SERVICE BULLETIN REVISION NOTICE

NACELLE – THRUST REVERSER ASSEMBLY COMPRESSION STRUT ADJUSTMENT AND RIGGING MODIFICATION

Turbojet Engine Service Bulletin No. V2500-NAC-78-0189 Revision No. 2 dated May 9, 2017

Revision History

Original Issue October 26, 2000

Revision 1 dated March 16, 2001

Revision 2 dated May 9, 2017

Reason for the Revision

The information contained in this Service Bulletin has been superseded by the instructions provided in Boeing MD-90 Aircraft Maintenance Manual, Task 78-32-00-830-801. It is no longer necessary to do this Service Bulletin, Original Issue, or Revision 1 of this Service Bulletin.

Effect of Revision on Prior Compliance

None.

This is a Complete Revision (Not Applicable to the SGML version)

The format of this Service Bulletin has not been changed from Revision 1. See Reason for the Revision above.

MODEL APPLICATION
V2525-D5, V2528-D5

BULLETIN ISSUE SEQUENCE
V2500 Series 78-0189

Page	Revision No.	Date
Summary	2	May 9/17
1 thru 23	2	May 9/17

A copy of this Revision Notice and any future revision notices must be filed as a permanent record with your copy of the subject bulletin.

NO TECHNICAL DATA SUBJECT TO THE EAR OR ITAR.

TRANSMITTAL

SERVICE BULLETIN

Number: **V2500-NAC-78-0189, Revision No. 1**

Summary

Date: March 16, 2001

ATA System: 78-30

SUBJECT: THRUST REVERSER ASSEMBLY COMPRESSION STRUT ADJUSTMENT AND RIGGING MODIFICATION

BACKGROUND

GENERAL:

Due to insufficient compression of the thrust reverser seals, the thrust reverser latch access door can open inadvertently.

The thrust reverser compression struts and/or support brackets can become damaged in service.

This service bulletin provides instructions to change the thrust reverser rigging to improve the compression of the seals and so reduce the pressure of the core compartment.

This service bulletin provides instructions to examine and adjust the thrust reverser compression struts.

ACTION:

Change the thrust reverser bumper shim gaps.

Examine and adjust the thrust reverser compression struts.

COMPLIANCE:

Category 4

Accomplish at the first visit of the nacelle or nacelle component to a maintenance base capable of compliance with the accomplishment instructions regardless of the planned maintenance action for the nacelle or nacelle component.

EFFECTIVITY:

All V2500-D5 thrust reversers with serial numbers prior to 0701001.

MANPOWER:

Manpower necessary to incorporate Service Bulletin is 8 man hours for each thrust reverser.

MATERIAL INFORMATION:

No parts are required to accomplish this service bulletin.

"MODIFICATION SERVICE BULLETIN" - "NACELLE - EXHAUST - THRUST REVERSER COMPRESSION STRUT AND RIGGING MODIFICATION"

1. PLANNING INFORMATION

A. Effectivity

(1) Airplane: MD-90

(2) Nacelle: All V2500-D5 thrust reversers with serial numbers prior to 0701001.

B. Concurrent Requirements

(1) Service Bulletin V2500-NAC-78-0186 should be done before or at the same time as this service bulletin to gain maximum advantage from this change.

(2) Service Bulletins V2500-NAC-36-0002 and V2500-ENG-72-0281 must be done before or at the same time as this service bulletin to get adequate clearance between the thrust reverser heat shield and the ECS duct.

C. Reason

(1) Problem

(a) The thrust reverser latch access door can open inadvertently in flight.

(b) The thrust reverser compression struts and support brackets can become damaged in service.

(2) Cause

(a) Insufficient compression of the thrust reverser seals.

(b) Improper adjustment of the compression struts and/or damage to the support brackets.

(3) Background

(a) Thrust reverser latch access doors have inadvertently opened in flight.

(b) Thrust reverser compression struts and support brackets have been found damaged in service.

(4) Objective

(a) The changes in configuration recommended in this Service Bulletin are intended to maintain reliability of the thrust reverser by preventing the latch access door from opening inadvertently.

(5) Substantiation

(a) Not applicable.

D. Description

This service bulletin provides instructions to change the thrust reverser rigging.

This service bulletin provides instructions to examine and adjust the thrust reverser compression struts.

E. Compliance

Category 4

Accomplish at the first visit of the nacelle or nacelle component to a maintenance base capable of compliance with the accomplishment instructions regardless of the planned maintenance action for the nacelle or nacelle component.

F. Approval

Incorporation of this Service Bulletin must be accomplished only in conjunction with Boeing Service Bulletin MD90-78-046 which has received exclusive FAA approval for MD-90 Series Aircraft.

G. Manpower

Estimated manhours to incorporate the full intent of this Service Bulletin.

VENUE	EST'D MAN HOURS
(1) In Service	
(a) To accomplish	8 hours
Total	8 hours per nacelle (16 hours per aircraft)

NOTE: Man hour estimate is provided for planning purposes only. No labor reimbursement is provided under the terms of this service bulletin offering.

H. Material Cost and Availability

No parts are required to accomplish this service bulletin.

I. Tooling

None.

J. Weight and Balance

1)	Weight change	None
2)	Moment Arm	No effect
3)	Datum	Engine front mount centreline (Powerplant Station PS 100)

K. References

Publication	Chapter/Section
MD-90 Service Bulletin V2500-NAC-78-0186	
MD-90 Service Bulletin V2500-NAC-36-0002	
MD-90 Service Bulletin V2500-ENG-72-0281	
IAE Standard Practices/Processes Manual (SPP-V2500-1IA)	70-09-00
MD-90 Aircraft Maintenance Manual	

L. Other Publications Affected

None.

2. Material Information

A. Material - Price and Availability

None.

B. Material Requirements

(1) The following is applicable to one thrust reverser.

C. Kits necessary for this Service Bulletin:

None.

D. Parts affected by this Service Bulletin:

None.

E. Instructions/Disposition Codes:

None.

F. Tooling - Price and Availability:

None.

G. Materials Required to do this Service Bulletin:

None.

3. Accomplishment Instructions

A. Open the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

B. Remove the thrust reverser compression struts. Refer to Figure 1.

C. Modify the Thrust Reverser Rigging.

CAUTION: IT IS NECESSARY THAT THE CLOSING FORCE OF EACH THRUST REVERSER LATCH IS PROPERLY ADJUSTED. GIVE PARTICULAR ATTENTION TO THE THRUST REVERSER NUMBER 1 (V-GROOVE) LATCH.

(1) Check and adjust the closing Force of the thrust reverser latches. Refer to Figure 2, positions 2, 3, and 4.

a. Close the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

b. Check and adjust the closing force of each of the thrust reverser and translating sleeve latches. Refer to the MD-90 Aircraft Maintenance Manual.

(2) Check and adjust the distance (gap) between the upper and lower translating sleeve tracks. Refer to Figure 2.

a. If the distance (gap) is greater than 15.690 inch (398,53 mm), remove the necessary shims at the appropriate pairs of bifurcation latch positions L1 through L6. (Shim thickness to remove = actual distance measured minus 15.690 inch).

b. If the distance (gap) is less than 15.590 inch (395,98 mm), add necessary shims at the appropriate pairs of bifurcation latch positions L1 through L6. (Shim thickness to add = 15.590 inch minus actual distance measured).

(3) Check and adjust the engagement of the pressure relief door latches.

a. If the engagement is not 0.010 inch (2,54 mm) minimum as shown in Figure 2, add or remove shims at the bifurcation bumper positions L1 through L6. Refer to Figure 4 (sheet 1).

(4) Adjust the shims at bumper positions #5 through #9. Refer to Figure 4.

a. Open the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

b. Apply release agent to bumper locations #5 through #9.

c. Apply clay to bumper locations #5 through #9.

d. Close and latch the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

e. Open the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

f. Measure the thickness of the clay at the bumper locations #5 through #9.

g. Install shims on the bumper locations #5 through #9 as required to maintain gaps in Table 1.

1. At each bumper position, subtract 0.150 inch (3,81 mm) from the measurement in step 3.C.(4)f. Install this amount of shim on the bumper.

(5) Check and adjust the CNA to upper thrust reverser half fixed structure (inner barrel) "vertical" in-to and out-of wind steps.

a. Measure the "vertical" step between the upper thrust reverser fixed structure (inner barrel) and the CNA inner annulus at 7 positions. Refer to Figure 3.

b. If the step is not 0.030 - 0.280 inch (0,762 - 7,11 mm) at each location:

1. Open the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

2. Remove all bumper shims from the lower and upper thrust reverser halves except those at positions L1 through L6 and bumper locations #5 through #9. Refer to Figure 4.

3. Install 0.330 - 0.400 inch (0,838 - 10,1 mm) thickness of shim at bumper positions #3 upper and #4E. Refer to Figure 4 (sheet 2).

4. Close and latch the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

5. Do step C.(5)a. again.

6. If the inboard "vertical" step (2 positions in Figure 3) is not 0.030 - 0.280 inch (0,762 - 7,11 mm), add or remove shim at the #3 upper position. Refer to Figure 4 (sheet 2).

7. If the outboard "vertical" step (2 positions in Figure 3) is not 0.030 - 0.280 inch (0,762 - 7,11 mm), add or remove shim at the #4E position. Refer to Figure 4 (sheet 2).

8. If the "vertical" step at the center of the upper thrust reverser half (3 positions in Figure 3) is not 0.030 - 0.280 inch (0,762 - 7,11 mm), add or remove shim equally at both the #3 upper and the #4E position. Refer to Figure 4 (sheet 2).

(6) Check and adjust the CNA to lower thrust reverser half fixed structure "vertical" in-to and out-of wind steps.

a. Measure the "vertical" step between the lower thrust reverser fixed structure (inner barrel) and the CNA inner annulus at 7 positions. Refer to Figure 3.

b. If the step is not 0.030 - 0.450 inch (0,762 - 11,43 mm) at each location:

1. Open the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

2. Install 0.330 - 0.400 inch (0,838 - 10,1 mm) thickness of shim at bumper positions #3 lower and #4F. Refer to Figure 4 (sheet 2).

3. Close and latch the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

4. Do step C.(6)a. again.

5. If the inboard "vertical" step (2 positions in Figure 3) is not 0.030 - 0.450 inch (0,762 - 11,43 mm), add or remove shim at the #3 lower position. Refer to Figure 4 (sheet 2).

6. If the outboard "vertical" step (2 positions in Figure 3) is not 0.030 - 0.450 inch (0,762 - 11,43 mm), add or remove shim at the #4F position. Refer to Figure 4 (sheet 2).

7. If the "vertical" step at the center of the lower thrust reverser half (3 positions in Figure 3) is not 0.030 - 0.450 inch (0,762 - 11,43 mm), add or remove shim equally at both the #3 lower and the #4F positions. Refer to Figure 4 (sheet 2).

(7) Check and adjust the CNA to upper and lower thrust reverser half fixed structure (inner barrel) "horizontal" in-to and out-of wind steps.

a. Close and latch the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

b. Measure the "horizontal" step between the upper and lower thrust reverser fixed structure (inner barrel) and the CNA inner annulus at 4 locations. Refer to Figure 3.

1. If the "horizontal" steps are 0.030 - 0.280 inch (0,762 - 7,11 mm) for the upper thrust reverser half and 0.030 - 0.450 inch (0,762 - 11,43 mm) for the lower thrust reverser half, go to step 3.C.(8).

2. If the "horizontal" steps are not 0.030 - 0.280 inch (0,762 - 7,11 mm) for the upper thrust reverser half and/ or not 0.030 - 0.450 inch (0,762 - 11,43 mm) for the lower thrust reverser half, go to step 3.C.(7)c.

c. Adjust the Shims at Bumper Positions #4A Through #4d. Refer to Figure 4 (sheet 2).

1. Open the thrust reverser halves. Refer to the MD-90

Aircraft Maintenance Manual.

2. Apply release agent to bumper positions #4A through #4D.

3. Apply clay to bumper positions #4A through #4D.

4. Close and latch the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

5. Open the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

6. Measure the thickness of the clay at bumper positions #4A through #4D.

7. Install shims at bumper positions #4A through #4D as required to make the distances (gaps) as shown in Table 1 (Figure 6).

d. Do Steps C.(7)a. and C.(7)b. again.

CAUTION: THE THRUST REVERSER HALF CAN ONLY BE MOVED A SMALL DISTANCE INBOARD. IF YOU ATTEMPT TO FORCE THE THRUST REVERSER HALF INBOARD, YOU WILL DISTORT THE SHAPE OF THE THRUST REVERSER AND CHANGE THE VERTICAL STEPS.

1. If the "horizontal" steps are not as required, move shim between bumper positions #4A and #4B and #4C and #4D. Refer to Figure 4 (sheet 2).

(8) Check and adjust the CNA to translating sleeve steps.

a. Close and latch the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

b. Check that the CNA to translating sleeve steps are as shown in Figure 5.

1. If the steps are not as shown in Figure 5, adjust the shims at positions 3 through 4F. Refer to Figure 4 (sheet 2). Make sure to maintain the steps specified in paragraphs 3.C.(5) through 3.C.(7).

D. Check and adjust the distance between the thrust reverser heat shield and the ECS duct and the distance between the ECS Duct and surrounding tubes and structure. Refer to Figure 7.

(1) Make sure the heat shield is securely attached to the thrust reverser and does not sag downward. Push up on the heat shield to engage the velcro attachment if necessary. If the velcro does not function properly, contact your BFGoodrich representative.

(2) Check and adjust the distance between the heat shield and the ECS duct.

a. Put release agent on the upper surface of the ECS duct.

b. Put clay on the upper surface of the ECS duct.

c. Close and latch the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

d. Open the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

e. Measure the thickness of the clay. Adjust the ECS duct links as necessary to make the distance between the ECS duct and the heat shield and the ECS duct and the surrounding tubes and structure as shown in Figure 7.

E. Examine the thrust reverser compression struts and support clips. Refer to Figure 1 (sheet 2).

(1) Examine the compression struts. Replace damaged compression struts.

(2) Examine the support clips. Replace damaged support clips.

F. Adjust the length of the thrust reverser compression struts. Refer to Figure 1 (sheet 2).

(1) Remove the lockwire.

(2) Loosen the jam nuts.

(3) Adjust the length of the compression strut as measured from the bottom of the support ring to the top end of the compression strut. Make the adjustment at the top end only. Refer to Figure 1 (sheet 2).

NOTE: One full turn of the compression strut end adjusts the strut length by 0.056 inch (1,37 mm).

(4) Adjust the length of the compression strut as measured from the top end to the bottom end of the strut. Make the adjustment at the bottom end only. Refer to Figure 1 (sheet 2).

NOTE: One full turn of the compression strut end adjusts the strut length by 0.056 inch (1,37 mm).

CAUTION: YOU MUST INSTALL THE COMPRESSION STRUTS IN THE CORRECT POSITION AND WITH THE "UP" PLACARD AT THE UPPER END OF THE STRUT. IF YOU DO NOT DO THIS, THE SUPPORT CLIPS, COMPRESSION STRUTS, AND THRUST REVERSER CAN GET DAMAGED.

G. Install the thrust reverser compression struts in the support clips. Make sure the "UP" placard on the compression strut is at the upper end of the strut. Refer to Figure 1.

(1) Install the 290-0069-501 (short) compression strut at the forward end of the flame deflector. Make sure the lower end of the compression strut fits in the bracket at location #1 on the lower thrust reverser half. Refer to Figure 1 and Figure 4 (sheet 1).

(2) Install the 290-0069-503 (long) compression strut at the aft end of the flame deflector. Make sure the lower end of the compression strut fits in the bracket at location #2 on the lower thrust reverser half. Refer to Figure 1 and Figure 4 (sheet 1).

H. Rig the thrust reverser compresson struts. Refer to Figure 1 (sheet 2).

(1) Apply solder to the upper end of each compression strut.

(2) Close and latch the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

(3) Open the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual.

(4) Measure the thickness of the solder on the compression struts.

(5) Adjust the length of the compression struts as necessary to make the distance (gap) between the upper end of the compression strut and the bracket on the thrust reverser as shown in Figure 1 (sheet 2).

NOTE: One full turn of the compression strut end adjusts the strut length by 0.056 inch (1,37 mm).

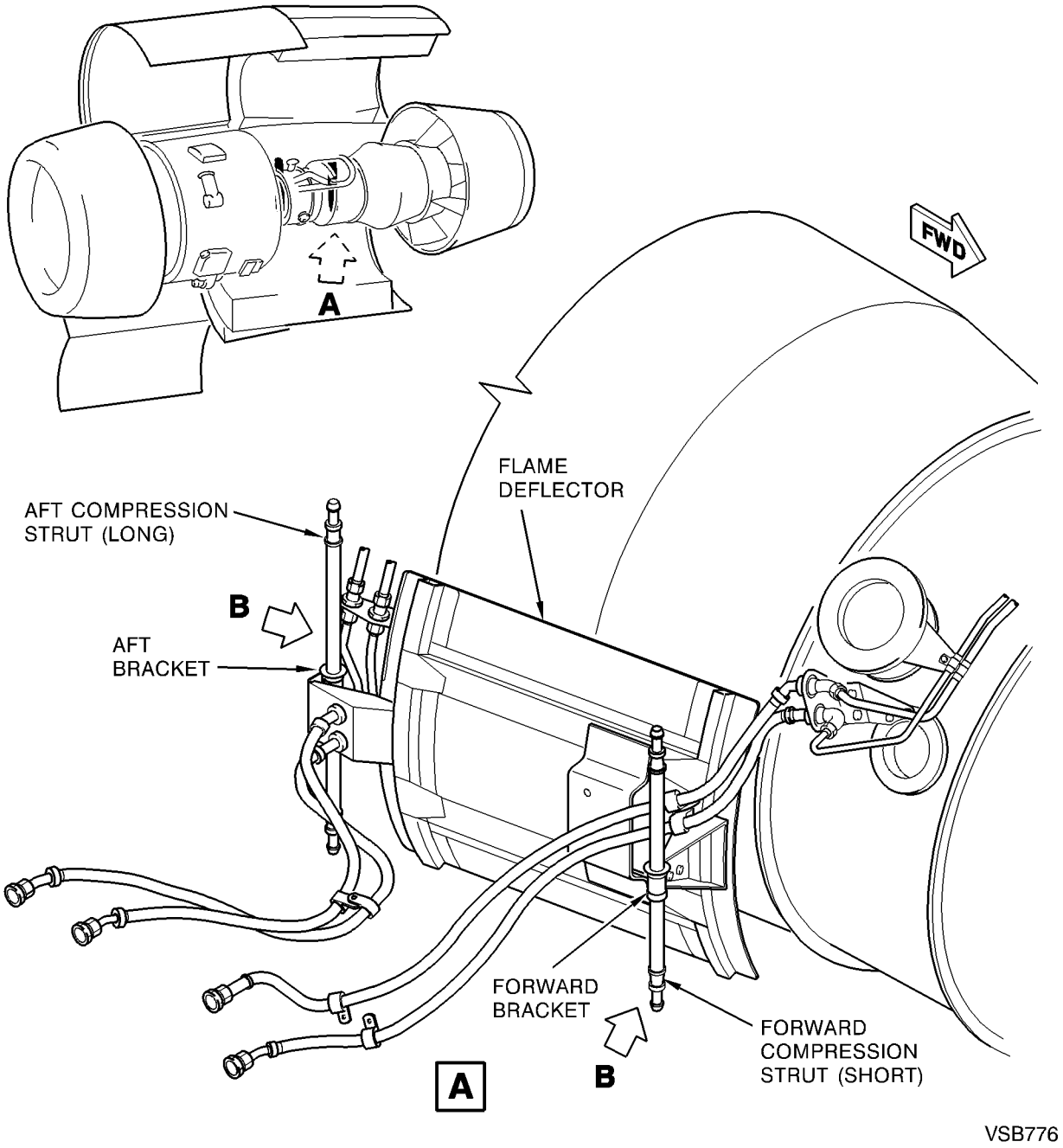
a. Adjust both ends of the strut equally to change the compression strut length.

b. Tighten the jam nuts.

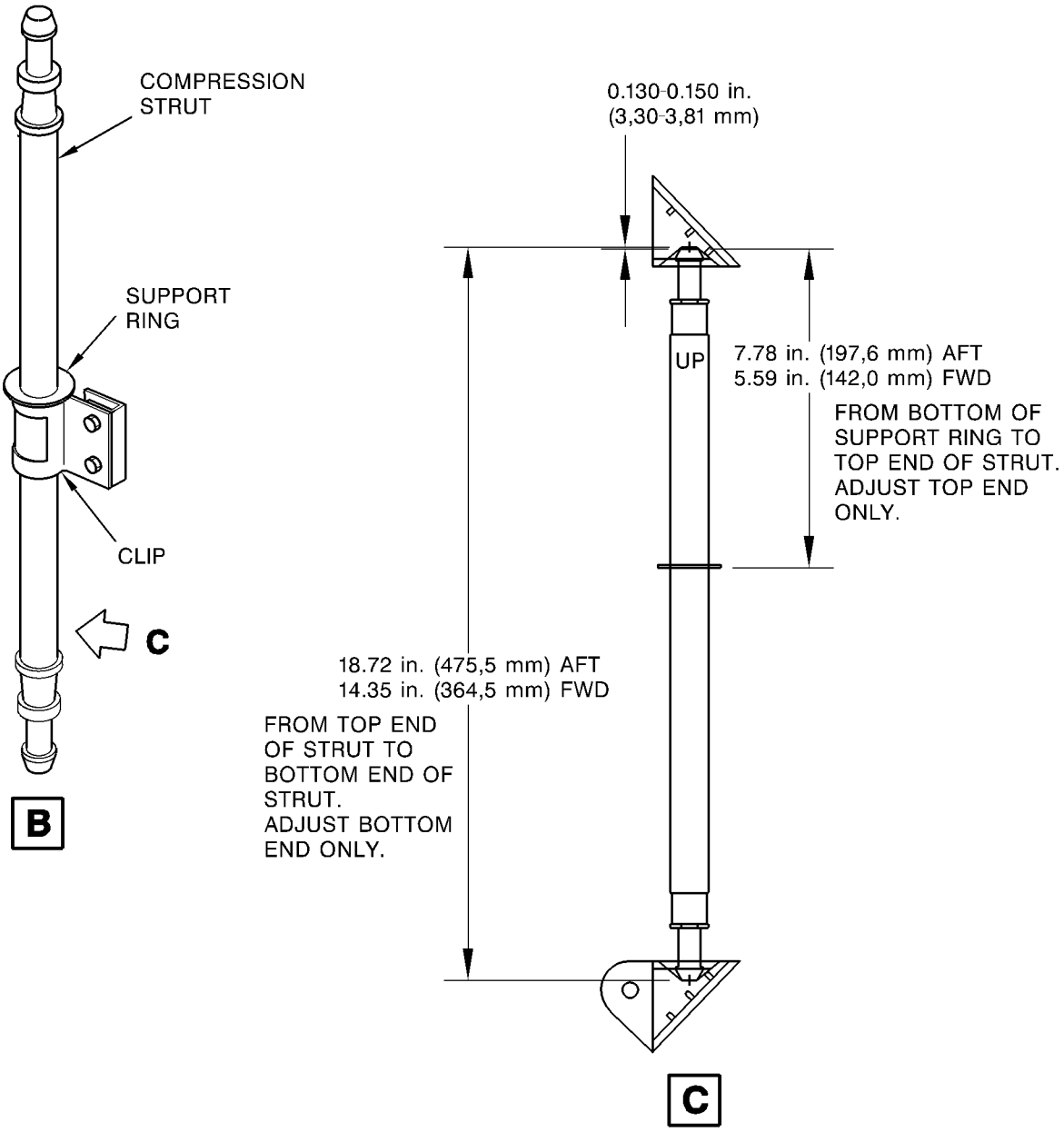
c. Install the lockwire.

I. Recording Instructions

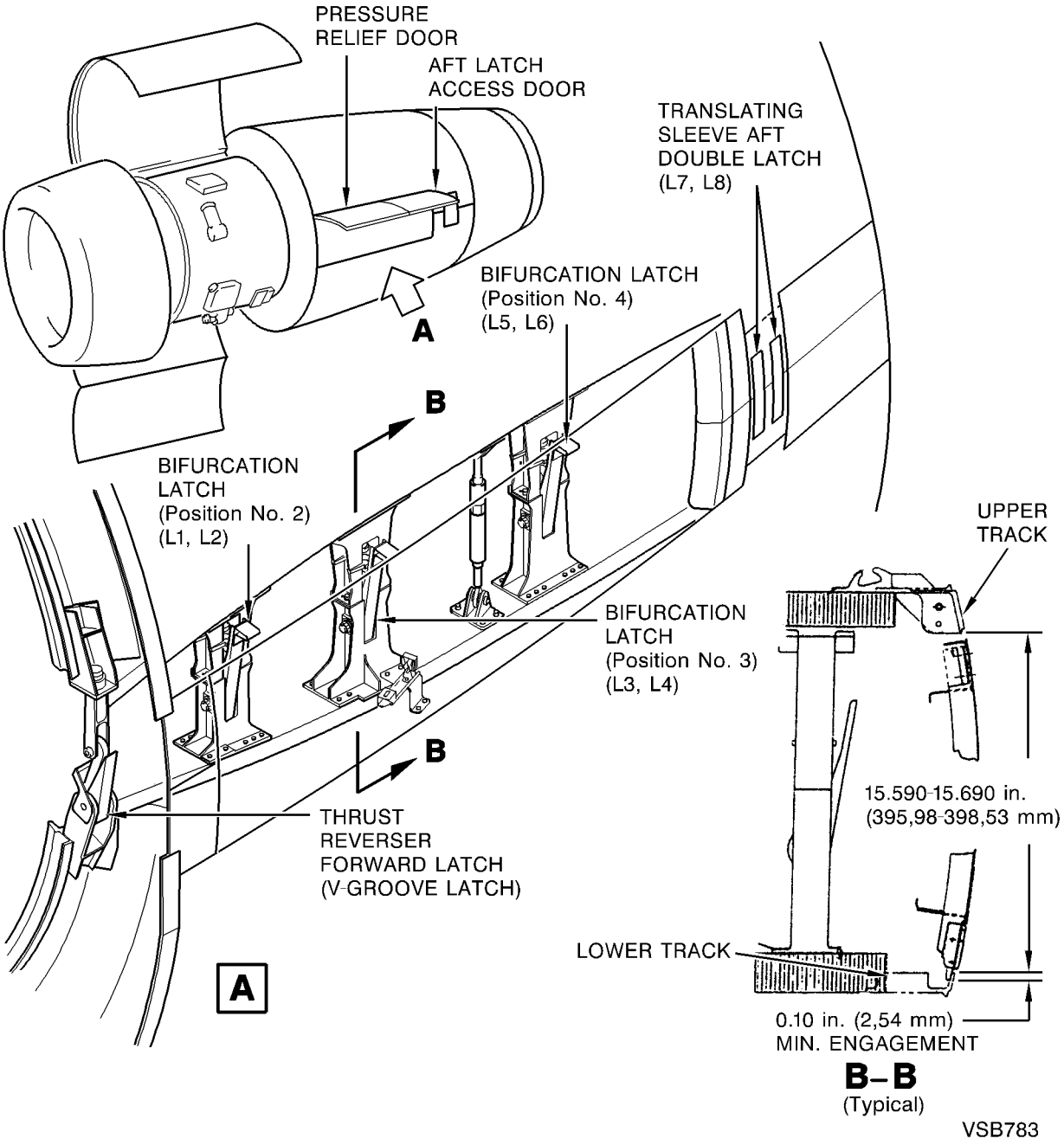
(1) A record of accomplishment is required. Write in the applicable records and metal stamp, electroetch, or vibroetch on the thrust reverser data plate that Service Bulletin V2500-NAC-78-0189 has been done. Refer to the Standard Practices/Processes Manual (SPP-V2500-1IA), Chapter 70-09-00.



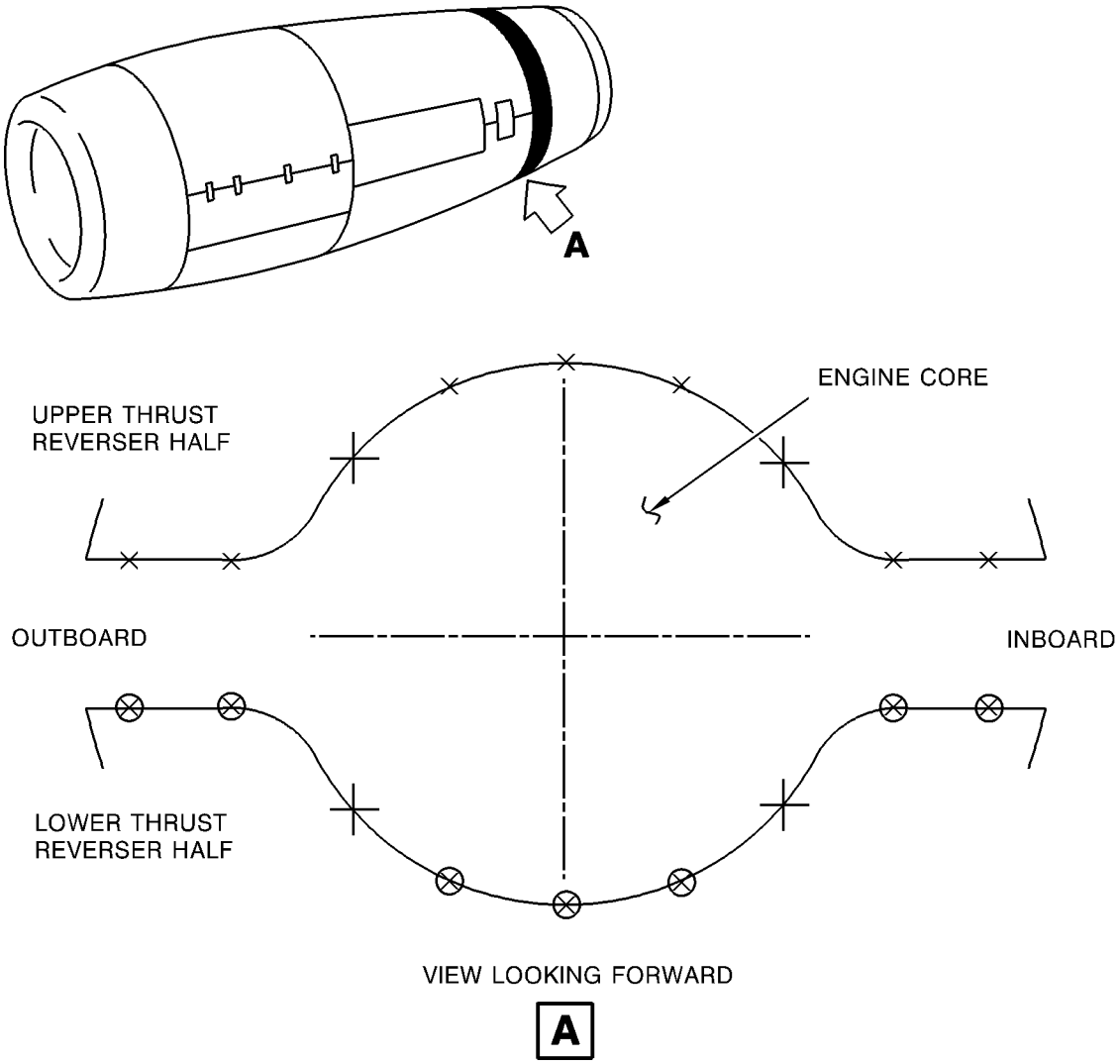
Thrust Reverser Compression Struts
Figure 1 (sheet 1)



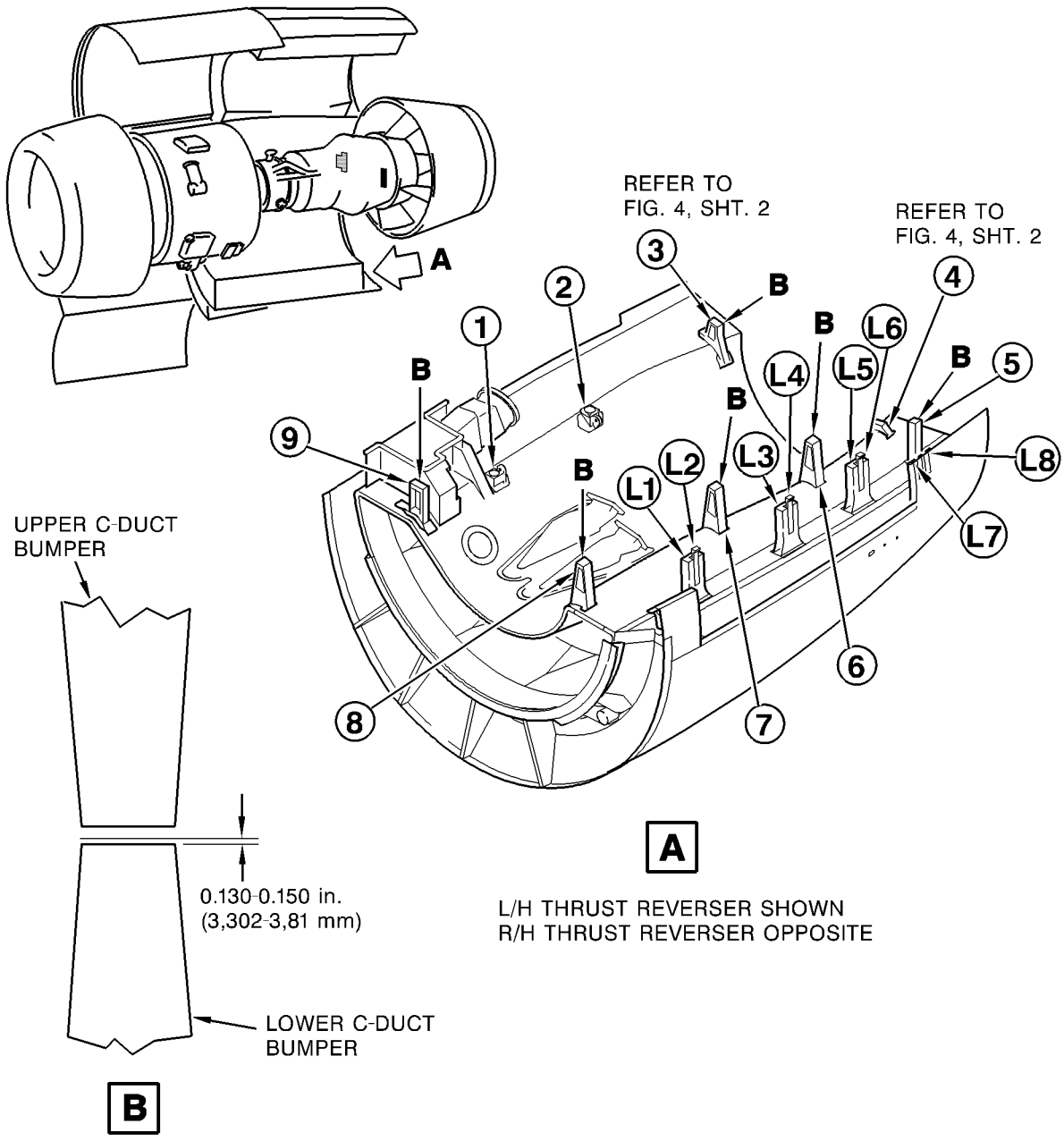
Thrust Reverser Compression Struts
Figure 1 (sheet 2)



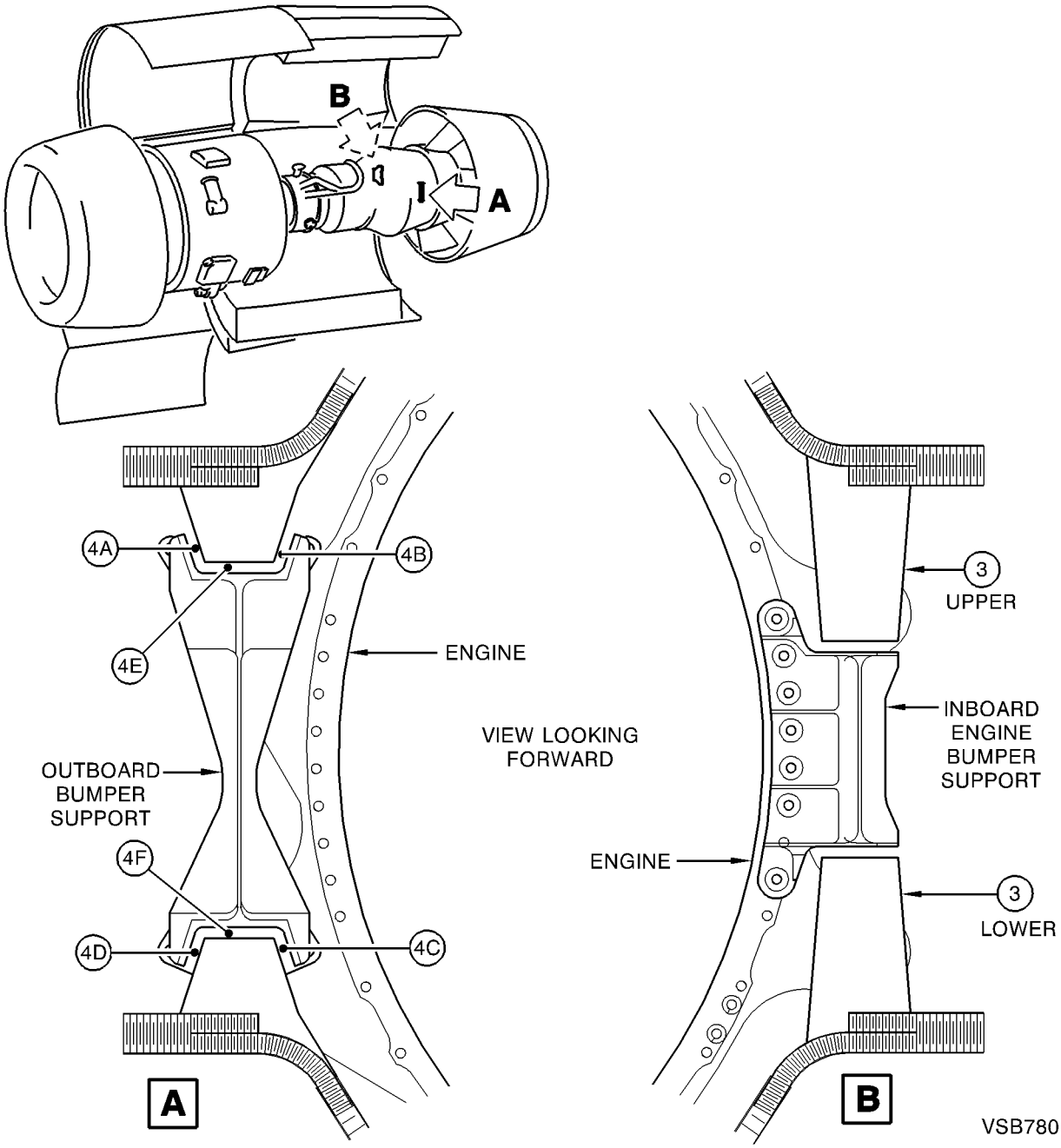
Thrust Reverser Rigging
Figure 2



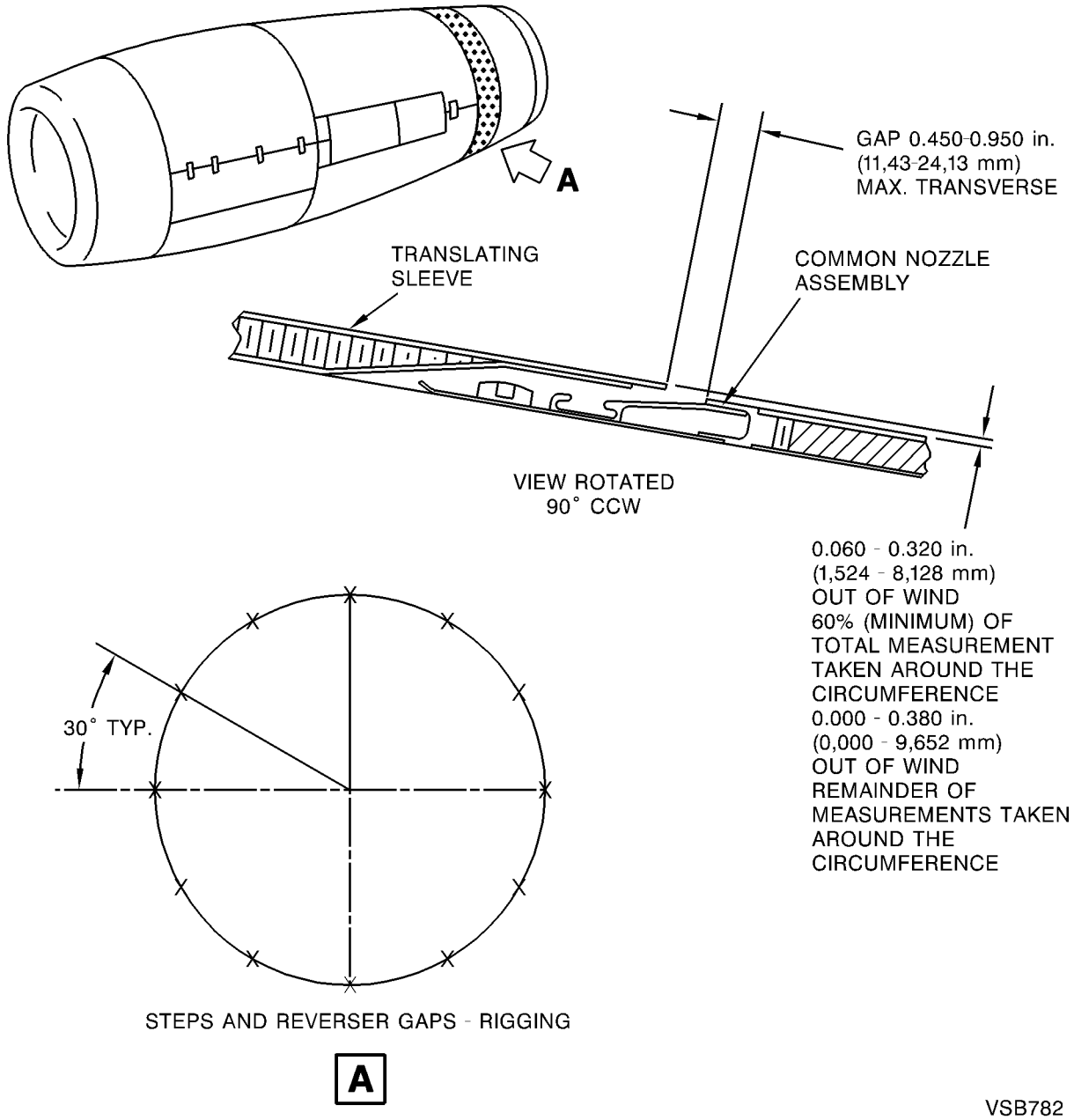
Thrust Reverser Rigging
Figure 3



Thrust Reverser Rigging
Figure 4 (sheet 1)



Thrust Reverser Rigging
Figure 4 (sheet 2)



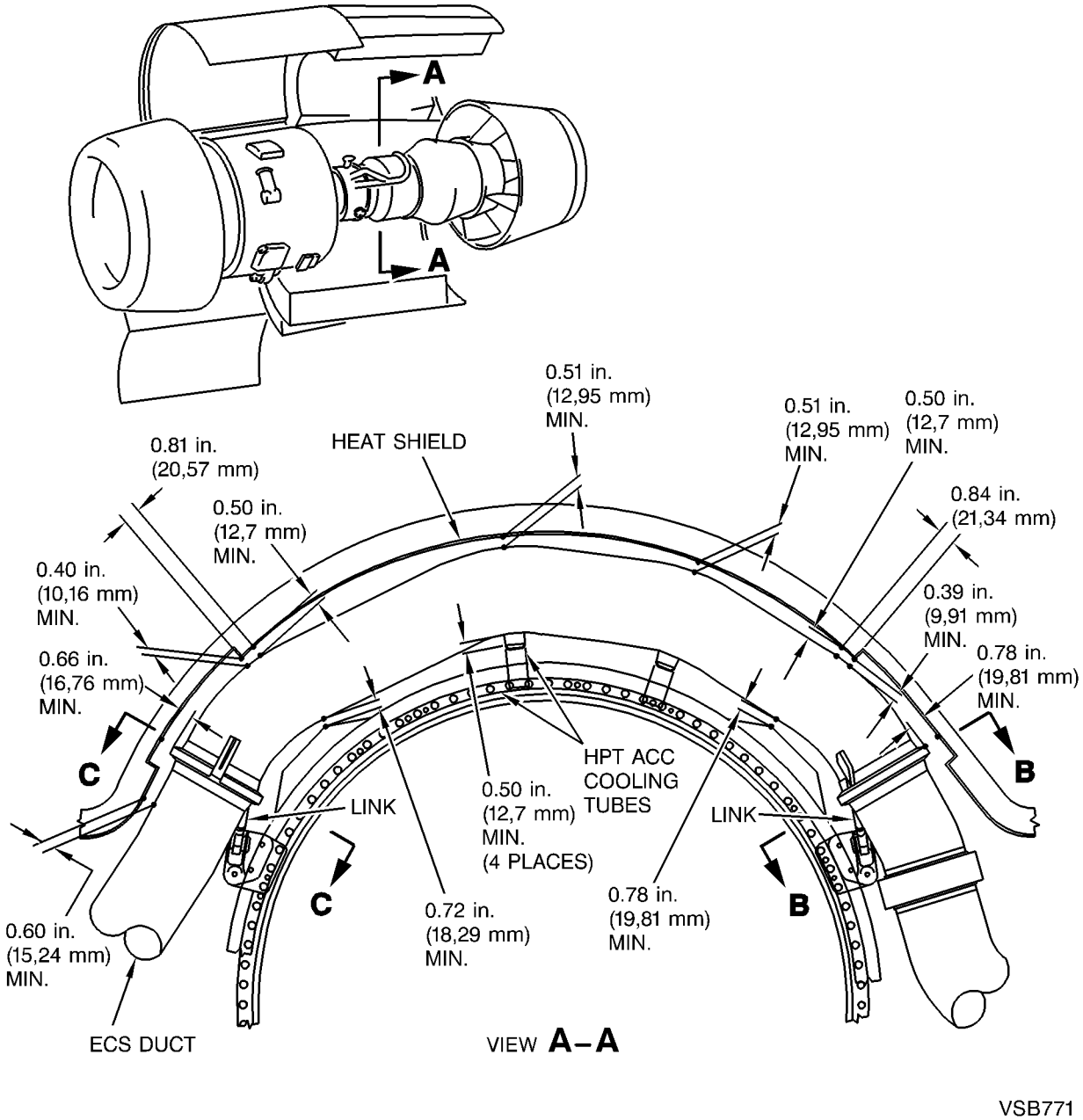
Thrust Reverser Rigging
Figure 5

TABLE 1 BUMPER SHIMS	
LOCATION	GAP TOLERANCE
#3 LWR	.130/.150 in. (3,30/3,81 mm)
#3 UPR	CONTACT
#4A	CONTACT
#4B	.040/.060 in. (1,02/1,52 mm)
#4C	.040/.060 in. (1,02/1,52 mm)
#4D	CONTACT
#4E	CONTACT
#4F	.130/.150 in. (3,30/3,81 mm)
#5	.130/.150 in. (3,30/3,81 mm)
#6	.130/.150 in. (3,30/3,81 mm)
#7	.130/.150 in. (3,30/3,81 mm)
#8	.130/.150 in. (3,30/3,81 mm)
#9	.130/.150 in. (3,30/3,81 mm)

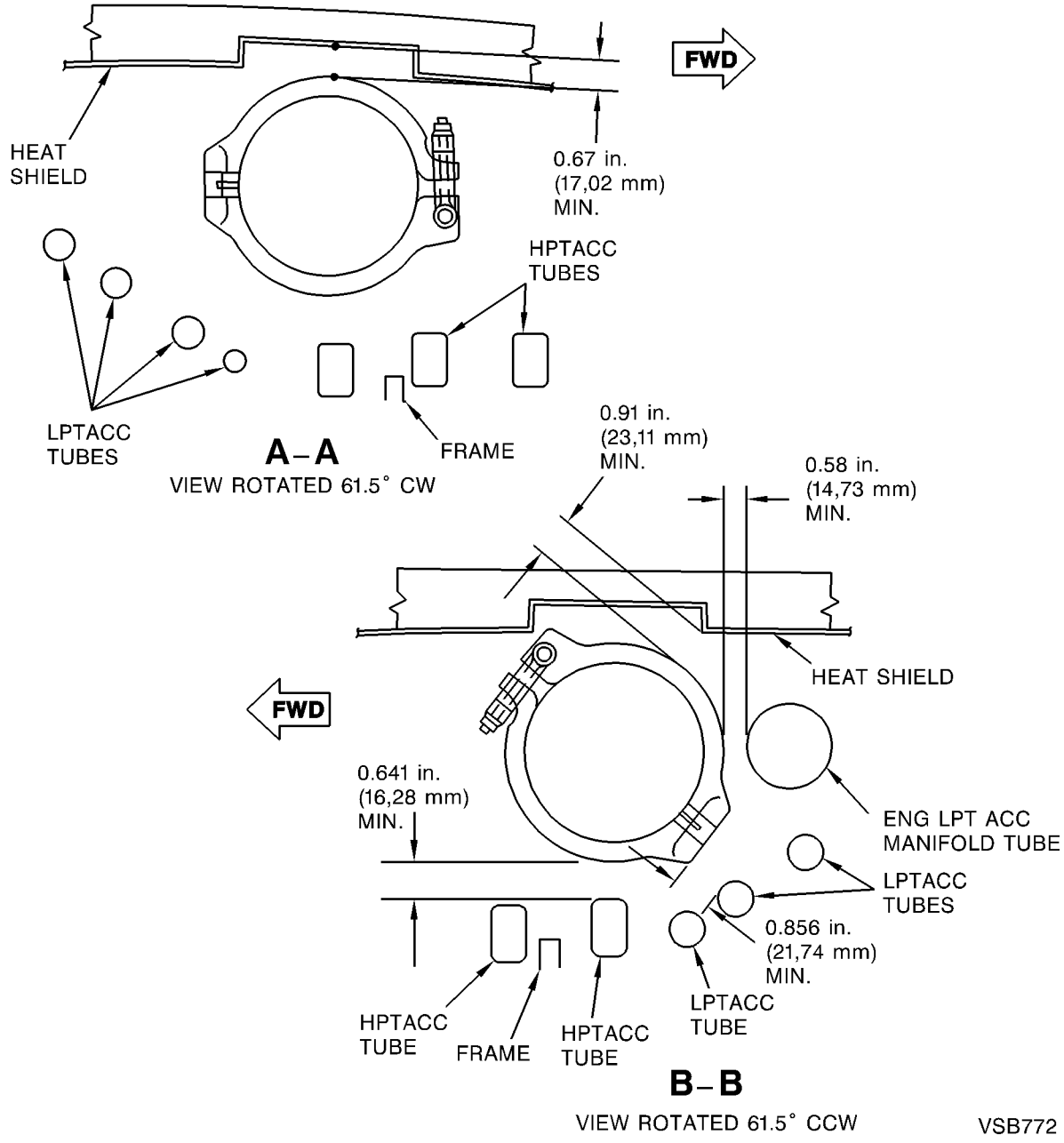
TABLE 2 COMPRESSION STRUTS	
LOCATION	GAP TOLERANCE
FWD	.130/.150 in. (3,30/3,81 mm)
AFT	.130/.150 in. (3,30/3,81 mm)

VSB779

Thrust Reverser Rigging
Figure 6



Thrust Reverser Rigging
Figure 7 (sheet 1)



Thrust Reverser Rigging
Figure 7 (sheet 2)