

REQUEST FOR QUOTATION



BHARAT HEAVY ELECTRICALS LIMITED
Electronics Division
PB No. 2606, Mysore Road Bangalore - 560026
INDIA

RFQ NUMBER:
AKSMEMU019

RFQ DATE :
22.01.2025

MMI:PU:RF:003

(address for communication) :

(for all correspondence)

Purchase Executive : ABHISHEK
Phone : 26998102
Fax : 00918026989215
E-mail: singh.abhishek@bhel.in

Sl No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	TI0668127689 Speed sensor for EMU * HSN/SAC : 3921 [REDACTED] [REDACTED] [REDACTED] [REDACTED] Test Certificate Speed Sensor with cable,connector & mating connector with Specification no: PS4452683,REV.02 FOR MEMU [REDACTED]	500	ST	500	30.05.2025

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.
[REDACTED]
[REDACTED]

* 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



PREQUALIFICATION CRITERIA FOR
SPEED SENSOR OF TRACTION MOTOR
(MEMU PROJECT)

PQC/PS4452683_REV.02/
SPEED SENSOR

Revision No. 01

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1.0 Pre-Qualification Criteria:

- a) The bidder should be a manufacturer/supplier of Hall effect Speed Sensor as per BHEL spec. PS4452683, REV.02 for Rolling stock application. The Rolling Stock Applications under consideration shall include Locomotive, EMU, MEMU, Metro Trains, High Speed Trains, Train sets, Inspection Cars and Special Track Machines.
- b) Authorization required from OEM for Agent/Distributor/Trader.
- c) Bidder should have supplied such/equivalent Speed sensors to Indian Railways in preceding 5 years (from original tender opening date).
- c) Bidder has to provide previously supplied unpriced PO copy along with supply proof (delivery challan, invoice etc). as proof for point (c).
- d) 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.
- e) 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

2.0 Documents to be submitted:

All the relevant documents proof for points referred in 1.0 shall be submitted along with the tender. Compliance of all the points referred in 1.0 is mandatory. In absence of compliance of above, vendor's offer is liable to be rejected.

Rev. 01 Dated 16.01.25

Traction Engineering
Dept.
BHEL-Electronics Division
Bangalore – 560026

Approved: Devanand

Prepared: Piyush
Arora

Checked: Jagdish
Shukla

Date:
16.01.25

Checklist - Documents to be submitted by Bidder

Sl. No.	Particulars	Acceptable documentation	Submitted with Tender	Document/s submitted by bidder	Remarks by Bidder
1	PQC qualification documentation	<ul style="list-style-type: none"> • Relevant PO copies • Previous supplied Invoice/Delivery challan 	YES / NO		
2	Type test reports & protocol	<ul style="list-style-type: none"> • Recent type test reports from NABL-accredited laboratory and/or protocol for Indian bidders • Recent type test reports from international accreditation agencies for international bidders and/or protocol 	YES / NO		
3	Routine test protocol	<ul style="list-style-type: none"> • Routine test protocol 	YES / NO		
4	QAP [Quality Action Plan]	<ul style="list-style-type: none"> • QAP [Quality Action Plan] 	YES / NO		
5	Clause-by-clause compliance - duly signed & stamped	<ul style="list-style-type: none"> • Signed & stamped copy of complete specification • Bidder's document tabling each specification clause and indicating the compliance against each clause 	YES / NO		
6	No deviation format - duly signed & stamped	<ul style="list-style-type: none"> • No deviation format, duly filled-in & signed/stamped 	YES / NO		
7	Drawings & datasheets if applicable	<ul style="list-style-type: none"> • Drawing with all required data & BoM • Datasheet with all required parameters mentioned & BoM • Catalogue for standard product with all technical & dimensional details mentioned 	YES / NO		
8	HL2 compliance	<ul style="list-style-type: none"> • Certificate from NABL approved lab or any International accreditation agency 	YES / NO		
9	Bill of Materials	<ul style="list-style-type: none"> • Unpriced copy of price format indicating "Quoted" against each line item 	YES / NO		
10	Checklist	<ul style="list-style-type: none"> • This checklist duly filled-in 	YES / NO		
11	Contact details for correspondence	<ul style="list-style-type: none"> • Email & contact details of representative to contact for technical & commercial queries 	YES / NO		
12	Authorization for bid signing	<ul style="list-style-type: none"> • Notarized/suitable valued bond paper stating authorization for bid signing 	YES / NO		
13	Formats in tech spec	<ul style="list-style-type: none"> • All formats to be filled which are part of the technical documentation . 	YES / NO		

Note to bidder -

1	Bidder shall necessarily fill this checklist and upload it as a part of the documentation towards this tender. Incomplete documentation may make your offer liable for rejection
2	Bidder shall upload the documents in a logical sequence & include a table of content clearly indicating the page numbers
3	This list is not exhaustive & BHEL may ask for additional documentation from bidders in the course of evaluation of the offers



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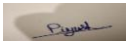

PURCHASE SPECIFICATION
GROUP: TRACTION ENGINEERING

P.S NO. : PS4452683

REV. NO: 02

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REVISION HISTORY SHEET

REV. NO.	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
00	03.05.19	FIRST ISSUE	--	--	--
01	10.10.2020	SPEC UPDATED			
01	16.01.2025	SPEC UPDATED	Connector make updated	 Piyush	 V.Devanand

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 01 DT: 10.10.2020
REVISIONS 02 DT:16.01.2025

APPROVED BY:



Bharat Arora, AGM/ Traction Engg.

PREPARED BY:
DATE

Santosh Kumar Sahu

ISSUED BY

PES/TE-445



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GROUP: TRACTION ENGINEERING

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SPECIFICATION FOR
Active Speed Sensor of Traction Motor for RCF, MEMU Project

			PURCHASE SPECIFICATION GROUP: TRACTION ENGINEERING	P.S NO. : PS4452683
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<div>COPYRIGHT AND CONFIDENTIAL</div> <div>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.</div>		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 Electrical Multiple Units. The mechanical interface on the traction motor should be as per attached drawing and electrical interface with the Traction Converter control system should be though connector as specified in the scope of supply. It shall be possible to mount these sensors in the allocated location of traction motor. The 3-phase EMU uses the Traction Motor speed for calculation of the EMU speed in order to activate the speed limits, for Inverter Control, 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 MEMU 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. A Single output signal 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 MEMU 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 the same cable and connector system as that of the output signal. The sensor shall also be protected against likely transients and surges in the power supply.		



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5.0 SIGNAL & POWER SUPPLY CABLES AND INTERFACES

Each sensor shall provide an integrated cable channel for signal and power taken on a single shielded cable. The cable shall be minimum 3x1 sq.mm, highly flexible EB irradiated and suitable for outdoor traction applications. The cable shall be provided with a MIL-C-26482 standard bayonet locking 5 pin circular connector (female) for interfacing with the EMU male connector mounted in the underframe. The length of each cable shall be minimum 300 cm. The cables shall be strain relieved at the connector using suitable heat shrinkable boots. The counterpart connector having adaptor ring for shield termination and male pins are also in the scope of supply. A Flexible Cable Conduit shall be provided for the protection of sensor cable.

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, and 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 Speed Sensor cable is interfaced to the MEMU circuits through corresponding male connectors provided at the connector plate mounted in the under frame.

8.0 Technical Details

Supply Voltage	:15V DC
Sensor Output	: 15V Pulses
Permissible air Gap	: > 1mm
Signal Pattern	: Single Channel, Square Wave Signal
No of Pulses	: 120 per rotation
Cable Length	: 3.0 Meter minimum
Cable	: 3x1 sqmm, 600V/1000V
Connector	: 5 Pole with counterpart connector
Module of Target wheel	: 1.6
Output Level	: Low<1.5V, High > 10V
Sink Current	: ≤ 30 mA
Source Current	: < 40 mA
Maximum Signal Frequency	: 20 KHz



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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 standard

IEC 60529 /DIN 40050 (for IP68/IP 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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12. 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, 3X1mm2 (18AWG) or Equivalent cable having a length of minimum 300 cm)	01
3	Connector for Interfacing 1) Signal Connector (Type:- ITT KPSE06E14-5S-DZ or Amphenol MS3476W14-5S- SQSC) 2) Counterpart Connector (Type:- KPSE07E14-5P-DZ or Amphenol MS3474W14-5P-SQSC)	01 nos. 01 nos.

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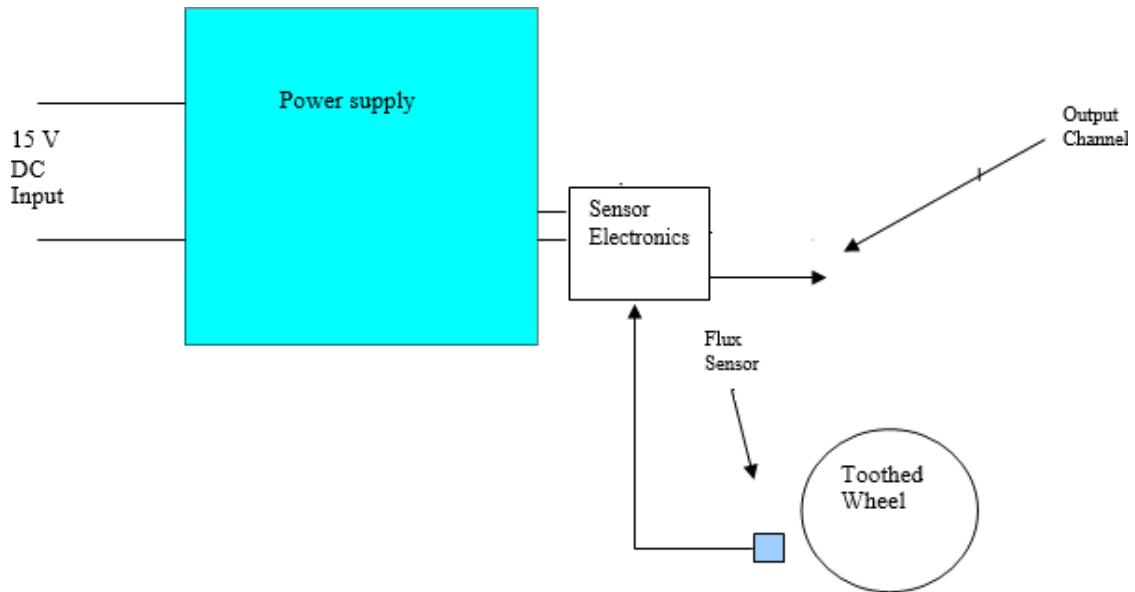


Fig.1-Schematic of the Active speed sensor

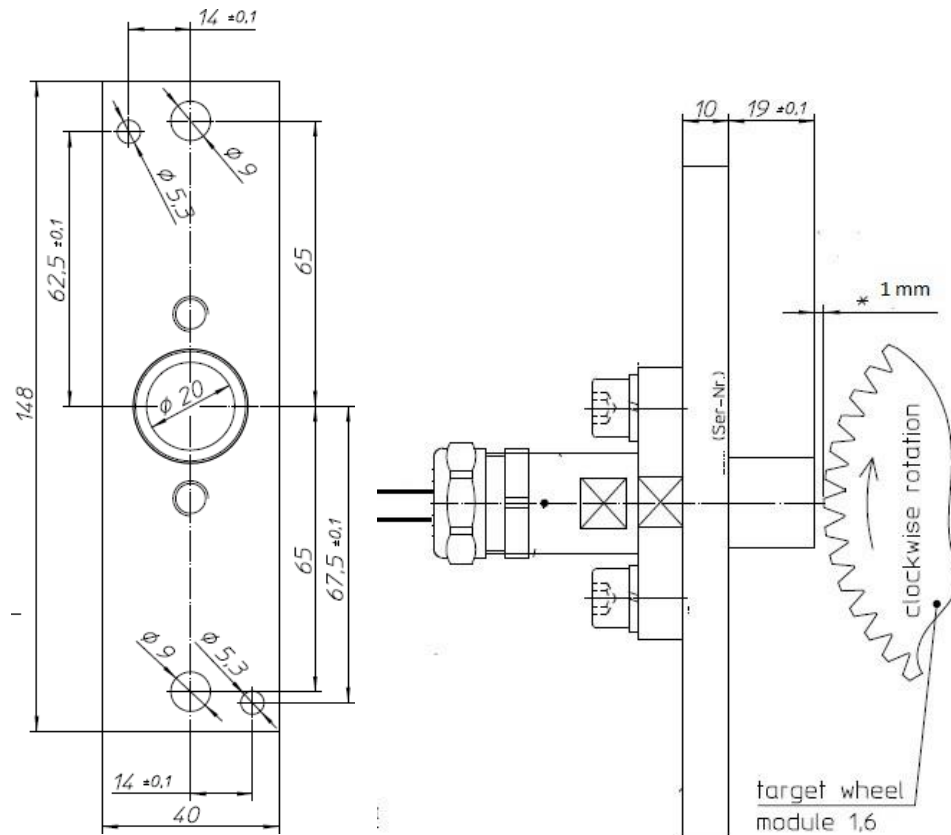


Fig.2- Dimensional details



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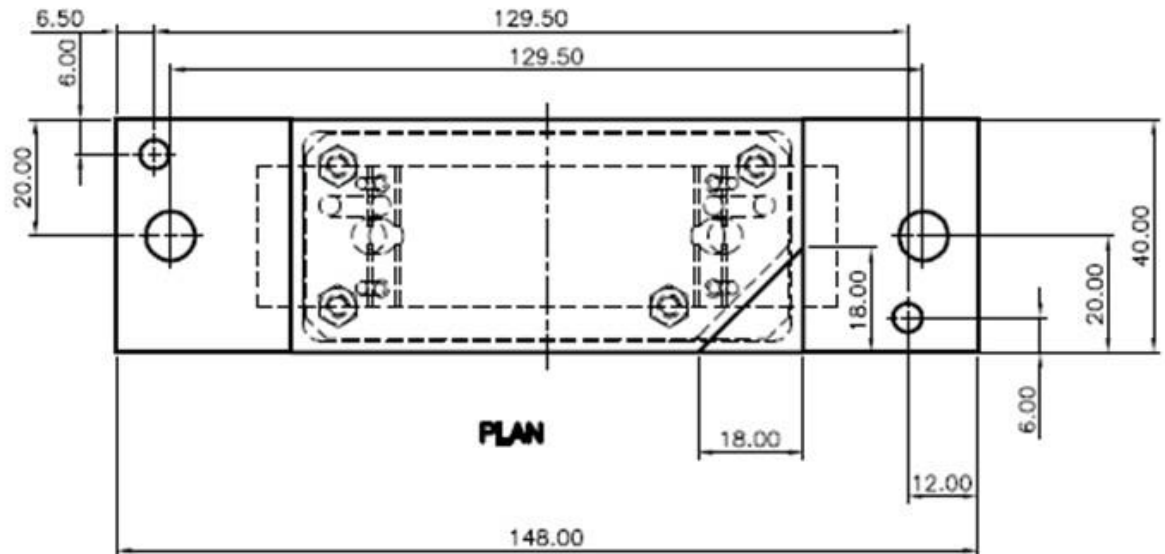


Fig-3. Dimension of the Speed sensor

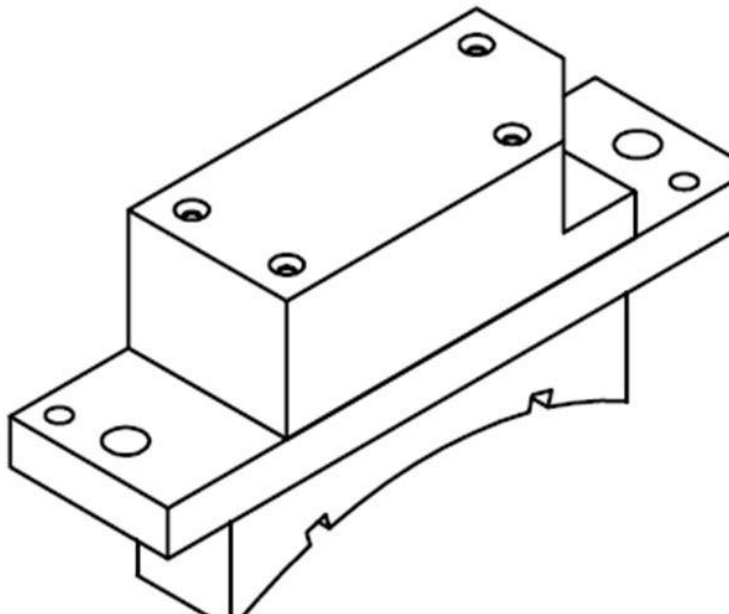


Fig-4. Isometric view of the sensor

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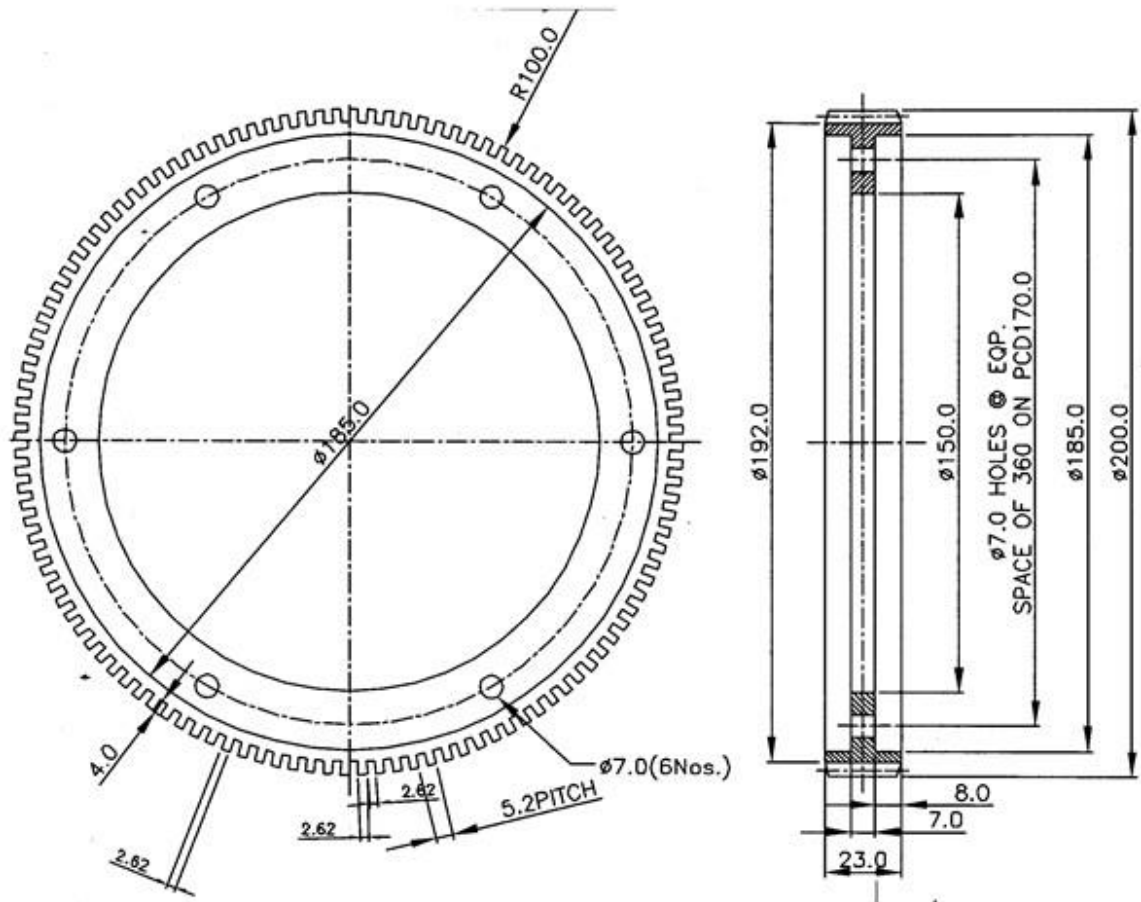
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WHEEL WITH 120 No. OF TEETH

Fig-5- Impulse ring



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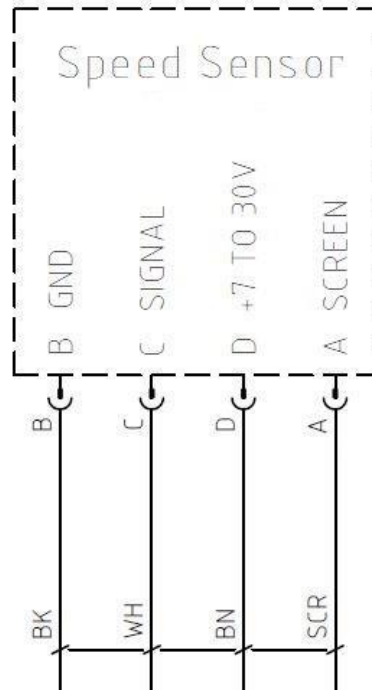


Fig-6-Colour code for cable

13. 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 at the time of bid submission.