


# REQUEST FOR QUOTATION

	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	<b>RFQ NUMBER:</b> AKSPROP073  <b>RFQ DATE :</b> 24.11.2023	<b>Due Date/Day:</b> 12.12.2023 TUE <b>Time</b> : 13:00 HRS <div style="background-color: black; height: 20px; width: 100%; margin-top: 5px;"></div> <div style="background-color: black; height: 20px; width: 100%; margin-top: 5px;"></div>
<b>MMI:PU:RF:003</b>			
(address for communication) :		(for all correspondence) <b>Purchase Executive :</b> ABHISHEK <b>Phone :</b> 26998102 <b>Fax :</b> 00918026989215 <b>E-mail:</b> singh.abhishek@bhel.in	

1) This RFQ is for entering into Rate contract (RC) with BHEL for the tendered item. Validity of the RC will be 1 year from the award of rate contract. Firm orders will be placed during the tenure of rate contract. Prices will remain firm till the validity of RC or till the completion of supplies against the Purchase Orders placed against this rate contract whichever is later. Please note that these quantities are projections based on the current business scenario and expected orders from customers. In the eventuality of business not coming through, BHEL is not obligated to exhaust the ordering of RC quantities.

2) Reverse Auction Clause: BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on [www.bhel.com](http://www.bhel.com)) for this tender. RA shall be conducted among all the techno-commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.

Sl No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	TI0668100567 LOW VOLTAGE LINE TRANSFORMER 200V 5V 10W * HSN/SAC : 3921 <div style="background-color: black; height: 20px; width: 100%; margin-top: 5px;"></div> <div style="background-color: black; height: 20px; width: 100%; margin-top: 5px;"></div> LOW VOLTAGE LINE TRANSFORMER 200V 5V 10W Article Number: <div style="background-color: black; height: 20px; width: 100%;"></div>  As per Specification PS4452545 Rev No 00	500	NO	500	<div style="background-color: black; height: 20px; width: 100%;"></div>

Total Number of Items - 1

- 1.
- 2.

## NOTES:


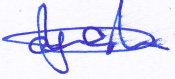

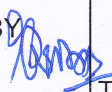
1. This RFQ is governed by:
  - a) INSTRUCTIONS TO BIDDERS/SELLERS and GENERAL CONDITIONS OF CONTRACT FOR PURCHASE available at <http://edn.bhel.com> (RFQ-PO Terms & Conditions)
  - b) Any other specific Terms and Conditions mentioned.

\* The HSN/SAC no mentioned against the line items in the RFQ are indicative only.

For and On behalf of BHEL.

ABHISHEK  
Control Equipment

1 OF 1

COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in anyway detrimental to the interest of the company.		<b>PREQUALIFICATION CRITERIA (PQC)</b>		<b>Ref: 445/PQ_LVT/21</b>
		<b>FOR LV TRANSFORMER</b>		<b>Rev. No.: 00</b>
		<b>GROUP: TRACTION ENGINEERING</b>		<b>Page 1 of 1</b>
<b>1.0 PRE QUALIFICATION CRITERIA (PQC)</b>				
1. The Bidder should be Supplier of Low Voltage Transformer for traction equipment's. 2. The supplier should have supplied at least 200 nos of Low voltage transformer for traction applications in the last 5 years and are performing satisfactorily in field.				
<b>2.0 DOCUMENTS SUBMISSION</b>				
1. Bidder to submit clause by clause compliance to complete technical specification (Technical specification no. PS4452545 Rev. No.00, dated 24-12-2015) along with copy of type test report mentioned in the specification 2. Should possess a valid type test report conducted as per relevant standards mentioned in the specification with respect to time during the bid submission. 3. Proof of supply of Low Voltage Transformer used in traction applications directly or through any agency to Indian Railways during the last 5 years to be submitted. 4. For the vendors already qualified and added in the source list, the above points are not applicable				
<b>3.0 REFERENCE DOCUMENTS</b>				
a) Purchase Specification No PS4452545 Rev. No. 00 for Low Voltage Transformer.				
REVISION      00		APPROVED BY AGOSH CHANDRAN R S 		
		PREPARED BY SADAT U K 	ISSUED BY TRACTION ENGG	DATE 1 <sup>st</sup> Feb 2021





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**PURCHASE SPECIFICATION**  
**GROUP: TRACTION ENGINEERING**

P.S NO. : PS4452545

REV. NO: 00

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**SPECIFICATION FOR LOW VOLTAGE TRANSFORMER**

Code No. TI0668100567

**REVISION HISTORY SHEET**

REV. NO.	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
00	24.12.2015	FIRST ISSUE		B. Haribhushan	Shekar R.

REVISIONS

00

APPROVED BY

PREPARED BY

ISSUED BY

DATE

TRACTION ENGG.

24.12.2015

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**PURCHASE SPECIFICATION**  
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P.S NO. : PS4452545

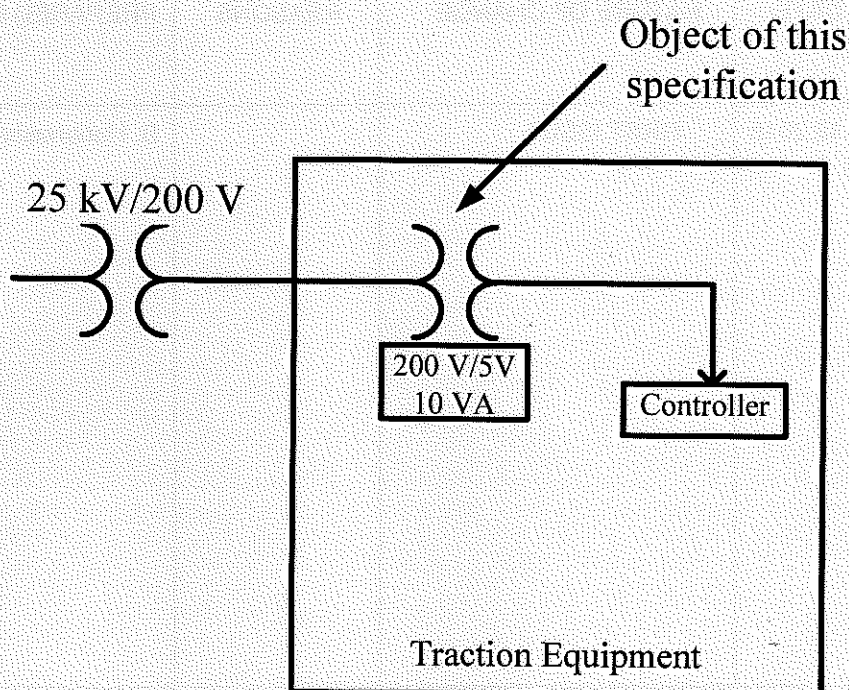
REV. NO: 00

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**SPECIFICATION FOR LOW VOLTAGE TRANSFORMER**

**1.0 Functional requirements:**

This document covers specification of a Low Voltage Transformer, to be used as a synchronizing transformer in an IGBT based equipment. The Inductor will be mounted in a cabinet/enclosure and will be used in traction applications for on board mounting. The block diagram is shown below.



**2.0 APPLICATION :** Synchronizing transformer

**3.0 TYPE :** Dry Type, Air natural cooling

**4.0 REFERENCE STANDARDS:**

IEC 60044-2

Instrument transformers - Part 2 : Inductive voltage transformers

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## PURCHASE SPECIFICATION

GROUP: TRACTION ENGINEERING

P.S NO. : PS4452545

REV. NO: 00

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## SPECIFICATION FOR LOW VOLTAGE TRANSFORMER

## 5.0 ENVIRONMENTAL CONDITIONS:

- 5.1 Ambient Temperature : 55°C  
5.2 Maximum Temperature : 70°C (when locomotive standing dead under sun)  
55°C (when locomotive working)  
47°C Nominal  
5.3 Relative Humidity : up to 95% any moisture condensation during operation shall not lead any damage or failure  
Yearly average  $\leq$  75% Rel. Humidity  
5.4 Altitude : up to 1200 m above mean sea level  
5.5 Atmosphere during hot weather: Extremely dusty and desert terrain in certain areas. The dust concentration in air may reach a high value of 1.6mg/cub meter.  
5.6 Air Pollution : The equipment shall be designed to work in coastal area in humidity and salt laden corrosive atmosphere. The maximum values will be as follows  
(a) Maximum pH Value : 8.5  
(b) Sulphate : 7mg/liter  
(c) Maximum concentrate of chlorine: 6mg/liter  
(d) Maximum conductivity: 130 $\mu$ Siemens/m  
5.7 Climate : Tropical, Hot and humid Climate

## 6.0 ELECTRICAL REQUIREMENTS

- 6.1 Nominal primary voltage: 200 V<sub>rms</sub>  
6.2 Nominal input frequency: 50Hz  
6.3 Nominal secondary voltage: 5 V<sub>rms</sub>  
6.4 Nominal output power: 10 VA  
6.5 Phase difference between input and output voltage: 0°  
6.6 Maximum primary voltage: 300 V<sub>rms</sub>  
6.7 Operating Temperature: -40°C to 70°C

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**PURCHASE SPECIFICATION**  
**GROUP: TRACTION ENGINEERING**

P.S NO. : PS4452545

REV. NO: 00

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**SPECIFICATION FOR LOW VOLTAGE TRANSFORMER**

**7.0 CONSTRUCTION**

**7.1 Core:**

Electrical steel should be CRGO with grade of M4 or better along with test certificate.

**7.2 Winding:**

Windings to be of electrolytic Grade copper conductor

**7.3 Cooling Type:**

Natural Air Cooling

**7.4 Insulation:**

Class H, all windings to be uniformly insulated

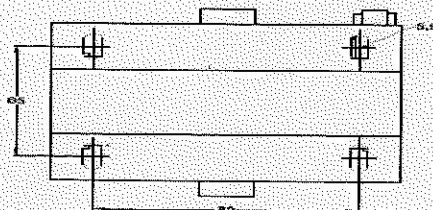
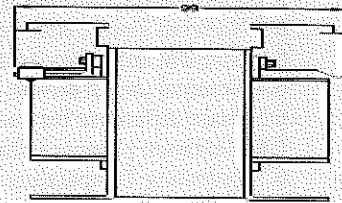
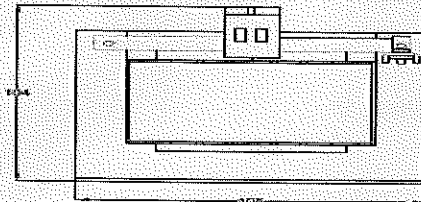
**7.5 Impregnation:**

Low voltage transformer assembly impregnated under vacuum with epoxy based resin for achieving high hygroscopic acid & alkali resistant insulation. The complete winding should have smooth finish after impregnation to ensure high Mechanical strength. Thickness of the resin should be uniform. The insulation should be self-extinguish type.

**7.5 Termination:** As per existing transformer

**8.0 MECHANICAL DIMENSION LIMITATION**

The low voltage transformer dimensions (overall & mounting) shall not exceed the dimensions indicated in the below sketch. This sketch is given for guidance only for limiting dimensions



Supplier to prepare detailed drawing & submit to BHEL for approval before commencing manufacturing process

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*[Signature]*  
24/12/2015

PREPARED BY

*[Signature]*

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## PURCHASE SPECIFICATION

GROUP: TRACTION ENGINEERING

P.S NO. : PS4452545

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## SPECIFICATION FOR LOW VOLTAGE TRANSFORMER

## 9.0 TESTS TO BE CONDUCTED AT SUPPLIER'S WORKSPACE

Low Voltage Transformer		
Name of the test	Routine test	Type test
Visual inspection	Yes	No
Functional test	Yes	No
Dielectric test	Yes	No
Phase angle difference test	Yes	No
Hot operation test	No	Yes

## 9.1 Visual inspection:

Check of dimensions and terminations as per drawing

## 9.2 Functional test:

Voltage ratio to be checked and it should be maintained constant from 125 V<sub>rms</sub> to 248 V<sub>rms</sub> of primary voltage at rated power output.

## 9.3 Dielectric test:

9.3.1 2 kV<sub>rms</sub>, 50 Hz for 1 minute duration between shorted input terminals and other points (Earth)9.3.2 500 V<sub>rms</sub>, 50 Hz for 1 minute duration between shorted output terminals and other points (Earth)

## 9.4 Phase angle difference test:

The phase angle displacement between the input and output voltage should be zero when measured with respect to same ground point.

## 9.5 Hot operation test:

The test 9.2 shall be repeated at the maximum ambient temperature.

## 10.0 TEST PROTOCOL

Supplier shall submit test protocol for Routine &amp; Type tests along with techno-commercial offer. List of tests are as per clause 5.0 of this specification.

## 11.0 DOCUMENTATION

12.1 Information required along with techno commercial offer without which offer is liable for rejection.


12.2 Supplier shall furnish clause wise confirmation/comments to the technical specification in the Typical format given below. Deviation, if any, shall be clearly brought out indicating the clause Number, original specification, deviation sought with proper technical backup (catalogue, Technical brochure, international standards, calculations etc.

If no deviations required, then supplier shall furnish certificate indicating "NO DEVIATION REQUESTED" and we comply fully with all the technical requirements of this specification no.

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## PURCHASE SPECIFICATION

GROUP: TRACTION ENGINEERING

P.S NO. : PS4452545

REV. NO: 00

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## SPECIFICATION FOR LOW VOLTAGE TRANSFORMER

- 12.3 Supplier shall take a copy of this specification and sign on each page and submit the signed copy along with offer.
- 12.4 Supplier shall furnish winding material, winding resistance, winding cross section.
- 12.5 Supplier shall furnish the type of core used along with technical details of core.
- 12.6 Information required after the placement of order
- 12.7 Detailed dimensional drawing for BHEL approval
- 12.8 Test protocol for BHEL approval.
- 12.9 Information required along with material supply.
- 12.10 Two sets of Test certificates.
- 12.11 BHEL engineer witnessed Pre inspection report.

## 12.0 ACCEPTANCE

- 13.1 Dimensions as per approved drawing
- 13.2 Routine test certificate
- 13.3 Type test certificate

## 13.0 PRE-SHIPMENT INSPECTION

Pre-shipment inspection will be carried out by BHEL engineer as per the approved test protocol. BHEL engineers will witness Routine & Type tests before dispatch.

## 14.0 RATING PLATE DETAILS

Weather proof Rating Plate (with following information) shall be fixed at a suitable position..

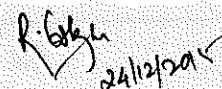
- 15.1 Rated Primary Voltage
- 15.2 Rated Secondary Voltage
- 15.3 Rated Power
- 15.4 Rated Current
- 15.5 Serial number
- 15.6 Month & Year of Manufacture
- 15.8 Ambient Temperature
- 15.11 Manufacturer' Name
- 15.12 Insulation level/Insulation Class
- 15.14 Rated Frequency
- 15.15 Type of Cooling

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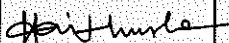
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