HEDNO S.A. **SPECIFICATION**	METERS FOR CONVENTIONAL POWER GENERATION UNITS MV & LV	**ND/375/19.04.2016**

Issued by the Metering Systems Section	**Network Department**	

CONTENTS

TECHNICAL SPECIFICATION

ELECTRONIC METERS FOR CONVENTIONAL POWER GENERATION UNITS MEDIUM VOLTAGE (MV) & LOW VOLTAGE (LV)

SCOPE

This specification determines the manufacturing, testing, acceptance tests and packing for transportation and delivery to HEDNO warehouses of electronic meters for conventional power generation units Medium Voltage (MV) & Low Voltage (LV) for energy measurement.

OPERATING CONDITIONS

OPERATING TEMPERATURE

1. The temperature zone in which the meter functions properly shall be between -20 °C and +55 °C.
2. The storage and transport temperature zone shall be between -20 °C and +70 °C.

HUMIDITY

3. The electronic meter shall operate under an average annual relative humidity of less than 75%.
4. For 30 days in total interspersed within the year, it shall operate under relative humidity of 75% to 95 %.
5. Additionally, at random moments within the day, it shall operate under relative humidity 85 % (IEC 62052).

TABLE OF CLIMATIC AND ENVIRONMENTAL CONDITIONS

Maximum altitude	2,000 m
Minimum ambient temperature	- 20^{o} C
Average ambient temperature	20^{o} C
Maximum ambient temperature	55° C
Maximum temperature at external surfaces due to solar radiation	70^{o} C
Minimum relative humidity	5 %
Maximum relative humidity	95 %

REGULATIONS - SPECIFICATIONS

REGULATIONS	TITLE
EN / IEC62052-11	Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 11: Metering Equipment
EN/IEC 62053-22	Electricity metering equipment (AC) – Particular requirements– Part 22: Static meters for active energy (classes 0.2S and 0.5S)
EN/IEC 62053-23	Electricity metering equipment (AC) – Particular requirements– Part 23: Static meters for reactive energy (classes 2 and 3)
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 / IEC 60529	Degrees of protection provided by enclosures.
EN/IEC 62056	Electricity metering data exchange - The DLMS/COSEM suite
EN/IEC 61000-4-2,3,4	Electromagnetic compatibility.
EN/IEC 60410	Sampling plans and procedures for inspection by attributes.
EN/IEC 60068-2-1	Environmental testing - Part 2-1: Tests - Test A: Cold
EN/IEC 60068-2-2	Environmental testing - Part 2-2: Tests - Test B: Dry heat
EN/IEC 60068-2-6	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)
EN/IEC 60068-2-27	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock
EN/IEC 60068-2-30	Basic environmental testing Procedures Part 2: Tests. Test Db and guidance: Damp, neat cyclic (12 + 12 – hour cycle).
EN/IEC 60068-2-75	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests
EN/IEC 60695-2-11, 12,13	Fire hazard testing part 2: test methods. Glow wire test and guidance.

EN/IEC 60695-11-5	Fire hazard testing part 2: Test methods - Needle flame test.

6. The electronic meters shall be industrial products manufactured according to International-European EN/IEC regulations / standards and to HEDNO Technical Specifications as mentioned above, which are valid on the day of the bids submission as well as on the day of installation and delivery.
7. Whenever the requirements of this Specification contradict with the above editions of International Regulations / Standards or any other relevant Standards, the corresponding HEDNO specification shall prevail.
8. The meters shall have markings according to the European Standards and they are particularly required to have the "CE" conformity mark.
9. The offered meters shall be of **class 0.2S**, for active energy measurement in compliance with EN/ IEC 62053-22 and **class 2** for reactive energy measurement in compliance with EN/IEC 62053-23.
10. All necessary certificates for the above compliance, that should have been issued for the offered meters by a competent Notified Body, shall be submitted.
11. The Bidder shall submit a certificate that the meters are manufactured, callibrated and tested in facilities compliant with the ISO 9001 quality management standard as well as the ISO/IEC 17025.

EQUIPMENT DESCRIPTION

MECHANICAL REQUIREMENTS

Cover

12. The electronic meter shall be designed and manufactured according to the protection class IP51 as specified in EN/IEC 60529 for indoor installation (but with the meter covers closed).
13. The cover window shall be made of a high purity transparent material, enabling the meter's readings to be easily read even after 15 years exposure to the sun.
14. The meter mounting dimensions shall be according to DIN 43857.
15. The meter width shall be according to DIN 43857.
16. The cover of the electronic meter as well as the terminal connections shall be in accordance with IEC regulations for connecting measurement transformers (VTs and CTs).
17. The electronic meter cover shall contain a communication port which is accessible through an optical head, which shall be waterproof.

18. The communication with the optical head port shall be performed in accordance with EN 62056 (DLMS/COSEM).

19. The electronic meter shall be delivered with its cover sealed.

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

- Reading through the display and activation of functionalities using push buttons.
- Reading of the meter's characteristics (name table).
- Programming and reading of the electronic meter by a laptop computer or portable handheld unit, 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.
- Check of measuring accuracy of active and reactive energy by pulse signals from two LEDs located on the front meter cover.

Terminals and Terminal Cover

21. The size and position for the terminals shall be in accordance with EN/IEC standards.

- The terminals for measurement shall be able to connect stranded cable of cross-section at least 6 mm^2.
- The terminals for signals or pulses shall be able to connect stranded cable of cross-section at least 1 mm^2.

22. The terminals shall be of front connection type and shall have lifted insulation separators in order to provide protection against accidental short-circuits between phases and neutral during the connection or disconnection of the meter.

23. Each current terminal shall have at least two terminal screws for cable tightening in order to ensure proper electrical contact and no risk of temperature rise or conductor loosening under normal operating conditions.

24. The terminal’s cover shall feature a tampering alarm and shall be sealed, so that any internal intervention to the terminals requires the breaking of the cover seals with simultaneous activation of an alarm signal.

Nameplate

25. The nameplate shall be designed and installed so that the following capabilities or information are provided:

- The PPC S.A. logo
- The manufacturer logo or name
- The meter constant

- The accuracy class of led diodes for metrological testing
- Optical head communication port (IR Port)
- The symbol for double insulation protection and the CE mark for conformance with EU regulations/standards.
- Meter information (including but not limited to meter type, serial number, nominal values / ratings, year of manufacture). The nominal values shall include nominal voltage, nominal current, maximum voltage and nominal external voltage for external supply.

Communication via the optical head (IR-Port)

26. The electronic meter shall feature a communication port through an optical head. The communication port shall be infrared type (IR-Port).
27. The communication protocol of the IR-Port shall be in accordance with EN 62056-21:2002.
28. The optical head shall be read using a portable handheld device or PC/laptop. The optical head shall be self-supported in a manner that does not affect the proper operation of the meter (e.g. magnetic).

METERING SYSTEM

General

29. The metering system shall be digital for connection to a Low Voltage or Medium Voltage network, through three (3) CTs and three (3) VTs or direct voltage connection. The connection type shall be three (3) elements and four (4) conductors.
30. The meters shall be suitable for the measurement of large quantities of electrical energy for Power Generation Units. For this purpose and for the accurate measurement of energy peaks, the instantaneous values of the voltage and the current per phase should be multiplied to form the instantaneous values of the power per phase, which should be integrated over an integration interval not bigger than 0,25 sec.

Operating Voltage Range

31. The meter shall be suitable for measurement with 3 elements – 4 wire connection. The rated voltage shall be 3X57/100V or 3X230/400V, and shall operate within a voltage range of 0.8 to 1.15 x U_n (where U_n is the nominal voltage). The rated voltage will be defined at the meter's description of the public tender.

Measured Current Range

32. The electronic meter shall be connected to a current transformer (CT) with secondary nominal current I_n = 1A or I_n = 5A. The meter maximum measurement current shall be $2*I_n$ (2A or 10A respectively). The rated

current will be defined at the meter's description of the public tender.

Load Capacity

33. The meter shall withstand overload according to EN/IEC 62052-11, 62053-22.

Network Frequency

34. The electronic meter shall operate at a network frequency of 50 Hz and a variation zone of ±5%.

OPERATION REQUIREMENTS

MEASURED QUANTITIES

35. The electronic meter shall be capable of measuring at least the following quantities:

- Active Energy of 1st Quadrant Q1 kWh
- Reactive Energy of 1st Quadrant Q1 kvarh
- Apparent Energy of 1st Quadrant Q1 kVAh
- Instant Power of 1st Quadrant Q1 kW
- Reactive Instant Power of 1st Quadrant Q1 kvar
- Active Energy of 2nd Quadrant Q2 kWh
- Reactive Energy of 2nd Quadrant Q2 kvarh
- Apparent Energy of 2nd Quadrant Q2 kVAh
- Instant Power of 2nd Quadrant Q2 kW
- Reactive Instant Power of 2nd Quadrant Q2 kvar
- Active Energy of 3rd Quadrant Q3 kWh
- Reactive Energy of 3rd Quadrant Q3 kvarh
- Apparent Energy of 3rd Quadrant Q3 kVAh
- Instant Power of 3rd Quadrant Q3 kW
- Reactive Instant Power of 3rd Quadrant Q3 Kvar
- Active Energy of 4th Quadrant Q4 kWh
- Reactive Energy of 4th Quadrant Q4 kvarh
- Apparent Energy of 4th Quadrant Q4 kVAh
- Instant Power of 4th Quadrant Q4 kW
- Reactive Instant Power of 4th Quadrant Q4 kVAr
- Active value of phase voltage (rms voltage), per phase
- Active value of phase current (rms current), per phase
- Vector angle of phase voltages
- Vector angle of phase currents

- Phase sequence
- Frequency
- Instant power factor (cos φ)
- Copper losses of the power transformer-lines, Iron losses of the power transformer and total losses of active energy at two directions (incoming/ outgoing). The technical characteristics of the power transformer and lines (losses constants for iron and copper) shall be configurable at the meter for the calculation of losses.

Alternatively, the above quantities can be measured per direction, as incoming or outgoing. The meter shall be able to measure per phase the above quantities.

Pulse weightiness

36. The meter output pulse weightiness shall be determined through programming so that the ratio of output pulses per kWh shall be within the zone of 5000 ... 20000 Imp/kWh.

Starting Current

37. The electronic meter shall begin the energy measuring for both directions at 0.1% of the nominal current I_n, according to EN/IEC 62053-22.

Meter Power Supply

38. The meters and the communication units (if supplied by the meter) shall be supplied by the uninterruptible auxiliary power supply of the Power Plant, in order to achieve the minimum load burden of the VTs circuits. The auxiliary power supply shall be in the range of 100 – 240V AC/DC.

39. In case of power loss of the uninterruptible auxiliary power supply of the Power Plant, the main meter of each power generation Unit and the communication unit (if supplied by the meter) shall be supplied by the voltage metering transformers (VTs). The back-up meter of each power generation Unit shall not be supplied by the VTs in case of loss of the uninterruptible auxiliary voltage supply. The quantities of main and back-up meters will be defined at the meter's description of the public tender.

40. The electronic meter shall be able to operate in each of the following cases of power failure, with the accuracy that characterizes the corresponding voltage asymmetry:

- Neutral loss
- Phase(s) loss
- Neutral/Phase inversion

41. Upon voltage restoration, the meter shall return to normal operation within 5 seconds at maximum.

42. The electronic meter shall be compliant with EN/IEC 62053 regarding the requirements for overloading and surges.

43. 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.

44. The supply failures shall be registered, along with the duration of the failure and the date and time they occurred or with the date and time of failure and restoration of the supply.

Meter self-energy consumption

45. The energy consumption shall be according to EN/IEC 62053/22 for multifunction meters.

46. Without the communication unit and the display backlight, the energy consumption shall not exceed the values specified in EN/IEC 62052-11 & EN/IEC 62053/22.

Auxiliary supply for clock autonomy

47. The auxiliary supply for clock autonomy shall provide power to the real time clock (R.T.C).

48. The meter shall be equipped with:

- 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.

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

Interchangeability of the Lithium Battery

50. 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 him to come in contact with any electrical conductor.

REGISTERS

Energy registers

51. The electronic meter shall be equipped with at least eight (8) total energy registers.

52. From the total of measured energy quantities, at least eight (8) shall be

selected in order to create multizone tariffs. The energy quantities shall be freely selected, without restrictions, from the total of the measured energy quantities. For each selected energy quantity, the meter shall permit the creation of twenty-four (24) segmentation zones.

53. For every selected energy quantity only one register shall be in operation at the same time.

54. The electronic meter shall have at least fifteen (15) history registers for storing the previous values of the total energy registers. The storage of values from the multizone tariff registers into the history registers shall be performed by MDI-reset.

55. It is required to specify whether the multizone pricing registers shall be reset when the values are transferred to the history registers during programming of the meter.

Current Power Registers

56. The electronic meter shall be equipped with at least four (4) current power registers for tariff zones. The interval duration for calculating the maximum demand shall be parametricaly defined.

57. The tariff zone of the power registers shall be independent of the other energy tariff zones.

58. If the structure of the tariff zones has not been programmed or cannot be carried out (e.g. due to an RTC fault), the meter shall go into a fault mode defined during programming. The power registers shall be reset each time a new completion period begins.

Maximum Power registers for tariff zones

59. The electronic meter shall be equipped with at least twenty four (24) current maximum power registers for tariff zones. The completion time for calculating the maximum demand shall be given parametrically.

60. The tariff zone of the maximum power registers shall be independent of the other energy tariff zones and current power tariff zones.

61. If the structure of the tariff zones has not been programmed or cannot be carried out (e.g. due to an RTC fault), the meter shall go into a fault mode defined during programming.

62. The maximum power registers shall be reset each time a new tariff period begins.

History power registers

63. The electronic meter shall be equipped with at least fifteen (15) historical maximum power registers for storage of previous values of maximum power registers with corresponding dates and times.

Power-Loss registers

64. The electronic meter shall be equipped with additional registers for recording copper and iron losses of the power transformer and power cables losses.

End of Pricing Period

65. At the end of the pricing period the energy total registers and the maximum power registers store their information into the History Registers.

66. The end of pricing period shall be performed with one of the following methods:

- Automatically on a prefixed date.
- By telemetering.
- Manually by reset push button (with sealing capability) operated from authorized personnel only.

Frequency min/max

67. The meter shall be able to store the minimum and maximum frequency values for each pricing period or to register frequency curves.

Voltage Quality

68. The meter shall record: Voltage Outages, Voltage Drops and Surges.

69. For each of the above cases, the voltage limit and the duration for event recording shall be determined through programming.

70. The recorded data shall include the date and time of the voltage interruption.

Diagnostic Functions

71. The electronic meter shall perform a diagnostic check on its circuits each time it is powered-up, after every voltage outage and at regular intervals.

72. Through the optical head communication port and through the communication port the user shall be able to set the meter in check mode, where all of its functions shall be checked.

73. In case an error is detected, a corresponding identifiable fault message shall be displayed on the meter display.

74. In case of a non-destructive error, the meter shall not perform any calculations but instead the fault message shall be displayed.

75. If an error is detected while checking the sum in the history registers, it shall be acknowledged and the calculations in the active registers shall continue.

76. Resetting of a non-destructive fault shall be possible only by communication.

77. Each diagnostic event shall be registered in a calendar file.

Display readings

78. Beyond measuring information (energy registers, reset, maximum registers, instant values of current, voltage and power, and quality data of the network) the meter shall store in its memory and determine through programming which of the following additional information shall be shown on the display :

- Meter serial number
- The current date and time
- User's tariff zone / calendar information
- Number of max value resets / date and time of latest reset
- Meter constants
- Multipliers of the voltage and current transformers
- Software edition

State Check

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

- Voltage loss per phase
- Three-phase outage (or lower voltage limit)
- Inversion of current set per phase
- Unsuccessful programming attempt

Definition of Tariff Zones

80. The definition of the meter's tariff zones shall be performed with the following ways:

- through the internal time switch.
- through appropriate meter programming.

<u>Time Switch / Calendars</u>

81. The meter shall be equipped with a calendar time switch for changing tariff zones for automatic resetting maximum power and determine the end of the billing period.

82. The clock mechanism shall be high precision Quartz (<5 ppm according to IEC).

83. The calendar time switch shall drive the registers of the energy, power and maximum power tariff zones according to the programming of "TARIFFS" and "DAILY PROFILES".

84. The programming of "TARIFF" shall set the combinations of the tariff zone

registers that shall be activated for each particular pricing.

85. The programming of "DAILY PROFILE" shall include the hours where the tariff zones change.

86. The season is defined as subdivision of months within the year. The meter shall permit up to 4 seasons to be defined within a year.

87. The calendar consists of 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 daily schedules.

88. The calendar can be changed once a year. This feature provides full flexibility regarding the adjustment of holidays.

Real Time Clock (RTC)

89. The clock shall provide all required timings for the proper operation of the three-phase meter regarding with:

- the display of date and hour
- the adjustment of the time switch for tariff zones
- the indication of time in load curves
- the creation of completion period for load curves.

90. The calendar shall support leap years and automatic change to/from wintertime.

91. The automatically change of hour according to the European standard shall be supported.

92. When synchronization is performed by the internal crystal the achieved accuracy shall be greater than 5 ppm.

93. A synchronization accuracy of one second shall be achieved through the communication unit.

DISPLAY

94. The display shall be able to show information from the energy registers and information from the historical registers, which have been defined through programming.

95. The information shall be read based on COSEM – OBIS Identification system.

96. The decimal digits, the units, the content and the display sequence shall be defined through programming.

97. Similarly, the list content and the display sequence shall be defined through programming.

98. The following information shall be shown at least on the display:

- Energy flow direction

- Energy flow quadrant
- Phase loss
- Phase sequence
- Units: W, kW, MW, Wh, kWh, MWh, var., kvar, Mvar, varh, Mvarh, VA, kVA, MVA, VAh, kVAh, MVAh , V, A, kV, kA, Hz
- Error code
- Active tariff zone

99. The meter display shall be visible from a distance of 1 m below and 0.75 m horizontally from the front side of the meter (observation angle 30^{o}).

100. All screens shall be visible under low lighting conditions and shall be equipped with back light, which shall be deactivated automatically after 10 seconds from the last buttom pushed

101. The date display type shall be user-definable as follows:

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

102. The meter may support the following operation modes of the display:

- Normal (automatic and manual rotation of displayed information) during also the battery mode.
- Technical Check

103. The meter shall be equipped with operation push buttons.

EVENT LOG

104. Any event that the meter can detect, and which does not constitute normal operation, shall be logged in an event file.

105. Each event logged in the event file shall provide information about the type, the date and time it occurred.

106. The event file shall be able to register at least 256 logged events.

107. Any events beyond the above shall replace the previously logged events.

108. It will be possible for the event file to be read through the communication ports.

PULSE OUTPUTS

109. The meter shall be equipped with at least four (4) pulse outputs.

110. The pulse outputs shall be activated by opto-switches (not conventional relays).

111. The number of openings-closings of pulse outputs shall be at least 1×10^{6}

for ohmic load.

112. It shall be possible to program pulse outputs transmitting energy pulses for all internally measured quantities. (Indicatively: ± Active Energy, ± Reactive Energy).

113. The pulse weightiness shall be determined through programming.

114. The pulse outputs shall be according to IEC 61393.

115. The pulse outputs shall be possible to be programmed remotely via the software of meters parameterization.

LOAD CURVES

116. The duration of the completion period shall be set through programming between 1 and 60 minutes and the measured quantities that will be stored in load curves shall be selected with parameterization.

117. The meters shall be able to record the following quantities in load curves, at least in two groups:

- Active incoming Energy +A
- Active outgoing Energy – A
- Reactive Energy (in the four quadrants of QI, QII, QIII, QIV)
- Voltages L1, L2, L3
- Currents I1, I2, I3
- Total power factor
- Active incident
- Apparent Energy +S
- Apparent Energy –S
- Total losses in the positive direction
- Total losses in the negative direction
- Incoming - outgoing active energy including iron and copper losses (reference to another measurement point)

Each group shall include at least 8 quantities, whereas the meter's data storage capacity shall be sufficient for storing data in load curves over the last 180 days, under an integration time of 15min.

118. The incorporated memory of curves recording will be non-volatile, with minimal maintenance time 10 years.

METER ACCESS

119. The meter shall provide the capability, of using passwords for restriction of the access to the meter for data reading, parameterization, etc.

120. The meter shall have at least four (4) access levels.

POWER QUALITY MONITORING

121. The meter shall have the capability, via appropriate parameterization, of defining measured quantities min/max levels, of monitoring at least the following events (each type individually), by logging of time (date and hour) appearance and disappearance of each event, without logging the intermediate status:

- under-voltage on each phase
- over-voltage on each phase
- under-frequency
- over-frequency

Alternatively the above data can be recorded on Load curves.

MONITORING OF METER OPERATION

122. The meter shall be capable of detection and recording the following events:

- Low level of battery
- Malfunction code of meter
- Status /update of meter reprogramming
- Completion of communication with the meter
- Failure of communication with the meter

COMMUNICATION PROTOCOL

123. The meter shall be compatible with the communication protocol DLMS/COSEM (Application Protocol) EN / IEC 62056.

124. It shall be possible to use the DLMS/COSEM for communication with the meter through every channel, like the optical head port, or the communication port.

125. For the explicit recognition and reliable transfer of measuring data to HEDNO's telemetering center, the communication should be in conformity with the coding of OBIS Identification system.

126. The meter manufacturer shall submit the codes of the objects used (according to DLMS/COSEM), together with the meter technical data.

127. Reading and parameterization of the meters shall be possible using relevant discrete passwords for various users. The list of these users and corresponding passwords and their relevant access rights (read-write) shall be communicated in writing and electronic format and will be defined before the series production. The meter shall have at least four, independent in terms of rights, access levels for reading and programming.

128. All above shall be documented by a compliance certification according to DLMS User Association procedure (http://www.dlms.com/conformance/certificationprocess/index.html).

ELECTROMAGNETIC COMPATIBILITY (EMC)

129. The meter shall comply with the following standards:
    - Electrostatic discharge according to IEC 61000-4-2
    - RF electromagnetic field according to IEC 61000-4-3
    - Line transients according to IEC 61000-4-4
    - Radio Interference suppression according to IEC/CISPR 22 class B

COMMUNICATION INTERFACE

130. The electronic meter shall be capable of communicating via GSM/GPRS or Ethernet MODEM for telemetering – parameterization.

131. The electronic meter shall be equipped with at least two communication ports RS485. At least one of those shall be RS 485 with famele connector RJ45 or RJ 12.

132. The communication unit shall be powered directly from the meter, without any external power supply.

133. The communication interface shall support communication with data transfer rate from 9.600 – 19.200bps at least.

134. The communication ports shall be able to support communication of a group of meters with HEDNO's telemetering center, via a MODEM installed in one meter named master. The rest of the meters shall be connected with the master through their RS485 port, with appropriate addressing (multidrop). This feature shall be included in the factory configuration of the meter. In the same group of meters, two modems (same or different type) shall be able to be connected for communication redundancy. Each meter shall be able to operate as the master of the group.

135. In addition to main and redundant modem connection requirement, the meters shall support serial multidrop connection via independent RS485 port, in order to provide connection to Producer's local Scada system through suitable software with read-only rights.

136. The communication unit (GSM/GPRS or Ethernet MODEM) must be modular. The communication unit may be plug-in/modular on the front of the meter, or adaptable inside the meter terminals cover, with the SIM card protected in order to be replaced only by authorized personnel.

137. Following the installation of the communication unit, the meter shall have at least one free (available for connection) RS485 communication port.

REMOTE CONFIGURATION

138. The electronic meter shall support local and remote full software parameterization.

TESTS

DEFINITION OF TESTS

- **Type Tests**

All tests intended to identify 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.

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

140. Series tests shall be perfomed at manufacturers' facilities on his own expenses and the offer's price shall include the cost of carrying out these tests.

Sample tests (acceptance tests)

141. Sampling tests for acceptance during the acceptance check are all the tests specified in IEC/EN 62058-31.

142. The sampling procedure for the tests shall be according to IEC 60410 using the following criteria:

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

SUBMITTAL OF SAMPLES

143. The tender's participants are required to submit along with their offer, two (2) complete meter samples (which are returnable), for the technical evaluation of the material.

144. The meter samples shall be obligatory accompanied by their respective software as well as the activation passwords for parameterization and remote mass configuration.

145. Offers which are not accompanied by required samples and software will be rejected.

SUBMITTAL OF INFORMATION

146. Offers shall be accompanied by:

- Construction drawings with meters dimensions
- Detailed description of the meter
- Construction and testing standards and type test certificates. Type test certificates are considered acceptable if they have been issued by an internationallly recognized laboratory accredited according to EN ISO / IEC 17025. Offers that are not accompanied by type tests certificates will be rejected.
- Meter manufacturer shall submit certificate for compliance with ISO9001.

METERS PARAMETERIZATION

147. The meters shall be delivered with the parameterization proposed and agreed by HEDNO, during the sample approval procedure, before the starting of the series production of the meters.

148. The meters shall be delivered with the real-time clock (RTC) set at the local time in Greece.

METERS READING/PARAMETERIZATION AND MASS REMOTE REPARAMETERISATION SOFTWARE

149. The manufacturer shall provide suitable software for on-site and remote reading and full parameterization of the meters , which shall be capable of downloading the complete set of load curves within 60 minutes.

    Complete set of load curves is defined as 8 different quantities with time stamp for 180 days and 15 minutes interval. The exported file shall be compatible for processing with excel.

150. The manufacturer shall provide suitable software for automated mass (onsite and remote) parameterization.

151. The mass parameterization software shall be able to import the relevant configuration parameters of the meters, from a file in excel or text or csv format and upon parameterization shall export files, compatible with excel, for the parameterization results.

152. The updates of the above software, or the relevant new software, shall be provided free of charge during the validity of the warranty of the meters (5 years). If HEDNO find a software malfunction, even after the 5-year warranty, the manufacturer shall restore the malfunction at maximum within 3 months.

GUARANTEE

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

SPARE PARTS

154. The suppliers shall guarantee the availability of spare parts for a period of 5 years after the end of the warranty period.

155. The suppliers are required to submit, together with their bid, a price list for the necessary spare parts.

OPERATING INSTRUCTIONS

156. Bidders shall submit in their offers, the operating instructions manual of the meters and software.

PACKING

157. The meters shall be placed, carefully packed, inside protective cardboard boxes. Each meter shall have a seperate cardboard box. Cardboard boxes shall contain at maximum 20 meters.

158. The cardboard boxes shall be placed on EU palettes to facilitate transport.

159. These boxes shall be externally and indelibly marked with the Contract number, the material Code and the Manufacturer's Data.

160. 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).