


# REQUEST FOR QUOTATION

	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	RFQ NUMBER: <b>AKSPROP066</b>  RFQ DATE : 28.10.2023	Due Date/Day: 10.11.2023 FRI Time : 13:00 HRS <div style="background-color: black; height: 20px; width: 100%;"></div> <div style="background-color: black; height: 20px; width: 100%;"></div>
MMI:PU:RF:003			
(address for communication) :		(for all correspondence) Purchase Executive : ABHISHEK Phone : 26998102 Fax : 00918026989215 E-mail: 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	TI0668105131 SPEED SENSOR <span style="background-color: black; color: black;">XXXXXXXXXX</span> * HSN/SAC : 3921 <div style="background-color: black; height: 15px; width: 400px; margin-bottom: 2px;"></div> <div style="background-color: black; height: 15px; width: 330px; margin-bottom: 2px;"></div> <div style="background-color: black; height: 15px; width: 160px; margin-bottom: 2px;"></div> <div style="background-color: black; height: 15px; width: 320px; margin-bottom: 2px;"></div> <div style="background-color: black; height: 15px; width: 160px; margin-bottom: 2px;"></div> <div style="background-color: black; height: 15px; width: 370px; margin-bottom: 2px;"></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 No 00	1,500	NO	1,500	<span style="background-color: black; color: black;">XXXXXXXXXX</span>

Total Number of Items - 1

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 2

## REQUEST FOR QUOTATION



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Electronics Division  
PB No. 2606, Mysore Road Bangalore - 560026  
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(address for communication) :

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Purchase Executive : ABHISHEK

Phone : 26998102

Fax : 00918026989215

E-mail: singh.abhishek@bhel.in

- 1.
- 2.

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ABHISHEK  
Control Equipment

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# PREQUALIFICATION CRITERIA (PQC)

## FOR SPEED SENSOR

GROUP: TRACTION ENGINEERING

Ref: 445/PQC\_SpS/22

Rev. No.: 01

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### 1.0 PRE QUALIFICATION CRITERIA (PQC)

1. The Bidder should be Supplier of Speed Sensors for Traction equipment for rolling stock application.
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.
3. 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 shall be 20%. Bidder to confirm this in the offer. Value addition less than 20% is not acceptable.

### 2.0 DOCUMENTS SUBMISSION

1. Bidder to submit clause by clause compliance to complete technical specification (Technical specification no. PS4452635 Rev. No.00, dated 03.05.2019) along with copy of type test report.
2. Should possess a valid type test report, not older than five years, conducted at a NABL accredited laboratory 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 (point no. 2 & 3) are not applicable.

### 3.0 REFERENCE DOCUMENTS

- a) Purchase Specification No PS4452635, Rev. No. 00 for Speed sensors.

REVISION 01

APPROVED

AGOSH CHANDRAN R S

PREPARED

L SUNITHA

ISSUED

TRACTION ENGG

DATE

04.08.2022

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

P.S NO. : PS/445/2635

REV. NO: 00

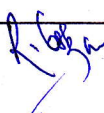
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**REVISION HISTORY SHEET**

REV. NO.	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
00	03.05.19	FIRST ISSUE	--	--	--

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.

REVISIONS 00 DT: 07.02.2019

APPROVED BY: PREPARED BY: Agosh Chandran R S  
Dy Mgr/Traction Engg

ISSUED BY

TE

DATE

03.05.2019



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

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



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

P.S NO. : PS/445/2635

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## 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.



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**PURCHASE SPECIFICATION**  
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**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



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**PURCHASE SPECIFICATION**  
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**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





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**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	<b>Cable</b> (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	<b>Connector for Interfacing</b> 1) Power supply connector (Type- KPSE06E12-3S-DZ) 2) Signal Connector (Type- KPSE06E14-5S-DZ) 3) Counterpart Power supply connector (Type- KPSE07E12-3P-DZ) 4) Counterpart Signal connector (Type- KPSE07E14-5P-DZ)	01 nos. 01 nos. 01 nos. 01 nos

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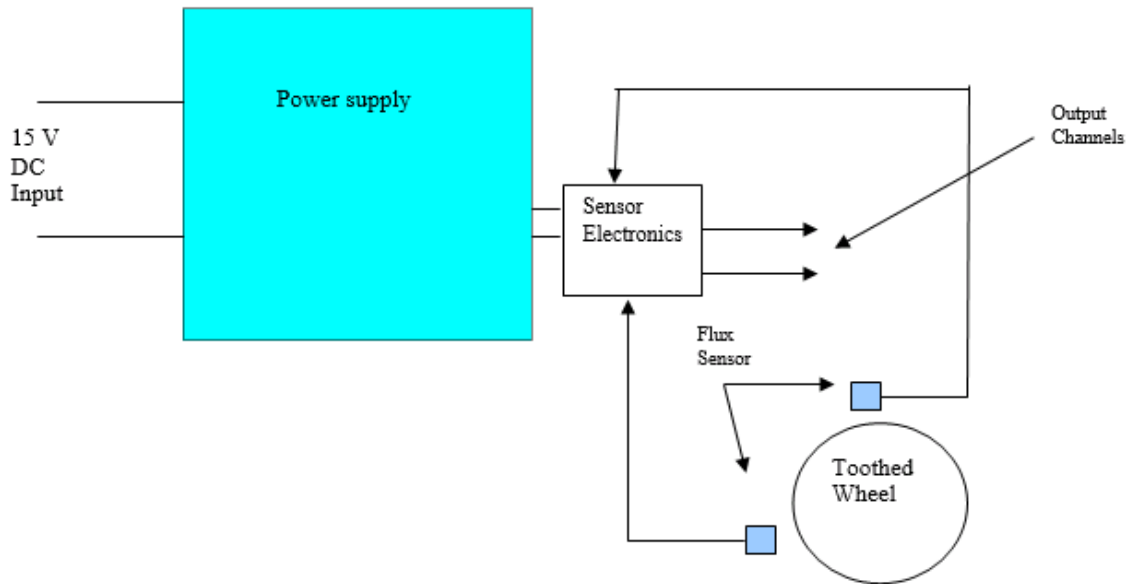
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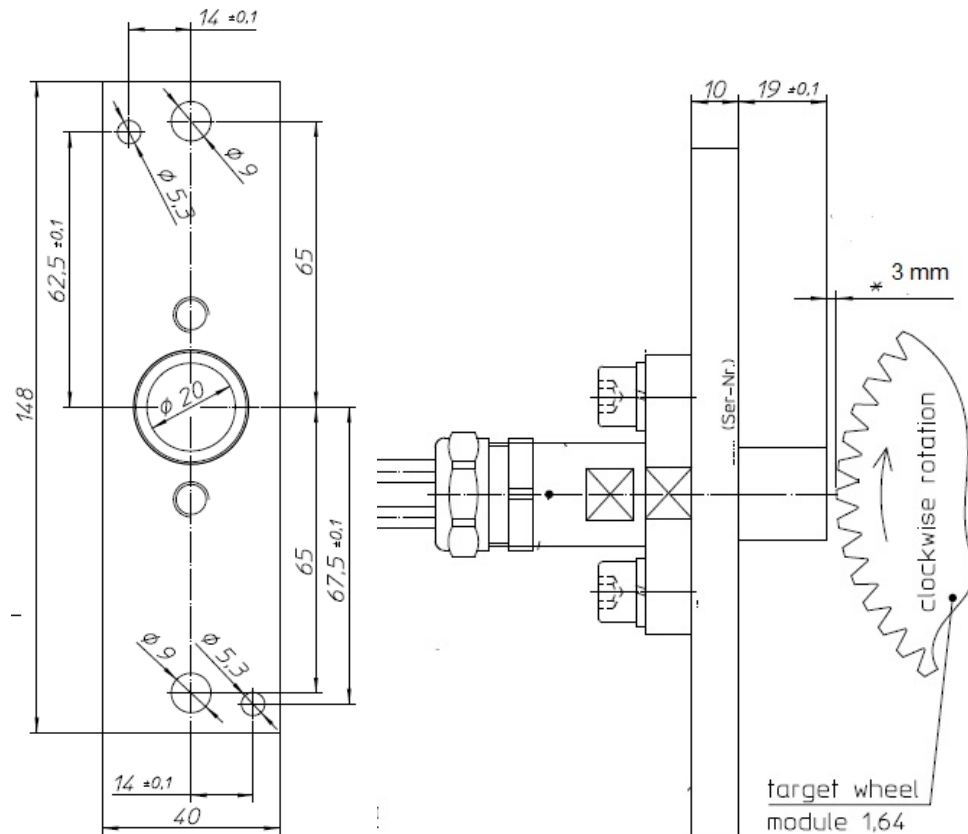
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**Fig.1-Schematic of the Active speed sensor**



**Fig.2- Dimensional details**

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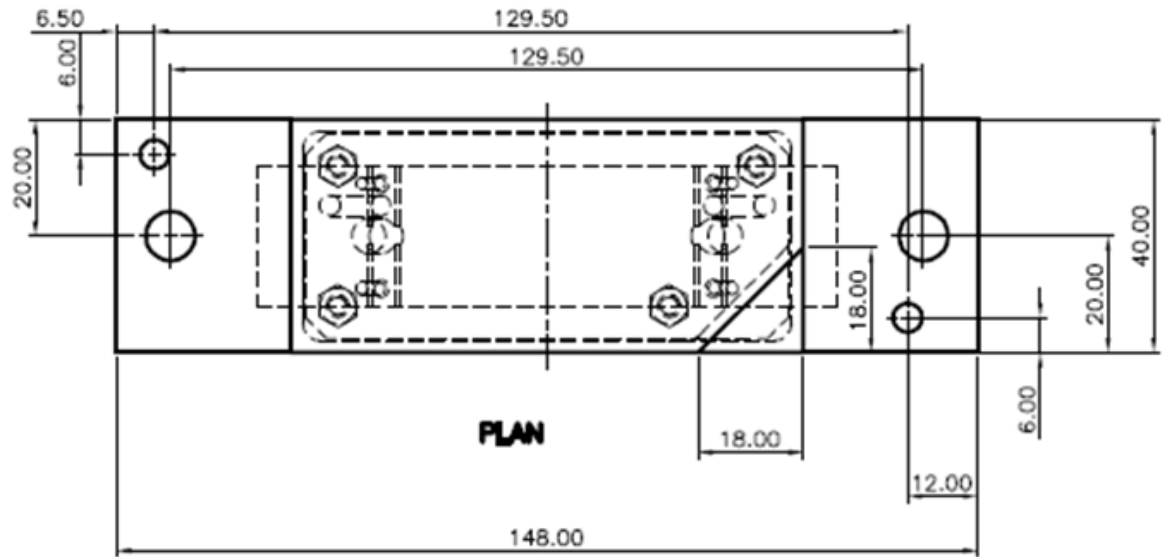
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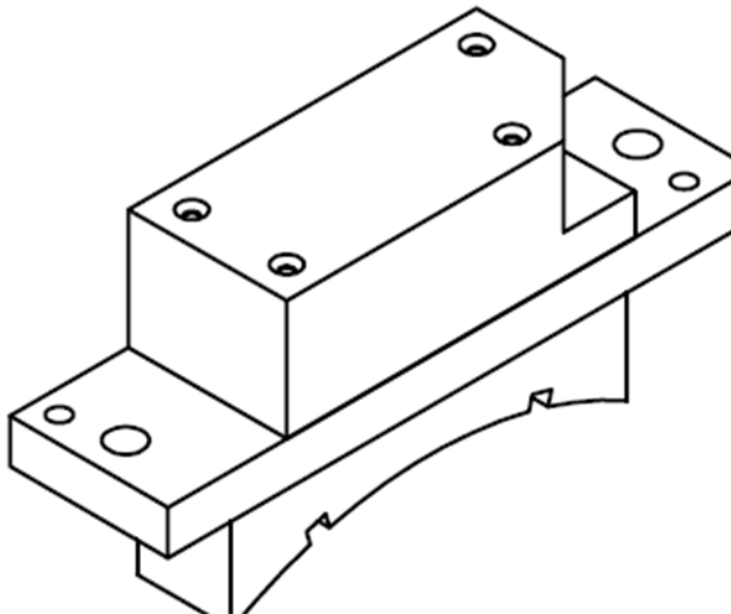
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**Fig-3. Dimension of the Speed sensor**



**Fig-4. Isometric view of the sensor**



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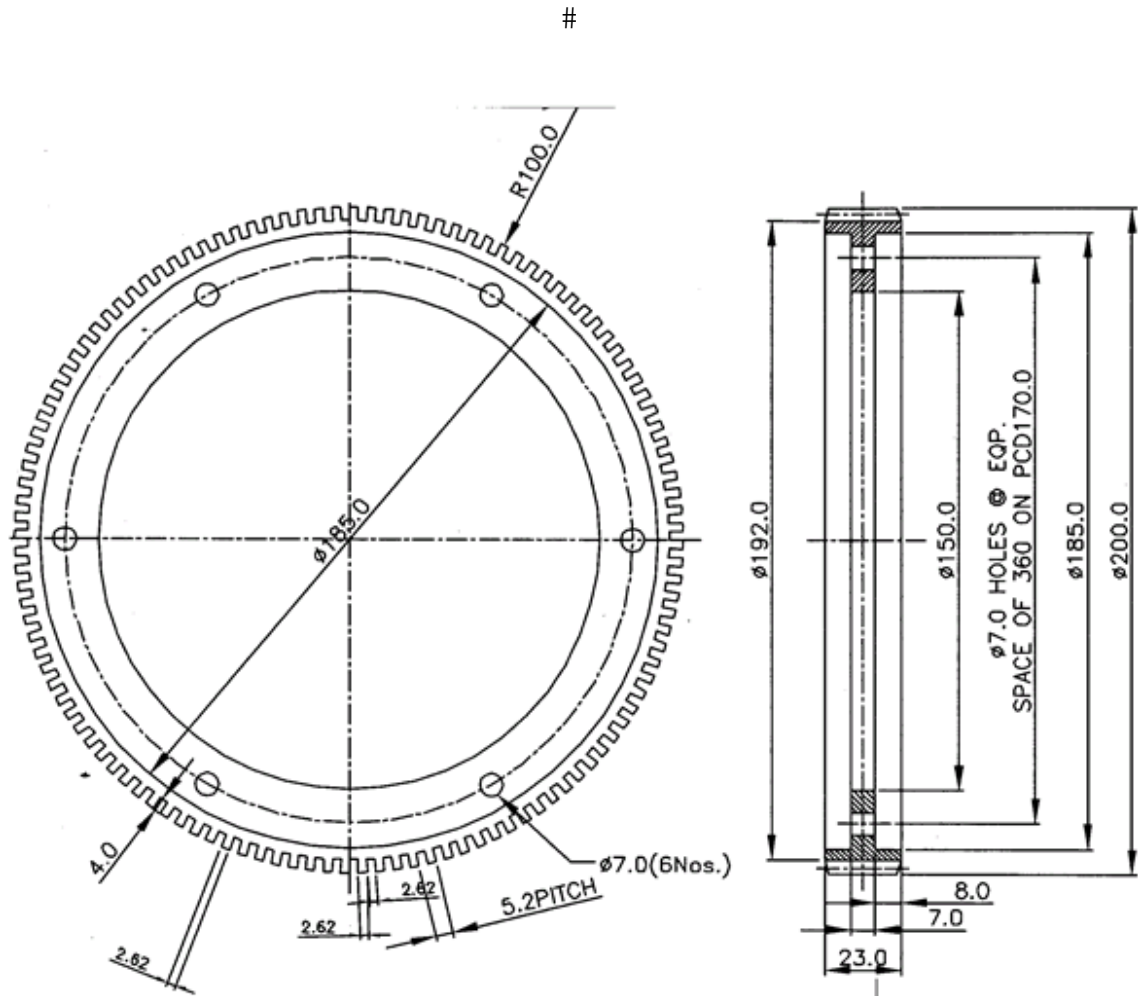
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WHEEL WITH 120 No. OF TEETH

**Fig-5- Impulse ring**



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**11. PRE QUALIFICATION CRITERIA (PQC)**

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