HELLENIC ELECTRICITY DISTRIBUTION NETWORK OPERATOR S.A.

NOTICE OF CALL FOR TENDERS No ND-207

PROJECT: "Pilot Telemetering and Management System for the Electric Power Supply Demand by Residential and Small Commercial Consumers and Implementation of Smart Grids".

TECHNICAL DESCRIPTION

THREE-PHASE SUBSTATION ELECTRONIC METERS

GENERAL REMARKS ~~THREE-PHASE SUBSTATION ELECTRONIC METERS~~

In this issue, the substations electronic meters are described, which shall connect to the LV output of the distribution transformers of the pilot project substations.

Attached are the minimal technical requirements of the ~~is~~ indicative technical specification "THREE-PHASE MAX-INDICATING LOW-VOLTAGE ELECTRONIC METERS FOR SUBSTATIONS" ~~GR-267 for three-phase max-indicating electronic meters for connection through current transformer and for direct connection to the low voltage grid~~, which should be appropriately followed for the substation electronic meters.

The substation electronic meters shall connect to the network through appropriate split-core current transformers or technically equivalent device according to the substation power, which shall be provided and installed by the Contractor, and should have at least 0.5 accuracy.

In case that a concentrator is installed on the substation for PLC communication with single and three-phase meters, the telemetering – configuration of the substation meter could be accomplished also through the concentrator.

The meters will be installed on all pilot project substations by the Contractor, housed in an appropriate box for their protection.

The substation meter and concentrator ~~substation~~ boxes ~~shall be according to the LV meter boxes, issue 10. In addition, the boxes~~ should be appropriately mounted on the substations ~~posts~~, and in particular:

- In case for overhead substations, they ~~They~~ should be mounted with appropriate distance from the posts, in order to allow climbing with climbing irons (as with meters for Lighting of Streets and Squares). In addition, they ~~They~~ should be mounted at height appropriate for indications reading (about 1.5m above ground).
- ~~They should be placed appropriately in order to avoid problems for climbing, i.e. for two-poles substations they should be mounted on the side between the two poles.~~
- The connection between the substation meters, concentrators and substation pillars should be implemented through appropriate protection ~~metallic~~ tubes and sealed using glands.

SPECIFICATION ~~GR-267 / 26.4.2010~~

THREE PHASE MAX-INDICATING ELECTRONIC METERS FOR CONNECTION THROUGH CURRENT TRANSFORMER FOR SUBSTATIONS ~~& FOR DIRECT CONNECTION TO THE LOW VOLTAGE NETWORK SCOPE~~

1. SCOPE

This specification defines the manufacture, the tests, the acceptance check ~~and packing, for transportation and delivery to PPC Warehouses,~~ of 3-phase current transformer ~~or direct connection~~ Low Voltage electronic meters with three-element four-conductor and with active and reactive energy measuring and maximum demand indication.

2. OPERATING CONDITIONS

2.1 OPERATING TEMPERATURE

- The meter proper operation temperature zone shall be between -20 °C and +55 °C.
- The storage and transport temperature zone shall be between -20°C and +70°C.

2.2 HUMIDITY

The electronic meter shall operate under an average annual relative humidity of less than 75% .
Moreover, for 30 days in total interspersed within the year, it shall operate under relative humidity 95 %.
Additionally, at random moments within the day, it shall operate under relative humidity 85 % (IEC 1036).

2.3 TABLE OF CLIMATIC AND ENVIRONMENTAL CONDITIONS

Maximum altitude	2000 m
Minimum ambient temperature	- 20° C
Average ambient temperature	20° C
Maximum ambient temperature	55° C
Maximum temperature at external surfaces due to solar radiation	70° C
Minimum relative humidity	5 %
Maximum relative humidity	95%

3. REGULATIONS - STANDARDS - SPECIFICATIONS

REGULATIONS	TITLE
EN / IEC62052/11 & EN/IEC62053/21-22-23	Alternating current static watt-hour meters for active energy (classes 0.5 & 1)
EN / IEC62052/11 & EN/IEC62053/21-22-23	Alternating current static watt-hour meters for reactive energy (class 2)
EN/IEC 62058-11	Electricity metering equipment (A.C.) - Acceptance inspection Part 11: General acceptance inspection methods
EN/IEC 62058-31	Electricity metering equipment (AC) - Acceptance inspection - Part 31: Particular requirements for static meters for active energy (classes 0,2 S, 0,5 S, 1 and 2)
EN 50470-1	Electricity Metering equipment (a.c.) Part 1: General requirements, tests and test conditions – Metering equipment (class indexes A, B and C)
EN 50470-3	Electricity Metering equipment (a.c.) Part 3: Particular requirements – Static meters for active energy (class indexes A, B and C)
EN / IEC 60529	Degrees of protection provided by enclosures.
EN/IEC 1334-4-41	Distribution automation using distribution line carrier systems- Part 4: Data communication protocols – Distribution line message specification.
EN/IEC 62056-53	DLMS/COSEM Application Layer
EN/IEC 62056-72	DLMS/COSEM Data Link Layer
EN/IEC 62056-61	DLMS/COSEM Obis Code
EN/IEC 62056-62	DLMS/COSEM Interface Classes
EN/IEC 62056/21	Data exchange for meter reading, tariff and load control.
EN/IEC 61000-4-2,3,4	Electromagnetic compatibility.
EN/IEC 60410	Sampling plans and procedures for inspection by attributes.
EN/IEC 60068-2-6	Basic environmetal testing Procedures Part 2: Tests. Test EA : shock
EN/IEC 60068-2-30	Basic enviromental testing Procedures Part 2: Tests. Test Db and quidance: Damp, neat cyclic (12 + 12 – hour cycle).
EN/IEC 60695-2-1	Fire hazard testing part 2: test methods. Glow wire test and quidance.
EN/IEC 60695-2-2	Fire hazard testing part 2: Test methods Needle flame test.

The electronic meters shall be industrial products manufactured according to the global l EN / IEC regulations / standards and to the Technical Specifications of HEDNO ~~PPC~~ as mentioned below, which are valid on the day of the submission of the bids.

In cases where the requirements of this Specification contradict with the above editions of International Regulations / Standards or any other relevant Standards, the corresponding HEDNO ~~PPC~~ specification shall prevail.
The meters shall have markings pursuant to the European Standards, and they are also required to have the "CE" conformity mark.

The offered meters shall be of **class B** , in compliance with the EU Directive 2004/22/EC (Measuring Instruments) and according to the Ministry Decision (Government Gazette 521 / issue B' / 12.04.2007, No. F2 – 1393).
"All the necessary certificates for the above compliance, that have been issued for the offered meters by a competent Notified Body, should be submitted"
~~Moreover, the supplier of the meters shall submit a certificate proving that all procedures specified in ISO9001 are observed.~~

4. EQUIPMENT DESCRIPTION

4.1 MECHANICAL REQUIREMENTS

4.1.1 COVER

The electronic meter shall be designed and manufactured according to the protection class IP51 as specified in IEC60529 for indoor installation (but with the meter covers closed).
The cover window shall be made of a high purity transparent material, enabling the meter's data to be easily read even after 15 years.
The meter width shall be according to DIN43857.
The meter cover shall be according to the IEC standard for ~~direct~~ connection of the phase and neutral conductors and for the connection of the pulse inputs, pulse outputs, signal inputs, signal outputs and communication unit by terminal blocks.

The electronic meter cover shall contain the communication port through the optical head, which shall be waterproof.
The communication of the optical head port shall be performed according to EN/IEC 62056/21 DLMS/COSEM.
The electronic meter shall be delivered with its cover, which shall have appropriate sealing screws.

It shall be possible to perform the following tasks without unsealing the meter cover:

- Reading through the display and activation of its functions by button (push buttons).
- Reading of the meter's characteristics (name table).
- Programming and reading of the electronic meter by a portable computer or portable register, using the optical communication port.
- Manual reset of the max values by a watertight button (push button) installed on the front cover, which shall be sealed with a seal, independently from the seal of the terminal cover, metrological pin, which will protect basic fixing parameters of the meter.
- Check of measuring accuracy of active and reactive (independently) by a pulse signal from a LED installed on the front cover of the meter.

4.1.2 Terminals and Terminal Cover

The size and position of the terminals shall be according to the DIN / IEC Standards.
The terminals shall be of front connection type and shall have lifted insulation diaphragms in order to provide protection against accidental short-circuits between phases and neutral during the connection or disconnection of the meter.
Each terminal shall have at least two terminal screws for tightening the conductor in order to ensure proper electrical contact and to avoid any risk of temperature rise or loosening of the conductor under normal operating conditions.
~~For the meters for direct connection to the network, the cross-section for connection of multi-wire stranded conductor shall be at least : 25 mm^2~~
~~For the meters for connection to the network through current transformers, the~~ The cross-section for connection of conductors to the meters for connection to the network through current transformers shall be at least : 6 mm^2
The minimum cross-section for connection of multi-wire cable at the signal or pulse terminals shall be at least: 1 mm^2
~~The connection terminals for the pulse outputs, signal outputs, communication unit shall be of spring type without tightening screws.~~
~~Concerning the terminals for the signal input-output it is also acceptable the use of connection terminals with tightening screws.~~
The terminal cover shall be sealed so that any intervention inside the terminals shall require the cover seals to be broken.

4.1.3 Nameplate

The nameplate shall be in compliance with the EU Directive 2004/22/EC (Measuring Instruments), according to the Ministry Decision no. F2 – 1393 (Government Gazette 521 / issue B' / 12.04.2007 F2 -1393)
The nameplate shall be appropriately designed and installed so that the following features or information shall be provided without removing the meter cover:

- PPC logo
- The meter constant
- The check LED DIODE, with accuracy class reading
- Optical head communication port (IR Port)
- The symbol for double insulation protection and the CE mark for compatibility with EU regulations/standards
- push-button for rolling display indications
- Meter information (type, serial number, nominal values / ratings, year of manufacture)
- The nominal values / ratings shall include the nominal voltage 3 x 230/400 V, the nominal current e.g. 5 A and the maximum current e.g. 10A (5/10 A) ~~or (20/100 A)~~.
- The codes of the measured quantities shall be explained on the meter nameplate (Obis), as well as information for the pulse outputs

4.1.4 Communication through the Optical Head (IR Port)

The electronic meter shall be equipped with a communication port through an optical head. The communication port shall be infrared (IR) type.
The communication protocol of the IR port shall be according to IEC 62056-21 for reading and according to DLMS/COSEM for bidirectional communication. The communication speed shall be at least 9600 bauds.
The optical head shall ensure the connection with a portable register or PC. Moreover, it shall be self-supported in a manner that does not affect the proper operation of the meter (e.g. magnetic).

4.1.5 Physical requirements

The electronic meter shall be manufactured according to the size requirements of DIN 43857 and DIN 43852. This facilitates the installation of the meter inside meter cabinets standardized by HEDNO ~~PPC~~.

5. ELECTRICAL REQUIREMENTS

5.1 Type of Connection with the Network

The electronic meter shall be designed for direct connection to a low voltage network, through CT or Direct Connected and shall be equipped with three elements, four conductors.

5.2 Measuring System

5.2.1 General

The measuring system shall be set in digital mode, suitable for connection to the network through CT ~~or direct connection to the network~~.
~~In particular, the~~ The meter shall be equipped with the following analog inputs:

- Current analog inputs I1, I2 and I3
- Voltage analog inputs U1, U2 and U3

From the above analog inputs, the measuring system shall generate customized instant digital values for voltage and power, for each phase.
From these values the meter shall calculate the following digital measured quantities (average value for at least one (1) second):

- Active energy for each phase P1, P2 and P3 (with sign for the direction of the energy flow).
- Phase voltage U1, U2, U3. and Phase current I1 I2 I3
- Reactive energy total and for each phase (positive for the two upper Quadrants)

For the above metered quantities the meter microprocessor shall calculate the following measured quantities:

- Incoming active energy (for each phase)
- Outgoing active energy (for each phase)
- Reactive energy per quadrant and phase
- Phase voltage and current
- Direction of rotation of the magnetic field.

5.2.2 Configuration of Measured Quantities

The meter shall register the active energy of all three phases, but in a separate register according to the direction (incoming - outgoing).
The microprocessor shall sum up the digital signals from the digital measuring system and shall provide the total measured value (incoming energy) for further processing in the relevant register.
The outgoing energy value shall be generated (processed) only if the sum of the signals from the digital measuring system is negative.
Moreover, the digital signal from the measuring system shall be adjusted (adapted) by the

microprocessor using an adjustment factor defined during its factory production test.

Finally, the microprocessor shall receive the measured power and compare it with the minimum starting value. If the signal exceeds the minimum value it shall be forwarded for further processing.

5.2.3 Accuracy Class

The offered meters shall be of class B, in compliance with the EU Directive 2004/22/EC and according to EN/IEC 62053-21 for measuring active energy and class 2 for measuring reactive energy according to EN/IEC 62053-23

5.2.4 Operating Voltage Range

The meter shall be suitable for operation with rated voltage 3 x 230 / 400 Volts, and shall operate within a voltage range of 0,8 to 1,15xU_n(where U_n is the nominal voltage).

5.2.5 Measured Current Range

CT CONNECTED (200/5 A or 400/5A)
CT connected meters shall have nominal current value I_n = 5 A.
The maximum meter current shall be I_{max} = 10 A.

~~**DIRECT CONNECTED TO THE NETWORK**~~
~~The meter maximum current shall be Imax = 100 A.~~
~~The meter shall have basic current value Ib = 20 A.~~

5.2.6 Loading capacity

The meter must withstand load according to EN/IEC 62052-11 and 62053-21,-22 and -23 and EN 50470.

5.2.7 Network Frequency

The electronic meter shall operate with a network frequency of 50 Hz and a variation zone of ±2%.

5.3 OPERATION REQUIREMENTS

5.3.1 Measured quantities

The electronic meter shall be able to measure and display at least the following quantities:

- Active Incoming Energy +A
- Active Outgoing Energy -A
- Reactive Energy (in all four quadrants QI, QII, QIII, QIV)»

5.3.2 Pulse weightiness

The meter pulse weightiness shall be defined through programming, taking into account the fact that the maximum interrupt frequency of the output contact shall be at least 25 Hz and the maximum current shall be at least 100 mA.

5.3.3 Testing (control)

The meter's control, programming and data retrieval shall be able to be performed also through the optical head communication port, but also through the RS-485 port.
Yet, the meter shall have the appropriate metrological LEDs for testing the measurement's accuracy of the active and the reactive energy

5.3.4 Starting Current

The CT connected electronic meter shall begin the energy measuring when the current reaches at least 0.2% of the nominal current In, according to IEC 50470-3.
~~The Direct connected electronic meter shall begin the energy measuring when the current reaches at least 0.4% of the reference current Iʀᴇ, according to IEC 50470-3.~~
The electronic meter shall use the starting power instead of the starting current in order to define the starting limit.

5.3.5 Accuracy

The electronic meter shall achieve the accuracy at power measuring (W) according to EN/IEC 62053 and EN 50470.

5.3.6 Meter Power Supply

The meter shall be suitable for low voltage measuring, with network voltage 3 x 230 / 400 V (±10%).
The meter shall be able to operate in case of loss of one or two phases, and to measure the active energy of the other phases.
The electronic meter shall also be able to operate in each of the following cases of power failure, with the accuracy that characterizes the corresponding voltage asymmetry:

- loss of neutral with normal power at all three phases or normal operation of two phases
- Phase-neutral inversion

The condition of the three phases and the phase sequence shall be displayed on the meter display.
Meter operation supply shall store enough energy so that its operation shall not be disturbed in case of 3-phase voltage loss for up to 500 ms~~, according to EN/IEC~~.
When the voltage is restored, the meter shall be ready for operation within a period of 5 sec.
The electronic meter shall be compliant with EN/IEC 62053, EN 50470 regarding the requirements for overloading and surges. In case of continuous voltage loss, the meter ~~non-volatile (EEPROM)~~ memory shall permit the retrieval of information even after a period of 10 years without help from any auxiliary supply.

5.3.7 Meter power supply and self-consumption

The energy consumption shall be according to EN / IEC 62052-11, EN/IEC 62053/21-22-23 for multifunction meters.
Without the communications unit and the display backlight the energy consumption shall not exceed the values specified in EN/IEC 62052-11 & EN/IEC 62053/21-22-23

5.3.8 Auxiliary Supply (Clock autonomy)

The auxiliary supply shall provide power only to the real time clock (R.T.C).
The meter shall be equipped with system (i.e.Lithium Battery) ~~Lithium battery~~ capable of providing sufficient energy for the operation of the internal clock (R.T.C) for three years at least (without the meter being connected to the network~~). The battery's life-time with the meter connected to the network shall be at least 10 years, with a maximum loss of 10% due to self-discharge.~~

- ~~Super-capacitor.~~

In any case the meter ~~billing~~ values of the meter must be reserved in its memory for at least ten (10) years.

~~5.3.9 Installation and Replacement of the Battery~~

~~The meter shall be manufactured in such a way that no removal of the seal or intervention into sealed parts shall be required, and the replacement of the battery shall be performed while the meter is in operation. The operator, during the replacement of the battery, shall not come in contact with electrical parts and it will not be possible for the worker to come in contact with any electrical conductor.~~

5.4 REGISTERS

5.4.1 Energy Registers

~~The meter shall be provided with at least four (4) tariff zones.~~

The measured values of selected quantities shall be registered as follows:

- In the active energy registers (in at least two ~~eight~~ (2 ~~8~~))
- In the active maximum demand registers (in at least two ~~eight~~ (2 ~~8~~))
- In the cumulative (total) energy registers (in at least two ~~eight~~ (2 ~~8~~)).

5.4.2 Historical data registers

The electronic meter shall have at least eight (8) Historical Maximum Demand registers for storing the values of four (4) previous billing period resets of import – export active demand with their corresponding date and time.

The control of the integration period shall be performed by the internal calendar clock of the meter. Integration period shall be programmable from 5 to 60 minutes (5, 10, 15, 20, 30 and 60).

~~The defined integration period shall be common for the rated (tariff) maximum demand registers.~~

5.4.3 End of ~~Billing~~ Integration Period

At the end of ~~billing~~ integration period, the total energy and maximum demand registers store their information into the Historical registers (logs).

The time period between two successful maximum value resets is defined as '~~billing~~ integration period'.

The maximum value reset shall be performed with the following ways:

- Automatically on a predefined date and time
- By telemetering
- Through a reset button ~~(capable of being sealed) that will be operated exclusively and only by authorized personnel~~

5.4.4 Instant Information

The registers of the three-phase measured quantities shall be updated at least every second.

This information shall be available to be shown either on the display or as events, e.g. demand overstepping, for activation of output signal.

5.4.5 Diagnostics Functions

The electronic meter shall perform a diagnostic check of its circuits each time it is placed under voltage, after every voltage outage and at regular time intervals.
In case an error is detected, a corresponding identifiable fault message shall be displayed on the meter display.

5.4.6 Display readings

Beyond measuring information (energy registers, reset, maximums, instantaneous values of current-voltage-power, network quality data), the meter shall store in its memory and shall be programmable which of the following additional information shall be shown on the display:

- Meter serial number (up to 12 digits)
- The current date and time
- ~~User Tariff zone / calendar information~~
- Error reading

5.4.7 State Check

The state of the meter shall be checked in the following cases:

- Voltage loss per phase
- Three-phase outage (or lower than voltage limit)
- Inversion of current set per phase
- Overstepping of agreed power

~~5.4.8 Definition of Tariff Zones~~

~~The definition of the meter's tariff zones shall be performed with the following methods:~~
- ~~through the internal time switch~~
- ~~through appropriate S/W for programming the meter~~

5.5 TIME SWITCH / CALENDARS

The meter shall be equipped with a calendar time switch~~, which shall generate signals for changing tariff zones,~~ for automatic maximum value reset and for setting the end of the ~~billing~~ integration period for the meters.
The clock mechanism shall be high precision Quartz (~~according to IEC:~~ <5 ppm).
~~The calendar time switch shall drive the registers of the energy, power and maximum demand tariff zones according to the programming of "TARIFFS" and "DAILY PROFILES".~~
~~The programming of "TARIFF" shall set the combinations of the tariff zone registers that shall be activated for each particular tariff.~~
~~The programming of "DAILY PROFILE" shall include the hours where the tariff zones change.~~
~~Each daily schedule shall include at least 8 intermediate time periods during the day.~~
The season is defined as month's subdivision within the year. The meter shall permit up to 4 seasons to be defined within a year.
The calendar consists or predefined weeks, which in turn consist of a set of daily schedules. The meter shall permit at least up to 50 excludable days (e.g. holidays) to be defined through the daily schedules.
The calendar can be changed once a year. This feature allows us full flexibility regarding the adjustment of holidays.

5.5.1 Real Time Clock (RTC)

The clock shall provide all required timings for the proper operation of the three-phase meter.
The calendar shall support leap years and programming of daylight time adjustment.

The clock shall support automatic change to/from daylight time according to the European standard.
When synchronization is performed by the internal crystal, the achieved accuracy shall be greater than 5 ppm.
Moreover, a synchronization accuracy of one second shall be achieved through the communication unit.
By using the button (push button) it shall be possible to set the clock with an accuracy of up to one second.

5.6 Display

The display shall be able to show information from the energy ~~and tariff zone~~ maximum (peak) demand registers, as well as information from the historical registers, which have been programmed.
The information reading shall be based on the DLMS/COSEM - OBIS Identification system.
The decimal digits, the units, the multipliers, the content and the display sequence shall be defined through programming. Similarly, the list content and the display sequence shall be defined through the same way.
It is required to include at least the following readings:

- Phase loss
- Phase sequence
- Units: ~~W,~~ kW, MW, ~~Wh,~~ kWh, MWh~~, var~~, kvar, Mvar, kvarh, Mvarh, V, ~~kV,~~ A, Hz
- Error code
- State of selected Outputs
- ~~Active tariff zone~~

The meter reading shall be displayed and therefore visible from a distance of 1 m below and 0.75 m horizontally from the front side of the meter (observation angle 30^{o}).
The date display type shall be user-definable as follows:

- dd/mm/yy
- yy/mm/dd

The meter shall support the following operation modes of the display:

- ~~Normal (automatic rotation of displayed information)~~
- Automatic alternating cyclical display rotation
- Manual alternating cyclical display rotation
- Technical Check (Programming - Set mode)

5.6.1 Button (Push button)

The meter shall be equipped with an operation push button.
By using the push button it shall be possible to adjust the date and time.

5.7 INPUTS - OUTPUTS

5.7.1 Pulse outputs

Two programmable ~~It shall be possible to program the~~ pulse outputs should be provided, which shall convey energy pulses for any type of internally measured quantity.
The pulse weightiness shall be defined through programming.
The pulse outputs shall be according to IEC 61393.

~~**5.7.2 Signal outputs**~~

~~The signal outputs shall operate with rated voltage from 100 V to 240 $V_{AC/DC}$.~~
~~It shall be possible to program their operation for the following functions:~~
- ~~Indication of active tariff zone~~
- ~~Maximum value overstepping warning~~

~~The number of open/close actions of the output contacts shall be at least 1 x 10^5 for resistive loads.~~

5.7.3~~2~~ Integrated Relay Output(s) (Load Management Facility)

The provision of an integrated relay output(s) will be included in all meters to provide for the remote switching of dedicated~~-~~ circuits .

The relay output(s) will be capable of operating contactors with the ability to isolate the supply~~-~~ completely (if required); or switching dedicated circuits .

The meters should have control capability (on/off) of relay outputs (at least two) by specific commands of the ~~telemetering~~ AMI software.
The technical specifications of the relay outputs are the following:
- Solid state relay,
- Voltage 12 – 240 V ac/dc,
- Minimum current 100mA,
- Maximum frequency alternation 25Hz, for pulse amplitude 20ms.

The above relay outputs should be programmable remotly from the software that parameterizes the meters.

5.7.3 Inputs

The meters shall have at least two inputs.

The inputs should be able to be activated with voltage between 12V and 240V AC/DC and minimum current 2mA and be able to be programmed for events for alarm activation.

5.8 COMMUNICATION PROTOCOL

The meter shall be compatible with the communication protocol DLMS/COSEM (Application Protocol) EN / IC 62056.
It shall be possible to use the DLMS/COSEM for communication with the meter through every channel, like the optical head port, or communication line (modem PSTN or GSM/GPRS etc..)
The meter's manufacturer is required to submit the codes of the objects used (according to DLMS/COSEM), together with the meter technical data~~, otherwise the bid shall not be accepted succesfully~~.
Reading and parameterisation (for setting date-time~~-change of tariff,~~ CT ration ~~or~~ full reparameterisation of the meter) of the meters must be possible with relevant discreet passwords. The list of these codes and their relevant access rights (read-write) shall be communicated in writing and electronic format and will be defined before the production line.

5.9 ELECTROMAGNETIC COMPATIBILITY (EMC)

The meter shall comply with the following standards:

- Electrostatic discharge according to IEC 61000-42
- High frequency electromagnetic field according to IEC 61000-4-4
- Line transients according to IEC 61000-4-4
- Radio interference attenuation according to IEC/CISPR22 class B

Additionally:

- Electrostatic discharge: 15 kV minimum
- HF electromagnetic fields: 10 V/m minimum
- Temporary voltage transients without load (IEC 1036-5-5): 2 kV minimum
- Radio interference: less than 64 dB μV

5.10 Communication Interface

The meters must have obligatory the capability of connection, via added communication medium (e.g. modem PSTN, GSM/GPRS etc), for their telemetering – parameterization»
For this reason they should have at least one communication port RS485 type.
The communication port will support communication with data exchange rate from 2.400 – 14,400 bps at least.

5.11 Load Profile

The meters must have the capability to register load profile for the following quantities:

- Active Incoming Energy +A
- Active Outgoing Energy -A
- Reactive Energy (in all four quadrants QI, QII, QIII, QIV)

and for integration period of 15min, the load profile data shall be stored for at least the past sixty (60) days.

~~5.12 Fraud detection event logging~~

~~The meter shall have the capability, via appropriate arrangements and parameterization, of detecting and logging at least the following events, of potential attempt for tampering the meter while in normal operation under voltage (each event individually), by logging the time (date and hour) of appearance and disappearance of each event :~~

- ~~strong DC magnetic field influence~~
- ~~terminals' cover removal~~
- ~~over-current in the neutral wire~~

~~Also, use of passwords for restriction of the access to the meter for data reading, parameterization, etc~~

5.12 Power Quality monitoring

The meter shall have the capability, via appropriate parameterization, of monitoring at least the following events (each event individually), by logging the time (date and hour) of appearance and disappearance of each event:

- under-voltage on each phase
- over-voltage on each phase
- over-current on each phase
- power down

- neutral loss

6. TESTS

6.1 DEFINITION OF TESTS

- Type Tests

All tests intended for identifying the type characteristics of the meter in order to prove the compliance with the requirements of the relevant standards/regulations that these characteristics are required to comply with.

- Series tests

Tests performed on new meters to ensure that they comply with the results of the above tests or to prove that the batch meets the specialized general and specific requirements of the relevant specification.

- Acceptance tests

Sampling tests performed on a batch of meters prior to delivery for the purpose of making a decision regarding the acceptance or rejection of the batch.

6.2 SUBMITTAL OF TEST CERTIFICATES

The bidders shall submit, together with their bid, type tests certificates and samples of series tests certificates specifying the series tests performed in their factories.
As acceptable test certificates are considered those that have been issued by a PPC laboratory, or a laboratory accredited by an independent public or private body.

6.3 TESTS

All tests shall be performed as described in each relevant and most recent issue of the IEC standards / regulations.

6.3.1 DESIGN TESTS

Not performed.

6.3.2 TYPE TESTS

Applicable type tests are those included in the current most recent EN or IEC standards / regulations, and they shall be performed in a PPC laboratory, or in an accredited laboratory.

6.3.3 SERIES TESTS

They shall be performed in the manufacturer's factory and their cost shall be borne by the manufacturer.

6.3.4 SAMPLING TESTS (ACCEPTANCE TESTS)

Sampling tests for acceptance during the acceptance check are all the tests specified in IEC EN 62058-31.
The sampling procedure for the tests shall be according to issue 410 of the IEC regulations / standards, using the following criteria:

- Test level II table I IEC 60410
- Simple or double sampling (tables II and II IEC 60410)
- Acceptable quality level A.Q.L. = 1 for each separate test

~~6.4 SUBMITTAL OF SAMPLES~~

~~The tender's participants are required to submit together with their offer, two (2) complete meter samples (which are returnable), for the technical evaluation of the material.~~
~~The meter samples shall be obligatory accompanied by their respective software for parameterization, control and configuration.~~
~~Additionally, they shall be accompanied by all the necessary information and instructions for their telemetering and billing data retrieval~~
~~The lower bidder shall provide PPC with all the required software drivers and user licenses, which are necessary for the connection and implementation of the meters into the Telemetering Centre (AMR system) of PPC~~
~~Any other information or potential presentation that may be required, concerning the offered material, must be provided to PPC's Technical Department.~~
~~It is noted that any additional capabilities of the offered meters, beyond the specified ones, should be described in detail~~

~~6.5 METERS REMOTE MASS REPARAMETERISATION SOFTWARE~~

~~The lower bidder shall provide PPC suitable software for remote mass reparameterisation of the meters (at least change of access passwords, change of billing period reset date, definition of time zones, of the meter)~~

6.6 SUBMITTAL OF INFORMATION

Together with their bids, the bidders are required to submit:

- Manufacturing drawings showing the dimensions of the meters
- A detailed description of the meter
- The applicable standards / regulations for manufacturing and tests, and certificates for these tests
- ~~Moreover, the manufacturer of the meters shall submit a certificate proving that all procedures specified in ISO 9000 are observed.~~

6.7 SPARE PARTS

The suppliers shall guarantee the availability of spare parts for a period of 5 years after the end of the guarantee ~~10 years after the delivery of the first batch~~.
The suppliers are required to submit, together with their bid, a price list for the necessary spare parts.

6.8 OPERATING INSTRUCTIONS

Together with their bids, the bidders shall submit one copy of the operating instructions of the meters, in Greek.

7. METERS PARAMETERISATION

- The meters shall be delivered programmed with the parameterization that will be advised and agreed by ~~PPC (DD / MD)~~ HEDNO, during the sample approval procedure, before the starting of the series production of the meters
- The meters shall be delivered with the Lithium battery activated and with the real time clock (R.T.C) programmed at the local Greek time.

8. Guarantee

The meters shall be accompanied by five (5) years warranty from their delivery date.

~~9. PACKING~~

~~The meters shall be placed, carefully packed, inside protective cardboard boxes.~~
~~The cardboard boxes shall be placed on EU palettes to facilitate transport.~~
~~These boxes shall be externally and indelibly marked with the Contract number, the material Code and the Manufacturer's Data.~~
~~Using the above packing, it shall also be possible to store the meters in open spaces without additional protection against weather conditions (rain or moisture).~~