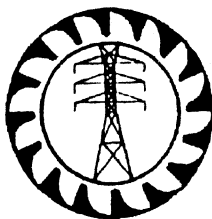


CEB STANDARD 049-1 : 1998

Specification

for

***GALVANISED HARDWARE PACKAGE FOR
INSTALLATION OF
DISTRIBUTION/BULK SUPPLY SUBSTATIONS***



CEYLON ELECTRICITY BOARD

SRI LANKA

Specification

for

***GALVANISED HARDWARE PACKAGE FOR
INSTALLATION OF
DISTRIBUTION/BULK SUPPLY SUBSTATIONS***

CEB Standard 049-1 : 1998

CEYLON ELECTRICITY BOARD

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SPECIFICATION FOR GALVANISED HARDWARE PACKAGE FOR INSTALLATION OF SUBSTATIONS

SCOPE

This specification covers the manufacture and testing of Galvanized Steel Hardware components required for the installation of pole mounted and plinth mounted Substations.

2.0 APPLICABLE STANDARDS

The item supplied shall be in accordance with the standards specified below.

- | | | | |
|----|-------------------------------|---|---|
| A) | E.N. 10113 Parts 1 & 3 - 1993 | - | Hot rolled products made in weldable, fine grain structural steel |
| b) | B.S. 729 1971 | - | Hot dipped galvanizing on iron and steel |
| c) | B.S.4848 Parts IV & V | - | Hot rolled structural steel sections |
| d) | B.S. 4 : Part 1 | - | Tolerances and dimensions for section other than hollow sections |

3.0 BASIC FEATURES

3.1 Quality of Steel

The steel used for fabrication of hardware components shall be sound and free from any internal and external defects or surface flaws which might preclude its use for the propose for which it is intended.

3.2 Grade of Steel

The steel used for fabrication of hardware components shall be of grade S 275 M. and their chemical composition /mechanical propoities shall be as per EN 10113-3 of 1993..

3.3 Construction

The hardware components shall be first cleaned and made rust free by shot blasting, necessary holes drilled, cut in to required sizes, identification marking welding and forging completed before galvanizing.

All components shall be smooth, and free from sharp edges. All burrs shall be removed after shearing, drilling punching, forging, welding and bending operations.



3.4 Connections

Position and size of holes on the hardware components to be precisely in accordance with the drawings annexed. All burrs shall be removed after shearing, drilling, punching and bending is completed.

3.5 Design Drawings

The design Drawings showing the arrangements and applications for various purposes are indicated in the Drawings supplied.

All Hardware Components shall be in accordance with the Specifications and Drawings.

3.6 Galvanized Steel Hardware Packages

The Galvanized Steel Hardware Components three different types of packages are given below

3.6.1 Double Pole Mounted Distribution Substations

- | | | | |
|----|---|---|---------|
| a) | Expulsion fuses switch mounting Cross-Arms (Channel Iron) | | |
| | 2400 x 100 x 50 x 6mm | - | 01 No. |
| b) | Surge Arrester Mounting Cross-Arms (Channel Iron) | | |
| | 2400 x 100 x 50 x 6mm | - | 01 No. |
| c) | Transformer Mounting Cross-Arms (Channel Iron) | | |
| | 2580 x 100 x 50 x 6mm | - | 02 Nos. |
| | For items (a) to (c) above refer | | |
| | Drwg. No. CEB/DS&S/49-1A2/1998 | | |
| d) | Transformer Mounting Channel Support (Channel Iron) | | |
| | 570 x 100 x 50 x 6mm | - | 02 Nos. |
| | 410 x 100 x 50 x 6mm | - | 02 Nos. |
| e) | Earth Wire attachment (Angle Iron) | | |
| | 64 x 64 x 10mm | - | 02 Nos. |



f) Bracket for Cut Out Assembly (Flat Iron)

460 x 50 x 6mm - 4 Nos.
 For items (d) to (f) above refer
 Drwg. No. CEB/DS&S/49-1A3/1998

g) Earth Rods

Copper Clad Earth Rods - 08 Nos.
 Couplings - 02 Nos.
 Driving Heads - 02 Nos.
 Adapters - 02 Nos.
 Clamps - 06 Nos.

as per CEB Standard 051 1997 (or latest version) Specification for Copper Clad Steel Earth Rod Assembly.

h) Bolts & Nuts

40 x 12mm - 06 Nos.
 50 x 16mm - 28 Nos.
 300 x 16mm - 02 Nos.
 325 x 16mm - 02 Nos.
 350 x 16mm - 20 Nos.

i) Washers

16mm - 52 Nos.
 12mm - 06 Nos.

3.6.2 Single Pole Mounted Distribution Substationsa) Expulsion Fuse Switch Mounting Cross-Arms
(Channel Iron) Drwg. No. 49-1B2/1998

2180 x 100 x 50 x 6 mm - 01 No.

Expulsion Fuse Switch Mounting Cross-Arms
 Fabricated as shown in
 Drwg. No. CEB/DS&S/49-1B2/1998

b) Lightning Arrester Mounting Cross-Arms
(Channel Iron) 2180 x 100 x 50 x 6 mm

- 01 No.

Lightning Arrester Mounting Cross-Arms fabricated
 as shown as in Drwg. No. CEB/DS&S/49-1B2/1998

c) Transformer Mounting Bracket single pole type
(Channel Iron)

Channel A 1344 x 150 x 75 x 6 mm - 02 Nos.
 Bracing 1483 x 150 x 75 x 6 mm - 02 Nos.
 Channel A and bracing welded together.



- d) Transformer Platform Rails (Channel Iron)
- | | | |
|---------------------------------|---|---------|
| Channel B 710 x 100 x 50 x 6 mm | - | 02 Nos. |
|---------------------------------|---|---------|
- e) Fuse switch disconnecter Mounting Bracket (Flat Iron)
- | | | |
|------------------|---|---------|
| 460 x 50 x 10 mm | - | 04 Nos. |
|------------------|---|---------|
- For items (c) to (e) refer Drwg.
No. CEB/DS&S-491B3/1998 given
in Annex 1B3
- f) Earth Rods
- | | | |
|------------------------|---|---------|
| Copper Clad Earth Rods | - | 08 Nos. |
| Couplings | - | 02 Nos. |
| Driving Heads | - | 02 Nos. |
| Adapters | - | 02 Nos. |
| Clamps | - | 06 Nos. |
- as per CEB Standard 051 1997 (or latest version) Specification for Copper Clad Steel Earth Rod Assembly.
- g) Bolts and Nuts
- | | | |
|-------------|---|---------|
| 40 x 12 mm | - | 04 Nos. |
| 50 x 16 mm | - | 14 Nos. |
| 225 x 16 mm | - | 02 Nos. |
| 250 x 16 mm | - | 04 Nos. |
| 300 x 16 mm | - | 04 Nos. |
- h) Washers
- | | | |
|-------|---|---------|
| 16 mm | - | 24 Nos. |
| 12 mm | - | 04 Nos. |

Galvanized Bolts, Nuts and Washers necessary for the hardware components shall be supplied with the package.

3.6.3 Plinth Mounted Bulk Supply Substations

- a) Insulator Mounting Cross-Arms Channel Iron
- | | | |
|-----------------------|---|--------|
| 2400 x 100 x 50 x 6mm | - | 01 No. |
|-----------------------|---|--------|
- b) Surge Arrester Mounting Cross-Arms (Channel Iron)
- | | | |
|------------------------|---|--------|
| 2400 x 100 x 50 x 6 mm | - | 01 No. |
|------------------------|---|--------|
- c) Expulsion Fuse Switch Mounting Cross-Arms (Channel Iron)
- | | | |
|------------------------|---|--------|
| 2400 x 100 x 50 x 6 mm | - | 01 No. |
|------------------------|---|--------|



d) Earth Rods

Copper Clad Earth Rods	-	08 Nos.
Couplings	-	02 Nos.
Driving Heads	-	02 Nos.
Adapters	-	02 Nos.
Clamps	-	06 Nos.

as per CEB Standard 051 1997 (or latest version) Specification for Copper Clad Steel Earth Rod Assembly.

For items (a) to (c) above refer Drwg. No. CE/DS&S/49-1C2/1998.

e) Bolts and Nuts

40 x 12mm	-	04 Nos.
50 x 16mm	-	06 Nos.
120 x 10mm	-	02 Nos.
225 x 16 mm	-	02 Nos.
250 x 16 mm	-	02 Nos.
300 x 16 mm	-	04 Nos.

f) Washers

16mm	-	16 Nos.
12mm	-	04 Nos.

Galvanised Bolts, Nuts and Washers necessary for the hardware components shall be supplied with the package

3.7 Galvanizing

All hardware components shall be hot dip galvanized as per BS 729 and treated with Sodium Dichromate or Proton W20 solution immediately after galvanizing to prevent the formation of white rust.

The preparation of galvanizing and the galvanizing itself shall not distort or adversely affect the mechanical properties of the material.

All components shall be effectively galvanized to consist of a coating not less than 610 grams of zinc per square meter of surface and the components shall have a galvanized coating of uniform thickness not less than 0.086 mm.

3.7.1 Finish

The galvanizing coating on all items shall be smooth, continuous, uniform and free from flux stains and holes shall be free from modules of spelter.



4.0 ADDITIONAL REQUIREMENTS

4.1 Marking

Manufacturer's identification marks and the letter "CEB" shall be impressed on all major components before galvanizing.

4.2 Packing

The complete Galvanized Steel Hardware Packages of each type shall be firmly bundled together using GS wire and five such packages shall be bundled together.

Each bundle shall carry a label that indicates the name of the package and quantity and the details of components of the bundle.

5.0 INFORMATION TO BE SUPPLIED WITH THE OFFER

Following shall be furnished with the offer.

- a) Completed schedule of Particulars
- b) Complete dimensional drawings of each package.
- c) Test certificates for the steel to be used for the fabrication of the item offered conforming to EN 10113-1 of 1993.

The offer shall be rejected if the above information is not furnished in complete manner with the offer.

6.0 TECHNICAL LITERATURE AND DRAWINGS

All relevant drawings of the each package offered shall be supplied with the items.

7.0 INSPECTION AND TESTING

CEB reserves the right to carry out visual inspection and to do the following tests on the items fabricated.

- a) Mechanical Tests
 - b) Determination of chemical composition
 - c) Galvanizing Tests
 - d) Tests for Technological Properties
as per EN 10113-1 of 1993
- and to check the Dimensions, Tolerances and Finish .



8.0 SAMPLE STUDY

One sample (non returnable) of each item shall be provided on request of the Purchaser.

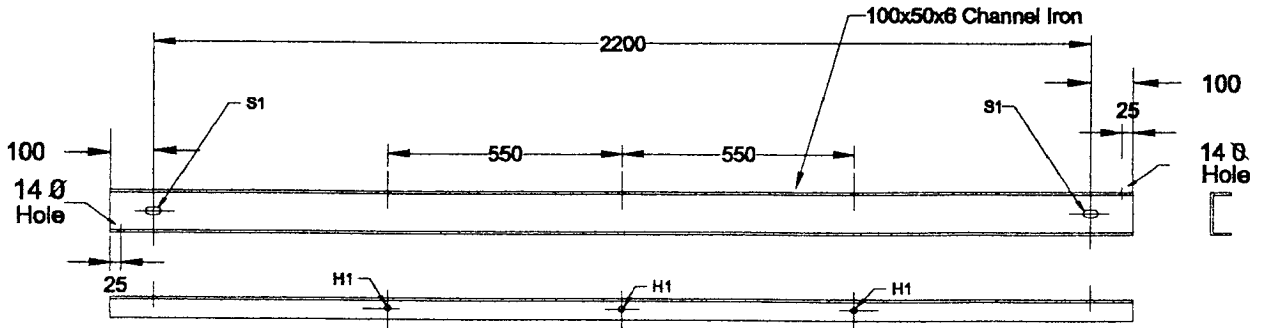
9.0 ANNEX.

- a) Drawing for hardware components for double pole mounted substation
CEB/DS&S/49-1A2 : 1998 & CEB/DS&S/49-1A3/1998
- b) Drawing for hardware components for single pole mounted substation
CEB/DS&S/49-1B2: 1998 & CEB/DS&S/49-1B3 : 1998
- c) Drawing for hardware component for plinth mounted substation
CEB/DS&S/49-1C2 : 1998

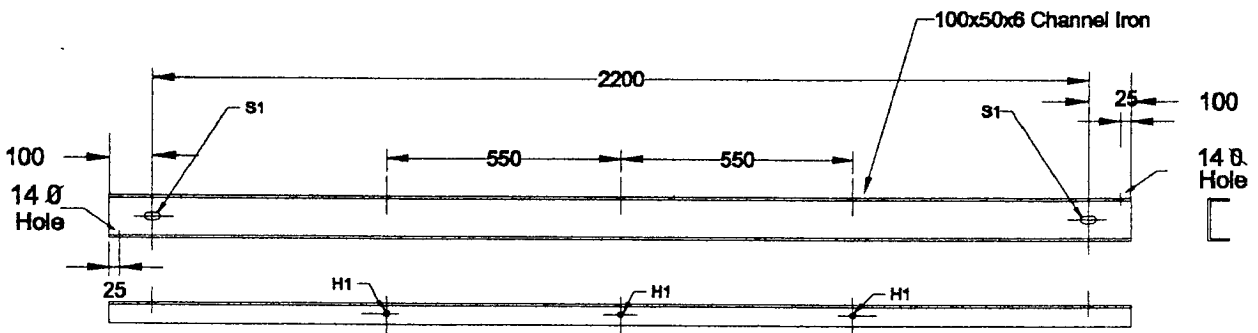
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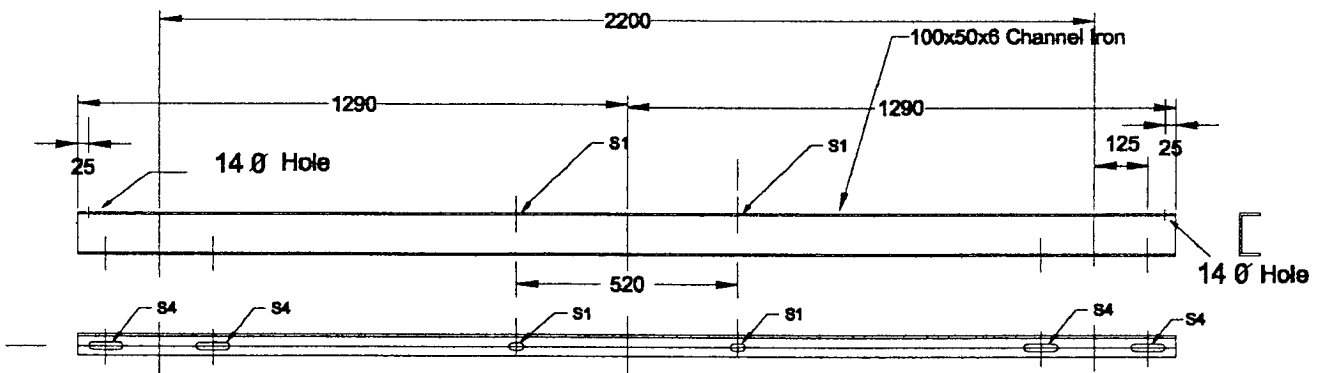
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**SURGE ARRESTER
MOUNTING CHANNEL**

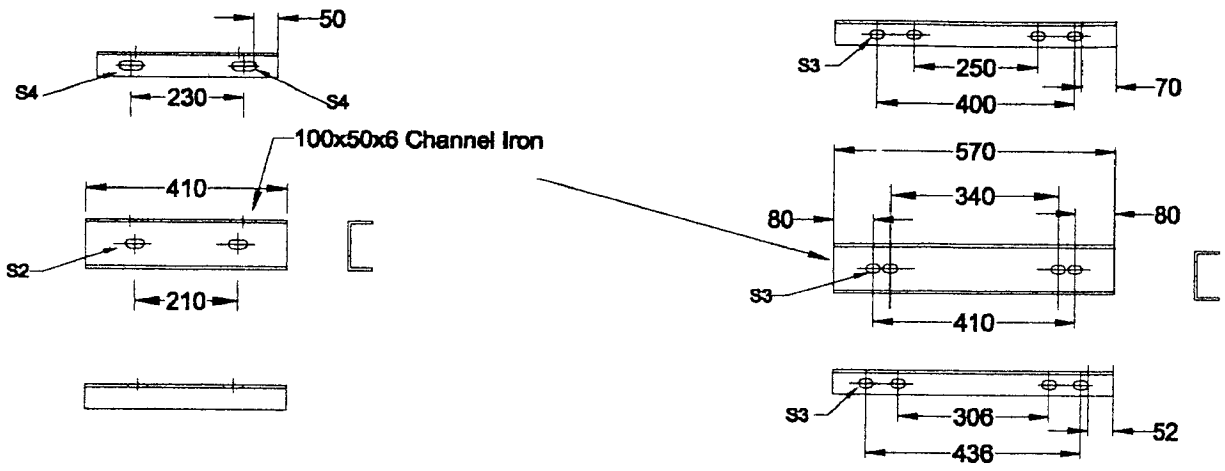


**EXPULSION FUSE SWITCH
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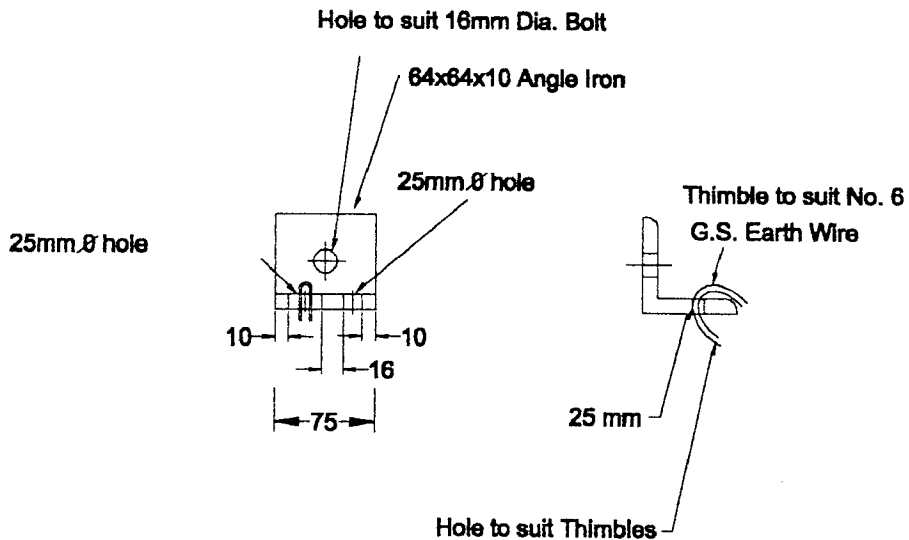


TRANSFORMER MOUNTING CHANNEL

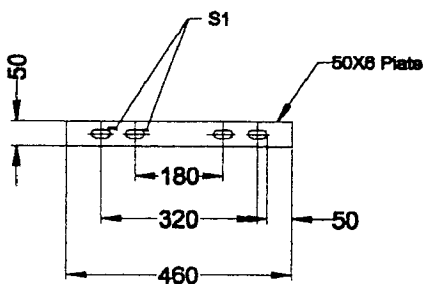
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	DOUBLE POLE MOUNTED DISTRIBUTION SUBSTATION		DRAWN : LALANI
	CHECKED BY <i>P. Fernando</i>	APPROVED BY <i>Lalani</i>	DATE : May 1998
			DRG. NO : CEB/DS&S/49-1A2/1998
DIST. PLANNING BRANCH	CHIEF ENGINEER (DS & S)	CHAIRMAN, SPECIFICATION COMMITTEE	CAD NO :



TRANSFORMER MOUNTING CHANNEL SUPPORT (2 Nos. EACH)




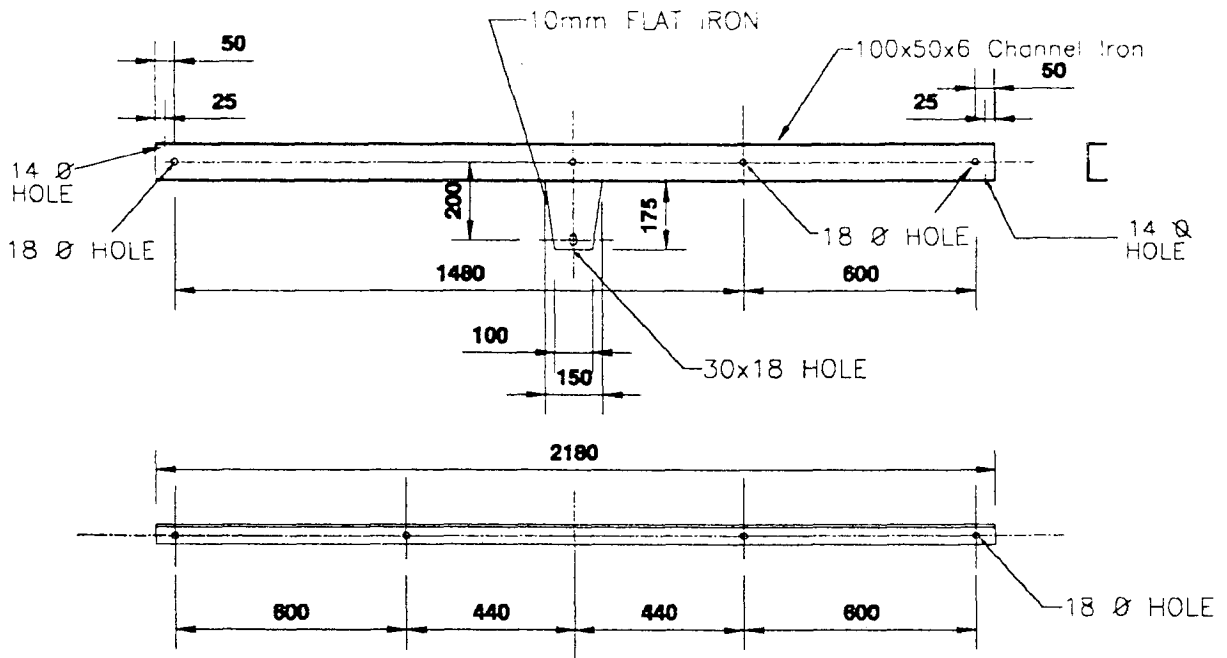
DETAILS OF EARTH WIRE ATTACHMENT (2 NOS.)



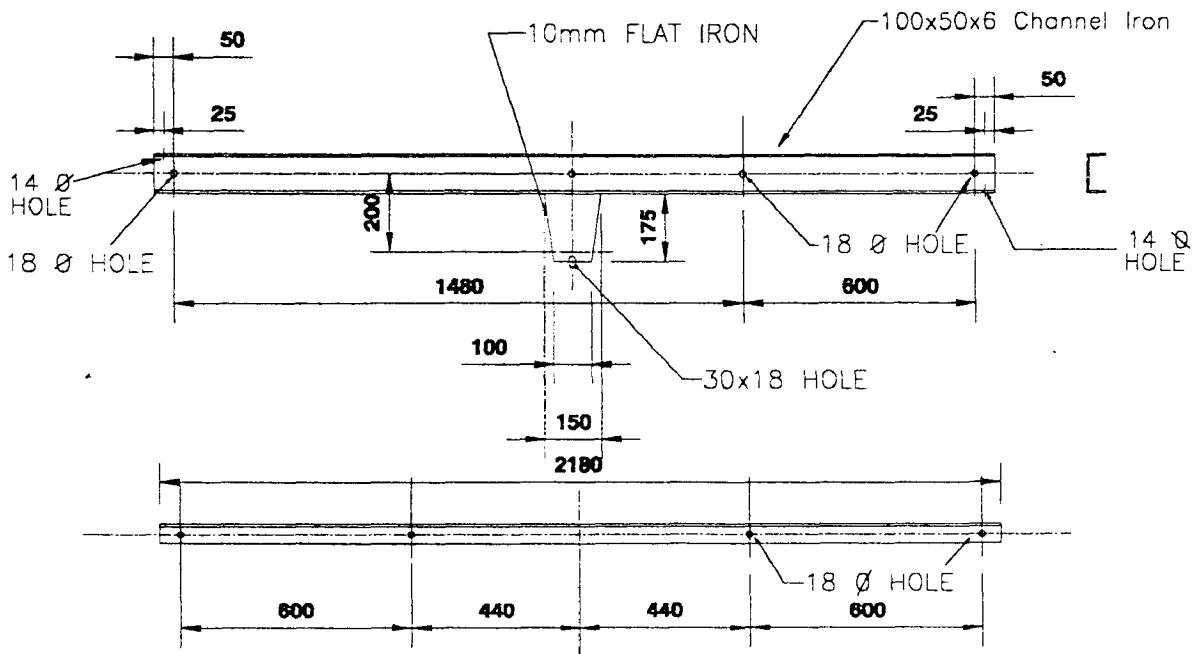
BRACKET FOR FUSE CUTOUT ASSEMBLY (4 Nos.)

- H1 = 18 Ø HOLE
- S1 = 36x18 SLOTTED HOLE
- S2 = 40x18 SLOTTED HOLE
- S3 = 30x18 SLOTTED HOLE
- S4 = 60x18 SLOTTED HOLE

 CEYLON ELECTRICITY BOARD DIST. PLANNING BRANCH	DISTRIBUTION STANDARDS & SPECIFICATION		SCALE : NOT TO SCALE
	DOUBLE POLE MOUNTED DISTRIBUTION SUBSTATION		DRAWN : LALANI
	CHECKED BY <i>L. Fernando</i>	APPROVED BY <i>[Signature]</i>	DATE : May 1998
			DRG. NO : CEB/DS&S/49-1A3/1998
	CHIEF ENGINEER (DS & S)	CHAIRMAN, SPECIFICATION COMMITTEE	CAD NO :



**EXPULSION FUSE SWITCH
MOUNTING CHANNEL**



**LIGHTNING ARRESTOR
MOUNTING CHANNEL**



**CEYLON
ELECTRICITY
BOARD**

DISTRIBUTION STANDARDS & SPECIFICATION

**HARDWARE COMPONENTS FOR SINGLE POLE MOUNTED
DISTRIBUTION SUBSTATION - PART 1**

CHECKED BY

L. Fernando

CHIEF ENGINEER (DS & S)

APPROVED BY

[Signature]

CHAIRMAN, SPECIFICATION COMMITTEE

SCALE : NOT TO SCALE

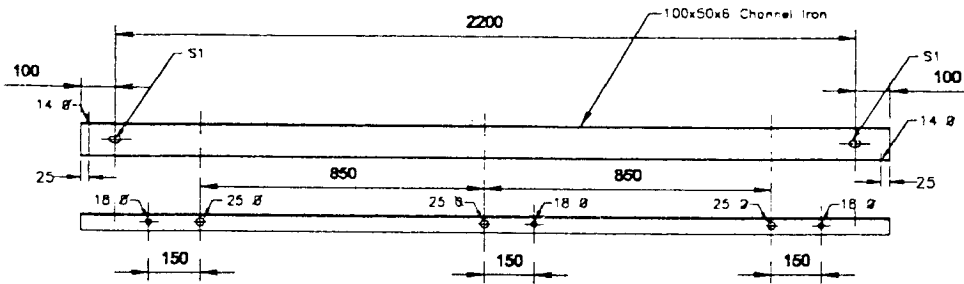
DRAWN : LALANI

DATE : May 1998

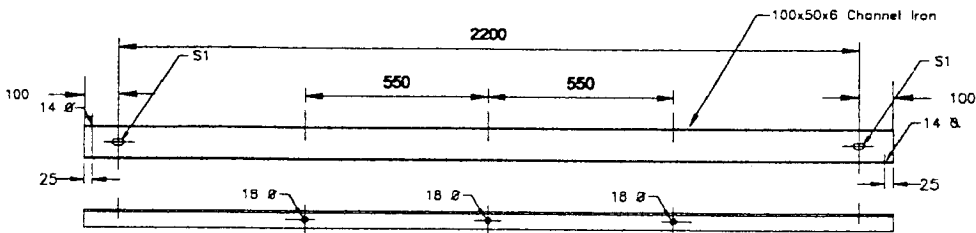
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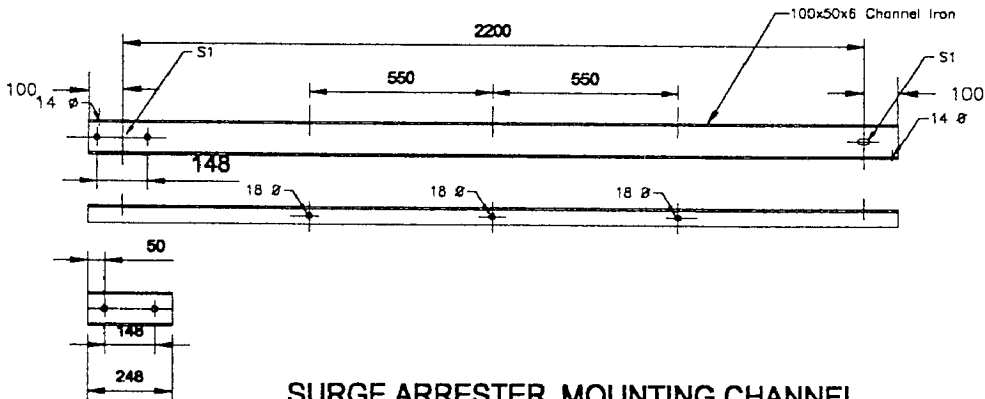
DIST. PLANNING BRANCH



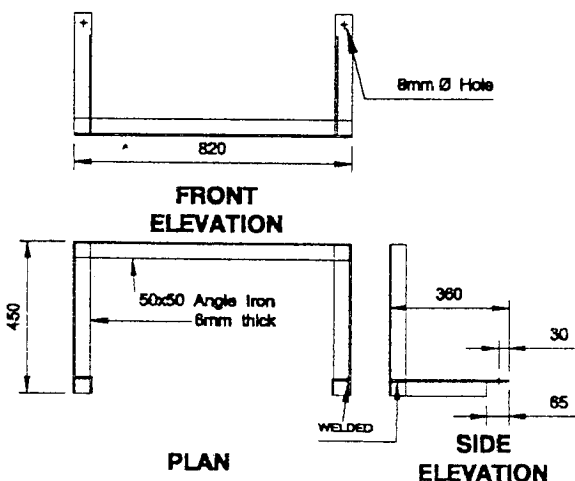
INSULATOR MOUNTING CROSS ARM



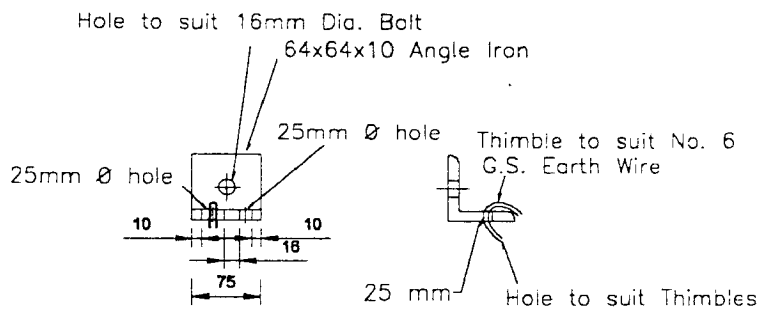
EXPULSION FUSE SWITCH MOUNTING CHANNEL



SURGE ARRESTER MOUNTING CHANNEL



CABLE SUPPORT BRACKET



DETAILS OF EARTH WIRE ATTACHMENT

S1 = 40x18 SLOTTED HOLE

DISTRIBUTION STANDARDS & SPECIFICATION

SCALE : NOT TO SCALE



HARDWARE COMPONENTS FOR PLINTH MOUNTED DISTRIBUTION SUBSTATION

DRAWN : LALANI

CHECKED BY

APPROVED BY

DATE : May 1998

S. Fernando

[Signature]

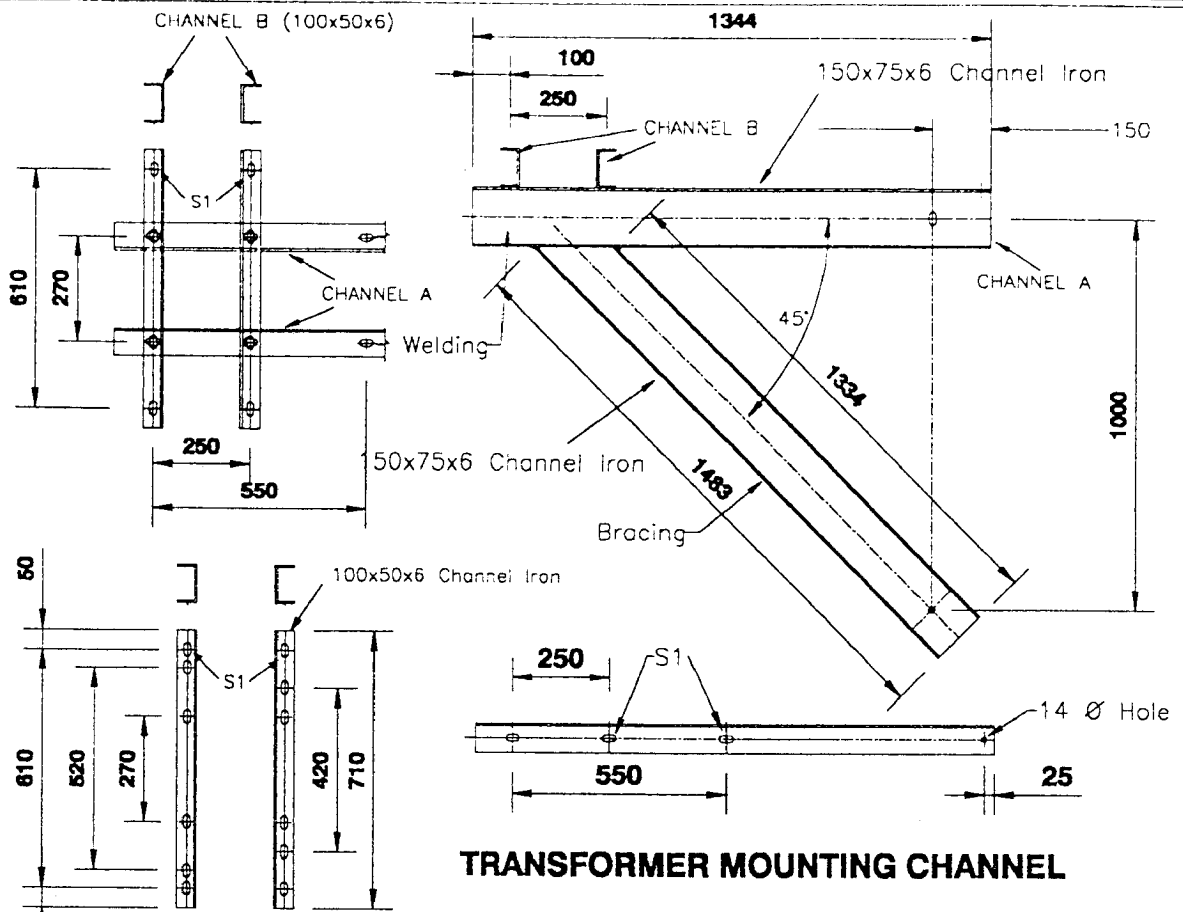
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DIST. PLANNING BRANCH

CHIEF ENGINEER (DS & S)

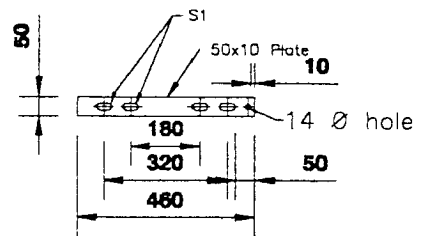
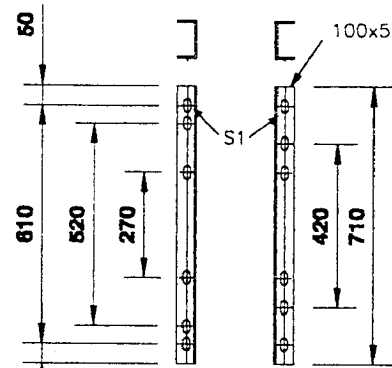
CHAIRMAN, SPECIFICATION COMMITTEE

CAD NO :

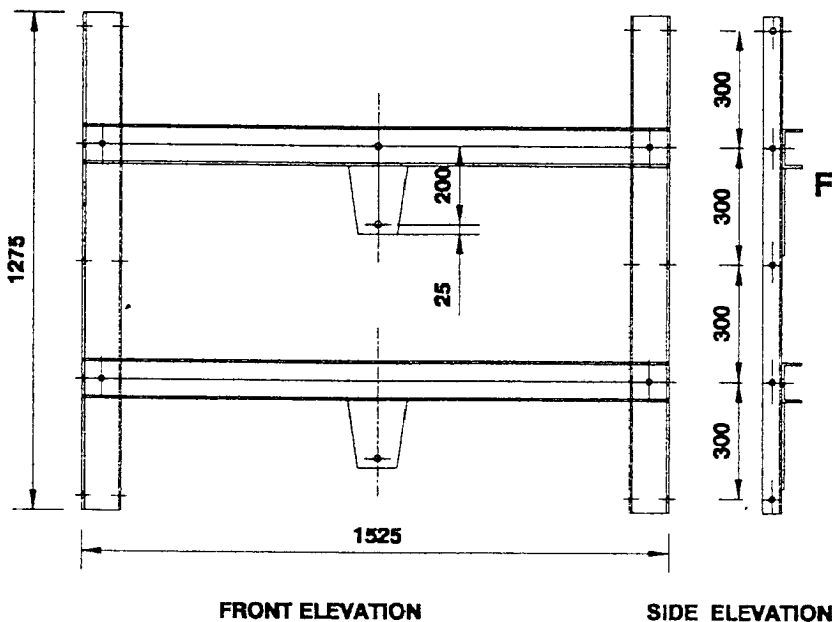


TRANSFORMER MOUNTING CHANNEL

TRANSFORMER PLATFORM RAILS



BRACKET FOR FUSE CUTOUT ASSEMBLY
(4 Nos.)



FRONT ELEVATION

SIDE ELEVATION

L.T. LINE SUPPORT



CEYLON ELECTRICITY BOARD

DIST. PLANNING BRANCH

DISTRIBUTION STANDARDS & SPECIFICATION

HARDWARE COMPONENTS FOR SINGLE POLE MOUNTED DISTRIBUTION SUBSTATION - PART 2

CHECKED BY

[Signature]

CHIEF ENGINEER (DS & S)

APPROVED BY

[Signature]

CHAIRMAN, SPECIFICATION COMMITTEE

SCALE : NOT TO SCALE

DRAWN : LALANI

DATE : May 1998

DRG. NO: CEB/DS&S/48-1B3/1998

CAD NO : SUB/PM/98/1C

APPROVAL OF CEB STANDARDS

CEB Standard No. : *CEB Standard 049-1 : 1998*

Title of the Standard : *Specification for Galvanized Hardware Package for Installation of Distribution/Bulk Supply Substations*

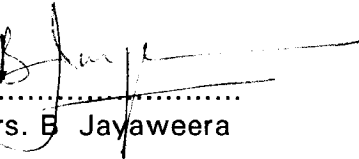
Date of Approval : *June 1998*

This is to certify that the above Standard has been recommended by us for adoption in the CEB.



.....
A M Tissera

Chairman Specification Committee



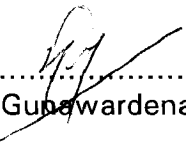
.....
Mrs. B Jayaweera

Member Specification Committee



.....
B J Gunawardena

Member Specification Committee



.....
G Gunawardena

Member Specification Committee



.....
K K A C Samarasinghe

Member Specification Committee



.....
A K Thiruparendran

Convenor Specification Committee

CEB Standard 049-1 : 1998 - Specification for Galvanized Hardware Package for Installation of Distribution/Bulk Supply Substations is approved for adoption in the CEB.



General Manager,
Ceylon Electricity Board.

Date *22.06.98*