



Teldat-3Ge Installation Manual

Teldat-Dm 398-I

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Chapter 1 Installing the Router

1.1 Introduction

The **Teldat-3Ge** enabler (**Teldat-3Ge**) is an external 3G interface that delivers 3G service to the current corporate network access infrastructure. This device is particularly suited for 3G installations where:

- The radio signal coverage in the area is fairly poor.
- It is impossible, or not convenient, to supply the current access router with an external 3G interface.



Fig. 1: Teldat-3Ge : External aspect

The **Teldat-3Ge** is the enterprise access point to the 3G network. This device provides a unique interface with the access router over the corporate Ethernet LAN infrastructure. This singular approach avoids deployment of expensive and bulky ultra-low-loss coaxial cables, needed to link the access router to an RF antenna (often located far from interior setups). The **Teldat-3Ge** is also an external interface and can be fully managed by the current access router, just as any point to point virtual interface.

The support for POE 802.3af further simplifies **Teldat-3Ge** installation, since the device can be powered from the same Ethernet port used for communications with the current access routers.

The following figure summarizes the **Teldat-3Ge** concept:

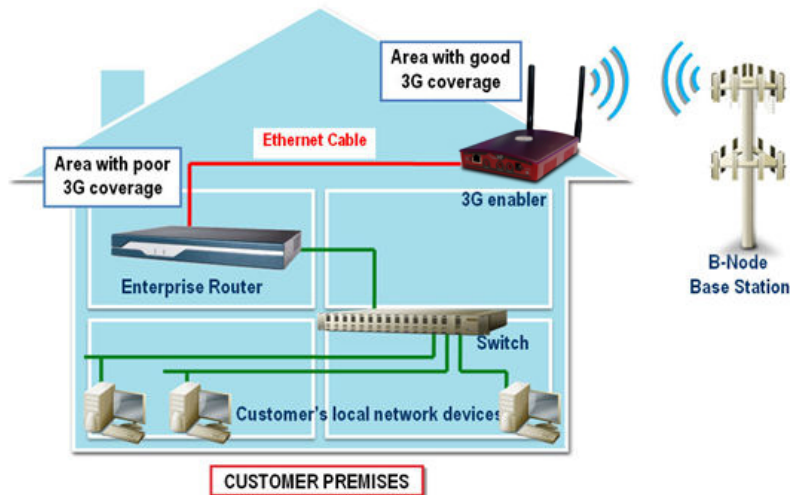
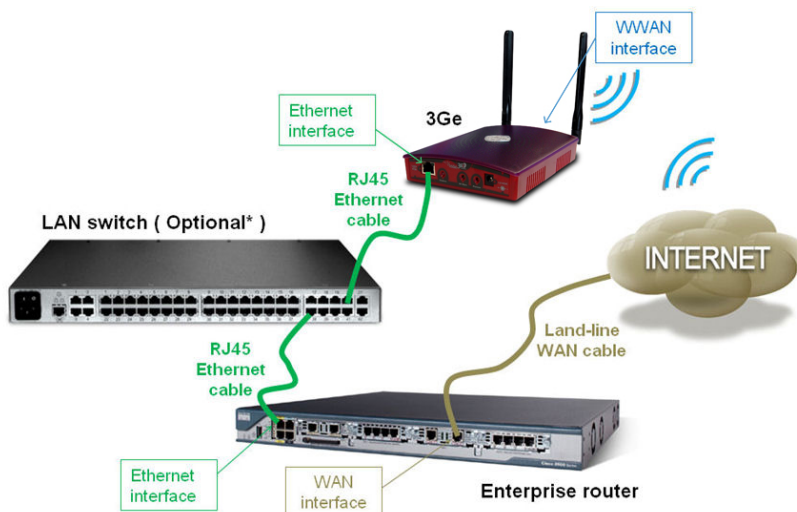


Fig. 2: The **Teldat-3Ge** concept

The **Teldat-3Ge** has two interfaces: the RF interface providing access to the 3G network, and an Ethernet port, which interfaces with the router over the LAN infrastructure.

Figure 3 illustrates the basic connection schema:



* Optional LAN Switch: The 3Ge can be directly connected to an spare Ethernet port of the enterprise router, if available.

Fig. 3: The **Teldat-3Ge** connection diagram

1.1.1 Recycling and the Environment

Please do not, under any circumstances, throw away any **Teldat-3Ge** with normal domestic waste. Ask your local town hall for information on how to correctly dispose of them in order to protect the environment against e-waste. Always respect the current laws regarding waste material.

Anyone found violating the environmental laws will be subject to fines and any additional steps established by law.

All the packing materials (i.e. the cardboard box, plastic and any other packaging) together with the pieces making up the **Teldat-3Ge**, must be recycled complying with the current active laws regarding recycling materials.



The above symbol with a cross over the rubbish container can be seen on the device. This means that, when a device reaches the end of its life, it must be taken to the official recycling/disposal centers where it must be disposed of in an environmentally responsible manner and separately from normal domestic waste.

1.2 Connections



Caution

BEFORE INSTALLING THE ROUTER, PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

Workplace Conditions. Main Characteristics

- Excessive cold and heat should be avoided, as should humidity and dust.
- Avoid direct exposure to sunlight and any other heat sources. Do not place the device between papers, magazines or other items that could hinder natural air circulation.
- Do not place the device near strong electromagnetic fields such as those produced by speakers, motors, etc.
- Avoid knocks and/or strong vibrations during operation, storage and transport.



Warning

The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set forth in the following section.

1.2.1 If the Ethernet cable is POE

To Connect	To Disconnect
Check that the Ethernet cable is not connected to the device.	Disconnect the Ethernet cable.
Check that the power supply is not connected to the device	Disconnect the power supply from the device.
Check that the power supply is not connected to the main electricity supply.	Disconnect the power supply from the main electricity supply.
If you need redundant power, connect the power supply to the main electricity supply.	
If you need redundant power, connect the power supply to the device.	
Connect the Ethernet cable.	

1.2.2 If the Ethernet cable is not POE

To Connect	To Disconnect
Check that the power supply is not connected to the device.	Disconnect the power supply from the device.
Check that the power supply is not connected to the main electricity supply.	Disconnect the power supply from the main electricity supply.
Connect the power supply to the main electricity supply.	
Connect the power supply to the device.	

1.2.3 Connecting the Power Source

1.2.3.1 With External Power Supply

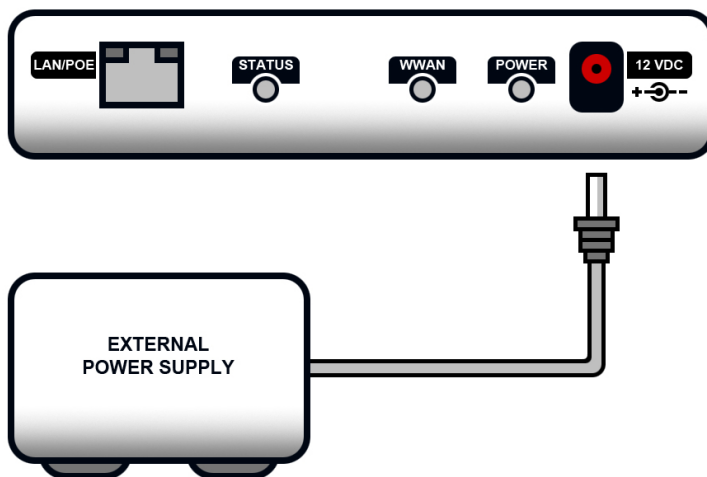


Fig. 4: Connecting the power source

The **Teldat-3Ge** can be powered by an external AC/DC power source through the Ethernet cable if it complies with the POE 802.3af standard.

To connect the power supply to the device, please follow the steps set forth in [If the Ethernet cable is POE](#) on page 3 above.



Warning

All interconnected communication devices should be plugged to **THE SAME GROUNDED POWER OUTLET**, which should, at the same time, be of good quality (lower than 10 ohms).

Whether the workplace is provided with an uninterrupted power supply system (UPS), regulated supply, or it is independent from the rest (such as lighting, etc.), it is highly recommended that all data devices should be connected to the same power source. This will avoid operating and premature aging problems of drivers and other components.

1.2.3.2 With POE Injector



Fig. 5: POE Injector: Aspect

The **Teldat-3Ge** can be powered through the Ethernet cable, provided it complies with the POE 802.3af standard.

To connect the Ethernet cable with the POE power to the router, please carry out the steps set forth in [If the Ethernet cable is POE](#) on page 3.

Figure 6 shows how to connect the POE injector to the **Teldat-3Ge**.

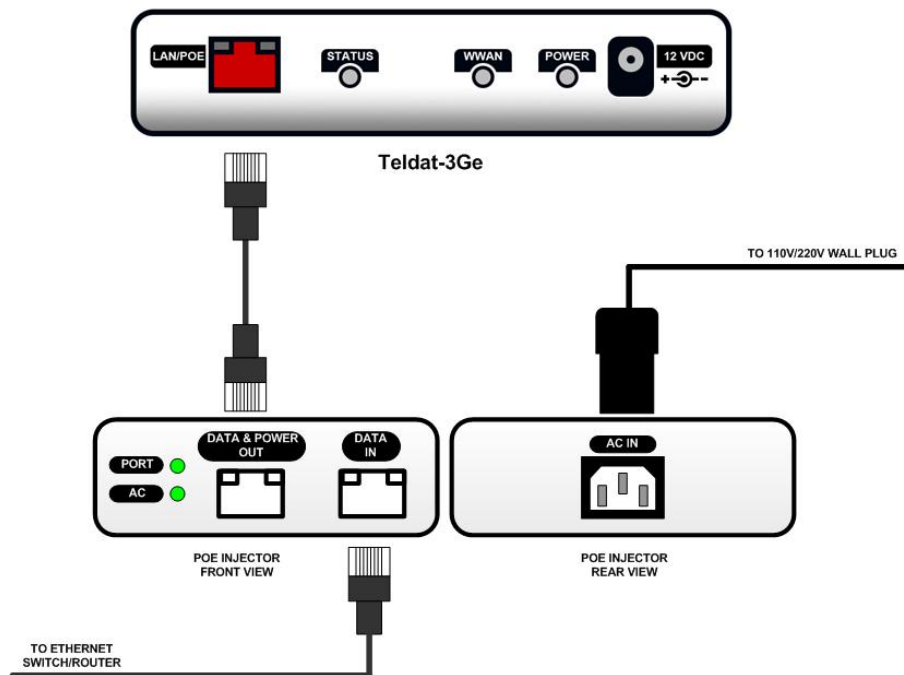


Fig. 6: Connecting the power with the POE injector

1.2.4 Data Connections

The **Teldat-3Ge** has the following available connectors:

1.2.4.1 LAN

Ethernet 10/100BaseT interface to connect to the local area network (LAN). This port is equipped with link status LEDs: a yellow LED indicates that the physical layer has been established and a green LED indicates frame reception.



Fig. 7: LAN Connector

1.2.4.2 Connecting the Teldat-3Ge

The **Teldat-3Ge** has one or two connectors for external SMA RF antennas, which improve the quality of the signal received and transmitted through the WWAN module.

There are various cellular telephony technologies that use antenna diversity to improve the received signal (HSUPA, CDMA EV-DO, etc.). Two WWAN connectors can be incorporated for this.

Scenario without diversity

Figure 8 shows the location of the antenna connector on routers that don't use antenna diversity.

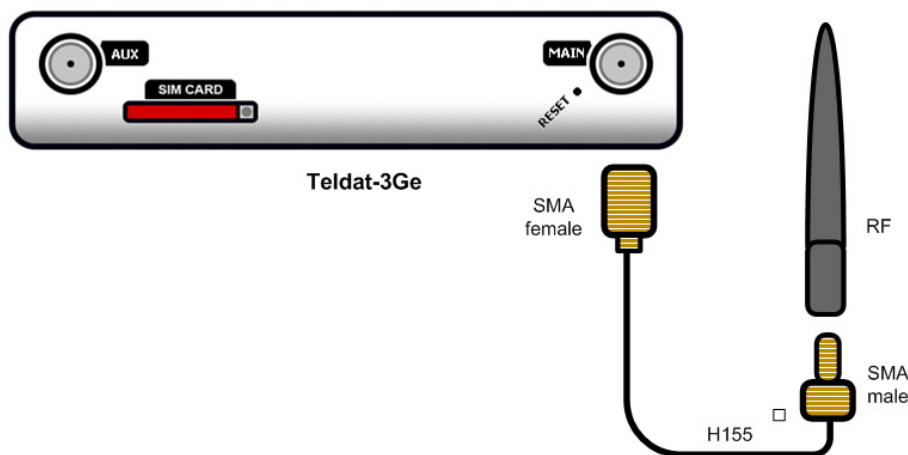


Fig. 8: Rear panel. Antenna connector for Wireless WAN (without diversity)

Scenario with diversity

Figure 9 shows the location of antenna connectors on routers that use antenna diversity.

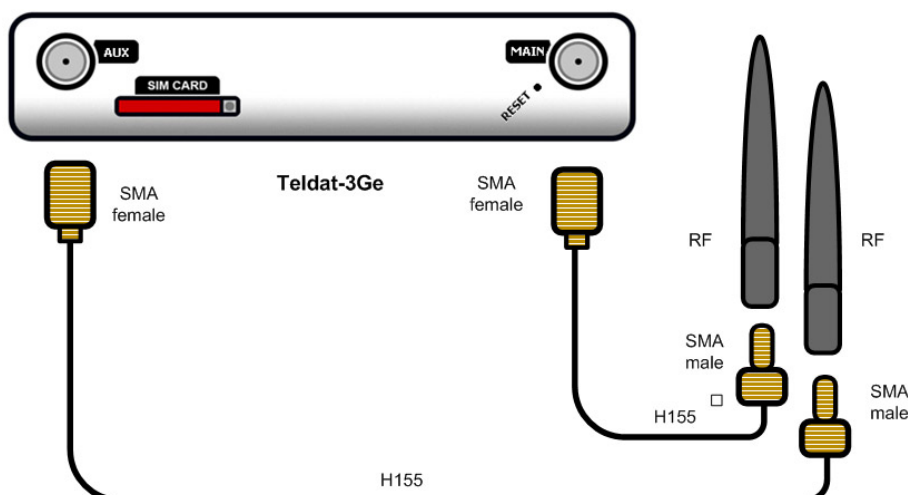


Fig. 9: Rear panel. Antenna connector for Wireless WAN (with diversity)

In routers with two WWAN antenna connectors (*Main* and *Aux*), we recommend, as a general rule, installing both antennas. You must always (**mandatory**) install the *Main* connector antenna. The *Aux* connector antenna is optional in some routers, depending on the technology used (e.g. Sierra Wireless HSUPA or Qisda H20 and H20D). However, in all cases we recommend installing an antenna in the *Aux* connector for diversity. In routers where the *Aux* antenna

is optional, and where it's not going to be installed, you need to appropriately configure the router, by disabling this antenna, to obtain maximum performance from the router.

Connecting with an extension cable

When the *Main* and *Aux* antennas are not directly connected to the router, but are installed through extension cables, the minimum distance between the two must be 7 cms. Maximum recommended distance is 25 cms.

For optimum performance, use the radio frequency accessories (antennas and cables) recommended by Teldat.

If you use extension cables to connect the antennas to the **Teldat-3Ge**, they must be H155 coaxial cables. Figure 8 and Figure 9 show you how to install them.

The following material is necessary for installation: the H155 coaxial cable, the RF antennas and the SMA connectors.

Cable characteristics:

Mechanical Specifications:

Storage temperature: -40°C to +80°C

Operating temperature: -40°C to +80°C

Minimum curvature of radio: 35 mm

Total weight: 38 g/m

Electrical Specifications:

- Impedance characteristic: 50 W
- Loop resistance DC: ≤ 32 W /km
- Internal resistance DC conductor : ≤ 15 W /km
- External resistance DC conductor: ≤ 17 W /km
- Capacitance: 82 pF/m
- Broadcasting rate: 0.81
- Screen effectiveness 30-1000 MHz: ≥ 75 dB
- Return losses 5-30 MHz: ≥ 22 dB*

30-470 MHz: ≥ 16 dB*

- Attenuation:

Attenuation at (MHz)	Nominal (dB/100m)
5	3.0
50	6.5
100	9.3
230	14.2
300	16.3
400	19.0
470	20.7
860	28.5
1000	30.9
1350	36.4
1750	41.9
2050	45.8

As a further recommendation for this second section, when installing antennas using extension cables, if the antennas are anchored the anchorage should be carried out through the male SMA connector.

1.2.4.3 Situating the Teldat-3Ge

The orientation of the **Teldat-3Ge** and its location with respect to other wireless devices or radiation sources (such as communication devices, personal computers, etc.) can influence significantly the device's performance.

The **Teldat-3Ge** transmits and receives radio signals. Performance is also affected by environmental factors (such as the distance between the device and the base station), physical obstacles and other interferences due to radiofrequencies (RF).

To achieve the best coverage, follow these steps:

- Whenever possible, place the **Teldat-3Ge** where there are no physical obstacles. Obstacles between the **Teldat-3Ge** and the base station degrade the RF signal. Place the device above ground level and steer it towards the nearest base station.
- The density of materials also affects the **Teldat-3Ge** . Place it away from any type of wall, metal screens, mirrors, etc.
- Do not place the device near columns that may throw shadows and reduce the coverage area.
- Keep the **Teldat-3Ge** away from metal pipes such as canals, air-conditioning, etc.
- Please bear in mind that other wireless devices (such as telephones, microwaves, etc.) can temporarily interfere with the quality of the radio signal.
- We do not recommend that you install antennas in racks containing communication devices, computers, etc. Use an extension cable and place the antenna outside.

The following recommendations are applicable to all wireless devices:

- Do not touch or move the antenna while the device is transmitting or receiving.
- Do not handle any equipment that contains devices which radiate where the antenna is very close to, or touching, any exposed part of the body (particularly the face and eyes).
- Do not install the device in areas where the atmosphere is potentially explosive.
- Wireless devices can cause interferences with other devices. Do not use the device in areas where medical equipment is installed.
- To ensure compliance with Directive R&TTE 1999/5/EC, the device must be at least 15 cm away from a person's body when it is operating.

1.3 Installing the SIM card

The **Teldat-3Ge** WWAN interface needs a SIM card to operate. The device is equipped with an external SIM card tray.

 **Warning**

When inserting the SIM card, please protect yourself against electrostatic discharges (ESD).

Do not touch the SIM card connector.



Fig. 10: Rear Panel

Procedure:

- Place the device as shown in the above figure so you can see the tray slot.
- Insert the SIM card by placing it on the tray.

- If the tray is inside the router, extract it. The tray is located in the red colored slot.
- Pull out the tray by pressing the yellow button (to the right of the slot).
- If the tray already has a SIM card, remove it by pushing it up through the circular hole underneath the tray.
- When placing the SIM, make sure the connectors are visible (these are normally a gold color). Also, make sure the tray connectors match the SIM connectors.
- Gently push the tray back into the slot, making sure the SIM card remains on the tray.

1.4 Meaning of the LEDS



Fig. 11: Front panel

POWER	Power-on indicator. This lights up when connected to the power.
WWAN	<p>This indicates the WWAN module status and means the following:</p> <p>OFF: Error in the WWAN module. 3G communications are not possible.</p> <p>Check that the module is correctly connected.</p> <p>Check that the WWAN LED is lit up in red.</p> <p>BLINKING GREEN: The module hasn't yet registered in the network.</p> <p>GREEN: The module has registered in the network.</p>
STATUS	<p>Device status:</p> <p>RED: Error in the WWAN module. 3G communications are not possible.</p> <p>Check that the module is correctly connected.</p> <p>Check that the WWAN LED is lit up.</p> <p>BLINKING RED: The WWAN module is operating correctly and the device has not yet obtained an IP address.</p> <p>Check the status of the Ethernet connector LEDs.</p> <p>The device must have an access route to the router.</p> <p>In Coverage Test mode (blinking more than 3 times per second) this indicates an invalid position.</p> <p>BLINKING YELLOW: The device has an IP address but still has not managed to establish the communication channel to the router.</p> <p>In Coverage Test mode (blinking more than 3 times per second) this indicates an acceptable position.</p> <p>GREEN: Communication has been established. The device is ready for normal operations.</p> <p>During startup, the application loads.</p> <p>BLINKING GREEN: There is traffic over the WWAN interface.</p> <p>In Coverage Test mode (blinking more than 3 times per second) this indicates an optimum position.</p>

	<p>YELLOW: The device is updating the application.</p> <p>OFF: The device cannot startup, please contact the technical service.</p>
LAN LEFT LED	<p>YELLOW: There is a physical layer in the Ethernet.</p> <p>OFF: There is no physical layer.</p> <p>Check the Ethernet cable.</p>
LAN RIGHT LED	<p>BLINKING GREEN: Data is being received over the LAN.</p>

Chapter 2 Appendices

2.1 Troubleshooting

The following table can help you solve problems when installing the device. If you cannot solve the problem, contact your dealer for more information.

Symptom	Solution
None of the LEDs light up.	Check the power supply to the device (power source, main power outlet, POE power configuration, etc.).
The LAN LED never lights up in yellow.	Check the Ethernet cable and the connection to the network.
The STATUS LED is on steady red.	Get your technical service to check the WWAN module location or change it.
The WWAN LED is off.	Get your technical service to check the WWAN module location or change it.
The STATUS LED is blinking in red and the LAN LED is blinking in green.	Check your router's DHCP configuration.
The STATUS LED is blinking in yellow.	Check your router's PPPoE or L2TP configuration.
The STATUS LED is green, however there is no access to the network.	Check that the SIM card has been inserted correctly. Check that the SIM card PIN is correct. Check the status of the WWAN LED.
The WWAN LED is blinking in green.	Check that the SIM card has been inserted correctly. Check that the PIN is correct. Check that you have configured the correct parameters to register correctly on the network.
The router doesn't start up due to a configuration error or you wish to restore the factory settings.	To restore the factory settings, you need to carry out the following procedure three consecutive times. Press the reset button while the STATUS LED remains lit up in red at the beginning of router start up.

2.2 Updating the software

The **Teldat-3Ge** can be updated to newer versions. Please contact your dealer for further details on new versions.

The firmware upgrade is carried out through a conventional TFTP file transfer. You will need a TFTP server where the **Teldat-3Ge** can download its firmware image. This server can actually be hosted in the current access router. Both the firmware image and the TFTP server IP address are configured in the **Teldat-3Ge** on startup during DHCP negotiation.

2.3 Connectors

2.3.1 LAN Connector

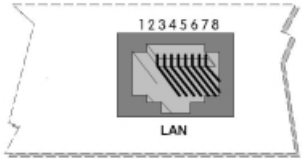
10/100-BASET automatic detection

Half/full duplex automatic negotiation

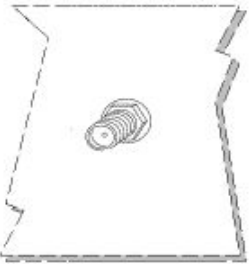
MDI / MDI-X automatic crossover detection

Ethernet V2 / IEEE 802.3

2 status and activity LEDs

RJ45 LAN	RJ45 PIN	LAN
	1	Tx+(input)/POE+
	2	Tx-(input)/POE+
	3	Rx+(output)/POE-
	4	POE+
	5	POE+
	6	Rx-(output)/POE-
	7	POE-
	8	POE-

2.3.2 ANT Connector

	PIN	ANT
	Internal	RF in/out
	External	GND

2.3.3 Power Connector

	PIN	ANT
	Internal	POSITIVE
	External	NEGATIVE

2.4 Technical Specifications

Hardware Architecture

PROCESSORS	Coldfire MCF5328
MEMORY	32 Mbytes in RAM.
STORAGE UNIT	FLASH Memory (8 Mbytes).

LAN Interface

PROTOCOLS	Ethernet (802.3).
SPEED	10/100 Mbps (10/100BaseT)

CONNECTOR	RJ45 female.
POE	POE Class 0: 12.95W maximum

RF Interface

STANDARDS	Please see the manual on plugin cards/modules
SPEED	Please see the manual on plugin cards/modules
CONNECTOR	Please see the manual on plugin cards/modules

Power supply

INPUT VOLTAGE	+12V DC.
INPUT CURRENT	1200 mA
JACK	5.5 mm
INTERNAL PIN	2.5 mm

External power source

INPUT VOLTAGE	100-240V AC
INPUT CURRENT	600 mA
INPUT FREQUENCY	50-60 Hz

Dimensions and weight

TYPE	Desktop or attached to wall
LENGTH x WIDTH x HEIGHT	142 x 160 x 30 mm.
WEIGHT	450 g.





Environmental Specifications

TEMPERATURE	NORMAL OPERATING: -20 °C to 65 °C RESTRICTED OPERATING: -30 °C to 75 °C STORED: -40 °C to 85 °C
RELATIVE HUMIDITY	ON: 5 % to 85 %

Others

MTBF	> 200.000 hours
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2.5 Translated Safety Warnings

	<p>The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set forth in the relevant section.</p>
	<p>La tensión eléctrica de los cables de alimentación, de los cables de la línea telefónica y de los cables de comunicación es peligrosa. Para evitar descargas, antes de instalar, mover o abrir las cubiertas de este equipo, conecte y desconecte los cables siguiendo el orden que se detalla en el apartado correspondiente.</p>
	<p>All interconnected communication devices should be plugged to THE SAME GROUNDED POWER OUTLET, which should, at the same time, be of good quality (lower than 10 ohms).</p> <p>Whether the workplace is provided with an uninterrupted power supply system (UPS), regulated supply, or it is independent from the rest (such as lighting, etc.), it is highly recommended that all data devices should be connected to the same power source. This will avoid operating and premature aging problems of drivers and other components.</p>
	<p>Todos los equipos de comunicaciones interconectados deberán estar unidos a UNA MISMA TOMA DE TIERRA, a ser posible de buena calidad (inferior a 10 ohmios).</p> <p>Si la instalación está dotada de un Sistema de Alimentación Ininterrumpida (SAI), alimentación estabilizada, o bien es independiente del resto (alumbrado, etc.), conecte todos los equipos de comunicaciones a la misma fuente de alimentación. Así, se ahorrará problemas de funcionamiento y envejecimiento prematuro de drivers y demás componentes.</p>
	<p>When inserting the SIM card, please protect yourself against electrostatic discharges (ESD).</p>
	<p>Al insertar la tarjeta SIM, protéjase contra descargas electroestáticas (ESD).</p>
	<p>Do not touch the SIM card connector.</p>
	<p>No toque el conector de la tarjeta SIM.</p>