

CM-u-3 module

GSM/GPRS/UMTS communication module for MT880 meters

Technical description



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i. About the Technical description

- This technical description contains detailed information on the CM-u-3 GSM/GPRS/UMTS communication module for MT880 meters, its key features and functionalities.
- It is intended for a technical audience, who are responsible for the product and its integration into the system.

ii. Definitions, Acronyms and Abbreviations

RXD	Receive data
TXD	Transmit data
GSM	Global System for Mobile Communications
EGSM	Extended GSM
GPRS	General packet radio service
EDGE	Enhanced Data rates for GSM Evolution or EGPRS
UMTS	Universal Mobile Telecommunications System
CSD	Circuit Switch Data

iii. Reference documents

- MT880 User manual
- MT880 Installation and maintenance manual

iv. Versioning

Date	Version	Update
15.11.2013	V1.00	First version of document

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1. SAFETY INFORMATION

Safety information used in this Technical description is described with the following symbols and pictograms:



DANGER: for a possibly dangerous situation, which could result in severe physical injury or fatality – attention to a high risk hazards.



WARNING: attention to a medium risk hazards.

CAUTION: for a possibly dangerous situation, which could result in minor physical injury or material damage - attention to a low risk hazards.



Operating instruction: for general details and other useful information.

All safety information in this Technical description describes the type and source of danger; it is possible consequences and measures to avoid the danger.

All safety information written in this document applies to the MT880 meter with or without the module and to the module itself.

1.1. Responsibilities

The owner of the meter/module is responsible to assure that all authorized persons who work with the meter read and understand the parts of this technical description, the MT880 User manual and Installation and maintenance manual that explains the safe handling with the meter.

The personnel must be sufficiently qualified for the work that will be performed. The installation personnel must possess the required electrical knowledge and skills, and must be authorised by the utility to perform the installation procedure.

The personnel must strictly follow the safety regulations and operating instructions, written in the individual chapters in this document, the MT880 User Manual and the Installation and maintenance manual.

The owner of the meter/module responds specially for the protection of the persons, for prevention of material damage and for training of personnel.

1.2. Safety instructions

1.2.1. Handling and mounting

At the beginning of installation at the metering point, the module should be carefully taken out of the box where they were packed. This should prevent the module from falling as well as any other external or internal damage to the device and personal injuries. Should such an incident occur despite all precautions the module may not be installed at the metering point as such damage may result in different hazards. In such case, the module needs to be sent back to the manufacturer for examination and testing.



DO NOT OPEN THE MODULE COVER!

Opening of the module might result in defects and damages. In such a case the warranty is not valid.



CAUTION: The edges of the seals, sealing wires as well as some edges under (removed) terminal cover are sharp!



DANGER: In case of any damage inside the meter/module (fire, explosion...) do not open the meter/module.




CAUTION: The meter/module may be used only for the purpose of measurement for which it was produced. Any misuse of the meter/module will lead to potential hazards.



WARNING: Safety measures should be observed at all times. Do not break the seals or open the meter/module at any time!



It must be consulted in all cases where symbol  is marked in order to find out the nature of the potential hazards and any actions which have to be taken to avoid them.

The module and the MT880 meter installation procedure is described in the MT880 Installation and maintenance manual. For safety reasons the following instructions should be followed.



See the complete MT880 User manual for detailed technical features of MT880 meter and the module and its intended use.



Only a properly connected meter/module can measure correctly! Every connection error could result in a financial loss for the power company!

1.2.2. Meter/module installation procedure



The installer must consult and comply with local regulations and read the installation instructions written in the MT880 Installation and maintenance manual before installation.

This Installation and maintenance manual provides the instructions for installing MT880 meters and modules. The document provides a short overview of the meter, details of device installation and set-up, installation considerations, and health and safety considerations.

The installer will be considered as a public face by both the power company and its customers. The installer shall adopt the highest standards of behaviour and be respectful to clients and members of the public.

Before the beginning of the installation procedure, check if the metering point is correctly prepared for meter installation. The metering point must always be left clean and in order.

The work location shall be defined and clearly marked. Adequate working space as well as means of access and lighting shall be provided at all parts of an electrical installation on, with, or near which any work activity is to be carried out.

Where necessary, safe access to the work location shall be clearly marked.

The metering point must not be exposed to running water or fire.

Meter/module installation may not be performed by unauthorised and untrained personnel. Such persons are not allowed to cut the seals and open the terminal or meter cover as contact with the live parts of the meter is dangerous for life.



CAUTION: The installer is expected to fully understand the risks and safety issues involved in electrical installations. The installer shall be aware at all times of the potential hazard of electrical shock and shall exercise due caution in completing the task!

Tools, equipment and devices shall comply with the requirements of relevant National or International Standards where these exist. Tools, equipment and devices shall be used in accordance with the instructions and/or guidance provided by the manufacturer or supplier.

Any tools, equipment and devices provided for the purpose of safe operation of, or work on, with, or near electrical installations shall be suitable for that use, be maintained and be properly used.

Personnel shall wear clothing suitable for the locations and conditions where they are working. This could include the use of close-fitting clothing or additional PPE (personal protective equipment).



CAUTION: The installer must be correctly equipped with personal protection equipment (PPE) and use the appropriate tools at all times during the installation.

Working procedures are divided into three different procedures: dead working, live working, and working in the vicinity of live parts. All these procedures are based on the use of protective measures against electric shock and/or the effects of short-circuits and arcing.



The installer must be informed if the national legislation permits the work on the installation under voltage – live work, and must follow the rules of legislation.



Depending on the kind of work, the personnel working in such conditions shall be instructed or skilled. Live working requires the use of specific procedures. Instructions shall be given how to maintain tools, equipment and devices in good working order and how to verify them before working.

This subclause deals with the essential requirements (“the five safety or golden rules”) for ensuring that the electrical installation at the work location is dead and secure for the duration of the work.

This shall require clear identification of the work location. After the respective electrical installations have been identified, the following five essential requirements shall be undertaken in the specified order unless there are essential reasons for doing otherwise: disconnect completely (1.), secure against re-connection (2.), verify that the installation is dead (3.), carry out earthing and short-circuiting (4.) and provide protection against adjacent live parts (5.).



CAUTION: Only one wire or ferrule may be connected in one terminal. Otherwise, the terminal could be damaged or the contact could not be made properly.



CAUTION: Do not use those types of cable, which are not prescribed for the installation site and the power requirements!



DANGER: The insulation of the connecting cable must extend over the whole visible part of the cable. There must be no further bare part of the cable visible above the terminal edge. Touching live parts is dangerous for life. The stripped part of the connecting wire should be shortened if necessary.

1.2.3. Module maintenance

No maintenance is required during the module's life-time. The implemented metering technique, built-in components and manufacturing procedures ensure high long-term stability of meters and the modules. Therefore no recalibration is required during entire meters life-time.



In case the service of the module is needed, the requirements from the meter installation procedure must be observed and followed.

Cleaning of the module is allowed only with a soft dry cloth. Cleaning is allowed only in upper part of the module. Cleaning is forbidden in the back and side sites of the module. Cleaning can be performed only by the personnel responsible for meter/module maintenance.



CAUTION: Never clean soiled meters/modules under running water or with high pressure devices. Penetrating water can cause short circuits. A damp cleaning cloth is sufficient to remove normal dirt such as dust. If the meter/module is more heavily soiled, it should be dismantled and sent to the responsible service or repair centre.

Visible signs of fraud attempt (mechanical damages, presence of a liquid, etc.) must be regularly checked.

The quality of seals and the state of the terminals and connecting cables must be regularly checked.

If there exists a suspicion of incorrect operation of the meter/module, the local utility must be informed immediately.



After the end of the meter's/module's lifetime, the meter/module should be treated according to the Waste Electric and Electronic (WEEE) Directive!

2. CM-u-3 COMMUNICATION MODULE

2.1. General

The CM-u-3 module (see Figure 1) has integrated GSM/GPRS/UMTS modem and is intended for meters remote readout via 2G/3G mobile networks. The module is also equipped with RS485 interface for connecting additional meters by using cascading functionality.

The module can only be inserted into meters of type MT880.

It is constructed to be inserted or removed (replaced) from the meter with ease and fixed without any screws.



Figure 1: CM-u-3 module with antenna

2.2. Identification

The version and hardware type are stored in the module. This information provides plug and play operation and can be later read anytime from the meters register.

3. MODULE CONFIGURATION

3.1. Power supply

Power supply for the module is provided by the meter. Consumption depends on signal strength and type of communication: from standby 0,6W to max. 3W in communication mode with low signal.

3.2. Communication channels

There are two communication channels on the module:

- Primary channel is used for modem communication
- Secondary channel is used for RS485 communication

3.3. Module to meter connector



Figure 2: 24 pin connector on the back side of the module

Module to meter connector provides power, control and data signals.

3.4. GSM/GPRS/UMTS

Primary communication channel of the module is GSM/GPRS/UMTS integrated modem, and it is used as remote reading access point to the meter.

Pre-set primary communication channel settings between meter and module are:

- baud rate : 115200bps
- data bits: 8
- stop bits: 1
- parity: none

A GSM LED shows current status of modem (see Figure 3 and Table 1).



Figure 3: GSM LED position on the front plate

LED STATUS	DESCRIPTION
OFF	Module has no power
ON	Modem turned on – not registered
Slow Flash	Modem registered to network
Quick Flash	CSD call in progress

Table 1: GSM LED status

Primary communication channel LEDs show activity on modems communication channel (see Figure 4 and Table 2).



Figure 4: Primary communication channel LEDs position on the front plate

LED	DESCRIPTION
TXD1	Lit when modem is receiving data from the meter
RXD1	Lit when modem is transmitting data to the meter

Table 2: Primary communication channel LEDs status

3.5. RS485

Secondary communication channel is implemented with RS485 interface. It can be used for:

- meter access,
- cascading up to 31 additional meters with unique identification number.

Same transfer rate needs to be set on all meters connected to a single module via RS485.

Each RS485 signal has two terminals for easier multiple connections.

The meter hosting the communication module controls secondary communication channel settings.

Secondary communication channel LEDs show activity on RS485 interface. (See Figure 5 and Table 3.)



Figure 5: Secondary communication channel LEDs position on the front plate

LED	DESCRIPTION
TXD2	Lit when RS485 is receiving data from the meter
RXD2	Lit when RS485 is transmitting data to the meter

Table 3: Secondary communication channel LEDs status

4. MODULE CONNECTION

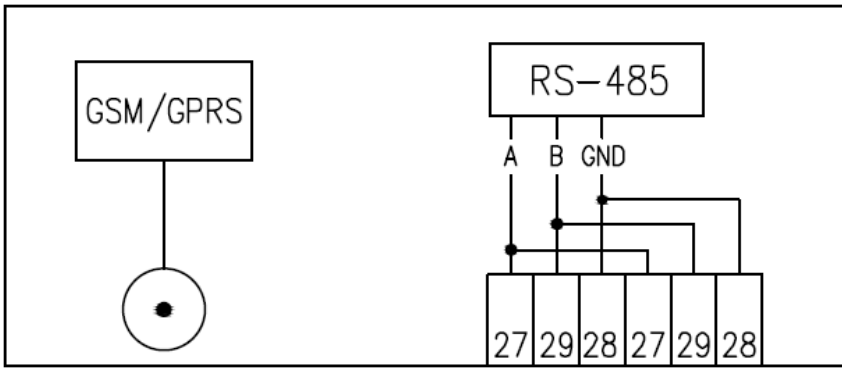


Figure 6: Connection diagram

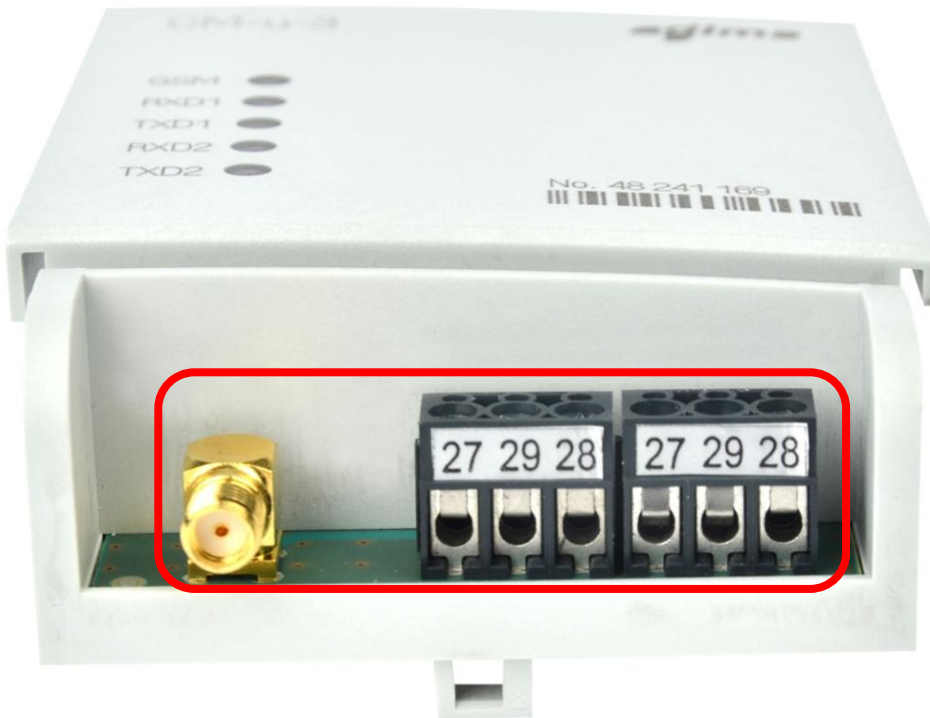


Figure 7: CM-u-3 module terminals and antenna connector

5. TECHNICAL DATA

5.1. GSM/GPRS/UMTS modem

The modem is built-in on the module. Basic features of the modem are:

- Quad band GSM/GPRS/EDGE 900/1800/850/1900MHz
- Dual band UMTS 900/2100MHz
- Complete shielding
- 2W EGSM/GPRS 850/900MHz radio section running under 3.6V
- 1W GSM/GPRS 1800/1900MHz radio section running under 3.6V
- 3V / 1.8V SIM interface
- GPRS multislots class 10
- EDGE multislots class 12
- Full GSM or GSM/GPRS/EDGE operating system stack
- Selective disabling of any 2G or 3G frequency band
- Echo cancellation plus noise reduction

5.2. Power consumption

Consumption depends on signal strength and type of communication:
from standby 0,6W to max. 3W in communication mode with low signal.

5.3. RS485 interface

Technical data for RS485 interface:

- transmission rate 300 - 115200 bit/s
- maximum of 31 connected meters
- 2-wire transfer mode
- maximum distance between meter and module 1200m

5.4. Environment conditions

Temperature ranges:

- operation: -40 to +70
- storage: -40 to +85

Air humidity: max. 95%

5.5. Impulse voltage test (IEC 62052-11)

- Level: 6kV
- Number of impulses: 10 of + and - polarity

6. DIMENSIONS

Width / Height / Length (mm) – see Figure 8

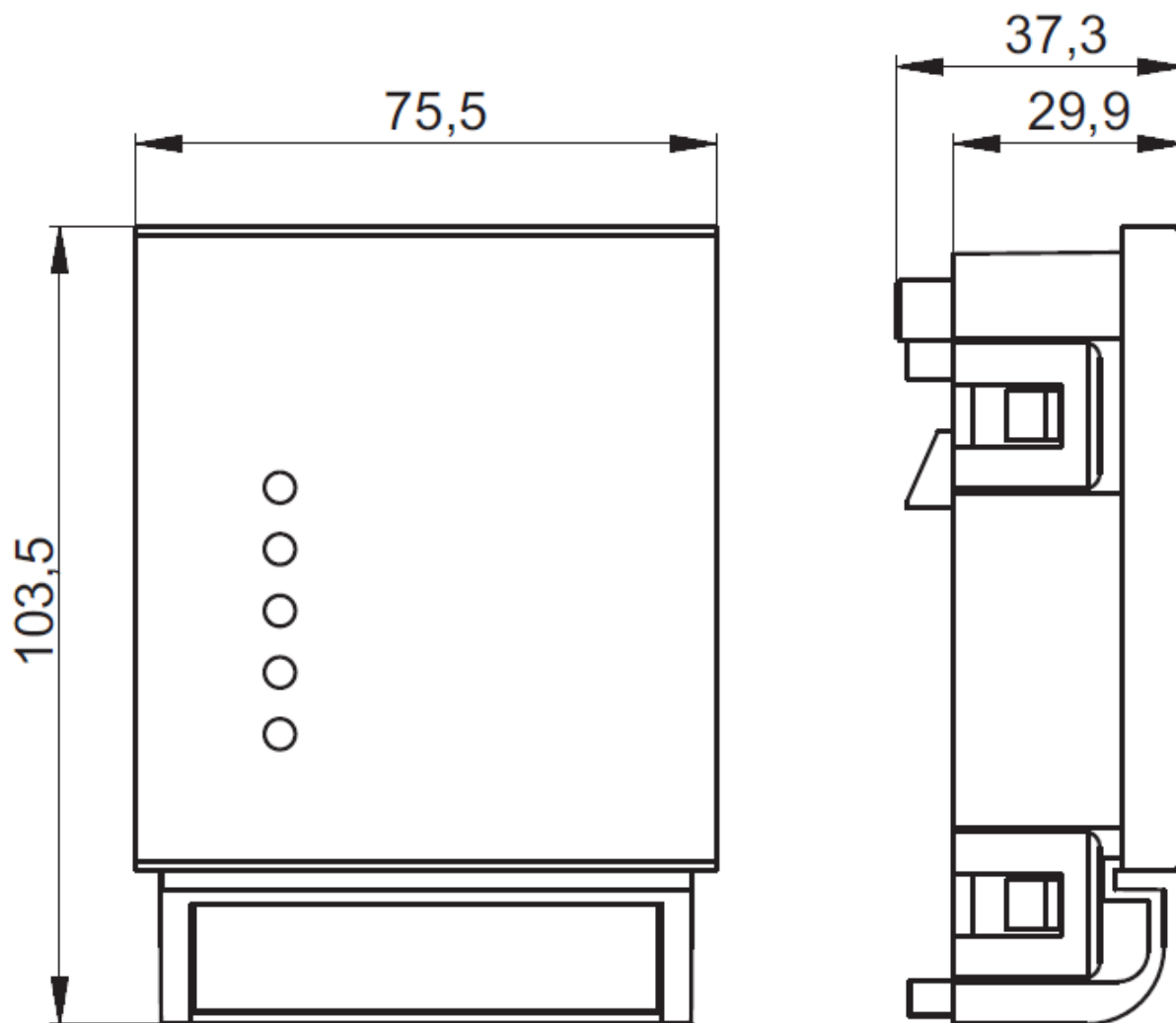


Figure 8: Dimensions of the CM-u-3 module

7. MODULE TYPE DESIGNATION



Figure 9: CM-u-3 module type designation

CM-u-3

CM	Communication Module
u	UMTS (3G) modem
3	RS485 interface

Table 4: Description of CM-u-3 module type designation

Owing to periodically improvements of our products the supplied products can differ in some details from data stated in this manual.

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