





THE KENYA POWER AND LIGHTING CO. LTD.

SPECIFICATION

For

POLE MOUNTED METERBOARDS

| NAME | NAME | DESIGNATION | SIGNATURE | DATE |
|-----------------|------------------|---|---|------------|
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REVISION RECORD

| REVISION | DESCRIPTION OF REVISION | COMPILED BY | DATE | APPROVAL |
|----------|-------------------------|-------------|------------|----------|
| 0 | 2 nd Issue | John Wekesa | 2010-04-05 | |
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SPECIFICATION FOR POLE MOUNTED METERBOARDS

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POLE MOUNTED METERBOARD

0. FOREWORD

0.1 This standard specification has been prepared by the Research and Development Department of the Planning, Research and Performance Monitoring Division, Kenya Power and Lighting Company Ltd in conjunction with the Prepayment Project Team. It lays down specification for pole-mounted meter boards.

0.2 This specification is intended for guidance of manufacturers and contractors and shall form the basis of procurement and installation of meter boards for applications stated herein. It does not include provision of contract.

1. SCOPE

1.1 This specification is for the design and manufacture of meter boards and covers the following items:

- (i) Discrete single-phase meter board, as detailed in Clause 11.1.
- (ii) Discrete three phase meter board, as detailed in Clause 11.2.

This specification covers meter boards for use for pole mounted meters supplied with 240V for single-phase meters and 415V for three-phase meters.

1.2 References

1. BS381C: 1996 (2002) Specifications for colours for identification, coding and special purposes
2. BS 7079: Preparation of steel substrates before application of paints and related products and associated parts

2. SERVICE CONDITIONS

2.1 Operating conditions

2.1.1 The meter boards shall be suitable for safe operation in tropical climate with the following atmospheric conditions.

- (a) Altitude: 0 to 2200 metres above mean sea level.
- (b) Temperature: +40°C maximum and -1°C minimum, averaging +30°C
- (c) Humidity: 30% to 90%, with an average of 70%. (Note that Coastal areas have heavily polluting saline atmosphere and high humidity while inland areas have relatively clean air and low humidity.)
- (d) Pollution: Design pollution level to be taken as "Heavy". Corrosion protection should take this into account.

2.2 System characteristics:

The meter boards are intended to be operated on 415 V for three phase and 240 V single phase system with protective multiple earthing (PME).

2.3 Operating height

The meter board is to be mounted vertically on the pole. It shall be therefore suitable for mounting and operation on outdoor where raindrops shall impinge upon it.

3. ENCLOSURE PROTECTION

- 3.1 The degree of protection of the enclosure shall be at least IP65 when the top cover is securely closed and sealed. (This means that it shall not be possible for a piece of wire 1.0 mm diameter to penetrate it, nor shall any rain or water sprayed at 60 degrees from the vertical enter it in any significant or dangerous quantity).

4. RATINGS

- 4.1 The meter board shall be rated at 3*100 A, 415V.

5. DESIGN PHILOSOPHY

The design of the meter boards are based on the following principles for optimum utilisation:

5.1 Din Rail metal plate

For safety and ease of use, the meter board shall be provided with two din rail metal plates to secure the meter and miniature circuit breaker (MCB). The dimensions of the rail metal plate are as shown in fig.2

5.2 Preferred cable entry & exit gland

5.2.1 The meter board shall have two (2) cable entries and two (2) cable exit glands. Fig. 4 and fig. 5 have the details.

5.2.2 The exit and the entry gland of the cable shall be all at the bottom of the meter board. Each cable gland shall have rubber seal sufficient to accommodate securely 25mm²-insulated cable.

5.3 Design and details of the meter boards.

5.3.1 The top cover shall be made of polycarbonate and easily opened by means of a hinge between it and the main meter board base. Other parts shall be made of polycarbonates or moulded Bakelite or fibreglass.

5.3.2 It shall have two sealing positions to prevent tampering and access by unauthorised persons.

5.3.3 It shall have a means of securing it firmly on the base using an Allen key.

5.3.4 A galvanized/electro plated steel mounting bracket shall be provided behind the meter board to assist in securing the meter board on the pole. This mounting bracket should also have holes on the protruding parts to provide further provision to fasten the meter board tightly on the pole using 5/8" (diameter) X 11" (length) bolt."

- 5.3.5 The exit and entry gland of the cables shall be fitted with rubber seal, which enhance permanent weather-proof epoxy adhesive and able to accommodate 25mm² insulated copper wire.
- 5.3.6 Din rail metal plate shall be firmly positioned as shown on fig. 2 and shall able to firmly hold the meter bearing the weight of the cables.
- 5.3.7 It shall be possible to accommodate four (4) single phase meters in the meter board.
- 5.3.8 The complete design of the meter board shall be as shown in fig.3

6. CONSTRUCTION

- 6.1 Construction details and sizes shall be as detailed in the respective clauses.

7. MATERIAL

- 7.1 The material shall be polycarbonates or moulded Bakelite or fibreglass for other parts as detailed in the respective clauses. The material should be ISO 75-2 certified and certificate for conformity should be availed.

8. METER BOARD FINISH

- 8.1 The meter board shall have durable weather-resistant finish.

9. COLOUR

- 9.1 The final colour of the meter-board shall be *light aircraft grey* as per pigment No. 627 of BS 381C.

10. SAFETY AND SECURITY

The meter board shall be entirely made of an insulator. Two (2) holes of four (4) mm in diameter shall also be provided for wire sealing (see fig. 3).

11 Particular requirements for pole mounted meter board.

11.1 Construction

- 11.1.1 The meter board shall measure 428 mm (Height) x 428 mm (width) x 166 mm (Depth) top cover inclusive.
- 11.1.2 The diameter holes for cable gland shall be 25mm and shall be aligned as shown in fig.4.
- 11.1.3 The top cover shall be secured to the main body by means of stainless steel hinge and provide a comprehensive protection of the meter from any substantial drops of water.
- 11.1.4 It shall be possible to easily open the top cover to facilitate connection of the cables to the meter.
- 11.1.5 The meter boards shall be capable of accommodating 4 single phase prepayment split meters.
- 11.1.6 The meter boards shall come fitted with 1X8 way neutral and 1X8 way earth copper terminal blocks as shown in figure 2.
- 11.1.7 Meter din rail metal plates shall be firmly secured as shown in fig. 2 below.
- 11.1.8 The dimension of the meter shall be as shown in fig. 1. & 2

11.2 Materials

The pole mounted meter board shall be made from the following materials:

- 11.2.1 Polycarbonate or moulded Bakelite or fibreglass, sufficiently stabilised against ultra violet rays for use outdoor as detailed in section 7.
- 11.2.2 Top cover shall also be made of polycarbonate as detailed in section 7.
- 11.2.3 Cable gland shall have rubber seal to enhance permanent weatherproof epoxy adhesive.
- 11.2.4 Meter din rail metal plates shall either be made of galvanized steel or electro plated metal.

11.2.5 Thickness, in millimetres, of the various components shall not be less than those indicated in the following table:

| | Tolerance | Body | Top cover | Rail metal plate |
|--------------------|--------------------|-------|-----------|-----------------------|
| Body and top cover | $\pm 0.1\text{mm}$ | 1.5mm | 1.5mm | $1 \pm 0.05\text{mm}$ |

11.3 Instructions and markings

11.3.1 The Top Cover shall be marked legibly and indelibly with the following information:

11.3.1.2 Name or trade mark of the manufacturer

11.3.1.3 Country of origin

11.3.1.4 HATARI! / DANGER! Warning of Electrical Hazard with standard symbol as in Figure 3.

11.3.1.5 Property of KP & L Co. Ltd.

11.4 Relevant technical details, schematic drawings, operational and service manuals shall be submitted to support the tender and shall be clearly marked to indicate the type/ model of the meter board being offered.

11.5 The Tenderer shall submit a clause-by-clause statement of compliance with these specifications in the format seen in Appendix A. In case of deviations the affected requirements shall be indicated.

11.6 Copies of test results of the meter board being offered certified by an international or the national certification body shall be provided. If test reports / certificate(s) is (are) from accredited certification laboratories (and not national or international body), then it (they) shall be accompanied with copies of certificates of accreditation from the national or an international certification body.

11.7 A sample of the meter board being offered shall be submitted together with the tender documents. This sample shall not be returned to the tenderer.

12. Systematic diagrams

12.1 Details of pole mounted meter board.

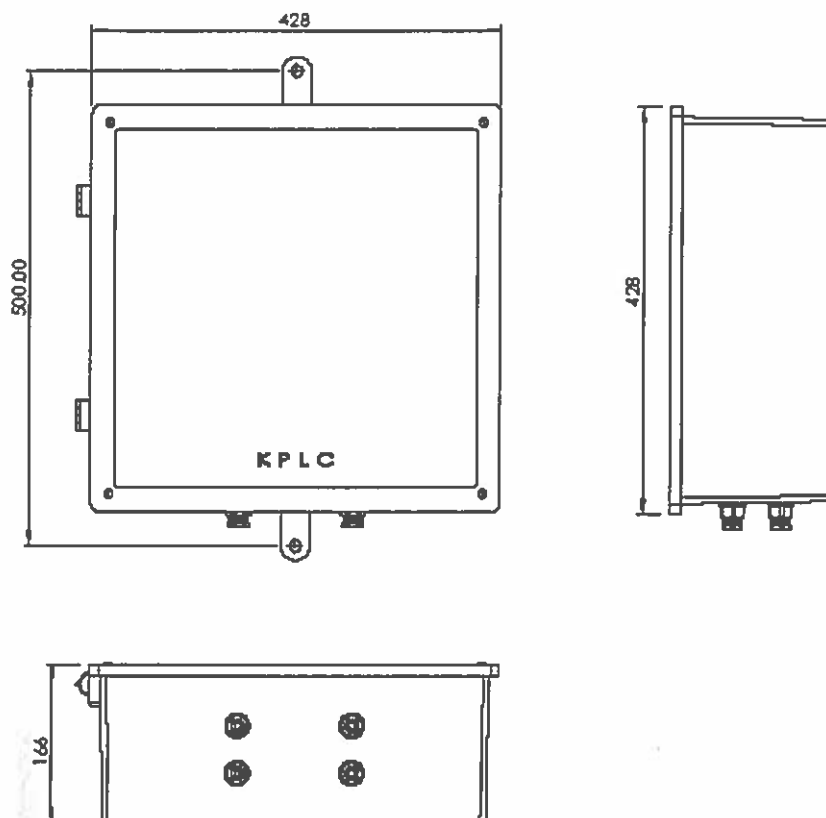
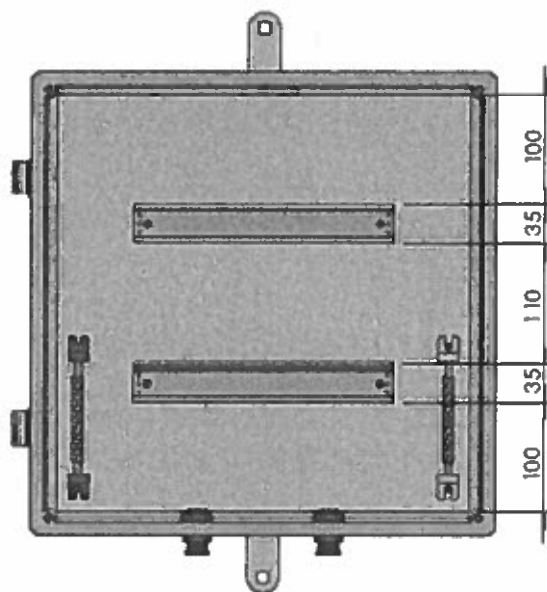


Fig. 1 Dimension of pole mounted Meter board

12.2 Position of Rail metal plate and Neutral & Earth Bars



- BASE (420 x 420 x 160)
- LID (420 X 420 X 15)
- COMPONENT plate (380 x 380)
- 4 x GLAND'S (No: 1)
- 1 x 8way EARTH BAR
- 1 x 8way NEUTRAL BAR
- 2 x DIN rails (236mm)
- MOUNTING bracket (MM10)

Fig.2 Details of rail metal plate

12.3 Overview of the complete meter board.

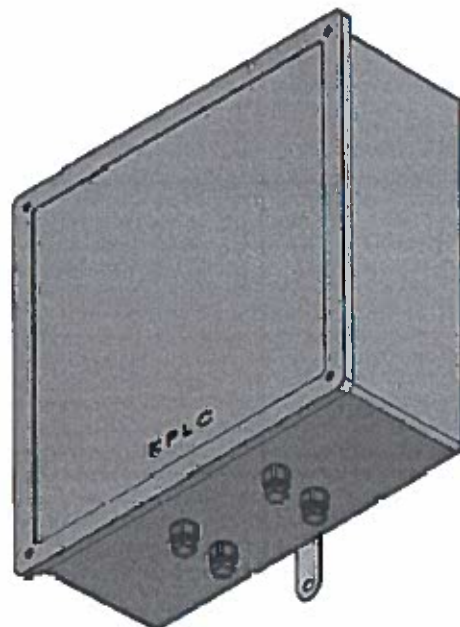


Fig. 3. Meter board general overview.

12.4 Position of cable gland



Fig. 4 Position of Cable gland

12.5 Meters dimensions and configuration.

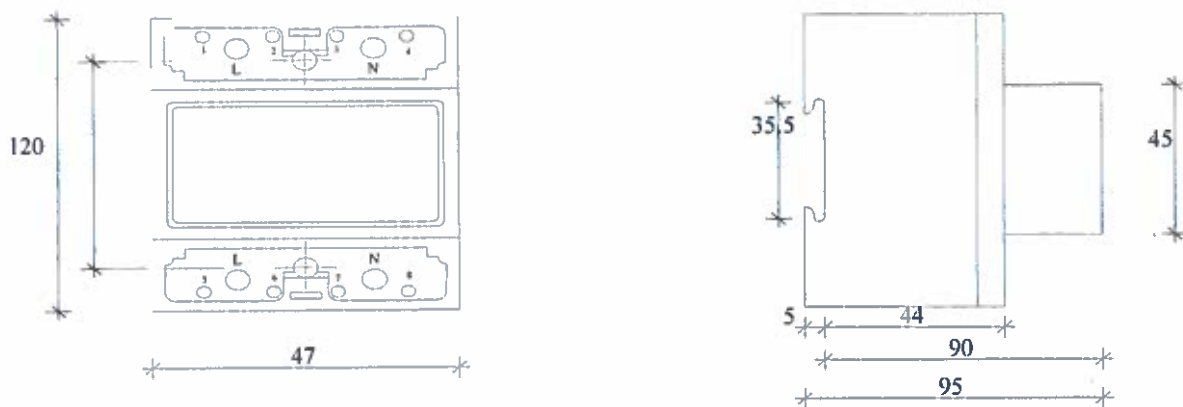


Fig. 5 Single phase meter

Appendix A. SPECIFICATION FOR POLE MOUNTED METERBOARDS

| CLAUSE | KPLC REQUIREMENT | MANUFACTURER'S COMPLIANCE/REMARKS | REFERENCE PAGE IN THE SUBMITTED DOCUMENTS |
|--------|--|-----------------------------------|---|
| 2.1 a) | Altitude: 0 to 2200 metres above mean sea level | | |
| b) | Temp: +40°C max and -1°C min. aver +30°C | | |
| c) | Humidity: 30% to 90%, with an average of 70% | | |
| d) | Pollution: Design pollution level to be taken as "Heavy". Corrosion protection should take this into account. | | |
| 2.2 | The meter boards are intended to be operated on 415 V for three phase and 240 V single phase system with protective multiple earthing (PME). | | |
| 2.3 | The meter board is to be mounted vertically on the pole. It shall be therefore suitable for mounting and operation on outdoor where raindrops shall impinge upon it. | | |
| 3.1 | The degree of protection of the enclosure shall be at least IP65 when the top cover is securely closed and sealed. | | |
| 4.1 | The meter board shall be rated at 3*100 A, 415V. | | |
| 5.1 | For safety and ease of use, the meter board shall be provided with two din rail metal plates to secure the meter and miniature circuit breaker (MCB). The dimensions of the rail metal plate are as shown in fig.2 | | |
| 5.2.1 | It shall be preferred that the meter board shall have two (2) cable entries and two (2) cable exit glands. Fig. 4 and fig. 5 have the details. | | |
| 5.2.2 | The exit and the entry gland of the cable shall be all at the bottom of the meter board. Each cable gland shall have rubber seal sufficient to accommodate securely 25mm ² -insulated cable. | | |
| 5.3.1 | The top cover shall be made of polycarbonate and easily opened by means of a hinge between it and the main meter board base. Other parts shall be made of polycarbonates or moulded Bakelite or fibreglass. | | |
| 5.3.2 | It shall have two sealing positions to prevent tampering and access by unauthorised persons. | | |
| 5.3.3 | It shall have a means of securing it firmly on the base using an Allen key. | | |
| 5.3.4 | A galvanized/electro plated steel mounting bracket shall be provided behind the meter board to assist in securing the meter board on the pole. This mounting bracket should also have holes on the protruding parts to provide further provision to fasten the meter board tightly on the pole using 5/8" (diameter) X 11" (length) bolt." | | |
| 5.3.5 | The exit and entry gland of the cables shall be fitted with rubber seal, which enhance permanent weather-proof epoxy adhesive and able to accommodate 25mm ² insulated copper wire. | | |
| 5.3.6 | Din rail metal plate shall be firmly positioned as shown on fig. 6 and shall able to firmly hold the meter bearing the weight of the cables. | | |
| 5.3.7 | It shall be possible to accommodate four (4) single phase meters in the meter board. | | |
| 5.3.8 | The complete design of the meter board shall be as shown in fig.3 | | |

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|--------------------|--|-----------------------------------|---|------------------|-----------|------------------|--------------------|--------|-------|-------|------------|--|--|
| 7.1 | The material shall be polycarbonates or moulded Bakelite or fibreglass for other parts as detailed in the respective clauses. The material should be ISO 75 certified and certificate for conformity should be availed. | | | | | | | | | | | | |
| 8.1 | The meter board shall have durable weather-resistant finish. | | | | | | | | | | | | |
| 9.1 | The final colour of the meter-board shall be light aircraft grey as per pigment No. 627 of BS 381C. | | | | | | | | | | | | |
| 10 | The meter board shall be entirely made of an Insulator. Two (2) holes of four (4) mm in diameter shall also be provided for wire sealing (see fig. 3). | | | | | | | | | | | | |
| 11.1.1 | The meter board shall measure 428 mm (Height) x 428 mm (width) x 166 mm (Height) top cover inclusive. | | | | | | | | | | | | |
| 11.1.2 | The diameter holes for cable gland shall be 25mm and shall be aligned as shown in fig.4. | | | | | | | | | | | | |
| 11.1.3 | The top cover shall be secured to the main body by means of hinge and provide a comprehensive protection of the meter from any substantial drops of water. | | | | | | | | | | | | |
| 11.1.4 | It shall be possible to easily open the top cover to facilitate connection of the cables to the meter. | | | | | | | | | | | | |
| 11.1.5 | The meter boards shall be capable of accommodating 4 single phase prepayment split meters. | | | | | | | | | | | | |
| 11.1.6 | The meter boards shall come fitted with 1X8 way neutral and 1X8 way earth copper terminal blocks as shown in figure 2. | | | | | | | | | | | | |
| 11.1.7 | Meter din rail metal plates shall be firmly secured as shown in fig. 2 below. | | | | | | | | | | | | |
| 11.2.1 | Polycarbonate or moulded Bakelite or fibreglass, sufficiently stabilised against ultra violet rays for use outdoor as detailed in section 7. | | | | | | | | | | | | |
| 11.2.2 | Top cover shall also be made of polycarbonate as detailed in section 7. | | | | | | | | | | | | |
| 11.2.3 | Cable gland shall have rubber seal to enhance permanent weatherproof epoxy adhesive. | | | | | | | | | | | | |
| 11.2.4 | Meter din rail metal plates shall either be made of galvanized steel or electro plated metal. | | | | | | | | | | | | |
| 11.2.5 | Thickness, in millimetres, of the various components shall not be less than those indicated in the following table: <table border="1" data-bbox="359 1753 821 1854"> <thead> <tr> <th></th> <th>Tolerance</th> <th>Body</th> <th>Top cover</th> <th>Rail metal plate</th> </tr> </thead> <tbody> <tr> <td>Body and top cover</td> <td>±0.1mm</td> <td>1.5mm</td> <td>1.5mm</td> <td>1± 0.05 mm</td> </tr> </tbody> </table> | | Tolerance | Body | Top cover | Rail metal plate | Body and top cover | ±0.1mm | 1.5mm | 1.5mm | 1± 0.05 mm | | |
| | Tolerance | Body | Top cover | Rail metal plate | | | | | | | | | |
| Body and top cover | ±0.1mm | 1.5mm | 1.5mm | 1± 0.05 mm | | | | | | | | | |
| 11.3.1.2 | Name or trade mark of the manufacturer | | | | | | | | | | | | |
| 11.3.1.3 | Country of origin | | | | | | | | | | | | |
| 11.3.1.4 | HATARII / DANGER! Warning of Electrical Hazard with standard symbol as In Figure 3. | | | | | | | | | | | | |
| 11.3.1.5 | Property of KP & L Co. Ltd. | | | | | | | | | | | | |

| CLAUSE | KPLC EQUIREMENT | MANUFACTURER'S COMPLIANCE/REMARKS | REFERENCE PAGE IN THE SUBMITTED DOCUMENTS |
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| 11.4 | Relevant technical details, schematic drawings, operational and service manuals shall be submitted to support the tender and shall be clearly marked to indicate the type/ model of the meter board being offered. | | |
| 11.5 | The Tenderer shall submit a clause-by-clause statement of compliance with these specifications in the format seen in Appendix A. In case of deviations the affected requirements shall be indicated. | | |
| 11.6 | Copies of test results of the meter board being offered certified by an International or the national certification body shall be provided. If test reports / certificate(s) is (are) from accredited certification laboratories (and not national or international body), then it (they) shall be accompanied with copies of certificates of accreditation from the national or an international certification body. | | |
| 11.7 | A sample of the meter board being offered shall be submitted together with the tender documents. This sample shall not be returned to the tenderer. | | |

Ion behalf

Declare that the above specifications matrix conforms to a typical tender meter, type..... Being offered for this tender.

Signature.....

Date.....Stamp/Seal.....

