


REQUEST FOR QUOTATION

	BHARAT HEAVY ELECTRICALS LIMITED Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	RFQ NUMBER: ANK0000206 RFQ DATE : 27.12.2018	Due Date/Day: 18.01.2019 FRI Time : 13:00 HRS Tender Box : Reception Area Opening Venue: NEW ENGG. BLDG
MMI:PU:RF:003	(address for communication) :		
		(for all correspondence) Purchase Executive : Ankita Reja Phone : 08025146134 Fax : E-mail: ankitareja@bhel.in	


1. Please drop your offer before due date & time in the tender at the reception of BHEL-ESD, Electronic city-1, Bangalore.
2. Offers by e-mail are also accepted. The offers by Email shall be sent to Email ID defnesdmm@bhel.in with subject line RFQ: ANK0000206.
3. Quotations and Items Items should be delivered to:
 BHEL-ESD,
 PLOT NO 98,
 ELECTRONIC CITY PHASE 1,
 HOSUR ROAD,
 BANGALORE-560100,
 KARNATAKA.
4. The following are the attachments along with the RFQ:
 - RFQ Special instructions
 - Pre-Qualification Criteria & Purchase Specification Ref: PS/460/020 dtd.21.12.2018
 - Commercial clarifications sheet (To be submitted along with offer)
 - Unpriced bid format (Price bid to be submitted in this format. Unpriced bid should be submitted as part of Part-I bid)
 - Instructions to Bidders and General Commercial Conditions of Contract

SI No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	DR0491227040 POWER TRANSFORMER 5 kVA * HSN/SAC : Power Transformer Dry Type 5 kVA, 350V/230V & 230V Single Phase, 50Hz, HV: Primary : 350 V Primary taps ± 5%, ± 10% LV: Secondary 1: 230v @3.5kVA Secondary 2: 230v @1.5kVA, Class B insulation Screen between primary and secondary. Screen to be brought out separately. Impedance: 4% Insulation level: 3kV Reference standards: IS2026 & IS11171 Natural Air cooling Ambient temperature of 55 deg C Terminal details: P1: 0 V P2: 350 V 1S1: 0 V 1S2: 230 V 2S1: 0 V 2S2: 230 V Std: ED 7461195 Polycarbonate sheet 8mm thick above terminals. Info required with offer: Dimensional drawing Maximum allowable dimensions are as below: Overall Dimensional(W*L*H)=	159	NO	159	15.02.2019

TWO PART BID - SUBMIT TECHNICAL AND PRICE BID IN SEPARATE SEALED COVERS

NOTES : 1.This RFQ is Governed by : a)INSTRUCTIONS TO BIDDERS/SELLERS(Doc No :BHEL:EDN:ITB-SHOP) available at www.bheledn.com (RFQ-PO Terms & Conditions) b)GENERAL CONDITIONS OF CONTRACT FOR PURCHASE(Doc no :BHEL:EDN:GCC-SHOP) available at www.bheledn.com (RFQ-PO Terms & Conditions) c)Any other specific Terms and Conditions mentioned. 2. Bidders / Representatives who would like to be present during opening of offers are required to furnish authorization letter for the same . * The HSN/SAC no mentioned against the line items in the RFQ are indicative only.	For and On behalf of BHEL. Ankita Reja Control Equipment 1 OF 2
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 - Instructions to Bidders and General Commercial Conditions of Contract

SI No.	Description	Qty	Unit	Delivery qty	Delivery Date
	(230*320*400)and Mounting pitch dimension (W*L)=(170*185) All dimensions are in mm.				

Total Number of Items - 1

- 1.
- 2.

TWO PART BID - SUBMIT TECHNICAL AND PRICE BID IN SEPARATE SEALED COVERS

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For and On behalf of BHEL.

Ankita Reja
Control Equipment

2 OF 2

RFQ No. ANK0000206 - SPECIAL INSTRUCTIONS

1. This RFQ is issued for entering into rate contract with BHEL for 159 no's Power Transformers 5kVA.
2. BHEL may consider an additional qty of $\pm 10\%$ of 159 nos.
3. Validity of this Rate contract will be for 1 year from the date of award of the contract.
4. The prices and other terms and conditions agreed upon shall remain firm till the validity of the rate contract or till completion of supplies against the purchase orders placed against this rate contract, whichever later.
5. RFQ qty is the projected quantity for 1 year. Purchase orders shall be placed as and when actual requirements arise during the tenure of this rate contract.
6. The quotation has to be submitted in TWO parts
 - i. PQC, Purchase specification, Techno-commercial unpriced bid AND
 - ii. Price bidSeparately against this RFQ. The PQC and Techno-commercial bids will be opened on the due date specified and shall be evaluated such that all technical and commercial issues are frozen. The date and time of opening of price bids will be intimated to the bidders whose techno-commercial bids are accepted.
7. Offers by e-mail are also accepted. Offers by e- mail to be sent to defnesdmm@bhel.in.
8. Validity of the offer should be 90 days for entering into Rate contract.
9. Offer shall be liable for rejection in case of non-acceptance for entering into a Rate Contract.
10. Delivery time shall be 04 weeks from the date of purchase order.
11. Warranty shall be for 12 months from the date of supply of items.
12. Quotations and items should be sent to:

BHEL - ESD, plot no. #98, electronic city phase 1, Hosur road, Bangalore- 560100.



**PRE-QUALIFICATION CRITERIA &
PURCHASE SPECIFICATION**

PS/460/020

Rev 00

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**PRE-QUALIFICATION CRITERIA
& PURCHASE SPECIFICATION FOR
POWER TRANSFORMER DRY TYPE**

REVISION 00

APPROVED

Baradw

PREPARED

Devrat

ISSUED

J. Singh

DATE

21-12-18



PRE-QUALIFICATION CRITERIA & PURCHASE SPECIFICATION

PS/460/020

Rev 00

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REVISION HISTORY SHEET

REV NO	DATE	NATURE OF CHANGE	REASON	PREPARED BY	APPROVED BY
00	21-12-18	First Issue	-	V.V.VENKAT	P.BARADHI

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PRE-QUALIFICATION CRITERIA & PURCHASE SPECIFICATION

PS/460/020

Rev 00

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Pre-Qualification Criteria & Purchase Specification For Power Transformer dry type (BHEL P/N. DR0491227040)

1.0 Pre-Qualification Criteria (PQC)

The supplier shall necessarily meet the following conditions.

Sl. No	Particulars	Supplier's Confirmation (Y/N)
1	The vendor shall be an Original Equipment Manufacturer (OEM) or OEM's authorized dealers/representative. <i>A latest valid authorization letter from OEM giving full contact details shall be furnished along with offer (by dealer/ representative).</i>	
2	Offer shall be for new equipment and not for any refurbished or used equipment. All the parts used in the equipment shall be new and not used / refurbished ones. <i>A declaration to that effect to be furnished along with offer.</i>	
3	The vendor or vendor's authorized service representatives shall have trained personnel for service for the offered equipment and shall be in a position to provide prompt after sales service. This service network shall necessarily be available in India. <i>A declaration to that effect to be furnished along with offer.</i>	

Note:

- 1) The Pre-Qualification Criteria (PQC) are mandatory requirements and the technical bid will be considered only if all the above PQC are met.
- 2) All Supporting documents related to PQC shall be enclosed in techno-commercial offer.

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PRE-QUALIFICATION CRITERIA & PURCHASE SPECIFICATION

PS/460/020

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2.0 Technical Requirements

- 1) Power Transformer Dry Type 5 kVA, 350V/230V & 230V Single Phase, 50Hz.
- 2) HV: Primary : 350 V, Primary taps $\pm 5\%$, $\pm 10\%$
- 3) LV: Secondary 1: 230V @3.5kVA
- 4) LV: Secondary 2: 230V @1.5kVA
- 5) Class B insulation Screen between primary and secondary. Screen to be brought out separately.
- 6) Impedance: 4% Insulation level: 3kV
- 7) Reference standards: IS2026 & IS11171
- 8) Ambient temperature of 55 deg C (Natural Air Cooling)
- 9) Terminal details: P1: 0 V P2: 350 V 1S1: 0 V 1S2: 230 V 2S1: 0 V 2S2: 230 V
- 10) Std: ED 7461195
- 11) Polycarbonate sheet 8mm thick above terminals.
- 12) Dimensional drawing (To be submitted along with the technical offer)

Maximum allowable dimensions are mentioned below:

Overall Dimensional (W*L*H) = (230*320*400)

Mounting pitch dimension (W*L) = (170*185)

Note: All dimensions are in mm.
- 13) Routine Tests (Reports are to be submitted along with the items)
 - (i) Verification of terminal marking and polarity.
 - (ii) Power frequency dry withstand tests on primary windings.
 - (iii) Power frequency dry withstand tests on secondary windings.
 - (iv) Over-voltage inter-turn test.

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BHEL

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PLANT STANDARD
ELECTRONICS DIVISION

ED 746 11 95

REV NO 02

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REVISION HISTORY SHEET

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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.1.2,4.1,4.3 &12.3 Revised	F.B. (GHC) CE\GHC\2003 STDS\KVBR Dt.10/07/03	HRN	NS

APPROVED :
N. SRIDHARAN



PREPARED : HRN ISSUED : STDS GROUP DATE : 14/07/03

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SPECIFICATION FOR POWER AND CONTROL TRANSFORMER

1.0 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

2.0 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

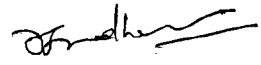
3.0 SERVICE CONDITIONS

- 3.1 Max ambient temp : 50⁰C
- 3.2 Cooling : Air natural
- 3.3 Humidity : 100 percent
- 3.4 Ventilation : Restricted as it is mounted inside a cubicle (1P 21)

4.0 RATING

- 4.1 KVA Rating :
The rated KVA assigned taking into account the service condition as specified in 3.0
The following shall be the preferred rated KVA

REVISIONS:

APPROVED: 
N. SRIDHARAN

PREPARED: BS, NS ISSUED: STDS.GROUP, DATE: 23/07/96.

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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, 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

SlNo.	Rating	Value
1	up to 1KVA	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%.

5.0 TEMPERATURE RISE

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

6.0 INSULATION LEVELS

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

7.0 TAPPING

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

8.0 CONNECTION

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

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9.0 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%

10.0 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 ()

FIG-1

11.0 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 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	-

12.0 FITTINGS

All transformers shall be provided with following fittings

12.1 Rating plate :
 Transformers shall be provided with rating plates of weather proof 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

- 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 annexure.

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.II.

FIGURE 2

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

13.0 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.

14.0 DIMENSIONAL DETAILS

All transformers should conform to dimensions specified in Annexure. 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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15.0 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. Check on % 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.

16.0 SUPPLY CONDITIONS

Following information are to be supplied by the supplier

16.1 Iron and copper losses at specified temperature

16.2 Flux density in the core

16.3 Current density of the coil : HV & LV

16.4 Winding resistance

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

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

FIGURE 3

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

FIGURE 4

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



PLANT STANDARD
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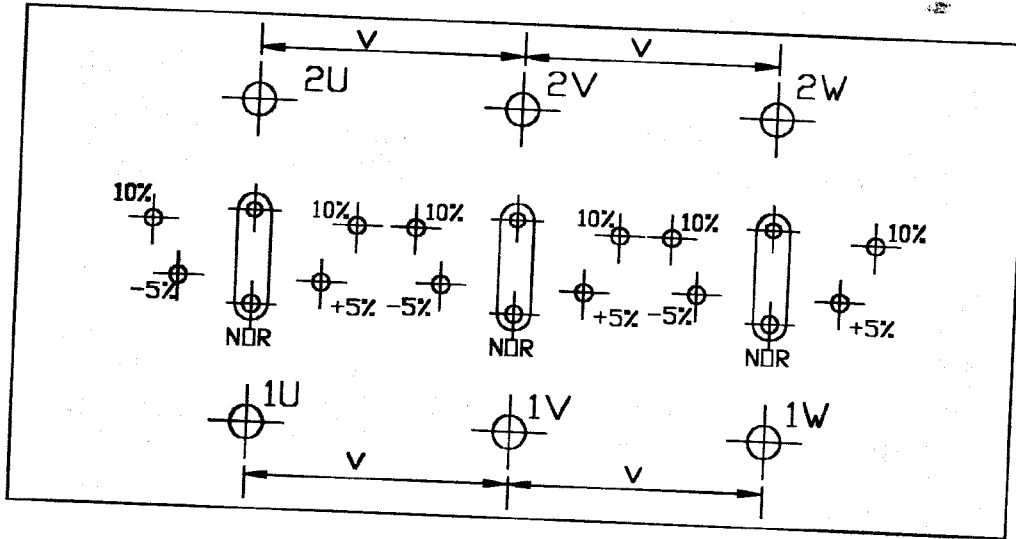


Fig. 1

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ELECTRONICS DIVISION

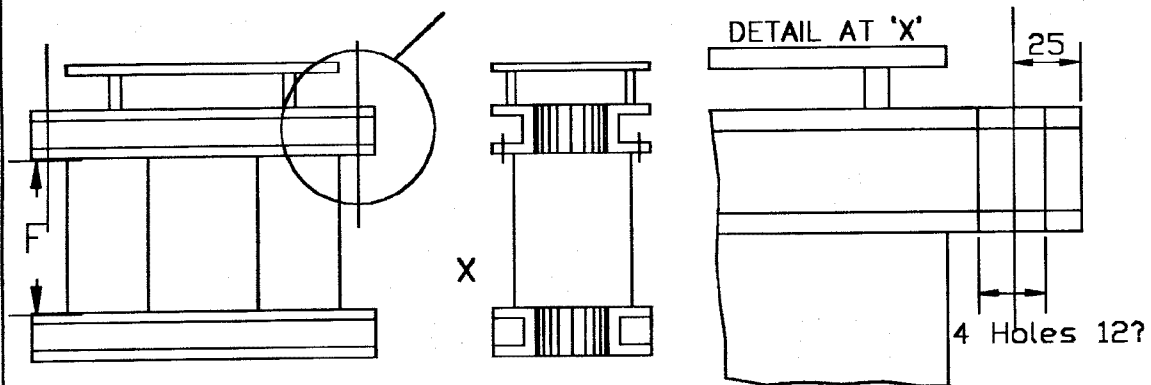
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FIG - 2



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



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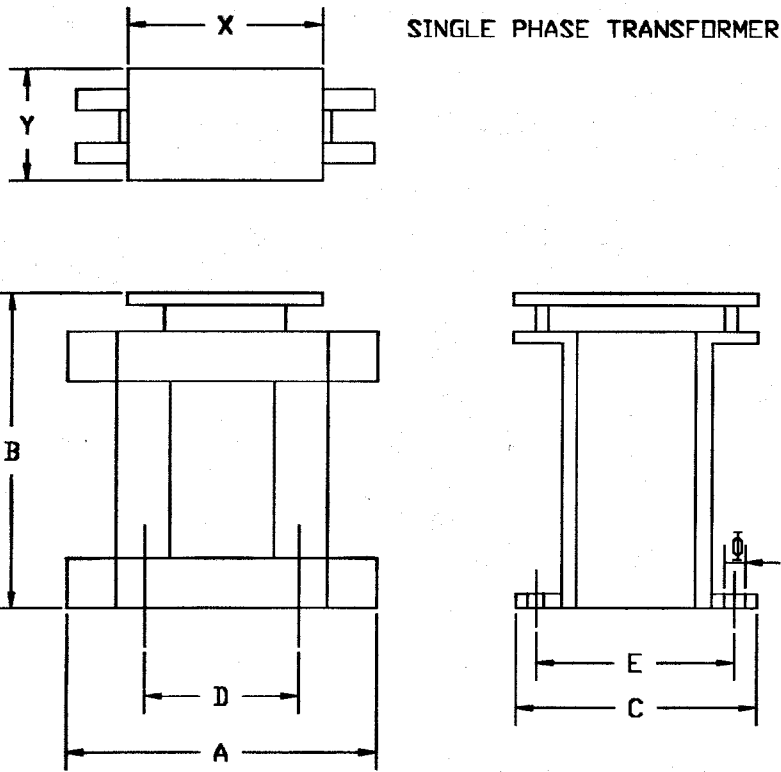
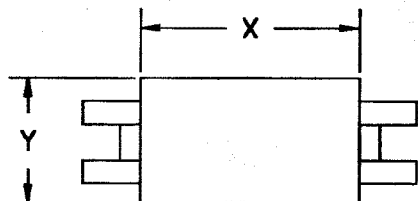


FIG - 3

NOTE: The tolerances for various dimensions shall be as per IS2102 'coarse'



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THREE PHASE TRANSFORMER

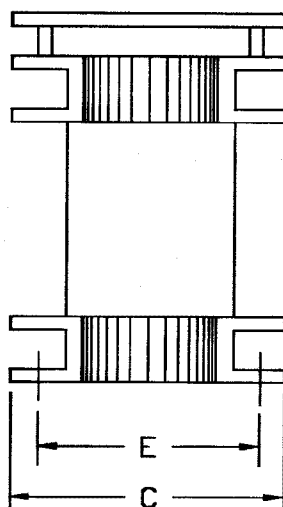
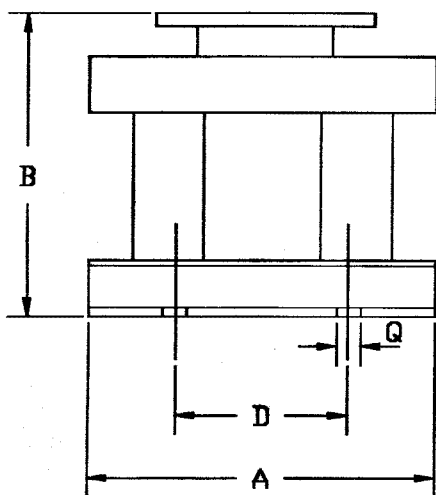


FIG - 4

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

Commercial Terms Discussion For ANK000206 (Power Transformer 5kVA)

Sl. No.	BHEL Terms	Complied (Yes/No)	Remarks
1	Payment Terms (100% within 45 days after receipt and acceptance of material)		
2	Penalty (0.5% per week on the basic value of the undelivered quantity max upto 10%)		
3	Delivery time 4 weeks from the date of PO		
4	Price Firm (PVC not acceptable- Prices should be firm till execution of order)		
5	Packing And Forwarding By Supplier		
6	Free Door Delivery at BHEL ESD, Electronic City		
7	Offer Validity (90 days from the tender opening)		
8	Validity of Rate Contract 1 year from the date of award of the contract		
9	Taxes & duties to be mentioned in offer (Applicable GST%)		
10	HSN Code		
11	Warranty 12 months from the date of supply		
12	Documents to be submitted along with offer		
a	Datasheets / Catalogues		
b	Distributor's authorisation certificate, if any		
13	Documents to be submitted along with supply of items. Confirmation for the same is required in technical offer.		
a	Test certificate/ Repots		
b	Datasheets / Catalogues		
c	Warranty Certificate		

PRICE BID

Price bid - ANK0000206

Sl. No.	Description	Quantity (No)	Currency	Unit Price	Total Price	Remarks
1	DR0491227040 Power Transformers 5kVA	159				
2	GST (if applicable indicating %)	159				
A	Total cost including equipment and applicable taxes (in figures)	159				
	Total cost including equipment and applicable taxes (in words)					