GSM Power Metering
User Manual

Index

1 PREAMBLE

We would like to thank you for your preference in chosing our product and kindly invite you To carefull read this manual for using our **GSM Power Metering**

1.1 COPYRIGHT

1.2 DECLARATION OF CONFORMITY

Electrex S.r.l.
Via Claudia 96 41056 Savignano s/P (MO)
Declares under its own responsibility :

GSM Power Metering

Is 89/336/CE standards compatible, end particularly with :

Health and Safety	:	EN60950:2000
EMC	:	EN 55022, EN 55024

The product contains the industrial modem PLUS GSM of the Company Audiotel Engineering S.p A. which is compatible with the existing R&TTE 1999/5/EC, standards S.p.A. che è conforme con le norme vigenti in relazione alla direttiva R&TTE 1999/5/EC, and particularly:

Radio	:	3GPP TS 51.010-1 v. 5.1.0 (12/2002);
	:	EN 301 511 V9.0.2 (final draft)
EMC	:	EN 301 489-7 V1.2.1 (08/2002)
Safety	:	En 60950:2000

CE 0681

Dece,mber 2003
Name
Technical Manager
Signature 

1.3 Warranty

This product is guaranteed against any material and manufacture defect for a period of 24 months starting from its purchase date.
The warranty will not cover any defect due to:
• Improper and careless use
• Damage caused by atmospheric agents
• Acts of vandalism
• Wearing material
Electrex reserves at its own discretion the right to repair or replace defective products. The warranty is deemed to be expired when the failure is caused by improper use or by an operating procedure which is not provided for by this manual

1.4 RETURN PROCEDURE FOR REPAIR (RMA) ALLEGATO RMA

Electrex will **only** accept the returns which have been authorized in advance. If the product has been directly purchased from Electrex, the purchaser has to ask the authorization to return the product for repair, to Electrex per fax at number **+39 035 614000** by using the attached form. Alternatively, the purchaser has to ask for assistance to the point of sale where he bought the product. The following information has to be supplied in both cases:
• Company name and data;
• Reference Person;
• Product description;
• Serial Number;
• Description of the accessories which may have been returned;
• Invoice / Document of transport number and date;
• Detailed description of failure and usage configuration.
The Electrex repair laboratory, which will be contacted by the point of sale or by the final customer (only in case of a direct sale), will issue an RMA number which has to be written by the point of sale / customer on the package and on the Document of transport (DDT).

ATTENTION: If the RMA number is not written on the outer package, the warehouse is authorized to reject the goods on customer charge. The material has to be shipped **DDP (delivery duty paid,** at customer charge**)**, not later than 15 working days from the date on which the RMA has been assigned, to the following address:

Electrex S.r.l.
Via Claudia 96 41056 Savignano s/P (MO)
Att.ne UFFICIO RIPARAZIONI

The under warranty product has to be returned with the **original packaging**.

1.3.2 SHIPMENT FOR PRODUCTS TO BE RETURNED TO THE CUSTOMER

The repaired product shipment from AUDIOTEL is **EXW (ex works,** at customer charge**)**.
If a product **IS NOT COVERED BY WARRANTY** and it works properly when it is checked by our technical staff, the amount of **40 EURO + V.A.T.** will be on customer charge for checks and calibration.

Request Authorization number fo return of the goods

Date:	
Company	
Reference person:	
Phone:	FAX:
Product description:	
Serial number:	
Description of the accessories which may have been returned:	
Invoice / Document of transport number and date: WARNING!! The warranty proof is under the customer responsibility: if this field is not filled in, the product is not considered to be under warranty)	
Detailed description of failure and usage configuration:	

☐ Tick off for quotation

If a product IS NOT COVERED BY WARRANTY and it works properly when it is checked by our technical staff, the amount of 40 EURO + V.A.T. will be on customer charge for checks and tests.

Space reserved for ELECTREX's answer:

R.M.A. N.

Il The RMA number has to be written on the outer package and on the Transportation Document (DDT). If it is not written, the ELECTREX warehouse is authorised to reject the goods.

2 GENERALITIES

2.1 CONTENT OF THE SALES BOX

- User Manual
- GSM POWER METERING PRODUCT

- Battery 12V 7Ah
- External Antenna
- 5 pole loose clamps (3 units) and 2 pole (1 units)
- Fusibile di ricambio

2.2 TECHNICAL FEATURES

2.2.1 PHISICAL DESCRIPTION

Dimention	254x200x98mm
Weight	3Kg max
Operation temperature	From –20°C to +55°C
Umidity	From 0 to 95% not condenced
Container	Plastic 120° IP54

2.2.2 EXTERNAL CONNECTION

Plug external antenna	Femail connector SMA
Passacavi	3 x PG13 1 x PG9

2.2.3 MAIN FEATURES

Primary power supply	230Vac 50/60Hz
Functional compatibility	GSM 900-1800 MHz
Antenna impedence	50Ω
Power RF	Class 4 (2W) @900MHz Class 1 (1W) @1800MHz
Consumption	
In stand by	2VA
With active inputs	4,5VA
Standby with rechargable bactery	9VA
Active GSM max. power	6,6VA
Active GSM+inputs + charger	15VA
From Battery to standby	2W
Battery with active GSM	6W

2.2.4 ELECTRICAL FEATURES

Selfsupplied inputs	7 Vdc 15 mA
Outputs	Optomos 250 Vac-dc 100 mA

2.2.5 CONNECTION

Inputs	4 optoisolated inputs with screw clamps compatible with closing contacts
Outputs	4 optoisolated outputs input repeaters with screw clamps compatible with AC DC current
Battery	Ermetics lead 12V 7Ah with faston 6mm
SIM	Type Plug-in

2.2.6 GSM PERFORMANCES

SMS	MT/MO/CB/PDU Modality
DATI	Asynchronous data transmission modality GSM not transparent mode (2400 / 4800 / 9600 bit/s), CSD till a 14.4 Kbps, USSD, V.110

2.2.6.1 PROTECTION

Fuse	250V 500mA tipo ritardato (T)

3 Apparatus description

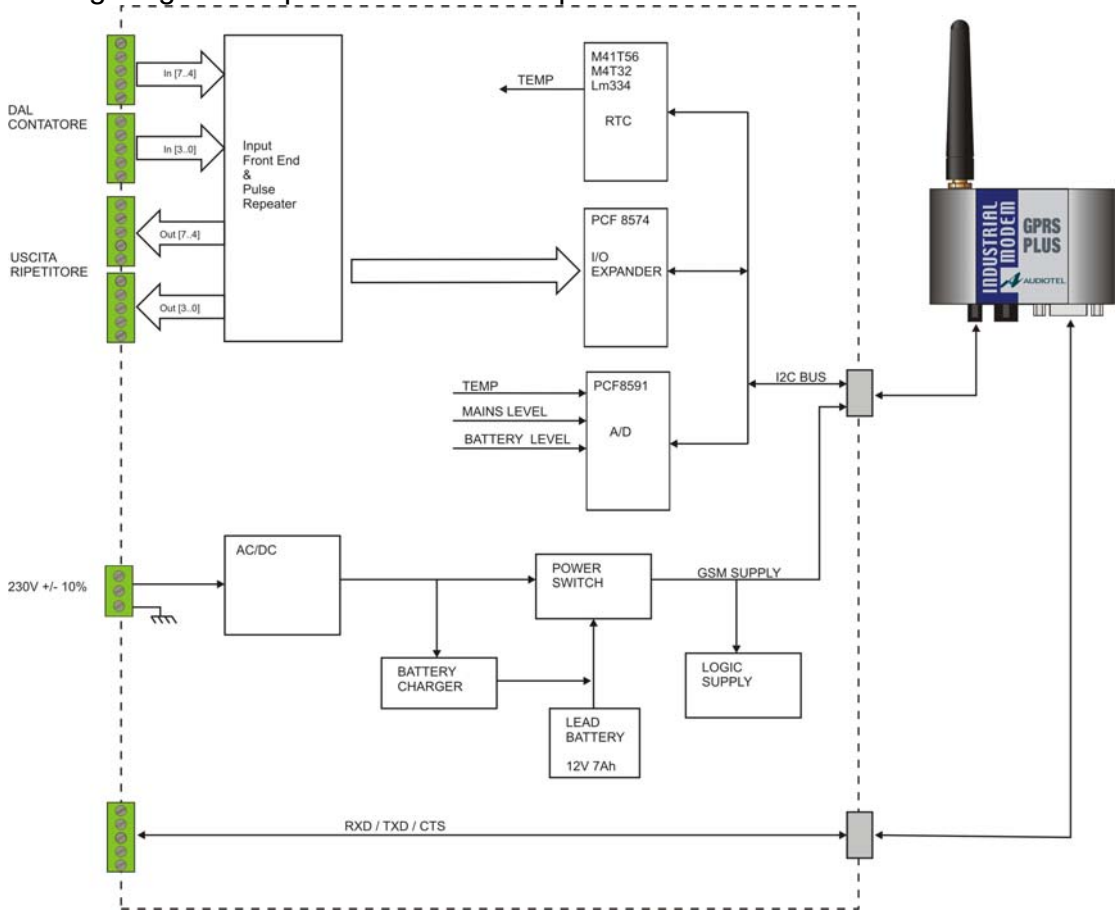
3.1 Descriiption

The GSM POWER METERING product is the ideal solution for and electrical energy counter generated pulses acquisition, and transmitt them through a GSM to a control center.

The product is constituted from a plastic container for external environment with contains:

- The electronics
- The GSM module
- The Battery

The following diagrams represents the entire product.



3.2 Elettronics

Is constituted from two boards

- Data Boards
- Power Boards

Data Boards

On this boards is mounted the entire circuit of the product, except for the power supply which is connected to the network.

The boards include the following groups:

Input and pulse repeater constituted by 8 optic isolated inputs (4 usually not equipped) and 8 optically insulated outputs (4 usually not equipped) connected to an i/o register bus I2C.
Clock with maintainance battery for bus I2C with local clock function.
Converter A/D D/A for temperature control, battery tention and network battery.
Powersupplier DC/DC for the power supply of the circuit.
Power supply DC/DC for battery recharging..
The GSM module is connected to this board, and to the Power board

Power board
Includes the circuits directly connected to the singlephase network with primary power supply. (Transformer and input protection), and it is mounted on the data boards to which is connected through the connector.

GSM Module
Constituted by the product Industrial Plus GSM belonging to the Audiotel Engineering S.p.A. company, integrating with the function for entering the GSM network, and also the intelligence for controlling the product.
It is supplied through the data boards, and it is connected through the bus I2C to it for reading the input data.
It is supplied with antenna connection , and SIM card.

Battery
Hermetiacally sealed battery of 12Vcc 7Ah connected to the data boards which allows its control and recharging. No maintenance required. It allows the functioning of the product in case of lack of primary power supply.

3.3 FUNCTIONALITY AND FIELD OF APPLICATION.
The GSM POWER METERING product has 4 optically insulated inputs, suitable for managing:

- 2 inputs for synchrony of the tariffs band
- 2 inputs for counting the energy pulses.

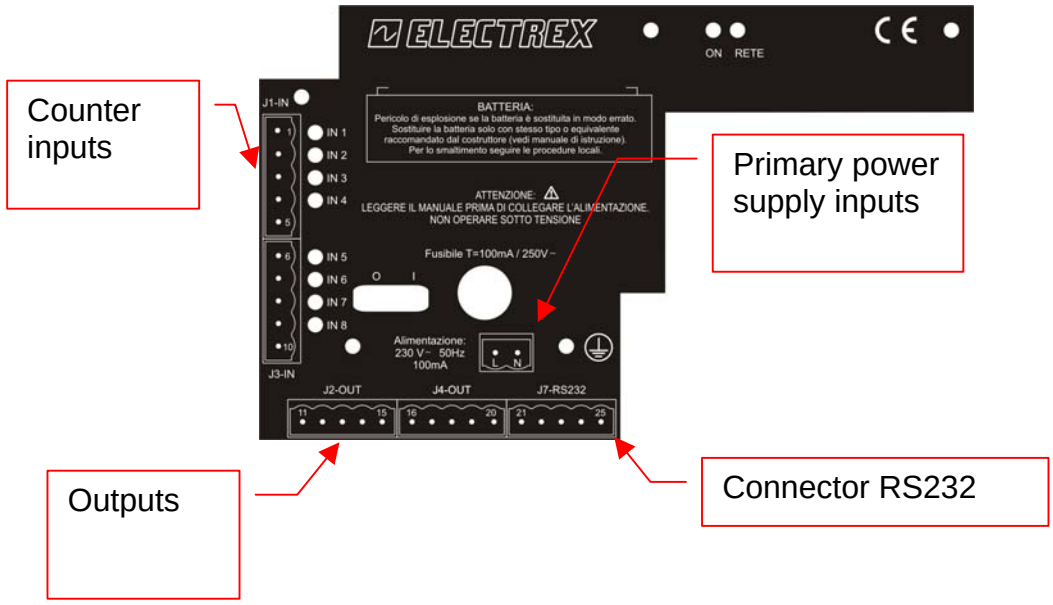
Also the 4 inputs are repeated on equally other optically insulated outputs, in order to allow the connection to other equipment.
Inputs for synchronisation on tariffs band.
The two input for the synchrony of the tariff band allows the GSM POWER METERING to synchronize the internal clock with the counter clock of the energy supplier.
Inputs for count reading.
The two inputs for counting the pulses allows the GSM POWER METETING to survey the computation coming from the counter and to record it inside of it while waiting for the request for data from the side of the control center.
Computation management
The GSM POWER METERING product survey the input account by means of pulses > 50mS, and generate a ratio , equal to the counter integration time ,which is written in a not volatile, for a maximum of 60 days. It is a circular memory, therefore every 60 days, the oldest day, is automatically eliminated. Upon request of the control center (GSM network entering call) this ratio can be read.

3.4 GSM POWER METERING front view

3.4 GSM POWER METERING INTERNAL VIEW

3.5 DIAGRAM CONNECTION

All the connection can be accessed by unhanging the panel placet on the electronics (see figure), which must be replaced after the installation



Connector primary power supply input

On Power board

# pin	Function
1 L	Phase
2 N	Neutral

Note.: On the Power board it is present a mechanical port by the primari power supply connector side predisposed for the neutral connection coming from the primary power supply line. To this port it must be connected the neutral heded with a eyelet rope, through a M3 screw + nut + washer. The connection of the neutral cable realizedin this way has also the purpose to mechanically hold back the power supply cable.

Input connector

J1-IN on data diagram

# pin	**Function**	**Clamp Diagram ES**
1	Input 1 Tariff band LSB	D (RI 1)
2	Input 2 Tariff band MSB	C (RI 2)
3	Input 3 Account 1	A (Ea Active Energy)
4	Input 4 §Account 2	B (Er Reactive Energy)
5	Common inputs	E (Cmmon)

Output Connector

J2-OUT on data diagram

# pin	**Function**
11	Common Output
12	Output 1 (Related to the Tariff band input LSB)
13	Output 2 (Related the the Tariff band input MSB)
14	Output 3 (Related to the account input1)
15	Output 4 (Related to the account input 2)

Connettore interfaccia RS232

J7-RS232 on data diagram

# pin	**Funzione**
21	+8V
22	TXD (level RS-232)
23	RXD (level RS-232)
24	CTS (level RS-232)
25	Neutral

4 INSTALLATION

4.1 GENERAL WARNINGS

The product may be only employed for the use for which it has been conceived and manufactured. Any other form of employment shell be considered on the user's sole responsibility.
Commissioning may only occur after the product has been correctly installed. As a consequence, the user shall carefully carry out all the operation described in the manual supplied.
Electrex S.r.L will disclaim all responsibility for any failure, breakdown, accident, etc. due to the lack of knowledge or observance of any instruction which may have been given. The same principle appies for any non authorised change. Electrex S.r.L. reserves the right to change the product for any constructive or commercial need. It is not obliged to update reference manuals promptly. GSM Power Meter use the GSM/GPRS standart for cellular telephony. As a consequence they can be used only in zone inside the system coverage area. Since the GSM/GPRS is a radiofrequency technology (RF). It may interfere with the operation of any other electric and electronic device.
In case the antenna is directly mounted on the product, the modem has to be placed at least 2 meters far from any electric or electronic device.

The user has to respect the regulations in force, in particular it is forbidden to use GSM Power Meter.

- On the plane
- In the hospitals and nursing centres.
- In the proximity of fuel stations or where the is a risk of explosion.
- In the places where chemical agents in general are in use and by paying special attention to the safety rules for environments saturated (or potentially saturated) with volatile gases or fumes.
- In the places where detonation operations are carried out.
- In the proximity of electromedical devices, including personal auxiliary systems, such as pacemakers and electroacoustic devices(hearing aids

- In the places with a high degree of humidity.

WARNING ON THE RIGHT USE OF THE BATTERY

GSM POWER METERING is supplied with a hermetical sealed battery (no maintenance required) from 12Vcc 7Ah t Yuasa type,. model NP7-12

Warning to be followed:

- Danger of explosion in case the battery is wrongly connected.
  (ATTENTION SHOULD BE PLACED TO THE POLARITY AND THE CHARACTERISTICS.)
- The battery should be substituted only with the same model or an equivalent one.
  In any case ask for replacement to Electrex.
- For getting rid of it, follow the local procedure.
  Don't get rid of it together with the common material, don't through the battery in the environment.
- Avoid any contact with the acid container in the battery.
  Electrolyte is highly toxic and can cause serious damages by touching it. If in contact with other materials it can emit dangerous gases.
- Avoid the transport when the battery is located inside the product.
  Use a strong different package, and indicate on its external side the presence of the battery.

In case of contact with the battery contained acid:

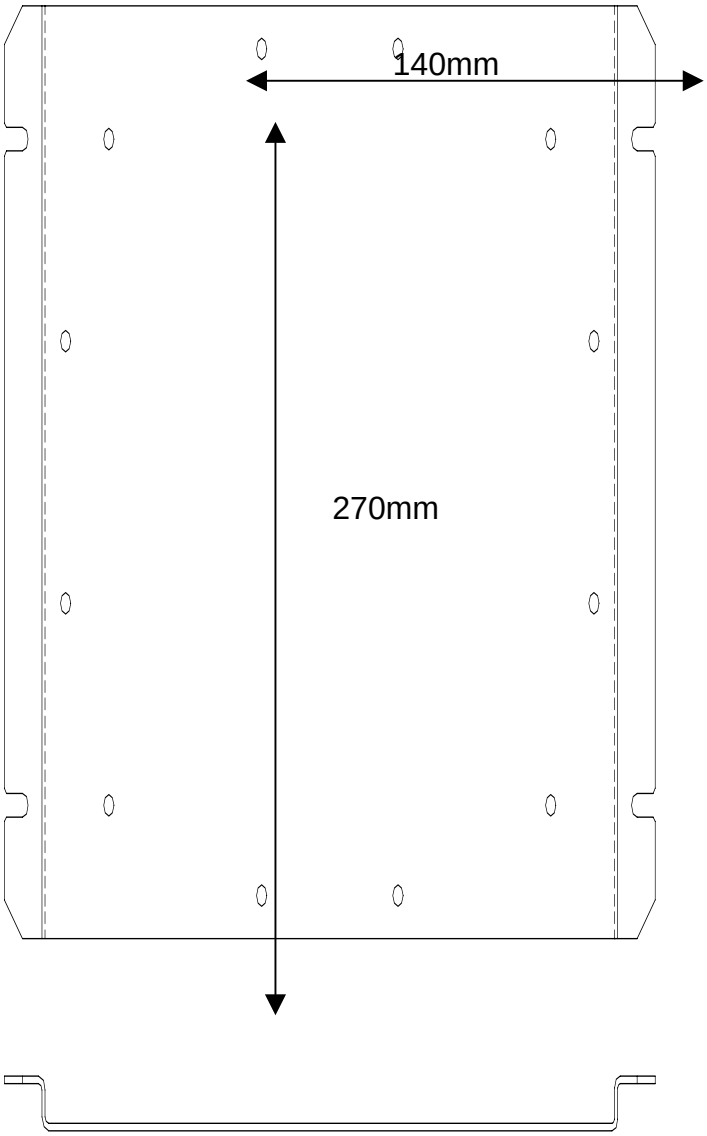
- Wash immediately with abundant water and neutralize with a soda based solution.
- In case of ingestion immediately to t the hospital.
- Avoid any other operation without the intervention of an expert.

4.2 GSM POWER METERING POSITIONING

GSM POWER METRING is supplied together with a wall mounting plate. The installation positioning should allow the access to the frontal panel.
It is advisable a mounting position with the antenna in an upward position , while it is better to avoid a mounting position with the battery in an upside down position.
Choose a compatible mounting position in a zone with the GSM system coverage area. (You can help yourself by using a mobile phone supplied with a SIM card belonging to company which you want to use for the product .and verify the presence of enough coverage indicated by the presence of three tally on the mobile phone).
Avoid too humid position, and avoid to expose the product to liquid.

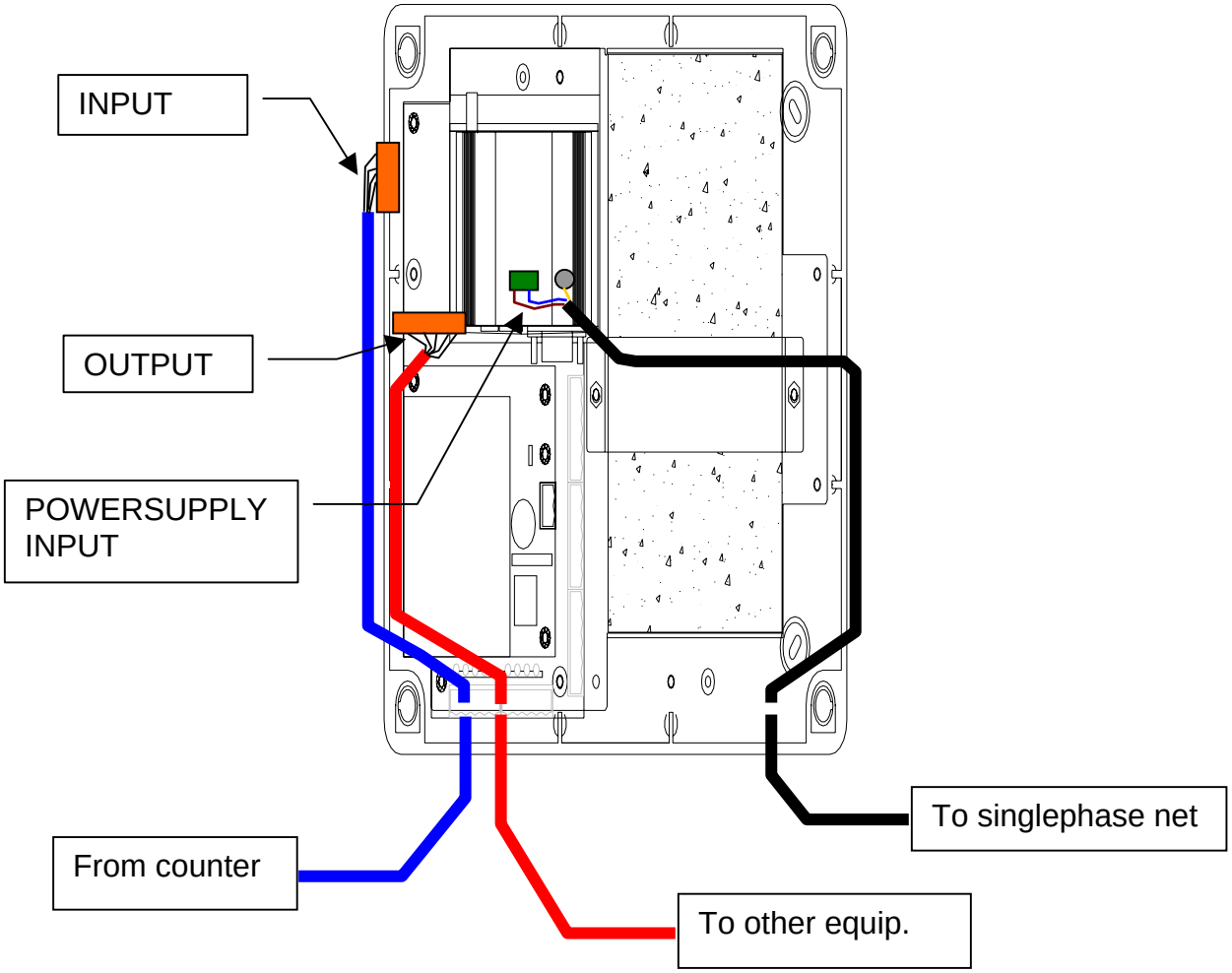
4.2.1 WALL MOUNTING

For the wall mounting use 4 plastic wall dowel positioned accordingly to the following diagram, at the corner of a rectangle.of 140mm x 270mm.

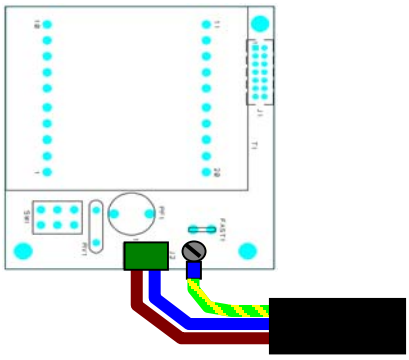


4.2.2 Wirig

After hanging the product to the wall , it is necessary to execute the right cabelling, accordingly to the following diagram, by keeping the primary cable separated from the cable connected to the input and output. For this purpose use the cable holder present on the equipment.

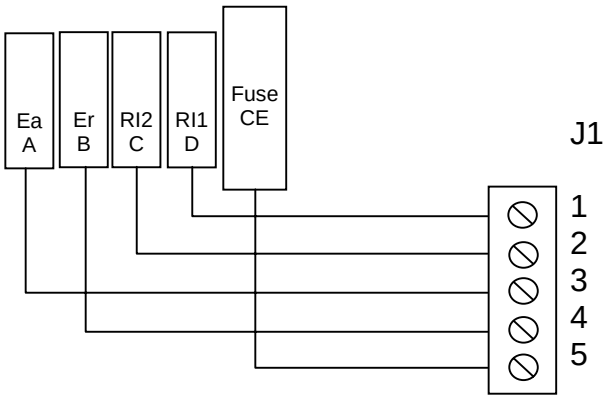


It is necessary to protect the primari powersupply cable up line on the protection fuse or any other protection device,accordingly to the electricity safety standards.
The primary powersupply cable shall have an adeguate section in order to bare a maximum working load of 18VA and a current of 1A to 230V 50 Hz.
Connection of the primari power supplì cable.



Example of connection to a GMC ENEL counter

Ea	Active Energy	3
Er	Reactive Energy	4
RI1	Tariff 1	1
RI2	Tariff 2	2



The input are optical insulated and compatible with usually opened contacts. The cable used for the input connection should have enough section in order to bear voltage of 12mA 8Vcc. We suggest the use of shielded couples in case of installation in particularly electrical disturbed environment

The cable used for the outputs connection should have a sufficient section and bear maximum voltage loads of 120mA 350Vp (both AC/DC) . We suggest the use of shielded couples in case of installation in particularly electrical disturbed environment.

At the end of the cabelling phase please close all the cables holder by tightening them to the end, and assuring a perfect adjustment of the cable.

4.2.3 Antenna

GSM POWER METERING should be connected to an antenna with suitable characteristics and operate in the band frequency of 890-960 Mhz and 1710-1880 MHz with nominal impedence of 50Ω.

Antenna should be placed at minimum two minimum 2m of distance from any electrical and electonic existing in the environment and at least at a distance of 15 cm from any obstacle and in such a position to allow a good reception of the radio field.

The antenna should be mounted on the SMA connector which is present on the container , by screwing it till the end without forcing it.

In case of lack of signal use the antenna mounted in an adequate position and connected to the product with a " coassale" cable of headed with SMA connector. 50Ω intestato con connettore SMA.

Evitare di piegare il cavo coassiale con raggi di curvatura inferiori ai 4 cm.

Per la scelta dell'antenna contattare Electrex.

Non tenere l'antenna con le mani quando l'apparato è in uso. Ciò penalizza la qualità del collegamento, oltre a richiedere a GSM POWER METERING un aumento della potenza in trasmissione.

Non utilizzare il prodotto se l'antenna è visivamente danneggiata, in tal caso la sostituzione deve essere eseguita senza indugio. Si consiglia l'uso delle antenne prescritte da ELECTREX.

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