

onway Router on3800



User Manual

2026-07-09

onway ag, Switzerland



1 Safety Instructions

Please carefully observe all safety instructions in the manual.

Compliance Information

The onway routers must be used in compliance with any and all applicable national and international laws and with any special restrictions regulating the utilization of the communication module in prescribed applications and environments.

Information about the accessories / changes to the device

- Please only use original accessories to prevent injuries and health risks.
- Changes made to the device or the use of non-authorized accessories will render the warranty null and void and potentially invalidate the operating license.
- onway routers must not be opened (SIM cards may be used according to the instructions).

Information about the device interfaces

- All systems that are connected to the onway router interfaces must meet the requirements for SELV (Safety Extra Low Voltage) systems.
- Interconnections must not leave the building nor penetrate the body shell of a vehicle.
- Connections for antennas may only exit the building or the vehicle hull if transient overvoltages (according to IEC 62368-1) are limited by external protection circuits down to 1500 V_{peak}. All other connections must remain within the building or the vehicle hull.
- Always keep a distance of more than 40 cm from the antenna in order to reduce exposure to electromagnetic fields below the legal limits.
- Devices with a WLAN interface may be operated only with the applicable regulatory domain configured. Special attention must be paid to country, number of antennas and the antenna gain. The maximum allowed gain is 3 dBi in the relevant frequency range. To use WLAN antennas with a higher gain, contact onway about custom radio configurations. The antenna gain and cable attenuation need to be correctly configured by certified specialized personnel. A misconfiguration will lead to loss of the approval.
- Cellular antennas attached to the router must have an antenna gain of no more than 2.5 dBi. The user is responsible for the compliance with the legal regulations.
- Only CE-compliant power supplies with a current-limited SELV output voltage range may be used with onway routers.

General safety instructions

- Observe the usage limitations of radio units at filling stations, in chemical plants, in systems with explosives or potentially explosive locations.
- The devices may not be used in airplanes.
- Exercise particular caution near personal medical aids, such as pacemakers and hearing aids.
- onway routers may also cause interference in the nearer distance of TV sets, radio receivers and personal computers.
- Never perform work on the antenna system during a thunderstorm.
- The devices are generally designed for normal indoor use. Do not expose the devices to extraordinary environmental conditions worse than IP40.
- Protect them against aggressive chemical atmospheres and humidity or temperatures outside specifications.

2 Specifications and Features

Interfaces

- 2× Gigabit Ethernet (10/100/1000 Mbit/s) with auto-MDIX, M12 X-coded female conn.
- 3× Fast Ethernet (10/100 Mbit/s) with auto-MDIX, M12 D-coded female connector
- 4× Mini-SIM card slot
- 1× USB-A 2.0 Host
- 1× Power input, M12 A-coded male connector
- 1× RS-232 serial console port on extension port, M12 A-coded female connector

Options

- Up to two 4×4 MIMO 5G and LTE-Advanced Category 20 modems
- Up to four LTE-Advanced Category 6 modems
- Up to four LTE Category 4 modems
- Up to two dualband WLAN modules (AP or station mode)
- Internal SSD mass storage for content
- GNSS receiver, optionally with dead reckoning and 3D accelerometer/gyroscope
- Optional passive or active dual CAN module

Dimensions

- Size of mounting base, excluding connectors: 190 mm x 106.5 mm
- Height: 121.1 mm
- Weight: Approx. 1900 g, depending on options

Environmental Conditions

- Input voltage: 24 V to 48 V (DC, $\pm 30\%$) **OR optionally** 72 V to 110 V (DC, $\pm 30\%$)
- Operating temperature range: $-40\text{ }^{\circ}\text{C}$ to $70\text{ }^{\circ}\text{C}$ (with >4 radio modules: $-25\text{ }^{\circ}\text{C}$ to $55\text{ }^{\circ}\text{C}$)
- Storage temperature range: $-40\text{ }^{\circ}\text{C}$ to $85\text{ }^{\circ}\text{C}$
- Humidity: 0 % to 95 % (non-condensing)
- Altitude: 4000 m maximum (for 72 V to 110 V model: 2000 m max.)
- Ingress protection rating: IP40 (with SIM and USB covers mounted)

3 Connectors and Indicators



ON3800 Router Front View

Status Indicators

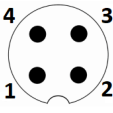
Name	State	Description
STAT		System booted in regular mode
		System booted in recovery mode
	 — 	First-boot system initialization
MOB1		IP connectivity on modem 1 established
		Modem 1 connected to mobile network
		Unable to connect modem 1 to mobile network
		No SIM detected on modem 1
MOB2		IP connectivity on modem 2 established
		Modem 2 connected to mobile network
		Unable to connect modem 2 to mobile network
		No SIM detected on modem 2
WLAN1	 access point	AP operational and some clients connected
	 client/mesh	Connected to a configured network

Name	State	Description
	 access point	AP operational, no clients connected
	 client/mesh	Currently not connected to any configured network
		WiFi interface configuration error
		WiFi interface not in use
WLAN2	 access point	AP operational and some clients connected
	 client/mesh	Connected to a configured network
	 access point	AP operational, no clients connected
	 client/mesh	Currently not connected to any configured network
		WiFi interface configuration error
		WiFi interface not in use
GNSS		GNSS 3D fix including altitude
		GNSS 2D fix without altitude or dead-reckoning fix
		Satellites in view, but no GNSS fix
		No GNSS satellites in view
VPN		All VPN conn. redundantly established over all uplinks
		All VPN conn. established, but limited uplink redundancy
		At least some VPN connections unavailable

Ethernet Status Indicators

Name	Color	Description
ETH 1-3	 / 	Link / Activity at 10 Mbit/s or 100 Mbit/s
		No link
ETH 4-5	 / 	Link / Activity at 10 Mbit/s, 100 Mbit/s or 1 Gbit/s
		No link

Interface Connectors

Interface Name	Connector	Function
ETH 1–3	M12 D-coded	Fast Ethernet ports 1–3
ETH 4–5	M12 X-coded	Gigabit Ethernet ports 4–5
MOB 1–4	TNC female	
<i>Option L, up to 4× 4G:</i>	A2/3	4G cellular modem 1 1×2 MIMO antennas
	A4/5	4G cellular modem 2 1×2 MIMO antennas
	A6/7	4G cellular modem 3 1×2 MIMO antennas
	A8/9	4G cellular modem 4 1×2 MIMO antennas
<i>Option N, 1× 5G:</i>	A2/3/4/5	5G cellular modem 1 4×4 MIMO antennas
<i>Option 2N, 2× 5G:</i>	A2/3/6/7	5G cellular modem 1 4×4 MIMO antennas
	A4/5/8/9	5G cellular modem 2 4×4 MIMO antennas
<i>Option NL, 1× 5G + 1× 4G:</i>	A2/3/6/7	5G cellular modem 1 4×4 MIMO antennas
	A4/5	4G cellular modem 2 1×2 MIMO antennas
<i>Option N2L, 1× 5G + 2× 4G:</i>	A2/3/8/9	5G cellular modem 1 4×4 MIMO antennas
	A4/5	4G cellular modem 2 1×2 MIMO antennas
	A6/7	4G cellular modem 3 1×2 MIMO antennas
WLAN 1–2	TNC female	
<i>Option Wac/2Wac</i>	A10/11	WLAN module 1 2×2 MIMO antennas
<i>Option 2Wac</i>	A8/9	WLAN module 2 2×2 MIMO antennas
GNSS	TNC female A1	Satellite navigation antenna
PWR 	M12 A-coded male Pin 1 Pin 3 Pin 2, 4	Power supply input connector V+ GND Not connected
EXT	M12 A-coded female	Extension Ports EP1/EP2, see Extension Connector
	Screw connector	Earth protection connector

Note

4G 1×2 MIMO antenna configurations use only the first antenna for TX, having an antenna connected to the first port is mandatory.

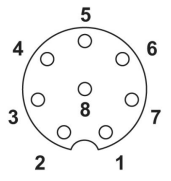
Extension Connector

The router has an extension connector which has different purposes depending on the chosen option. The following options are available:

- Option S — Non-isolated 3-wire RS-232 Port
- Option C — Dual CAN interface

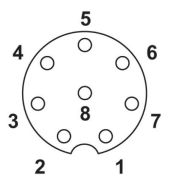
Option S — Non-isolated 3-wire RS-232 Port

The non-isolated 3-wire RS-232 port has the following pinout:

Connector	Pins	Function
EXT	M12 A-coded female	Extension Ports EP1/EP2
	Pin 1	GND
	Pin 2	RxD
	Pin 3	TxD
	Pin 4	Not connected
	Pin 5 - 8	Not connected

Option C — Dual CAN interface

Two CAN 2.0B interfaces are available on the EXT connector which are passive (Option Cm) or active (Option Cn). No internal bus termination is provided and an external termination of 120 Ω may be required according to the CAN specifications. The pinout is as follows:

Connector	Pins	Function
EXT	M12 A-coded female	Extension Ports EP1/EP2
	Pin 1	can0 GND
	Pin 2	can0 Low
	Pin 3	can0 High
	Pin 4	Not connected
	Pin 5	can1 GND
	Pin 6	can1 Low
	Pin 7	can1 High
	Pin 8	Not connected

Software Interface Mapping

The network interface naming and numbering used in the router configuration is different compared to the labels on the router housing. Refer to the following table to map between the two naming and numbering schemes.

Interface Name	Config Name
ETH 1-5	lan0-lan4
MOB 1-4	mbm0-mbm3
WLAN 1-2	wfi0-wfi1

for N Options (5G), refer to chapter Interface Connectors for details

Antenna Options

Depending on the installed router options, some connectors may be missing. If four cellular modems are installed, the WLAN 2 TNC connectors A8 and A9 are used for the MOB 4 primary and secondary antennas instead. If two 5G modems are installed, the connectors are used for the 5G MOB 2 MIMO antennas.

The installed cellular modems have multiple antenna ports. Two ports for 4G modems with 1×2 MIMO support, or four ports for 5G modems with 4×4 MIMO support. For optimal performance, these antennas should all be connected and use different polarizations and/or directions when using individual antennas.

When using only one antenna port of a 1×2 MIMO modem, the antenna must be connected to the primary (RX/TX capable) port, as the secondary port is for RX MIMO only. When using only two antenna ports of a 4×4 MIMO modem, the antennas shall be connected to the first two RX/TX capable ports, i.e. A2/A3 and A6/A7. Using a different combination of two ports, or using just one port of a 4×4 MIMO modem will result in decreased performance and/or missing frequency band support.

SIM Selection

The default SIM to modem connections are SIM 1 to modem 1, SIM 2 to modem 2, and so on. This mapping can be reconfigured and any SIM can be connected to any modem, if desired.

Supply Voltage

To power the router, a supply voltage of 24 – 48 VDC must be provided on the PWR connector. Optionally, a router variant with a power supply input voltage range of 72 – 110 VDC is available. For this higher voltage variant, the router's earthing screw **must** be connected to an earth protection. Consider the different operating temperature ranges depending on the model and the number of radio modules installed.

The required power supply rating depends on the installed options, but must be at least 25 W.

Factory Reset

On the left side of the SIM 1 slot there is a small hole to access the Factory Reset Button. A short press of the Factory Reset Button triggers a system reboot. A long press, greater than 5 seconds, triggers a system reset. A reset will delete all configuration data as well as all credential data stored on the router. A reset will flash all LEDs three times in red. After the reset is complete, a reboot will follow.

USB Mass Storage Devices

The USB-A port on the router supports USB 2.0 mass storage devices. If enabled in the configuration or if the device has a signed partition, the device will be mounted automatically upon insertion and named USB. Connecting mass storage devices through USB hubs is not supported.

GNSS Dead-Reckoning

Dead-reckoning is a method of estimating the current location based on a previously determined location and continuous integration of movement measured usually by inertial sensors. It allows a GNSS receiver to deliver a location estimate in the absence of a satellite signal. It does not usually improve location accuracy in combination with a satellite signal, but it can help mitigate errors in multi-path environments like urban canyons and particularly helps bridge short signal outages, for example below bridges or in tunnels.

For the correct integration of movement measurements it is crucial that the router axes are properly aligned with the vehicle axes. The offset error should be less than three degrees in any axis to avoid performance degradation, a misalignment of ten degrees or more can result in failure. If the router axes are not aligned with the vehicles axes due to mounting constraints, the router configuration allows for orientation corrections for all (XYZ) axes.

On router variants with dead-reckoning support, the built-in GNSS receiver supports the Untethered Dead-Reckoning (UDR) mode. This operation mode uses an internal Inertial Measurement Unit (IMU) consisting of a 3-axis accelerometer and a 3-axis gyroscope.

Note

This router does not support the Automotive Dead-Reckoning (ADR) mode, external wheel-speed or wheel-tick input is not supported.

In the router configuration, the dead-reckoning can be configured for different dynamic platform models. For optimal performance, the model should be selected to match the vehicle type the router is installed in. The following models are available:

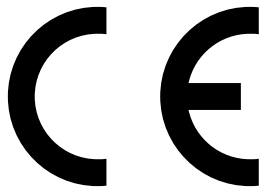
- Automotive: Four-wheeled road vehicles like cars or buses
- Scooter: Two-wheeled road vehicles like bicycles or electric scooters

Note

This router does not support the railway dynamic platform model.

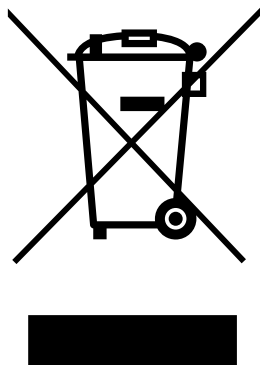
4 Conformity and Waste Disposal

Declaration of Conformity



onway routers comply with the relevant standards following the provisions of the RED Directive 2014/53/EU. To obtain a signed version of the Declaration of Conformity please contact the onway support.

Waste Disposal



This product is subject to the WEEE directive 2012/19/EU and compliant with the marking requirements. The WEEE symbol on this product indicates that it must not be disposed of with normal household waste at its end of life. Instead, it must be separated and returned to a designated collection point for waste electric and electronic equipment for proper recycling. Doing so helps to conserve natural resources and to protect the environment from unnecessary pollution.

5 Open Source Software Notice

This product does in part build on open source software. We are distributing such open source software to you under its respective license, and the licenses can be obtained here:

<https://support.onway.ch/onway-router/licenses/on3800/>

To obtain the corresponding open source codes covered by these licenses, please contact us at support@onway.ch.

Specific Acknowledgements

- This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<http://www.openssl.org/>)

6 Contact Information

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