

Bid Document/ बिड दस्तावेज़

Bid Details/बिड विवरण	
Bid End Date/Time/बिड बंद होने की तारीख/समय	11-03-2024 13:00:00
Bid Opening Date/Time/बिड खुलने की तारीख/समय	11-03-2024 13:30:00
Bid Offer Validity (From End Date)/बिड पेशकश वैधता (बंद होने की तारीख से)	90 (Days)
Ministry/State Name/मंत्रालय/राज्य का नाम	Ministry Of Heavy Industries And Public Enterprises
Department Name/विभाग का नाम	Department Of Heavy Industry
Organisation Name/संगठन का नाम	Bharat Heavy Electricals Limited (bhel)
Office Name/कार्यालय का नाम	10090001-edn Bangalore
Total Quantity/कुल मात्रा	27
Item Category/मद केटेगरी	TRFMR CNTRL 200VA 3 YNYN0 110/415 (BHEL Material code: CN9074470394) (Q3) , TR 200VA 280, 265, 250, 235, 220/110V YNYN0 (BHEL Material code: SA0657000043) (Q3)
MSE Exemption for Years of Experience and Turnover/ अनुभव के वर्षों से एमएसई छूट	No
Startup Exemption for Years of Experience and Turnover/ अनुभव के वर्षों से स्टार्टअप छूट	No
Document required from seller/विक्रेता से मांगे गए दस्तावेज़	Additional Doc 1 (Requested in ATC) *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Bid to RA enabled/बिड से रिवर्स नीलामी सक्रिय किया	No
ITC available to buyer/क्रेता के लिए उपलब्ध आईटीसी	Yes
Type of Bid/बिड का प्रकार	Two Packet Bid
Primary product category	TRFMR CNTRL 200VA 3 YNYN0 110/415 (BHEL Material code: CN9074470394)
Time allowed for Technical Clarifications during technical evaluation/तकनीकी मूल्यांकन के दौरान तकनीकी स्पष्टीकरण हेतु अनुमत समय	2 Days

Bid Details/बिड विवरण	
Inspection Required (By Empanelled Inspection Authority / Agencies pre-registered with GeM)	No
Payment Timelines	Payments shall be made to the Seller within 90 days of issue of consignee receipt-cum-acceptance certificate (CRAC) and on-line submission of bills (This is in supersession of 10 days time as provided in clause 12 of GeM GTC)
Evaluation Method/मूल्यांकन पद्धति	Item wise evaluation/

EMD Detail/ईएमडी विवरण

Required/आवश्यकता	No
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ePBG Detail/ईपीबीजी विवरण

Required/आवश्यकता	No
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Splitting/विभाजन

Bid splitting not applied/बोली विभाजन लागू नहीं किया गया.

MII Purchase Preference/एमआईआई खरीद वरीयता

MII Purchase Preference/एमआईआई खरीद वरीयता	No
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MSE Purchase Preference/एमएसई खरीद वरीयता

MSE Purchase Preference/एमएसई खरीद वरीयता	Yes
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1. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% (Selected by Buyer) of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 25%(selected by Buyer) percentage of total QUANTITY. The buyers are advised to refer the OM No.F.1/4/2021-PPD dated 18.05.2023 [OM No.1_4_2021_PPD_dated_18.05.2023](#) for compliance of Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017.

2. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc.

This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.

Evaluation Method (Item Wise Evaluation Method)

Contract will be awarded schedulewise and the determination of L1 will be done separately for each schedule. The details of item-consignee combination covered under each schedule are as under:

Evaluation Schedules	Item/Category	Quantity
Schedule 1	Trfmr Cntrl 200va 3 Ynyn0 110/415 (bhel Material Code: Cn9074470394)	17
Schedule 2	Tr 200va 280, 265, 250, 235, 220/110v Ynyn0 (bhel Material Code: Sa0657000043)	10

TRFMR CNTRL 200VA 3 YNNO 110/415 (BHEL Material Code: CN9074470394) (17 pieces)

Technical Specifications/तकनीकी विशिष्टियाँ

Buyer Specification Document/क्रेता विशिष्टि दस्तावेज़	Download
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Input Tax Credit(ITC)/इनपुट कर क्रेडिट(आईटीसी) and/ तथा Reverse Charge(RCM)/रिवर्स प्रभार (आरसीएम) Details

ITC on GST/जीएसटी पर इनपुट कर क्रेडिट	ITC on GST Cess/जीएसटी उपकर कर क्रेडिट
100%	NA

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Dinesh Kumar Bhagat	560026,MANAGER STORES,- GI Bharat Heavy Electricals Limited Electronics Division, Mysore Road, Bangalore - 560026 Karnataka India	17	30

TR 200VA 280, 265, 250, 235, 220/110V YNNO (BHEL Material Code: SA0657000043) (10 pieces)

Technical Specifications/तकनीकी विशिष्टियाँ

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100%	NA

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1	Dinesh Kumar Bhagat	560026,MANAGER STORES,- GI Bharat Heavy Electricals Limited Electronics Division, Mysore Road, Bangalore - 560026 Karnataka India	10	30

Buyer Added Bid Specific Terms and Conditions/क्रेता द्वारा जोड़ी गई बिड की विशेष शर्तें

1. Scope of Supply

Scope of supply (Bid price to include all cost components) : Only supply of Goods

2. Generic

OPTION CLAUSE: The Purchaser reserves the right to increase or decrease the quantity to be ordered up to 25 percent of bid quantity at the time of placement of contract. The purchaser also reserves the right to increase the ordered quantity by up to 25% of the contracted quantity during the currency of the contract at the contracted rates. Bidders are bound to accept the orders accordingly.

3. Generic

Data Sheet of the product(s) offered in the bid, are to be uploaded along with the bid documents. Buyers can match and verify the Data Sheet with the product specifications offered. In case of any unexplained mismatch of technical parameters, the bid is liable for rejection.

4. Generic

Bidders are advised to check applicable GST on their own before quoting. Buyer will not take any responsibility in this regards. GST reimbursement will be as per actuals or as per applicable rates (whichever is lower), subject to the maximum of quoted GST %.

5. Generic

Supplier shall ensure that the Invoice is raised in the name of Consignee with GSTIN of Consignee only.

6. Generic

While generating invoice in GeM portal, the seller must upload scanned copy of GST invoice and the screenshot of GST portal confirming payment of GST.

7. Buyer Added Bid Specific ATC

Buyer Added text based ATC clauses

A. PRE-QUALIFICATION REQUIREMENT (PQR)

Bidder should submit documentary evidence for PQC, for evaluating the eligibility of Bidder as per **Buyer specification document** in this bid.

B. Payment Timelines:

Type of Bidder	Payment Terms (Number of days)
Micro & Small Enterprises (MSEs)	45 days from CRAC date
Medium Enterprises	60 days from CRAC date
Non MSME	90 days from CRAC date

C. Risk Purchase - In case of failure of supplier, BHEL at its discretion may make purchase of the material s/ services not supplied/ rendered in time at the RISK & COST of the supplier. Under such situation, the supplier who fails to supply the goods in time shall be wholly liable to make good to BHEL any loss due to risk purchase. In case of invocation of risk purchase, BHEL shall get Balance work/ supply done at supplier risk and cost, which shall be recovered from supplier out of dues of this contract, any other contract with BHEL and balance amount, if any shall be required to be deposited by supplier.

D. Contact Details:

Engineering Dept.	Tender Dept.
Ms. Poornachandrika/ Sr. Manager	Mr. Dinesh Kumar Bhagat/ Manager
e-mail: gpc@bhel.in	e-mail: dkbhagat@bhel.in
Tel: 080 26998085	Tel: 080 26998108

Disclaimer/अस्वीकरण

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization, whereby Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and / or terms and conditions governing the bid. Any clause(s) incorporated by the Buyer regarding following shall be treated as null and void and would not be considered as part of bid:-

1. Definition of Class I and Class II suppliers in the bid not in line with the extant Order / Office Memorandum issued by DPIIT in this regard.

2. Seeking EMD submission from bidder(s), including via Additional Terms & Conditions, in contravention to exemption provided to such sellers under GeM GTC.
3. Publishing Custom / BOQ bids for items for which regular GeM categories are available without any Category item bunched with it.
4. Creating BoQ bid for single item.
5. Mentioning specific Brand or Make or Model or Manufacturer or Dealer name.
6. Mandating submission of documents in physical form as a pre-requisite to qualify bidders.
7. Floating / creation of work contracts as Custom Bids in Services.
8. Seeking sample with bid or approval of samples during bid evaluation process.
9. Mandating foreign / international certifications even in case of existence of Indian Standards without specifying equivalent Indian Certification / standards.
10. Seeking experience from specific organization / department / institute only or from foreign / export experience.
11. Creating bid for items from irrelevant categories.
12. Incorporating any clause against the MSME policy and Preference to Make in India Policy.
13. Reference of conditions published on any external site or reference to external documents/clauses.
14. Asking for any Tender fee / Bid Participation fee / Auction fee in case of Bids / Forward Auction, as the case may be.

Further, if any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

[This Bid is also governed by the General Terms and Conditions/ यह बिड सामान्य शर्तों के अंतर्गत भी शासित है](#)

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws./जेम की सामान्य शर्तों के खंड 26 के संदर्भ में भारत के साथ भूमि सीमा साझा करने वाले देश के बिडर से खरीद

पर प्रतिबंध के संबंध में भारत के साथ भूमि सीमा साझा करने वाले देश का कोई भी बिडर इस निविदा में बिड देने के लिए तभी पात्र होगा जब वह बिड देने वाला सक्षम प्राधिकारी के पास पंजीकृत हो। बिड में भाग लेते समय बिडर को इसका अनुपालन करना होगा और कोई भी गलत घोषणा किए जाने व इसका अनुपालन न करने पर अनुबंध को तत्काल समाप्त करने और कानून के अनुसार आगे की कानूनी कार्यवाई का आधार होगा।

---Thank You/धन्यवाद---

COPY RIGHT AND CONFIDENTIAL THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.		 A4 - 10	PRE-QUALIFICATION CRITERIA FOR SMALL RATING TRANSFORMER		PQC/408/0022															
		REV. NO.: 03																		
		Page 1 of 1																		
		<table border="1"> <thead> <tr> <th>Sl.No.</th> <th>CRITERIA</th> <th>DOCUMENT REQUIRED</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>The bidder should be a manufacturer / supplier of small rating transformers (up to 15KVA) for two years or more.</td> <td>Self-certification for OEM/OEM authorization for dealers.</td> </tr> <tr> <td>2.</td> <td>The bidder shall fully comply with all the clauses mentioned in the latest revision of specification ED7461195 (Current revision number is REV No..03).</td> <td>Conformance for complying.</td> </tr> <tr> <td>3.</td> <td> The Bidder shall submit the documents indicated during bidding stage. OR The bidder should have supplied the item to BHEL against an earlier purchase order. </td> <td> a) At least one end user performance certificate. b) Reference list of customers for dry type transformers. c) Relevant purchase order copies along with invoice and delivery challans. OR If supplier had already supplied transformer to BHEL, then supplier shall provide relevant purchase order details. </td> </tr> <tr> <td>4.</td> <td>On -site service support shall be provided at purchaser's works within 6 working days, if it is observed that the item requires rework /rectification.</td> <td>Conformance for complying.</td> </tr> </tbody> </table>		Sl.No.	CRITERIA	DOCUMENT REQUIRED	1.	The bidder should be a manufacturer / supplier of small rating transformers (up to 15KVA) for two years or more.	Self-certification for OEM/OEM authorization for dealers.	2.	The bidder shall fully comply with all the clauses mentioned in the latest revision of specification ED7461195 (Current revision number is REV No..03).	Conformance for complying.	3.	The Bidder shall submit the documents indicated during bidding stage. OR The bidder should have supplied the item to BHEL against an earlier purchase order.	a) At least one end user performance certificate. b) Reference list of customers for dry type transformers. c) Relevant purchase order copies along with invoice and delivery challans. OR If supplier had already supplied transformer to BHEL, then supplier shall provide relevant purchase order details.	4.	On -site service support shall be provided at purchaser's works within 6 working days, if it is observed that the item requires rework /rectification.	Conformance for complying.		
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Transformer Technical specification- CN9074470394:

TRANSFORMER CONTROL
200VA
THREE PHASES, 50Hz
LV1:110V
HV1:415V
VECTOR GROUP:YNYN0
HV TAP:+/-5%, +/-10%
IMPEDANCE: 4%
INSULATION CLASS: B
INSULATION LEVEL:
(50Hz 1MIN): 4 KV
NICKEL PLATED BRASS
STUD TERMINALS.
EARTHED SCREEN BETN
HV & LV WDGS.
IS2026 & IS11171

REVISION HISTORY SHEET

REV NO	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
00	23/07/96	SUPERSEDES CN74500S	-	BS, NS	N. J
01	02/10/99	Cl.4.3 & Cl.12.3 Note added	F.B From GHC. Group	BKD, CCR	NS
02	14/07/03	Cl.1.1.2, 4.1, 4.3 & 12.3 Revised	F.B. (GHC) CE\GHC\2003 STDS\KVBR Dt.10/07/03	HRN	NS
03	17/11/21	Cl.16. Acceptance criteria included. Cl.15.Tests refined	FB FROM QS	Anusri S	R Rukmani

APPROVED :
R Rukmani

PREPARED : ISSUED : DATE :
Anusri S ENGG. SERV. 17/11/21

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SPECIFICATION FOR POWER AND CONTROL
TRANSFORMER

1. SCOPE

1.1. This Standard details the specifications for single and polyphase drytype, power and control transformers.

1.2. This Standard shall be read in conjunction with IS:11171 and IS:2026

2. DEFINITIONS

For the purpose of this Standard following definitions shall apply.

2.1 Power transformer: Single phase transformer rated above 1KVA and 3 phase transformer rated above 5KVA shall be designated as power transformer.

2.2 Control transformer : Single phase transformer below 1KVA and 3 phase transformer below 5 KVA shall be designated as control transformer

3. SERVICE CONDITIONS

3.1 Max ambient temp : 50°C

3.2 Cooling : Air natural

3.3 Humidity : 100 percent

3.4 Ventilation : Restricted as it is mounted inside a cubicle (IP 21)

4. RATING

4.1 KVA Rating:

The rated KVA assigned taking into account the service condition as specified in 3.0

APPROVED:
R Rukmani

PREPARED: ISSUED: DATE:
Anusri S ENGG. SERV, 17/11/21

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The following shall be the preferred rated KVA
 3 Phase Transformers:
 0.25,1,1.5,2,2.5,3,4,5,6,7.5,10,12.5,15,20,25,30,35,40,45,
 50,55,60,65,75,80,100,135,160,200,250,300,350 & 400 KVA

Single Phase Transformers:
 50, 100, 150, 200, 300, 500, 750 VA
 1,1.25,1.5,2,3,4,4.5,5,6,7.5,10,12.5,15,20 & 25 KVA

4.2 Rated Voltages :

The rated voltages assigned to the windings of the transformers may be operated at its rated KVA at any voltage within +/-10% of rated voltage.

4.3 No Load Current

SlNo.	Rating	Value
1.	up to 1KV	Less than 20% of Rated current
2.	above 1KVA to less than 5KVA	less than 15% of rated current
3.	above 5KVA to less than 10KVA	less than 10% of rated current
4.	Rating higher than above subject to approval of iron and copper losses by EDN.	

4.4 Rated Frequency

The frequency for the purpose of this standard shall be 50 Hz unless otherwise specified, with a tolerance of +/-3%.

5. TEMPERATURE RISE

The Transformer shall conform to the requirements of Temperature Rise specified in IS:2026 part II.

6. INSULATION LEVELS

The Transformer shall conform to the requirements of insulation Levels Specified in IS:2026 part III.

7. TAPPING

Unless otherwise specified all transformers shall be provided with off load tapings on +/-5% and +/-10% on primary.

8. CONNECTION

For the purpose of this standard the winding connections shall be in accordance with IS:2026 part - IV.

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9. IMPEDANCE

Unless otherwise specified transformers shall have the following impedances.

Up to and including 250VA	-	6%
Above 250VA up to and including 150KVA	-	4%
Above 150KVA up to 400 KVA	-	5%

The tolerance for the impedance values shall be +/-10%

10. TERMINAL MARKINGS

For the purpose of this standard the various terminal markings shall be as stated below

10.1 The windings of the transformers shall be denoted by HV & LV. HV refers to high voltage winding and LV refers to low voltage winding.

10.2 Line terminals shall be marked as

For 3 phase transformers
1U, 1V, 1W for HV windings and
2U, 2V, 2W for LV windings

For Single phase Transformers
P1, P2 for HV winding and
S1, S2 for LV winding

The markings shall be started from left hand-side as viewed for HV side.

Neutral Terminal shall be marked as 1N for HV side and 2N for LV side.

10.3 The tapings shall be marked with natural ascending sequence as shown in the figure-1. The tapings shall be through tap selector for all transformers rated above 250VA.

10.4 The rated voltage of the transformer shall be marked by the side of respective terminals.

10.5 Earthing terminals shall be marked with earthing mark ()

11. TERMINALS

All terminals except Bar type shall be of nickel plated Brass. Bar terminal shall be of pure copper of appropriate grade. Nut & Bolt shall be secured with vibration proof washers. The

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appropriate size of the terminals shall be as given in Table-III.

TABLE - III

Type of terminal	Current rating							
	5A	10A	20A	50A	100A	200A	300A	500A
Screw/Stud	M6	M6	M8	M10	M12	-	-	-
Bar	-	-	-	-	-	20X6 1 hole M8	25X6 1 hole M8	40X6 1 hole M12

Note: All the terminals including hardware shall be free from rusting. After tightening the bolt, minimum 3 threads of bolt shall project outside the nut. Adequate clearances between phases shall be ensured and indicated in the drawing. Proper fixing arrangement with insulators shall be provided to ensure same clearances for the entire quantity of a purchase order.

12. FITTINGS

All transformers shall be provided with following fittings

12.1 Rating plate:

Transformers shall be provided with rating plates of weatherproof material. Rating plate shall be fixed along the breadth of the transformer & a provision shall be made to fix it along the length of the adjacent side.

For transformer rated 250VA & below rating plate shall be fixed along the breadth

The rating plate shall be marked legibly with following markings

A. Transformers rated above 250VA

- 1) KVA rating
- 2) Voltage Ratio
- 3) HV/LV Current
- 4) Tapings
- 5) No. of Phases
- 6) Vector grouping
- 7) System Frequency
- 8) Insulation Level
- 9) Insulation Class

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- 10) % Impedance
- 11) Reference Standard : IS:2026
- 12) Ambient temperature
- 13) Weight
- 14) Sl. No. & Year of manufacture
- 15) Manufacturer Name

B. Transformers rated below 250VA

- 1) KVA rating
- 2) Voltage ratio
- 3) Phase
- 4) Connection
- 5) Insulation class
- 6) Frequency

12.2 Diagram Plate:

Transformers shall be provided with diagram plate and shall be fixed along the breadth along with rating plate. It shall be legibly marked with a connection diagram.

12.3 Terminal board:

All the terminations of the transformers shall be brought out and fixed on the terminal board which is fixed on the top. The dimensions shall be as specified in corresponding Annexure for 1ph or 3ph transformer.

The material of the terminal board shall be of PRBC sheets (or any other better insulator) insulated and varnished. It shall be designated to take up the required torque. The terminals shall be rigidly fixed on the board with suitable fasteners, with adequate clearance as per table-IV.

Note: 8mm thick perspex cover shall be provided over the terminal board

TABLE -IV CLEARANCE DISTANCES

Rated Voltage	To earth in air (mm)	Between phases in air (mm)
415V	15.8	19.0
600V	19.0	19.0
3300V	50.8	50.8
6600V	63.5	88.9
11KV	76.2	127.0

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12.4 Lifting lugs:

Lifting lugs shall be provided for transformers weighing more than 50Kgs. Two lifting lugs shall be provided at two ends diagonally opposite to each other for transformers weighing more than 50 Kgs but below 100 Kgs. For transformers weighing more than 100 Kgs four lifting lugs shall be provided at each end.

12.5 Earthing terminals:

Two earthing terminals shall be provided on all the transformers. The size of the earthing terminals may be less than the rated conductor size.

12.6 Top Supports

4 holes each of 12mm dia shall be drilled on the lower portion of the top frame of transformer, to facilitate rigid fixing to the enclosure. However, this shall be provided for transformers rated 10KVA and above. The details are shown in Fig.2.

Note: 'F' is taken approximately as 75% of 'B'

13. ADDITIONAL INFORMATION

The following are the materials recommended to be used for constructions of transformers

- A. Core: CRGO grade 41/51 or any equivalent grade.
- B. Winding: Pure copper of appropriate grade and with suitable insulation.
- C. Insulation, Varnish etc: Shall be to appropriate class of insulation.

14. DIMENSIONAL DETAILS

All transformers should conform to dimensions specified in corresponding Annexure for 1ph or 3ph transformer. The values mentioned for overall dimensions are maximum values. The values for mounting holes are exact values. The dimensions shall be within tolerance mentioned therein.

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15. TESTS

15.1 Following are the tests for power transformers

A. Type tests :

1. Temperature rise test
2. Lightning impulse test

B. Routine tests:

1. Measurement of winding resistance
2. Voltage ratio test
3. Check on vector grouping
4. Measurement of losses : Load & No load loss
5. Induced over voltage test
6. Measurement of short circuit Impedance (% Impedance)
7. High voltage test

15.2 Following are the test for control transformers

A. Type test :

1. Temperature rise test

B. Routine test:

1. Measurement of winding resistance
2. Voltage ratio and polarity check
3. Vector grouping test
4. Measurement of loss: Load & No load loss
5. Induced over voltage test
6. Insulation resistance test.

15.3 The manufacturer shall submit the test certificates for tests on transformers.

16. ACCEPTANCE CRITERIA

16.1 Conducting Routine tests and Submission of reports

16.2 Inspection/Acceptance by BHEL-EDN Quality Services

16.3 Conducting Type tests and Submission of reports (On one transformer)

16.4 Test certificates for major bought out items

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17. SUPPLY CONDITIONS

Following information are to be supplied by the supplier

17.1 Iron and copper losses at specified temperature

17.2 Flux density in the core

17.3 Current density of the coil : HV & LV

17.4 Winding resistance

17.5 Supplier shall submit 6 copies of test guarantee certificates along with the materials

17.6 Transformers shall be suitably packed in wooden carters such that no damage is caused during transportation and handling.

Annexure-1
SINGLE PHASE TRANSFORMER

TYPE	KVA	A	B	C	KXE	O	X	Y
ST-1	0.05	100	130	85	80X60	5X10	95	85
ST-02	0.10	120	130	90	80X60	5X10	95	90
ST-03	0.15	120	150	90	95X60	5X10	115	90
ST-04	0.20	120	175	100	95X75	6X12	115	100
ST-05	0.25	120	175	100	95X90	6X12	115	100
ST-06	0.30	120	175	125	95X100	6X12	120	125
ST-07	0.50	150	190	150	125X100	8X15	150	145
ST-08	0.75	200	250	150	150X120	8X15	185	150
ST-09	1.00	200	250	160	160X130	8X15	185	160
ST-10	1.25	200	250	160	160X130	8X15	185	160
ST-11	1.50	280	300	175	160X130	10	200	160
ST-12	2.00	280	300	175	180X130	10	220	160
ST-13	3.00	300	350	200	200X150	10	220	180
ST-14	4.00	320	360	200	240X150	10	220	180
ST-15	4.50	320	400	200	240X170	10	250	200
ST-16	4.50	350	450	200	240X170	10	250	200
ST-17	5.00	350	450	200	240X170	10	250	200
ST-18	6.00	350	475	200	260X170	10	300	200
ST-19	7.50	350	500	240	290X200	10	300	250
ST-20	10.00	400	500	240	290X200	10	300	250
ST-21	12.50	400	600	250	330X200	10	300	250
ST-22	15.00	450	600	250	250X200	10	300	250
ST-23	25.00	500	600	250	400X200	10	300	250

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Annexure-2
THREE PHASE TRANSFORMER

TYPE	KVA	A	B	C	KXE	O	X	Y
TT-01	0.25	250	220	150	150X100	10	230	120
TT-02	0.05	280	250	190	200X150	10	250	150
TT-03	1.00	300	280	200	200X150	10	280	160
TT-04	1.50	300	320	200	200X150	10	300	180
TT-05	2.00	320	300	200	200X150	10	300	180
TT-06	2.50	340	350	200	200X150	10	300	180
TT-07	3.00	380	350	200	200X150	10	350	180
TT-08	4.00	400	425	250	250X200	10	350	180
TT-09	5.00	450	425	250	250X200	10	350	200
TT-10	6.00	450	480	250	250X200	10	350	200
TT-11	7.70	450	480	250	250X200	10	350	200
TT-12	10.00	500	525	250	300X200	10	400	250
TT-13	12.50	620	550	250	350X200	10	450	250
TT-14	15.00	620	600	250	350X200	10	450	250
TT-15	20.00	650	600	300	400X250	10	450	250
TT-16	25.00	650	600	300	400X250	10	450	250
TT-17	30.00	700	600	300	400X250	10	450	250
TT-18	35.00	700	600	300	400X250	10	450	250
TT-19	40.00	700	650	300	400X250	10	450	250
TT-20	45.00	700	650	300	400X250	10	450	250
TT-21	50.00	750	650	300	450X250	10	500	300
TT-22	55.00	750	700	300	450X250	10	500	300
TT-23	60.00	750	700	300	450X250	10	500	300
TT-24	65.00	750	800	300	450X250	10	500	300
TT-25	75.00	800	850	300	500X300	10	600	300
TT-26	80.00	800	850	350	500X300	10	600	300
TT-27	100.00	850	900	350	550X300	10	600	300
TT-28	135.00	850	900	400	550X300	10	600	300
TT-29	160.00	1000	1000	400	600X400	10	600	400
TT-30	200.00	1100	1250	450	650X500	12	700	550
TT-31	250.00	1150	1400	600	650X550	12	700	550
TT-32	300.00	1200	1600	600	700X600	12	750	600
TT-33	350.00	1300	1700	650	800X600	12	800	650
TT-34	400.00	1400	1750	750	800X630	12	850	650

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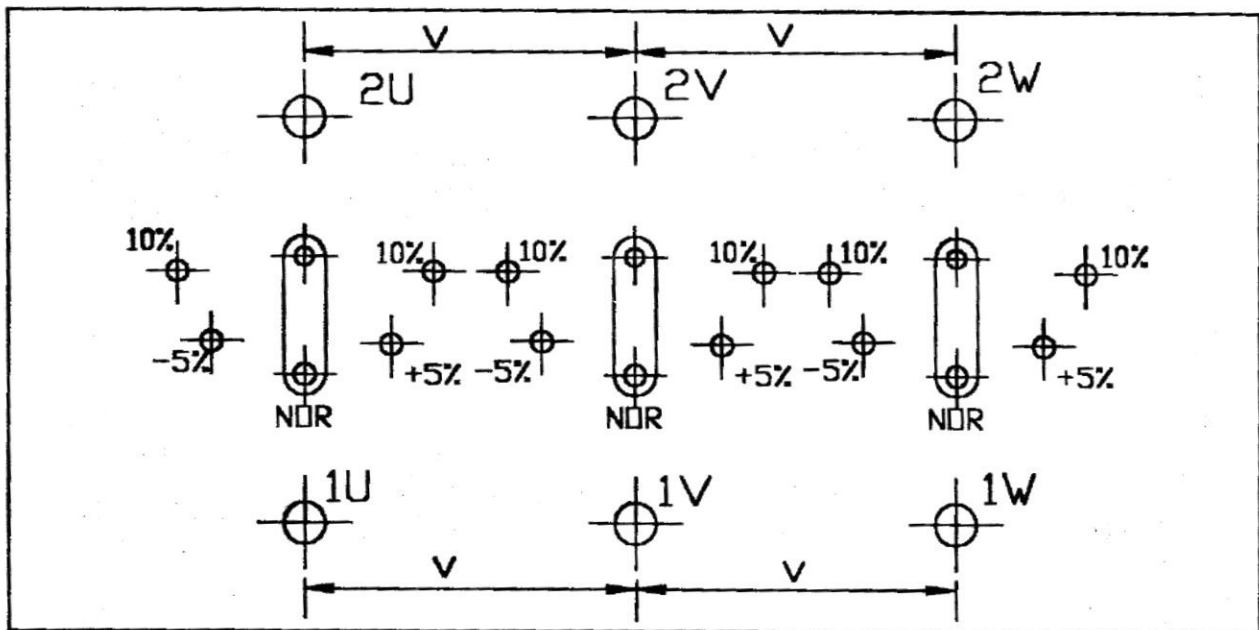
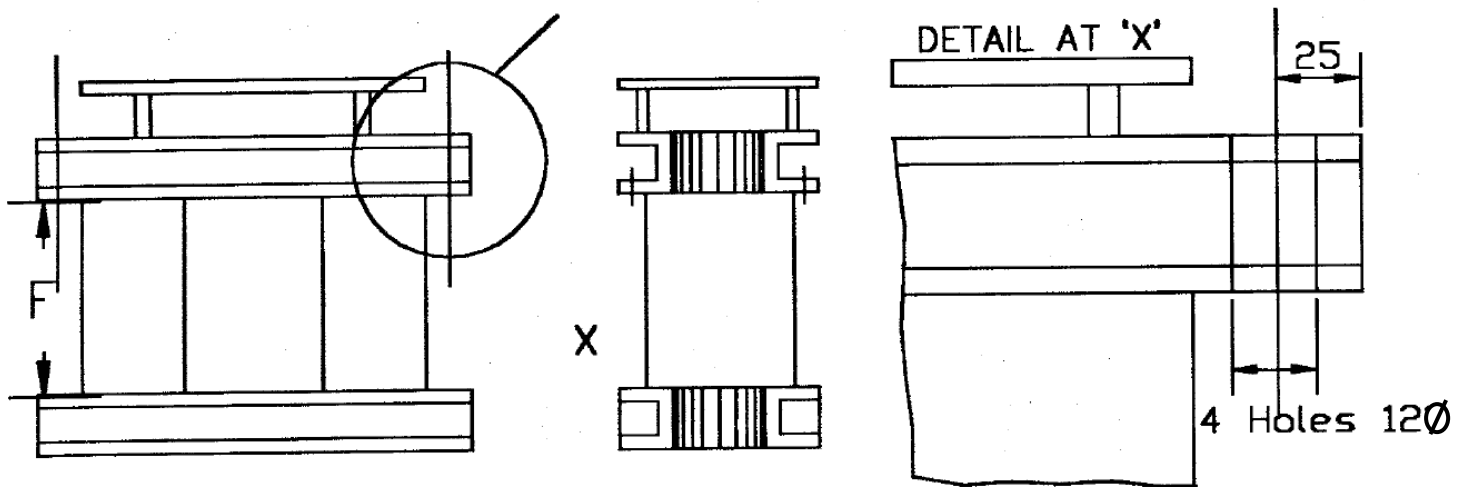


Fig. 1

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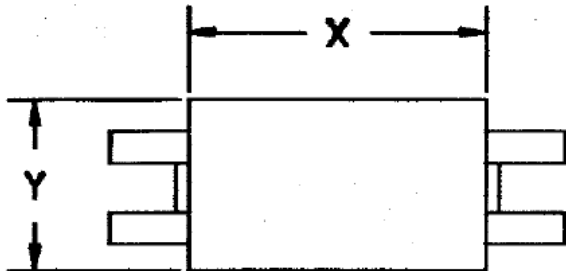
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FIG - 2

Note: 'F' is taken approximately as 75% of B

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SINGLE PHASE TRANSFORMER

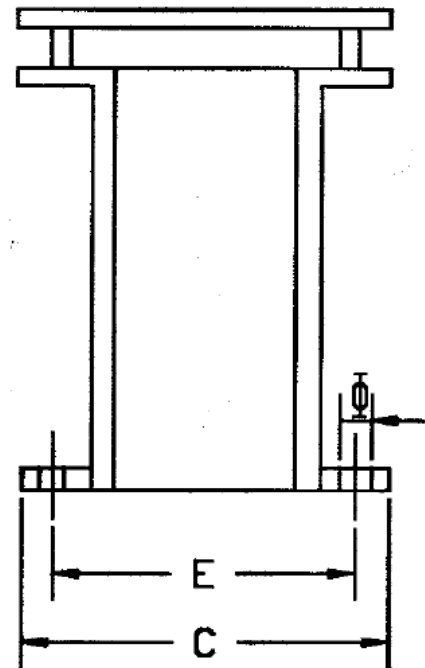
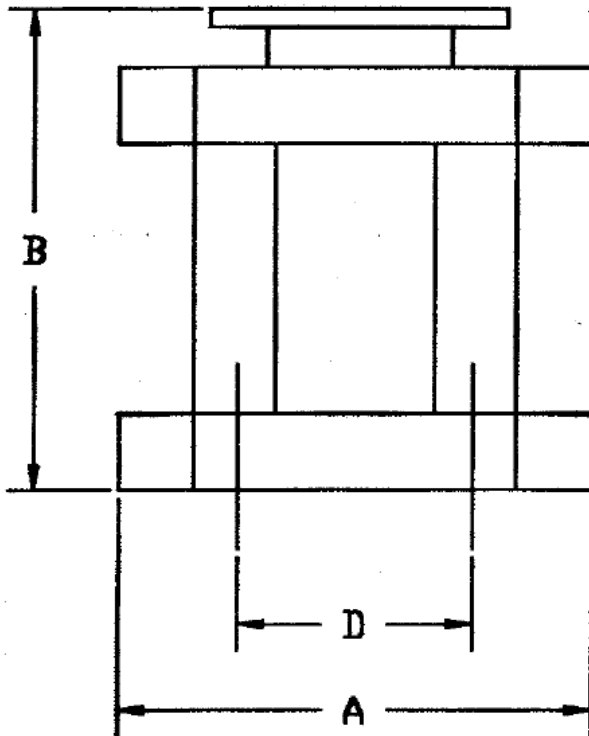


FIG - 3

NOTE: The tolerances for various dimensions shall be as per IS:2102 'coarse'

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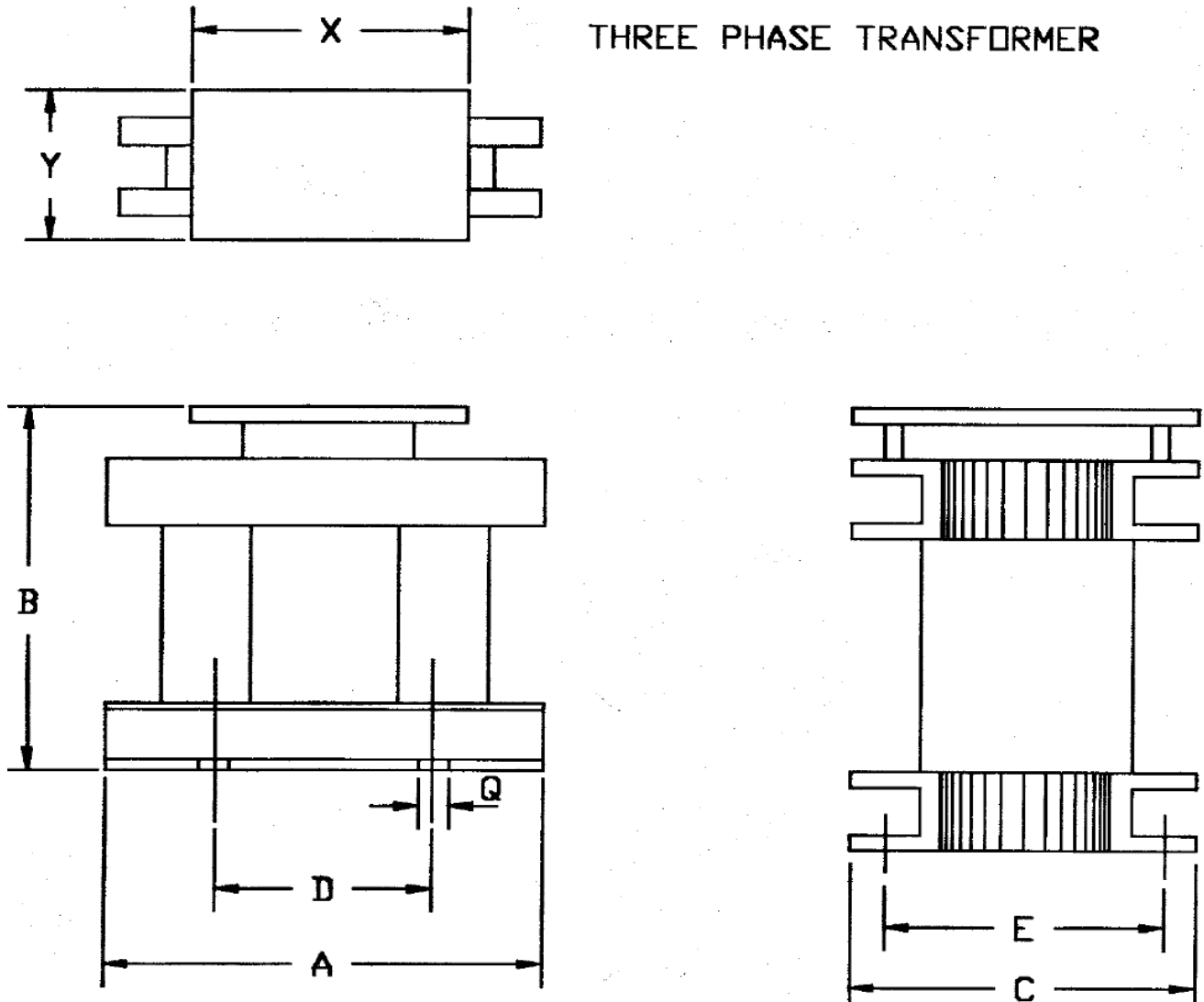


FIG - 4

NOTE: The tolerances for various dimensions
shall be as per IS: 2102 'coarse'

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	A4 - 10				REV. NO.: 03																
					Page 1 of 1																
<table border="1"> <thead> <tr> <th>Sl.No.</th> <th>CRITERIA</th> <th>DOCUMENT REQUIRED</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>The bidder should be a manufacturer / supplier of small rating transformers (up to 15KVA) for two years or more.</td> <td>Self-certification for OEM/OEM authorization for dealers.</td> </tr> <tr> <td>2.</td> <td>The bidder shall fully comply with all the clauses mentioned in the latest revision of specification ED7461195 (Current revision number is REV No..03).</td> <td>Conformance for complying.</td> </tr> <tr> <td>3.</td> <td> The Bidder shall submit the documents indicated during bidding stage. OR The bidder should have supplied the item to BHEL against an earlier purchase order. </td> <td> a) At least one end user performance certificate. b) Reference list of customers for dry type transformers. c) Relevant purchase order copies along with invoice and delivery challans. OR If supplier had already supplied transformer to BHEL, then supplier shall provide relevant purchase order details. </td> </tr> <tr> <td>4.</td> <td>On -site service support shall be provided at purchaser's works within 6 working days, if it is observed that the item requires rework /rectification.</td> <td>Conformance for complying.</td> </tr> </tbody> </table>							Sl.No.	CRITERIA	DOCUMENT REQUIRED	1.	The bidder should be a manufacturer / supplier of small rating transformers (up to 15KVA) for two years or more.	Self-certification for OEM/OEM authorization for dealers.	2.	The bidder shall fully comply with all the clauses mentioned in the latest revision of specification ED7461195 (Current revision number is REV No..03).	Conformance for complying.	3.	The Bidder shall submit the documents indicated during bidding stage. OR The bidder should have supplied the item to BHEL against an earlier purchase order.	a) At least one end user performance certificate. b) Reference list of customers for dry type transformers. c) Relevant purchase order copies along with invoice and delivery challans. OR If supplier had already supplied transformer to BHEL, then supplier shall provide relevant purchase order details.	4.	On -site service support shall be provided at purchaser's works within 6 working days, if it is observed that the item requires rework /rectification.	Conformance for complying.
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Transformer Technical specification-SA0657000043:

TRANSFORMER CONTROL
RATING :200VA,
3 PHASE,50 - 400 HZ
HV : 280 V
LV : 110 V
TAP ON HV :
AT 265, 250, 235 & 220V
VECTOR GROUP : YNyn0
IMPEDENCE :4%
INS.CLASS :B
INS.LEVEL :2.5 KV
50HZ FOR 1 MIN.
ACCEPTANCE CRITERIA:
ROUTINE TEST AT 50HZ
NO LOAD CURRENT LESS
THAN 20% OF RATED
CURRENT.
NICKEL PLATED BRASS
STUD TERMINALS
PERSPEX SHEET OF 8MM
THICKNESS OVER
TERMINAL BOARD.
SCREEN BETN. HV & LV
TO BE PROVIDED
REF.STANDARD:IS 2026,
IS 11171 AND ED7461195

REVISION HISTORY SHEET

REV NO	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
00	23/07/96	SUPERSEDES CN74500S	-	BS, NS	N. J
01	02/10/99	Cl.4.3 & Cl.12.3 Note added	F.B From GHC. Group	BKD, CCR	NS
02	14/07/03	Cl.1.1.2, 4.1, 4.3 & 12.3 Revised	F.B. (GHC) CE\GHC\2003 STDS\KVBR Dt.10/07/03	HRN	NS
03	17/11/21	Cl.16. Acceptance criteria included. Cl.15. Tests refined	FB FROM QS	Anusri S	R Rukmani

APPROVED :
R Rukmani

PREPARED : ISSUED : DATE :
Anusri S ENGG. SERV. 17/11/21

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SPECIFICATION FOR POWER AND CONTROL
TRANSFORMER

1. SCOPE

1.1. This Standard details the specifications for single and polyphase drytype, power and control transformers.

1.2. This Standard shall be read in conjunction with IS:11171 and IS:2026

2. DEFINITIONS

For the purpose of this Standard following definitions shall apply.

2.1 Power transformer: Single phase transformer rated above 1KVA and 3 phase transformer rated above 5KVA shall be designated as power transformer.

2.2 Control transformer : Single phase transformer below 1KVA and 3 phase transformer below 5 KVA shall be designated as control transformer

3. SERVICE CONDITIONS

3.1 Max ambient temp : 50°C

3.2 Cooling : Air natural

3.3 Humidity : 100 percent

3.4 Ventilation : Restricted as it is mounted inside a cubicle (IP 21)

4. RATING

4.1 KVA Rating:

The rated KVA assigned taking into account the service condition as specified in 3.0

APPROVED:
R Rukmani

PREPARED: ISSUED: DATE:
Anusri S ENGG. SERV, 17/11/21

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The following shall be the preferred rated KVA
 3 Phase Transformers:
 0.25,1,1.5,2,2.5,3,4,5,6,7.5,10,12.5,15,20,25,30,35,40,45,
 50,55,60,65,75,80,100,135,160,200,250,300,350 & 400 KVA

Single Phase Transformers:
 50, 100, 150, 200, 300, 500, 750 VA
 1,1.25,1.5,2,3,4,4.5,5,6,7.5,10,12.5,15,20 & 25 KVA

4.2 Rated Voltages :

The rated voltages assigned to the windings of the transformers may be operated at its rated KVA at any voltage within +/-10% of rated voltage.

4.3 No Load Current

SlNo.	Rating	Value
1.	up to 1KV	Less than 20% of Rated current
2.	above 1KVA to less than 5KVA	less than 15% of rated current
3.	above 5KVA to less than 10KVA	less than 10% of rated current
4.	Rating higher than above subject to approval of iron and copper losses by EDN.	

4.4 Rated Frequency

The frequency for the purpose of this standard shall be 50 Hz unless otherwise specified, with a tolerance of +/-3%.

5. TEMPERATURE RISE

The Transformer shall conform to the requirements of Temperature Rise specified in IS:2026 part II.

6. INSULATION LEVELS

The Transformer shall conform to the requirements of insulation Levels Specified in IS:2026 part III.

7. TAPPING

Unless otherwise specified all transformers shall be provided with off load tapings on +/-5% and +/-10% on primary.

8. CONNECTION

For the purpose of this standard the winding connections shall be in accordance with IS:2026 part - IV.

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9. IMPEDANCE

Unless otherwise specified transformers shall have the following impedances.

Up to and including 250VA	-	6%
Above 250VA up to and including 150KVA	-	4%
Above 150KVA up to 400 KVA	-	5%

The tolerance for the impedance values shall be +/-10%

10. TERMINAL MARKINGS

For the purpose of this standard the various terminal markings shall be as stated below

10.1 The windings of the transformers shall be denoted by HV & LV. HV refers to high voltage winding and LV refers to low voltage winding.

10.2 Line terminals shall be marked as

For 3 phase transformers
1U, 1V, 1W for HV windings and
2U, 2V, 2W for LV windings

For Single phase Transformers
P1, P2 for HV winding and
S1, S2 for LV winding

The markings shall be started from left hand-side as viewed for HV side.

Neutral Terminal shall be marked as 1N for HV side and 2N for LV side.

10.3 The tapings shall be marked with natural ascending sequence as shown in the figure-1. The tapings shall be through tap selector for all transformers rated above 250VA.

10.4 The rated voltage of the transformer shall be marked by the side of respective terminals.

10.5 Earthing terminals shall be marked with earthing mark ()

11. TERMINALS

All terminals except Bar type shall be of nickel plated Brass. Bar terminal shall be of pure copper of appropriate grade. Nut & Bolt shall be secured with vibration proof washers. The

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appropriate size of the terminals shall be as given in Table-III.

TABLE - III

Type of terminal	Current rating							
	5A	10A	20A	50A	100A	200A	300A	500A
Screw/Stud	M6	M6	M8	M10	M12	-	-	-
Bar	-	-	-	-	-	20X6 1 hole M8	25X6 1 hole M8	40X6 1 hole M12

Note: All the terminals including hardware shall be free from rusting. After tightening the bolt, minimum 3 threads of bolt shall project outside the nut. Adequate clearances between phases shall be ensured and indicated in the drawing. Proper fixing arrangement with insulators shall be provided to ensure same clearances for the entire quantity of a purchase order.

12. FITTINGS

All transformers shall be provided with following fittings

12.1 Rating plate:

Transformers shall be provided with rating plates of weatherproof material. Rating plate shall be fixed along the breadth of the transformer & a provision shall be made to fix it along the length of the adjacent side.

For transformer rated 250VA & below rating plate shall be fixed along the breadth

The rating plate shall be marked legibly with following markings

A. Transformers rated above 250VA

- 1) KVA rating
- 2) Voltage Ratio
- 3) HV/LV Current
- 4) Tapings
- 5) No. of Phases
- 6) Vector grouping
- 7) System Frequency
- 8) Insulation Level
- 9) Insulation Class

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- 10) % Impedance
- 11) Reference Standard : IS:2026
- 12) Ambient temperature
- 13) Weight
- 14) Sl. No. & Year of manufacture
- 15) Manufacturer Name

B. Transformers rated below 250VA

- 1) KVA rating
- 2) Voltage ratio
- 3) Phase
- 4) Connection
- 5) Insulation class
- 6) Frequency

12.2 Diagram Plate:

Transformers shall be provided with diagram plate and shall be fixed along the breadth along with rating plate. It shall be legibly marked with a connection diagram.

12.3 Terminal board:

All the terminations of the transformers shall be brought out and fixed on the terminal board which is fixed on the top. The dimensions shall be as specified in corresponding Annexure for 1ph or 3ph transformer.

The material of the terminal board shall be of PRBC sheets (or any other better insulator) insulated and varnished. It shall be designated to take up the required torque. The terminals shall be rigidly fixed on the board with suitable fasteners, with adequate clearance as per table-IV.

Note: 8mm thick perspex cover shall be provided over the terminal board

TABLE -IV CLEARANCE DISTANCES

Rated Voltage	To earth in air (mm)	Between phases in air (mm)
415V	15.8	19.0
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12.4 Lifting lugs:

Lifting lugs shall be provided for transformers weighing more than 50Kgs. Two lifting lugs shall be provided at two ends diagonally opposite to each other for transformers weighing more than 50 Kgs but below 100 Kgs. For transformers weighing more than 100 Kgs four lifting lugs shall be provided at each end.

12.5 Earthing terminals:

Two earthing terminals shall be provided on all the transformers. The size of the earthing terminals may be less than the rated conductor size.

12.6 Top Supports

4 holes each of 12mm dia shall be drilled on the lower portion of the top frame of transformer, to facilitate rigid fixing to the enclosure. However, this shall be provided for transformers rated 10KVA and above. The details are shown in Fig.2.

Note: 'F' is taken approximately as 75% of 'B'

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The following are the materials recommended to be used for constructions of transformers

- A. Core: CRGO grade 41/51 or any equivalent grade.
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 - 2. Lightning impulse test
- B. Routine tests:
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 - 2. Voltage ratio test
 - 3. Check on vector grouping
 - 4. Measurement of losses : Load & No load loss
 - 5. Induced over voltage test
 - 6. Measurement of short circuit Impedance (% Impedance)
 - 7. High voltage test

15.2 Following are the test for control transformers

- A. Type test :
 - 1. Temperature rise test
- B. Routine test:
 - 1. Measurement of winding resistance
 - 2. Voltage ratio and polarity check
 - 3. Vector grouping test
 - 4. Measurement of loss: Load & No load loss
 - 5. Induced over voltage test
 - 6. Insulation resistance test.

15.3 The manufacturer shall submit the test certificates for tests on transformers.

16. ACCEPTANCE CRITERIA

16.1 Conducting Routine tests and Submission of reports

16.2 Inspection/Acceptance by BHEL-EDN Quality Services

16.3 Conducting Type tests and Submission of reports (On one transformer)

16.4 Test certificates for major bought out items

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Following information are to be supplied by the supplier

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17.2 Flux density in the core

17.3 Current density of the coil : HV & LV

17.4 Winding resistance

17.5 Supplier shall submit 6 copies of test guarantee certificates along with the materials

17.6 Transformers shall be suitably packed in wooden carters such that no damage is caused during transportation and handling.

Annexure-1
SINGLE PHASE TRANSFORMER

TYPE	KVA	A	B	C	KXE	O	X	Y
ST-1	0.05	100	130	85	80X60	5X10	95	85
ST-02	0.10	120	130	90	80X60	5X10	95	90
ST-03	0.15	120	150	90	95X60	5X10	115	90
ST-04	0.20	120	175	100	95X75	6X12	115	100
ST-05	0.25	120	175	100	95X90	6X12	115	100
ST-06	0.30	120	175	125	95X100	6X12	120	125
ST-07	0.50	150	190	150	125X100	8X15	150	145
ST-08	0.75	200	250	150	150X120	8X15	185	150
ST-09	1.00	200	250	160	160X130	8X15	185	160
ST-10	1.25	200	250	160	160X130	8X15	185	160
ST-11	1.50	280	300	175	160X130	10	200	160
ST-12	2.00	280	300	175	180X130	10	220	160
ST-13	3.00	300	350	200	200X150	10	220	180
ST-14	4.00	320	360	200	240X150	10	220	180
ST-15	4.50	320	400	200	240X170	10	250	200
ST-16	4.50	350	450	200	240X170	10	250	200
ST-17	5.00	350	450	200	240X170	10	250	200
ST-18	6.00	350	475	200	260X170	10	300	200
ST-19	7.50	350	500	240	290X200	10	300	250
ST-20	10.00	400	500	240	290X200	10	300	250
ST-21	12.50	400	600	250	330X200	10	300	250
ST-22	15.00	450	600	250	250X200	10	300	250
ST-23	25.00	500	600	250	400X200	10	300	250

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Annexure-2
THREE PHASE TRANSFORMER

TYPE	KVA	A	B	C	KXE	O	X	Y
TT-01	0.25	250	220	150	150X100	10	230	120
TT-02	0.05	280	250	190	200X150	10	250	150
TT-03	1.00	300	280	200	200X150	10	280	160
TT-04	1.50	300	320	200	200X150	10	300	180
TT-05	2.00	320	300	200	200X150	10	300	180
TT-06	2.50	340	350	200	200X150	10	300	180
TT-07	3.00	380	350	200	200X150	10	350	180
TT-08	4.00	400	425	250	250X200	10	350	180
TT-09	5.00	450	425	250	250X200	10	350	200
TT-10	6.00	450	480	250	250X200	10	350	200
TT-11	7.70	450	480	250	250X200	10	350	200
TT-12	10.00	500	525	250	300X200	10	400	250
TT-13	12.50	620	550	250	350X200	10	450	250
TT-14	15.00	620	600	250	350X200	10	450	250
TT-15	20.00	650	600	300	400X250	10	450	250
TT-16	25.00	650	600	300	400X250	10	450	250
TT-17	30.00	700	600	300	400X250	10	450	250
TT-18	35.00	700	600	300	400X250	10	450	250
TT-19	40.00	700	650	300	400X250	10	450	250
TT-20	45.00	700	650	300	400X250	10	450	250
TT-21	50.00	750	650	300	450X250	10	500	300
TT-22	55.00	750	700	300	450X250	10	500	300
TT-23	60.00	750	700	300	450X250	10	500	300
TT-24	65.00	750	800	300	450X250	10	500	300
TT-25	75.00	800	850	300	500X300	10	600	300
TT-26	80.00	800	850	350	500X300	10	600	300
TT-27	100.00	850	900	350	550X300	10	600	300
TT-28	135.00	850	900	400	550X300	10	600	300
TT-29	160.00	1000	1000	400	600X400	10	600	400
TT-30	200.00	1100	1250	450	650X500	12	700	550
TT-31	250.00	1150	1400	600	650X550	12	700	550
TT-32	300.00	1200	1600	600	700X600	12	750	600
TT-33	350.00	1300	1700	650	800X600	12	800	650
TT-34	400.00	1400	1750	750	800X630	12	850	650

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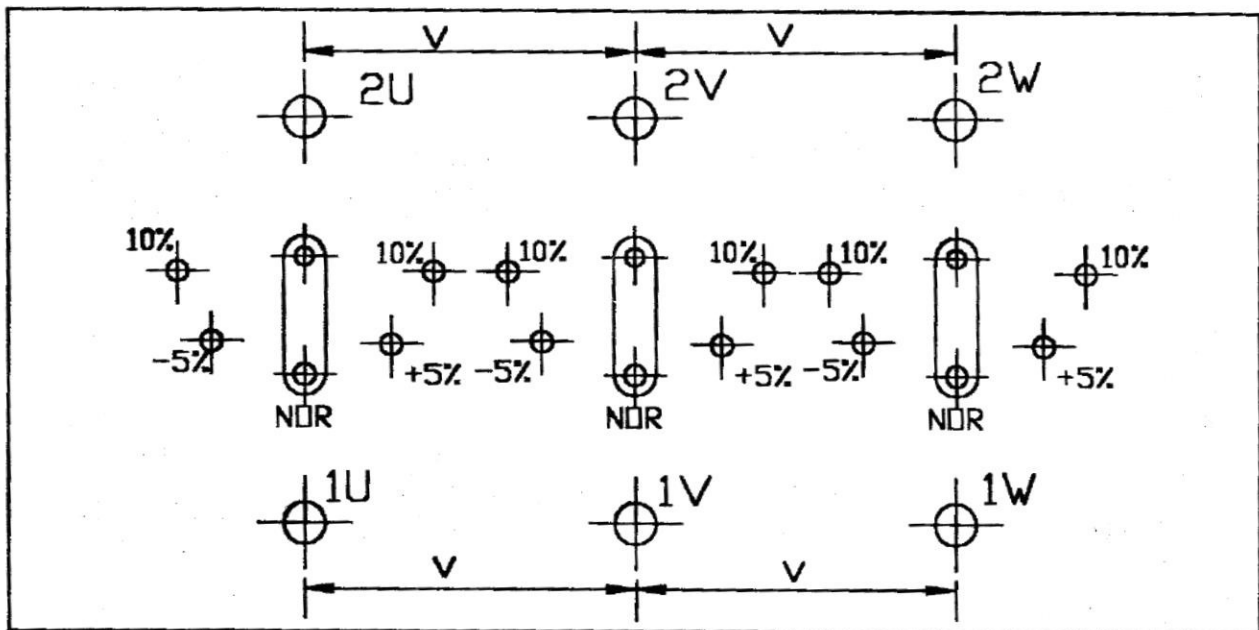
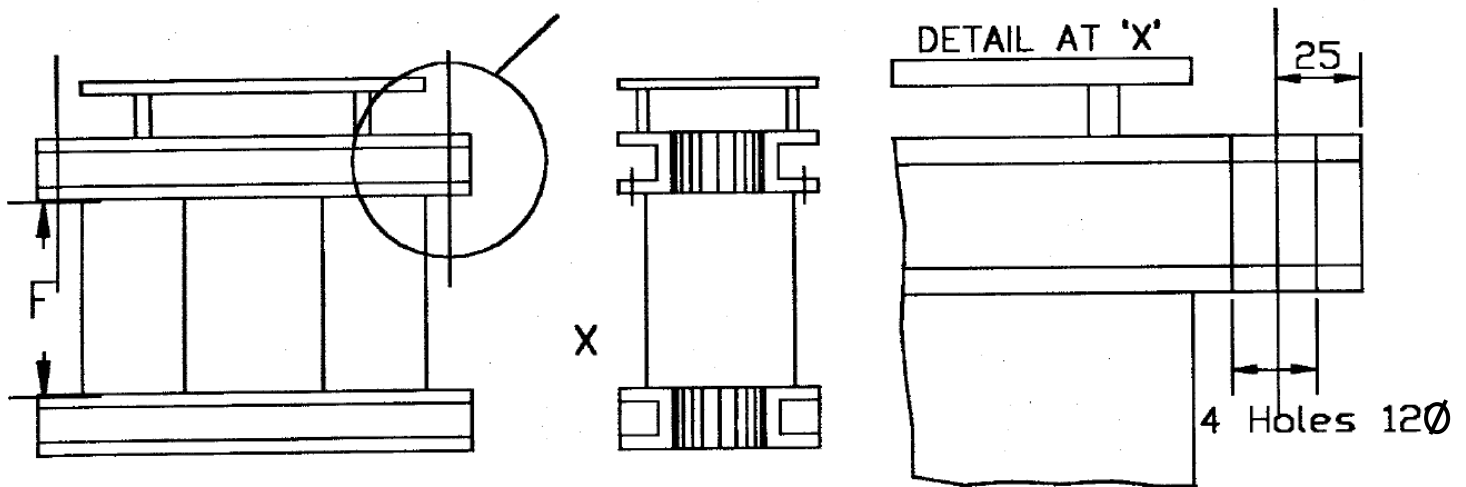


Fig. 1

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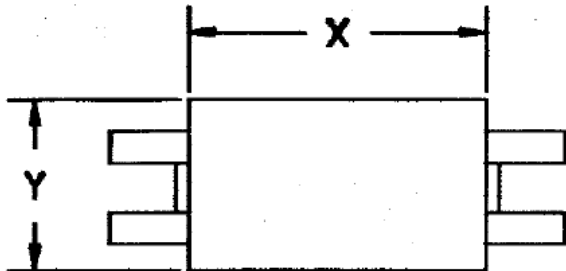
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FIG - 2

Note: 'F' is taken approximately as 75% of B

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SINGLE PHASE TRANSFORMER

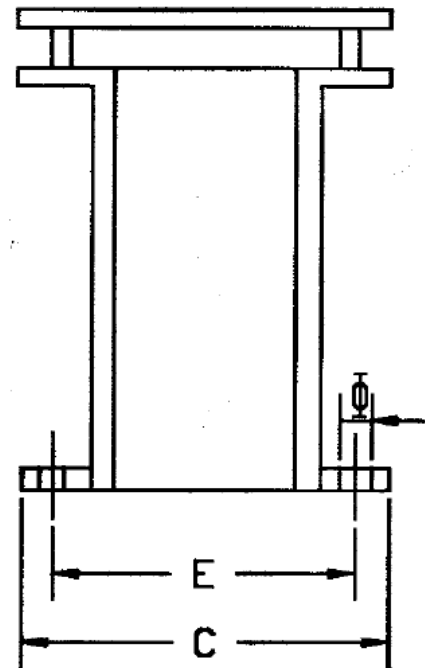
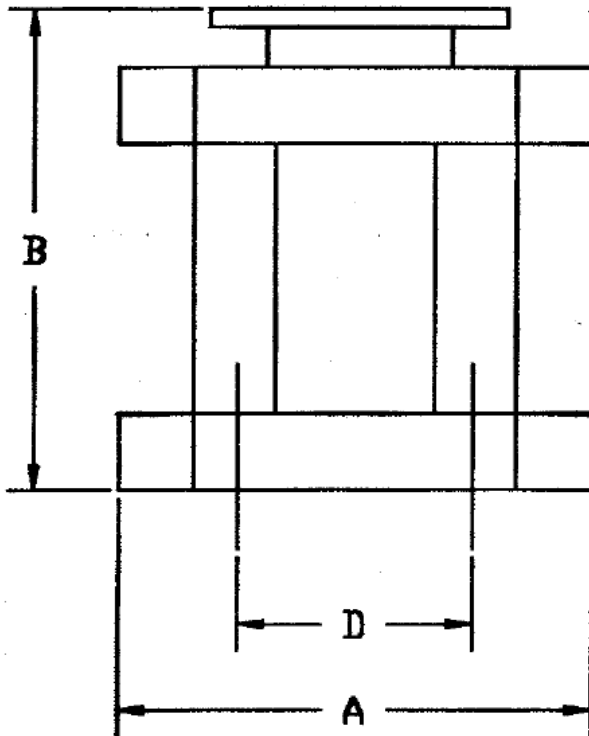


FIG - 3

NOTE: The tolerances for various dimensions shall be as per IS:2102 'coarse'

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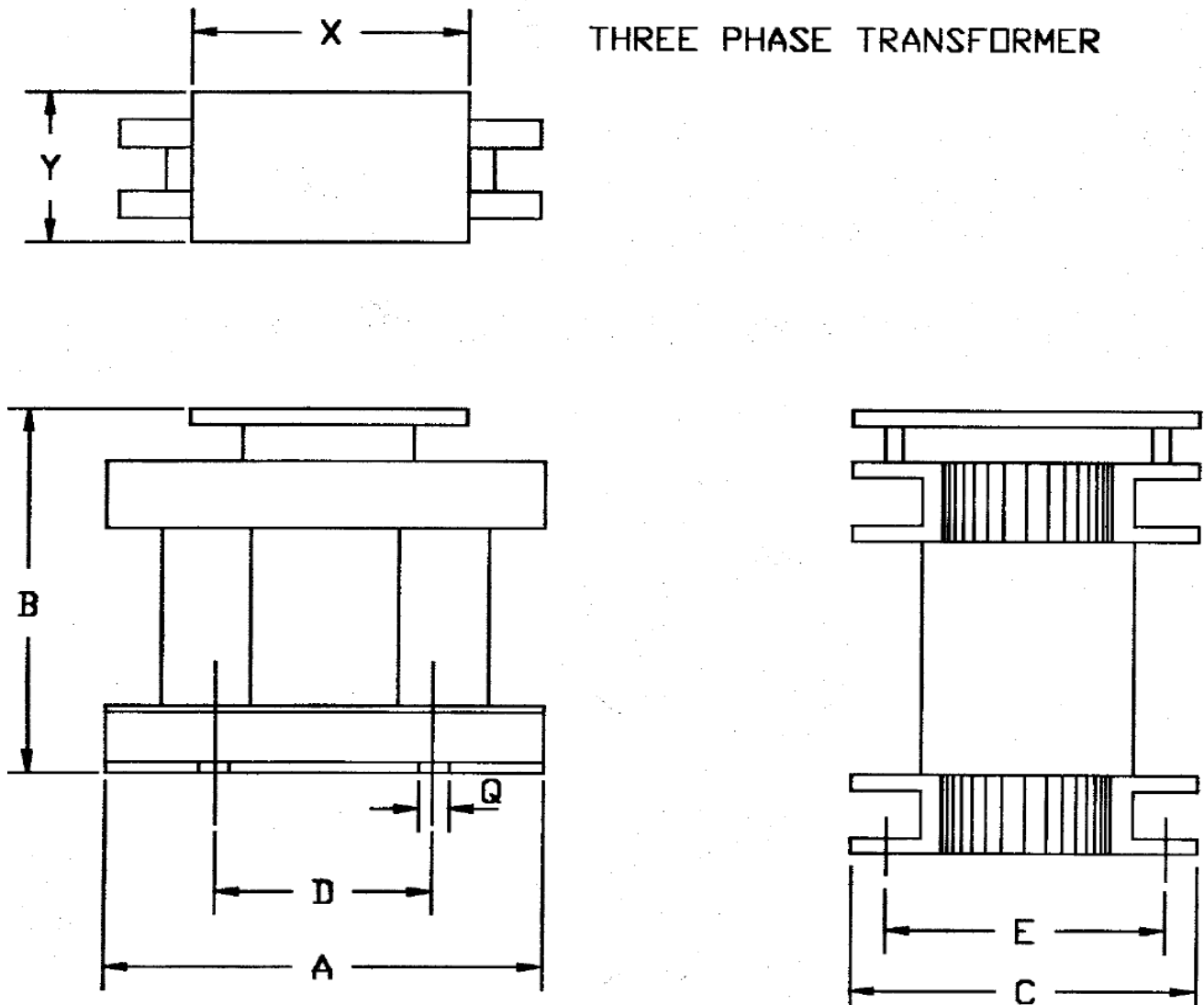


FIG - 4

NOTE: The tolerances for various dimensions
shall be as per IS: 2102 'coarse'

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