P U B L I C A T I O N T R A N S M I T T A L

RR-DERBY

V2500 International Aero Engines

400 MAIN STREET, MAIL STOP 121-10
EAST HARTFORD, CT 06108, USA.
TELEPHONE: 860 565 5515
FAX: 860 565 0600

P.O. BOX 31, DERBY
TELEGRAMS - 'ROYCAR' DERBY
TELEX - 37645
TELEPHONE - DERBY 242424

DATE R Apr.23/03

V2500-D5 SERIES PROPULSION SYSTEM SERVICE BULLETIN

This document transmits Revision 1 to Service Bulletin EV2500-77-0010 and Revision 1 to the Supplement

Document History

Service Bulletin Revision Status		Supplement Revision Status	
Initial Issue	Mar.12/03	Initial Issue	Mar.12/03

Bulletin Revision 1

Remove	Incorporate	Reason for change
All pages of the Service Bulletin	Pages 1 to 7 of the Service Bulletin	To add AMM references.

Supplement Revision 1

Remove	Incorporate	Reason for change
All pages	Page 1	To add AMM references.

V2500-ENG-77-0010

CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
If any have not been received please advise Publication Services, Rolls-Royce plc, Derby, England

LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 1 to the Bulletin and Revision 1 to the Supplement are as follows:

	Page	Revision Number	Revision Date
	Bulletin		
R	1	1	Apr.23/03
R	2	1	Apr.23/03
R	3	1	Apr.23/03
R	4	1	Apr.23/03
R	5	1	Apr.23/03
R	6	1	Apr.23/03
R	7	1	Apr.23/03
	Supplement		
R	1	1	Apr.23/03

ENGINE INDICATING - EGT HARNESS AND JUNCTION BOX - INTRODUCTION OF A EGT HARNESS JUNCTION BOX ASSEMBLY WITH REVISED SELF LOCKING NUTS

1. Planning Information

A. Effectivity

Boeing - Longbeach Division MD-90

V2525-D5, V2528-D5 Engines prior to Serial No. V20285

B. Concurrent Requirements

None.

C. Reason

(1) Condition

Fluctuation or loss of Exhaust Gas Temperature (EGT) signal to the aircraft cockpit engine indicating system may occur.The problem is attributed to the EGT harness junction box terminal self locking cable securing nuts becoming loose due to engine vibration.

(2) Background

The problem has been observed on units in service.

(3) Objective

Incorporation of this Service Bulletin (Modification) is designed to maintain reliability.

(4) Substantiation

The changes introduced by this Service Bulletin have been the subject of satisfactory engineering assessment and significant satisfactory service experience on V2500-A1 and V2500-A5 engine models without any problems being encountered.

(5) Effect of Bulletin on:

(a) Operation

Not affected.

(b) Maintenance

Not affected.

(c) Overhaul

Affected (see 1.O. Other Publications Affected).

(d) Repair Schemes

Not affected.

(e) Interchangeability

Not affected.

(f) Fits and Clearances

Not affected.

D. Description

(1) This Service Bulletin covers the fitment to engines of an EGT Harness Junction Box assembly supplied by HARCO Laboratories Inc. incorporating design changes to prevent fluctuating or loss of EGT signal to the aircraft cockpit engine indicating system.

(2) The changes introduced are:

A revised EGT harness junction box assy is introduced similar to the existing part except for the following:

(a) The junction boxs terminal post self locking nuts have been changed to SBACS elliptical lock nuts from Klincher lock nuts.

E. Compliance

Category Code 6

Accomplish when the sub-assembly (i.e. modules, accessories, components, components. build groups) is disassembled sufficiently to afford access to the affected spare parts.

F. Approval

The part number changes and/or part modification described in Section 2 and 3 of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA approved for the engine model listed.

G. Manpower

Refer to Vendor Service Bulletin (see 1.N. References).

H. Material Price and Availability

Refer to Vendor Service Bulletin (see 1.N. References).

I. Tooling Price and Availability

Special tools are not required.

J. Industry Support Information

Not applicable.

K. Weight and Balance

(1) Weight Change

None.

(2) Moment Arm

None.

(3) Datum

Engine Front Mount Centreline (Power Plant Station PPS 100).

L. Electrical Load Data

This Service Bulletin does not affect the aircraft electrical load.

M. Software Accomplishment Summary

Not applicable.

N. References

(1) Engine Manual, Chapter/Section 72-00-50, Removal-01.

(2) Engine Manual, Chapter/Section 72-00-50, Installation-05.

R (3) Aircraft Maintenance Manual, Chapter/Section 77-21-43,
R Removal/Installation.

(4) HARCO Laboratories Service Bulletin SB1-77-28-01.

(5) Internal Reference No. - 02VI002.

(6) ATA Locator - 77-21-43.

O. Other Publications Affected

(1) V2500 Engine Illustrated Parts Catalogue (EIPC) (S-V2500-1IA, 2IA, 2IB, 5IA, 5IB, 6IA, 6IB, 7IA, 7IB), Chapter/Section 77-21-43, to add the new parts.

(2) V2500 Engine Manual (EM) (E-V2500-1IA), Chapter/Section 77-28-01, Cleaning, Inspection and Repair.

(3) Engine Manual, Chapter/Section 72-00-50, Removal-01.

(4) Engine Manual, Chapter/Section 72-00-50, Installation-05.

R (5) Aircraft Maintenance Manual, Chapter/Section 77-21-43,
R Removal/Installation.

(6) HARCO Laboratories Service Bulletin SB1-77-28-01.

P. Interchangeability of Parts

(1) Affected (See 2.D).

2. Material Information

A. The kit required consists of the following parts:

None.

B. Parts to be reworked:

None.

C. New production parts:

77-21-43

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
02010	26669-000	1	.Box, Cable, TC (V00060)	-	HAD20759	(A)(B) (S1)
02052	AS27832	2	..Nut, self locking (.164dia)	-	HDA13955	(A)(B) (S2)
02052	2A3565	2	..Nut, self locking (.164dia)	-	HDA13955	(A)(B) (S2)(C)
02054	AS20624	2	..Nut, self locking (.190dia)	-	HDA13956	(A)(B) (S2)
02054	2A3564	2	..Nut, self locking (.190dia)	-	HDA13956	(A)(B) (S2)(D)

D. Instruction/Disposition Codes

(A) Part will be made available from September 2003.

(B) Old part becomes redundant upon embodiment of this modification.

(C) Alternative to AS27832.

(D) Alternative to AS20624.

(S1) Old and new parts are freely and fully interchangeable.

(S2) New part may be used in place of old part, but not vice versa.

3. Accomplishment Instructions

A. Rework Instructions

None.

B. Assembly Instructions

For the correct assembly instructions for the revised EGT harness junction box assy introduced by this Service Bulletin, refer to Engine Manual (D5),
R Chapter/Section 72-00-50, Installation-05 or Aircraft Maintenance Manual,
R Chapter/Section 77-21-43, Page Block 401, Removal/Installation.

C. Recording Instructions

(1) A record of accomplishment is necessary. Refer to Vendor Service Bulletin (see 1.N. References).

V2500-D5 EGT Harness Junction Box Assy. Family Tree *

Service Bulletin Number

BASELINE
HARCO Laboratories Inc.

HAD20759

V2500-ENG-77-0010
Introduction of a EGT Harness Junction Box Assy. with revised self locking nuts.

26669-000

ded0004837

Family Tree
Figure 1

ENGINE INDICATING - EGT HARNESS AND JUNCTION BOX - INTRODUCTION OF A EGT HARNESS JUNCTION BOX ASSEMBLY WITH REVISED SELF LOCKING NUTS

SUPPLEMENT - PRICES AND AVAILABILITY

The prices if shown are for estimating purposes only and as such are given in good faith, without commercial liability for advanced planning purposes only. Refer to IAE Spares and/or current price catalogue for current prices.

1. Modification Kit:

Not applicable.

2. New Production Parts:

Part No.	Desc.	Unit Price US Dollars
26669-000	Box, cable, TC	Price supplied on request
AS27832	Nut	3.71
2A3565	Nut	Price supplied on request
AS20624	Nut	1.50
2A3564	Nut	Price supplied on request

Letter Of Transmittal

This Original Issue of Service Bulletin SB1-77-28-01-BASIC requires a change to the retaining nuts which are used to secure the harness leads to the terminal studs in the Junction Box. These Retaining Nuts are used in the Junction Box of top level assembly HAD20759 RR P/N L902503).

The old Harco part numbers for the EGT Harness and Junction Box HAD20759 (RR P/N L902503) will be replaced new Harco part number 26669-000.

The old Harco part numbers for the Retaining Nuts HDA13955 (IAE P/N 2A2443) and HDA13956 (IAE P/N 2A2442) will be replaced by new Harco part numbers 25483-000 (IAE P/N 2A3565) and 25483-001 (IAE P/N 2A3564).

A Run-On Torque Test will be performed to determine the effectiveness of the replacement nuts.

Original July 31, 2002

HARCO LABORATORIES, INC.
186 CEDAR STREET
BRANFORD, CT. 06405

SERVICE BULLETIN #

SB1-77-28-01-BASIC

ENGINEERING CHANGE IN DESIGN

EGT HARNESS AND JUNCTION BOX &
NUT, RETAINING

P/N26669-000
P/N 25483-000 (IAE P/N 2A3565)
P/N 25483-001 (IAE P/N 2A3564)

INTRODUCTION OF
EGT HARNESS AND JUNCTION BOX &
REPLACEMENT NUTS, RETAINING

Original July 31, 2002

1. PLANNING INFORMATION:

A. SUMMARY:

This Service Bulletin introduces new Nuts, Retaining which secure the harness leads to the terminal studs in the junction box for the V2500 engine series. This Service also introduces a change to the top level part number for the EGT Harness and Junction Box which the Nuts, Retaining go into.

B. EFFECTIVITY:

V2500 engine series incorporating the use of the below listed Retaining Nuts in the junction box assembly.

The old EGT Harness and Junction Box is as follows:

Nomenclature	Harco Part No.	RR Part No.
EGT Harness & Junction Box	HAD20759	L902503

The old Nuts, Retaining are as follows:

Nomenclature	Harco Part No.	IAE Part No.
Nut, Retaining	HDA13955	2A2443

Nomenclature	Harco Part No.	IAE Part No.
Nut, Retaining	HDA13956	2A2442

The new EGT Harness and Junction Box is as follows:

Nomenclature	Harco Part No.
EGT Harness & Junction Box	26669-000

The new Nuts, Retaining are as follows:

Nomenclature	Harco Part No.	IAE Part No.
Nut, Retaining	25483-000	2A3565

Nomenclature	Harco Part No.	IAE Part No.
Nut, Retaining	25483-001	2A3564

C. REASON:

1. Problem : Exhaust Gas Temperature (EGT) display fluctuations and loss of EGT display events in service have been correlated with the loosening of the EGT Harness junction box terminal nuts.

2. Cause : The current EGT junction box harness connection nuts on the V2500 use a spring type locking feature. This type of nut has very specific torque requirements and is also subject to incorrect installation. Service experience has also shown that the nuts may become loose over time.

3. Solution : Replace the current spring type locking nut with an elliptical (Deformed Thread) locking nut.

D. DESCRIPTION:

This Service Bulletin provides a change to the Retaining Nuts used in the Junction Box Assembly. It also introduces a new Top Level part number for the EGT Harness and Junction Box. There is a test for Run-On torque to assure that the new nuts are functioning properly. When the nuts are changed out, the top level assembly part number will have to be changed to reflect the new configuration of the part.

E. APPROVAL:

The procedures given in this Service Bulletin obey the applicable Federal Aviation Regulations. The procedures are FAA approved for the Harness that is given in EFFECTIVITY. The technical content of this document was approved by IAE Technical Services in February 2003.

F. COMPLIANCE:

Category 6.
Accomplish when the subassembly (i.e. modules, accessories, components, build groups) is disassembled sufficiently to afford access to the affected part and to affected spare parts.

G. MANPOWER:

The procedure can be completed in one hour.

H. MATERIAL COST AND AVAILABILITY:

See Section 3.

I. TOOLING - PRICE AND AVAILABILITY:

No special tools are necessary.

J. WEIGHT AND BALANCE:

Not changed.

K. ELECTRICAL LOAD DATA:

Not changed.

L. SOFTWARE ACCOMPLISHMENT SUMMARY:

M. REFERENCES:

Harco Component Maintenance Manual 77-28-01, P/N HS51149
IAE V2500-ENG-77-0010

N. OTHER PUBLICATIONS AFFECTED:

1. V2500 Engine Illustrated Parts Catalogs (S-V2500-1IA, S-V2500-2IA, S-V2500-2IB, S-V2500-5IA, S-V2500-5IB, S-V2500-6IA, S-V2500-6IB, S-V2500-7IA, and S-V2500-7IB), Chapter/Section 77-28-01, to add the new parts.

2. V2500 Engine Manuals (E-V2500-1IA) Chapter/Section 77-28-01 Cleaning, Inspection and Repair, to add the new parts.

2. ACCOMPLISHMENT INSTRUCTIONS:

A. DISASSEMBLY INSTRUCTIONS

1. Remove safety wire from screws which secure the cover to the junction box assembly.
2. Remove screws and cover from the junction box assembly.
3. Remove 2 larger thread diameter nuts from the larger (.190-32) terminal studs and properly dispose of.
4. Remove 2 smaller thread diameter nuts from the smaller (.164-32) terminal studs and properly dispose of.

B. ASSEMBLY INSTRUCTIONS

CAUTION: THE USE OF LUBRICATION IS NOT PERMITTED ON EITHER THE STUDS OR LOCK NUTS.

CAUTION: ONCE A NEW STYLE NUT IS INSTALLED ONTO THE MATING STUD, YOU MUST NOT INSTALL AN OLD NUT ON THAT STUD.

1. Install 2 larger thread diameter nuts onto the larger thread diameter terminal studs.
2. Install 2 smaller thread diameter nuts onto the smaller thread diameter terminal studs.
3. Perform a Run-On Torque Test as follows:

a. Use a torque wrench with a resolution of 1 inch-pound (0.113 Nm) or smaller.
b. Run the nut onto the stud until finger tight so that the locking thread is in contact with the stud thread.

1. Minimum Run-On torque for the smaller (0.164-32) thread diameter nut shall be 1.5 inch pounds (0.169 Nm).
2. Maximum Run-On torque for the smaller (0.164-32) thread diameter nut shall be 9 inch pounds (1.017 Nm).
3. Minimum Run-On torque for the large (0.190-32) thread diameter nut shall be 2 inch pounds (0.226 Nm).
4. Maximum Run-On torque for the larger (0.190-32) thread diameter nut shall be 13 inch pounds (1.469 Nm).

c. While using the torque wrench to install the nuts, measure and record the torque necessary to run the nut down to the stud shoulder.
d. If either nut fails to meet the minimum or maximum torque requirement, use a new nut and redo the test. If the second test fails also, replace the stud per CMM 77-28-01 or return the unit to Harco.

2. ACCOMPLISHMENT INSTRUCTIONS:

B. ASSEMBLY INSTRUCTIONS

NOTE: IF THE NEW NUTS GO ONTO THE STUDS WITH NO PROBLEMS, ONLY THE CONTINUITY AND SHORT CIRCUIT CHECK ARE REQUIRED. IF A STUD HAS TO BE REPLACED, THEN THE INSULATION RESISTANCE TEST MUST ALSO BE DONE.

4. Torque the larger thread diameter Nut to 25 – 30 Inch Pounds (2.82 – 3.39 N.M).
5. Torque the smaller thread diameter Nut to 20 – 25 Inch Pounds (2.26 – 2.82 N.M).
6. Perform Testing and Fault Isolation (Page 7) to assure electrical integrity.
7. Attach the cover to the junction box with 4 screws.
8. Safety wire the screws which attach the cover to the junction box.

VIBROPEEN INSTRUCTIONS

NOTE: Suitable alternates may be used for grinding and vibropeening

1. Use a hand grinder to remove the old part numbers from the Cover Assembly (HAD20759 and L902503).
2. Vibropeen new part number onto the Cover Assembly (26669-000).

1. Testing and Fault Isolation

A. General

(1) Use a good quality multimeter. Make sure that it operates properly.

(a) The meter needle must move freely, without stopping.
(b) The test lead probes must be tight and the jacks must be held firmly in position.
(c) the batteries must be in good condition to permit the meter needle to move freely through its full range at all ranges.

(2) Refer to Table 101 for the necessary test equipment and materials.
(3) Refer to Table 102 for fault corrective actions.

NOTE: You can use equivalent alternatives.

TYPE	DESCRIPTION	DESIGNATION	MANUFACTURER
Test Equipment	Multimeter Bench Model (5 digit resolution)	HP Model 3468A	Hewlett Packard 19310 Pruneridge Ave. Cupertino, CA. 95014 (800) 752-0900
Test Equipment	Megohmmeter	Model 1620-C	Freed Transformer Co., Inc 21 Yenicock Ave. Port Washington, N.Y. 11050 (800) 548-0904

TEST EQUIPMENT AND MATERIAL
TABLE 101

B. Testing (Figures 101 and 102)

WARNING: BE CAREFUL WHEN YOU TOUCH BROKEN BRAID ENDS.

CAUTION: DO NOT MAKE SHARP-ANGLE BENDS, CAREFULLY BEND OR TWIST CABLES AND WIRES OR YOU CAN DAMAGE THE CONDUCTORS OR WIRE BRAID.

NOTE: Be careful that the terminal lugs do not touch each other.

To do a continuity and intermittent (broken wire) test; set the range switch of the multimeter to approximately ten ohms or less.

(1) Continuity Test (Figure 102)

NOTE: If you gently bend the cable, you may find an intermittent (broken wire) circuit.

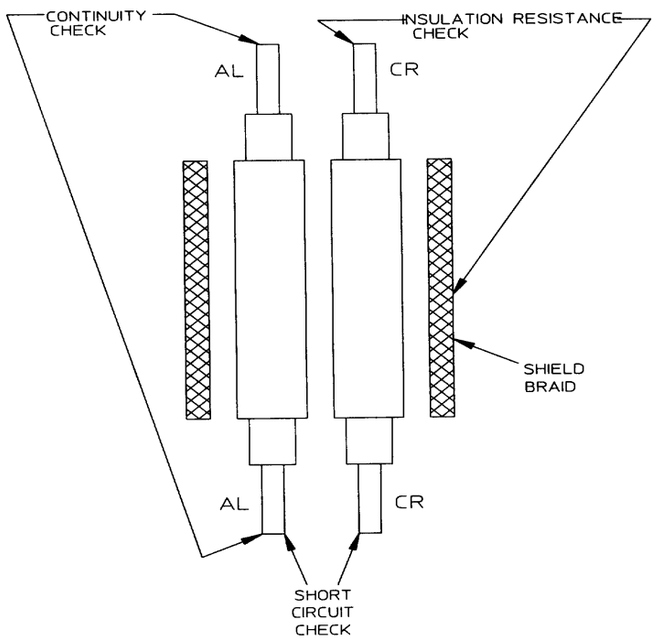
(a) Use the schematic wiring diagram (Figure 102) to do this continuity test.

(b) Measure the resistance values of each wire from its thermocouple terminal lug to its output terminal stud as follows:

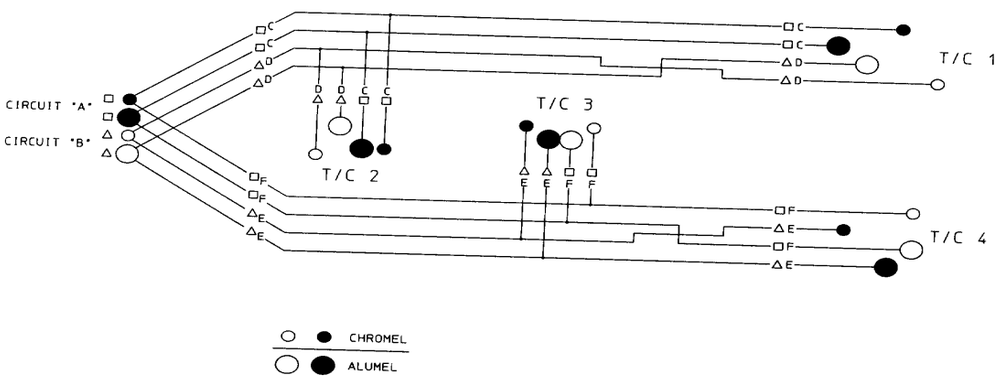
Connect the wire from the multimeter to the input lug of a harness wire, then connect the other wire from the multimeter to the output stud (in the junction box) of the same harness wire.

(c) Do step (b) for each wire in the harness.

The resistance value in each case must be less than two (2) Ohms. If the resistance value is high or changes when you bend the wire, the harness assembly is not satisfactory.



TYPICAL THERMOCOUPLE CABLE TEST DIAGRAM
FIGURE 101



SCHEMATIC WIRING DIAGRAM
PART NO. HAD20759
FIGURE 102

(2) Short Circuit Test (Figure 102)

WARNING: BE CAREFUL WHEN YOU USE EQUIPMENT WITH HIGH VOLTAGE.

(a) Set the megohmmeter to zero and make sure that it operates correctly. Set the scale to get values up to 10 megohms at 100 "VDC".

(b) Do a test for short circuits between all parts of the "A" and the "B" circuits. Use the test wires form the megohmmeter to connect the terminal studs in the junction box as follows:

(1) Connect wire one from the megohmmeter to the chromel stud of the "A" circuit.

(2) Connect wire two from the megohmmeter to the alumel stud of the "A" circuit and measure the resistance value.

If resistance is below 1 megohm at 100 vdc, the assembly is not satisfactory.

(3) Gently bend the cable and measure the resistance.

If the meter moves from a high to a low resistance value, the assembly is not satisfactory.

(4) Do steps (2) and (3) again with wire two connected to the chromel stud of the "B" circuit.

(2) Short Circuit Test (continued)

(5) Do steps (2) and (3) again with wire two connected to the alumel stud of the "B" circuit.
(6) Connect wire one from the megohmmeter to the chromel stud of the "B" circuit.
(7) Do steps (2) and (3) again with wire two connected to the alumel stud of the "A" circuit.
(8) Do steps (2) and (3) again with wire two connected to the alumel stud of the "B" circuit.

(3) Insulation Resistance

(a) With one wire from the megohmmeter touch the wire braid. With the other wire, touch each one of the four output studs in the junction box. In each test, the megohmmeter must show a resistance value larger than 1 megohm at 100 vdc.
(b) Do a test of the resistance between each terminal lug and its protective band. In each test, the resistance value must be larger than 1 megohm at 100 vdc.
(c) Do a test of the resistance between each protective band and the wire braid. In each test, the resistance must be larger than 1 megohm at 100 vdc.

(4) End Of Testing

(a) After the TESTING is completed, attach the cover to the junction box. Refer to ASSEMBLY.

END OF TASK

C. Fault Isolation (Table 102)

TROUBLE	PROBABLE CAUSE	CORRECTION
HARNESS ASSEMBLY		
(1) Open Circuit (Continuity)	(a) Broken wire at terminal Lug	Send to Harco
	(b) Broken wire in cable	Send to Harco
	(c) Test instrument batteries defective	Replace
	(d) Test leads loose in test instruments	Tighten
	(e) Test leads open or broken	Replace
	(f) Test instrument needle does not move freely	Repair and calibrate

FAULT ISOLATION
TABLE 102

TROUBLE	PROBABLE CAUSE	CORRECTION
HARNESS ASSEMBLY		
(2) Short Circuit	(a) Worn or damage insulation sleeve at terminal lugs	Send to Harco
	(b) Mounting clip pushed into cable	Send to Harco
	(c) Terminal lugs touching	Move apart
	(d) Test instrument leads touching	Move apart
	(e) Unwanted material on terminal lugs.	Clean Lugs with scratch brush
(3) Low Insulation	(a) Moisture in cable.	Bake in Oven at 250 Deg F for four hours
	.	

TESTING AND FAULT ISOLATION
TABLE 102 (continued)

TROUBLE	PROBABLE CAUSE	CORRECTION
JUNCTION BOX		
(1) Open Circuit	(a) Broken wire at terminal lug.	Send to Harco
	(b) Broken terminal lug	Send to Harco
(2) Short Circuit	(a) Unwanted material between stud and terminals.	Clean with scratch brush
	(b) Damaged stud terminals	Replace
(3) Low Insulation	(a) Unwanted material between stud terminals.	Clean with scratch brush
	(b) Moisture is found.	Bake in Oven at 250 Deg F for four hours
HARNESS AND JUNCTION BOX		
(1) Reading drifts during insulation resistance test.	(a) Moisture is found.	Bake in Oven at 250 Deg F for four hours

FAULT ISOLATION
TABLE 102 (continued)

3. MATERIAL INFORMATION:

New Part Number	Qty.	Price	Part Name	Old Part Number	Old Part Disposition
26669-000	1	Call Harco	EGT Harness and Junction Box	HAD20759 (L902503)	Modify
25483-000 (2A3565)	2	Call Harco	Nut, Retaining	HAD13955 (2A2443)	Scrap
25483-001 (2A3564)	2	Call Harco	Nut, Retaining	HAD13956 (2A2442)	Scrap

NOTE: Refer to ACCOMPLISHMENT INSTRUCTIONS in this bulletin for rework parts.

******** The Harco Sales Department will give a firm price when necessary.