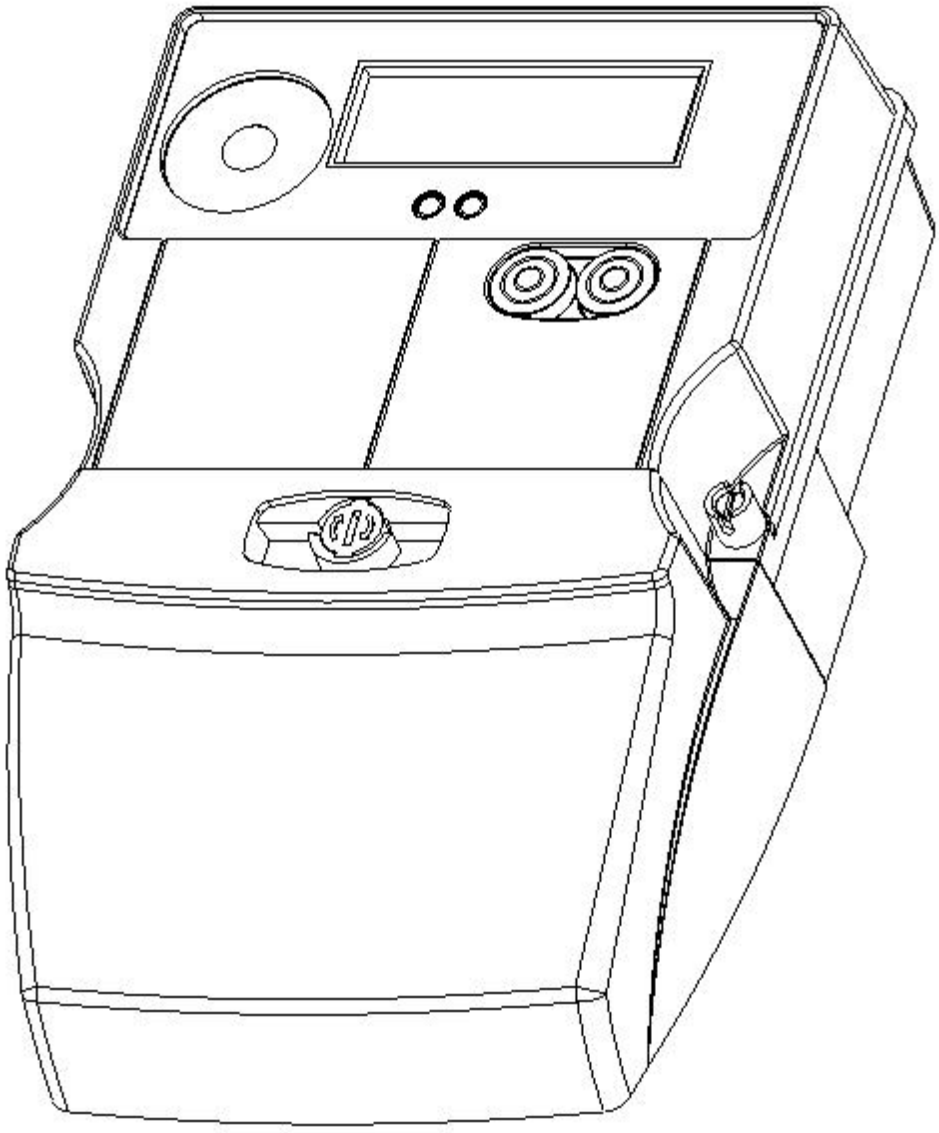
# CX1000-5 PLC

***Single phase meter with Powerline communication***

# USER MANUAL
# (V1.00)



SAGEM

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# 1. INTRODUCTION

## 1.1 Object

This document makes up the user manual for SAGEM CX1000-5 PLC single phase meters.
It details:

- Meter characteristics,
- Tariff management,
- Installation, assembly and connection conditions,
- Reading and local programming procedures.

## 1.2 Reference standards

| | |
|---|---|
| IEC 62052-11 | Electricity metering equipment (c.a)-<br>General requirements, tests and test conditions - Part 11: Metering equipment" |
| IEC 62053-21 | Electricity metering equipment (c.a) -<br>Particular requirements - Part 21: Static meters for active energy.(class 1 et 2)". |
| IEC 62053-23 | Electricity metering equipment (c.a) -<br>Particular requirements - Part 23: Static meter for reactive energy (class 2 et 3)". |
| British Standard BS5685 | « Specifications for electricity meters - Class 0.5, 1 and 2 single-phase and polyphase, single rate and multi-rate watt-hour meters » |
| IEC 62054-21 | Tariff and load check time switch |
| IEC 62056-21 | Data exchange for meter reading, tariff and load control. Local data exchange. |
| IEC 62053-31 | Pulse output devices for electromechanical and electronic meters ( 2-wire only) |
| IEC 61334-5-1 | Distribution automation using distribution line carrier systems – Part 5-1: Lower layer profiles - I **-** Profil S-FSK (spread frequency shift keying) |
| DIN 43864 | Electricity meter – current interface for transmission of impulses between an impulse encoding counter and a tariff meter. |
| IEC 60529 | Degree of protection provided by casing |

## 1.3 EC marking

The CE marking attests to the conformity of the product with the international technical regulations and harmonized European standards that apply when the product is released on the market, in particular in accordance with the European Electromagnetic Compatibility directive 89/336/CEE modified by directive 93/68/CEE.

# 2. CHARACTERISTICS

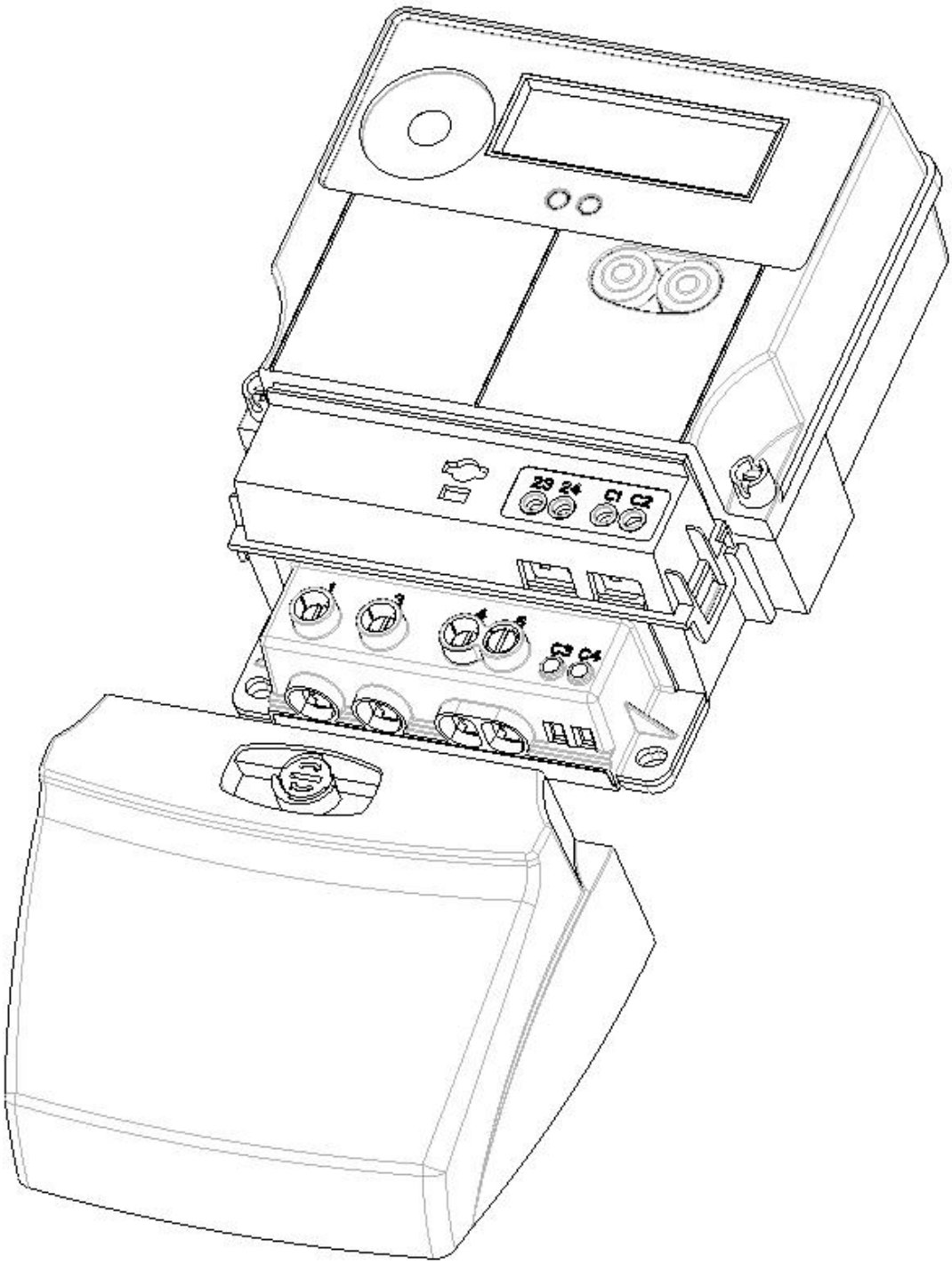
## 2.1 Presentation

SAGEM CX1000-5 PLC meters are single-phase, direct connection, multi-tariff meters with integrated PLC communication. They offer the following features:

Imported and exported active energy measuring in compliance with standard IEC 62053-21 5 (80) A class 1. The meter can also perform the following measurements :

- Reactive energy: QI, QII, QIII, QIV (reactive energy in each quadrant)
- Instantaneous voltage
- Instantaneous current
- Instantaneous active imported power (W)
- Average active power (W): P (average over the integration period)
- Average reactive power (Var): Q (average over the integration period) 4 quadrants.
- Tariff management up to 6 tariffs. Switching is handled by internal clock.
- LCD display for local data display
- Communication transported by Powerline communication in compliance with PLAN and DLMS COSEM HDLC S-FSK standard.
- Local communication by optical link according to IEC 62056-21
- Power relay
- Software programming possible only when the meter terminal cover is open (optional)
- Load curve
- Historisation

The meter is as illustrated below:



## 2.2 Electrical characteristics

### 2.2.1 Voltage

CX1000-5 PLC meters are designed to operate on 230V - 50Hz mains power.

| | Nominal value | Maximum values |
|---|---|---|
| Voltage | Un = 230 $V_{AC}$ | 191 $V_{AC} \leq U \leq$ 276 $V_{AC}$<br>Accepts permanent over voltages up to 440 $V_{AC}$ |

### 2.2.2 Intensity

| | Reference values | Maximum values | Standard |
|---|---|---|---|
| Intensity | Ib = 5 A<br>Imax = 80 A | 0.05 Ib at Imax<br>30 Imax (500 ms) | IEC 62053-21 |

### 2.2.3 Frequency

| | Nominal values | Maximum values | Standard |
|---|---|---|---|
| Frequency | fn = 50 Hz | 47 Hz $\leq$ f $\leq$ 53 Hz | IEC 62053-21 |

### 2.2.4 Consumption

| | |
|---|---|
| Voltage circuit | < 2 W and < 10 VA |
| Intensity circuit | < 2.5 VA at Ib |

### 2.2.5 Measurement precision

The meter is set at the factory. It does not require any adjustment after installation.

| | |
|---|---|
| Active imported and exported energy | Class 1 or class 2<br>(depending on model), IEC 62053 -21 |
| Real-time clock | IEC 62054-21 < 6 ppm,<br>< 15 s/month at 23°C<br>drift < 0.15 s /°K /24 h |

For the metrological check, the meter is equipped with an optical pulse transmitter device (Flash Led) with a 1 Wh/pulse output.

### 2.2.6 Power break relay

The meter is optionally equipped with a 100 A relay to disconnect the customer connection, phase break only.
Under no circumstances does the relay represent a security measure.

### 2.2.7 Operating reserve

The meter is not affected by power cuts lasting less than 500 ms.

The data is saved in a non-volatile EEProm type memory each time there is a mains disconnection, and at least once every 24 hours.

Versions equipped with a clock have a special super-capacity operating reserve, guaranteeing more than 7 days autonomy. If the time is lost after a power cut lasting longer than the operating reserve, or on delivery, the meter's clock is set to a default date: 01 January 2000 at 00.00.00. The meter will start up in default tariff mode with the relay open (optional).

As the meter does not use any batteries it does not require any maintenance.

## 2.3 Environmental conditions

### 2.3.1 Temperature range

| | Values |
|---|---|
| Specified operating range | -25 °C to +70 °C |
| Maximum operating range * | -30 °C to +70 °C |
| Storage and transportation | -40°C to +80 °C |

* Within the maximum operating range, the meter's accuracy is not guaranteed. All of the meter's functionalities will be available on return to the specified operating range.

### 2.3.2 Humidity

| | Values |
|---|---|
| Specified operating range | $\leq$ 90 % at 40 °C |
| Storage and transportation | $\geq$ 95 % at 40 °C |

### 2.3.3 Protection

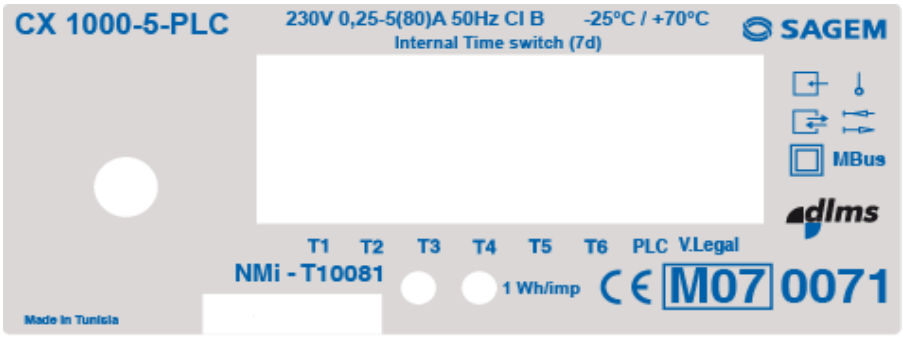
CX1000-5 PLC meters are indoor meters complying to protection standards IEC 62052-11.

The electrical insulation level conforms to class II.

The casing is protected against water and dust penetration (protection index IP51 according to IEC 60529).

## 2.4 Marking

***Meter identification (CX 1000-5 PLC class 1)***



## 2.5 Communication

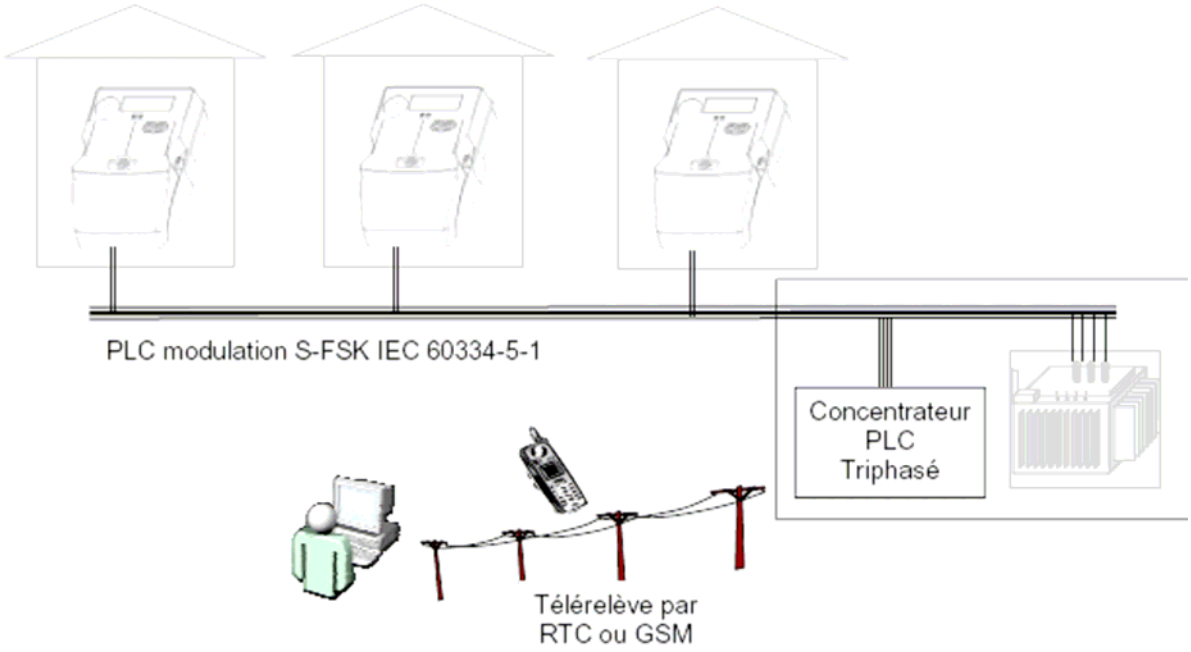
The meter can be read or programmed via a numeric link. There are two possibilities:

- Meters can be connected using Powerline Communication, PLAN S-FSK protocol, in compliance with IEC 61334-5-1, IEC 61334-4-511 and DLMS COSEM HDLC S-FSK protocol, in compliance with IEC 62056-46, IEC 62056-53 and IEC 62056-61
- Local connection using standard methods (optical probe) via frontal optical link, IEC 62053-21 compatible optical probe.

The same meter-reading and programming software may be used for both channels.

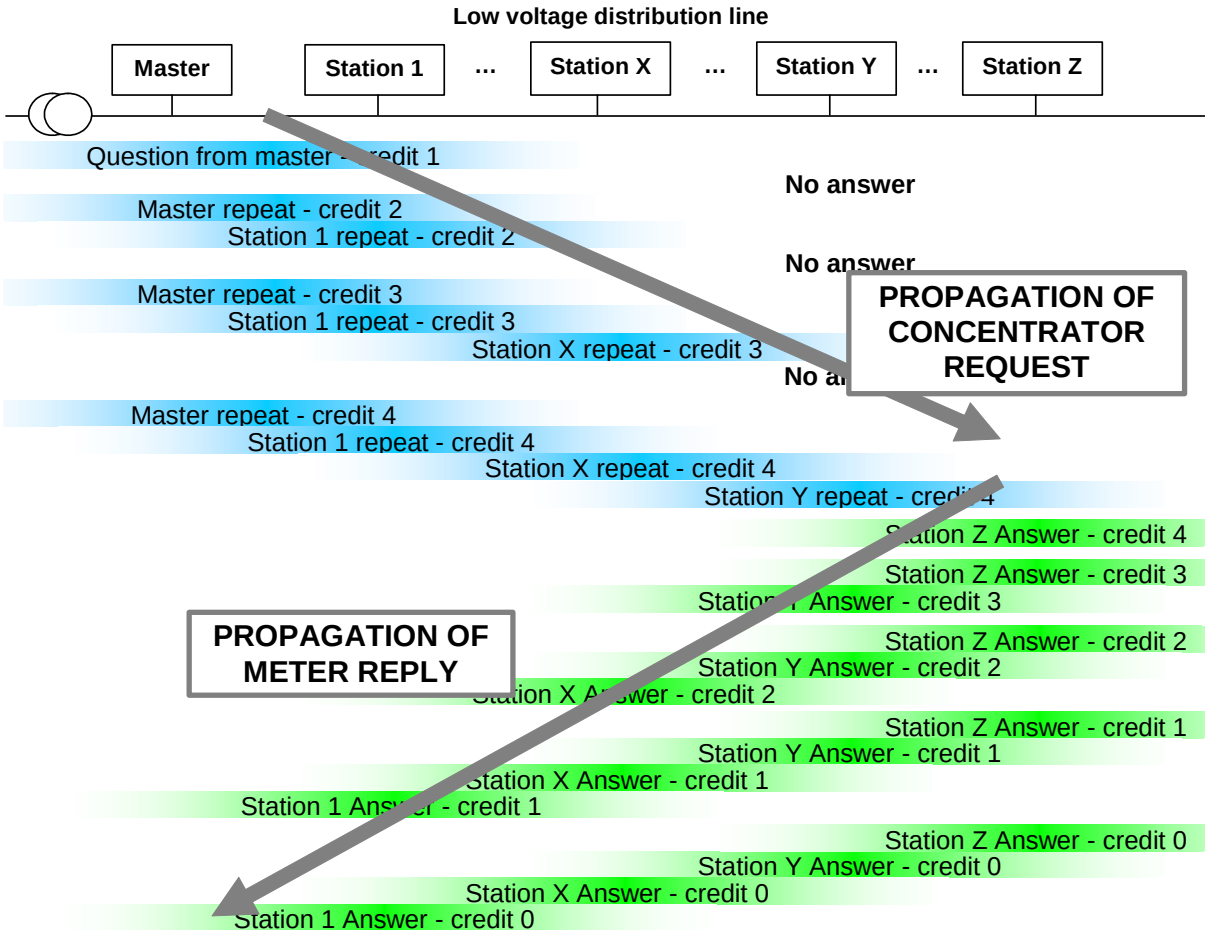
### 2.5.1 PLC communication

All the meters connected in a low-voltage network may be linked via PLC communication to a data concentrator generally located at the distribution substation. The data can thus be read by remote meter-reading using RTC, GSM GPRS etc.




The CX 1000-5 PLC meter uses PLAN OR DLMS COSEM HDLC protocol in compliance with international standard S-FSK in bandwidth 50-90 kHz (CENELC A-Band). Transmission speed is 1200 bds.

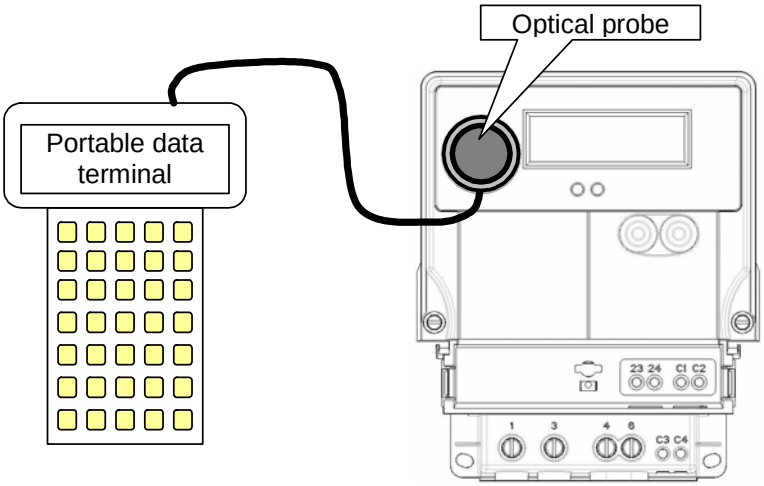
CX 1000-5 PLC meters use the PLAN and DLMS COSEM HDLC protocol combined repetition function. Each meter repeats the message emitted by its neighbour up to 7 times. The message is spread in this way from meter to meter throughout the network and thus reaches all the meters in the low-voltage network.




The combined repetition function means that each meter is a natural message repeater. This avoids using specific equipment to re-amplify the message. This function allows the communication system to adapt automatically to any modification in the electrical network structure: meter addition/removal, network impedance modification, electrical noise, etc.

### 2.5.2 Optical link

The optical link is accessed using an IEC 62056-21 compatible probe on the front panel of the meter. Transmission speed is 1200 bauds and the protocol complies with international standard IEC 62056-31.




To avoid any untimely modification, an option can be factory-programmed to authorise optical link programming only when the terminal cover is open.

## 2.6 Options

### 2.6.1 Pulse emitting device

Depending on the version, the meter is equipped with a pulse emitting device in accordance with standards DIN 43864 and IEC 62053-31. Its position on the meter is described in paragraph “Auxiliary terminals”, on page 25. Pulse output value is 1 Wh/imp (imported active energy measurement only).

# 3. FUNCTIONALITIES

## 3.1 Tariff management

Up to 6 active and reactive energy registers may be handled.

Switching from one register to another is managed by internal clock.

## 3.2 Internal clock

Selection of the applicable tariff for power consumption is determined by a programmed timetable saved in the meter's non-volatile memory.

The meter handles four seasons whose starting dates must be programmed into the meter.

For each season the meter handles 8 types of day.

- Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday
- Public holidays.

Seasons can be optionally programmed to follow official time-change dates (according to EC standards). The change from one season to another will take place on the last Sunday of March and October. In this case only 2 seasons (WINTER/SUMMER) can be programmed.

Specific tariff bands can be programmed into the meter for each day, with a maximum of 8 changes per day.

The meter can handle 30 "fixed" or "variable" public holidays.

The following table displays the hour/date structure information used in the meter:

| | |
|---|---|
| Number of seasons handled | 4 |
| Number of tariffs handled | 6 |
| Number of types of day handled | 7 |
| Number of daily tariff bands handled | 28 = 4 (seasons) X 7 (types of day) |
| Maximum number of tariff changes per day | 8 |

Legal time-change:

Legal time-change (winter/summer) can be programmed according to the EC standard or at any time during the year.

The time of legal time-change is programmable.

Example of a 3-band tariff program.

In the following example the meter is programmed with three tariff bands, I,II, III, which in this case correspond to:

- I: reduced tariff (night)
- II: normal tariff (day)
- III: peak tariff

In summer (1st April to 30th September):

Week: Monday, Tuesday, Wednesday, Thursday, and Friday

- Reduced tariff (I) from 00.00 to 06.00
- Normal tariff (II) from 06.00 to 17.00
- Peak tariff (III) from 17.00 to 21.00
- Normal tariff (II) from 21.00 to 22.30
- Reduced tariff (I) from 22.30 to 00.00

Weekend: Saturday and Sunday

- Reduced tariff (I) from 00.00 to 00.00

Winter (1st October to 31st March):

Week: Monday, Tuesday, Wednesday, Thursday, and Friday

- Reduced tariff (I) from 00.00 to 06.00
- Normal tariff (II) from 06.00 to 22.00
- Reduced tariff (I) from 22.30 to 00.00

Weekend: Saturday and Sunday

- Reduced tariff (I) from 00.00 to 00.00

The meter handles the changeover date for legal time-change:

- Programmable changeover dates for winter/summer and summer/winter:
- Programmable changeover date time, 2 and 3 am by default.

## 3.3 Maximums

An average maximum is calculated for an integration period and the highest value is recorded as maximum demand for each tariff.

The maximums take into account:

- Active power P-
- Active power P+

The meter manages programmable integration periods of 1, 2, 3, 4, 5, 6, 10, 15, 20, 30, 60 minutes. (default configuration: 15 minutes).

These maximums can be reset locally or at each historisation.

The CX1000-5 -CLK version also registers the date and time of the maximum values.

When Pmax exceeds the subscribed value, one of the status word bits is set to 1.

## 3.4 Records

The meter can record the history values in billing, scheduled and profile.

List of values to select:

- Meter ID
- Configuration ID
- Clock
- Total Imported active energy
- Imported Tariff (1-6) active energy
- Total exported active energy
- Exported Tariff (1-6) active energy
- M_BUS (1-4) Customer ID
- M_BUS (1-4) Manufacturer ID;
- M_BUS (1-4) Primary address
- M_BUS (1-4) Customer ID
- M_BUS (1-4) Manufacturer ID;
- M_BUS (1-4) Medium (Water, Gas, Warm Water);
- M_BUS (1-4) Number of M-Bus answers;
- M_BUS (1-4) Status
- M_BUS (1-4) Version
- M_BUS (1-4) Data capture time
- M_BUS (1-4) Result 0
- M_BUS (1-4) Result 1
- M_BUS (1-4) Result 2
- M_BUS (1-4) Result 3

### 3.4.1 Billing

The meter can handle up to 24 billings.

At the end of billing interval the meter record the selected history values.

The billing interval can be pre-programmed by software or manually in the manual programming model.

### 3.4.2 Scheduled

The meter can handle up to 24 scheduled.

On a given date the meter can record the selected history values.

The ‘given date’ can be pre-programmed by software or manually in the manual programming model.

### 3.4.3 Load profile

The meter can handle two loads profile.

The load curve integration period varies between 1 and 60 minutes. It can record up to 132 days for a 15 minute integration period.

## 3.5 Maximum subscribed values

The meter handles four programmable subscribed values:

- Contractual Power Limit (W),
- Power Exceeding period,
- Contractual “Energy” Limit (W),
- “Energy” Exceeding period

Note1: The value of Power Limit must be higher that “Energy” Limit and the Power exceeding period must be smaller that energy exceeding period

Note2: If the value of Power Limit or “Energy” Limit is zero the function is disabled.

If the maximum is exceeded the maximum value flashes when maximum subscribed value is selected.

## 3.6 Other functions

### 3.6.1 Exported active energy register into imported active register

If this option is selected, the absolute active energy value can accumulate in the active energy register, depending on meter configuration.

### 3.6.2 Reactive energy registers

4 registers are handled by the meter; one for each quadrant.

## 3.7 Power relay

The customer can be disconnected by the 100 A power relay, phase cut-off only.

Under no circumstances does the power relay represent a security measure.

### 3.7.1 Power relay opening

**The power relay opens:**

- according to configuration, when the contract is exceeded
- by remote control using remote PLC link or by local optical link.

### 3.7.2 Power relay closure

The power relay can be closed again by a local manual operation consisting of holding one push buttons down for an extended length of time:

- after opening following contract overrun.
- after reactivation by remote control using PLC or by local link.

## 3.8 Tamper detection

### 3.8.1 Surveillance of terminal cover opening and programmed events

When the meter is powered up a device detects when the terminal cover is opened, or when a programmed event occurs.

The corresponding bit in the status word changes to 1 indicating that the terminal cover has been opened.

### 3.8.2 Programmed event management

The meter registers up to 32 programmed events with the time and date.

### 3.8.3 Total power on duration (optional)

The meter manages a total operating duration index. This index is equal to zero when the meter is powered up for the first time and then increments after each minute the mains voltage is present.

This index cannot be reset.

When it reaches maximum value it remains at this value. This value represents 20 years.

### 3.8.4 Total meter consumption time (optional)

The meter manages a total consumption duration index. This index is at zero when the meter is powered up for the first time and then increments after each minute of accumulated imported active energy consumption.

This index cannot be reset.

When it reaches maximum value it remains at this value. This value represents 20 years.

### 3.8.5 Total no-consumption time (optional)

The meter handles a no-consumption time index. This index is at zero when the meter is powered up for the first time. This variable shows the difference between operating time and consumption time. This index cannot be reset when it reaches its maximum value. It remains at this value.

### 3.8.6 No-consumption indicator (optional)

When the meter does not detect any consumption for X days in a row, the corresponding bit in the status word changes to 1. Variable X is programmable.

### 3.8.7 Change of energy direction (optional)

At any given moment the arrows on the screen show energy flow direction.

This surveillance is available when the exported energy register is inhibited.

If transit direction through the meter is reversed at any time the corresponding bit in the status word changes to 1 to indicate tampering or error on meter connection.

In this case an exported energy arrow permanently displayed on the screen indicates that the meter has measured reverse direction energy flow on at least one phase.

## 3.9 Definition of status words

Anomalies are detected both by material and software resources. The results of tests performed are stored in memory spaces called ‘status words’.

The status words can be read:

- On the LCD screen: Only the UTILITY status word (7 digits) is accessible.
- On the IEC 62053-21 optical link and by remote PLC link: all 4 bytes are accessible (UTILITY status word and SURVEILLANCE status word).

The status word can be reset by meter programming.

Resetting consists of setting all the status word bits to zero.

### 3.9.1 Surveillance status word

| Alarme | Number Digit display | Bit |
|---|---|---|
| Alarme input | 6 | 0 |
| Not used | | 1 |
| Not used | | 2 |
| Date/time loss | 3 | 3 |
| Problem com M-BUS | 6 | 4 |
| Alarm M-BUS meter | 6 | 5 |
| Not used | 2 | 6 |
| Terminal cover opened | | 7 |
| Not used | 4 | 8 |
| Not used | 4 | 9 |
| Not used | 4 | 10 |
| Not used | 5 | 11 |
| Not used | 5 | 12 |
| Not uesd | 5 | 13 |
| Not used | | 14 |
| Power fail | | 15 |
| Over-voltage | 7 | 16 |
| Subscribed contract exceeded | 7 | 17 |
| Prolonged consumption absence prolongée | 7 | 18 |
| Stack overflow | 1 | 19 |
| Problem EEP | 1 | 20 |
| Problem SPI | | 21 |
| FAB Mode | | 22 |
| Not used | | 23 |
| Not used | | 24 |
| Number of reset bit4 | | 25 |
| Number of reset bit3 | | 26 |
| Number of reset bit2 | | 27 |
| Number of reset bit1 | | 28 |
| Not used | | 29 |
| Not used | | 30 |
| Meter Alert | 1 | 31 |

### 3.9.2 Utility status word

| Type of problem associated | | Display |
|---|---|---|
| Digit 1 (most significant) | Meter problem: RAM, ROM, EEPROM registers likely, Stack overflow | " A " (Meter alert) |
| Digit 2 | Terminal cover opened at least once<br>This information is detailed in the terminal cover opening time and date register | " F " (Fraud alert) |
| Digit 3 | Date/time loss | “H” (Time alert) |
| Digit 4 | Not used | |
| Digit 5 | Wiring input/output crossing | " 1 " |
| Digit 6 | External meters | " 1 ", " 2 ", " 3 ", " 4 ", " 5 ", " 6 ", " 7 " |
| Digit 7 | Network over-voltage<br>Prolonged consumption absence<br>Subscribed contract exceeded | " 1 ", " 2 ", " 3 ", " 4 "," 5 ", " 6 ", " 7 ", " 8 ",<br>" 9 ", " A ", " B ", " C ", " D ", " E ", " F " |

**Note: if the meter’s time/date is reprogrammed, digit 3 of the status word (time alert) is automatically reset.**

**Note: During the programming P- in P+ that indicates the phase concerned. In this case the bits of the status word are positioned to 1 if there is consumption of energy exported during 2 minutes continuous**.

The digit 6 must be interpreted according to the following table:

| Value displayed | Meaning |
|---|---|
| 0 | No problem |
| 1 | PB com M-bus |
| 2 | Alarm M-bus meter |
| 3 | PB com M-bus and Alarm M-bus meter |
| 4 | Extern Alarm |
| 5 | PB com M-bus and Extern Alarm |
| 6 | Alarm M-bus meter and Extern Alarm |
| 7 | PB com M-bus, Alarm M-bus meter and Extern Alarm |

The digit 7 must be interpreted according to the following table:

| Value displayed | Meaning | Value displayed | Meaning |
|---|---|---|---|
| 0 | No problem | 8 | Reserved |
| 1 | Prolonged consumption absence | 9 | Reserved |
| 2 | Subscribed contract exceeded | A | Reserved |
| 3 | Prolonged consumption absence + subscribed contract exceeded | B | Reserved |
| 4 | Over-voltage | C | Reserved |
| 5 | Over-voltage + Prolonged consumption absence | D | Reserved |
| 6 | Over-voltage + subscribed contract exceeded | E | Reserved |
| 7 | Over-voltage + Prolonged consumption absence + subscribed contract exceeded | F | Reserved |

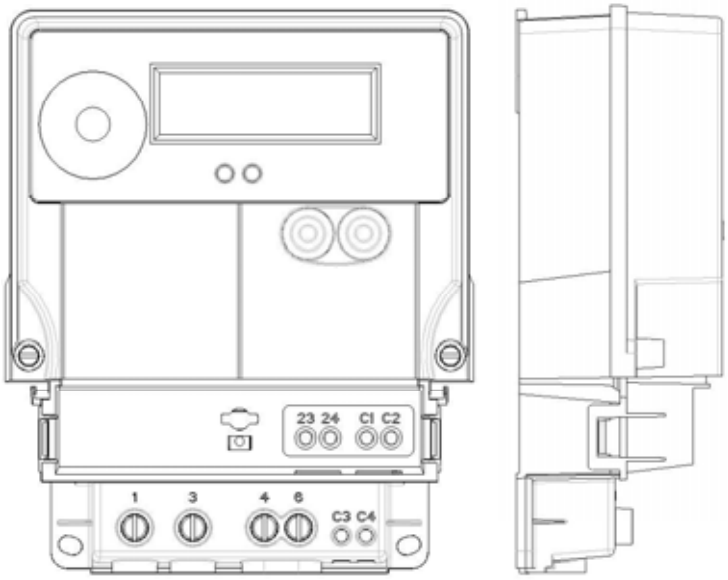
# 4. INSTALLATION

CX1000-5-PLC meters are designed for indoor use. Protection index: IP51 (IEC 60529). They must therefore be protected against bad weather conditions and splashes of any type of liquid.

## 4.1 Assembly

The CX1000-5 PLC terminal cover dimensions once installed are W=145mm x h=215mm x D=63mm.

The meter is attached at three points arranged in a triangle of base 105 ±1 mm and maximum height 140 ±1 mm (Standard DIN 43857-2).



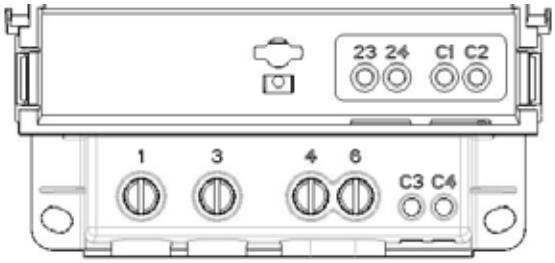

The meter is equipped with a terminal cover locked by a plastic sealable screw. A contact detects when the terminal cover is opened.

## 4.2 Connections

### 4.2.1 Power terminals

CX1000-5 PLC meters exist in version DIN

The layout and connection of the terminals conform to standards DIN 43856 and DIN 43857.




The power terminal accepts a maximum cable section of 25 mm². The permanent current overload acceptable is 1.1 x Imax.

### 4.2.2 Auxiliary terminals

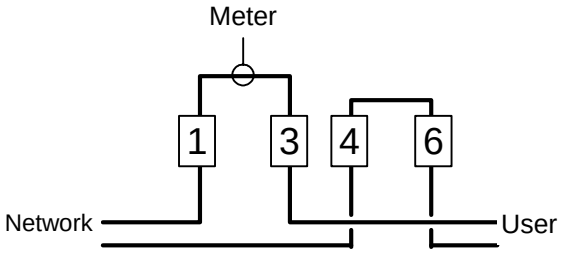
The auxiliary terminal accepts a maximum cable section of 2.5 mm². Maximum authorised current is 2.3 A.

### 4.2.3 Connection diagram

A connection diagram is indicated inside the terminal cover:

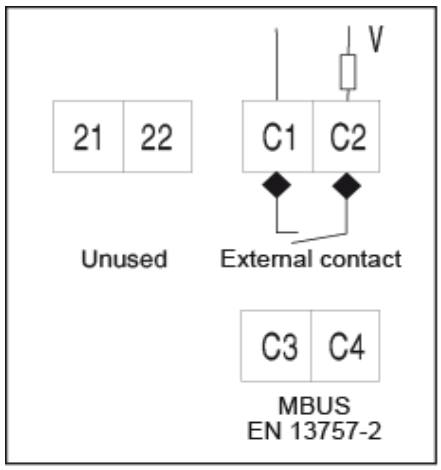
***Power connection:***

**DIN connection**




1 : Incoming phase
3 : Outgoing phase
4 : Incoming neutre
5 : Outgoing neutral

**Others connection**



## 4.3 Installation tool

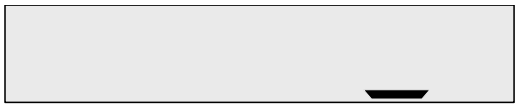
***Connexion check***

In the event of connection of the meter between 2 phases, the screen is blocked on the following indication:

***PLC communication check***

When the meter is connected to the power network for the first time, ‘pairing with the concentrator’ status is displayed (local address allocation), the seventh pictogram is displayed. No indication is displayed.

As soon as the link with the concentrator (local address allocation) is achieved, the seventh pictogram is displayed.



Pairing time between meter and concentrator depends on the concentrator configuration.

# 5. MANUAL READING

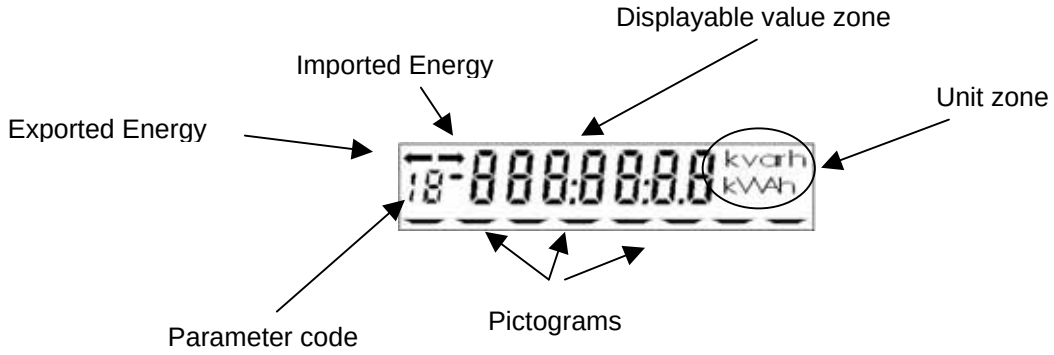
## 5.1 General

The following information can be displayed on CX1000-5 PLC meters via the LCD screens and the two frontal keys: One can program of 20 menus on the display at the same time.

| Parameters (button A) | First and Sub-parameters (button B) |
|---|---|
| Current active energy register (default screen) | |
| Imported Active Energy registers | Total, tariff I,II, III, IV, V, VI |
| Exported Active Energy registers | Tariff I,II, III, IV, V, VI |
| Reactive Energy Q1 registers | Tariff I,II, III, IV, V, VI |
| Reactive Energy Q2 registers | Tariff I,II, III, IV, V, VI |
| Reactive Energy Q3 registers | Tariff I,II, III, IV, V, VI |
| Reactive Energy Q4 registers | Total, tariff I,II, III, IV, V, VI |
| Reactive Energy Q+ = QI + Q2 registers | Total, tariff I,II, III, IV, V, VI |
| Reactive Energy Q+ = QI + Q4 registers | Total, tariff I,II, III, IV, V, VI |
| Reactive Energy Q- = Q3 + Q4 registers | Total, tariff I,II, III, IV, V, VI |
| Reactive Energy Q- = Q2 + Q3 registers | Total, tariff I,II, III, IV, V, VI |
| Tariff option | Number of registers managed – Present register |
| Power subscribed contract | Energy contract, Power contract |
| Serial number | first 6 figures<br>last 6 figures |
| Relay statuses | Relay status |
| Partial totalizer | Reset to zero |
| Display test | Pattern 1<br>Pattern 2<br>Pattern 3 |
| Instantaneous voltage and current | Instantaneous voltage<br>Instantaneous current |
| Instantaneous active imported power (W) | Instantaneous active imported power (W) |
| Average power | Average active imported power (P+)<br>Average reactive imported power (on Q1 and Q4) |

| Parameters (button A) | First and Sub-parameters (button B) |
|---|---|
| | Average power factor (on Q1 and Q4) |
| Date/time | Current time<br>Current date |
| Exceeded time of active power | Tariff I,II, III, IV, V, VI |
| Number and duration of power failure | Number<br>Duration (all power failure) |
| Status word | |
| Time | Total duration during which the meter has been switched on<br>Total consumption duration<br>Total no-consumption duration |
| Zip code | 5 first characters<br>3 last characters |
| Main Frequency | (Hz) |
| Available Credit | One or two screen according to the value |
| Emergency Credit | One or two screen according to the value |
| Last Credit | One or two screen according to the value |
| Meter constant | One or two screen according to the value |
| RED Code | Group ID RED Code<br>Time next RED Code (date/time)<br>Duration RED Code (hour)<br>Power limit RED Code (Watt) |
| PLC communication status | Displays PLC communication-concentrator pairing status PLC ON or PLC OFF, Mac address, Flash led configuration, repetition configuration and EEP configuration |
| M_BUS Registers | ID1first part ID1second part, Register1<br>ID2first part ID2second part, Register2<br>ID3first part ID3second part, Register3<br>ID4first part ID4second part, Register4 |
| Version software | Application software number<br>Metrological software number |
| Checksums METRO/APPLI | Metrological Checksum<br>Application first part Checksum<br>Application second part Checksum |

### 5.1.1 Display presentation

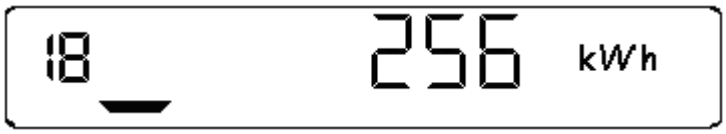



## 5.2 Menu navigation principle

Press button **A** to move to the following parameter and button **B** to view the sub-menus for each parameter.

### 5.2.1 Active imported energy register

The entry in this menu do display the Register 1.




Example: 256 kWh in register 1, current active energy is imported

Press button **B** to display the following registers. Only the registers according to the tariff structure are displayed.

- Register 2.
- Register 3.
- Register 4.
- Register 5.
- Register 6.

Pictograms are displayed to distinguish the different energy registers. The flashing pictogram indicates the current register.

### 5.2.2 Active exported energy registers

Similar imported energy with the minus sign activates.

### 5.2.3 Reactive energy registers

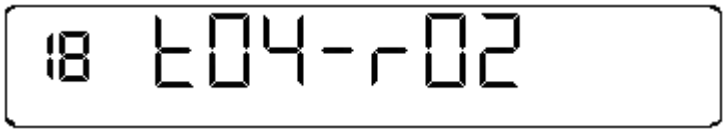
Similar imported energy with the kvar unit.

| |
|---|
| Reactive Energy Q1 registers |
| Reactive Energy Q2 registers |
| Reactive Energy Q3 registers |
| Reactive Energy Q4 registers |
| Reactive Energy Q+ = QI + Q2 registers |
| Reactive Energy Q+ = QI + Q4 registers |
| Reactive Energy Q- = Q3 + Q4 registers |
| Reactive Energy Q- = Q2 + Q3 registers |

### 5.2.4 Tariff option

The LCD is separate into two part. The first indicates the number of tariff used by the tariff structure and the second part indicates the tariff in progress.

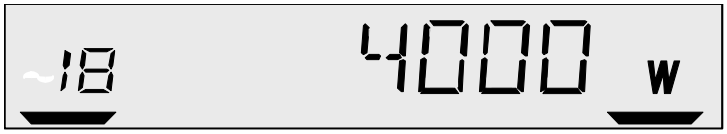
Example : t04 for 4 tariff in tariff structure and r02 for the tariff 2 in use.




### 5.2.5 Power subscribed contract

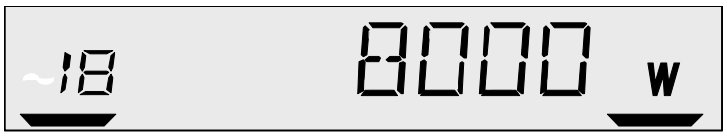
The entry in this menu do display the energy contract.

Example 4000 Watts.



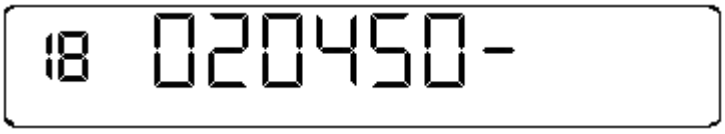

Press button **B** to display the power contract.

Example 8000 Watts.



### 5.2.6 Meter serial number

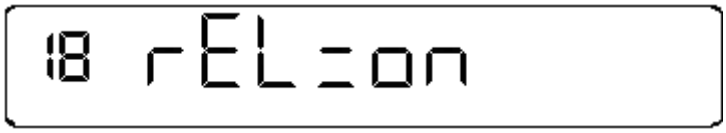
The entry in this menu does display the first 6 digits of the serial number.




Press button **B** to display the last 6 digits of the serial number.


### 5.2.7 Relay status

The entry in this menu does display the Relay status




REL = ON : relay contact Closed
REL = OFF : relay contact Open

### 5.2.8 Partial totalizer

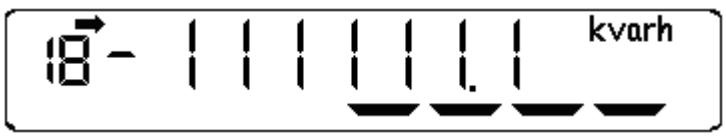
The entry in this menu does display the consumption partial of the meter.
The value is incremented with each consumed Wh.

This value can be reset to zero per press on the button **B**.

### 5.2.9 Display test

The entry in this menu does display all segments

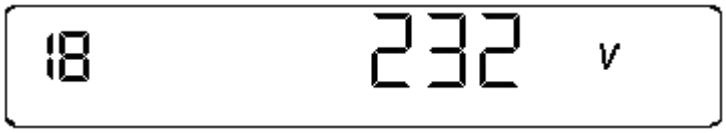

Press button **B**, the first part of the characters are displayed.



Press button **B**, the rest of the characters are displayed.


### 5.2.10 Instantaneous voltage and current

The entry in this menu does display the Instantaneous voltage.
Example: 232 V




Press on the button **B** to display the Instantaneous current.


### 5.2.11 Instantaneous active imported power (W)

The entry in this menu does display the P active instantaneous
Sign: - if the power is exported

Example : 148 W

### 5.2.12 Average power

***Average active imported power (P+)***

The entry in this menu does display the power P active imported average.

Press on the button **B** to display Power P active imported average total.

***Average reactive imported power (Q)***

The entry in this menu does display the power Q reactive imported total average.

Press on the button **B** to display Power Q reactive imported average total.

***Average active exported power (P-)***

The entry in this menu does display the power P active exported average.

Press on the button **B** to display Power P active exported average total.

***Average reactive exported power (Q)***

The entry in this menu does display the power Q reactive exported average.

Press on the button **B** to display Power Q reactive exported average total.

***Average power factor P+***

The entry in this menu does display the power-factor.

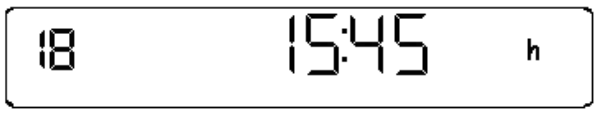
Press on the button **B** to display Total power-factor.

### 5.2.13 Date/time

The entry in this menu does display the hour in form HH:MM

Press on the button **B** to display the date in form JJ.MM.AA

Example: February 10, 2003, 15. 45




Press on the button **B**

### 5.2.14 Exceeded time of active power

The entry in this menu does display the number of minutes in going beyond of power in tariff 1 compared to the contract subscribes in active power.

Only the registers according to the tariff structure are displayed :

Press on the button **B** to display the going beyond in tariff 2.

Press on the button **B** to display the going beyond in tariff 3.

Press on the button **B** to display the going beyond in tariff 4.

Press on the button **B** to display the going beyond in tariff 5.

Press on the button **B** to display the going beyond in tariff 6.

### 5.2.15 Number and duration of power failure

The entry in this menu does display the number of power failure.

Press on the button **B** to display the total duration of power failure

### 5.2.16 Status word

This parameter is used to display (in hexadecimal) the meter's three status word in the form Byte1, Byte 2, Byte 3.

See chapter 9.2 for explanation.


### 5.2.17 Zip code

The entry in this menu does display the first 5 characters.

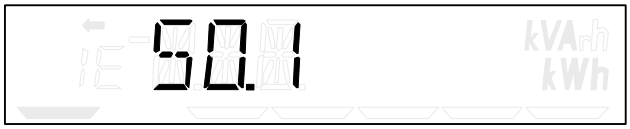
| | | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | -- |

Press on the button **B** to display the 3 following characters.

| | | | | | | |
|---|---|---|---|---|---|---|
| -- | 5 | 7 | 8 | | | |

### 5.2.18 Main Frequency

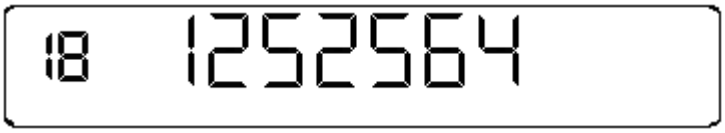
Example Frequency 50,19 Hz




### 5.2.19 Available Credit

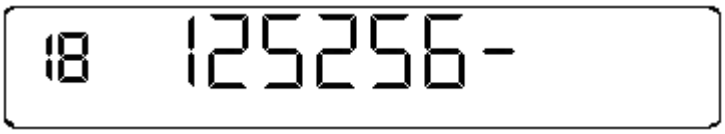
The displayable maximum value in only once is +-999 9999 and -2 147 483 648… 2 147 483 647 twice

Example: to display 1252564




Example 12525683

First display:




Press on the button **B** to display the second screen:


### 5.2.20 Emergency Credit

The displayable maximum value in only once is +-999 9999 and 4294967295 twice.

Before its selection **emergency credit** is equal to zero.

A long press on key **A** during more than 3 seconds makes it possible to obtain an advance of credit. From this moment the meter can display the value **of emergency credit**. The selection **of emergency credit** can be made only once with the first powering after the installation or only once after each recharging of the credit. After exhaustion **of emergency credit**, when its value reached zero, the value of zero is displayed blinking.

### 5.2.21 Last Credit

Indicate the value of the last credit received by the meter.

### 5.2.22 RED Code

The entry in this menu does display the group ID RED code from 0 to 255.

Press on the button **B** to display the horodate of beginning of next RED code or RED code in progress.

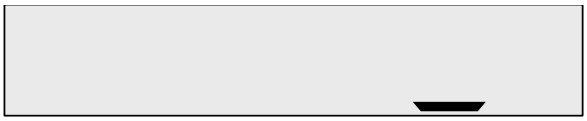
Press on the button **B** to display the remaining duration of RED code, in hour.

Press on the button **B** to display the power limit according to contract RED code, in Watt. The displayable maximum value in only once is +-999 9999 and 4294967295 twice.

### 5.2.23 PLC communication status

The entry in this menu does display the PLC communication status, when the meter is paired with the concentrator, the seventh pictogram is displayed.

PLC ON :



PLC OFF :

Press on the button **B** to display the MAC address.

Press on the button **B** to display the Flash LED configuration.

Press on the button **B** to display the repetition configuration.

Press on the button **B** to display the EEP configuration.

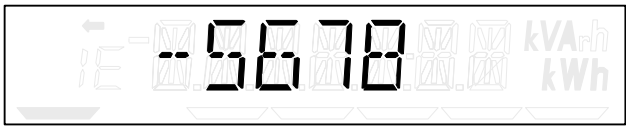
### 5.2.24 M_BUS registers

According to the number of external meter present on the M-bus, the button **B** displays the identification number and the register of consumption of each external meter. The identification number is presented twice because it is composed of 8 numerical characters. The register of consumption represents the value read at the time of the last meter reading and not the instantaneous value.

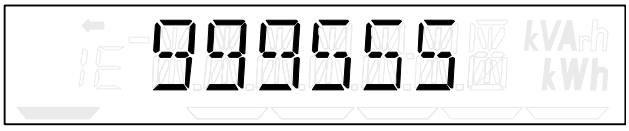
Example of display of external meter ID 12345678 having consumed 999555 :

Press on the button **B** to display the first part of identification number:


Press on the button **B** to display the second part of identification number:



Press on the button **B** to display the m_bus register consumption:



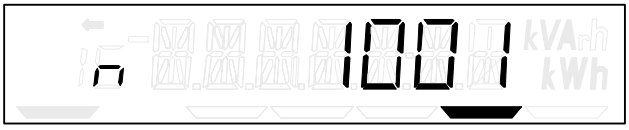

The maximum value of displayable consumption is 9 999 999.

### 5.2.25 Versions logicielles

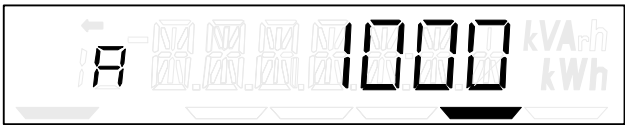
The entry in this menu does display the number of version of the Metrologic part.

Press on the button **B** to display the Application part.

Example for the version METRO 1001:




Example for version APPLI 1000:




### 5.2.26 Checksums METRO/APPLI

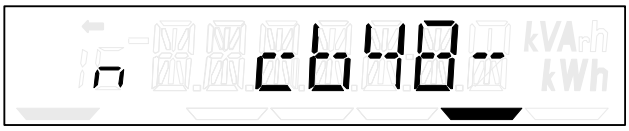
The entry in this menu does display the first part of the metrologic checksum number. The metrologic checksum is calculated in back task. If calculation is not carried out at the time of the request it is replaced by caracters – (minus).

Press on the button **B** to display the second part.

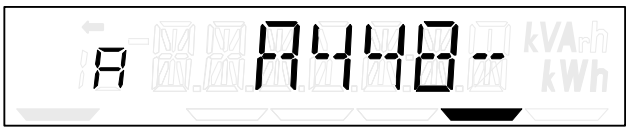
Press on the button **B** to display the first part of the application checksum number.

Press on the button **B** to display the second part.

Example for the metrologic cheksum CB484C0F:




Example for the application cheksum A4489C8A:



## 5.3 Auto-scrolling

With the terminal cover in place, press buttons A and B simultaneously for at least 3 seconds to switch to the auto-scroll mode.

Repeat the same operation to exit the auto-scroll mode.

One or several menus can be displayed in auto-scroll mode, chosen from those available in static display.

### 5.3.1 Auto-scrolling By defect

Auto-scrolling: 3 seconds

Parameter 0, 1, 2, 3 are in Auto-scrolling mode.

# 6. LOCAL PROGRAMMING

Local programming enables users to carry out the following operations:

- Reset the status word
- Activate (or deactivate) the communication data encryption key,
- Set the date,
- Set the time,
- M_BUS Install
- Uninstall M_BUS

| Prog Button |
|---|
| Reset status word |
| Encryption key |
| Setting the date |
| Setting the time |
| M_BUS Install |
| Uninstall M_BUS |
| Exit programming |

**Remarque :** Local programming mode can only be accessed with the terminal cover off, by pressing the **PROG** button. If buttons **A, B** or **PROG** are not pressed for 60 s, programming mode is exited.

## 6.1 Resetting the status word

- Press twice on the PROG button to display the three status words of the meter, displayed as Byte 1, Byte 2, Byte 3:

- Press button B once to reset the meter status word:

- Press button B once to validate the reset of the meter status word:

## 6.2 Activating or deactivating the encryption key

- Press the PROG button 3 times. One of the two following static displays appears:


CLE=0: the encryption key is not active (default mode),

CLE=1: the encryption key is active.

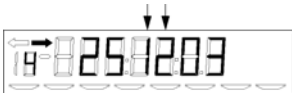
- Press button B to display the other state, which flashes.
- Press button A to validate the new programming. The screen stops flashing.

## 6.3 Setting the date

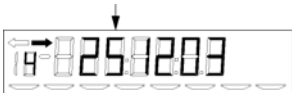
- Press the PROG button 5 times. The following screen appears with the year unit flashing:

- Press button B to set the unit (0 to 9) then press button A to set the tens digit for the year. The tens digit flashes.

- Press button B to set the tens digit for the year (0 to 9) then press button A to set the month. The month flashes.



- Press button B to set the month (1 to 12) then press button A to set unit for the day. The day unit flashes.



- Press button B to set the unit for the day (0 to 9) then press button A to set the tens digit for the day. The tens digit for the day flashes.

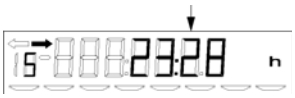
- Press button B to set the tens digit for the day (0 to 3).
- Press button A to validate the date setting. If the date is not valid, programming will not be accepted and the operation must be repeated.

**Note: if the meter date is reprogrammed, digit 3 of the status word (time alert) is automatically reset (see description in paragraph 3.6.2).**

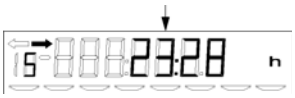
## 6.4 Setting the time

- Press the PROG button 6 times. The following screen appears with the minutes unit flashing:

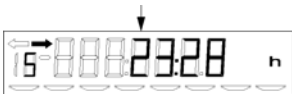
- Press button B to set the unit (0 to 9) then press button A to set the tens digit for the minutes. The tens digit for the minutes flashes.



- Press button B to set the tens digit for the minutes (0 to 6) then press button A to set the hours unit. The hours unit flashes.



- Press button B to set the hours unit (0 to 9) then press button A to set the tens digit for the hours. The tens digit for the hours flashes.



- Press button B to set the tens digit for the hours (0 to 2).
- Press button A to validate the setting. If the time is not valid, programming will not be accepted and the operation must be repeated.

**Note: if the meter time is reprogrammed, digit 3 of the status word (time alert) is automatically reset (see description paragraph 3.6.2).**

## 6.5 M_BUS Install

The entry in this menu does display **“Mtr = N”** , N is the number of M-Bus equipment already connected

Press on the button **A** to prepare the installation, **“START”** is blinking.

Press on the button **A** to start the installation, **“INSTALL”** is blinking during the process, or press on the button **B** to abort.

➔ If equipment discovered

| ADR = x |
|---|

➔ If no equipment available

| No FInD |
|---|

x is the new address of the equipment :

1 for gas meter
2 for Waer meter
3 for Hot water meter
4 other equipment

Press on the button **A** or **B** to display **“Mtr = N”** Number of meter install is incremented if an equipment as been discovered

## 6.6 Uninstall M_BUS

The entry in this menu does display **"M-BUS 0",** If no meter installed or **“ADR = X”** if meters already installed. X is the address of the first meter installed.

Press on the button **B** to select address **“ADR = X”** of equipment to uninstall.

Press on the button **A** to uninstall the meter **“ADR = X”**

➔ If equipment uninstalled

| SUCCESS |
|---|

➔ If no equipment available

| FAILED |
|---|

Press on the button **B** to return to the entry menu.

User manual
Non contractual document

*253032176A-03*

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