User Manual

CompactIQ



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1.Introduction

IQ0404100K1-R Meter are designed for measuring and monitoring energy parameters, such as total active energy and reactive energy in both directions, instantaneous voltage and current, PF, Vrms, Irms, active power and reactive power in power network. The meter records according to its customized capture period load profiles of energy consumption and energy generation.

1.1. Reference

The IQ0404100K1-R meter is in compliance with the following standards and specifications

ID	Standard	Description
1	EN 50470-3:2022	Electricity metering equipment - Part 3: Particular requirements - Static meters for AC active energy (class indexes A, B and C)
2	EN IEC 62052 - 11:2021+A11:2022	Electricity metering equipment – General requirements, tests and test conditions – Part 11: Metering equipment
3	EN 62052-31:2016	Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests
4	EN 13757-2:2018	Communication systems for and remote reading of meters – Part 2: Physical and link layer
5	DLMS UA 1000-1 ed.13, 2019	Blue Book, COSEM Identification System and Interface Classes
6	DLMS UA 1000-2 ed.9, 2019	Green Book, DLMS/COSEM Architecture and Protocols
7	DLMS UA 1001-1 Ed.5, 2015	Yellow Book, DLMS/COSEM Conformance Testing Process
8	DLMS UA 1002: ed.1, 2003	White Book, COSEM Glossary of Terms
9	EN IEC 62053-21:2021 EN IEC 62053-23:2021	Electricity metering equipment – Particular requirements – Part 21: Static meters for AC active energy (classes 0,5, 1 and 2) Electricity metering equipment – Particular requirements – Part 23: Static meters for reactive energy (classes 2 and 3)

Table 1: Reference standards

2. General Description

2.1. Profile Feature

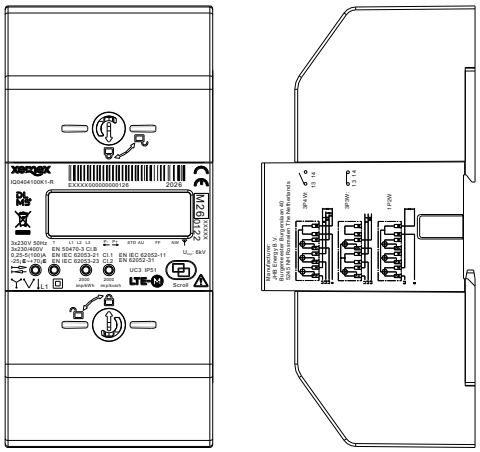


Figure 1: Product nameplate

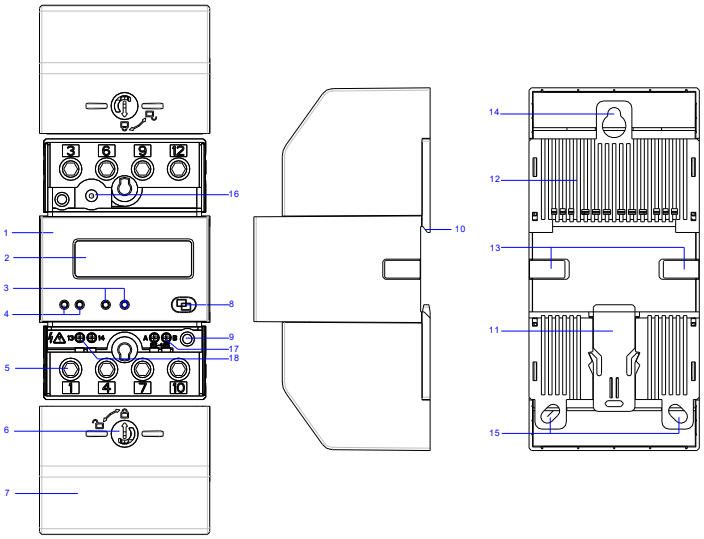


Figure 2: Product view

(1) Meter cover	(10) DIN rail upper hook
(2) LCD	(11) DIN rail moveable hook
(3) Active/Reactive pulse LED	(12) Meter base
(4) Reserved	(13) Metrology seals
(5) Main terminal screws	(14) Upper mounting hole
(6) Terminal cover seal screw	(15) Lower mounting hole
(7) Terminal cover	(16) MCX port for external antenna
(8) Scroll button	(17) Reserved
(9) Terminal cover open detection	(18) Default (Open); 3P4W; Short-circuit: 3P3W

2.2. General Technical Features

Type	IQ0404100K1-R
Voltage	1P2W:230V, 3P3W:3×230V, 3P4W:3×230(400)V (Switching by short-circuiting through auxiliary terminal)
Current	Ist=0.02A, Ib=5A, Imax=100A
Frequency	50 Hz
Meter constant	2000imp/kWh, 2000imp/kvarh
Accuracy	Active: EN50470-3 Class B and Class A EN IEC 62053-21:2021 Class 1 Reactive: EN IEC 62053-23:2021 Class 2 and Class 3
Connection	Single phase two wire, three phase three wire, three phase four wire
Environmental	Operating temperature range: -25℃~ +70℃ Storage and transport temperature range: -25℃~ +70℃ Relative Humidity Up to 95% non-condensing Altitude up to 2 000 m
Location	Indoor
Power consumption	Less than 4W / 20 VA without P3 communication; Less than 8W with P3 communication.
Degree of Protection	IP51 indoor
Communication protocol	DLMS/COSEM
Utilization category (UC)	UC3
Display format	Dot matrix LCD
Button	Scroll button, for manual-scroll mode
LED Pulse	2000imp/kWh, 2000imp/kvarh
Communication interface	LTE-M
RTC	At least 20 years calendar into future Normal power source: Main supply Clock Backup source: Super Cap. 0.5 S circular error every day@23℃
Data retention	20 years (minimum) in case of power failure.
Sealing arrangement	2 seals for terminal cover
Impulse Voltage with standing capability.	Impulse voltage 6kV (with limitation to test environments and conditions)

Type	IQ0404100K1-R
Electromagnetic environment	E2 & E1
Mechanical environment	M2 & M1
Protective class and earthing (grounding)	, II

Table 2: General technical features

2.3. Functional Description

2.3.1. Overview Description

2.3.1.1. No load feature

The measurement ICs used in products have integrated no load detection circuits that prevents any registration of residual power caused by creep effects in the meter. Creep effects in the meter are typically caused by cross-talk from the current channel into the voltage channel, or from emission from a nearby transformer. These creeps' effects can occur at any level of consumption or delivery, however, they are only noticeable as erroneous registration when the consumption or delivery through the meter is extremely small, when the load is closed to zero or even zero. The employed measurement IC has a so called "No-load" features as a countermeasure against erroneous registration at almost "zero -load". Detection circuits are incorporated into the IC design for each phase, one for total active, one for reactive and one for apparent power.
In addition, a unique guard band mechanism is part of the non-legal part of the firmware in which the FW monitors constantly the data from the measurement IC to guarantee no load is registered when the energy consumption is below 0.2% of Ib, which is about half of the mandatory starting current of 0.4%Ib as stated in the EN IEC6053-21 specification.

2.3.2. Setting of meter parameters

The parameters of the meter can be set via P3 or P0 port. There are 2 sorts of configuration:

- Pre-configuration loaded at the factory
- Individual configuration by GO after receiving.

Pre-configured by vendor:

The meter can be ordered with GO-defined configuration settings. An advantage of pre-configuring is that the configuration information does not need to be distributed.

Configured by GO (grid operator):

It is possible to modify the settings in configuration table after receiving the meter. Typical reasons are:

- The configurations provided by the GO might not be up to date and therefore will need to be updated.
- A sub-set of the equipment might need specific values (different from the default values provided) for the configuration.

2.3.3. Data Communication

After a power restoration from an outage the meter behaves differently depending on the configuration. If E-meter is configured “triggered”, the connection will be lost. Otherwise, the E-meter will re-connect to the network randomly based on network situation, and the average time cost is approximately 1 minute.

2.3.3.1. Communication via communication modem

The communication interface of P3 is based on the DLMS/COSEM standard and is designed for transmitting data over LTE-M networks. The total time required to retrieve all requested information from the meter and to publish it through P3 shall not exceed 5 seconds. The key features are listed in table 2.

General Function	Performance & Availability	Configurable LTE-M communication slot cycle Support reconnection behaviour after detecting an unexpected, interrupted communication session should be configured.
	Roaming	Support LTE-M 450Mhz network (only compatible with external antenna)
	SIM	Support ESIM
	Indications of LTE-M	Indicate on the display the reception of the LTE-M signal in a minimum of 4 separate signal strength levels.
Access and connection	Wake up	The address and the content of an IP message that is send to the CS should be defined. It is configurable that endpoints in the meter by their IP address and by a Fully Qualified Domain Name. Support fully qualified domain names. Receive and store the IP addresses of the primary and secondary address when establishing a PPP connection based on the DHCP protocol
	Authentication and security	changeable PAP key
	Assign IP address	LTE-M Module support dynamic IP address assignment

Table 3: Key features of models with LTE-M modem

2.3.4. Event Record and Alarm

The E-meter features 6 different event logs as described below. The capture objects per event log is fixed rather than configurable. The record can be cleared by resetting the command, and then correspondingly 'Clear event—event code 255' will be recorded. The earliest time stamp of event log can be dated back to '01-01-2000.' The detailed information is described in Table 4

Event Type	Description	Structure	Capacity
Standard Event Log	Contains all events not recorded in a special event log, e.g. changes of the clock, changes of the configuration, clearing of profiles, all kind of self-check errors, activation of new parameters, activation of Timestamp – Event Code new time of use, etc.	Timestamp Event Code	100 entries
Power Failure Event Log	Contains information related to long power outages, i.e. duration and end time of a long power outage.	Timestamp duration of long power failures	10 entries
Fraud Detection Event Log	Contains all events related to the detection of fraud attempts, e.g. removal terminal cover, removal meter cover, strong magnetic field detection, access with wrong password, etc.	Timestamp Event Code	30 entries
Power Quality Event Log	It contains all events related to the power quality, e.g. under-voltage, over-voltage and normal voltage events.	Timestamp Event Code	100 entries
Power Quality Extended Event Log	Contains sag and swell events for which voltage magnitude and duration are captured. Linked to sag/swell alarming functionality.	Timestamp Event Code Magnitude Duration	100 entries
Communication Session Log	Contains all events related to communication session, e.g. reading of meter reading, exchange for technical maintenance of the grid, exchange for metrological maintenance	Timestamp Event Code Counter	2190 entries

Table 4: Key features of events

The table below gives an overview of all possible alarms and their assignments.

Alarm Code

Group	Byte	Bit	Meaning	Events
Other Alarms	1 (LSB)	0	Clock invalid	6
		1	Replace battery	7
		2	Power Up	2
		3	not used	
		4	not used	
		5	not used	
		6	not used	
		7	not used	
Critical Alarms	2	0	Program memory error	12
		1	RAM Error	13
		2	NV memory Error	14
		3	Measurement System Error	16
		4	Watchdog error	15
		5	Fraud attempt	40,42, 44,46, 47
		6	Problem with indexes	22, 23, 24
		7	not used	
Reserved for M-Bus Alarms	3	0	Battery low	100
		1	Battery consumption high	101
		2	Reverse flow	102
		3	Tamper P2	103
		4	Tamper P0	104
		5	Tamper case	105
		6	Tamper magnetic	106
		7	Temp out of range	107
	4	0	Clock sync error	108
		1	SW error	109
		2	Watchdog error	110
		3	System/hw error	111
		4	CFG Calibration error	112
		5	Q > Qmax	113
		6	Temp sensor error	114
		7	Binding flag	115

Group	Byte	Bit	Meaning	Events
	5	0	FW upgrade successful	116
		1	FW upgrade unsuccessful	117
		2	FUAK change successful	118
		3	Reserved for future use	119
		4	Vendor specific	120
		5	Vendor specific	121
		6	Vendor specific	122
		7	Vendor specific	123
	6	0	Vendor specific	124
		1	Vendor specific	125
		2	Vendor specific	126
		3	Vendor specific	127
		4	Vendor specific	128
		5	Vendor specific	129
		6	Vendor specific	130
		7	Vendor specific	131
	7	0	Reserved for M-Bus Communication error	132
		1	Reserved for M-Bus Communication error resolved	133
		2	Reserved for M-Bus security error	134
		3	Reserved for M-Bus security error resolved	135
		4	Reserved for New M-Bus device discovered	136
		5	reserved for future use	137
		6	reserved for future use	138
		7	reserved for future use	139
Power Quality Alarms	8 (MSB)	0	Phase Outage detected on L1	86
		1	Phase Outage detected on L2	87
		2	Phase Outage detected on L3	88
		3	Phase Outage Test indication	89
		4	reserved for future use	144
		5	reserved for future use	145
		6	reserved for future use	146
		7	reserved for future use	147

Table 5: Relationship among alarms and events

2.3.5. RTC

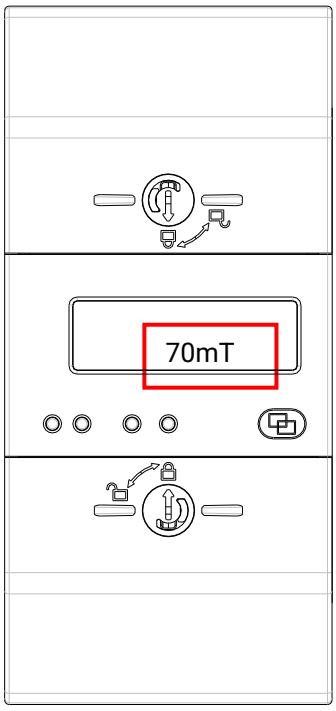
The embedded super capacitor has the capability to maintain the accuracy of the Real Time Clock better than 0,5s/day at 23° Celsius for up to 120 hours (5 days) while unpowered. The charge time of the super capacitor after power restoration to its rated voltage of 4.8 Volt is around 3 hours.

2.3.6. Tamper Detection

The meter is featured with sensors to detect physical tampering events such as terminal cover removal and exposure to high magnetic fields. The susceptibility threshold to magnetic fields was determined by averaging the test data of several samples at a stable temperature of 23°C after the voltage circuits had been energized for one hour. The resulting threshold for triggering an alarm was calculated in accordance with ESMR standards.

	Susceptibility Threshold (mT)	Alarm Threshold (mT)	Location with highest sensitivity
IQ0404100K1-R	70	70	Front side

Table 6: Susceptibility and alarm thresholds



The tamper attempts include shown below:

1) terminal cover open
2) magnet field
3) password error

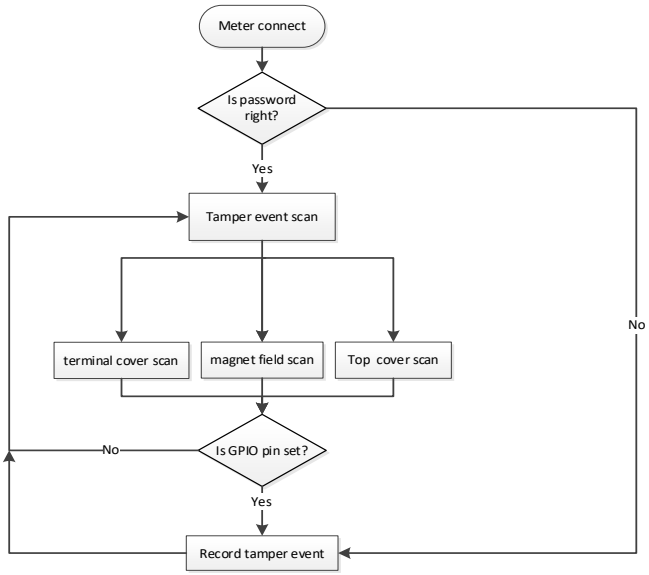


Figure 3: tamper scan

Tamper detection (fraud and violation) is always active on all equipment (even during outages).
The anti-tamper proceeding detects per second while the meter is running and will record current tamper status if happened any tamper events. While the duration of tamper exceeds the detection threshold, meter will record this event in the fraud detection log.
When the meter is in power-off status, software runs in sleep mode, any tamper can arouse the meter and detect the tamper such as opening terminal. If the tamper has been detected, meter will record the event log in data flash and its date and time in EEPROM. After tamper behaviour, meter will come back to the sleep mode.

2.3.7. LED

The LED, item (4) in figure 1 and figure 2, emits light pulses with a frequency that is proportional to the measured power. The emitted signal is used to calibrate the meter and can be used to monitor the energy consumption during normal operation without removing from service or breaking any seals.
Depending on the load and use period of the meter, the LED can be in one of the 2 described states:

- Flashing LED: indicates energy import or export
- Non-flashing LED: indicates no load

2.3.8. Tariff Management

The meter allows the customization of various tariff structures as follows:

- The Meter provides two tariff tables described as “active” and “passive”.
- Only the passive table can be updated while the active table is in use.
- The date for activation can be set in advance
- Each table can accommodate up to 4 Seasons, 4 Weeks, 4 Day profiles.

- Each Day profile allows up to 8 entries.
- A Holiday list for up to 30 special days.

Notice: For programming a new tariff successfully, it is mandatory to update the passive table in a sequential order, starting with the Day-profiles-, then Week-profiles and followed by Season-profiles.

2.3.9. Button

The inductive push button, behaves differently, depending on the duration of pressing as follows.

Display button

- Both short and long press to the button will make display mode turn into manual scroll mode or show next display index.

2.3.10. Profiles

Profiles mainly includes the following one type:

E-meter profiles;

The following table shows the profiles module details.

Profiles type	Capture object	Capacity
1. Electricity load profile in 15min	timestamp AMR profile status active energy import active energy export	960 entries
2. Electricity daily billing	timestamp AMR profile status +A rate1; +A rate 2; -A rate1; -A rate 2;	40 entries
3. Electricity monthly billing	timestamp AMR profile status +A rate1; +A rate 2; -A rate1; -A rate 2;	13 entries

Profiles type	Capture object	Capacity
4. Definable load profile	1 phase meter: timestamp Instantaneous Voltage L1 Average Voltage L1 3 phase meter: Clock: Instantaneous Voltage L1 Average Voltage L1 Instantaneous Voltage L2 Average Voltage L2 Instantaneous Voltage L3 Average Voltage L3	960 entries
5. Power system quality load curve in 15min	timestamp AMR profile status average active power (+P) L1 average active power (-P) L1 average reactive power (+Q) L1 average reactive power (-Q) L1 average active power (+P) L2(for poly phase) average active power (-P) L2(for poly phase) average reactive power (+Q) L2(for poly phase) average reactive power (-Q) L2(for poly phase) average active power (+P) L3(for poly phase) average active power (-P) L3(for poly phase) average reactive power (+Q) L3(for poly phase) average reactive power (-Q) L3(for poly phase)	960 entries
6. Power system quality load curve in 10min	timestamp AMR profile status average voltage L1 average voltage L2(for poly phase) average voltage L3(for poly phase) average current L1 average current L2(for poly phase) average current L3(for poly phase)	1440 entries

Table 7: Load Profiles

Self Diagnostic
The meter has 4 integrated self-diagnostic features to ensure that it is always operating normally

- Memory Consistency
- Meter Accuracy
- RTC Abnormal Reset Recording
- Program Memory Consistency

Furthermore, its extended monitoring capability keeps track of up to 20 changes in the meter and stores them in standard event log which includes RAM error, NV memory error, Program memory error, adjustments to RTC, Replace Battery, Clock invalid, upgrades to firmware and so on. After the maximum number of entries has been stored, the latest record will occupy the space of the oldest record. But the displaying sequence is ordered by the generated date and time.

2.3.11. Firmware in-field upgrading

The meter provides the functionality to upgrade the non-legal part of the firmware at the security level 5 of HLS remotely via LTE-M(P3). Every change to the firmware is documented in the change log. While upgrading the meter retains its full meteorological functionality.

The equipment shall complete a firmware upgrade within a limited period of time in cases where no delay is programmed. The completion rates and times for execution of the use case for the respective ports are:
For example the first row means the E-meter will finish 80% of upgrade process in 24 hours take network condition and communication frequency under consideration.

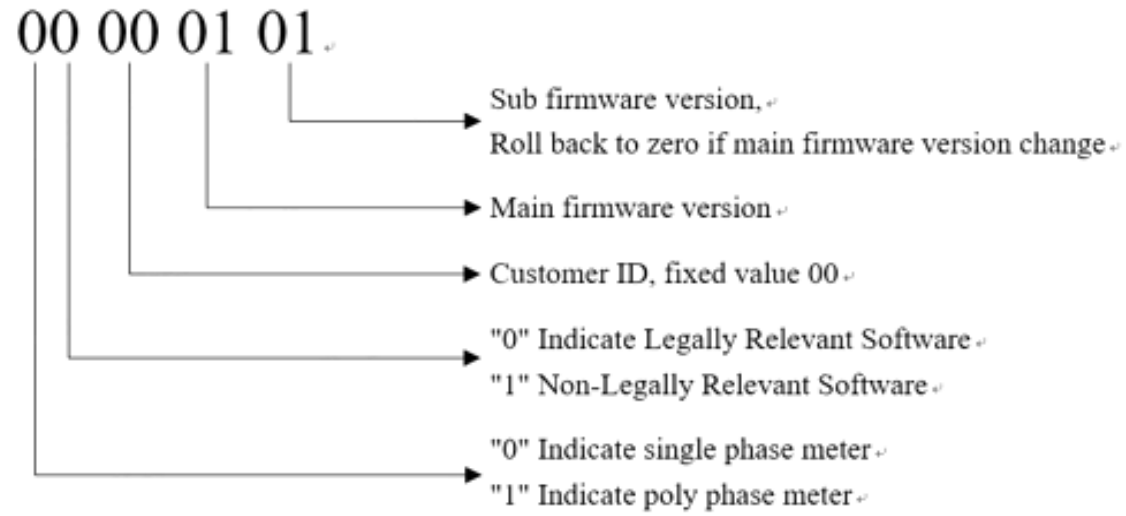
Rate	P3	P0
80 %	24 hours	Void
95 %	48 hours	Void
99 %	120 hours	5 minutes

Table 8: Tariff rate example

2.3.12. Firmware identifier and numbering

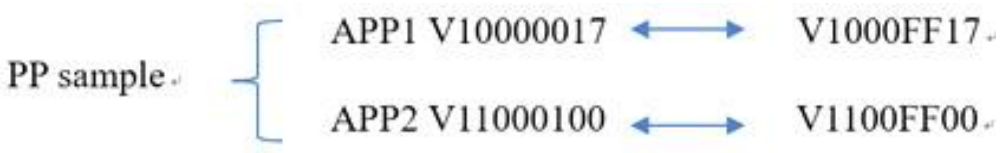
E-meter

Software numbering is made by four parts Like XX XX XX XX. Each part has different meaning for example: firmware number is like this;



Note:

Main version FF is the test image file for corresponding versions. i.e.



No upgrade priority for APP1 or APP2. There should be remarks if a dedicated order required for upgrading the APPs.

Image Identifier

image_identifier identifies the Image to be transferred; it is used when invoking the method naming image_transfer_initiate of E-meter upgrade.

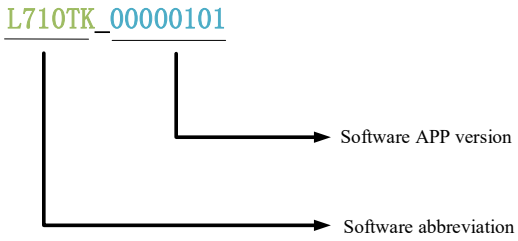
SP: KFM-01

PP: KFM-03

P3 – LTE module

Software numbering is made by three parts like XX_XX_XX. Each part has different meaning for example: firmware number is like this;

***Example of the LTE-M module firmware number*:**



2.3.13. Security

Access to the meter is protected through an integrated security scheme based on DLMS/COSEM, allowing a controlled access to the data stored in the meter using different levels of authentication, Only High Level Security (HLS) authentication mechanisms.

- High level security (HLS) comprises a four-pass two-way authentication that uses encryption technology in the last two pass.
- Data encryption and authentication is performed using the Galois/Counter Mode (GCM) of operation with 128-bit keys (AES-128).

Security policy for the interfaces
Using HLS 5 is mandatory when communicating through P0 and P3.

Key management for built-in security policy

No	Type Name	Description
1	Authentication key	Ensure data integrity and authenticity
2	Encryption key	Ensure data confidentiality
3	Master key	Use to change other keys
4	Key for HLS-5	Access and Use Control

Table 9: Key management for built-in security policy

2.3.14. Power Quality Monitor

The meter is equipped with monitoring features that can be used to detect momentary voltage sags & swells. The parameters for this feature lower and upper threshold for voltage and threshold duration can be pre-configured at factory or reprogrammed individually through P0 or P3 port. The default threshold values for voltage sag and voltage swell are 207V and 253V respectively. The duration thresholds for sag and swell are both 30 seconds.

The meter supports the detection of sag and swell with duration as low as 100ms. When this phenomenon occurs, the meter will record related parameters into event log, such as voltage magnitude, voltage duration (0.1s).

The meter is programmed to update all instantaneous values, which are determined in a basic measurement interval of 0.2 seconds, on a 1 second cycle, including voltage, current, active and reactive power (+P&-P, +R&-R), whereas the refreshing rate for moving average values is 10 minutes.

2.3.15. Display Introduction

The LCD is used for displaying meter data and status information. The display is Dot-Matrix with back light, and can display 3 lines X 16 characters. The height of the characters is 4mm and the V.A is 49.1mm X 15mm.

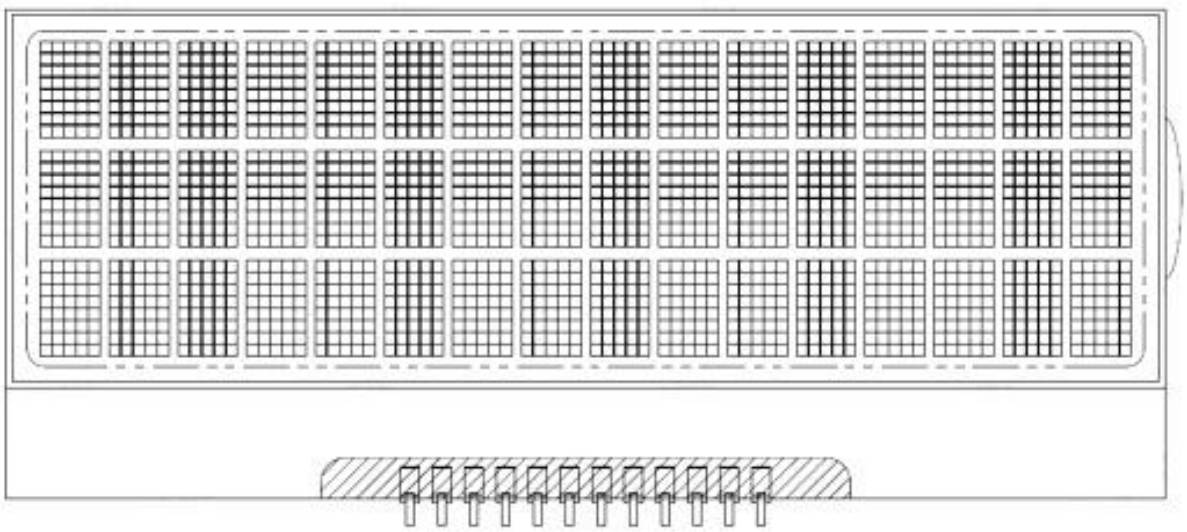


Figure 4: Dot-matrix LCD display

Display operating modes

The meter has four operating modes for the display:

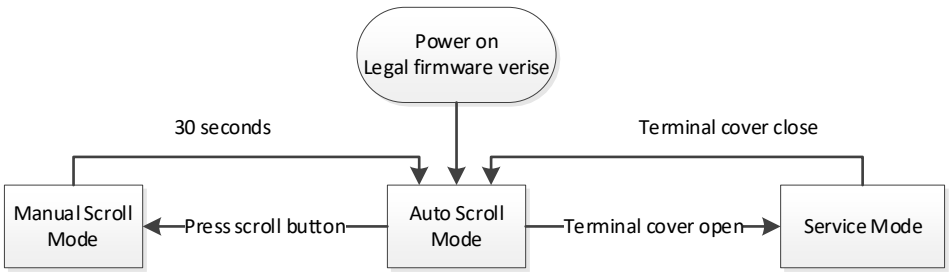


Figure 5: Display process

1) Power on

   Every time the meter power on, the legal relevant firmware version will be shown for 5 seconds. And later the meter turns into scroll mode if terminal cover is closed or into service mode if terminal cover is open.

2) Auto-scroll mode

   Auto scroll mode is used for showing basic information, and each value is visible for 5 seconds.

3) Manual-scroll mode

   Manual scroll mode is activated by pressing scroll button shortly. Every time the button is pressed, the item will be switched to the next. When the button is not pressed during a period of 30 seconds, display mode changes from manual mode to auto scroll mode.

4) Service mode

   Service mode is activated when terminal cover is open, the display item will be switched to the next every 5 seconds or by pressing scroll button. When the terminal cover is installed/closed, the display changes to auto scroll mode. In the service mode the display resolution of energy value will be 0.001kWh.

The dot- matrix LCD is adapted to show more characters than segment LCD can do. And the screen can be divided into 3 rows to show detailed information.

2.4. LTE-M Module Features

For the communication to Central Systems the meter has an integrated LTE-M communication module with the following main features:

Feature	LTE-M
Signal Strength Indication	yes
LTE-M Access Authentication with Username, and CHAPKEY	yes
Data Communication and Data Exchange	yes
Support of IMEI Lock Function	yes
Support of Push-Events, Notification, and Pull Data	yes
IP Message & Domain Name Resolution	yes
Dynamic or Static IP Address Assignment available.	yes
HTTPs upgrade	yes
FOTA upgrade	yes

Table 10: LTE-M module features

3. Installation and Mechanical Size

3.1. Mechanical size

Dimensions PP (mm) 153mm×72mm×74.5mm

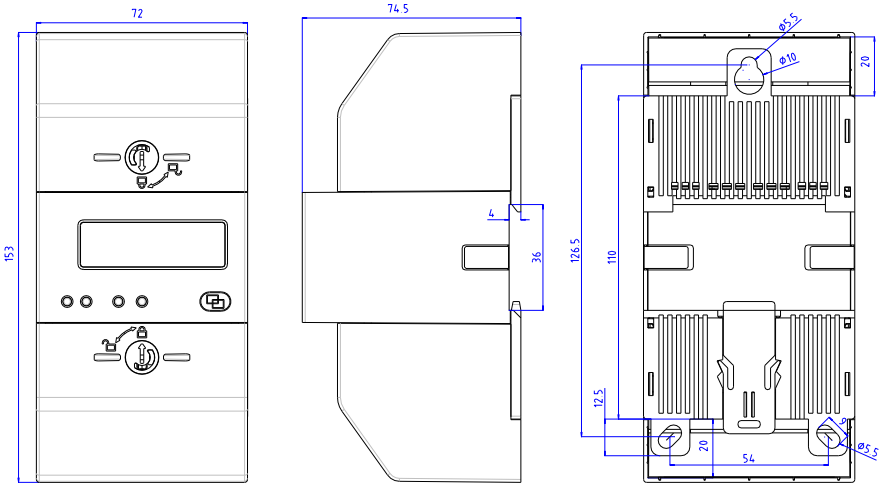


Figure 6: Dimensions of meter

3.2. Requirements on wires

The terminal block allows inserting wires with varying cross-sectional area ranging 4 to 25 mm^2.

The type of wires can be solid cores, flexible cores or stranded wires. All types with or without the use of insulated or non insulated cable end sleeves.

The terminal block also allows inserting wires with cross-sectional area of 35 mm^2, which with solid cores or stranded type wires.

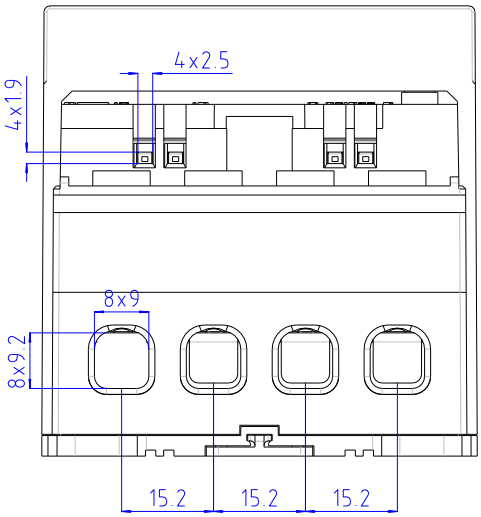


Figure 7: Wires requirements on meter

The connection hole can be inserted into the maximum depth of 24mm, the recommend wire strip length is 18~22mm.

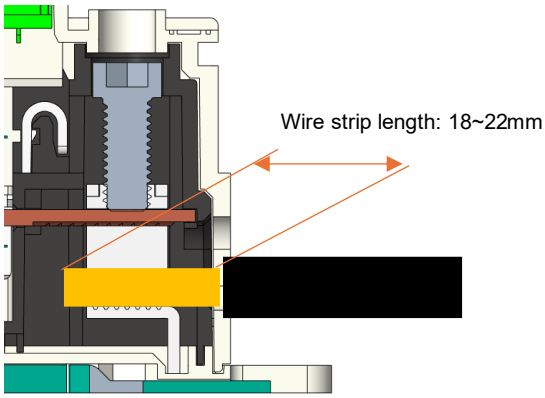


Figure 8: Wire strip length

The recommended torque for tightening the terminal strip screws is 3.5~4 Nm with a Hex/Inbus 5 screwdriver.
The recommended voltage and environment temperature should follow the features in chapter 2.2.

3.3. Installation

Meter installation must be carried out in accordance with national legislation and the DSO's regulations.
The meter must be installed in a dry and ventilated environment. The installation board must be fixed on a steady, fire-resistant and non-vibrant wall. The method as to how the meter should be installed is as shown below. (Please refer to the wire diagram.)

Cut off the power supply to where the meter will be installed, this is the most important thing!!!

Step 1: Inspect meter before install.
Before installation, please make sure that there is no damage, broken or any other defect to the meter. Do NOT install the meter if any defect is found.

Step 2: Fixing
The meter is 3 points mounting type, it can be fixed by upper 1 hook and bottom 2 fixing point.
The hook must be slide out for installation.
To fix meter, first hang the meter by hook then fasten three fixing screws.

Step 3: Connect power line

Connect all necessary wires according to wiring diagram which is printed on terminal cover.

Step 4: Install the terminal cover, power on inspection

After correct connection, install the terminal cover, seal the screw, and turn on the power.

Step5: Display inspection:

After power on, first page of LCD will display firmware version. Then the meter will display the list of auto-scrolling mode 1.

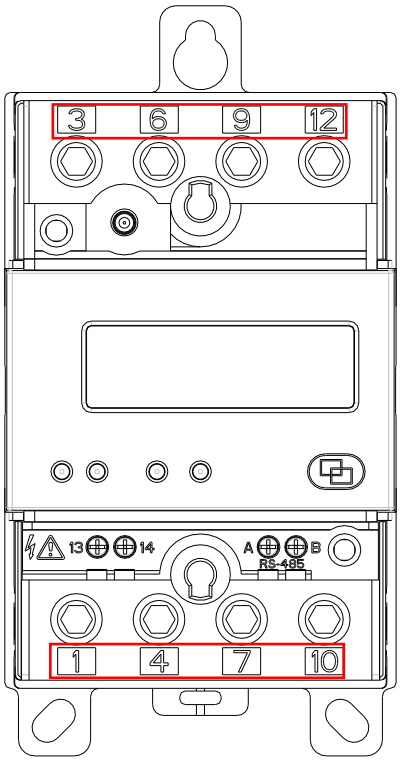


Figure 9: Terminal block of PP meters

- **1, 4, 7** Phase supply (L1, L2, L3)
- **3, 6, 9** Phase load (L1, L2, L3)
- **10** Neutral supply
- **12** Neutral load

The meter can operate normally even when the phase sequence is reversed.

3.4. Wire diagram

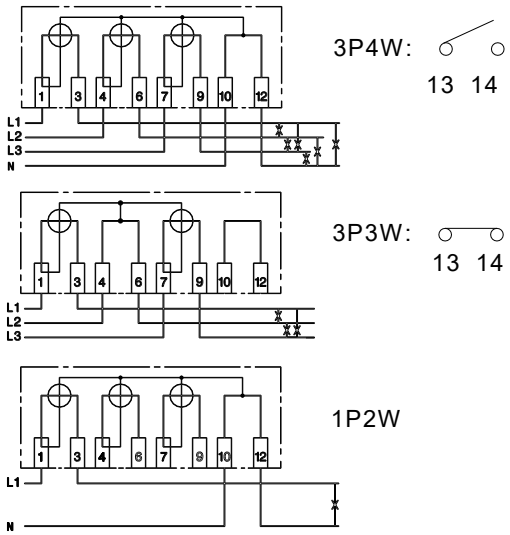


Figure 10: Wire diagram

3.5. LTE-M port installation

The LTE-M module is integrated in meter, it can't be replaced unless change the new meter. An external antenna is optionally available for installation locations with insufficient network coverage, such as closed metal cabinets.

3.6. Location of seals

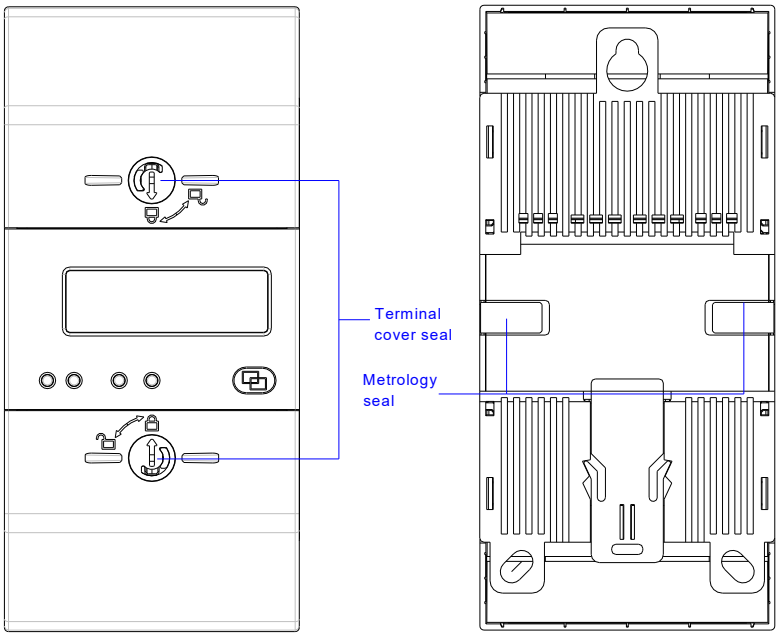


Figure 11: Seals location of IQ0404100K1-R

The poly-phase meter is supplied with special seals for calibration. These seals shall be kept intact under regular installation procedures; if the calibration (or better metrological) seals are broken the meter may not be used and must be returned to the warehouse of the grid operator.

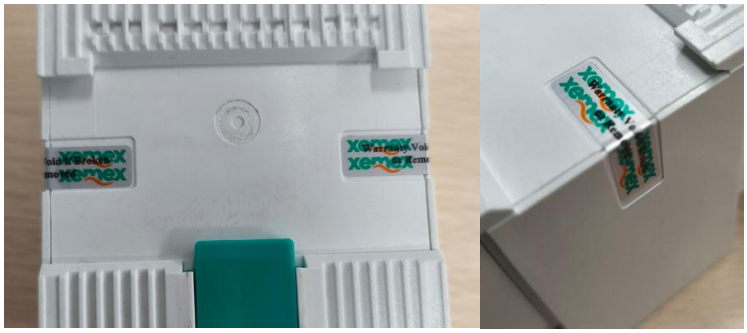


Figure 12: Seals of IQ0404100K1-R

3.7. Protection

3.7.1. Protective class

This equipment protective class is II and is fully protected by double insulation or reinforced insulation.

: Equipment of protective class II

3.7.2. External protection devices

The electrical installations must comply with the national regulations in place.
Although the supply side external protection device is not required, it is still recommended.
Generally, the installer should consult local regulations and the installation manual for the necessary protection requirements before installation.
The relevant information can be found in this manual.
Statement: The installer is responsible for coordinating the rating and the characteristics of the supply side overcurrent protection devices with the maximum current rating and, in the case of direct connected meters, with the UC rating of the metering equipment.

3.7.3. Auxiliary power supply

On this meter, this in not applied.

3.7.4. Batteries replacement

On this meter, this in not applied.

3.7.5. Commissioning

Statement: where danger or damage is expected to arise due to an interruption of supply, suitable provisions shall be made in the installation or installed equipment.
The external protection devices need to be installed correctly to protect accidental electric shock. If the terminal cover is not screwed tight, there is a danger of contact with the connection terminals. Contact with live components is dangerous to life.
The functional check requires voltage to be applied and load applied to all phases. If export is possible, determine first the energy direction present.
If no network voltage is present, commissioning and functional check must be performed at a later date.

3.7.6. Maintenance and cleaning

Cleaning
If the meter outside surface need to be cleaned, please cut-off the power supply first, and wait the surface temperature cools to ambient temperature, then use a wet towel with clear water to wipe the meter surface.
Be careful not to use volatile or corrosive solvents and no drops.
Otherwise it may cause meter damage or electric shock.

3.7.7. Maintenance

The meter installation, remove and maintenance should be performed comply with appropriate procedures and arrangements, and cut off the power supply before starting.
If it is necessary to operate with power, please do not touch the exposure metal parts directly, it may be live parts under normal or abnormal conditions, it may cause electric shock.
If it cannot be solved, please contact the manufacture.

4.Storage and mounting

4.1. Storage

The meters should be transported and stored within the temperature range specified in chapter 2.2 and follow the instructions on the packing.
The transport should be carried in the original packaging whenever possible and protected from exposure to rain, dusts, sunshine insects and corrosive atmospheres.
Impacts and drops should be avoided during transport.

4.2. Mounting

During handling lifting and moving the meters, or removing the packaging, the appropriate tools and equipment should be used to avoid damaging the meters or operators.

The meters are indoor use only and should be installed at a dry and well-ventilated place, and avoided exposure to sunshine, rain, dusts and corrosive atmospheres.

The environment temperature must not exceed meter operation temperature range

The installation board or cabinet should be fixed on a solid, fire-resistant and sturdy wall.

After installation, the meter back should be fitted to the mounting surface.

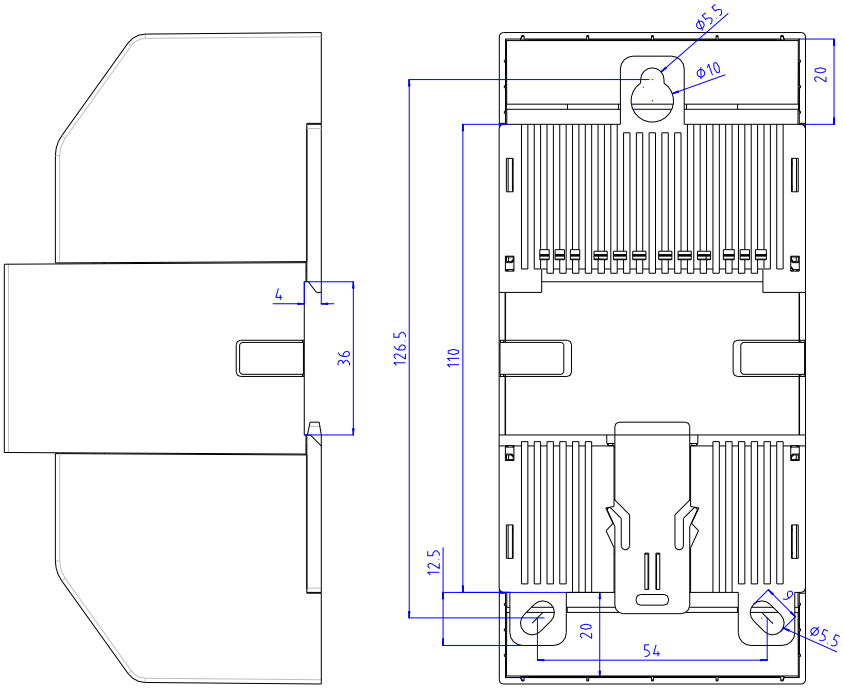
When meter used under extreme conditions (ie. Max. current, +70°C, long time), the meter outside surface temperature maybe higher than 90°C. Therefore, the installation surface in contact with meter must be high-temperature resistance and prevent the spread of flames.

The meter can be fixed by 3 points, upper 1 hook and bottom 2 point, the fix screw should be less than Φ5mm.

Electric drill with Φ3 drilling bit for metal meter box installation.

Electric drill with Φ5 drilling bit and plastic plug for concrete wall installation.

The main installation dimension shown in below figure.



Installation dimensions of PP meter

The meter can also be fixed by DIN rail of TH 35-7.5 type, release the moveable hook first, then hang the meter on rail by upper hook, finally push the moveable hook to lock.