

# ECM2040 Edge Computing Module



- 2 x 10/100 BaseT Ethernet
- 3 x CAN interfaces
- USB Interface
- RS232 interface
- Configurable Inputs
- Programmable via Guitu
- Designed to operate with both 12 VDC and 24 VDC
- Real Time Clock
- WLAN and Bluetooth
- Global 4G LTE
- GNSS
- Operating voltage 9-32 VDC

ECM2040 Edge Computing Module is compact and versatile high-performance computing unit with comprehensive interfaces. It includes computational capacity to perform edge analytics and enough memory to store the data locally when network connection is not temporarily available.

Wired interfaces include 2 x ethernet, 3 x CAN buses, USB, RS-232, analog inputs and digital inputs.

Wireless interfaces include global 4G LTE connection, WLAN connection, Bluetooth connection and GNSS receiver.

The design is robust with milled aluminium case, and it is targeted for heavy machinery industries.

## Technical Information

- ARM Cortex A9 800 MHz main CPU
  - 1 GB DDR3 RAM
  - 8 GB flash memory
- 3 x CAN Interface 2.0 B, ISO 11898
- WLAN (a/ac/b/g/n)
- Bluetooth 4.2, BLE
- Worldwide LTE, UMTS/HSPA(+) and GSM/GPRS/EDGE coverage
- GNSS (GPS/GLONASS/Galileo)
- 100 Mb Ethernet
- 4 configurable inputs
- Reference voltage output
- Real time clock (RTC)
- 6 programmable LEDs
- IP67 aluminium housing
- 9 - 32 VDC Operating voltage range (Protected against reverse polarity)
- -30...+85 °C operating temperature range
- Main dimensions: 195 mm(l) x 145 mm(w) x 53 mm(h)
- Weight 1,2 kg

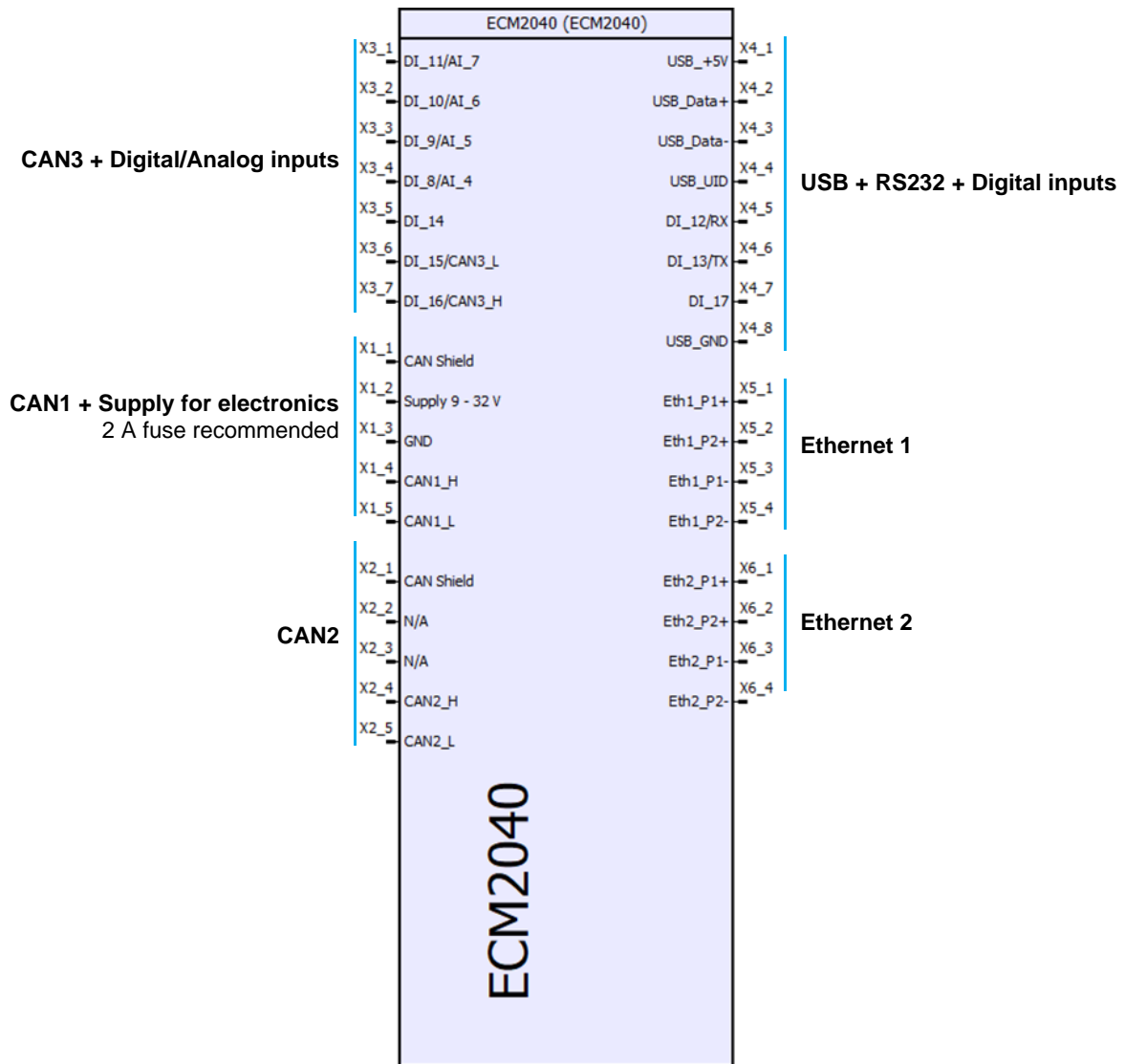
## I/O Interface

Amount	Configurability	Details
1	Reference voltage (USB 5 V out)	5 V, max. 250 mA
4	Digital input (PNP) Analog input	Low < 1,6 V, High > 3,1 V, max 100 Hz 12-bit AD conversion, 0-10,3 V, 69 kΩ, 0-22 mA, 150 Ω.
6	Digital input (PNP)	Low < 2 V, High > 6 V, max 100 Hz

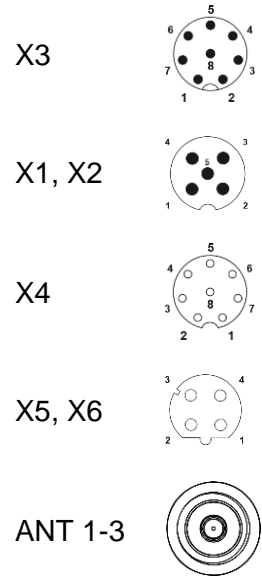
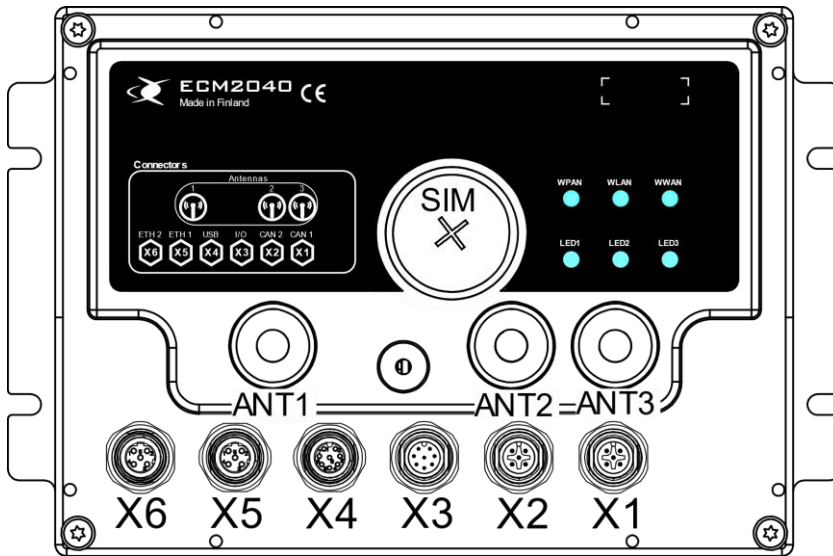
## Note

- If CAN 3 is selected as active, it consumes 2 input pins
- If RS232 is selected as active, it consumes 2 input pins

**Wiring Diagram for M12 connectors (X1 through to X6):**



## Connectors location



## Connectors

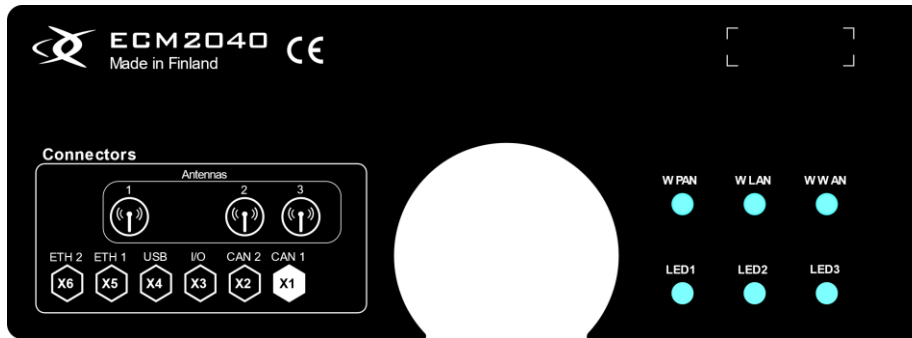
### Connector needed:

As seen from cable entry side

X1: CAN 1	M12 5 pin, Female A-coded
X2: CAN 2	M12 5 pin, Female A-coded
X3: CAN 3 + DI/AI	M12 8 pin, Female A-coded
X4: USB + DI	M12 8 pin, Male A-coded
X5: Ethernet 1	M12 4 pin, Male D-coded
X6: Ethernet 2	M12 4 pin, Male D-coded
ANT1: WLAN + Bluetooth	RPSMA male
ANT2: 4G LTE	SMA male
ANT3: GNSS	SMA male
Protective cap for Male M12*	Erni 374342
Protective cap for Female M12*	Erni 374343

\* Protective caps must be used on unused connectors to reach waterproofness

## Led indicators

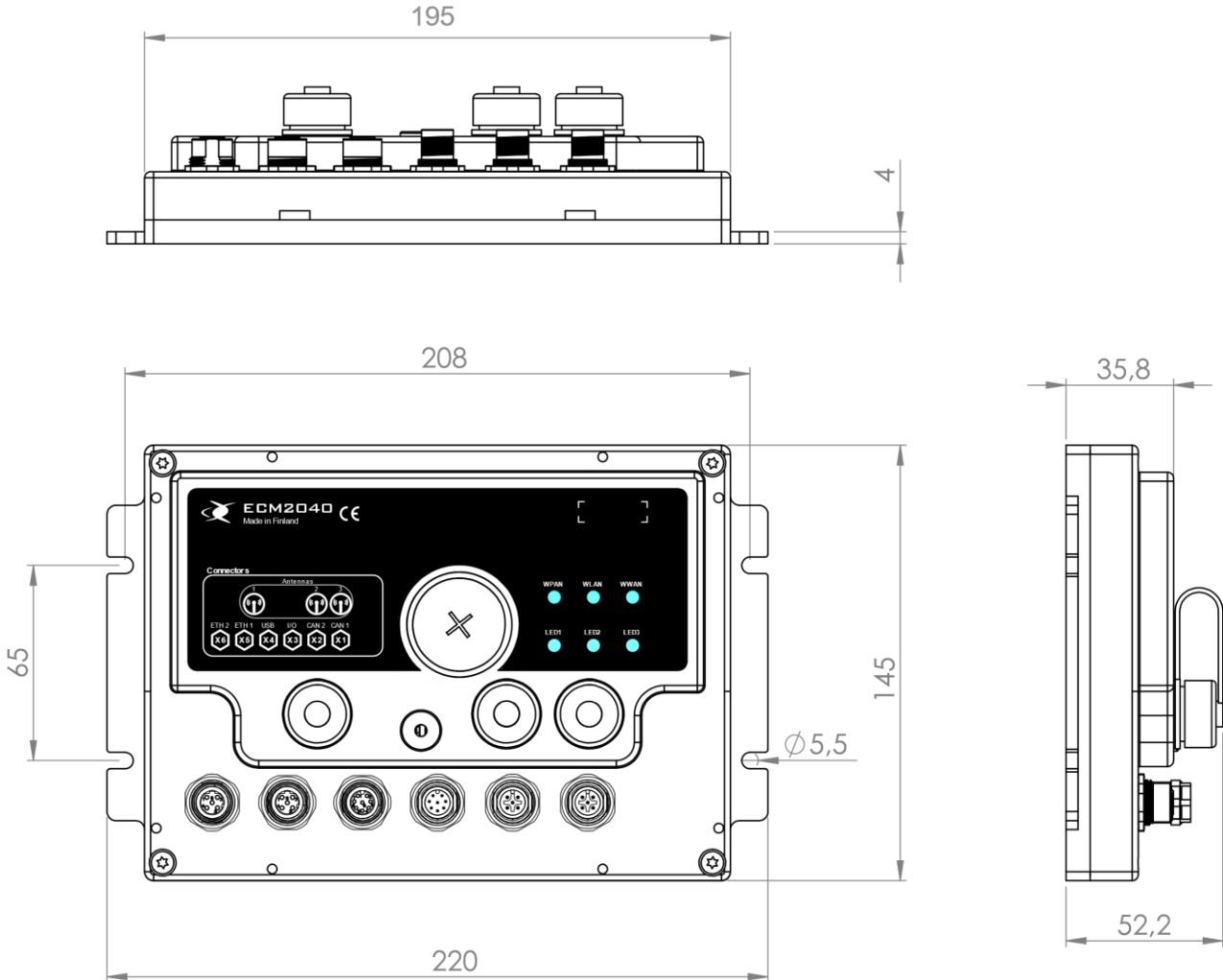


LED	Function
LED1	Reserved for customer use.
LED2	Redi Exmebus connection status. <ul style="list-style-type: none"> <li>• LED OFF: Not connected</li> <li>• LED ON: Connected</li> </ul>
LED3	Reserved for customer use.
LED4 (WWAN)	LTE status <ul style="list-style-type: none"> <li>• LED OFF: No SIM</li> <li>• Blinking 3 sec. OFF, 3 sec. ON: PIN required</li> <li>• Blinking 1 sec. OFF, 1 sec. ON: PIN ok, radio OFF.</li> <li>• Blinking 0,2 sec OFF, 0,2 sec. ON: PIN ok, radio ON.</li> <li>• LED ON: Connected</li> </ul>
LED5 (WLAN)	WLAN status <ul style="list-style-type: none"> <li>• LED OFF: WLAN radio OFF.</li> <li>• Blinking 1 sec. ON, 1 sec. OFF: WLAN radio ON, AP not connected</li> <li>• LED ON: AP connected</li> </ul>
LED6 (WPAN)	Reserved for Bluetooth

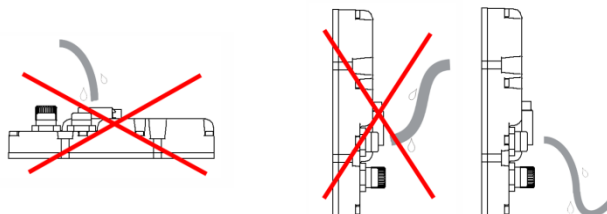
Note: All LEDs are programmable by user. This is default usage of LEDs.

## Mounting and Housing Information

ECM2040 is fastened to flat surface using four M5 size screws.



The preferred mounting position is connectors pointing downwards. If the unit is mounted connectors pointing to the side, then it is vital to leave some loose cable with a downward cue to prevent the ingress of moisture through connector.



## Antenna requirements

### GNSS

- Frequency range: 1559-1609 MHz
- Polarization: RHCP or linear
- VSWR: < 2 (Typ.)
- Passive antenna gain: > 0 dBi
- Active antenna noise figure: < 1.5 dB
- Active antenna gain: > 0 dBi
- Active antenna embedded LNA gain: < 17 dB

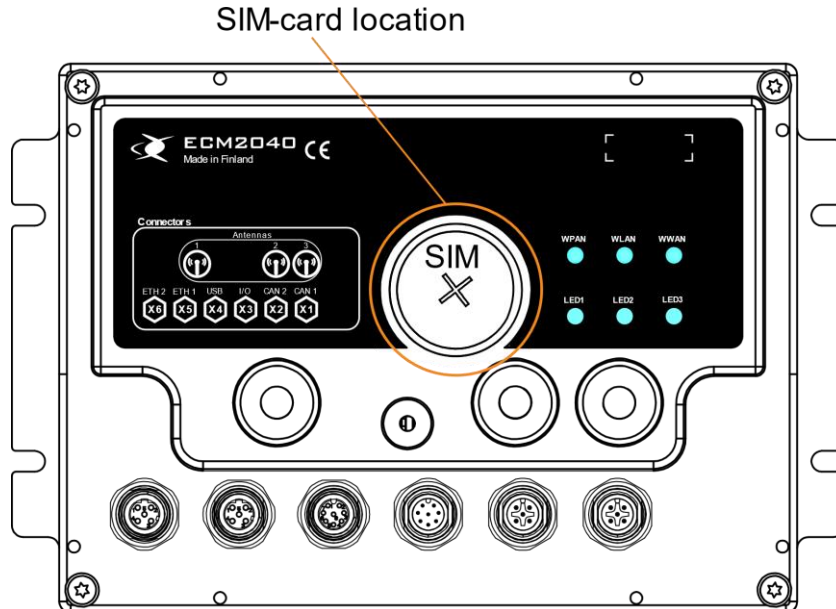
In the networks, where LTE B13 and B14 frequency bands are in use, it is recommended to use passive GNSS antenna. Active antenna may generate harmonics which will affect the GNSS performance.

### GSM/WCDMA/LTE

- VSWR:  $\leq 2$
- Efficiency: > 30%
- Max input power: 50 W
- Input impedance: 50  $\Omega$
- Cable insertion loss: < 1 dB  
(GSM850, EGSM900, WCDMA B5/B6/B8/B19,  
LTE-FDD B5/B8/B12/B13/B18/B19/B20/B26/B28)
- Cable insertion loss: < 1.5 dB  
(DCS1800, PCS1900, WCDMA B1/B2/B4, LTE-FDD B1/B2/B3/B4/B25/B39)
- Cable insertion loss < 2 dB  
(LTE-FDD B7, LTE-TDD B38/B40/B41)

## How to install SIM card

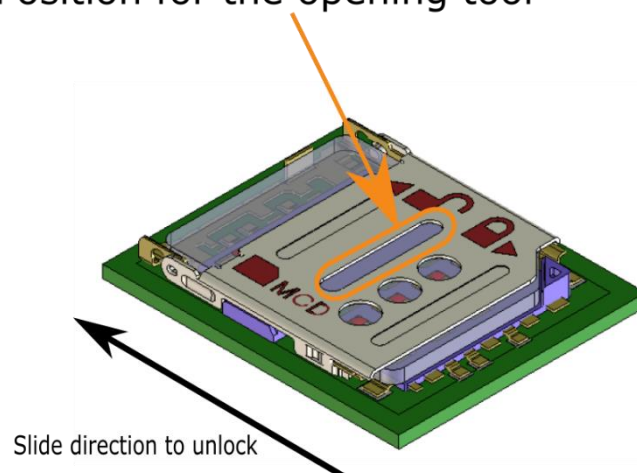
ECM2040 includes a SIM card tray in the middle of the module, behind the grey plug. To open the plug, turn the plug with a screwdriver counterclockwise.



After opening the plug, the SIM card tray can be seen. First the metal cover must be opened.

1. Slide the metal cover to the direction indicated top of the cover. Use suitable tool to slide the cover from the place indicated in the picture. Plastic, flat headed tool is recommended.
2. After unlocking the cover, lift the cover in up position.

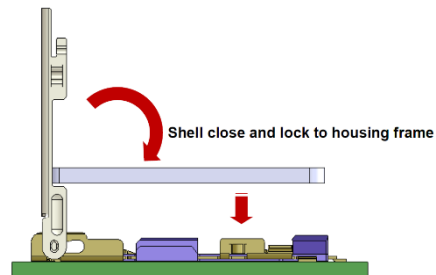
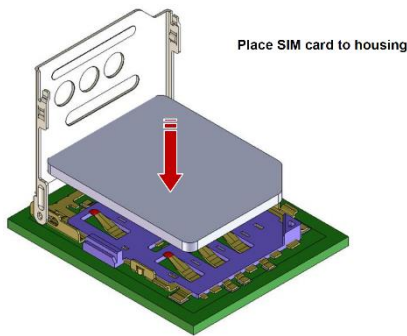
## Position for the opening tool





After the cover is in open position, the SIM card can be installed.

- 1 First place the SIM card to the housing.
- 2 Turn cover over the SIM card.
- 3 Lock the cover in opposite order.



### CAUTION!

Because of the very tight installation place, the module must be placed on level position when installing the SIM card. If you are not cautious, SIM card might slip and stuck inside the module. Getting SIM card out, might needs opening of the module casing.

## **FCC and ISED Interference statement**

### **NOTICE:**

This device complies with Part 15 of the FCC Rules and contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS standard(s).

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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### **NOTICE:**

Changes or modifications made to this equipment not expressly approved by Exertus Oy may void the FCC authorization to operate this equipment.

**NOTE:** 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:

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

## **FCC Radiofrequency radiation exposure statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

### **ISED Radiation Exposure Statement**

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

### **Déclaration d'exposition aux radiations**

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

### **NOTE:**

For use in Canada, the device has been tested to comply with the ISED e.i.r.p. limits when using the specific antenna 2J6A50BGF. If an OEM needs to utilize a different antenna model, they must make sure that it is of the same antenna type with equal or lesser antenna gain such that the equipment still complies with the e.i.r.p. limits