

User Guide

GenPro 16e



Référence : EG_GenPro16e_1055_UG_000_UK

Révision : 000

Date : 06/12/11

Document History

Revision	Modifications	Author	Date
000	CREATION	YST	05/12/11

The main modifications in this document compared to its previous version are easily identifiable on a screen by the blue color of the text.

TABLE OF CONTENTS

PRESENTATION..... 6

WARNING 7

COPYRIGHT 8

1 REFERENCES..... 9

1.1 REFERRED DOCUMENTS..... 9

1.2 ABBREVIATIONS 9

1.3 SYMBOLS..... 11

2 PACKAGING 12

2.1 CONTENT 12

2.2 PACKING CASE 12

2.3 MODEM LABELS 13

3 GENERAL PRESENTATION 14

3.1 DESCRIPTION 14

3.1.1 Front side..... 14

3.1.2 Back side 14

3.1.3 Two brackets to fix the modem on a support. 14

3.2 EXTERNAL CONNECTIONS 15

3.2.1 Connections 15

3.2.1.1 Antenna connectors..... 15

3.2.1.2 Micro FIT connectors 15

3.2.1.3 Connector Sub D HD 15-pin 16

3.2.2 Cables 17

3.2.2.1 Cable micro FIT 4-wire..... 17

4 CHARACTERISTICS AND SERVICES 18

5 USE OF THE MODEM..... 19

5.1 STARTING WITH THE MODEM..... 19

5.1.1 Assembly of the modem 19

5.1.2 Installation of the modem 19

5.1.3 Verification of the communication with the modem 20

5.1.4 Example of AT commands 20

5.1.4.1 Example of voice communication 20

5.1.4.2 Example of Data communication..... 21

5.1.4.3 Example of SMS transmission..... 21

5.1.4.4 Example of GPRS connection..... 21

5.1.5 SIM card extraction 21

5.1.6 Hardware reset of the modem 21

5.2	SPECIFIC RECOMMENDATIONS FOR THE USE OF THE MODEM IN VEHICLES	22
5.2.1	Recommended connection on the battery of a truck.....	22
5.2.2	Technical constraints of trucks.....	23
5.3	LEDs OF THE MODEM	24
5.4	ECHO FUNCTION OF AT COMMANDS DEACTIVATED	24
5.5	CHECKING THE QUALITY OF THE GSM RECEPTION SIGNAL.....	25
5.6	VERIFICATION OF THE PIN CODE	26
5.7	VERIFICATION OF THE MODEM REGISTRATION ON THE NETWORK	26
5.7.1	GSM network	27
5.7.2	GPRS network	27
5.8	SAVE SETTINGS.....	28
5.9	MAIN AT COMMANDS (HAYES).....	28
5.10	TURNING OFF THE MODEM	29
5.11	MODEM UPDATING PROCEDURE.....	29
6	TROUBLE SHOOTING	29
6.1	PROBLEM OF COMMUNICATION BETWEEN THE MODEM AND THE RS232 LINK (V24).....	29
6.2	"ERROR" MESSAGE.....	30
6.3	"NO CARRIER" MESSAGE	31
7	FUNCTIONAL DESCRIPTION	32
7.1	ARCHITECTURE	32
7.2	POWER SUPPLY.....	32
7.2.1	General presentation	32
7.2.2	Protections of the power supply	32
7.3	RS232 SERIAL LINK	33
7.3.1	General presentation	33
7.3.2	Pins description	34
7.4	RESET	34
7.4.1	General presentation	34
7.4.2	RESET sequence	35
7.5	AUDIO.....	35
7.5.1	Microphone inputs.....	36
7.5.2	Loudspeaker outputs (Speaker).....	36
8	TECHNICAL CHARACTERISTICS.....	37
8.1	MECHANICAL CHARACTERISTICS	37
8.2	ELECTRICAL CHARACTERISTICS	38
8.2.1	Typical consumption	38
8.2.2	Consumption max.....	39
8.2.3	Audio interface.....	40
8.2.3.1	Microphone	40
8.2.3.2	Loudspeaker	41

8.2.4 SIM interface..... 41

8.2.5 RESET signal..... 42

8.2.6 RF characteristics GSM/DCS..... 43

 8.2.6.1 RF functioning..... 43

 8.2.6.2 GSM external antenna 43

8.2.7 Characteristics of the serial link (UART)..... 44

8.3 ENVIRONMENTAL CHARACTERISTICS 44

8.4 STANDARDS/CONFORMITIES 45

9 SECURITY RECOMMENDATIONS 46

 9.1 GENERAL SECURITY 46

 9.2 SECURITY IN A VEHICLE 47

 9.3 CARE AND MAINTENANCE..... 47

 9.4 YOUR RESPONSIBILITY 47

10 RECOMMENDED ACCESSORIES..... 48

11 CLIENT SUPPORT..... 48

APPENDIX I - PARAMETERS SAVED IN NON VOLATILE MEMORY 49

APPENDIX II - EXAMPLE OF PDP CONTEXT ACTIVATION..... 50

DECLARATION OF CONFORMITY 51

Presentation

Entirely dedicated to the wireless markets throughout the world, the modem **GenPro 16e** allows a simple and quick integration of the GSM/GPRS Quad-Bands (850/900/1800/1900 MHz) connectivity in a M2M application.

Entirely dedicated to the embedded computer services, the modem **GenPro 16e** combines GSM/GPRS functions in one single compact metal casing, adapted for the embedded sector, and is a robust, reliable and long-life product.

The modem **GenPro 16e** is Quad-Bands GSM 850/EGSM 900/DCS 1800/PCS 1900 MHz and GPRS multi slot Class 10.

This document describes the modem and provides the following information:

- General presentation,
- Functional description,
- Available basic services,
- Installation and use of the modem (first level),
- Trouble shooting,
- Recommended accessories for the use of the modem.
- Options, contact us

For more information about this document, ERCO & GENER puts at your disposal the following elements:

- Commands List U-blox_AT_Commands_Manual_(WLS-SW-11000)-x
- Application Note EG_GenPro16e_1055_AN_xxx_yy
- Client support (Hot-Line)

Warning

- **ERCO & GENER** recommends to read carefully all documents about the product **GenPro 16e** (User Guide, Application notes, Command List).
 - **ERCO & GENER** cannot be held responsible for:
 - The problems due to an inappropriate use of the **GenPro 16e**.
 - The problems due to a wrong configuration
 - The problems due to a wrong use of an embedded software application developed or supplied by a third party.
 - The dysfunctions due to the absence or a bad coverage of the GSM, GPRS networks.
 - The dysfunctions if the product is used for the watching of physical persons where human life is engaged.
 - **ERCO & GENER** reserves the right to modify the functions of its product "**GenPro 16e**" without previous notice.
- To avoid any risk of electrocution, do not open the casing.
- For any functioning, the casing must be closed.
- No internal part can be repaired by the user. The **GenPro 16e** must be returned to the factory for any repair.
- The **GenPro 16e** must be placed in a normally ventilated area, out of sources of heat.
- In order to guarantee the electromagnetic compatibility, the length of the serial cable, the power supply cable, and the inputs/outputs cable must not exceed 3 meters.
- The **GenPro 16e** must not be connected directly to the mains supply; a voltage adapter must be used.



This product complies with the European Directive 2002/96/CE.

SCRAP THIS PRODUCT ACCORDING TO THE CORRESPONDING LOCAL REGULATIONS REGARDING RECYCLING NON DANGEROUS FOR THE ENVIRONMENT.

Copyright

The reproduction, transfer, distribution or storage of part or the totality of the contents of this document, in any form, without the prior written authorization of **ERCO & GENER** is strictly prohibited.

GenPro 16e is a trademark of **ERCO & GENER**.

Hayes is a registered trademark of Hayes Microcomputer Product Inc. The names of products and companies mentioned in this document may be names or trademarks of their respective holders.

The use of some products or services described in this document may require a paying subscription. The availability of some products or services described in this document may change depending on the configurations and the materials.

In some countries, restrictions of use of the devices may be applied. For more information, thank you to contact your nearest legally qualified local government representative.

ERCO & GENER follows a method of continuous development. Consequently, **ERCO & GENER** reserves the right to change and improve any of its products described in this document, without notice.

The contents of this document are provided "as it is". Except for the applicable obligatory laws, no guarantee in any form, explicit or implicit, including but without being limited to it, the implicit guarantees of aptitude to marketing and of appropriateness to a particular use, is granted concerning the precision, the liability or the contents of this document. **ERCO & GENER** reserves the right to revise or withdraw this document at any time and without notice.

ERCO & GENER cannot be held responsible for any loss of data or income, as well as particular damage, incidental, consecutive or indirect.

1 References

1.1 Referred documents

Command List.....: U-blox_AT_Commands_Manual_(WLS-SW-11000)-x

Application Notes.....: EG_GenPro16e_1055_AN_xxx_yy

GSM reference documents:

- 3GPP TS 27.007
- 3GPP TS 27.005
- 3GPP TS 27.010
- u-blox AT command extension

1.2 Abbreviations

Abbreviations definition

AC	Alternative Current
ACM	Accumulated Call Meter
AMR	Adaptive Multi-Rate
AT	Attention (prefix for modem commands)
BTS	Base Transceiver Station
CLK	Clock
CMOS	Complementary Metal Oxide Semiconductor
CS	Coding Scheme
CTS	Clear To Send
dB	Decibel
dBc	Decibel relative to the Carrier power
dB_i	Decibel relative to an Isotropic radiator
dB_m	Decibel relative to one milliwatt
DC	Direct Current
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi-Frequency
DTR	Data Terminal Ready
EEPROM	Electrically Erasable Programmable Read-Only Memory
EFR	Enhanced Full Rate
EGM	Erco Gener Middleware
E-GSM	Extended GSM
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
ESD	ElectroStatic Discharges
ETSI	European Telecommunications Standards Institute
FIT	Series of connectors (micro-FIT)
FR	Full Rate
FTA	Full Type Approval
FTP	File Transfert Protocol
GCF	Global Certification Forum
GND	GrouND

GPIO	General Purpose Input Output
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile communications
HR	Half Rate
I	Input
IEC	International Electrotechnical Commission
IMEI	International Mobile Equipment Identification
I/O	Input / Output
LED	Light Emitting Diode
LLC	Low Level Command
MAX	MAXimum
ME	Mobile Equipment
MIC	MICrophone
Micro FIT	Family of connectors from Molex
MIN	MINimum
MNP	Microcom Networking Protocol
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
NOM	NOMinal
O	Output
Pa	Pascal (for speaker sound pressure measurements)
PBCCH	Packet Broadcast Control Channel
PC	Personal Computer
PCL	Power Control Level
PDP	Packet Data Protocol
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUK	Personal Unblocking Key
RF	Radio Frequency
RFI	Radio Frequency Interference
RI	Ring Indicator
RMS	Root Mean Square
RS232-C	Serial link V24
RTS	Request To Send
RX	Receive
SIM	Subscriber Identification Module
SMA	SubMiniature version A RF connector
SMB	SubMiniature version B RF connector
SMS	Short Message Service
SNR	Signal-to-Noise Ratio
SNTP	Simple Network Time Protocol
SPI	Serial Peripheral Interface
SPL	Sound Pressure Level
SPK	SpeaKer
SRAM	Static RAM
TCP/IP	Transmission Control Protocol / Internet Protocol
TDMA	Time Division Multiple Access
TU	Typical Urban fading profile
TUHigh	Typical Urban, High speed fading profile
TX	Transmit
TYP	TYPical
UTC	Universal Time Clock
VSWR	Voltage Stationary Wave Ratio
V24	Serial link RS232-C

1.3 Symbols

The following symbols are used to highlight the important information of this user guide.



A symbol for the essential information about the module integration and performance.



A warning symbol indicates the actions that could harm or damage the module

2 Packaging

2.1 Content

The GenPro 16e is supplied with:

- A cardboard packaging GenPro 16e,
- A modem GenPro 16e,
- Two fixing brackets,
- A 4-wire cable
Red/Black stripped with fuse 5x20 of 2.5A/250V
- A technical sheet (Instructions Sheet).



2.2 Packing case

The external dimensions of the modem packing case are:

- Width.....: 54.5 mm,
- Height.....: 68 mm,
- Length.....: 108 mm.

An identification label is put on the box. It shows:

- The logo ERCO & GENER,
- The product reference: GenPro 16e,
- The CE mark,
- The IMEI barcode with 15 digits.

The dimensions of the label are:

- Height.....: 37 mm,
- Length.....: 70 mm.

2.3 Modem labels

On the standard modem, there are two labels placed on the back side of the modem:

- A production label shows the following information:
 - The CE mark,
 - The crossed wheelie-bin mark (DEEE standards),
 - The direct current mark (VDC),
 - The IMEI barcode with 15 digits.
- A label with the marks: ROHS (2002/95/CE).

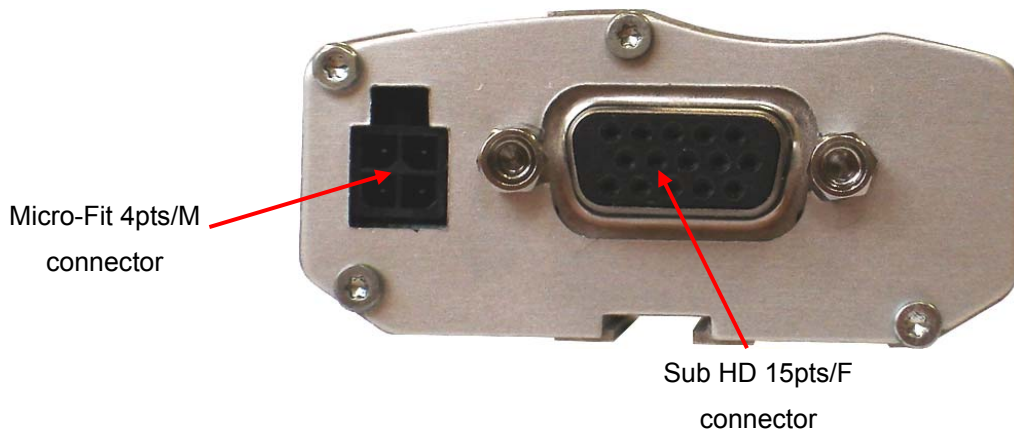


3 General presentation

3.1 Description

Description of the modem GenPro 16e:

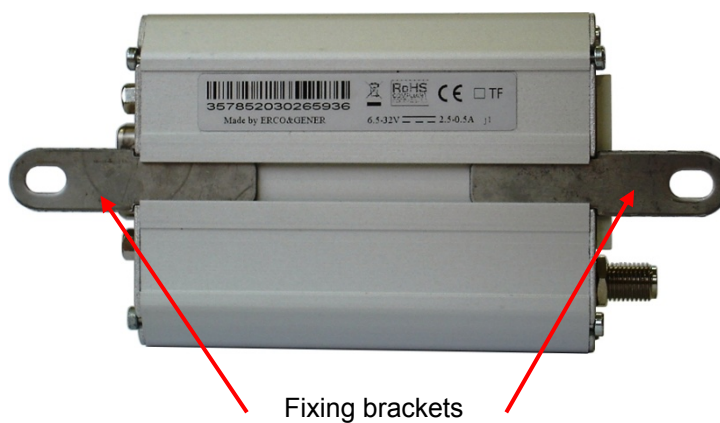
3.1.1 Front side



3.1.2 Back side



3.1.3 Two brackets to fix the modem on a support.



3.2 External connections

3.2.1 Connections

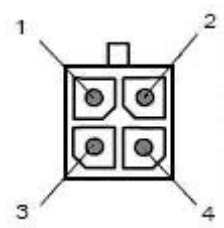
3.2.1.1 Antenna connectors

The GSM antenna connector is SMA female with a 50Ω impedance.

3.2.1.2 Micro FIT connectors

Connector Micro FIT Female with 4 male pins:

This connector of the GenPro 16e is used for the DC external power supply.



Pin N°	Signal
1	+V _{DC}
2	GND
3	Not connected
4	Not connected



The pins 3 and 4 are not used. The modem can be powered only via the pins 1 (+V_{DC}) and 2 (GND).

3.2.1.3 Connector Sub D HD 15-pin

The connector Sub D High Density 15 pins Female is used for:

- The RS232 serial link connection,
- The audio line connection (microphone and loudspeaker),
- The RESET signal.



Pin N°	Standard appellation	Circuit (V24 – RS232C)	I/O	Option	I/O
1	Signal detection	109 – DS – DCD	O		
2	Data transmission	103 – ED – TXD	I		
3	Not connected	-	-		
4	Microphone +	MICP	I		
5	Microphone -	MICN	I		
6	Data reception	104 – RD – RXD	O		
7	Data set ready	107 – PDP – DSR	O		
8	Data terminal ready	108/2 – TDP – DTR	I		
9	Signalization ground	102 – TS – GND	-		
10	Loudspeaker +	SPKP	O		
11	Ready to send	106 – PAE – CTS	O		
12	Request to send	105 – DPE – RTS	I		
13	Call indicator	125 – IA – RI	O	Power supply ⁽¹⁾ 3,8V / 100 mA	O
14	Reset	RESET	I		
15	Loudspeaker -	SPKN	O		

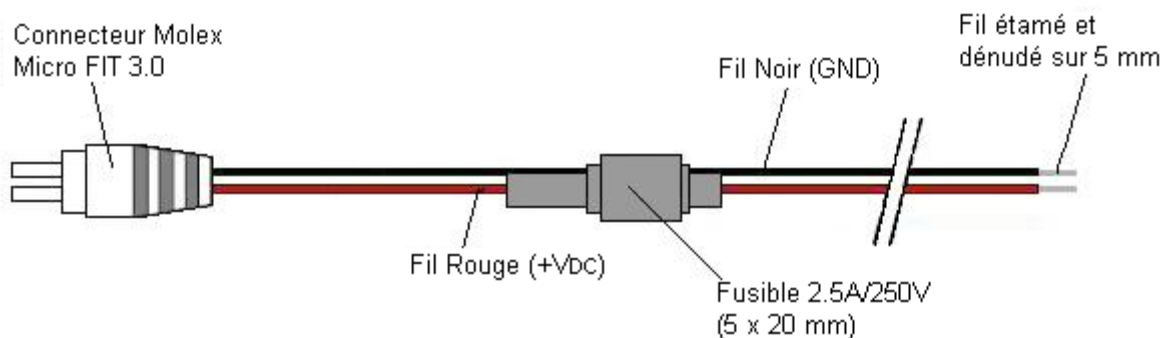


⁽¹⁾ As an option, the pin 13 is a fixed tension (to supply power to an accessory like GenBlue 15e) of 3,8V 100mA.

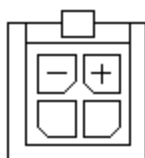
3.2.2 Cables

3.2.2.1 Cable micro FIT 4-wire

The 2-wire micro FIT cable allows to supply power to the modem.



Vue de côté du cordon



Component	Characteristics
Micro FIT 4-pin connector	
Cable	Length ≈ 1.5m
Wire	Tinned copper 24 x 0.2 mm Section : 0.75 mm ²
Fuse	F2.5A L250V

4 Characteristics and Services

The **GenPro 16e** is:

A modem GSM/GPRS class 10 dedicated to the transmission of binary data in asynchronous, SMS, Voice, and Fax Group 3 Class 2.0.

The characteristics of the modem and the available services are summarized in the table below.

GSM functions

- Quad-Bands GSM 850/EGSM 900/DCS 1800/PCS 1900 MHz
- ETSI GSM Phase 2+ Class 4 (2W @ 850 / 900 MHz - 33 dBm)
 Class 1 (1W @ 1800 / 1900 MHz - 30 dBm)
- SIM Toolkit

VOICE functions

- Voice (GSM mode)
- Telephony, Emergency call 112
- Full Rate, Enhanced Full Rate, Half Rate and AMR (FR/EFR/HF/AMR)
- Echo cancelation and noise reduction
- Full Duplex Free-hand

DATA functions

- GPRS Class 10 (Up to 4Rx / 2Tx)
- PBCCH/PCCCH supported, Coding schemes : CS1 to CS4
- TCP/IP libraries (UDP Socket*, TCP*)
- CSD 9600 kbs (Max.)
- SMS Text, PDU, point to point MT/MO and SMS Cell Broadcast

Interfaces

- GSM antenna: connector SMA female
- Power supply : $+6.5 \leq +V_{DC} \leq +32$ VDC (micro-FIT connector)
- RS232 (2 400 to 115 200 bds (autoauding)) + Audio through the Sub-D 15 points female
- AT commands: 3GPP TS 27.007 / 27.005 / 27.010
- SIM reader (SIM 3V – 1,8V)

Accessories supplied

- Fixing brackets (x2)
- Cables Micro FIT 2-wire (Power supply)

Options / Additional accessories *

External auto-supply via the pin RI

- GenBlue 15e : Adapter Bluetooth® / RS232 auto-powered
- Accessories: Antennas, cables, power supply... (consult our website)

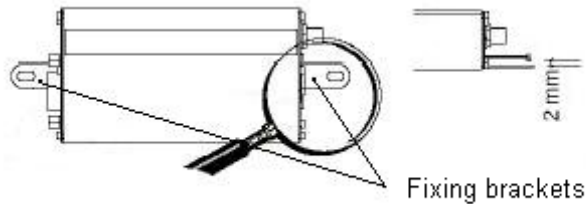
* contact us

5 Use of the modem

5.1 Starting with the modem

5.1.1 Assembly of the modem

To place the modem on a support, use the fixing brackets as indicated on the scheme below.



- Must be fixed on a flat surface plate.
- Max. height of the screw head : 2 mm.



The aluminium casing of the modem is connected to the 0V (GND) of the power supply and to the 0V of the RS232 serial link. To avoid any risk of conduction of the ground plane towards other equipments, the modem must be electrically insulated from its mechanical support.

5.1.2 Installation of the modem

To install the modem, it is recommended to do the following operations with the modem turned OFF:

- Remove the SIM card cover on the back side.
- Carefully insert the SIM card in the reader.



- Push the SIM card until hearing a "clic" that ensures its correct positioning.
- Put the SIM cover back.
- Connect the GSM antenna to the SMA female connector.
- For the connection to the DTE, connect the V24 link via the cable Sub HD 15-pin.
- Connect the power supply cable to the continuous and regulated external power source (for a vehicle application, see § 5.2 Specific recommendations for the use of the modem in vehicles).
- Connect the power supply cable to the modem and turn ON the external power source.

The modem is now ready.

5.1.3 Verification of the communication with the modem

Use a communication software like Windows HyperTerminal®.

Set the COM port of the DTE as follows:

- Bits per second : 115200 bps,
- Data Bits : 8,
- Parity..... : None,
- Stop Bits : 1,
- Flow control : material.

After that, send the command `ATI` in the window under HyperTerminal, the modem must reply

LEON-G100-06S-00

OK

Possible status of the Led:

- OFF if there is no SIM card or if the modem is not attached to the network,
- Flashing if the modem is attached to the network

In the case where no communication can be established with the modem:

- Check the RS232 connection between the DTE and the modem (DCE),
- Check the configuration of the COM port of the DTE.

5.1.4 Example of AT commands

Example of AT commands that can be sent once the communication with the Modem is validated:

- **AT+CGSN**: the response of the modem must be a 15-digit number (starting by "35785203xxxxxx") when the serial link is correct.
- **AT+CPIN="xxxx"**: enter the code of the SIM card xxxx (if activated).
- **AT+CSQ**: check the reception level of the GSM signal received.
- **AT+CREG ?**: check the registration of the modem on the network.

5.1.4.1 Example of voice communication

- **ATD<telephone number>;** : to launch a voice call.
- **ATH** : hang-up (end of call).

5.2 Specific recommendations for the use of the modem in vehicles



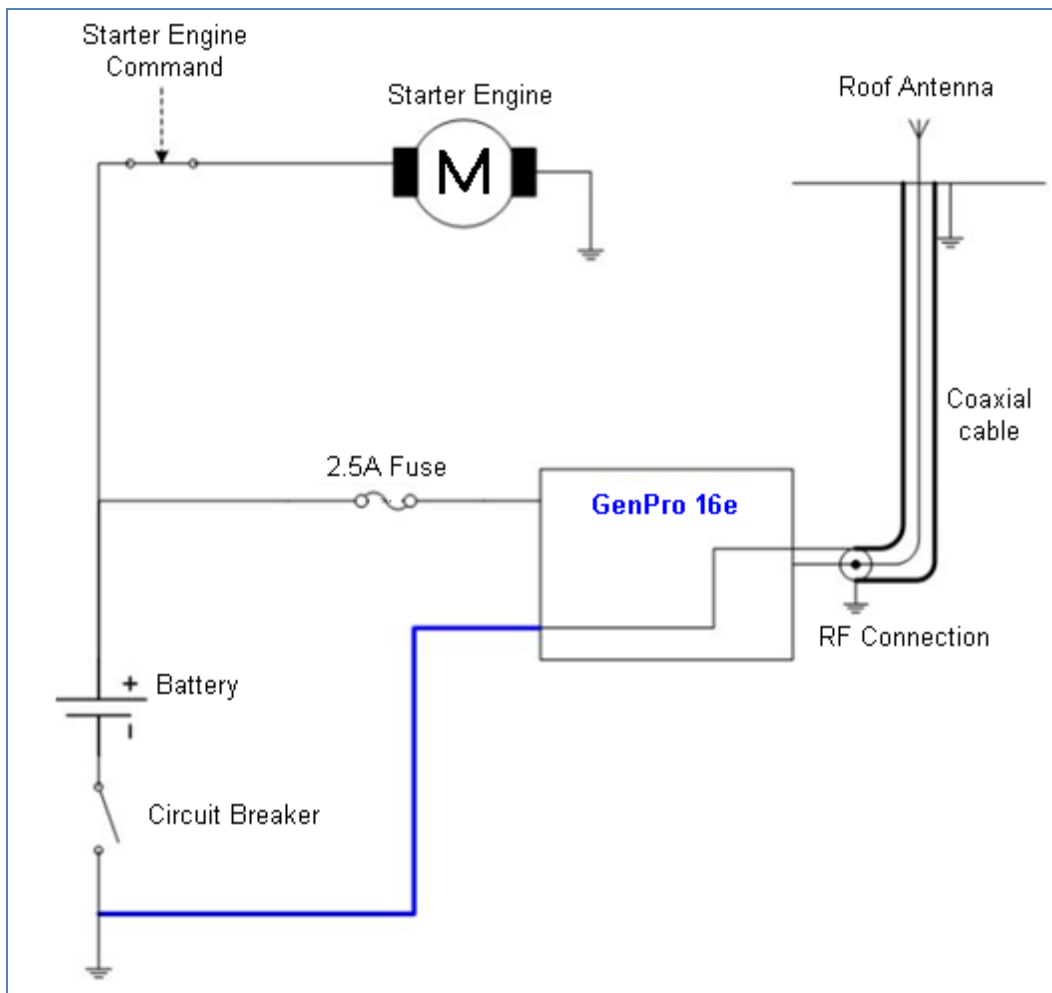
The power supply connector of the modem GenPro 16e must **NOT** be connected directly to the battery of the vehicle.

5.2.1 Recommended connection on the battery of a truck

All trucks have a Circuit Breaker outside the cabin. The circuit breaker is used for security reasons: for example, if a fire breaks out in the electric box of the truck, the driver can cut off the power source and avoid more damage (explosion).

The circuit breaker is connected to the ground of the truck, usually connected to the fuse box.

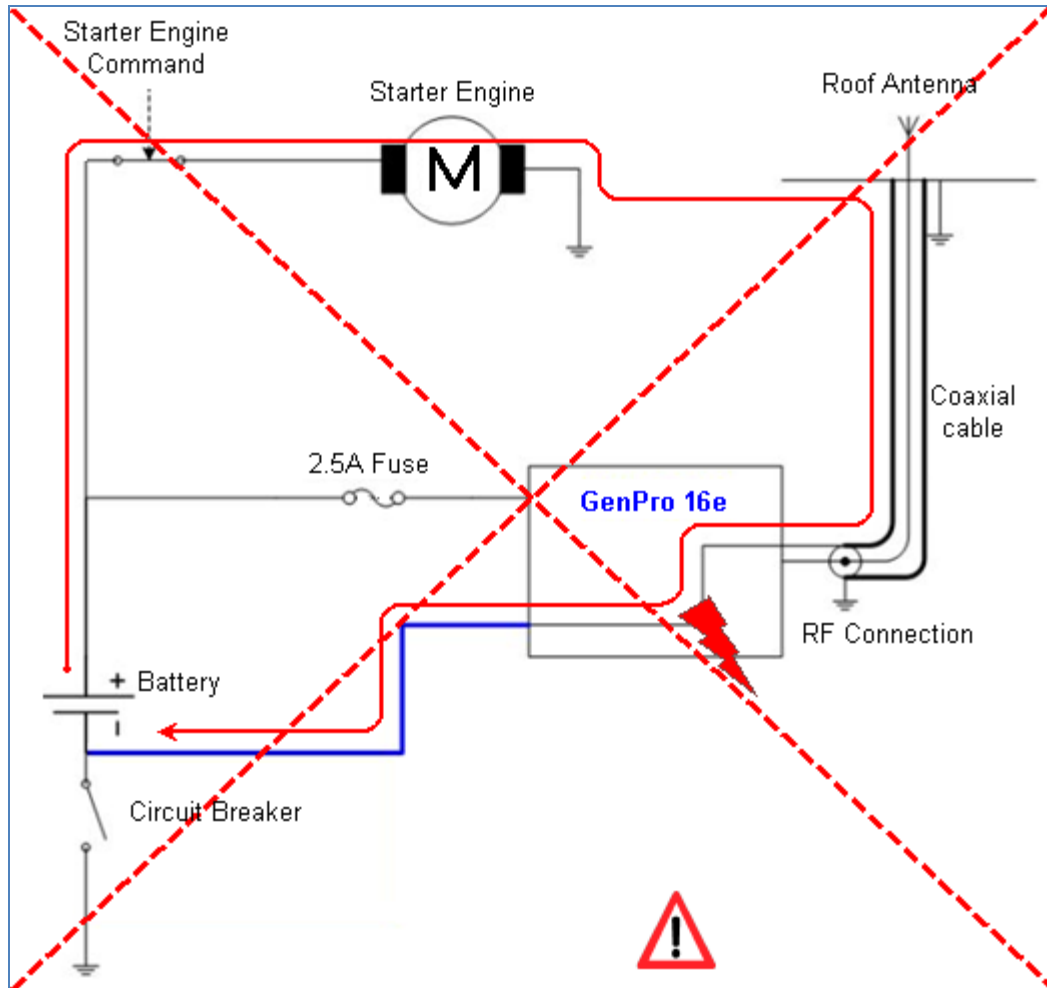
Most of truck circuit breakers do not cut off the PLUS of the battery, but cut off the ground.



The scheme above shows a recommended power connection where the connection of the modem ground is not directly connected to the battery, but connected after the circuit breaker (to the ground of the truck or in the fuse box).

5.2.2 Technical constraints of trucks

It is highly recommended **NOT** to connect the modem supply directly to the battery but to the circuit breaker. Otherwise the modem can be damaged when the truck is starting up if the circuit breaker is closed (in this case, the ground of the truck and the ground of the battery will be connected via the modem as described in the scheme below).



Example of **forbidden** electrical connection (risk of damage on the modem)

The scheme above shows an example of electrical connection that could damage the modem due to the fact that the ground connection is directly connected to the battery ground.

In fact in this example, when the circuit breaker is open, the current escapes via the modem and the electrical circuits of the truck (the dashboard for example). And when the motor's starter is used, it will destroy the cables or the modem.

Moreover, the internal circuits of the modem are not designed to resist to a current of 60 A (when starting the truck), or they would be destroyed.

5.3 LEDs of the modem

The status of the GSM module is indicated by the status of the GSM YELLOW LED situated on the back side of the modem. (see § 3.1 Description).



The command AT+UGPIOC=20,2 must have been previously entered.

GSM LED status	LED activity	GSM status
OFF	OFF	The module is not activated or OFF.
LED flashing	0.1s ON / 2s OFF	The module is attached to the GSM/GPRS network.
ON	ON	The module is in GSM/GPRS communication.

5.4 Echo function of AT commands deactivated

If no echo is returned when entering an AT command, it means that:

- The "local echo" of your communication software (like Hyperterminal) is not activated,
- The echo function of the modem has been deactivated.

The echo function can be configured with the command **ATEn**. It requires a backup with the command **AT&W**.

To activate the echo function of the modem, enter the command **ATE1**.

When sending AT commands to the modem using a communication software, it is recommended to:

- Deactivate the "local echo" parameter in your communication software (like Hyperterminal),
- Activate the echo function of the modem (the command **ATE1**).

For a Machine to Machine communication with the modem, it is recommended to deactivate the echo function of the modem (the command **ATE0**) in order to avoid the CPU receiving redundant responses.

For more information, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".

5.5 Checking the quality of the GSM reception signal

The modem will be able to make a call only if the received GSM signal is powerful enough.

The command **AT+CSQ** allows to know the reception level (*rssl*) of the signal sent by the closest GSM Base Transceiver Station (BTS), as well as the reception error code (*ber*).

When the SIM card is inserted and the PIN code entered, the command **AT+CSQ** allows to know the measure of the signal coming from the BTS of the subscribed operator network.



Without SIM card, the modem returns the message **ERROR**.

To check the quality of the GSM signal, do the following operations:

With a communication software like Hyperterminal, enter the command **AT+CSQ**.

The response is in the following format:

+CSQ : *<rssl>*, *<ber>* with:

<rssl> = indicates the reception level,

<ber> = receive bit error rate.

Check the answered value *<rssl>* with the help of the table below.

<i><rssl></i> value	Gain in dbm	Interpretation	<i><ber></i> value	Interpretation
0	-113 dbm	Insufficient	0 to 7	See standards ETSI GSM 05.08
1 to 10	-111 to -95 dbm	Insufficient		
11 to 30	-93 to -53 dbm	Sufficient		
31 (max)	-51dbm	Perfect		
99		Unknown/not detectable	99	Unknown/not detectable

The GSM modem works normally with a minimum *<rssl>* between 11 and 15.



Bellow 10, the signal level is insufficient; the modem cannot work depending on the geographical situation or the vehicle mobility. Above 15, the signal is sufficient.

For more information, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".

5.6 Verification of the PIN code

The PIN code is essential in order to make a call or to accept a response coming from the GSM network. This code is held in the SIM card and can be modified by the user.

To check that the PIN code has been previously entered, use a communication software like Hyperterminal, and enter the command **AT+CPIN?**

The table below shows the main responses given by the modem:

Command	Response	Interpretation
AT+CPIN?	+CPIN : ERROR	The SIM card is absent or not recognized
	+CPIN : READY	The PIN code is correct
	+CPIN : SIM PIN	The PIN code is wrong or not entered yet
	+CPIN : SIM PUK	The PUK code is required
	+CPIN : SIM PIN2	The PIN code 2 is wrong or not entered yet
	+CPIN : SIM PUK2	The PUK code 2 is required

For more information, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".



The command AT + UPINCNT allows to know the number of attempts remaining

5.7 Verification of the modem registration on the network

1. Ensure that a valid SIM card has been inserted in the SIM card reader of the modem.
2. Using a communication software like Hyperterminal, enter the following AT commands:
 - a. *AT+CPIN="xxxx"* to enter the PIN code. The user has only 3 attempts to enter the PIN code. After the third attempt, only a second code (PUK code) supplied by the operator, will allow you to chose a new PIN code.

5.7.1 GSM network

b. *AT+CREG?* to check the registration status on the network. The response will be of the following format: *+CREG : <mode>, <stat>* with:

<Mode> = configuration of registration message not solicited,

<Stat> = registration status.

3. Check the registration status according to the value given in the table below.

Command	Response	Interpretation
AT+CREG?	<i>+CREG : 0,0</i>	Modem not recognized by the network.
	<i>+CREG : 0,1</i>	Modem attached in GSM to the local operator.
	<i>+CREG : 0,2</i>	Modem searching for a network operator.
	<i>+CREG : 0,3</i>	Registration denied.
	<i>+CREG : 0,4</i>	Unknown.
	<i>+CREG : 0,5</i>	Modem attached in GSM to the roaming operator.

For more information, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".

5.7.2 GPRS network

b. *AT+CGREG?* Check the registration status on the network. The response is on the following format: *+CGREG : <mode>, <stat>* with:

<Mode> = configuration of registration message not solicited,

<Stat> = Registration status.

3. Check the registration status according to the value given in the following table.

Command	Response	Interpretation
AT+CGREG?	<i>+CGREG: 0,0</i>	Modem not recognized by the network.
	<i>+CGREG: 0,1</i>	Modem attached in GPRS to the local operator.
	<i>+CGREG: 0,2</i>	Modem searching for a network operator.
	<i>+CGREG: 0,3</i>	Registration denied.
	<i>+CGREG: 0,4</i>	Unknown.
	<i>+CGREG: 0,5</i>	Modem attached in GPRS to the roaming operator.

For more information, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".

If the modem is not registered: check either the connection between the modem and the antenna or the reception level of the signal (see § 5.5 Checking the quality of the GSM reception signal).

For more information, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".

5.8 Save settings

To save the settings it is necessary to comply with the following procedure:

- Configure the device as desired
- Send the command AT&W, and wait for the OK to return
- Send the command AT+CFUN = 16 and wait for the OK to return.

From that moment on, the settings are saved.

5.9 Main AT commands (HAYES)

The table below shows the main AT commands necessary for the control of the modem.

Other AT commands are available, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".

Table: Main AT commands used with the modem.

Description	AT command	Response	Interpretation
Enter the PIN code	AT+CPIN="xxxx"	OK	PIN code accepted
	(xxxx = PIN code)	+CME ERROR: 16	PIN code incorrect (1*)
		+CME ERROR: 3	PIN code already entered (1*)
Verification of registration on network	AT+CREG?	+CREG : 0,1	The modem is attached in GSM to the local operator.
		+CREG : 0,5	The modem is attached in GSM to the roaming operator.
		+CREG : 0,2	The modem is searching for a network operator.
		+CREG : 0,0 or 0,3	The modem is not recognized by the network.
Reception of an incoming call (2*)	ATA	OK	Answer to the call
Make an outgoing call	ATD< telephone number >;	OK	Communication established
	(the ; at the end of the string is important, it allows to make a voice call)	+CME ERROR: 11	PIN code not entered
		+CME ERROR: 3	The credit has run out or a communication has already been established.
Make an emergency call (112)	ATD112;	OK	Communication established
Communication lost		NO CARRIER	
Hang-up	ATH	OK	

(1*) with **+CMEE=1**. The command **AT+CMEE=1** allows the display of extended error codes.

(2*) with **+CRC=1**. The command **AT+CRC=1** allows, in the case of an incoming call, the display of an extended message that indicates the kind of channel called. This message corresponds to the type of number called: voice or data.

Examples:

If the VOICE number is called, the modem returns: +CRING : VOICE

If the DATA number is called, the modem returns: +CRING : REL ASYNC

5.10 Turning OFF the modem

It is strongly advised to un-register from the network with the command AT+COPS=2.

5.11 Modem updating procedure

To be able to benefit from the latest functions of the GenPro 16e, an updating procedure can be used to upgrade the software program in the modem.

This procedure consists in downloading the software into the internal Flash memory of the modem via the RS232 link available on the Sub HD 15-pin connector.

Contact us for the software update.

6 Trouble Shooting

This section of the document describes the problems that may be encountered when using the modem.

6.1 Problem of communication between the modem and the RS232 link (V24)

If the modem does not respond to the AT commands via the RS232 link, see the table below for the possible causes and the solutions.

Table: Solutions when there is no dialogue between the modem and the RS232 link

If the modem...	Check:	Action
Returns nothing	Is the modem correctly powered?	Ensure that the modem is connected to an external regulated power source and supplies a voltage from 5.5V to 32V (§ 8.2 Electrical characteristics).
	Is the serial cable connected at both ends (PC and Modem)?	Check the connection of the serial cable.
	Is the serial cable correctly cabled according to § 3.2.1.3 Connector Sub D HD 15-pin	Connect the serial cable according to the table of § 3.2.1.3 Connector Sub D HD 15-pin
Returns nothing or random characters	Is the communication terminal correctly configured on the PC?	Ensure that the configuration of the communication terminal complies with the one of the modem. Factory configuration of the modem: Speed = 115 200 bps Data Bits = 8 Parity = none Stop Bits = 1 Flow control = hardware
	Is there another application used, creating a conflict during the access to the communication port?	Close the conflicting application.
	Is the modem without echo and without reporting?	Send the command ATE1Q0 followed by AT&W if a backup is necessary.

6.2 "ERROR" message

The modem returns an "ERROR" message (in response to an AT command) in the following cases:

- The COM port is not directed towards the modem **GenPro 16e** but towards another modem. Enter **ATI**, the response must be **LEON-G100-06S-00...** Any other response indicates a dialog with another modem. In this case, check the COM port used in HyperTerminal.
- The syntax of the AT command is incorrect: check it (see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x").
- The syntax of the AT command is correct, but transmitted with wrong parameters:
 - Enter the command **AT+CMEE=1** to obtain an error message with its error code instead of the simple message "ERROR",
 - Enter again the **AT** command which previously caused the reception of the message "ERROR" in order to obtain the error code.

In case of an error code obtained, the response of the modem can be on the following format:

+CME ERROR : < error code >

For more information about the error codes returned after having sent the command **AT+CMEE**, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".



It is strongly recommended to systematically allow the modem to return the extended error codes (enter the command **AT+CMEE=1**).

6.3 "NO CARRIER" message

If the modem returns the message "NO CARRIER" after an attempted call (voice or data), check the table below for the possible causes and the solutions.

Table: Solutions when a message "NO CARRIER " is returned

If the modem...	Check:	Action
"NO CARRIER"	Is the received GSM signal strong enough?	See the § 5.5 Checking the quality of the GSM reception signal, to check the quality of the received signal.
	Is the modem registered on the network?	See the § 5.7 Verification of the modem registration, to check its registration.
	Is the antenna correctly connected?	See the § 8.2.6.2 GSM external antenna.
"NO CARRIER" (when attempting a VOICE communication)	Has the semi-colon (;) been entered immediately after the telephone number in the AT command?	Ensure that the semi-colon (;) has been entered immediately after the telephone number in the AT command. For example: ATD0123456789;
"NO CARRIER" (when attempting a DATA communication)	Is the SIM card configured for data calls?	Ensure that the SIM card is allowed to make data calls (Check with your SIM card supplier)
	Is the selected modulation supported by the called number?	Ensure that the selected modulation is supported by the called number.
	Is the selected modulation supported by the network?	Ensure that the selected modulation is supported by the network. If not, select a modulation compatible with the command <i>AT+CBST=0,0,1</i> (1*)

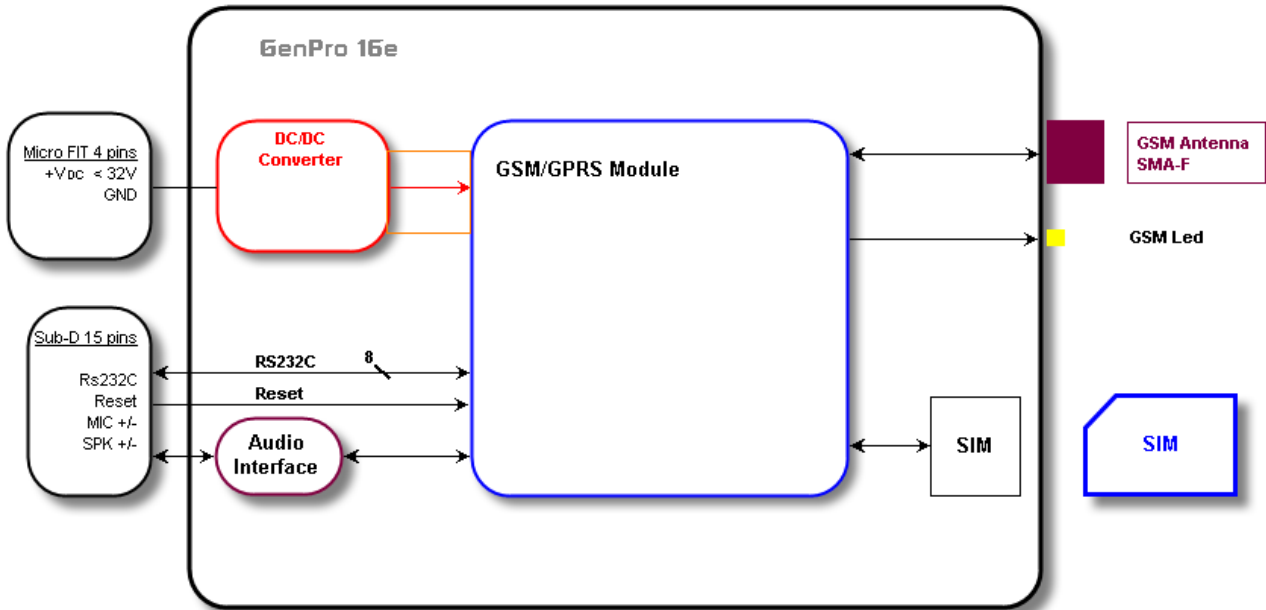
(1*) For more information about this AT command, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".

If the modem sends a message "NO CARRIER", you can obtain the extended error code with the command *AT+CEER*.

For more information about the error codes returned after having sent the command *AT+CEER*, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x".

7 Functional description

7.1 Architecture



7.2 Power supply

7.2.1 General presentation

The modem must be powered by an external DC voltage ($+V_{DC}$) between:

Standard $+6.5V \leq +V_{DC} \leq +32V$

The regulation of the modem's power supply is made with a DC/DC internal converter in order to supply all the necessary internal DC voltages.

7.2.2 Protections of the power supply

The modem is protected by a fuse F2.5 A / L250 V.

The modem is also internally protected against voltage peaks of more than 32 V.

Filter guarantees: According to CE certification.

7.3 RS232 serial link

7.3.1 General presentation

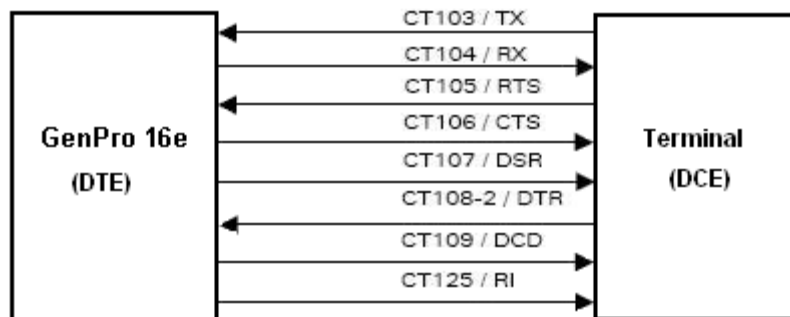
The RS232 interface realizes the adaptation of tension levels (V24/CMOS ↔ V24/V28) between the GSM/GPRS module (DCE) and a communication Port of a PC (DTE).

The RS232 interface is internally protected (ESD protection) against electrostatic peaks coming from the RS232.

Filter guarantees: According to CE certification.

The signals available on the RS232 serial link are:

- TX data (CT103/TX): Data transmission,
- RX data (CT104/RX): Data reception,
- Request To Send (CT105/RTS): Request to send,
- Clear To Send (CT106/CTS): Ready to send,
- Data Terminal Ready (CT108-2/DTR): Data terminal ready,
- Data Set Ready (CT107/DSR): Data set ready,
- Data Carrier Detect (CT109/DCD): Signal detection (optional),
- Ring Indicator (CT125/RI) / 3.8V: Call indicator.



Normalized signals of a RS232 serial link

The RS232 interface was designed to allow a certain flexibility in the use of the signals of the serial interface. Indeed, after the setting (see command **AT+IFC**), the modem can work in 3-wire mode (using only the signals TX, RX, GND), but the use of the signals TX, RX, GND, CTS, RTS is compulsory for a GPRS application, which is not the case for the signals DTR, DSR, DCD and RI which may be not used.

7.3.2 Pins description

Signal	Connector Sub HD Pin N°	I/O	Standards RS232	Description
CTXD/CT103	2	I	TX	Transmit serial data
CRXD/CT104	6	O	RX	Receive serial data
CRTS/CT105	12	I	RTS	Request To Send
CCTS/CT106	11	O	CTS	Clear To Send
CDSR/CT107	7	O	DSR	Data Set Ready
CDTR/CT108-2	8	I	DTR	Data Terminal Ready
CDCD/CT109	1	O	DCD	Data Carrier Detect
CRI/CT125	13	O	RI	Ring Indicator
CT102/GND	9		GND	Ground

7.4 RESET

7.4.1 General presentation

This signal is used to:

- In input, to make a Hardware RESET of the modem. Indeed, this pin is used to force a RESET of the modem, by keeping a low level during at least 50 ms.
- In output, it indicates that the modem is in Power Off mode or is under a Reset process.

This signal must be used only in case of emergency RESET.

This signal must be driven with an open collector assembly:

- pin 14 (RESET) at 0, for Modem Reset,
- pin 14 (RESET) at 1, for normal mode.

Pin description

Signal	Connector Sub HD Pins N°	I/O	Type I/O	Description
RESET	14	I/O		Reset Modem



- This signal must be used only in case of emergency RESET. A Software RESET is always preferable than a Hardware RESET. It is strongly unadvised to use this function during a communication or a dialogue, without having previously detached it from the operator network.
- In all cases, the use of the RESET does not restore the factory parameters.



For more information about the Software RESET, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x" in § 5.9 Turning OFF the modem and detaching it properly from the network operator.

7.4.2 RESET sequence

To activate the emergency RESET sequence, the RESET signal must be kept downwards during at least 50 ms.

As soon as the modem did the RESET,

- The signal goes upwards once the modem has finished its reset sequence.
- If a SIM card is inserted inside the modem, you must wait for the end of its initialization before accessing it again.



In all cases, the use of the RESET does not restore the factory parameters.

7.5 Audio

The audio interface is standard to connect an equipment like a telephone handset.

The echo cancelation (see command **AT+UMGC**) and noise reduction features are also available to improve the audio quality in the case of free-hand applications.

The audio interface is standard to connect an equipment like a telephone handset (the command **AT+USPM** allows the selection of the Handset, see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x").

ERCO & GENER advises the following cable DATA/AUDIO Sub D 9pts Fem / Sub HD 15pts Male / RJ9 (order code 4404000205) and the telephone handset (order code 3153400000).

Designation	SUBD 9 F	SUBD 15 M-HD
DCD	1	1
RXD	2	6
TXD	3	2
DTR	4	8
GND	5	9
DSR	6	7
RTS	7	12
CTS	8	11
RI	9	13
	RJ9	
Micro +	1	4
Speaker +	2	10
Speaker -	3	15
Micro -	4	5

7.5.1 Microphone inputs

The microphone inputs are assembled in differential to reduce the noise in common mode and the TDMA noise.

They include the functionality for a microphone like Electret (0.5 mA and 2 Volts) and they are ESD protected. This Electret microphone can be directly connected to these inputs allowing an easy connection to a telephone handset.

The main electrical characteristics required for the Electret condenser microphone are:

An output impedance of 2,2 kΩ to 1 kHz maximum

A maximum voltage of 2 V

The gain of the microphone inputs is internally adjusted by a differential amplifier and can be adjusted with the commands **AT+USGC**, **AT+UDBF**, **AT+USTN** (see the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x").

Pin description

Signal	Connector Sub HD Pins N°	I/O	Type I/O	Description
MICP	4	I	Analog	Positive input of Microphone
MICN	5	I	Analog	Negative input of Microphone

7.5.2 Loudspeaker outputs (Speaker)

The outputs are assembled in differential to reduce the noise in common mode and the TDMA noise.

These outputs can be directly connected to a loudspeaker.

Pin description

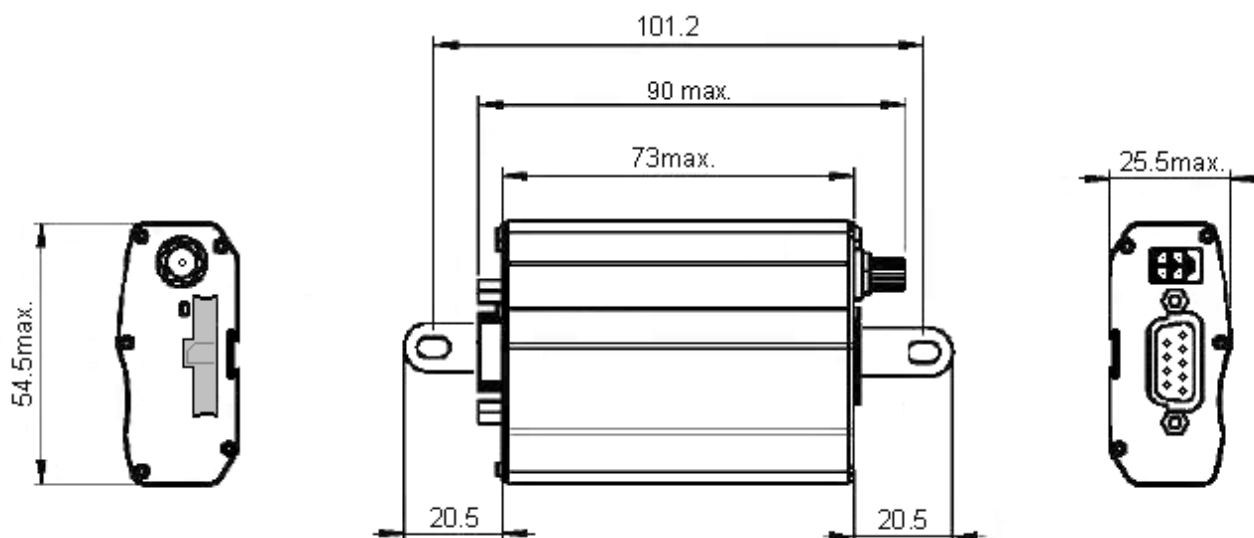
Signal	Connector Sub HD Pins N°	I/O	Type I/O	Description
SPKP	10	S	Analog	Positive output of loudspeaker
SPKN	15	S	Analog	Negative output of loudspeaker

8 Technical characteristics

8.1 Mechanical characteristics

Dimensions	73 x 54.5 x 25.5 mm (excluding connectors)
Complete dimensions	90 x 54.5 x 25.5 mm
Weight	≈ 81 grams (modem only) < 113 grams (modem + brackets + cables)
Volume	101.5 cm ³
Casing	Aluminium profile
Waterproof level	IP31

The illustration below shows the dimensions of the modem including the clearances necessary for the installation of the modem.



8.2 Electrical characteristics

8.2.1 Typical consumption

Table: Electrical characteristics

Power supply range	- 6.5V to 32V DC (GSM or DCS or GPRS)
Average consumption	- GSM 900 MHz...: 128 mA @ 12V in communication - GSM 1800 MHz.: 105 mA @ 12V in communication - Idle mode.....: 14 mA @ 12V



Once the power supply is connected, the modem is permanently consuming.

The following table describes the consequences of over-voltage and insufficient voltage on the modem.

Table: Effects of a power supply defect

	Then:
▪ Drop of voltage under 6.5V	▪ The functioning and the GSM and GPS communication are not guaranteed.
▪ Voltage above 32V (punctual peaks)	▪ The modem guarantees its own protection.
▪ Voltage above 32V (Continuous over-voltage)	▪ The modem is protected by the fuse (the modem is put in c.c. via a para surtensior internal varistance).

The following tables show the modem consumption.



The consumptions of the power supply may vary by 5% depending on the temperature range (-20 °C to +55 °C).

Table: Consumption of the GSM module @ 25 °C without RS232 connection

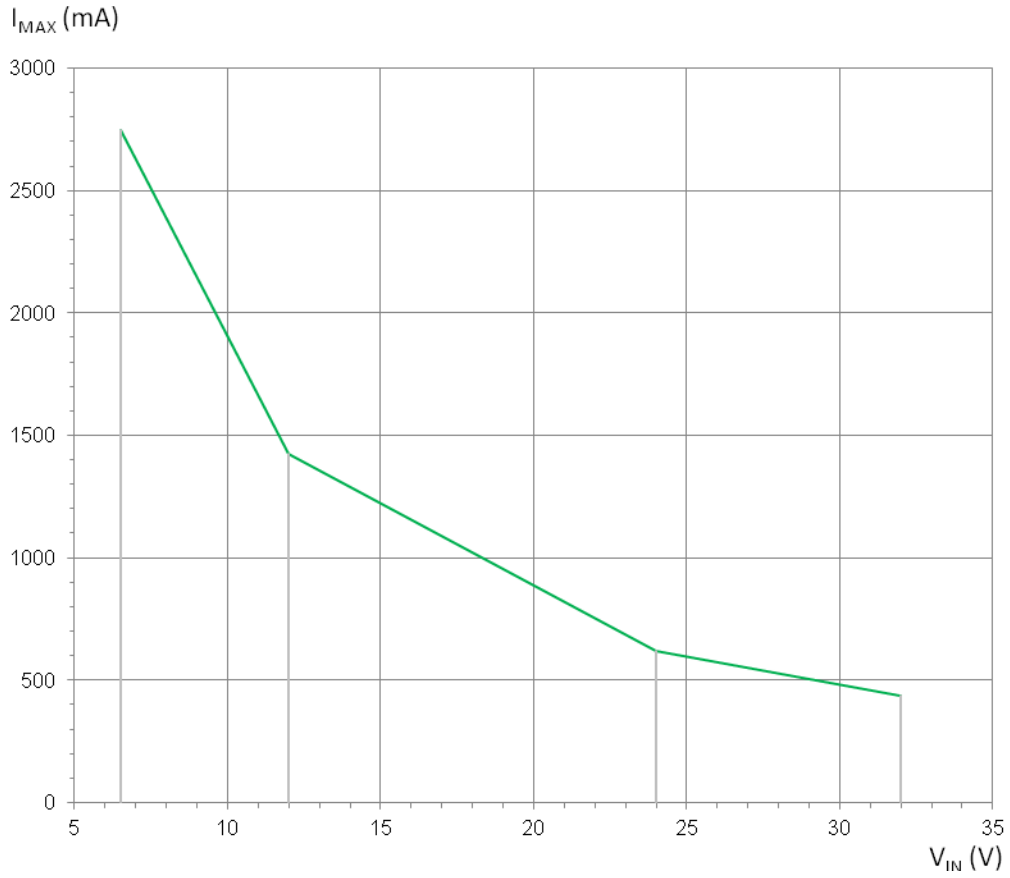
GSM module	Band	Mode	Average I Nominal				Unit.
			6.5	12	24	32	
V_{IN}							V
Weak Consumption	Power Off Mode		1,3	0,8	0,49	0,39	mA
	GSM/GPRS Power	@ DRX = 5	2,6	1,7	1	0,8	mA
	Saving (Idle) ⁽¹⁾	@ DRX = 9	2	1,3	0,77	0,62	mA
Current peak			2186	1066	504	375	mA
GSM ⁽²⁾	850 / 900 MHz (P = 32.2 dBm typ.)		213	116	60	47	mA
	1800 / 1900 MHz (P = 29.2 dBm typ.)		178	97	51	39	mA
GPRS⁽²⁾	850 MHz (P = 30.5 dBm typ.)		291	158	81	63	mA
	900 MHz (P = 30.5 dBm typ.)		248	135	70	54	mA
2 Tx + 3 Rx slots TBF	1800 MHz (P = 27.5 dBm typ.)		234	128	66	51	mA
	1900 MHz (P = 27.5 dBm typ.)		241	131	68	53	mA

⁽¹⁾ The module is attached to the network

⁽²⁾ The module transmits at its maximum power.

8.2.2 Consumption max

The scheme below indicates the maximum current peak. The power supply must be able to supply this current during the GSM "Bursts".



8.2.3 Audio interface

The audio interface is available through the connector Sub HD 15-pin, see the § 3.2.1.3 Connector Sub D HD 15-pin .



Main AT commands for the audio string drive.

- AT+UHFP: Hand Free Parameters
- AT+UMGC: Microphone Gain Control
- AT+USGC: Speaker Gain Control
- AT+USTN: Sidetone
- AT+USPM: Audio Path mode setting
- AT+USTN: Sidetone

8.2.3.1 Microphone

The microphone input is designed for a direct connection of the Electret condenser micro (for more details, see the command AT+USPM).



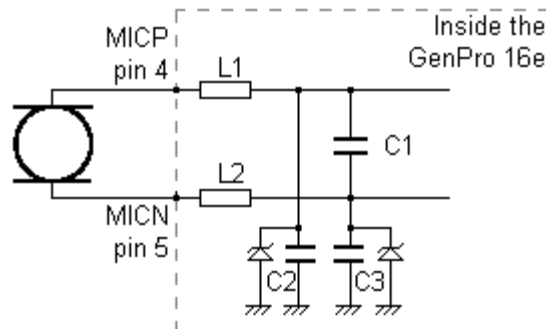
By default, the microphone input is active (pins MICP, MICN)

Characteristics of polarization for a dynamic Microphone

Micro Input	Parameter/Conditions	Min	Typ	Max	Units
Microphone supply open circuit voltage output	Provided by MICP with MICN.		2.2		V
Microphone supply current				2	mA
Microphone supply output resistance		2.85	3	3.15	kΩ
Microphone ground	MICN		0		V

Recommended characteristics for the dynamic Microphone

Micro Input	Parameter/Conditions	Min	Typ	Max	Units
Maximum Input Level Range	Full scale single-ended voltage. Signal applied to MICP with MICN as reference.			1.03	V _{PP}
Input Impedance – Mic(+) to Mic(-)	At 1 kHz. Impedance between MICP and MICN.		1.5		kΩ
Internal discrete high-pass -3dB cutoff frequency	Differential MIC		70		Hz



Component	Value
C1, C2, C3	CONDENSER 22pF
L1, L2	Inductance 82nH

8.2.3.2 Loudspeaker

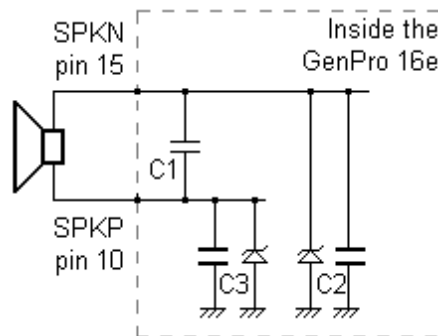


By default, the loudspeaker output is not active.
For more details, see the command AT+USPM. This output corresponds to SPK_P and SPK_N of the documentation.

Characteristics of the output for the loudspeaker

Speaker Output	Parameter/Conditions	Min	Typ	Max	Units
Maximum differential output voltage	Overdrive Gain stage = +9 dB		7.8		V _{PP}
Common mode output voltage			1.6		V
Output load resistance			8		Ω
Single-ended output load capacitance				10	nF
Inductive load				400	μH
Signal to noise	Load = 16 Ω, Gain stage = +0 dB, Input signal = 0 dBFS, Code 0, A-weighted	70	80		dB
Signal to distortion (THD)	Load = 8 Ω, 350 mW	50			dB
Power supply rejection	1 kHz	60			dB

If they not precised, the parameters are measured in the frequency band 20 Hz,...,20 kHz.



Component	Value
C1, C2, C3	CONDENSER 22pF

8.2.4 SIM interface

Table: Characteristics of the power supply voltage of the SIM card

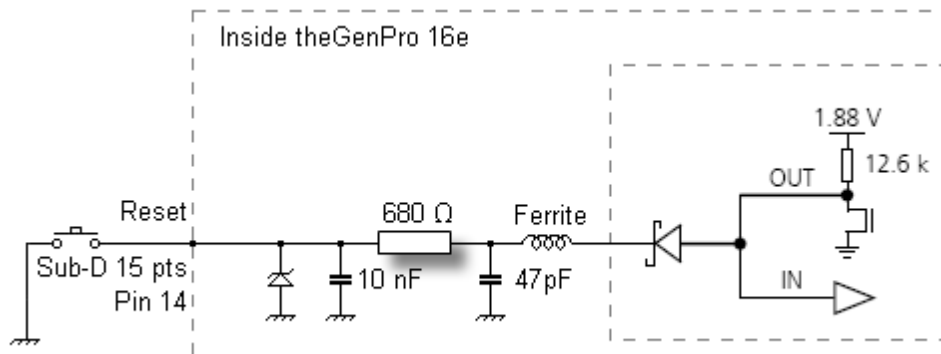
SIM card	3 V or 1.8 V
----------	--------------

8.2.5 RESET signal

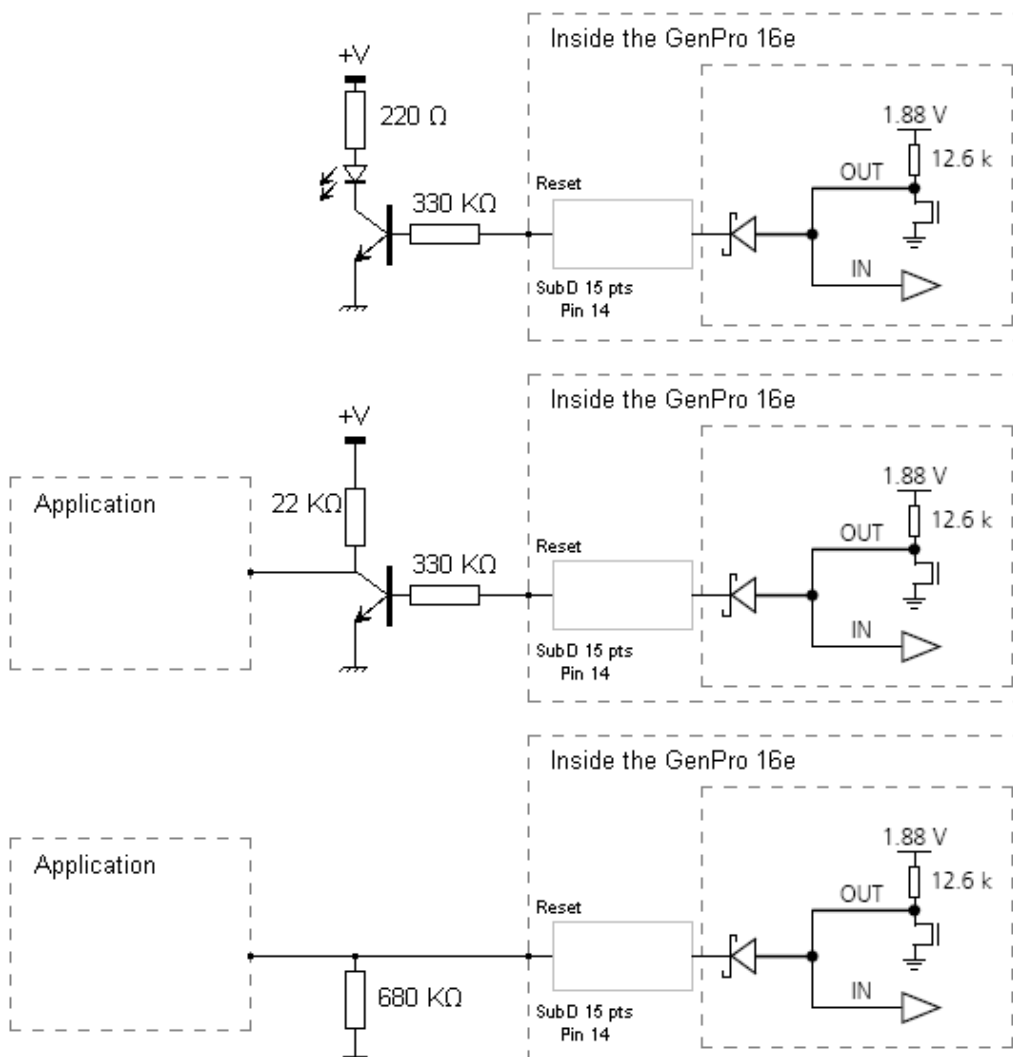
Table: Conditions of use

Parameters	Condition	Min.	Typ.	Max.	Unit
V_{IL}	Input Voltage – Low	-0.1		0.15	Vdc
V_{IH}	Input Voltage – High	1.6		4.5	Vdc
V_{OL}	Output Voltage – Low		0		Vdc
V_{OH}	Output Voltage – High		1.88		Vdc
I_{IL}	Input current - Low		-150		μA

Wiring scheme



Example of application



8.2.6 RF characteristics GSM/DCS

8.2.6.1 RF functioning

The RF functioning complies with the recommendation ETSI GSM Standard.

The RF performances for the receiver and the transmitter are described below.

Table: Parameters of the RF receiver and transmitter

Receiver	
Sensitivity in 850/900 @ 25 °C	- 110 dBm, GPRS Coding Scheme 1 (CS1)
Sensitivity in 1800/1900 @ 25 °C	- 109 dBm, GPRS Coding Scheme 1 (CS1)
Transmitter	
Maximum power (Power Class4 - 850/900) at room temperature	33 dBm +/- 2 dB @ antenna connection
Maximum power (Power Class1 - 1800/1900) at room temperature	30 dBm +/- 2 dB @ antenna connection

8.2.6.2 GSM external antenna

The GSM external antenna is connected to the modem via the connector SMA female.

The external antenna must comply with the characteristics described in the table below.

Table: Characteristics of the GSM external antenna

Frequency band	
GSM 900	880..960 MHz
GSM 1800	1710..1880 MHz
GSM 850	824..894 MHz
GSM 1900	1850..1990 MHz
Impedance	50 Ohms nominal
Input power	> 2 W peak
Gain	< 3 dBi
VSWR	< 2:1 recommended < 3:1 acceptable
Return Loss	S ₁₁ <-10 dB recommended S ₁₁ <-6 dB acceptable



See § 10 Recommended accessories, for the GSM antennas recommended by ERCO & GENER.

8.2.7 Characteristics of the serial link (UART)

Table: Characteristics of the UART

Characteristics	Symbols	Conditions	Min.	Typ.	Max.	Unit
Input Voltage – Range	V_{Input}	Input Voltage – Range	-25		+25	V_{dc}
Input Voltage – Low	V_{IL}	Input Voltage – Low	0.4	1.3		V_{dc}
Input Voltage – High	V_{IH}	Input Voltage – High		2	24	V_{dc}
Input Hysteresis	V_{Hys}	Input Hysteresis		0.14		V_{dc}
Input Resistance	R_{in}	Input Resistance	3	5	7	$K\Omega$
Output Voltage	V_{out}	All transmitter outputs loaded with 3 k Ω to ground	± 5	± 6.4		V_{dc}
Transmitter Output Resistance	R_{out}		300			Ω
RS-232 Output Short-Circuit Current	I_{cc}			± 15	± 60	mA

8.3 Environmental characteristics

To ensure a correct functioning of the modem, the specific limits described in the table below must be respected.

Table: Environmental characteristics

Operating temperature range	-20 °C to +60 °C
Storage temperature range	-40 °C to +85 °C
Operating humidity without condensation	HR < 70% @ +55°C
Atmospheric pressure	normal

8.4 Standards/Conformities

The product complies with the essential requirements:

- R&TTE 1999/5/EC Directive,
- EN301489-1:V1.8.1
- EN301489-7:V1.3.1
- §6.5, §6.6, §6.8 and §6.9 of the 2004/104/CE directive
- EN 301 511 v9.0.2
- EN 60950-1:2006 + A11:2009
- EN50385: 2002
- ROHS Compliant: Directive 2002/95/CE
- "REACH" N°1907/2006
- 2002/96/CE DEEE (Crossed-out wheelie bin).

The following mark appears under the device.



9 Security recommendations

9.1 General security

It is important to respect the specific regulations concerning the use of radio equipment, in particular with the possible risks of interference due to radio frequency (RF). Please respect carefully the following security advices.

Turn OFF your GSM modem:

- On an aircraft, the use of cellular telephones can endanger the plane operations; disturbing the cellular network is illegal. The non-observance of this instruction can lead to the suspension or the exclusion of the cellular telephone services, or even to a trial, or both,
- At a refueling station,
- In any area with a potential explosive atmosphere that could cause an explosion or a fire,
- In hospitals and other places where medical equipment may be used.

Restrictions of use of radio equipments in:

- Fuel warehouses,
- Chemical factories,
- Places where destruction operations are in the running,
- Other places where signs indicate that the use of cellular telephones is prohibited or dangerous.
- Other places where you should normally turn OFF the engine of your vehicle.

There can be a danger associated with the use of your GSM modem close to insufficiently protected medical devices such as acoustic devices and pacemakers.

Consult the manufacturers of medical equipment to know if it is adequately protected.

Using your GSM modem close to other electronic equipment may also cause interferences if the equipment is insufficiently protected.

Pay attention to the warnings and the recommendations of the manufacturers.

The modem is designed to be used with "fixed" and "mobile" applications:

- "Fixed" application: the GSM modem is physically linked to a site and it is not possible to move it easily to another site.
- "Mobile" application: the GSM modem is designed to be used in various places (other than fixed) and is intended to be used in portable applications.
- The modem must be used at more than 20cm from the human body.

This equipment is powered in Very Low Security Tension at a non-dangerous energy level.

9.2 Security in a vehicle

Do not use your modem whilst driving, unless equipped with a correctly installed ear-piece/hands-free kit. Respect the national regulations concerning the use of cellular telephones in vehicles. Road safety is always a priority.

An incorrect installation of the GSM modem in a vehicle could cause an incorrect functioning of the vehicle electronics. To avoid such problems, ensure that the installation was made by a qualified person. During the installation, a verification of the electronic protection system of the vehicle must be done.

The use of a warning equipment that activates the headlights or the horn of a vehicle on public highways is not authorized.

9.3 Care and maintenance

The suggestions below will help you to preserve this product for many years.

Do not expose the modem to extreme environments, to high temperature or high humidity.

Do not use or store the modem in dusty or dirty places, it could be damaged.

Do not try to disassemble the modem, at the risk of cancelation of the guarantee.

Do not expose the modem to water, rain or spilled beverage, it is not impermeable.

Avoid dropping, striking, or shaking your modem violently. The lack of care can damage it.

Do not place the modem next to computer disks, credit or travel cards or other magnetic supports. The information contained on disks or cards can be affected by the modem.

The use of other equipments or accessories, not made or authorized by **ERCO & GENER** can cancel the guarantee of the modem.

9.4 Your responsibility

This modem is under your responsibility. Treat it with care, it is not a toy. Keep it always in a secure place and out of the reach of children.

Try to remember your PIN and PUK codes. Familiarize yourself with the modem and use the security functions to lock it in case of non-authorized use or in case of theft.

10 Recommended accessories

The accessories recommended by **ERCO & GENER** for the modem **GenPro 16e**, are shown on our website in the section Products/Accessories. For more information, contact our sales department.

11 Client support

ERCO & GENER ensures the client support for all its modems sold. You will then have access to:

- The latest version of this document
- The datasheet of the product
- The latest versions of the OS user guides
- Certificates
- Application notes

APPENDIX I - Parameters saved in non volatile memory

Command	Value by default	Saved	Command	Value by default	Saved
E	1	✓	+CR	0	✓
Q	0	✓	+CRC	0	✓
S0	0	✓	+CRLP	61,61,48,6	✓
S2	43	✓	+CRSL	4	✓
S3	13	✓	+CSAS	0	✓
S4	10	✓	+CSCA	""	✓
S5	8	✓	+CSCB	0,"", ""	✓
S7	60	✓	+CSGT	""	✓
V	1	✓	+CSMP	17,168,0,0	✓
X	4	✓	+ICF	3,1	✓
&C	1	✓	+IFC	2,2	✓
&C	3	✓	+IPR	0	✓
&D	1	✓	+UCLASS	10	✓
&K	1	✓	+UCSD		✓
&Y	0	✓	+UDBF	⁽¹⁾	✓
+CALA		✓	+UDTMF	0	✓
+CALM	0	✓	+UFOTA	1,0, ""	✓
+CBST	7,0,1	✓	+UGPIOC	255	✓
+CCLK	04/01/01,00:00:00+00	✓	+UHFP	⁽¹⁾	✓
+CCUG		✓	+UI2S	4,2,1	✓
+CGMI	u-blox	✓	+UMGC	⁽¹⁾	✓
+CGMM	LEON-G100	✓	+UPSD		✓
+CGMR	07.30.01	✓	+UPSV	0	✓
+CGSMS	0	✓	+URAT	1,2	✓
+CLIR		✓	+URNG	0	✓
+CLVL	80	✓	+USGC	⁽¹⁾	✓
+CMGF	0	✓	+USPM	0,0,1,1	✓
+CNMI	1,0,0,0,0	✓	+USTN	⁽¹⁾	✓
+COPS	0,0,FFFF	✓	+USTS	0	✓
+CPIN		✓	+UUBF	⁽¹⁾	✓
+CPMS	"MT", "MT", "MT"	✓			



Value saved



Value not saved

⁽¹⁾

See the document "U-blox_AT_Commands_Manual_(WLS-SW-11000)-x"

APPENDIX II - Example of PDP context activation

In this example, we use the profile 0.

The modem provides 7 profiles, from 0 to 6.

Activation of a GPRS connection		
Command	Response	Description
AT+UGPIOC=20,2	OK	Activate the LED of the modem.
AT+CMEE=2	OK	Extended display of error codes.
AT+CGATT?	+CGATT: 1 OK	Verification of modem attachment to network. (Not mandatory).
AT+UPSND=0,8	+UPSND: 0,8,0 OK	Verification if the GPRS connection with the context of profile 0 is active. In this case "Not active". (Not mandatory).
AT+UPSD=0,1,"internet-entreprise"	OK	Entry of APN of your operator.
AT+UPSD=0,7,"0.0.0.0"	OK	Affectation of a dynamic IP address.
AT+UPSDA=0,1		Backup in non volatile memory of the connection context. (Not mandatory).
AT+UPSDA=0,3	OK	Activation of GPRS connection
AT+UPSND=0,8	+UPSND: 0,8,1 OK	Verification if the GPRS connection with the context of profile 0 is active. In this case "Active". (Not mandatory).
AT+UPSND=0,0	+UPSND: 0,0,"90.94.215.17" OK	Reading of IP Address attributed. (Not mandatory).
The GPRS connection is active		

Closing a GPRS connection		
Command	Response	Description
AT+UPSDA=0,4	OK	Close the connection.

DECLARATION OF CONFORMITY

Manufacturer : ERCO & GENER

Address : Rue des Petites Granges
Z.I. de Saint Lambert des Levées
B.P. 30163
49412 SAUMUR CEDEX – France

Website : <http://www.ercogener.com>

declares that the product :

Name : GenPro 16e Type : Modem

Complies with :

- R&TTE 1999/5/EC Directive,
- EN301489-1:V1.8.1
- EN301489-7:V1.3.1
- §6.5, §6.6, §6.8 and §6.9 of the 2004/104/CE directive
- EN 301 511 v9.0.2
- EN 60950-1:2006 + A11:2009
- EN50385 :2002
- ROHS Compliant : Directive 2002/95/CE
- "REACH" N°1907/2006



The corresponding markings appear under the appliance.

Saumur, xxx xxth xx

Charles CHAUSSONNIER
Managing Director