HEDNO S.A. SPECIFICATION	AUTOMATIC SINGLE POLE AND THREE POLE CIRCUIT BREAKERS FOR LV SUPPLIES	ND/384/10.01.2019

Issued by the Metering Systems Section	Network Department	

CONTENTS

TECHNICAL SPECIFICATION

AUTOMATIC SINGLE POLE AND THREE POLE CIRCUIT BRAKERS FOR LV SUPPLIES

SCOPE

This specification determines the manufacturing, testing, acceptance tests and packing for transportation and delivery to HEDNO warehouses of automatic DIN-rail single pole and three pole circuit brakers, which will be installed in metering systems before the meter.

OPERATING CONDITIONS

Below, the operating and installation conditions of miniature circuit breakers (MCBs) are provided.

Environmental Conditions

1. The MCBs shall operate satisfactory and continuously under the environmental conditions specified in the following table, installed in the metering system and with their covers mounted:

Maximum altitude	2000 m
Minimum environmental temperature	- 15^{o} C
Average environmental temperature	20^{o} C
Maximum tempereature due to sun radiance	75^{o}C
Maximum relative humidity	90%
Minimum relative humidity	5%

Installation

2. The MCBs shall be installed inside polyester boxes for single-phase or three-phase meters.
3. The mounting of the MCBs shall be done on a metallic DIN-rail inside the meter box.

LV Supply

4. The MCBs shall be installed in LV supplies of 230/400 V, at 50 Hz frequency for domestic and general use customers.
5. The power supply can be three phase of four conductors with asymmetric load or single phase and the MCBs shall be able to be installed both in the Interconnected System as well as the Non-Interconnected Island (NII) system, according to EN/IEC 50160.

REGULATIONS - SPECIFICATIONS

6. The MCBs shall be industrial products manufactured according to the EN/IEC

International Standards and the HEDNO S.A Technical Specifications mentioned below and shall be valid on the day of the tender, as well as according to the European Directives 2014/35/EE regarding the availability in the electrical equipment market and 2011/65/EE regarding the restriction of use of specific hazardous substances in electrical and electronical equipment (RoHS).

REGULATIONS	**REGULATION TITLE**
EN/IEC 60898	Protection for household and similar installations
EN/IEC 60898-1	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 1: Circuit-breakers for a.c. operation
IEC 60695-2-11	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products (GWEPT)
IEC 60947-2	Low-voltage switchgear and controlgear - Part 2: Circuit-breakers
IEC 60410	Sampling plans and procedures for inspection by attributes
EN 50160	Voltage characteristics of electricity supplied by public electricity networks

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 MCBs shall have markings according to the European Standards and they are particularly required to have the "CE" conformity mark, in accordance to the European Directives 2014/35/EE and 2011/65/EE (RoHS).
9. The manufacturer of the MCBs shall implement a Quality Management System according to ISO 9001, an Occupational Health and Safety Assessment System according to OHSAS 18001 and an Environmental Management System according to ISO 4001, for which certificates by accredited institutions shall be submitted.

EQUIPMENT DESCRIPTION

This specification covers the materials described in the following table:

	Miniature Circuit Breaker, 230/400V	
	Single Pole	**Three pole**
Nominal Current	**25A**	**25A**
Characteristic curve	C	C
Short-circuit capacity	$I_{cn} \geq 6000A$	$I_{cn} \geq 6000A$
Nominal Current	**40A**	**40A**
Characteristic curve	C	C
Short-circuit capacity	$I_{cn} \geq 6000A$	$I_{cn} \geq 6000A$
Nominal Current	**63A**	**63A**
Characteristic curve	C	C
Short-circuit capacity	$I_{cn} \geq 6000A$	$I_{cn} \geq 6000A$
Nominal Current		**100A**
Characteristic curve		C
Short-circuit capacity		$I_{cn} \geq 10000A$

General description and requirements

Materials

10. All materials used to manufacture the offered items shall be of excellent quality and the mostly appropriate for the purpose and the operational conditions specified. They shall withstand the temperature and humidity variations as defined in the specification without any deformation, accuracy reduction, or any impact on the mechanical and electrical properties outside the specified limits.
11. The non-metallic parts shall be made of non-hygroscopic material and shall ensure sufficient protection against flammability and flame spread.

Manufacturing Details

Morphological

12. The manufacture of the MCBs shall be appropriate for mounting on a metallic DIN rail that exists inside the meter boxes.
13. The three pole MCBs shall be delivered as a block and not as three single pole MCBs. The three-pole MCBs shall have an interlocking mechanism, so that in case of overcurrent in any phase, all phases shall trip simultaneously.

Terminals

14. The terminals shall be covered locally and protected against incidental contacts.
15. The terminals shall allow the connection of cables of cross-sections according to the following table:

Nominal current of MCB	**Cable Cross-section**
25A	10-25 mm^2
40A	10-25 mm^2
63A	10-25 mm^2
100A	16-50 mm^2

Switch on/off device

16. The operating handle of the MCB shall be lever type. It shall be on its front side and shall turn round its axis at approximately 60^o.
17. The operating handle of the three-pole MCB shall feature a mechanical interlock connecting the three phases, as displayed on figures 9.2 and 9.3, and all three switches shall open and close simultaneously.
18. The height of the handle for the single phase 25A, 40A and 63A circuit breakers shall meet the requirements of drawing 1.
19. The height of the handle for the three-phase 25A, 40A and 63A circuit breakers shall meet the requirements of drawing 2.

Plastic Covers of MCB Terminals

20. The offered circuit breakers shall be accompanied by appropriate plastic covers to ensure protection against accidental human contact to the clamping screws and the cable connections to the MCB terminals.
21. Each circuit breaker terminal shall be accompanied by a plastic cover. To avoid accidental contact while under voltage, the plastic cover shall cover the clamping screw as well as the potentially bare end of the cable connected to the terminal, as indicated on drawing .
22. The terminal covers shall be detachable and shall attach to the body of the MCB.
23. The proper fitting of the covers to the MCBs shall be inspected during the Sample Approval procedure performed by the responsible HEDNO department.
24. The MCBs shall be delivered with the respective protective covers for single phase and three phase breakers.

Special requirements

25. The circuit breaker shall be capable of independent tripping (which means that in case of short-circuit or overheating the MCB will always trip regardless of the state of the handle) and shall feature the following characteristics:
    - Nominal voltage U_e 230/400V
    - Nominal Frequency 50Hz
    - Insulation level 500V
    - Nominal Current I_n 25, 40, 63 A ,100A

- Short-circuit capacity I_{cn}≥6000 A (for I_n 25, 40, 63 A)
- Short-circuit capacity I_{cn}≥10000 A (for I_n 100A)
- Type C characteristic curve

OFFER CONTENTS

Sample submission

26. The tenderers shall deliver, along with the offer, at least two (2) full samples from each offered type, returnable upon request, for equipment verification purposes, including the appropriate terminal covers.
27. Offers not accompanied by samples will be rejected.
28. The lowest bidder per MCB shall deliver to HEDNO, before the series production, complete samples of the terminal covers, as well as of each type of MCB, for approval.

Offer Contents Submission

29. The tenderers shall deliver, along with the offer:
    a. Manufacture drawings containing the dimensions of the MCBs.
    b. Detailed description of the MCB.
    c. Complete type test certificates according to the latest edition of EN/IEC 60898-1.
    d. Evolution of the operation curve under temperatures ranging from 0ºC to 40ºC.
    e. Characteristic operation curves.
    f. For the manufacturer of the offered MCBs, a Quality Assurance Certificate according to the latest edition of the standard EN/ISO 9001, which shall specifically address the manufacture of MCBs.
    g. For the manufacturer of the offered MCBs, an Environmental Management Certificate according to the latest edition of the standard EN/ISO 14001.
    h. Declaration of the manufacturer that the manufacture of the circuit breakers conforms to the requirements of the directive 2011/65/EE regarding hazardous substances (RoHS), as well as the requirements of the directive 2014/35/EE regarding the availability of electrical equipment.

TESTS

30. All tests shall be executed as described in the latest edition of the regulations EN / IEC 60898.
31. Any tests executed during the delivery of the equipment will be performed with the offered plastic terminal cover attached.

Design Tests

32. No design tests are executed.

Type Tests

33. The tenderers shall submit complete type test certificates issued by certified laboratories according to the standard ISO 17025. HEDNO may, at its discretion, confirm the above test certificates either before production or during the implementation of the contract, requesting the repetition of all or part of the

tests in a certified laboratory selected by HEDNO or in the TRSC.

Series tests

34. All information in the standard EN/IEC 60898 apply.

Sample tests (acceptance tests)

35. The sampling procedure for the tests shall comply to the standard IEC 60410 with the following criteria:
    - Test level II, table I IEC 60410.
    - Simple or double sampling (tables II and III IEC 60410).
    - Accepted Quality Level A.Q.L. = 1, for each test separately.
36. The sample in question shall be subjected to the test of paragraph 9.10 of EN 60898. Provided that this test is successful, the rest of the tests of ANNEX C of EN/IEC 60898 shall be performed, based on the sampling of Table C2. The samples used in those tests are chosen from the initial sample.

Special tests

37. No special tests are executed.

NAMEPLATE AND MARKINGS

38. The cover of each MCB shall feature a proper indelibly marking in a visible position with the following:
    a. The HEDNO logo.
    b. The nominal current, voltage and frequency.
    c. The A.C. power supply marking.
    d. Type according to the characteristic curve.
    e. Rated short circuit capacity.
    f. Name or trademark of the manufacturer as well as the year of manufacture.
39. The handle of the MCB shall bear the marking "I" for indoor and "O" for outdoor.

PACKING

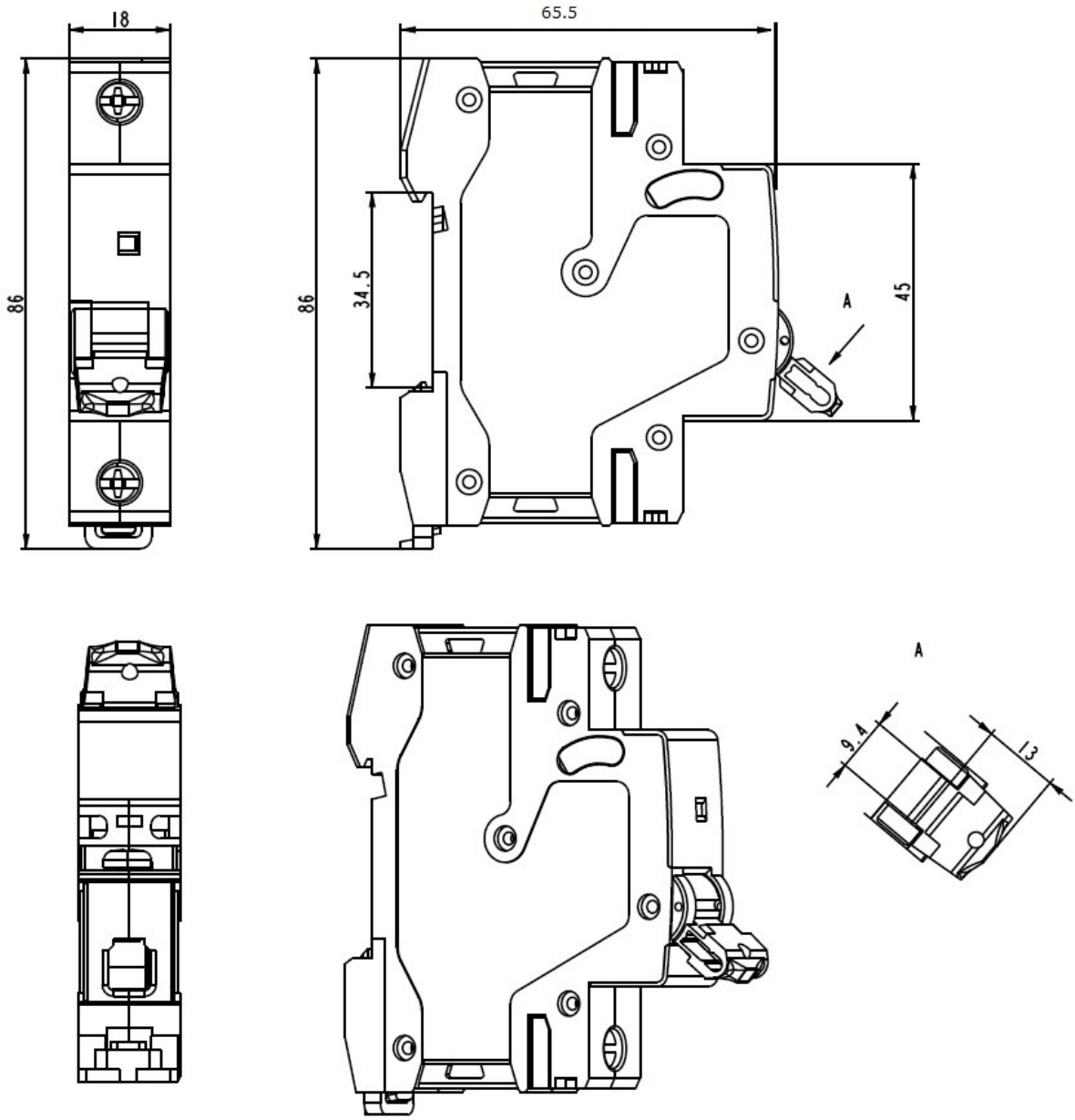
40. The MCBs shall be placed in protective boxes made of cardboard or polysterene.
41. Said boxes shall be indelibly marked with the contract number, the item code and the supplier's data.
42. The MCBs shall be placed, in the aforementioned packing, in boxes made of wood or another material of equal sturdiness, also suitable for outdoor storage without need for any further protection against weather conditions (such as rain or humidity).

DRAWINGS -PICTURES

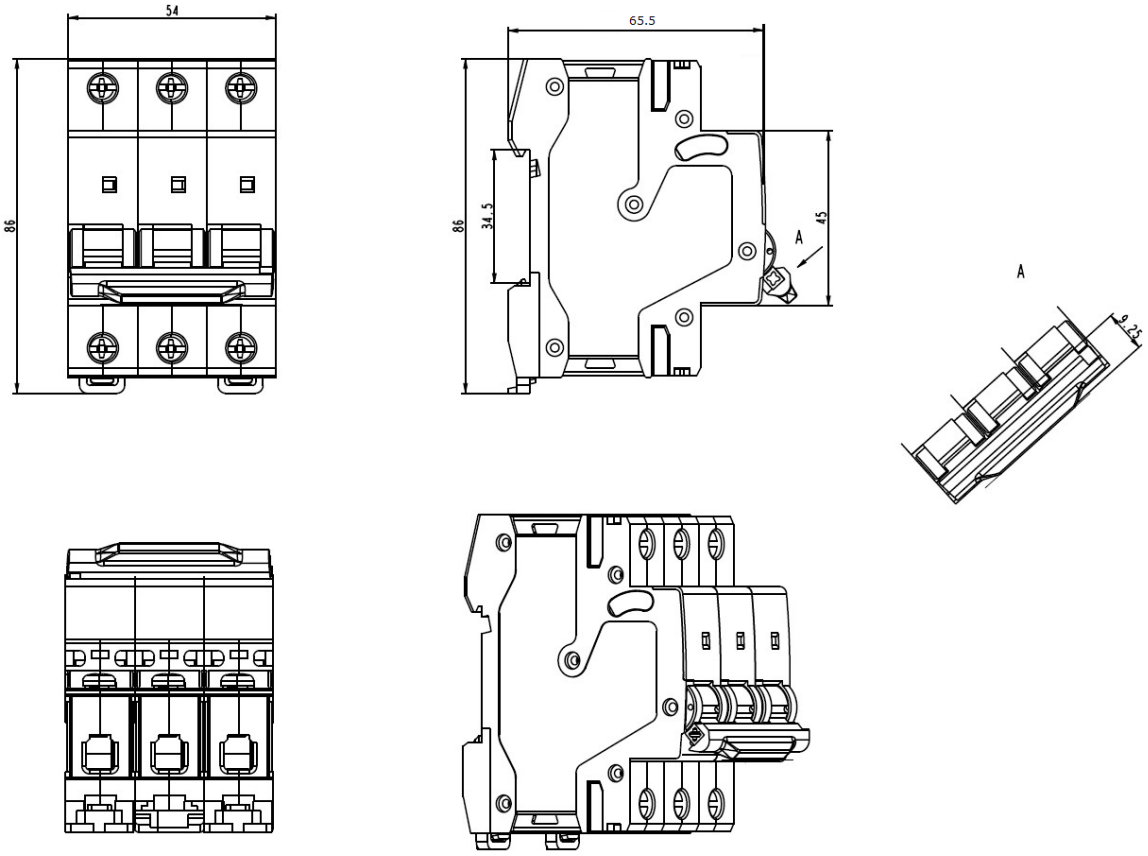
43. The MCBs shall meet the requirements set in the following annexes and drawings that are attached to the present specification:

Drawing 1	Layout of 25, 40 and 63A single-pole MCB and its operating handle
Drawing 2	Layout of 25, 40 and 63A three-pole MCB and its operating handle
Drawing 3	Layout of 100A three-pole MCB and its handle
Picture 1	Picture of indicative terminal cover of MCBs

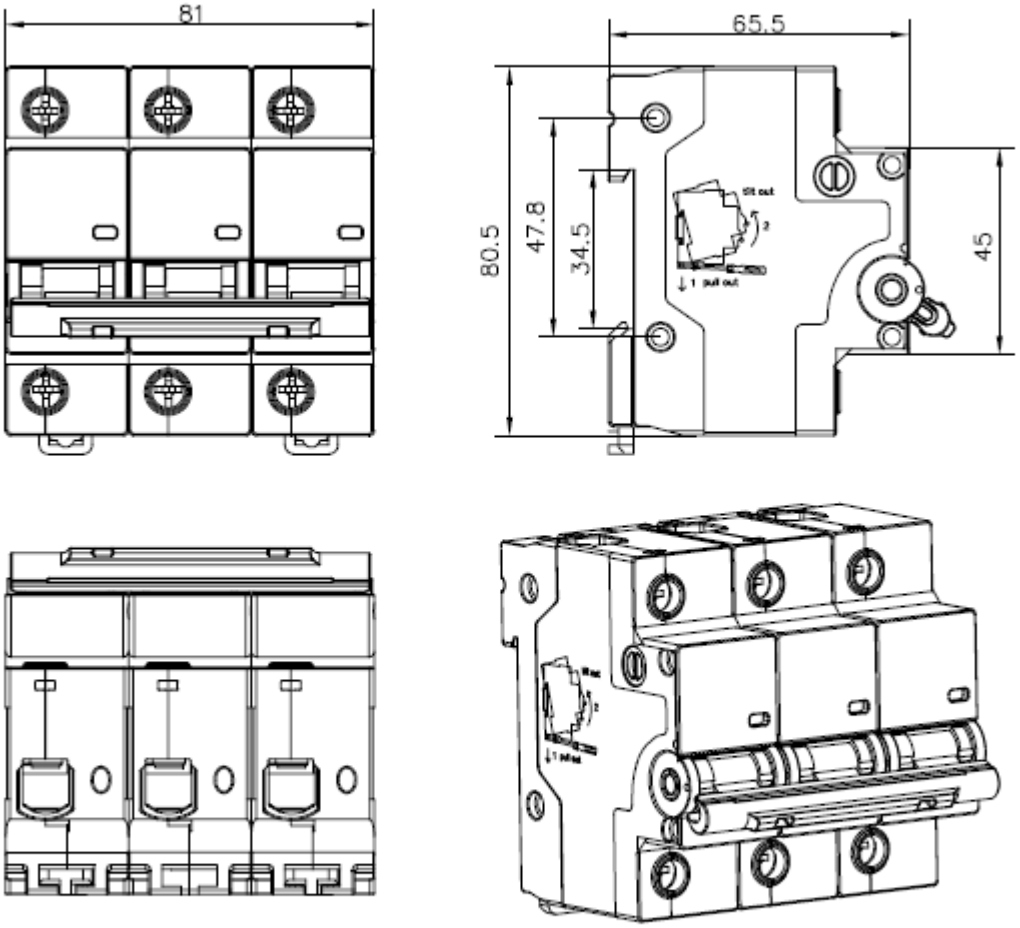
Drawing 1: Layout of 25, 40 and 63A single-pole MCB and its operating handle



Drawing 2: Layout of 25, 40 and 63A three-pole MCB and its operating handle



Drawing 3: Layout of 100A three-pole MCB and its handle



Picture 1: Picture of indicative terminal cover of MCBs