CEYLON ELECTRICITY BOARD

(Established by Act of Parliament No. 17 of 1969)

BIDDING DOCUMENT FOR

Bid No: CEB/PM/ GPDEEIIPTrII: P1&P2/RTV_NM

SUPPLY AND APPLICATION OF ROOM TEMPERATURE VULCANIZATION (RTV) SILICONE COATING FOR THE OUTDOOR INSULATORS OF NADUKUDA GRID SUBSTATION & MANNAR GRID SUBSTATION

CONTENTS

Office of the Project Manager (GPD&EEIIP-TRII, P1&P2)
Ceylon Electricity Board,
No: 318, Averiwatta Road,
Wattala.

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March, 2022

CEYLON ELECTRICITY BOARD

GREEN POWER DEVELOPMENT & ENERGY EFFICIENCY IMPROVEMENT INVESTMENT PROGRAMME – TRANCHE II

BID DATA SHEET

BIDS ARE INVITED FOR:

Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators at Nadukuda Grid Substation & Mannar Grid Substation located in Mannar, Sri Lanka

BID NUMBER AND NAME:

Bid Number: CEB/PM/ GPDEEIIPTrII : P1&P2/RTV_NM

Bid Name: Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators

BID SECURITY:

Value of the Bid Security is **Sri Lankan Rupees Five Hundred Thousand only (LKR 500,000/-)** The Bid Security shall be valid for **Ninety days (90)** days from the date of closing of bids.

VALIDITY PERIOD OF THE BID:

Offers shall be valid for a minimum period of **Ninety (90) days** from the date of closing of bids.

BIDS SHALL BE ADDRESSED TO:

Project Manager (GPD&EEIIP-TRII, P1&P2)
Ceylon Electricity Board,
No: 318, Averiwatta Road,
Wattala.

PLACE OF ACCEPTANCE OF BIDS:

Office of the Project Manager (GPD&EEIIP-TRII, P1&P2)
Ceylon Electricity Board,
No: 318, Averiwatta Road,
Wattala.

TIME AND DATE OF THE CLOSING OF BIDDING:

10:00 hrs on 24/03/2022 and Bids will be opened immediately thereafter

PRE – BID MEETING & SITE VISIT:

Pre-Bid Meeting and Site Visit will be held on 16/03/2022 at 10:30hrs at Mannar Grid Substation, Mannar & 12:30hrs at Nadukuda Grid Substation

APPLICABLE PROCUREMENT COMMITTEE:

Divisional Procurement Committee (Projects)

EMPLOYER'S REPRESENTATIVE:

Project Manager (GPD&EEIIP-TRII, P1&P2)
Ceylon Electricity Board,
No: 318, Averiwatta Road,
Wattala.

Tel: 011 2931543
Fax: 011 2931543
Email: anuruddhatilaka@gmail.com

FURTHER INFORMATION:

Further information can be obtained from the Project Manager (GPD&EEIIP-TRII, P1&P2), 3 days before the date of bid closing.

GENERAL CONDITIONS OF BID (NCB)

GREEN POWER DEVELOPMENT & ENERGY EFFICIENCY IMPROVEMENT INVESTMENT PROGRAMME – TRANCHE II

Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators at Nadukuda Grid Substation & Mannar Grid Substation located in Mannar, Sri Lanka

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1 SCOPE OF WORK

1.1 This Bid is for the Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators as given in the schedule of quantities and prices, complying with the technical specification and terms & conditions stipulated in this document.

2 ELIGIBILITY

2.1 Bidder shall provide a copy of business registration along with the bid. Those who failed to submit the above will be rejected.

2.2 All bids should be in original bidding documents obtained from the Employer

3 QUALIFICATION OF THE BIDDER

To be qualified for award of Contract, bidders shall conform to the following:

3.1 General Qualification

- The bidder should be the original manufacturer of offered RTV Coating Material or valid authorization letter shall be submitted from the original manufacturer of the offered product.

- The original manufacturer shall have minimum of 05 yrs experience in the field of manufacturing similar RTV Coating Material suitable for 220kV or above Transmission Systems. Attach proof in the form of copies of purchase orders, customer receipts/ certification etc. (two proof experiences)

3.2 Equipment Requirement

3.2.1 A List of all equipment owned by or available to the bidder for the uninterrupted execution of work shall be provided by the bidder

4 POWER OF ATTORNEY

The bidder shall submit a valid power of attorney authorizing the signatory of the bidder to commit the bid.

5 PRE-BID MEETING AND SITE VISIT

5.1 The dates for the Pre-Bid meeting and Site Visits are given in the Bid data sheet.

5.2 Bidders will be given an opportunity to visit and examine the Nadukuda Grid substation & Mannar Grid Substation and obtain all information that may be necessary for preparing the bid and entering into a contract for himself is his own responsibility.

5.3 The costs of visiting the site shall be at the Bidder's own expense.

6 RECEIPT OF BIDS

6.1 Bids shall be submitted in duplicate. The Original and Duplicate copy of the Bid shall be placed in two separate envelopes marked "**Original**" and "**Duplicate**". Both envelopes shall be enclosed in one securely sealed envelope. **Bid Number**, **Name of the bid** and **closing date of the bid** as specified the bid data sheet shall be marked on the top left hand corner of the envelope. The **Name and Address of the Bidder** shall also be clearly marked on the envelope.

6.2 Project Manager (GPD&EEIIP-TRII, , P1&P2) at the address specified in the bid data sheet will receive sealed bids on behalf of Chairman, Procurement Committee, Ceylon Electricity Board.

6.3 The Bidder shall bear all costs associated with the preparation and submission of the bid and Ceylon Electricity Board will in no way be responsible or liable for those costs.

7 CLOSING OF BIDS

7.1 Bids enclosed, marked, sealed and addressed as aforesaid shall be;

7.1.1 Sent under registered cover to reach Project Manager (GPD&EEIIP-TRII, , P1&P2) not later than the bid closing time as specified in the bid data sheet.

Or

7.1.2 Deposited in the Box provided for this purpose at the office of the Project Manager (GPD&EEIIP-TRII, , P1&P2) not later than the bid closing time as specified in the bid data sheet.

7.2 Any Bid received after the closing time will be rejected and returned unopened to the Bidder or to bidder's authorized representative.

8 OPENING OF BID

8.1 The Employer shall conduct the opening of bids at the Place of acceptance of Bids as specified in Bid Data Sheet.

8.2 Bidders or their duly authorized representative/s may be present at the time of opening of bids.

8.3 The total Bid Sum, Name and Address of each Bidder, whether a Bid Security/s is/are submitted, the amount of the Bid Security and the amount of discount declared if any, as indicated in the Schedule of Quantities and Prices shall be read out or cause to be read out and recorded.

8.4 Detailed Prices, Technical Data, Specifications or other particulars of the Bid will not be divulged.

9 BID SECURITY

9.1 Each bid shall be accompanied by Bid Security in the form of a Bank Draft or a Bank Guarantee issued by a Bank operating in Sri Lanka and payable to the **General Manager, Ceylon Electricity Board**, **Colombo** equivalent in value as specified in Bid data sheet. The validity period of the bid security shall be as specified in Bid Data Sheet.

9.2 All Guarantees should be unconditionally encashable, on the receipt of first written demand from General Manager, Ceylon Electricity Board or his authorized officer/s. Failure to submit the Bid Security at the time or before the closing of the bids will result in the bid being rejected.

9.3 Bid Security from unsuccessful Bidders will be returned after the contract award is made to the successful Bidder. The Bid Security of the successful Bidder will be returned after receipt of the Performance Security.

9.4 The Bid Security may be forfeited;

a) if a bidder withdraws its bid during the period of bid validity specified in the Form of Bid or
b) if the Successful bidder fails to;
    i. sign the Contract
    ii. Furnish a Performance Security
    iii. Accept the arithmetical corrections of the bid

10 SIGNING OF AGREEMENT

Within **Fourteen (14)** days from the date of the Letter of Award or as given in the Letter of award, the successful Bidder shall sign a Contract Agreement incorporating all agreements between the parties.

11 PERFORMANCE SECURITY

11.1 Within **Fourteen (14)** days from the date of the Letter of Award or as given in the Letter of award, the successful Bidder shall furnish a Performance Security in the form of a Bank Guarantee from a Bank operating in Sri Lanka, acceptable to the CEB for the amount equal to ten percent (10%) of the Contract Value. The Performance Security shall be in favour of the **General Manager, Ceylon Electricity Board, Colombo**, and shall be valid at least **Hundred and twenty days (120)** days beyond the anticipated date of completion of work.

11.2 The Performance Security should be unconditionally encashable, on the receipt of first written demand

from General Manager, Ceylon Electricity Board or his Authorized officer/s.

11.3 In the event of default on the part of the contractor resulting from breach of agreement or relevant conditions hereto, the Employer may, by a written notice, terminate the right of the contractor to proceed with, and claim the Performance Security without recourse to law.

11.4 On satisfactory completion of the Contract, the Performance Security will be released.

12 COMPLETION PERIOD

The work shall be completed within **Hundred and Fifty days (150**). The Bidders should specifically state in their bid whether they could comply with this time of commencement of contract and the completion period. If they are unable to comply with the said time of commencement and the completion period, they should clearly state their proposed commencement time and the completion period possible in the Bid.

13 PAYMENT

Payments for the work will be made as follows:

i. Twenty percent (20%) of the contract sum will be paid as an advance payment on the receipt of an Advance Payment Bank Guarantee from a bank operating in Sri Lanka acceptable to CEB. Thereafter payment shall be made on submission of interim bills certified by the Employer.

ii. Twenty percent (20%) of the cost of each bill of payment will be deducted as recovery of the advance payment. However, it will be fully deducted when the cumulative bill value reaches 80% of the contract sum.

iii. Every certificate for payment on account of work shall be regarded as only provisional and approximate.

iv. The final payment of 20% of the contract sum shall be paid on the completion of the works and submission of all documents and reports, to the satisfaction of the Employer as specified in this Bidding document. Any recovery to the Employer will be deducted from the final payment. The Employer reserves the right to recover any shortfalls.

14 TAXATION

14.1 Income Tax

The Contractor will have to comply with regulations of the Department of Inland Revenue for payment of any kind of tax imposed by the government arising out of the contract.

14.2 Value Added Tax

Any applicable Tax and Duty will be paid by the Employer at prevailing rates or if claimed with the VAT registration number.

15 REGISTRATION UNDER PUBLIC CONTRACT ACT NO.3 OF 1987 (APPLICABLE FOR CONTRACT VALUE EXCEEDING RS. 5 MILLION ONLY)

15.1 It is mandatory for any person who act as an agent or sub–agent, representative or nominee for and on behalf of any principal tenderer/bidder to register prior to the bid/tender being submitted, under Public Contact Act No. 03 of 1987 at the Department of Registrar of Companies, Sri Lanka. Failure to submit registration form (PCA 3) with the bid shall result in the bid being rejected.

15.2 It is mandatory for any principal tenderer/bidder to register under Public Contact Act No. 03 of 1987 at the Department of Registrar of Companies, Sri Lanka prior to the award of the tender/bid.

15.3 It is mandatory for the successful tenderer/bidder to register the contract within Sixty (60) days after the tender/bid being awarded/Accepted.

16 CONTRACT NOT TO BE SUB-LET.

The Contractor shall not assign or subcontract his obligations, without the written authority of the Employer. If any part of his obligation has been assigned or sublet by the Contractor with written authority, he shall nevertheless be held responsible for the due performance of the part assigned or sublet.

17 WORKMEN'S COMPENSATION

Adequate workmen's compensation and/or employer's liability insurance which complies with applicable legislation in Sri Lanka shall be provided and maintained by the Contractor for the entire contract period. This shall include cover against riots and civil commotion.

18 INSURANCE

The Contractor shall obtain and maintain for the entire contract period an insurance cover against third party liabilities, in an amount not less than Two hundred Thousand Sri Lankan Rupees per occurrence of claim or series of claims arising out of any one accident or event. Maximum limit of the insurance cover shall not be less than One million Sri Lankan Rupees.

19 LAW OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA.

The bids and any contracts resulting there from shall be governed and abide by Law of the Democratic Socialist Republic of Sri Lanka.

APPENDIX I – IV

Appendix I	Certificate of Purchase of Bidding Document
Appendix II	Form of Bid
Appendix III	Specimen Form of Bid Security
Appendix IV	Specimen Form of Performance Security

Appendix I

CERTIFICATE OF PURCHASE OF THE BIDDING DOCUMENT

(To be signed and attached with the bid)

Date :

Issued to M/s .....

.....

.....

On behalf of M/s. .....

.....

.....

Non-refundable Tender fee receipt No..... dated.....

Project Manager (GPDEEIIP-TRII, P1&P2)
Ceylon Electricity Board,
No: 318, Averiwatta Road,
Wattala.

I / We agree to abide by the Conditions of Bid for Bid No: (CEB/PM/ GPDEEIIPTrII: P1&P2/RTV_NM) and therefore submit my / our Bid in the attached Schedule of Price (Appendix VI)

Position and Name of Signatory: .....

Address : .....
.....
.....
.....

Date : .....

.....
Signature of Bidder and Seal

APPENDIX II

CEYLON ELECTRICITY BOARD
FORM OF BID

The Chairman,
Divisional Procurement Committee (Ceylon Electricity Board),

I/We having examined the Conditions of Bid, the Schedule of Prices and all other Documents pertaining to this work/supply, do hereby offer and undertake to carry out the work/supply, to the satisfaction of the General Manager, Ceylon Electricity Board strictly in accordance with the conditions of Bid; at the prices and within the delivery period set forth in the accompanying Bill of Quantities pertaining to Bid No CEB/PM/ GPDEEIIPTrII: P1&P2/RTV_NM and in consideration of the trouble and expense incurred by you in preparing the contract documents and in examining and considering the Bid, I/We further undertake that this Bid shall not be withdrawn by me/us before the expiration of 90 days from the date of the closing of bidding but shall remain binding on me/us and may be accepted at any time before such expiration.

And I/We further undertake in the event of this Bid being accepted to furnish a Performance Bond corresponding to 10% of the contract sum. Such Bond shall be on the form of a Bank Guarantee or such other form as provided in the Bid Conditions and shall be in favour of the General Manager, Ceylon Electricity Board for the due Performance of the Contract and for the payment of all claims to which the Ceylon Electricity Board may be entitled, and to execute an agreement in the prescribed from duly stamped by me/us at my/our expense in accordance with the Stamp Duty Ordinance and to complete the work to the entire satisfaction of the General Manager, Ceylon Electricity Board.

And I/We further agree that, in the event of my/our withdrawing the bid or declining or failing to execute such bond and/or agreement within two (2) weeks of my/our being called upon to execute such bond and/or such Agreement, the Ceylon Electricity Board has the right to confiscate the Bid Security and to recover from me/us the full amount of damages sustained by the Ceylon Electricity Board as a result of my/our so declining or failing.

I/We understand that you are not bound to accept the lowest or any Bid you may receive.

…..
Signature of Bidder

Date: ……

Bidder's Name: .....

Address: .....

Witness

Signature: 1 ..... 2.....

Name: 1 ..... 2.....

Address: 1..... 2.....

APPENDIX III

Specimen Form of Bid Security

BID SECURITY

…../…../…….. *Date.*

Ceylon Electricity Board,
Colombo.

Dear Sirs,

Bid No: CEB/PM/ GPDEEIIPTrII: P1&P2/RTV_NM
Bid Security No:……..

At the request of our constituent ..... of .....(hereinafter referred to as "The Contractor") we the undersigned ..... duly incorporated in ..... and having its head office at ..... and carrying on business at ..... in the island of Sri Lanka do hereby undertake and promise to pay to you on demand at Colombo in Sri Lanka currency such sum/s not exceeding in the aggregate Rupees ..... (Rs. .....) as may be demanded by you from time to time here-under provided every such demand is made in writing under the hand of the General Manager or the Chief Executive Officer or your Board or any person purporting to act under the Authority of the General Manager or the Chief Executive Officer of the Ceylon Electricity Board.

Notwithstanding anything to the contrary herein contained these presents shall be valid only up to and include the ..... day of ..... and shall not hereafter be of any force of avail in law except in respect of any demand made by you before 2 p.m. on the said ..... day of ..... provided however that in case we shall have before 2 p.m. on the said ..... day of ..... extended the period of validity of these presents up to any date subsequent to the said ..... day of ..... then the provisions of this clause shall set and amended and read as if the date of which these presents is so extended and originally been inserted wherever in this clause the said ..... day of ..... occurs and these presents shall have force accordingly. Such period of validity may similarly be extended from time to time so as to keep these presents in full force up to such extended date or dates.

A demand addressed to us under the hand of your General Manager or the Chief Executive Officer or other Officer of your Board acting as aforesaid shall be sufficient and conclusive proof that we are liable to pay to you the sum demanded hereunder.

Our liability hereunder shall not in any event exceed a sum of Rs ..... (Rs.....) in the aggregate and every payment made by us hereunder shall be a pro tanto discharge of our aggregate liability hereunder.

We specifically agree that you shall be at liberty either in one action to sue us and the said contractor or any other persons or persons jointly and severally or to proceed in the first instance against us only and further that we hereby expressly renounce our right to claim the said Contractor should be excused or proceeded against by action in the first instance and the right to claim that you should recover from us appropriate share of the amount claimed and all other rights, benefits and privileges to which guarantees or sureties are or may in law be entitled, it being expressly agreed and understood that we shall be liable in all respects hereunder as principal debtor to the extent aforementioned including the liability to be used before recourse is had against the Contractor.

Yours faithfully,

Witness :

.....
.....

The above Guarantee is issued in respect of the Bid No.: CEB/PM/ GPDEEIIPTrII: P1&P2/RTV_NM submitted by …… to the General Manager, Ceylon Electricity Board, for the Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators at Nadukuda Grid Substation & Mannar Grid Substation located in Mannar, Sri Lanka.

APPENDIX IV

Specimen Form of Performance Security

Performance Security No:
Award No:

KNOW ALL MEN BY THESE PRESENTS that by this BOND we ..... whose registered office is at ..... (hereinafter called "Contractor") and ..... a body incorporated in Sri Lanka carrying on business in Colombo whose registered office is at .....(hereinafter called the "Surety") are hold and firmly bound into the CEYLON ELECTRICITY BOARD having its Head Office at No. 50, Sir Chittampalam A Gardiner Mawatha, Colombo 2, its Successor and assigns for an on behalf of the CEYLON ELECTRICITY BOARD.

Hereinafter called the ("Employer") in the Sum of Rupees ..... (Rs. .....) for the payment of which said sum of money the Contractor and the Surety bond themselves, their successors and assigned jointly and severally by these presents.

WHEREAS We the said Contractor and Surety do hereby undertake and promise to pay to you on demand at Colombo such sum not exceeding Rupees ..... (Rs. .....) as may be demanded by you from time to time provided every such demand is made in writing under the hand of the General Manager of the Employer or by any person purporting to act under the authority of the General Manager. Such written demand shall be sufficient and conclusive proof that we are liable to pay to the Employer the sum demanded herein due.

WHEREAS the Contractor and the Employer have entered into an Agreement herein after called ("the said Contract") for the Supply and delivery/executing of ..... more particularly described in the Bid bearing No..... dated ..... in conformity with the provisions of the said Contract.

NOW THEREFORE, the CONDITIONS of the above written Bond is such that if the Contractor shall duly perform and observe all the terms provisions, conditions and stipulations of the said Contract on the Contractor's part to be performed and observed, according to the true purport, intent and meaning thereof, or if on default by the Contractor the Surety shall satisfy and discharge any damage or loss and shall pay all costs or expenses, or otherwise sustained by the Employer thereby, up to the amount of the above written Bond then this obligation shall be null and void, but otherwise shall be and remain in full force and effect, but no alteration in terms of the said Contract made by agreement between the Employer and the Contractor, or in the extend, or nature of the works to be executed thereunder, and no allowance of time by the Employer or the Engineer under the said Contract, nor any forbearance or forgiveness in, or in respect of any matter or thing concerning the said Contract on the part of the Employer or the said Engineer shall in any way release the surety from any liability under the above written Bond.

THIS BOND shall operate and take effect as from the date hereof and shall continue in force and remain valid as and from ..... day of ..... Two Thousand ..... until ..... day of ..... Two Thousand ..... both days inclusive provided however, the period of validity of this Bond may be extended up to any date subsequent to the said ..... day of ..... Two Thousand …….. then this Bond shall remain full force and effect up to such extended date.

Provided always and it is hereby declared and agreed that all the rights and remedies of the Employer under this Bond are to be cumulative and in addition to and not in substitution for their respective rights and remedies under the said Contract and the rights of the Employer against the Contractor and Surety and either of them and their or his respective successors and assigns shall not be prejudiced or affected by any alteration which may be made by agreement between the parties to the said Contract in the terms thereof and of any such award as aforesaid or in the nature of the work to be executed and obligations to be performed thereunder or by time being granted to the Contractors.

It is hereby further declared and we specifically agree that you shall be at liberty either in one action to sue us and the said Contractor or any other person or persons jointly and severally or to proceed in the first instance against us only and further that we hereby expressly renounce our right to claim that the said Contractor should be excused or proceeded against by action in the first instance and the right to claim that you should recover from us a pro-rata share of the amount claimed and all other rights, benefits and privileges to which Guarantors or Sureties are and may in law be entitled, it being expressly agreed and understood that we shall be liable in all respects hereunder as principal debtor to the extent aforementioned including the liability to be sued before recourse is had against the Contractor. Any suit at Law or Proceedings in equity if brought against the Surety or Contractor of any other person to recover any claim hereunder the same shall be instituted in Sri Lanka.

In witness whereof the parties hereto have hereunto set their hand at Colombo on the dates herein mentioned.

…….
Signature and seal

Name of The Bank ……..
Address ……..
……
Date ……

APPENDIX V

SPECIMEN FORM OF CONTRACT AGREEMENT

CONTRACT AGREEMENT

THIS AGREEMENT made on the _____ day of _____BETWEEN

(1) ***Ceylon Electricity Board***, a body corporate established under the Act No. 17 of 1969 and having its registered office at ***No.50, Sir Chittampalam A. Gardiner Mawatha, Colombo 02*** (hereinafter called "the Employer"), and (2) ***……*** formed under the laws of Sri Lanka and having its registered office at ***……*** (hereinafter called "the Contractor").

WHEREAS the Employer desires to engage the Contractor to …… ***, Bid No: ……., Award No: ……*** and the Contractor have agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1
Contract Documents

1.1. **Contract Documents**

The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

1. The Contract Agreement
2. Legal Clearance of the Contract Agreement
3. Performance Security for this Contract, ……dated ……
4. The Letter of Acknowledgement of Letter of Acceptance dated ……
5. The Letter of Acceptance: …… Dated……
6. Clarifications Requested by the Employer and replies for clarifications by the bidder
7. The Form of Bid, Technical Particulars & Guarantees and the Schedule of Prices submitted by the bidder dated ……..
   Or
   The Form of Bid and Qualification Information and the Bills of Quantities submitted by the bidder dated ……..
8. Clarifications requested by the bidder and the answers for the clarifications issued by the Employer
9. Minutes of Pre-Bid Meeting held on .....
10. Scope of Work of the Bidding Document
11. The Technical Specifications and Drawings attached to the Bidding document and its amendments.
12. The General Conditions and Special Conditions of Contract of the Bidding document.
    Or
    The Conditions of Contract (ICTAD/SDB/……) and Contract Data/ Schedule of the Bidding document.

1.2. **Order of Precedence**

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

Article 2 Contract Price and Terms of Payment

2.1. **Contract Price**

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be the aggregate of: ***…… (Sri Lankan Rupees ……..) Excluding Taxes*** or such other sums as may be determined in accordance with the terms and conditions of the Contract.

2.2. **Terms of Payment**

The terms and procedures of payment according to Clause 15 of the General Conditions and Special Conditions of the Bidding Document

Or

Clause 43 of the ICTAD/SBD/01 – Section 03, Condition of Contract

Or

Clause 10 of the ICTAD/SBD/03 – Section 08, Conditions of Contract

Article 3 Effective Date

3.1. **Effective Date**

The Effective Date upon which the period until the Time for Completion of the contract shall be counted from is the date of Letter of Acceptance/Letter of Credit

Article 4 Communications

4.1. The address of the Employer for notice purposes is: ***Office of the Project Manager (GPD&EEIIP-TRII, P1&P2),Ceylon Electricity Board,No: 318, Averiwatta Road,Wattala.***

4.2. The address of the Contractor for notice purposes is:*……*

Article 5 Appendices

5.1. The Appendices listed in the attached List of Appendices shall be deemed to form an integral part of this Contract Agreement.

5.2 Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by, for and on behalf of the **Employer**

(1).....

General Manager
Ceylon Electricity Board

In the presence of

(1)..... (2)……

Name: Name:

Designation: Designation:

Signed by, for and on behalf of the **Contractor**

(1).....

Authorized Signature and Company Seal of

in the presence of

(1)..... (2)……

Name: Name:

Designation: Designation:

Appendix

1. The Contract Agreement
2. Legal Clearance of the Contract Agreement.
3. Performance Security for this Contract, ……dated ……
4. The Letter of Acknowledgement of Letter of Acceptance dated …….
5. The Letter of Acceptance, …….. Dated…….
6. Clarifications Requested by the Employer and replies for clarifications by the bidder
7. The Form of Bid, Technical Particulars & Guarantees and the Schedule of Prices submitted by the bidder dated ……..

   Or

   The Form of Bid and Qualification Information and the Bills of Quantities submitted by the bidder dated ……..
8. Clarifications requested by the bidder and the answers for the clarifications issued by the Employer
9. Minutes of Pre-Bid Meeting held on .....
10. Scope of Work of the Bidding Document
11. The Technical Specifications and Drawings attached to the Bidding document and its amendments.
12. The General Conditions and Special Conditions of Contract of the Bidding document.

    Or

    The Conditions of Contract (ICTAD/SDB/……) and Contract Data/ Schedule of the Bidding document.

Appendix VI

CEB TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATION

GREEN POWER DEVELOPMENT & ENERGY EFFICIENCY IMPROVEMENT INVESTMENT PROGRAMME – TRANCHE II

Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators

No.	Item	Required	Tendered
1	Manufacturer Name and country of manufacturing		
2	Type designation of paint		
3	Reference Standard for Application	IEEE 1523	
4	RTV Coating Type according to IEEE 1523 clause 5		
5	Number of components	one	
6	Specific Gravity		
7	Method of application	Spray	
8	Maximum Full cure time required before energization		
9	Coating Thickness (dry film thickness)	350µm	
10	Service Life time		
11	Performance Warranty Period (Minimum)	10 years	
12	Primer required	No	
13	Usage Temperature Range °C	5°C to 120°C	
14	Salinity Level withstood during Artificial Pollution Test	>110 kg/m3	
15	Color	Grey	
16	Fillers	Quartz and ATH	
17	Di electric strength	> 340 kV/cm	

Name: …… **Signature: ……**

Seal: ……

Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators

TECHNICAL SPECIFICATION

1) Silicone must be used in the product. Other polymers, such as Fluor urethanes, lack the long-term UV resistance and adherence of a well-designed Silicone.

2) The bidder shall only deliver the product kind, e.g., silicone rubber coating material RTV Type I. RTV Type I silicone (sometimes spelled RTV-I or RTV-1) is a one-component silicone that cures without the addition of catalyst or additional chemicals during the application process. The use of solvents or primers is strictly prohibited.

3) Alumina Tri-Hydrate (ATH) must be used in the formulation; greater particle size ATH is preferred (Vendor should indicate the grain size of ATH).

4) Peeling or chalking is not permitted; cracking or crazing is not permitted, blistering or bubble formation is not permitted.

a) The product must adhere well to porcelain, glass, or non-ceramic insulators.
b) The product must not need the use of primers to ensure adherence.
c) Appropriately qualified and certified applicators must execute the application.

5) Never allow a product to generate tracking markings more than 100 millimeters in length.

6) Never allow the product to degrade in regions more than 500 square millimeters.

7) The product must maintain a hydrophobicity rating equal to or greater than that of Class HC3 as defined in STRI Guide 92/1.

8) Long-term, the product must remove substantial leakage current: - This performance attribute may be quantified subjectively and quantitatively.

a) The acoustic noise generated by surface discharges is eliminated.
b) The cessation of visible discharges (after dark);
c) The erasure of hotspots (as indicated through infrared thermal imaging) The item's exact specification is included on page 2 of this annexure. The seller must complete Colum in the manner specified on page 2 of 2 for the given item.

9) APPLICATION EQUIPMENT

Compressor-driven 1:70 airless spray gun Ascertain that the air compressor is equipped with suitable oil and water separators to ensure that the air delivered to the pump is completely dry.

10) ACCESS

Access to the insulators and substation equipment bushings would be gained using a scaffold or a Mobile Elevated Work Platform, depending on the site layout and clearances, among other factors.

11) PREPARATION OF INSULATOR, EQUIPMENT SURFACE

All insulator and equipment surfaces should be completely clean and free of dust, oil, grease, wax, and other foreign matter, including frost, prior to applying the RTV coating. Additionally, all surfaces must be dry

prior to applying the coating. This is to guarantee that the RTV silicon coating is applied properly to the insulator surface.

If the insulators and equipment have been previously covered with silicone compounds or other forms of greases, thoroughly clean them. The contractor shall require applying solvent to eliminate grease buildup. It is advised to begin with a solvent-soaked scourer and then finish with a clean cloth drenched with fresh solvent. After wiping off the insulator and equipment surfaces with a paper towel to eliminate any residue, they should be cleansed with alcohol on a clean cloth immediately before to spraying. Cleaning fluids that are recommended: Isopropanol IPA (with high purity)

12) APPLICATION OF RTV COATING

RTV coating shall be sprayed undiluted, direct from its container. However, if temperature and humidity are very high causing quicker than normal curing, it may be necessary to dilute up to a maximum of 10% by weight of the recommended solvent. The final mixture shall be homogenous and have a viscosity suitable for spraying. The material shall be mixed in the pump pail or in a separate container. Rubber or plastic gloves shall be used when mixing the RTV coating and solvent.

Place the flexible suction hose in the pail with the RTV coating. Connect the compressor's airline to the spray pump and the pump's fluid & air hose kits to the spray guns. Adjust the fluid pressure to about 15psi, open the fluid isolation valves, shut the air isolation valves, and then purge the system until the RTV coating flows at the gun. Adjust the air isolation valves to around 100psi for the air and approximately 25psi for the pump. Increased pressures may be necessary if operating at a height or with very lengthy hoses. When spraying RTV coating, vapor masks, safety glasses, and rubber gloves should be used. If the application is carried out inside in an area with inadequate ventilation, an extraction device should also be employed. The first application of RTV coating may be runny.

In the first instance, a light 'flash' coat should be applied; once sticky, consecutive heavier coatings may be applied. Each layer must cure at least until tacky before applying the next. Typically, three coats (including the ‘flash' coat) are necessary to achieve the requisite thickness. The number of coatings needed varies according to the dilution, the sprayer's expertise, and the surrounding environment. Between coats, the time interval is between 10 and 30 minutes, depending on the temperature and humidity. Following the first application, subsequent coats may be applied more heavily. The operator should spray in an arc motion until ripples emerge on the coated surface, at which point he or she should switch to another part of the insulator. Continued spraying in the presence of this rippling may result in runs and drips.

We recommend spraying the tops of the insulator shirts first and allowing them to dry to the touch before spraying the undersides of the insulator skirts. Each applicator may need to cycle between two or three insulators to allow for curing time between applications and to maintain productivity. Spray until the pail is completely empty, or fill up the pail with more RTV coating from a separate container for continuing spraying. Regularly clean spray gun nozzles/caps and pump filters by removing, flushing with solvent, and blowing with compressed air. The cured thickness should be around 0.5mm +/- 0.14mm, which should be verified and documented frequently during the process using an ultrasonic thickness gauge or by removing a

part of the cured RTV coating and measuring the thickness with a micrometer. It is not always feasible to achieve the entire 0.5mm cured thickness on difficult-to-reach areas of the insulator using the spray gun (e.g. inside of the inner profile of a multiple skirted insulator). It is critical to apply enough RTV coating in these instances such that the insulator's base color is not visible through the cured coating. As long as the proper cleaning technique is followed, adhesion of the RTV coating to the porcelain/glass surface should be satisfactory. If, however, it is determined that the adhesion is insufficient, the cleaning technique, equipment, and materials will need to be checked and the issue corrected before continuing with the application. While the use of 1200 OS Primer considerably enhances adhesion, it should not be used to compensate for improper cleaning or material or equipment difficulties. After at least 24 hours of curing, adhesion may be evaluated by cutting a tiny U-shape in the cured covering. This may then be lifted by tickling a knife blade under the front edge and pulling away. The slice of coating should be rather difficult to remove and should separate from the surface, leaving remnants of RTV coating. The slice should NOT readily lift and pull away from the region under examination. After seven days, complete adhesion and healing occur

13) CLEAN-UP

Fill a bucket with solvent. Place the suction hose in the bucket of solvent and point the gun in to the opening in the RTV coating pail. With the fluid control valve open and the air control valve closed, press the gun trigger until all the RTV coating has been removed and solvent starts to flow from the gun nozzle, reduce the fluid pressure and continue the cleaning operation by recycling the solvent in the bucket. Finally flush some clean solvent through the system. Remove the filters, air caps and nozzles and clean manually.

14) PROTECTION OF EXISTING EQUIPMENT'S & STRUCTURES

During the application of RTV coating, all other structures or equipment should always be covered to the satisfaction of the CEB representatives, who must be present at all times. Further, it is primarily the contractor's obligation to maintain proper quality control procedures under close supervision in order to avoid any damage to existing equipment's or structures.

Appendix VII

SCHEDULE OF PRICES

SCHEDULE OF PRICES

(Duly signed this Schedule of Prices is to be attached with the offer)

Bid No: CEB/PM/ GPDEEIIP-TrII: P1&P2/RTV_NM

Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators at Nadukuda Grid Substation & Mannar Grid Substation					
Item No	**Description**	**Quantity**	**Unit**	**Unit Price (LKR) (including taxes & duties)**	**Total (LKR) (including taxes & duties)**
1	Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators of Nadukuda Grid Substation.	1	Lot		
2	Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators of Mannar Grid Substation.	1	Lot		
3	Supply of RTV Paints for future use	15	Lts		
GRAND TOTAL					

Note: All import taxes and customs duties shall be borne by the contractor.

……

Signature of Bidder

Date: …… **Company Seal**

Bidder's Name: ……

……

Address: ……

……

Appendix VIII

METHOD STATEMENT & WORK PROGRAMME

METHOD STATEMENT & WORK PROGRAMME

Note: Separate sheets may be attached if the provided space is insufficient.

Bid No: CEB/PM/ GPDEEIIPTrII : P1&P2/RTV_NM

Description	**To be filled by the Bidder**				
Working Method					
Number of Teams Proposed					
Details of equipment	Instruments	Type & Brand	Model	Accuracy	No of units
Appling thickness of the RTV (minimum 350um)					
Work Program:	*Gantt chart for work program (can be attached)*				
Special Comments If any					

Name: …… **Signature…….**

Seal: ……

Appendix IX

Scope of Work

Scope of Work

A. Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators at Nadukuda Grid Substation

NADUKUDA GRID SUBSTATION			
Item	**Description**	**Quantity**	**Unit**
1	220kV Outdoor Cable Termination - Line side	6	Nos
2	220kV LA - Line Side	6	Nos
3	220kV Suspension Disc Insulator (17 Nos per string) - Line Side	6	Nos
4	220kV Outdoor Cable Termination - Trafo side	6	Nos
5	220kV LA - Trafo Side	6	Nos
6	220kV HV Trafo Bushing	6	Nos
7	33kV LV Trafo Bushing	6	Nos
8	33kV LV Trafo Neutral Bushing	2	Nos
9	33kV Post Insulators	12	Nos
10	33kV LA	6	Nos
11	145kV NCT Bushing	2	Nos
12	Supply of RTV Paints for future use	5	Ltrs

Name: …… **Signature: ……**

Seal: ……

B. Supply and Application of Room Temperature Vulcanization (RTV) Silicone Coating for the Outdoor Insulators at Mannar Grid Substation

MANNAR GRID SUBSTATION			
Item	**Description**	**Quantity**	**Unit**
1	220kV Line Bay		
	SA	3	Nos
	CVT	3	Nos
	DS&ES	6	Nos
	CT	3	Nos
	CB	3	Nos
	Bus 1 DS	6	Nos
	Bus 2 DS	6	Nos
	String Insulators	153	Nos
	Post Insulators	3	Nos
2	220kV TF /Reactor Bays		
	SA	3	Nos
	HV Bushing	3	Nos
	HVN Bushing	1	Nos
	CT	4	Nos
	CB	3	Nos
	Bus 1 DS	6	Nos
	Bus 2 DS	6	Nos
	String Insulators	153	Nos
	Post Insulators	3	Nos
3	Bus Coupler Bay		
	CT	6	Nos
	CB	3	Nos
	Bus 1 DS	6	Nos
	Bus 2 DS	6	Nos
	String Insulators	306	Nos
	Post Insulators	6	Nos

Name: …… **Signature: ……**

Seal: ……

MANNAR GRID SUBSTATION			
Item	**Description**	**Quantity**	**Unit**
4	220kV Bus Bar		
	CVT	6	Nos
	Post Insulators	62	Nos
5	33kV System		
	SA	12	
	DS&ES	24	
	Bushing	1	
	CT	1	
6	Supply of RTV Paints for future use	10	Ltrs

Name: …… **Signature: ……**

Seal: ……

Appendix X

Drawings

A. Drawings Related to Nadukuda Grid Substation
B. Drawings Related to Mannar Grid Substation

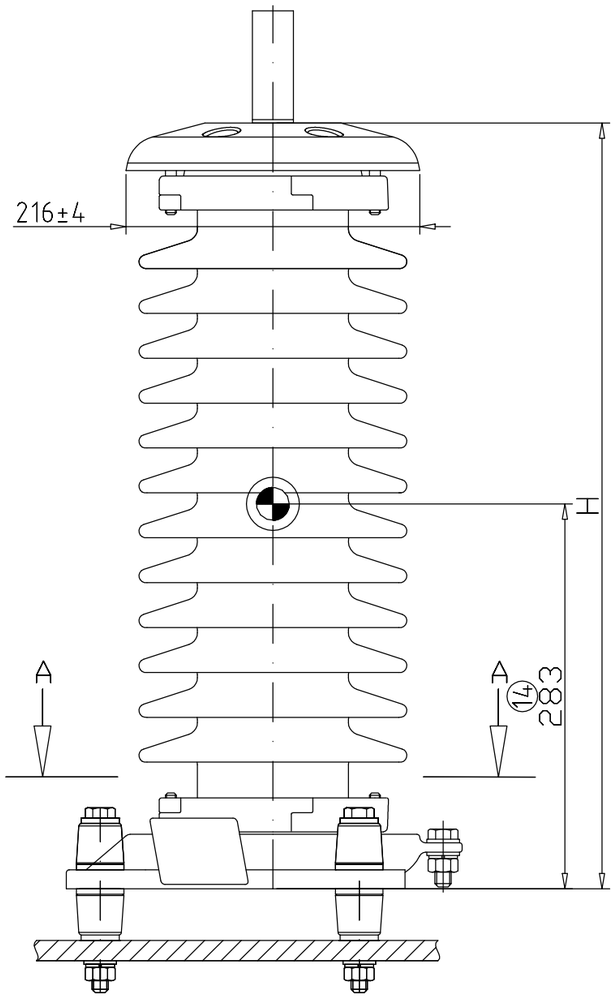
A. Drawings Related to Nadukuda Grid Substation

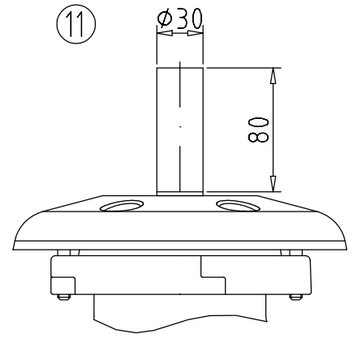
① Type	② U_r kV	③ U_c kV	H mm	④ G kg	⑤ n	⑥ d mm	⑥ l mm	⑦ SLL N	⑦ SSL N	⑧ k mm
3EP5 036-1PE21-1DA1-Z	36	28.8	566±15	27,9	1	-	-	1410	3530	1260

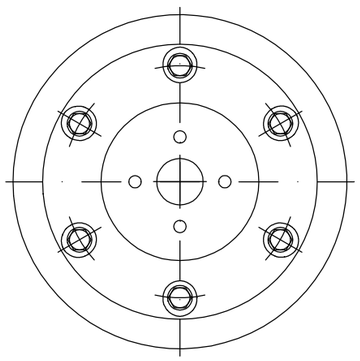
1. Type
2. Rated voltage
3. Continuous operating voltage
4. Total weight, approx.
5. Number of units
6. Dimensions of the grading fittings
7. Max. permissible pull at insulator top
8. Min. creepage distance
9. Insulation parts with screws M12x120
10. Earth terminal or terminal for control devices
11. Bolt terminal AZ
12. Name plate (anodized aluminum)

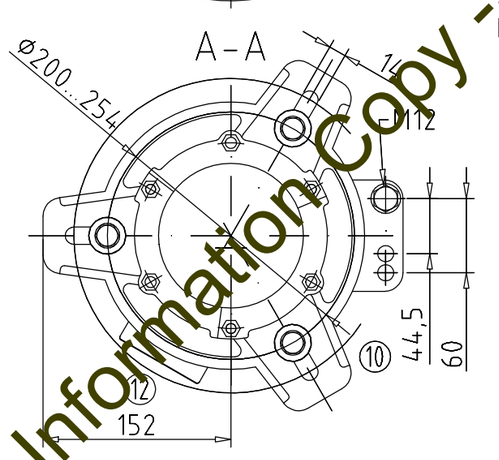
14. Center of mass

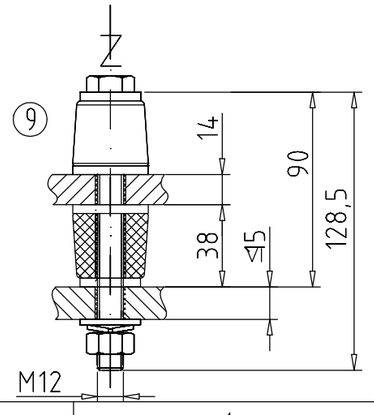
Remarks
Frequency: 48 ... 62 Hz
Altitude above sea level: up to 1000 m
Material and color of insulator: Porcelain housing, brown







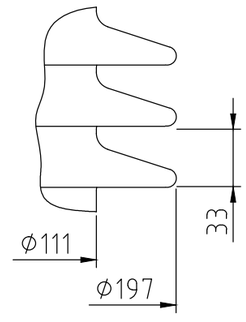




12

SIEMENS

Überspannungsableiter/Surge Arrester
Type 3EP5 036-1PE21-1DA1-Z
U_r 36 kV U_c 28.8 kV SL
I_n 10 kA I_s 50 kA LD-CL2
Dat 2018
S/N K/35.....
- 490-12430-174+QR
Made in Germany



CEB - Nadukuda and Mannar 220/33kV

Siemens Ltd.

Index	Remark	Ä.d.	Date
			05.11.2018

First issue		Current update	CAD-drawing
05.11.2018	Date		
Symphorianus	Handled by		
H. Jin	Checked		
	Section leader		
	Standard		

Surge arrester 3EP5

AL: N
ECCN: N

f. type | type

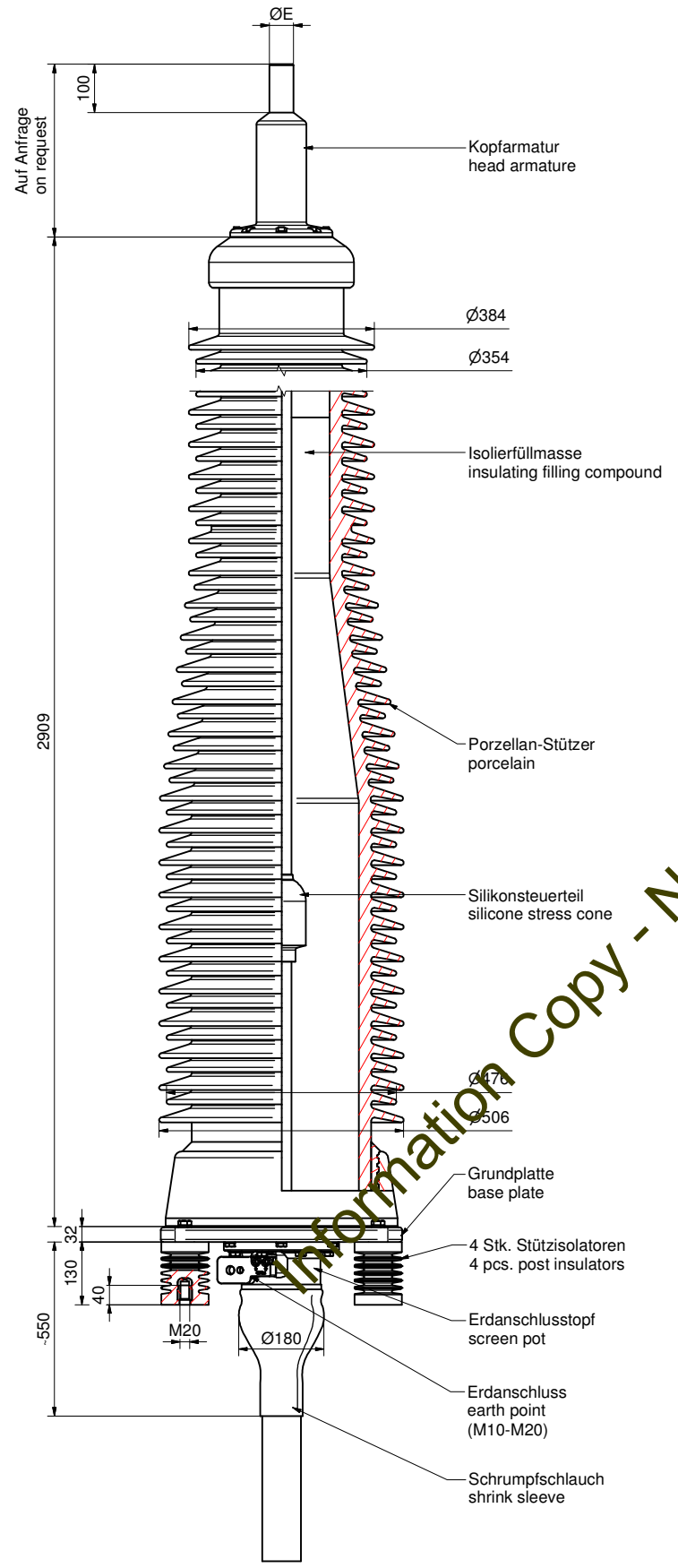
SIEMENS

EM HP AR / 27122069.0020 (drawing number)

B01- (Sheet no. / Index)

Replacement for | Superseded by

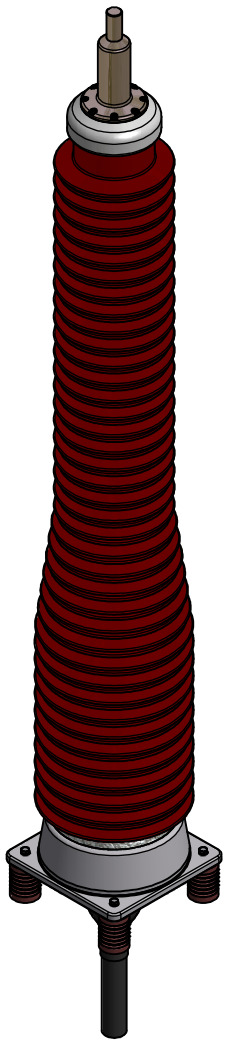
file: 27122069-0020.dwg

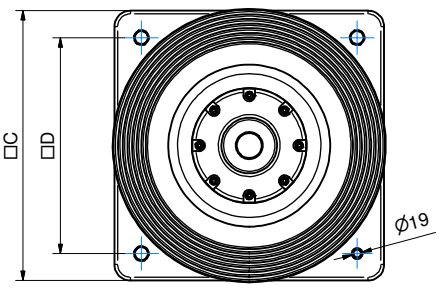


Höchste Spannung für Betriebsmittel (Um) highest voltage for equipment (Um)			245kV
Mindest-Kriechweg minimal creepage distance			10230mm
Verschmutzungsklasse pollution class	IEC60815 IEC60815-2	38mm/kV 71.5mm/kV	IV e
Farbe des Isolators colour of insulator		braun brown	RAL 8016
Totalgewicht ohne Kabel (ca.) total weight without cable (approx.)			480kg
Kabelisolation ø geschält ø of cable insulation prepared			72-99mm
entspricht ca. Leiterquerschnitt conductor cross-section (approx.)			400..2000mm²

Kopfarmatur Bolzenabmessungen head armature top bolt dimensions	
Leiterquerschnitt conductor cross-section	ØE [mm]
≤ 500mm² > 500mm² - <1200mm² ≥ 1200mm²	30 40 50

Grundplatte base plate	C [mm]	D [mm]
Standard	500	400
on request auf Anfrage	600	500





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	Name / name	Datum / date					
Erstellt von / created by	tanner	2019-08-13					
Geprüft von / approved by	Ferrazza	2019-08-13					

Beschreibung / title
ESP245-C103
Freiluft Endverschluss (Porzellan)
ESP245-C103
Outdoor termination (porcelain)

PFISTERER
PFISTERER Switzerland AG Switzerland

Ersatz für / replacement for	Dokumentart / type of document	Dateiname / filename	Format / size	Blatt / sh.
PRO00201	Für Kunden	S04-154773	A2	1/1

Änd.nr. / rev. no.	Änd.datum / date of issue	Name / name	Index / rev.	Dokumentnr. / document no.
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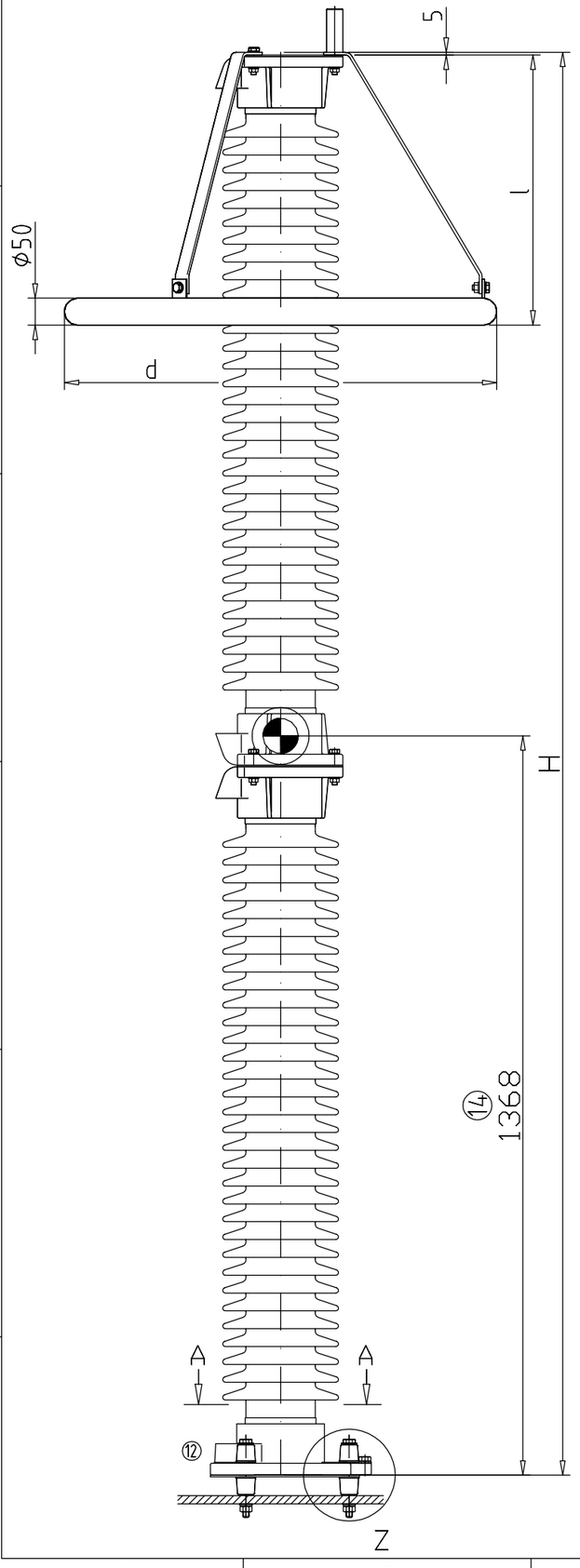
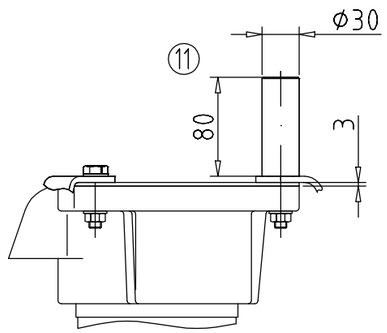
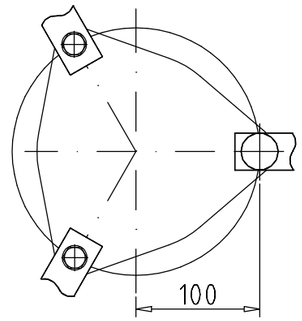
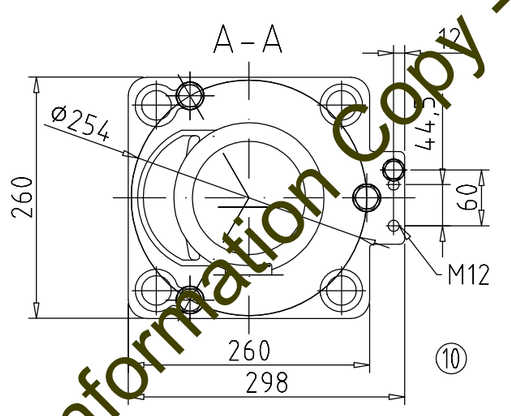
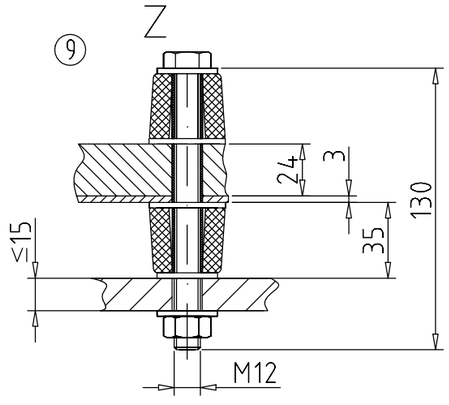










① Type	② U_r kV	③ U_c kV	H mm	④ G kg	⑤ n	⑥ d mm	⑥ l mm	⑦ SLL N	⑦ SSL N	⑧ k mm
3EP4 192-2PE22-1DA7-Z	192	154	2630	129,4	2	800	500	680	1710	6810

1. Type
2. Rated voltage
3. Continuous operating voltage
4. Total weight, approx.
5. Number of units
6. Dimensions of the grading fittings
7. Max. permissible pull at insulator top
8. Min. creepage distance
9. Insulation parts with [illegible]ews and adapter 10"
10. Earth terminal or terminal for control devices
11. Bolt terminal AZ
12. Name plate (anodized aluminum)

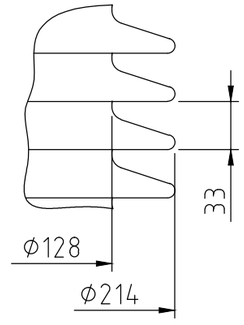
14. Centre of mass

Remarks
Frequency: 50 Hz
Altitude above sea level: up to 1000 m
Material and color of insulator: Porcelain housing, brown

⑫

SIEMENS

Überspannungsableiter/Surge Arrester
Type 3EP4 192-2PE22-1DA7-Z
U_r 192 kV U_c 154 kV SL
I_n 10 kA I_s 65 kA LD-CL2
Dat 2018
S/N K/35.....
- 490-12111-174+QR



CEB - Nadukuda and Mannar 220/33kV

Siemens Ltd.

Index	Remark	Ä.d.	Date
			05.11.2018

First issue		Current update	CAD-drawing
05.11.2018	Date		
Symphorianus	Handled by		
H. Jin	Checked		
	Section leader		
	Standard		

Surge arrester 3EP4

AL: N
ECCN: N

f. type

type

SIEMENS

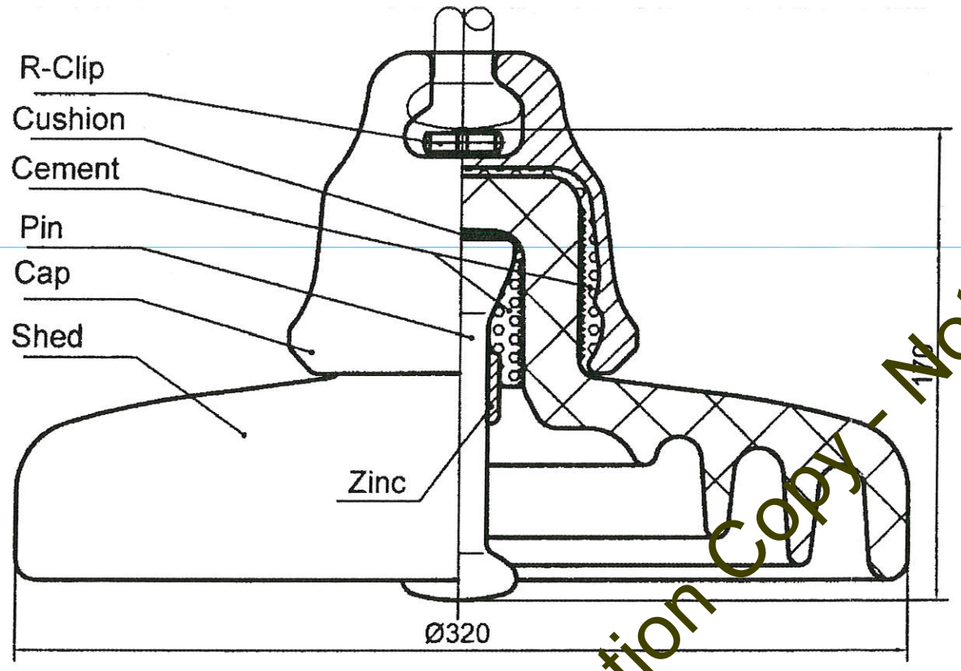
EM HP AR / 27122069.0010
drawing number

B01-
Sheet no. Index

Replacement for

Superseded by

file: 27122069-0010.dwg



TECHNICAL DATA

Specification Applied : IEC Pub. 60383-1

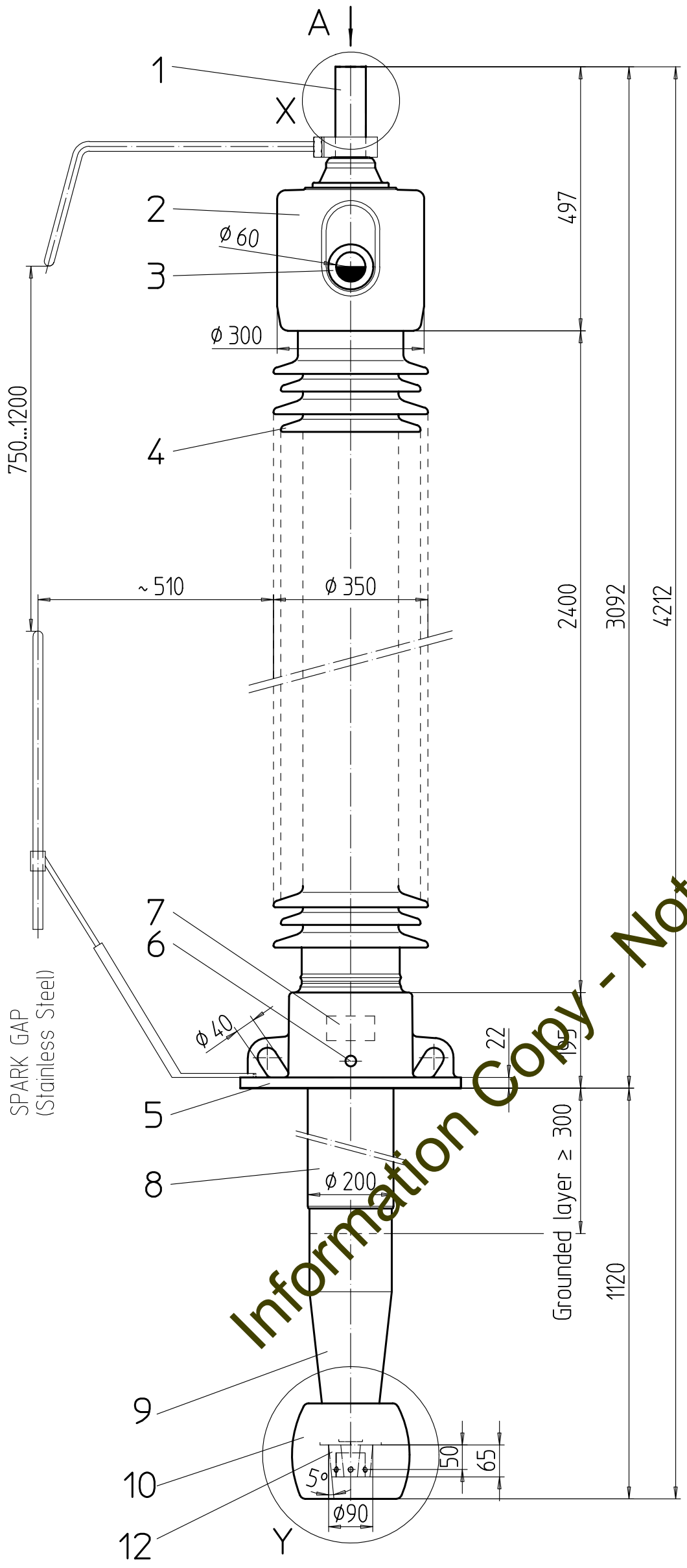
1.	Dimensions	
	a. Nominal unit spacing , mm	170
	b. Nominal porcelain disc diameter , mm	320
	c. Nominal creepage distance , mm	450
	d. Type of ball and socket coupling	IEC 60120 20
2.	Mechanical values	
	a. Rated E&M failing load , kN	160
	b. Mechanical routine test load , kN	80
3.	Electrical values	
	a. Power-frequency dry withstand voltage , kV	75
	b. Power-frequency wet withstand voltage , kV	45
	c. Dry lightning impulse withstand voltage(pos) , kV	115
	d. Power-frequency puncture voltage , kV	120
4.	Radio influence voltage date	
	a. Test voltage to ground , kV	10
	b. Maximum RIV at 1,000kHz , μV	50

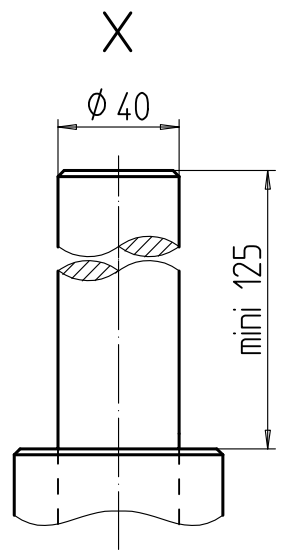
Notes : Mark on porcelain

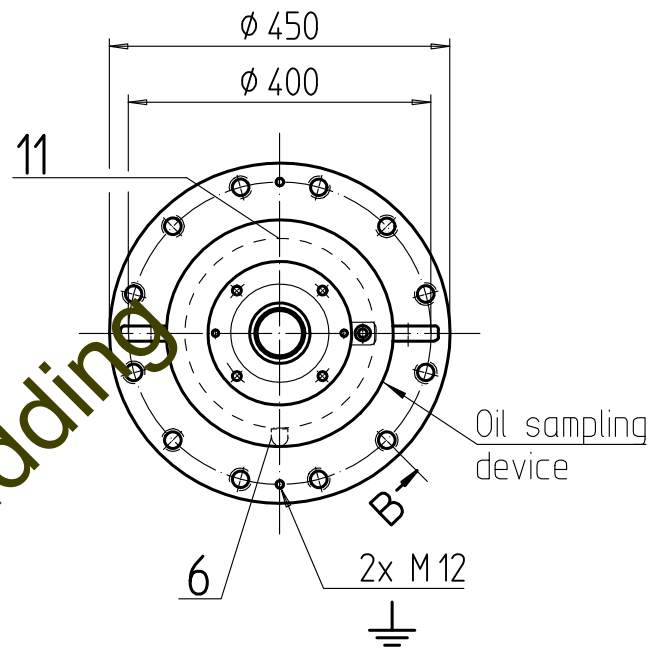
YEAR
M·E 160kN
CHINA

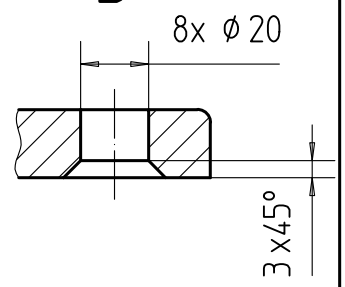
Design		160kN E&M STRENGTH DISC PORCELAIN INSULATOR	Dalian Insulator Group T&D Co.,Ltd.
Check			UNIT MASS-9.9kg
Confirm		ASSEMBLY DRAWING	DRG.NO. U160BL
DATE: 2019.5.22			

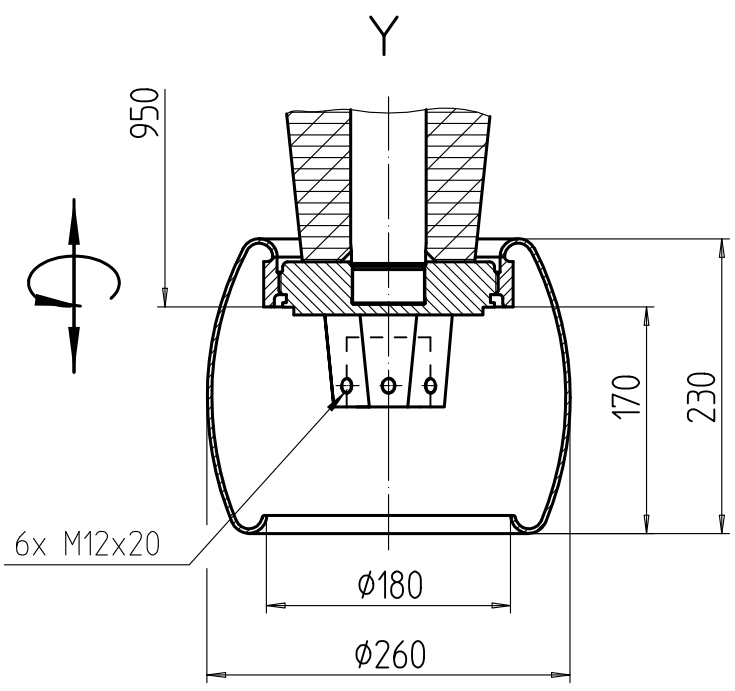
TB19168
SY441-2
H160Q-129Z
20R
6.9











Bottom connection / fixed conductor

Standard = IEC60137-2017

Item	Designation
1	Top terminal (Cu/Ag)
2	Head (Al)
3	Oil level indicator (Optic ø60)
4	Porcelain insulator (Brown)
5	Flange (Al)
6	Test tap
7	Rating plate
8	Ground sleeve (Al)
9	Epoxy insulator
10	Shield (Al)
11	Air escape screw
12	Bottom terminal (Cu)

Drawn :	Checked :
2018/07/05	2018/07/11
Ch.Spindler	J.Schmitter
Modifications : 00	
Modified :	Checked :

Material :	Dimensions :	Mass :	Material No :

Title :

Outline drawing

Type COT 1175-1600 L300

Transformer Bushing C

General tolerance :

Scale :

Format : A3

Sheet : 1 / 2

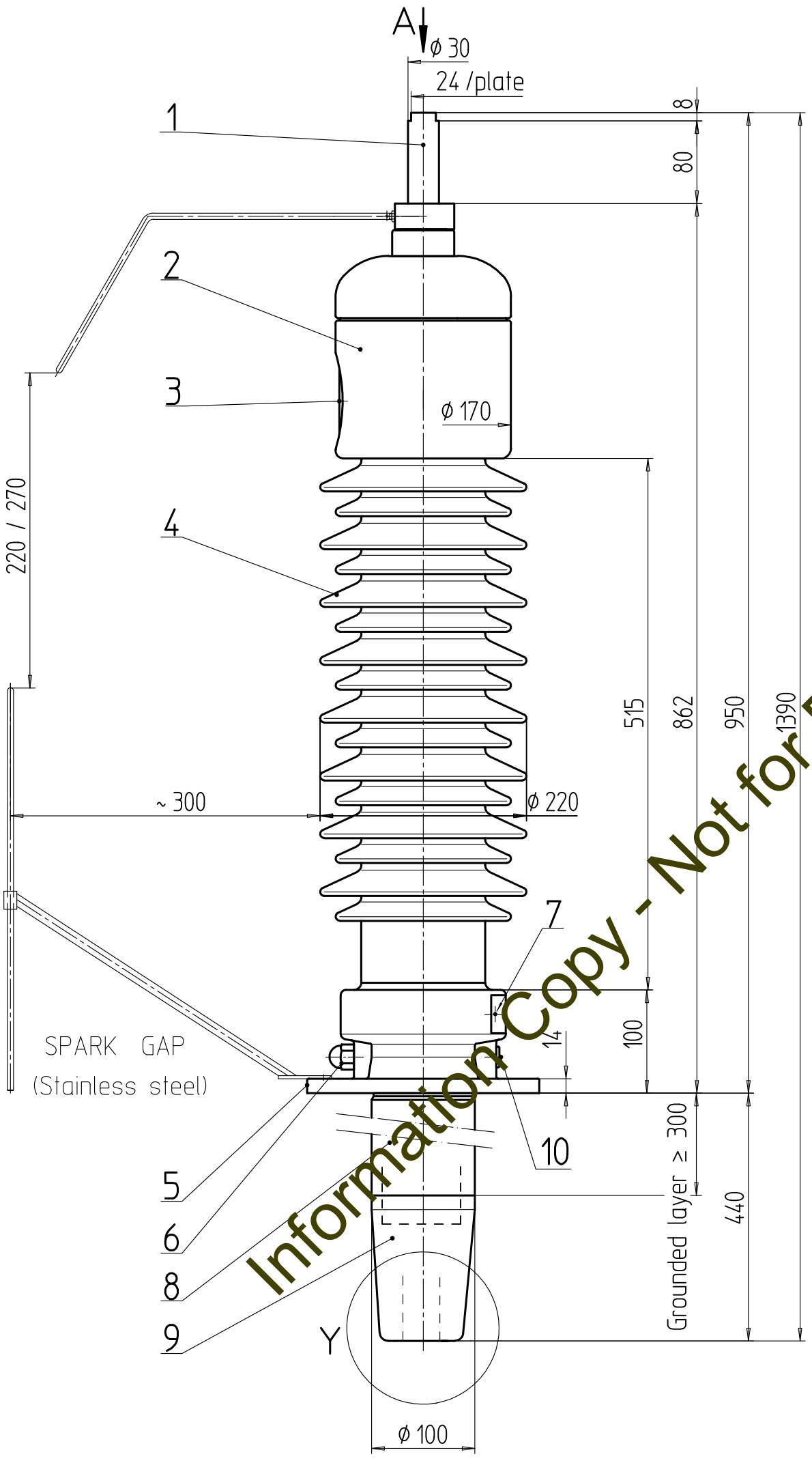
TRENCH
TRENCH France SAS

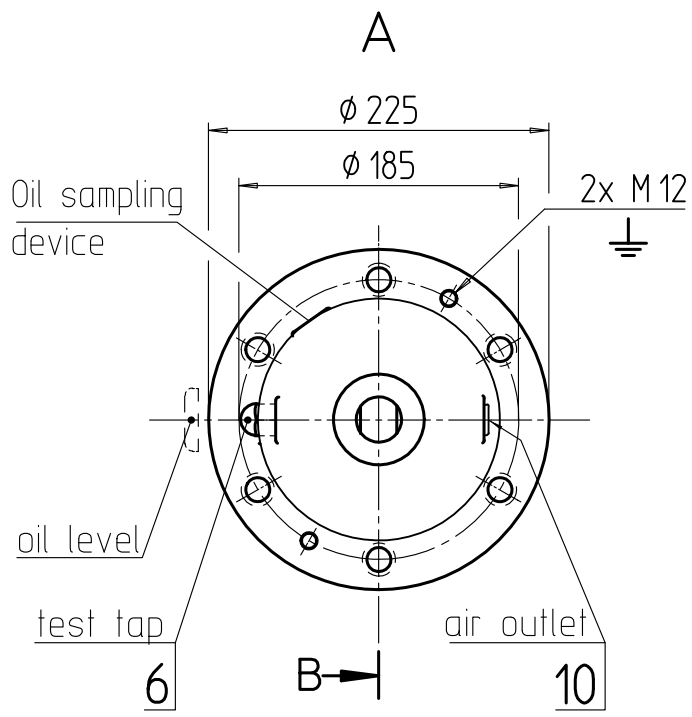
Stock/Req. No :

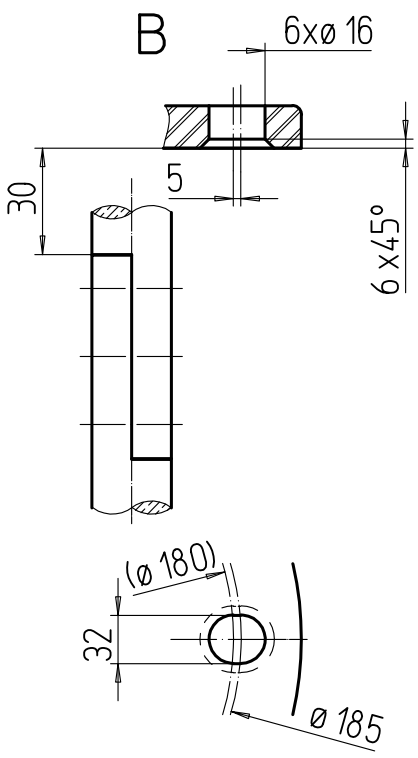
Substitute for :

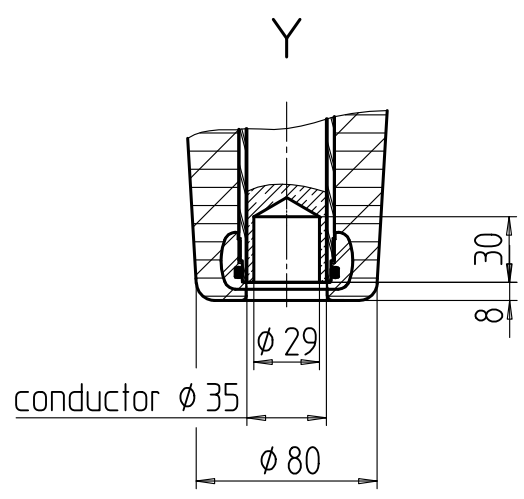
Substituted by :

41419634Z









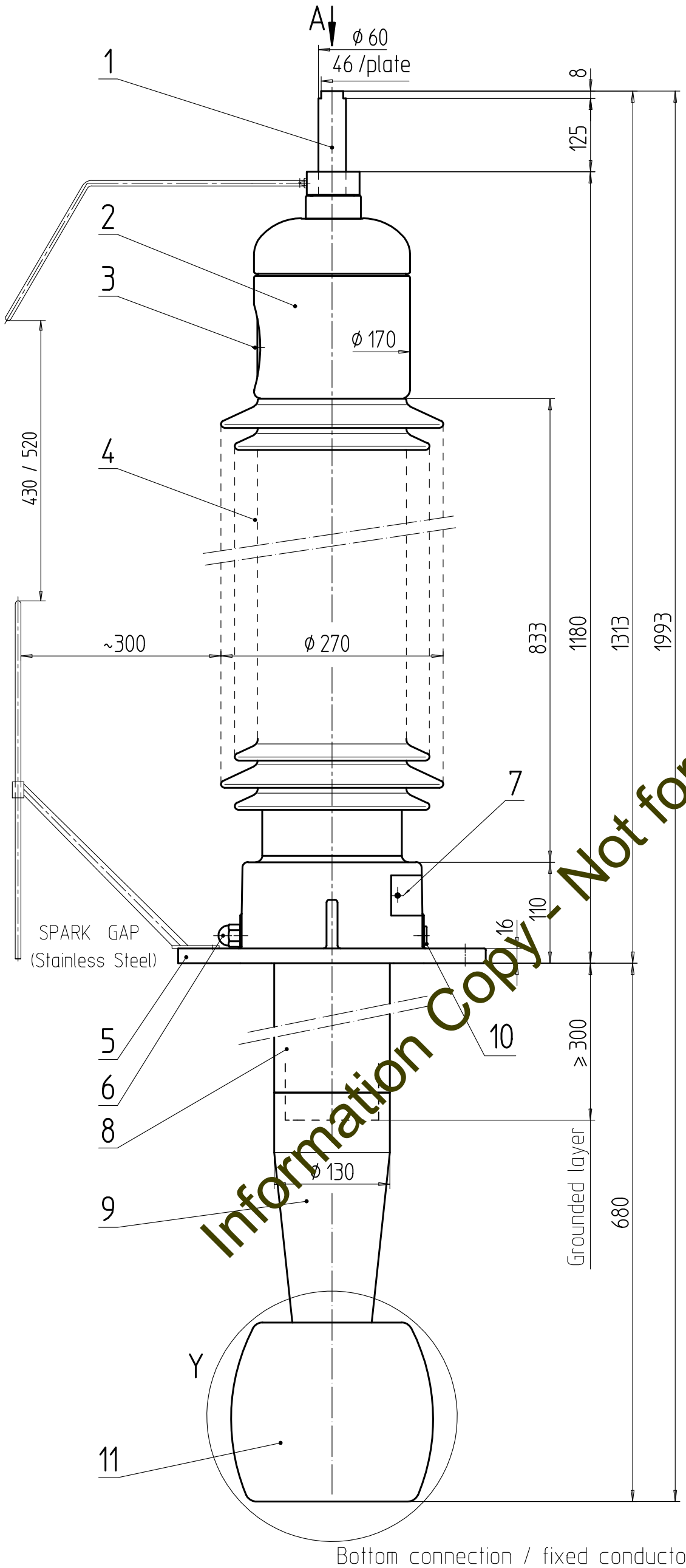
Removable copper conductor

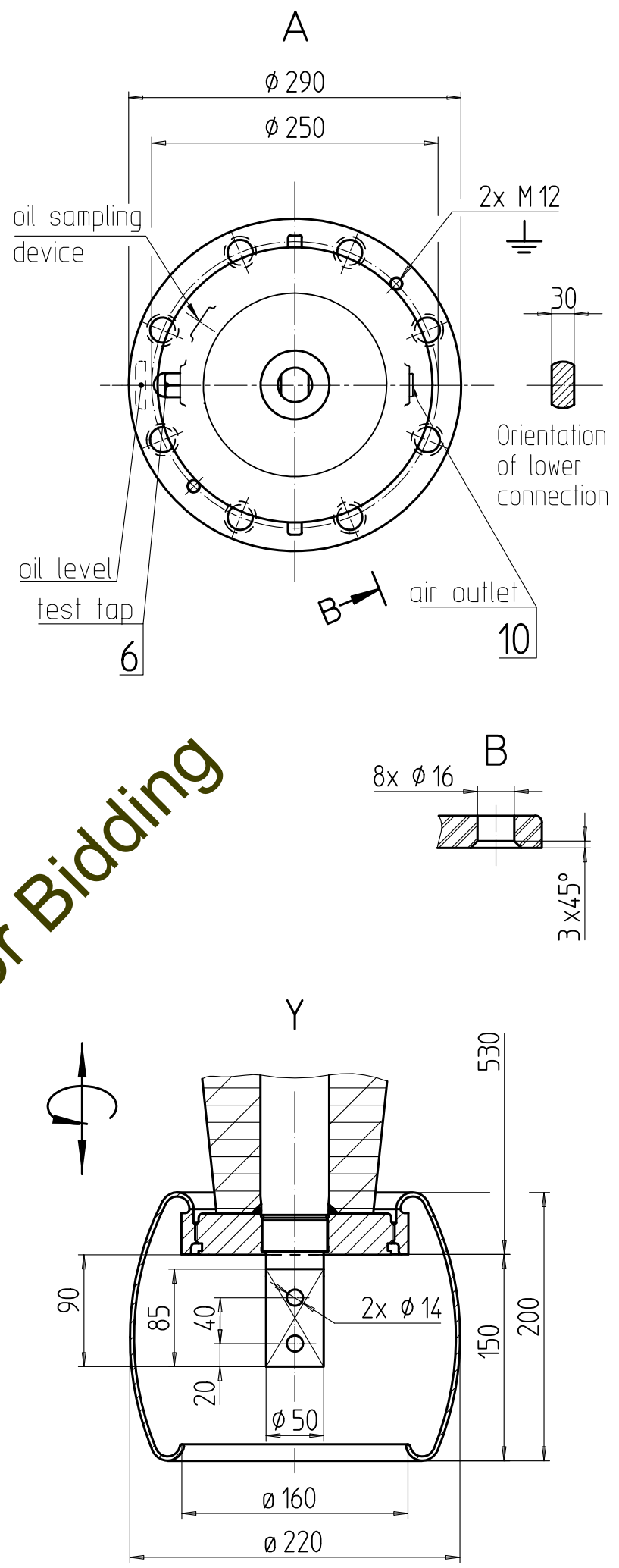
Standard = IEC60137-2017

Item	Designation
1	Top terminal (Al)
2	Head (Al)
3	Oil level indicator opt. ø60
4	Porcelain insulator (brown)
5	Flange (Al)
6	Test tap
7	Rating plate
8	Ground sleeve (Al)
9	Epoxy insulator
10	Air outlet

Drawn :	Checked :	Material :	Dimensions :	Mass :	Material No :
2018/06/13	2018/06/13				
Ch.Spindler	E.Wurtlin	Title :		General tolerance :	
Modifications : 00		Outline drawing		Scale :	
Modified :	Checked :	Type COT 250-1250 L300		Format : A3	
		Transformer Bushing C			
		Stock/Req. No :		Sheet : 1 / 2	
		Substitute for : 418092		41419436Z	
		Substituted by :			

TRENCH
TRENCH France SAS





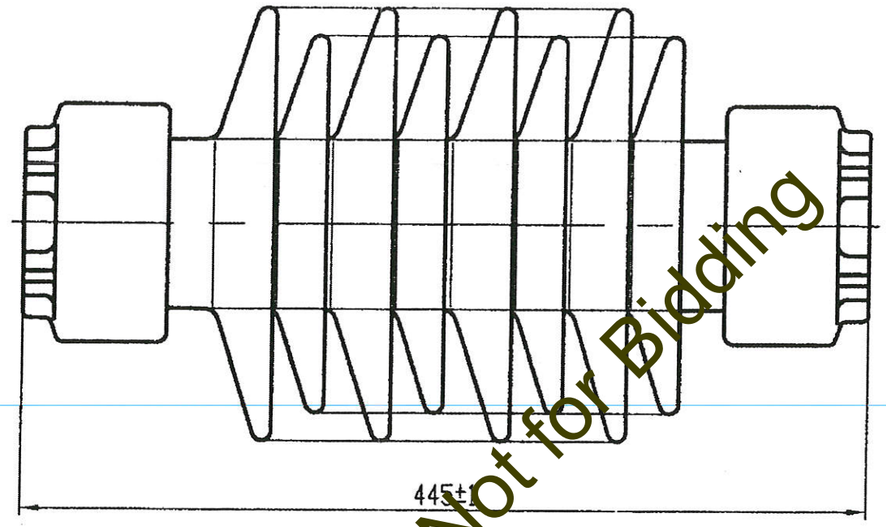
Warning : this Ø is only 30mm smaller as the Flange fixing diametre

Bottom connection / fixed conductor

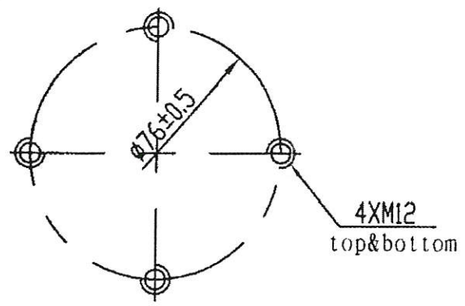
Standard = IEC60137-2017

Item	Designation
1	Top terminal (Cu/Ag)
2	Head (Al)
3	Oil level indicator (Optic ø60)
4	Porcelain insulator (brown)
5	Flange (Al)
6	Test tap
7	Rating plate
8	Ground sleeve (Al)
9	Epoxy insulator
10	Air outlet
11	Lower terminal (Cu)

Drawn :	Checked :	Material :	Dimensions :	Mass :	Material No :
2018/07/05	2018/07/11				
Ch.Spindler	J.Schmitter	Title :		General tolerance :	
Modifications : 00		Outline drawing		Scale :	
Modified :	Checked :	Type COT 450-1600 L300		Format : A3	
		Transformer Bushing C			
		Stock/Req. No :		Sheet : 1 / 2	TRENCH France SAS
		Substitute for :		41419635Z	
		Substituted by :			



THE POSITION OF TOP AND BOTTOM MOUNTING HOLES

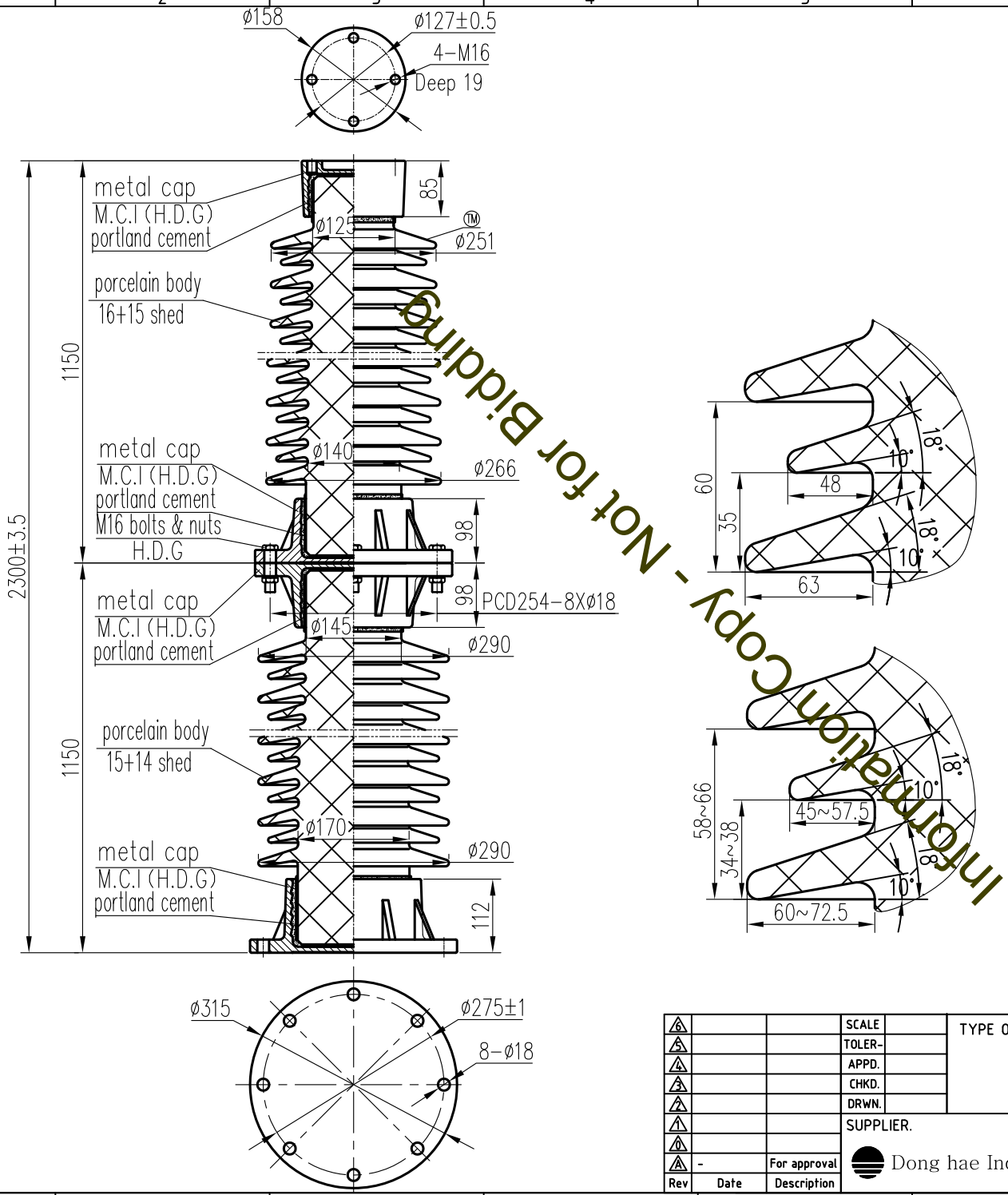


Min. failing load
——Cantilever strength (kN) 4
——Torsion strength (kN. m) 2
Min. creepage distance (mm) 1116
Lightning impulse withstand voltage (kV) 170
Power frequency wet withstand voltage (kV) 70
Material
——Porcelain: C130—IEC60672
——Color of glaze: Brown
——Fitting: Hot dip galvanized
Tolerance
——Porcelain: IEC60168
——Insulator: IEC60273
Tests
——Acc. to IEC60168

DESIGNED		CHECKED		APPROVED	2018-12-24		
					C4-170-1116		
	Porcelain	1	High strength porcelain	Brown	Weight	Unit	Rev
	Flange	2	QT450	H.D.G.	22kg	mm	0
No.	Name	Quantity	Material	Remark	Dalian Insulator Group Co., Ltd		

2018-338

A. Drawings Related to Mannar Grid Substation



ELECTRICAL PROPERTIES

Power Frequency Withstand Voltage
Wet : 460kV Dry : 525kV
Lightning Impulse Withstand Voltage
1050kV
Switching Impulse Withstand Voltage
750kV

PHYSICAL PROPERTIES

Min. Creepage Distance: 7812mm
Net weight: 235Kg

MECHANICAL PROPERTIES

Min. Failing Cantilever Strength: 12.5kN
Min. Failing Torsion Strength: 8.5kNm
Min. Failing Tensile Strength: 130kN
Min. Failing Comperssion Strength: 395kN

According to Standard Specification:
IEC 60273 except drawing.

Rev	Date	Description
6		
5		
4		
3		
2		
1		
0		
A	-	For approval

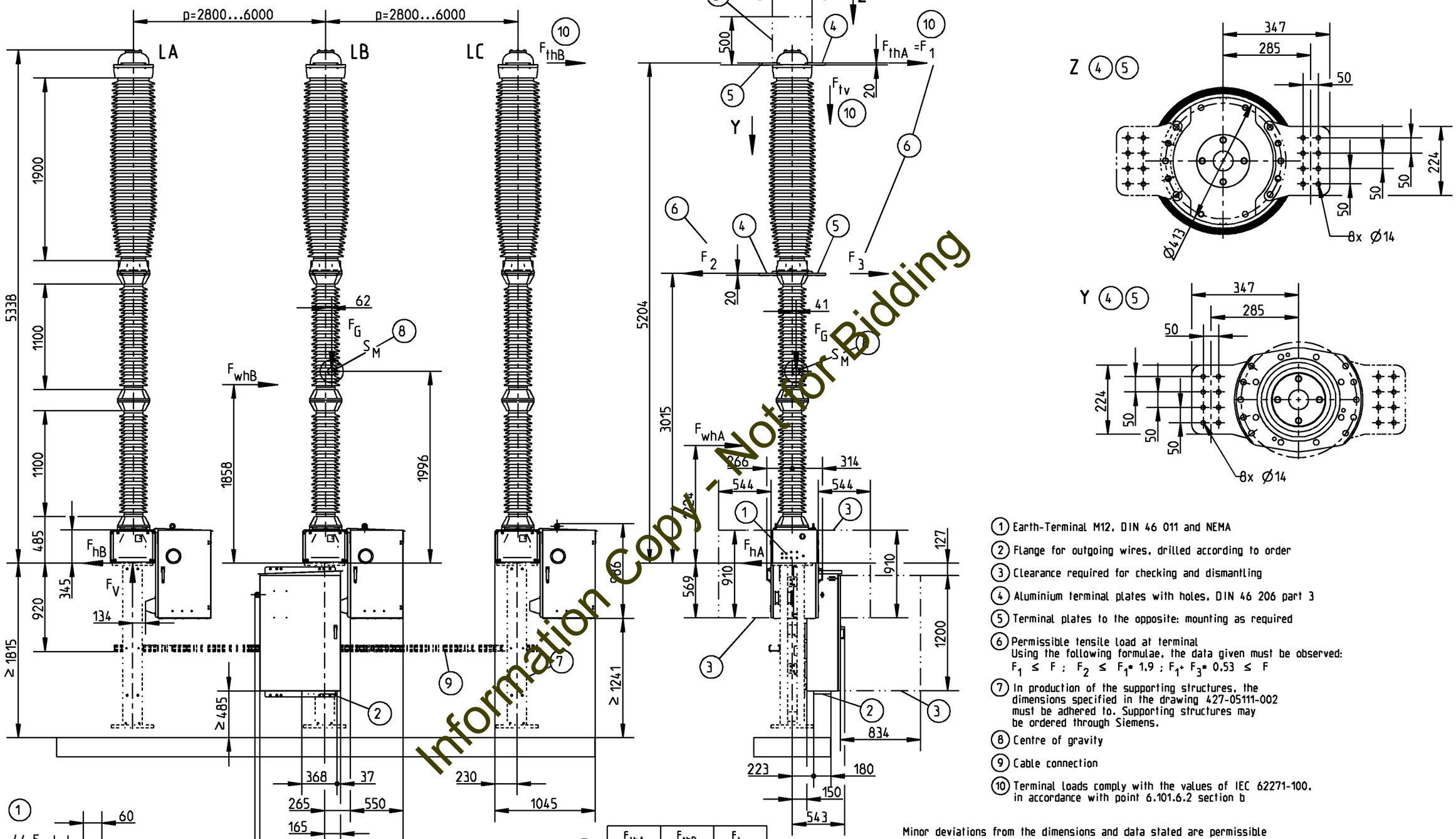
SCALE
TOLER-
APPD.
CHKD.
DRWN.

TYPE OF POST INSULATOR :
C12.5-1050

TITLE/NAME.
SOLID CORE OUTDOOR POST INSULATOR

SUPPLIER.
Dong hae Industries Co.

DWG NO.
36945A



(10)	F_{thA}	F_{thB}	F_{tv}
	tensile load at terminal		
stat.	2000N	1800N	2000N
stat.+ dyn.	4000N	3000N	5000N

loads per pole (LB)					
F_G	F_{whA}	F_{whB}	F_{hA}	F_{hB}	F_V
weight loads	wind loads, at a wind speed of 33m/s		operating loads horizontal		operating loads vertikal
10.0 kN	2.0 kN	1.5 kN	0 kN	±6.5 kN	+23.0kN (pull) -28.0kN (push)

For Approval purposes only !

(1) Earth-Terminal M12, DIN 46 011 and NEMA

(2) Flange for outgoing wires, drilled according to order

(3) Clearance required for checking and dismantling

(4) Aluminium terminal plates with holes, DIN 46 206 part 3

(5) Terminal plates to the opposite: mounting as required

(6) Permissible tensile load at terminal
Using the following formulae, the data given must be observed:
$F_1 \leq F$; $F_2 \leq F_1 \cdot 1.9$; $F_1 + F_3 \cdot 0.53 \leq F$

(7) In production of the supporting structures, the dimensions specified in the drawing 427-05111-002 must be adhered to. Supporting structures may be ordered through Siemens.

(8) Centre of gravity

(9) Cable connection

(10) Terminal loads comply with the values of IEC 62271-100, in accordance with point 6.101.6.2 section b

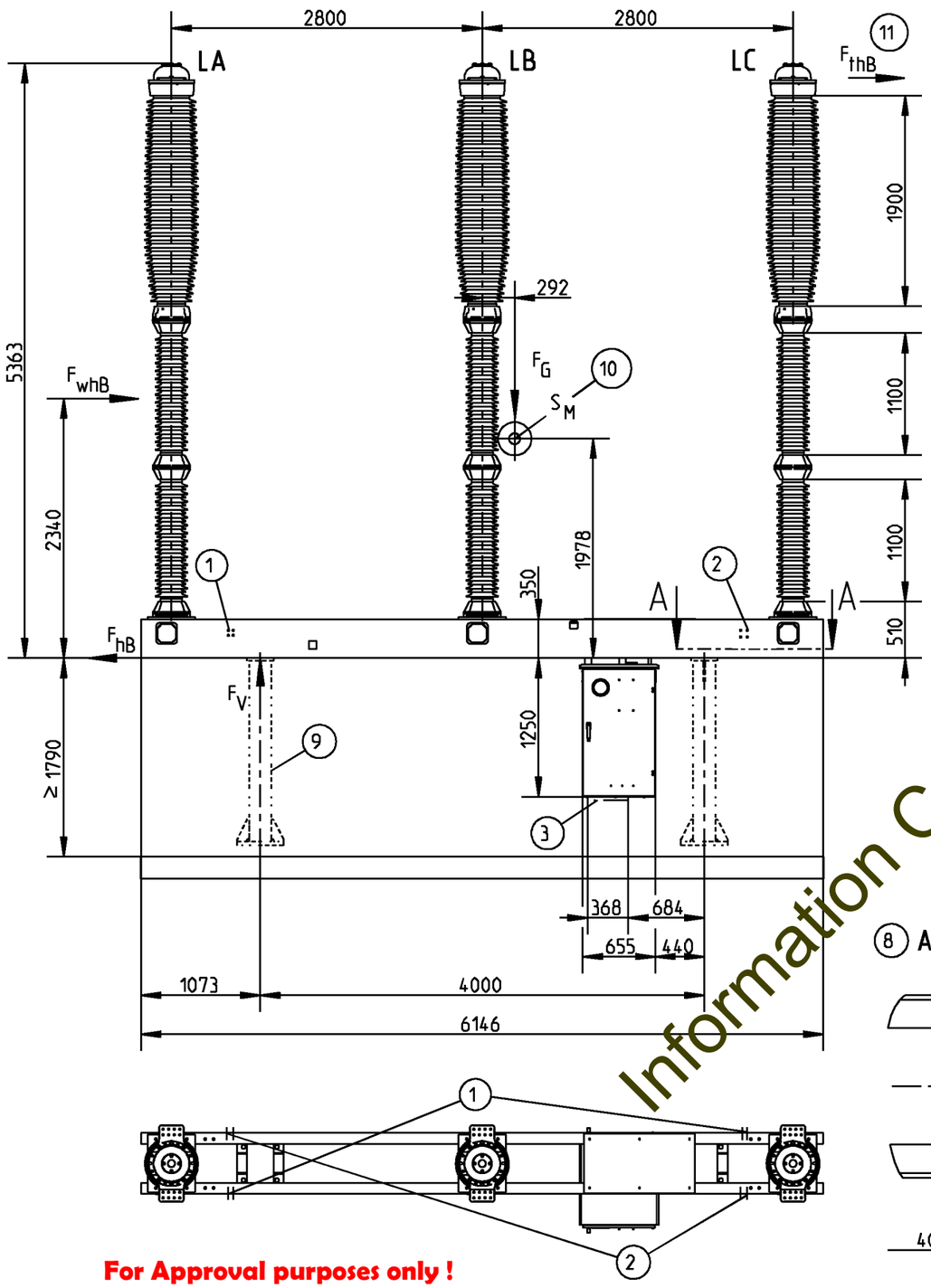
Minor deviations from the dimensions and data stated are permissible

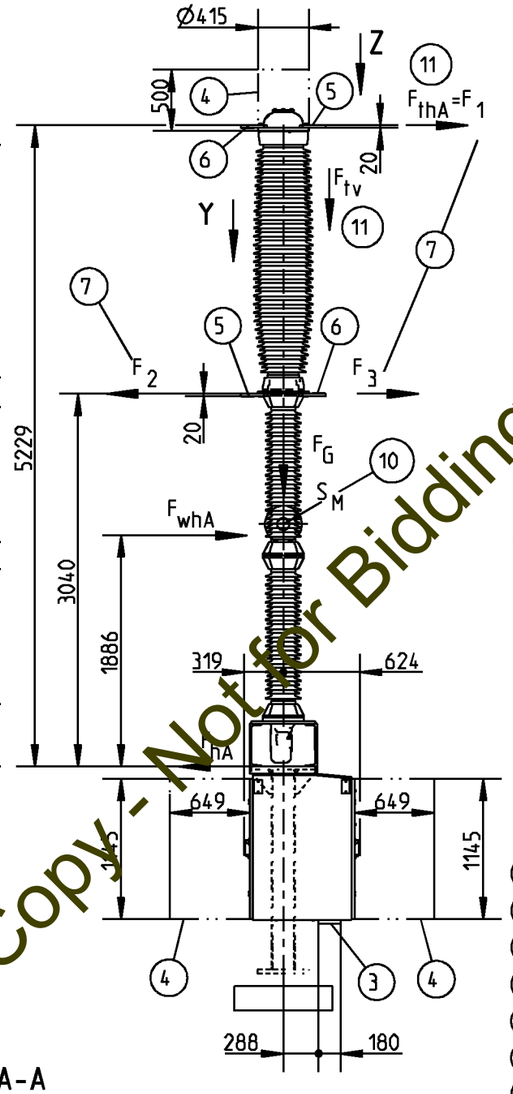
Index	Remark	Date
A	Übernahme ProE	20.06.12

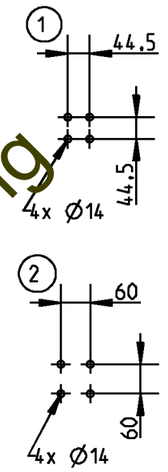
First issue		Current update	Standard dimensional drawing	Pro/E - drawing
05.06.2003	Date	20.06.2012	Triple-pole circuit-breaker 245kV	
GRANT-HUNT	Handled by	HASE		
AK	Checked	AK		
----------	---	----------		
----------	Standard	----------		
HP CB B OM CE / 26320			f.type	type 3AP1FI

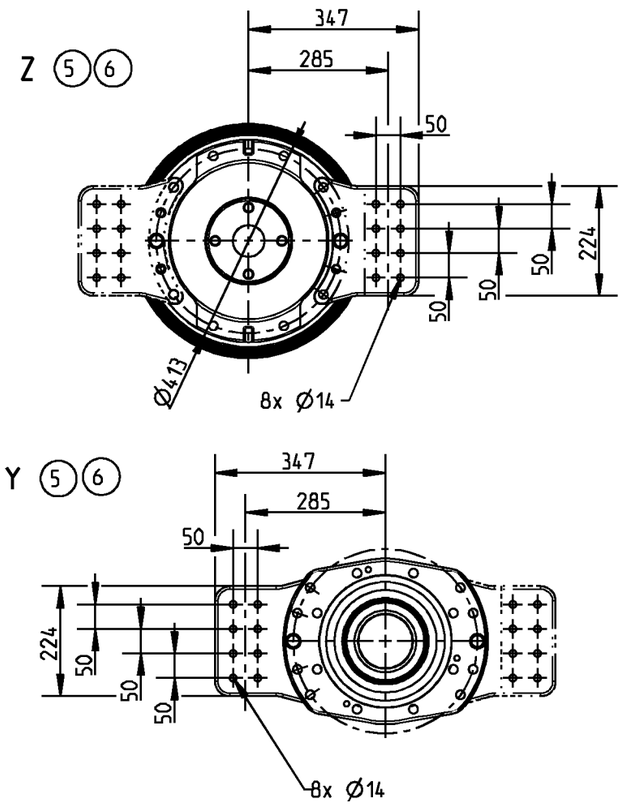
SIEMENS
Energy Sector
Power Transmission Division

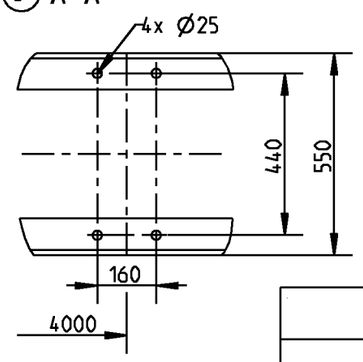
3HM	427-07300-102		1 of 1	A
Format/Type	Product no.	Serial no.	Sheet no.	Index
Replacement for			Superseded by	











For Approval purposes only !

1. Two earth-terminals M12, arranged diagonally to the opposite, holes acc. to NEMA
2. Two earth-terminals M12, arranged diagonally to the opposite, holes acc. to DIN 46 011
3. Flange for outgoing wires, drilled according to order
4. Clearance required for checking and dismantling
5. Aluminium terminal plates with holes, DIN 46 206 part 3
6. Terminal plates to the opposite: mounting as required
7. Permissible tensile load at terminal
   Using the following formula, the data given must be observed:
   $F_1 \leq F$; $F_2 \leq F_1 * 1,86$; $F_1 + F_3 * 0,54 \leq F$
8. Dimension for mounting on pillar acc.: 160x440
9. Supporting structures may be ordered through Siemens
10. Centre of gravity
11. Terminal loads comply with the values of IEC 62271-100, in accordance with point 6.101.6.2 section b

Minor deviations from the dimensions and data stated are permissible

(11)	F_{thA}	F_{thB}	F_{tv}
	tensile load at terminal		
stat.	2000N	1800N	2000N
stat.+ dyn.	4000N	3000N	5000N

	operating loads per pillar				
F_G	F_{whA}	F_{whB}	F_{hA}	F_{hB}	F_V
weight loads	wind loads, at a wind speed of 33m/s		operating loads horizontal		operating loads vertikal
31.9 kN	4.45 kN	3.52 kN	0 kN	±9.0 kN	+25.0kN (pull) -52.0kN (push)

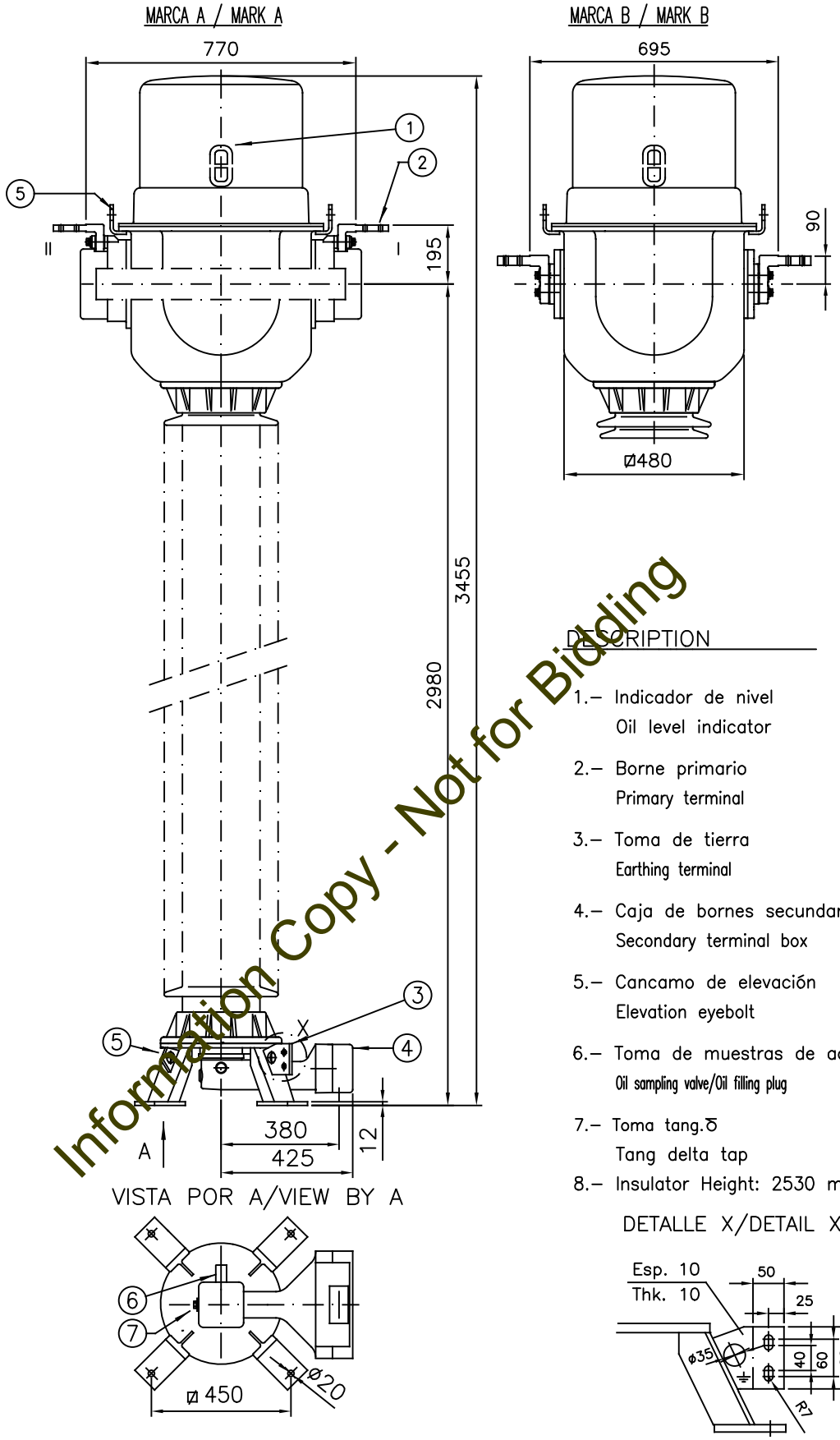
Index	Remark	Date
A	Übernahme ProE	13.02.13

First issue		Current update	Standard dimensional drawing	Pro/E - drawing
18.04.2002	Date	13.02.2013		
Neidow	Handled by	HASE		
	Checked	AK		
	—	----------		
	Standard	----------		
HP CB B OM CE / 26320	f.type		type 3AP1FG	

Triple-pole circuit-breaker 245kV

SIEMENS
Energy Sector
Power Transmission Division

3HM	427-07401-102		1 of 1	A
Format/Type	Product no.	Serial no.	Sheet no.	Index
Replacement for		Superseded by		



DESCRIPTION

1.– Indicador de nivel
Oil level indicator

2.– Borne primario
Primary terminal

3.– Toma de tierra
Earthing terminal

4.– Caja de bornes secundarios
Secondary terminal box

5.– Cancamo de elevación
Elevation eyebolt

6.– Toma de muestras de aceite
Oil sampling valve/Oil filling plug

7.– Toma tang.δ
Tang delta tap

8.– Insulator Height: 2530 mm

DETALLE X/DETAIL X

PESO WEIGHT	ACEITE–OIL	120 kg
	TOTAL	600 kg

arteche

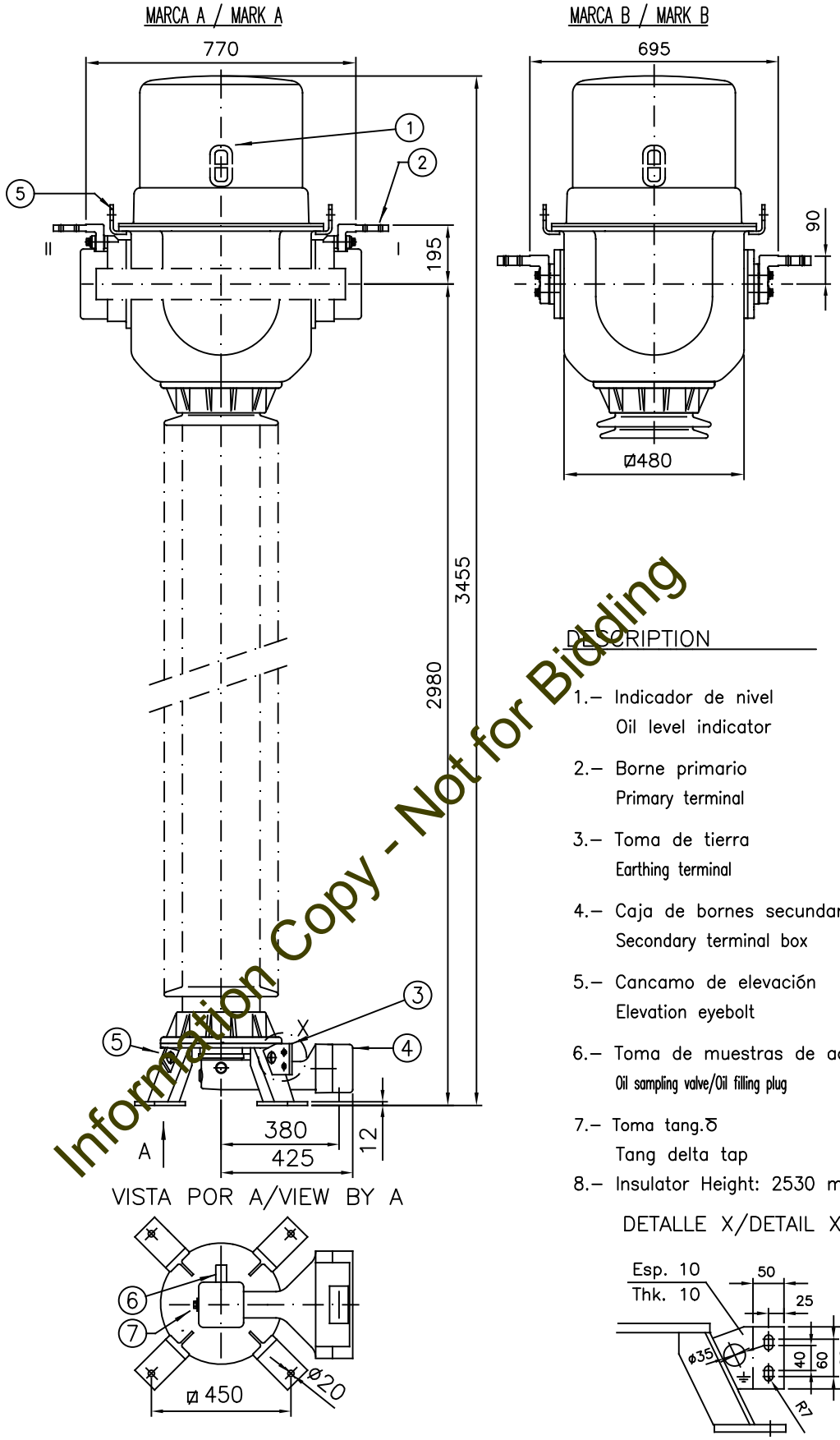
Dimensiones en m.m. aproximadas
Dimensions in m.m. only aproximatives

F

TRANSFORMADOR DE INTENSIDAD
CURRENT TRANSFORMER

CA–245

Fecha	Comprobado	Dibujo número
21/04/2015	JMN	4284813



DESCRIPTION

1.– Indicador de nivel
Oil level indicator

2.– Borne primario
Primary terminal

3.– Toma de tierra
Earthing terminal

4.– Caja de bornes secundarios
Secondary terminal box

5.– Cancamo de elevación
Elevation eyebolt

6.– Toma de muestras de aceite
Oil sampling valve/Oil filling plug

7.– Toma tang.δ
Tang delta tap

8.– Insulator Height: 2530 mm

DETALLE X/DETAIL X

PESO WEIGHT	ACEITE–OIL	120 kg
	TOTAL	600 kg

arteche

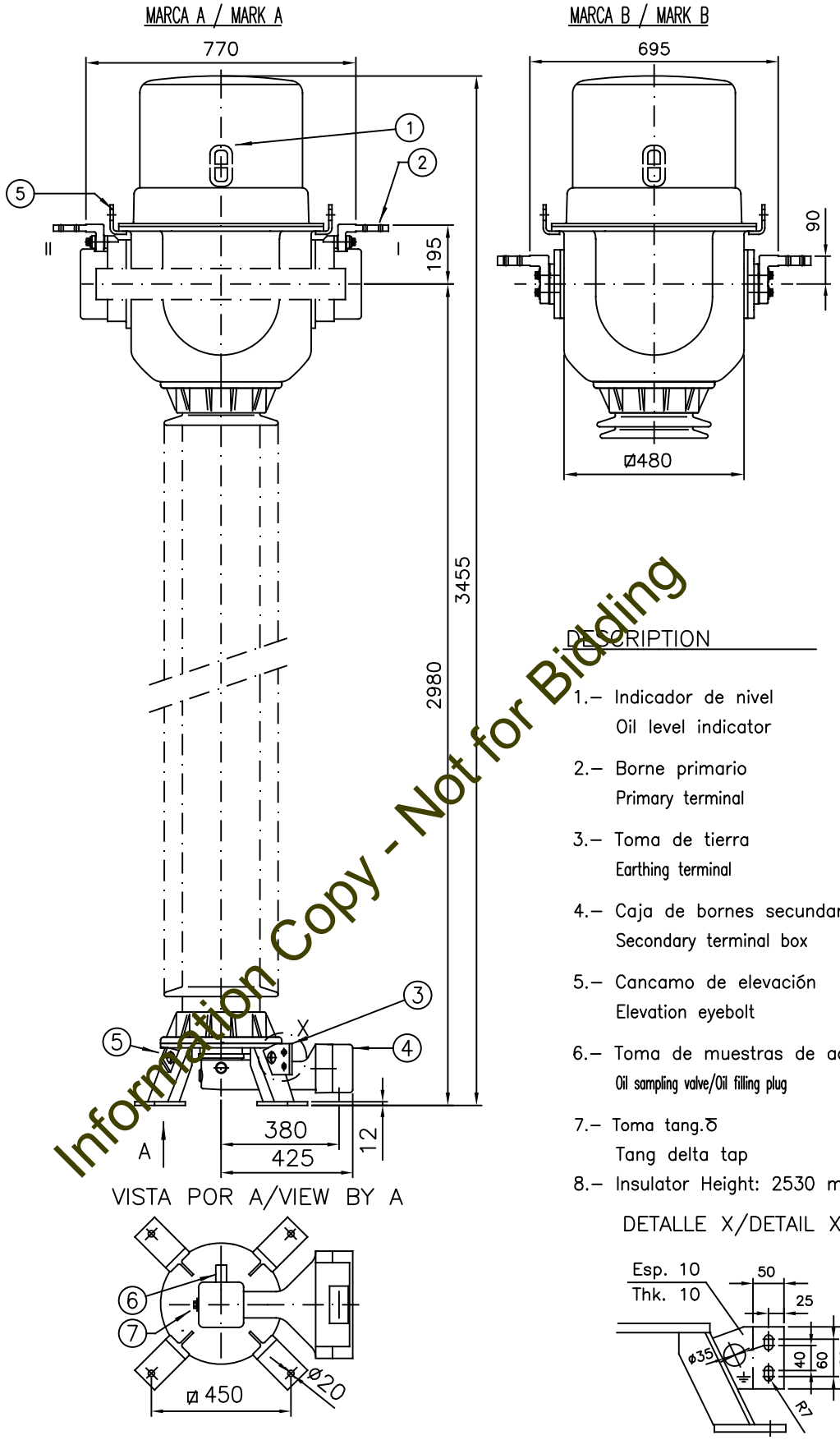
Dimensiones en m.m. aproximadas
Dimensions in m.m. only aproximatives

F

TRANSFORMADOR DE INTENSIDAD
CURRENT TRANSFORMER

CA–245

Fecha	Comprobado	Dibujo número
21/04/2015	JMN	4284813



DESCRIPTION

1.– Indicador de nivel
Oil level indicator

2.– Borne primario
Primary terminal

3.– Toma de tierra
Earthing terminal

4.– Caja de bornes secundarios
Secondary terminal box

5.– Cancamo de elevación
Elevation eyebolt

6.– Toma de muestras de aceite
Oil sampling valve/Oil filling plug

7.– Toma tang.δ
Tang delta tap

8.– Insulator Height: 2530 mm

DETALLE X/DETAIL X

PESO WEIGHT	ACEITE–OIL	120 kg
	TOTAL	600 kg

arteche

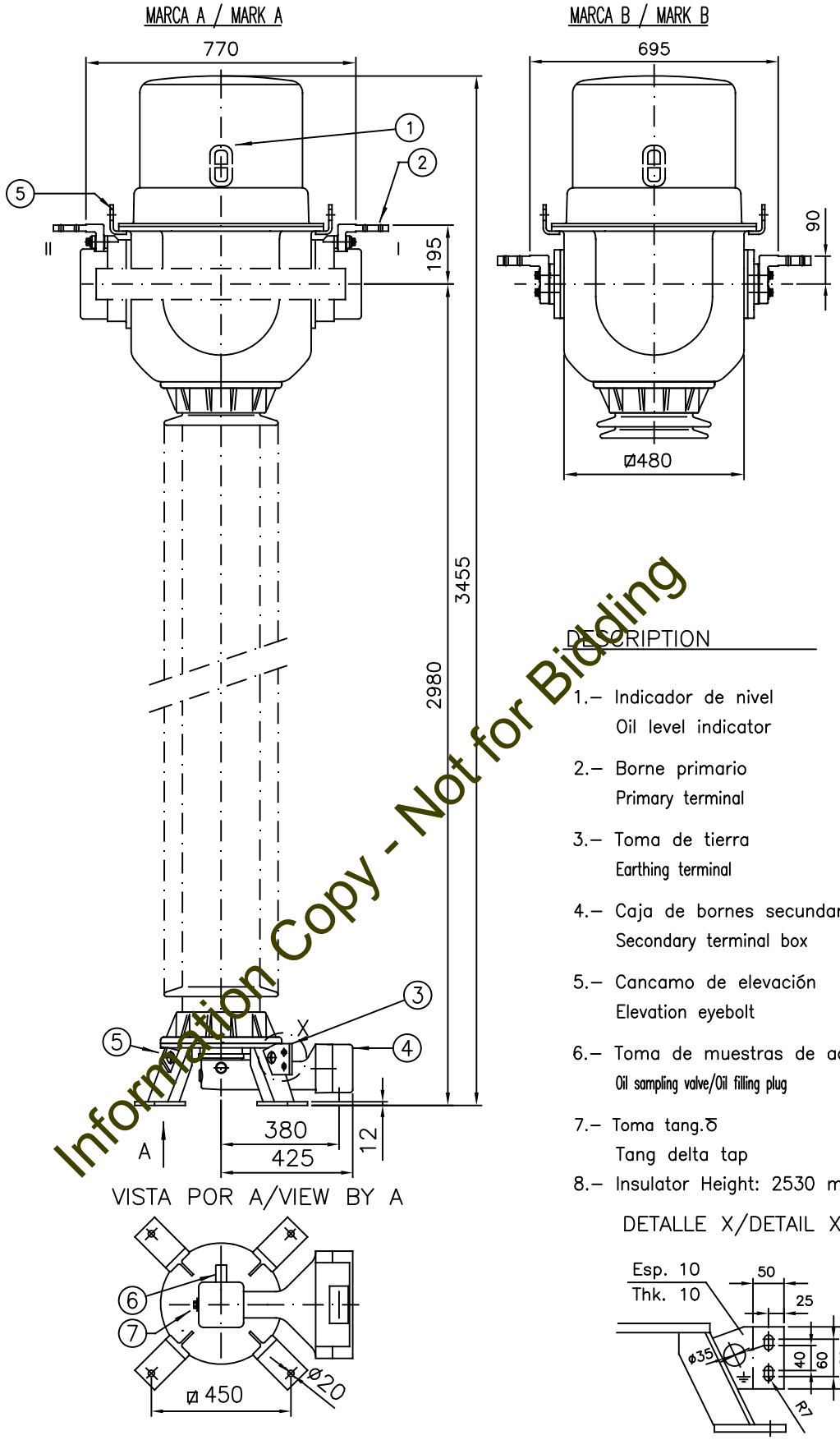
Dimensiones en m.m. aproximadas
Dimensions in m.m. only aproximatives

F

TRANSFORMADOR DE INTENSIDAD
CURRENT TRANSFORMER

CA–245

Fecha	Comprobado	Dibujo número
21/04/2015	JMN	4284813



DESCRIPTION

1.– Indicador de nivel
Oil level indicator

2.– Borne primario
Primary terminal

3.– Toma de tierra
Earthing terminal

4.– Caja de bornes secundarios
Secondary terminal box

5.– Cancamo de elevación
Elevation eyebolt

6.– Toma de muestras de aceite
Oil sampling valve/Oil filling plug

7.– Toma tang.δ
Tang delta tap

8.– Insulator Height: 2530 mm

DETALLE X/DETAIL X

PESO WEIGHT	ACEITE–OIL	120 kg
	TOTAL	600 kg

arteche

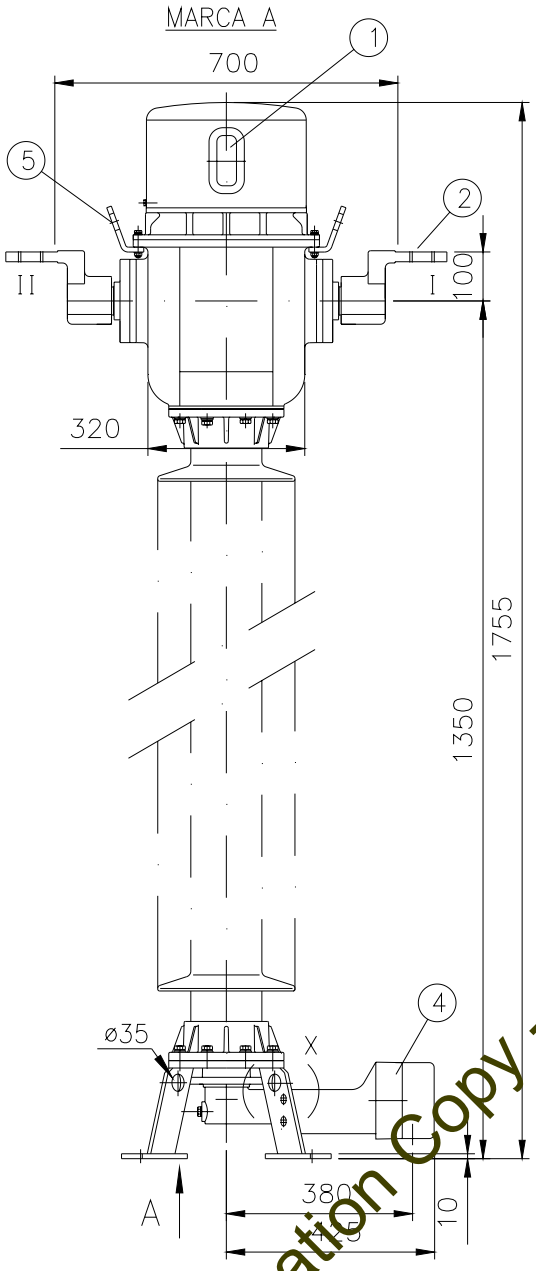
Dimensiones en m.m. aproximadas
Dimensions in m.m. only aproximatives

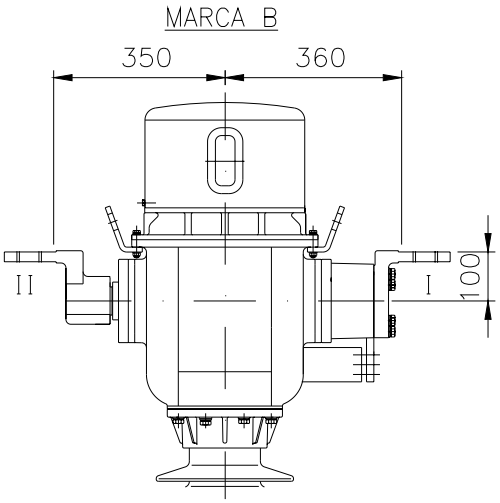
F

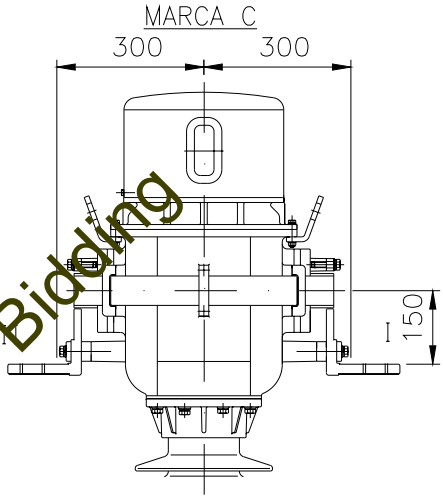
TRANSFORMADOR DE INTENSIDAD
CURRENT TRANSFORMER

CA–245

Fecha	Comprobado	Dibujo número
21/04/2015	JMN	4284813



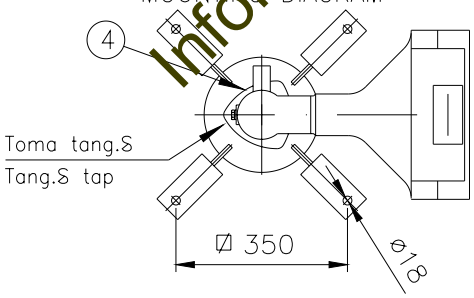




DESCRIPTION

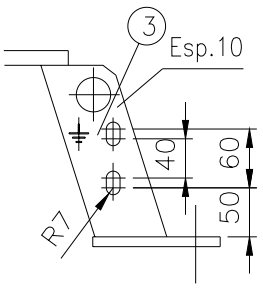
1.– Indicador de nivel
Oil level indicator
2.– Borne primario
Primary terminal
3.– Toma de tierra
Earthing terminal
4.– Caja de bornes secundarios
Secondary terminal box
5.– Cancamo de elevaci?n ø35
Elevation eyebolt
6.– Toma de muestras de aceite
Oil sampling valve

DIMENSIONES DE ANCLAJE
MOUNTING DIAGRAM



VISTA POR A

DETALLE X



PESO WEIGHT	ACEITE–OIL	35 kg
	TOTAL	220 kg

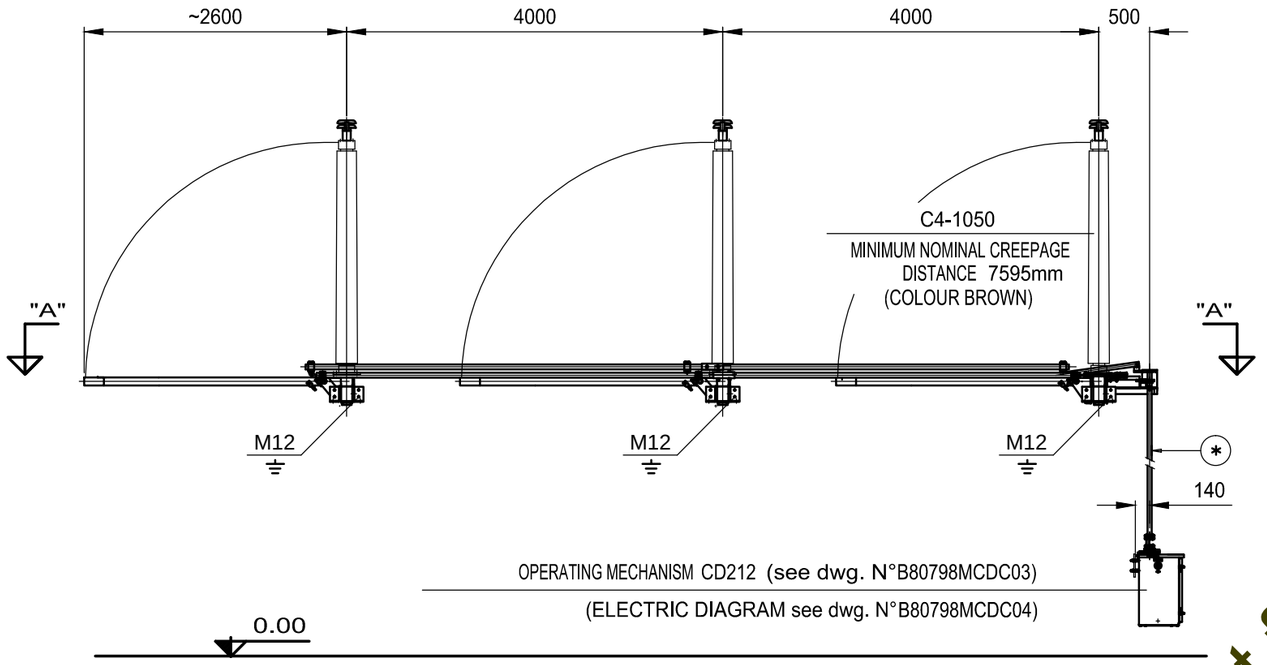
arteche

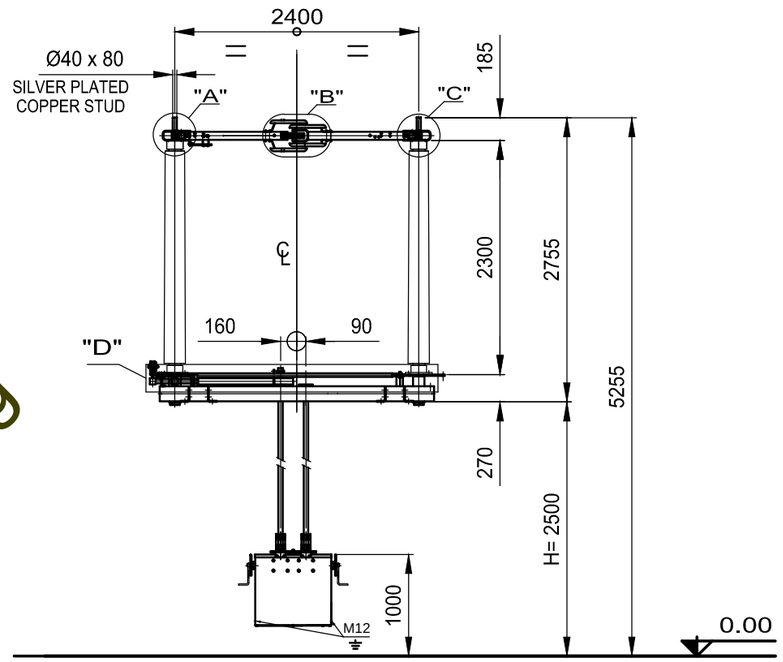
Dimensiones aproximadas en m.m.
Approximate dimensions in m.m.

TRANSFORMADOR DE INTENSIDAD
CURRENT TRANSFORMER

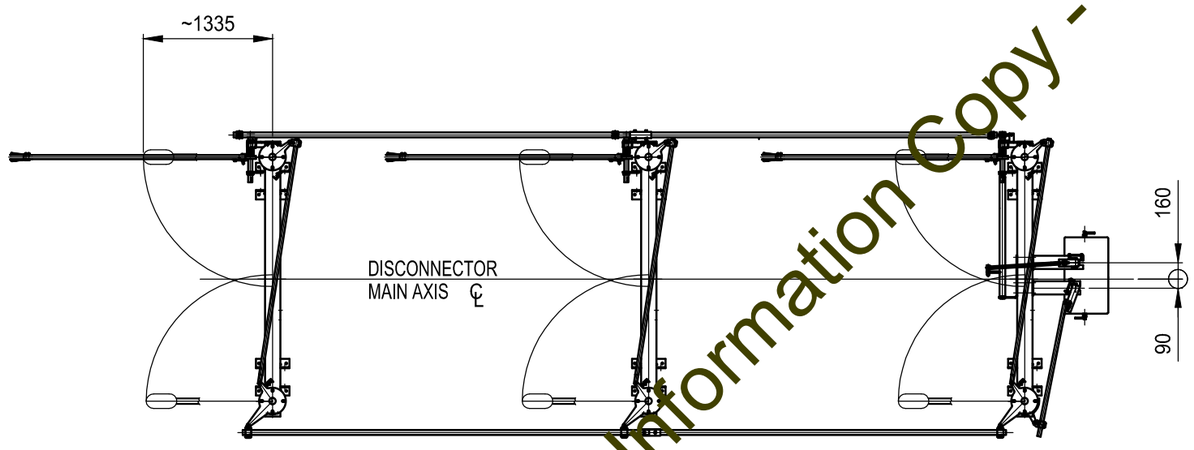
CA–72

Fecha	Comprobado	Dibujo n?mero
14/09/2017	JMN	4285882





SECTION "A-A"



ALLOWED TERMINAL LOADS (N)			
STATIC		STATIC + DYNAMIC	
LONGITUDINAL	TRANSVERSAL	LONGITUDINAL	TRANSVERSAL
1100	700	1500	1400

Approximate weight of three pole disconnector complete of operating rods, vertical shaft and insulators : Kg 1600

Approximate weight of operating mechanism : Kg 100

MAIN BLADES ARE "CLOSED" - EARTHING BLADES ARE "OPEN"

(*) VERTICAL SHAFTS TO BE CUT TO SIZE AT SITE

Checked according ISO 9000 procedures

DISCONNECTOR CBD-E 245-2000

(BIL 1050 kV - Ik 40 kA x 1" - Ir 2000 A)

OVERALL DIMENSIONS

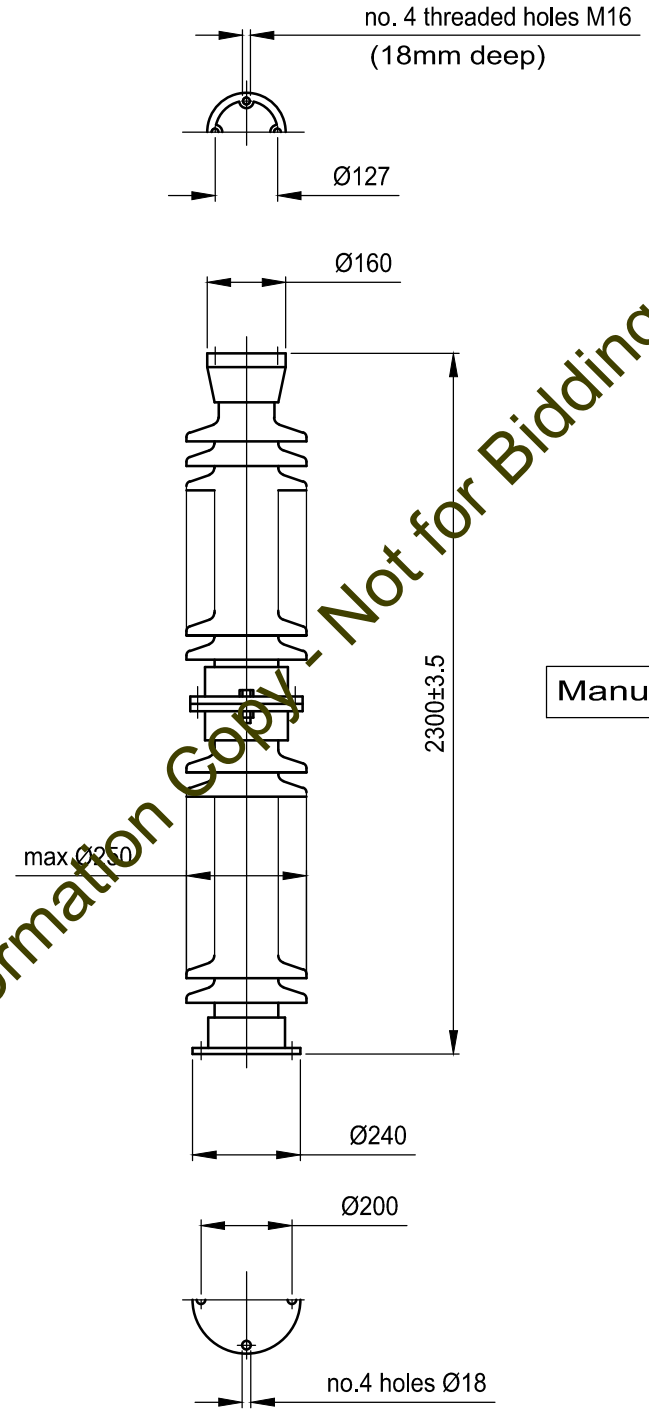
COELME COSTRUZIONI ELETTROMECCANICHE-SPA egic

Format:	Standard:	Scale:	Language:
A3o	B45023ECDC05	1:60	ENG
	Revision: A	Sheet/of: 1/2	

B80798ECDC02

Rev	Description	Date	Drawn	Checked
A.	First Issue	22/01/2018	Lorenzon	Maggiora

Nominal lighting impulse withstand voltage	Nominal wet switching impulse withstand voltage	Nominal wet power frequency withstand voltage	Nominal bending failing load	Nominal torsion failing load	Nominal creepage distance	Porcelain colour
kV	kV	kV	N	Nm	mm	
1050	750	460	4000	3000	7595	BROWN



Manufacturer : CIL - ITALY

Checked according ISO 9000 procedures

INSULATOR TYPE IEC C4-1050

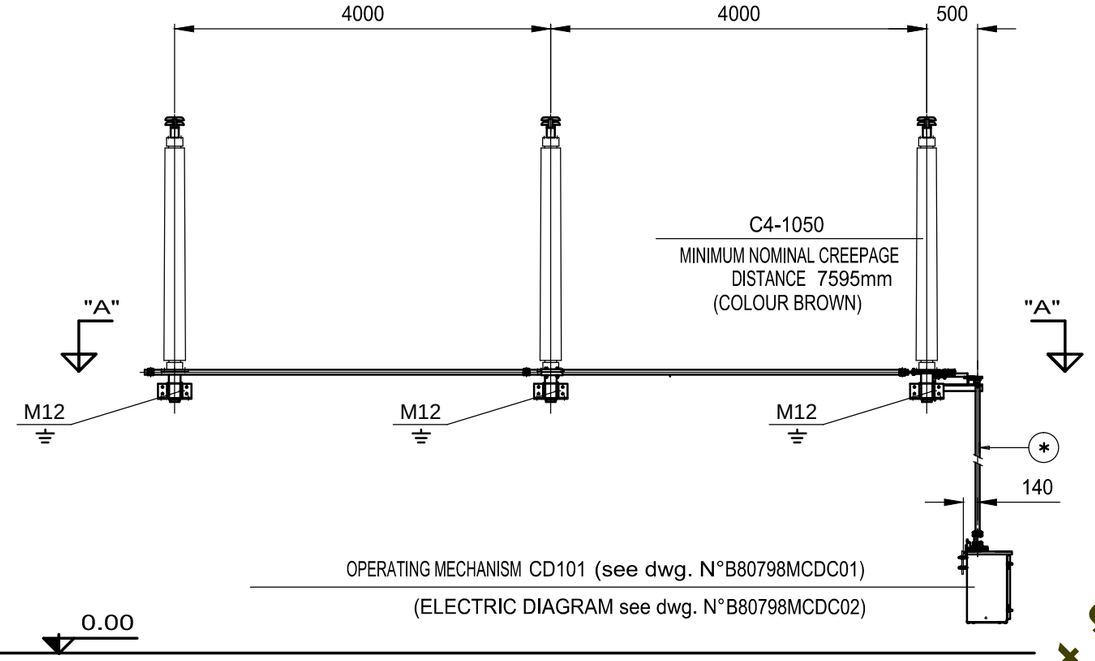
OVERALL DIMENSION

Format:	Standard:	Scale:	Language:
A4v	B44963MCDC04	1:15	ENG
	Revision: A	Sheet/of: 1/1	

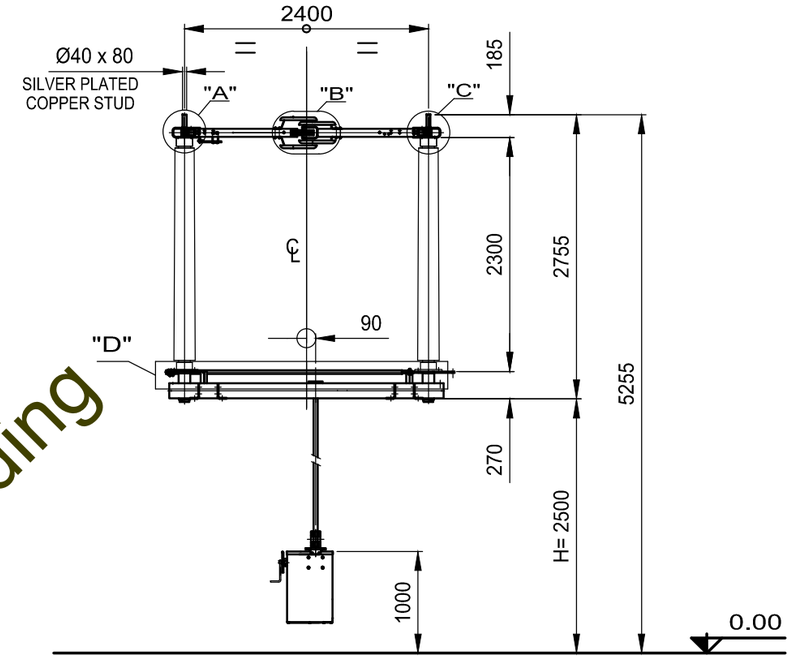
COELME COSTRUZIONI ELETTROMECCANICHE-SPA egic

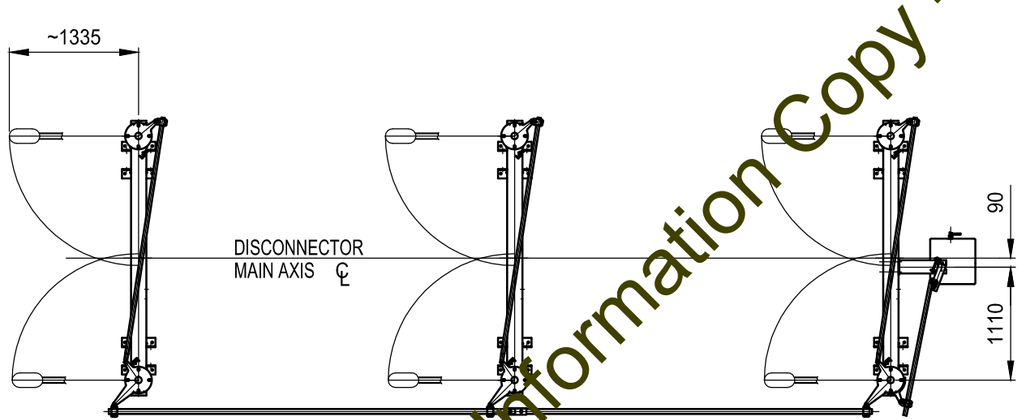
B80798ECDC04

Rev	Description	Drawn	Checked	Date
A	First issue	Lorenzon	Maggiora	25/01/2018



SECTION "A-A"





ALLOWED TERMINAL LOADS (N)			
STATIC		STATIC + DYNAMIC	
LONGITUDINAL	TRANSVERSAL	LONGITUDINAL	TRANSVERSAL
1100	700	1500	1400

Approximate weight of three pole disconnector complete of operating rods, vertical shaft and insulators : Kg 1450

Approximate weight of operating mechanism : Kg 50

MAIN BLADES ARE "CLOSED"

(*) VERTICAL SHAFT TO BE CUT TO SIZE AT SITE

Rev	Description	Date
A	First Issue	22/01/2018

Drawn	Checked	Date
Lorenzon	Maggiora	22/01/2018

Checked according ISO 9000 procedures

DISCONNECTOR CBD 245-2000

(BIL 1050 kV - Ik 40 kA x 1" - Ir 2000 A)

OVERALL DIMENSIONS

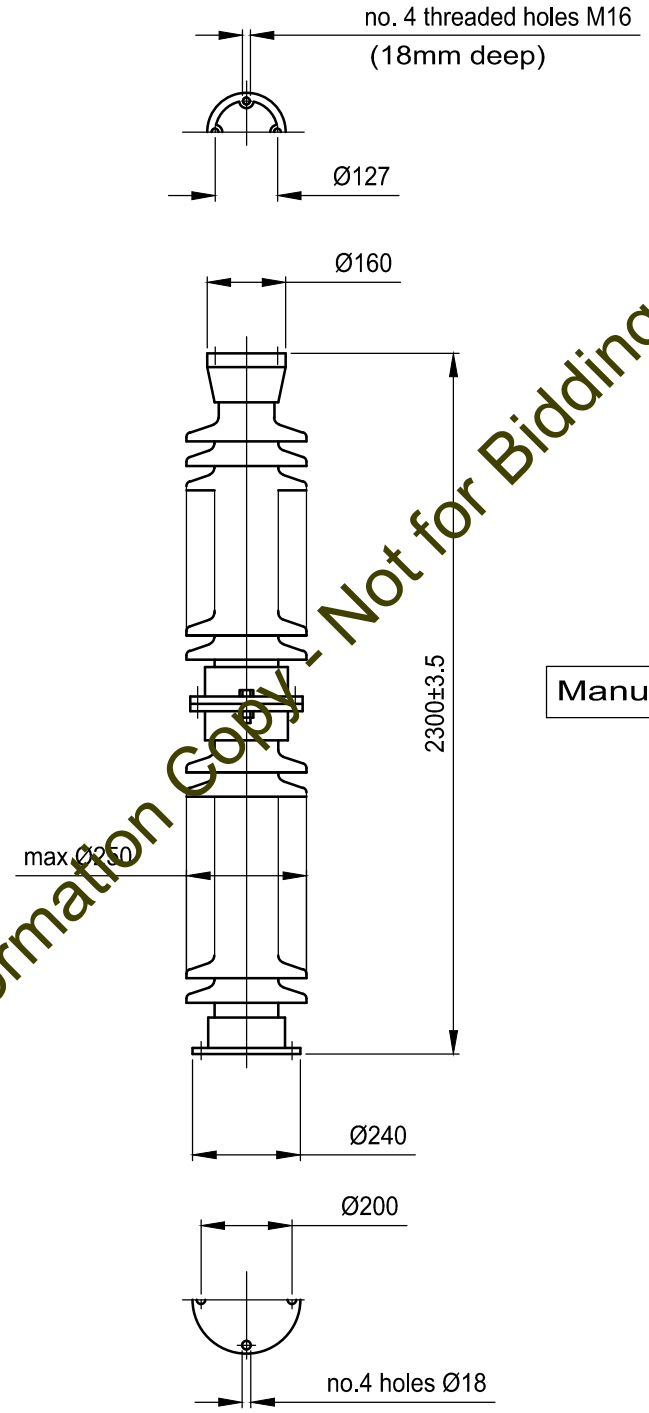
COELME COSTRUZIONI ELETTROMECCANICHE-SPA egic

Format:	Standard:	Scale:	Language:
A3o	B45023ECDC05	1:60	ENG
	Revision: A	Sheet/of: 1/2	

B80798ECDC01

File:

Nominal lighting impulse withstand voltage	Nominal wet switching impulse withstand voltage	Nominal wet power frequency withstand voltage	Nominal bending failing load	Nominal torsion failing load	Nominal creepage distance	Porcelain colour
kV	kV	kV	N	Nm	mm	
1050	750	460	4000	3000	7595	BROWN



Manufacturer : CIL - ITALY

Checked according ISO 9000 procedures

INSULATOR TYPE IEC C4-1050

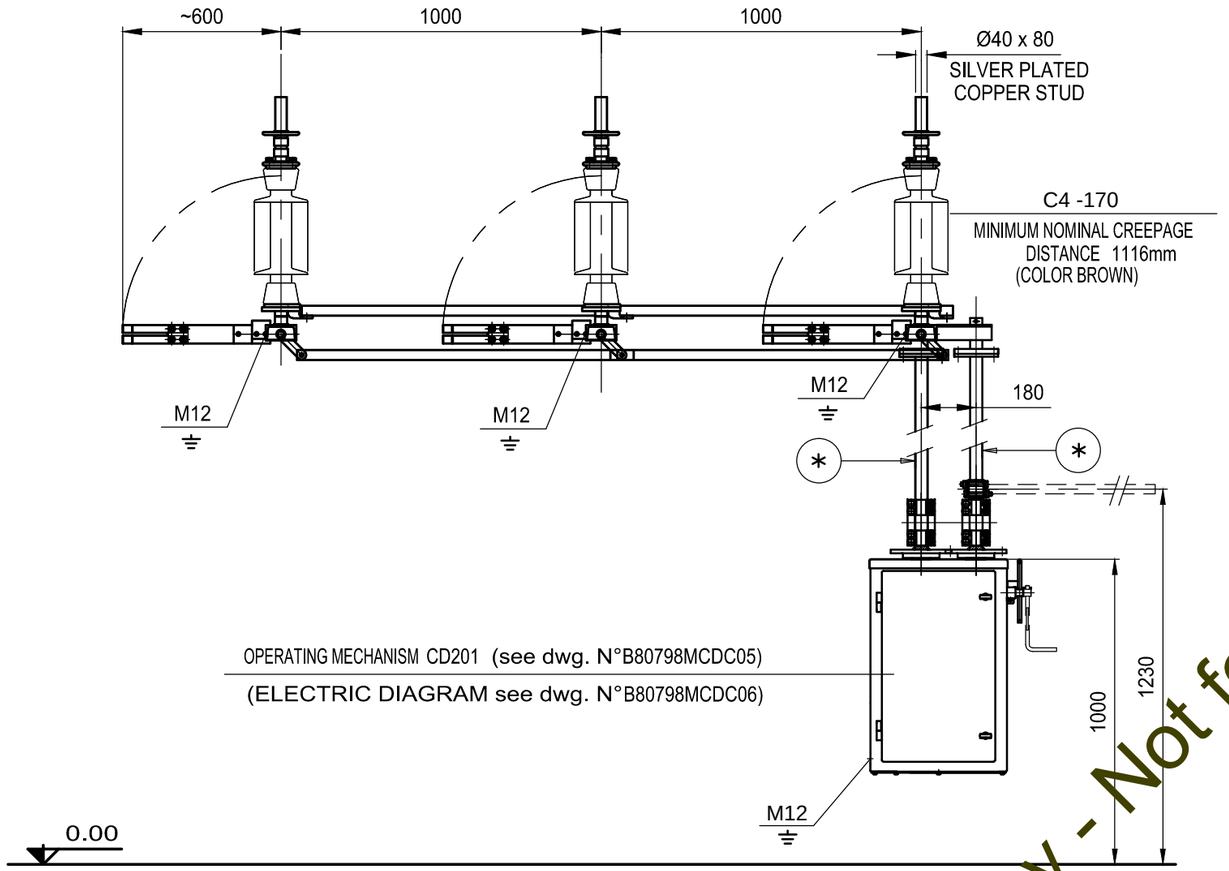
OVERALL DIMENSION

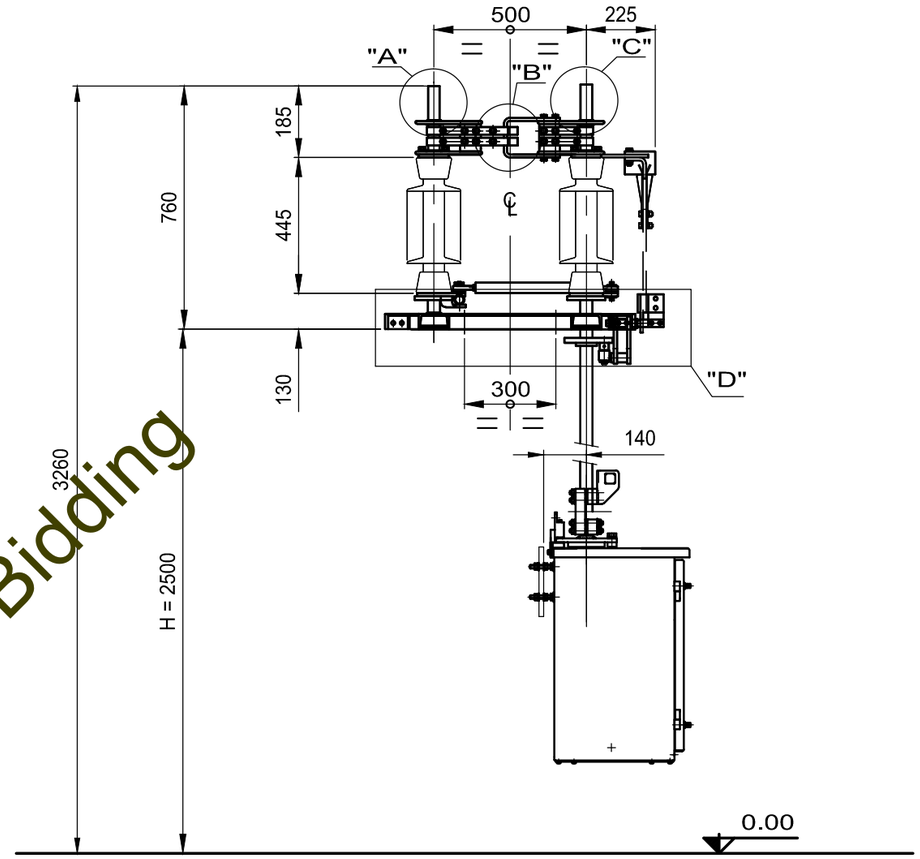
Format:	Standard:	Scale:	Language:
A4v	B44963MCDC04	1:15	ENG
	Revision: A	Sheet/of: 1/1	

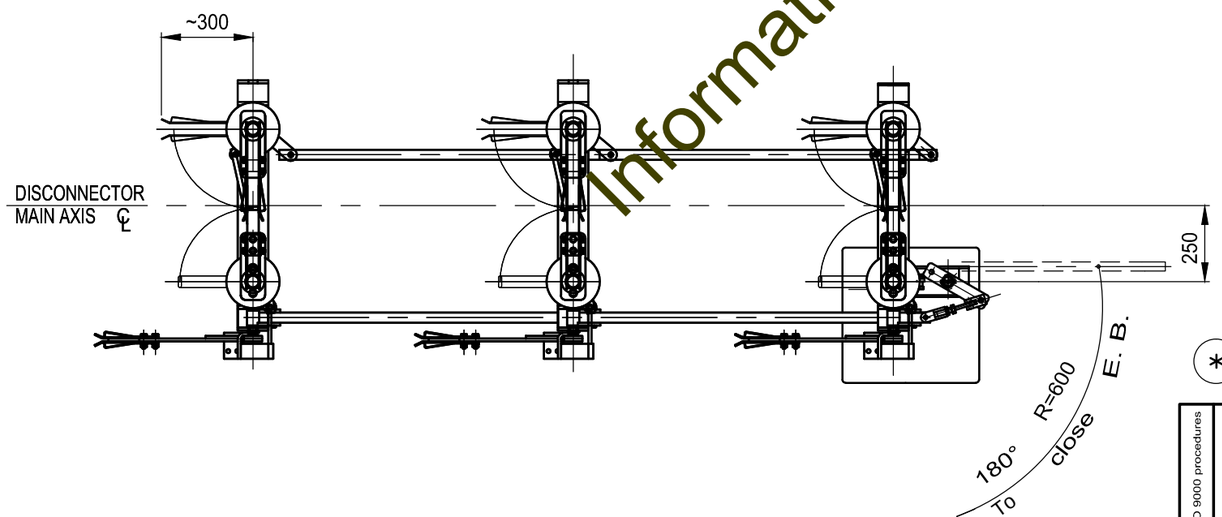
COELME COSTRUZIONI ELETTROMECCANICHE-SPA egic

B80798ECDC04

Rev	Description	Drawn	Checked	Date
A	First issue	Lorenzon	Maggiora	25/01/2018







Approximate weight of three pole disconnector complete of operating rods, vertical shaft and insulators : Kg 350

Approximate weight of operating mechanism : Kg 60

ALLOWED TERMINAL LOADS (N)			
STATIC		STATIC + DYNAMIC	
LONGITUDINAL	TRANSVERSAL	LONGITUDINAL	TRANSVERSAL
300	100	800 (**)	800 (**)

NOTE (**) : NOT APPLIED AT THE SAME TIME

(*) VERTICAL SHAFTS TO BE CUT TO SIZE AT SITE

Checked according ISO 9000 procedures

DISCONNECTOR CBD-E 36-1250

(BIL 170 kV - Ik 25 kA x 1" - Ir 1250 A)

OVERALL DIMENSIONS

COELME COSTRUZIONI ELETTROMECCANICHE-SPA egic

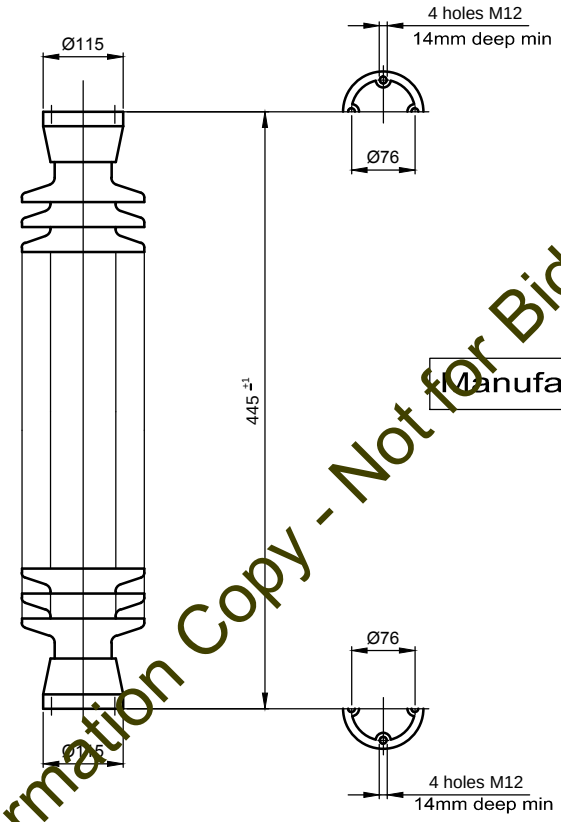
Format:	Standard:	Scale:	Language:
A3o	B66528ECDC04	1:20	ENG
	Revision: A	Sheet/of: 1/2	

B80798ECDC03

Rev	Description	Drawn	Checked	Date
A	First Issue	Lorenzon	Maggiora	25/01/2018

File:

Nominal lighting impulse withstand voltage	Nominal wet power frequency withstand voltage	Nominal bending failing load	Nominal torsion failing load	Nominal creepage distance	Porcelain colour
kV	kV	N	Nm	mm	
170	70	4000	1200	1116	BROWN



Manufacturer : CIL - ITALY

Rev	Description	Date
A	First issue	25/01/2018

Drawn: Lorenzon | Checked: Maggiora

Checked according ISO 9000 procedures

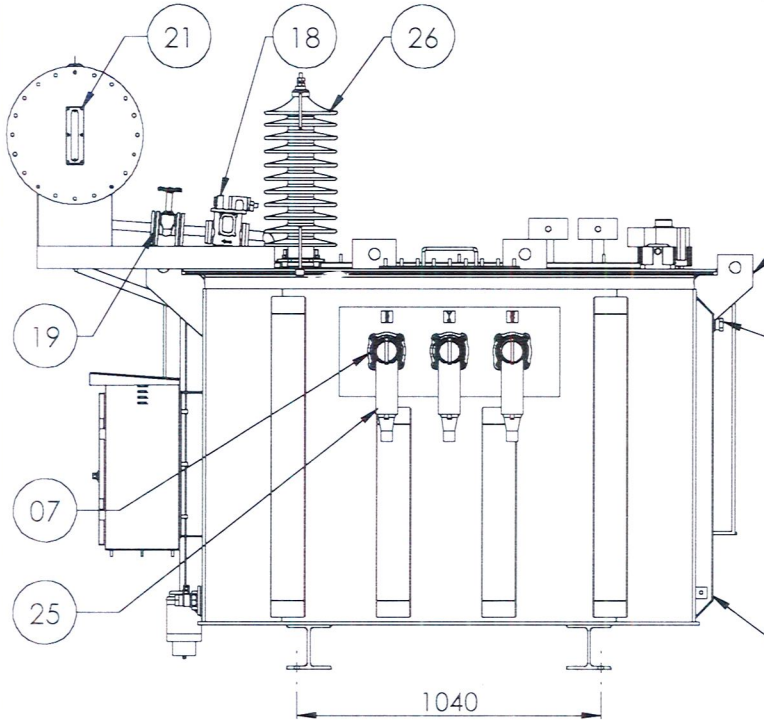
INSULATOR TYPE IEC C4-170

OVERALL DIMENSION

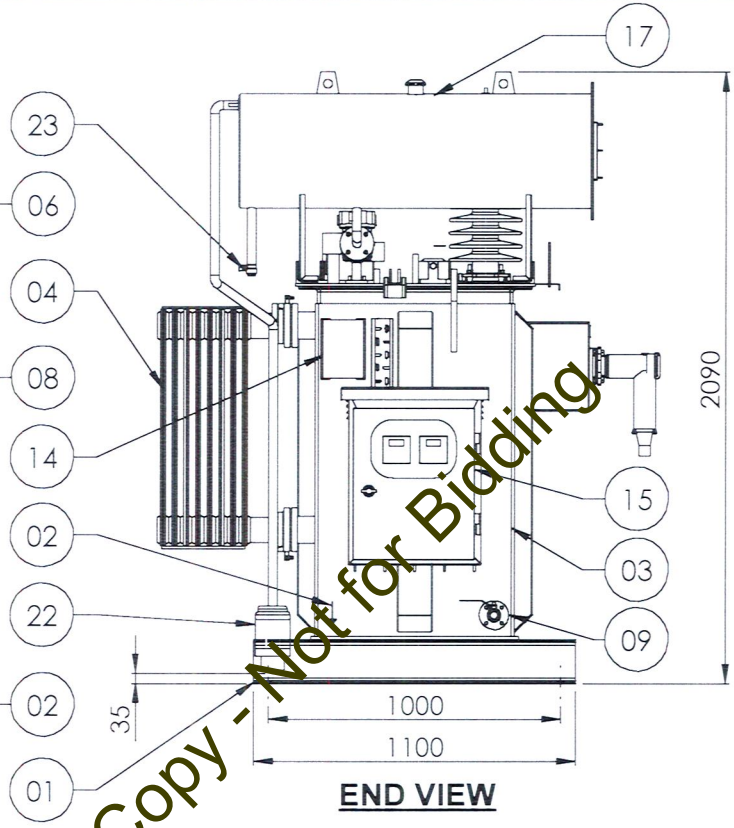
Format:	Standard:	Scale:	Language:
A4v	B44963MCDC04	1:15	ENG
	Revision: A	Sheet/of: 1/1	

COELME COSTRUZIONI ELETTROMECCANICHE-SPA egic

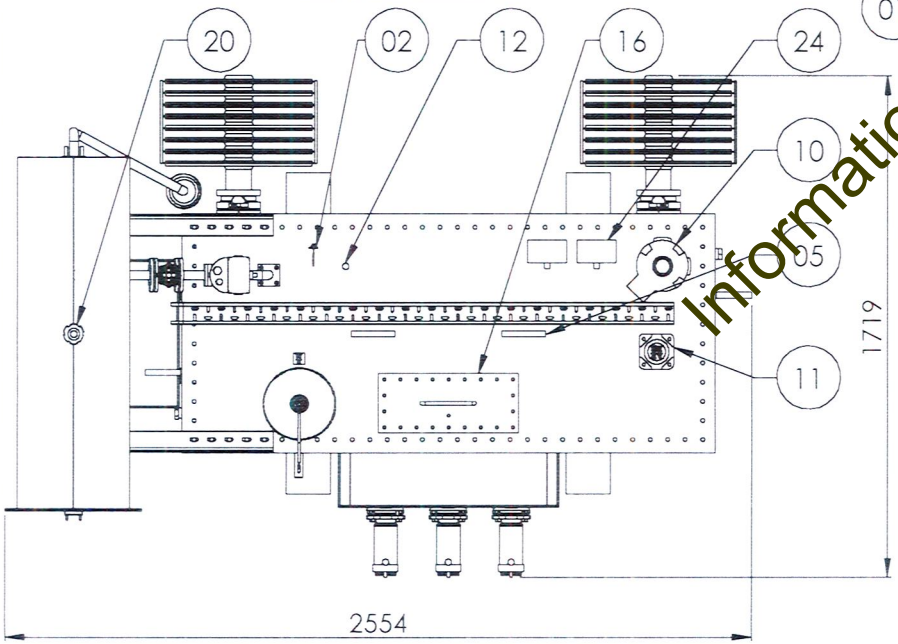
B80798ECDC05



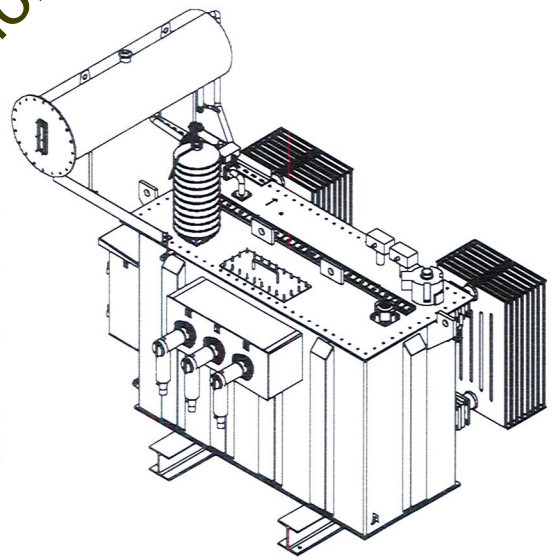
HV END VIEW



END VIEW



TOP VIEW



NOTE:

01. UNIT WEIGHT IS 4060kg

02. ALL WEIGHT & DIMENSIONS SUBJECT TO ± 5% TOLERANCE

01	BASE SKID	02
02	EARTH FLAGS-02Nos ON BASE & 01No ON COVER PLATE	03
03	TANK	01
04	PANEL RADIATOR WITH SHUNT VALVE	02
05	LIFTING LUGS - FOR COVER ONLY	02
06	LIFTING LUGS - FOR TRANSFORMER	02
07	HV BUSHINGS - PLUGIN TYPE	03
08	FILTER VALVE	01
09	DRAIN/SAMPLING VALVE	01
10	PRESSURE RELIEF DEVICE	01
11	CT TERMINAL BOX	01
12	THERMOMETER POCKET	01
13	PHASE MARKING PLATES	04
14	RATING/DIAGRAM/PROPERTY PLATE	01
15	MARSHALLING BOX WITH WTI & OTI	01
16	ACCESS HOLE	01
17	CONSERVATOR WITH REMOVEBLE END	01
18	BUCHHOLZ RELAY	01
19	SHUTOFF VALVE	01
20	FILLING CAP	01
21	PRISMATIC OIL LEVEL GAUGE	01
22	SILICA GEL BRETHER	01
23	CONSERVATOR DRAIN VALVE	01
24	PT100 SENSOR	02
25	ELBOW CONNECTOR	03
26	NEUTRAL BUSHING	01

REV:	DATE	DRAWN:	DESCRIPTION	APPROVED BY
06	2019/03/06	THARINDU	HV BUSHING CHANGED	EE-1
05	2019/01/04	THARINDU	NEUTRAL BUSHING CHANGED	EE-1

LTL Transformers (Pvt) Ltd

154/11, Railway Station Road, Angulana, Moratuwa, Sri lanka

PROJECT: CLEAN ENERGY AND NETWORK EFFICIENCY IMPROVEMENT

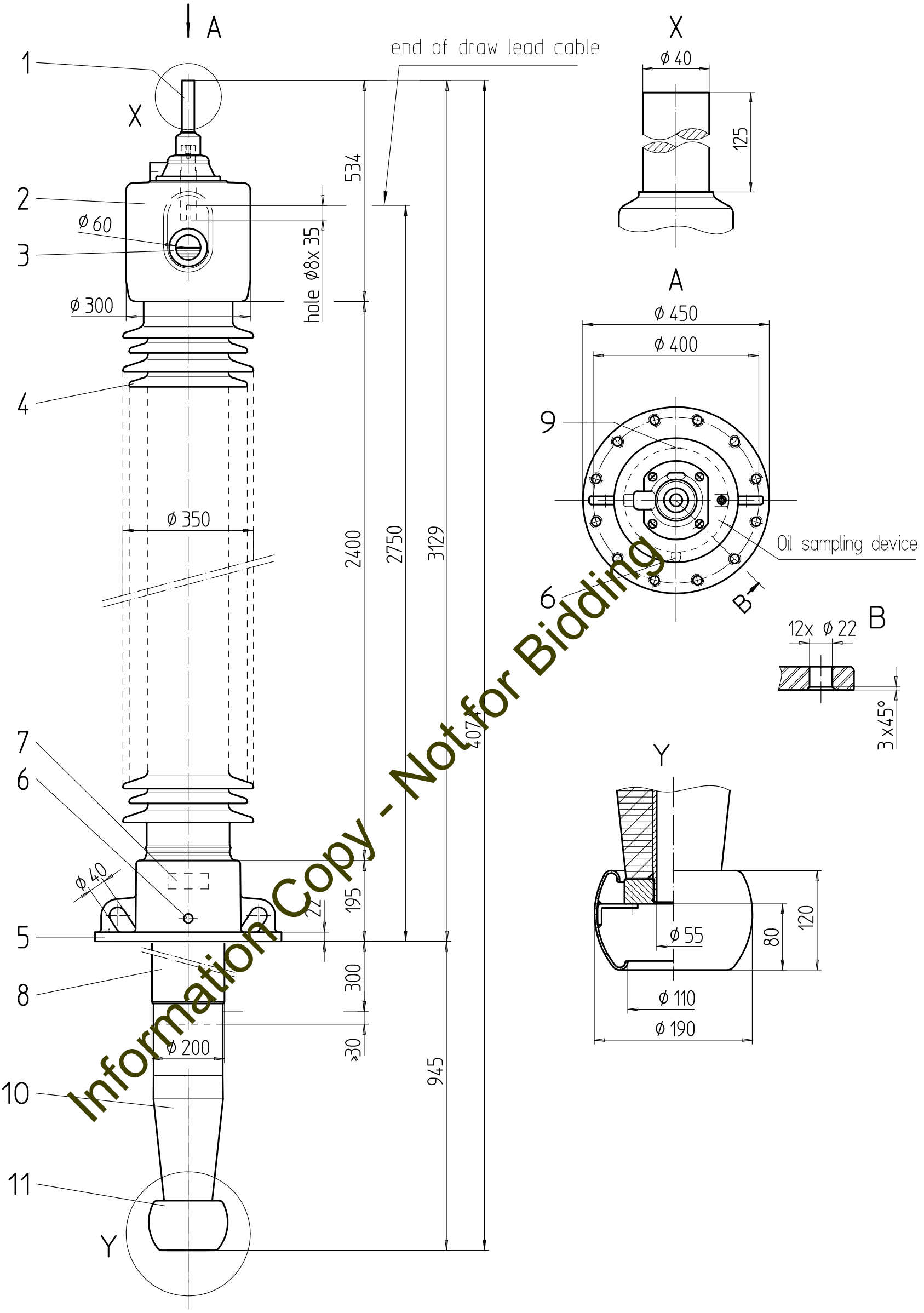
PROJECT - PACKAGE 1:MANNAR TRANSMISSION INFRASTRUCTURE-LOT A

TITLE :

OUT LINE ARRANGEMENT

800A 30s EARTHING TRANSFORMER

DESIGNED BY:	SCALE: 1:37	SIZE: A4	UNITS: mm
	DRAWN BY: PIVITH	DESIGN NO:	800A30sET
APPROVED BY:	DRAWING NO:	DRW/QTMTFMANNARGSS800A30sET/22	
	DATE: 6/03/2019		REV: 06



Modifications reserved

Draw lead connection

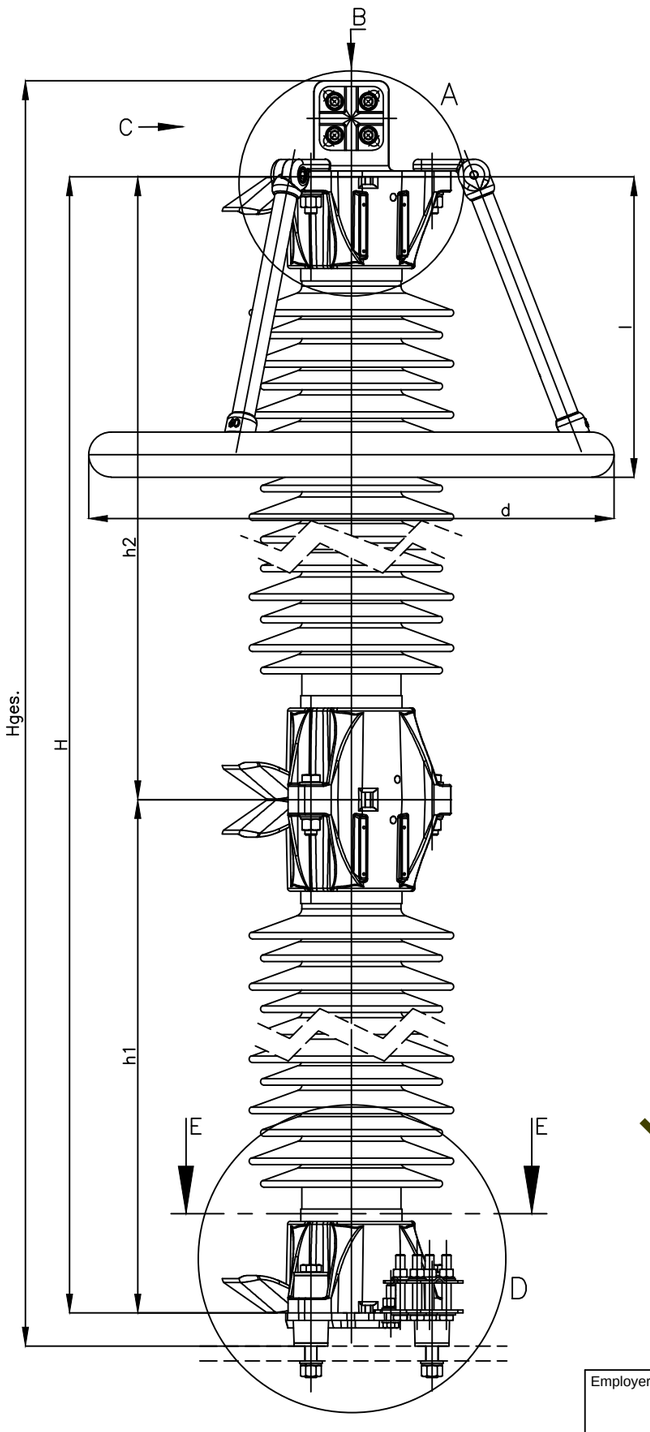
Standard = IEC60137-2008

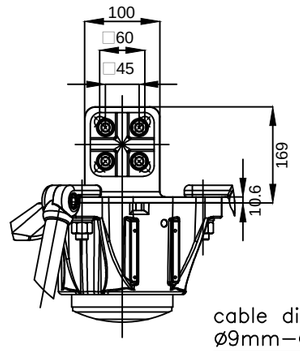
Item	Designation
1	Top terminal (Silverplated copper alloy)
2	Head (Al-casted)
3	Oil level indicator
4	Porcelain insulator (brown)
5	Flange (Al-casted)
6	Test tap
7	Rating plate
8	Ground sleeve (Al)
9	Air escape screw
10	Epoxy insulator
11	Shield (Al)

Drawn :	Checked :	Material :	Dimensions :	Mass :	Material No :
2016/12/19	2016/12/19			~375 kg	
G.Billig	D.Fischer	Title :		General tolerance :	
Modifications : 01		Outline drawing		Scale :	
Modified :	Checked :	Type COT 1050-800		Format : A3	TRENCH France SAS
2017/01/13	2017/01/17	Transformer Bushing A			
K.Bittighoffer	F.Gutzwiller	Stock/Req. No :		Sheet : 1 / 3	
		Substitute for :		41417266Z	
		Substituted by :			

Typ	h1 mm	h2 mm	h3 mm	h4 mm	H mm	Hges. mm	grading ring d mm	grading ring l mm	weight kg	creepage distance mm
SB 192/10.2-0	1335	1335			2670	2842	700	400	174	8650

SB 192/SL-A-0 acc. IEC 60099-4 Ed.3





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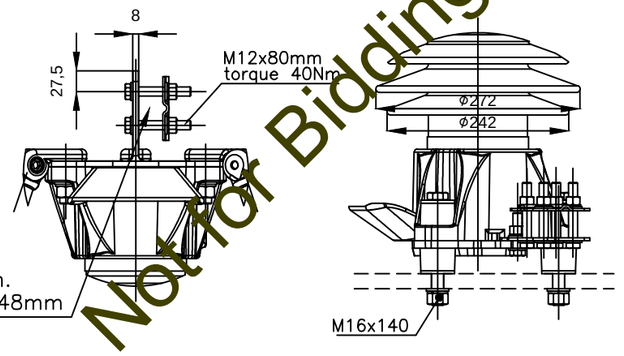

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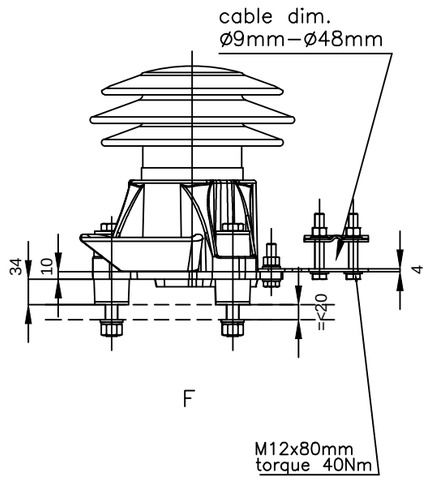
D



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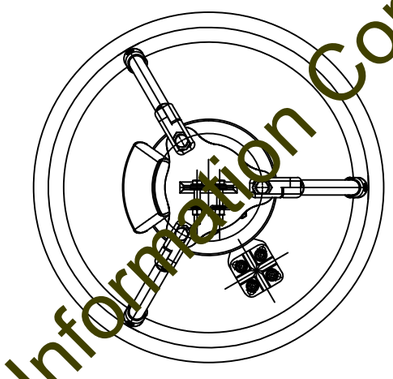

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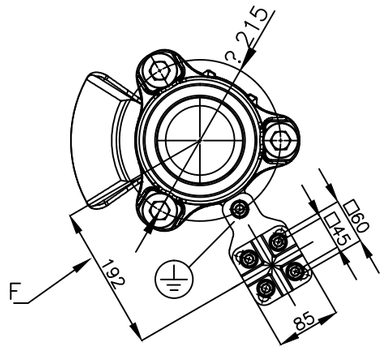


E–E

Employer's Representative Approval Stamp

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
1	REVISED AS PER CEB'S COMMENT	16/03/18			
0	ISSUED FOR APPROVAL	31/01/18			

EMPLOYER: CEYLON ELECTRICITY BOARD SRI LANKA
P.O.BOX 540, COLOMBO 02, SRI LANKA

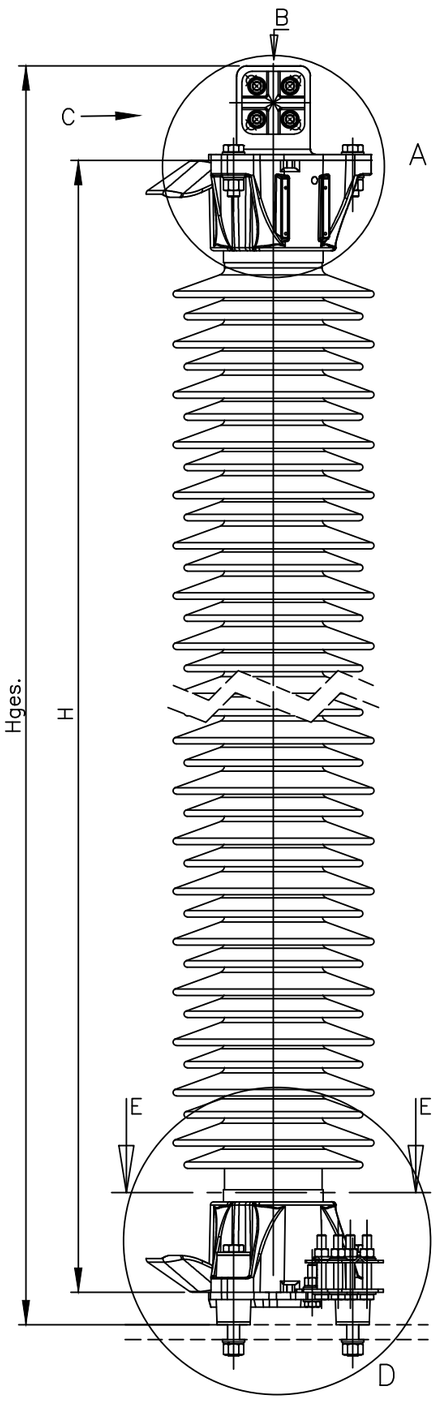
CONTRACTOR: LS Industrial Systems Co.,Ltd.
431-848, LS Tower 127, LS-ro, KOREA

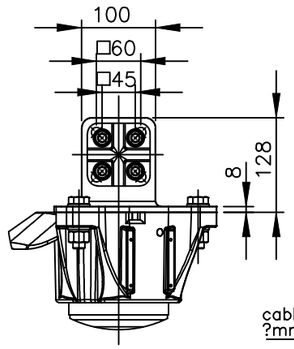
PROJECT TITLE: PACKAGE1 : MANNAR TRANSMISSION INFRASTRUCTURE - LOT A
Construction of Mannar 220/33kV Grid Substation

DRAWING TITLE: 192KV SURGE ARRESTER

SCALE NONE	SIZE A3					REVISION NO. 1
DRAWING NO.	LOTAMA-ESA-LO-01					SHEET NO. 1
CONTRACT NO.	CEB/AGM/PROJ/2012/ICB/CE&NEIP-P1/01					NO. OF SHEET 2
	DRWN	DSGN	CHKD	Approved	PJTMGR	DRAWING STATUS
	D.W.CHO	D.W.CHO	Y.W.LEE	S.W.PARK	T.S.SONG	
SIGNATURE						Engineering Approval
DATE	29/01/18	29/01/18	30/01/18	30/01/18	31/01/18	

Typ	h1 mm	h2 mm	h3 mm	h4 mm	H mm	Hges. mm	grading ring d mm	grading ring l mm	weight kg	creepage distance mm
SB 36/10.2-0					859	1031			54	2327





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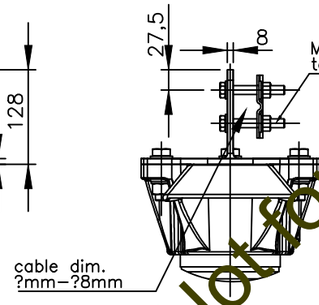

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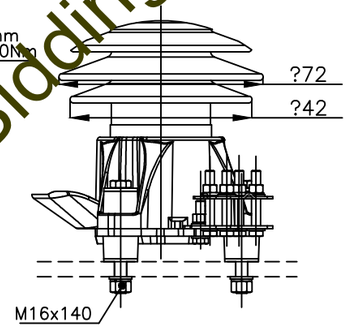

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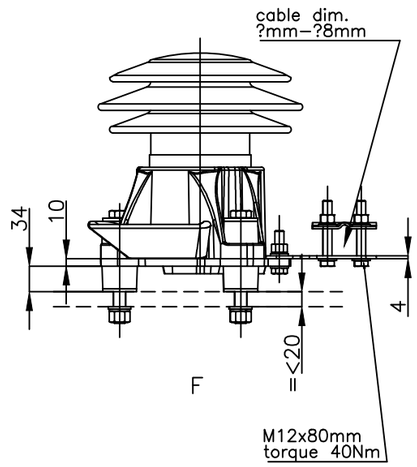

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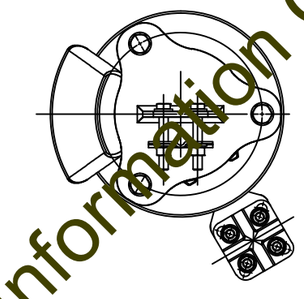

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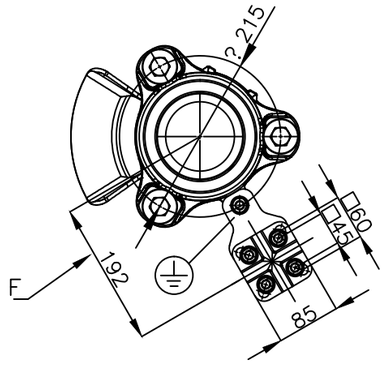


E–E

Employer's Representative Approval Stamp

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
0	ISSUED FOR APPROVAL	31/01/18			

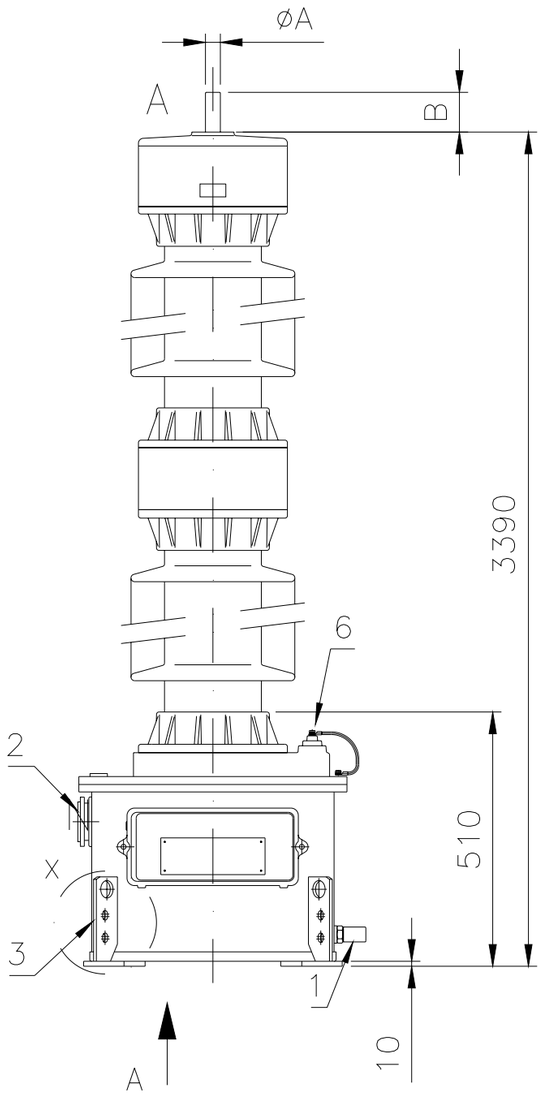
EMPLOYER: CEYLON ELECTRICITY BOARD SRI LANKA
P.O.BOX 540, COLOMBO 02, SRI LANKA

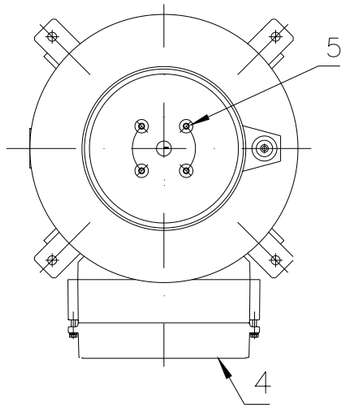
CONTRACTOR: LS Industrial Systems Co.,Ltd.
431-848, LS Tower 127, LS-ro, KOREA

PROJECT TITLE: PACKAGE1 : MANNAR TRANSMISSION INFRASTRUCTURE - LOT A
Construction of Mannar 220/33kV Grid Substation

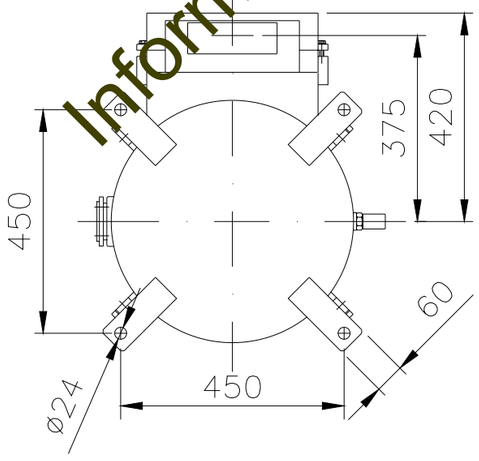
DRAWING TITLE: 36KV SURGE ARRESTER

SCALE NONE	SIZE A3				REVISION NO.	0
DRAWING NO.	LOTAMA-ESA-LO-02				SHEET NO.	1
CONTRACT NO.	CEB/AGM/PROJ/2012/ICB/CE&NE|P-P1/01				NO. OF SHEET	2
	DRWN	DSGN	CHKD	Approved	PJTMGR	DRAWING STATUS
	D.W.CHOI	D.W.CHOI	Y.W.LEE	S.W.PARK	T.S.SONG	Engineering Approval
SIGNATURE						
DATE	29/01/18	29/01/18	30/01/18	30/01/18	31/01/18	



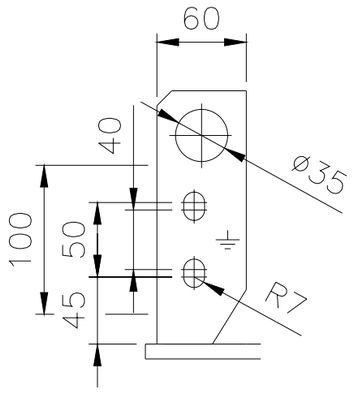


VISTA POR A
VIEW



Dimensiones aproximadas en mm
Dimensions in mm only approximatives

DETALLE X
DETAIL X



DESCRIPCION
DESCRIPTION

1.–Toma de muestras de aceite
Oil sampling valve
2.–Indicador de nivel de aceite
Oil level indicator
3.–Toma de tierra
Earthing terminal
4.–Caja de bornes secundarios
Secondary terminal box
5.–Fijacion para bobina bloqueo (Bajo Pedido)
Line trap fixing (on request)
6.–Borne AF M6^l
HF Terminal M6

Primary terminal material: Natural Aluminum
Min. creepage distance: 35mm/kV
Gravity center: 1015mm
Insulator: Brown porcelain

PESO	ACEITE–OIL	51 kg
WEIGHT	TOTAL	410 kg

ØA	B
30	80

arteche

DFK–245

TRANSFORMADOR DE TENSION CAPACITIVO
CAPACITOR VOLTAGE TRANSFORMER

O.F.: 17030218 2017

4285420