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ReliaGATE 10-05-34
Multi-Service Gateway & Edge Controller

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Revision history

Revision	Description	Date
1-0	First release	13 May 2016

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1　　IMPORTANT INFORMATION

CAREFULLY READ AND UNDERSTAND THE INSTRUCTIONS CONTAINED IN THIS DOCUMENT BEFORE INSTALLING / OPERATING THE PRODUCT.

KEEP THIS DOCUMENT FOR FUTURE REFERENCE.

Whenever you have any doubt regarding the correct understanding of the instructions contained in this document contact your local Eurotech Technical Support Team (see the last page of this document for further details).

To lower the risk of personal injury, electric shock, fire or damage to equipment, observe the following precautions, as well as using good technical judgment, whenever installing / operating the product.

1.1　Signals used in this document

⚠ **DANGER**
INDICATES A HAZARD WITH A HIGH LEVEL OF RISK WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY

⚠ **WARNING**
INDICATES A HAZARD WITH A MEDIUM LEVEL OF RISK WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY

⚠ **CAUTION**
INDICATES A HAZARD WITH A LOW LEVEL OF RISK WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY

NOTICE
Indicates practices not related to personal injury, such as: 　ɪ **An instruction to follow to use the product effectively** 　ɪ **A statement of company policy related to product or property protection**

1.2   Disclaimer of liability

Eurotech has reviewed the contents of this document to ensure accuracy and consistency with the hardware and software described.

Always refer to the latest available manual revision available at: www.eurotech.com.

1.3   Intended audience

This document is intended for **system developers**, who are skilled persons with a thorough knowledge in installing and implementing computer systems, networks, and related operating software.

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2   SAFETY INSTRUCTIONS

Observe the following safety instructions when installing / operating the product.

Failure to comply with these instructions or with specific warnings elsewhere in this document violates safety standards of design, manufacture, and intended use of the product.

Eurotech assumes no liability for any failure to comply with these instructions.

2.1   Observe antistatic precautions

NOTICE

PREVENTING ELECTROSTATIC DISCHARGE (ESD)
When handing the product described in this document, always use appropriate antistatic precautions to avoid damages due to electrostatic discharge. For example: use a wrist strap or ESD cuff kept in constant contact with bare skin and attached to an ESD ground.

2.2   Connect power supply correctly

⚠ WARNING

ELECTRIC SHOCK HAZARD

Before applying power, thoroughly review all installation, operation, and safety instructions.

Failure to supply power correctly, or failure to follow all operating instructions correctly, may create an electric shock hazard, which could result in personal injury or loss of life, and / or damage to equipment or other property.

To avoid injuries:
- Before operating any equipment, carefully read any supplied instructions
- Do not perform any connections with wet hands
- Check any power cords for damage before using them
- Use certified power cables. The power cables must meet the power requirements of the device
- Position cables with care. Avoid positioning cables in places where they may be trampled or compressed by objects placed on them
- Take particular care of plugs, power-points and outlets. Avoid overcharging them
- Always disconnect power and discharge the circuits before touching them
- Only start the product with a power supply that meets the requirements stated on the voltage label. In case of uncertainties about the required power supply, contact the Eurotech Technical Support Team (see the back cover for full contact details) or the electricity authority.

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3   HOW TO RECEIVE TECHNICAL ASSISTANCE

3.1   How to receive technical support

If you have technical questions, or if you cannot isolate a problem with your product, or for any inquiry about repair and returns policies, contact:

- ı The Eurotech Global Support Center: https://eurotech.desk.com/
- ı Your local Eurotech Technical Support Team: see the back cover for full contact details.

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4 CONVENTIONS USED IN THIS DOCUMENT

4.1 Conventions for signal names

Convention	Description
GND	Digital ground plane
#	Active low signal
_P	Positive signal in differential pair
_N	Negative signal in differential pair

4.2 Abbreviations for direction and electrical characteristics of a signal

Convention	Description
I	Signal is an input to the system
O	Signal is an output from the system
IO	Signal may be input or output
P	Power and ground
A	Analog signal
3.3	3.3 V signal level
5	5 V signal level
NC	No Connection
Reserved	Use is reserved to Eurotech

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5   PRODUCT OVERVIEW

The ReliaGATE 10-05-34 is a compact and lightweight device intended to be used as Multi-Service IoT Gateway. It is based on the NXP i.MX285 CPU, with 512MB of RAM, 4GB of eMMC, and a user-accessible microSD slot.

It is suitable for intensive workload in industrial applications. It supports a 9 to 36 V power supply with transient / surge / noise / reverse polarity protection, two protected serial ports (RS-232 and RS-485), and one noise and surge protected USB port. An internal battery provides up to 30/50 minutes of uptime and allows for a safe system shutdown in case of a blackout.

The ReliaGATE 10-05-34 can be equipped with Everyware™ Software Framework (ESF), a commercial, enterprise-ready edition of Eclipse Kura, the open source Java/OSGi middleware for IoT gateways.

The ReliaGATE 10-05-34 can also take advance of Everyware Cloud (separately available). Everyware Cloud (EC) is a specialized cloud solution that allows you to easily connect, configure and manage your device through all its life-cycle.

A Development Kit is available upon request. It allows you to quickly and easily start the development of your applications.

Figure 5.1 - The ReliaGATE 10-05-34

5.1   Product labels

The product label is placed on the bottom side of the product.
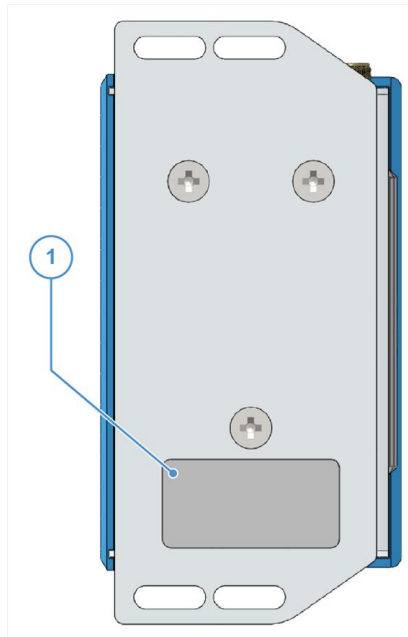
Ref#	Label content	Label example
1	• ReliaGATE model number • ReliaGATE serial number • WEEE symbol • CE mark • Ethernet MAC address • IMEI number • FCC ID numbers • Power details	MODEL: **REGATE-10-05-XX** S.N.: **PPYYMDL0004** ETH MAC: 00049F910D0B IMEI: 353386061998544 FCC ID: xxxxxxxxxxxx Contains FCC ID: xxxxxxxxxx POWER: 9-36VDC/500mA

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6   DECLARATION OF CONFORMITY

The ReliaGATE 10-05-34 conforms to the following:
- Reduction of Certain Hazardous Substances (RoHS2)
- CE Mark
- Wi-Fi and Bluetooth Radio:
    - CE - EN300 328 (2.4GHz ISM), EN50371 (EMI), EN301 489 (EMC)
    - FCC - 15.209 (General RF device), 15.247 & 15.249 (2.4GHz ISM)
- Cellular Radio:
    - FCC PART 22, 24 & 27 and suitable GSM radio certifications
- IEC/UL 60950-1 Information Technology Equipment - Safety - Part 1: General Requirements
- Product compliance with part 15.21 of FCC

6.1   FCC Class A notice

Conditions of operation	This product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1. This product may not cause harmful interference 2. This product must accept any interference received, including interference that may cause undesired operation.
FCC Radio Frequency Interference statement	This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.
Modifications	Any modifications made to this product that are not approved by Eurotech may void the authority granted to the user by the FCC to operate this product.
Product FCC IDs	**FCC ID: UKMMRG1005** **Contains FCC ID: XPYLISAU201**

STATEMENT：

1. 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.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the

interference at his own expense.

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

6.2   RoHS compliance

The product described in this document, including all its components and its sub-assemblies, have been manufactured in compliance with the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

6.3   WEEE compliance

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In compliance with the Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), the symbol on the right, shown on the product or within its literature, indicates separate collection for this electrical and electronic equipment (EEE) that has been placed on the market after 2005.

This product, at the end of its life cycle, must be collected separately and managed in accordance with the provisions of the current Directive on waste electrical and electronic equipment.

Because of the substances present in the product, improper use or disposal of the refuse can cause damage to human health and the environment.

To avoid any possible legal implications, contact your local waste collection body for full recycling information.

7   TECHNICAL SPECIFICATIONS

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Specifications		Description
Processor	CPU	NXP i.MX285, 454MHz, 1 core
Memory	RAM	512 MB, DDR2
Storage	Embedded	4 GB eMMC
	Other	1x MicroSD slot (user accessible)
I/O Interfaces	Ethernet	1x Fast Ethernet port
	USB	1x USB 2.0 Host port (Noise and Surge Protected)
	COM	1x RS-232 (3-wire, Surge Protected) 1x RS-485 (Surge Protected, with Termination and Fail-safe Resistors) 1x Console port (RS-232 Serial port)
Radio interfaces	Cellular	3G global (integrated)
	Wi-Fi / BT	802.11b,g,n / 4.0 BLE
	Antennas (external)	1x SMA: Cellular 1x RP-SMA: Wi-Fi / Bluetooth
Other	RTC	Yes
	External Watchdog	Yes
	UPS	Integrated Li-ion Battery (3.7V, 48mAh), Safe shutdown and Power state restore
	LEDs	1x Power 1x Cellular activity 2x User configurable
	Buttons	1x Reset, 1x Programmable
	SIM slot	1x MicroSIM (user accessible)
Power	Input	Nominal: 24 V dc; Range: 9 - 36 V dc with Transient, Surge, Noise, Reverse Polarity, Overvoltage protection
	Consumption	1.5 W idle
Environment	Operating Temp	0 °C to +50 °C
	Storage Temp	-40 °C to +85 °C
Certifications	Regulatory	CE, FCC
	Safety	IEC/UL 60950-1
	Environmental	RoHS2; REACH
	Radio	CE - EN 300 328 (2.4 GHz ISM), EN 50371 (EMI), EN 301489 (EMC) FCC - 15.209 (General RF device), 15.247 & 5.249 (2.4 GHz ISM)
	Cellular	PTCRB FCC PART 22, 24 & 27 and suitable GSM radio certifications
	Ingress	IP40
Mechanical	Enclosure	Material: ABS (Color: blue) and Aluminum
	Dimensions	112 (L) x 68 (W) x 37 (H); mm
	Weight	180 g (Mounting Bracket included)
	Mounting	Mounting Bracket (Optional: DIN Rail Mounting Kit)

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8   GETTING STARTED

Follow these steps to get started with your ReliaGATE 10-05-34:

1. **Know the ReliaGATE 10-05-34 interfaces.**

   The ReliaGATE 10-05-34 provides connectivity to several wired and wireless interfaces.
   For further information, see:
   - "Product interfaces" on page 23
   - "Interfaces in detail" on page 27

2. **Apply power to the ReliaGATE 10-05-34.**

   The ReliaGATE 10-05-34 supports a variety of usage scenarios.
   For further information, see "Power supply" on page 27

3. **Log into the Administration console.**

   The ReliaGATE 10-05-34 runs a Linux distribution based on a Yocto framework and supports login
   via a variety of methods.
   For further information, see:
   - "The Software" on page 39
   - "How to log in the Administration Console" on page 49
   - "How to access the interfaces under Linux" on page 41

4. **Install the ReliaGATE 10-05-34.**

   The ReliaGATE 10-05-34 is lightweight and compact. You can easily install it, even on a DIN rail.
   For further information, see:
   - "Mechanical specifications" on page 53
   - "How to install the product" on page 55

5. **Start developing your applications.**

   Your ReliaGATE 10-05-34 supports ESF, which is an inclusive software framework that puts a
   middleware layer between the operating system and the OEM application.
   For detailed instructions, and sample applications for developing device applications using ESF on
   Eurotech platforms, see: http://esf.eurotech.com/docs.

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9   PRODUCT INTERFACES

This section gives you an overview of the interfaces available on the ReliaGATE 10-05-34.

9.1   Front panel interfaces

The interfaces available on the front panel are the following:
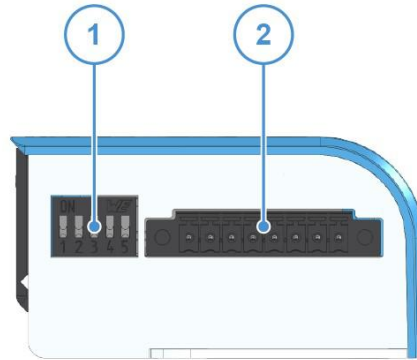
Figure 9.1 - Front panel interfaces layout

Ref#	Description	Connector / Mating connector information	
1	DIP switch selector	-	
2	8-position connector	**Connector:**	Base strip, Header; 8-pin, 3.5 mm pitch
		Mating connector:	Pluggable screw terminal block; 8-pin, 3.5 mm pitch Example: • Shenzhen Connection Electronics Co., Ltd. • P/N: PLTB1.5-08-BF-3.50-GY

Table 9.1 - Rear panel interfaces description

9.1.1   *DIP switch selector functions*

Use the DIP switch selector to:
- Insert the RS-485 fail-safe resistors
- Insert the RS-485 termination resistors
- Control the Boot sequence
- Enable the watchdog

9.1.2   *8-position connector functions*

Use the 8-position connector to:
- Connect the power input
- Connect the RS-485 Serial port
- Connect the RS-232 Serial port

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9.2 Rear panel interfaces

The interfaces available on the rear panel are the following:
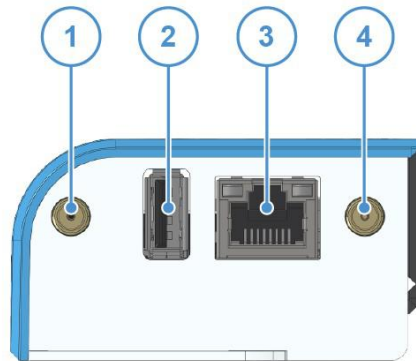
Figure 9.2 - Rear panel interfaces layout

Ref#	Description	Connector / Mating connector information	
1	Cellular antenna connector	**Connector:**	Female SMA
		Mating connector:	Male SMA
2	USB 0 host port	**Connector:**	USB Type-A socket
		Mating connector:	USB Type-A plug
3	Ethernet 0 port	**Connector:**	Female RJ-45
		Mating connector:	Male RJ-45
4	Wi-Fi/BT antenna connector	**Connector:**	Female RP-SMA
		Mating connector:	Male RP-SMA

Table 9.2 - Rear panel interfaces description

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9.3   LED indicators

The available LED indicators are the following:
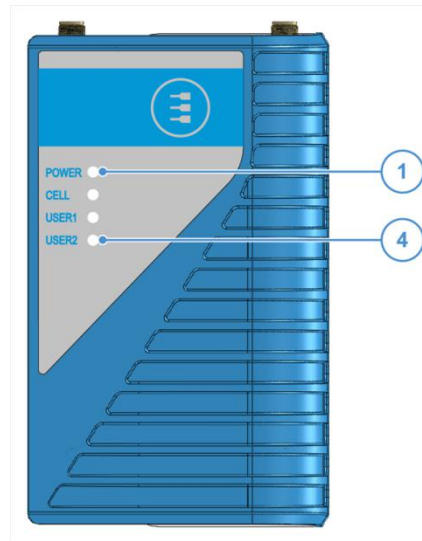
Figure 9.3 - LED indicators layout

Ref#	Use	Color
1	POWER: - LED ON: ReliaGATE powered by the external source - LED OFF: ReliaGATE not powered by the external source	Blue
2	CELL (Cellular modem activity): - LED ON means modem ON; - LED blinking means modem attached to GSM network	Green
3	USER1 (General purpose)	Green / Amber
4	USER2 (General purpose)	Green / Amber

Table 9.3 - LED indicators description

To manage the USER LEDs see .

9.4   Service panel interfaces

The interfaces available behind the service panel are the following:
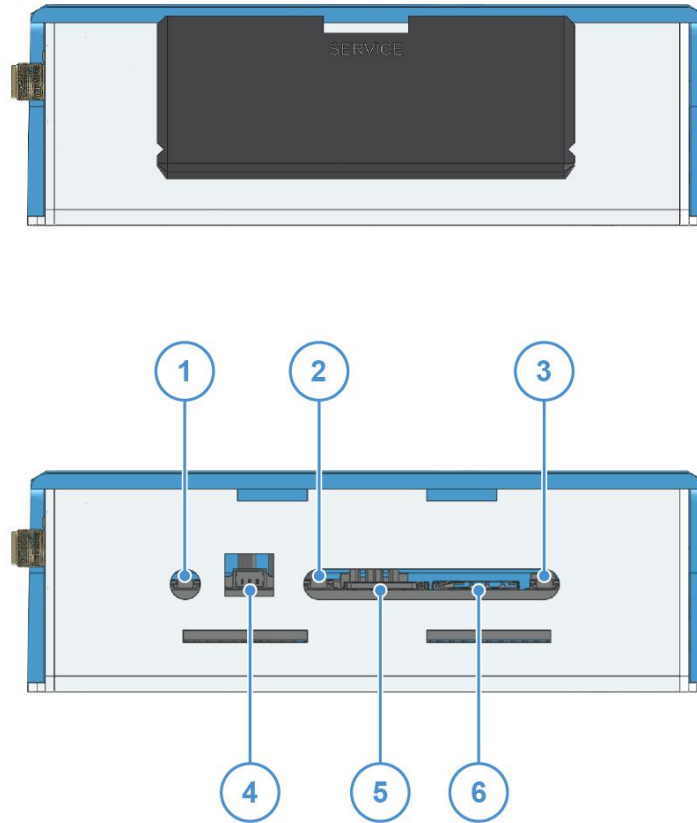
Figure 9.4 - Service panel interfaces layout

Ref#	Description
1	Reset pushbutton
2	Programmable pushbutton
3	TBD
4	Console port
5	Micro SD card slot
6	Micro SIM card slot

Table 9.4 - Service panel interfaces description

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10   INTERFACES IN DETAIL

10.1   Power supply

10.1.1   Power supply parameters

Power supply	Nominal: 24 V dc; Range: 9 - 36 V dc with Transient, Surge, Noise, Reverse Polarity, Overvoltage protection
Power consumption	1.5 W idle
Peak demand	< 15 W

The power input is protected against: surge, noise, reverse polarity, over-voltage and short circuit.

The power input is also protected with a resettable fuse.

10.1.2   Power supply connector pinout

The power supply input is available on the 8-position connector located on the front panel, pins 1 and 2.
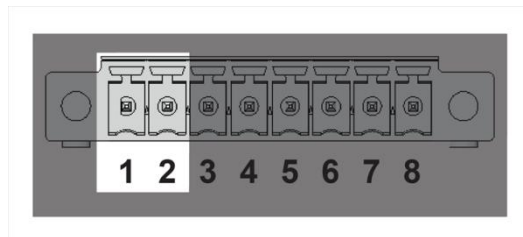
Pin#	Name	Type	Description
1	Power IN +	P	Positive power supply input
2	Power IN -	P	Negative power supply input

10.1.3   How to turn ON the ReliaGATE 10-05-34

To turn the ReliaGATE 10-05-34 ON, supply power to Pins 1 and 2.
The system automatically turns ON and the LED 1 (POWER) turns ON.

10.1.4   How to turn OFF the ReliaGATE 10-05-34

To turn the ReliaGATE 10-05-34 OFF, follow these steps:
1. Login the Administration console and run the shutdown command. The system turns OFF
2. Remove power from pins 1 and 2.

10.1.5   How to manage the ReliaGATE 10-05-34 power consumption

To reduce the power consumption of your ReliaGATE 10-05-x4: turn OFF the radio interfaces and / or set the CPU in low power consumption mode (sleep mode).

The maximum power consumption at the lowest power state is ≤ 0.4 W.

To wake the ReliaGATE 10-05-34 up from the low power consumption mode, use the Console port.

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10.1.6   *How to perform a power reset of the ReliaGATE 10-05-34*

To trigger a hardware reset of the ReliaGATE 10-05-34, push the reset pushbutton available behind the Service Panel.

Ref#	Description
1	Reset pushbutton

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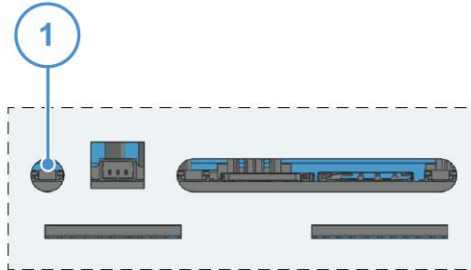
10.2 Wi-Fi and Bluetooth

The ReliaGATE 10-05-34 includes a WLAN + Bluetooth (BT) module and an external antenna connection to fully implement 802.11b,g,n WiFi and Bluetooth 4.0 functions.

10.2.1 Wi-Fi specifications

Specification	Description
Standard	IEEE 802.11b, g, n, Wi-Fi compliant
Frequency Range	2.400 GHz to 2.497 GHz (2.4 GHz ISM Band)
Number of Channels	2.4GHz：Ch1 to Ch14
Modulation	802.11b : DQPSK, DBPSK, CCK 802.11g, n: OFDM /64-QAM,16-QAM, QPSK, BPSK
Data Rate	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Data Rate (20 MHz, Long GI, 800 ns)	802.11n: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps
Data Rate (20 MHz, Short GI, 400 ns)	802.11n: 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65,72.2Mbps
Maximum Input Level	802.11b: -10 dBm 802.11g, n: -20 dBm
Antenna Reference	Small antennas with 0 to 2 dBi peak gain

10.2.2 Bluetooth specifications

Specification	Description
Standard	Bluetooth V4.0 of 1, 2 and 3 Mbps
Host Interface	UART
Antenna Reference	Small antennas with 0 to 2 dBi peak gain
Frequency Band	2402 MHz to 2480 MHz
Number of Channels	79
Modulation	FHSS, GFSK, DPSK, DQPSK

10.3   Cellular

The ReliaGATE 10-05-34 integrates a cellular modem having the following characteristics:

Specification	Description
UMTS/HSPA	800/850/900/1900/2100 MHz (Bands VI, V, VIII, II, I) 3GPP Release 7 5.76 Mb/s uplink, 21.1 Mb/s downlink or 5.76 Mb/s uplink, 7.2 Mb/s downlink
GSM	GSM 850 / 900 / 1800 / 1900 MHz 3GPP Release 7, PBCCH support
GPRS	Class 12, CS1-CS4 - up to 86.5 kb/s
EDGE	Class 12, MCS1-9 - up to 236.8 kb/s
CSD	GSM max 9.6 kb/s
UMTS	Max 64 kb/s
SMS	MT/MO PDU / Text mode
Protocols	Embedded TCP/IP, UDP/IP HTTP/FTP/SSL (Secure Socket Layer)
Network	Jamming detection

10.4   The MicroSIM card receptacle

Your ReliaGATE 10-05-34 includes a push-push type Micro SIM card receptacle.
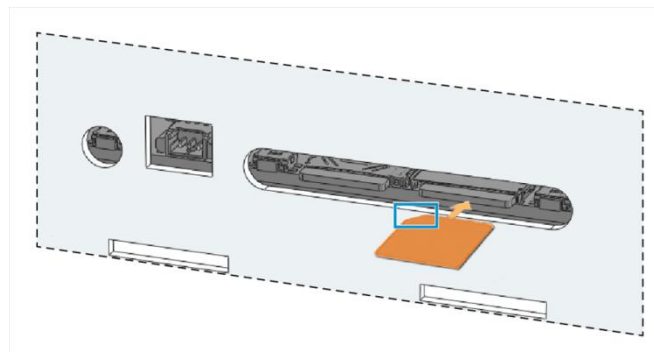
This interface is available behind the Service Panel.

NOTICE

TURN THE SIM PIN OFF!
     Turn the SIM PIN OFF before inserting the SIM card in the receptacle!
     The cellular connection will not work if the SIM PIN is ON!

Insert the MicroSIM card as in the picture below, with the contacts facing down, and the cut corner facing inwards.

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10.5   Ethernet port

On the rear panel, the ReliaGATE 10-05-34 provides one 10/100 Mbps Ethernet port for wired network connectivity: ETH0.

10.5.1   Connector pinout
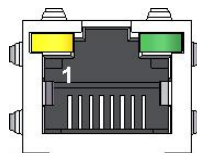
Pin#	Name	Type	Description
1	TX+	O	Transmit Data +
2	TX-	O	Transmit Data -
3	RX+	I	Receive Data +
6	RX-	I	Receive Data -

10.5.2   Port specifications

Feature	Description
Network Standard	IEEE802.3u 10/100-BaseTX. IEEE 802.3x full-duplex flow control.
Speeds	10/100-BaseTX interfaces with MAC
Notes	The interfaces are noise and surge protected. The RJ-45 connector has integrated magnetics.

10.6   Host USB port

The ReliaGATE 10-05-34 provides one USB 2.0 host port For power supply only".

This interface is available on the rear panel, and is noise and surge protected.

10.6.1   Connector pinout
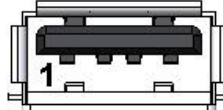
Pin#	Name	Type	Description
1	VBUS	5	+5V
2	D-	IO	Negative data
3	D+	IO	Positive data
4	DGND	P	Digital ground

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10.7   COM ports 0 and 1

The ReliaGATE 10-05-34 provides 2 COM ports on the 8-position connector located on the front panel (pins 3 to 8):

| Port	Type	Protection	Max baud rate
COM 0	RS-485	Surge Protected	Up to 3.6864 Mbps
COM 1	RS-232 (3-wire)	Surge Protected	Up to 450 kbps

10.7.1   *How to insert RS-485 fail-safe and termination resistors*

To insert the RS-485 fail-safe and termination resistors use the DIP switch selector located on the front panel, sliding levers 1 to 3.

The sliding levers have the following meaning:
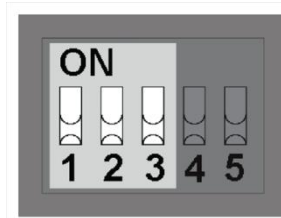
Lever #	Description
1	ON: 4.7 kΩ pull-up resistor inserted on line RS-485+ (A) OFF: No resistor inserted **(default configuration)**
2	ON: 4.7 kΩ pull-down resistor inserted on line RS-485- (B) OFF: No resistor inserted **(default configuration)**
3	ON: 120 Ω termination resistor inserted on lines RS485+ / RS485- (A / B) OFF: No resistor inserted **(default configuration)**

10.7.2   COM ports pinout

The 2 COM ports are available on the 8-position connector located on the front panel, pins 3 to 8.
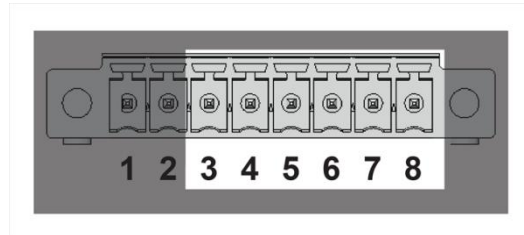
Pin#	Name	Type	Description
3	COM 0: RS-485+ (A)	I/O	COM port 0 (RS-485): ˌ A Line
4	COM 0: RS-485- (B)	I/O	COM port 0 (RS-485): ˌ B Line
5	COM 0: GND	P	COM port 0 (RS-485): ˌ Ground
6	COM 1: TX	O	COM port 1 (RS-232): ˌ Transmit Data
7	COM 1: RX	I	COM port 1 (RS-232): ˌ Receive Data
8	COM 1: GND	P	COM port 1 (RS-232): ˌ Ground

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10.8   The MicroSD card receptacle

The ReliaGATE 10-05-34 includes a push-push type Micro SD card receptacle behind the Service Panel.

Insert the Micro SD card as in the picture below, with the contacts facing down.
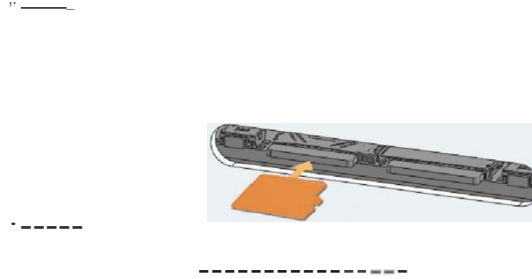
10.9   Console port

The ReliaGATE 10-05-34 provides a Console port behind the Service Panel.

It is an RS-232 serial port. You can use it to access the Operating System.

10.9.1   Connector and mating connector specifications

Connector	Shrouded header, 3-pin, 1.25 mm pitch
Mating connector	Receptacle Housing, 3-pin, 1.25 mm pitch Example: ı Manufacturer: Molex ı Part number: 51021-0300

10.9.2   Connector pinout
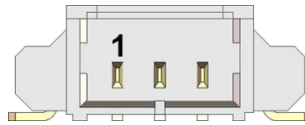
Pin#	Name	Type	Description
1	TX	O	Transmit Data
2	RX	I	Receive Data
3	DGND	P	Digital Ground

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10.10 RTC (Real Time Clock)

Your ReliaGATE 10-05-34 includes the following two RTC (Real Time Clocks) devices:

RTC device	Description	Use
/dev/rtc0	ı It comes from the CPU SoC	Reserved
/dev/rtc1	ı It does not come from the CPU SoC ı It is the default RTC used by Linux to set and get the Wall time while booting up and while suspending / resuming ı It has an accuracy of 25 minutes per year (at 25 °C) ı It can trigger an interrupt to the CPU.	Wake your ReliaGATE 10-05-x4 up from a deep low power state

10.10.1 The RTC device "/dev/rtc1"

The RTC device "/dev/rtc1" offers:
- ı three timestamp registers
- ı one user-available byte

To manage the RTC device see the section .
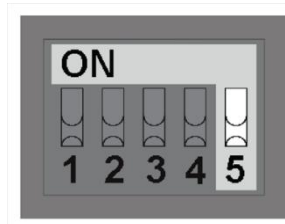
10.11 Watchdog

Your ReliaGATE 10-05-34 includes a watchdog / supervisor IC, external to the CPU.

To manage the watchdog see the section "Watchdog" on page 46.

10.11.1 *How to enable / disable the watchdog*

To enable / disable the watchdog use the DIP switch selector located on the front panel, sliding lever 5.

The sliding lever has the following meaning:

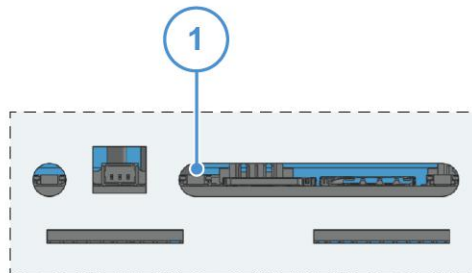| Lever #	Description
5	ON: Watchdog disabled OFF: Watchdog enabled **(default configuration)**

10.12 The Programmable pushbutton

A programmable pushbutton is available behind the Service Panel.

The pushbutton is sensed by a Linux daemon which executes a shell script every time the button is either pushed or released.

Ref#	Description
1	Programmable pushbutton

11   THE SOFTWARE

11.1   The Linux OS distribution

Eurotech can provide a Linux operating systems based on Yocto framework (www.yoctoproject.org) as well as an SDK for application development.

All the documentation for the developer is available from: www.yoctoproject.org/documentation.

11.2   The bootloader procedure

The bootloader procedure is the following:
1. The MLO file is loaded from the on-board eMMC memory, and saved in the on-chip memory to configure the RAM memory for use
2. The u-boot.img file is loaded, saved in the RAM memory, and executed
3. U-Boot executes the Linux kernel from either one of the following sources:
    ▪ From the Ethernet from a server with a defined IP address
    ▪ From the on-board eMMC
4. U-Boot fetches the Linux kernel (/boot/zImage) and the device tree (/boot/reliagate-10-11.dtb), and boots the operating system up
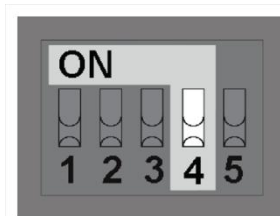
11.2.1   How to select the Linux kernel sources

U-boot can execute the Linux kernel from either one of the following sources:
    ▪ From the Ethernet from a server with a defined IP address
    ▪ From the on-board eMMC

To select the Linux kernel source use the DIP switch selector located on the front panel, sliding lever 4.

The sliding lever has the following meaning:

Lever #	Description
4	ON: U-boot executes the Linux kernel from the Ethernet OFF: U-boot executes the Linux kernel from the on-board eMMC **(default configuration)**

11.2.2   How to set up a correct eMMC card partition

To allow the correct bootloader procedure, configure the eMMC memory with at least these 2 partitions:
    ▪ 1st partition:
        ○ Type: FAT16
        ○ Flags: lba, boot
        ○ Contains the files: MLO and u-boot.img
    ▪ 2nd partition:
        ○ Type: ext4
        ○ Contains the operating system, including the Linux kernel (/boot/zImage) and the device tree (/boot/reliagate-10-11.dtb)

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12   HOW TO ACCESS THE INTERFACES UNDER LINUX

12.1   Ethernet port

On the rear panel, the ReliaGATE 10-05-x4 exposes one 10/100 Mbps Ethernet port for wired network connectivity:
- Ethernet 0 port, referenced as **eth0**

12.2   Wi-Fi and Bluetooth

On the rear panel, the ReliaGATE 10-05-x4 exposes an external antenna connection to fully implement Wi-Fi 802.11b/g/n and Bluetooth 4.0 BLE functions:
- The Wi-Fi interface is referenced as **wlan0**
- The Bluetooth interface is referenced as **hci0**

12.3   Modem

By default the ReliaGATE 10-05-x4 exposes the modem as follows:
- AT commands port (data communication):   **/dev/ttyACM0**

To turn the modem OFF unconditionally, use the following commands:

```
echo 1 > /sys/class/gpio/gpio30/value
sleep 0.5
echo 0 > /sys/class/gpio/gpio30/value
```

To toggle the modem power status, use the following commands:

```
echo 1 > /sys/class/gpio/gpio60/value
sleep 5
echo 0 > /sys/class/gpio/gpio60/value
```

12.4   COM ports 0 and 1, Console port

The ReliaGATE 10-05-x4 exposes the COM ports as follows:
- COM port 0:   **/dev/ttyO4** (available on the front panel)
- COM port 1:   **/dev/ttyO3** (available on the front panel)
- Console port   **/dev/ttyO0** (available behind the service panel)

12.4.1   How to test a COM port

Use the utility below to test the COM port. It works in either RS-232 or RS-485 mode.
This utility allows you to transmit/receive data to/from the COM port.

NOTE: this utility does not include a local echo (it does not allow you to see the sent data)

```
#connect tty03 with a baud rate of 9600
microcom /dev/tty03 —s 9600
```

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12.5   **LED indicators**

The available LED indicators are the following:

Ref#	Use	Color
1	POWER: - LED ON: ReliaGATE powered by the external source - LED OFF: ReliaGATE not powered by the external source	Blue
2	CELL (Cellular modem activity): - LED ON means modem ON; - LED blinking means modem attached to GSM network	Green
3	USER1 (General purpose)	Green / Amber
4	USER2 (General purpose)	Green / Amber

They are exposed as follows:
- LED 1:   **Reserved**
- LED 2:   **/sys/class/gpio/gpio114/value**
- LED 3:   **/sys/class/gpio/gpio115/value**
- LED 4:   **/sys/class/gpio/gpio116/value**

12.5.1   *How to manage a LED*

Each LED is managed by its respective GPIO.
Each GPIO needs to be exported before you can use it.
The export procedure has to be repeated at each power ON.

To drive a LED, complete the following steps:
1. Export the LED (if it hasn't already exported before)
2. Drive the LED

To export LED3, use the following commands:

```
#export gpio 117
echo 117 > /sys/class/gpio/export
#gpio is output
echo out > /sys/class/gpio117/direction
```

To drive LED3, use the following commands:

```
#turn led on
echo 1 > /sys/class/gpio117/value
```

```
#turn led off
echo 0 > /sys/class/gpio117/value
```

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12.6   Flash Memory

The ReliaGATE 10-05-x4 exposes the flash memory as follows:

ˌ Internal flash (eMMC) memory: **/dev/mmcblk0**
ˌ MicroSD card memory: **/dev/mmcblk1**

12.7 RTC

The ReliaGATE 10-05-x4 exposes the user-available RTC as follows:

- RTC: **/dev/rtc1**

The "/dev/rtc1" offers:

- three timestamp registers
- one user-available byte.

12.7.1 *How to manage the timestamp registers*

The timestamp registers are the following:

Timestamp register	What it contains
sys/class/rtc/rtc1/device/timestamp1	Reserved data
sys/class/rtc/rtc1/device/timestamp2	The timestamp that the system last lost power (only if a successful initialization has been achieved)
sys/class/rtc/rtc1/device/timestamp3	The timestamp that the system last has been powered (only if a successful initialization has been achieved)

You can only read and reset the timestamp registers.

To read the timestamp2, use the following command:

```
cat /sys/class/rtc/rtc1/device/timestamp2
```

To reset the timestamp2, use the following command:

```
echo timestamp2 > /sys/class/rtc/rtc1/device/resets
```

12.7.2 *How to manage the user-available byte*

The user-available byte is the following:

User-available byte	What it contains
/sys/class/rtc/rtc1/device/ram_byte	The default value is 0. You can write in it a value included in the range: 0 to 255. This value is retained as long as the /dev/rtc1 device receives a valid power supply (main power supply or battery)

You can read and write the user-available byte.

To read the byte, use the following command:

```
cat /sys/class/rtc/rtc1/device/ram_byte
```

To write 112 in the byte, use the following command:

```
echo 112 > /sys/class/rtc/rtc1/device/ram_byte
```

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12.7.3   *How to manage the sleep mode (example)*

To make the ReliaGATE 10-05-34 enter sleep mode, use the following command:

```
echo mem > /sys/power/state
```

The commands in the example below perform the following actions:
1. Sets a specific date and time in the ReliaGATE 10-05-34: 4 September 2015 at 10:00 AM
2. Tells the ReliaGATE 10-05-34 to automatically wake up 20 seconds after the specific date and time
3. Makes the ReliaGATE 10-05-34 enter sleep mode

```
#set current date and time
DATE="09/04/2015"
TIME="10:00:00"
date +"%m/%d/%y %H:%M:%s" —s "$DATE $TIME"
#set wake up date and time
rtctest —d /dev/rtc1 —a "04/09/2015 10:00:20"
#enter sleep mode
echo mem > /sys/power/state
```

To make the ReliaGATE 10-05-34 exit from sleep mode, use the following procedure:
1. Connect the Console port
2. Send a character on the Console port

12.8   Watchdog

The ReliaGATE 10-05-34 exposes the watchdog as follows:

- Watchdog: **/dev/watchdog1**

12.8.1   How to manage the watchdog using the C programming language

To manage the watchdog using the C programming language use the following commands:

```
Int interval;
Int bootstatus;
Long value;

/* display current watchdog value */
If (ioctl(fd,WDIOC_GETTIMEOUT,&interval)==0)
{
   // interval contains current timeout in seconds
}

/* Check if lasdt boot is caused by watchdog */
If (ioctl(fd,WDIOC_GETBOOTSTATUS,&bootstatus)==0)
{
   //bootstatus <> 0 Watchdog
   //bootstatus = 0 Power-on reset
}

/* set the watchdog value (for example: 30 seconds) */
value=30;
If (ioctl(fd,WDIOC_SETTIMEOUT,&value)==0)
{
   //Watchdog has been set to value content
}

/* stop the watchdog */
write(fd,"V",1);

/* feed the watchdog */
ioctl(fd,WDIOC_KEEPALIVE,0);
```

12.8.2   How to manage the watchdog from the command line

To set the watchdog value (for example: 30 seconds), use the following command:

```
wdt_setup –d /dev/watchdog1 –t 30
```

To start and feed the watchdog, use the following command:

```
echo 10 > /dev/watchdog1
```

To stop the watchdog, use the following command:

```
echo V > /dev/watchdog1
```

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12.8.3   *How to obtain further information*

To obtain further information on Linux support for watchdog, see:
www.kernel.org/doc/Documentation/watchdog/watchdog-api.txt

12.9   The Programmable pushbutton

The ReliaGATE 10-05-34 is provided with a programmable pushbutton.

The programmable pushbutton is sensed by a Linux daemon which executes a shell script every time the button is either pushed or released.

To export the pushbutton, use the following commands:

```
echo 86 > /sys/class/gpio/export
echo in > /sys/class/gpio/gpio86/direction
```

To see the pushbutton status, use the following commands

```
cat /sys/class/gpio/gpio86/value
```

The output will be like the following:
  ı If the button is being pushed, then `value` is 1.
  ı If the button is not being pushed, then `value` is 0.

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13   HOW TO LOG IN THE ADMINISTRATION CONSOLE

Your ReliaGATE 10-05-34 runs a Yocto Linux Operating System.

This section describes how to enter the Administration console to access the Operating System for: first setup, diagnostic and system maintenance purposes.

To login the ReliaGATE 10-05-34 Administration console, use one of the following methods:
- Direct login via Console Port
- Remote login via Secure Shell (SSH)

The default username is `root` and the default password is `eurotech`. Both the username and password are case sensitive.

13.1   How to login using the Console port

To log in using the Console port, complete the following steps:
1. Make sure the ReliaGATE is turned OFF
2. Connect a null modem serial cable from your development PC to the Console port on the ReliaGATE device
3. Start a terminal emulator program (for example TeraTerm) on your development PC (minicom on a Linux host). Configure the serial port connection for 115200, 8 bits, 1 stop bit, no parity, and no flow control
4. Connect the power supply to the ReliaGATE. The Power LED lights when power is successfully connected
5. Via the Uboot bootloader, the Linux kernel is found and launched automatically.
6. At the login prompt, enter username and password:

   - Default username (case sensitive): **root**

   - Default password (case sensitive): **eurotech**

13.2   How to login via Secure Shell (SSH)

The default (out-of-the-box) network configuration of your ReliaGATE 10-05-x4 is the following:
- **eth0**
  ◦ Status: Enabled for LAN
  ◦ Configure: Manually (Static IP)
  ◦ IP Address: 172.16.0.1
  ◦ Subnet Mask: 255.255.255.0
  ◦ DHCP Server Enabled
- **wlan0**
  ◦ Status: Disabled

13.2.1   *How to login if your development PC is running Linux*

ReliaGATE 10-05-34 eth0 port is configured with the static IP address: 172.16.0.1/24.

To log in using eth0, complete the following steps:
1. Enter the command `ssh root@172.16.0.1`
2. At the prompt, enter the password: `eurotech` (case sensitive)

13.2.2   *How to login if your development PC is running Windows*

ReliaGATE 10-05-x4 eth0 port is configured with the static IP address: 172.16.0.1/24.

To log in using eth0, and complete the following steps:
1. Download, install, and run an SSH client (for example PuTTY)

2. Enter the IP address of your ReliaGATE 10-05-34: 172.16.0.1/24
3. Set the Connection type to 'SSH' and Port to '22'. Click Open to connect
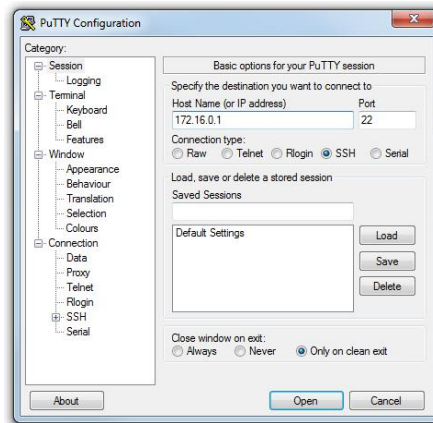
13.3   How to change your security settings

For security reasons, Eurotech recommends you to change the Linux password after your initial setup.

To change your Linux password, complete the followint steps:
1. At the login prompt, enter username and password:
   ı Default username (case sensitive): **root**
   ı Default password (case sensitive): **eurotech**
2. Use the command `passwd` to change the 'root' password
3. Enter a new 'root' account password when prompted

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14   EUROTECH M2M / IOT SOLUTIONS

Eurotech solutions are a combination of hardware, firmware, operating systems, and programming frameworks that dramatically accelerate the time to market of M2M / IoT projects and enable customers to layer their added-value components on a reliable read-to-use infrastructure.

14.1   Everyware Software Framework (ESF)

The ReliaGATE 10-05-34 comes pre-configured with Eurotech's Everyware Software Framework (ESF).

ESF is a smart application container that enables remote management of IoT gateways and provides a wide range of APIs allowing you to write and deploy your own IoT application.

ESF runs on top of the Java Virtual Machine (JVM) and leverages OSGi, a dynamic component system for Java, to simplify the process of writing reusable software building blocks. ESF APIs offer easy access to the underlying hardware including serial ports, GPS, watchdog, USB, GPIOs, I2C, etc. They also offer OSGi bundles to simplify the management of network configurations, the communication with IoT servers, and the remote management of the gateway.

ESF is based on Kura, the popular Eclipse open source project, that was originally contributed to the Eclipse community by Eurotech.

ESF automatically starts at the boot of the ReliaGATE 10-05-x4.

14.2   The ESF Web UI

ESF provides a web-based user interface - "ESF Web UI" - that allows you to:
ι   Monitor the gateway status
ι   Manage the network configuration
ι   Oversee the installed application(s) and services.

The ESF Web UI is available on port 80 of the gateway IP.

The following picture gives you an example of the "ESF Web UI":

14.3　Everyware Cloud (EC)

Eurotech's Everyware™ Cloud (EC) provides an open and flexible software platform that easily connects embedded devices to IT systems or to existing applications, immediately solving infrastructure problems among distributed devices and systems.

With EC you can:
- Connect any sensor, device or asset to the platform to quickly create new products
- Dynamically and remotely create and add new services and functionalities to your field devices
- Configure the platform to analyze data in real-time and trigger immediate alerts
- Leverage a device-specific message-oriented infrastructure for fast and easy creation of reliable, device-independent M2M/IoT applications
- Integrate MVNO Connectivity Platforms to have a single point of management of Connected Devices and associated SIM cards
- Enable IoT Analytics through built-in connectors to on-line Dashboards and Analytical Reports
- Enable IoT Business Application Integrations through native REST APIs

14.4　For further information

For further information about ESF and EC, and to find exhaustive tutorials, refer to the following links:

Information	Available at
ESF Guide	esf.eurotech.com/docs/
Kura website	eclipse.org/kura/
EC Developer's Guide	everywarecloud.eurotech.com/doc/ECDevGuide/
EC M2M Integration Platform	eurotech.com/en/products/software+services/everyware+cloud+m2m+platform

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15   MECHANICAL SPECIFICATIONS

15.1   ReliaGATE 10-05-34 mechanical dimensions

The ReliaGATE 10-05-34 electronics are housed in an ABS (Color: blue) and Aluminum enclosure, having the following dimensions: 112 (L) x 68 (W) x 37 (H); mm (antenna SMA connectors not included).

The following figure shows the dimensions of the ReliaGATE 10-05-34. All dimensions are in millimeters.
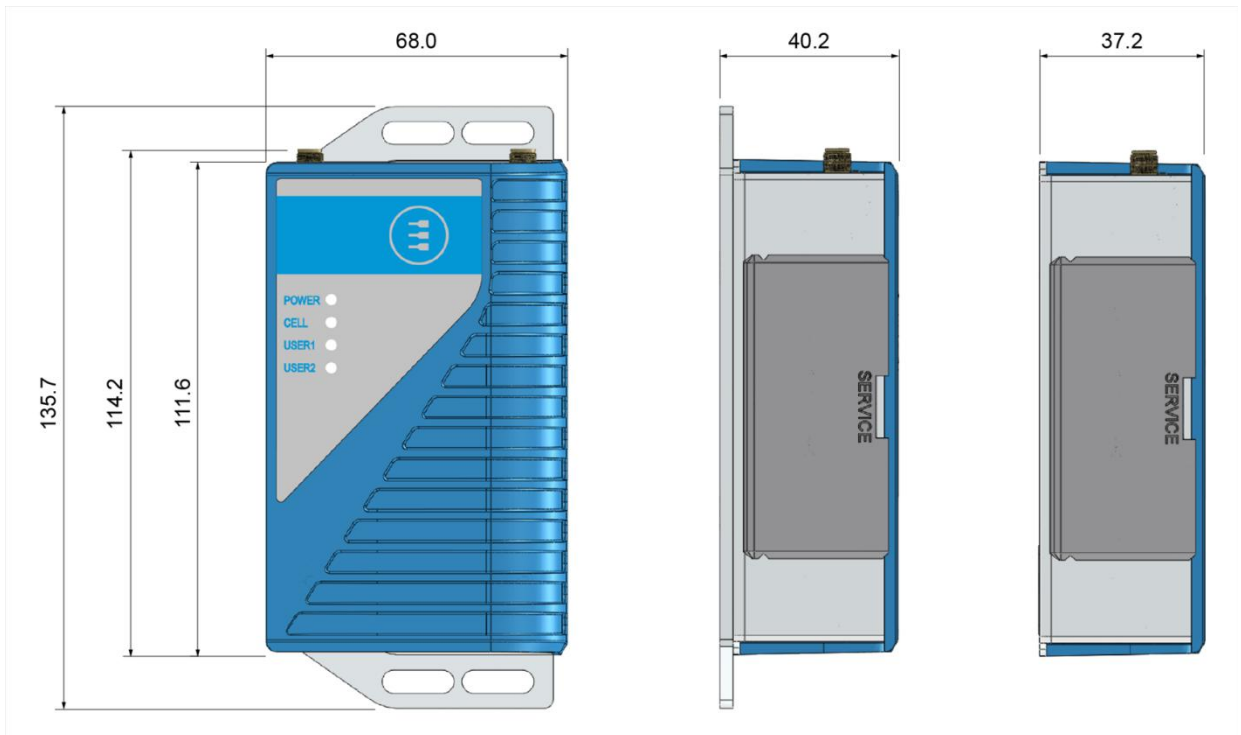
Figure 15.1 - ReliaGATE 10-05-34: mechanical dimensions

15.2 Mounting bracket mechanical dimensions

The following figure shows the dimensions of the Mounting bracket. All dimensions are in millimeters.
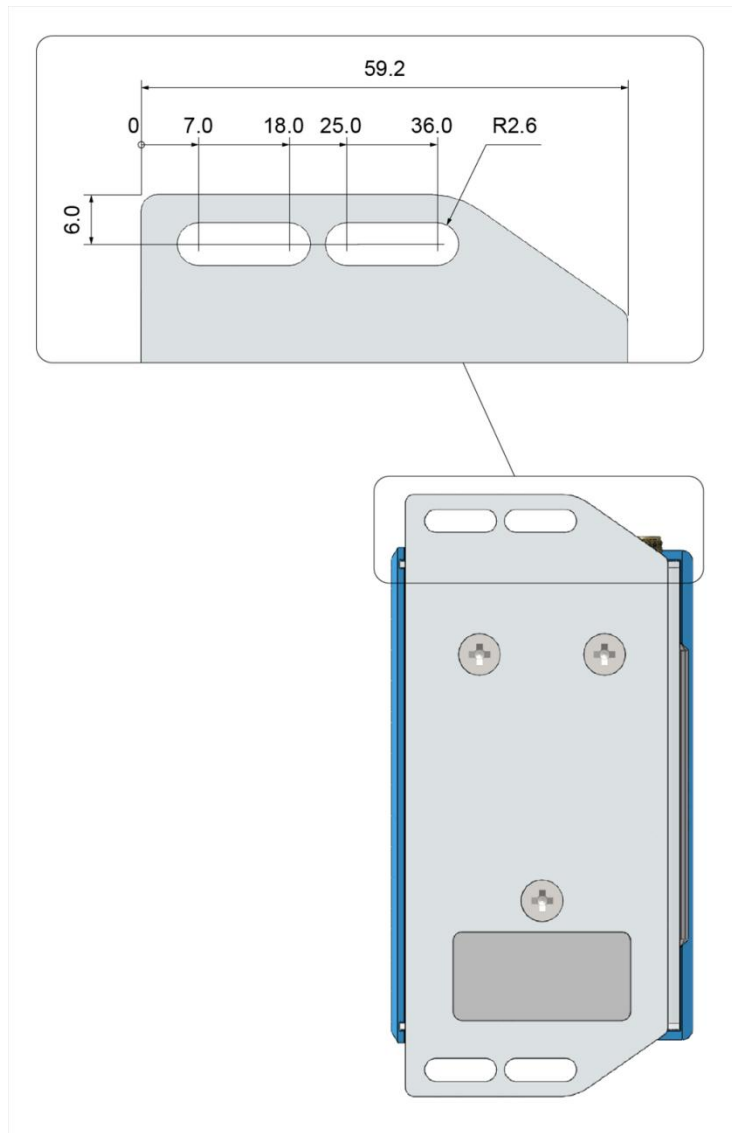

Figure 15.2 - Mounting bracket mechanical dimensions

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16   HOW TO INSTALL THE PRODUCT

To install the ReliaGATE 10-05-34 in place you can use the provided Mounting Bracket.

Optionally, you can use the DIN Rail Mounting Kit to install the ReliaGATE 10-05-x4 on a DIN rail.

16.1   How to install the ReliaGATE 10-05-34 using the Mounting Bracket

To install the ReliaGATE 10-05-34 in place using the Mounting Bracket, add all the necessary screws and locking parts to safely secure the ReliaGATE 10-05-34 in place according to your installation requirements (for example use M5 screws).

For further information see
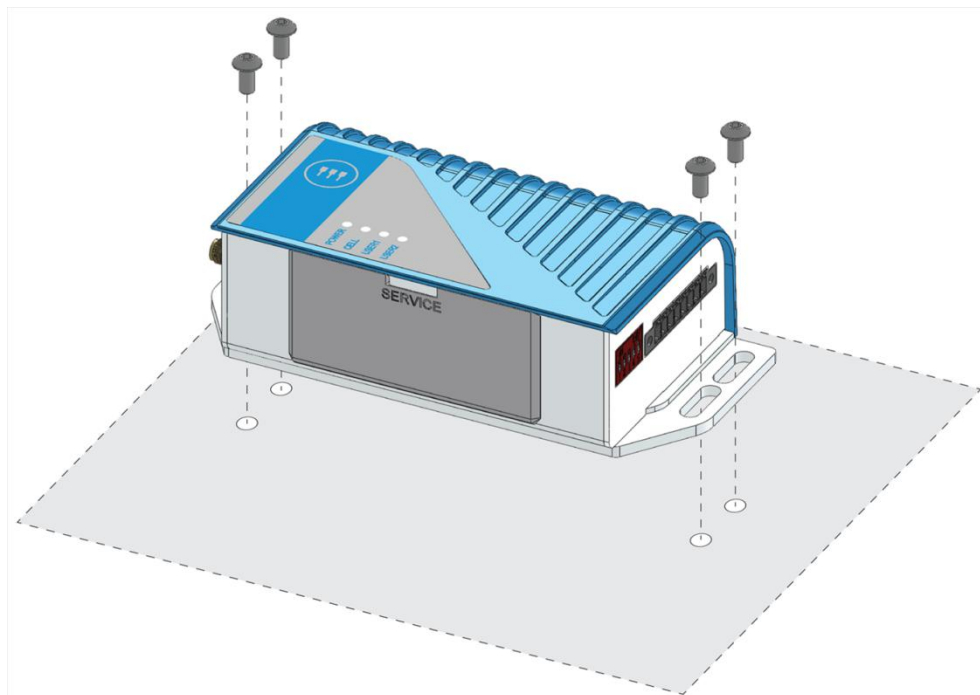
16.2 Optional: How to install the ReliaGATE 10-05-34 using the DIN Rail Mounting Kit
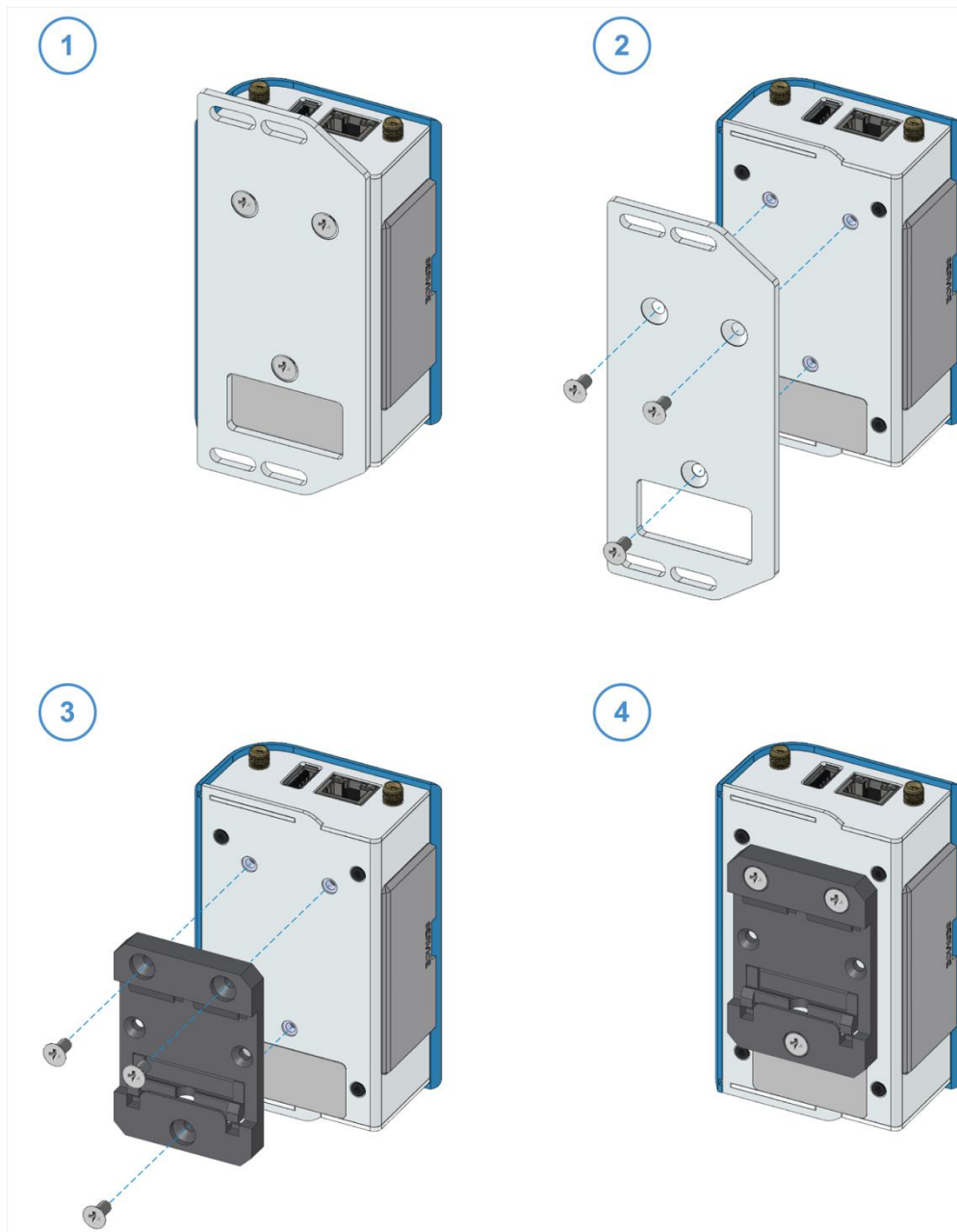
Use the optional DIN Rail Mounting Kit to install the ReliaGATE 10-05-34 on a DIN rail.

Before installing the ReliaGATE 10-05-34 on a DIN rail, replace the Mounting Bracket with the optional DIN Rail Mounting Kit.

16.2.1 How to replace the Mounting Bracket with the DIN Rail Mounting Kit

To replace the Mounting Bracket with the DIN Rail Mounting Kit, complete the following steps:
1. Remove the 3 screws that hold the Mounting Bracket in place
2. Remove the Mounting Bracket
3. Place the DIN Rail Mounting Kit
4. Fasten the 3 screws removed at Step 1 to hold the DIN Rail Mounting Kit in place

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NOTE ABOUT THE 3 SCREWS:

The 3 screws that hold the Mounting Bracket in place have the following features:
- Cross socket flat head countersunk
- Fully threaded
- Stainless steel
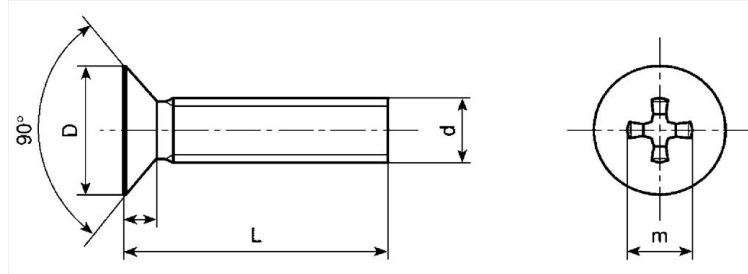
16.2.2   *How to install the ReliaGATE 10-05-34 on a DIN rail*

Prerequisite: Replace the Mounting Bracket with the DIN Rail Mounting Kit

To install the ReliaGATE 10-05-34 on a horizontal DIN rail, complete the following steps:
1. Hook the lower mobile latches of the mechanical adapter on the lower edge of the DIN rail
2. Push the ReliaGATE 10-05-34 upwards against the DIN rail and lock upper latches of the mechanical adapter on the upper edge of the DIN rail.
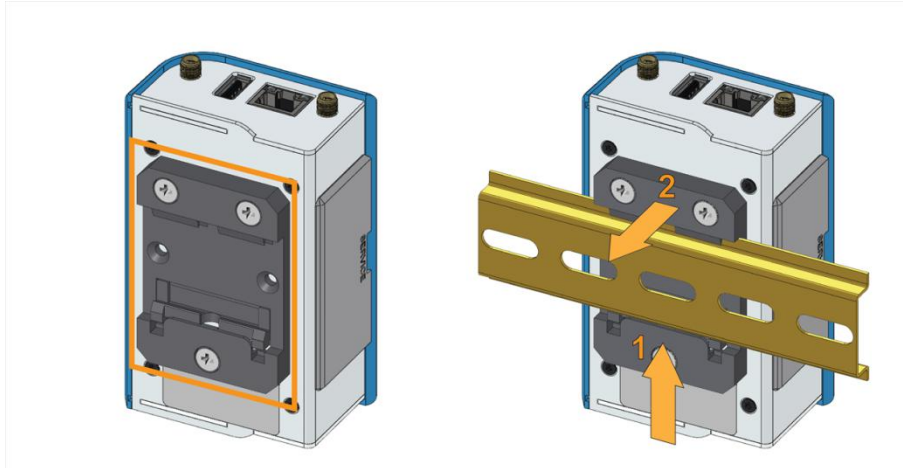
16.2.3   *How to remove the ReliaGATE 10-05-34 from a DIN rail*

To remove the ReliaGATE 10-05-34 from a horizontal DIN rail, complete the following steps:
1. Push the lower mobile latches of the mechanical adapter upwards to release the upper latches
2. Pull the ReliaGATE 10-05-34 out

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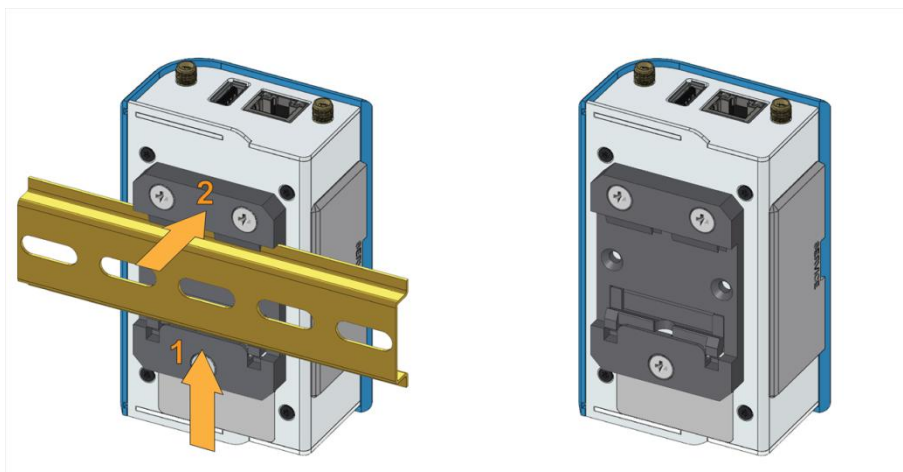
17   HOW TO MAINTAIN THE PRODUCT

Periodically inspect the installation of the product to verify its integrity and to ensure proper operation.

Before starting the maintenance of the product, carefully read and understand the instructions contained in the sections "Important Information" on page 1 and "Safety Instructions" on page 1.

17.1   Use antistatic precautions

NOTICE
PREVENTING ELECTROSTATIC DISCHARGE (ESD)
When handing the product described in this document, always use appropriate antistatic precautions to avoid damages due to electrostatic discharge. **For example: use a wrist strap or ESD cuff kept in constant contact with bare skin and attached to an ESD ground.**

17.2   Remove the power supply

⚠ WARNING
ELECTRIC SHOCK HAZARD **To avoid injuries do not perform any cables connection/disconnection with wet hands** **Before starting the maintenance of the product, complete the following steps:** 1. **Remove the power supply** 2. **Disconnect all the cables** 3. **Make sure all the circuits are discharged.** **Failure to complete the steps above, may create an electric shock hazard, which could result in personal injury or loss of life, and / or damage to equipment or other property**

17.3   Inspect the installation of the product

To inspect the installation of the product, complete the following steps:
1. Verify that the external surface of the product is clean and not damaged
2. Verify that the LED indicators are not damaged, clean and visible
3. Verify that all the screws, bolts, nuts, etc. are correctly fastened.

17.4   Clean the product

To clean the product, complete the following steps:
1. Use a dry cloth to remove dust and fingerprints from the external casing
2. Do not use detergents, aerosol sprays, solvents or abrasive sponges
3. Use water-based, non-flammable, cleaner products to remove all types of dirt (example: grease, oil, nicotine etc.)
4. Wipe the chassis with a lint-free cloth

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NOTES

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WORLD SUPPORT	EUROPE	AMERICAS	ASIA

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For the Eurotech Global Support Center refer to: eurotech.desk.com

For the Eurotech Download Area refer to: eurotech.com/download