

|   |   |                                      |
|---|---|--------------------------------------|
| <b>SPECIFICATION<br/>HEDNO S.A.</b>   | <b>INSTALLATION BOXES<br/>OF THREE PHASE<br/>ELECTRONIC MEDIUM &amp;<br/>LOW VOLTAGE METERS</b> | <b>ND-GR226A/Rev.<br/>22.07.2021</b> |
|  |   |                                      |
| <b>Issued by the<br/>Metering Branch</b>  | <b>Network<br/>Department</b>   |                                      |

## Contents

|  |    |
|--|----|
| 1. SCOPE .....   | 3  |
| 2. KEYWORDS .....  | 3  |
| 3. OPERATING CONDITIONS .....                            | 3  |
| 3.1 GENERAL .....  | 3  |
| 3.2 OPERATING - STORAGE TEMPERATURE .....                | 3  |
| 3.3 HUMIDITY .....                                       | 4  |
| 3.4 TABLE OF CLIMATIC AND ENVIRONMENTAL CONDITIONS ..... | 4  |
| 4. NORMS/STANDARDS - SPECIFICATIONS .....                | 4  |
| 5. DESCRIPTION .....                                     | 6  |
| 5.1 GENERAL REQUIREMENTS - GENERAL CHARACTERISTICS ..... | 6  |
| 5.1.1. Materials .....                                   | 6  |
| 5.1.2. Manufacturing characteristics and finishing ..... | 7  |
| 5.1.3. Interchangeability .....                          | 7  |
| 5.1.4. Safety requirements .....                         | 7  |
| 5.1.5. Applicable drawings .....                         | 8  |
| 5.1.6. Drawings and information to be submitted .....    | 8  |
| 5.1.7. Spare parts .....                                 | 9  |
| 5.2. SPECIAL REQUIREMENTS AND CHARACTERISTICS .....      | 9  |
| 5.2.1. General .....                                     | 9  |
| 5.2.2. Special manufacturing characteristics .....       | 9  |
| 5.2.3. Support and design .....                          | 11 |
| 5.2.4. Material .....                                    | 11 |
| 5.2.5. Accessories .....                                 | 12 |
| 5.2.6. IP Degree of protection .....                     | 12 |
| 6. TESTS .....   | 12 |
| 6.1. Design Tests .....                                  | 12 |
| 6.2. Type Tests .....                                    | 12 |
| 6.2.1. Type tests on raw material .....                  | 13 |
| 6.2.2. Type tests on finished product .....              | 14 |
| 6.3. Sampling tests .....                                | 17 |
| 6.3.1. Acceptance tests .....                            | 17 |
| 6.3.2. Sampling .....                                    | 18 |
| 6.4. Series tests .....                                  | 18 |
| 7. SIGNS - MARKING .....                                 | 18 |
| 7.1 Signs .....  | 18 |
| 7.2. Marking .....                                       | 19 |
| 8. PACKING .....   | 19 |
| 9. APPENDICES .....                                      | 19 |
| 9.1. TABLES .....  | 19 |
| 9.2. DRAWINGS LIST .....                                 | 26 |
| 10. COMMENTS .....                                       | 27 |
| 11. PHOTOS OF TEST BOX INSIDE THE BOX .....              | 27 |

# **TECHNICAL SPECIFICATION HEDNO ND-GR226A/22.07.2021 INSTALLATION BOXES OF THREE-PHASE ELECTRONIC MEDIUM & LOW VOLTAGE METERS**

## **1. SCOPE**

This specification defines the manufacturing, testing, acceptance control and packing for transportation and delivery at HEDNO warehouses, of Polyester Boxes for the installation of housing three-phase electronic medium & low voltage meters and their components, which shall be used for the metering devices of medium & low voltage supply customers.

## **2. KEYWORDS**

Polyester Box for Meter Installation, Metering Device, Operating Voltage 100/230/400 V.

## **3. OPERATING CONDITIONS**

### **3.1 GENERAL**

The boxes described in this specification shall be installed outdoors (uncovered) as well as indoors.

They shall be mounted vertically either on walls, on concrete or wooden poles, or other similar structures.

Prior to their installation, the materials may be stored in areas of any type: outdoors (either with or without a shed) or indoors (without heating or air-conditioning).

The electronic meters that will be used in metering devices will be electronic max demand meters for connection to the L.V. network at which both the neutralization and the direct earth are applied, either direct or through current transformer.

The L.V. electronic meters will be with three-element four-conductor, and M.V. electronic meters will be with two-element three-conductor.

### **3.2 OPERATING - STORAGE TEMPERATURE**

- The proper operation temperature zone for the boxes shall be between -25°C and +55°C.
- The storage and transport temperature zone shall be between -25°C and 70°C.

### **3.3 HUMIDITY**

The boxes shall operate at an average annual relative humidity greater than 75%.

Moreover, for thirty (30) days in total interspersed within the year, the boxes shall operate under a relative humidity of 95%. Additionally, at random moments within the day, they shall operate under a relative humidity of 85%.

### **3.4 TABLE OF CLIMATIC AND ENVIRONMENTAL CONDITIONS**

The climatic and environmental conditions, under which the boxes shall be installed and continuously operate in a satisfactory manner, are defined in the following table:

|   |         |
|---|---------|
| Maximum altitude  | 2000 m  |
| Minimum ambient temperature                                     | - 25° C |
| Average ambient temperature                                     | 20° C   |
| Maximum ambient temperature                                     | 55° C   |
| Maximum temperature at external surfaces due to solar radiation | 70° C   |
| Minimum relative humidity                                       | 5%      |
| Maximum relative humidity                                       | 95%     |

## **4. NORMS/STANDARDS - SPECIFICATIONS**

The boxes and their accessories shall be industrial products manufactured and tested according to International standards and to HEDNO Technical Specifications as mentioned below, which are valid on the day of bids submission.

The degree of protection that will provide, the properties of the materials to be used for their manufacturing, as also the final product shall comply with the standards mentioned above.

All tests shall be carried out according to International standards unless otherwise specified) that are valid on the day of bids submission.

The standards applying to this specification are as follows:

|                         |   |
|-------------------------|---|
| 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               | Water absorption of plastics                                      |

|   |  |
|---|--|
| or<br>ISO 62                            |  |
| ASTM D638<br>or<br>EN ISO 527-4         | Tensile properties of plastics.  |
| ASTM D790<br>or<br>EN ISO 178           | Flexural properties of unreinforced and reinforced plastics and electrical insulating materials.                                   |
| ASTM D792<br>or<br>ISO 1183             | Density and specific gravity (relative density) of plastics by displacement.   |
| ASTM D1525<br>or<br>ISO 306             | Vicat softening temperature of plastics.   |
| EN / IEC<br>60068-2-2                   | Basic environmental testing procedures.<br>Part 2 : Tests, Tests B: Dry heat.  |
| EN / IEC<br>60068-2-11                  | Basic environmental testing procedures.<br>Part 2 : Tests, Tests ka : Salt mist.   |
| EN / IEC<br>60068-2-14                  | Basic environmental testing procedures.<br>Part 2 : Tests, Tests N: Change of temperature.   |
| EN / IEC<br>60068-2-30                  | Basic environmental testing Procedures.<br>Part 2: Tests, Test Db : Damp heat cyclic.  |
| EN / IEC<br>60216                       | Guide for the determination of thermal endurance properties of electrical insulating materials.                                    |
| EN / IEC<br>60243                       | Recommended methods of test for electric strength of solid insulating materials at power frequencies.                              |
| EN / IEC<br>60529                       | Classification of degrees of protection provided by enclosures   |
| IEC<br>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.<br>Part 11-5: Test flames - Needle-flame test method – Apparatus, confirmatory test arrangement and guidance. |
| EN/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<br>X.K.11.01/11.11.87 | Electrolytic zinc coating of iron or steel items.  |
| PPC Specification                       | Electrolytic tinning   |

|                                   |   |
|-----------------------------------|---|
| X.K.<br>11.04/23.10.92            |   |
| PPC Specification<br>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 cases where the requirements of this Specification contradict with the above versions of International Standards or any other relevant Standards, the HEDNO specification shall prevail.

The boxes shall have the required markings according to the European Standards; they are also required to have the "CE" certification mark at a visible spot on their base and cover, according to Ministerial Decisions 470/85 (ONG issue 183/4.4.85) and 16717/5052/94 (ONG Issue 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**

This specification relates to the following items:

- Three-phase electronic medium & low voltage meter installation box.

### **5.1 GENERAL REQUIREMENTS - GENERAL CHARACTERISTICS**

#### **5.1.1. Materials**

All materials to be used for the manufacturing of the boxes shall be of very high quality, suitable for the specified purpose and operating conditions.

They shall be able to withstand the specified temperature and humidity without any deformation or damage, and without their mechanical and electrical properties been affected, beyond the specified limits.

The metallic parts that are susceptible to oxidization shall be effectively protected.

The protective coating to be used for this purpose shall not be degraded under normal use or over time under the specified operating conditions, thus losing its protective properties.

Non-metallic parts shall be made of non-hygroscopic material and provide protection against fire and propagation of flames that might occur internally or close to the material; they shall also comply with the requirements of EN/IEC 60695-11-10:2013 for level HB and HB40.

### **5.1.2. Manufacturing characteristics and finishing**

The low voltage meter installation boxes shall be manufactured in a manner that provides strength and reliability, offers satisfactory mechanical protection against impacts and pressure and facilitates mounting of the box and installation of the meter of the micro circuit-breaker of rail and conductors.

All surfaces shall be free of defects, smooth and shiny.

The polyester material to be used for the manufacture of these boxes shall be reinforced with glass fiber type SMC and shall be of light gray color, similar to the colour that HEDNO uses for such boxes to date.

As electronic devices shall be housed in them (meter and communication device), the boxes to be manufactured shall comply with the specified increased water-tightness level.

In order to achieve the specified water-tightness a rubber gasket between the boxe's base and the cover shall not be used.

All boxes shall provide sufficient ventilation to prevent condensation and limit the increase in temperature in their interior due to direct exposure to sunlight or generated inside.

Ventilation shall be ensured by providing a suitable gap between the base and the cover without affecting the tightness of the box.

### **5.1.3. Interchangeability**

All parts comprising the box shall be fully interchangeable.

### **5.1.4. Safety requirements**

The boxes shall be manufactured in order to provide, when they are installed, full protection against contact strains.

The external enclosure edges shall be rounded in order to avoid any injuries.

Due to the use of glass fiber in the polyester material, perforation of the material shall be generally avoided.

For this purpose, suitable removable circular parts for cable routing (knock-outs) shall be provided at the box base, which shall be visible on the outer side of the base.

The straight boundaries of the removable sections will be visible from the inside of the base.

Removing such parts shall be easy and for this purpose the wall thickness at those points shall be very small.

#### **5.1.5. Applicable drawings**

Apart from the general and special requirements, the material shall comply, regarding its basic dimensions, with the drawings attached to the drawings list 9.2 in the Appendix.

The dimensions of the boxes of this Technical Specification can have a tolerance of  $\pm 1\%$ .

#### **5.1.6. Drawings and information to be submitted**

The bid shall be submitted together with a complete technical description addressing all requirements of this specification one-by-one, as well as detailed drawings showing the manufacturing of the material in general, its finishing and the materials from which it shall be manufactured.

The bids shall be necessarily accompanied by performance certificates for all suitability tests (both for the polyester raw materials and for the boxes) related to materials used for the manufacturing of the boxes, as specified in paragraph 6.2, which shall clearly show that the requirements of the specifications are met.

The supplier is required to inform us about the properties and characteristics of the materials they use for their manufacturing, and for this purpose they shall fill in and submit, together with their bid, Tables 9.1.2 and 9.1.4. (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 details of the boxes shall be thoroughly presented.



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 period of 10 years following the date of the last partial delivery of the material.

## **5.2. SPECIAL REQUIREMENTS AND CHARACTERISTICS**

### **5.2.1. General**

This paragraph includes the special requirements and the specific characteristics of the boxes and their accompanying accessories.

Moreover, the boxes shall comply with the drawings attached to the drawings list 9.2 regarding the following:

- Design - Form
- Basic dimensions
- Locations of holes and inserts for mounting screws
- Markings
- Installation in array
- Provision of notches for easy detachment of enclosure parts
- Installation protection against water penetration
- Sufficient ventilation.

### **5.2.2. Special manufacturing characteristics**

The box shall be manufactured with the Compression Moulding method, and shall be entirely made of high quality thermoset material and **polyester type SMC in particular, reinforced with glass fiber.**

The quantitative requirements regarding the properties of the glass fiber reinforced polyester to be used for the manufacturing of the box and for the boxes themselves, are described in the attached Table 9.1.1 in the Appendix.

Morphologically, the box dimensions shall comply with the attached drawings of list 9.2.

The thickness of the base walls shall be at least 3mm and the cover at least 2.5mm.

Deviations in the nominal thickness chosen by the manufacturer are acceptable as long as they do not exceed 0.2mm, but in no case will a wall thinner than 3mm for the base and 2.5mm for the cover be accepted.

Each meter box will consist of the following parts:

- Mail Body or Base (1 piece).
- Cover (1 piece + 1 safety screw)
- Basic accessories (1 full set)

The three-phase electronic meter Box shall be able to accommodate one three-phase Meter and one Test Box which shall be mounted with screws to the sockets of the box base mounted on suitable plastic spacers.

A window for taking meter readings shall be provided at the upper part of the box cover.

The (transparent) window of box cover for taking meter readings shall be made of polycarbonate material of 3mm thick.

In case of breaking, the window shall be easily replaced with a new interchangeable window.

For this purpose suitable holes shall be provided on the box cover, enabling easy installation and replacement of the window, as well as suitable grooves for sealing the window, as shown in the attached drawings.

The quantitative requirements regarding the properties of the polycarbonate to be used for the manufacturing of the window for taking meter readings, are described in the attached Table 9.1.3 in the Appendix.

The installation of the window should be done without the use of glue or other adhesive material.

In the inner part of the box base it should be possible to place suitable plastic spacers for fixing the test box. The spacers will be fixed to the base of the box by means of suitable brass inserts that it will have and with suitable screws (corresponding to the length of the spacer).

It will be possible to place the test box on these spacers and it will be fixed with suitable screws.

The detachable box cover shall fit on the box base and shall be secured with a (safety) screw, with dimensions as shown in the attached drawings. The screw shall be made of tinned bronze and it shall have a suitable hole on its head for passing the sealing wire.

The box shall be sealed with a special safety seal in order to prevent any illegal access to the internal of the box as well as any access from non-authorized persons, and to ensure protection against contact with live elements inside the box.

The PPC relief mark and the mounting holes for the Customer Note shall be on the surface of the box cover at the locations specified in the drawings attached in Appendix 9.2.

All bronze or copper items to be used shall be tinned according to Specification X.K. 11.04/23.10.92, while all metallic items shall be galvanized according to Specification X.K. 11.01, with average galvanization thickness 25 µm and chromium strength treatment of 96 h in salt mist according to Specification X.K. 11.03.

Bronze insert nuts of appropriate size shall be installed (built-in during casting of the polyester material) in all sockets of the box base used for mounting the meter according to DIN 16903.

The number of insert nuts and their installation positions on the box base are shown in the attached drawings of drawings list 9.2.

### **5.2.3. Support and design**

Meter Boxes will be installed indoors and outdoors on wall surfaces with four support screws or will be supported on poles by clamping strips and suitable steel blades that will be placed on the outer rear surface of the box base.

### **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.

### **5.2.5. Accessories**

Each box shall be delivered complete, with its **cover, its base and the suitable plastic spacers** for mounting the test box.

Inside the box will be delivered a plastic bag that will contain all the **necessary screws securing the meter to the base of the box, the spacer screws and the spacers themselves, and the locking screw** for the box cover.

**The blades for placing the box on a pole, will be mounted on the back of the base of the box.**

### **5.2.6. IP Degree of protection**

The boxes shall be provided with a degree of protection equal at least to IP 44 according to the regulations EN/IEC 60529.

## **6. TESTS**

The manufacturer shall perform tests in order to establish that the material under bid (SMC) has the properties specified in Table 9.1.1 in the Appendix.

These tests may be repeated either partially or in total during the series production phase, at the discretion of the Supervision and at the Corporation's expenses.

In case of material failure the cost shall be borne by the supplier. If it is ascertained that the material composition has been modified during the production phase, new tests shall be performed.

### **6.1. Design Tests**

Not provided.

### **6.2. Type Tests**

**The bids shall necessarily be accompanied by certificates for all type tests performed which are related to the raw material**

**(polyester) and to a finished box**, which shall clearly show that the requirements of the specification are met.

All certificates issued by Tests, Research and Standards Centre (TRSC) or other accredited by independent private or public bodies laboratories specialized in plastic material tests shall be accepted.

Any bids not accompanied by the above certificates shall be rejected during the technical evaluation stage.

During the delivery stage of the first lot of each item, any type test may be performed at the supervision's discretion.

### **6.2.1. Type tests on raw material**

#### **6.2.1.1. Determination of impact breaking strength of the plastic materials used for the manufacturing of the boxes.**

The test shall be performed according to Standards ASTM D256 (or EN/ISO 180) "Impact resistance of plastics and electrical insulating materials".

#### **6.2.1.2. Determination of tensile breaking strength of the plastic materials used for the manufacturing of the boxes.**

The test shall be performed according to Standards ASTM D638 (or EN/ISO D527-4) "Tensile properties of plastics".

#### **6.2.1.3. Determination of flexural yield strength of the plastic materials used for the manufacturing of the boxes.**

The test shall be performed according to Standards ASTM D790 (or EN/ISO 178) "Flexural properties of unreinforced and reinforced plastics and electrical insulating materials".

#### **6.2.1.4. Determination of density of the plastic materials used for the manufacturing of the boxes.**

The test shall be performed according to Standards 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 the plastic materials used for the manufacturing of the boxes.**

The test shall be performed according to Standards ASTM D1525 (or EN/ISO 306) "Vicat softening temperature of plastics".

#### **6.2.1.6. Determination of water absorption by the plastic materials used for the manufacturing of the boxes.**

The test shall be performed according to Standards ASTM D570 (or EN/ISO 62) "Water absorption of plastics".

#### **6.2.1.7. Test for confirmation of the resistance of the plastic materials used for the manufacturing of the boxes to acidic or alkaline chemical reagents and common solvents.**

The test shall be performed according to Standards ASTM D543 (or EN/ISO 175) "Resistance of plastics to chemical reagents". The chemical reagents used for this test 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 ASTM standards.

#### **6.2.1.8. Determination of flammability level of the plastic materials used for the manufacturing of the boxes.**

The test shall be performed as described in Standards 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 on finished product**

All tests described below are considered as type tests. Note that these tests (either all or a certain number of them) shall be performed in the following order:

#### **6.2.2.1. Confirmation of suitability of the boxes for use or storage under high temperature conditions.**

The test shall be performed as described in Standards EN/IEC 60068-2-2 "Basic environmental testing procedures - Part 2: Tests - Test Bd: Dry heat".

The test shall be considered successful if no deformation or fault occurs either during or after the test, which might limit the functionality of the materials.

Moreover, following the recovery period, the plastic boxes shall successfully pass the impact test as described in paragraph 6.2.1.1.

#### **6.2.2.2. Test for the impact of temperature change on the boxes.**

The test shall be performed as described in Standards EN/IEC 60068-2-14 "Basic environmental testing procedures - Part 2: Tests - Test Nb: Change of temperature with specified rate of change".

The test shall be considered as successful if no deformation of fault occurs either during or following the test, which might limit the functionality of the materials.

Moreover, following the recovery period, the plastic boxes shall successfully pass the impact test as described in paragraph 6.2.1.1.

### **6.2.2.3. Test for the confirmation of protection level against external mechanical impacts (IK code).**

This test shall be performed as described in Standards EN 62262:2002, for protection level IK 10.

The impact energy shall be 20 Joules.

The test shall be performed at any point on the flat surface of the box (fully assembled with its cover in place).

The test shall be performed as described in paragraph 6.4. of the above mentioned standard EN 62262.

The test shall be considered successful if no indication of fault occurs, which might limit the functionality of the box.

Any slight deformation, which however does not reduce the protection against penetration of solid objects, dust or water, shall be accepted.

### **6.2.2.4. Test for protection against humidity and oxidation.**

This test includes the following individual tests:

#### **a. Humidity - temperature test.**

The test shall be performed as described in Standards EN/IEC 60068-2-30: "Basic environmental testing procedure - Part 2 : Tests - Test Db and guidance: Damp heat cyclic, 12 + 12 hour cycle".

The boxes to be tested shall be mounted on a flat vertical surface with all screws provided by the manufacturer for this purpose. The test shall be performed on fully assembled boxes, with all metallic parts in place and their covers closed.

The test shall be considered successful if:

- Following the test, there is no indication of deformation, cracking or other fault on the plastic parts, which might limit their functionality.
- There is no indication of oxidation on metallic parts.

Moreover, following the recovery period, the boxes shall successfully pass the impact test (paragraph 6.2.1.1) and the dielectric breakdown voltage test as described in paragraph 6.2.2.6.

#### **b. Salt mist test (for metallic parts)**

The test shall be performed as described in Standards EN/IEC 60068-2-11: "Basic environmental testing procedure - Part 2 : Tests - Test Ka : Salt mist".

This test is performed in order to control the metallic components at the box base as well as at its door, so it must be performed with the door open.

The test shall be considered successful if no indication of oxidation occurs on the metallic parts.

#### **6.2.2.5. Test for protection against penetration of solid objects, dust and water.**

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

These tests shall be performed on fully assembled boxes, with their metallic parts in place and their cover, for protection degree **IP 44**, according to Standard EN/IEC 60529.

These tests consist of the following individual tests:

##### **a. Protection against penetration of solid objects and dust.**

The test shall be performed as described in EN/IEC 60529 "Classification of degrees of protection provided by enclosures".

##### **b. Protection against water penetration.**

The test shall be performed as described in EN/IEC 60529 according to the required degree of protection.

#### **6.2.2.6. Dielectric strength test**

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



- The voltage rise rate shall be 1kV/sec (test on finished box).
- Using a voltage of 4 kV for 1 min (test on finished box).

#### **6.2.2.7. Tests for resistance to heat and fire**

The following tests shall be performed on the plastic parts of the box:

##### **a. Glow wire test**

The test shall be performed in a way as 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 test shall be performed as described in EN/IEC 60695-11-5:2016 "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 of compliance of the box dimensions with the approved manufacture drawings.**

Type tests on raw material and Type tests on finished 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 9.1.4 of the Technical Specification will be appropriately filled in with the applicable standards.

### **6.3. Sampling tests**

#### **6.3.1. Acceptance tests**

The acceptance tests are as follows:

##### **a. Visual control**

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

- There is no trace of damage or deformation at any point
- The outer surfaces are smooth and free of defects
- There are no indications of faulty casting

- Marking is correct and complies with the requirements of the specification
- All accessories are included

**b. Confirmation of interchangeability on pieces of the same type.**

**c. Performance of the 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 acceptance tests shall be carried out on a randomly selected sample from the lot to be received, according to EN/IEC 60410 and with the following criteria:

- Control level II (table I, IEC 410).
- Simple or double sampling plans (tables II and III, IEC 410).
- Acceptable quality level AQL = 1.0, for each test separately.

In the event of failure on some acceptance tests that entails the rejection of the lot or in the event of poor experience from previous use of the material, it is required to perform those suitability tests related to the failure or poor experience.

In this case the suitability tests shall be performed on three plastic boxes randomly selected from the next lot, prior to its receipt.

In case one of the plastic boxes from the sample of three fails, even in one point of a single test, the suitability tests shall be repeated on a sample of two boxes.

In case a second failure occurs, the lot shall be rejected.

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

### **6.4. Series tests**

Not applicable.

## **7. SIGNS - MARKING**

### **7.1 Signs**

No signs are provided for.

## **7.2. Marking**

Each box shall have the following relief or engraved indications at a visible spot (at the base or the door), which shall be designated by HEDNO:

- The PPC logo
- The Contract number and the lot index number
- The manufacturer's name or logo
- The HEDNO material code number

The exact dimensions of all markings and their exact positions are specified in drawings 9.2. in the appendix.

According to paragraph 5.2.1 of the Specification, the above material shall have the following numbers (relief or engraved) at a suitable spot so that the proper fitting and water-tightness of the box is not affected:

### HEDNO MATERIAL CODE

Three phase Box:

- For the base M.C 45400 \_ \_ \_ \_.
- For the cover M.C. 45400 \_ \_ \_ \_.

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

## **8. PACKING**

Each box shall be carefully packed in a plastic bag and then placed on EU palettes and delivered so that the total weight per palette does not exceed 550 kg.

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

Using the above packing, it shall be also possible to store the boxes at open spaces without additional protection against weather conditions (rain or moisture).

## **9. APPENDICES**

### **9.1. TABLES**

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

| <b>Index</b> | <b>Characteristic or test</b>                         | <b>Specification paragraph</b> | <b>Standard</b>                        | <b>Units</b>                                    | <b>Values</b>                     |
|--------------|---|--------------------------------|--|---|-----------------------------------|
| <b>1</b>     | <b>Impact breaking strength (Reversed Notch Izod)</b> | <b>6.2.1.1</b>                 | <b>ASTM D256</b>                       | <b>ft * lbf</b><br>-----<br><b>in. of Width</b> | <b>= 11</b>                       |
|              |   |                                | <b>EN ISO 180</b>                      | <b>KJ/m<sup>2</sup></b>                         | <b>&gt; 50</b>                    |
| <b>2</b>     | <b>Tensile breaking strength</b>                      | <b>6.2.1.2</b>                 | <b>ASTM D638</b>                       | <b>P.S.I.</b>                                   | <b>min. 9.000</b>                 |
|              |   |                                | <b>EN ISO 527-4</b>                    | <b>Mpa</b>                                      | <b>min 61</b>                     |
| <b>3</b>     | <b>Flexural yield strength</b>                        | <b>6.2.1.3</b>                 | <b>ASTM D790</b>                       | <b>P.S.I.</b>                                   | <b>min. 20.000</b>                |
|              |   |                                | <b>EN ISO 178</b>                      | <b>Mpa</b>                                      | <b>min 138</b>                    |
| <b>4</b>     | <b>Density</b>  | <b>6.2.1.4</b>                 | <b>ASTM D792</b>                       | <b>gr/cm<sup>3</sup></b>                        | <b>1,7-1,8</b>                    |
|              |   |                                | <b>ISO 1183</b>                        |   |                                   |
| <b>5</b>     | <b>Thermal strength (Softening) Vicat (Method B)</b>  | <b>6.2.1.5</b>                 | <b>ASTM D1525</b><br><b>EN ISO 306</b> | <b>°C</b>                                       | <b>130</b>                        |
| <b>6</b>     | <b>Water absorption 24h/23°C</b>                      | <b>6.2.1.6</b>                 | <b>ASTM D570</b><br><b>EN ISO 62</b>   | <b>%</b>  | <b>0,5</b>                        |
| <b>7</b>     | <b>Impact of solvents and chemical reagents</b>       | <b>6.2.1.7</b>                 | <b>ASTM D543</b><br><b>EN ISO 175</b>  | <b>-</b>  | <b>No effect on functionality</b> |
| <b>8</b>     | <b>Material flammability</b>                          | <b>6.2.1.8</b>                 | <b>IEC 60695-11-10:2013</b>            | <b>Level Class</b>                              | <b>HB &amp; HB40</b>              |
| <b>9</b>     | <b>Test in hot and dry environment (Bd Test)</b>      | <b>6.2.2.1</b>                 | <b>EN / IEC 60068-2-2</b>              | <b>°C - hrs</b>                                 | <b>100-16</b>                     |
| <b>10</b>    | <b>Temperature variation test (Nb Test)</b>           | <b>6.2.2.2</b>                 | <b>EN / IEC 60068-2-14</b>             | <b>°C</b>                                       | <b>min. -25<br/>max. +75</b>      |
| <b>11</b>    | <b>Level of protection</b>                            | <b>6.2.2.3</b>                 |  | <b>Level</b>                                    | <b>IK 10</b>                      |

|            |  |                  |                                 |                     |               |
|------------|--|------------------|---------------------------------|---------------------|---------------|
|            | <b>against impact (IK code)</b>                              |                  | <b>EN 62262:2002</b>            |                     |               |
| <b>12a</b> | <b>Test in hot and wet environment (Bd Test) Variation 1</b> | <b>6.2.2.4.a</b> | <b>EN / IEC 60068-2-30</b>      | <b>°C - cycles</b>  | <b>55 – 8</b> |
| <b>12b</b> | <b>Salt mist test (Ka Test)</b>                              | <b>6.2.2.4.β</b> | <b>EN / IEC 60068-2-11</b>      | <b>Weeks</b>        | <b>2</b>      |
| <b>13</b>  | <b>Level of Protection</b>                                   | <b>6.2.2.5</b>   | <b>EN / IEC 60529</b>           | <b>--</b>           | <b>IP 44</b>  |
| <b>14</b>  | <b>Dielectric strength</b>                                   | <b>6.2.2.6</b>   | <b>EN / IEC 60243</b>           | <b>KV for 1 min</b> | <b>4</b>      |
| <b>15a</b> | <b>Glow wire test</b>  | <b>6.2.2.7.a</b> | <b>EN / IEC 60695-2-11</b>      | <b>°C</b>           | <b>960</b>    |
| <b>15b</b> | <b>Needle flame test</b>                                     | <b>6.2.2.7.β</b> | <b>EN / IEC 60695-11-5:2016</b> | <b>Sec</b>          | <b>30</b>     |

**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)**

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

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

**TABLE 9.1.3 - MATERIAL PROPERTIES AND QUANTITIES FOR ITS TESTS (Polycarbonate – Readings window)**

| <b>Index</b> | <b>Characteristic or test</b>  | <b>Specification paragraph</b> | <b>Standard</b>             | <b>Units</b>             | <b>Values</b>             |
|--------------|--|--------------------------------|-----------------------------|--------------------------|---------------------------|
| <b>1</b>     | <b>Impact breaking strength (Izod notched Impact strength at 23 °C, 3.2 mm wall section)</b> | <b>6.2.1.1</b>                 | <b>ASTM D256</b>            | <b>KJ /m<sup>2</sup></b> | <b>&gt; 20</b>            |
| <b>2</b>     | <b>Dielectric strength</b>   | <b>6.2.2.6</b>                 | <b>IEC 60243</b>            | <b>KV for 1 min</b>      | <b>4</b>                  |
| <b>3</b>     | <b>Material flammability</b>   | <b>6.2.1.8</b>                 | <b>IEC 60695-11-10:2013</b> | <b>Level</b>             | <b>HB &amp; HB40</b>      |
|              | <b><u>Special characteristics:</u></b>   |                                |                             |                          |                           |
| <b>1</b>     | <b>Clear (Visual Control)</b>  |                                |                             |                          | <b>Remains functional</b> |
| <b>2</b>     | <b>Stable under UV radiation</b>   |                                |                             |                          | <b>Remains functional</b> |
| <b>3</b>     | <b>Stable under weather conditions</b>   |                                |                             |                          | <b>Remains functional</b> |



**TABLE 9.1.4 - MATERIAL REQUIREMENTS AND QUANTITIES FOR ITS TESTS (Polycarbonate – Readings window)**

**(TO BE FILLED-IN BY THE SUPPLIER)**

| <b>Index</b> | <b>Characteristic or test</b>  | <b>Specification paragraph</b> | <b>Standard</b>             | <b>Units</b>             | <b>Values</b> |
|--------------|--|--------------------------------|-----------------------------|--------------------------|---------------|
| <b>1</b>     | <b>Impact breaking strength (Izod notched Impact strength at 23 °C, 3.2 mm wall section)</b> | <b>6.2.1.1</b>                 | <b>ASTM D256</b>            | <b>KJ /m<sup>2</sup></b> | <b>*</b>      |
| <b>2</b>     | <b>Dielectric strength</b>   | <b>6.2.2.6</b>                 | <b>IEC 60243</b>            | <b>KV for 1 min</b>      | <b>*</b>      |
| <b>3</b>     | <b>Material flammability</b>   | <b>6.2.1.9</b>                 | <b>IEC 60695-11-10:2013</b> | <b>Level</b>             | <b>*</b>      |
|              | <b><u>Special characteristics:</u></b>   |                                |                             |                          |               |
| <b>1</b>     | <b>Clear (Visual Control)</b>  |                                |                             |                          | <b>*</b>      |
| <b>2</b>     | <b>Stable under UV radiation</b>   |                                |                             |                          | <b>*</b>      |
| <b>3</b>     | <b>Stable under weather conditions</b>   |                                |                             |                          | <b>*</b>      |

## **9.2. DRAWINGS LIST**

### **9.2.1. Drawings for three-phase boxes**

#### **Full box.....Drawing no**

- **Three dimension view .....1.1.**

#### **Box base .....Drawing no**

- **Base underneath view ..... 1.2.**
- **Base plan view ..... 1.2.**
- **Base section A-A..... 1.3.**
- **Base section B-B..... 1.4.**
- **Base right side view ..... 1.5.**
- **Base plan view ..... 1.6.**

#### **Box door ..... Drawing no**

- **Cover plan view ..... 2.1.**
- **Cover underneath view..... 2.2.**
- **Cover section A-A ..... 2.3.**
- **Cover section B-B ..... 2.4.**
- **Cover right side view ..... 2.5.**
- **Three dimension view.....2.6.**

#### **Readings window .....Drawing no**

- **Window plan view ..... 3.1.**
- **Window section A-A ..... 3.2.**
- **Window right side view ..... 3.3.**
- **Three dimension view.....3.4.**

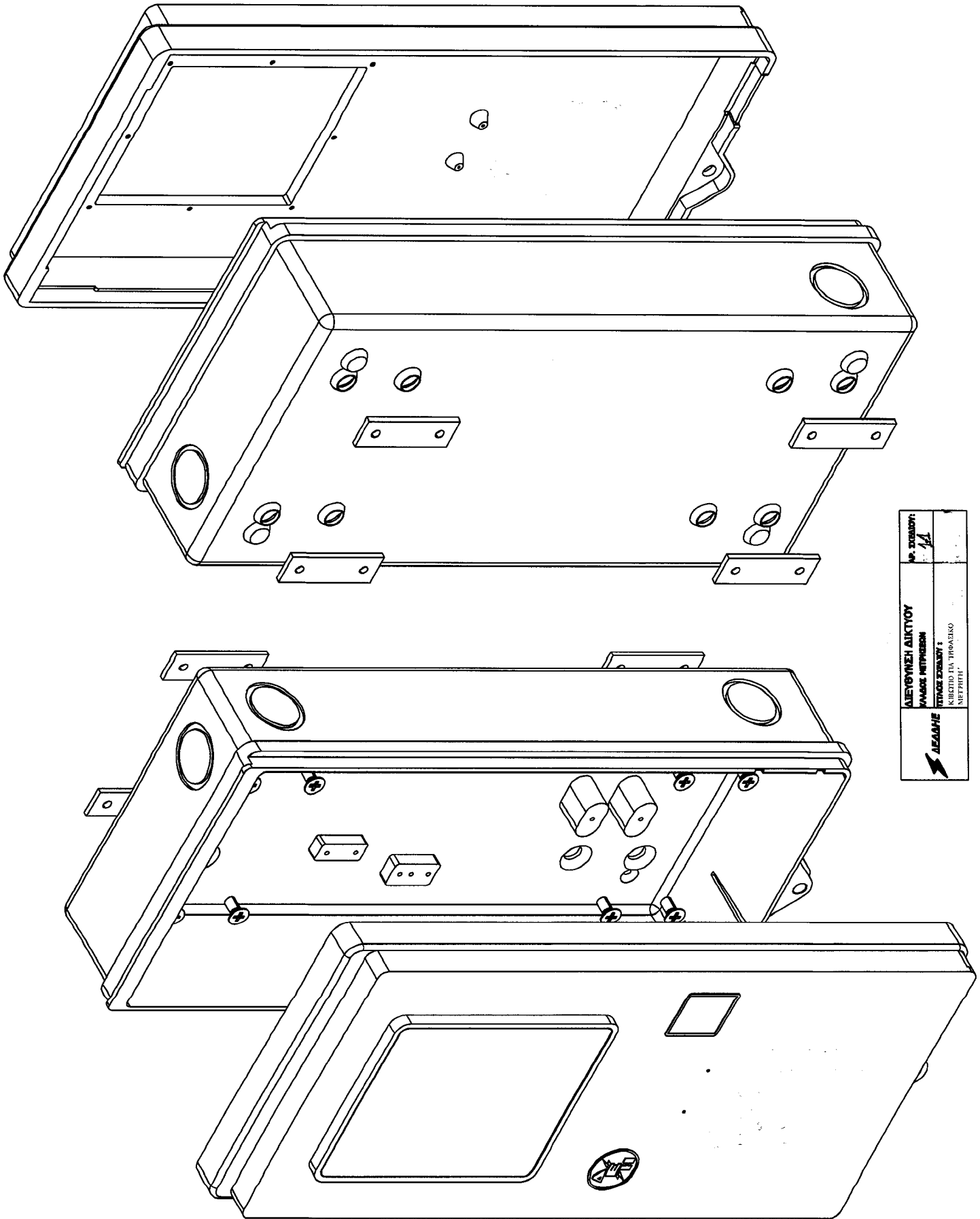
#### **Safety screw .....Drawing no**

- **Safety screw.....4.1.**

## **10. COMMENTS**

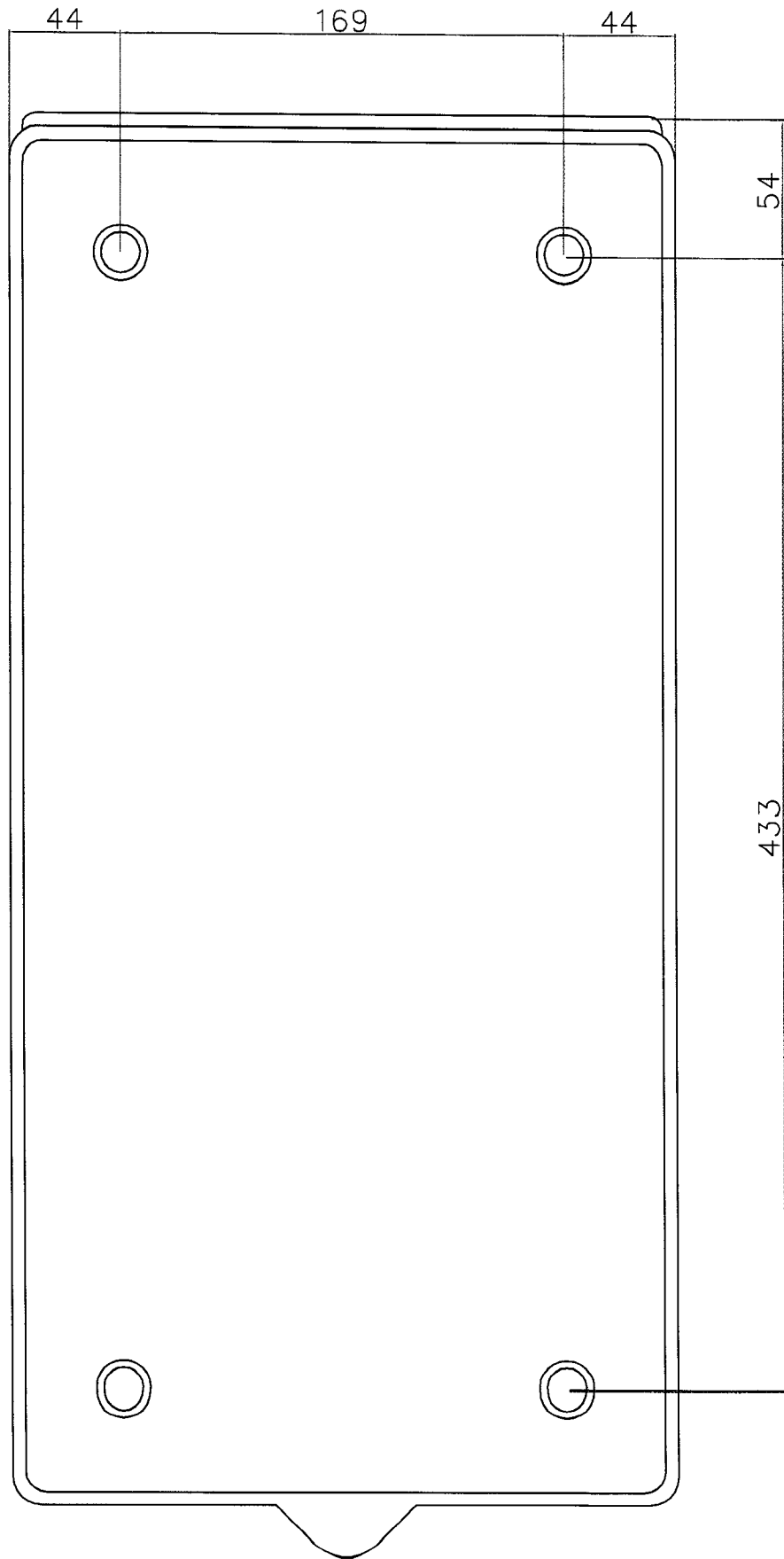
- **The bidders in the Tender, have the possibility in addition, to help in the preparation of their technical offer (construction of technical drawings of the boxes - but also for their final construction), to be procured by Network Department / Smart Metering Systems Section), sample of a Test Box.**
- **The following photos are exclusively for the support / placement of the test box in the box.**
- **The boxes will be delivered with the blades for placing the box on a pole, mounted on the back of the box base.**


## **11. PHOTOS OF TEST BOX INSIDE THE BOX**

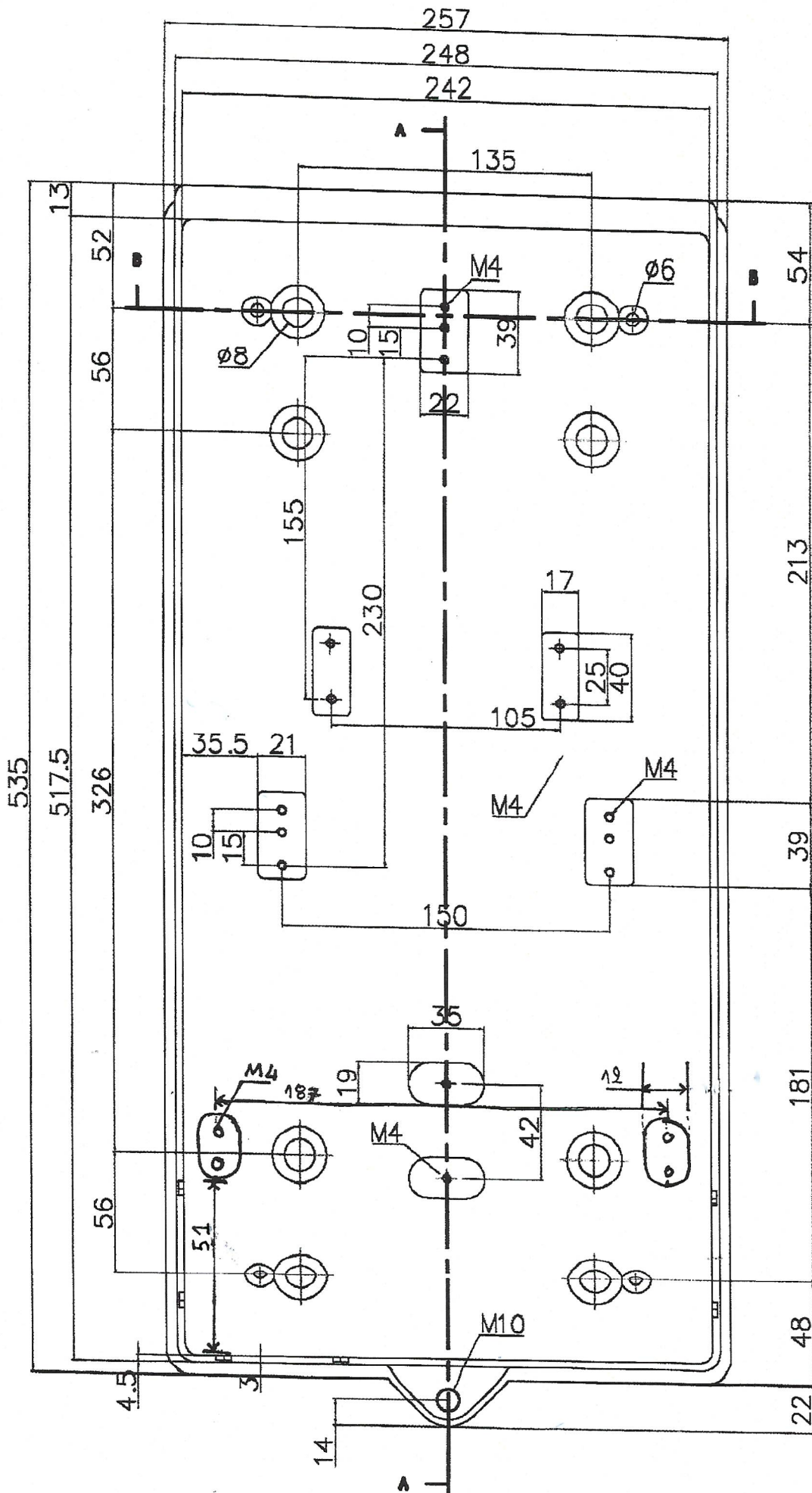



|                     |     |
|---------------------|-----|
| № ДИЗАЙНУ           | 1/1 |
| АЛЕКСАНДЕР АИКТУОВ  |     |
| АНДРЕЙ МЕДВЕДЕВ     |     |
| ИГОРЬ КИЗАНОВ       |     |
| КИРИЛЛО ЕИЛ ТИМОШКО |     |
| МЕДВЕДЬ             |     |

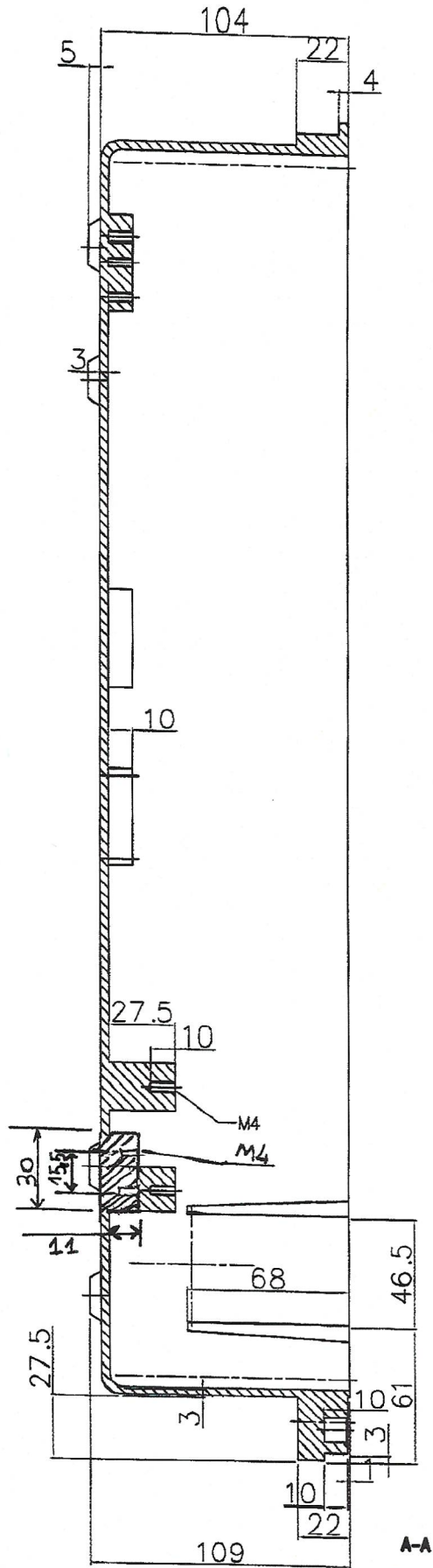
**АЕААНН**




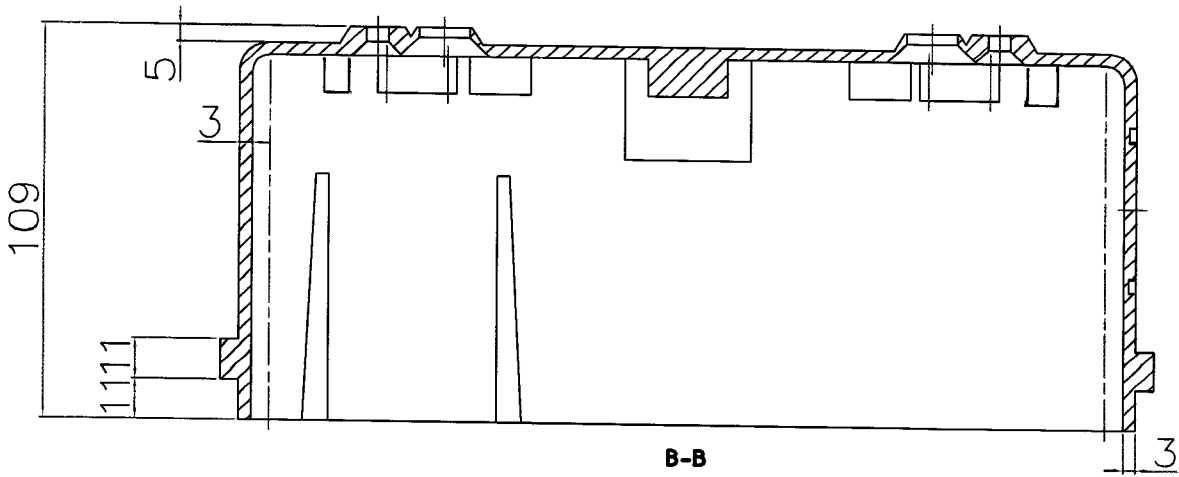
|   |  |                            |
|---|--|----------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ                     | ΑΡ. ΣΧΕΔΙΟΥ:<br><b>1-2</b> |
|   | ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :<br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΑΝΟΨΗ ΒΑΣΗΣ |                            |




|   |   |               |
|---|---|---------------|
|  | ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ   | ΑΡ. ΣΧΕΔ. 1.3 |
|   | ΚΑΛΩΣ ΜΕΤΡΗΣΕΩΝ   |               |
|   | ΤΥΠΟΣ ΣΧΕΔΙΟΥ :<br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΚΑΤΩΝ ΒΑΣΗΣ |               |

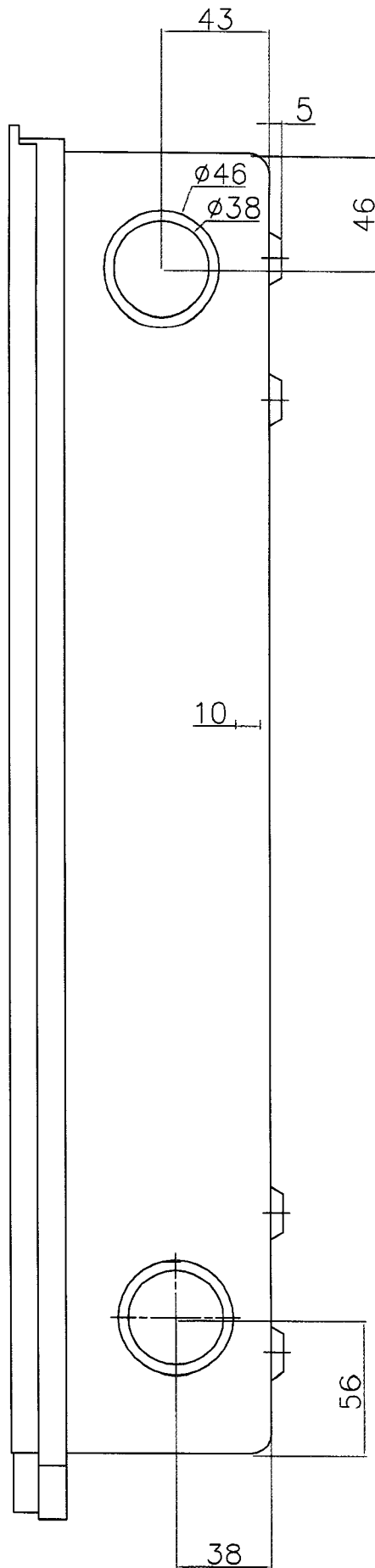



|   |  |                        |
|---|--|------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                        | ΑΡ. ΣΥΝΔ.<br><b>44</b> |
|   | <b>ΤΙΤΑΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΤΟΜΗ Α-Α ΒΑΣΗΣ |                        |

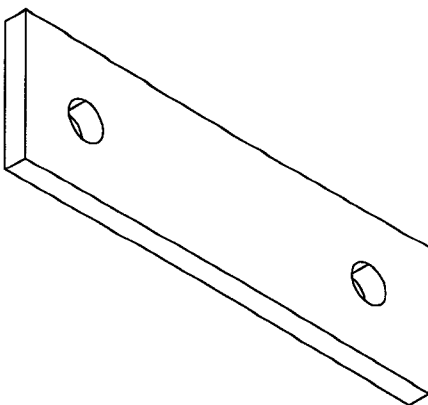
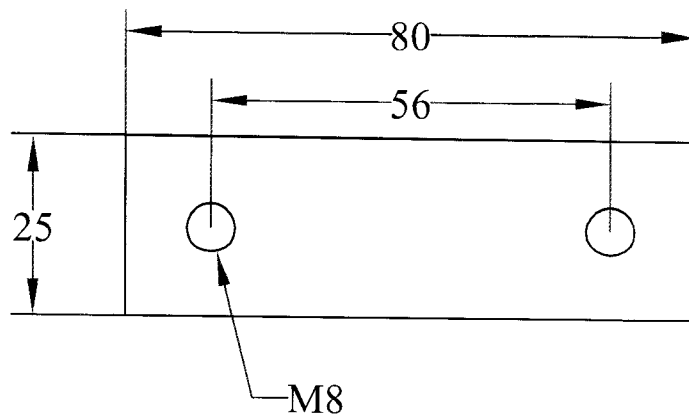
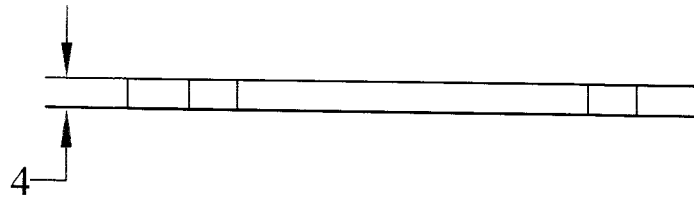



|  |  |                           |
|--|--|---------------------------|
| <br><b>ΔΕΔΔΗΕ</b> | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                        | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br>15 |
|  | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΤΟΜΗ Β-Β ΒΑΣΗΣ |                           |

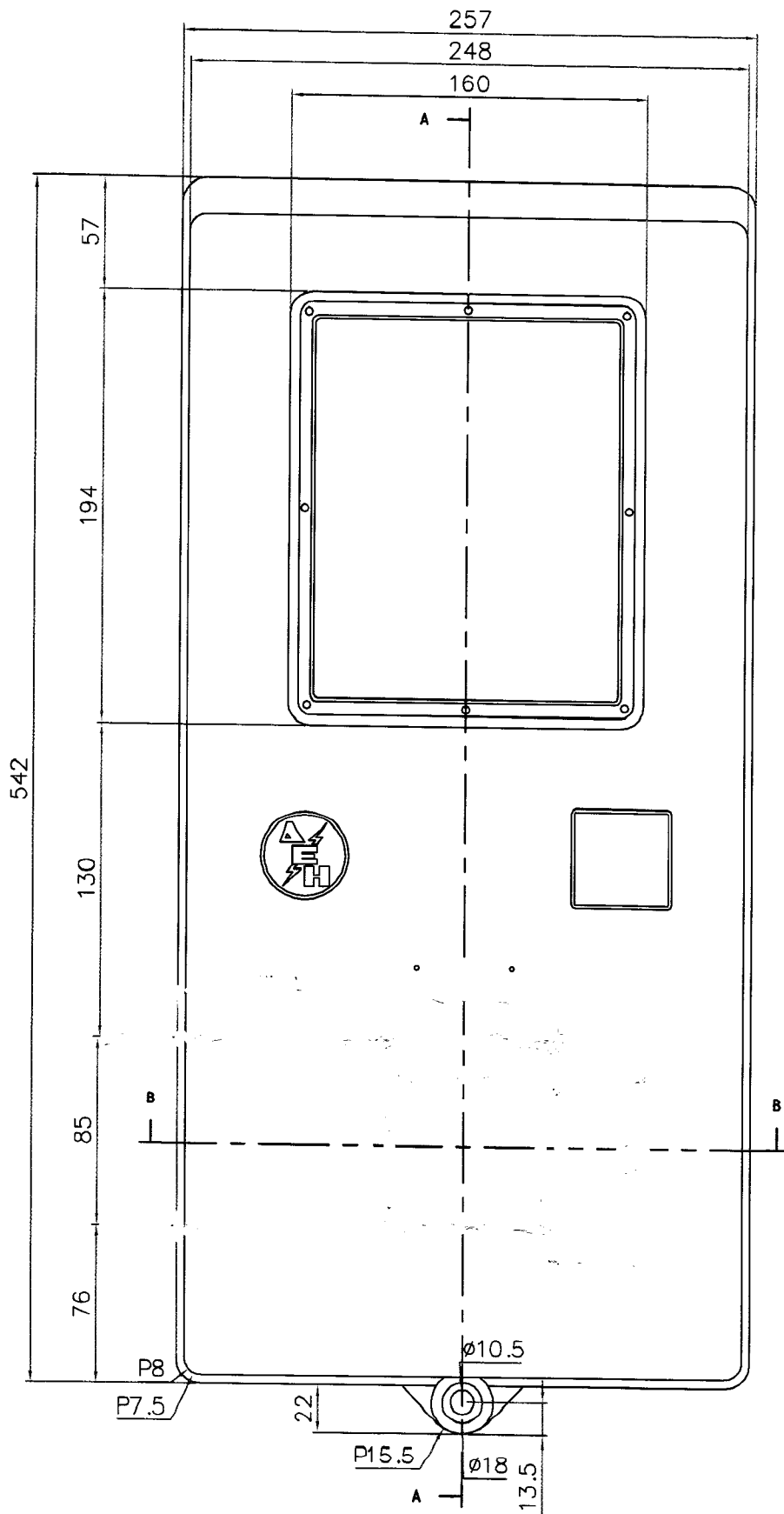





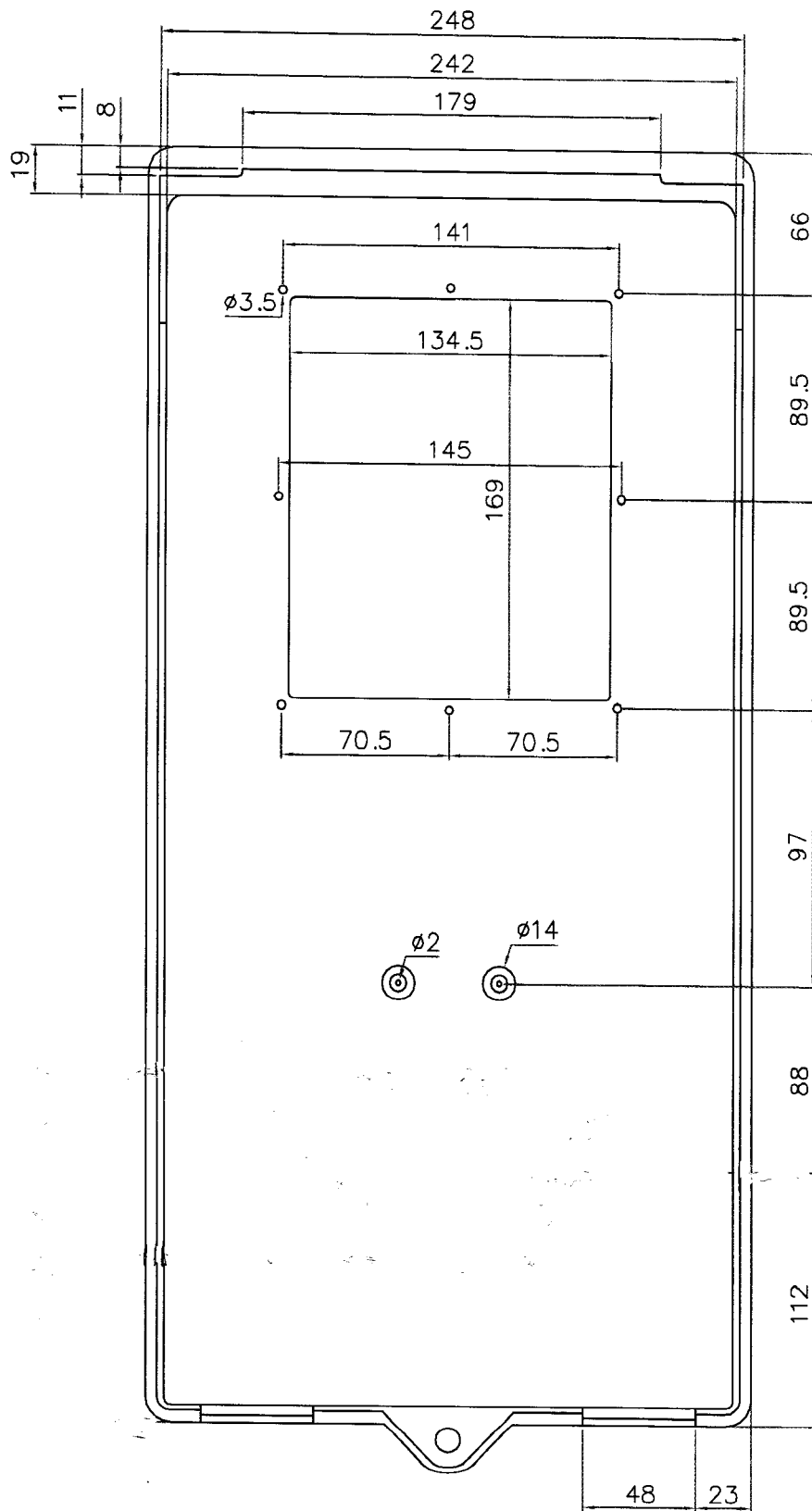
|   |  |                                  |
|---|--|----------------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>  | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br><b>16</b> |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br><b>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ</b><br><b>ΜΕΤΡΗΤΗ ΠΛΑΓΙΑ ΔΕΞΙΑ ΟΥΗ ΒΑΣΗΣ</b> |                                  |




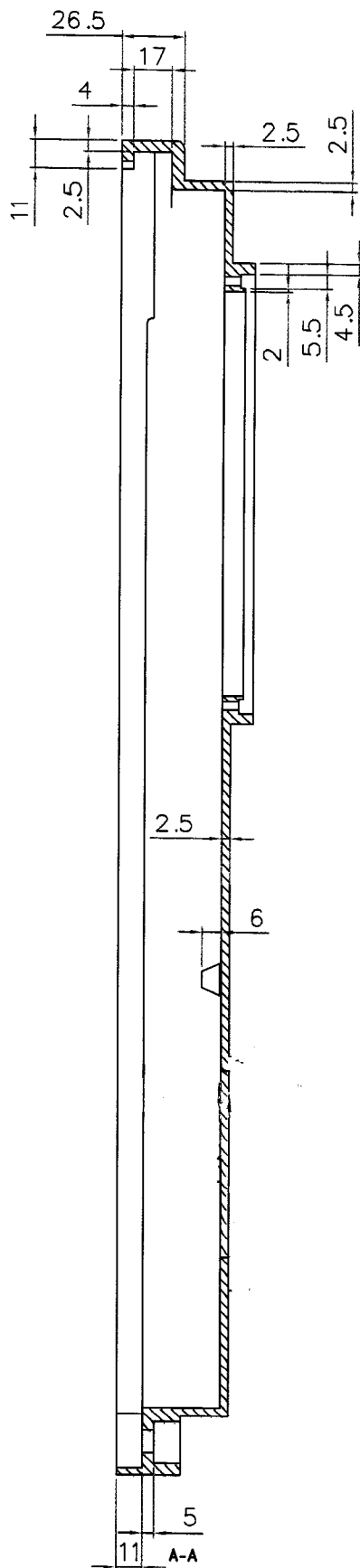
|   |   |                            |
|---|---|----------------------------|
|  <b>ΔΕΔΔΗΕ</b> | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b> | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br>1.7 |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΛΑΜΕΣ ΑΝΑΡΤΗΣΗΣ          |                            |




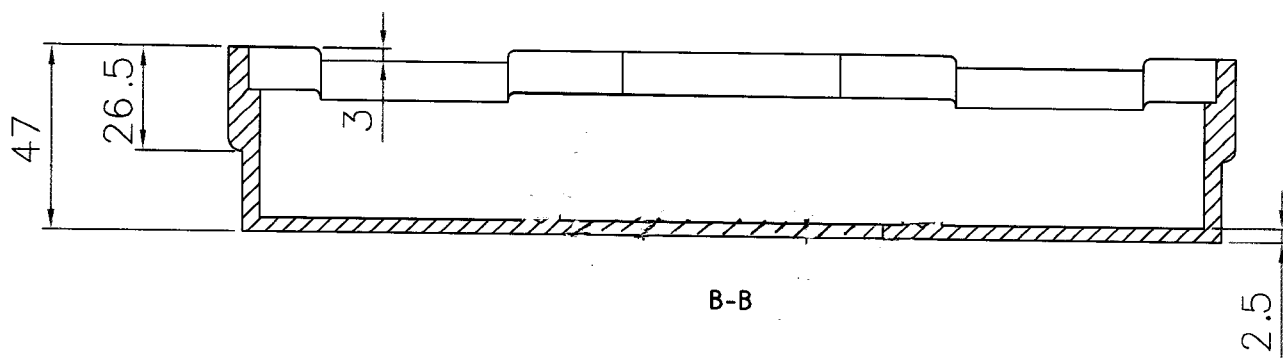
|   |  |                     |
|---|--|---------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ                           | ΑΡ. ΣΧΕΔΙΟΥ:<br>2.1 |
|   | ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :<br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΚΑΤΩΦΗ ΚΑΛΥΜΜΑΤΟΣ |                     |




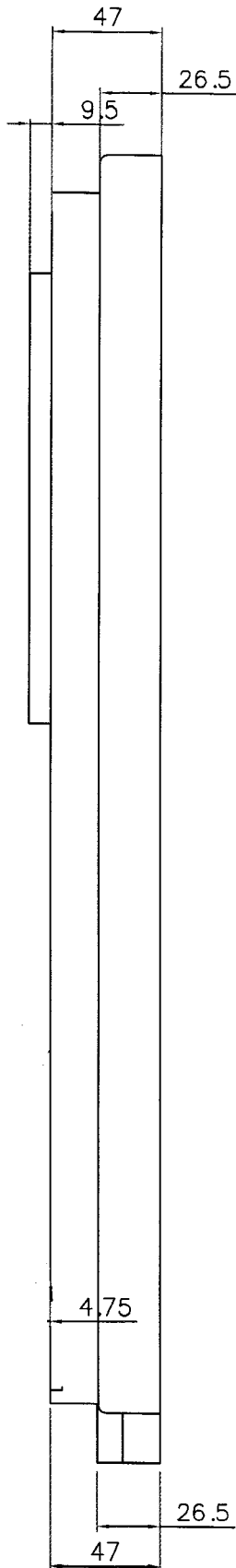
|   |   |                                   |
|---|---|-----------------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΑΛΟΣ ΜΕΤΡΗΣΕΩΝ</b>                            | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br><b>2-2</b> |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΑΝΟΧΗΣ ΚΑΤΙΜΜΑΤΟΣ |                                   |




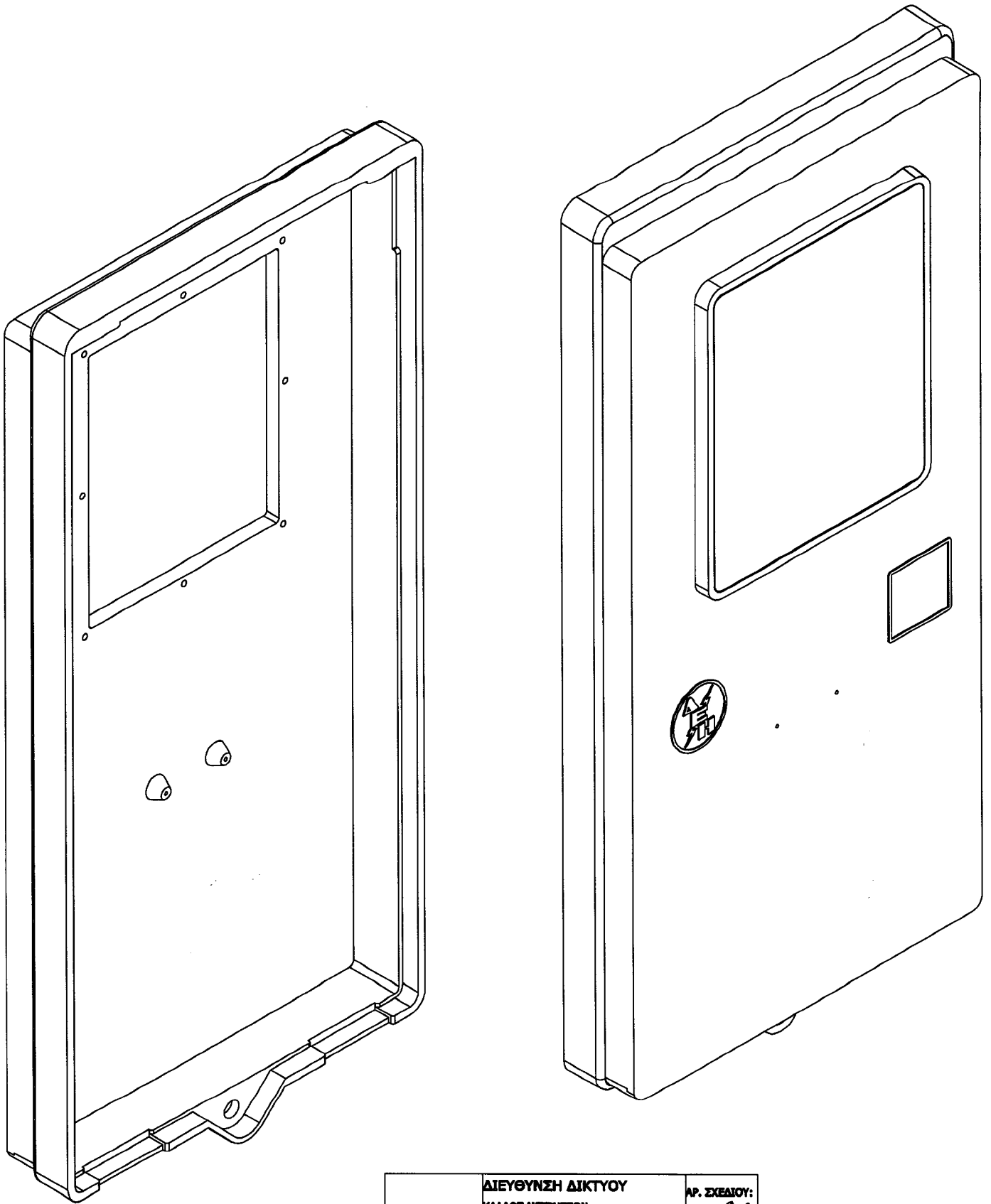
|   |   |                                   |
|---|---|-----------------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΑΛΩΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                            | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br><b>2-3</b> |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΤΟΜΗ Α-Α ΚΑΛΩΜΜΑΤΟΣ |                                   |




|   |   |                                   |
|---|---|-----------------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                             | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br><b>2.4</b> |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΤΟΜΗ Β-Β ΚΑΛΤΗΜΑΤΟΣ |                                   |

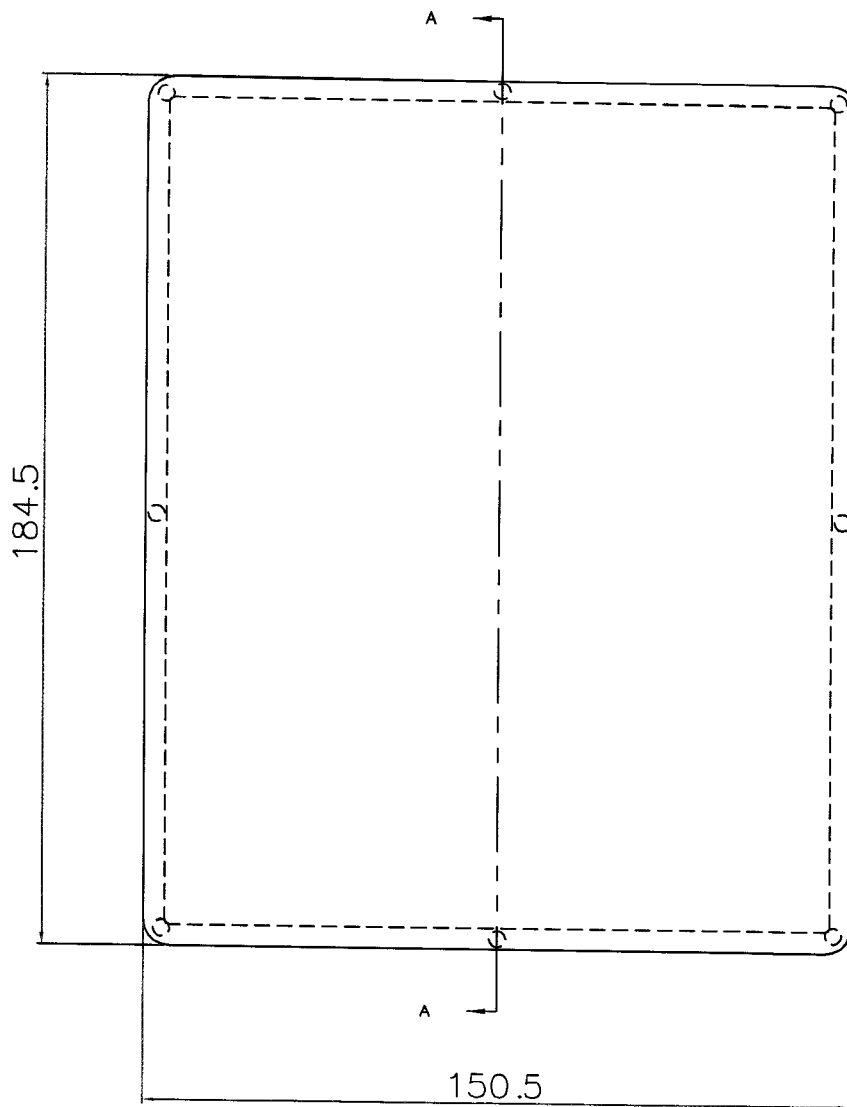



|   |  |                                   |
|---|--|-----------------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΟΣ ΜΕΤΡΗΣΕΩΝ</b>                                     | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br><b>2.5</b> |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΠΛΑΤΑ ΔΕΞΙΑ ΟΥΗ ΚΑΥΤΗΜΑΤΟΣ |                                   |

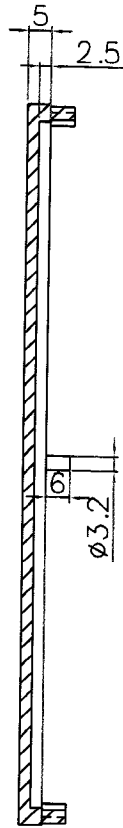


|   |  |                           |
|---|--|---------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                                    | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br>26 |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΤΡΙΣΤΑΣΙΑΤΗ ΟΥΝ ΚΑΥΤΗΜΑΤΟΣ | <b>ΗΜΕΡΟΜΗΝΙΑ:</b>        |




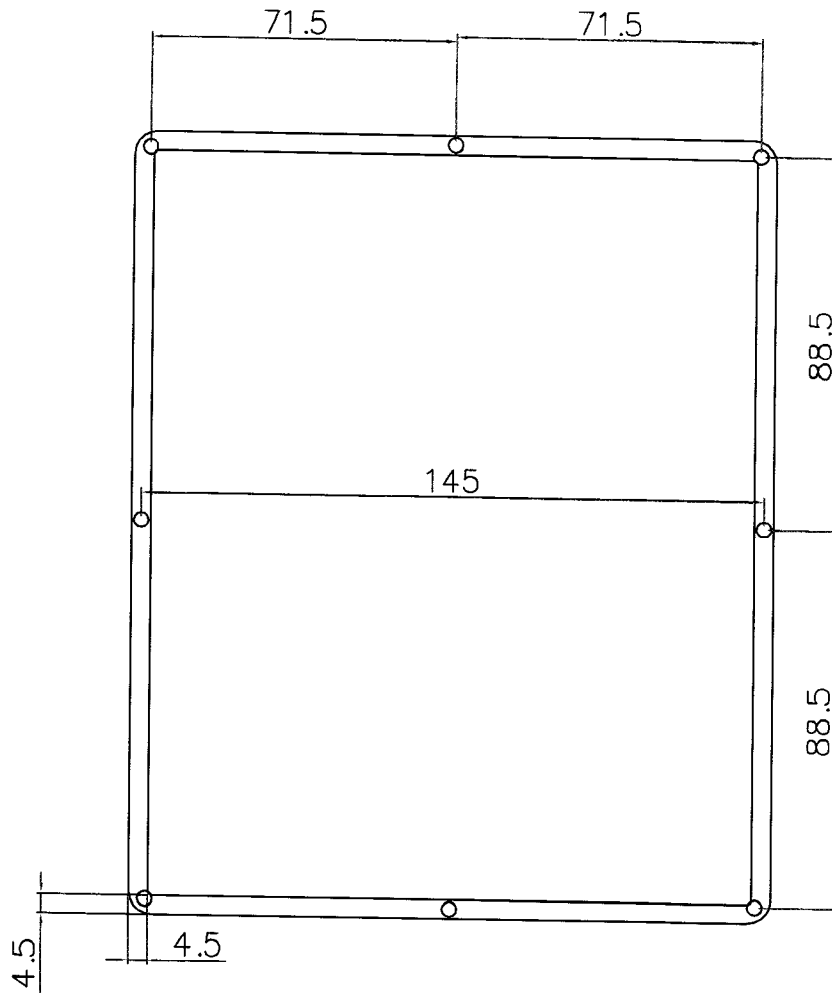



|   |  |                                   |
|---|--|-----------------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                          | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br><b>3.1</b> |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΚΑΤΟΨΗ ΠΑΡΑΘΥΡΟΤ |                                   |

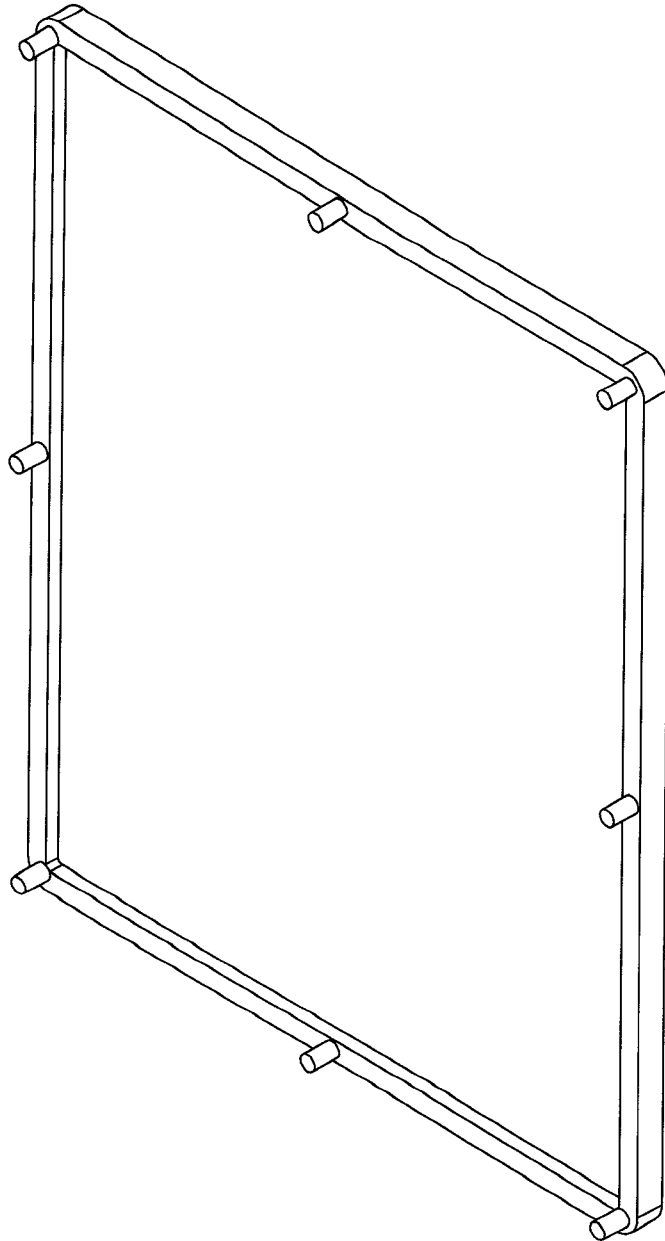



ΣΕΧΤΙΟΝ Α-Α

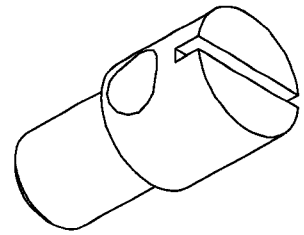
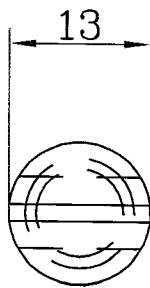
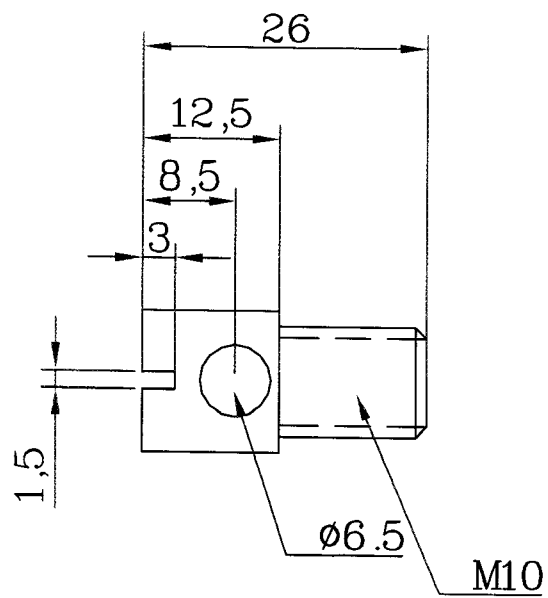
|   |  |                            |
|---|--|----------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                            | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br>3.2 |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΤΟΜΗ Α-Α ΠΑΡΑΘΥΡΟΥ |                            |



|   |   |                                   |
|---|---|-----------------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                         | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br><b>3.3</b> |
|   | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΑΝΟΨΗ ΠΑΡΑΘΥΡΟΤ |                                   |



|  |   |                     |
|--|---|---------------------|
|  ΔΕΔΔΗΕ | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b>                                    | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b> |
|  | <b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                                     | 3.4                 |
|  | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b>                                     |                     |
|  | ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΤΡΙΣΔΙΑΣΤΑΤΗ ΟΨΗ ΠΑΡΑΘΥΡΟΥ |                     |



|  |  |                            |
|--|--|----------------------------|
|  | <b>ΔΙΕΥΘΥΝΣΗ ΔΙΚΤΥΟΥ</b><br><b>ΚΛΑΔΟΣ ΜΕΤΡΗΣΕΩΝ</b>                        | <b>ΑΡ. ΣΧΕΔΙΟΥ:</b><br>4.1 |
|  | <b>ΤΙΤΛΟΣ ΣΧΕΔΙΟΥ :</b><br>ΚΙΒΩΤΙΟ ΓΙΑ ΤΡΙΦΑΣΙΚΟ<br>ΜΕΤΡΗΤΗ ΒΙΔΑ ΑΣΦΑΛΕΙΑΣ |                            |

