MAHAVITARAN
Maharashtra State Electricity Distribution Co. Ltd.

Maharashtra State Electricity Distribution Company Limited

SPEC. NO. STORES: MSC-II/DB/Rural/ 2011/02

TECHNICAL SPECIFICATION

FOR

63, 100 kVA, LT DISTRIBUTION BOX with Kitkats for Rural Area

FOR

DISTRIBUTION SYSTEM

IN

MSEDCL

I N D E X

MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY

Technical Specifications for

63,100 KVA L.T. DISTRIBUTION BOX with KITKATs

SPEC. NO. STORES: MSC-II/DB/Rural/ 2011/02

1. SCOPE:

Specification covers the design, manufacture, testing at works and supply of Distribution Boxes made out of **CRCA MS** sheet for controlling the L.T. feeders from the L.T. side of Distribution Transformers. The system shall be A.C. 3 phase, 4 wire, 433 V, 50 HZ with effectively grounded neutral.

2. SERVICE CONDITIONS:

The equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

2.1	Maximum ambient temperature (Degree C)	50
2.2	Maximum temperature in shade (Degree C)	45
2.3	Minimum Temperature (Degree C)	3.5
2.4	Relative Humidity (percent)	10 to 95
2.5	Maximum Annual rain fall (mm)	1450
2.6	Maximum wind pressure (kg/sq.m)	150
2.7	Maximum altitude above mean sea level (Meter)	1000
2.8	Isoceranic level (days per year)	50
2.9	Siesmic level (Horizontal Acceleration)	0.3 g

Moderately hot and humid tropical climate conductive to rust and fungus growth.

3. SYSTEM DETAILS:

Distribution Boxes are meant for control and protection of Distribution Transformers with relevant parameters as under:-

S.N.	Particulars	Details	
1.	KVA rating	63 KVA	100 KVA
2.	Voltage	433 V, 3 Ph (3x250 V)	
3.	Frequency	50 Hz	

4.	Phases	3 phase, solidly grounded neutral	
5.	Approximate full load current of transformer	84 A	133 A
6.	No. Outgoing circuits	2 nos	

4. Applicable Standards:

4.1. IS :13947/1993 (Part 3) for Isolator (Switch Disconnector)

4.2. IS 2086-1993 as amended upto date for L.T. KITKATs.

4.3. IS: 8623/1993 (amended upto date) for enclosure Box & for degree of protection provided by enclosures of electrical equipments.

4.4. IS:4237/1982, IS:8623/1993 (amended upto date) – for general requirement of L.T. switchgears.

4.5. IS 13703/1993 (Part I & II amended upto date) for HRC Fuse Base and HRC Fuse Link.

4.6 IS:5 /2007 - Colour of Ready Mixed paints and Enamels.

4.7 IS: 13871/1993 – Powder coatings – specifications

4.8 IS : 6005/1998 – Code of Practice for phosphating of iron and steel.

5. MANUFACTURE/CONSTRUCTION OF BOXES:

5.1. Distribution Boxes shall have Isolator (Switch Disconnector) and HRC fuse base with links on incoming circuit and single pole KITKAT s & Link Disconnector on outgoing circuits with necessary interconnecting Bus Bars/ Links.

5.2. Standard General Arrangement of Isolators, HRC fuse base with links, KITKAT s, Link Disconnector, Neutral Links, Bus Bars, connecting links, Cable termination arrangement etc inside the Box is shown in the enclosed drawing No. Dist /DB/06 for 63/100 KVA distribution boxes.

6. INCOMER CIRCUIT –

6.1 Isolator (Switch Disconnector)-

Each distribution box shall have one triple pole Isolator (Switch Disconnector), conforming to IS: 13947/1993 and MSEDCL specification. The bidder shall indicate makes and types of offered isolator in GTP. The successful bidder shall submit type test report of the isolator as specified in Cl.No. 12.3 (II) for approval of CE (Stores) before commencement of supply. The Switch disconnector to be provided in the Distribution Box will be as per MSEDCL's approval as given in the detailed purchase order.

The Isolator should be front operated triple pole type. The casing of Isolator shall be of Non –tracking and heat resistant insulating material superior electrical and mechanical properties equivalent to Dough Moulding Compound (DMC), no separate enclosure is required. Isolator Base should withstand the breaking capacity of 80 kA. To extinguish the arc immediately in isolators, in each phase archutes with minimum 12 strips shall be provided.

The isolator shall be robust in construction and easy for operation. The handle of the isolator should be detachable easily for security purpose while working on L.T. circuits.

The characteristics of Isolator shall be as follows:

S.N	Characteristics	Rating 63 KVA and 100 KVA
1.	Basic uninterrupted duty:	250 A
2.	Mechanism :	Manual quick make quick break
3.	Standard applicable :	IS : 13947 /1993 amended upto date
4.	Utilization category :	AC –23 A
5.	Mechanical Endurance :	As per IS 13497 /1993 amended upto date
6.	Electrical Endurance :	As per IS: 13947 /1993 amended upto date
7.	Rated Duty :	Uninterrupted
8	Making /Breaking capacity:	Not less than requirement of AC –23 A category
9.	Two seconds rating :	4 KA
10.	Rated insulation voltage :	660 V

The terminal connector strips of the isolator shall be projecting out of isolator of 80 mm (minimum) in length on cable connection side and 60mm (minimum) on HRC fuse base side as shown in the drawings. In 63 /100 kVA distribution box, the cross section of the strips on outside of the isolator shall be provided as below :

63/100 KVA - 25X5 mm.

The material of isolator strips shall be EC grade tin-plated copper. The terminal strip shall be continuous from the point of contact separation in side the Isolator.

6.2 HRC FUSE

HRC Fuse of suitable capacity shall be provided in between outgoing terminal of Switch Disconnector (Isolator) and incoming busbar as shown in the Drg.No.Dist/DB/08 to facilitate electrical breaking of the circuit. Each Distribution Box shall have 3 Nos. of HRC Fuse Base with HRC Fuse Links. (Blade type Contacts).

The bidder shall indicate the makes, types and capacity of HRC Fuse Base and Fuse Links offered in GTP.

6.2.1 HRC FUSE BASE

The base of the HRC Fuse shall be of non-tracking, heat resistant insulating material of superior electrical and mechanical properties equivalent to Dough Moulding Compound (DMC). The Fuse Base shall be sturdy in construction.

The extension terminal connector strips of the Fuse Base shall be projecting out on both sides, made with two pieces (half portion of the terminal contact and extension strip should be continuous in one piece), as shown in the drawing. The dimensions shall be as shown in

the drawing. The material for both strips shall be Silver Plated EC Grade copper. HRC Fuse Base & the fuse link should have withstand the breaking capacity of 80 kA.
HRC Fuse base shall be suitable for fuse of 200A for 63/100 KVA distribution box.

6.2.2 HRC FUSE LINK

The HRC Fuse Links shall be sturdy in construction of "Din Type". Breaking Capacity shall be 80 kA. For fault indication red pop up indicator should come out instantly on fusing. Manufacturer's name, current rating, breaking capacity and type shall be marked on HRC fuse link.

HRC Fuse link Current rating for 63/100 KVA distribution box shall be as follows:

63 KVA - 100 A

100 KVA - 160 A

The successful bidder shall submit type test report of HRC Fuse base and HRC Fuse Link as specified in Cl.No 12.3 (III) for approval of CE (Stores) before commencement of supply. The HRC fuse base with links to be provided in the Distribution Box will be as per MSEDCL's approval as given in the detailed purchase order.

7. OUTGOING CIRCUITS:

7.1. KITKAT Fuses:

7.1.1 GENERAL REQUIREMENTS :

In the outgoing circuit, 6 nos of kitkats of rating 63 A for 63 KVA Box and 100 A for 100 KVA in each distribution box shall be provided. The bidder shall be have to indicate makes of offered Kitkats in GTP. The successful bidder shall submit type test report of the Kitkat as specified in Cl.No.12.3 (IV) for approval of CE (Stores) before commencement of supply. The kitkat to be provided in the distribution box will be as per MSEDCL's approval as given in the detailed purchase order.

Rewirable fuse unit:

a. The rewirable fuse unit shall be made of Electrical grade porcelain of fine grain, homogeneous, non-porous, chemically inert, of high mechanical and electrical strength and shall be thoroughly vitrified and smoothly glazed. The porcelain and the glaze shall be white or cream in colour. Any other colour shall be subject to the approval of CE (Stores). The glaze shall cover at least those surfaces, which are exposed when the fuse has been mounted in the intended manner. The design and dimensions of fuse unit (porcelain/DMC part) shall be in accordance with the drawing enclosed with this specification. i.e. MSEDCL's design.

b. The rewirable fuse unit shall also be made of non-tracking, heat resistant insulating material of superior electrical and mechanical properties equivalent to Dough Moulding Compound (DMC). The Fuse Base shall be sturdy in construction. Breaking Capacity of DMC part shall be 80 kA.

c. The asbestos paper to be provided in the fuse base shall be fire proof and insulating. The thickness of asbestos paper shall be as per manufacturer design.

d. The insulating compound shall conform to the requirements of B.S.1858/57or equivalent I.S.

7.1.2 RATED CURRENT : The rated current shall be 63/100 Amps.

7.1.3. CONTACTS:

A) For 100 Amp. Kitkats - Tinned brass contacts of the fuse base, fuse carrier and Continuous extension terminal strip shall be as per drawing No. CE/Dist/MM-II/MSEDCL/KITKAT/100/02/rev 02 attached with specification..

B) For 63Amp. Kitkats - Tinned brass contacts of the fuse base, fuse carrier and Continuous extension terminal strip/block shall be as per drawing No. CE/Dist/MM-II/MSEDCL/KITKAT/100/02/rev 02 attached with specification..

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Current carrying pointed screws and washers shall be of tinned brass, while the screws/washers not carrying current shall be of MS Electro galvanized. Brass (tinned) used for contacts of KITKATs shall conform to IS as stated below :

It shall conform to grade DCB-I/DCB-II as per IS 1264/1981 (amended up to date)/IS 410 of 1977 (amended up to date). However, the metal composition as given below will be acceptable.

Copper %		Tin, Lead, Nickel, Iron, Aluminum, Manganese and other Impurities put together %	Zinc %
Min.	Max.	Max.	
58.00	63.00	8.6	Remainder

7.1.4 MARKING :

On top of the every Fuse carrier following minimum information. shall be clearly and indelibly marked.

a. Rated current.
b. Rated Voltage.
c. Manufacturer's name or trade mark.
d. The words `M.S.E.D.C.L .'.

And every Fuse Base the words ' **MSEDCL**' shall be clearly and indelibly marked as shown in the Kikat drawing.

7.1.5 TOLERANCES TO THE DIMENSION OF REWIRABLE FUSES :

1. Dimensional tolerances for Porcelain/ DMC Parts shall be + 0.3mm + 0.01 x length
2. Dimensional Tolerance for all contacts/current carrying parts shall be:
   - i. Upto and including 20 = + 0.5
   - ii. Above 20 = +1
   - iii. For thickness = Negative tolerance is not permissible.

3. Extension Terminal strips:

The terminal connector strips of the KITKAT shall be projecting out of the KITKAT for minimum length of 65 mm on Link Disconnector side and 65 mm on busbar side as shown in the drawings. The cross section of the strips shall be 25 X 4 mm on outside of the KITKAT and the length and cross section inside the KITKAT shall be provided as per manufacturer design. The material shall be EC grade tined brass.

4. Terminal block:

Busbar droppers on Kitkat side shall be rounded off suitably to fix at terminal block of Kitkat and link disconnectors strips shall be rounded off on Kitkat side to fit at terminal block of Kitkat. The design shall be such that the current carrying capacity should be remain as per capacity of Kitkat.

7.2. LINK DISCONNECTOR :

Link Disconnector of 200 A capacity shall be provided between outgoing terminal of KITKAT & cable connection as shown in the Drg.No.Dist/DB/10 to facilitate mechanical breaking (manual isolation) of the circuit. 63 /100 kVA Distribution Box shall have 6 Nos. of link Disconnectors.

The bidder has to indicate the makes and types of Link Disconnector offered in GTP. The successful bidder shall submit type test report of the Link Disconnector as specified in Cl.No.12.3(V) for approval of CE (Stores), before commencement of supply. The Link Disconnectors to be provided in the Distribution Box will be as per MSEDCL's approval as given in the detailed purchase order.

The base of the Link Disconnector shall be of non-tracking, heat resistant insulating material of superior electrical and mechanical properties equivalent to Dough Moulding Compound (DMC). The Link Disconnector shall be sturdy in construction and easy in operation.

The link of Link Disconnector shall be of Tin-plated E.C. grade copper. The construction of the Link Disconnector shall be such that it shall be hinged type on cable connection end and disconnectable at the KITKAT end. The disconnection will be with the help of special handle/puller. One handle/puller shall be supplied along with each Distribution Box. The terminal connector strips of the Link Disconnector of 25X5 mm cross section, shall be projecting out of Link disconnector for minimum length of 80 mm on cable connection side and 40 mm on KITKAT outgoing side (as shown in the Drg DIST/DB/04. The cross section of knife edge link shall be 20 x 4 mm. The material for both the strips and links shall be tin-plated E.C. grade copper. The size of bimetallic lugs hole & the hole on the disconnectors strip on cable side should be same.

The base of Link Disconnectors for 63 /100 kVA distribution box shall be rated as follows :

63 and 100 KVA - 150 A .

8. BUSBARS AND CONNECTIONS:

As shown in Drg DIST/DB/07, the incomer feeder should be on right side of the distribution box and all outgoing feeders will be on left side of the distribution box, with phase sequence RYB to be maintained. The phase busbars and feeder droppers from busbars shall be of tin-plated E.C. grade copper. The phase busbar strips shall be of size 25X5 mm for 63 KVA/100 KVA. Feeder droppers shall be 25X5 mm. Incomer dropper of

25 x 5 mm cross section for 63 /100 KVA box be provided. All busbars and droppers shall be properly drilled and deburred. Each busbars shall be of one single strip without any joint. Busbars shall be provided with durable PVC insulating sleeves of standard colour code for different phases. Corrugated/Spring & Plain washers shall be used for Nut -Bolt connections.

Busbars shall be mounted on suitable size support insulators which should be tightened from inside. i.e. once fitted , should not be able to removed.

Minimum clearances, wherever shown, shall be as per General Arrangement Drawing enclosed with this specification. Other clearances shall be as per requirement of IS: 4237/1982 amended upto date.

9. ENCLOSURE:

9.1 The Box & Doors shall be made up of CRCA MS sheet of 2mm thickness.

9.2 The manufacturing process of Box shall be either Deep Drawn process or Fabrication.

9.3 In case of Deep drawn type distribution boxes, the rounding of corners and slope on Top shall be as shown in the drawing. No joints in the body of the Box are permitted in Deep Drawn Process.

9.4 In case of fabricated box sharp corners & one side slope will be acceptable. The fabrication boxes, involving welding, shall not have more than two joints.

9.5 The welding process of both type of distribution boxes shall be done by MIG (Metal Inert Gas) welding and workmanship/finishing should be good enough.

9.6 **A. For Fabrication Box** : the general overall clear dimensions of 63 / 100 KVA Distribution Box shall be 1000 x 1010 x 325 (LXHXW)mm. The height of distribution boxes on front side shall be 1010 mm and backside shall be 990 mm. (Drg No. Dist/DB/01/A)

B B. For Deep Drawn Box : the general overall clear dimensions of 63 / 100 KVA Distribution Box shall be 1000 x 1010 x 325 (LXHXW)mm. without considering collor of box. The center height of distribution boxes on front side shall be 1010 mm and right & left side of the box shall be 995 mm. (Drg No. Dist/DB/01/B)

9.7 The Base and doors of enclosure shall be individually in one piece without any welding, except for fixing of the accessories like hinges, clamps, mounting clamps, bolts etc. The Box door (one) shall be fixed on right side of the box as shown in the indicative drawings attached with the specification. The Base and doors shall have flange / collars as shown in drawing. Collar of Base and doors shall overlap by 10mm. Rubber gasket of suitable size shall be provided between base and doors, such that it provides proper sealing between the door and base of box to avoid penetration of dust & ingress of water. Degree of protection shall be IP- 33 as per IS-8623/1993 (amended upto date). Rubber Gasket shall be fixed with suitable adhesive. On right side of the box four hinges shall be provided from inside of the box to fix the doors. Hinges shall be minimum 50 mm in length and made from 2mm thick sheet. Hinge stainless steel pin diameter shall be 4mm. The Hinges shall not be visible from outside.

9.8 The Isolator, HRC fuse base with link, KITKATs and Link Disconnector, shall be housed inside the enclosure. Isolator operating handle shall be accessible only after opening of the doors.

9.9 Four set of Louvers (Two sets on each side) shall be provided. The perforated sheet 20 SWG CRCA MS with 2.5mm holes shall be welded from inside of the louvers.

9.10 Mounting of components inside the enclosure shall allow free air circulation keeping the electrical clearances as per drawing Nos Dist/DB/06 attached with the specification .

9.11 Locking Arrangement to the Box:
The locking arrangements to boxes shall be such that the door (s) shall be automatically closed without applying external force. The door should be front operated with a common handle provided outside the door. In addition to this, C&R panel door locks shall be provided to the door at top & bottom. Key way shall be provided on the door for operating the lock from out side. Key way shall be provided with cover. A nylon washer shall be provided between the handle and door to avoid penetration of water.

9.12 A suitable cable termination arrangement with support insulators shall be provided on Isolators and Link Disconnectors. The bimetallic lugs of adequate size, as per enclosed specification & drawing shall be provided. Clearances, Creepages and convenience in making connections shall be ensured.

9.13 Tin-plated EC grade copper Neutral Busbar of 300 x 30 x 5mm for 63/100 KVA box capable of carrying for full load current. Neutral Busbar shall be isolated with respect to body. The Bimetallic lugs of adequate size, as per enclosed specification & drawing, shall be provided. Neutral Busbar shall be as shown in the drawing attached with the specifications.

9.14 Two galvanized earthing Bolts of M12 x 50 mm size shall be welded from inside and projecting outside of the box as shown in the drawing. There should be no powder coating on the earthing bolts. Two Nuts with washers shall be provided on each bolt.

9.15 Three bottom plates of the size 125mm x 125mm fixed with four screws from inside shall be provided for incoming and outgoing cables. Bottom plates shall be provided with suitable holes and rubber glands for the cables. Rubber glands shall be made such that internal diameter of glands provided for cables should be closed with the rubber film of minimum 1mm thickness. Cable will go through the glands by cutting the film of the glands. Bottom plates shall also be provided with cable clamps as shown in drawing.

9.16 Necessary fixing arrangement shall be provided at the back of the enclosure to ensure proper fixing on double pole structure by means of suitable clamps at four places.

9.17 Danger Board as shown in drawing no. Dist/DB/14 attached with specifications shall be riveted on the box as per IS:2551. Danger board marking by painting shall not be accepted.

9.18 All the components inside the Box shall be mounted on CRCA MS strips of 2mm thickness. The mounting strips shall be provided with required bends or ribs to give the extra strength and shall be powder coated or zinc plated.

9.19 All joints of current carrying parts shall be bolted with 8.8 grade high tensile MS nuts & bolts, corrugated/Spring & Plain washers. The nuts & bolts should be of hexagonal type.All the nuts, bolts & washers should be properly zinc plated.

9.20 Each distribution box shall be supplied with proper packing in five ply- corrugated box.

9.21 Name plate having details such as Month & year of manufacturing, Name of

manufacturer/Trade mark, Sr.No, and rating of Distribution box, shall be riveted on the Distribution box door. The name plate should be of stainless steel of thickness 1 mm. Mahavitaran logo in Marathi Language shall be embossed on the door of the distribution box. Marathi slogans as per attached Annexure – I shall be painted in glowing colour (Red/ Yellow/ Bright Green/Orange). The letter size, font, height & length shall be suitable to the size of distribution boxes such that slogan can be clearly readable from 30 feet distance. There are total 15 nos Marathi slogans, out of them one slogan has to be painted per box. All slogans shall be covered equally on the ordered quantity. All above shall be so placed to give box good look.

9.22 Incoming and outgoing circuit should be duly highlighted with paint by stencil printing.

9.23 Adequate slope on the top of box shall be provided to drain out rainwater from the top.

9.24 3 Nos. Kitkats and 3 Nos. HRC fuse links in spare should be invariably provided with each box.

9.25 Good-quality plastic sticker leaflet should be pasted inside of distribution box door. The matter of instruction leaflet is given along with this specification. All the instructions in Leaflet should be in Marathi language.

10. CABLE TERMINATION:

Adequate size of lugs shall be provided for 3½ core, LT XLPE cable on incoming side and out going side for 63/100 KVA boxes as below :

	Incoming side	Outgoing Side
63 KVA /100 kVA	120 sq.mm	50/ 70 sq.mm

11. FINISHING OF DISTRIBUTION BOX:

The outer side and inside.surface of the box shall be properly Pre-treated / Phosphated in seven tank process as per IS: 6005 and shall be applied powder coating of minimum 40 micron thickness. The Colour shade of **smoke gray** for 63 kVA box and **light gray** for 100 KVA box as per IS: 5/2007 (Colours of Ready Mixed paints and Enamels) shall be applied inside & outside surface of the box. Powder coating shall be suitable for outdoor use, conforming IS: 13871/1993 – Powder coatings. The facility for powder coating including seven tank shall be in-house to ensure proper quality for outdoor application.

12. TESTS & TEST CERTIFICATES:

In case of bought out items, routine and acceptance tests as per relevant IS and this specification shall be carried out at the original manufacturers' works.

12.1. Routine Test (Carried out on all boxes):

a. Overall Dimensions Checking.

b. Insulation Resistance Tests.

c. High Voltage Test at 2500 V, 50 Hz AC for one minute.

d. Operation Test on KITKAT /Isolator/Link Disconnector/ HRC fuse base and fuse links.

12.2. Acceptance Tests (on complete Distribution Box):

Following tests shall be carried out as per acceptance tests in addition to routine tests on one random sample of each rating out of the lot offered for inspection:

i) Temperature rise test on one sample of each rating.

Temperature rise test will be carried out as per the procedure given below:

For temperature rise test, a distribution box with all assembly of Kitkat/Link Disconnectors/ Isolator /HRC fuse base with link shall be kept in an enclosure such that the temperature outside the box shall be maintained at 50° C. 20% more current than transformer secondary capacity i.e. for 63 KVA Distribution Transformers full load current 84 A, 20 % more is 100 A shall be kept in incoming circuit keeping outgoing circuits short, till the temperature stabilizes and maximum temperature rise should be recorded.

12.3. TYPE TESTS :

I ON COMPLETE BOX:

a. Temperature rise test:-

The temperature rise test should be carried out as per IS: 8623 –1993.

b. High voltage test shall be carried out as per IS:8623/ 1993 amended upto date.

c. Short Time Withstand Current Test on Distribution Box shall be carried out as per IS 8623 or latest version.

The Distribution Box should be subjected to Short Time Withstand Current Test for 4 KA for 2 seconds for 63/100 KVA all the circuits independently. The test should be carried out after by- passing KITKATs, HRC fuse links.

d. Degree of protection for **IP- 33** on complete box shall be carried out as per IS:13947/1993 or the latest version thereof.

II. ISOLATOR (SWITCH DISCONNECTOR):

All type tests on isolator (Switch Disconnector) as per IS:13947/1993 (amended upto date) shall be carried out.

III. ON HRC fuses base and HRC fuse links :

All type tests on HRC fuses and HRC fuse links as per IS 13703/1993 (Part I & II amended upto date) for HRC Fuse Base and HRC fuse link shall be carried out.

IV. KITKAT fuse:

All type tests on Kitkat as per IS 2086-1993 (amended upto date).

A. TYPE TESTS :

The tests for rewirable fuses shall be carried out as per the procedure detailed in I.S.2086-1993. However, for the guidance of the tenderer, the different type tests are mentioned below :

1. Visual examination.

2. Test for dimensions.
3. Test for mechanical endurance.
4. Test for mechanical strength.
5. Test for temperature rise :- As per Clause No.9.6 of I.S. 2086/1993 , temperature rise of different parts of the kitkats when tested in an ambient temperature of 40 deg. C, should not exceed 55 deg.C.
6. Insulation Resistance test
7. High Voltage Test
8. Test for breaking capacity.
9. Test for water absorption.
10. Test on ceramic material.
11. Ignition test (for non-ceramic materials).
12. Test for withdrawal force.

V) On Link Disconnector –

Following tests shall be carried out on link disconnector as per IS:

1. Short Circuit Withstand Strength
2. Temperature rise Limits
3. Mechanical Operations

B. ROUTINE TESTS :

Every rewirable fuse unit manufactured and to be supplied against MSEDCL's order will be subject to routine tests mentioned below :

a. High Voltage Test :

This test shall be carried out on fuse unit as per the procedure detailed in clause 9.8 of I.S.2086-1993.(amended upto date) The test voltage shall not be less than 2.5 kV A.C. with frequency 50 Hz and shall be maintained for one minute. There shall be no puncture of arcing during the high voltage test. Immediately following the test, the insulation resistance by 1kV megger as per Clause 9.7 of I.S.2086-1993 (amended up to date) shall be measured which shall not be less than 10 mega ohms.

12.4 TYPE - TEST CERTIFICATES:

The Distribution Box, Isolator (Switch Disconnector), HRC fuse, HRC Fuse Link, Link Disconnector and Kitkat offered shall be fully type tested as per relevant IS and this specification. The successful bidder shall furnish detailed type test reports before commencement of the supply.

The detailed type test Reports shall be furnished with relevant oscillogram drawings and certified Drawings of the equipment tested. The purchaser reserves the right to demand repetition of some or all the Type Tests in presence of purchaser's representative at purchaser's cost.

All the above Type Tests shall be carried out from laboratories accredited by the National Board of Testing and Calibration Laboratories (NABL) of Department of science & technology, Government of India such as CPRI Bangalore/Bhopal, ERDA Baroda, to prove that the complete Box, Isolator & Kitkat meets the requirements of the specification. The Tenderers should also furnish certificate from laboratories where Type Tested that requisite test facility available in house. The type test reports conducted in manufacturers own laboratory and certified by testing institute shall not be acceptable.

The Tenderer should also furnish the particulars giving specific required details of

Distribution Boxes, L.T. Circuit Breakers, Isolator and Link Disconnector in Schedule `A' attached.

The offers without details in Schedule `A' stand rejected.

13 TESTING & MANUFACTURING FACILITIES :

The Tenderer must clearly indicate what testing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out all Routine, Acceptance and Type Tests. These facilities should be available to MSEDCL's Engineers, if deputed to carry out or witness the tests in the manufacturer's works.

The tenderer must have all the in-house testing facilities to carry out the acceptance tests on the Box. The tenderer shall furnish detailed process of manufacturing and powder coating. In case box manufacturing/ powder coating is to be carried out from outside agencies, the tenderer shall furnish the facilities available with the sub-vendor. Undertaking from sub vendor regarding providing services of these facilities, shall be submitted.

14. PROTOTYPE SAMPLE :

The successful bidders should manufacture 3 Nos. of prototype L.T. Distribution Boxes as per the specification and keep at their works for the purpose of sample inspection and testing. The MSEDCL at their option may sent a team of Engineers to the works. Prior intimation of this inspection may not be given to the Bidder.

15 INSPECTION:

All Routine and Acceptance tests and inspection shall be carried out at the place of manufacturer. The manufacturer shall offer the Inspector (representing the purchaser), all reasonable facilities free of charge at the time of the inspection.

The representative of the CE (Stores) and the Executive Engineer (INSPECTION WING) shall jointly inspect the first lot of each rating of box.

16 REJECTION:

The purchaser may select one box at random from a lot of 100 Distribution Boxes of each type or part thereof as may be supplied from time to time. The Box so selected must pass any or all the Type Tests mentioned above otherwise the whole lot of 100 boxes or part thereof, from which one box was selected, will be rejected. For this purpose, lots will be made consisting of 100 boxes per lot of each rating at stores after supply.

The testing under this clause will be done in any Laboratory of the MSEDCL's choice including MSEDCL's Laboratory. Notice of such tests will be given by the MSEDCL to supplier. The supplier is at liberty to be present during the testing.

17 SCHEDULES:

The tenderer shall fill in the following schedule, which form part of the tender specification and offer. If the schedules are not submitted duly filled-in with the offer, the offer shall be liable for rejection.

Schedule `A' - Guaranteed Technical Particulars
Schedule `B' - Tenderer's Experience.

The tenderer shall submit the list of orders for similar type of equipments, executed or under execution during the last three years, with full details in the schedule of Tenderer's experience (Schedule `B') to enable the purchaser to evaluate the tender.

18. DRAWINGS ENCLOSED:

The following listed of indicative Drawings are attached with the specifications.

i) Dist/DB/01/A ii) Dist/DB/01/B iii) Dist/DB/06 iv) Dist/DB/07

v) Dist/DB/08 vi) Dist/DB/10 vii) Dist./DB/12

ix)Dist/DB/13 x) Dist/DB/14 xi) CE/Dist/MM-III/MSEDCL/KITKAT/100/02 rev.02

xii) Annexure -I

XVVV

The successful bidder shall submit set of all drawings of the distribution box and its components in triplicate to CE (Stores) office and get approved before commencement of supply (i.e. Ist Lot of Distribution Boxes).

TECHNICAL SPECIFICATION OF BIMETALLIC LUGS

1) SCOPE:

Bimetallic terminal lugs are for use in Distribution Boxes/Distribution Transformer and other O&M application for Crimping Copper and Aluminum Cables and termination on surface namely Aluminum/Brass/Copper Plated terminals without the use of Bimetallic washers.

2) STANDARD:

Bimetallic lug crimped joint should conform to all tests laid down in IS-8337 e.g. clause 4.1.1 (6.2) for initial resistance and clause 4.1.3 (6.4) for Electrical Load Cycle test for 1000 Cycles and Tensile Test clause 4.2 (6.5). Type Test certificate to this effect giving numerical values obtained must be provided.

3) SERVICE CONDITION:

The Lugs to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

3.1	Maximum ambient temperature (Degree C)	50
3.2	Maximum temperature in shade (Degree C)	45
3.3	Minimum Temperature (Degree C)	3.5
3.4	Relative Humidity (percent)	10 to 95
3.5	Maximum Annual rain fall (mm)	1450
3.6	Maximum wind pressure (kg/sq.m)	150
3.7	Maximum altitude above mean sea level (Meter)	1000
3.8	Isoceranic level (days per year)	50
3.9	Siesmic level (Horizontal Acceleration)	0.3 g
3.10	Moderately hot and humid tropical climate conductive to rust and fungus growth	

4) MATERIAL SPECIFICATION:

Bimetallic lug should be made for electrolytic grade aluminum. Each lug should be copper coated by electrolytic process and rich layer of tin should be mounted through out the lug to protect from Galvanic Corrosion. The lugs shall be such that the rich layer of tin should not peeled during operation. Individual lot should be pre- filled with conductive inhibition compound and lug should be duly capped to prevent oozing of compound. The ductility of material should be such that flow ability of material be adequate to flow in to the strand of the conductor and withstand on crimping pressure of 8500 PSI. The cut cross section of the joints shall be homogeneous.

5) GENERAL REQUIREMENTS:

The minimum dimensions of the bimetallic lug in respect of barrel thickness and holes diameter should conform to enclosed Drawing No. No.Dist./DB/13.

6) TESTS:

i) Initial resistance test of bimetallic crimped joint as per IS: 8337.
ii) Heating cycle test for 1000 cycles of crimped joint of bimetallic lugs as per IS 8337.
iii) Tensile strength test of the crimped joint of bimetallic lug as per IS: 8337.
iv) Dimensional test as per drawing/offer.

7. TEST CERTIFICATES:

At present the following makes and types of bimetallic lugs are accepted by the MSEDCL.

Usha Martin Industries, Ismail, Chetna , Klippon, SRI, Alcon, NES , Hames and HB

In case any other equivalent make of bimetallic lugs, if bidder offer, they should indicate makes and types of bimetallic lugs in E-tendering GTP. The bidders should submit complete test reports of the bimetallic lugs as per this specification, clause No. 6 to CE (Stores) for approval before commencement of supply. The Tests on lugs should be done in any reputed independent laboratory.

8. DRAWING ENCLOSED: No.Dist./DB/13

SCHEDULE - `A'

E-tendering Guaranteed Technical Particulars

SCHEDULE - `B'

SCHEDULE OF TENDERER'S EXPERIENCE

Tenderer shall furnish here a list of similar orders executed/under execution by him to whom a reference may be made by Purchaser in case he considers such a reference necessary.

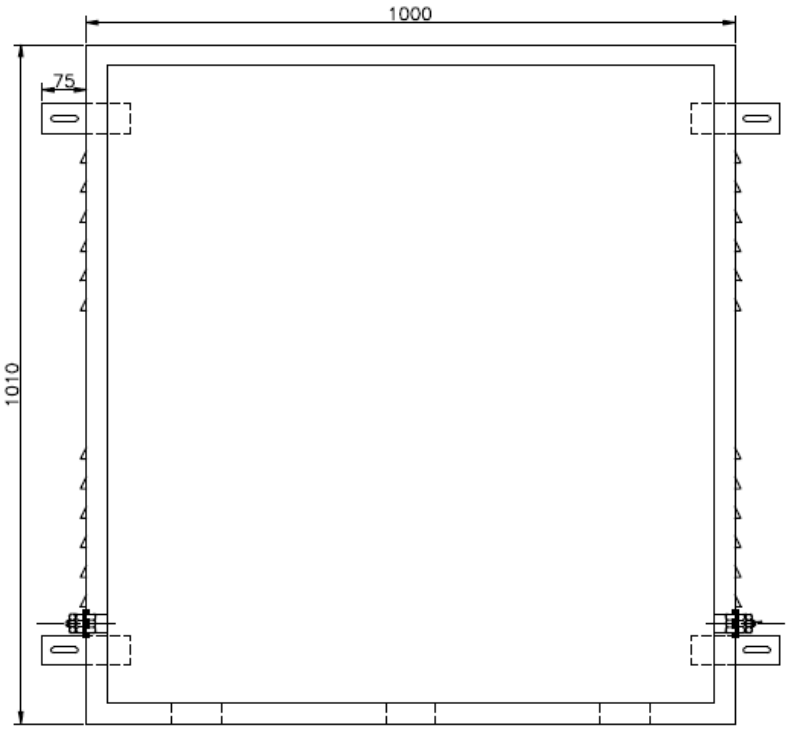
Sr. No.	Name of Client & Description	Value of order	Period of supply and commissioning	Name & Address to whom reference may be made.
1	2	3	4	5

NAME OF FIRM _____

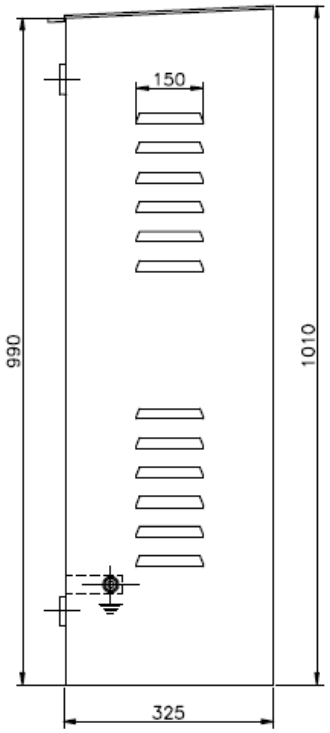
NAME & SIGNATURE OF THE TENDERER_____

DESIGNATION _____

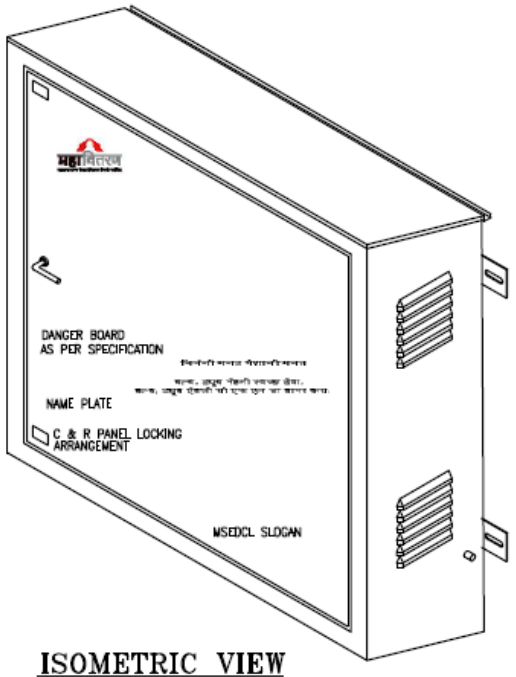
DATE _____



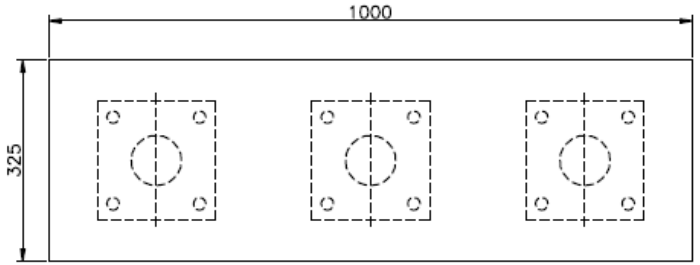
FRONT VIEW (WITHOUT DOOR)



SIDE VIEW
(WITHOUT DOOR)



ISOMETRIC VIEW

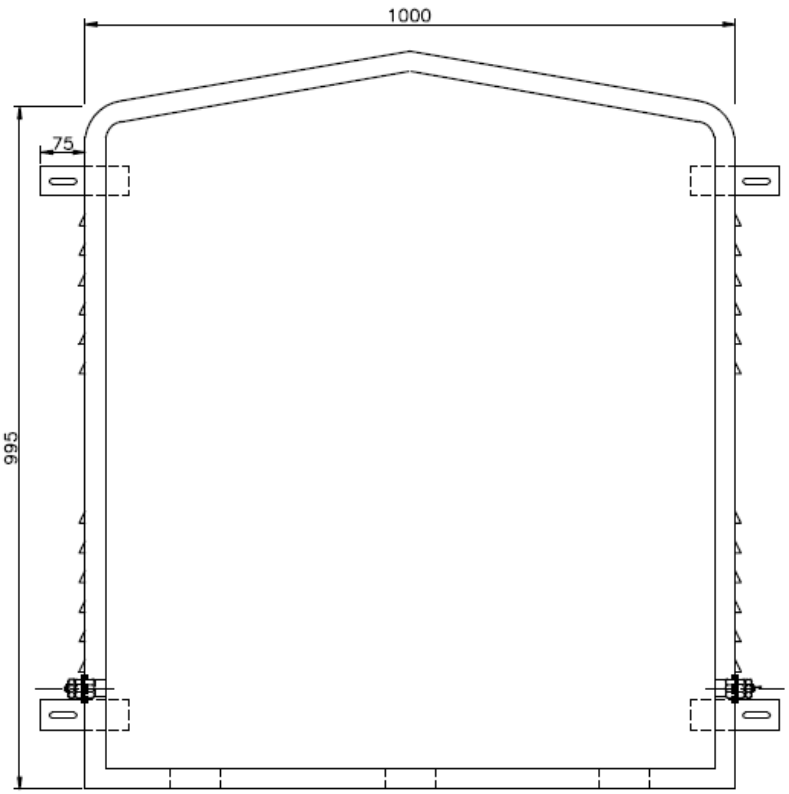


BOTTOM PLATE OF THE BOX

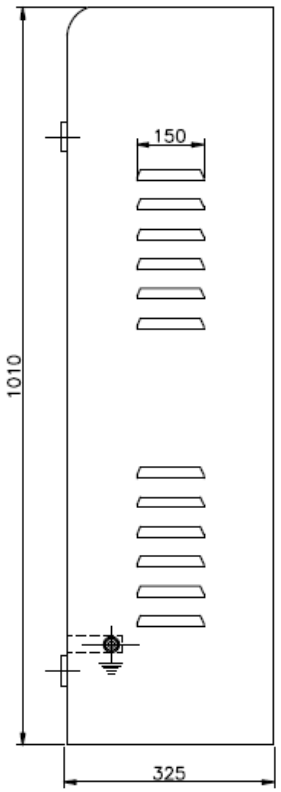
THIS IS AN INDICATIVE DRAWING.

ALL DIMENSIONS ARE IN MM

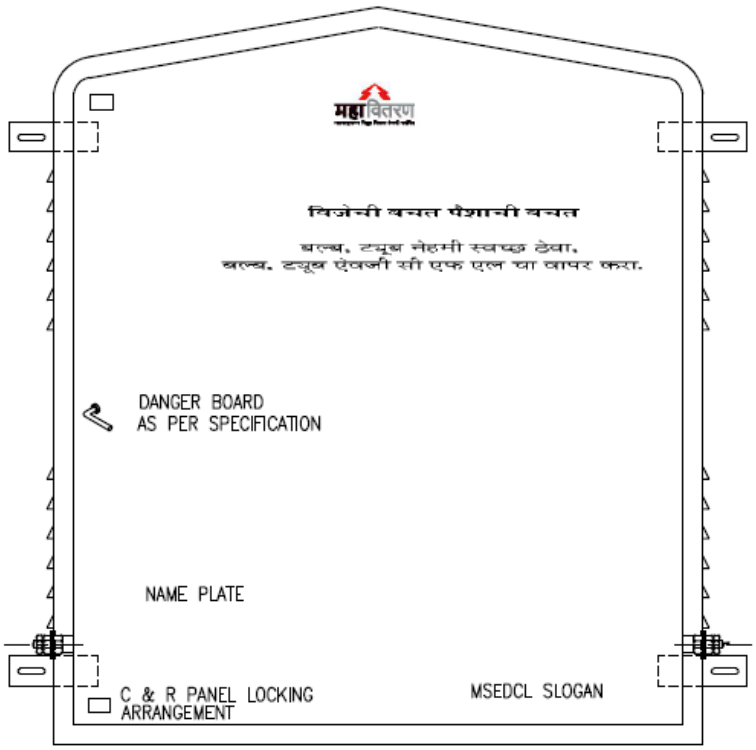
		DyEE	
G.A. OF L.T. DISTRIBUTION BOX 63/100 KVA (SINGLE DOOR)		EE	
		SE	
	Scale :N.T.S.	APPROVED BY - C.E.	
DATE	SHEET	Drg.No.: DIST/DB/01/A	



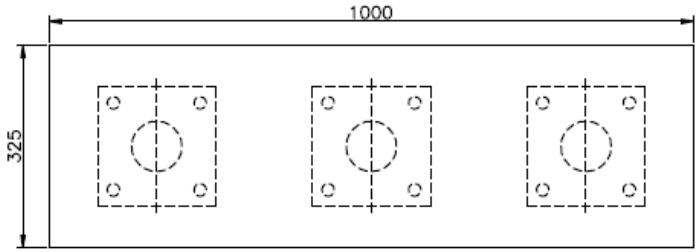
FRONT VIEW (WITHOUT DOOR)



SIDE VIEW
(WITHOUT DOOR)



FRONT VIEW (WITH DOOR)

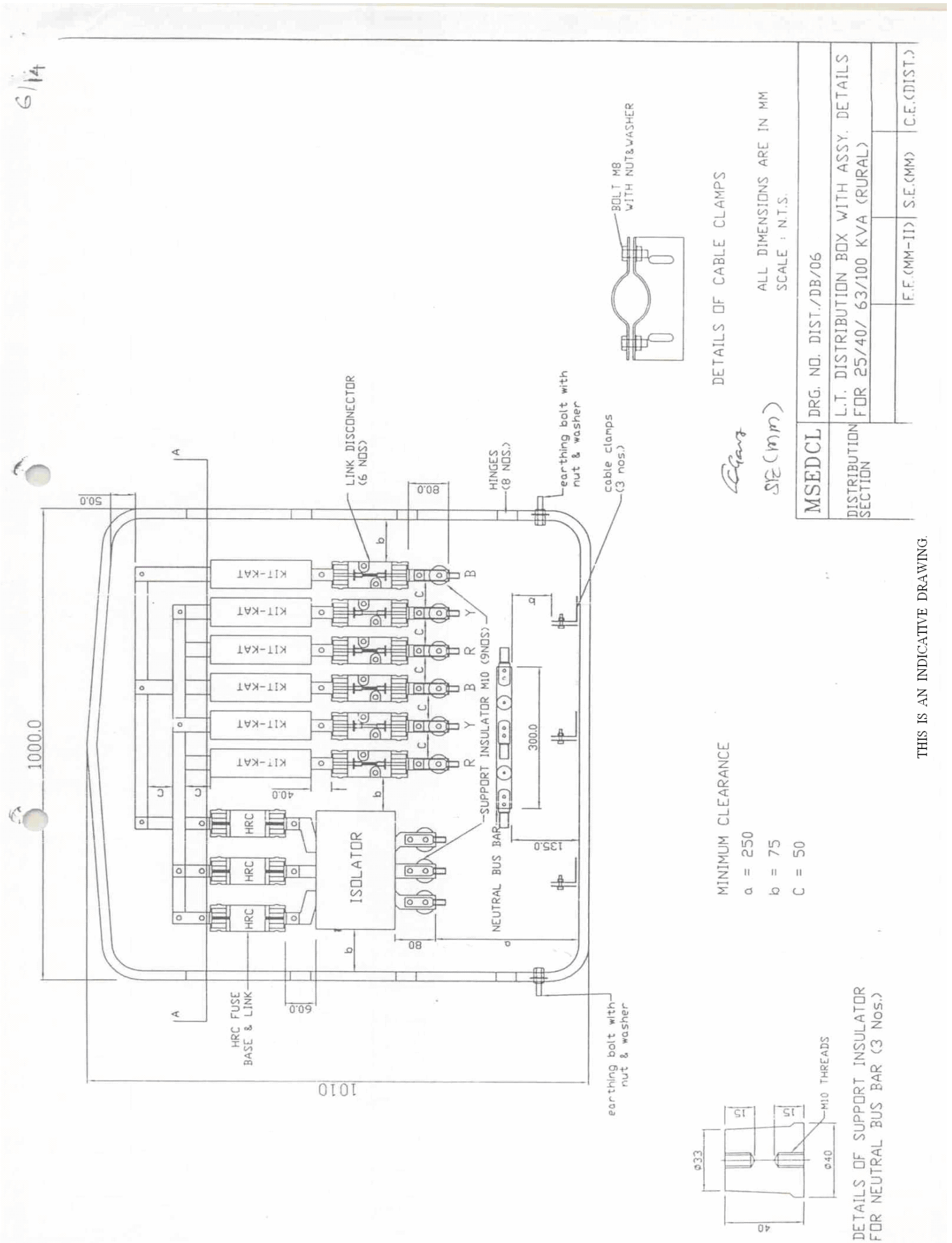


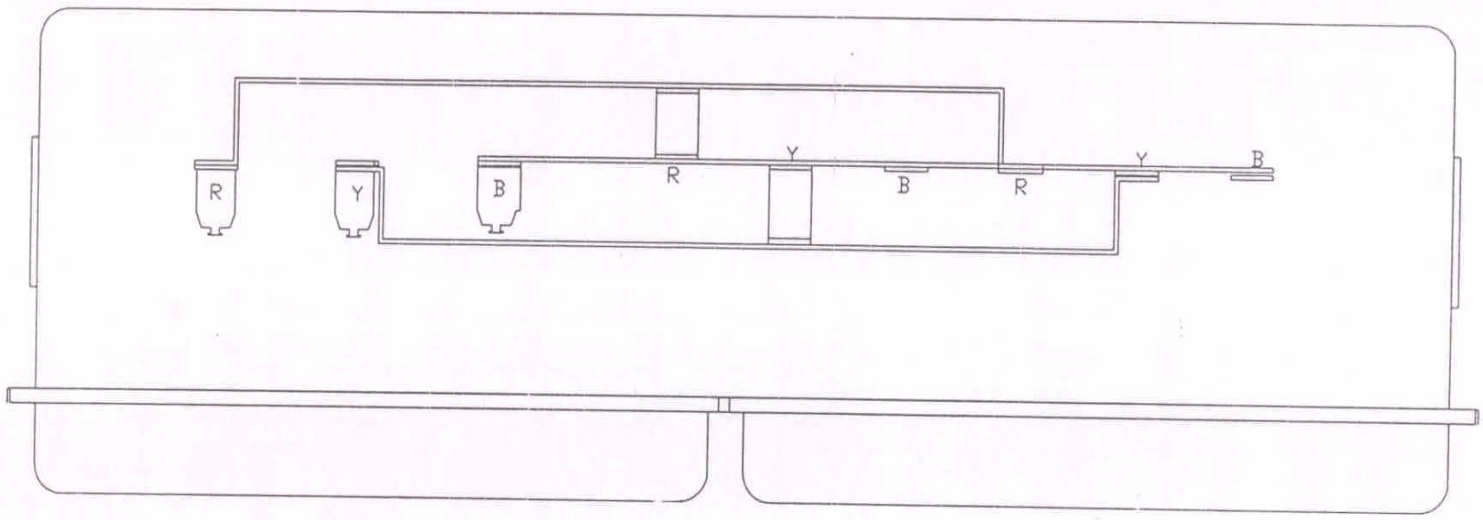
BOTTOM PLATE OF THE BOX

THIS IS AN INDICATIVE DRAWING.

ALL DIMENSIONS ARE IN MM

		DyEE	
G.A. OF L.T. DISTRIBUTION BOX 63/100 KVA (SINGLE DOOR)		EE	
		SE	
	Scale :N.T.S.	APPROVED BY - C.E.	
DATE	SHEET	Drg.No.: DIST/DB/01/B	


6/14
1000.0
1010
50.0
80.0
40.0
60.0
80
135.0
300.0
KIT-KAT
HRC
ISOLATOR
A
B
C
Y
R
LINK DISCONNECTOR (6 NOS)
HINGES (8 NOS.)
earthing bolt with nut & washer
cable clamps (3 nos.)
SUPPORT INSULATOR M10 (9NOS)
NEUTRAL BUS BAR
HRC FUSE BASE & LINK
earthing bolt with nut & washer
BOLT M8 WITH NUT&WASHER
DETAILS OF CABLE CLAMPS
ALL DIMENSIONS ARE IN MM
SCALE : N.T.S.
MINIMUM CLEARANCE
a = 250
b = 75
C = 50
MSEDCL
DRG. NO. DIST./DB/06
DISTRIBUTION SECTION
L.T. DISTRIBUTION BOX WITH ASSY. DETAILS FOR 25/40/ 63/100 KVA (RURAL)
F.F.(MM-II)
S.E.(MM)
C.E.(DIST.)
M10 THREADS
15
15
ø33
ø40
40
DETAILS OF SUPPORT INSULATOR FOR NEUTRAL BUS BAR (3 Nos.)
THIS IS AN INDICATIVE DRAWING.



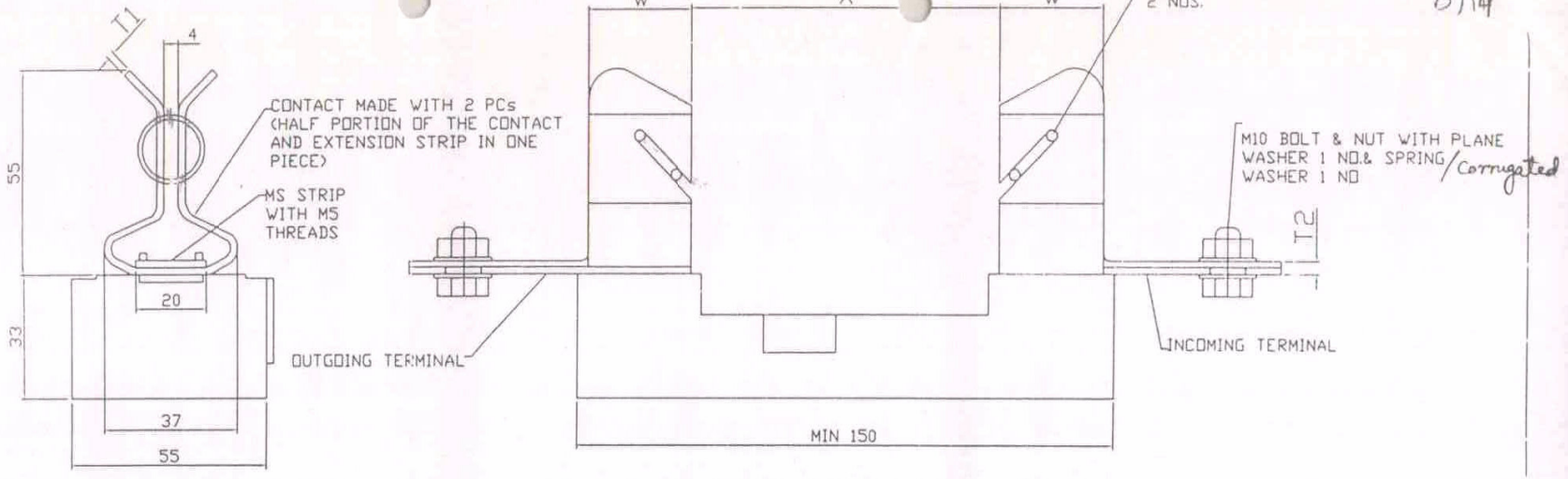
SECTION "A-A" WITH BUS BAR ASSEMBLY DETAILS.

Sfz(mm)

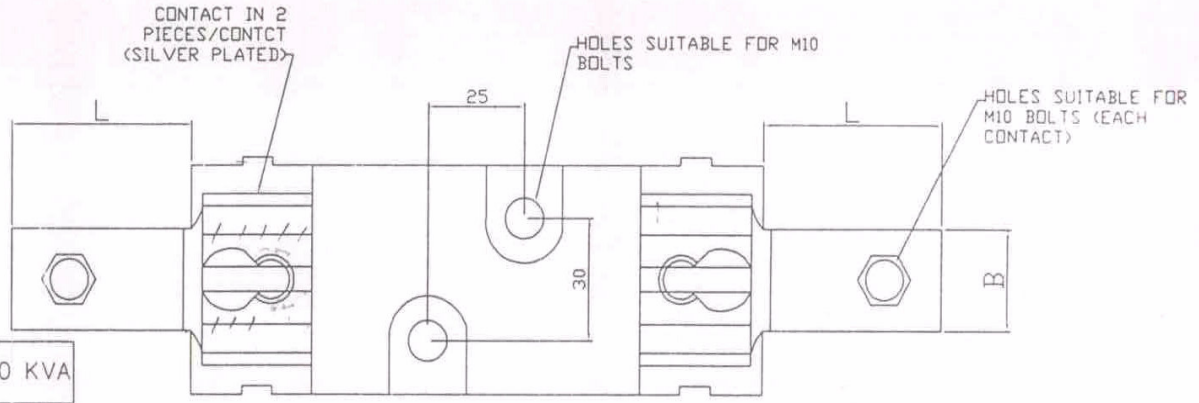
ALL DIMENSIONS ARE IN MM
SCALE : N.T.S.

MSEDCL	DRG. NO. DIST./DB/07			
DISTRIBUTION SECTION	L.T. DISTRIBUTION BOX WITH BUS BAR DETAILS FOR 25/40/ 63/100 KVA (RURAL/URBAN)			
		E.E.(MM-II)	S.E.(MM)	C.E.(DIST.)

THIS IS AN INDICATIVE DRAWING.



8/14



DESCRIPTION	25/40 KVA	63/100 KVA	200 KVA
FUSE BASE CURRENT RATING	80 Amps	200 Amps	400 Amps
TERMINAL THICKNESS T1	1.25 MM	1.8 MM	3 MM
TERMINAL THICKNESS T2	2.5 MM	3.6 MM	6 MM
X	74 MM	84 MM	86 MM
W	29 MM	29 MM	35 MM
L	25 MM	25 MM	38 MM
B	28 MM	28 MM	34 MM

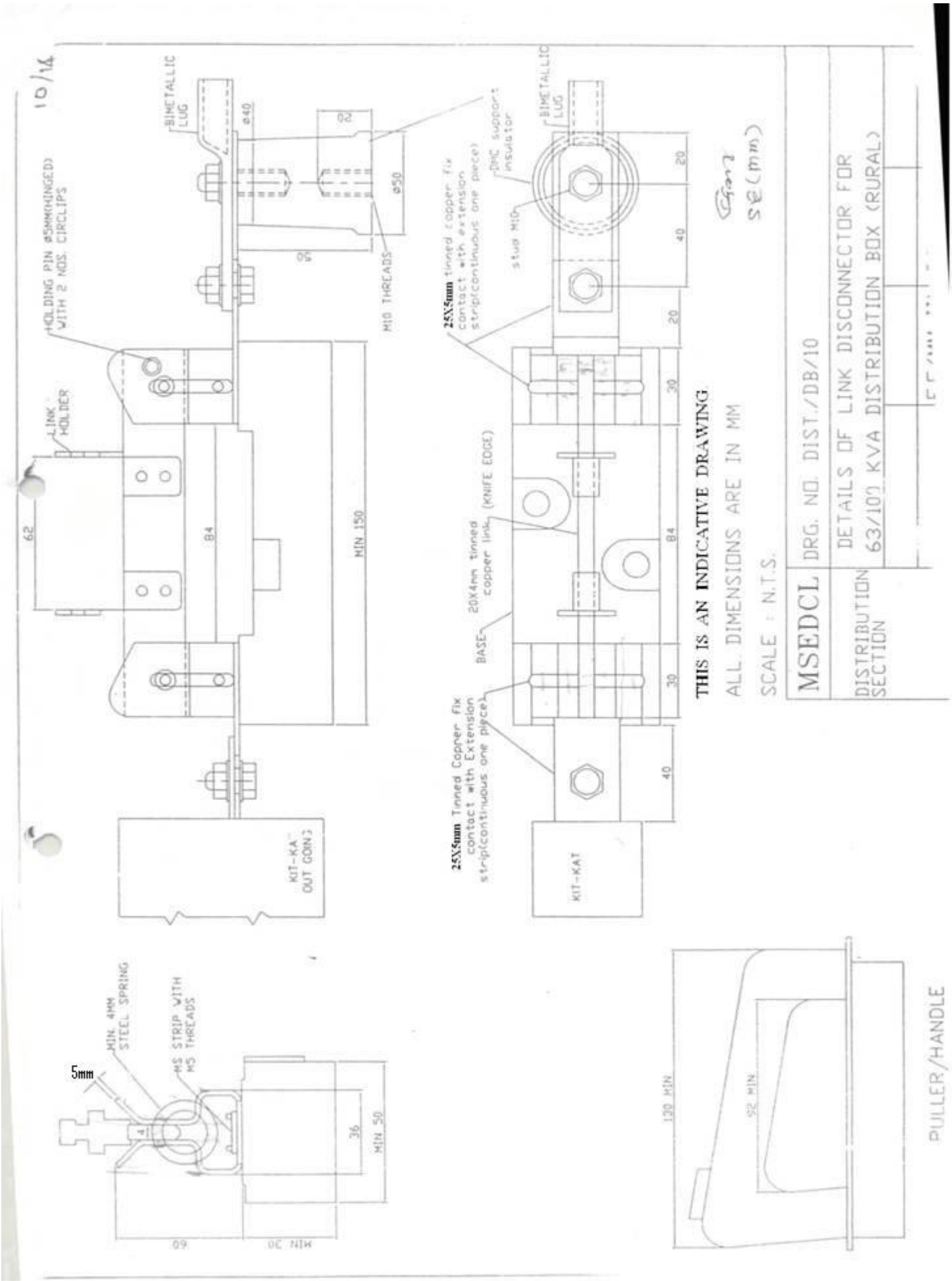
THIS IS AN INDICATIVE DRAWING.

ALL DIMENSIONS ARE IN MM

SCALE : N.T.S.

SE(MM)

MSEDCL	DRG. NO. DIST./DB/08			
DISTRIBUTION SECTION	HRC FUSE BASE FOR 25/40/63/ 100/200 KVA			
		F.F.(MM-II)	S.E.(MM)	C.E.(DIST.)


10/14
BIMETALLIC LUG
ø40
ø50
M10 THREADS
HOLDING PIN ø5MM(HINGED) WITH 2 NOS. CIRCLIPS
LINK HOLDER
62
84
MIN 150
KIT-KAT OUT GOING
25X5mm tinned copper fix contact with extension strip(continuous one piece)
DMC support insulator
stud M10
BIMETALLIC LUG
20
40
20
30
84
30
40
20X4mm tinned copper link (KNIFE EDGE)
BASE
25X5mm Tinned Copper fix contact with Extension strip(continuous one piece)
KIT-KAT
THIS IS AN INDICATIVE DRAWING
ALL DIMENSIONS ARE IN MM
SCALE : N.T.S.
MSEDCL
DRG. NO. DIST./DB/10
DETAILS OF LINK DISCONNECTOR FOR 63/100 KVA DISTRIBUTION BOX (RURAL)
DISTRIBUTION SECTION
5mm
MIN 4MM STEEL SPRING
MS STRIP WITH M5 THREADS
4
36
MIN 50
60
MIN 30
130 MIN
92 MIN
PULLER/HANDLE

STORES: MSC-II/DB/Rural/ 2011/02

बोल्टने आवळून घट्ट करा. त्यामध्ये फ्लॅट (सपाट) वॉशर, स्प्रिंग वॉशर व ग्रीस वापरण्यास विसरू नका.

६) डिस्ट्रिब्युशन बॉक्सची वापरात न घेतलेली छिद्रे उघडी असल्यास ती बंद करा म्हणजे उंदीर, घूस, साप, पाल, चिमणी वगैरेसारखे प्राणी आतमध्ये जाणार नाहीत व शॉर्ट सर्किटचा धोका टाळला जाईल.

७) बॉक्सलगत दिलेल्या पी.व्ही.सी. च्या किंवा ब्रासच्या रिंग (ग्लैड) डिस्ट्रिब्युशन बॉक्सच्या इन्कमिंग व आऊटगोईंग वायरींच्या छिद्रांभोवती पकडण्या करण्या म्हणजे वायरी तीक्ष्ण कापल्या जाणार नाहीत.

८) सर्व भाग रंगवल्यानंतर डिस्ट्रिब्युशन बॉक्सचा दरवाजा व्यवस्थित बंद करून कुलुप लावण्यास विसरू नका.

९) नियमित सर्व जॉईंट्स (साधे) तपासा व आवश्यकतेनुसार घट्ट करा.

ब) एम. सी. सी. बी. वापरण्याबाबत घेण्याची काळजी.

१) एम. सी. सी. बी. हा सर्विस ब्रेकर असून दिलेल्या ठराविक करंट सेटिंगवर तो ट्रिप होत असतो म्हणून लाईनवरील वीजभार त्या मर्यादेतच ठेवा.

२) एम. सी. सी. बी ट्रिप झाल्यानंतर थोडया वेळानंतर "नॉब" ऑफपोझिशनवर आणा म्हणजे एम. सी. सी. बी. रीसेट होईल. एम. सी. सी. बी ऑन/ऑफपोझिशनवर नका.

३) लाईनवर लोड करण्याचे असल्यास प्रथम एम. सी. सी. बी. बंद करा टेस्टरने खात्री करा ऑफपोझिशनला आहे

४) एम. सी. सी. बी. बंद करून लिंकडिस्कनेक्टर ऑफ करा. तसेच लाईनला स्पर्श करण्यापूर्वी अर्थिंग रॉडचा वापर करून लाईन "अर्थ" करा. एम. सी. सी. बी. वापरात करण्याचा किंवा करंट सेटिंग बदलण्याचा प्रयत्न करू नका. लाईनचे लोड झाल्यानंतर प्रथम लिंकडिस्कनेक्टर क्लोज करा व नंतर एम. सी. सी. बी. ऑन करा.

५) एम. सी. सी. बी. बदलताना तो त्या नमूद केलेल्या / योग्य करंट सेटिंगवर वापरा.

क) इन्कमिंग स्विच वापरण्याबाबत सूचना :

१) इन्कमिंग स्विच साधारण "ऑन / ऑफ" करू शकतो अशा पध्दतीचा आहे. "ऑन / ऑफ' इन्डीकेशन ऑपरेटिंग हॅन्डलवर आहे.

२) इन्कमिंग स्विच "ऑन" करण्यासाठी हॅन्डल क्लॉकवाईज (घड्याळाच्या) दिशेने फिरवा.

३) इन्कमिंग स्विच "ऑफ" करण्यासाठी हॅन्डल अन्टिक्लॉकवाईज (घड्याळाच्या विरूद्ध) दिशेने फिरवा.

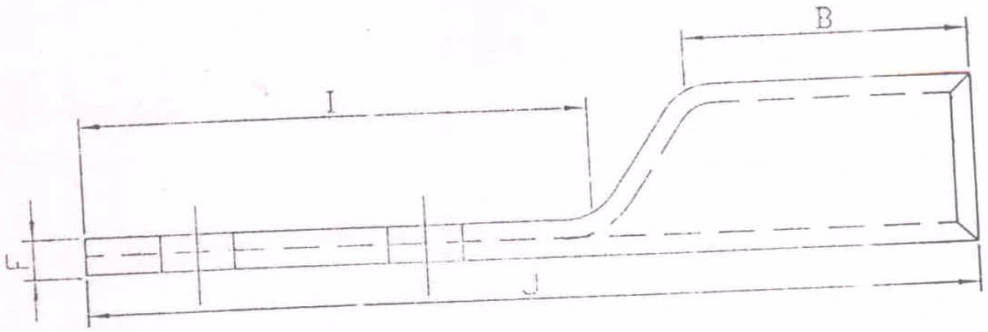
४) इन्कमिंग स्विच बदलताना तो वर नमूद केलेल्या / योग्य ऑफिअर क्षमतेचा वापरा.

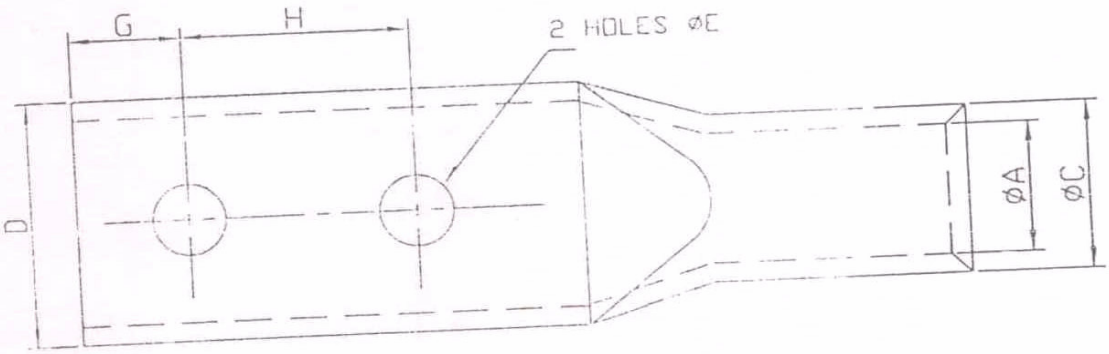
लक्षात ठेवा हा डिस्ट्रिब्युशन बॉक्स व्यवस्थित हाताळल्यास ट्रान्सफॉर्मरचे व इतर मालमत्तेचे नुकसान टाळता येते. तसेच लाईन स्टाफला सुद्धा अधिकसुरक्षितता मिळते

INSTRUCTIONS LEAFLET IN MARATHI				MSEDCL
22/8		22.8.06	24/08/06	DISTRIBUTION SECTION
WRITTEN BY Dy. E.E (MM-II)	CHK. BY E.E. (MM-II)	SUB. BY S.E.(MM)	APPR. BY C.E.(Dist)	DRG NO. Dist./ DB/ 12

STORES: MSC-II/DB/Rural/ 2011/02

13/14





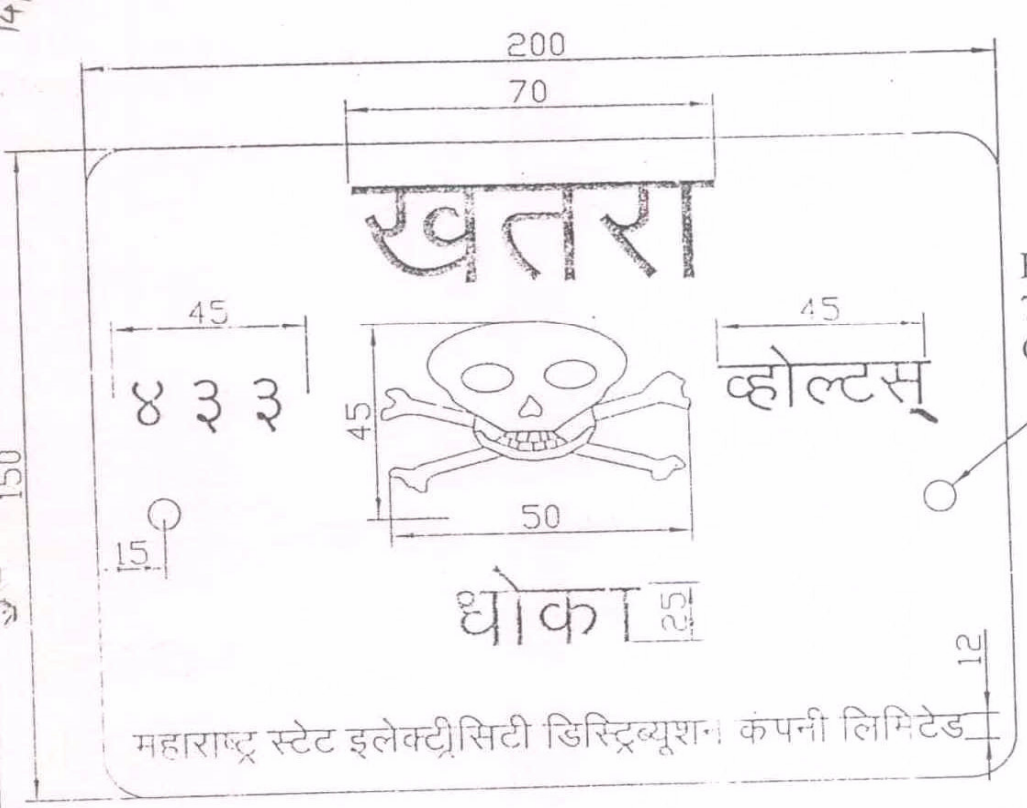
CABLE SIZE	ØA	ØC	D	F	ØE	B	G	H	I	J
(25 SQ MM)	7.0	9.7	13.7	2.7	8.2	21	11	20.0	–	70
(35 SQ MM)	8.0	10.8	15.4	2.8	8.2	21	11	20.0	–	70
(50 SQ MM)	9.6	13.6	20.0	3.5	10.3	30	13	40	65.0	115
(70 SQ MM)	11.8	17.0	24.0	5.3	10.3	38	13	40	65.0	115
(95 SQ MM)	13.0	17.0	30.0	3.9	10.3	30	13	40	65.0	115
(120 SQ MM)	15.6	21.9	30.0	6.0	13.0	50	20	40	81.0	145
(150 SQ MM)	16.5	22.0	31.5	5.3	13.0	50	20	40	90.0	156
(185 SQ MM)	18.2	27.6	50.0	9.0	13.0	50	20	40	90.0	156
(225 SQ MM)	21.8	30.0	50.0	7.5	13.0	50	20	40	90.0	156
(240 SQ MM)	21.8	30.0	50.0	7.5	13.0	50	20	40	90.0	156
(300 SQ MM)	24.0	31.0	45.0	6.8	13.0	50	20	40	90.0	156

ALL DIMENSIONS ARE IN MM
SCALE : N.T.S.
THIS IS AN INDICATIVE DRAWING.

BIMETALLIC LUGS			SCALE: NTS	MSEDCL
		22-8-06	22/08/06	DISTRIBUTION SECTION
DRN. BY. Dy.E.E(MM-II)	CHK. BY. E.E.(MM-II)	SUB.. BY. S.E.(MM)	APPR. BY. C.E.(DIST.)	DRG. NO. Dist./DB/ 13

STORES: MSC-II/DB/Rural/ 2011/02

14/14



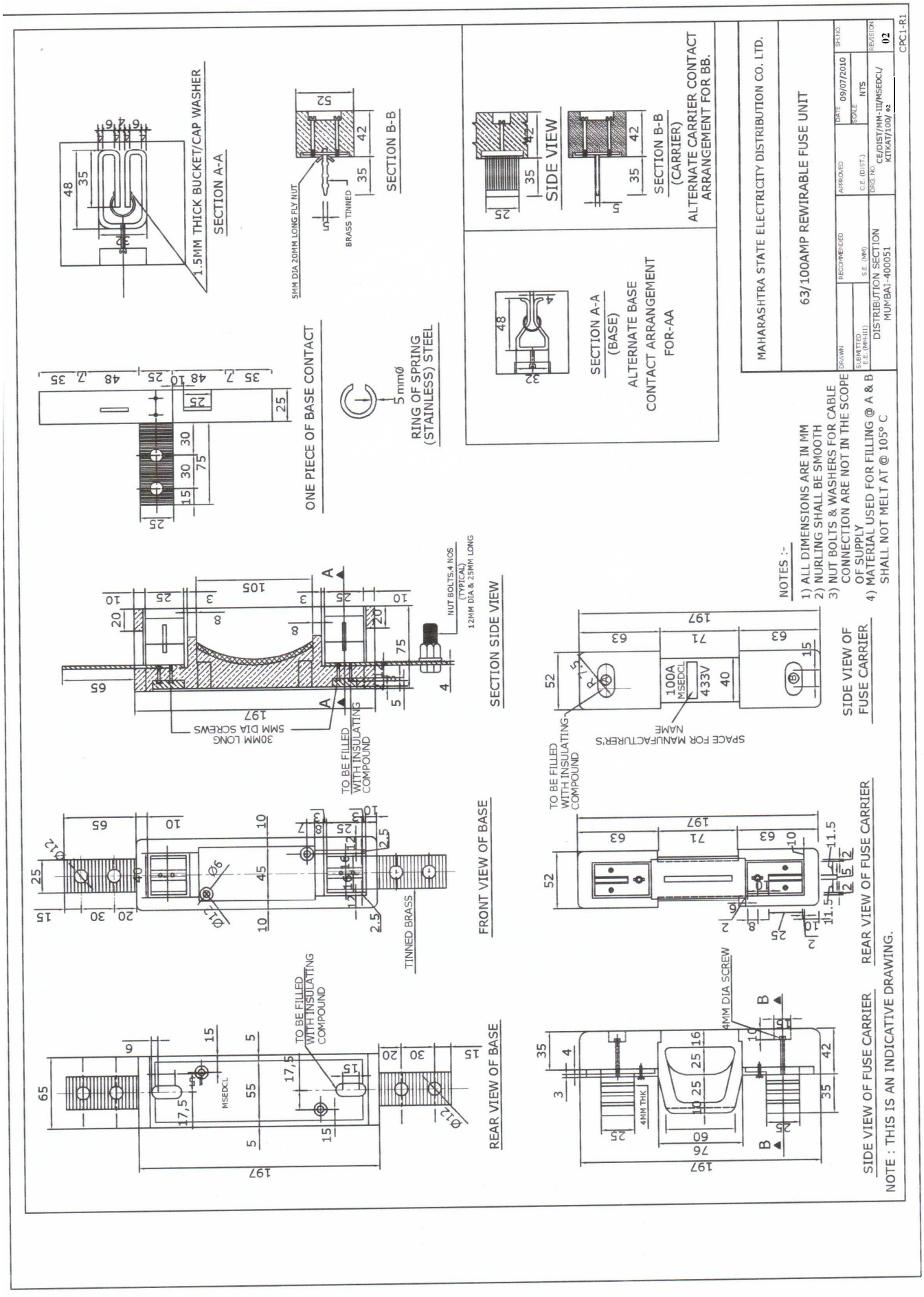
A. SPECIFICATION FOR THE BOARD.

1. MATERIAL : 18 SWG M.S. SHEET.
2. SIZE : 200mm X 150mm.
3. FRONT SIDE (BACKGROUND) ENAMMELED WIRE.
   LETTERING, FIGURES OF VOLTAGE,
   PAINTING OF SKULL AND BONES
   SHALL BE IN SIGNAL RED COLOUR
4. BACKSIDE : ENAMELLED AS PER IS :2551.
5. BOLT HOLES : 2 Nos. 7mm Ø FOR 60 G.I. BOLTS.

NOTE : CORNERS OF THE PLATE SHALL BE ROUNDED.
ALL LETTERINGS SHALL BE CENTRLLY SPACED.

ALL DIMENSIONS ARE IN MM
SCALE : N.T.S.
THIS IS AN INDICATIVE DRAWING.

DANGER BOARD			SCALE: NTS	MSEDCL
22/8	3/6	22.8.06	22/08/06	DISTRIBUTION SECTION
DRN. BY. Dy.E.E.(MM-II)	CHK. BY. E.E.(MM-II)	SUB. BY. S.E.(MM)	APPR. BY. C.E.(DIST.)	DRG. NO. Dist./DB/ 14


MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD.
63/100AMP REWIRABLE FUSE UNIT
DRAWN
SUBMITTED
E.E. (MM-III)
RECOMMENDED
S.E. (MM)
APPROVED
C.E. (DIST.)
DATE 09/07/2010
SCALE NTS
SH.NO
REVISION 02
DRG. NO. CE/DIST/MM-III/MSEDCL/KITKAT/100/ 02
DISTRIBUTION SECTION MUMBAI-400051
CPC1-R1
1.5MM THICK BUCKET/CAP WASHER
SECTION A-A
5MM DIA 20MM LONG FLY NUT
BRASS TINNED
SECTION B-B
SIDE VIEW
SECTION B-B (CARRIER)
ALTERNATE CARRIER CONTACT ARRANGEMENT FOR BB.
ONE PIECE OF BASE CONTACT
5 mmø
RING OF SPRING (STAINLESS) STEEL
SECTION A-A (BASE)
ALTERNATE BASE CONTACT ARRANGEMENT FOR-AA
NOTES :-
1) ALL DIMENSIONS ARE IN MM
2) NURLING SHALL BE SMOOTH
3) NUT BOLTS & WASHERS FOR CABLE CONNECTION ARE NOT IN THE SCOPE OF SUPPLY
4) MATERIAL USED FOR FILLING @ A & B SHALL NOT MELT AT @ 105° C
NUT BOLTS.4 NOS (TYPICAL) 12MM DIA & 25MM LONG
30MM LONG SMM DIA SCREWS
TO BE FILLED WITH INSULATING COMPOUND
SECTION SIDE VIEW
FRONT VIEW OF BASE
TINNED BRASS
REAR VIEW OF BASE
SPACE FOR MANUFACTURER'S NAME
100A MSEDCL 433V
SIDE VIEW OF FUSE CARRIER
REAR VIEW OF FUSE CARRIER
4MM DIA SCREW
4MM THK
SIDE VIEW OF FUSE CARRIER
NOTE : THIS IS AN INDICATIVE DRAWING.

Annexure - I

1) विजेची बचत पैशाची बचत

बल्ब, ट्यूब नेहमी स्वच्छ ठेवा,
बल्ब, ट्यूब ऐवजी सी एफ एल चा वापर करा.

2) विजेची बचत पैशाची बचत

एक युनिट विजेची बचत म्हणजे
दीड युनिट विजेची निर्मिती

3) विजेची बचत पैशाची बचत

गरज नसेल तेव्हा दिवे, पंखे व
विजेची इतर उपकरणे बंद ठेवा.

4) विजेची बचत पैशाची बचत

सायंकाळी ६ ते रात्री १० या वेळेत
इस्त्री, मिक्सर, गिझर, ओव्हन
या उपकरणांचा वापर टाळा.

5) विजेची बचत पैशाची बचत

४० वॅटचा साधा बल्ब २५ तासात एक युनिट
वीज खातो तेवढाच प्रकाश देणाऱ्या १० वॅटच्या
सीएफएलसाठी १०० तास लागतात.

6) विजेची बचत पैशाची बचत

स्वच्छता गृह, शयनकक्ष, व्हरांडा अशा ठिकाणी मंद प्रकाश देणा-या कमी क्षमतेच्या दिव्यांचा वापर करा.

7) **विजेची बचत पैशाची बचत**
आवश्यक तेवढा गारवा निर्माण झाल्यावर एअर कंडिशनर, कुलर बंद करा.

8) **विजेची बचत पैशाची बचत**
एक दिवा येई अनेक कामी
पैशांची करी बचत नामी

9) **विजेची बचत पैशाची बचत**
विजेची बचत हा विजेचा नवा स्त्रोत
उज्ज्वल भविष्यासाठी आज करा बचत

10) **विजेची बचत पैशाची बचत**
थेंबे थेंबे तळे साचे
तुमच्या बचतीने वीज वाचे

11) **विजेची बचत पैशाची बचत**
असेल शक्य जेथे जेथे वीज वाचवा तेथे तेथे

12) **विजेची बचत पैशाची बचत**
मोफत व विपुल सूर्य प्रकाशाचा पुरेपूर वापर करा.

13) **विजेची बचत पैशाची बचत**
विजेचे साहित्य दर्जेदारच वापरा.

14) **विजेची बचत पैशाची बचत**
नैसर्गिक ऊर्जा स्त्रोतांचा पुरेपूर वापर करा.

15) **विजेची बचत पैशाची बचत**
सुर्यप्रकाश आहे फुकट
वीज मिळते विकत
विजेची बचत हीच विजेची निर्मिती.

STORES: MSC-II/DB/Rural/ 2011/02