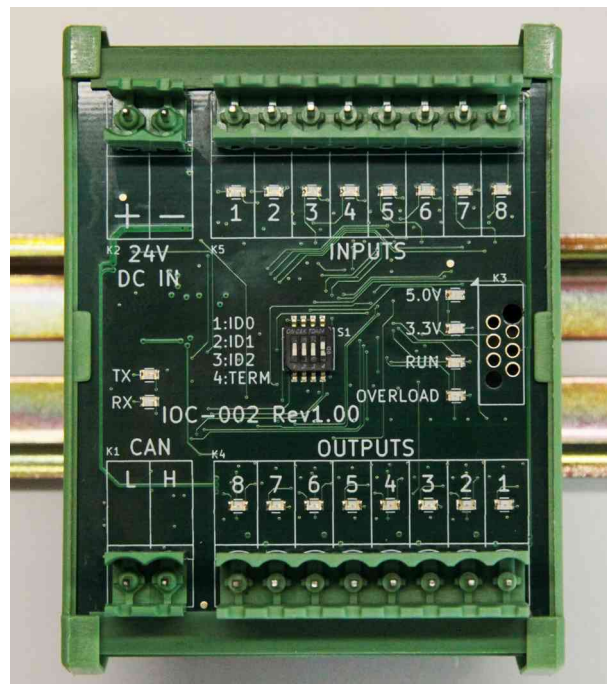


IOC-002

Description of CAN messages
Revision 1.00 / 02.03.2022
0007-000082



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Revision 1.00

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Table of contents

1 Overview.....	1
2 Intended audience.....	1
3 General CAN properties.....	1
4 IOC-002 CAN messages.....	2
4.1 Status of digital input.....	2
4.2 Set-point value of digital output.....	2
4.3 Module status information.....	3
4.4 Clear module overload.....	4
4.5 Startup.....	4
5 History of revisions.....	5

1 Overview

This document describes the CAN bus communication of the *IOC-002* module. There are messages to access the 8 digital inputs and outputs as well as messages used to transfer status information.

A basic knowledge of the CAN bus communication according to ISO specification 11898-1 is a good foundation for reading this document.

2 Intended audience

The intended audience for this document is the **software developer** integrating *IOC-002* modules in a custom product or application.

3 General CAN properties

The *IOC-002* module uses 29 bit CAN message identifiers, a payload of 0 to 8 bytes and transfers data at a bit rate of 1MBit. Payload data is represented in little-endian.

Remote frames are supported for some data frames to query the *IOC-002* actively for any input and system status. A remote frame consist of the same CAN message identifier as the data frame but has no payload.

4 IOC-002 CAN messages

A CAN bus can hold up to 8 *IOC-002* modules numbered 0 to 7. This number is part of the message identifier and indicated by a placeholder hash mark # in the following CAN message identifiers. All message identifiers are represented in hexadecimal format.

4.1 Status of digital input

Message identifier	0x1ff#ffff
Payload length (bytes)	1
Payload description	Bit 0 corresponds to input channel 1, bit 7 to input channel 8. A bit value of 1 indicates that the input channel is driven by 24V.
Remote frame support	yes

This message is either transmitted automatically by the *IOC-002* module on changes of the digital inputs or on request by a remote frame.

4.2 Set-point value of digital output

Message identifier	0x1fe#ffff
Payload length (bytes)	1 to 8
Payload description	Every byte of the payload holds information about one specific digital output. The lower nibble of this byte indicates the output number or channel (1 to 8). The higher nibble indicates the desired state (0 to connect the output to the 0V rail, 1 to connect the output the 24V rail and any other value to leave the output floating).
Remote frame support	no

This message is typically transmitted by a control unit to command a digital output's new set-point.

4.3 Module status information

Message identifier	0x1fd#ffff
Payload length (bytes)	8
Payload description	<p>Bytes 0 and 1 represent a 16 bit unsigned integer reporting the total sink current of all outputs mA.</p> <p>Bytes 2 and 3 represent a 16 bit unsigned integer reporting the total source current of all outputs mA.</p> <p>Bytes 4 and 5 represent a 16 bit unsigned integer reporting the supply voltage of the module in mV. This value can be up 1V below the supply voltage measured on the terminals of the module.</p> <p>Byte number 6 represents the PCB temperature in °C. This temperature is generally 5 – 20 °C above the ambient temperature of the module.</p> <p>Bit 0 (LSB) of byte 7 indicates the overload state of the module. If set either the sum of all currents of the 8 digital outputs exceeds the limit or the module temperature is too high or a power supply voltage failure has been detected.</p> <p>Bit 1 of byte 7 indicates a power failure of the supply voltage. If set the supply voltage does not correspond to the limits specified by the module's datasheet. If this happens all digital outputs are disconnected from any respective power rail and left floating. Furthermore all changes of digital inputs are ignored and therefore not reported by the respective CAN message.</p>
Remote frame support	yes

This message is emitted by the module whenever one or more of the supervised limits turn from **good to bad** or back from **bad to good**.

Alternatively it is transmitted on reception of the corresponding remote frame and therefore allows querying the status information at any time.

4.4 Clear module overload

Message identifier	0x1fc#ffff
Payload length (bytes)	0
Description	This message will clear a possibly pending overload condition allowing the digital outputs to continue sourcing or sinking current.
Remote frame support	no

A control unit will typically transmit this message to *re-enable* a module after a failure state. It is therefore important that the cause that led to the failure state is removed **before** this message is sent to the corresponding module. Failing to do so will re-trigger failure state.

Repetitive transmission of this message to a module without removing the cause of the failure can damage the IOC-002 module itself or any load connected to its digital outputs.

4.5 Startup

Message identifier	0x1fb#ffff
Payload length (bytes)	0
Description	This message is emitted by the IOC-002 module on startup.
Remote frame support	no

This message is mainly used as notification information. An IOC-002 module can emit this message due to normal power-up, reset, watchdog or any other event forcing it to restart.

5 History of revisions

Revision	Date	Comment
1.00	02.03.2022	initial revision