Hardware Manual

Industrial Cellular Router

ICR-3232

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Document No. MAN-0043-EN, revised on January 28, 2026.

Used symbols

Important

Important — Indicates a risk to personal safety or potential damage to the router. Follow these instructions precisely to prevent injury or equipment damage.

Warning

Warning — Highlights conditions that may cause malfunction, loss of data, or unexpected behavior in specific situations. Read carefully before proceeding.

Info

Info — Provides helpful tips, context, or references that improve understanding but are not strictly required to complete the task.

Code Example

```
Code Example - Copy-pasteable configuration snippets or CLI commands.
```

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1. Product Overview

1.1 Product Introduction

ICR-3232 is an industrial cellular router intended for the Australian market. This router is an ideal device for wireless communication in mobile networks that make use of LTE, HSPA+, UMTS, TD-SCDMA, EDGE or GPRS technology. Due to the high speed of data transfer up to 150 Mbps (download) and up to 50 Mbps (upload) is this router an ideal solution for specialized M2M devices and IoT as well as for wireless connection of traffic and security camera systems, individual computers, LAN networks, automatic teller machines (ATM) and other self-service terminals.

The standard configuration includes two Ethernet 10/100 ports, serial line RS232, RS485, one binary input and one output. The device also has two readers for 3 V and 1.8 V SIM cards, which are located on the left panel of the router. The router can be equipped with a Wi-Fi module, but this must be part of the initial configuration – it cannot be assembled to the router at some point in the future. The router can be provided only in a metal casing.

Configuration of the router may be done via a password-protected Web interface. Web interface provides detailed statistics about the router's activities, signal strength, detailed system log etc. The router supports the creation of VPN tunnels using IPSec, OpenVPN and L2TP to ensure safe communication. DHCP, NAT, NAT-T, DynDNS, NTP, VRRP, control by SMS, backup primary connection and many other functions are supported.

The router provides diagnostic functions which include automatically monitoring the PPP connection, automatic restart in case of connection losses, Low Power Mode, and a hardware watchdog that monitors the router status. The user may insert Linux scripts which are started on various actions. It is possible to create up to four different configurations for the same router. These configurations can be switched whenever necessary via Web interface, SMS or binary input status.

The router supports automatic upgrades of both its configuration and firmware, leveraging updates from a central server. This feature ensures that the router remains up-to-date with the latest enhancements and security protocols.

This model is fully compatible with *WebAccess/DMP*, Advantech's powerful, flexible, and secure remote device management platform. WebAccess/DMP enables comprehensive remote management, monitoring, and troubleshooting of network devices without the need for on-site access. The platform supports features such as VPN management, digital twin functionality, customizable dashboards, multi-tenancy, and strict security controls including PKI, two-factor authentication, auditing, permission management, and alerts.

Examples of possible applications

- mobile office
- fleet management
- security system
- telematic
- telemetric
- remote monitoring
- vending and dispatcher machines

1.2 Hardware Overview

The router case preview is shown in Figure 1. A short description of hardware parts of the router is listed in Table 1, including the links to the chapters with a detailed description.

Figure 1: Hardware overview of the router

#	Item	Type	Description
1	LEDs	-	Status LED indication; see Chapter 2.8.
2	RST	-	Button to reboot the router or to restore the default configuration; see Chapter 2.9.
3	PWR	2-pin	Power supply 2-pin terminal socket; see Chapter 2.5.
4	ETH0, ETH1	RJ45	100 MB Ethernet connection for the firts and second LAN; see Chapter 2.4.
5	DIV, ANT	SMA	Connector for the diversity and main antennas of the cellular module; see Chapter 2.2 and Chapter 3.4 for cellular module parameters.
6	Wi-Fi, GNSS	SMA, R-SMA	One SMA connecor for the GNSS antenna and two R-SMA connectors for the Wi-Fi antennas. See Chapter 2.2 for more information, Chapter 3.5 for GNSS parameters and Chapter 3.6 for Wi-Fi parameters. The Wi-Fi2 connector can also be used for a Bluetooth antenna. See details in Chapter 2.2 and Chapter 3.7 for bluetooth parameters.
7	DIN clip	-	DIN rail clip, included as standard accessories; see Chapter 1.10.
8	Grounding screw	M3	Pay attention to proper grounding; see Chapter 2.5.
9	SIM slots	Mini SIM	Two SIM card slots; see Chapter 2.1.
10	SERIAL | I/O	10-pin terminal	RS232, RS485, binary inputs, and binary outputs interfaces. See Chapter 2.7 for more information.
11	Wall clips	-	Wall mounting clips, included as standard accessories; see Chapter 1.9.

Table 1: Hardware overview of the router

1.3 Product Versions

ICR-3232 router is supplied in the following versions (see table below). All versions are available in metal box.

Router versions	SIM	BIN	BOUT	ETH	Wi-Fi	GNSS	RS232	RS485
Version without Wi-Fi and GNSS	2 x	1 x	1 x	2 x			1 x	1 x
Version with Wi-Fi and GNSS	2 x	1 x	1 x	2 x	1 x	1 x	1 x	1 x

Table 2: Router versions

Figure 2: Version without Wi-Fi and GNSS

Figure 3: Version with Wi-Fi and GNSS

1.4 Order Codes

The table below provides an overview of the order codes.

Order code	Configuration
ICR-3232	LTE module for ANZ, 2x ETH, 1x BI, 1x BO, 1x RS232, 1x RS485, 2x SIM reader
ICR-3232W	LTE module for ANZ, 2x ETH, 1x BI, 1x BO, 1x RS232, 1x RS485, 2x SIM reader, Wi-Fi, GNSS

Table 3: Order code overview

1.5 Product Revisions

For the product revision history of the entire product platform, refer to the table below. Please note that some revisions may not be available for certain order codes. The revision number is printed on both the packaging and product labels.
The router GUI can also display the product revision under *Status* → *General* → *System Information* → *Product Revision*. Please note that the default revision (Rev. 1.0) may not be available here.

Rev.#	Description
1.0	Initial version (revision number not printed on the labels).
2.0	PCBU and other changes; see PCN-2022-01 for details.
2.1	PCBU changes; see PCN-2023-06 for details.

Table 4: HW revision history

1.6 Package Contents

The standard set of router includes items listed in the following table:

Item#	Description	Figure	Q'ty
1	ICR-3232 or ICR-3232W router		1 pcs
2	DIN holder (screwed on the router)		1 pcs
3	Wall clips for wall-mounting (screwed on the router)		2 pcs
4	2-pin terminal block for power supply (deployed on the router)		1 pcs
5	10-pin terminal block for RS232, RS485 and I/O (deployed on the router)		1 pcs
6	*Quick Start Guide Leaflet*		1 pcs

Table 5: Package contents

1.7 Product Dimensions

For the dimensions of the product in metal and plastic boxes see the figures below. Note that all sizes are measured in millimeters.

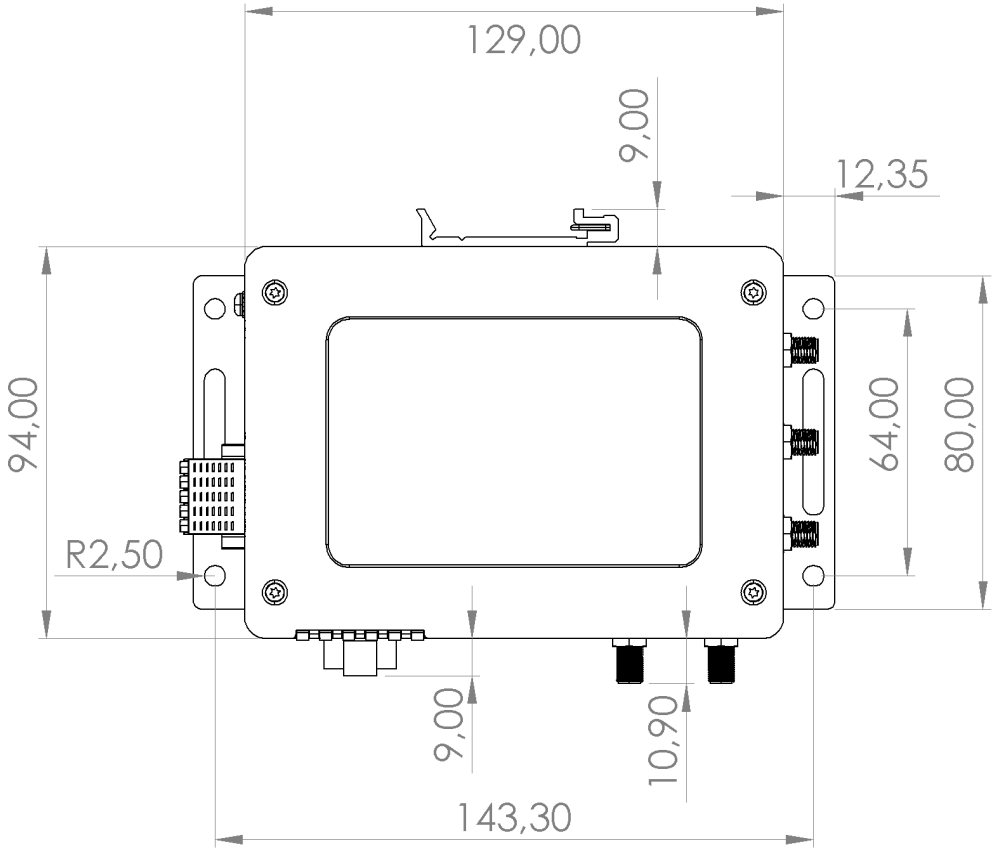

Figure 4: Basic router box dimensions

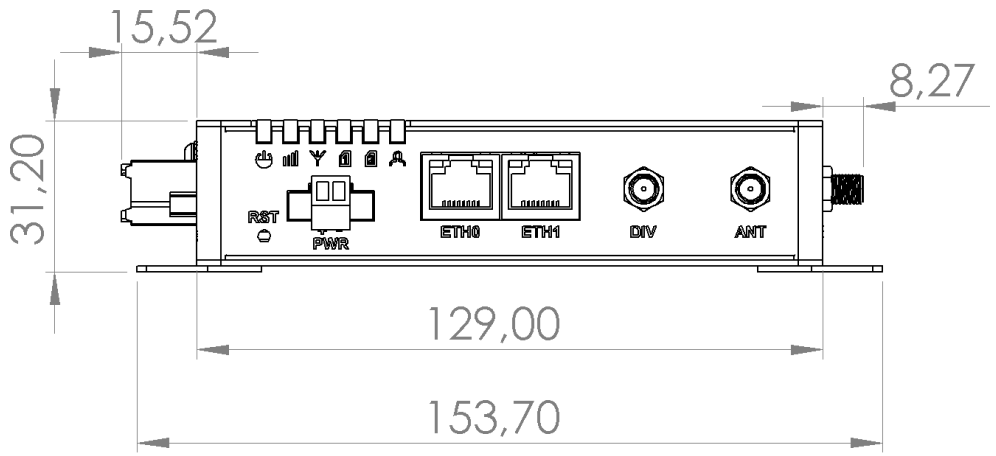

Figure 5: Basic router box dimensions

1.8 Mounting Recommendations

The router can be placed:

- on a flat surface,
- on a wall (or another surface) using the side clips,
- on a DIN rail EN 60715 with the included metal DIN rail clip.

For most applications with a built-in router within a switchboard, it is possible to recognize two kinds of environments:

- A non-public, industry environment of low voltage with high interference,
- a public environment of low voltage and without high interference.

For both of these environments, it is possible to mount the router to a switchboard, after which there is no need to have examination immunity or issues in connection with EMC according to EN 61439-1:2011.

Warning

In compliance with the EN 61439-1:2011 specification, it is necessary to observe the following assembly instructions for a router attached to a switchboard:

- For whip antennas it is recommended to observe a minimum distance of 6 cm from cables and metal surfaces on every side in order to avoid interference. When using an external antenna separate from the switchboard it is necessary to fit a lightning conductor.
- When mounting a router on sheet-steel we recommend using a cable antenna.
- For all cables, we recommend to bind the bunch, and for this we recommend:
  - The length of the bunch (the combination of power supply and data cables) should be a maximum 1.5 m. If the length of data cables exceeds 1.5 m or if the cable is leading towards the switchboard, we recommend installing surge protectors.
  - Data cables must not have a reticular tension of $\sim$ 230 V/50 Hz or $\sim$ 120 V/60 Hz.
- Sufficient space must be left between each connector for the handling of cables,
- To ensure the correct functioning of the router we recommend the use of an earth-bonding distribution frame for the grounding of the power supply of the router, data cables and antenna within the switchboard.

1.9 Wall-Mounting

Info

The wall-mounting clip is supplied with the router as standard accessories.

The router can be screwed to a wall (or another surface) using the wall-mounting clips. Two wall-mounting clips are assembled to the router during the production and need to be roteted as shown of Figure 6. There are two wholes on the clip with a diameter of 5 millimeters. For detailed information about the mounting dimensions see Chapter 1.7.

Warning

When mounting the wall-mounting clip, tighten the screws with max. torque of 0.4 Nm.

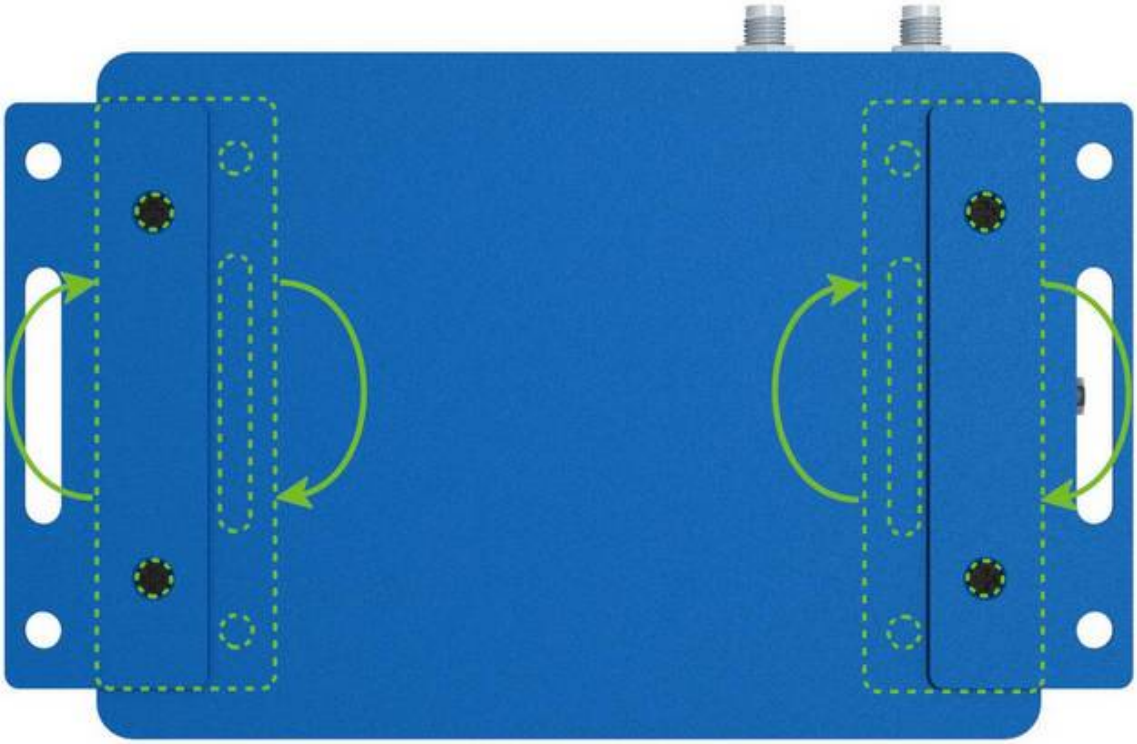

Figure 6: Rotated wall-mounting clips

1.10 DIN Rail Mounting

Info

The DIN rail clip is suitable for a DIN rail according to EN 60715 standards.

Warning

When mounting the DIN rail clip, tighten the screws with max. torque of 0.4 Nm.

To remove the router from the DIN rail it is necessary to lightly push down the router so that the bottom part of the DIN rail clip hitched to the DIN rail get out of this rail and then fold out the bottom part of the router away from the DIN rail.

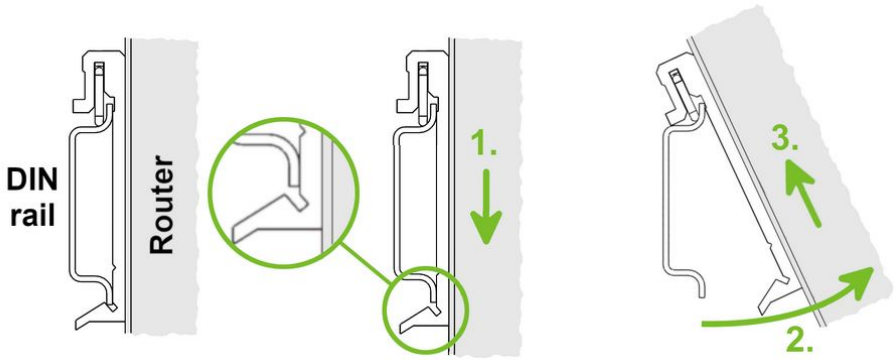

Figure 7: Removing from the DIN rail

1.11 Product Label

The figure below shows an example of the product labels with all the information printed on them.

Figure 8: Product label

1.12 First Use

You can perform the initial configuration of the router using a web browser on your PC. This interface enables router monitoring, configuration, and administration.

Warning

- Before putting the router into operation, ensure that all components required for running your applications are connected. Refer to Chapter *1.2 Hardware Overview* for an overview of the hardware.
- Do not operate the router without an antenna connected to the main antenna connector. Transmitted energy will be reflected by an open connector, which could potentially damage the equipment.
- This device utilizes radio frequency bands that may be subject to specific usage restrictions in certain European Union countries (e.g., indoor use only). Please refer to Appendix C for detailed regulatory information before operation.

The procedure for connecting to a new router is described in the *Configuration Manual* [1], Chapter *Getting Started* → *Configuration Environments* → *Web Interface Initial Setup*. This manual also provides detailed descriptions and examples of router configuration using the web interface.

2. Hardware Functionality

See Chapter 1.2 for an overview of the product's hardware, along with links to chapters offering detailed explanations.

2.1 SIM Card Slots

Slots for two SIM cards are located on the router beneath a metal cover. If you plan to use this device for cellular network communication, insert an activated data-provisioned SIM card into the SIM card slot.
You have the option to install two SIM cards simultaneously for utilizing the switching feature. The SIM cards can have different Access Point Names (APNs) configured. The procedure for changing SIM cards is outlined below. If the SIM requires a PIN, input it in the router's web interface (*Administration* → *Unlock SIM Card*).

Info

Type of SIM card: Mini SIM (2FF) 25.0 × 15.0 × 0.76 mm.

Warning

Inserting the SIM card:

- Always disconnect the router from the power supply before handling the SIM card.
- Unscrew the two screws on the SIM card cover and remove the cover.
- To remove an inserted SIM card, use the flat end of a spudger or your fingernail to press the SIM card slightly into its slot until you hear a click. Upon hearing the click, release the card, and it will pop out of its slot.
- To insert a SIM card, push the card into the slot until it clicks into place.
- Put the cover back and secure it with the two screws.

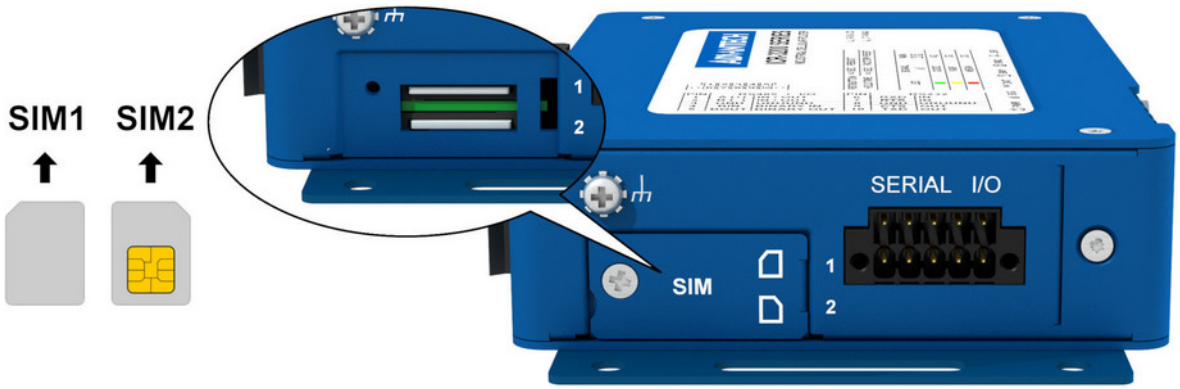

Figure 9: SIM card insertion

2.2 Antennas

Connect cellular antennas to the router to main (ANT) and diversity (DIV) SMA female connectors on the front panel. For Wi-Fi models, connect Wi-Fi antennas to the router to *WIFI1* and *WIFI2* RP-SMA female connectors on the right panel. Connect the GNSS antenna to the router to GNSS SMA female connector on the right panel between the Wi-Fi antennas.

Warning

Always operate the router with a cellular antenna securely connected to the main antenna connector. Transmitting without an antenna attached will cause RF energy to be reflected at the open connector, which can lead to permanent damage to the radio circuitry. Ensure the antenna is properly installed before powering on or transmitting to prevent equipment failure.

Info

The DIV cellular antenna is required for the MIMO DL functionality.

Info

Recommended tightening moment for screwing the antenna to the SMA female connectors is 0.9 Nm.

Info

To get maximum throughput when operate Wi-Fi at MIMO 2x2, two antennas with at least 25 dB isolation is recommended.

2.3 Bluetooth

The *Wi-Fi2* connector is compatible with Bluetooth antennas. For detailed Bluetooth specifications, refer to Chapter 3.7. Our router's Bluetooth functionality is divided into three main components:

1. **Kernel Support and Drivers:** Integrated from firmware version 6.2.6, this includes kernel-level Bluetooth support and necessary drivers.
2. **Bluetooth Router Application with BlueZ:** This application, featuring the BlueZ Linux Bluetooth stack, enhances the router's Bluetooth capabilities. It is not pre-installed on the router. To use this feature, download the Bluetooth Router App from our website[1] and install it manually.
3. **Node-RED Applications:** For advanced Bluetooth functionality, Node-RED and its Bluetooth node can be utilized. Like the Bluetooth Router App, *Node-RED*[2] and the *Node-RED Bluetooth Node*[3] are not pre-installed and require manual installation on the router.

[1] https://icr.advantech.com/products/software/user-modules#bluetooth
[2] https://icr.advantech.com/products/software/user-modules#node-red
[3] https://icr.advantech.com/products/software/user-modules#node-red-bluetooth-node

2.4 Ethernet Interfaces

The router is equipped with one or more RJ45 Ethernet ports for wired network connections. The pinout for the standard 10/100 Ethernet connector is detailed below.

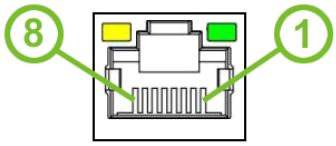

Figure 10: Ethernet RJ45 connector

Pin	Signal	Description
1	Tx+	Transmit Data+
2	Tx-	Transmit Data-
3	Rx+	Receive Data+
4	—	Not Connected
5	—	Not Connected
6	Rx-	Receive Data-
7	—	Not Connected
8	—	Not Connected

Table 6: Ethernet connector pinout

Info

The Ethernet ports provide an isolation barrier of 1500 V from the router's ground.

2.5 Power Supply

Terminal block 3.5 mm.

Pin	Signal mark	Description
1	VCC(+)	Positive pole of DC supply voltage (+9 to +36 V DC)
2	GND(-)	Negative pole of DC supply voltage

Table 7: Connection of power connector

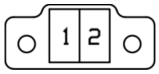

Figure 11: Power connector

Power supply for router is required between +9 V to +36 V DC supply. Protection against reversed polarity without signaling is built into the router.

Warning

- If the router is grounded, using the grounding screw, there is no protection against the reversed polarity. The negative pole of the DC power supply must be at the same voltage reference as the grounding screw. If not, a voltage difference between these two points might damage the router, and only an authorized service center can fix it.
- Unit has to be supplied by a power supply specified as a Limited Power Source (LPS) or CEC/NEC Class 2 source of supply.

For correct operation it is necessary that the power source is able to supply a peak current of 1.2 A.

Circuit example:

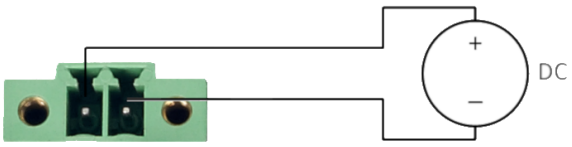

Figure 12: Power supply connection

Info

All metal parts, including the box, are connected together with the negative pole of power supply (common pole). To ground the router can be used the grounding screw located on the left panel.

2.6 Low Power Mode

Warning

In applications requiring low power consumption (such as solar power - not 7/24 mode) is strictly recommended to use LPM mode prior to powering down the entire router.

LPM (Low Power Mode) is a router mode where the router is in sleep mode with minimal power consumption; see Chapter 3.1 for the LPM consumption. The router can be woken up from this mode by a signal applied to the BIN0 input or after a predetermined period of time. Putting the router into LPM mode can be done using the `lpm` command, see Command Line Interface application note for more details.

2.7 Serial Interfaces and I/O Port

The RS232 and RS485 serial interfaces together with the I/O interface are physically connected to the 10-pin panel socket. All three interfaces are not isolated from the router. The pinout of this conector is described in the tables below.

Figure 13: Serial + I/O connector

Pin	Signal mark	Description
1	B (+)	IN/OUT
2	A (-)	IN/OUT
3	GND	GROUND

Table 8: RS485 connector pinout

Info

We recommend connecting a termination resistor outside the router. Without termination resistors, signal reflections off the unterminated end of the cable can cause data corruption. Termination resistors also reduce electrical noise sensitivity due to the lower impedance.

Pin	Signal mark	Description
4	BIN	BINARY IN
5	BOUT	BINARY OUT

Table 9: Connection of I/O

Pin	Signal mark	Description
6	RXD	IN
7	CTS	IN
8	GND	GROUND
9	RTS	OUT
10	TXD	OUT

Table 10: RS232 connector pinout

The I/O user interface is designed for binary input processing and binary output control. By default, the binary output is open, so it is not grounded. The maximum binary output load is 36 V at 500 mA. The constant current supplied by the binary input is 3 mA.

The functional scheme of connection for the binary input and binary output is drawn on the picture below.

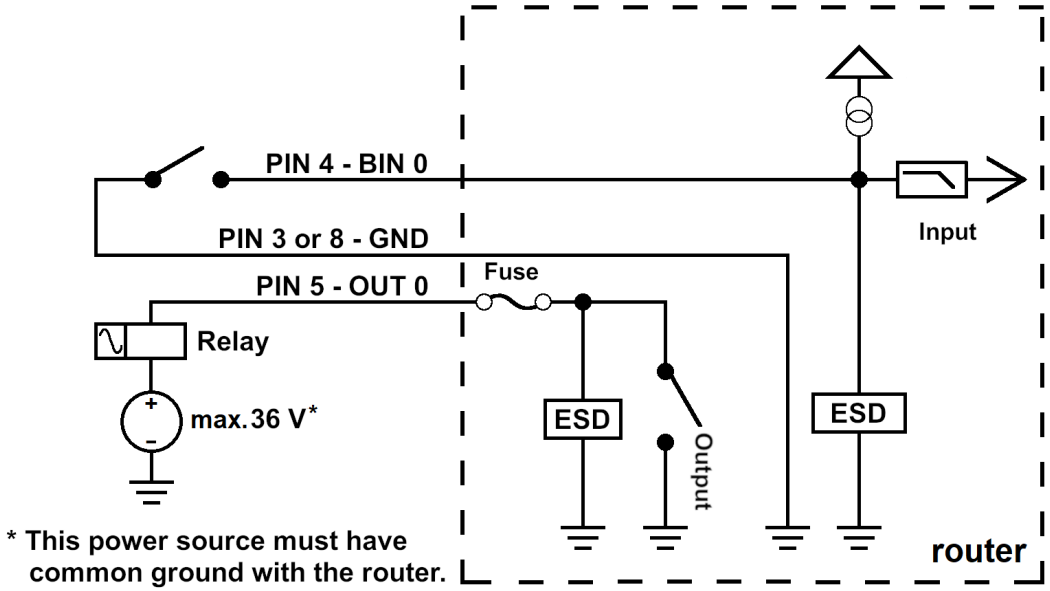

Figure 14: Functional scheme of the binary interface

2.8 LED Status Indication

There are six LED indicators on the front panel to provide router status information. Each ETH port has two additional LEDs that provide information about the port status.

	Caption	Color	State	Description
	PWR	Green Green Green	On Blinking Fast blinking	The router is booting up. The router booted up and is ready. The router firmware is being updated.
	SIG	Green Orange Red	On On On	Good cellular signal. Fair cellular signal. Poor cellular signal.
	DAT	Green	Blinking	Cellular communication is in progress.
	SIM1	Green Green Orange Red Red	Blinking On On On Fast blinking	SIM1 is active and waiting for the data connection. The active SIM uses 4G technology. The active SIM uses 3G technology. The active SIM uses 2G technology. A SIM1 issue (missing card or PIN not entered).
	SIM2	Green Green Orange Red Red	Blinking On On On Fast blinking	SIM2 is active and waiting for the data connection. The active SIM uses 4G technology. The active SIM uses 3G technology. The active SIM uses 2G technology. A SIM2 issue (missing card or PIN not entered).
	USR	Green	—	The function of this LED is user-defined.
	ETH0 ETH1	Green Green	On Off	Selected 100 Mbps bit rate. Selected 10 Mbps bit rate.
	ETH0 ETH1	Yellow Yellow Yellow	On Blinking Off	The network cable is connected. Data transmission. The network cable is not connected.

Table 11: LED status indication

2.9 Reset Functions

The *RST* button has multiple functions. For more details, refer to the configuration manual [1], Chapter *Introduction* → *Device* → *Reset*.

Info

Use a narrow screwdriver or a small tool to press the *RST* button.

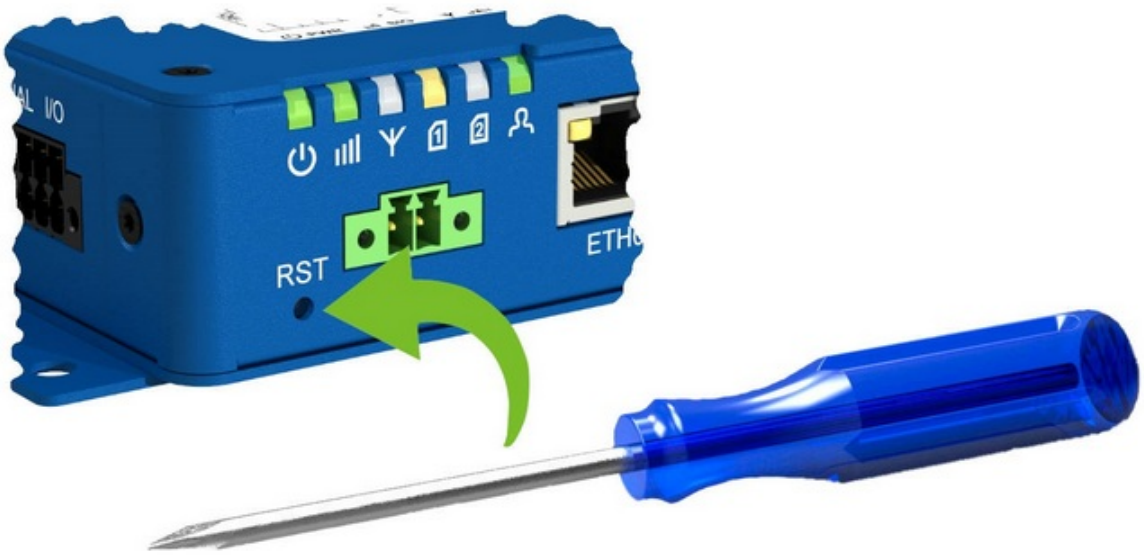

Figure 15: Resetting the router

3. Technical Parameters

3.1 Basic Technical Parameters

Parameter	Conditions	Description
Temperature range	Operating Storage	-40 °C to +75 °C -40 °C to +85 °C
Humidity	Operating Storage	0 to 95 % relative humidity non condensing 0 to 95 % relative humidity non condensing
Altitude	Operating	2000 m / 70 kPa
Degree of protection		IP30
Supply voltage		9 to 36 V DC
Battery for RTC		CR1225
Consumption of the router with Wi-Fi module @ 9 V	Idle Average Peak LPM mode	2.6 W 4.3 W 5.8 W 20 mW (rev. 2.x)[1]
Dimensions of device		31,2 × 94 × 129 mm
DIN rail clip dimensions		DIN 35 mm, EN 60715
Weight	Metal box	480 g for non-Wi-Fi version 500 g for Wi-Fi version

Table 12: Basic technical parameters

[1] 100 mW for product revision 1.x

3.2 Standards and Regulations

The router complies with the following standards and regulations:

Parameter	Description
Radio	AS/CA S042, AS/NZC 4268
EMC	AS/NZC CISPR 32, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-6-2
Safety	EN IEC / UL 62368-1, IEEE 802.3
Transportation	EN 45545-2
Railway	EN 50155 (A1, OT4, ST1, H1, Cat 1 Class B, S1, C1, L4, PD2, K2, PC2)
Cybersecurity	EN 18031-1
National	RCM, Brazil - Anatel (15831-20-05739)
Environmental	REACH, RoHS3 and WEEE compliant

Table 13: Standards and regulations

3.3 Type Testing and Environmental Conditions

Phenomena	Test	Description	Test levels
ESD	EN 61000-4-2	Enclosure contact Enclosure air	± 6 kV (crit. A) ± 8 kV (crit. A)
RF field AM modulated	EN 61000-4-3	Enclosure	20 V/m (crit. A) (80 – 1000 MHz) 10 V/m (crit. A) (1 – 6 GHz)
Fast transient	EN 61000-4-4	Signal ports Power ports Ethernet ports	± 1 kV (crit. A) ± 2 kV (crit. A) ± 1 kV (crit. A)
Surge	EN 61000-4-5	Ethernet ports Power ports	± 1 kV (crit. A), shielded cab. ± 2 kV (crit. A)
RF conducted	EN 61000-4-6	All ports	10 V/m (crit. A) (0.15 – 80 MHz)
Radiated emission	EN 55032	Enclosure	Class B
Conducted emission	EN 55032	DC power ports Ethernet ports	Class B Class B
Dry heat	EN 60068-2-2	+75 °C *, 40 % rel. humidity	
Cold	EN 60068-2-1	-40 °C *	
Damp heat	EN 60068-2-78	95 % rel. humidity (+40 °C)	
Vibration	EN 60068-2-64 ed. 2	Vibration spectrum A.3 (rolling stock)	Category 1 (3 axis, 8 hours per axis)
Shock	EN 60068-2-27 ed. 2	half-sine, 50 g peak, 11 ms	

Table 14: Type testing and environmental conditions

3.4 Parameters of Cellular Module

Item	Description
Antenna	Connector type: SMA Impedance: 50 Ω
LTE parameters	LTE: LTE Cat.4, 3GPP Rel. 11 **FDD frequencies**: B28 (700 MHz), B5 (850 MHz), B8 (900 MHz), B4 (1700 MHz)[1], B3 (1800 MHz), B2 (1900 MHz)[2], B1 (2100 MHz), B7 (2600 MHz) **TDD frequencies**: B40 (2300 MHz) **Bit rates**: up to 150 Mbps (DL), 50 Mbps (UL) **Maximum output power:** 23±2 dBm
HSPA+/UMTS parameters	**Supported frequencies**: B5 (850 MHz), B8 (900 MHz), B4 (1700 MHz), B2 (1900 MHz), B1 (2100 MHz) **Bit rates**: up to 42 Mbps (DL) / 5.76 Mbps (UL) **Maximum output power:** 24+1/-3 dBm
EDGE/GPRS parameters	**Supported frequencies**: B8 (900 MHz), B5 (850 MHz), B3 (1800 MHz), B2 (1900 MHz) **Bit rates**: up to 296 kbps (DL) / 236.8 kbps (UL) **Maximum output power:** 33±2 dBm

Table 15: Technical parameters of the cellular module

3.5 Parameters of GNSS

Parameter	Description
Antenna	Connector type: SMA 50 Ω – active
Protocols	NMEA 0183
GNSS Systems	GPS, GLONASS, BeiDou, Galileo, QZSS
Frequency	GPS/Galileo/QZSS: 1575.42 ± 1.023 MHz GLONASS: 1597.5 – 1605.8 MHz BeiDou: 1561.1 ± 2.046 MHz
Sensitivity (autonomous)	Tracking: -157 dBm Reacquisition: -157 dBm Cold start: -146 dBm
Acquisition time (autonomous)	Hot start: 2.5 s Warm start: 26 s Cold start: 35 s
Accuracy	< 1.5 m

Table 16: Technical parameters of GNSS

[1] For product revision 2.0 and higher only.
[2] LTE-FDD B2 does not support Rx-diversity.

3.6 Parameters of Wi-Fi

Warning

The 5 GHz Wi-Fi interface operates in frequency bands (specifically 5150–5350 MHz) that are restricted to **indoor use only** in certain EU member states. Please refer to Appendix C for detailed regulatory information.

Parameter	Description
Antenna connector	2x R-SMA – 50 Ω (MIMO)
Supported Wi-Fi bands	2.412 to 2.472 GHz, 5.180 to 5.825 GHz
Standards	IEEE: 802.11b, 802.11b+g, 802.11b+g+n, 802.11a, 802.11a+n, 802.11ac
2.4 GHz supported channels	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
5 GHz supported channels	36, 40, 44, 48, 149, 153, 157, 161, 165
Type of device	Access point, Station
Security – Standards	WEP, WPA, WPA2, WPA3, 802.1X
Security – Encryption	WEP, TKIP, AES
Security – EAP Types	EAP–FAST, EAP–TLS, EAP–TTLS, PEAP–GTC, PEAP–MSCHAPv2, PEAP–TLS, LEAP
TX Power (2 chains)[1]	max. 20 dBm @ 2.4 GHz max. 23 dBm @ 5 GHz
AP maximum users	Unlimited (Wi-Fi module supports multi-role operation in STA and AP).

Table 17: Technical parameters of Wi-Fi

3.7 Parameters of Bluetooth

Item	Description
Bluetooth Standards	Bluetooth version 2.1 with Enhanced Data Rate Bluetooth 4.2 (Bluetooth Low Energy or BLE)
Features	Bluetooth 4.2 (BDR/EDR/LE), Bluetooth class 1 Adaptive Frequency Hopping (AFH) using Package Error Rate (PER)
Antenna	Shared with Wi-Fi2 R-SMA connector
Frequency Range	2.4 to 2.4835 GHz
Data Rates Supported	1 Mbps (GFSK), 2 Mbps (π/4-DQPSK), 3 Mbps (8-DPSK)
Maximum Output Power	10 dBm
Bluetooth Modulation	GFSK@ 1 Mbps Pi/4-DQPSK@ 2 Mbps 8-DPSK@ 3 Mbps
Encryption support	AES

Table 18: Technical parameters of Bluetooth

[1] The maximum transmit power is determined by the *Country* setting in the router's GUI; for more details, please refer to the *Configuration Manual*.

3.8 System Configuration

Parameter	Description
CPU	Cortex A8, 32-bit, 1 GHz 2 DMIPS per MHz
Flash memory	Available memory space 1 862 MB • 2x 256 MB – FW • 512 MB – User data storage • 838 MB – Space for Router Apps
RAM	512 MB

Table 19: System configuration

Appendix A: Troubleshooting

Warning

If you cannot connect to the router from your PC, your network card may be configured in a way that prevents a connection. Try one or more of the following steps to resolve the issue:

- Ensure your PC's network card is configured to obtain an IP address automatically from a DHCP server (the router's DHCP server is enabled by default).
- Connect the router to the PC via a network switch.
- Connect the PC directly to the router, but start the router first and wait for it to initialize completely before starting the PC.

Ethernet Connection Fails or Is Unstable

- On the router's *Configuration* → *LAN* page, you can disable auto-negotiation and manually set a specific link speed and duplex mode. This can resolve compatibility issues with some network devices.

Mobile WAN Connection Fails or Is Intermittent

- Check the signal strength on the *Status* → *Mobile WAN* page. If the signal is weak, a more powerful antenna is required. If neighboring cells have similar signal strength, a directional antenna may be necessary to lock onto the optimal cell tower.
- Enable the connection check feature on the *Configuration* → *Mobile WAN* page in the *Check connection* section. Select the *Enable + bind* option. This will send periodic pings to check connectivity and restart the connection if it fails. The "bind" option ensures the ping is always sent through the Mobile WAN interface.

Cannot Establish Mobile WAN Connection

- Verify all settings on the *Configuration* → *Mobile WAN* page, including the *APN*, *username*, *password*, and *IP address*. For many public networks, these fields can be left blank.
- Check if the SIM card requires a PIN. If so, enter it on the *Administration* → *Unlock SIM Card* page.
- For private APN networks, it is often not recommended to obtain DNS server addresses from the operator. Disable this option on the *Configuration* → *Mobile WAN* page.
- Check the *Status* → *System Log* for error messages that can help diagnose the issue.

Cannot Connect to a Device Behind the Router from the Internet (NAT)

- The device behind the router must be configured to use the router's IP address as its default gateway.

Cannot Access a Web Server Behind the Router via NAT

- Remote HTTP access to the router itself must be disabled. This can be done on the *Configuration* → *NAT* page.
- On the same page, enable the *Send all remaining incoming packets to default server* feature and enter the IP address of your web server.
- Ensure the web server's default gateway is set to the router's IP address.

✍ DynDNS Does Not Work

- DynDNS will not work with a private APN if the router's IP address is not publicly accessible.
- If your DynDNS hostname resolves to the same private IP address that is assigned to the router, it means your mobile operator is using NAT or a firewall, preventing direct connections.
- You can verify operator NAT by pinging a server with a static public IP and comparing the source IP (seen by the server) with the IP address shown on the router's status page.
- You can test for a firewall by trying to access the router's web interface remotely.
- The operator may not be providing DNS server addresses. Without DNS, the router cannot resolve the DynDNS service hostname. The System Log would show errors like:
  - `Error resolving hostname: no such file or directory`
  - `Connect to DynDNS server failed`

✍ L2TP or IPsec Tunnel Fails to Establish

- Check the *Status* → *System Log* for specific error messages related to the VPN tunnel negotiation.

✍ IPsec Tunnel Establishes, but No Data Is Transferred

- This is typically caused by incorrect routing rules or a misconfigured default gateway on either the client device or the remote network.

✍ Router Reverts to Online Mode After a Reboot, Despite Being Set to Offline via SMS

- State changes made via SMS commands are temporary and do not alter the saved configuration. They remain in effect only until the router is rebooted.

✍ Serial Communication Is Not Working

- Verify that your router model is equipped with a serial port. Check the serial communication settings on the *Configuration* → *Expansion Port* page.

✍ Is the Router Cisco Compatible?

- No. The router's operating system (ICR-OS) is based on Linux, not Cisco IOS. Therefore, Cisco configuration commands cannot be used.
- However, since all network connections are based on open standards, the router is fully compatible and can be connected to Cisco devices or any other standard networking equipment.

✍ FTP or SFTP Does Not Work

- **FTP** is available on v2 platform routers only. Ensure it is enabled in *Configuration* → *Services* → *FTP*. Connect using any FTP client to port `21` with the same username and password as the web interface.
- **SFTP** (SSH File Transfer Protocol) is available on all routers. Ensure SSH is enabled in *Configuration* → *Services* → *SSH*. Connect using any SFTP-capable client (like FileZilla or WinSCP) to port `22` with the same credentials as the web interface.

✍ How to Access the Router's Command Line

- You can connect to the router's command line using SSH (all routers) or Telnet (v2 routers only).
- **SSH** is enabled by default. You can verify this in *Configuration* → *Services* → *SSH*. Use any SSH client to connect to the router's IP address on port `22` .
- **Telnet** can be enabled on v2 routers in *Configuration* → *Services* → *Telnet*.
- For both methods, use the same username and password as for the web interface.

Appendix B: Customer Support

Customer Support for Europe

Advantech Czech s.r.o.
Sokolska 71
562 04, Usti nad Orlici
Czech Republic

Phone: +353 91 792444
Fax: +353 91 792445
E-mail: iiotcustomerservice@advantech.eu
Web: www.advantech.com

Customer Support for NAM

Advantech North America
707 Dayton Road
Ottawa, IL 61350 USA

Phone: +1-800-346-3119 (Monday – Friday, 7 a.m. to 5:30 p.m. CST)
Fax: +1-815-433-5109
E-mail: support.iiot.ana@advantech.com
Web: www.advantech.com

Customer Support for Asia

Phone: +886-2-2792-7818 #1299 (Monday – Friday, 9 a.m. to 5:30 p.m. UTC+8)
Fax: +886-2-2794-7327
E-mail: icg.support@advantech.com.tw
Web: www.advantech.com

Appendix C: Regulatory & Safety Information

Safety Notices

For your safety and proper operation of the device, please observe the following instructions:

- The router must comply with all applicable international, national, and local regulations, including any specific restrictions concerning its use in designated applications and environments.
- To avoid personal injury or damage to the device, use only accessories that are approved or supplied by the manufacturer. Unauthorized modifications or the use of non-approved accessories may damage the router, violate regulations, and void the warranty.
- Do not attempt to open the router enclosure under any circumstances.
- Before handling the SIM card, always switch off the router and disconnect it from the power supply. Handle the SIM card with care to avoid damage or electrostatic discharge.

Important

This equipment is not suitable for use by or near young children. Small children could accidentally swallow the SIM card.

- Always ensure that the power supply voltage does not exceed 48 V DC.
- Do not expose the router to harsh environmental conditions. Protect it from dust, moisture, and excessive temperatures.
- Use only routers with proper certifications and markings in areas containing flammable or explosive materials (such as gas stations, chemical plants, or locations with explosives). In these environments, always follow the applicable restrictions regarding the use of radio devices.
- When traveling by airplane, always switch off the router. Using the router on board may endanger flight safety, interfere with mobile networks, and violate local regulations. Non-compliance can result in suspension or cancellation of telecommunications services or legal penalties.
- Take special care when operating the router in close proximity to personal medical devices such as cardiac pacemakers or hearing aids. If in doubt, consult the manufacturer of the medical device or your physician.
- This device may cause interference if used near television sets, radio receivers, or personal computers.
- Maintain a minimum separation distance of at least 20 cm between the router and the human body during operation.
- It is strongly recommended to regularly back up all critical configuration data stored in the router's memory.
- **Specific Usage Restrictions for 5 GHz Wi-Fi:** This device operates in the 5150–5350 MHz frequency band, which is restricted to **indoor use only** within the European Union, EFTA countries, and Northern Ireland. Outdoor use in this frequency band is prohibited to prevent harmful interference with other radio services.

AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	
FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	
PT	RO	SE	SI	SK	IS	LI	NO	CH	TR	UK	

Product Disposal Instructions

The WEEE directive (Waste Electrical and Electronic Equipment: 2012/19/EU) ensures the environmentally responsible recycling and recovery of electronic products. This device contains high-quality materials and components suitable for recycling. At the end of its life, **do not dispose of this product with ordinary commercial waste**. The router also contains a battery. Remove the battery before disposing of the device, and ensure the battery is disposed of separately and in accordance with local regulations. For detailed information on product and battery disposal, consult your supplier's terms and conditions.

Appendix D: Related Documents

[1] *ICR-3200 Configuration Manual* (see *Documents to download* → *Manuals* section)

[EP] Product-related documents and applications can be obtained on **Engineering Portal** at *https://icr.advantech.com/download* address.