

# **CAN2CAN converter**

Version 1.00



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# 1 Important Notices

Information in this document is subject to change without notice. LXNAV reserves the right to change or improve their products and to make changes in the content of this material without obligation to notify any person or organization of such changes or improvements.



A Yellow triangle is shown for parts of the manual which should be read very carefully and are important when operating the CAN2CAN.



Notes with a red triangle describe procedures which are critical and may result in loss of data or any other critical situation.



A bulb icon is shown when a useful hint is provided to the reader.

## 1.1 Limited Warranty

This Can2Can product is warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, LXNAV will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour, provided that the customer pays for shipping costs. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alterations or repairs.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL LXNAV BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT.

Some states do not allow the exclusion of incidental or consequential damages, so the above limitations may not apply to you. LXNAV retains the exclusive right to repair or replace the unit or software, or to offer a full refund of the purchase price, at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

To obtain warranty service, contact your local LXNAV dealer or contact LXNAV directly.

## 1.2 Packing Lists

- CAN2CAN converter
- Optional M12 – J1939 adapter

## 2 Technical Data

### 2.1 General specifications

Parameter	Condition	Min	Typ	Max	Unit
Operating supply voltage		8	12	32	V
Current consumption			14		mA
Load equivalent number		1			LEN
Operating temperature		-20		+65	°C
Storage temperature		-40		+85	°C
Recommended humidity		0		95	RH
Weight		74			g
Housing length		94			mm
Housing width		71.6			mm
Housing height		35			mm
Ingress Protection		IP67			

**Table1: General specifications**

### 2.2 NMEA2000 specifications

Parameter	description
Compatibility	NMEA2000 compatible
Bit rate	250kbps
Connection	A coded M12 connector

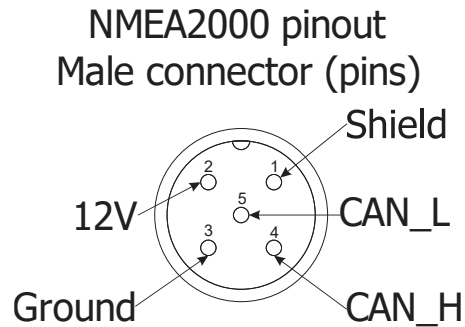
Note1: Supplied via M12 NMEA2000 connector

**Table2: General specifications**

## 3 Connectors on CAN2CAN converter

### 3.1 NMEA2000 Connector

M12 5-pin A-coded connector on side of unit is compatible with NMEA2000 and has standard pinout.



**Figure 1: NMEA2000 M12 Male connector pinout (view from unit side)**



CAN2CAN converter has isolated power supply for each side. It means we need to provide 12V power supply to each M12 connector.

### 3.2 Port A

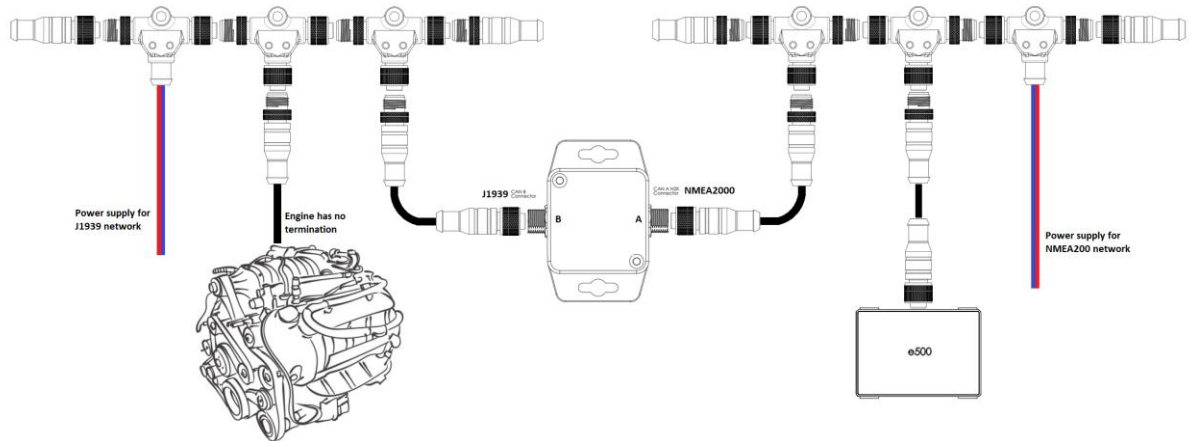
M12 Port A is for NMEA2000 bus. To this port is connected NMEA2000 network of the vessel. Converter is supplied from port A.

### 3.3 Port B

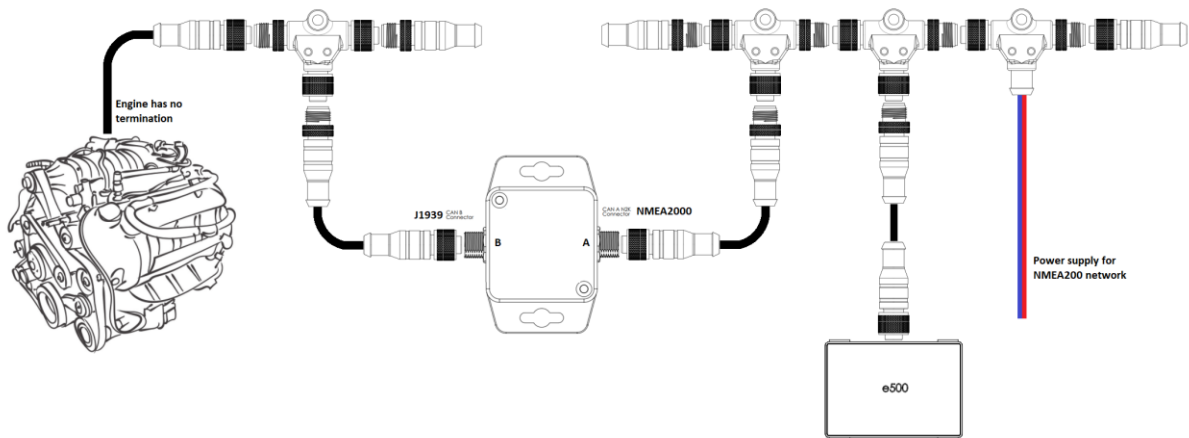
M12 Port B is for J1939 bus. To this port is connected engine network adapter, which could be 6 or 12 pins. Port B also need power supply, because the ports A and B are isolated.

## 4 Typical installations

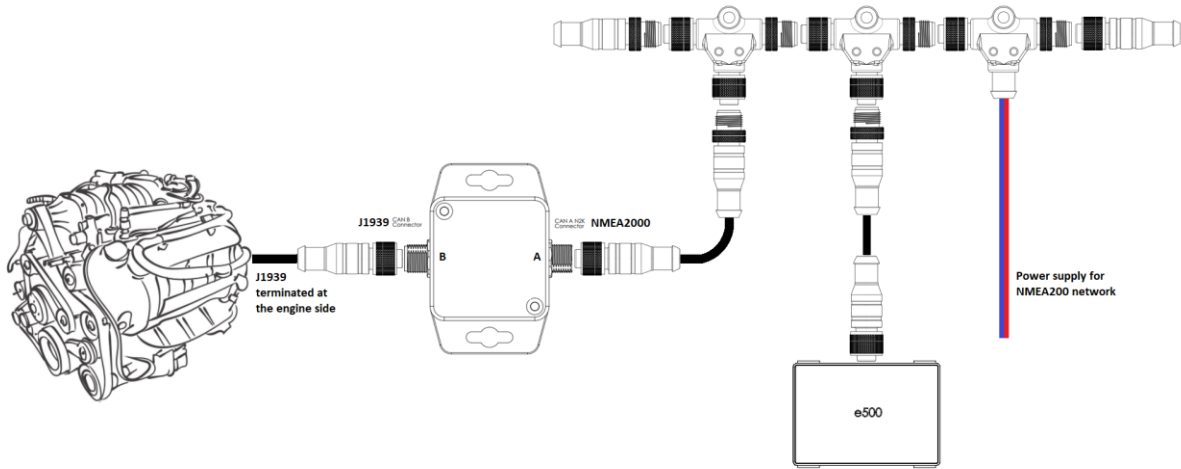
### 4.1 Engine does not provide power supply and termination



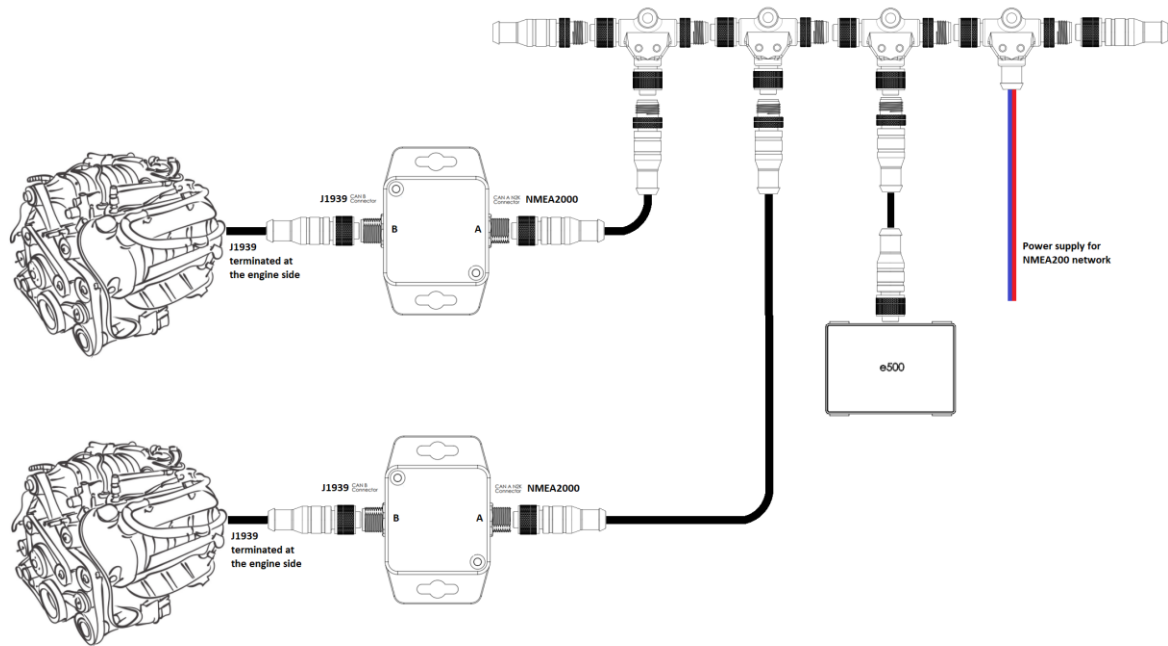
### 4.2 Power supply for J1939 is provided by engine, external terminators



### 4.3 Power supply and termination for J1939 is provided by engine

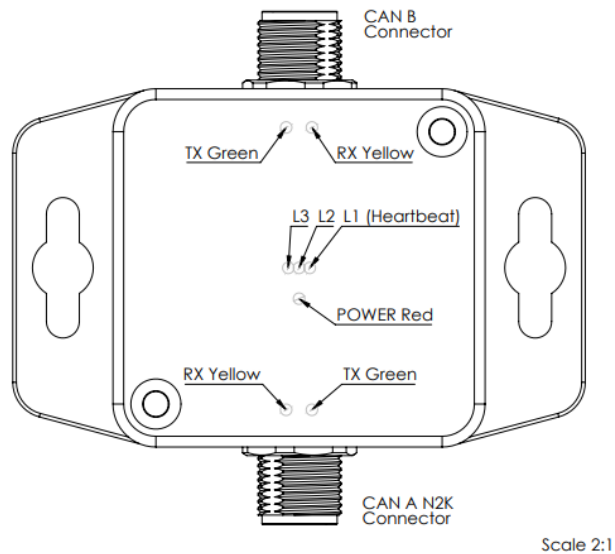


### 4.4 Twin engine installation



For multi engine installation an instance number must be assigned with the DIP switch.

## 5 Description



Port B is assigned as J1939 network interface, Green led on this side, indicates CAN2CAN transmits data to J1939 network, Yellow led indicates, data is receiveing from J1939 network.

LED1 (L1) represents heartbeat of the CAN2CAN unit. It blinks with approximately 1Hz and indicates the unit is alive.

LED2 and LED3 are not in use.

Power Red LED indicates power supply at the NMEA2000 side where is supplied complete electronics.

Port A is assigned as NMEA2000 network interface, Green led on this side, indicates CAN2CAN transmits data to NMEA2000 network, Yellow led indicates, data is receiveing from NMEA2000 network.



In case that RX/TX LEDs are not blinking, please check connection and power supply. Unit needs power supply for each network separately.

## 6 DIP Switch configuration

### Important

To use two CAN2CAN converters for dual-engine monitoring, the engines **must not** be connected to the same J1939 bus.

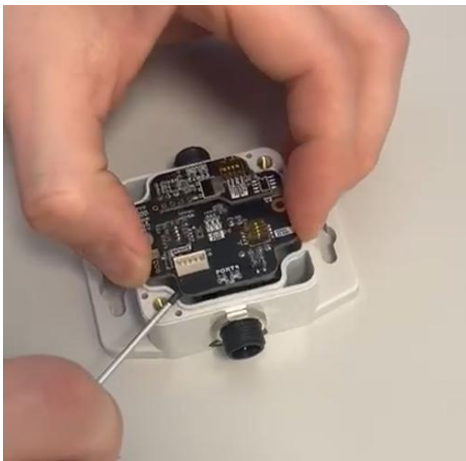
If each engine is connected to its **own** J1939 bus (same as picture chapter 4.4), follow the steps below.

### Port Side CAN Converter

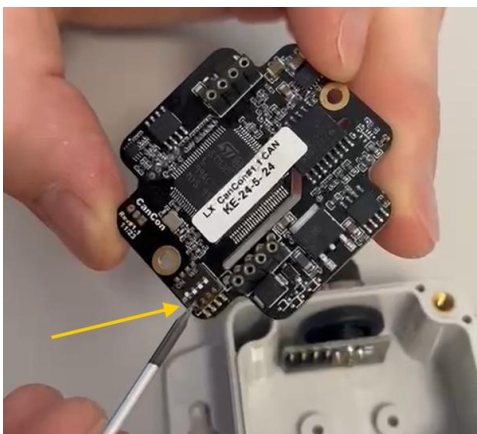
Ensure all DIP switches are set to **OFF (0)**

### Starboard Side CAN Converter

Open the CAN2CAN device by removing the screws and the cover  
Carefully remove the circuit board (see reference pictures)



On the back of the circuit board, set **DIP switch #1 to ON**



### Reinstallation

Reinstall the circuit board and close the CAN2CAN device  
Reinstall the device on the starboard side

### Verification

Power on the system and verify correct operation

## 6.1 Engine Instance Assignment (DIP Switches)

Engine instances are assigned using **DIP switch 1** and **DIP switch 2**:

<b>DIP 1</b>	<b>DIP 2</b>	<b>Engine Instance</b>
OFF	OFF	Instance 0 (Engine 1)
ON	OFF	Instance 1 (Engine 2)
OFF	ON	Instance 2 (Engine 3)
ON	ON	Instance 3 (Engine 4)

### Bitrate

At the bottom of the PCB, a DIP switch is used to control the instance number. On the top side of the PCB, a separate DIP switch is used to select the J1939 bitrate.

- **All switches OFF:** J1939 bitrate is set to **250 kbps** (default).
- **Switch 1 ON:** J1939 bitrate is set to **500 kbps**.

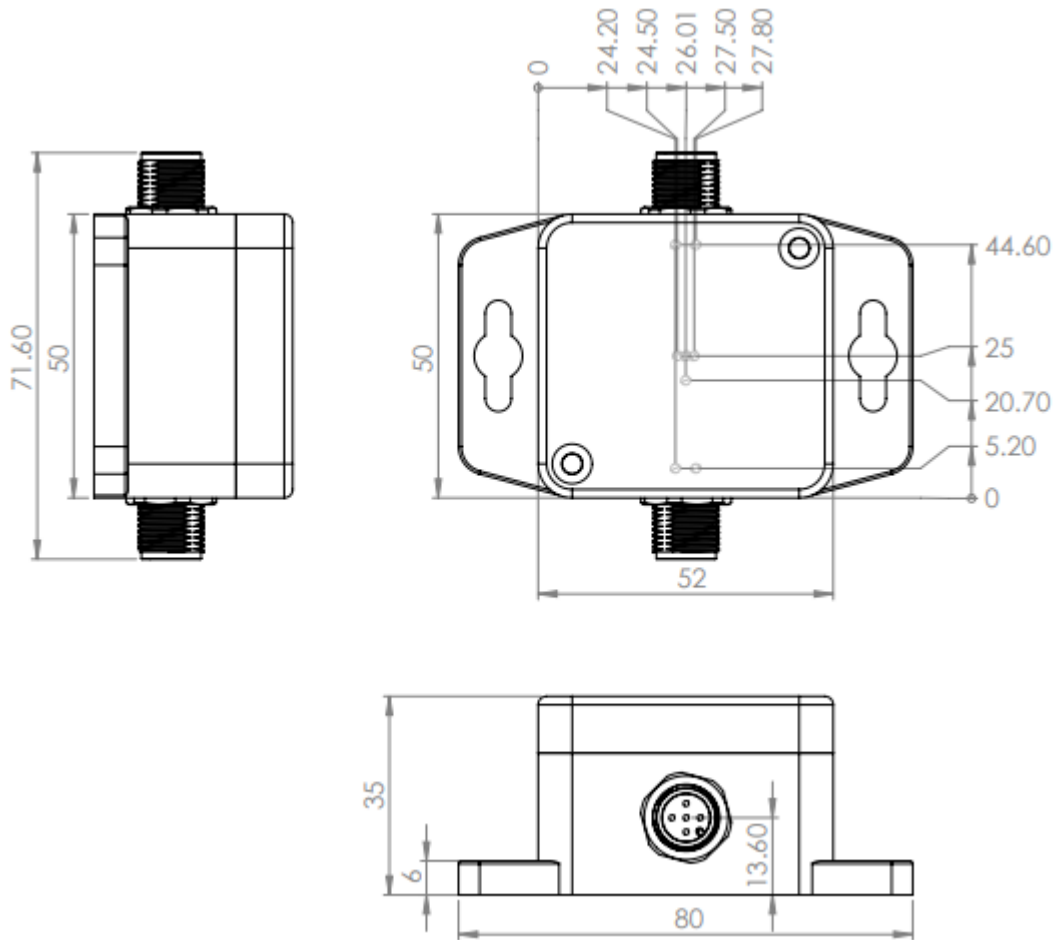
## 7 Data conversion table

This table describes conversion of J1939 application layer messages to NMEA2000 messages. Only messages related to engine are converted. This also includes DTC codes as well as transmission messages. The full list of converted messages is listed below.

N2K Field name	N2K PGN	J1939 Field name	J1939 PGN	J1939 SPN	N2K Device
<b>Engine speed</b>	127488	Engine speed	61444	190	Engine
<b>Engine boost pressure</b>	127488	Engine intake manifold pressure	65270	102	Engine
<b>Engine oil pressure</b>	127489	Engine oil pressure	65263	100	Engine
<b>Engine oil temperature</b>	127489	Engine oil temperature	65262	175	Engine
<b>Engine coolant temperature</b>	127489	Engine coolant temperature	65262	110	Engine
<b>Alternator potential</b>	127489	Charging system potential	65271	167	Engine
<b>Fuel rate</b>	127489	Engine fuel rate	65266	183	Engine
<b>Total engine hours</b>	127489	Total engine hours	65253	247	Engine
<b>Percent engine load</b>	127489	Percent engine load	61443	92	Engine
<b>Water in fuel ind.</b>	127489	Water in fuel	65279	97	Engine
<b>Engine emergency stop</b>	127489	DTC	65226	Any	Engine
<b>Check engine</b>	127489	DTC	65226	100 – Oil press 158 – L/H sys. voltage 102 – High boost press 106 - 190 – Rev limit exceeded 110 – Over temp. 111 – Eng. coolant lvl. 97 – Water in fuel 94 – Fuel del. Press. 98 – Eng. Oil level	Engine
<b>Low oil pressure</b>	127489	DTC	65226	100	Engine
<b>Low system voltage</b>	127489	DTC – Keyswitch batt. voltage	65226	158	Engine
<b>High boost pressure</b>	127489	DTC -	65226	102 & 106	Engine
<b>Rev limit exceeded</b>	127489	DTC	65226	190	Engine
<b>Over temperature</b>	127489	DTC	65226	110	Engine
<b>Water in fuel indicator</b>	127489	DTC	65226	97	Engine
<b>Battery voltage</b>	127508	Battery voltage	65271	168	Battery
<b>Battery voltage</b>	127508	Battery potential 2	65165	444	Battery
<b>Transmission oil</b>	127493	Transmission oil	65272	127	Engine

<b>pressure</b>		pressure			
<b>Transmission oil temp.</b>	127493	Transmission oil temp.	65272	177	Engine
<b>Outside ambient air temp.</b>	130310	Outside ambient air temp.	65269	171	Temperature
<b>Low fuel pressure</b>	127489	DTC - Low fuel pressure	65226	94	Engine
<b>Low oil level</b>	127489	DTC – Low oil level	65226	98	Engine
<b>Low coolant level</b>	127489	DTC – Low coolant lvl	65226	111	Engine
<b>Percent Engine Torque</b>	127489	Percent torque	61444	513	Engine
<b>Fuel pressure</b>	127489	Engine fuel delivery pressure	65263	94	Engine
<b>Engine coolant pressure</b>	127489	Engine coolant pressure	65263	109	Engine
<b>Fluid level</b>	127505	Engine fuel level	65276	96	Fluid level
<b>Fluid level</b>	127505	Engine oil level	65263	98	Fluid level

## 8 Dimensions



## 9 Revision history

Date	Revision	Version	Description
April 2020	1	1.0	Initial release of this manual
June 2021	2	1.0	Added conversion table
June 2022	3	1.0	Added chapter 4.4
July 2022	4	1.0	Updated chapter 4.4, 5
Feb. 2023	5	1.0	Added general specification
Aug 2023	6	1.0	Updated chapter 5
Dec. 2025	7	1.0	Added chapter 6