Netbiter® EC300 Series

USER MANUAL

scm-1202-012 1.0 ENGLISH

HMS Connecting Devices™

Important User Information

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1 Preface

1.1 About This Document

This manual describes how to install and configure Netbiter EC300 Series gateways.

For additional related documentation and file downloads, please visit the support website at www.netbiter.com/support.

1.2 Related Documents

Related documents

Document	Author
Netbiter EC300 Series Installation Guide	HMS
Netbiter Argos Administration Manual	HMS
Netbiter Remote Access User Manual	HMS

1.3 Document history

Revision list

Version	Date	Description
1.00	2016-10-03	First release

Summary of changes in this version

Change	Where (section no.)

1.4 Conventions

Unordered (bulleted) lists are used for:

- Itemized information
- Instructions that can be carried out in any order

Ordered (numbered or alphabetized) lists are used for instructions that must be carried out in sequence:

1. First do this,
2. Then open this dialog, and
   a. set this option...
   b. ...and then this one.

Bold typeface indicates interactive parts such as connectors and switches on the hardware, or menus and buttons in a graphical user interface.

```
Monospaced text is used to indicate program code and other
kinds of data input/output such as configuration scripts.
```

This is a cross-reference within this document: *Conventions, p. 4*

This is an external link (URL): www.hms-networks.com

This is additional information which may facilitate installation and/or operation.

This instruction must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.

Caution
This instruction must be followed to avoid a risk of personal injury.

WARNING
This instruction must be followed to avoid a risk of death or serious injury.

2 Description

Netbiter EC300 Series gateways can be connected to Modbus devices via multiple interfaces and physical connections. The interface(s) to use must also be enabled in Netbiter Argos. Please refer to the Netbiter Argos Administration Manual for more information.

> **!** This product contains parts that can be damaged by electrostatic discharge (ESD). Use ESD protective measures to avoid equipment damage.

2.1 Terminal Block (11-pin)

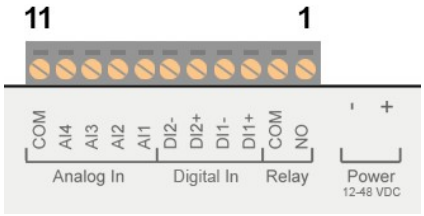

Fig. 1 Terminal block

Terminal block pin layout

Pin	Label		Function	Note
11	Analog In	COM	Analog Input Common	
10		AI4	Analog Input 4	0–20 mA or 0–10 VDC
9		AI3	Analog Input 3	0–20 mA or 0–10 VDC or PT100
8		AI2	Analog Input 2	0–20 mA or 0–10 VDC
7		AI1	Analog Input 1	0–20 mA or 0–10 VDC or PT100
6	Digital In	DI2-	Digital Input 2	Dry contact type
5		DI2+	Digital Input 2 current source	
4		DI1-	Digital Input 1	
3		DI1+	Digital Input 1 current source	
2	Relay	COM	Relay output common, isolated	Rated load: 1 A @ 24 VDC
1		NO	Relay output, NO, isolated	

The analog inputs can be configured in Netbiter Argos for either current, voltage or PT100 (temperature sensor).

The digital inputs are of the “dry contact” type which do not require any control voltage and will function with a switch or breaker.

> **!** Do not connect a power source to the digital inputs, as this may damage the unit.

> **!** The relay output must be supplied from an isolating transformer using a secondary listed fuse rated at maximum 3.3 A and minimum 30 VDC.

2.2 RS-485 Serial Interface (3-pin connector)

The RS-485 serial interface can be used to connect multiple Modbus RTU devices.

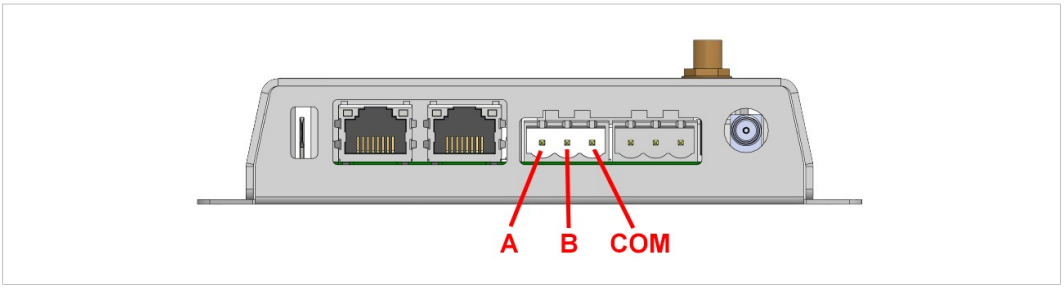

Fig. 2 RS-485 connector

RS-485 connector pin layout

Pin	Function
A	RS-485 A line
B	RS-485 B line
COM	RS-485 common

2.3 RS-232 Serial Interface (3-pin connector)

The RS-232 serial interface can be used to connect a single Modbus RTU device.

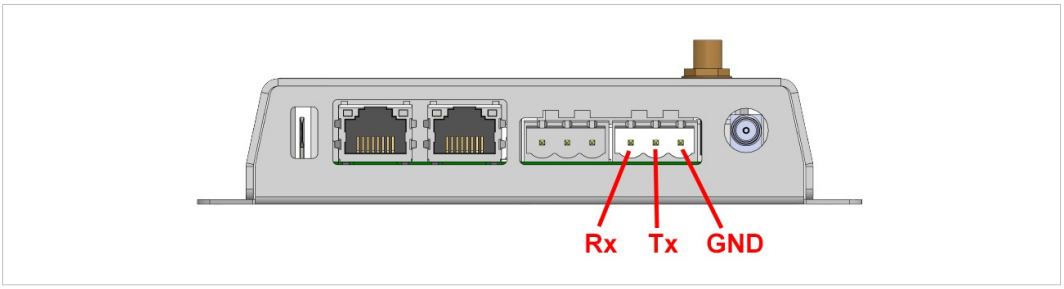

Fig. 3 RS-232 connector

RS-232 connector pin layout

Pin	Function
Rx	Receive (input)
Tx	Transmit (output)
GND	Signal ground

2.4 Ethernet Ports (RJ-45)

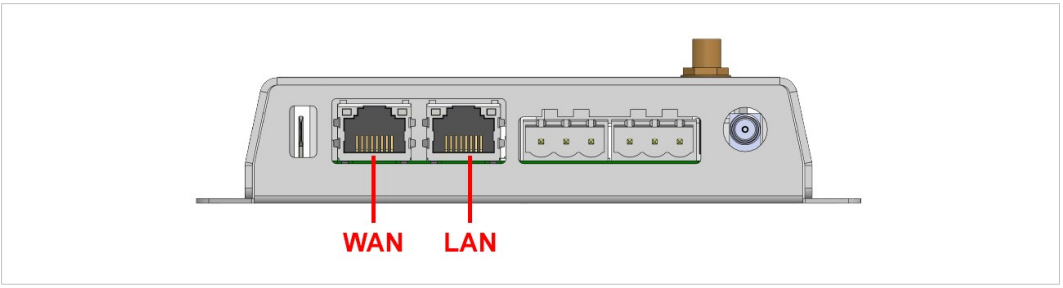

Fig. 4 Ethernet Ports

The **WAN** port is used for connecting to the Internet and Netbiter Argos.

The **LAN** port is used for EtherNet/IP, Modbus TCP and Remote Access.
It can also be used for configuration, see *Local Configuration, p. 14*.

> **!** Do not connect the LAN and WAN ports to the same logical network.

Ethernet connector pin layout

Pin	Function
1	TD+
2	TD-
3	RD+
4, 5, 7, 8	Termination
6	RD-

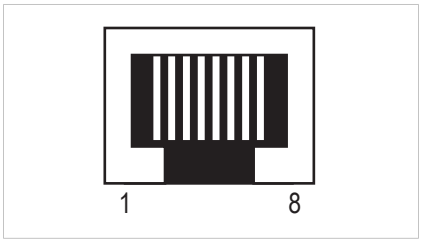

Fig. 5 Ethernet connector

2.5 USB Connector

The USB connector is used to connect locally to the Netbiter for configuration, firmware upgrades and troubleshooting. See *Local Configuration, p. 14*.

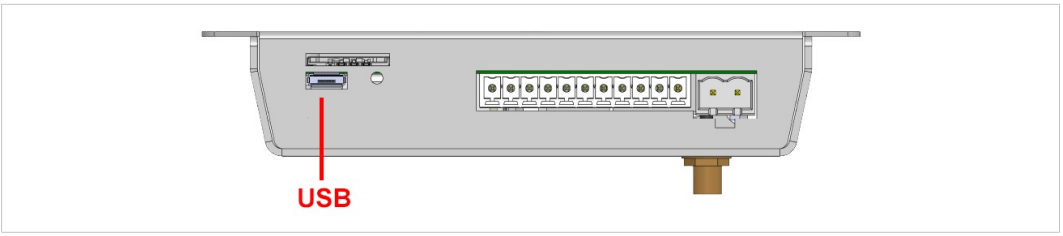

Fig. 6 USB connector

2.6 3G/GPRS and GPS Antenna Connectors (EC350)

The 3G/GPRS antenna connector on the front of the Netbiter EC350 is a standard female SMA screw connector. A stub antenna is supplied as standard[1], and optional external antennas are available from your supplier.

Netbiter EC350 includes a built-in GPS receiver. An external GPS antenna (not included) must be connected to the female SMA screw connector on the underside of the unit. The connector also provides power for active GPS antennas.

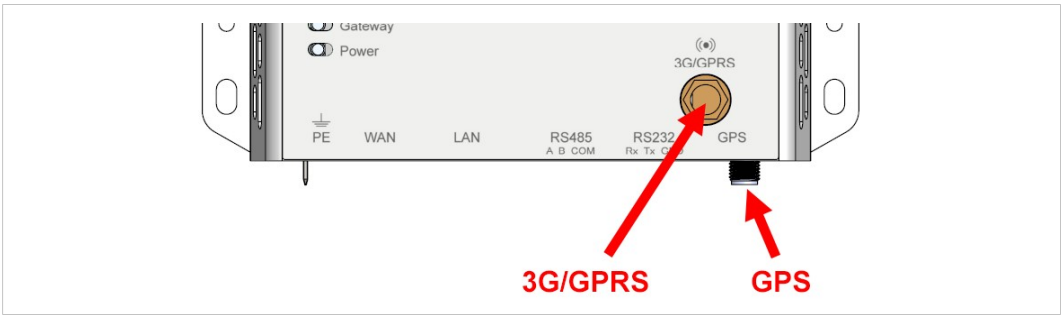

Fig. 7 EC350 antenna connectors

2.7 SIM Card (EC350)

SIM cards provided by HMS will load the correct network settings automatically and do not require configuration.

SIM cards not issued by HMS will require additional configuration in Netbiter Argos or through the local web interface. The SIM card must have a mobile data plan and allow text messaging, and PIN code security must be disabled.

2.7.1 Installing the SIM Card

Insert the SIM card carefully into the Netbiter and push it firmly downwards until it clicks into place. Observe the position of the cut-off corner and the contact surfaces.

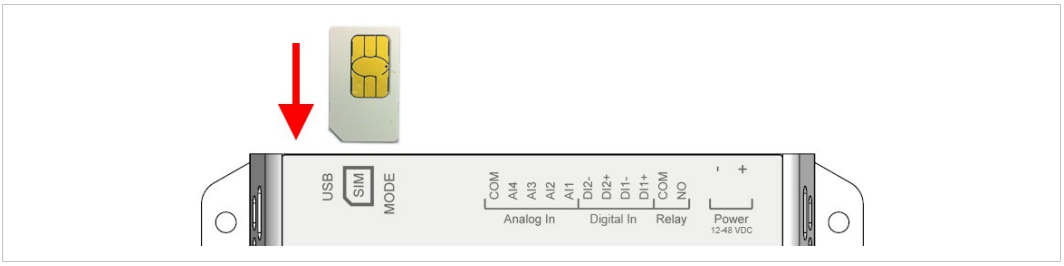

Fig. 8 Installing the SIM card

> **!** Make sure that the SIM card it does not accidentally slip behind the holder.

An SMS text message will be sent to Netbiter Argos when a new SIM card is inserted.

1. Antenna not included when sold in the U.S.

2.8 Power Supply

> **!** Always make sure that the power supply is correctly connected and of the recommended type. Connecting power with reverse polarity or using the wrong type of power supply may damage the equipment.

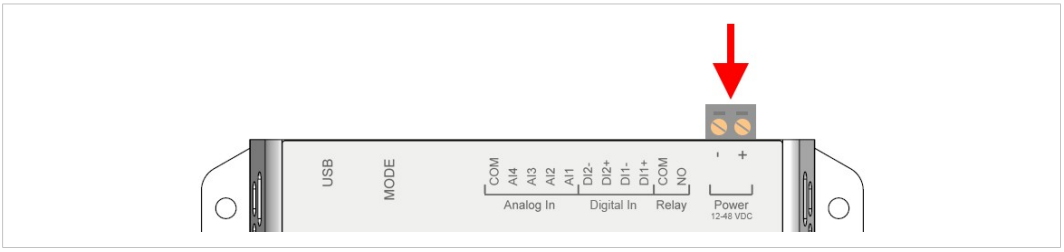

Fig. 9 EC310/EC350 power supply connection

Connect a DC power supply of the recommended type to the **+** (plus) **-** (minus) terminals. See also *Technical Data, p. 23*.

2.9 Factory Reset

Keep the **MODE** button pressed while powering on to reset to the factory default settings.

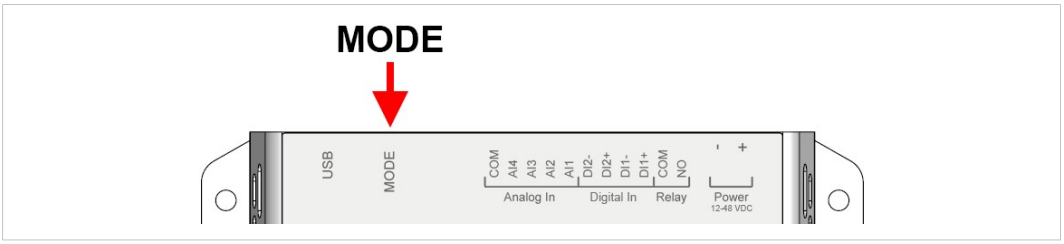

Fig. 10 Factory reset

3 LED Indicators

3.1 Netbiter EC310

Fig. 11 EC310 LED indicators

LED Indication		Meaning
RS485/RS232	Off	Port not in use
	Red (steady)	Port failure – contact Netbiter support
	Green (steady)	Port enabled in Netbiter Argos
Uplink/WAN	Red (steady)	Incorrect IP address settings • DHCP: Check for a working DHCP server on the network. • Static IP: Check that the IP address, default gateway and DNS are correctly set.
	Red (flashing)	No connection to Netbiter Argos • Check your network settings. • Check that port 443 is open in the firewall.
	Green (steady)	Connected to Netbiter Argos
Gateway	Off	No power, or unit is starting up
	Red (steady)	Hardware failure – contact Netbiter support
	Red (flashing)	Application failure – contact Netbiter support
	Green (flashing)	Firmware update in progress
	Green (steady)	Unit is operational
Power	Off	No power
	Green (steady)	Unit has power

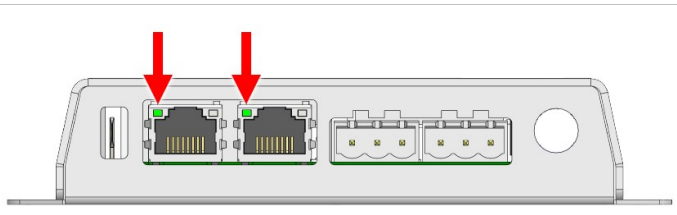

Fig. 12 Ethernet Link LEDs

LED Indication	Meaning
Off	No Ethernet traffic
Orange (flashing)	Activity on 10 Mbit/s network
Green (flashing)	Activity on 100 Mbit/s network

3.2 Netbiter EC350

All LED indicators will light up while the gateway is starting up. After the startup sequence has completed they will indicate system status.

Pressing and releasing the **MODE** button will temporarily change the function of the top 5 LED indicators to show the strength of the mobile network signal. After 60 seconds the indicators will go back to showing system status.

Fig. 13 EC350 LED indicators

System Status (default mode)

LED Indication		Meaning
RS485/RS232	Off	Port not in use
	Red (steady)	Port failure – contact Netbiter support
	Green (steady)	Port enabled in Netbiter Argos
Uplink/WAN	Red (steady)	Incorrect IP address settings • DHCP: Check for a working DHCP server on the network. • Static IP: Check that the IP address, default gateway and DNS are correctly set.
	Red (flashing)	No connection to Netbiter Argos • Check your network settings. • Check that port 443 is open in the firewall.
	Green (steady)	Connected to Netbiter Argos
Modem	Off	Modem disabled
	Red (steady)	Modem failure – contact Netbiter support
	Red (flashing)	SIM card failure • Check that the SIM card is correctly inserted and undamaged.
	Orange (steady)	PIN code is activated for the SIM card • Disable the PIN code on the SIM card.
	Orange (flashing)	APN (Access Point Name) not set
	Green (flashing)	Searching for mobile network
	Green (steady)	Connected to mobile network
Gateway	Off	No power, or unit is starting up
	Red (steady)	Hardware failure – contact Netbiter support
	Red (flashing)	Application failure – contact Netbiter support
	Green (flashing)	Firmware update in progress
	Green (steady)	Unit is operational
Power	Off	No power
	Green (steady)	Unit has power

Press and release **MODE** to show signal strength.

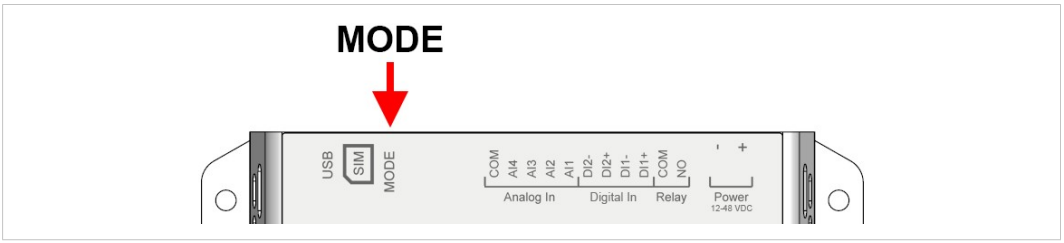

Fig. 14 EC350 mode switch

Signal Strength (shown for 60 seconds)

LED indication	Meaning
1 red LED (flashing)	No/unknown signal
1 orange LED (flashing)	Poor mobile network signal • Make sure the antenna is correctly installed and pointing upwards. • Try a different antenna placement. • Use an external antenna.
1 green LED (flashing)	Acceptable mobile network signal
2–5 green LEDs (flashing)	Good to optimum mobile network signal

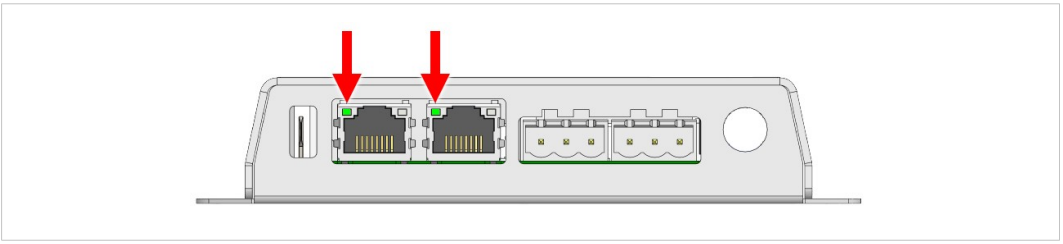

Fig. 15 Ethernet Link LEDs

LED Indication	Meaning
Off	No Ethernet traffic
Orange (flashing)	Activity on 10 Mbit/s network
Green (flashing)	Activity on 100 Mbit/s network

4 Wiring Examples

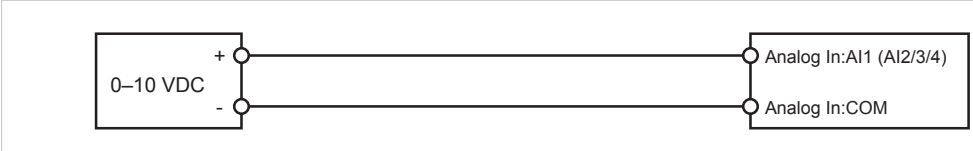

Fig. 16 Analog Input – Voltage Sensor

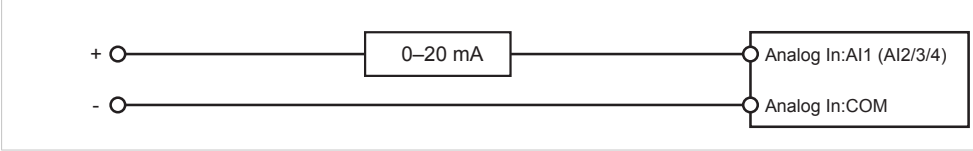

Fig. 17 Analog Input – 2-wire Current Sensor

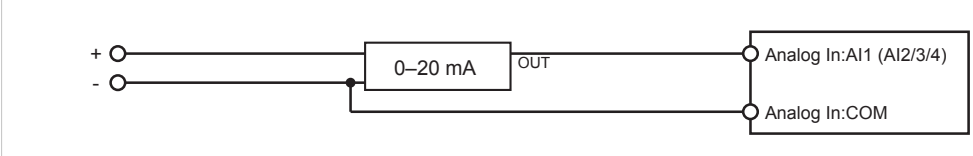

Fig. 18 Analog Input – 3-wire Current Sensor

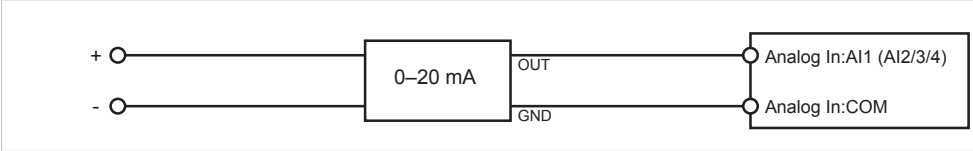

Fig. 19 Analog Input – 4-wire Current Sensor

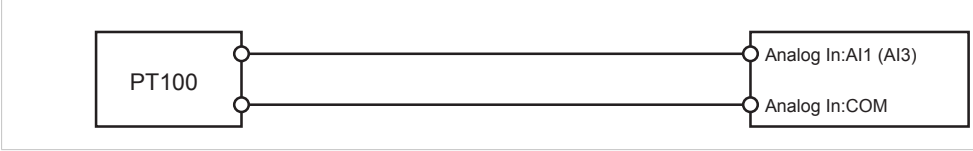

Fig. 20 Analog Input – Temperature Sensor

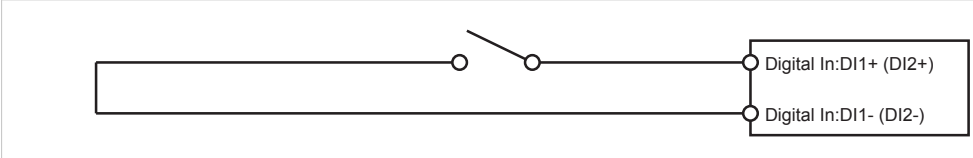

Fig. 21 Digital Input

> **!** Do not connect a power source to the digital inputs as this may damage the unit.

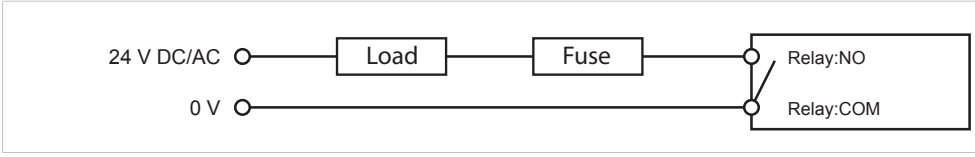

Fig. 22 Relay Output

> **!** The relay output must be supplied from an isolating transformer using a secondary listed fuse rated at maximum 3.3 A and minimum 30 VDC.

5 Local Configuration

> **!** Local configuration is normally not required and should only be carried out when necessary. Please read the instructions below carefully.

The built-in web interface is primarily intended for informational purposes and troubleshooting. Netbiter Argos is always the preferred way of configuring the gateway. The only configuration changes that should be made using the local web interface are:

- Proxy settings (if required)
- Modem/Ethernet connection mode (EC350 only)
- Firmware updates

5.1 Connecting via USB

Connect a USB Micro B cable between the computer and the **USB** port on the Netbiter.

The USB device driver will automatically load and create a virtual network interface on the computer with an IP address in the range 169.254.200.xxx. The local web interface of the gateway can then be accessed by entering the IP address **169.254.200.200** in a web browser.

Fig. 23 Network Connections

5.2 Connecting via Ethernet

Connect an Ethernet cable between the computer and the **LAN** port on the Netbiter.

The default IP address of the LAN port interface is **10.200.1.1**. The connecting computer must have an IP address within the same subnet (10.200.1.xxx). The LAN IP address can be changed after logging in or from Netbiter Argos when the Netbiter is online.

5.3 Login

Enter the IP address of the gateway in a web browser to log in. The default user name is *admin*, and the password is the activation code that was supplied with the unit.

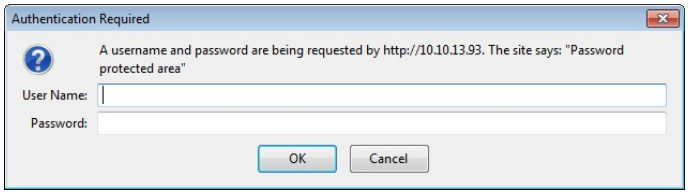

Fig. 24 Local configuration login

5.4 Status

The **Status** tabs present an overview of the configuration as well as detailed information about the current connections, which can be used when troubleshooting and when contacting Netbiter support.

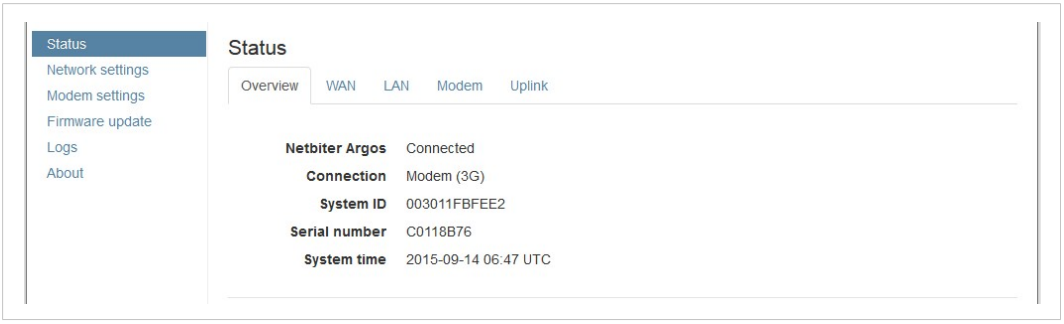

Fig. 25 Status – Overview

5.4.1 Status – WAN/LAN

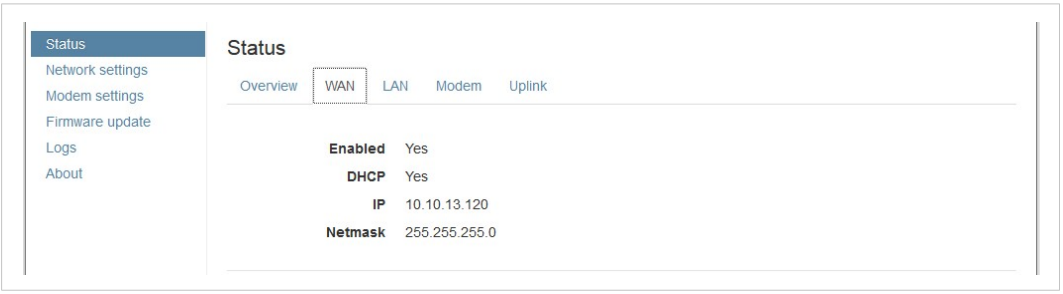

Fig. 26 WAN/LAN Status

The **WAN** and **LAN** status tabs present the current IP settings of the Ethernet interfaces.

5.4.2 Status – Uplink

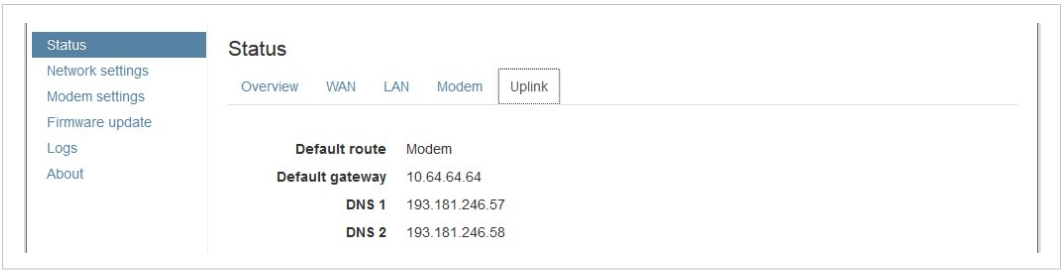

Fig. 27 Uplink Status

The **Uplink** status tab shows the default connection type (modem or Ethernet) and the default gateway and DNS servers for the uplink connection.

5.4.3 Status – Modem

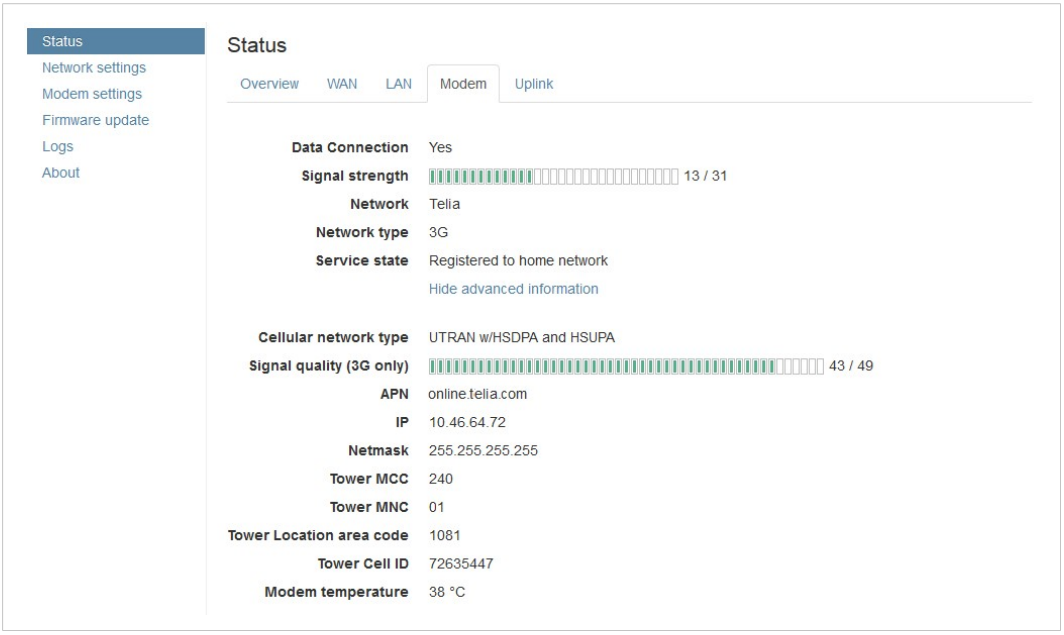

Fig. 28 Modem Status

The **Modem** status tab presents basic and advanced information about the current mobile network connection.

Basic information	
Data Connection	Indicates if data connection is established
Signal strength	The strength of the mobile signal
Network	Mobile network operator
Network type	Mobile network type (3G or GSM)
Service state	Network registration status

Advanced information	
Cellular network type	Network type details
Signal quality (3G only)	Signal-to-noise ratio of the 3G signal. 0 = -24 dB, 49 = 0 dB
APN	Access Point Name
IP, Netmask	IP settings for the modem connection
Tower MCC	Country code of the connected base station
Tower MNC	Network code of the connected base station
Tower Location Area Code	Area code of the connected base station
Tower Cell ID	Cell ID of the connected base station
Modem temperature	The temperature of the modem in °C

5.5 Network Settings – WAN

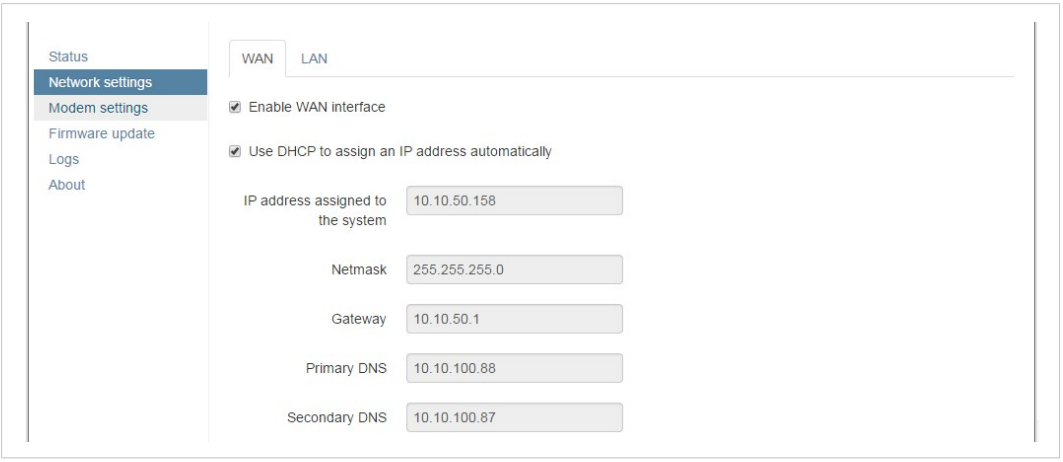

Fig. 29 WAN settings

The **WAN** interface should be enabled when connecting to Netbiter Argos via Ethernet.

When DHCP is enabled the unit will automatically receive the settings for IP address, subnet mask, default gateway, and DNS. Contact your network administrator if in doubt.

5.5.1 Proxy Settings

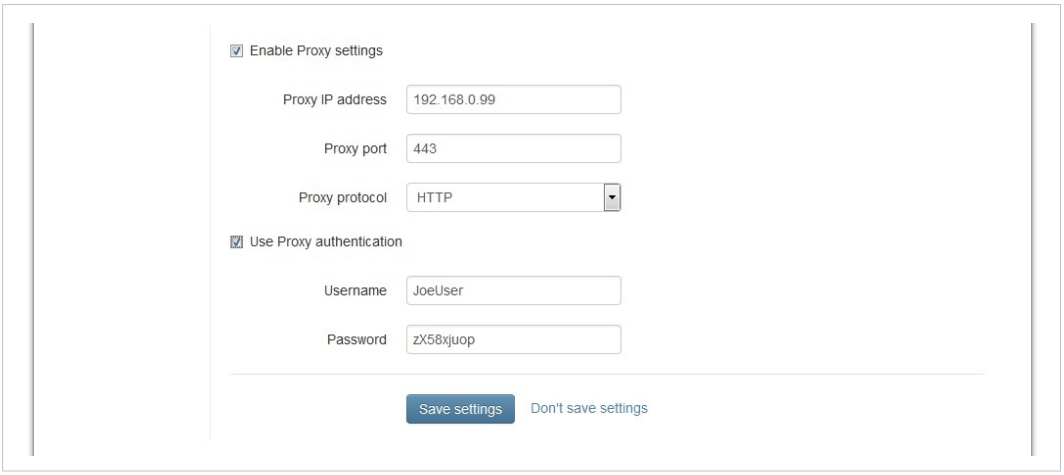

Fig. 30 Proxy settings

If you are connecting to the Internet via a proxy, check **Enable Proxy settings**, select the **Proxy protocol** and fill in the IP address and port number for the proxy server. If the proxy requires authentication, check **Use Proxy authentication** and fill in the username and password.

> **!** The proxy password must not contain blank spaces.

Click on **Save settings** when finished.

For information about supported proxy types, see *Technical Data, p. 23*.

5.6 Network Settings – LAN

The **LAN** interface must be enabled when using EtherNet/IP or Modbus TCP applications and when using the Netbiter Remote Access service.

These settings can also be made in Netbiter Argos. See the Netbiter Argos Administration Manual.

Fig. 31 LAN settings

To avoid potential address conflicts when setting a static IP address and netmask for the LAN port, use only the address spaces that are reserved for private networks:

- 10.0.0.1 – 10.255.255.254
- 172.16.0.1 – 172.31.255.254
- 192.168.0.1 – 192.168.255.254

> **!** Do not connect the LAN and WAN ports to the same logical network.

Click on **Save settings** when finished.

5.7 Firmware Update

Firmware updates can also be made through Netbiter Argos. See the *Netbiter Argos Administration Manual.*

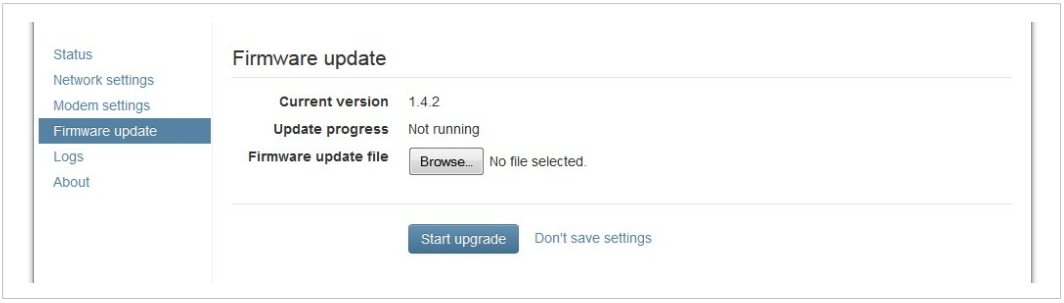

Fig. 32 Firmware update

> **!** The Netbiter gateway must be connected to the Internet to ensure that the internal clock has synchronized the time and date before updating the firmware.

1. Download the latest firmware from www.netbiter.com/support.
2. Click on **Browse** and select the firmware file you downloaded.
3. Click on **Start upgrade** to start the update.

> **!** Do not close the web page while the update is in progress.

5.8 Modem Settings (EC350)

Modem settings and information about the mobile connection.

These settings can also be made in Netbiter Argos. A SIM card with SMS capability is required. See the *Netbiter Argos Administration Manual*.

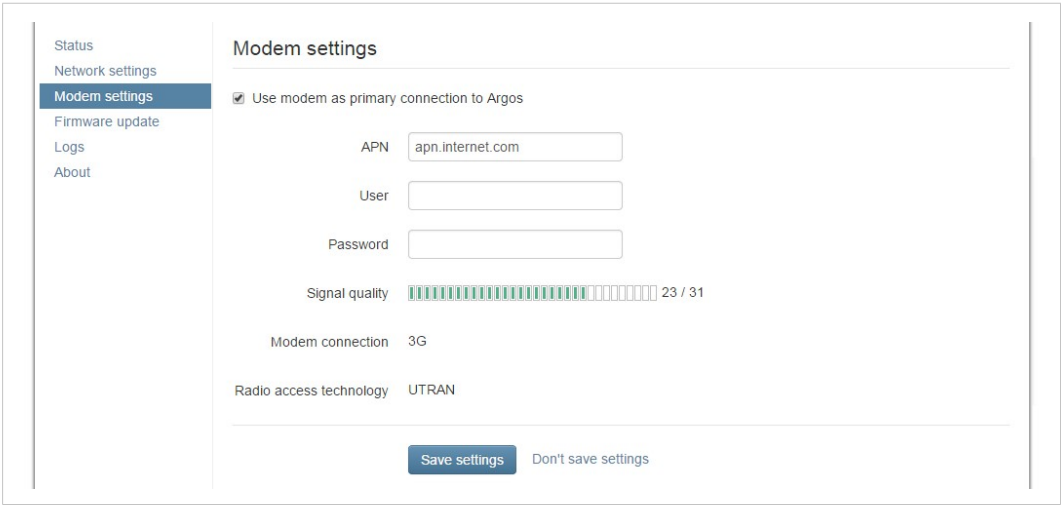

Fig. 33 Modem settings (EC350)

Use modem as primary connection to Argos	When enabled, mobile networking will be used as default as long as the signal strength is adequate. If the WAN interface is also enabled the gateway will automatically switch to Ethernet networking if mobile communication is interrupted.
APN	The APN (Access Point Name) is the identifier for the mobile network. The APN is supplied by the network operator for the SIM card.
User/Password	Required by some mobile network operators.

Click on **Save settings** when finished.

> **!** SIM cards with active PIN codes cannot be used in Netbiter EC350. PIN code security cannot be disabled in the local configuration or in Netbiter Argos. To disable the PIN code, install the SIM card in a mobile phone and follow the instructions from the manufacturer.

A EtherNet/IP Implementation

See also the *Netbiter Argos Administration Manual* on how to configure EtherNet/IP.

A.1 Client

Connection Type

UCMM (Class 1 and 3 connection not supported)

Adapter Timeout

1000 ms

Services

The following services are implemented:

Code	Service Name	Addressing	Note
0x0E	Get_Attribute_Single	Class, Instance, Attribute	
0x10	Set_Attribute_Single	Class, Instance, Attribute	
0x4C	Read_Tag_Service	Symbolic Segment Addressing	Can be used to access Controller Tags. Vendor specific service code (see note below).
0x4D	Write_Tag_Service		

Read_Tag_Service and Write_Tag_Service using symbolic segment addressing is only supported by some PLCs. Please refer to the PLC vendor's documentation for more information.

A.2 Adapter

A.2.1 Identity Object (0x01)

Class Attributes

No attributes are implemented.

Instances

Instance 1 is implemented with the following attributes:

ID	Access	Name	Value
1	Get	Vendor ID	90
2	Get	Device Type	100
3	Get	Product Code	85
4	Get	Revision	1
5	Get	Status	1
6	Get	Serial Number	...
7	Get	Product Name	Netbiter

Services

The following services are implemented:

Code	Class	Instance	Service Name
0x01	No	Yes	Get_Attribute_All
0x0E	No	Yes	Get_Attribute_Single

A.2.2 TCP/IP Interface Object (0xF5)

Class Attributes

The following class attributes are implemented:

ID	Access	Name
1	Get	Revision

Instances

Instance 1 is implemented with the following attributes:

ID	Access	Name
1	Get	Status
2	Get	Configuration Capability
3	Get	Configuration Control
4	Get	Physical Link Object
5	Get	Interface Configuration
6	Get	Hostname
13	Get/Set	Encapsulation Inactivity Timeout

Services

The following services are implemented:

Code	Class	Instance	Service Name
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

A.2.3 Ethernet Link Object (0xF6)

Class Attributes

No attributes are implemented (= Rev 1).

Instances

Instance 1 is implemented with the following attributes:

ID	Access	Name
1	Get	Interface Speed
2	Get	Interface Flags
3	Get	Physical Address

Services

The following services are implemented:

Code	Class	Instance	Service Name
0x0E	No	Yes	Get_Attribute_Single

B Technical Data

Technical Specifications

Model name	Netbiter EC310	Netbiter EC350
Order code	NB1007	NB1005 with antenna NB1008 without antenna
Ethernet	10/100 Mbit/s	
Proxy support	SOCKS (authentication: none, username/password) WEB (authentication: none, basic)	
Mobile communication	N/A	5-band 3G/UMTS (WCDMA/FDD): 800/850, 900, 1900, 2100 MHz Quad-band GSM/GPRS: 850, 900, 1800, 1900 MHz
Alarms	E-mail, SMS	
Relay output (max 24 V AC/DC, 1 A)	1	
Digital inputs	2, dry contact type	
Analog inputs	4 inputs, all supporting 0–10 V or 0–20 mA. Current: 0–20 mA, R=3.3 %, A/D=0.1 mV+0.15 % Voltage: 0–10 VDC, R=1.7 %, A/D=0.1 mV+0.15 % Support for PT100 on AI1 and AI3. Sensor range -50 to +150 °C. 16-bit resolution.	
Serial port #1	RS-232 up to 115.2 kbit/s	
Serial port #2	RS-485 up to 115.2 kbit/s	
Antenna connector	N/A	SMA female
Protocols	Modbus-RTU, Modbus TCP. EtherNet/IP	
Connected devices	32	
Baud rates	1200–115200 baud	
Wall mounting	Yes	
DIN rail mounting	Yes (optional)	
Dimensions (W x D x H)	135 x 92 x 27 mm	
Operating temperature	-40 to +65 °C	
Storage temperature	-45 to +85 °C	
Housing class	IP20	
Input voltage	12–48 VDC Recommended power supply: 24 VDC, 25 W	
Power consumption	4.5 W (typical)	
Certifications	CE RoHS cULus	CE RoHS cULus Telec JATE FCC IC PTCRB RCM

All measurements are in millimeters.

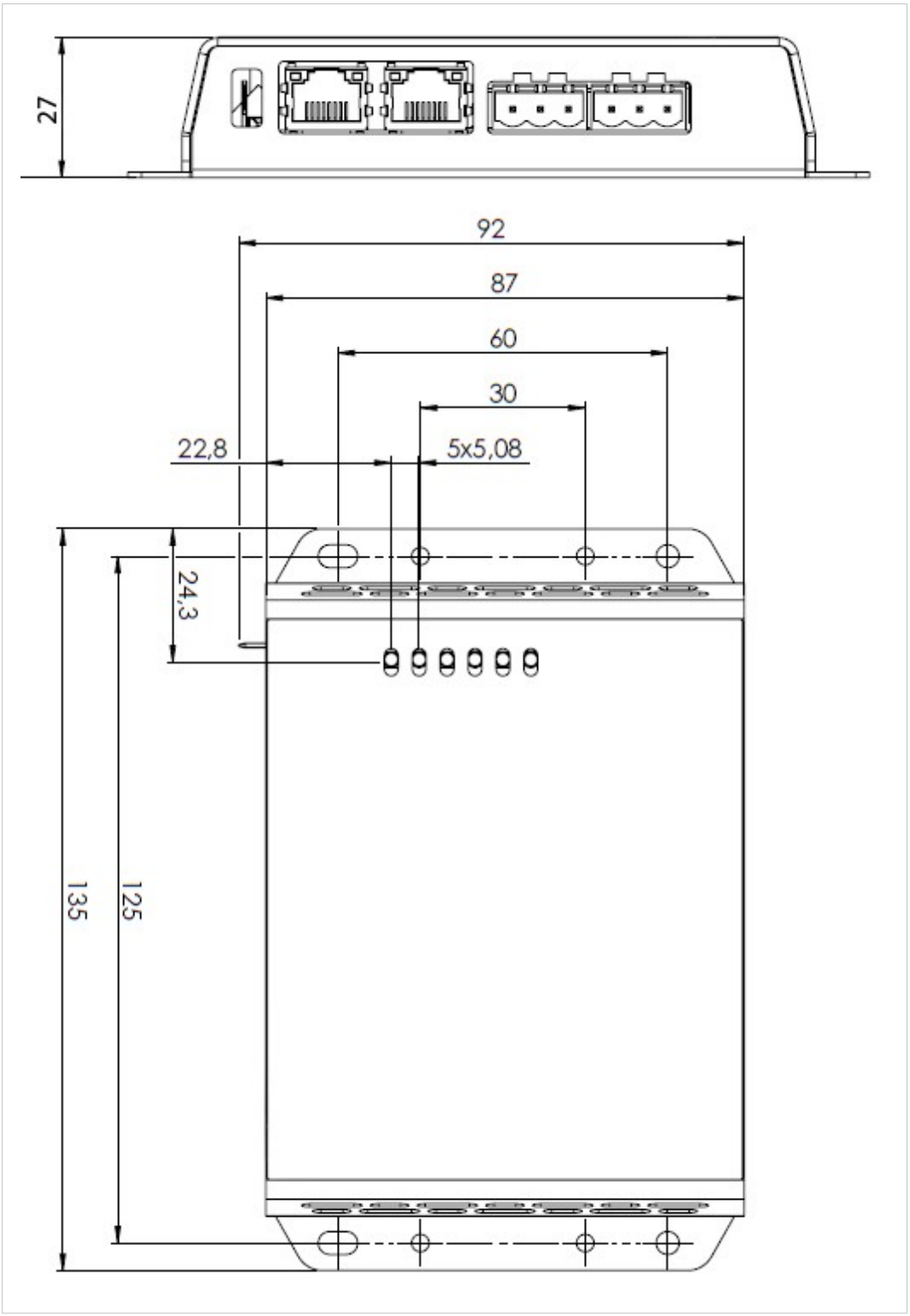

Fig. 34 EC310 dimensions

All measurements are in millimeters.

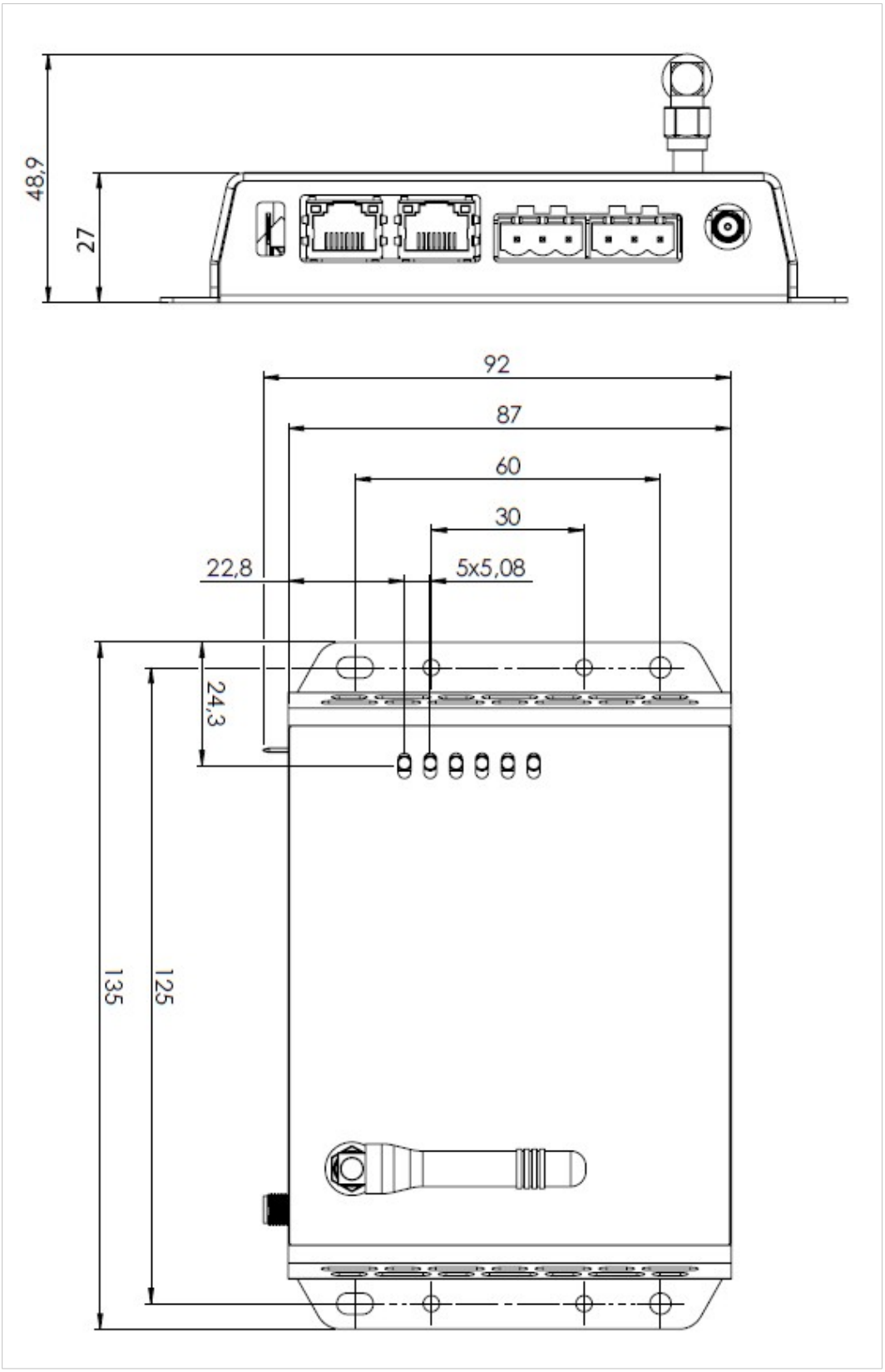

Fig. 35 EC350 dimensions

C Regulatory Compliance

EMC Compliance (CE)

The product Netbiter EC350 is in compliance with the RED Directive 2014/53/EU through conformance with the following standards:

EMC

EN 55022 (2011)
EN 301 489-1 v1.9.2
EN 301 489-3 v1.6.1
EN 301 489-7 v1.3.1
EN 301 489-24 v1.5.1
EN 300 440-1 v1.6.1
EN 300 440-2 v1.4.1

EN 61000-6-2 (2005)
- EN 61000-4-2 (2009)
- EN 61000-4-3 (2006)
- EN 61000-4-4 (2012)
- EN 61000-4-5 (2014)
- EN 61000-4-6 (2014)

Effective use of frequency spectrum

EN 301 511 v9.0.2
EN 301 908-1 v6.2.1
EN 301 908-2 v6.2.1

Safety

EN 60950-1 (2006)

The product Netbiter EC310 is in compliance with the EMC Directive 2014/30/EU through conformance with the following standards:

Emission standard for industrial environment

EN 61000-6-4 (2007)
- EN 55016-2-3, Class A (2010)
- EN 55022, Class A (2011)

Immunity for industrial environment

EN 61000-6-2 (2005)
- EN 61000-4-2 (2009)
- EN 61000-4-3 (2006)
- EN 61000-4-4 (2012)
- EN 61000-4-5 (2014)
- EN 61000-4-6 (2014)

The Declaration of Conformity is available at www.netbiter.com/support.

Disposal and Recycling

You must dispose of this product properly according to local laws and regulations. Because this product contains electronic components, it must be disposed of separately from household waste. When this product reaches its end of life, contact local authorities to learn about disposal and recycling options, or simply drop it off at your local HMS office or return it to HMS.
For more information, see www.hms-networks.com.

UL Certification

c UL US LISTED

E466303
NWGQ

This equipment is Listed to applicable UL Standards and requirements by UL.

FCC Compliance Statement (EC350)

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

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

This equipment contains FCC ID: **QIPPHS8-P**

> **!** Any changes or modifications not explicitly approved by HMS Industrial Networks AB could cause the module to cease to comply with FCC rules part 15, and thus void the user's authority to operate the equipment.

Industry Canada Statement (EC350)

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

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

Cet équipement est conforme aux limites d'exposition de rayonnement d'IC RSS-102 déterminées pour un environnement non contrôlé. Cet équipement devrait être installé et actionné avec la distance minimum 20 cm entre le radiateur et votre corps.

Son utilisation est soumise aux deux conditions suivantes:

1. Cet appareil ne doit pas causer d’interférences et
2. il doit accepter toutes interférences reçues, y compris celles susceptibles d’avoir des effets indésirables sur son fonctionnement.

This equipment contains IC ID: **7380A-PHS8P**

Japan Radio Certification (EC350)

Contains MIC ID: R 204-LSE047 / AD 16-0016 202

R 202-LSC024
T AD 14-0020 202

Japanese Radio Law and Japanese Telecommunications Business Law Compliance.
This device is granted pursuant to the Japanese Radio Law (電波法)
and the Japanese Telecommunications Business Law (電気通信事業法)
This device should not be modified (otherwise the granted designation number will become invalid)

HMS Industrial Networks AB
Box 4126
300 04 Halmstad, Sweden

info@hms.se

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