

SPECIFICATION HEDNO S.A.	MAX INDICATING METER BOXES - L.V. CT/FUSE BOXES	ND-151/Rev. 02.08.2021
 HEDNO		
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TECHNICAL SPECIFICATION ND-151/Rev. 02.08.2021 **"MAX INDICATING METER BOXES (L.V. CT/FUSE BOXES)"**

1. OBJECT

The present specification establishes the manufacturing, tests, acceptance control and packaging for transportation and delivery at HEDNO warehouses of Polyester Max Indicating Meters Boxes (L.V. CT/FUSE Boxes) to be used to Low Voltage customers metering devices.

2. KEY WORDS

Polyester Max Indicating Meter Boxes (L.V. CT/FUSE Boxes), Metering Devices, L.V. 200 or 400/5 A Current Transformers, L.V. Fuse-Holders, Operating Voltage 400V.

3. OPERATING CONDITIONS

3.1 GENERAL

Materials referred to in the present specification shall be placed both outdoor, uncovered, as well as indoor.

They shall be placed vertically whether on a wall or on a pole or on any other similar construction.

The storage of materials prior to their installation shall be made to any kind of storage area, outdoor with or without lean-to-roof or indoor without heating or air condition.

The low voltage system operates with the neutral earthed and the frequency of the power supply shall be mainly 50Hz and the voltage 400V, in the case of small to medium industrial and commercial consumers. Voltage may vary from -10% to +10%.

Under this voltage, the supply is 3-phase 4-wire with asymmetric load.

3.2 OPERATING-STORAGE VOLTAGE

- Temperature shall range from -25°C to $+55^{\circ}\text{C}$ in order to allow for the smooth operation of boxes.
- Storage and transportation temperature shall range from -25°C to 70°C .

3.3 HYMIDITY

Boxes shall operate in average annual relative humidity of more than 75%.

Moreover for (30) thirty non consecutive days in total, over the year, with relative humidity of 95%.
 Moreover random moments within the day 85%.

3.4 TABLE OF WEATHER AND ENVIRONMENTAL CONDITIONS

Weather and environmental conditions under which the boxes shall be installed and operate in a satisfactory and continuous way, are determined in the following table:

Maximum altitude	2000 m
Minimum environmental temperature	- 25° C
Average environmental temperature	20° C
Maximum environmental temperature	55° C
Maximum temperature at the outer surface due to sun.....	70° C
Minimum relative humidity	5%
Maximum relative humidity	95%

4. REGULATIONS – SPECIFICATIONS

The boxes and their auxiliary components shall be industrial products manufactured and tested in accordance with the following European and International regulations EN/IEC standards and with HEDNO Technical Specifications as mentioned below, which are applicable on the date of submission of tenders.

The protection degree and the properties of the materials to be used for their manufacturing, as well as the end product shall comply with the said regulations.

All tests shall be performed in accordance with the EN/IEC regulations (unless otherwise specified) applicable on the date of submission of tenders.

Regulations applying to the present specification:

ASTM D256 or EN/ISO 180	Impact resistance of plastics and electrical insulating materials
ASTM D543 or ISO 175	Resistance of plastics to chemical reagents.
ASTM D570 or ISO 62	Water absorption of plastics
ASTM D638 or EN ISO 527-4	Tensile properties of plastics.
ASTM D790 or	Flexural properties of unreinforced and reinforced plastics and electrical insulating materials.

EN ISO 178	
ASTM D792 or ISO 1183	Density and specific gravity (relative density) of plastics by displacement.
ASTM D1525 or ISO 306	Vicat softening temperature of plastics.
EN / IEC 60068-2-2	Basic environmental testing procedures. Part 2 : Tests, Tests B: Dry heat.
EN / IEC 60068-2-11	Basic environmental testing procedures. Part 2 : Tests, Tests ka : Salt mist.
EN / IEC 60068-2-14	Basic environmental testing procedures. Part 2 : Tests, Tests N: Change of temperature.
EN / IEC 60068-2-30	Basic environmental testing Procedures. Part 2: Tests, Test Db : Damp heat cyclic.
EN / IEC 60216	Guide for the determination of thermal endurance properties of electrical insulating materials.
EN / IEC 60243	Recommended methods of test for electric strength of solid insulating materials at power frequencies.
EN / IEC 60529	Classification of degrees of protection provided by enclosures
IEC 60410	Sampling plans and procedures for inspection by attributes.
EN / IEC 60695-2-11	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products.
EN / IEC 60695-11-5	Fire hazard testing. Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance.
IEC 60695-11-10:2013	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods.
EN 62262:2002	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code).
ELOT EN 50298	Empty enclosures for low voltage switching and control device sets - General requirements.
PPC Specification X.K.11.01/11.11.87	Electrolytic zinc coating of iron or steel items.
PPC Specification X.K. 11.04/23.10.92	Electrolytic tinning
PPC Specification GR-88/7.9.83	Bolted connector with notch for copper conductors.
IEC 60999	Connecting devices – Safety requirements for screw-type and screwless-type clamping units for electrical copper conductors.

In the event of controversy between the requirements of the present Specification and the above international regulations or any other relative document, HEDNO specification shall prevail.

The boxes shall bear the markings which conform to the European standards, the "CE" marking on a distinct position on the base and the cover of the boxes, in accordance with the provisions of Ministerial Decisions 470/85 (National Official Gazette 183/4.4.85) and 16717/5052/94 (National Official Gazette 992/30.12.94).

Moreover, the box supplier shall submit a certificate from their factory, stating that it follows the procedures provided in ISO 9001 for the manufacture of the items made of glass fiber reinforced polyester using the Compression Moulding (SMC) method as raw material, accompanied with a valid ISO 9001 certificate for the production plant of the polyester (SMC) to be used in the production of the boxes.

5. DESCRIPTION

The present specification covers the following items:

- «Max Indicating Meters Boxes (L.V. CT/FUSE Boxes)»

5.1. GENERAL REQUIREMENTS – GENERAL CHARACTERISTICS

5.1.1. Materials.

All materials to be used for the manufacturing of boxes shall be of very good quality, adequate for the purposes and the operation conditions specified herein.

They shall resist to the specified temperature and humidity without any distortion or damage, while their mechanical and electrical properties shall not be affected beyond the limits determined in the specification.

The metallic parts that may be oxidized must be effectively protected.

Under the specified operating conditions, the protective coating to be used for that purpose should not deteriorate due to common use or over the time, in such a way as to lose its protective properties.

Non metallic parts should be manufactured from non hygroscopic material and provide protection against fire and flame propagation inside or near the material. Moreover, it shall meet the requirements of EN/IEC 60695-11-10:2013 for HB and HB40 level.

5.1.2. Manufacturing characteristics and finishing

Max indicating meter boxes shall be manufactured in such a way as to ensure rigidity and reliability, provide adequate mechanical protection against shock and pressure and facilitate their fitting and the installation of transformers and fuses of the metering device.

All surfaces shall be flawless, smooth and shiny.

The polyester material to be used for the manufacturing of the said boxes shall be reinforced with SMC type fiberglass and shall be of light gray color similar to the one used by HEDNO for such boxes till today.

All boxes shall ensure adequate ventilation in order to prevent condensation and restrict temperature increase inside the boxes. Ventilation shall be ensured by providing for the proper clearance of 2-3 mm on the upper part of the door of the boxes or to the side walls of the boxes using the adequate louver, in a way as to ensure said protection according to EN/IEC 60529.

Suppliers may recommend any different way of ventilation of the boxes, which shall be evaluated and approved by the competent HEDNO Service.

Boxes shall be manufactured in such a way so as to ensure uninterrupted power supply, rigidity and reliability, offer adequate mechanical protection against shock and pressure and facilitate their fitting and the installation of supply cables of the metering device.

Boxes shall meet the specified level of sealing.

5.1.3. Interchangeability

All parts of the boxes shall be fully interchangeable.

5.1.4. Safety requirements

The boxes shall be manufactured in such a way in order to provide complete protection against touch voltage after their installation.

The edges of the external enclosure shall be rounded so as to prevent any kind of injuries. Due to the use of fiberglass in the polyester material, material drilling should be avoided.

For this reason, suitable round removable parts (knock-outs) shall be provided for the penetration of the cables on the box base which shall be visible from the external side of the base.

The removal of these parts shall be easy and for this reason the thickness of the walls shall be very small in this part.

5.1.5.Applicable drawings.

Apart from the general and special requirements, the material shall conform to the drawings attached in the list of drawings 9.2 of the Appendix as regards the basic dimensions.

5.1.6. Drawings and information to be submitted.

Along with the tender, a full technical description shall be submitted which shall refer to the requirements of the present specification one by one, as well as detailed drawings concerning the manufacture of the material, its finishing and the materials to be used for the manufacture.

The bids shall be accompanied obligatorily by certifications of performance of all suitability testing (both for the polyester raw materials and for the boxes), which refer to materials used for the manufacture of boxes as defined in paragraph 6.2., which make clear that the specification requirements are met.

The Supplier is obliged to inform us about the properties and characteristics of the materials used for their manufacture and for this purpose they shall fill in and submit, together with their bid, Tables 9.1.2 (in the Appendix), replacing any asterisks with material properties .

The Supplier is also required to submit, together with their bid, complete manufacture drawings in which all the details of the boxes shall be indicated.

HEDNO reserves the right, after the opening of the technical offers, and always in cooperation with the suppliers to make any necessary improvements and corrections in the dimensions and to state any deficiencies regarding the technical specification.

The approved drawings by HEDNO, which will be produced by the above procedure, will form an integral part of their offer.

5.1.7. Spare parts.

The suppliers shall ensure the availability of spare parts and accessories for a ten-year period starting from the date of the final partial material delivery.

5.2. SPECIAL REQUIREMENTS AND CHARACTERISTICS

5.2.1. General.

This paragraph includes the special requirements and special characteristics of the box and accessories which accompany them. The box shall conform to the designs attached in the list of designs 9.2 as regards the following:

- Designing- Form.
- Basic dimensions.
- Positions of holes and inserts for the fixing screws.
- Marking.
- Installation in a device.
- Provision of grooves for easy removal of parts of the enclosure.
- Installation protection against water penetration.
- Sufficient ventilation.

5.2.2. Special manufacturing characteristics.

The box shall be entirely manufactured from high quality thermoset material and more precisely from **polyester reinforced with fiberglass, SMC type, with the method of Compression Moulding.**

The quantitative requirements concerning the properties of polyester reinforced with fiberglass (SMC) which shall be used for the box manufacture, as well as the boxes are mentioned in Table 9.1.1. attached to the Appendix.

The dimensions of the boxes shall be in accordance with the designs attached in the list 9.2.

Morphologically: The external dimensions of the box shall be as follows:

Height 830 mm

Width 606 mm

Depth 230 mm

with tolerance $-/+10\text{mm}$.

The **thickness of the box walls** shall be at least **3mm**.

Any deviations regarding the nominal thickness selected by the Manufacturer shall be accepted on condition that these do not exceed 0.2 mm. However, a wall thinner than 3mm shall in no case be accepted. The thickness of the walls in the reinforcement belts shall be 4mm.

Suppliers shall complete the values of the material testing of the boxes offered in Table 9.1.2. (Requirements from the material and sizes for its testing).

The accessories which constitute the box are the following:

a) The body of the box shall consist of 1 piece (uniform manufacture).

b) Front door with two mechanisms of safe locking (handles) and two closing positions.

The locking mechanism shall be provided with a safety lock in the key hole or other suitable way of locking (eg with two suitable protrusions, one on the box body and one on the door with suitable holes of 10mm for placing a safety lock).

The embossed trade-mark of PPC S.A. shall be on the surface of the box cover at the points marked in the designs of appendix 9.2.

For the fitting of the door to the box body, if hinges are used, these shall be of metal and shall be placed inside the box.

The material of the metal hinges shall be corrosion resistant (from stainless steel or zamak etc.).

In order to facilitate the access to the employees, the desirable opening of the door in relation to the box body shall be greater or equal to 90°. In order to avoid the opening of the door more than 120°, there shall be installed a mechanism to restrict its full opening (eg plastic belt).

For the fitting of the hinges to the body as well as to the box door, plug-in brass nuts of appropriate size shall be used.

For the fitting of the Test Box internally to the box door, insert brass nuts of appropriate size shall be used.

The number of insert nuts, as well as the positions where they shall be placed at the box door are given in the attached designs of the design list 9.2.

c) The box fitting shall be in such a way so as to allow wall mounting (with closed holes of 10mm) or pole mounting (with steel supports being available by HEDNO in accordance with the attached description at the draws of the Specification GR-128/12.8.71 of DMKLD). The reinforcement belts which shall be used on the box backside for mounting the box on a pillar shall be of suitable size and shall embody special plug-in blind nuts (4 pieces) for its safe mounting and in the positions corresponding to the abovementioned steel supports.

There shall be mounting holes at the four corners of the box backside, which shall be closed (box sealing) and shall be marked with a recess for easy opening.

d) On the lower part of the box there shall be placed two (2) **earthing bolts** bridged with a blade inside the box. The earthing bolts shall be M10, manufactured from tin plated brass and each of them shall be equipped with four (4) nuts and six (6) washers from the same material. The two

central nuts shall be tightened inside and outside the box for the fixing of the bolts, as well as of the blade that bridges the bolts.

The other two nuts shall be used for the tightening and locking of the terminals (COSSE).

The blade shall be made of tin plated electrolytic copper of hard drawing E-CU according to DIN-40500 and shall have the shape of flat rod.

The tin plating shall be made after hole drifting. The blade dimensions are marked in the attached description at the draws "Detail A".

e) Installation of suitable knock-outs on the walls of the box body for the entry and exit of the cables (installation of corresponding glands). The points of installation of the knock-outs in the box body, maximum cross sections of 45mm, are marked in the attached description at the drawings.

f) The designing of the box shall ensure the required **degree of sealing** as specified, as well as the box resistance to mechanical and other stresses for its entire service life.

Each box shall consist of the following parts:

- Main body (1 piece + connection terminal with the earthing blade)
- Cover (1 piece)
- Basic accessories (screws and washers for equipment installation).

The box shall accommodate the supply cable through suitable **knock-outs** for the entry and exit of cables (installation of corresponding glands).

The **box sealing** shall be secured with a safety lock (with a pass par tout key, being available by the Company's technical personnel), in order to prevent any illegal intervention inside the box, as well as any access to non authorized persons in order to ensure protection against contact with live parts in its inner surface.

In all recesses of the base and door of the box used for the equipment support, there shall be placed insert brass nuts of appropriate size (built-in during the casting of the polyester material), according to DIN 16903.

The number of insert nuts as well as their positions on the box base are given in the attached designs of the design list 9.2.

The points where the equipment shall be fitted on the base of the box, shall provide dielectric resistance of at least 4KV, as well as sufficient mechanical resistance for the purpose for which they are provided. They shall also bear suitable insert brass nuts (installed during the casting of the material), in order to increase mechanical resistance.

Accessories:

- Set screws for fuse holders (6 pieces) suitable for insert nuts M10, of appropriate length, shall be accompanied by safety washers, made of zinc coated steel.
- Set screws for current transformers, for rail Circuit Breaker, for earth, (24 pieces) suitable for insert nuts M4, of appropriate length, shall be accompanied by safety washers, made of zinc coated steel.
- Set screws of the Test Box on the box door (2 pieces) suitable for insert nuts M4, of appropriate length, made of zinc coated steel.

The earth terminal shall consist of the following parts:

- Earthing strip 2mm thick (tin plated copper).
- Earthing bolt 3/8" W x 80 mm long (2 pieces) (tin plated brass)
- Nut 3/8" W for the earthing bolt (4 pieces) (tin plated brass)
- Washer for earthing bolt 3/8" (6 pieces) (tin plated brass).

The boxes shall be delivered with all accessories packed.

5.2.3. Protection degree IP

The max indicating meter boxes shall provide a protection degree equal at least to IP 43 according to the regulations EN/IEC 60529.

All boxes shall bear upon a distinct position the conformity mark "CE", according to those mentioned in the Ministerial Decisions 470/85 (OG Issue No 183/4.4.85) and 16717/5052/94 (OG Issue No 992/30.12.94).

5.2.4. Material

The meter boxes shall be made of high quality thermoset material (polyester reinforced with glass fiber, type SMC).

The final composition of the polyester material to be selected for the manufacturing of the boxes shall provide the operating characteristics and shall meet the specific requirements necessary for the electrical equipment.

Thus, the boxes shall provide:

- Improved insulating capability
- High mechanical strength against impact and pressure
- Proper rigidity
- High resistance to chemicals, common solvents and ultraviolet radiation
- Low water absorption
- Resistance to aging (no change in dimensions and no deformation of the box)

- High operating temperature limit
- Resistance to heat and fire

The quantitative requirements regarding the above properties of the polyester materials that shall be used for the manufacturing of the boxes are given in Table 9.1.1, Appendix 9.

6. TESTING

The Manufacturer shall perform testing in order to ascertain that the material to be offered (SMC) has the properties mentioned in Table 9.1.1 of the Appendix.

Part or all of these tests can be repeated during the production in line according to the opinion of the Inspectors and the expense shall be borne by the Company.

In case of material failure, the expenses shall be borne by the Supplier.

In the event that during the production, a change is ascertained as regards material composition, new testing shall be performed.

6.1. Designing tests

Not required.

6.2. Type tests

Tenders shall be accompanied obligatorily by certificates of execution of all Suitability Tests referring to a polyester raw material to a ready to use box, from which it shall be made clear that the specification requirements are met.

There shall be accepted certificates issued by Tests, Research and Standards Centre (TRSC) or recognized laboratories specialized in the inspection of plastic materials.

Tenders which shall not be accompanied by the above certificates shall be rejected during the stage of technical evaluation.

During the stage of receipt of each material lot, it is at the discretion of the inspectors to proceed to the execution of any of the type tests.

6.2.1. Type Tests to raw material.

6.2.1.1. Determination of impact strength of plastic materials used for the manufacture of boxes.

The testing shall be carried out according to the Regulations ASTM D256 (or EN/ISO 180) "Impact resistance of plastics and electrical insulating materials".

6.2.1.2. Determination of tensile strength of plastic materials used for the manufacture of boxes.

The testing shall be carried out according to the Regulations ASTM D638 (or EN/ISO D527-4) "Tensile properties of plastics".

6.2.1.3. Determination of Flexural strength of plastic materials used for the manufacture of boxes.

The testing shall be carried out according to the Regulations ASTM D790 (or EN/ISO 178) "Flexural properties of unreinforced and reinforced plastics and electrical insulating materials".

6.2.1.4. Determination of the density of plastic materials used for the manufacture of boxes.

The testing shall be carried out according to the Regulations ASTM D792 (or EN/ISO 1183) "Density and Specific Gravity (Relative Density) of plastics by displacement".

6.2.1.5. Determination of the softening temperature of plastic materials used for the manufacture of boxes.

The testing shall be carried out according to the Regulations ASTM D1525 (or ISO 306) "Vicat softening temperature of plastics".

6.2.1.6. Determination of water absorption of plastic materials.

The testing shall be carried out according to the Regulations ASTM D570 (or ISO 62) "Water absorption of plastics".

6.2.1.7. Testing for the resistance of plastic materials used for the manufacture of boxes to acid or alkaline chemical reagents and usual solvents.

The testing shall be carried out according to the Regulations ASTM D543 (or ISO 175) "Resistance of plastics to chemical reagents".

The chemical reagents which shall be used for the testing shall be those mentioned in paragraphs 5.3.5, 5.3.7, 5.3.8, 5.3.23, 5.3.28, 5.3.33, 5.3.42, 5.3.47, 5.3.50 of the relevant regulations ASTM.

6.2.1.8. Determination of the flammability degree of the plastics used for the manufacture of boxes.

The testing shall be carried out according to the Regulations IEC 60695-11-10:2013 "Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods".

6.2.2. Type Tests to a ready to use product.

Type tests are considered to be the testing described below and in the event of execution of the total or part of these tests, the following sequence shall be kept:

6.2.2.1. Confirmation of the suitability of the boxes to be used or stored under conditions of high temperatures.

The testing shall be carried out according to the Regulations EN/IEC 60068-2-2 "Basic environmental testing procedures - Part 2: Tests - Test Bd: Dry heat".

The testing shall be considered successful if there is not any kind of distortion or failure during or after the testing, which could affect the functional capacity of materials.

Moreover, the plastic boxes must resist with success after the period of recovery the impact strength described in paragraph 6.2.1.1.

6.2.2.2. Testing for the impact of the change of temperature to the boxes.

The testing shall be carried out according to the Regulations EN/IEC 60068-2-14 "Basic environmental testing procedures - Part 2: Tests - Test Nb: Change of temperature with specified rate of change".

The testing shall be considered successful in case there is not any kind of distortion or failure during or after the testing, which could affect the functional capacity of materials.

Moreover, the plastic boxes must resist with success after the period of recovery the impact strength described in paragraph 6.2.1.1.

6.2.2.3. Testing of confirmation of the degree of protection against external mechanical impact (Code IK).

The testing shall be carried out according to the Regulations ELOT EN 62262:2002, for protection degree IK 10.

The impact shall be equal to 20 Joule.

The testing shall be carried out at any position of the flat surface of the box (fully assembled with the cover in its position). The testing shall be carried out as described in paragraph 6.4 of the mentioned standard EN 62262.

The testing shall be considered successful in case there is not any indication of failure which could affect the functional capacity of the box.

6.2.2.4. Testing for the protection against moisture and oxidation.

This testing includes the following partial tests:

a. Damp-heat test.

The test shall be carried out according to the Regulations EN/IEC 60068-2-30 : "Basic environmental testing procedure - Part 2 : Tests - Test Db and guidance: Damp heat cyclic, 12 + 12 hour cycle".

The Test boxes shall be fitted on a vertical flat surface with all bolts provided by the manufacturer for this purpose. The test shall be carried out in fully assembled boxes with the metallic parts fixed and the covers closed.

The test shall be considered successful if:

- There is no indication of distortion, fracture or other fault in the plastic parts after its execution, which could affect their functional capacity.
- There is no indication of oxidation in metallic parts.

Moreover, the boxes shall bear with success, after the period of recovery, the impact testing of paragraph 6.2.1.1. and the testing concerning the dielectric strength described in paragraph 6.2.2.6.

b. Salt mist test (for metallic parts)

The test shall be carried out according to the Regulations EN/IEC 60068-2-11: "Basic environmental testing procedure - Part 2 : Tests - Test Ka : Salt mist".

The test is carried out for inspection of the metallic fittings which are placed on the box base, as well as on its door and for this reason the testing shall be carried out with the door open.

The testing shall be considered successful if there is no indication of oxidation in the metallic parts.

6.2.2.5. Testing for protection against penetration of solid materials, dust and water.

The boxes shall be fitted on a vertical flat surface with all screws provided by the manufacturer for this purpose.

The testing shall be carried out in fully assembled boxes with the metallic parts in their position and the covers closed, for protection degree **IP43** EN/IEC 60529.

This testing consists of the following partial testing:

a. Protection against penetration of solid materials and dust.

The testing shall be carried out as described in EN/IEC 60529 "Classification of degrees of protection provided by enclosures".

b. Protection against water penetration.

The testing shall be carried out as described in EN/IEC 60529 according to the required degree of protection.

6.2.2.6. Testing of dielectric strength.

The testing shall be carried out as described in EN/IEC 60243 "Recommended methods of test for the electric strength of solid insulating materials at power frequencies".

- The rate of voltage step-up shall be 1KV/sec (testing in polyester).
- With voltage 4 KV for 1 min (testing in a ready box).

6.2.2.7. Testing for resistance to heat and fire.

The following testing shall be carried out in the plastic parts of the box:

a. Glow wire test.

The testing shall be carried out according to the mode described in EN/IEC 60695-2-11 "Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products".

b. Needle flame test.

The testing shall be carried out according to the mode described in EN/IEC 60695-11-5 "Fire hazard testing - Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance".

The test burner flame shall be placed exactly as shown in figure 2.b of the relevant IEC standard.

6.2.2.8. Confirmation for conformity of the dimensions of the boxes with the approved manufacturing designs.

Type tests on raw material and Type tests on a ready to use product must be carried out in accordance with the regulations / standards referred to above-mentioned paragraphs 6.2.1 & 6.2.2 of this Technical Specification, but in case the regulations / standards have been replaced, the tests must be carried out in accordance with the regulations / standards that **are in force on the day of bids submission**.

In addition, Tables 9.1.1 to 9.1.2 of the Technical Specification will be appropriately filled in with the applicable standards.

6.3. Sample Tests

6.3.1. Acceptance tests

Acceptance tests are the following:

a. Visual inspection.

The boxes shall be visually inspected in order to ascertain that:

- There is no indication of fault or distortion
- The external surfaces are even with no defects.
- There are no indications of defective casting.
- The marking is correct and conforms to the specification requirements.
- All accessories are provided.

b. Confirmation of interchangeability in parts of the same item.

c. Execution of tests of paragraphs 6.2.2.2., 6.2.2.3., 6.2.2.5., 6.2.2.6., 6.2.2.7., 6.2.2.8.

6.3.2. Sampling.

The above mentioned acceptance tests shall be carried out on randomly selected sample, from the lot to be delivered, as per IEC 60410, with the following criteria:

- Level of inspection II (table I, IEC 410).
- Designs of simple or double sampling (tables II and III, IEC 410).
- Level of acceptable quality AQL = 1,0 for every single test.

In case of failure of any of the acceptance tests which entails rejection of the lot or in case of bad experience from previous use of the material, a suitability testing shall be carried out which is related to the failure or the bad experience.

In this case, the suitability testing shall be performed in three plastic boxes which shall be randomly selected from the next lot before its delivery.

In case of failure of one plastic box from the sample of the three ones, even as regards one single testing, the suitability testing shall be repeated in a sample of two boxes.

In case of second failure, the lot shall be rejected.

It is noted that the lots coincide with the partial deliveries of material.

6.4. Series Tests

Not required.

7. LABELS – MARKING

7.1. Labels

Labels are not required.

7.2. Marking

The follow indications shall be embossed or engraved upon a distinct position on each box (on the base or the door) to be indicated by HEDNO:

- PPC logo.
- Contract number and lot serial number.
- Name or logo of the manufacturer.
- HEDNO Material Code.

The exact dimensions of all markings, as well as their exact location shall be determined on the drawings 9.2 of the Annex.

According to par. 5.2.1 of the Specification, the above mentioned material shall bear, embossed or engraved, on a location that can not affect the perfect condition and the tightness of the box, the following numbers:

HEDNO MATERIAL CODES

M.C. 454000021 – BOX FOR SUPPLY No5

M.C. 454000022 – BOX FOR SUPPLY No6

M.C. 454000023 – BOX FOR SUPPLY No7

Suppliers must be informed of new material codes prior to in-production.

8. PACKING

Boxes shall be delivered fully assembled.

Each box shall be carefully packed in a nylon bag and then placed on EU palettes and shall be delivered in such a manner that the total weight per palette shall not exceed 550kgr.

Boxes shall bear on their outer surface indelibly engraved or embossed the number of the contract, the material code and the suppliers details.

The above mentioned packing shall also allow for outdoor storage without any further protection measures against weather conditions (rain or humidity).

9. ANNEXES

9.1. TABLES

TABLE 9.1.1 - MATERIAL PROPERTIES AND QUANTITIES FOR ITS TESTS (polyester reinforced with glass fiber of SMC type)

Index	Characteristic or test	Specification paragraph	Standard	Units	Values
1	Impact breaking strength (Reversed Notch Izod)	6.2.1.1	ASTM D256	ft * lbf ----- --- in. of Width	= 11
			EN ISO 180	KJ/m²	> 50
2	Tensile breaking strength	6.2.1.2	ASTM D638	P.S.I.	min. 9.000
			EN ISO 527-4	Mpa	min 61
3	Flexural yield strength	6.2.1.3	ASTM D790	P.S.I.	min. 20.000
			EN ISO 178	Mpa	min 138
4	Density	6.2.1.4	ASTM D792 EN ISO 1183	gr/cm³	1,7-1,8
5	Thermal strength (Softening) Vicat (Method B)	6.2.1.5	ASTM D1525 EN ISO 306	°C	130
6	Water absorption 24h/23°C	6.2.1.6	ASTM D570 EN ISO 62	%	0,5
7	Impact of solvents and chemical reagents	6.2.1.7	ASTM D543 EN ISO 175	-	No effect on functionality
8	Material flammability	6.2.1.8	IEC 60695-11-10:2013	Level Class	HB & HB40
9	Test in hot and dry environment (Bd Test)	6.2.2.1	EN / IEC 60068-2-2	°C - hrs	100-16
10	Temperature variation test (Nb Test)	6.2.2.2	EN / IEC 60068-2-14	°C	min. -25 max. +75
	Level of				

11	protection against impact (IK code)	6.2.2.3	EN 62262:2002	Level	IK 10
12a	Test in hot and wet environment (Bd Test) Variation 1	6.2.2.4.a	EN / IEC 60068-2-30	°C - cycles	55 – 8
12b	Salt mist test (Ka Test)	6.2.2.4.β	EN / IEC 60068-2-11	Weeks	2
13	Level of Protection	6.2.2.5	EN / IEC 60529	--	IP 44
14	Dielectric strength	6.2.2.6	EN / IEC 60243	KV / mm	min 12
15a	Glow wire test	6.2.2.7.a	EN / IEC 60695-2-11	°C	960
15b	Needle flame test	6.2.2.7.β	EN / IEC 60695-11-5:2016	Sec	30

TABLE 9.1.2 - MATERIAL REQUIREMENTS AND QUANTITIES FOR ITS TESTS (polyester reinforced with glass fiber of SMC type)

(TO BE FILLED-IN BY THE SUPPLIER)

Index	Characteristic or test	Specification paragraph	Standard	Units	Values
1	Impact breaking strength (Reversed Notch Izod)	6.2.1.1	ASTM D256 ñ EN ISO 180	ft * lbf ----- in. of Width KJ/m²	*
2	Tensile breaking strength	6.2.1.2	ASTM D638 ñ EN ISO 527-4	P.S.I. Mpa	*
3	Flexural yield strength	6.2.1.3	ASTM D790 ñ EN ISO 178	P.S.I. Mpa	*
4	Density	6.2.1.4	ASTM D792 ñ ISO 1183	gr/cm³	*
5	Thermal strength (Softening) Vicat (Method B)	6.2.1.5	ASTM D1525 ñ ISO 306	°C	*
6	Water absorption 24h/23°C	6.2.1.6	ASTM D570 ñ ISO 62	%	*
7	Impact of solvents and chemical reagents	6.2.1.7	ASTM D543 ñ ISO 175	-	*
8	Material flammability	6.2.1.8	IEC 60695-11-10:2013	Level Class	*
9	Test in hot and dry environment (Bd Test)	6.2.2.1	EN / IEC 60068-2-2	°C - hrs	*
	Temperature				

10	variation test (Nb Test)	6.2.2.2	EN / IEC 60068-2-14	°C	*
11	Level of protection against impact (IK code)	6.2.2.3	EN 62262:2002	Level	*
12a	Test in hot and wet environment (Bd Test) Variation 1	6.2.2.4.a	EN / IEC 60068-2-30	°C - CYCLES	*
12b	Salt mist test (Ka Test)	6.2.2.4.b	EN / IEC 60068-2-11	weeks	*
13	Level of Protection	6.2.2.5	EN / IEC 60529	--	*
14	Dielectric strength	6.2.2.6	EN / IEC 60243	KV / mm	*
15a	Glow wire test	6.2.2.7.a	EN / IEC 60695-2-11	°C	*
15b	Needle flame test	6.2.2.7.b	EN / IEC 60695-11-5:2016	Sec	*

9.2. Drawings List

Box drawings

Full box

- **3D**

Box base

Box door

Terminal for connection earth to neutral

- Earth terminals (Bowden cable) - Earth blade

L.V. Fusebox base

- Specification GR-128/12.8.71 of DMKLD

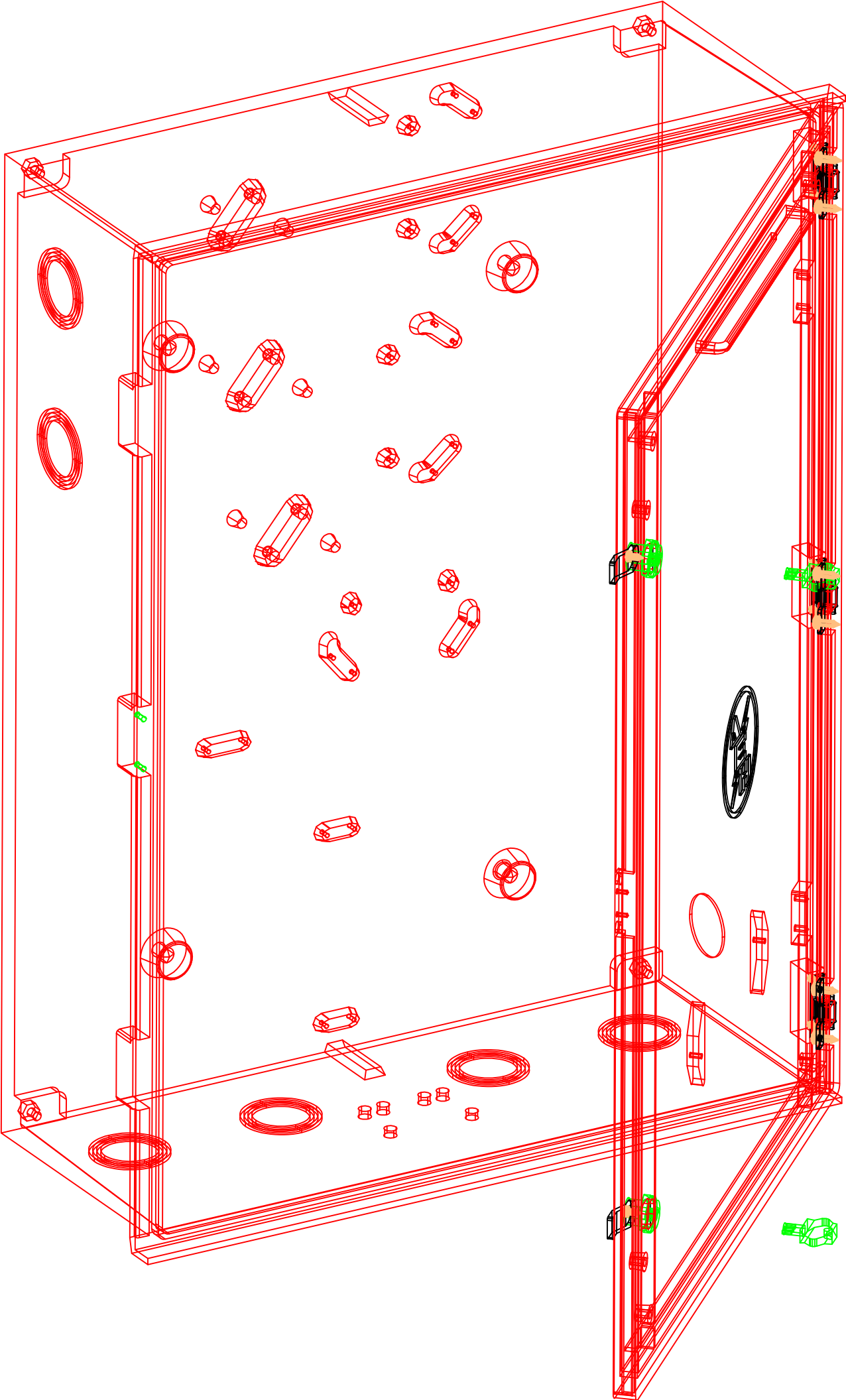
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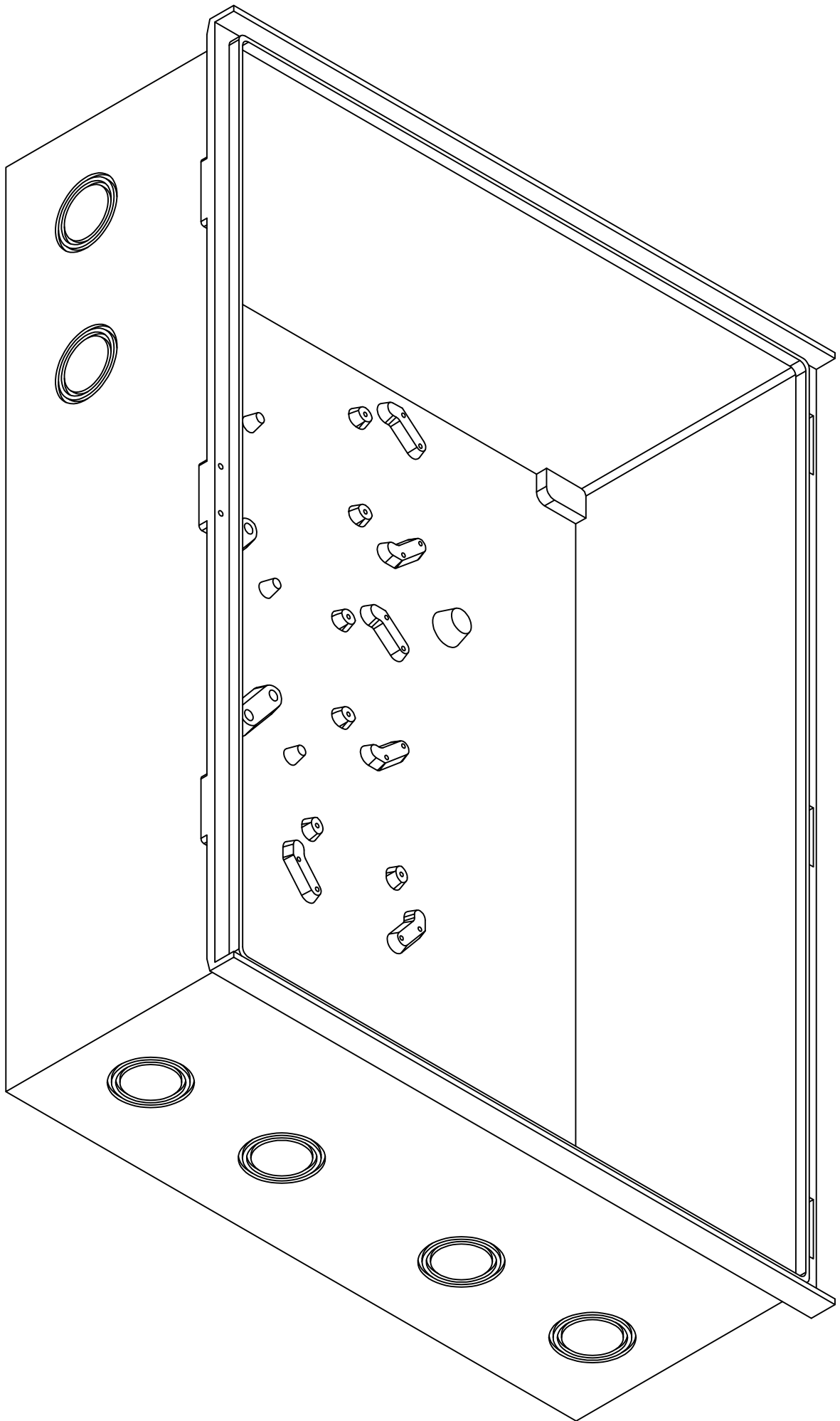
Fuse Base drawing

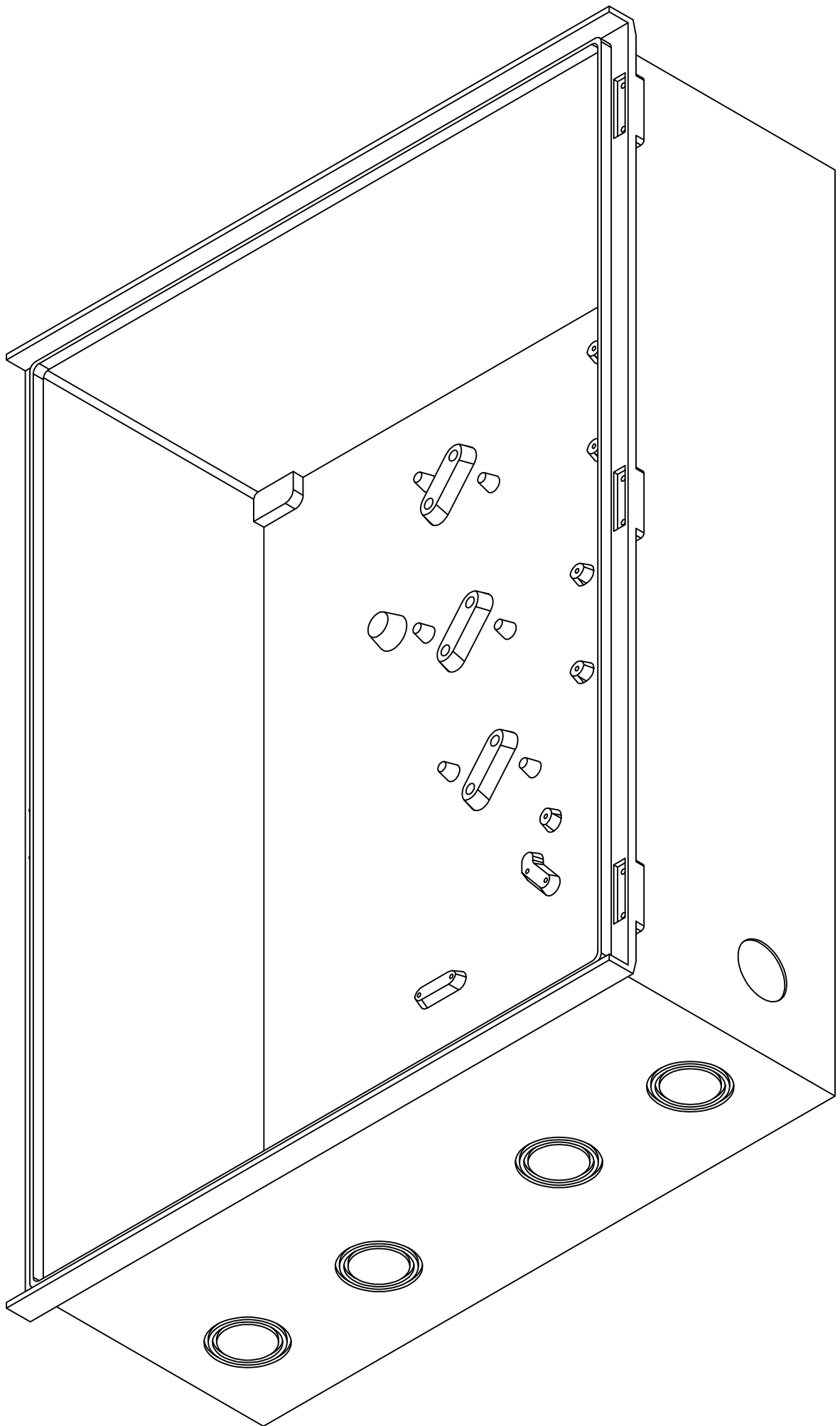
Test Box drawing

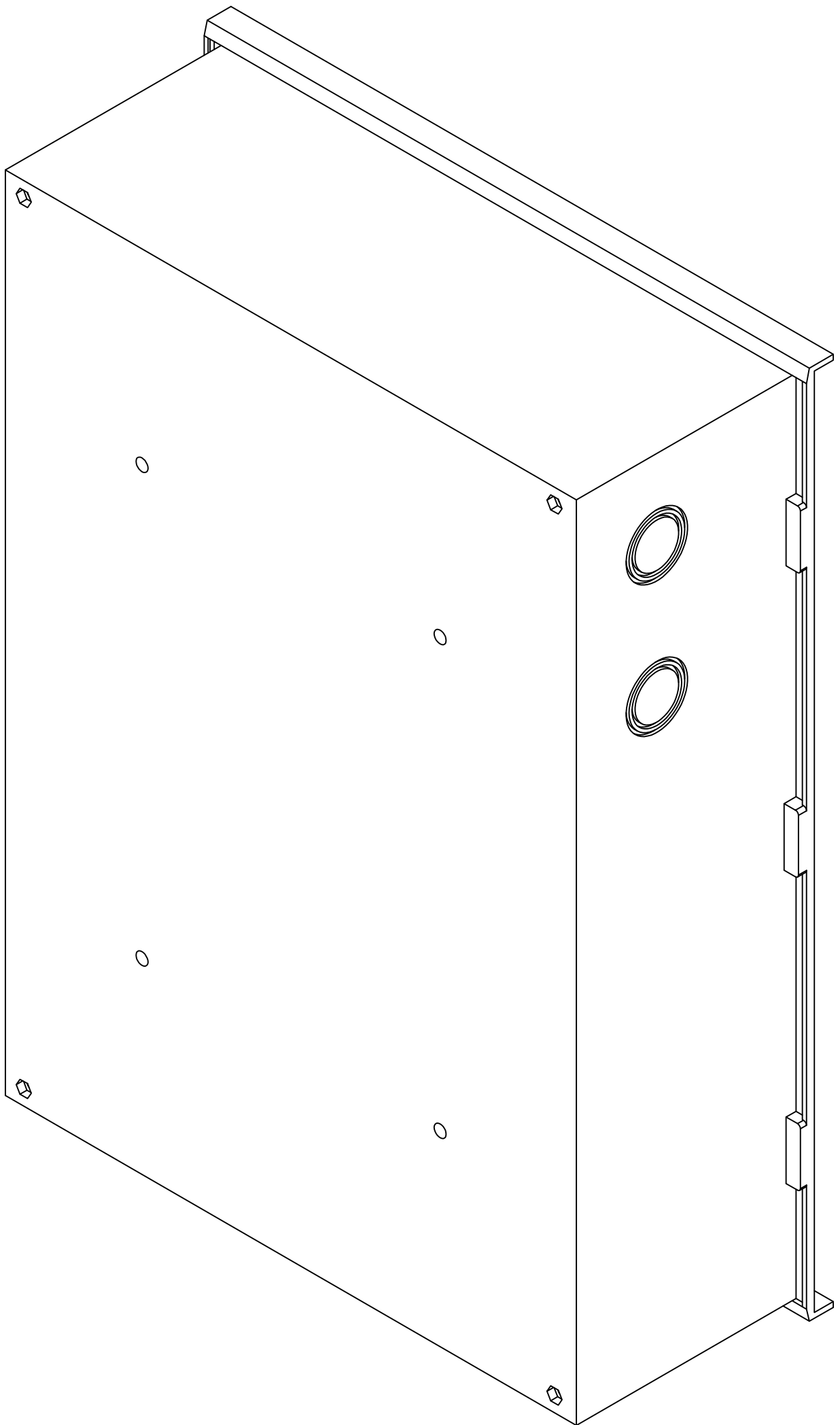
LV Current Transformers' drawings (anchor points)

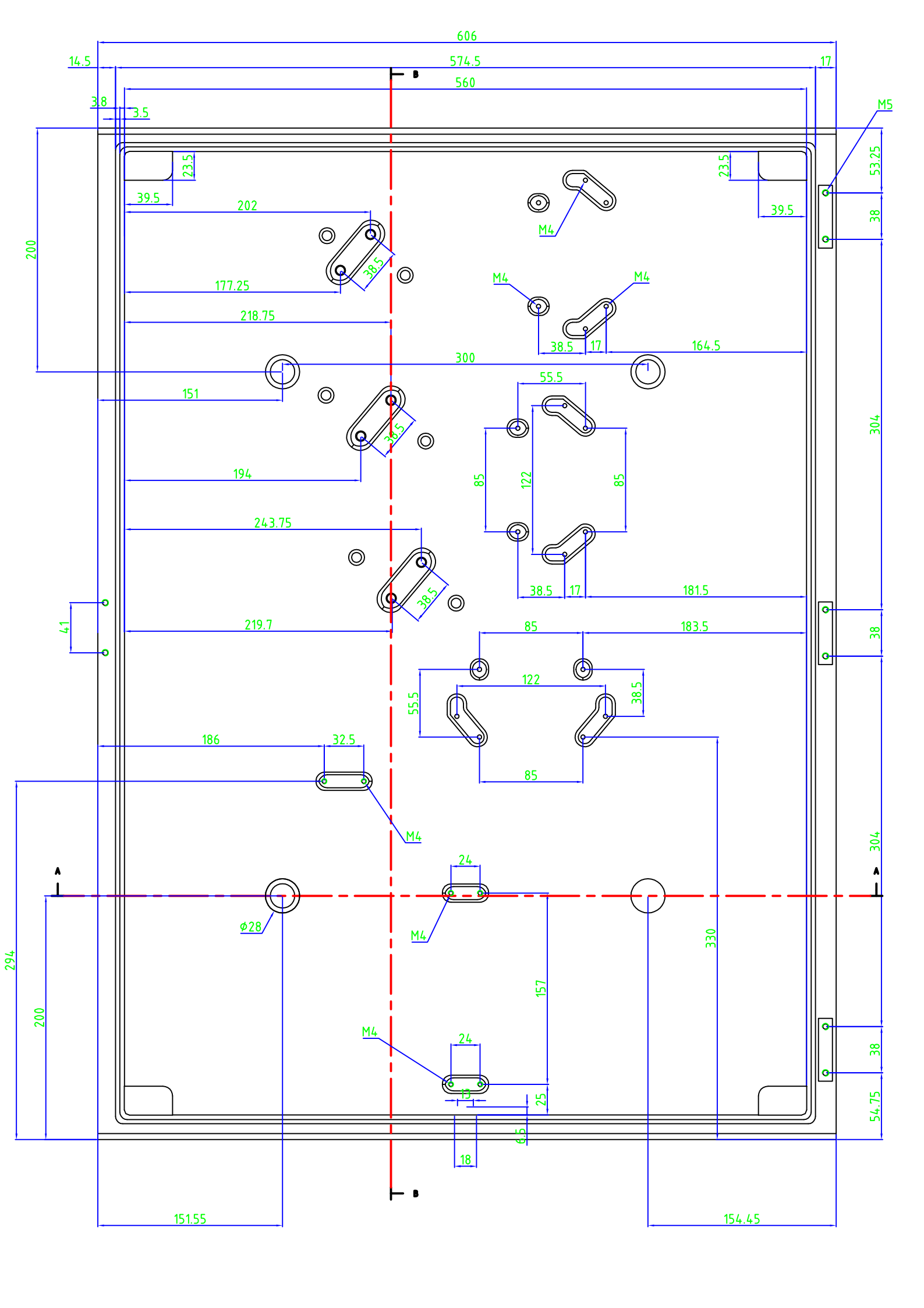
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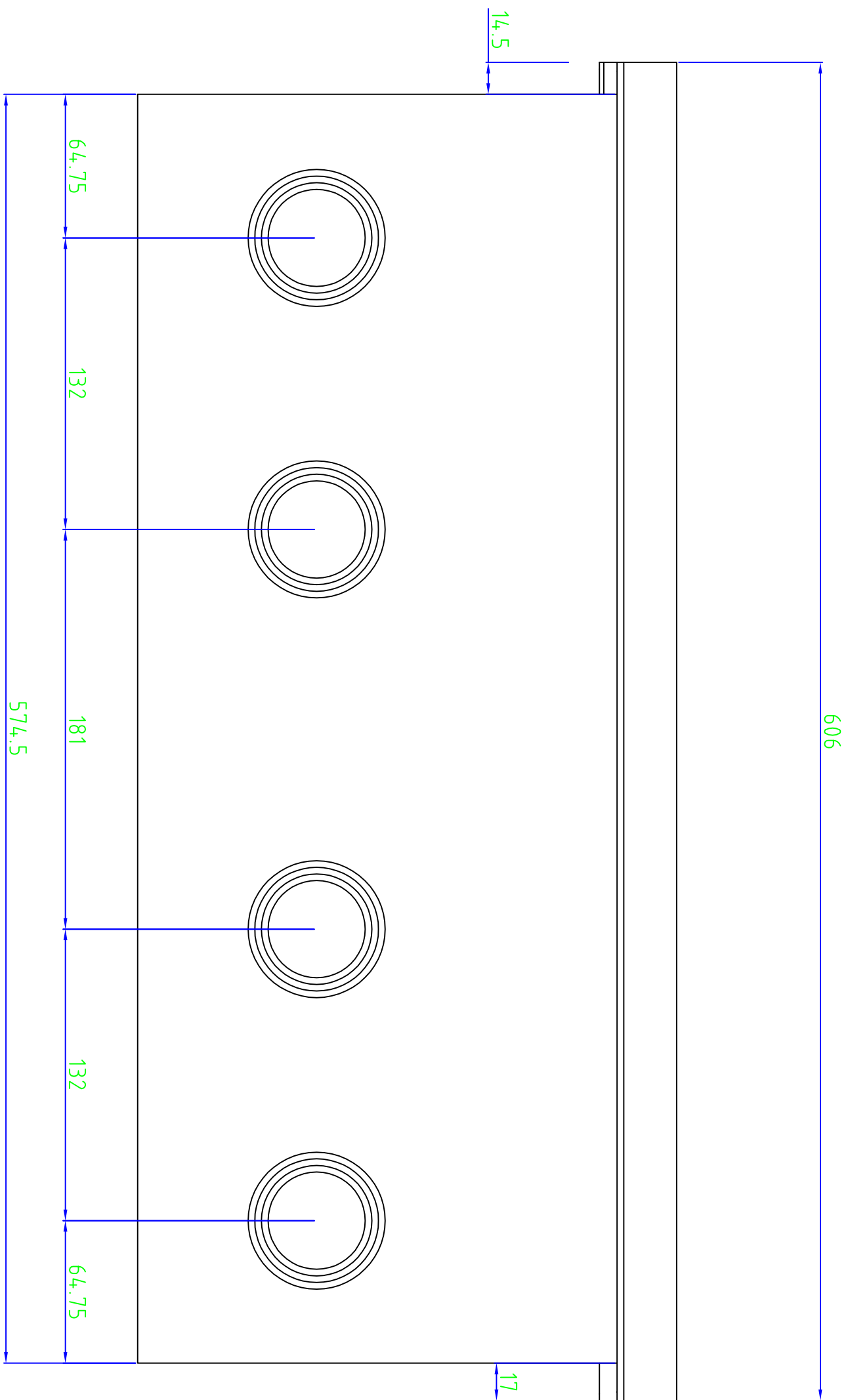


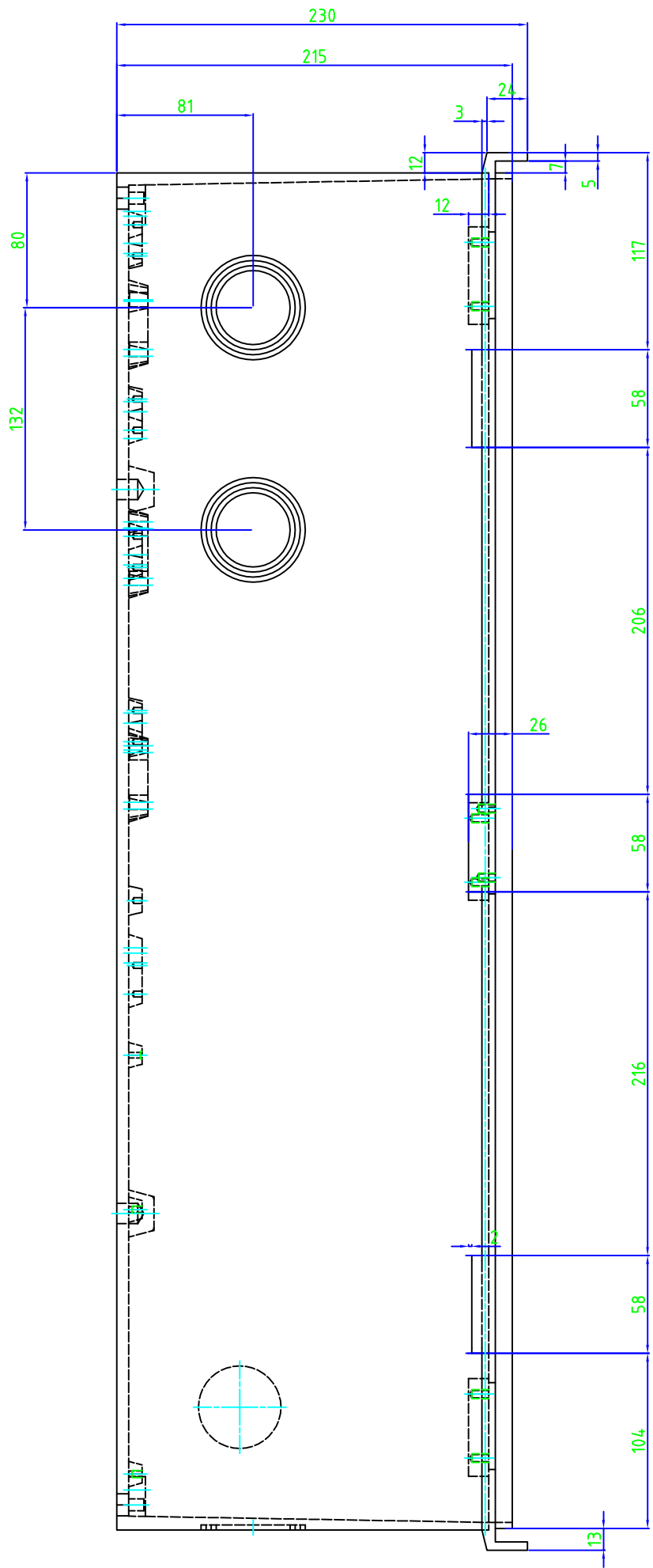


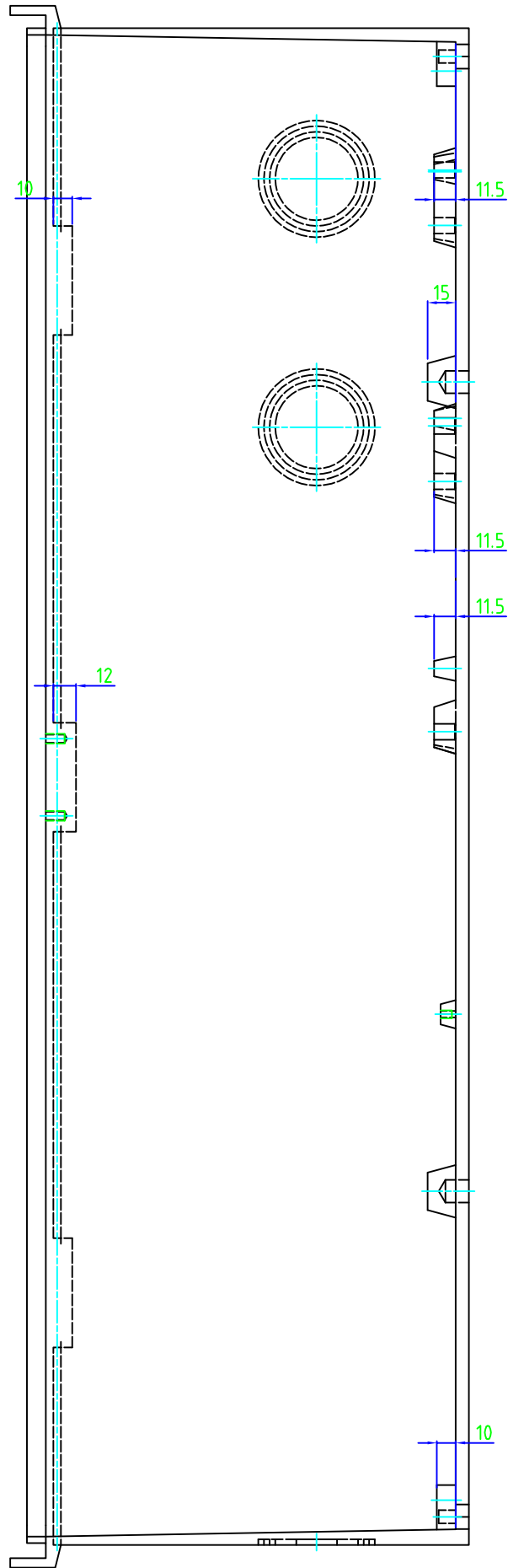




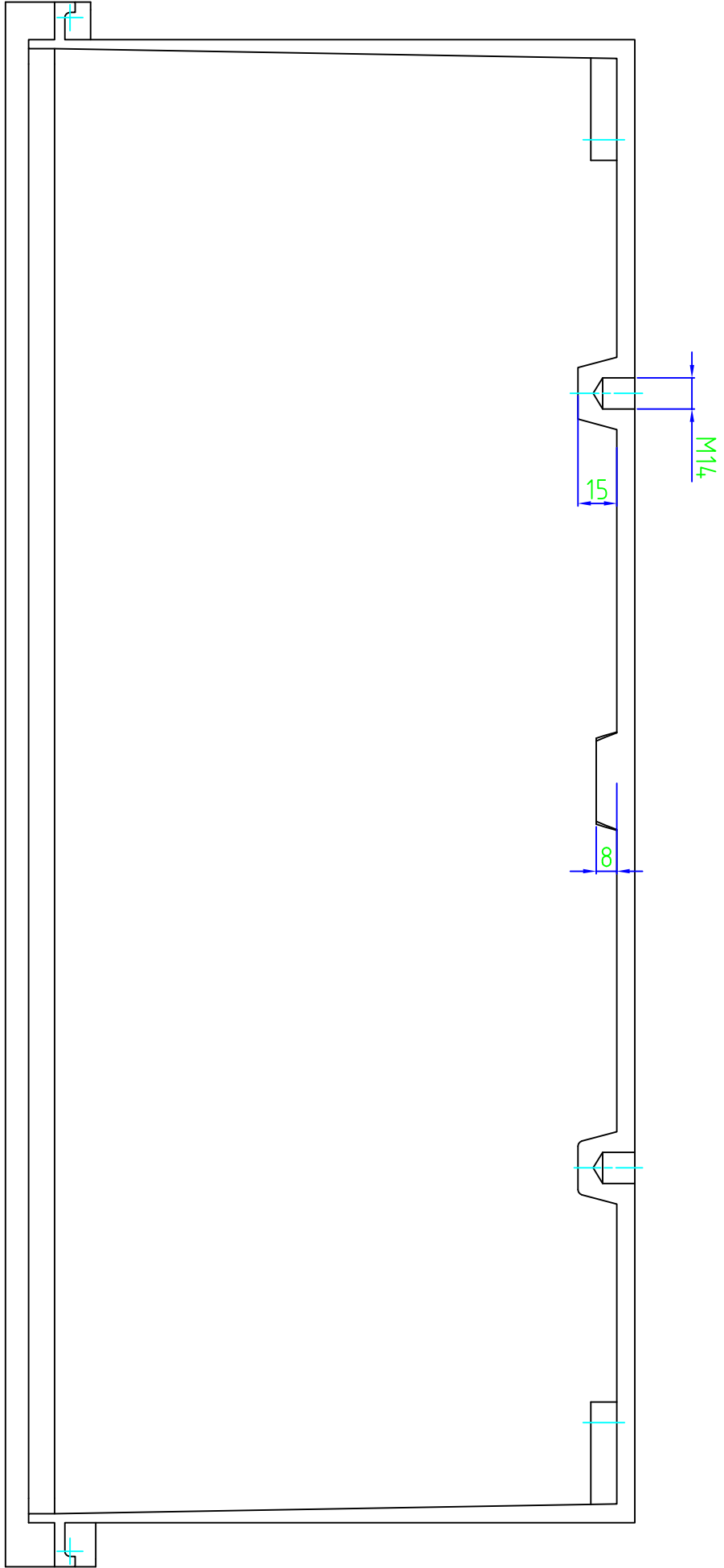


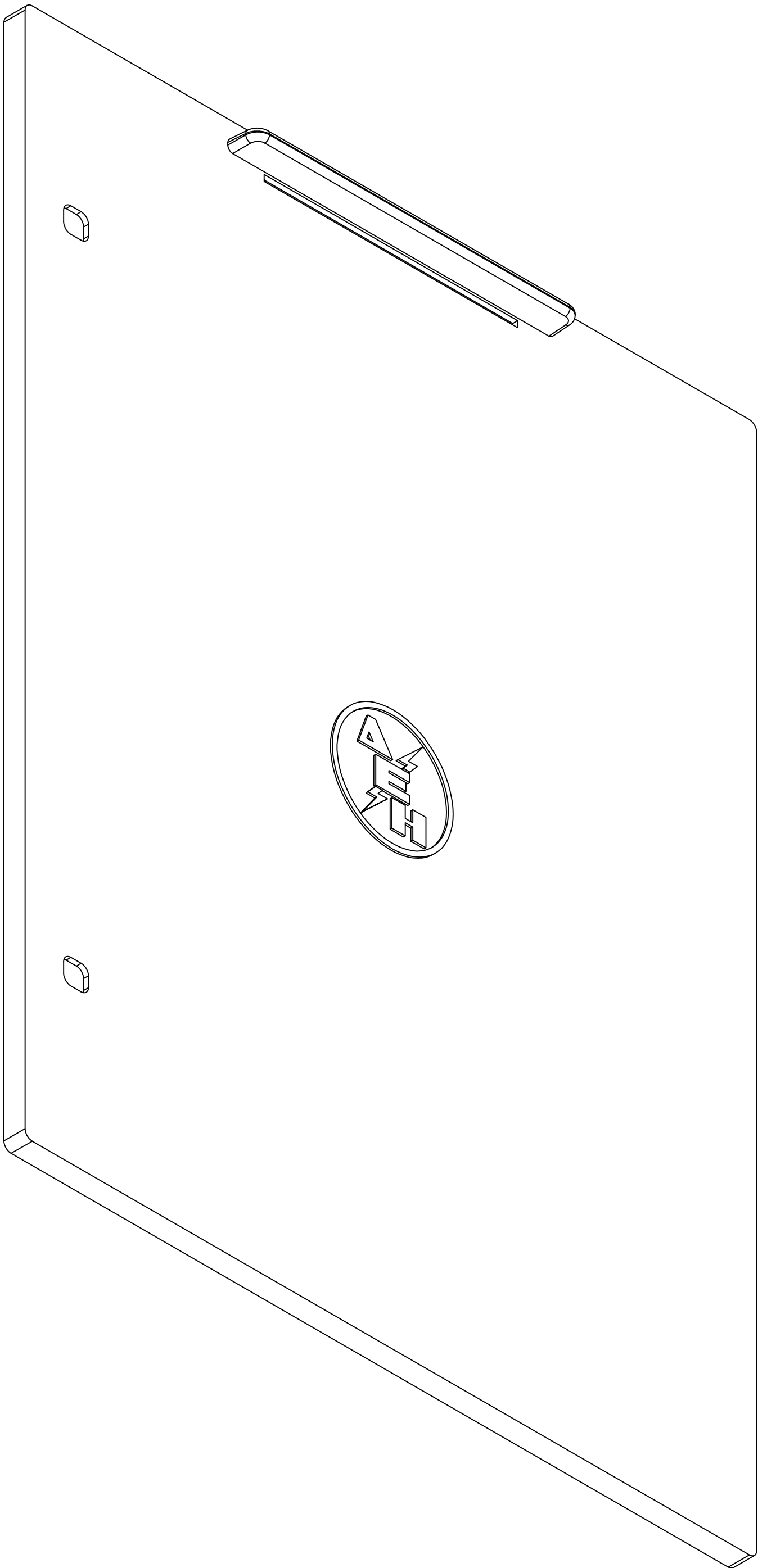


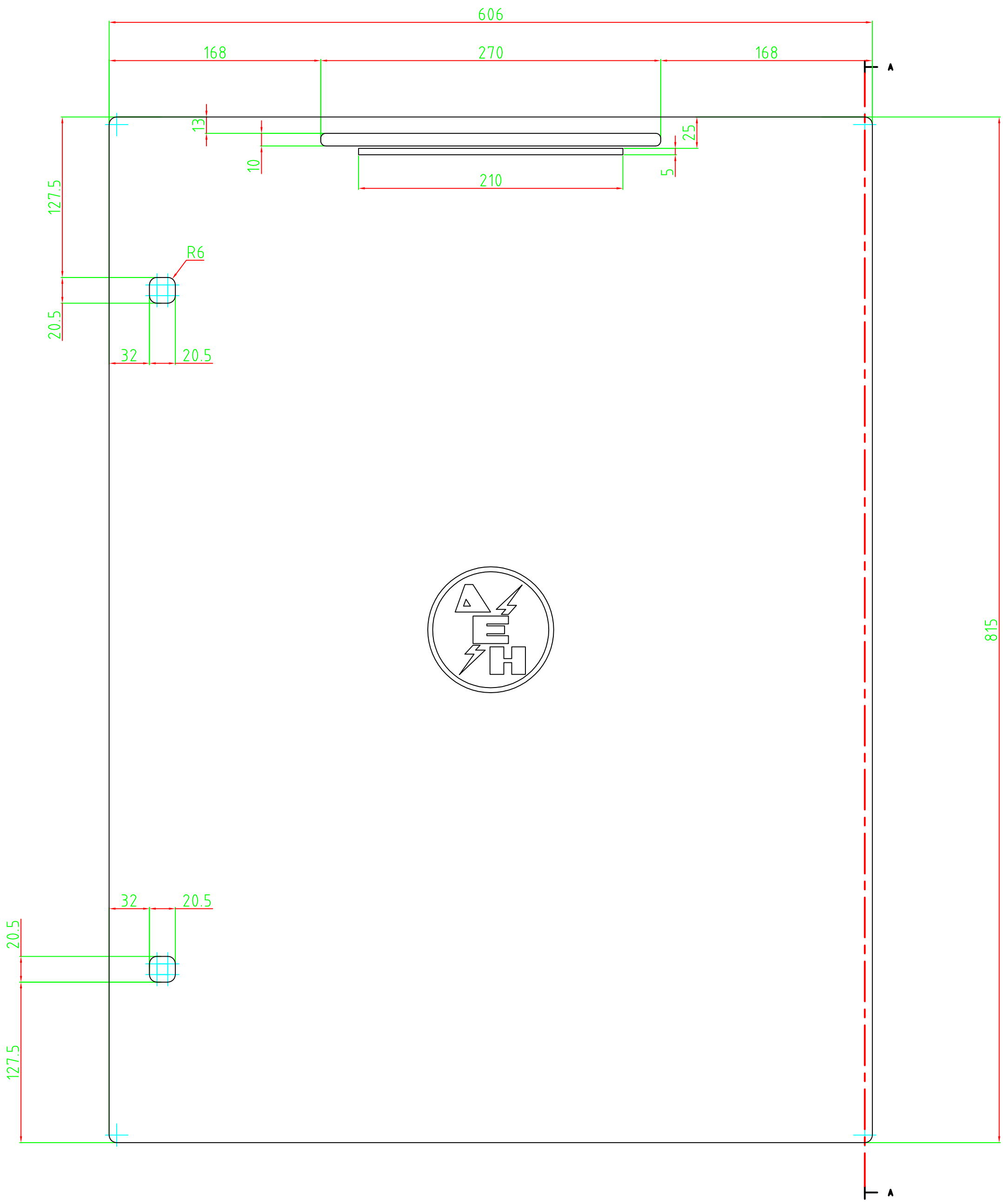




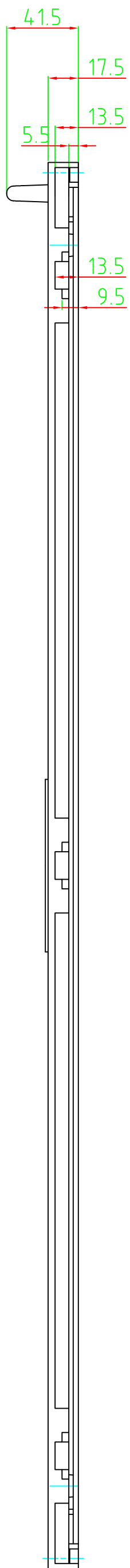
A-A



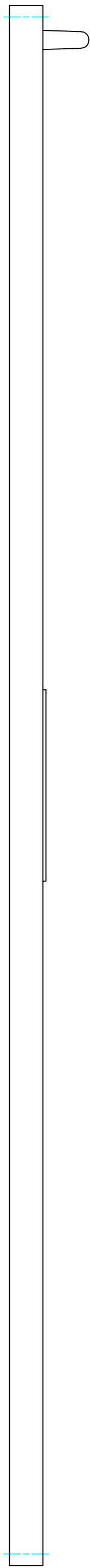


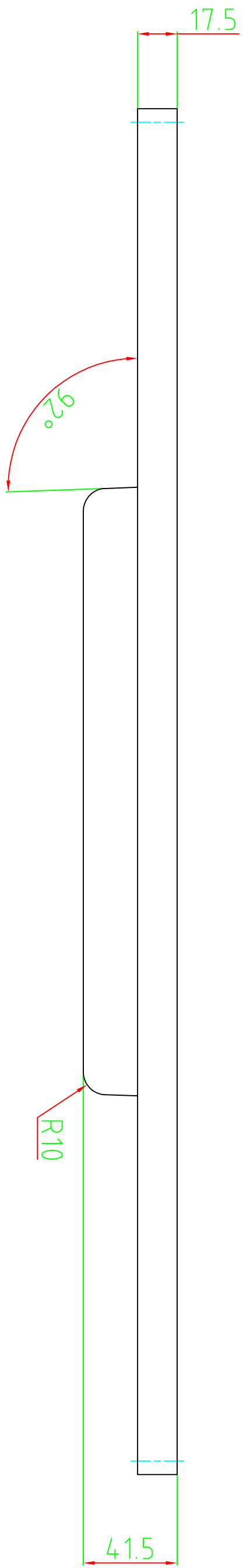


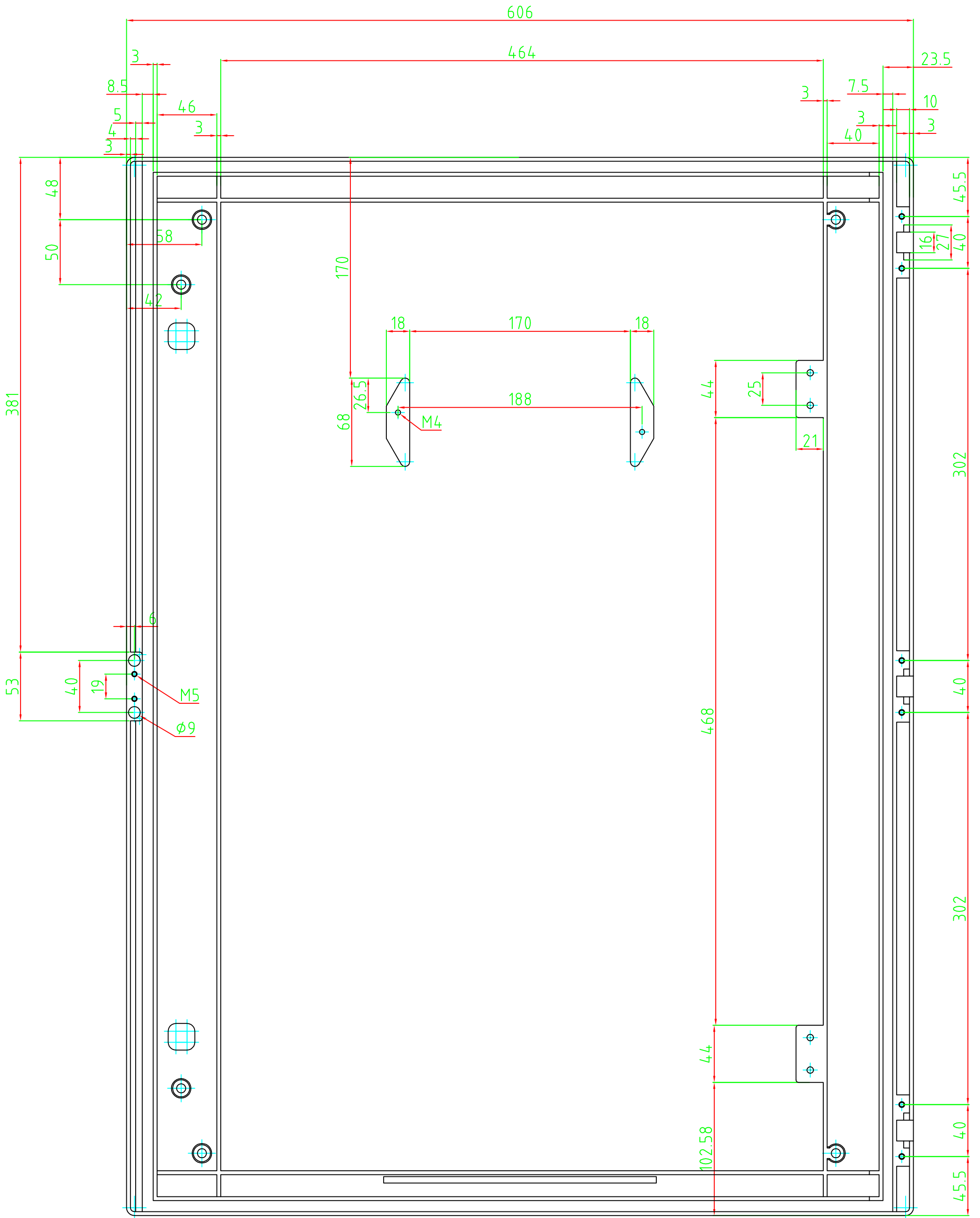
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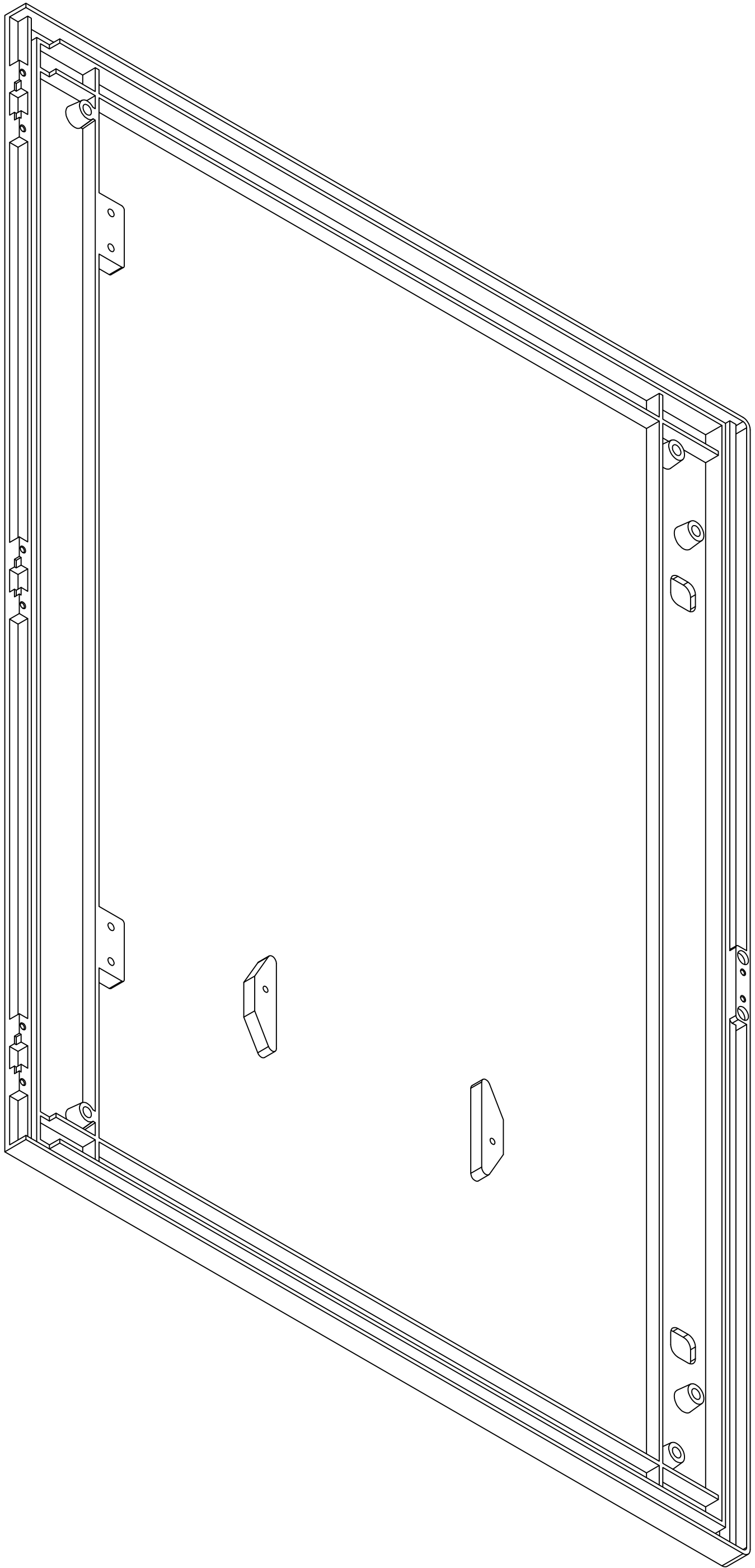


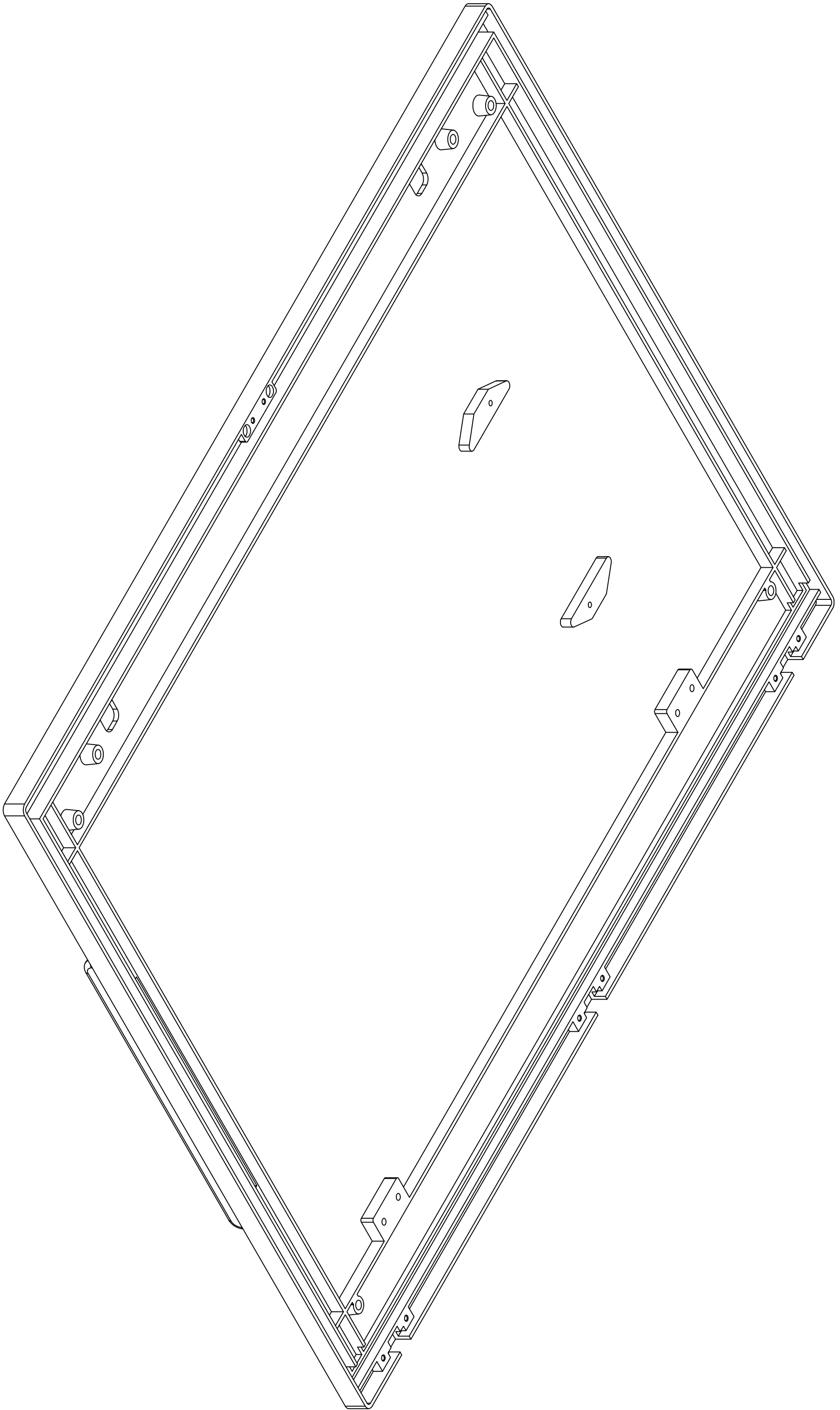
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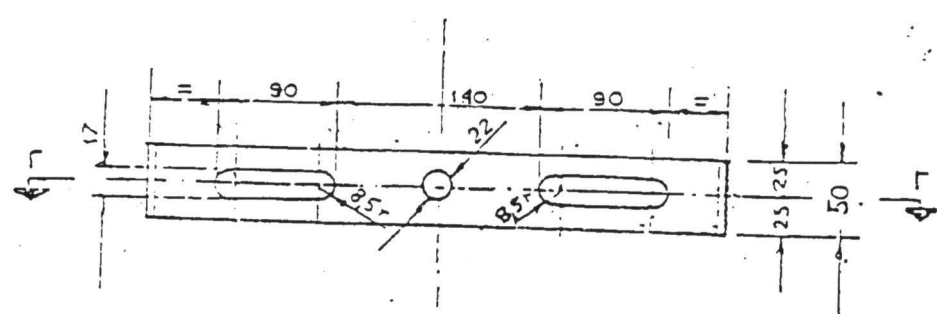




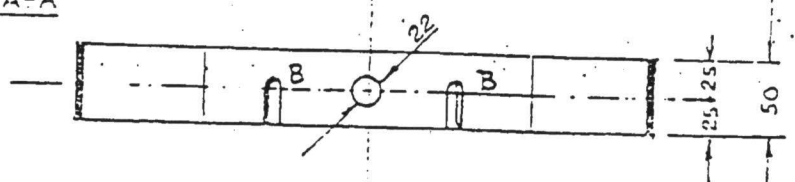




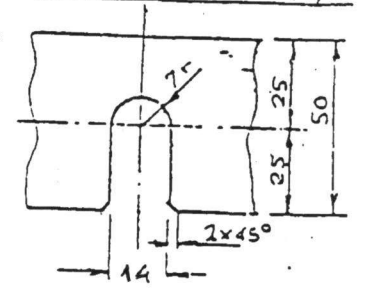
Κ.Υ. 430009084



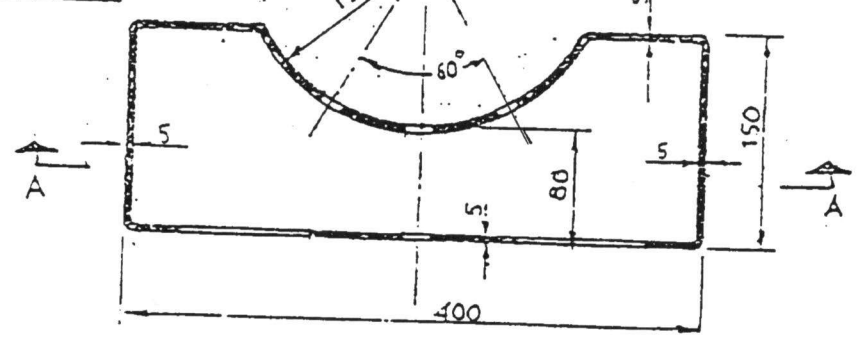
ΤΟΜΗ Α-Α



ΛΕΠΤΟΜΕΡΕΙΑ Β κλ. 1/2

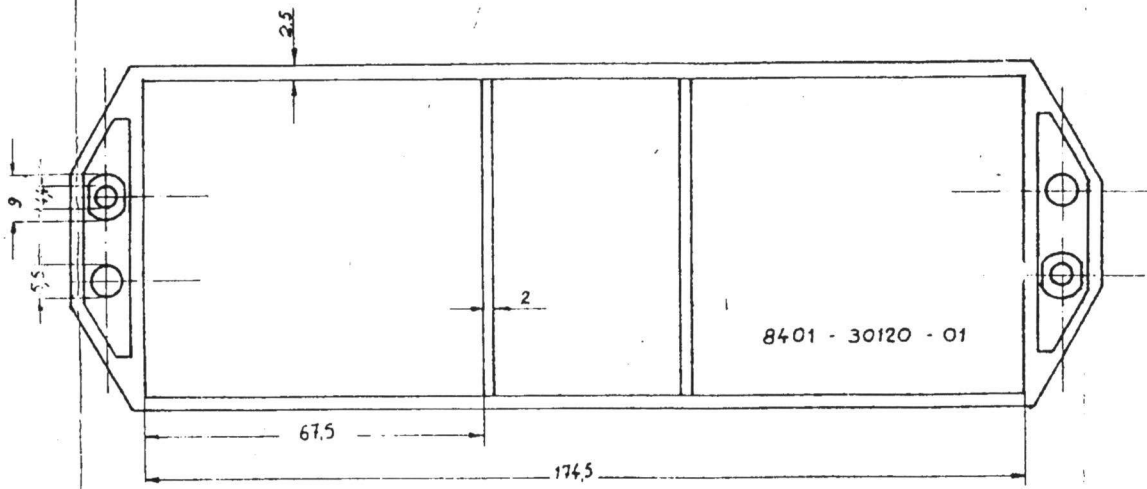


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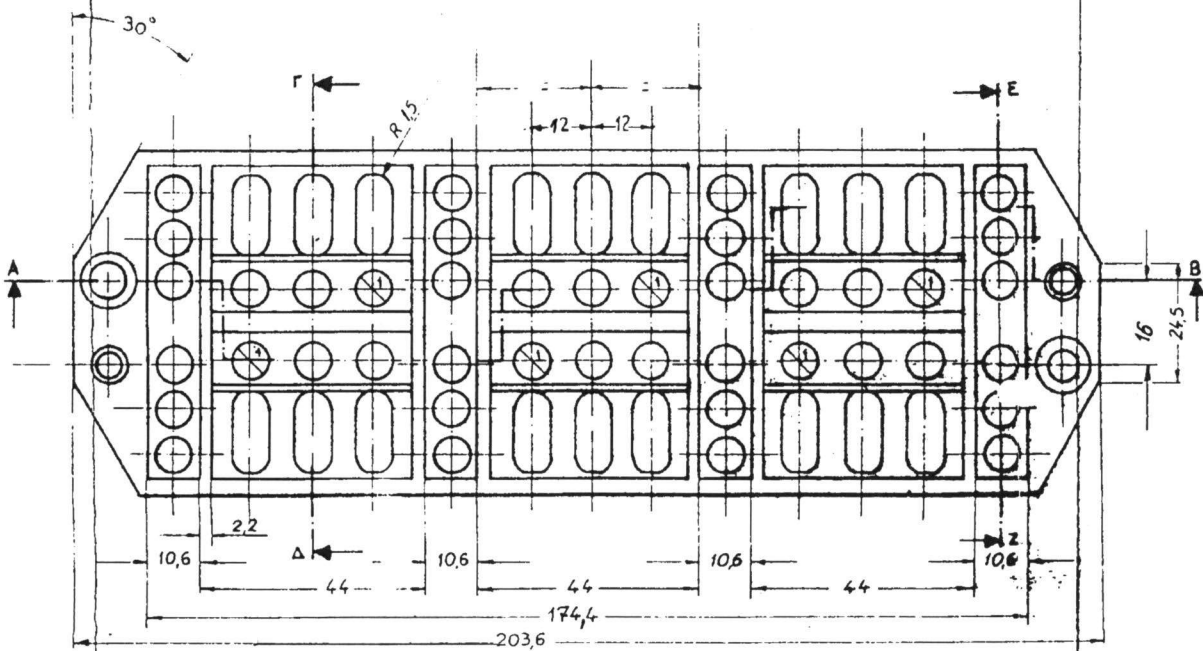
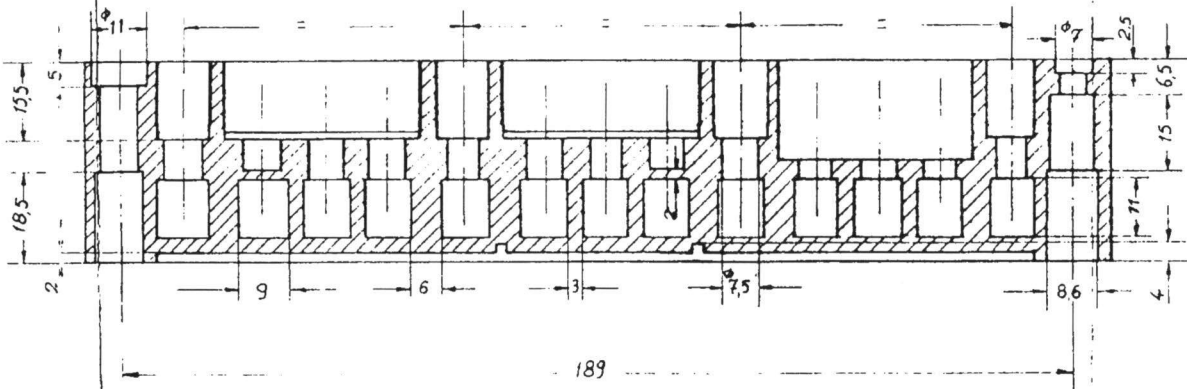


- ΣΗΜΕΙΩΣΕΙΣ:**
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 2. ΕΠΙΨΕΥΔΑΡΓΥΡΕΣΙΣ: Συμφώνως προς την τελευταία αναθεώρηση της GR-181.

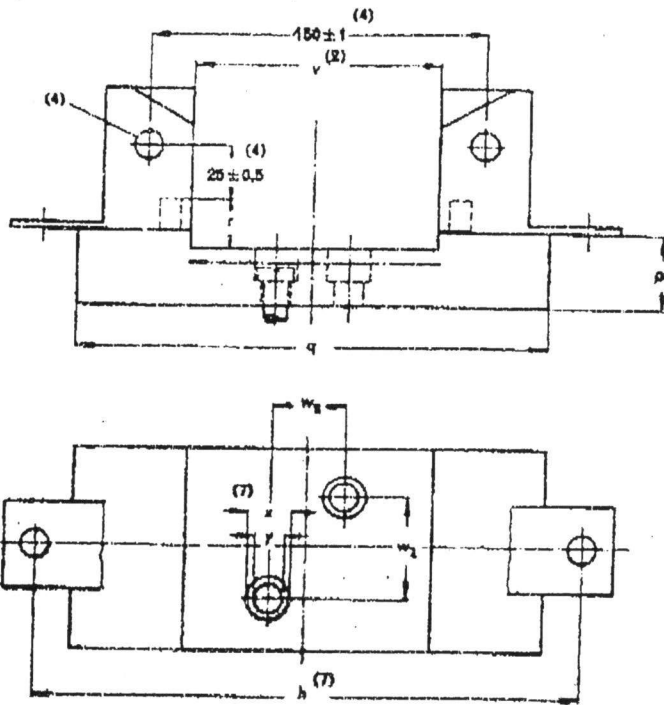
2						
2						
1	Πρότυπα σπριζ και δύο σπριζονίων	Ι. ΠΑΪΣΗΣ	Υ. ΠΑΥΛΟΥ	Υ. ΠΑΥΛΟΥ	Ε. ΣΑΥΑΣ	12-8-71
Α/Α	ΑΝΑΘΕΩΡΗΣΙΣ	ΕΣΧΕΔΙΑΣ.	ΕΜΒΛΕΤ.	ΜΑΓΕΡΧΟΝ	ΕΠΕΚΡΙΘΗ	ΚΜ. ΕΓΚΡΙΣ
						(ΟΥΑ. 195
ΣΤΗΡΙΓΜΑ ΑΣΦΑΛΕΙΟΚΙΒΩΤΙΟΥ Χ.Τ		ΔΕΗ : ΔΙΕΥΘΥΝΣΙΣ ΜΕΛΕΤΩΝ & ΚΑΤΑΣΚΕΥΩΝ ΔΙΑΝΟΜΗΣ			ΚΑΙΜΑΣ 115	
					GR-128	



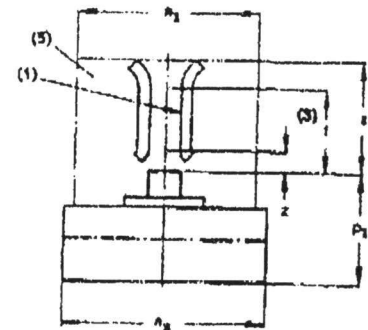
ТОМН А-В



Dimensions en millimètres



Dimensions in millimetres



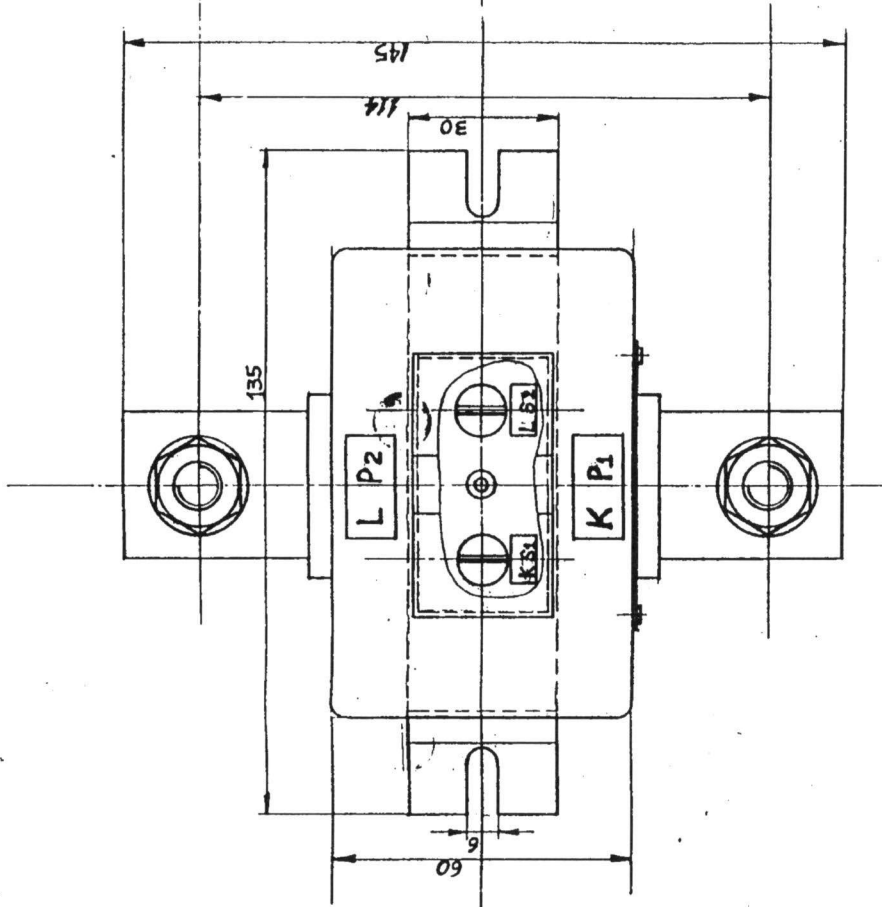
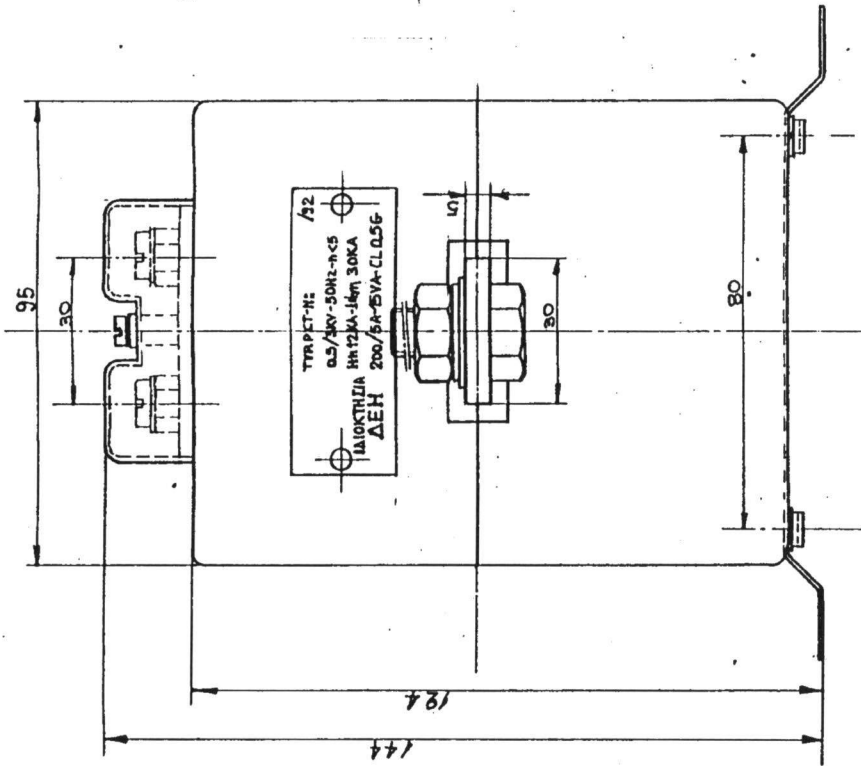
301/75

Les dessins ne sont pas destinés à imposer un modèle d'éléments de remplacement, sauf en ce qui concerne les notes et les dimensions indiquées.

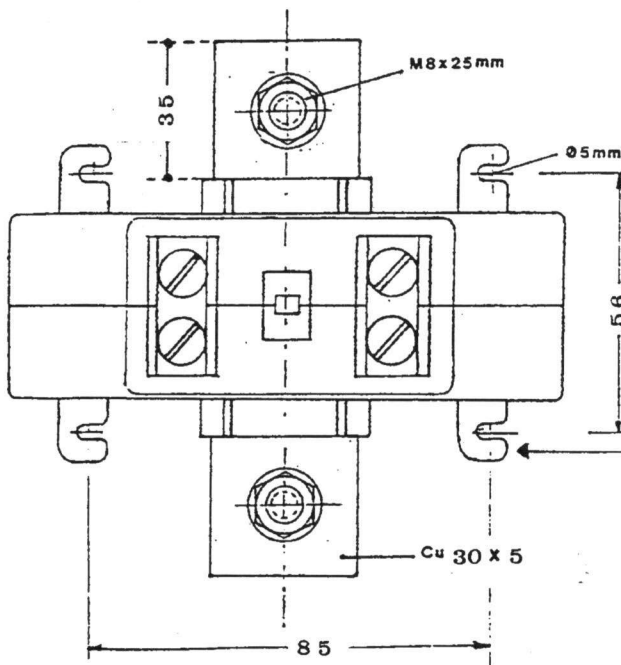
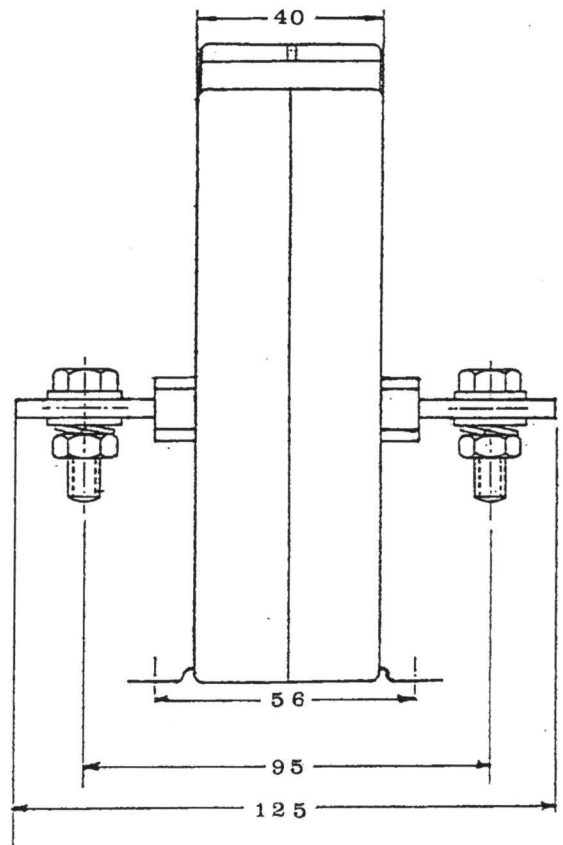
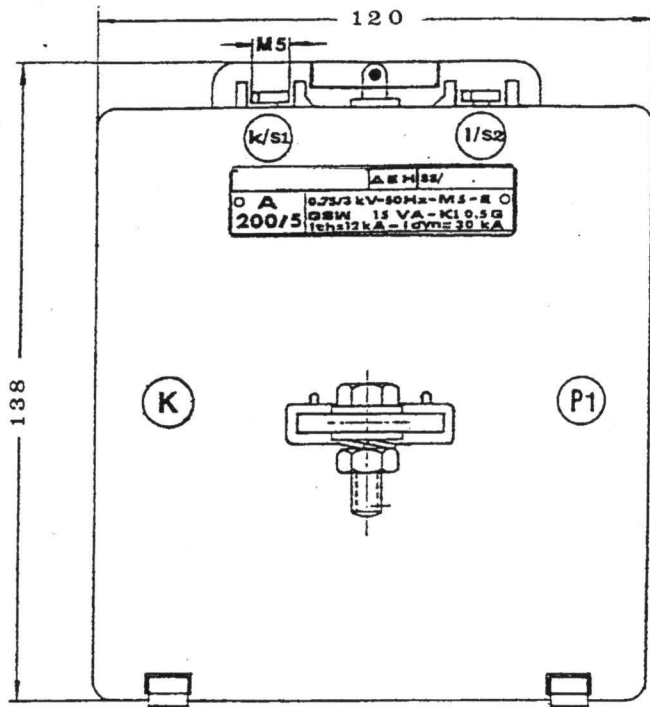
The drawings are not intended to govern the design of fuse-links except as regards the notes and dimensions shown.

Taille Size	h $\pm 1,5$ (7)	n_1 (max.)	n_2 (max.)	p_1 (max.)	p_2 $\pm 1,5$ (min.)	r (min.)	s (max.)	t (min.)	v	w_1 (7)	w_2 (7)	x (min.) (7)	y $\pm 0,5$ (7)	z (max.)
00	100	30	38	40	—	17	21	15	$56,5 \pm 1,5$	$0 \pm 0,7$	$25 \pm 0,7$	14	7,5	3
0	150	40	48	48	—	17	25	15	74 ± 3	$0 \pm 0,7$	$25 \pm 0,7$	14	7,5	3
1	175	52	60	55	35	17	38	21	80 ± 3	$30 \pm 0,7$	$25 \pm 0,7$	20	10,5	5
2	200	60	68	60	35	17	46	27	80 ± 3	$30 \pm 0,7$	$25 \pm 0,7$	20	10,5	5
3	210	75	83	68	35	20	58	33	80 ± 3	$30 \pm 0,7$	$25 \pm 0,7$	20	10,5	5
4	—	—	—	—	—	27	84	50	97(min.)	—	—	—	—	5
(6) 4a	270	102	115	—	40	32	84	50	110 ± 15	$45 \pm 0,7$	$30 \pm 0,7$	36	14	6

FIG. 2(1). — Socles pour éléments de remplacement à couteaux. (Suite de la figure, page 31)
Fuse-bases for fuse-links with blade contacts. (Figure continued on page 31)



Α/Α	ΟΝΟΜΑΣΙΑ	ΤΕΜΑΧΙΑ	ΑΡ. ΣΕΛΙΔΩΝ	ΕΣΑΚΟΙ ΑΡ.	ΠΑΡΑΤΗΡΗΣΕΙΣ
Τό παρόν σχέδιον αποτελεί πρωτογενή ιδιοκτησίαν ήμων ως προς τη επωφελεστέα παρτίδα ή γενική δικαιοσύνη μας. Πρώτος έλεγχοποιείται ή καθ' ολοκληρίαν χρήση χρησιμοποίησις, διατύπωσις ή τήρησις τρίτων ή άλλων ήτοι.					
ΣΥΛΛΟΓΗ - ΜΕΤΑΦΟΡΑ	ΤΑΙΟΝ				
ΗΜΕΡΟΜ.	ΕΠΕΛΗΞΗ				
5-2-92	14/12/84				
ΜΕΤΑΣΧΗΜΑΤΙΣΤΗΣ ΕΝΤΑΣΕΩΣ					
ΕΣΩΤΕΡΙΚΟΥ & ΕΞΩΤΕΡΙΚΟΥ ΧΩΡΟΥ					
200/5 - 400/5Α. 15VA. ΚΛΑΣΗ 0.5G					
ΤΥΠΟΥ ΡCT					
ΚΑΙΝΑΕ					032.0000

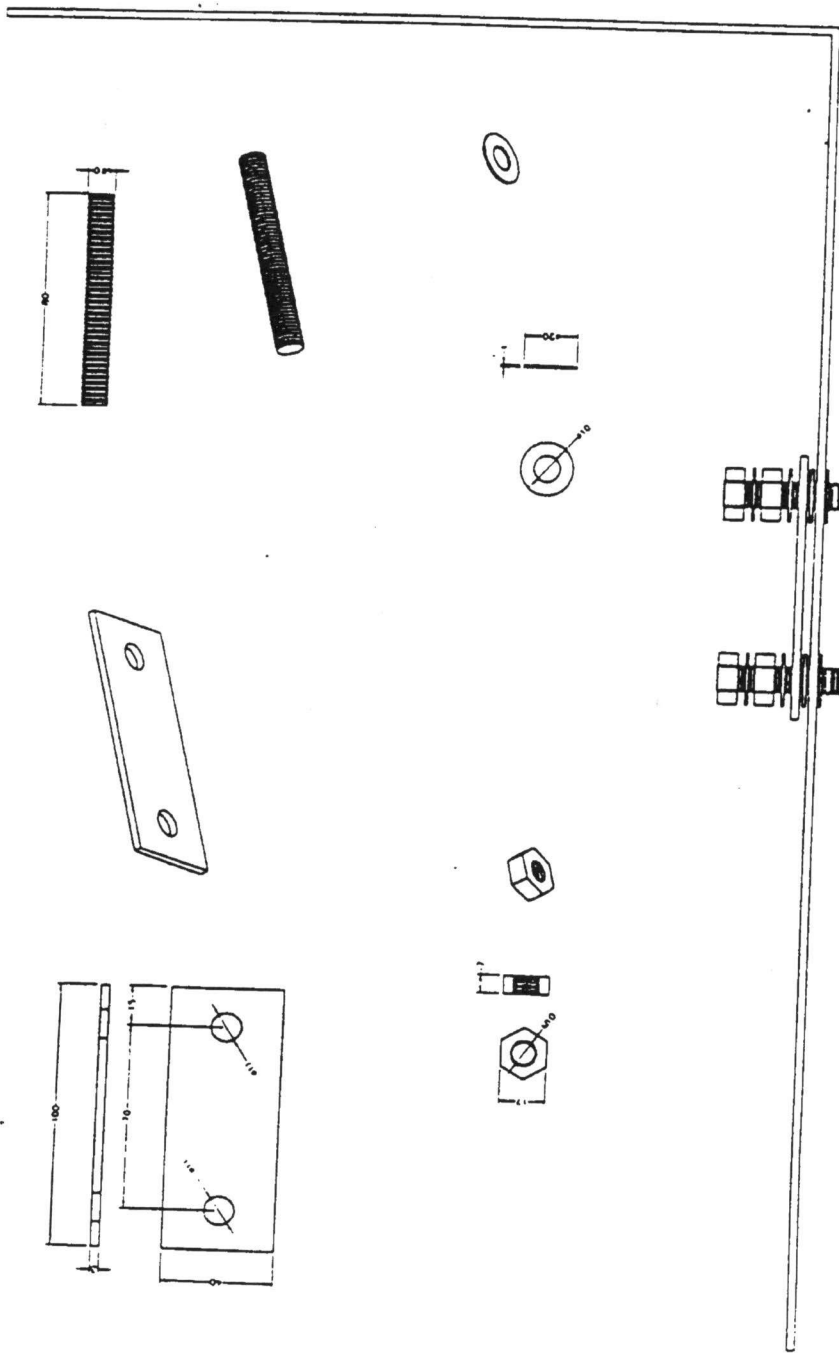


Έλασμα βάσης πάχους 1,5 mm

Βάρος περίπου 1200 γραμμάρια

Διαστάσεις σε χιλιοστά

CURRENT-VOLTAGE TRANSFORMER TYPE	GSW	NR 1140
200/5A ή 400/5A — 15VA — KL 0,5G — M5		
Εσωτερικού ή εξωτερικού χώρου	0,75/3 KV	



ΤΕΧΝΙΚΗ ΠΡΟΔΙΑΓΡΑΦΗ ΔΕΗ		GR 151	
ΣΧΕΔΙΑΣΤΗΣ	ΔΙΑΜ. ΣΤΑΔ	10/8/70	
ΕΓΚΡΙΘΗΣΕ	Ε. ΚΑΡΑΚΩΣΤΑΣ	10/8/70	
Αρ. Σχ. Διευ.	ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ	ΚΙΒΩΤΙΑ ΚΑΤΑΓΡΑΦΙΚΩΝ ΜΕΤΡΗΣΕΩΝ ΜΕΛΙΣΣΟΤ ΛΕΠΤΟΜΕΡΕΙΑ "Α" ΓΕΩΠΗΡΑΙ	
1			



