

T-008 Inspection Limits and Repair

Thermocouple Harness

Engine Application(s):	Allison 250-B15G; 250-C18, C18A, C18B, C18C; 250-C20, C20B, C20F, C20J, C20R, C20R/1, C20R/2, C20R/4, C20S, C20W; 250-C28B, C28C.
Compliance:	Any time the Thermocouple Harness is removed for engine overhaul, it should be inspected to Extex criteria. The inspection will determine if the component is serviceable in its current condition, if the component is repairable per this instruction, or if the component should be replaced.
Notes:	Replaces Service Letter T-94-010 issued by Superior Turbine on May 31, 1994. Refer to the Type Certificate Holder's published data for assembly, disassembly and engine operation.
Revisions:	N/C Dated: 01/30/97 Original issue. A Dated: 11/28/97 Updated format. B Dated: 08/11/98 Updated format. Added ® to ALUMEL® and CHROMEL®. C Dated: 09/09/09 Updated EXTEX to TIMKEN. D Dated: 11/16/2015 Updated Timken to Extex

Inspection Procedures

1.0 Inspect part using the following criteria.

Condition	Service Limit	Repair Limit	Corrective Action
Lead Terminal Damage: Distorted, Corroded, Broken Out, etc. (Visual Inspection)	No lead terminal damage is acceptable.		If Service Limit is exceeded, replace assembly or repair per Approved Procedure.
Insulation Damage or Break Out. (Visual Inspection)	Maximum 0.18 inch of original insulation.	Not Repairable.	Replace assembly if Service Limit is exceeded.
Sleeving Damage: Tears, Frays, Looseness, etc. (Visual Inspection)	No sleeving damage is acceptable.		If Service Limit is exceeded, replace assembly or repair per Approved Procedure.
Cable Shielding Damage (Visual Inspection)	No cable shielding damage is acceptable.		If Service Limit is exceeded, replace assembly or repair per Approved Procedure.
Probe Tip Damage: Cracking, Over-temperature, Damage, Erosion, etc. (Visual Inspection using 10X magnification)	Cracks are not acceptable. Minimum tip area erosion of 25%. Evidence of over temperature is not acceptable.		Replace assembly if Service Limit is exceeded.

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Condition	Service Limit	Repair Limit	Corrective Action
Sheath Wear (Visual Inspection)	Maximum of 0.015 inch deep. Maximum of 90° Circumferentially.		Replace assembly if Service Limit is exceeded.
Internal Resistance Check between CHROMEL® and ALUMEL® leads. (Remove harness from engine. If harness cannot be removed, disconnect one lead from the junction block.) * See Caution Below.	0.55 to 0.65 ohms (Cold Harness) * See Note Below.		Replace assembly if Service Limit is exceeded.
Continuity Check (Hot) (Resistance-to-ground)	2000 ohms minimum ** See Note Below.		Replace assembly if Service Limit is exceeded.

*** Notes on Internal Resistance Check:**

If resistance checks over maximum, this indicates an open circuit in the harness assembly. If resistance checks under minimum, this indicates a short in the harness assembly. Replace harness either way. CAUTION: When installed on a hot engine, the thermocouples can generate a small potential which can produce errors in the measured internal resistance values.

**** Notes on Continuity Check:**

Resistance-to-ground measurement method:

- 1) Connect the Harness terminal leads to a millivolt meter.
- 2) Connect a 1 ½ volt ohmmeter between one terminal lead and a ground, such as a metal shield or flange.
- 3) Using Jet Cal and kit BH8001 (or equivalent), apply 1200± 50°F (650± 28°C) temperature to each probe.
- 4) An acceptable harness will indicate the following at all 4 probes:
 - a) Upscale millivolt meter reading
 - b) Gradual increase in resistance rising above 2000 ohms
- 5) If either of the following characteristics are observed at any probe, replace the harness:
 - a) Decrease in resistance reading regardless of reading
 - b) Zero resistance (short)

To properly measure resistance to ground on an uninstalled harness, apply heat and measure between each probe flange and either harness lead. If resistance checks under minimum, this indicates a short in the probe probably caused by a magnesium oxide insulation short and/or probe tip carbon build-up.

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Repair Procedures

1.0 Terminal Replacement:

- a. Cut off flat end of the terminal.
- b. Fit terminal to wire size by grinding.
- c. Insert wire into new terminal and weld in place.
- d. Ensure that the terminals are on the correct wire. The CHROMEL® wire (terminal size 8-32) is color-coded white and nonmagnetic. The ALUMEL® wire (terminal size 10-32) is color-coded green and magnetic.

2.0 Sleeving Replacement:

- a. Separate the ALUMEL®/CHROMEL® terminal junction. The potting material will be destroyed.
- b. Pull at terminal end to remove both the Teflon and fiberglass sleeves.
- c. Pull a replacement silicone impregnated fiberglass sleeve onto the lead. Tuck under approximately ¼ inch (6mm) of the sleeving at the terminal end. Before proceeding further, verify that the CHROMEL® lead sleeving is white and that the ALUMEL® lead sleeving is green.
- d. Pull the shrinkable thin wall Teflon sleeving over the fiberglass sleeve. Shrink the Teflon with heat.
- e. Close the clamp over the sleeving. At the junction of the CHROMEL® and ALUMEL® leads, repair the clamp with cement (Englhard EMS 8282 cement, G.E. RTV No. 60 with 0.1% Thermolite No. 12 catalyst, or equivalent).

3.0 Cable Repair (Short):

- a. Unwrap wire to expose short.
- b. Without cutting metal wrap, unwind wrap approximately 1 inch each way from the shorted area.
- c. Wrap the individual wires with pressure sensitive tape (3M No. 69 or equivalent) before rewinding metal wrap over repaired area.
- d. Use a cushioned loop-type clamp (similar to clamp used for engine tubing) to cover the metal wrapped repair area.

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