SOP Calibrate the Thermocouple Transmitter

Scope: To Calibrate the Thermocouple Transmitter of Pyrotech make.

Responsibility: Instrumentation technician.

Accountability: Instrumentation - Section Engineer.

PPE:

- Safety helmet
- Safety shoe
- Mask
- Goggles
- Hand gloves (Heat Resistance)

Tools required:

- Multimeter
- Tester
- Screw Driver

Hazard Analysis:

Risks associated	Mitigating Measures
Electrocution	Use Insulated Tools/ hand gloves
Hand/Leg injury	Use Hand gloves and shoes

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Procedure:

Get work permit (Hot work) and line clearance from CCR.

1. Remove the input from terminals 4 & 5 and connect mV source.
2. Short dip switches s2 & s3 and feed input mV as per Log sheet and check the mA output at terminal no 7 & 8.
3. Note the readings. If the accuracy is more than +/- 0.5% go to step 5.4 else go to Step 5.8.
4. Feed zero mV at input and adjust the output to 4 mA by P4 pot.
5. Feed span mV as per Log sheet and adjust the output to 20 mA by P1 pot.
6. Repeat the steps 5.4 & 5.5 until the accuracy is within +/- 0.5%.
7. Feed the intermediate mV as per Log sheet and note down the readings.
8. Short S1 and open S2, S3. Check the output mA corresponds to ambient temperature.

$$mA = \left(\frac{16}{\text{max. Range in deg. C}} \times \text{amb .temp} \right) + 4\ mA$$

9. Check the accuracy. If the accuracy is more than +/- 0.5% go to step 5.10 else go to step 5.12.
10. Short dip switches 1 & 3 and open dip switch 2. Set the voltage "V2" at pin of IC2 (308) by "P2" pot using the formula

$$V2 = \frac{R5 + P1}{R14 + R15} \times (2.73 + 0.Rt + \text{offset voltage}) \text{ volts}$$

Where Rt is the ambient temperature.

Offset voltage can be measured at Pin 6 of IC 2, when S1, S2 and S3 are short.

Note: Refer PCB details for the exact values of P1, R5, R14 and R15 values.

11. Short S1 and open S2 & S3 and adjust the output mA corresponds to ambient temperature by "P3" pot.

12. Open dipswitches 1, 2 & 3 and restore the connections.

Emergency / Emergency Shut OFF:

1. If any unconsciousness is there, give First aid and inform to the Safety department or Call Emergency number 222/233/9865155288

Records/Annexure:

1. JSA as enclosed below.

JOB SAFETY ANALYSIS :(JSA)

Job Safety Analysis	Job: Calibration of temperature transmitter	Date: 25.05.2016	Analysis by: Section Engineer	Reviewed by: Section Head
Title of employee doing job: INST - TECHNICIAN	Supervisor: SECTION ENGINEER	Department: INSTRUMENTATION	Section: RAWMILL, PYRO , CEMENT MILL & PACKING PLANT	Approved by: HOD INSTRUMENTATION
Req'd/recommended PPE: SAFETY HELMET, SAFETY SHOES, GOGGLES, DUST MASK, HAND GLOVES				
SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURE**	**WHAT COULD GO WRONG**	**CORRECTIVE ACTION**
1. REMOVE TRANSMITTER CONNECTION	HEAT BURNS DUE TO NEAR BY HOT ZONE OR WHILE HANDLING HOT EQUIPMENTS	SWITCH OFF THE BLASTERS AND KEEP ALL OPENINGS CLOSED NEAR BY TO AVOID HOT MATERIAL COMING OUT ,USE HEAT RESITANT HAND GLOVES FOR HANDLING HOT PARTS	USE HEAT RESITANT HAND GLOWS IF	USE GOOGLES, DUST MASK AND HAND GLOVES -HEAT RESITANT AND OTHER PPE