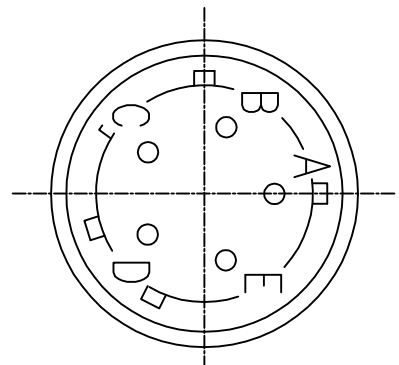
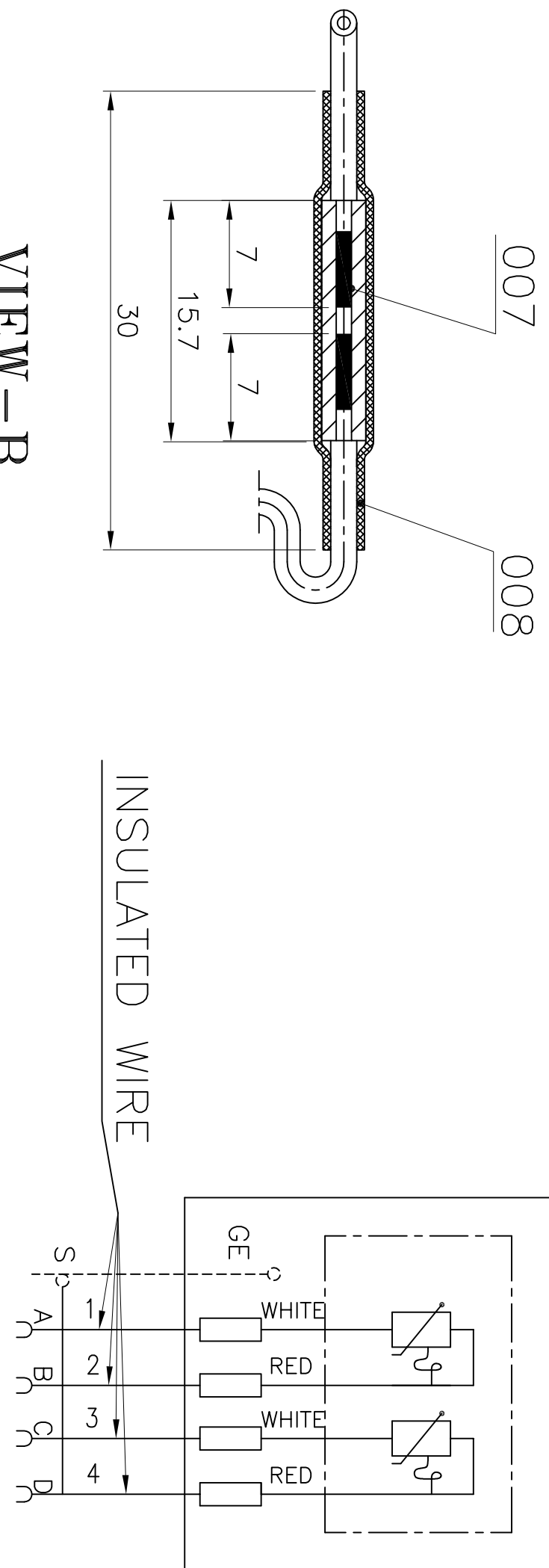
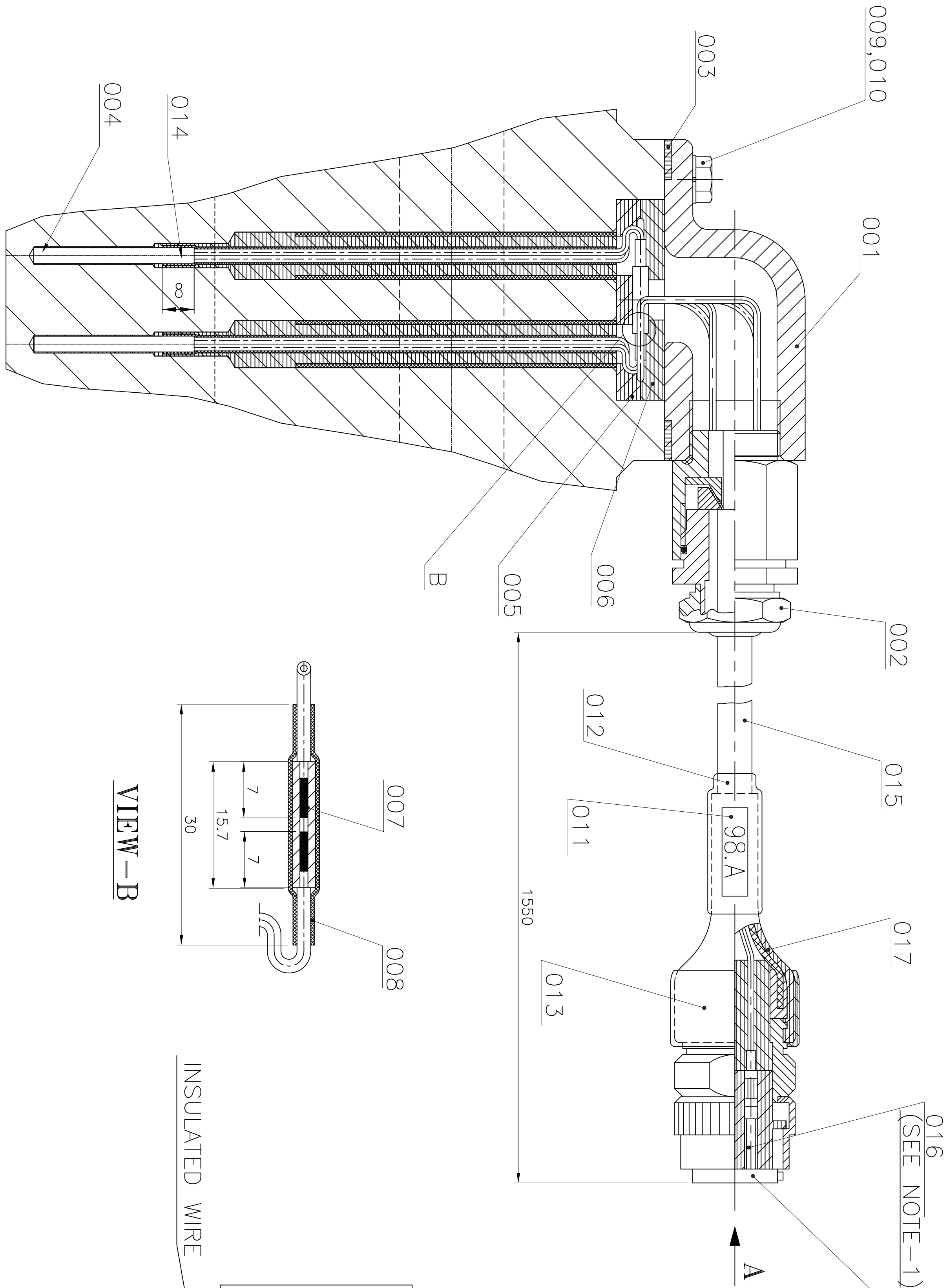


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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



SEE NOTE-3

NOTES:—

1. INSERT CABLE CORD IN CONTACT PIN.
2. SHORTON CABLE TO 200 MM.
3. CONTACTS TO BE PROTECTED WITH PLASTIC COVER.
4. FOR ITEMS DETAILS REFER SPECN. NO. TM19583.

150601044511NO. DRG.

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INVENTORY NO.

SIGN. & DATE

REF. DRG. NO.

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NOTES:-

1. INSERT CABLE CORD IN CONTACT PIN.

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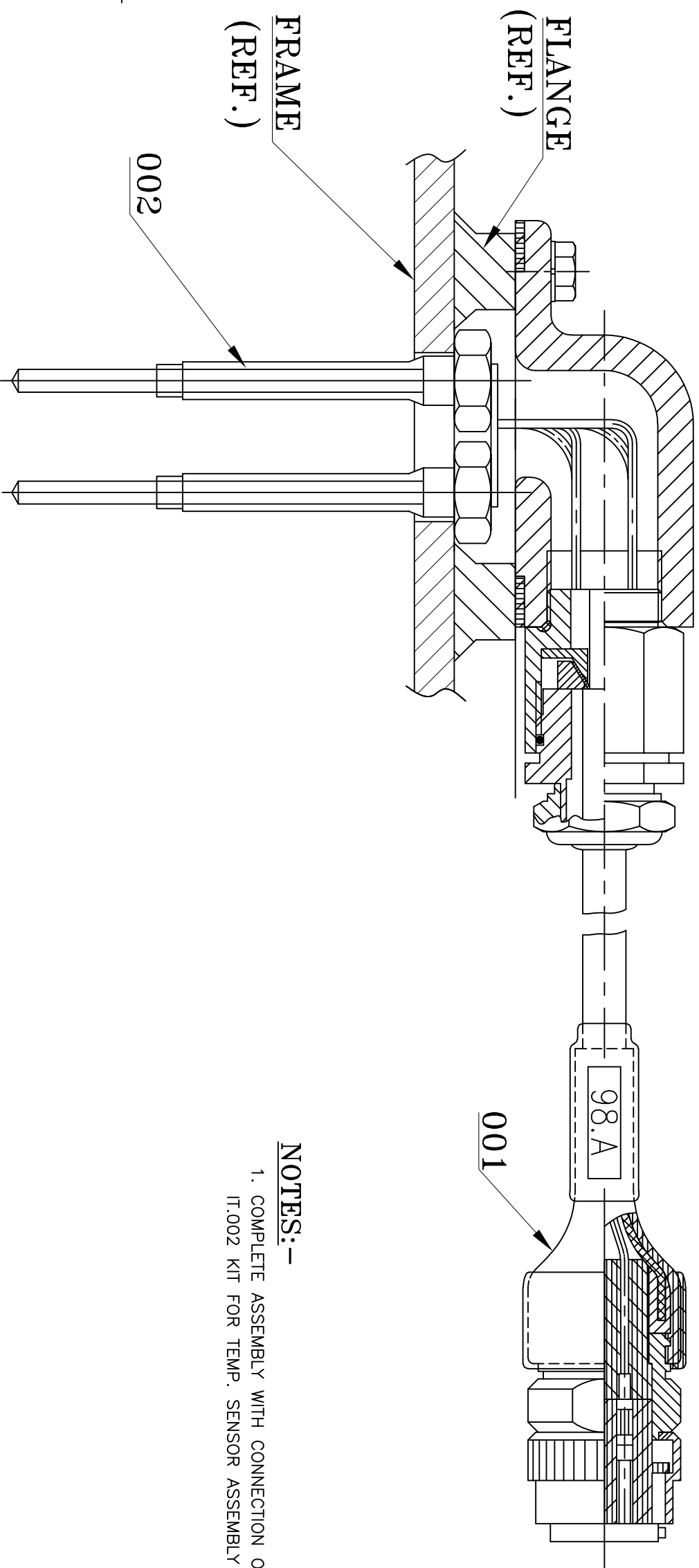
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DRG. NO. 3 445 01 09 053

DRG. NO.



NOTES:-

1. COMPLETE ASSEMBLY WITH CONNECTION OF IT.001 TEMPERATURE SENSOR ASSY. & IT.002 KIT FOR TEMP. SENSOR ASSEMBLY TO BE SUPPLIED.



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REF. DRG. NO.

SIGN. & DATE

INVENTORY NO.

REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHECKED			CHECKED
		APPD.			APPD.

ADDITIONAL INFORMATION				TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT							
STATUS OF DRAWING				IM3302AZ/BZ							
DISTRIBUTION OF PRINTS				<div> BHARAT HEAVY ELECTRICALS LTD. BHOPAL</div>							
TME – 1 TXM – 4											
TNX – 1											
REV.	DATE	ALTERED CHECKED APPD.		DEPT. T.M.E.	GRADE OF UN.TOL.		SCALE NTS	WEIGHT(K.G.) 0.88	REF. TO ASSY.DRG.	ITEM NO.	NO.OF ITEM
				CODE 405					04451009051	012	02
TITLE				COMPLETE TEMPERATURE SENSOR ASSY.							
DRAWING NO.				3 445 01 09 053							
REV.				00							
SHT. NO. 01				NO. OF SHT. 01							

Pre-Qualifying Criteria (PQR):

- It is envisaged that the selected partner shall fulfil the requirement of manufacturing and supply of Temperature sensor assembly manufactured as per drawing no. 34450109053 and specification TM19583.
- The prospective partner/ respondent must meet all the following pre-qualification requirement supported with relevant documents/ credentials/ certificates for further consideration.

1.1. Be an OEM of Temperature sensor assembly.

Applicant's Response (meeting the above criteria): Yes/ No.
Supporting document attached: Yes/ No

1.2. Must have past experience of manufacturing and supply of Temperature sensor assembly to Indian Railways or any other Traction Machine Manufacturer, in the last ten (10) years from the date preceding submission of this EOI. Vendor to submit Unpriced PO copy & Supply proof (tax invoice)

Applicant's Response (meeting the above criteria): Yes/ No.
Supporting document attached: Yes/ No

1.3. Shall comply and offer clause by clause compliance comments of specification no. TM19583 for Temperature sensor assembly.

Applicant's Response (meeting the above criteria): Yes/ No.
Supporting document attached: Yes/ No

1.4. Shall carry out routine & type testing as per BHEL specification TM19583.

Applicant's Response (meeting the above criteria): Yes/ No.
Supporting document attached: Yes/ No

1.5. Vendor have requisite facility for carrying routine & type testing as per specification TM19583.
Applicant's Response (meeting the above criteria): Details of testing facility to be submitted.
In case testing facility is outsourced details of same to be informed.


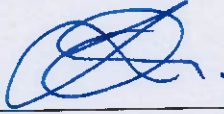
1.6. Has not been blacklisted / banned business dealings for Ministry of Railways/ Ministry of Heavy Industries or any Government Department of India.

Applicant's Response (meeting the above criteria): Yes/ No.
Supporting document attached: Yes/ No

1.7. No previous contract has been terminated or part terminated due to bidder's failure.

Applicant's Response (meeting the above criteria): Yes/ No.
Supporting document attached: Yes/ No

Based on the information & document submitted by potential vendors technical capability assessment shall be done for vendor development at BHEL.

	
S. S. Patel Manager/TME	S. K. Yadav DGM/TME



PRODUCT STANDARD
TME DIVISION, BHOPAL

TM19583

Rev.00

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**SPECIFICATION OF TEMPERATURE SENSOR ASSEMBLY
FOR 3-PHASE TRACTION MOTORS**

1.0 GENERAL :

This specification is for Temperature sensor assembly for 3-phase traction motors. The sensors are to be fitted in holes provided in the stator frame of motor for monitoring the temperature of the motor stator during service. The temperature sensor assembly consists of two Resistance Temperature Detectors – PT100 (RTD) with required cables and connectors. The details of the items are as per drg. No. 14450109051. This specification is to supplement the above drawing.

2.0 SCOPE OF SUPPLY :

All the items of drg. No. 14450109051 are in the scope of supply against this specification. All the items to be as per dimensions and details called in the drawing. The items to be supplied in a kit form in one packet with quantities as per drawing.

3.0 TECHNICAL REQUIREMENTS

The Temperature Sensor assembly consists of RTD – PT100 resistance elements with cables, connectors and miscellaneous items. Test certificate of components to be submitted and wherever testing is not possible, the technical requirements described below for such item of referred drawing are to be ensured for maintaining the proper quality standards of the materials. For all the items purchased from outside, the source details have to be discussed and approved from BHEL before supply.

3.1 Item No. 001 Thermo-Couple Housing

Thermo-couple housing shall be as per drawing no. 34450164054, Item No. 001

3.2 Item No. 002 Cable Fitting PG16

This is a cable gland made of brass, machined with good finish and Nickel plated. The gland is provided with PG16 thread (as per DIN 40430) for mounting. In case this item is procured from standard suppliers, a sample with catalogue No. etc. will have to be approved by BHEL before supply. In case of in-house manufacture, a detailed drawing is to be approved by BHEL.

Revision : 00

Date: 25-07-2019

Distribution

Qty.

Approved By :

(V. Rawtiya)

TME
TXM

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Prepared By:
Servish Bharati
25/07/19
(S. Bharati)

Checked By:
Servish Bharati
25/07/19
(S. Bharati)

Date:

25-07-2019



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3.3 Item No. 003 Gasket

This gasket should be made from silicone rubber. This gasket is meant for shielding purpose. The gasket sheet to be procured from standard well known sources.

3.4 Item No. 004 Resistance element

The resistance element to be RTD-PT100 with accuracy level of $\pm 0.5\%$ or as per IEC 60751/ Class-B or IS2848 (Latest Revision), housed in stainless steel to be made out of solid stainless steel bar (not tube). The resistance elements should be functional for a range of 0-260°C. The connections to RTD is through PTFE insulated cable of length as per drawing. The exit point of stainless steel housing to be crimped to hold tightly the PTFE cables.

The RTD with housing and cables should be procured from standard international (Suitable Make- UST-Germany or Allmetra-AG (SWZ) or any other standard make) manufactures. Concurrence to be obtained from BHEL regarding source.

Each RTD to be tested at supplier's works for the following :

- a) Resistance measurement in oil bath at 50, 75, 100, 125, 150, 175, 200, 225, 260°C. The calculated value of temp, and measured value of temp. should not differ by $\pm 0.5\%$ or as per IEC 60751/ Class-B or IS 2848(Latest Revision).
- b) After resistance measurement, HV test to be done at 1500 V AC 50 Hz for 1 minute. IR to be measured before and after HV test with 500 V megger. IR value to be minimum 100 M-ohm.

Two RTD's from each lot shall be tested for the following (mainly in accordance with IEC 60751) :-

- a) Drop test
- b) Vibration test
- c) Thermal response time
- d) IR value measurement at ambient and 100°C to be minimum 100 M-ohm. To be done after all tests.
- e) Lead pulling test at 3 Kgs load (this is in addition to IEC 60751). To be done in hot condition immediately after heating the resistance element up to 200°C.

3.5 Item No. 05 & 06 Foamed gaskets

This is a foamed gasket compressible by hand. The gaskets to be made of silicon rubber in foamed condition.

3.6 Item 007 press plug

This item is like standard Ferrule used for crimped connections. The item to be made of copper with silver plating.



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3.7 Item 008, 012 & 013 Shrink Sleeve

This is Heat Shrinkable Sleeve with a shrink ratio of 1:4 or 1:3. This item is to be procured from M/s Raychem, M/s PEP or M/s Alpha or any standard supplier.

3.8 Item No. 09 & 010 Hardwares

Standard hardwares with zinc plating to be used.

3.9 Item 011 Designation Strip

A suitable strip with "BHEL" embossed to be tied to the cable or embossing / engraving can be done on item 017.

3.10 Item 014 Protective Layer Tube

This is a Silicone rubber impregnated glass tube to be used as covering over the resistance element and crimped joints.

3.11 Item 015 Cable

This is a 4 core cable with PTFE insulation with a temperature withstanding capacity of minimum 120 deg. C. This cable to be procured from standard sources (Suggested Supplier- HUBER+SUHNER(SWZ) or any other standard make). The cable technical details to be approved by BHEL before supply.

Alternative Cable type RADOX TENUIS TW/S EMC 2×2×0.5 MM² can be used.

3.12 Item No. 016 Connector (Circular Type)

Item 16 is a Circular type connector. This connector is from ITT cannon (USA), Model type KPSE06E14 and has to be preferably procured from ITT Cannon. If equivalents are used, source of supply and sample to be approved by BHEL before supply.

3.13 Item No. 017 heat Shrink tube

This is a Heat Shrinkable boot to be fitted over the connector after connections. This is to be procured from standard sources.

4.0 INSPECTION REQUIREMENTS

For all the materials, test certificate from supplier or original manufacturer to be submitted. In addition, other tests may be conducted at BHEL, if felt necessary. For each purchase order from BHEL, the first two samples to be approved by Quality Control and Engg. Division of BHEL before regular supply.

Other requirements as per Purchase Order will also apply.

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