esse·ti
TELECOMUNICAZIONI

Certificato n. 9110.ESTI
UNI EN ISO 9001:2015

User's manual

17/09/2021 7IS-80490

CE

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GENERAL INSTALLATION INSTRUCTIONS

GENERAL NOTES

Carefully read the notes contained in this section as they provide important information on safe correct installation, use and maintenance of the product.

- The product must be EXCLUSIVELY used for the purpose it was designed for. Esse-ti shall not be responsible for damages arising from improper use.
- The product has been designed in compliance with the regulations in force and must be installed in systems that comply with the provisions of law.
- Always disconnect power supply before performing internal or external operations on the product (cleaning, maintenance, etc.).
- Always refer to an authorized service centre for repair.
- The device must be installed in a ventilated place, making sure that the ventilation slots are never obstructed.
- Do not install the product in environments with risk of explosion.
- Make sure that the product has been installed as required.
- Do not introduce objects, liquids or powders inside the product. Do not use sprays inside the product.
- Packing components (such as plastic bags, foam polystyrene, etc.) must be kept out of the reach of children because potentially dangerous.

CAUTION
Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries in accordance with current regulations.

MAKING THE INSTALLATION

Internal telephone installations must be carried out by specialised personnel.
The installation and connection of telephone terminals to the telecommunications network that do not comply with the regulations in force is not permitted.

DESCRIPTION

4G.VoLTE

4G.VoLTE is a device that, connected to a fixed telephone or to the PSTN input terminals of a PABX or autodialer, allows you to make and receive calls over the 4G LTE/UMTS/GSM network.

4G.VoLTE gateway comes with built-in backup batteries and a relay output which can be activated either locally or remotely via SMS.

4G.VoLTE CAN

4G.VoLTE CAN gateway also comes with a female DB-9 connector for data transmission and SMS and e-mails forwarding. For correct operation the SIM card must be enabled for voice, SMS and data traffic.

WARNING
Check with your network provider that VoLTE service is active on the SIM card you are using.

	Market EMEA (Europe, Middle East and Africa)
4G bands (MHz)	B1, B3, B7, B8, B20, B28A (2100-1800-2600-900-800-700 MHz)
3G bands (MHz)	B1, B3, B8 (2100-1800-900 MHz)
2G bands (MHz)	B3, B8 (1800-900 MHz)
LTE	Cat 1

Features

- Local programming via telephone (DTMF tones)
- Remote programming via SMS
- Reading of programming codes via SMS
- Data connection and voice call simultaneously
- 3G / 2G fallback
- Display of caller identification
- Automatic country setting
- CLIP / CLIR
- Roaming setting
- SIM card expiration control
- Battery check
- External power failure control
- Periodic test
- Relay-based notification of external power failure
- Relay-based notification of 4G LTE/UMTS/GSM network loss
- SMS notifications (SIM card expiration, battery, external power failure/restore, 4G LTE/UMTS/GSM network restore)
- Data notifications (battery, external power failure/restore, periodic test) on the web-app *e-stant web*
- Measurement of 4G LTE/UMTS/GSM signal level
- Automatic converter of selected telephone number
- Receiver and transmitter gain adjustment
- Remote reboot function
- Data transmission from devices connected to the DB-9 connector in RS-232, RS-485 or CAN-bus standards (4G.VoLTE CAN only)
- SMS sending from devices connected to the DB-9 connector in RS-232, RS-485 or CAN-bus standards (4G.VoLTE CAN only)
- E-mails sending from devices connected to the DB-9 connector in RS-232, RS-485 or CAN-bus standards (4G.VoLTE CAN only)

- Forwarding of received SMS to devices connected to the DB-9 connector in RS-232, RS-485 or CAN-bus standards (4G.VoLTE CAN only)
- Remote firmware update
- 4G LTE/UMTS/GSM signal indicator LED
- Device status indicator LED
- Line status indicator LED / Data transmission indicator LED
- Power supply status indicator LED
- 4G LTE/UMTS/GSM module
- 2 W transmission power
- 230 Vac external adapter input
- 12 Vdc power supply input
- NiMH 800 mAh 7,2 V back up battery
- Female DB-9 connector (4G.VoLTE CAN only)
- Relay output
- External antenna (cable length = 2 m)
- External adapter (230 Vac 50 Hz input; 12 Vdc 500 mA output; CE mark)

LED

The gateway is equipped with 4 visible LEDs.
LEDs flashing is described at chapter "Signals" (see page 47).

Green LED: 4G LTE/UMTS/GSM signal indicator LED

Red LED: Device status indicator LED

White LED: Line status indicator LED /
Data transmission indicator LED

Blue LED: Power supply status indicator LED

Hardware description

- Remove the cover.

A ANTENNA cable connector
B SIM CARD housing with front panel
C LED indicating signal strength (green), LED indicating device operation status (red), LED indicating line status / data transmission (white) and LED indicating power supply status (blue)
D Female DB-9 connector (4G.VoLTE CAN only)
E RS-485 termination jumper (4G.VoLTE CAN only)
F CAN-bus termination jumper (4G.VoLTE CAN only)
G Telephone line output (RJ11 connector) for telephone set connection or autodialer/PABX analogue line connection
H 230 Vac external adapter input
I Telephone line output (terminal block) for telephone set connection or autodialer/PABX analogue line connection
L 12 Vdc power supply terminal block
M Relay terminal block
N Backup battery connector

INSTALLATION

Inserting the SIM card

Before inserting or replacing the SIM card, always make sure that the gateway has been disconnected from the mains and battery and that no electrostatic discharge is present in order to avoid damaging it.
Take all necessary measures to avoid electrostatic discharge.

- Slide the SIM card housing cover downward until it unblocks and lift it.
- Carefully slide the SIM card into its housing cover.
- Lower the SIM card housing cover and slide it upwards until it locks.

WARNING
The SIM card PIN must be DISABLED. If the PIN is enabled, it must be disabled through a mobile phone.

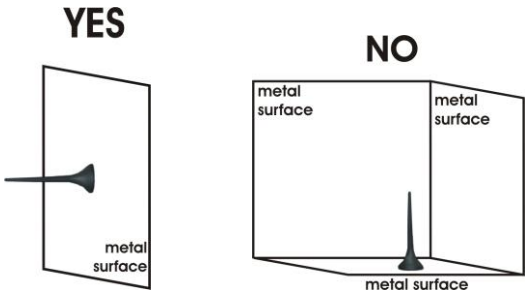
Connecting the antenna

- Screw the antenna cable in to the connector on the top of the module.

WARNING
NEVER connect the gateway without having previously connected the antenna. The gateway may get damaged.

WARNING
Do not install the product near other electric or electronic devices that were not especially designed to be used with it. They could be subjected to RF interference from the module.

- Position the antenna with magnetic base so that any metal surfaces do not block the signal.



Connection to the telephone line

- Connect the gateway to a standard telephone or to the PSTN input terminals of a PABX or autodialer via the RJ-11 connector (G in the picture at page 8).

or

- Connect the gateway to a standard telephone or to the PSTN input terminals of a PABX or autodialer using the TEL terminal (I in the picture at page 8).

Connection to the power supply

Power supply via 230 Vac / 12 Vdc external adapter

- Connect the external adapter to the specific input (H in the picture at page 8).
- Connect the backup batteries to the dedicated input (N in the picture at page 8).
- Close the gateway cover.

or

12 Vdc power supply

- Connect the power supply cable to the specific terminal (L in the picture at page 8) taking care to respect the polarity.
- Connect the backup batteries to the dedicated input (N in the picture at page 8).
- Close the gateway cover, paying attention to the power supply cable.

WARNING
Backup batteries may be connected only after gateway has been powered up.

Note: the max voltage to be supplied to the 12 Vdc terminal is 17 Vdc.

Note: the min voltage required to supply the gateway by the 12 Vdc terminal is 10 Vdc.

Note: a protection cut-out switch must be installed upstream to interrupt power supply in case of fault.

Turning the gateway on

- Power-up the gateway.
- Wait 30 seconds after power-up to give time for the gateway to register correctly with the 4G LTE/UMTS/GSM network.
- Make sure the red LED (device status) flashes as shown in chapter "Signals" (see page 48).

If the red LED stays lit permanently, the gateway has not properly registered with the 4G LTE/UMTS/GSM provider:

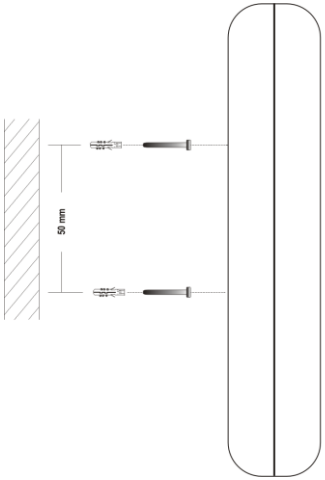
- Disconnect the gateway and make sure the SIM card is inserted correctly and that the PIN is not locking it.
- See chapter "Trouble shooting guide" (page 50).

Gateway mounting operations

- Check the 4G LTE/UMTS/GSM signal strength through the green indicator LED (see chapter "Signals", page 47) and identify an area where the signal is strong enough.

  Note: the signal strength may vary according to the network provider.

- Drill two holes with 5 mm diameter on the wall at a distance of 50 mm.
- Insert the 2 wall plugs and screws down until the screws are at a 5 mm distance from the wall.
- Place the gateway onto the two screws through the two back slots.



Installation recommendations

- The gateway must be installed in a location where the radio signal allows for using the 4G LTE/UMTS/GSM network.
- It is advisable to leave plenty of space around the gateway for maintenance operations.
- Do not install the gateway outdoors, since it lacks protection against weather conditions that can damage the gateway (water, humidity, etc.).
- Do not install the gateway near electronic (radio or TV sets, Personal Computers, wired radio systems, etc.) or magnetic devices that could be subjected to RF interference from the module: recommended distance from the antenna is min. 2,5 m.
- Do not install the gateway near medical devices. Its operation may cause damage to hearing aids or pacemakers.
- Always make sure that the device operation is permitted in the place of installation (e.g. installation is not allowed in hospitals, airplanes, etc.).

Current consumption chart

Power supply	12 Vdc (battery not connected)	12 Vdc (battery connected)
Telephone handset on hook	40 mA	60 mA
Telephone handset off hook	80 mA	100 mA
Conversation established	130 mA	150 mA
Data transmission	90 mA	110 mA

PROGRAMMING

Programming can be carried out locally via a multi-frequency telephone or remotely via SMS.

PROGRAMMING BY TELEPHONE

- Connect a standard telephone to the gateway via the RJ-11 connector (G in the picture at page 8) or using the TEL terminals (I in the picture at page 8).
- Lift the handset and dial the desired programming code (see table "Programming by telephone").

Note: at the end of each programming carried out correctly, you will hear a confirmation tone, while an error tone will be heard in case of error. In any case, the dialling tone will follow, after which you can proceed with the programming or make a call.

Note: during programming, the inter-digit dialling time must not exceed 5 seconds (see the programming "Inter-digit dialling time"). Once 5 seconds has elapsed without digits you will hear the dissuasion tone and you will have to wait the dialling tone or to hang up.

Note: programming can be carried out even if the signal is absent. After the confirmation or the error tones, the dissuasion tone will follow, after which you can proceed with programming or hang up.

*Note: in the table "Programming by telephone" factory default values are highlighted in **bold**.*

PROGRAMMING BY TELEPHONE		
TELEPHONE LINE VOLTAGE (TEL terminals and RJ-11 connector)	****61*X#**	X: option, from 0 to 3 0= 36 Vdc 1= **52 Vdc** 2= 36 Vdc with line polarity reversal 3= 52 Vdc with line polarity reversal
COUNTRY SETTING	****09*X…X#**	X…X: country calling code of the country where the gateway is installed
	Default: automatic country setting	
LINE TONES	****2X#**	X: option, from 1 to 2 1= **mobile network line tones** 2= line tones generated by 4G.VoLTE (recommended for autodialers or other devices effecting tone detection over the line)
INTER-DIGIT DIALLING TIME	****8*X#**	X: seconds, from 1 to 9; 0= 10 seconds **5** factory default
CLIP SETTING	****7*1*DDMMYY*HHMM#**	Enabling DD: day, MM: month, YY: year; HH: hour, MM: minutes
	****7*0#**	Disabling
	Default: disabled (call date and time not displayed on the display of the connected telephone or device)	
CLIR PERMANENT SETTING	****6*X#**	X: option, from 0 to 2 0= **the sending of your number to the called user depends on the settings of the telephone operator** 1= your number is not sent to the called user 2= your number is sent to the called user
CLIR TEMPORARY SETTING	****16#**	Your number is not sent for a single call
	****17#**	Your number is sent for a single call

PROGRAMMING BY TELEPHONE		
ROAMING	****5*1#**	Enabling
	****5*0*XXXY…Y#**	Disabling XXX: MCC of your telephone operator Y…Y: MNC of your telephone operator (when roaming is disabled, in case the gateway registers with a different provider than the programmed, it is not possible to make or receive any calls)
	Default: roaming enabled	
DATA NOTIFICATIONS ON E-STANT WEB	****02*1#**	Enabling
	****02*0#**	Disabling
	Default: notifications disabled Instructions to use *e-stant web* can be downloaded at the following link: http://webshare.esse-ti.it/guide.zip	
NOTIFICATION TELEPHONE NUMBER	****40*X…X*X…X#**	X…X: telephone number appointed for SMS notifications of SIM card expiration, battery, external power failure/restore, mobile network restore and for SMS reading SIM expiration
	****40#**	Deleting
ADMINISTRATOR TELEPHONE NUMBER	****18*X…X*X…X#**	X…X: telephone number with country code (if set, it is the only number from which programming via SMS is allowed)
	****18#**	Deleting
PROGRAMMING PASSWORD	****19*X…X*Y…Y*Y…Y#**	X…X: old password (max. 3 digits) Y…Y: new password (max. 3 digits) **0** factory default

PROGRAMMING BY TELEPHONE		
SIM CARD EXPIRATION CHECK (1)	****53*X…X#**	Enabling X…X: days before SIM expiration, from 1 to 330
	****53*0#**	Disabling
	Default: check disabled	
BATTERY CHECK (2)	****5X#**	X: option, from 0 to 1 0= **check enabled** 1= check disabled
	****52*X#**	X: option, from 0 to 7 0= 7 h 1= 6 h e 30' 2= 6 h 3= 5 h e 30' 4= **4 h** 5= 2 h e 30' 6= 1 h e 30' 7= 1 h (minimum number of operating hours, in idle mode, guaranteed by the battery charge; below this threshold, a notification SMS is sent out)
EXTERNAL POWER FAILURE CONTROL (3)	****81*XXYY#**	XX: minutes of external power failure, from 01 to 99 YY: minutes of external power restore, from 01 to 99
	****81*0#**	Disabling
	Default: control disabled	

PROGRAMMING BY TELEPHONE		
RELAY-BASED NOTIFICATION OF EXTERNAL POWER FAILURE AND/OR MOBILE NETWORK LOSS (4)	****94*X#**	X: option, from 0 to 6 0= **notifications disabled** 1= the relay is deactivated in case of external power failure 2= the relay is deactivated in case of mobile network loss 3= the relay is deactivated in case of external power failure or in case of mobile network loss 4= the relay is activated in case of external power failure 5= the relay is activated in case of mobile network loss 6= the relay is activated in case of external power failure or in case of mobile network loss
PERIODIC TEST (5)	****72*X…X*X…X#**	X…X: telephone number appointed for periodic test SMS or calls
	****72#**	Deleting telephone number
	****73*X#**	X: periodic test mode, from 0 to 1 0= **CLI call** 1= SMS
	****74*XX#**	XX: frequency, from 1 to 99 1-10: days 11-99: hours **3** factory default
	****75*HHMM#**	Time of periodic test HH: hour, MM: minutes **0400** factory default
	****76*XX#**	XX: seconds duration of the CLI call, from 01 to 99 **20** factory default
	****77*X#**	X: option, from 0 to 2 0= **periodic test disabled** 1= periodic test enabled 2= force periodic test manually

PROGRAMMING BY TELEPHONE		
AUTOMATIC CONVERTER OF DIALED TELEPHONE NUMBER (6)	****26*X…X*Y*Z… Z*Z…Z#**	ENTERING NUMBER TO CALL X…X: programming password Y: table position, from 1 to 6 Z…Z: telephone number
	****26*X…X*Y#**	DELETING NUMBER TO CALL X…X: programming password Y: table position, from 1 to 6
	****26*X…X*#**	DELETING ALL NUMBERS TO CALL X…X: programming password
	****25*X…X*Y*Z… Z*Z…Z#**	ENTERING DIALED NUMBER X…X: programming password Y: table position, from 1 to 6 Z…Z: telephone number
	****25*X…X*Y#**	DELETING DIALED NUMBER X…X: programming password Y: table position, from 1 to 6
	****25*X…X*#**	DELETING ALL DIALED NUMBERS X…X: programming password
TRANSMITTER GAIN ADJUSTMENT	****10*X#**	X: value, from 1 (min.) to 7 (max.) **4** factory default (do not change unless it is strictly necessary)
RECEIVER GAIN ADJUSTMENT	****11*X#**	X: value, from 1 (min.) to 5 (max.) **3** factory default (do not change unless it is strictly necessary)
DURATION OF VOLTE DTMF TONES (OUT OF BAND)	****06*X…X#**	X…X: value, from 0 to 255 DTMF duration= (X…X)·10 ms **10** factory default (= 100 ms) (do not change unless it is strictly necessary)
VOLUME OF VOLTE DTMF TONES (OUT OF BAND)	****07*X#**	X: value, from 1 (min.) to 9, 0= 10 (max.) **5** factory default (do not change unless it is strictly necessary)

PROGRAMMING BY TELEPHONE		
VOICE CALLS CODEC SETTING	****15*X…X#**	X: option, from 0 to 128 0= **all codecs enabled** 1= FR enabled 2**=** EFR enabled 4**=** HR enabled 8**=** AMR-FR enabled 16**=** AMR-HR enabled 32**=** GSM-AMR-WB enabled 64**=** UMTS-AMR-NB enabled 128**=** UMTS-AMR-WB enabled
IMS CODEC SETTING	****14*X…X*Y…Y* Z#**	X…X: AMR-WB mode (configurable as a bitmask: 0x1 - Mode 0 (6.60 kbps) 0x2 - Mode 1 (8.85 kbps) 0x4 - Mode 2 (12.65 kbps) 0x8 - Mode 3 (14.25 kbps) 0x10 - Mode 4 (15.85 kbps) 0x20 - Mode 5 (18.25 kbps) 0x40 - Mode 6 (19.85 kbps) 0x80 - Mode 7 (23.05 kbps) 0x100 - Mode 8 (23.85 kbps)) Y…Y: AMR-NB mode (configurable as a bitmask: 0x1 - Mode 0 (4.75 kbps) 0x2 - Mode 1 (5.15 kbps) 0x4 - Mode 2 (5.9 kbps) 0x8 - Mode 3 (6.17 kbps) 0x10 - Mode 4 (7.4 kbps) 0x20 - Mode 5 (7.95 kbps) 0x40 - Mode 6 (10.2 kbps) 0x80 - Mode 7 (12.2 kbps) 0x100 - Mode 8 (12.2 kbps)) Z: high definition voice, from 0 to 1 0= AMR-WB disabled 1= **AMR-WB enabled**

PROGRAMMING BY TELEPHONE		
COMMUNICATION TECHNOLOGY SETTING	****33*X#**	X: option, from 0 to 6 0= GSM 1= GSM / UMTS 2= UMTS 3= LTE 4= UMTS / LTE 5= GSM / LTE **6= GSM / UMTS / LTE**
RESTORING DEFAULT SETTINGS	****99#**	Restoring factory default does not modify the programming password and the settings entered for the "Automatic converter of selected telephone number"
RESET	****98#**	Resetting the gateway does not modify its programming profile

(1) SIM card expiration check

If the SIM card expiration check is enabled, when the preset days have passed, a notification SMS is sent with the following text message: "*SIM expiring*".

Note: the days internal counter stops when the gateway is powered off and restarts at the next power on.

(2) Battery check

If the battery check is enabled, in case of power failure the gateway constantly checks the battery status. When the charge goes below the previously-programmed threshold ensuring the minimum number of operating hours in idle mode, a notification SMS is sent with the following text message: "*Low battery*". The gateway sends out one notification SMS only. A new SMS will be sent out if the charge status rises and goes again below the previously-set threshold.

The built-in backup batteries ensure 8 operating hours in idle mode and 2 operating hours in conversation mode.

If the battery check is enabled, the gateway detects the presence of the battery. If the battery is absent or in case of disconnection, a notification SMS is sent to the programmed number with the following text message: "*Dead battery*".

(3) External power failure control

If the control on external power failure is enabled, the gateway constantly controls the external power supply (230 Vac or 12 Vdc). If the external power failure lasts longer than the preset time interval, a notification SMS is sent with the following text message: "*External power failure*".
If the external power supply is restored for a time interval equal to the preset threshold a new SMS will be sent with the following text message: "*External power restored*".

(4) Relay-based notification of external power failure and/or mobile network loss

If the relay-based notification of mobile network loss is enabled, when the mobile network is restored, a notification SMS is sent with the following text message: "*Mobile network restored*".

(5) Periodic test

If the periodic test is enabled, the gateway sends, with programmable frequency, an SMS or a CLI call to the set number.
The SMS is sent with the following text message: "*Periodical test message*".

Note: the CLI call is a call that does not need to be answered.

Note: for the correct operation of the Periodic test, to program the internal clock of the device is required (see the programming "CLIP setting").

Note: the internal clock must be programmed each time the device is switched off.

(6) Automatic converter of selected telephone number

If the function is enabled the gateway, instead of calling the telephone number dialed from the connected telephone (autodialer or other telephone device), forwards the call to a previously set number.
It is possible to pre-set up to 6 telephone numbers to call, each of which can be combined, through programming and / or automatic learning procedure, a dialed number.
When dialed number is not associated with any preset number, the call will be automatically forwarded to the first preset telephone number.

Note: to enable the "Automatic converter" service, you simply need to preset one telephone number; to disable this service, all preset telephone numbers must be deleted.

Example: preset table:

Location	Selected tel. number (code 25)	Preset tel. number (code 26)
1	3331234567	0717506065
2	3339876543	0717506066
3	0733434343	0717506067
4	0733445566	0717506068
5	0733778899	0717506069
6	0733001122	0717506070

- when selecting tel. number 3331234567, the gateway will make a call to 0717506065
- when selecting number 3339876543 , the gateway will make a call to 0717506066
- etc.
- when selecting any number not included in the "Selected telephone number" column, the gateway will send a call to the first

telephone number included in the "Preset telephone number" column.

Matching telephone numbers automatically

- Enter the number to be called in a table location using programming code 26.
- Enter the dialed number, to be associated, in the same table location using programming code 25.

Automatic learning procedure

The auto-learning procedure allows to match automatically each preset number with the numbers dialed by the connected telephone (autodialer or other telephone device) with the gateway.

- Enter the number to be called using programming code 26.
- Dial a telephone number by the connected telephone (autodialer or other telephone device) with the gateway.

The gateway will check if the number is already matched with a preset telephone number.

If so, it will send a call to the preset number.

If not, it will match the dialed number to the first available preset number and will make a call to it.

In case there are not available preset numbers, but it's still possible to make associations, the dialed number will be automatically matched with the first preset number.

In case all 6 possible associations have been effected, the call will be sent to the first preset number.

An SMS containing the dialed number and the preset number is sent out to the administrator number (if present) upon creating any new matching.

An SMS is also sent out every time a different selection from the 6 preset ones is effected.

PROGRAMMING VIA SMS

Programming via SMS is possible by any mobile phone or other device supporting SMS. In case the administrator number has been previously set, programming via SMS is only allowed from such telephone number. An SMS notifying that programming has been completed will be sent back by the gateway to the same telephone number that forwarded the programming SMS.

WARNING
Programming outgoing SMS from the Internet may not be successful if the requested format is not respected.

Message format

The message format is required to be as follows:

ET-IL2*xxx#c..c#

where:

ET-IL2	programming string start
*xxx#	password string (default xxx = 0)
c..c	programming string as per table below
#	separator character or end string character

Programming	Code (x..x)
Telephone line voltage	61*X
Reading telephone line voltage	61R
Country setting	09*X…X
Reading country setting	09R
Line tones setting	2X
Reading line tones setting	2R
Inter-digit dialling time	8*X
Reading inter-digit dialling time	8*R

Programming	Code (x..x)
Enabling CLIP	7*1*DDMMYY*HHMM
Disabling CLIP	7*0
Reading CLIP status	7*R
CLIR permanent setting	6*X
Reading CLIR permanent status	6*R
CLIR temporary activation	16
CLIR temporary deactivation	17
Enabling roaming service	5*1
Disabling roaming service	5*0*XXXY…Y
Reading roaming service status	5*R
Enabling notifications on *e-stant web*	02*1
Disabling notifications on *e-stant web*	02*0
Reading *e-stant web* notifications status	02R
Setting telephone number for notification service	40*X…X*X…X
Deleting notification number	40
Reading notification number	40R
Setting administrator number	18*X…X*X…X
Deleting administrator number	18
Reading administrator number	18R
Setting programming password	19*X…X*Y…Y*Y…Y#
Enabling SIM card expiration check	53*X…X
Disabling SIM card expiration check	53*0
Reading SIM card expiration check status	53R
Battery check enabling	50
Battery check disabling	51
Reading battery check status	5R
Low-battery check minimum value	52*X
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External power failure control enabling	81*XXYY
External power failure control disabling	81*0
Reading external power failure control status	81R
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Setting periodic test number	72*X…X*X…X
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Periodic test mode	73*X
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Programming	Code (x..x)
Periodic test frequency	74*XX
Reading periodic test frequency	74R
Time of periodic test	75*HHMM
Reading time of periodic test	75R
Duration of CLI call	76*XX
Reading duration of CLI call	76R
Enabling periodic test	77*1
Disabling periodic test	77*0
Forcing periodic test	77*2
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Entering preset number	26*X…X*Y*Z…Z*Z…Z
Deleting preset number	26*X…X*Y
Deleting all preset numbers	26*X…X*
Reading preset numbers	26*X…X*YR
Entering dialed number	25*X…X*Y*Z…Z*Z…Z
Deleting dialed number	25*X…X*Y
Deleting all dialed numbers	25*X…X*
Reading dialed number	25*X…X*YR
Transmitter gain setting	10*X
Reading transmitter gain	10R
Receiver gain setting	11*X
Reading receiver gain	11R
Duration of VoLTE DTMF tones	06*X..X
Reading duration of VoLTE DTMF tones	06R
Volume of VoLTE DTMF tones	07*X
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Programming	Code (x..x)
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Example:
it is required to enable battery check and to set the telephone number for notifications.

Outgoing message text:
*ET-IL2*0#50#40*X..X*X…X#*

Notification message format

The format of the message notifying the user or the administrator who previously sent out a programming SMS, is the same as the programming message format.

SMS notifying an accepted command:

ET?IL2*xxx#c..c#

SMS notifying a rejected command:

ET?IL2*xxx#c..cERR#

Example:
outgoing SMS to enable battery check and to set the following incoming notification number: 3330123456.

Outgoing message text:
*ET-IL2*0#50#40*3330123456*3330123456#*

Message text notifying accepted command:
*ET?IL2*0#50#40*3330123456*3330123456#*

SERVICES

INCOMING CALLS

Allows you to answer incoming calls.

Upon receiving a phone call, the LED indicating the line status (white) will blink shortly 4 times every 4 seconds as described at chapter "Signals" (see page 48) and the telephone will be ringing.

- Pick up the handset to answer the call.

The LED indicating the line status (white) will turn on and the communication with the calling party will be set up.

OUTGOING CALLS

Allows you to dial over the 4G LTE/UMTS/GSM network.

If the gateway is connected to a PABX, please refer to the switchboard's manual.

If the gateway is connected to a telephone:

- Pick up the handset.

The LED indicating the line status (white) will turn on and the dialling tone will be heard.

- Dial the telephone number to be called.

Note: once you have dialled the number, you can either press # to send the number immediately, or you can wait for the call to be automatically forwarded once the inter-digit dialling time has elapsed (by default 5 seconds).

Note: in the event you receive the dissuasion tone picking up the handset, check if the signal is present and make sure the SIM card is working correctly.

MEASURING THE SIGNAL LEVEL

This procedure allows you to check the 4G LTE/UMTS/GSM signal level through your telephone.

- Lift the handset and dial **30#.
- Wait for the signal reading.

The gateway will send a number of short tones corresponding to the signal level:

Tones	Quality
No signal	No signal
1 Tone	Low
2 Tones	Medium
3 Tones	Good
4 Tones	High

Since the signal can be subject to variations, we recommend repeating the code **30#, 2 or 3 times a few seconds apart, in order to have a reliable measurement.

Note: in case of low signal, we recommend installing the gateway in a different area with a better signal.

Note: if you receive the "no signal" tone, it means that the gateway has not been registered correctly by the provider. We recommend trying again after a few moments, and in case of no result, make sure that the SIM card is working correctly.

READING THE DAYS MISSING TO SIM CARD EXPIRATION

This procedure allows you to check how many days until the SIM card expiration.

- Lift the handset and dial **54#.
- After the confirmation tone hang up.

After receiving the request, the gateway will send an SMS to the number programmed to be alerted.
The outgoing message text is the following: "*Days to upload reminder: xxx*".
The request will not be executed (an error tone will be received) if the SIM card expiration control is disabled, if the notification number to be alerted has not been previously entered or if the gateway is not correctly registered to the 4G LTE/UMTS/GSM network.

READING THE BATTERY STATUS

This procedure allows you to check the battery status through your telephone.

- Lift the handset and dial: **91#.

The gateway will send a number of short tones corresponding to the guaranteed number of operating hours in idle mode:

Tones	Hours in idle mode
No tones	Absent or damaged battery
1 Tone	1 hour
2 Tones	2 hours
3 Tones	up to 7 hours
4 Tones	more than 7 hours

RELAY USE

This programming only applies when the relay is not used to signal the external power supply and/or 4G LTE/UMTS/GSM network failure.

Activation/Deactivation

Allows you to activate or deactivate the relay.

- Lift the handset and dial: **92*.
- Enter:

  0 to deactivate the relay;
  1 to activate the relay.

- Dial # to confirm.
- After the confirmation tone hang up.

Pulse

Allows you to activate or deactivate the relay for a specific time.

- Lift the handset and dial: **93*.
- Enter the length of the pulse in seconds (01 ~ 99).
- Dial # to confirm.
- After the confirmation tone hang up.

READING ADVANCED DEVICE AND RADIO CELL PARAMETERS

This procedure allows you to check advanced parameters of the device and the radio cell.

- Send the following SMS to 4G.VoLTE:

ET-IL2*xxx#90#

where:

ET-IL2 programming string start

*xxx# password string (default xxx = 0)

4G.VoLTE will send one or two SMS to the number that sent the request with the following data:

String (the values shown are for illustrative purposes)	**Meaning**
ET?IL2*XXX#904G-NET*	String start
210010001 Feb 4 2020 12:07:15	4G.VoLTE software version
25.20.228-T206-POF.229401MOF.220008-T2060A	Radio module data
354033074014898	IMEI code
4G	AcT (Access Technology)
222	MCC (Mobile Country code)
01	MNC (Mobile Network Code)
EFF0	TAC (Tracking Area Code) / LAC (Location Area Code)
59084BF	CELL (Cell ID)
-5.0	RSRP (Reference Signal Received Power)
-83	RSRQ (Reference Signal Received Quality)
POW or BATT	POW (external power supply present) BATT (external power supply absent)
ONH or OFH	ONH (line in use) OFH (line not in use)
RM: YES or RM:NO	Roaming

SMS / E-MAILS THROUGH DB-9

4G.VoLTE CAN gateways allow devices connected to the DB-9 connector (in standard RS-232, RS-485 or CAN-bus) to send or receive SMS and to send e-mails.

DB-9 PROGRAMMING		
COMMUNICATION STANDARD	****12*X#**	X: option, from 0 to 3 0= communication disabled 1= **RS-232** 2= RS-485 3= CAN-bus (for CAN-bus communication please refer to corresponding documentation)
COMMUNICATION PARAMETERS (this programming can be effectuated only after the communication standard programming)	****57*XYWZ#**	X: bits per second, parameter from 1 to 9 1= **RS-232/485: 115200 / CAN-bus: 1M** 2= RS-232/485: 57600 / CAN-bus: 500k 3= RS-232/485: 38400 / CAN-bus: 250k 4= RS-232/485: 19200 / CAN-bus: 125k 5= RS-232/485: 9600 / CAN-bus: 64k 6= RS-232/485: 4800 / CAN-bus: 50k 7= RS-232/485: 2400 / CAN-bus: 20k 8= RS-232/485: 1200 / CAN-bus: 10k 9= RS-232/485: 600 / CAN-bus: 5k Y: data bits, parameter from 0 to 1 0= **8** 1= 7 W: stop bits, parameter from 0 to 1 0= **1** 1= 2 Z: parity, parameter from 0 to 2 0= **none** 1= even 2= odd
	Note: if data bits = 7 is not possible to set parity = none Note: for CAN-bus communication please enter ****57* X(bits per second) 000#**	

DB-9 PROGRAMMING		
COMMUNICATION PROTOCOL	****38*X#**	X: option **3= ES protocol (for SMS/e-mail in RS-232/RS-485/CAN-bus standard)** 5= SS/RS protocol (for SMS in CAN-bus standard)
	Note: after this code the gateway must be switched off and on again	

Sending SMS (ES protocol)

Text messages transmitted from an external device to the 4G.VoLTE CAN, through the DB-9 connector, are sent via SMS when they comply with the following format:

ES^SMSX…X:Y…Y<CTRL+Z>

where:

ES^SMS	string start
X...X	telephone number on which the SMS must be sent
Y...Y	message text to be sent (max. 160 characters)
<CTRL+Z>	non-editable character defining end of text

The SMS can be sent to the number programmed for notifications (code 40). In this case, the text format is required to be as follow:

ES^SMS:Y…Y<CTRL+Z>

Note: to send SMS, the 4G.VoLTE must be correctly registered to the mobile network and the SIM card must be topped up.

Note: for CAN-bus communication please refer to corresponding documentation.

Notifications sent from 4G.VoLTE CAN to the external device:

String	Meaning
^SMSREC<CTRL+Z>	SMS taken in charge
^SMSOK<CTRL+Z>	SMS sent correctly
^SMSERROR<CTRL+Z>	error in sending the SMS
^SMSBUSY<CTRL+Z>	4G.VoLTE CAN being registered to the network or not registered

Receiving SMS (ES protocol)

All SMS received by 4G.VoLTE (except programming SMS) are forwarded to the external device connected to the DB-9 connector.
The text forwarded has the following format:

^SMSRX…X:Y…Y<CTRL+Z>

where:

^SMSRX	string start
X...X	telephone number of the sender of the SMS
Y...Y	text of the SMS received
<CTRL+Z>	non-editable character defining end of text

Sending e-mails (ES protocol)

A text transmitted from an external device to the 4G.VoLTE CAN, through the DB-9 connector, is sent via e-mail when it complies with the following format:

ES^MAILX…X<CTRL+Z>Y…Y<CTRL+Z>Z…Z<CTRL+Z>

where:

ES^MAIL	string start
X...X	e-mail address of recipient (max. 50 characters)
Y...Y	subject of the e-mail to be sent (max. 100 characters)
Z...Z	text of the e-mail to be sent (max. 400 characters)
<CTRL+Z>	non-editable character defining end of text

*Note: the e-mail is sent via the 4G.VoLTE data connection to a dedicated Esse-ti server **(COMNet Server)** and a specific configuration of 4G.VoLTE is required [(*)].*

Note: to send e-mails, the 4G.VoLTE must be correctly registered to the mobile network and the SIM card must be topped up.

Note: for CAN-bus communication please refer to corresponding documentation.

Notifications sent from 4G.VoLTE CAN to the external device:

String	Meaning
^MAILREC<CTRL+Z>	e-mail taken in charge
^MAILOK<CTRL+Z>	e-mail sent correctly
^MAILERROR<CTRL+Z>	error in sending the e-mail
^MAILBUSY<CTRL+Z>	4G.VoLTE CAN being registered to the network or not registered

[(*)] 4G.VoLTE CAN configuration for connection to COMNet Server

- Send the following configuration SMS to 4G.VoLTE CAN:

ET-IL2*xxx#62*n...n*n…n#Cy...y#Fw...w#Gz...z#13*u#

where:

ET-IL2	programming string start
*xxx#	password string (default xxx = 0)
n...n	telephone number of the SIM card in 4G.VoLTE CAN (with country code)
y…y	APN
w…w	APN username (if any)
z…z	APN password (if any)
u	COMNet Server connection mode 1= rejected call 3= missed call 4= data ring
#	separator character or end string character

Sending SMS (ES protocol SS/RS)

Text messages transmitted from an external device to the 4G.VoLTE CAN, through the DB-9 connector, are sent via SMS when the sequence of CAN-bus messages, used for communication, respects the formatting highlighted in the following example:

Example:
- external device CAN-bus identifier: 0x378
- 4G.VoLTE CAN CAN-bus identifier: 0x500 (customizable)
- message text to be sent: test sms
- telephone number on which the SMS must be sent: 00393357063310

CAN-bus messages sent to 4G.VoLTE CAN by the external device:

Message n° 1

0	*1*	*2*	*3*	*4*	*5*
0x03	*0x78*	*0x53*	*0x53*	*0x0E*	*0x08*
adH	*adL*	*S*	*S*	*Ln*	*Lm*

Message n° 2

0	*1*	*2*	*3*	*4*	*5*	*6*	*7*
0x03	*0x78*	*0x30*	*0x30*	*0x33*	*0x39*	*0x33*	*0x33*
adH	*adL*	0	0	3	9	3	3

Message n° 3

0	*1*	*2*	*3*	*4*	*5*	*6*	*7*
0x03	*0x78*	*0x35*	*0x37*	*0x30*	*0x36*	*0x33*	*0x33*
adH	*adL*	*5*	*7*	*0*	*6*	*3*	*3*

Message n° 4

0	*1*	*2*	*3*
0x03	*0x78*	*0x31*	*0x30*
adH	*adL*	*1*	*0*

Message n° 5

0	*1*	*2*	*3*	*4*	*5*	*6*	*7*
0x03	*0x78*	*0x74*	*0x65*	*0x73*	*0x74*	*0x20*	*0x73*
adH	*adL*	*t*	*e*	*s*	*t*		*s*

Message n° 6

0	*1*	*2*	*3*
0x03	*0x78*	*0x6D*	*0x73*
adH	*adL*	*m*	*s*

where:
SS: send sms
adH: address high
adL: address low
Ln: number length
Lm: message length

CAN-bus message sent by 4G.VoLTE CAN to the external device in case of successfully sent SMS:

0	*1*	*2*
0x05	*0x00*	*0x41*
adH	*adL*	*A*

CAN-bus message sent by the external device to verify the presence of 4G.VoLTE CAN on the bus:

0	*1*	*2*
0x03	*0x78*	*0x51*
adH	*adL*	*Q*

CAN-bus message sent by 4G.VoLTE CAN to the external device to confirm the presence on the bus:

0	*1*	*2*
0x05	*0x00*	*0x41*
adH	*adL*	*A*

DATA TRANSMISSION

The **COMNet** system allows users to connect remotely with devices equipped with RS232/RS485/CAN BUS, replacing traditional serial communication which is commonly performed locally (i.e. between peripherals and custom boards – Fig. A – or between a PC-based proprietary application and a lift controller board – Fig. B –).

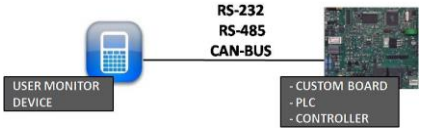


Figure A: example of local serial communication

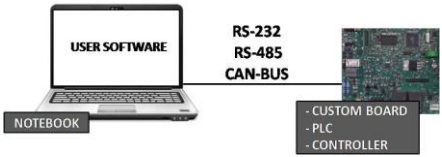


Figure B: example of local serial communication

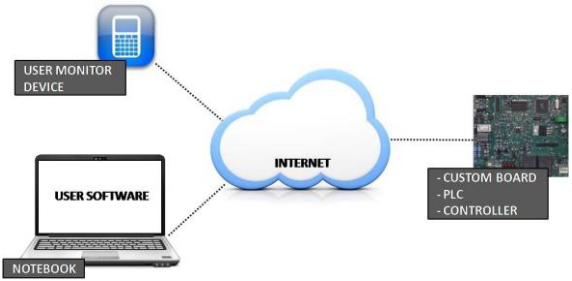


Figure C: general example of remote serial communication

Setting up a **COMNet** system requires:
- connecting a **4G.VoLTE CAN** gateway (properly programmed) to the serial port of the remote device to be controlled (the SIM card to be inserted into the gateway must be enabled for voice/SMS/data traffic)
- installing the **COMNet PC Client** software in the PC which will be used for remote-monitoring (the PC must be able to access the Internet) or use similar proprietary application (PC application, mobile app, web server or other solution respecting the COMNet protocol).

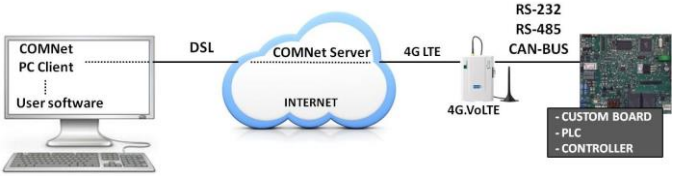


Figure D: example of COMNet system

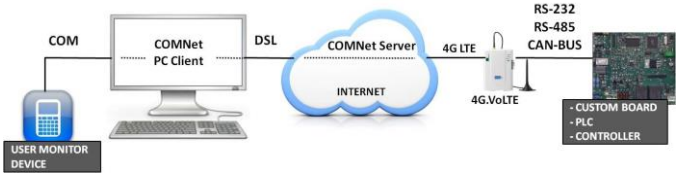


Figure E: example of COMNet system

The **COMNet** system exclusively allows to set up a remote two-way data communication. The data flow coming out of the remote device will be sent to the same application commonly used for local wired communication or to a physical COM port of the computer.

The connection procedure simply requires to enter the SIM card telephone number associated with the remote 4G.VoLTE CAN into the

COMNet PC Client or similar proprietary application. This eliminates any difficulties in locating remote devices not assigned to static IP addresses.

The data connection is established by the system on demand and the data are transferred over an Esse-ti proprietary server (**COMNet Server**).

The 4G.VoLTE CAN connected to the remote device to be monitored, may also be used as a standard gateway for voice transmission, by means of the dedicated plug or connector (i.e. it can be connected with the elevator emergency phone dialer) and the same SIM card needed for remote monitoring.

4G.VoLTE CAN can manage a data call and a voice call at the same time, therefore in case of a voice emergency call, the ongoing data connection will not be cut off.

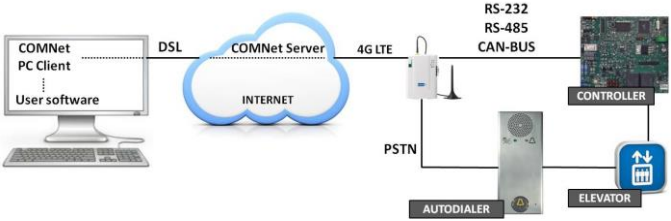
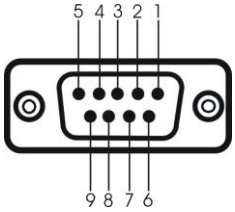


Figure F: example of COMNet system with 4G.VoLTE CAN used as gateway for voice transmission

Please see the user manual of the COMNet for the data transmission programming of the 4G.VoLTE CAN and for the installation and use of the COMNet PC client software.

FEMALE DB-9 CONNECTOR



RS-232

TX	PIN2
RX	PIN3
GND	PIN5

RS-485

TXD-	PIN6
TXD+	PIN7
GND	PIN5

CAN-bus

CANH	PIN8
CANL	PIN9
GND	PIN5

SIGNALS

TONES

Dialling

It indicates that the gateway is ready for dialing.

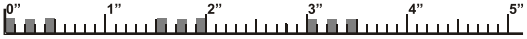
Dissuasion

It indicates that the gateway has not properly registered with the 4G LTE/UMTS/GSM provider or a delay in dialling or the end of conversation or an access to services not permitted.

Busy

It indicates that the called party is busy.

Confirmation



It indicates that the requested service or programming has been accepted.

Error

It indicates that the requested programming has not been accepted.

Mobile signal level

It indicates low signal level.

It indicates medium signal level.

It indicates good signal level.

It indicates high signal level.

It indicates no signal.

CALL SIGNALS

It indicates an incoming call.

LED

4G LTE/UMTS/GSM signal indicator LED (GREEN)

It indicates no signal.

It indicates low signal level (2G/3G network).

It indicates medium signal level (2G/3G network).

It indicates good signal level (2G/3G network).

It indicates high signal level (2G/3G network).

It indicates low signal level (4G network).

It indicates medium signal level (4G network).

It indicates good signal level (4G network).

It indicates high signal level (4G network).

It indicates the SIM card is protected by the PIN code.

It indicates the SIM card is protected by the PUK code.

Status indicator LED (RED)

It indicates the gateway has not been correctly registered with the network, the SIM card is protected by the PIN code or other problems.

It indicates the gateway is correctly registered to the network.

Line status indicator LED / Data transmission indicator LED (WHITE)

It indicates that the line is in use or that a data connection is in progress.

It indicates that the line is not in use.

It indicates an incoming call.

Power supply status indicator LED (BLUE)

It indicates that the external power supply is connected and the battery guarantees more than 7-hour operation in idle state.

It indicates that the external power supply is connected and the battery guarantees up to 7-hour operation in idle state.

It indicates that the external power supply is connected and the battery guarantees 2-hour operation in idle state.

It indicates that the external power supply is connected and the battery guarantees 1-hour operation in idle state.

It indicates that the external power supply is connected and the battery is absent or damaged.

It indicates that the external power supply is NOT connected and the battery guarantees more than 7-hour operation in idle state.

It indicates that the external power supply is NOT connected and the battery guarantees up to 7-hour operation in idle state.

It indicates that the external power supply is NOT connected and the battery guarantees 2-hour operation in idle state.

It indicates that the external power supply is NOT connected and the battery guarantees 1-hour operation in idle state.

TROUBLE SHOOTING GUIDE

This section shows a list of solutions to the most commonly encountered problems.

Detected problem	Root cause	Solution
All LEDs are unlit	Gateway not supplied	Check power supply
The red LED lights up all the time	SIM card not present or not correctly inserted	Correctly insert the SIM card in the dedicated location
	SIM card locked by PIN code	Disable the PIN code through your mobile phone
	SIM card expired or damaged	Check the SIM card operation on your mobile phone
	Antenna not connected or damaged antenna cable	Check the antenna connection and the the cable
	Signal absence	Check the signal strength using your mobile phone
	Insufficient power supply	Check the power supply
	Generic SW problem	Turn the power off, wait 30 s and reconnect the power
The red LED flashes, but the green LED is off	Signal level is too low to allow outgoing calls	Move the gateway and the antenna into a better position
The green LED lights up all the time	SIM card locked by PUK code	Insert the PUK code through your mobile phone
The autodialer connected to gateway does not detect the telephone line	Telephone line voltage on TEL terminals and on RJ-11 plug is insufficient	Increase the voltage (see programming "Telephone line voltage")
The autodialer connected to gateway does not succeed in forwarding a call	The autodialer performs a tone detection over the telephone line	Set line tone generation by 4G.VoLTE (see programming "Line tones" option 2)

EU DECLARATION OF CONFORMITY

Hereby, Esse-ti S.r.l. declares that the equipment type 4G.VoLTE is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available from the following Internet address:

https://www.esse-ti.it/en/dichiarazioni-di-conformita

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