HEDNO S.A. SPECIFICATION	LOW VOLTAGE METERING CURRENT TRANSFORMERS	ND/404/10.12.2018

HEDNO

Issued by the Metering Systems Section	Network Department	

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TECHNICAL SPECIFICATION HEDNO ND/404/10.12.2018.

LV METERING CURRENT TRANSFORMERS

1. SCOPE

This specification determines the construction, tests, delivery inspection and packaging of Low Voltage Metering current Transformers for indoor installation, to be transferred and delivered at HEDNO S.A. warehouses. The LV current transformers are intended to meet the needs of the Company for the measurement of electrical current at Low Voltage customers with agreed maximum power up to 250 KVA.

2. KEY WORDS

Metering Current Transformer (CT), Metering Arrangement, Operating Voltage 0,4kV.

3. OPERATING CONDITIONS

3.1 GENERAL

The materials covered by this specification shall be placed inside plastic boxes (LV plastic boxes) at outdoor or indoor places.
Storage of materials prior to installation will be in roofed warehouses without heating or air conditioning.
CTs shall be suitable for use on a 3-phase system of 50 Hz with grounded neutral node.

3.2 OPERATING – STORAGE TEMPERATURE

- Proper operation temperature for T/F should range between -25 °C and +50 °C.
- Storage and transport temperature should range between -25 °C to 50°C.

3.3 HUMIDITY

CTs shall operate at an average annual relevant humidity greater than 75 %.
Relevant humidity should reach 95%, though, for thirty (30) days scattered in a year.
Also, relative humidity may reach 85% at random moments within a day.

3.4 TABLE OF CLIMATE AND ENVIRONMENTAL CONDITIONS

Climate and environmental conditions under which CTs shall be installed, and efficiently and uninterruptedly operate are shown in the following table:

Maximum altitude	1000 m
Minimum ambient temperature	- 25° C
Mean ambient temperature	20° C
Maximum ambient temperature	50° C
Minimum relevant humidity	5 %
Maximum relevant humidity	95 %

3.5 REQUIREMENTS REGARDING OPERATING CONDITIONS AND FEATURES

1. Air temperatures for outdoor transformers – 25 0C to +50 0C
2. For installation up to 1000m above sea level
3. Grid nominal voltage 0,4 kV
4. Maximum operating voltage 0,75 kV
5. Frequency 50 Hz
6. Insulation class 'E', namely for maximum overheating of 75 °C.
7. Resistance of secondary under industrial frequency voltage 3kV (r.m.s).
8. Resistance to industrial frequency voltage 3kV for the primary terminal (r.m.s).

4. STANDARDS - SPECIFICATIONS

Transformers and auxiliary components shall be industrial products manufactured and tested in accordance with the HEDNO S.A. Technical Specifications and European and International regulations, stated at Annex D and are in force at the day of submission of bids.

All tests shall be performed in accordance with EN/IEC regulations (unless otherwise stated) in force at the day of submission of bids.

International standards EN 60044-1 for current transformers shall apply for the construction of the aforementioned metering transformers.

Also, the CT supplier should submit a certificate to prove compliance with the procedures specified:

- for transformer manufacturing, ISO 9001 / 2015 and
- for testing / measurement, to ELOT EN ISO/IEC 17025 standard, or as applicable to ensure traceability of tests / measurements to national standards or national / international reference materials.

5. DESCRIPTION

The present specification refers to:

Indoor bar type current transformers.

5.1 GENERAL REQUIREMENTS – GENERAL CHARACTERISTICS

5.1.1 Materials

All materials to be used for the construction of transformers shall be of excellent quality, suitable for the purpose intended and operating conditions specified.

They shall withstand the temperature and humidity prescribed without distortion or destruction and without affecting their mechanical and electrical properties beyond the limits specified in the specification..

With the exception of the secondary terminals, which shall be suitable for 4 mm2 copper conductor wiring, all other metal parts of the transformer should be either hot-dip galvanized steel or corrosion-resistant metal. Metallic parts that may be oxidized must be effectively protected.

The protective cladding to be used for this purpose should remain unaffected from wear and tear or time under the operating conditions specified, so that its protective properties are preserved.

Non-metal parts should be made of non-hydroscopic, fire and flame retardant material, providing protection against fire which could be caused inside or near the material, and meet the requirements of regulations EN/IEC 60707 class FH 1 or UL94 level VO.

5.1.2 Construction characteristics and finish

The CTs shall be constructed so as to ensure continuous power supply, rigidity and reliability, provide satisfactory mechanical protection against impulse and stress and facilitate fixing for cabling.

5.1.3 Drawings and information to be submitted

A full technical description shall be submitted together with the bid, which shall refer to the requirements of this specification one by one, as well as detailed drawings showing in general the construction of the material, its finish and the materials from which it will be made.

Tenders will be accompanied by certificates of execution of all type tests which clearly show that the requirements of the specification are met.

The supplier must also deliver, together with its bid, a full range of drawings presenting in detail all external CT dimensions.

The supplier shall also deliver, together with its bid, the compliance sheets listed in the annex.

All above are mandatory with a penalty of rejection**.**

5.1.4 Spare parts

Suppliers shall ensure the existence of parts and components for a period of 10 years from the date of the last partial delivery of material.

5.2 SPECIAL REQUIREMENTS AND CHARACTERISTICS

5.2.1. General

This section includes the special requirements and particular characteristics of transformer and accompanying components.

5.2.2. Secondary terminals

The secondary winding terminals will be suitable for wiring with a 4 mm2 cross section.
The secondary terminals will be indelibly embossed and labelled in accordance with EN 60044-1 (§10) for power transformers.

The secondary terminals will have a transparent cover that can be sealed by blocking access to the terminals.

5.2.3. Primary terminals

The primary terminals will be indelibly embossed and labelled in accordance with EN 60044-1 (§10) for current transformers.

5.2.4. Nameplate

Each current transformer shall have a nameplate indicating all the components necessary for the transformer to operate. The nameplate shall include:

- Manufacturer's name
- Transformer type
- Year and number of manufacture
- Primary rated current of CT.
- Secondary rated current of CT.
- Rated power in VA
- Metering accuracy class
- FS Security Coefficient
- Overload factor
- Maximum Operating and Insulation Voltage
- Short-circuit strength in thermal and dynamic current transformers (Ith, Idyn).
- Rated operating voltage
- Rated frequency 50 Hz
- Insulation Class E
- Standard compliant by the CT
- HEDNO’s material code

5.2.5. Transformation ratio

Single winding primary current

200 or 400 A, according to the tender

Secondary current: 5 A

5.2.6. Nominal load in VA for metering CTs: 10 VA

5.2.7. Metering CT accuracy class: 0,5S

5.2.8. Factor of safety: FS<5

5.2.9. Overload coefficient

Current transformers shall enable continuous operation at 1.2 multiple of their nominal current, i.e. 1.2 x IN.

5.2.10. Thermal and dynamic strain for Current Transformers

The requirement on peak current in terms of thermal strain Ith is minimum 10 kA.

The requirement on peak current in terms of dynamic strain Idyn is minimum $I_{dyn} = 2{,}5 \cdot I_{th} = 25kA$.

5.2.11. Fixing and design

The transformers will be placed in plastic boxes, according to the standardized HEDNO's fixing structure illustrated on Annex C. The transformers will be screwed with M4 screws. HEDNO's plastic boxes have two support options with 4 or 2 points, respectively.

5.2.12. Weight <= 1900 gr

5.2.13. Primary terminal bar and auxiliary components

Transformers will have a rectangular bar with at least one hole for each primary terminal, suitable for M10 bolt. The transformer will be delivered with M10 bolt, nut, washer and a spring lock washer assembled to each hole.

6. TESTING

The manufacturer will perform tests to determine that the material has the properties specified in this Technical Specification. Tests will be performed by accredited laboratories or laboratories that have been accepted by the Company.

Part or all of these tests may be repeated during serial production at the discretion of the Inspectıon department and at the expense of the HEDNO. In case of material failure the costs are borne by the supplier.

It is forbidden to modify the material during the contract. If there is a change in material composition during production, new tests will be performed. The costs of which are borne by the supplier.

Adequacy of production equipment and quality control
Potential suppliers shall declare the devices, measurement instruments etc. available at their respective laboratories for the purpose of performing routing tests. The manufacturer will perform tests to determine that the material has the properties specified in this Technical Specification. Tests will be performed by accredited laboratories or laboratories that have been accepted by the Company.

6.1 Design Tests

Not applicable

6.2. Type Tests

Bids shall be accompanied by type test certificates, as designated for current metering transformers, in paragraph 6.1 of EN / IEC 60044-1 standard. Test certificates shall clearly evidence that the specification requirements are met.

Certificates issued by the PPC Group or accredited laboratories, according to the requirements of ELOT EN ISO/IEC 17025 standard, shall be accepted. The authorization field of the above mentioned laboratories shall include the relevant tests / measurements on metering transformer.

Any bids not accompanied by the aforementioned certificates will be rejected at the stage of technical evaluation.

6.3. Routine Tests

The manufacturer shall perform all routine tests designated for current metering transformers, in paragraph 6.2 of EN / IEC 60044-1. The manufacturer **shall issue an inspection certificate** for each individual transformer, as provided in the System Operation and Power Exchange Code (Gov't Gazette 793/B/30-6-2006).

The HEDNO reserves the right to repeat any routine or/and type tests. Should the specimen fail the tests, the expenses shall be paid by the manufacturer.

7. PACKAGING

CTs will be delivered fully assembled and packaged each in a carton.
At the visible point of each CT packing case to be indicated by HEDNO, the following indications will be illustrated:

- The logo of HEDNO SA
- The number of the Contract and the serial number of the lot.
- The name or logo of the manufacturer.
- The code number of the material.
- Transformation ratio

According to the specification, the above material will have embossed or engraved or indicated on a suitable tag, the codes of HEDNO material, at a point which would not affect proper CT fitting and tightness.
The CTs will be carefully packaged for their safe transport.
They will be placed on EU pallets in boxes and delivered in such a way that the total weight per pallet does not exceed 550 Kgr.
These boxes shall have a glued indelible tag:

- The logo of HEDNO SA
- The number of the Contract.
- The Hardware Code.
- Vendor Details.
- Type of CT.
- Transformation ratio.

With the above-mentioned package, they will be able to be stored in a sheltered place without any further protection from weather conditions.

8. ANNEXES

«ANNEX A»
COMPLIANCE SHEET FOR 0,4 KV CURRENT TRANSFORMERS

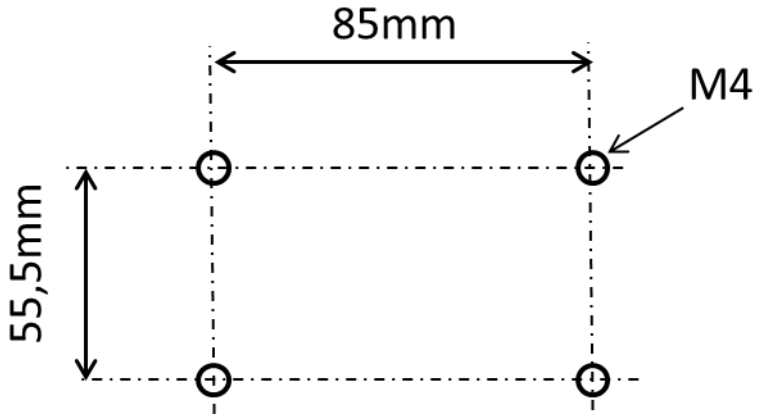
Bidders shall submit the details bellow. Non-conformance will constitute sufficient ground for bid rejection.

ITEM ..... UNITS .....

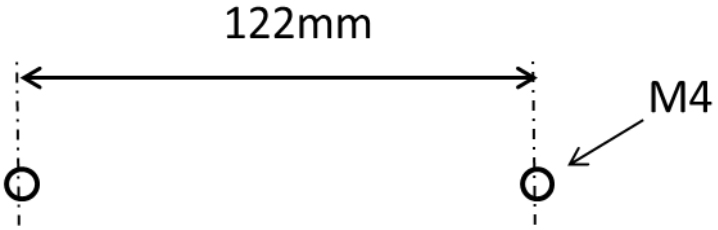
Requirement	Specification	Acceptance	Manufacturer compliance
1. Type and manufacturer:			
2. Country of manufacture:			
3. Rated frequency 50 Hz:	3.5		
4. Operating and insulation voltage:	3.5		
5. Insulation class E:	3.5		
6. Resistance to industrial frequency voltage of the primary winding	3.5		
7. Resistance to industrial frequency voltage of secondary windings	3.5		
8. Production Quality Control Certificate:	4		
9. Type test certificate:	4		
10. Material of non-metallic parts.	5.1.1		
11. Documentation (eg test certificates) that non-metallic parts meets the equirements of EN/IEC 60707 class FH 1 or UL94 level VO.	5.1.1		
12. Spare parts for 10 years	5.1.4		
13. Are the secondary terminals suitable for wiring with a $4mm^2$ cross section cables?	5.2.2		
14. Secondary	5.2.2		

Requirement	Specification	Acceptance	Manufacturer compliance
Terminal Marking:			
15. Transparent secondary terminal cover:	5.2.2		
16. Marking of Primary Terminals:	5.2.3		
17. Nameplate	5.2.4		
18. Primary current:	5.2.5		
19. Secondary current 5 A:	5.2.5		
20. Rated power 10 VA	5.2.6		
21. Accuracy Class 0.5S:	5.2.7		
22. Safety factor (FS) <5:	5.2.8		
23. Overload Factor ≥ 1,2	5.2.9		
24. Maximum thermal stress intensity I_{th} ≥ 10 kA:	5.2.10		
25. Maximum dynamic stress intensity I_{dyn} ≥ 25kA	5.2.10		
26. M4 bolt support in plastic boxes:	5.2.11		
27. Weight ≤ 1900 g:	5.2.12		
28. Primary terminal bar with M10 bolt, nut, washer and spring lock washer	5.2.13		
29. Test Certificate	6.2		
30. Labeling of a packing box	7		
31. Packing	7		

«ANNEX C»
STANDARD MOUNTING USED FOR METERING CURRENT TRANSFORMERS



Drawing 1 Support at 4 points



Drawing 2 Support at 2 points

«ANNEX D»
STANDARDS

The following list refers to European and International Codes.

- EN 60044-1 E1.2: 2003, Instrument transformers - Part 1: Current transformers; to be replaced by IEC 61869-2 E1: 2011.
- EN ISO/IEC 17025 E2:2005, General requirements for the competence of testing and calibration laboratories.
- EN ISO 9001:2015, Quality management systems – Requirements.
- Gov't Gazette 793/B/30-6-2006.

All tests shall be performed in accordance with the regulations (unless otherwise specified) in force as of the date of submission of bids.