

USB-to-CAN V2

Plugin

HARDWARE MANUAL

ENGLISH



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Support

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Further international support contacts can be found on our webpage www.ixxat.com

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1 Introduction

By purchasing the USB-to-CAN^{V2} Plugin interface, you decided for a high-quality electronic component developed and manufactured according to the latest technological standards.

In the further description these interfaces are referred as CAN interface.

The features of the CAN interfaces are described below.

Common Features

All CAN interfaces have the following features:

- USB 2.0 Hi-Speed (480 MBit/s)
- Connection using single row female header (Fieldbus and USB)
- Same dimensions and fastening possibilities

Type Dependent Features

Depending on the used CAN interface different field busses and features are supported.

Order number	Features
1.01.0288.11003	<ul style="list-style-type: none"> ▪ one CAN-High-Speed channel according ISO11898-2
1.01.0288.12003	<ul style="list-style-type: none"> ▪ one CAN-High-Speed channel according ISO11898-2 ▪ galvanic isolated
1.01.0288.22003	<ul style="list-style-type: none"> ▪ two CAN-High-Speed channels according ISO11898-2 ▪ galvanic isolated (both CAN channels on same potential)
1.01.0288.22043	<ul style="list-style-type: none"> ▪ two CAN-High-Speed channels according ISO11898-2, one of these channels is software switchable to ISO 11898-3 (CAN low speed/Fault tolerant) ▪ one LIN-Interface V1.3 and V2.1, Master/Slave-Mode switchable via software. <i>Please note instructions under chapter 5.2.</i> ▪ galvanic isolated (both CAN channels and LIN on same potential)

Table 1-1

2 Installation

2.1 Software Installation

To operate the interface a driver has to be installed first. For Windows this driver is part of the VCI (Virtual CAN Interface) V3, which can be downloaded for free on the Ixxat webpage <http://www.ixxat.com>.

For installation of the VCI V3 driver on Windows computers, please refer to the VCI installation manual.

HMS also offers the ECI driver for Linux and real-time operating systems for many CAN interfaces. Information on supported operating systems and interfaces is available on the Ixxat webpage <http://www.ixxat.com>.

2.2 Hardware Installation

Before installing the CAN interface onto your PC, you should install the software driver first (see previous section).

For all work on the PC and interface, you must be statically discharged. Work must be carried out on an earthed, anti-static work mat.

Take the following steps in sequence:

- (1)** Switch off the PC and unplug the power cord.
- (2)** Open the PC according to the instructions of the PC manufacturer and find a suitable slot. Please note the polarity and the occupancy of the pin connector in your PC. Do not use force when plugging in.
- (3)** Make sure that the interface sits tightly in the PC.
- (4)** Close the PC; the hardware installation is now complete.

3 Connectors and Displays

3.1 Connectors

In Figure 3-1 the position of field bus and USB connectors of the CAN Interface with the appropriate pin no. 1 is shown.

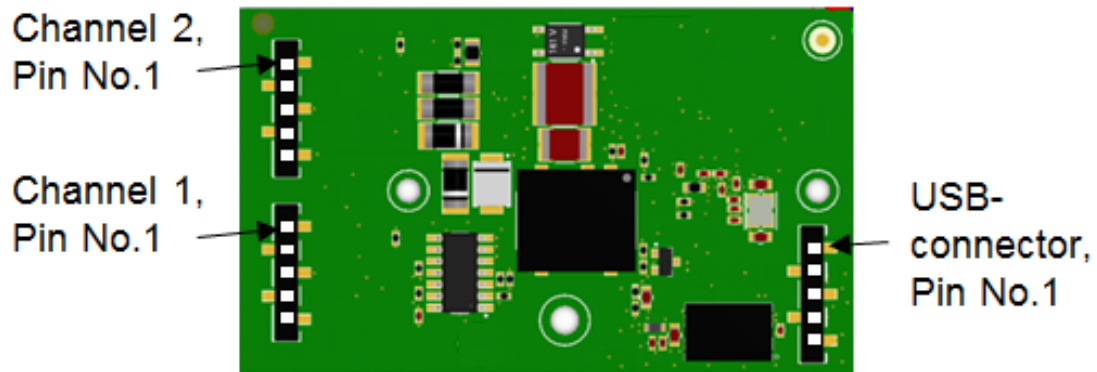


Figure 3-1: Displays (LED) on bottom side

3.1.1 USB Connector

The shield (pin 5) of the USB cable is connected to ground (GND) using a 100nF capacitor and therefore also connected to ground of the USB plug.

It is recommended, that the interface is directly connected to PC USB ports or to self-powered USB hubs to ensure sufficient power supply.

<i>USB Pin No.</i>	<i>Signal</i>
1	+5V / Voltage + / VCC
2	D- / Data - / USB -
3	D+ / Data + / USB +
4	GND / Voltage - / Ground
5	S-GND / Shield

Table 3-1, Pinning USB connector

3.1.2 Fieldbus Connectors

If you are using a not galvanic isolated CAN interface, field bus ground (CAN GND) and USB ground (GND) have the same potential.

Using a CAN interface with galvanic isolation, these grounds are separated. Please be care, that in this case the grounds of the field busses (CAN1 / CAN 2 / LIN) have no galvanic isolation among each other.

For best noise immunity, the shields of the CAN cables must directly connected to ground.

Pinning of the single row female headers for field bus connections are listed below (see also Figure 3-1).

		CAN Interface 1.01.0288.xxxxx			
<i>Channel 1</i>		11003	12003	22003	22043
<i>Pin No.</i>	Signal				
1	CAN HS High	✓	✓	✓	✓
2	CAN HS Low	✓	✓	✓	✓
3	CAN GND	✓	✓	✓	✓
4	CAN LS High				✓
5	CAN LS low				✓
<i>Channnel 2</i>					
<i>Pin No.</i>	Signal				
1	CAN HS High			✓	✓
2	CAN HS Low			✓	✓
3	CAN GND			✓	✓
4	LIN				✓
5	LIN VBat (18V max.)				✓
Field bus galvanic isolated			✓	✓	✓

Table 3-2: Fieldbus pinning

3.2 Displays

The CAN interfaces have LED's that shows the current communication status of USB and fieldbus activities (see Figure 3-2).

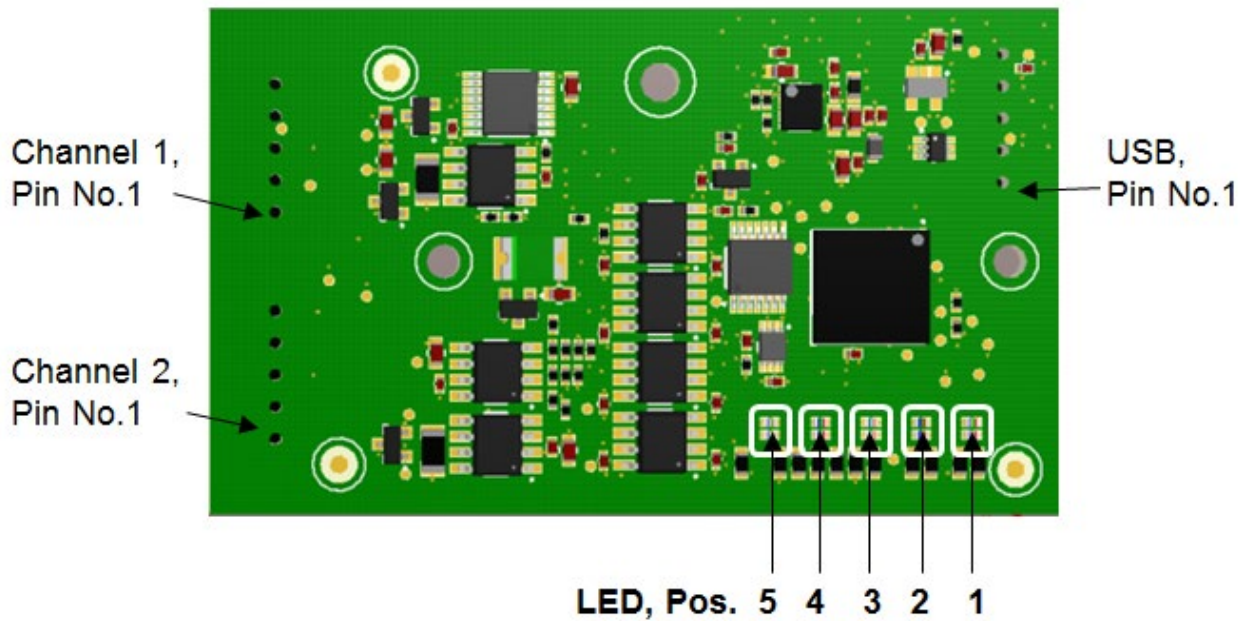


Figure 3-2: Displays (LEDs) on top side

Available LEDs on the different CAN interfaces are show in Table 3-3

LED Pos.	Signal	CAN Interface 1.01.0288.xxxxx			
		11003	12003	22003	22043
1	USB	✓	✓	✓	✓
2	CAN 1 LS				✓
3	CAN 1	✓	✓	✓	✓
4	CAN 2			✓	✓
5	LIN				✓

Table 3-3: LED position and meaning

3.2.1 USB LED

Light pattern	Description	Causes / Hints
off	No communication via USB	<ul style="list-style-type: none"> • Device not properly initialized, maybe the USB port can't provide enough power. • Device not connected to USB port
green	USB communication possible	<ul style="list-style-type: none"> • Device ready for action
red flash	State change power saving ⇔ active	<ul style="list-style-type: none"> • Change power state

3.2.2 CAN LED

Light pattern	Description	Causes / Hints
off	No CAN communication	<ul style="list-style-type: none"> • No CAN communication. • Device not connected to CAN
green/ green flash	CAN communication	<ul style="list-style-type: none"> • With each CAN message the LED is triggered
red blinking	CAN communication, CAN controller in error state	<ul style="list-style-type: none"> • The CAN controller is in "Error Warning" of "Error passive" state. CAN communication is further possible.
red	Bus Off	<ul style="list-style-type: none"> • The CAN controller is in "Bus Off" state. No CAN communication possible

3.2.3 CAN1 LS LED

CAN-Low Speed functionality according to ISO11898-3 is only available on model 1.01.0288.22043.

Light pattern	Description	Causes / Hints
off	CAN High-Speed transceiver active	<ul style="list-style-type: none"> • CAN high speed interface is activated
orange	CAN low speed (fault tolerant) transceiver active	<ul style="list-style-type: none"> • CAN low speed interface activated

The communication status is shown on CAN1-LED (see chapter 3.2.2)

3.2.4 LIN LED

LIN functionality is only available on model 1.01.0288.22043.

Light pattern	Description	Causes / Hints
off	No LIN communication	<ul style="list-style-type: none">• No LIN communication on the LIN bus• Device not connected LIN bus
green/green flash	LIN communication	<ul style="list-style-type: none">• With each LIN message the LED is triggered
red/red flash	LIN communication with errors	<ul style="list-style-type: none">• On transmission or reception of a LIN message an error was detected

4 Dimensions

Figure 4-1 shows the mechanical dimensions of the CAN interface. All dimensions in millimeter ± 0.1 if not otherwise noted.

4.1 Overview

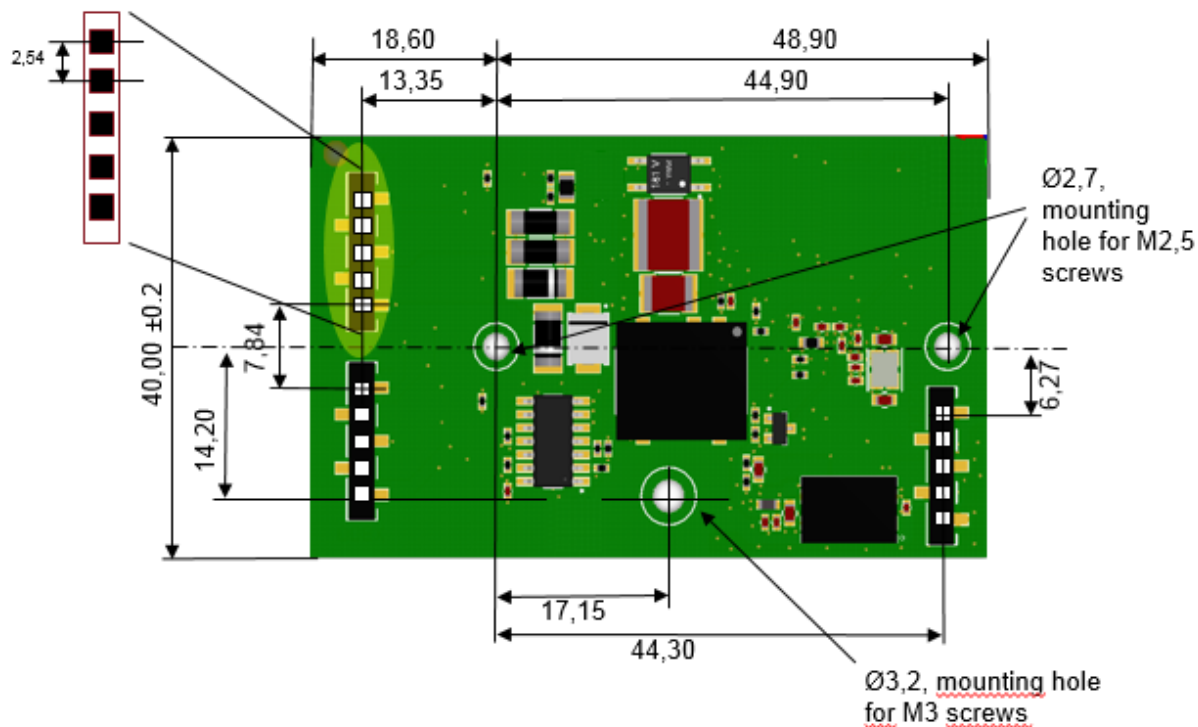


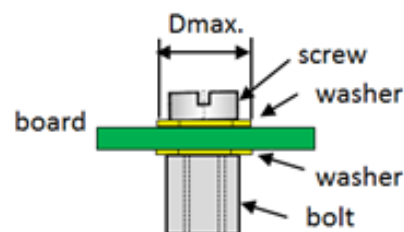
Figure 4-1: Display (LEDs) on bottom side

4.2 Recommended Fastening Elements

Using the foreseen mounting holes, fastening elements shown in Table 4-1 are recommended.

Mounting hole diameter in mm	2.7	3.2
Dmax in mm	5.0	7.0
Recommended fastening element	M2.5 x 5	M3 x 6

Table 4-1



4.3 Mounting Options

The CAN interface can be mounted in two ways therefore different heights are to be considered.

4.3.1 Display (LED) on Bottom Side

Mounting the device in this orientation, the display elements (LEDs) are on the baseboard side and cannot be optimally viewed.



Figure 4-2

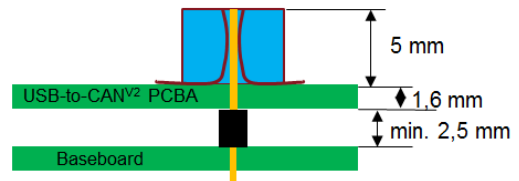


Figure 4-3

4.3.2 Display (LED) on Top Side

With this type of mounting, the display elements are visible.

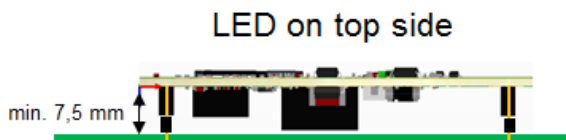


Figure 4-4

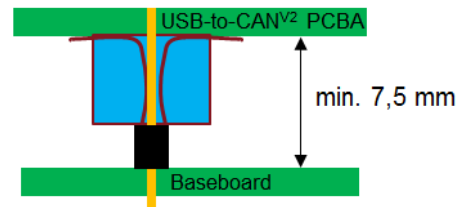


Figure 4-5

5 Notes

5.1 CAN Bus Termination

There is no bus termination resistor for the CAN bus in the CAN interface integrated. HMS offers a bus termination resistor as a feed through connector as accessory (order number 1.04.0075.03000)



Figure 5-1: CAN bus termination resistor 1.04.0075.03000

5.2 LIN Interface

A LIN interface is only available on model 1.01.0288.22043.

The LIN interface can be configured as LIN Master according to LIN specification. If the CAN interface is used as a LIN-Master, a voltage of 12 V DC (voltage range 8 - 18 V DC) has to be connected to pin V_{BAT_LIN} , see Table 3-2. Power consumption is limited by a 1 k Ω resistor.

6 Appendix

6.1 Technical Data

USB interface	USB 2.0, Hi-Speed (480 MBit/s)
Microcontroller / RAM / Flash:	32 Bit / 192 kByte / 512 kByte
CAN High Speed , ISO 11898-2	
CAN bitrates:	10 kbit/s - 1 Mbit/s
CAN transceiver:	TI SN65HVD251
CAN bus termination:	none
CAN Low Speed, ISO 11898-3	
CAN bitrates:	10 kbit/s – 125 kbit/s
CAN transceiver:	NXP TJA1054
CAN bus termination:	RTH=RTL=4,7 kΩ
LIN transceiver:	NXP TJA1020
LIN bitrate:	max. 20 kbit/s
LIN-VBAT _{LIN} :	8 - 18 V DC, 12 V DC typical
Galvanic field bus isolation:	800 V DC / 500 V AC for 1 min.
Power supply:	via USB, 5 V DC / 300 mA
Dimension:	67.5 x 40 x 11 mm
Weight:	14 g
Operating temperature range:	-40 °C - +85 °C
Storage temperature range:	-40 °C - +85 °C
Relative humidity:	10% - 95%, non condensing
Protection class:	none

6.2 Support

For more information on our products, FAQ lists and installation tips, please refer to the support area on our homepage (<http://www.ixxat.com>). There you will also find information on current product versions and available updates.

6.3 Returning Hardware

If it is necessary to return hardware to us, please download the relevant RMA form from our homepage and follow the instructions on this form.

6.4 FCC Compliance

Declaration of conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Product Name: USB-to-CAN V2
Model: Plugin
Responsible Party Name: HMS Industrial Networks Inc
Address: 35 E. Wacker Dr, Suite 1700
Chicago , IL 60601
Phone: +1 312 829 0601

Class B digital device – Instructions

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

- Changes and Modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under FCC rules.

In order to maintain compliance with FCC regulations shielded cables must be used with this equipment.

Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television reception.

6.5 Information on EMC

The product is a class B device. If the product is used in office or home environment radio interference can occur under certain conditions. To ensure faultless operation of the device, the following instructions must be followed due to technical requirements of EMC:

- use only the included accessories
- the shield of the interfaces must be connected with the device plug and with the plug on the other side

6.6 EC Declaration of Conformity

EMC compliance testing has been conducted to the Electromagnetic Compatibility Directive 2004/108/EC. For more information please consult the EMC compliance document on the support pages on HMS website.