



Advanced Wireless Devices



This equipment conforms to the Radio Equipment Directive (RED) 2014/53/EU, covering requirements included in EMC directive 2014/30/UE, and Low Voltage Directive 2014/35/UE as well as other requirements as those from ROHS Directive 2011/65/UE. Complete Declaration of Conformity at Owasys web site:
<http://owasys.com/bundles/owasysweb/docs/products/owa450/owa450.DoC.en.pdf>



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.
2. This device must accept any interference received, including interference that may cause undesired operation.



DISPOSAL OF OLD ELECTRICAL & ELECTRONIC EQUIPMENT (APPLICABLE IN THE EUROPEAN UNION AND OTHER EUROPEAN COUNTRIES WITH SEPARATE COLLECTION SYSTEMS).

This product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help preventing potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local council, your waste disposal service or the distributor where you purchased the product.

Dispose of used batteries according to the instructions in section 3.10

1. owa450 kit content

- owa450 unit

2. Technical specifications summary

| Item | Specification |
|--|---|
| Power Supply | 9 to 48 Vdc (minimum 1.5A) |
| Operating Temperature range | -40 °C to +85 °C |
| Safety Purposes Temperature range without Li-ion battery | -40 °C to +70°C |
| Safety Purposes Temperature range with Li-ion battery | -40 °C to +60 °C Discharge internally limited from -20 °C to +60°C Charge internally limited from 0°C to 45°C |
| Storage Temperature | -40°C to +85 °C |

3. Safety and other precautions

3.1. General

IMPORTANT: FOR THE EFFICIENCY AND SAFE OPERATION OF YOUR owa450 MODULE READ THIS INFORMATION BEFORE USE!

Care must be taken when handling the unit. Only staff authorized by **Owasys** can dismantle the product. If the product is dismantled by non-authorized people and/or ESD precautions are not taken the warranty is not valid.

Do not push objects into connectors of your device. Doing so can cause fire or electric shock by short-circuiting.

If the product is subject to severe conditions beyond the limits specified in the Technical Specifications, the product could be damaged.

Keep the device away from radiators and heat sources. The device may become hot during normal operation, so switch it off and wait for a while before handling it.

Do not clean the device when powered up. Clean it with a soft cloth. Do not use liquid or aerosol cleaners, which may contain flammable substances.

Use only approved batteries to avoid the risk of explosion. The use of an incorrect type of battery may cause an explosion.

3.2. owa450 connections

An **external fuse** should be included in the positive Vin supply with a rating of **2A** (to protect the cables and input circuitry in case of a faulty condition if the external power supply has not short circuit protection below 3A).



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The highest internal voltage applied to the owa450 unit can be 48Vdc and complies with Low Voltage European Directive. The power supply can be made with a battery or continuous voltage supply with reinforced isolation.

Before you connect the device to an electrical outlet, check the voltage and current rating to ensure that the required ones match the available power source. Exceeding the specified input range may cause unexpected operation and/or irreversible damage to owa450.

To remove the device from all power sources turn the device off and disconnect it from the electrical outlet.

Be sure that nothing rests on the connected cables and that the cables are not located where they can be tripped over or stepped on.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to owa450. Read **owa450 Family Integrators Manual** carefully before connecting any load to the outputs. If there is any uncertainty, please contact **Owasys** Customer Support.

Use shielded signal cables to ensure that you maintain the appropriate EMC classification for the intended environment.

Keeping cables as short as possible is recommended.

3.3. **Exposure to RF Energy**

The antenna(s) and device must be installed in such a position that a minimum separation of 33cm is maintained between the radiator (antenna(s)) and the human body. Those installations not complying with this statement are responsible for providing SAR measurement reports and corresponding declaration

Do not hold the antenna during a call since it affects call quality and can cause the module to operate at a higher power level than needed. If you are concerned about RF energy exposure try to minimize exposure by limiting the duration of GSM calls and operating the unit efficiently.

3.4. **Antennas care and replacement.**

Do not use the product with a damaged antenna because when the antenna comes into contact with the skin, a minor burn may result. Replace the antenna immediately.

Only use antennas according to the technical specifications. Antennas that do not fulfill the specifications, could damage the product and may contravene local RF emissions regulations or invalidate its fulfillment.

Compliance tests for certifications have been performed with ANT100_9100 and ANT100_9101 official accessories.

3.5. **Electronic devices**

Most electronic devices are shielded from RF energy. However RF energy may cause some malfunctioning of improperly shielded electronic devices.

In case that the product is mounted in a vehicle, check your vehicle to determine that all on board electronic equipment is adequately shielded from RF energy.

In the same way, in case that the product is in the proximity of medical devices (hospitals,...) check the manufacturer of medical equipment to determine if they are properly shielded.

This equipment should not be operated on an aircraft.

3.6. **Blasting areas**

To avoid interfering with blasting operations, turn the unit OFF in these areas or in areas posted "turn off your two way radio". Construction workers often use remote control RF devices to set off explosives.

3.7. **Children**

Do not allow children to play with owa450. It is not a toy and they could hurt themselves or others. Children could also damage the unit.

3.8. **Explosive atmospheres**

Do not operate this product in environments containing explosive materials or vapor. This includes Petrol service stations.

The unit accessories could generate sparks that can cause an explosion or fire resulting in bodily injury or even death.

To avoid interfering with blasting operations, turn the unit off in areas posted "blasting area".

Do not transport or store flammable gas or liquid, or explosives, in the compartment of your vehicle which contains owa450 or its accessories.



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3.9. Handling the device

Observe the following safe-handling guidelines to prevent damage to owa450:

- When setting up the device for work, place it on a level surface.
- Protect the device from environmental hazards such as extreme temperatures and overexposure to sunlight.
- When you move your device between environments with very different temperature and/or humidity ranges, condensation may form on or within the device. To avoid damaging it, allow sufficient time for the moisture to evaporate before using the device.
- When taking the device from low-temperature conditions into a warmer environment or from high-temperature conditions into a cooler environment, allow the device to acclimate to room temperature before turning on power.
- When disconnecting a cable, pull on its connector or on its strain-relief loop, not on the cable itself. As you pull out the connector, keep it evenly aligned to avoid bending any connector pins. Also, before you connect a cable make sure both connectors are correctly oriented and aligned.

3.10. For owa450 including battery backup

These models include the optional battery backup of lithium-ion. Do not dispose of the battery along with household waste. Contact your local waste disposal agency for the address of the nearest battery deposit site.

The battery poses a burn hazard if you disassemble or handle it improperly. If the battery is damaged, electrolyte may leak from the cells and may cause personal injury.

Keep the battery away from children.

When the battery is heated to excessive temperatures, its cells could explode or vent, posing a risk of fire.

Use only approved batteries to avoid the risk of explosion. The use of an incorrect type of battery may cause an explosion.

3.11. Part 15B EMC Notice

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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and 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.

4. Radio Technical Features

These products may include several radios depending on specific model. Find below a list of the frequencies and output powers for the different radios, according to standards.

4.1. GSM, UMTS/HSPA+ and LTE

| | |
|-----------------|---|
| Frequency bands | GSM/GPRS/EDGE: Quad Band 850/900/1800/1900 UMTS/HSPA+: Five Bands 800/850/900/1900/2100MHz LTE: Twelve band, 700 (Bd12 <MFBI Bd17>, Bd28) 800 (Bd18, Bd19, Bd20) 850 (Bd5) / 900 (Bd8) / AWS (Bd4) / 1800 (Bd3) / 1900 (Bd2) / 2100 (Bd1) / 2600 (Bd7) |
| Output Power | Class 4 (+33dBm +/- 2 dB) for EGSM850 Class 4 (+33dBm +/- 2 dB) for EGSM900 Class 1 (+30dBm +/- 2 dB) for GSM1800 Class 1 (+30dBm +/- 2 dB) for GSM1900 Class E2 (+27dBm +/- 3dB) for GSM850 8-PSK Class E2 (+27dBm +/- 3dB) for GSM900 8-PSK Class E2 (+26dBm +3/-4dB) for GSM1800 8-PSK Class E2 (+26dBm +3/-4dB) for GSM1900 8-PSK Class 3 (+24dBm +1/-3dB) for UMTS 2100, WCDMA FDD BdI Class 3 (+24dBm +1/-3dB) for UMTS 1900, WCDMA FDD BdII |



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| | |
|--|--|
| | Class 3 (+24dBm +1/-3dB) for UMTS AWS, WCDMA FDD BdIV Class 3 (+24dBm +1/-3dB) for UMTS 1800, WCDMA FDD BdIX Class 3 (+24dBm +1/-3dB) for UMTS 900, WCDMA FDD BdVIII Class 3 (+24dBm +1/-3dB) for UMTS 850, WCDMA FDD BdV Class 3 (+24dBm +1/-3dB) for UMTS 800, WCDMA FDD BdVI Class 3 (+23dBm ±2dB) for LTE 700, LTE FDD Bd12 <MFBI Bd17> Class 3 (+23dBm ±2dB) for LTE 700, LTE FDD Bd28 Class 3 (+23dBm ±2dB) for LTE 800, LTE FDD Bd18 Class 3 (+23dBm ±2dB) for LTE 800, LTE FDD Bd19 Class 3 (+23dBm ±2dB) for LTE 800, LTE FDD Bd20 Class 3 (+23dBm ±2dB) for LTE 850, LTE FDD Bd5 Class 3 (+23dBm ±2dB) for LTE 900, LTE FDD Bd8 Class 3 (+23dBm ±2dB) for LTE AWS, LTE FDD Bd4 Class 3 (+23dBm ±2dB) for LTE 1800, LTE FDD Bd3 Class 3 (+23dBm ±2dB) for LTE 1900, LTE FDD Bd2 Class 3 (+23dBm ±2dB) for LTE 2100, LTE FDD Bd1 Class 3 (+23dBm ±2dB) for LTE 2600, LTE FDD Bd7 |
|--|--|

4.2. WIFI/BLUETOOTH

| | |
|----------------|---|
| Standard | 802.11 a/b/g/n/ac, BT 4.2 |
| Frequency band | Dual 2412-2472 Mhz, 5180MHz-5825MHz) |
| Channels | 1 to 13 for Europe 1 to 11 for USA |
| Output Power | 2.4GHz: 802.11 b: Typ 17dBm 802.11 g Typ 17dBm 802.11 n/ac: Typ 16dBm 5GHz: 802.11 a: Typ 15dBm 802.11 n/ac: Typ 14dBm 802.11 ac VHT20: Typ 10dBm 802.11 ac VHT80: Typ 9dBm BT BR: 6dBm BT EDR: 3dBm BT LE: 7dBm |

4.3. Restrictions

FCC and IC RF Radiation Exposure Statement.

owa450 can embed several radio modules. Embedded radio modules are all FCC and IC certified and they comply with Part 15 of the FCC Rules and RSS-210. Operation is subject to 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.

Permitted Antenna

This radio transmitter has been approved by the FCC to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

| Interface and frequency range | Type | Max gain |
|-------------------------------|----------|----------|
| LTE 700MHz | External | 1.9 dBi |
| LTE 850MHz | External | 3 dBi |
| LTE 1700MHz | External | 1.3dBi |
| LTE 1900MHz | External | 1.3dBi |
| LTE 2600MHz | External | 0.5dBi |
| BT/WIFI 2.4GHz | Internal | 1.8dBi |
| BT/WIFI 5GHz | Internal | 4.9dBi |

According to limitations established by the radio-modules Grants, antenna(s) gain should also be limited. For cellular antenna, in mobile and fixed operating configurations the antenna gain, including cable loss, must not exceed 2 dBi at 700 MHz, 5.15 dBi at 850 MHz, 2.15 dBi at 1700 MHz and 1900 MHz and 4.2 dBi at 2600 MHz for satisfying RF exposure compliance. The antenna(s) must be installed such that a minimum separation distance of 33cm is maintained between the radiator (antenna) and all persons at all times.

Specific conditions by FCC and IC must be observed by any integrator in order to comply with the specific restrictions of the Grants for all the radios.

CONDITIONS

- Antenna(s) to user distance of all transmitters listed above is 33 cm or larger.

5. Installation

5.1. Choosing a location

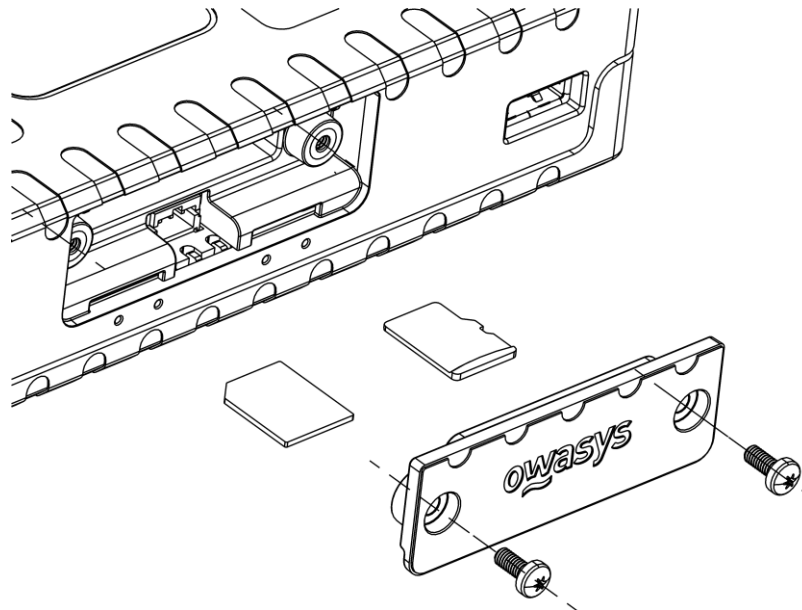
The device should be installed by authorized trained maintenance operators in a restricted area.

Choose a location for owa450 which allows for convenient routing and connection of the antenna and interface cables, and which has access to power source, and status LED's. When selecting a mounting location avoid the following hazards:

- Excessive heat or cold.
- High vibration areas.
- Corrosive fluids and gases.
- Direct exposure to solar radiation.
- Do not obstruct drivers view or impede operation, when mounted in vehicles.

5.2. Inserting the microSIM Card, microSD card and Optional Battery.

owa450 microSIM Card holder is a push-push connector type. To access the microSIM compartment, first unmount the 2 screws Torx 8 of the back cover.



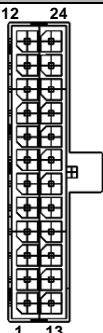
Then, insert SIM card with contacts facing downwards as in the figure below.

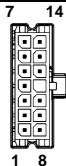
Same procedure for inserting the microSD card in its compartment and for connecting/disconnecting optional Battery using its one-position connector.

5.3. Connecting the cables

- Disconnect the power from the equipment whenever you manipulate it.
- Allow sufficient cabling to enable the removal of the equipment.
- Place a 2A fuse in the Vin positive cable.
- Ensure cables are not damaged or rubbing against sharp objects.
- The antennas should have an unobstructed view. GPS should have unobstructed view of the sky. Antennas should not be shielded from satellite signals by metal objects or other impenetrable materials.
- The antennas have to be safe from damage during normal vehicle or installation operation and maintenance. Choose a location with access both above and below the antenna-mounting surface. This access is required for installing fasteners and for routing the antenna cable.
- Separate GSM and GPS antennas when possible.

5.4. Machine Connector Pin-Out

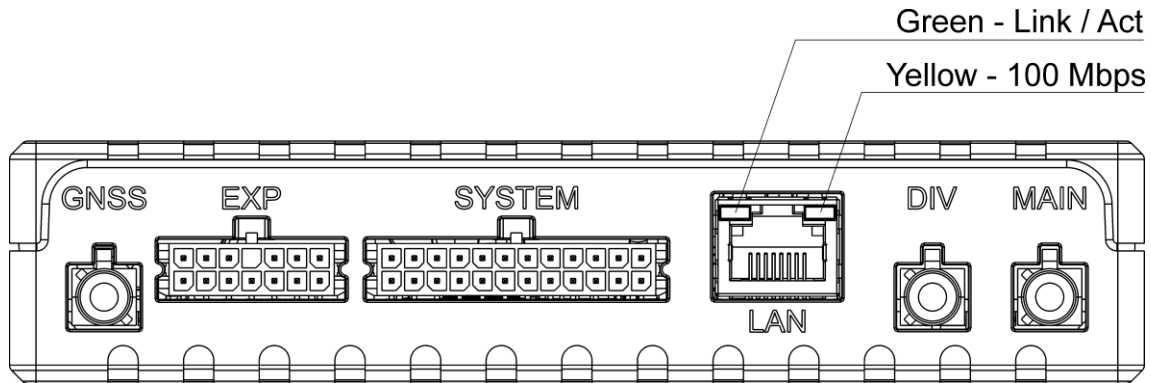
| Machine Connector: Micro-Fit 24 pin | Pin | Function | Pin | Function |
|--|-----|------------------------|-----|-----------------------|
|  | 12 | GND | 24 | Vin |
| | 11 | ON/OFF | 23 | V_OUT (4V5) |
| | 10 | TXD-4 | 22 | RXD-4 |
| | 9 | TXD-5 / RTS-4 | 21 | RXD-5 / CTS-4 |
| | 8 | TXD-1 | 20 | RXD-1 |
| | 7 | RS485A | 19 | RS485B |
| | 6 | DIO-0 / AIN0 | 18 | DIO-1 / AIN1 |
| | 5 | DIO-2 / AIN2 // CANL2* | 17 | DIO-3 / AIN3 |
| | 4 | DIO-4 // CANH2* | 16 | DIO-5 / K LINE2 |
| | 3 | DIO-6 /i-Button | 15 | DIO-7 / LIN / K LINE1 |
| | 2 | DIO-8 HS | 14 | DIO-9 HS |
| | 1 | CANL1 | 13 | CANH1 |

| Optional Exp Connector: Micro-Fit 14 pin | Pin | Function | Pin | Function |
|---|-----|-----------|-----|-----------|
|  | 7 | CAN4H | 14 | CAN4L |
| | 6 | CAN3H | 13 | CAN3L |
| | 5 | SPM | 12 | SPP |
| | 4 | MCN | 11 | MCP |
| | 3 | 2NDRS485A | 10 | 2NDRS485B |
| | 2 | GND | 9 | DIN10 |
| | 1 | DIN11 | 8 | DIN12 |

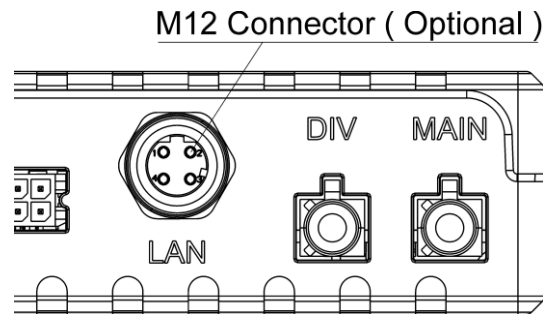
***Note:** For owa450 with CAN2 option DIO2 and DIO4 are not available.

5.5. owa450 Front View

Interfaces availability will depend on chosen model. See the most complete version below.



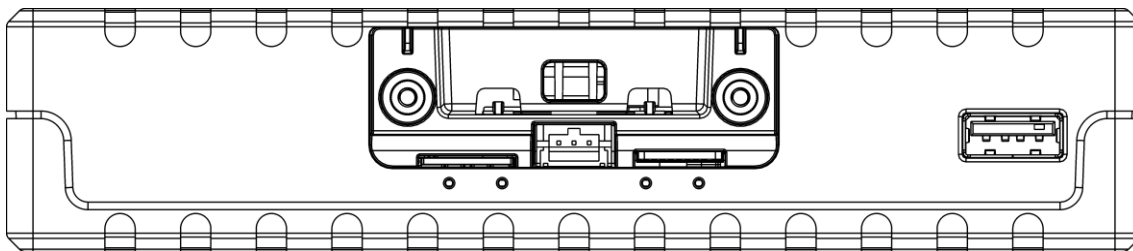
* Connectors depend on product variant



* M12 Connector is an alternative to RJ45.

5.6. owa450 Rear View

Interfaces availability will depend on chosen model. See the most complete version below.



* Connectors depend on product variant

6. SW Licenses

This product includes SW under GNU/GPL Software licenses along with SW covered by owasys proprietary SW license. Find the complete license in the following link for your product.

<https://www.owasys.com/en/products/owa450/licenses>