

**SPECIFICATION  
FOR  
TEMPERATURE SENSOR OIL CIRCUIT TRANSFORMER  
FOR  
WAG-9/WAP-7/WAP-5, 3-PHASE ELECTRIC LOCOMOTIVES**

**Specification No: CLW/ES/3/0033/ GH**

ISSUED BY  
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**ALTERATION RECORD SHEET**

Amendment Number	Date of Amendment	Page number	Alteration	Descriptions	Authority
1	12.02.02		A	Specification has been thoroughly revised.	Sd/-
2	10.03.03	8	B	Fire retardant/ self-extinguishing clause included as a note	Sd/
3	12.04.05	5 & 8	C	Correction of ABB identification number	Sd/
4	18.11.05	9 & 12	D	Correction of inner Dia in the drawing No: CLW/ES/3/SK-5/0033 and Scope of supply listed in the drawing no: CLW/ES/3/SK-1/0033.	Sd/
5	27.06.07	9	E	Cable screen must be connected to the connector body & sensor housing to ground at both ends	Sd/
6	16.01.10		F	Mounting Temperature Sensor deleted from scope of supply as it is procured from supplier of Set of Metallic Pipe	Sd/
7	03.05.12	6	G	Thickness of Copper Washer increased from 1.5 mm to 02mm	Sd/-
8			H	Specification has been thoroughly revised. Test description elaborated. drawing no-CLW/ES/3/SK-2, SK-3, SK-4 & SK-5/0033 removed. Existing drawing no- CLW/ES/3/SK-1/0033/G replaced by New modified drawing No-CLW/ES/3/SK-1/0033/H.	

**Note:** Specification has been digitized and all the alteration i.e addition, deletion, modification etc. has been incorporated in the digitized specification.

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**1.0 General**

TECHNICAL SPECIFICATION FOR TEMPERATURE SENSOR OIL CIRCUIT TRANSFORMER for 3-PHASE, WAG-9/WAP-7/WAP-5 ELECTRIC LOCOMOTIVES.

**2.0. SCOPE**

This specification covers the supply of Temperature Sensor Oil Circuit Transformer used in WAG-9, WAP-7 WAP- 5, 6000 HP, 3-phase, 25 Hz, AC locomotives.

In addition to the general conditions of the supply and the requirement given below, the supplier has to comply with the dimensions and instruction given in the relevant drawing sheet. The successful tenderer can obtain any other relevant technical details/drawing for further clarification from CLW.

**3.0 SERVICE CONDITIONS**

Maximum atmospheric temperatures: Under Sun: 70°C, In shade.: 50°C.

Ambient Temperature(operating) : -20°C +70°C

Ambient Temperature (Storage) : -30°C...+80°C

Normal Humidity : 60%.

Maximum Humidity : 100% saturation during rainy season.

Altitude : 160 m above mean sea level.

Rainfall.: Very heavy in certain areas. The locomotive will be designed to permit it's running at 10 kilometer per hour in flood water level of 102 millimeter above rail level.

Atmosphere during hot weather : Extremely dusty and desert terrain in certain areas.

Coastal areas :Locomotive and equipment will be designed to work in coastal areas in humid and salt laden atmosphere.

Vibration.: The equipment, subsystem and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in corresponding IEC-61373 publications unless otherwise prescribed.

**4.0 CONFORMING STANDARDS**

The Temperature Sensor shall conform to the requirements as per IEC 60571 & 60721-3-5 or latest updates/ equivalents.

**5.0 SCOPE OF SUPPLY**

Temperature Sensor consists of two items-1) Sensor Assembly and 2) Copper Washer.

Sl.No.	Description	ABB Identification No	CLW Drawing No-
01	SENSOR	3EHN424142R3000	CLW/ES/3/SK-1/0033/GH

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**6.0 TECHNICAL DESCRIPTION****SENSOR**

**6.1 DESCRIPTION:** The sensor consists of 2 PT 100 platinum resistance thermometers in one body

**6.2 CONNECTION:** Each Thermometer is connected to the control electronics in the two wire configuration.

**6.3 THERMOMETER REQUIREMENTS**

**6.3.1** Operating Temperature : -45 °C to +125°C

**6.3.2** Sensor tip environment : -45 °C to +125°C

**6.3.3** Accuracy : <0.5K in the temperature range as per IEC60571

**6.3.4** Test voltage : 1000VAC 60sec.

**6.4 INSTALLATION**

To installed in pipes with an outer diameter from 76.1 to 114.3mm

The sensor tip should be approximately in the middle of the pipe.

**6.5 ENVIRONMENTAL RESISTANCE**

Climatic Environmental Resistance : 5K2

Biological Environmental Resistance : 5B1

Chemical Environmental Resistance : 5C1

Mechanical Active Substances : 5S1

**6.6 MECHANICAL CONDITIONS**

Operating Environment : Insulating Oil.

**6.7 CABLE**

Cable Type : Cables Radox GKW RW/EMV 2x2x0.5mm (Electron beam Irradiated)

Construction : Cores 0.5mm<sup>2</sup>

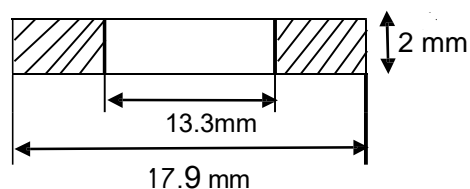
Conductor : Stranded Tin plated copper

Insulation : Radox GKW/RW

**6.8 SENSOR COVER**

Material : Stainless Steel

**6.9 COPPER WASHER:** The copper sealing washer belongs to the delivery.



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**6.10 CONNECTOR:-** All connectors must be of ITT CANNON or CLW/BLW/RDSO approved Source.

**6.11** Cable Screen must be connected to the connector body & sensor housing to ground at both ends.

## **7.0 APPROVAL OF SAMPLE**

**7.1** The offers from the OEM or its authorized agent for identical type of Temperature Sensor shall be verified based on the original test certificates from the OEM, the invoice particulars, which shall contain the Batch No./ SL. No, etc. and approval shall be given according to this data.

**7.2** For offers other than the Original type, the supplier shall make available at least two prototypes of the Temperature Sensor proposed to be supplied for inspection and tests at his works and request CLW/BLW when such sample is ready.

**7.3** The prototype testing facilities must be arranged by the supplier at his own cost. Tests shall be carried out as per relevant IEC standard mentioned above. The tenderer shall clearly indicate in the offer, his preparedness for carrying out the prototype tests and adequacy facilities to carry out the Type / Routine test at his premises.

**7.4** After the prototype tests as mentioned above, if it is considered necessary by **CLW/BLW's** representative to carry out any further tests or trials of the prototype at **CLW/BLW**, The supplier shall arrange for the same by the quickest means at his own cost.

**7.5** Series supply shall commence only after the prototypes are approved and cleared.

**7.6** Routine tests on 100% of the items shall be carried out by the authorized representative of CLW/BLW according to the relevant IEC standard mentioned above. Necessary facilities for carrying out the routine tests shall be arranged by the supplier free of cost.

## **8.0 TESTS**

### **FOLLOWING TESTS SHOULD BE CARRIED OUT ON TEMPERATURE SENSOR**

Sl. No.	Test Description	Type Test	Routine Test
8.1	Physical Verification, Quality of Workmanship and Dimensional measurement.	Y	Y
8.2	Di Electric test at 1000V AC.	Y	Y
8.3	Insulation Resistance Measurement.	Y	Y
8.4	Earth Checking.	Y	Y
8.5	Measurement of Resistance at Ambient Temperature.	Y	Y
8.6	Measurement of Resistance at -45° C and +125° C as per IEC: 60751.	Y	No
8.7	Damp Heat Test as per IEC: 60571.	Y	No
8.8	Dry Heat Test as per IEC: 60571.	Y	No
8.9	Ingress Protection Test (Level- IP-64 as per IEC: 60529).	Y	No
8.10	Shock and Vibration Test as per IEC: 61373.	Y	No
8.11	Verification of OEM documents as per approved Bill of Material.	Y	Y
8.12	Marking and Labeling as per specification clause no-10.0	Y	Y

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All Type test & Routine test will be carried out according to the International Standard (IEC-60571) & shall be finalized jointly with the firm.

## 9.0 HARDWARE

Standard Hardware and fasteners of **CLW/BLW** approved source only to be used.

## 10.0 LABELING/MARKING: -

Products should be marked with the following: -

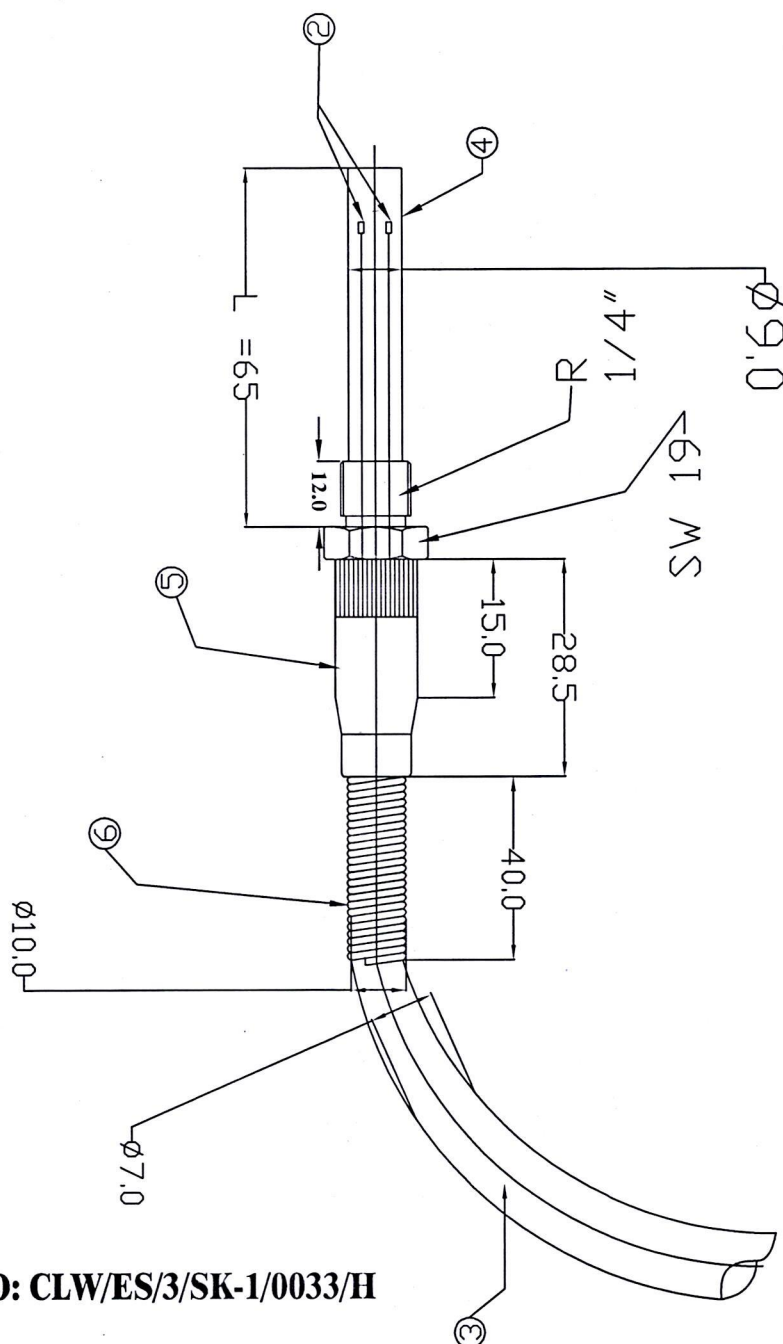
- i) Type no. of each product should be provided for identification.
- ii) Month/Year of manufacture.
- iii) Name of manufacturer with trademark, Code No. & Batch No.

## 11.0 QUANTITY/LOCO

Sl. No.	Description	ABB Identification No	CLW Drawing No.	QTY/ LOCO
01	TEMPERATURE SENSOR	3EHN424142R3000	CLW/ES/3/SK-1/0033/G H	02

**12.0 NOTE:** The Non Metallic part of Sensor should be Fire Retardant and Self Extinguishing type as per IEC 11731 or any other relevant DIN/IEC Standard.

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DRG. NO: CLW/ES/3/SK-1/0033/H

**NOTES:**

1. ALL DIMENSION ARE IN MM &amp; TOLERANCE AS PER IS

SL.NO.	DESCRIPTION	ITEM DETAILS
1.	5 PIN CONNECTOR (Circular type)	As per clause no-6.10
2.	PT-100 ELEMENT	2 PT 100 PLATINUM RESISTANCE THERMOMETER IN ONE BODY
3.	CABLE 4 CORE(PTFE)	CABLE RADOX GKW RW/EMV 2X2X0.5mm ELECTRON BEAM IRRADIATED
4.	SS HOUSING	SS 304
5.	SS PROTECTION COVER	SS 304
6.	SS PROTECTION SPRING	SS 304
7.	COPPER WASHER (2 Nos.)	AS PER DRAWING AT PAGE 5 TO BE LOOSE SUPPLY

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