


REQUEST FOR QUOTATION

	BHARAT HEAVY ELECTRICALS LIMITED Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	RFQ NUMBER: AKSPROP122 <div style="background-color: black; width: 50px; height: 15px; margin: 5px auto;"></div>	<div style="background-color: black; width: 100px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 60px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 80px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 100px; height: 15px;"></div>
MMI:PU:RF:003			
(address for communication) :		(for all correspondence) Purchase Executive : ABHISHEK Phone : 26998102 Fax : 00918026989215 E-mail: singh.abhishek@bhel.in	

SI No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	TI0668105131 SPEED SENSOR as per PS4452635R1 * HSN/SAC : 3921 <div style="background-color: black; width: 400px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 330px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 160px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 320px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 160px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 370px; height: 15px;"></div> Test Certificate SPEED SENSOR WITH CURRENT OUTPUT OR VOLTAGE OUTPUT (STANDSTILL VOLTAGE) WITH TWO CONNECTORS : 1) POWER SUPPLY CONNECTOR : KPSE06E12-3S-DZ 2) SIGNAL CONNECTOR : KPSE06E14-5S-DZ COUNTER PART FOR ABOVE CONNECTORS WITH ADOPTOR RING FOR SHIELD TERMINATION 1) KPSE07E12-3P-DZ 2) KPSE07E14-5P-DZ EACH HAVING 2.65 METRE LENGTH OF CABLES(Minimum), AND MECHANICAL INTERFACE PLATE As per Specification PS4452635 Rev 01	1,500	NO	1,500	30.07.2025

Total Number of Items - 1 <hr style="border-top: 1px dashed black;"/> 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. <div style="background-color: black; width: 580px; height: 15px; margin-bottom: 5px;"></div> <div style="background-color: black; width: 240px; height: 15px;"></div> * 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

1. SCOPE

The Pre-Qualification Requirement document specifies the requirements to be met by the vendors (hereafter called Bidder) who wish to participate in the tender for supply of Active **Speed Sensor for rolling stock applications**.

This PQR should be read in conjunction with the Purchase Technical Specification **PS4452635 R01 dtd 06.03.2025**.

2. CREDENTIAL

- a) The Bidder should be Manufacturer or authorized dealer / supplier of – **Active speed sensor for traction motor** used in Rolling Stock applications. Documentary proof like relevant POs / invoice copies, valid authorization certificate etc shall be provided along with the offer.
- b) The Rolling Stock Applications under consideration shall include Locomotive, EMU, MEMU, Metro Trains, High Speed Trains, Train sets, Inspection Cars and Special Track Machines.
- c) For the vendors outside India, documentary proof for usage of the product in rolling stock applications shall be submitted. Acceptance of such certification shall be at BHEL's discretion.
- d) The Bidder should not be under the category of "hold" or "blacklisted" by any of the BHEL units/ any Govt of India PSU/ Govt of India/ statutory bodies of any state Govt as on date of bid submission. A declaration to this effect shall be submitted along with the offer.

3. QUALITY SYSTEM

- a) The manufacturer should have valid ISO 9001:2015 or latest certification covering the manufacturing and testing of the subject item
- b) The manufacturer should possess a clearly laid down quality Assurance Plan for the product covering the following aspects
Organization Chart, clearly indication the quality control set up
Qualification of key personnel and officials deployed in the quality control cell.
- c) Process Flow Chart indicating process of manufacture for an individual product or for a family of products, if the process is same.
- d) Quality Assurance System – Inspection and Testing plan to cover
 - Incoming material
 - Process control
 - Product control
 - System control
 - Testing facility
- e) Stage inspection details shall include the inspection procedure, inspection parameters, method of testing/ test procedure, sample sizes for destructive & non-destructive testing etc.
- f) Calibration scheme and status of calibration of test equipment
The process, testing and measuring equipment shall be duly calibrated by approved agency and the validity of calibration should be current.

4. GENERAL REQUIREMENTS

- a) It is preferred that the bidder is the manufacturer of this item. If the bidder is importing some portion of the components, then minimum value addition in India shall be 20%. Bidder to confirm this in the offer. Value addition less than 20% is not acceptable. A declaration to this effect shall be submitted along with the offer.
- b) The technical bid of bidders, which qualify technically but are not approved for the subject item by the Customer Approving Authority, shall be referred by BHEL to the customer Approving Authority for approval with intimation to the bidder. Consequent to the decision of Customer Approving Authority, the bidder shall be added to the vendor list of the subject item for future tenders. Concurrently BHEL shall consider placing developmental order on the bidder after accessing the capability of the bidder to manufacture / develop the subject item. However, BHEL shall treat the offer as “Not meeting” Pre-Qualification Criteria for the subject tender.
- c) The Customer Approving Authority shall be RDSO/CLW/BLW/PLW/ICF/RCF/MCF or any other agency as designated by the Customer.
- d) The bidder should possess a valid type test report, not older than five years, as per relevant standards mentioned in the specification with respect to time during the bid submission in case of catalog items. In case of custom made items, a bidder can submit the type test report of an item of similar or higher rating with a declaration for conducting the type test in case of award of order or developmental order. The bidder can also submit the test reports conducted in their own facility with the document of their lab accreditation. However, BHEL reserve it's right to insist on conducting the Type test again in a laboratory of it's choice.
- e) For the bid of vendors already qualified and appearing in BHEL's source list, the requirement of type test report and proof of supply shall not be applicable.

5. DOCUMENTATION TO BE SUBMITTED ALONG WITH OFFER

- a) Documentary proof for experience as per clause 2.a
- b) Clause by Clause compliance to the technical specification
- c) Declaration regarding status as per clause 2.d
- d) Declaration on MII (Make in India) as per clause 3.a
- e) Declaration for conducting Type Test as per clause 3.d



A4 — 12



PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. PS/445/2635

REV. NO: 01

PAGE 00 OF 09

REVISION HISTORY SHEET

REV. NO.	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
00	03.05.19	FIRST ISSUE		 Piyush	 V. Devanand
01	06.03.25	Revision 01	Connectors make updated		

THIS DOCUMENT IS A SPECIFICATION CUM DATA SHEET. VENDOR TO FILL UP ALL CONFIRMATIONS AND DATA AS REQUIRED AND SUBMIT THE SAME TO BHEL / EDN, BANGALORE. ANY DEVIATIONS TO THIS DOCUMENT TO BE BROUGHT OUT CLEARLY BY VENDOR.

APPROVED BY:

Prepared By:

ISSUED BY

Date

Agosh Chandran RS
Dy Mgr/Traction Engg

TE

03.05.2019



A4 – 10

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS/445/2635

REV. NO: 01

PAGE 01 OF 09

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.

SPECIFICATION FOR
Active Speed Sensor for Traction Motor for WAG-9, WAP-5 & WAP-7
Electric Locomotives



A4 – 11

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS/445/2635

REV. NO: 01

PAGE 02 OF 09

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.

1.0 INTRODUCTION:

The TM speed sensors proposed to be procured against this specification is intended to be used along with the IGBT based Propulsion System for 3 phase Electric Locomotives. The existing mechanical interface on the traction motor and electrical interface with the Traction Converter control system shall be retained without any change. It shall be possible to mount these sensors in the same allocated location of traction motor and there shall not be need for any electrical modification on the converter interface panel where the sensor signal terminates. The 3-phase locomotive uses the Traction Motor speed for calculation of the locomotive speed and travel direction in order to activate the speed limits, for constant speed control and more importantly for the adhesion control during starting and braking.

2.0 FUNCTION:

The active speed sensor is powered by the power supply generated in the existing loco control electronics and output pulse amplitude shall be maintained strong at constant levels even under very adverse conditions like ingress of grease, increase of air gap, misalignment of motor shaft etc. This active speed sensor can sense the speed right up to zero speed. The active speed sensor measures the speed on the Hall effect sensing principle and provides very accurate measurement almost till zero speed. The sensor shall be embedded in a Stainless Steel housing along with its electronics circuitry for pulse amplification and power circuit and signal conditioning. Two separate outputs shall be provided for each sensor. A toothed iron sensing wheel having 120 teeth shall be attached to the motor shaft. The sensor shall provide output pulses of 120 pulses per revolution of motor shaft.

3.0 OUTPUT

The sensor output pulses shall be proportional to the speed of the locomotive and the timing and amplitude shall match with the presently used converter electronics. The sensor shall provide 120 pulses for every rotation of the traction motor shaft. The output shall be protected against likely surges and transients, which may appear in the cable between the sensor and the converter electronics.

4.0 POWER SUPPLY

Power supply for active sensors shall be availed from the control electronics at 15V DC (nominal), which is subjected to variation as per IEC-60571. The power supply has to be routed through a separate cable and connector system. The sensor shall also be protected against likely transients and surges in the power supply.



A4 – 11

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS/445/2635

REV. NO: 01

PAGE 03 OF 09

5.0 SIGNAL & POWER SUPPLY CABLES AND INTERFACES

Each sensor shall provide two independent channels for signal and power, and each channel has to be taken on a separate shielded cable. The power supply shall be drawn through an independent cable. Both signal cables and power supply cables shall be of shielded type, minimum 2x1 sq.mm, highly flexible EB irradiated and suitable for outdoor traction applications. The signal cables shall be provided with a MIL-C-26482 standard bayonet locking 5-pin circular connector (female) for interfacing with the locomotive male connector. The power supply cable shall be provided with a MIL-C-26482 standard 3 pin circular connector (female). The length of each cable shall be minimum 265 cm. The cables shall be strain relieved at the connector using suitable heat shrinkable boots. The counterpart connectors having adaptor ring for shield termination and male pins are also in the scope of supply.

6.0 INGRESS PROTECTION

The sensors are to be used in very harsh outdoor traction environment and hence have to be well engineered to take care of the likely vibration, shock, high temperature, humidity and dust conditions. The speed sensors shall have an ingress protection class of IP68 and shall be tested according to IEC-60529.

7.0 Cable Interface

The signal cables and power cables are interfaced to the locomotive circuits through corresponding male connectors provided at the connector plate mounted in the under frame.

8.0 Cable Interface

Electrical:

- a) Input to the sensor : 15 VDC
- b) Output of the sensor : 15V pulses x 2, phase shifted by 90°.
- c) Number of pulses : 120 per revolution of motor shaft



A4 – 11

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS/445/2635

REV. NO: 01

PAGE 04 OF 09

9.0 TEST

Name of Test	As per IEC-60571	
	Type Test	Routine Test
Performance Test	Yes	Yes
Dielectric Test	Yes	Yes
Surge Test	Yes	No
Temperature Rise Test (Dry Heat)	Yes	No
Temperature Rise Test (Damp Heat)	Yes	No
Vibration, Shock & Bump Test	Yes	No

The speed sensor protection class shall be as per IP68 and Ingress test shall be done as per IEC-60529. This shall be a type test.

10.0 INSPECTION

The type test & routine shall be witnessed by the authorized representative of BHEL.

11.0 APPLICABLE NORMATIVE STANDARD

The offered system shall generally conform to the following normative standards

IEC 60529 /DIN 40050 (for IP68/JP 68 protection)

EN 50155 Railway applications electronics equipment used on rolling stock

EN 50121-2 EMC: Emissions to external environments

IEC60077 Rules for equipment for onboard rail vehicles

IEC 60571 Rules for electronic equipment onboard rail vehicles
IEC-61373 Electric Railway Equipment-Rolling Stock-Shock & Vibrations Requirements



A4 – 11

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS/445/2635

REV. NO: 01

PAGE 05 OF 09

10. SCOPE OF SUPPLY

Following items shall be the deliverables with one set of equipment.

SL No	Item	Quantity
1	Rotational Speed Sensor	01 nos.
2	Cable (Type: -H+S – 12583003-720689,RAD0X-TENUIS-TW/S, EMC-SC, 600/1000Volt, 2X1mm2 (18AWG) 1) Signal cable – 265 cm (Type mentioned above) 2) Power supply cable–265 cm (Type mentioned above)	01 nos. 01 nos.
3	Connector for Interfacing 1) Power supply connector (Type- KPSE06E12-3S-DZ) or Amphenol Make MS3476W12-3S-SQSC. 2) Signal Connector (Type- KPSE06E14-5S-DZ) or Amphenol Make MS3476W14-5S-SQSC 3) Counterpart Power supply connector (Type- KPSE07E12-3P-DZ) or Amphenol make MS3474W12-3P-SQSC 4) Counterpart Signal connector (Type- KPSE07E14-5P-DZ) or Amphenol Make MS3474W14-5P-SQSC	01 nos. 01 nos. 01 nos. 01 nos

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.



A4 – 11

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS/445/2635

REV.NO: 01

PAGE 06 OF 09

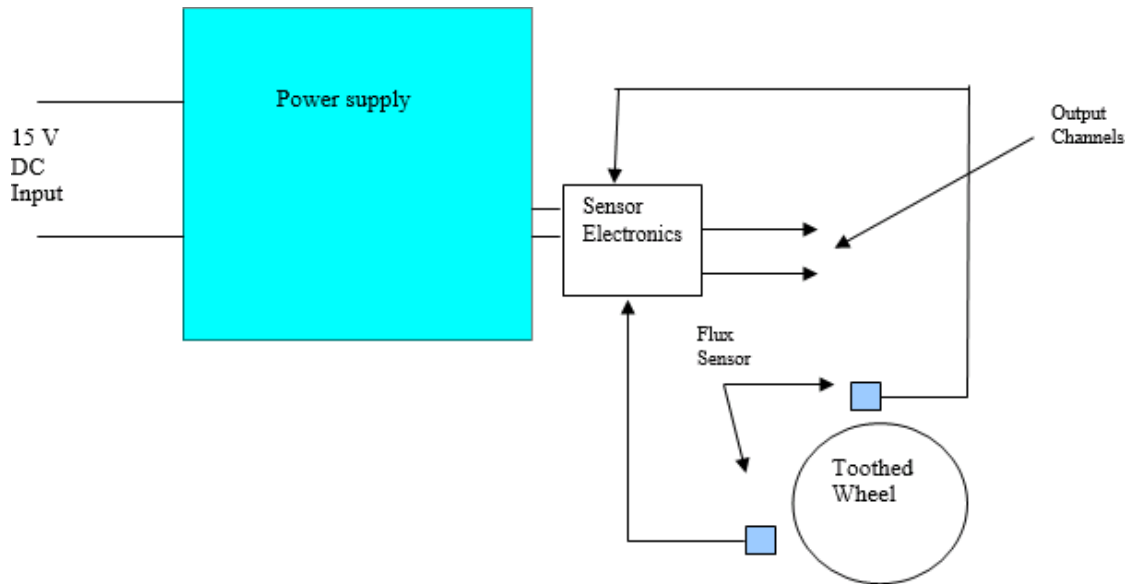


Fig.1-Schematic of the Active speed sensor

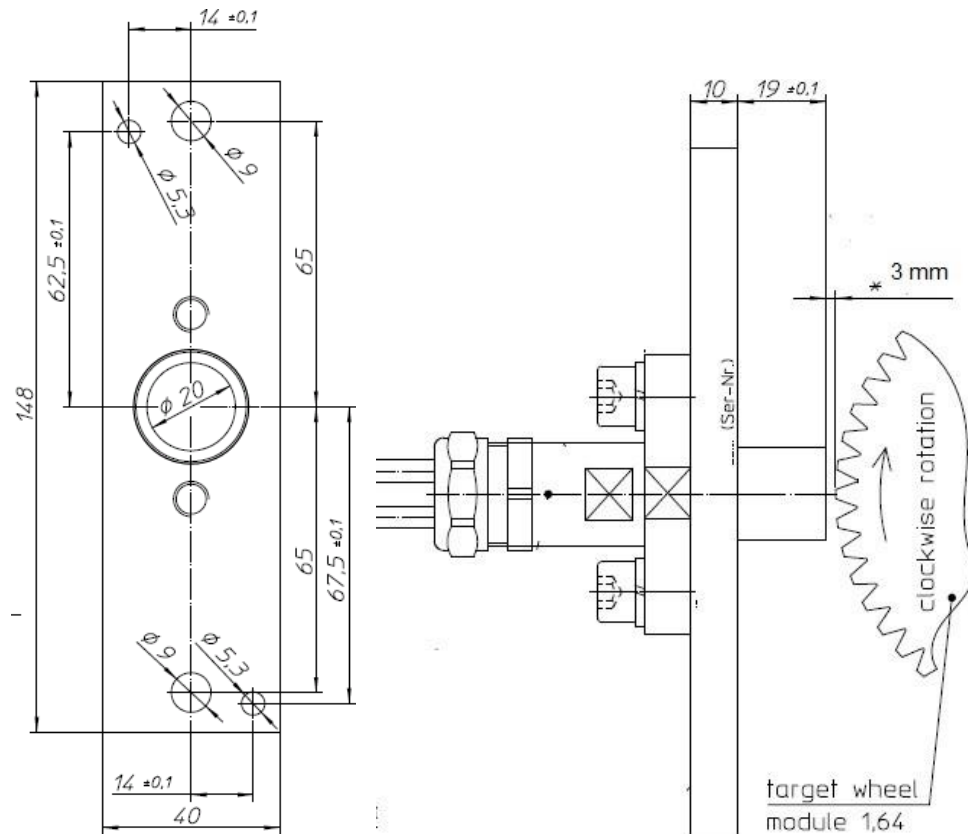


Fig.2- Dimensional details

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.



A4 – 11

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS/445/2635

REV. NO: 01

PAGE 07 OF 09

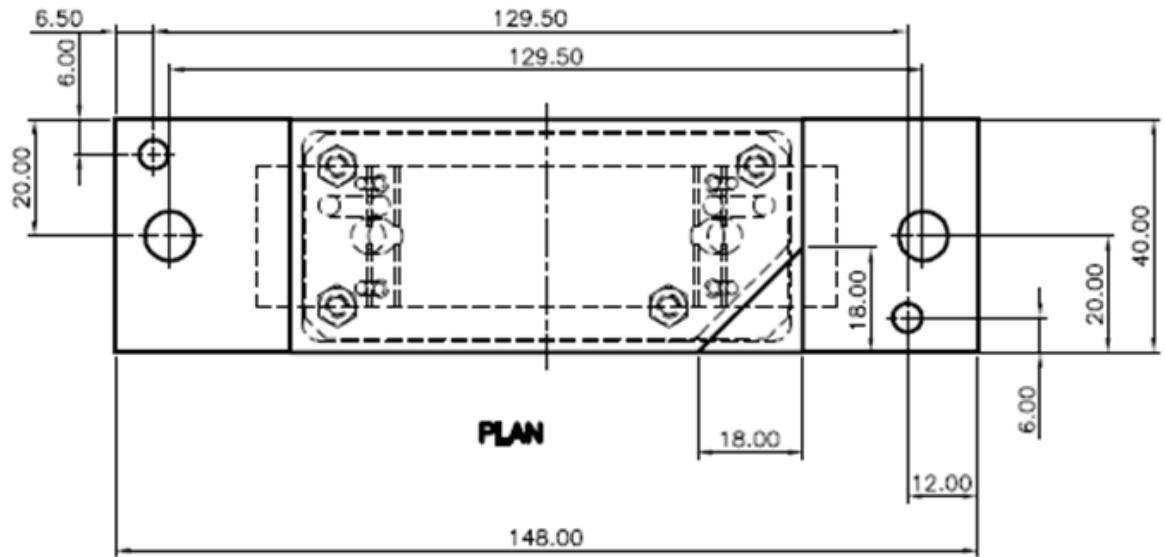


Fig-3. Dimension of the Speed sensor

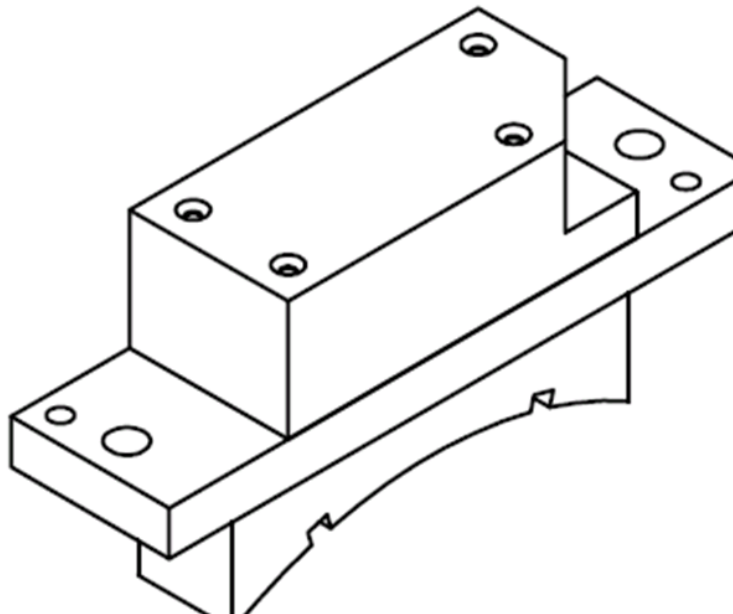


Fig-4. Isometric view of the sensor

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.



A4 - 11

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

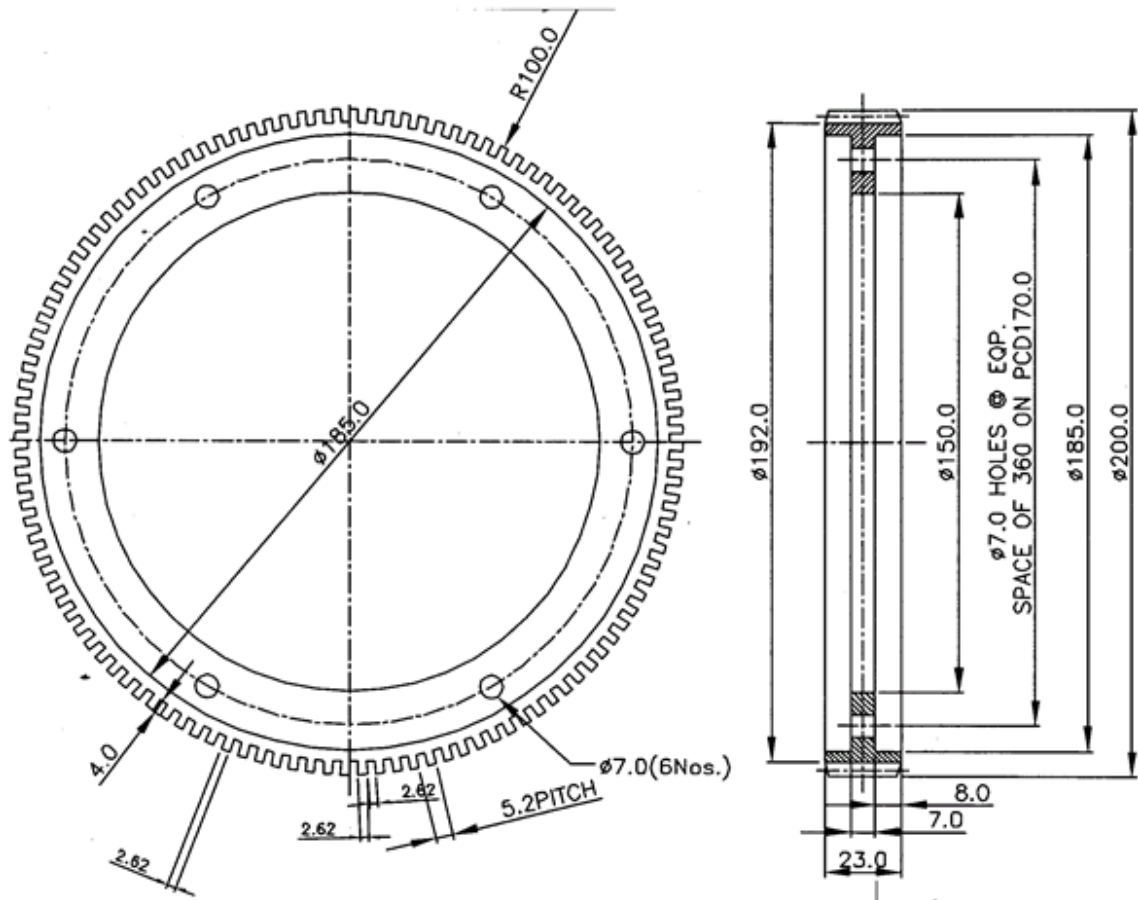
P.S NO. : PS/445/2635

REV. NO: 01

PAGE 08 OF 09

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.



WHEEL WITH 120 No. OF TEETH

Fig-5- Impulse ring



A4 – 11

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS/445/2635

REV. NO: 01

PAGE 09 OF 09

11. PRE QUALIFICATION CRITERIA (PQC)

1. The Bidder should be Supplier of Speed Sensors used in sensing of Traction motor speed.
2. BHEL shall approach and submit credentials/details furnished by vendor with their offers to customer and await customer's decision for a maximum of one month from the date of tender opening. If approval is not received within the above period, BHEL shall treat the offer as "Not meeting" Pre-qualification criteria and offer shall be rejected.

12. DOCUMENTS SUBMISSION

1. Bidder to submit clause by clause compliance to complete technical specification along with copy of type test report.
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 Speed Sensors 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.