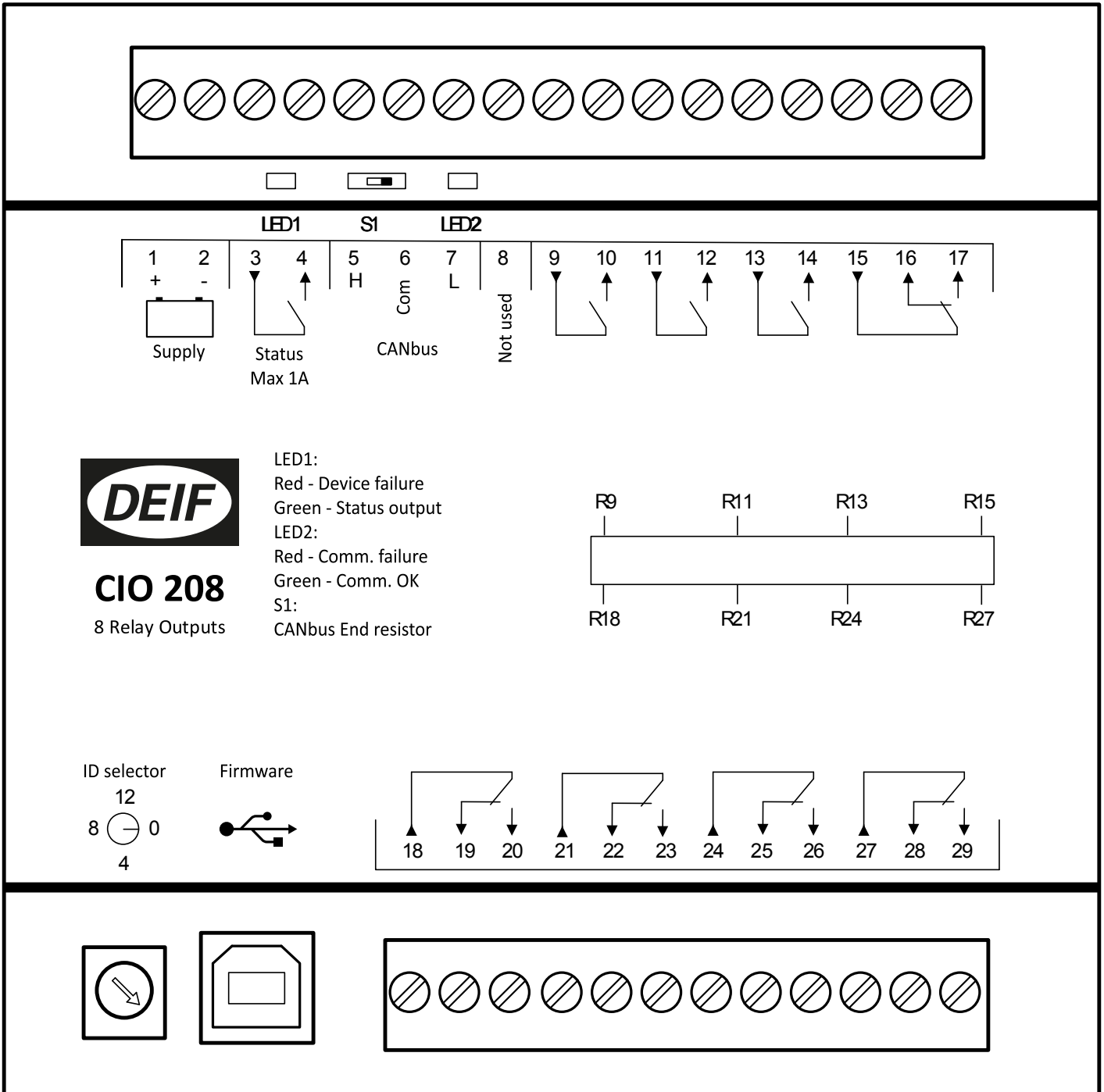
CIO 308 can use IDs from 1 to 15

5. USB for firmware update

The firmware of the CIO modules can be updated via the USB port.

2.4 Wiring and terminals

2.4.1 Terminal overview CIO 208



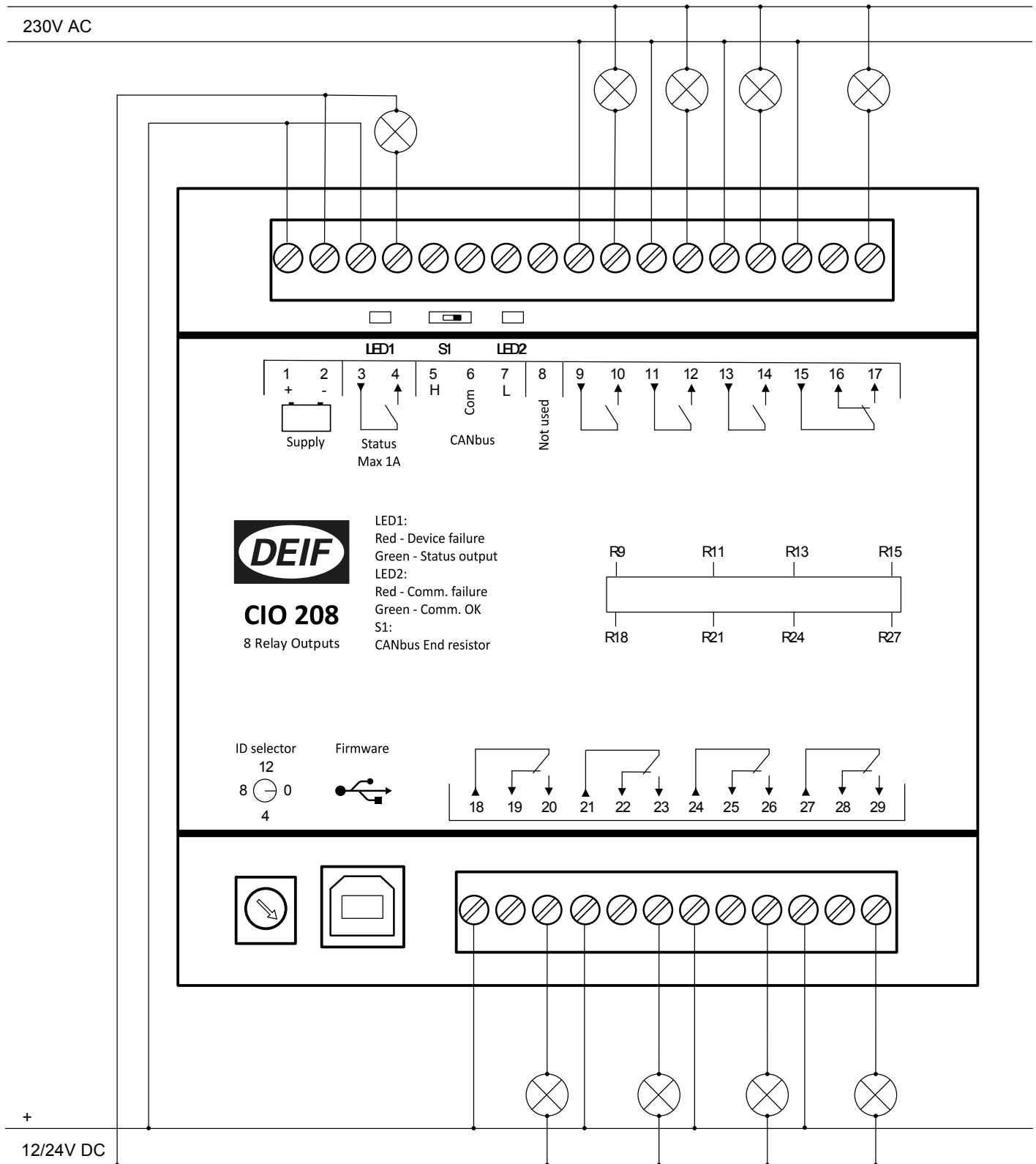
Terminal	Name	Description	Comment		
1	+	+12/24 V DC	Power supply		
2	-	0 V DC			
3	Status	Common	Status relay (configurable)		
4		Normally open			
5	H	CAN H	CAN bus interface		
6	Com	CAN Com			
7	L	CAN L			
8	<i>Not used</i>				
9	R9	Common	Relay 9	Relay group 1	
10		Normally open			
11	R11	Common	Relay 11		
12		Normally open			
13	R13	Common	Relay 13		
14		Normally open			
15	R15	Common	Relay 15		
16		Normally closed			
17		Normally open			
18	R18	Common	Relay 18		
19		Normally closed			
20		Normally open			
21	R21	Common	Relay 21		Relay group 2
22		Normally closed			
23		Normally open			
24	R24	Common	Relay 24		
25		Normally closed			
26		Normally open			
27	R27	Common	Relay 27		
28		Normally closed			
29		Normally open			



INFO

The two relay groups can have different voltage levels.

2.4.2 CIO 208 wiring



INFO
Rated for 250 V AC/30 V DC, 8 A resistive load.

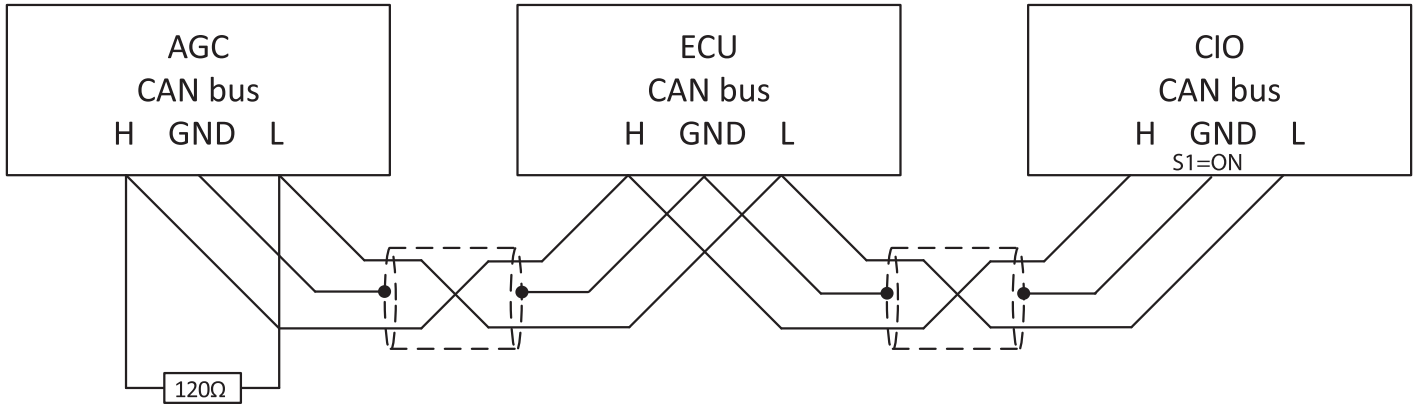
2.4.3 CAN bus

The CIO module(s) can be configured as the only device on the CAN bus or together with an engine controller (ECU) on the same CAN bus as shown in the below example. CIO module(s) can be placed together with all the different engine protocols which are available in the AGC (both J1939 and CANopen), because the CIO module will adapt to the baud rate on the CANline.

It is possible to connect up to three CIO modules of each type to one AGC.

INFO
A controller cannot have both CIO modules and Beckhoff modules connected

Below is an example that shows how the CAN bus can be connected:



AGC 200

On the AGC 200, only CAN port C is available.

Terminal	Function	Description
13	CAN H	CAN port C
14	Com	
15	CAN L	

AGC-4/AGC Plant Management

On the AGC-4 and AGC Plant Management, it is possible to use the CAN ports C, D, E or F, and you need to have at least one of the following options: H5, H8 or H12.

INFO
Option H7 is not available for use with CIO modules.

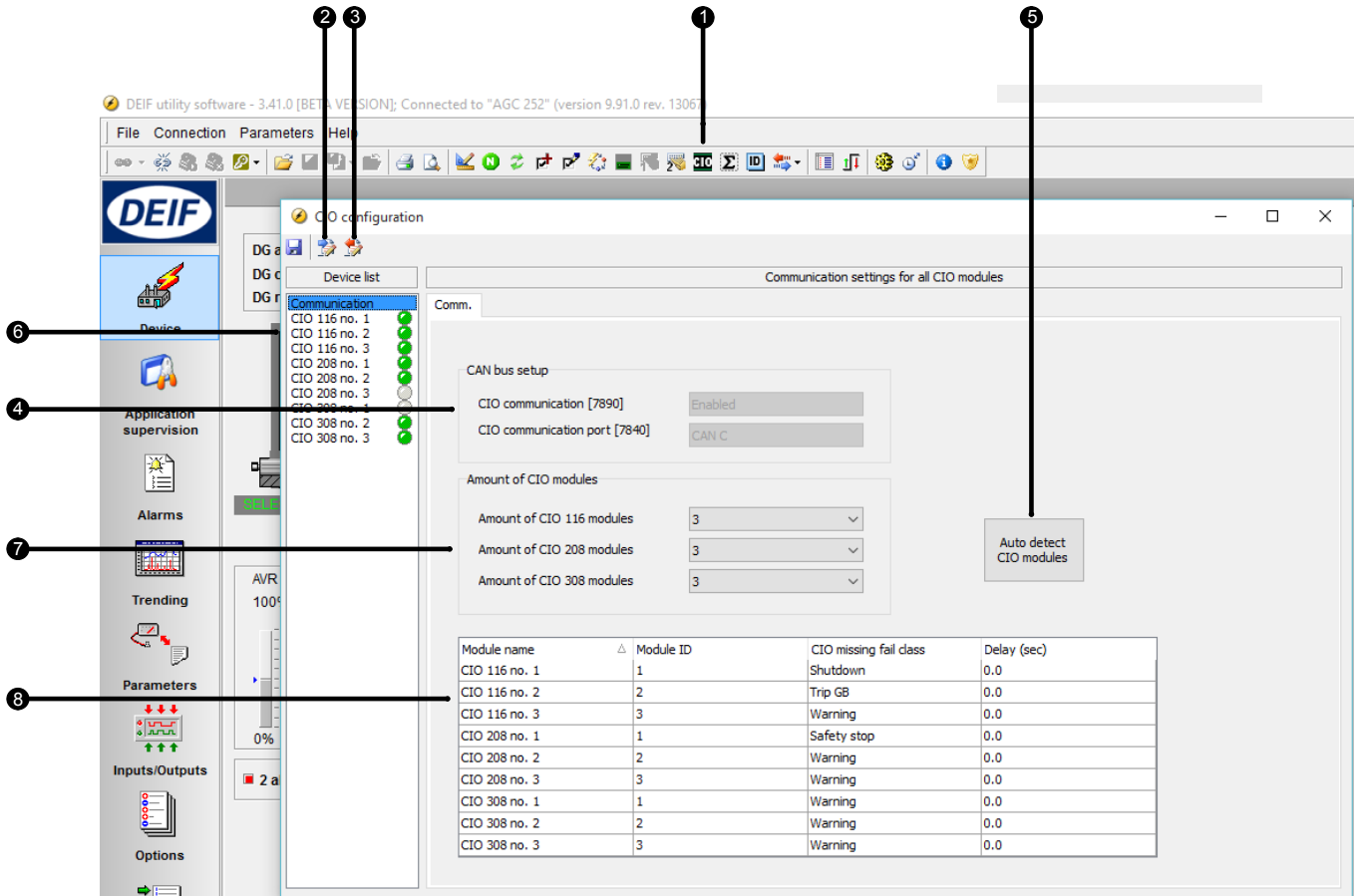
Terminal	Function	Description
29	CAN H	CAN port C
30	Com	
31	CAN L	

Terminal	Function	Description
32	CAN H	CAN port D
33	Com	
34	CAN L	
131	CAN L	CAN port E
132	Com	
133	CAN H	
128	CAN L	CAN port F
129	Com	
130	CAN H	

3. Communication

3.1 Communication setup

A few parameters revolving around communication to the CIO can be accessed through the display. Through the CIO tab in the USW, full access to all the CIO parameters is available. The CIO configuration menu is accessed from the top menu bar of the USW.



1. CIO configuration menu

When you open the CIO configuration menu, the first page is Communication setup.

2. Read configuration from the controller

3. Write configuration to the controller

4. CAN bus setup

The CAN port for the CIO modules is illustrated as well as the communication port, which are both configured in the USW parameter list.

5. Auto detect

If the CIO modules are already connected and have the correct ID, the USW can automatically detect the number and composition of CIO modules by using the auto detect function.

6. Device navigation list

Click a module from the list to access setup of the module. The green/grey light indicates if connection to the module is established.

7. Manually select how many devices are connected

8. List of modules

The module ID must correspond with the ID selected on the module and can be changed manually in the list. The fail class and delay set here are triggered if the specific module is missing.



INFO

The first time you open the menu, the buttons will be inactive and it is necessary to read the configuration from the controller.



INFO


If the communication to a CIO 116 or CIO 308 module is lost, the AGC will continue with the last received input value.

3.1.1 Step-by-step guide to setting up communication the first time

Follow these steps to establish communication to the CIO modules. Setup of the I/Os is described in a later chapter.

- Adjust the ID from 1-15 on the switch by rotating the screw in the lower left corner
- Select which CAN port to use for CIO (parameter 7840).

Select "Ext. modules DEIF" if the CAN port is only used to CIO modules, but if an engine (ECU) also is connected to the CAN line then "H5 EIC" or similar should be selected.

- Enable CIO communication (parameter 7890).
- Open the CIO menu by pressing the CIO icon 
- Read the configuration from the controller.
- Auto-detect the number of modules and their ID.

This only works if the CIO modules are connected, but it is also possible to manually add and configure modules by changing value in "Amount of CIO xxx modules"

- Determine fail class for module missing for all modules.
- Write the configuration to the controller.





CAUTION

When the configuration is written to the controller all I/Os are temporarily disabled. For example, all relays are de-energised.

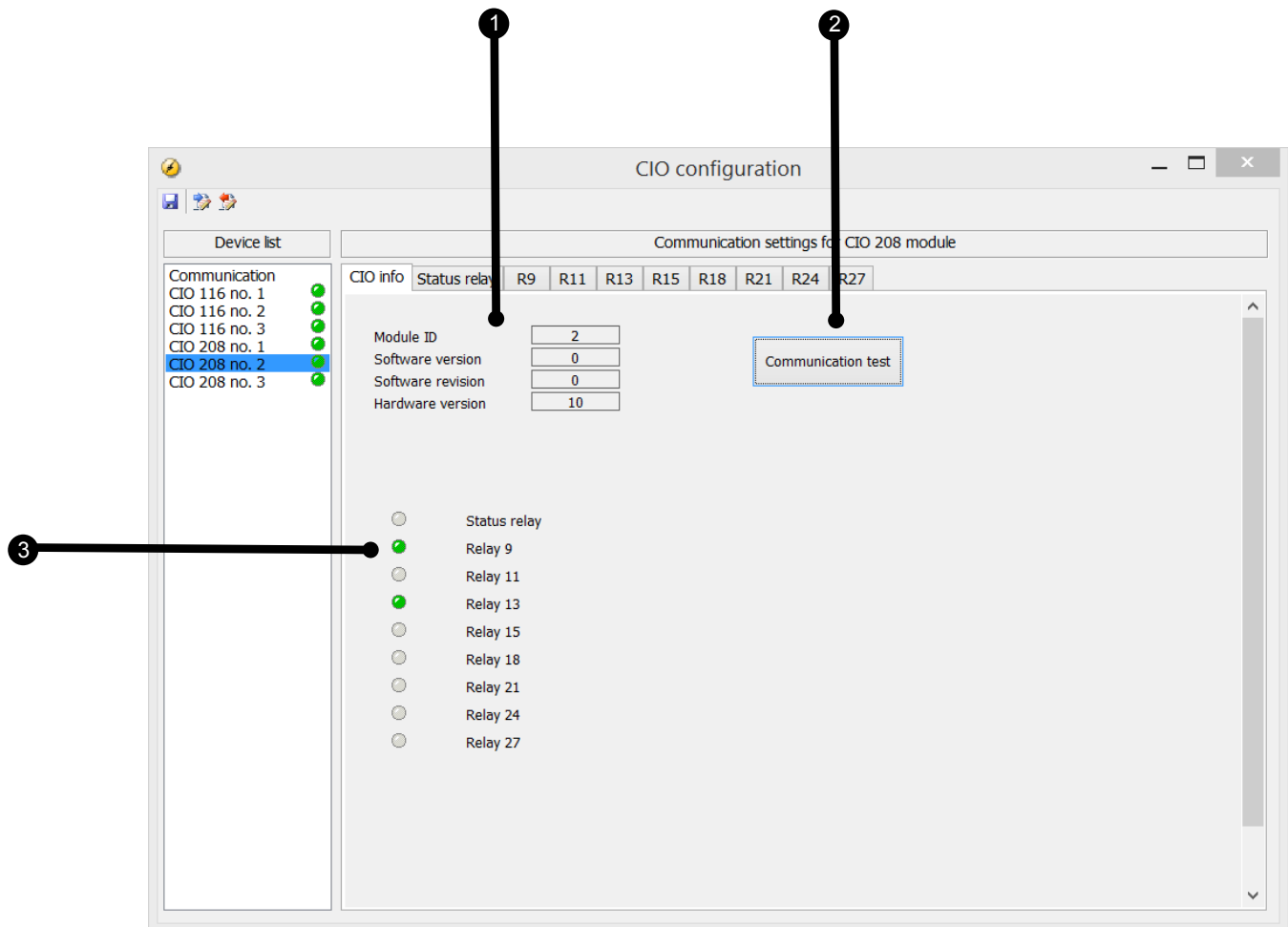
3.1.2 Step-by-step guide to update firmware to CIO module

Follow these steps to update the firmware for a CIO module.

- Apply power to the module
- Set ID to 0.
- Connect a USB cable between the CIO module and a PC
- Open the utility software and connect to the CIO module via USB.
- Login as "Customer" with the password 2000.
- Write a new firmware to the device by pressing this icon 
- When the firmware is completed, the connection can be stopped , the USB cable can be removed, and the ID should be returned to the desired ID.

4. I/O setup

4.1 CIO info tab



1. Module info

This section gives an overview of the specific module's ID and the software and hardware version of the module. This information is important if support is needed for the product.

2. Communication test

When you click the Communication test button, the CAN bus LED (LED2) of the corresponding module will flash green.

3. I/O status

In this section, the state of the relays is shown.

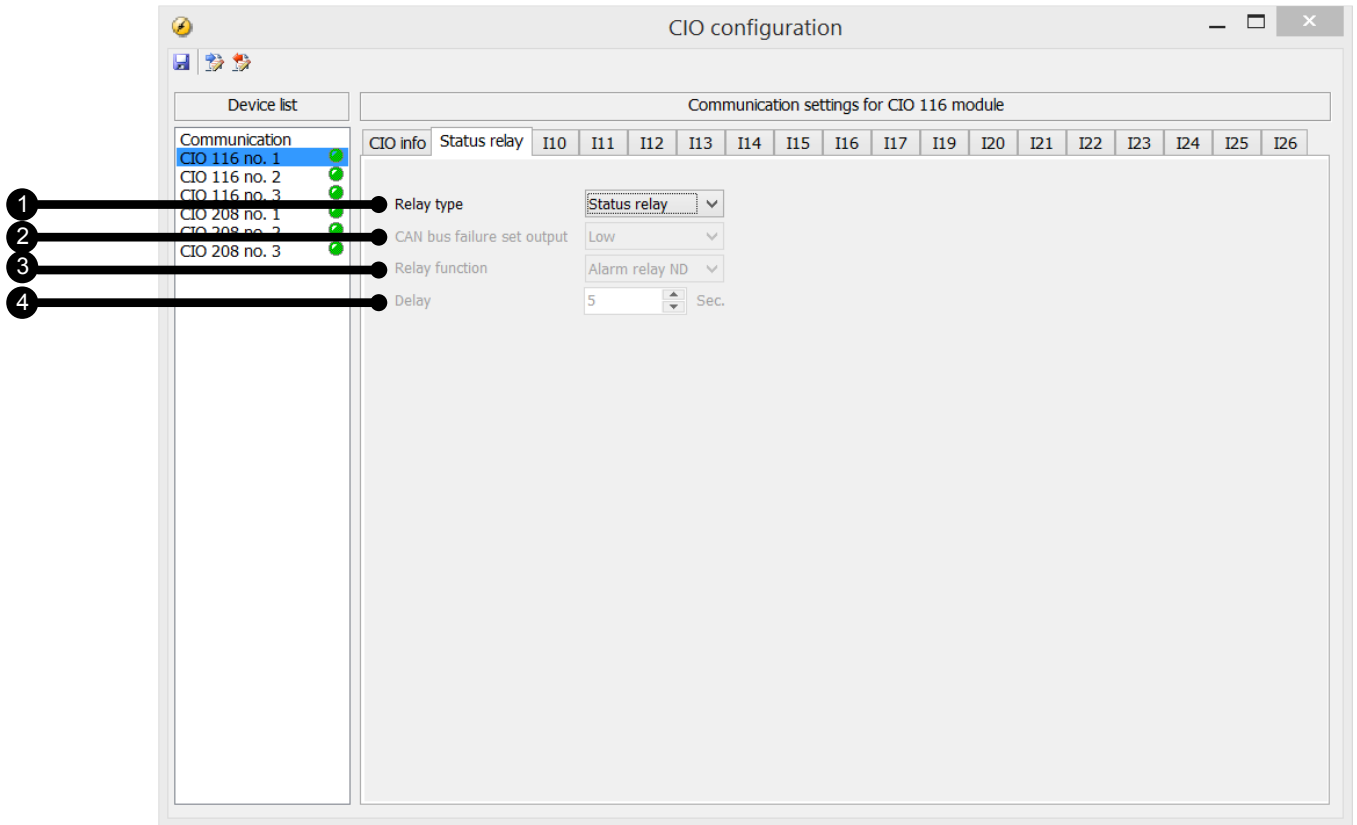
4.2 Status relay

The module has a status relay, which can be used as a status relay or as a configurable relay.



INFO

Power cycling the CIO module while there is no communication to the AGC will reset the settings results, and the relay will be set as a status relay until communication is established. The CIO configuration is stored in the AGC, and this means that the CIO module will be configured when the communication to the AGC is available.



1. Relay type

This setting has two states: Status relay and Configurable.

If it is used as a status relay, the relay will stay closed as long as the state of the module is OK, which corresponds with a constant green status LED (see Status LED). If the relay is used as a status relay, the settings below are disregarded.

2. CAN bus failure set output

This setting has three levels: Low, High and Stay. In case of a CAN bus failure, the related relay will change its state based on this setting. If it is set to Stay, the relay will keep its current state until communication is working again.

3. Relay function

The relay function can be set to five different settings:

Alarm relay ND

The related relay is used as an alarm relay of the type "ND" (Normally De-energised).

The relay is activated until the alarm that caused the activation is acknowledged and gone.

Limit relay

The relay will activate at a certain predefined limit set point. When the condition that activated the relay has returned to normal, and when the delay has expired, the relay will deactivate. The delay is adjustable.

An output relay should be configured as a limit relay, otherwise an alarm will be raised when the output is activated.



INFO

To use the relay in M-Logic, it must be configured as a limit relay.

Horn relay

All configurable relays can be selected to be a horn output (horn relay).

This means that, for example, the relay can be connected to an alarm annunciator, like a horn. When "Horn relay" is selected, an external horn is activated every time a new alarm occurs. If the alarm horn timer in parameter 6130 is adjusted to 0 seconds, the horn remains activated until the alarm is acknowledged. If the alarm horn parameter (6130) is not 0 seconds, the horn relay output is active until the timer expires and then the relay deactivates, even though the alarm is still present.

Siren relay

When "Siren relay" is selected, an external siren is activated on all alarms, like the selection "Horn relay". When the siren relay is activated and another alarm is active, a short-time reset will be activated. If the alarm horn timer in parameter 6130 is adjusted to 0 seconds, the siren relay remains activated until all alarms are acknowledged.

Alarm relay NE

The related relay is used as an alarm relay of the type "NE" (Normally Energised).

The relay is normally closed, and if the related alarm occurs, the relay will open until the alarm is acknowledged and gone.

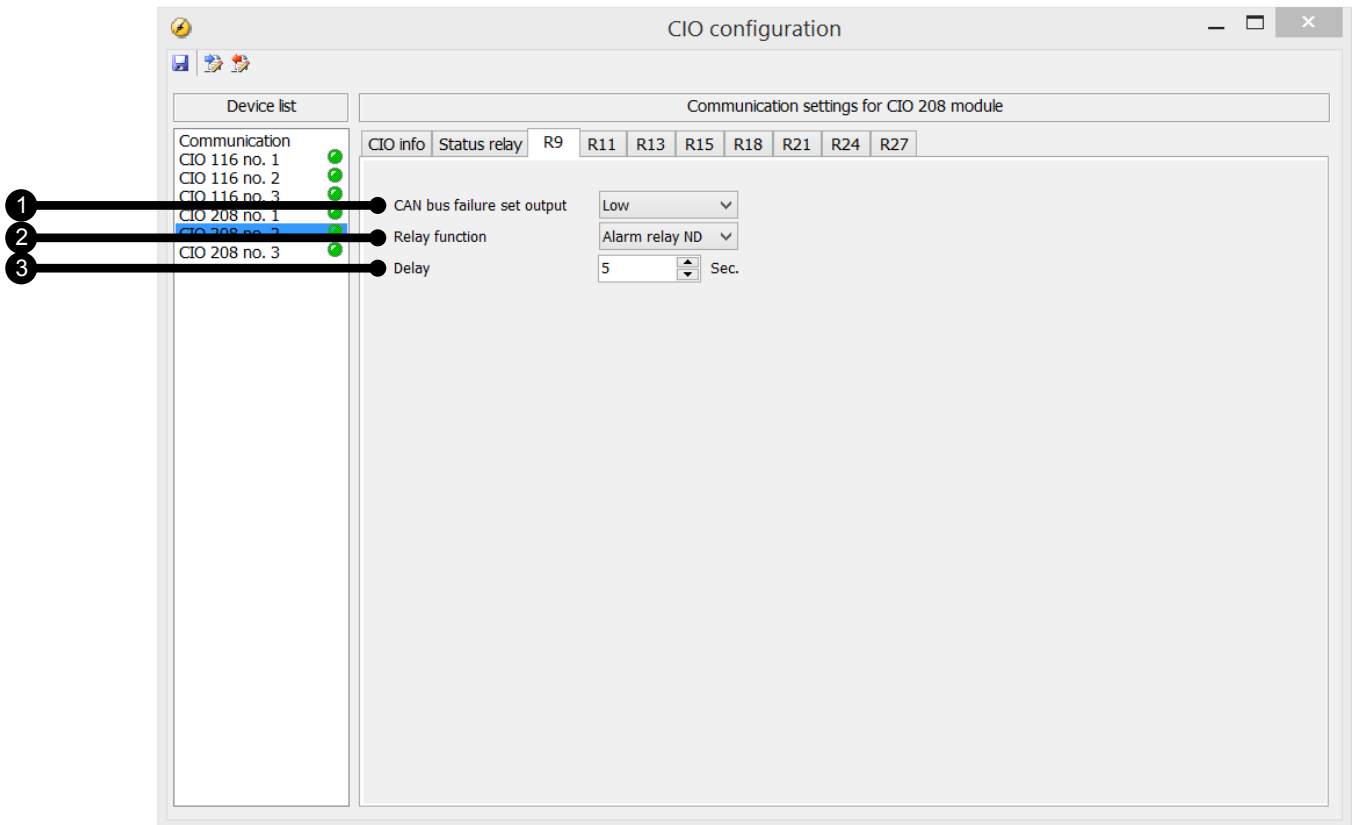
4. Delay

Used when the relay function is "Limit".

The delay setting indicates how many seconds the relay stays energised after the input has become inactive. This functionality is also called off-delay.

4.3 CIO 208

4.3.1 Relay settings



In the following, the functions for the relays of the CIO 208 are described:

1. CAN bus failure set output

This setting has three levels: Low, High and Stay. In case of a CAN bus failure, the related relay will change its state based on this setting. If it is set to stay, the relay will keep its current state until communication is working again.

2. Relay function

The relay function can be set to five different settings.

Alarm relay ND

The related relay is used as an alarm relay of the type "ND" (Normally De-energised).

The relay is activated until the alarm that caused the activation is acknowledged and gone.

The alarm LED is flashing or constant, depending on the acknowledged state.

Limit relay

The related relay will activate at the limit set point. After the condition that activated this relay has returned to normal, the relay will deactivate when the "Delay" has expired. The delay is adjustable.

An output relay should be configured as a limit relay. Otherwise, an alarm will be raised whenever the output is activated.

To use the relay in M-Logic, it must also be configured as a limit relay.

Horn relay

All configurable relays can be selected to be a horn output (horn relay).

This means that, for example, the relay can be connected to an alarm annunciator, like a horn. When "Horn relay" is selected, an external horn is activated every time a new alarm occurs. If the alarm horn timer in parameter 6130 is adjusted to 0 seconds, the horn remains activated until the alarm is acknowledged. If the alarm horn parameter (6130) is not 0 seconds, the horn relay output resets itself after the adjusted delay has expired, even though the alarm is still present.

Siren relay

When "Siren relay" is selected, an external siren is activated on all alarms, like the selection "Horn relay". When the siren relay is activated and another alarm is active, a short-time reset will be activated. If the alarm horn timer in parameter 6130 is adjusted to 0 seconds, the siren relay remains activated until all alarms are acknowledged.

Alarm relay NE

The related relay is used as an alarm relay of the type "NE" (Normally Energised).

The relay is deactivated until the alarm that caused the deactivation is acknowledged and gone.

3. Delay

Used when the relay function is "Limit".

The delay setting indicates how many seconds the relay stays energised after the input has become inactive. This functionality is also called off-delay.