



## AIRCRAFT MAINTENANCE MANUAL

### DUCT LINES - REMOVAL/INSTALLATION

EFFECTIVITY: ALL

#### 1. General

- A. This section gives the procedures for the typical removal and installation of the duct lines.
- B. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

TASK NUMBER	DESCRIPTION	EFFECTIVITY
36-11-09-000-801-A	FUSELAGE DUCT LINES - TYPICAL RE- MOVAL	ALL
36-11-09-400-801-A	FUSELAGE DUCT LINES - TYPICAL IN- STALLATION	ALL
36-11-09-000-802-A	ENGINE DUCT - TYPICAL REMOVAL	ALL
36-11-09-400-802-A	ENGINE DUCT - TYPICAL INSTALLATION	ALL



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TASK 36-11-09-000-801-A

EFFECTIVITY: ALL

2. FUSELAGE DUCT LINES - TYPICAL REMOVAL

A. General

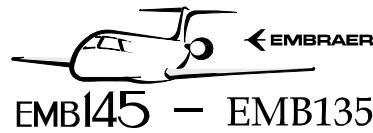
(1) This task gives the instructions for the typical removal of the fuselage duct lines.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-30-00/100	-
AMM MPP 06-41-01/100	-
AMM MPP 06-43-00/100	- COMPONENT LOCATION
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE
AMM TASK 25-23-01-000-801-A/400	-
AMM TASK 25-23-01-000-802-A/400	-
AMM TASK 53-01-02-000-801-A/400	-
AMM TASK 53-01-02-000-802-A/400	-
AMM TASK 53-01-03-000-801-A/400	BAGGAGE-COMPARTMENT FLOOR PANELS - REMOVAL
S.B. 145-36-0048	-
S.B. 145-36-0049	-

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
193	193	Aft wing-to-fuselage fairing
194	194	RH side of wing-to-fuselage fairing
195	195	LH side of wing-to-fuselage fairing
261	261BF	Passenger floor panel
261	261DF	Passenger floor panel
262	262AF	Passenger floor panel
262	262BF	Passenger floor panel
262	262CF	Passenger floor panel
271	271AF	Floor panel of the baggage compartment
271	271BF	Floor panel of the baggage compartment
271	271BLW	Inside baggage compartment
272	272DR	In the aft electronic compartment
272	272AF	Floor panel of the baggage compartment



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ZONE	PANEL/DOOR	LOCATION
272	272BF	Floor panel of the baggage compartment
272	272CRW	Inside baggage compartment
320	322	Dorsal Fin
320	323	Vertical-Stabilizer Leading-Edge
414	414CB	LH pylon
424	423CB	RH pylon
813	813	Baggage compartment

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Inside and outside the aircraft

I. Preparation

SUBTASK 841-002-A

- (1) De-energize the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
- (2) Remove access panel 272DR (AMM MPP 06-41-01/100).
- (3) Open baggage compartment door 813 (AMM MPP 06-30-00/100).
- (4) Remove sidewall linings 271BLW and 272CRW (AMM TASK 25-23-01-000-801-A/400) for the EMB-145 () models or (AMM TASK 25-23-01-000-802-A/400) for the EMB-135 () models, as applicable.
- (5) On the EMB-145 () models, remove floor panels 271AF, 271BF, 272AF, and 272BF ([AMM TASK 53-01-03-000-801-A/400](#)), 261BF, 261DF, 262AF, 262BF, and 262CF (AMM TASK 53-01-02-000-801-A/400), as applicable.
- (6) On the EMB-135 () models, remove floor panels 271AF, 271BF, 272AF, and 272BF ([AMM TASK 53-01-03-000-801-A/400](#)), 261DF, 262BF, and 262CF (AMM TASK 53-01-02-000-802-A/400), as applicable.
- (7) Remove panels 193, 194 and 195 (AMM MPP 06-30-00/100).



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- (8) Remove the Dorsal Fin access panel 322 and the Vertical-Stabilizer Leading-Edge access panel 323 (AMM MPP 06-30-00/100), as applicable.
- (9) Remove access panels 414CB and 424CB ([AMM MPP 06-43-00/100](#)).

J. Removal ([Figure 401](#)) ([Figure 402](#)) ([Figure 404](#))

SUBTASK 020-002-A

EFFECTIVITY: AIRCRAFT WITH GAMAH FLANGE/CLAMP JOINT

**WARNING: DO NOT TOUCH THE BLEED-AIR SYSTEM DUCTS OR COMPONENTS IMMEDIATELY AFTER THE ENGINE OR APU STOPS BECAUSE OF THE HIGH BLEED-AIR TEMPERATURE.**

- (1) (ON ACFT WITH SHIMS ASSEMBLY) Remove the shims assembly as follows (Refer to [Figure 404](#)):
  - (a) Remove the screws (7), washers (8) (5) and nuts (6) that attach the shims assembly to the duct.
  - (b) Remove the shims assembly from the duct.
- (2) In an assembly where a Gamah flange/clamp joint is used, refer to [Figure 401](#), sheet 2, DET. D and do as follows:
  - (a) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Remove the blanket (REF.) from the protective sleeve (2).
  - (b) Remove and discard the cable tie-down straps (1).
  - (c) Remove the protective sleeve (2).
  - (d) Remove the lockwire (Refer to [Figure 401](#), sheet 2, DET. J and VIEW K).
  - (e) Remove the Gamah joint (4), sleeve (3), O-ring (5) and O-ring (6).
  - (f) Remove the clamp(s) positions (3) or (14) refer to [Figure 402](#), sheet 1, DET. E.
  - (g) Remove the duct (REF.) from the support (REF.) at the fuselage. Refer to [Figure 402](#), sheet 1, DET. E.
  - (h) Put plastic protective plugs in the ducts.
- (3) In an assembly where a check valve is used, refer to [Figure 402](#), sheet 1, DET. G and do as follows:
  - (a) Loosen the V-band clamp (11).
  - (b) Remove the gasket (10) between the duct (REF.) to APU and check valve (12).
  - (c) Remove the check valve (12).
  - (d) Remove the V-band clamp (11).
  - (e) Remove the gasket (13) between the duct (REF.) from Pax Cabin FWD and check valve (12).

- (f) Remove the clamp(s) positions (3) or (14) refer to [Figure 402](#), sheet 1, DET. E.
  - (g) Remove the duct (REF.) from the support (REF.) at the fuselage. Refer to [Figure 402](#), sheet 1, DET. E.
  - (h) Put plastic protective plugs in the ducts.
- (4) In assemblies where a Marman V-clamp is used to connect the ducts (REF.), refer to [Figure 402](#), sheet 1, DET. C and do as follows:
- (a) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Remove the blanket (REF.) from the Marman V-clamp (1).
  - (b) Remove the Marman V-clamp (1).
  - (c) Remove the clamp(s) positions (3) or (14) refer to [Figure 402](#), sheet 1, DET. E.
  - (d) Remove the duct (REF.) from the support (REF.) at the fuselage. Refer to [Figure 402](#), sheet 1, DET. E.
  - (e) Put plastic protective plugs in the ducts.
- (5) In assemblies where a Marman V-clamp is used to joint the cross bleed valve, refer to [Figure 402](#), sheet 1, DET. H and do as follows:
- (a) Remove the Marman V-clamp (9) between the duct (REF.) and the cross bleed valve (8).
  - (b) Remove Marman V-clamp (7) between the duct (6) and cross bleed valve (8).
  - (c) Remove the cross bleed valve (8).
  - (d) Remove the bolt (4) and washers (5) from the support (REF.).
  - (e) Remove the duct (6).
  - (f) Remove the clamp(s) positions (2) or (14) refer to [Figure 402](#), sheet 1, DET. W and E; respectively.
  - (g) Put plastic protective plugs in the ducts and valve.
- (6) In an assembly where a flange is used, refer to [Figure 402](#), sheet 2, DET. B and do as follows:
- (a) Remove the flange and the duct (REF.) from the pylons-to-engines. Refer to [Figure 402](#), sheet 2, DET. T, and do as follows:
    - 1 Remove the old sealant with use of an acrylic spatula.
    - 2 Remove the bolts (14) and washers (13).
    - 3 Remove the flange (15).
    - 4 Remove the seal (16).
    - 5 (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) to the Marman V-clamp (17).

- 6 Remove the Marman V-clamp (17).
  - 7 Remove the duct (REF.) from the fuselage.
  - 8 Put plastic protective plugs in the duct.
- (b) Remove the flange and the duct (REF.) from the engines-to-pylons. Refer to [Figure 402](#), sheet 2, DET. Q, and do as follows:
- 1 Remove the old sealant with use of an acrylic spatula.
  - 2 Remove the bolts (19) and washers (18).
  - 3 Remove the flange (21).
  - 4 Remove the seal (22).
  - 5 (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) to the Marman V-clamp (20).
  - 6 Remove the Marman V-clamp (20).
  - 7 Remove the duct (REF.) from the fuselage.
  - 8 Put plastic protective plugs in the duct.
- (c) Remove the flange and the duct (REF.) from the fuselage-to-pylons. Refer to [Figure 401](#), sheet 3, DET. N, and do as follows:
- 1 Remove the old sealant with use of an acrylic spatula.
  - 2 Remove the bolts (27) and washers (26).
  - 3 Remove the flange (23).
  - 4 (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) to the Marman V-clamp (25).
  - 5 Remove the Marman V-clamp (25).
  - 6 Remove the duct (REF.) from the fuselage.
  - 7 Remove the packing (24).
  - 8 Put plastic protective plugs in the duct.
- (d) Remove the flange and the duct (REF.) from the APU to the fuselage. Refer to [Figure 402](#), sheet 2, DET. F, and do as follows:
- 1 Remove the old sealant with use of an acrylic spatula.
  - 2 Remove the bolts (28) and washers (29).
  - 3 Remove the duct (REF.) from the supports at the fuselage support (REF.). Refer to [Figure 402](#), sheet 1, DET. E.
  - 4 Remove the seal (30).

- 5 Put plastic protective plugs in the ducts.
- (e) Remove the duct (REF.) from the external fuselage to the internal. Refer to [Figure 402](#), sheet 2, DET. L, and do as follows:
  - 1 Remove the old sealant with use of an acrylic spatula.
  - 2 Remove the bolts (32) and washers (33).
  - 3 Remove the duct (REF.) from the supports at the fuselage support (REF.). Refer to [Figure 402](#), sheet 1, DET. E.
  - 4 Remove the seal (35).
  - 5 Put plastic protective plugs in the ducts.
- (7) Remove the ducts from the vertical stabilizer, refer to [Figure 401](#), sheet 3:
  - (a) Do as follows:
    - 1 Remove the duct (2).
      - a Remove the clamp (1).
      - b Remove the Gamah joint (4), Refer to [Figure 401](#), sheet 2, DET. D.
      - c Remove the duct (2).
      - d Put plastic protective caps on the ducts.
    - 2 Remove the duct (6) as follows:
      - a Remove the bolts (8) and washers (7).
      - b Remove the Gamah joints (4) and (9) (Refer to [Figure 401](#), sheet 2, DET. D).
      - c Remove the duct (6) and the packing (5).
      - d With the use of acrylic spatula, remove the old sealant from the packing (5) and the adjacent surface of the fuselage structure.
      - e Put plastic protective caps on the ducts.
    - 3 Remove the duct (11) as follows:
      - a Remove the clamp (12).
      - b Remove the Gamah joint (10) (Refer to [Figure 401](#), sheet 2, DET. D).
      - c Remove the duct (11).
      - d Put plastic protective caps on the ducts and valve.



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K. Removal ([Figure 402](#)) ([Figure 403](#)) ([Figure 404](#))

SUBTASK 021-002-A

EFFECTIVITY: AIRCRAFT WITH GAMAH THREADED COUPLING.

**WARNING: DO NOT TOUCH THE BLEED-AIR SYSTEM DUCTS OR COMPONENTS IMMEDIATELY AFTER THE ENGINE OR APU STOPS BECAUSE OF THE HIGH BLEED-AIR TEMPERATURE.**

- (1) (ON ACFT WITH SHIMS ASSEMBLY) Remove the shims assembly as follows (Refer to [Figure 404](#)):
  - (a) Remove the screws (7), washers (8) (5) and nuts (6) that attach the shims assembly to the duct.
  - (b) Remove the shims assembly from the duct.
- (2) For assemblage where a threaded coupling is used, refer to [Figure 403](#), sheet 2, DET. D; and do as follows:
  - (a) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) to the tie-down strap (2).
  - (b) Remove and discard the cable tie-down straps (1).
  - (c) Remove the protective sleeve (2).
  - (d) Move the locking collar on the coupler (3) towards the back end of the coupler to disengage the locking mechanism. The nut (4) can now be unthreaded as usual.
  - (e) Remove the nut (4) from the coupler (3).
  - (f) Disengage the coupler (3) from the threads on the nut (4) and move it out from the O-ring (5) on the mating flange.
  - (g) Move the coupler (3) out completely from over the O-ring (5) on its flange.
  - (h) Remove and discard the O-rings (5).
  - (i) Remove the clamp(s) positions (3) or (14) refer to [Figure 402](#), sheet 1, DET. E.
  - (j) Remove the duct (REF.) from the support (REF.) at the fuselage. Refer to [Figure 402](#), sheet 1, DET. E.
- (3) In an assembly where a check valve is used, refer to [Figure 402](#), sheet 1, DET. G and do as follows:
  - (a) Loosen the V-band clamp (11).
  - (b) Remove the gasket (10) between the duct (REF.) to APU and check valve (12)..
  - (c) Remove the check valve (12).
  - (d) Remove the V-band clamp (11).
  - (e) Remove the gasket (13) between the duct (REF.) from Pax Cabin FWD and check valve (12).

- (f) Remove the clamp(s) positions (3) or (14) refer to [Figure 402](#), sheet 1, DET. E.
  - (g) Remove the duct (REF.) from the support (REF.) at the fuselage. Refer to [Figure 402](#), sheet 1, DET. E.
  - (h) Put plastic protective plugs in the ducts.
- (4) In assemblies where a Marman V-clamp are used to join the ducts (REF.). Refer to [Figure 402](#), sheet 1, DET. C and do as follows:
- (a) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) of the Marman V-clamp (1).
  - (b) Remove the Marman V-clamp (1).
  - (c) Remove the clamp(s) positions (3) or (14) refer to [Figure 402](#), sheet 1, DET. E.
  - (d) Remove the duct (REF.) from the support (REF.) at the fuselage. Refer to [Figure 402](#), sheet 1, DET. E.
  - (e) Put plastic protective plugs in the ducts.
- (5) In assemblies where a Marman V-clamp is used to joint the cross bleed valve. Refer to [Figure 402](#), sheet 1, DET. H and do as follows:
- (a) Remove the Marman V-clamp (9) between the duct (REF.) and the cross bleed valve (8).
  - (b) Remove Marman V-clamp (7) between the duct (6) and cross bleed valve (8).
  - (c) Remove the cross bleed valve (8).
  - (d) Remove the bolt (4) and washers (5) from the support (REF.).
  - (e) Remove the duct (6).
  - (f) Remove the clamp(s) positions (2) or (14) refer to [Figure 402](#), sheet 1, DET. W and E; respectively.
  - (g) Put plastic protective plugs in the ducts and valve.
- (6) In an assembly where a flange is used, refer to [Figure 402](#), sheet 2, DET. B and do as follows:
- (a) Remove the flange and the duct (REF.) from the pylons to the engines. Refer to [Figure 402](#), sheet 2, DET. T, and do as follows:
    - 1 Remove the old sealant with use of an acrylic spatula.
    - 2 Remove the bolts (14) and washers (13).
    - 3 Remove the flange (15).
    - 4 Remove the seal (16).
    - 5 Remove the Marman V-clamp (17).

- 6 Remove the duct (REF.) from the fuselage.
  - 7 Put plastic protective plugs in the duct.
- (b) Remove the flange and the duct (REF.) from the engines to the pylons. Refer to [Figure 402](#), sheet 2, DET. Q, and do as follows:
- 1 Remove the old sealant with use of an acrylic spatula.
  - 2 Remove the bolts (19) and washers (18).
  - 3 Remove the flange (21).
  - 4 Remove the seal (22).
  - 5 (For A/C POST-MOD. S.B. 145-36-0048 or/and A/C POST-MOD. S.B. 145-36-0049) Install the blanket (REF.) of the Marman V-clamp (20).
  - 6 Remove the Marman V-clamp (20).
  - 7 Remove the duct (REF.) from the fuselage.
  - 8 Put plastic protective plugs in the duct.
- (c) Remove the flange and the duct (REF.) from the fuselage to the pylons. Refer to [Figure 402](#), sheet 2, DET. N, and do as follows:
- 1 Remove the old sealant with use of an acrylic spatula.
  - 2 Remove the bolts (27) and washers (26).
  - 3 Remove the flange (23).
  - 4 (For A/C POST-MOD. S.B. 145-36-0048 or/and A/C POST-MOD. S.B. 145-36-0049) Install the blanket (REF.) of the Marman V-clamp (25).
  - 5 Remove the Marman V-clamp (25).
  - 6 Remove the duct (REF.) from the fuselage.
  - 7 Remove the packing (24).
  - 8 Put plastic protective plugs in the duct.
- (d) Remove the flange and the duct (REF.) from the APU to the fuselage. Refer to [Figure 402](#), sheet 2, DET. F, and do as follows:
- 1 Remove the old sealant with use of an acrylic spatula.
  - 2 Remove the bolts (28) and washers (29).
  - 3 Remove the duct (REF.) from the supports at the fuselage support (REF.). Refer to [Figure 402](#), sheet 1, DET. E.
  - 4 Remove the seal (30).
  - 5 Put plastic protective plugs in the ducts.

(e) Remove the duct (REF.) from the external fuselage to the internal. Refer to [Figure 402](#), sheet 2, DET. L, and do as follows:

- 1 Remove the old sealant with use of an acrylic spatula.
- 2 Remove the bolts (32) and washers (33).
- 3 Remove the duct (REF.) from the supports at the fuselage support (REF.). Refer to [Figure 402](#), sheet 1, DET. E.
- 4 Remove the seal (35).
- 5 Put plastic protective plugs in the ducts.

(7) Remove the ducts from the vertical stabilizer. Refer to [Figure 403](#), sheet 3:

(a) Do as follows:

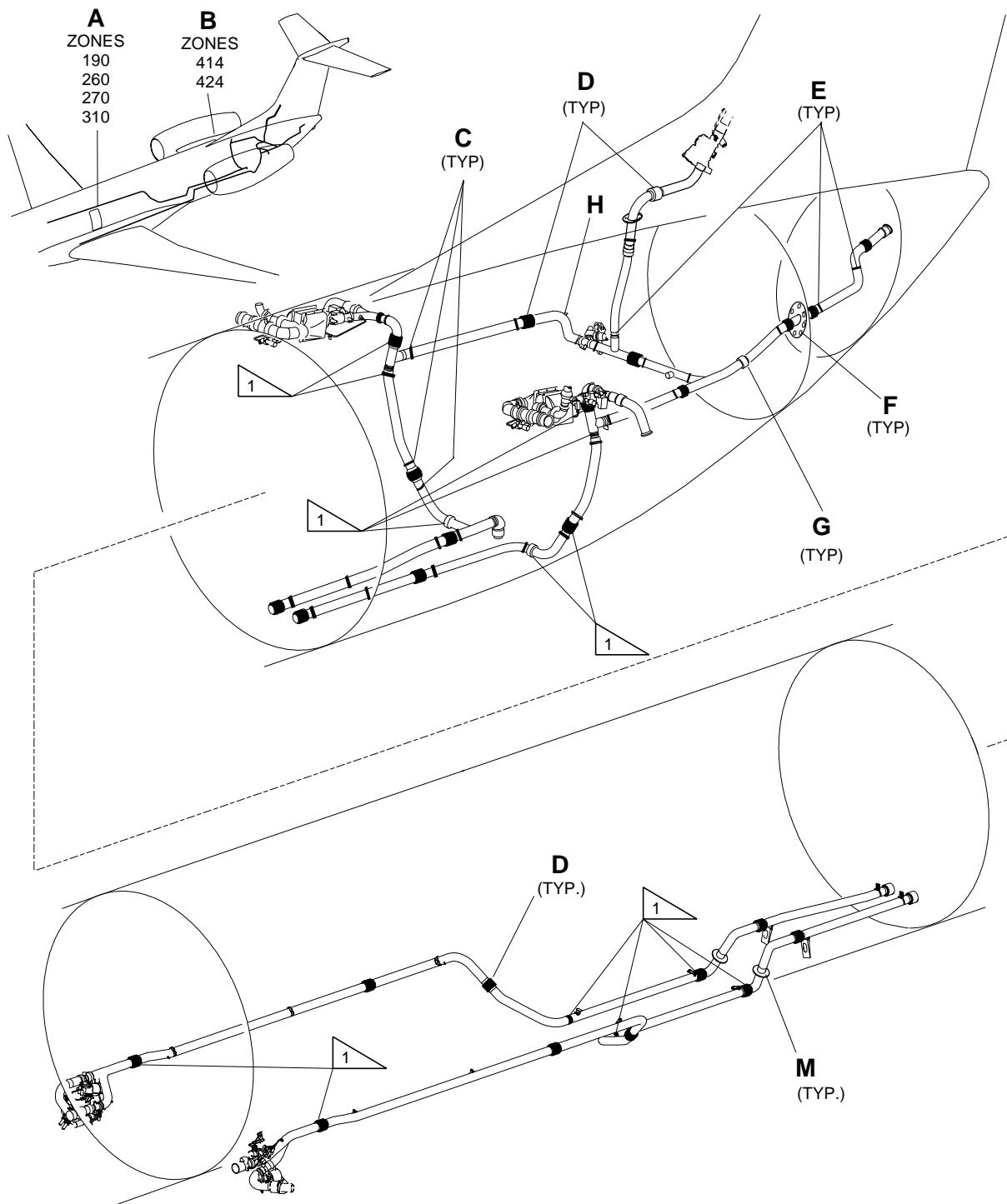
- 1 Remove the duct (14) as follows:
  - a Remove the clamp (15).
  - b Remove and discard the cable tie-down straps (4).
  - c Remove the protective sleeve (5).
  - d Move the locking collar on the coupler (6) towards the back end of the coupler to disengage the locking mechanism. The nut (8) can now be unthreaded as usual.
  - e Remove the nut (8) from the coupler (6).
  - f Disengage the coupler (6) from the threads on the nut (8) and move the parts fully away from the O-ring (7) on the mating flange.
  - g Remove and discard the O-rings (7).
  - h Remove the clamp (13) from the attachment of the duct to the fuselage.
  - i Remove the duct (14).
  - j Put plastic protective caps an the ducts.

- 2 Remove the duct (11) as follows:
  - a Remove the bolts (9) and washers (10).
  - b Remove and discard the cable tie-down straps (4).
  - c Remove the protective sleeves (5).
  - d Move the locking collar on the coupler (6) towards the back end of the coupler to disengage the locking mechanism. The nut (8) can now be unthreaded as usual.
  - e Remove the nut (8) from the coupler (6).
  - f Disengage the coupler (6) from the threads on the nut (8) and move the parts fully away from the O-ring (7) on the mating flange.
  - g Remove and discard the O-rings (7).
  - h Remove the duct (11) and the packing (12).
  - i With the aid of an acrylic spatula, remove the old sealant from the packing (12) and from the adjacent area of the fuselage structure.
  - j Put plastic protective caps on the ducts.
- 3 Remove the duct (3) as follows:
  - a Remove the clamp (1).
  - b Remove and discard the cable tie-down straps (4).
  - c Remove the protective sleeve (5).
  - d Move the locking collar on the coupler (6) towards the back end of the coupler to disengage the locking mechanism. The nut (8) can now be unthreaded as usual.
  - e Remove the nut (8) from the coupler (6).
  - f Disengage the coupler (6) from the threads on the nut (8) and move the parts fully away from the O-ring (7) on the mating flange.
  - g Remove and discard the O-rings (7).
  - h Remove the clamp (2) from the attachment of the duct to the fuselage (Refer to [Figure 403](#), sheet 3, DET. H).
  - i Remove the duct (3).
  - j Put plastic protective caps on the ducts and valve.

**EFFECTIVITY: ASSEMBLAGE WITH GAMAH FLANGE/CLAMP JOINT**

Fuselage Duct Lines - Typical Removal/Installation

Figure 401 - Sheet 1



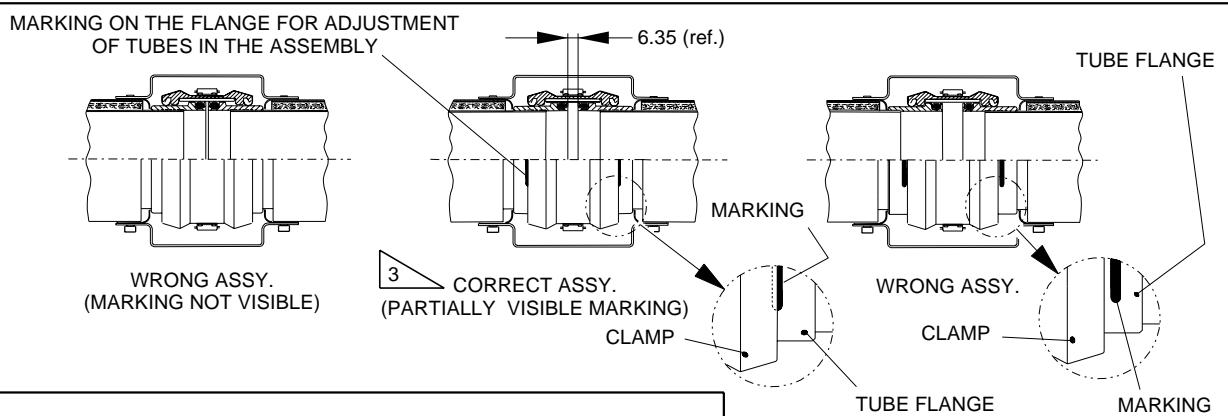
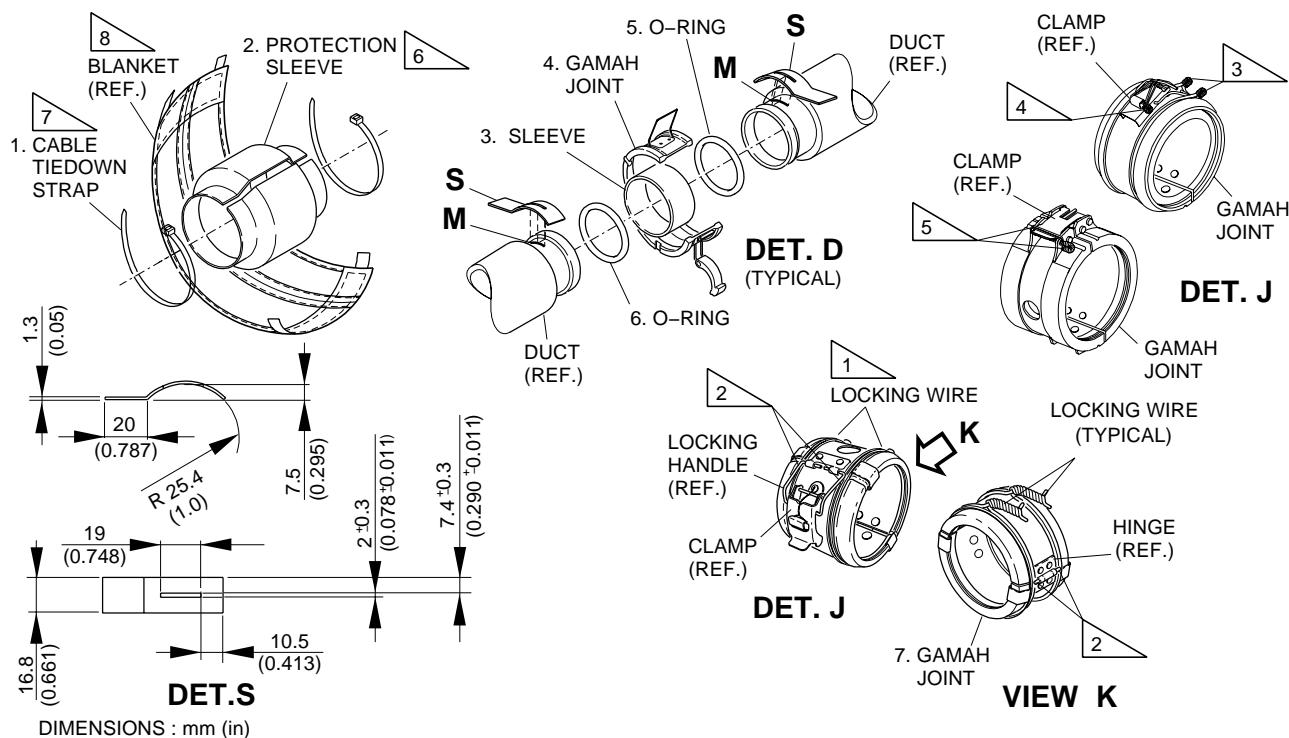
 FOR AIRCRAFT POST-MOD. S.B. 145-36-0048.

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**EFFECTIVITY: ASSEMBLAGE WITH GAMAH FLANGE/CLAMP JOINT**

Fuselage Duct Lines - Typical Removal/Installation

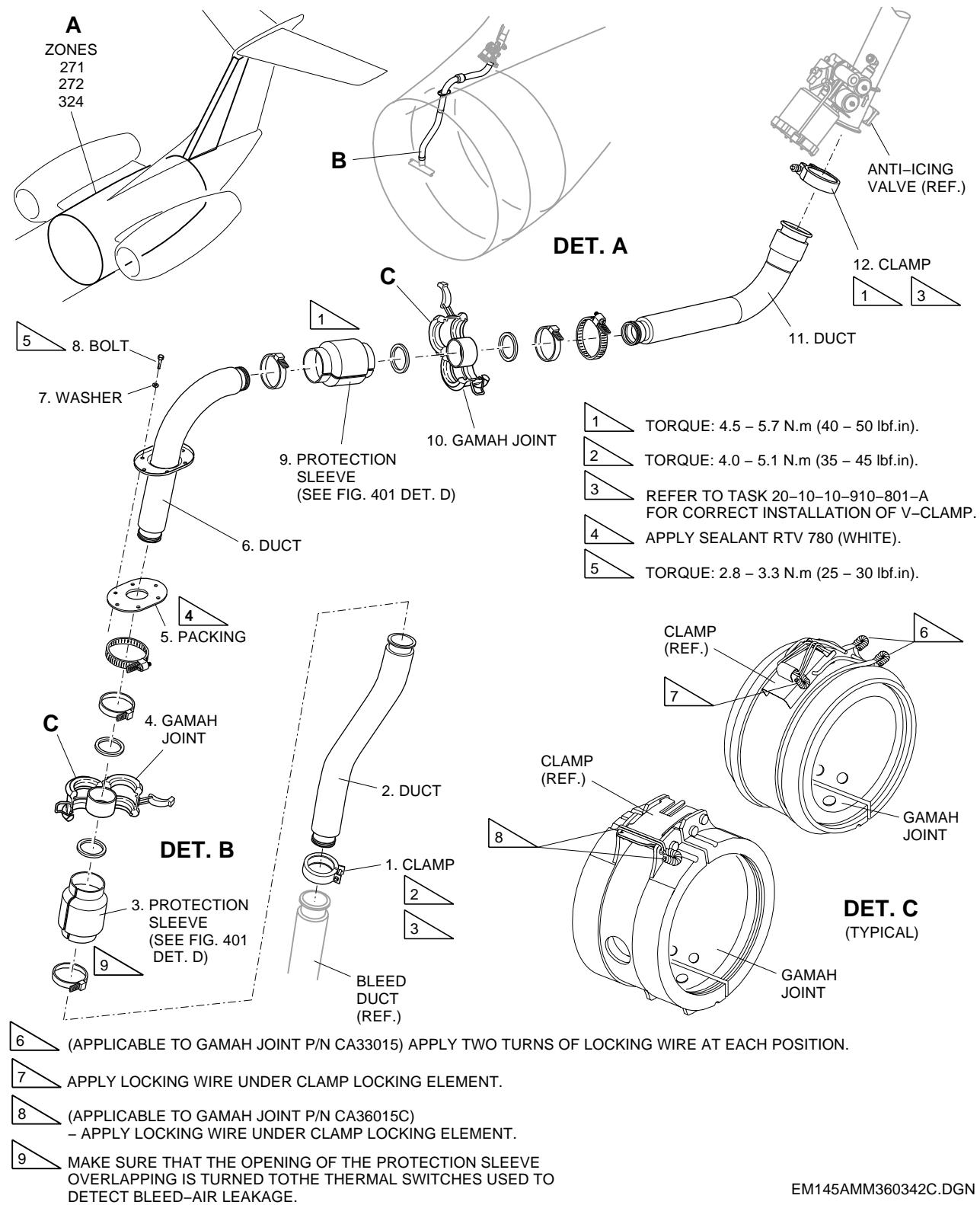
Figure 401 - Sheet 2



- 1 **APPLY TWO TURNS OF LOCKING WIRE AT EACH POSITION.**
- 2 **IF APPLICABLE, THE LOCKING WIRE STRAP MUST BE PUT UNDER THE HINGE PIN ENDS AND LOCKING HANDLE.**
- 3 **DETAIL- CORRECT ASSY.**
- 4 **APPLY LOCKING WIRE UNDER CLAMP LOCKING ELEMENT.**
- 5 **(APPLICABLE TO GAMAH JOINT P/N CA36015C) – APPLY LOCKING WIRE UNDER CLAMP LOCKING ELEMENT.**
- 6 **MAKE SURE THAT THE OPENING OF THE PROTECTION SLEEVE OVERLAPPING IS TURNED TO THE THERMAL SWITCHES USED TO DETECT BLEED-AIR LEAKAGE.**
- 7 **MAKE SURE THAT THE TIE DOW STRAPS AREN'T ATTACHED ABOVE THE DUCTING OF BLEED SYSTEM.  
THE ACCESSED WARM OF DUCT WHEN IN OPERATION, CAN CAUSE DAMAGE AND TO BREAK OUT THE STRAPS.**
- 8 **FOR A/C POST-MOD. S.B. 145-36-0048.  
MAKE SURE THAT THE TIEDOWN STRAPS ARE NOT ATTACHED ABOVE THE DUCTING OF BLEED SYSTEM.  
THE HEAT FROM DUCT DURING OPERATION CAN CAUSE DAMAGE TO AND BREAK THE STRAPS.**

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**EFFECTIVITY: ASSEMBLAGE WITH GAMAH FLANGE/CLAMP JOINT**  
**Fuselage Duct Lines - Typical Removal/Installation**  
**Figure 401 - Sheet 3**

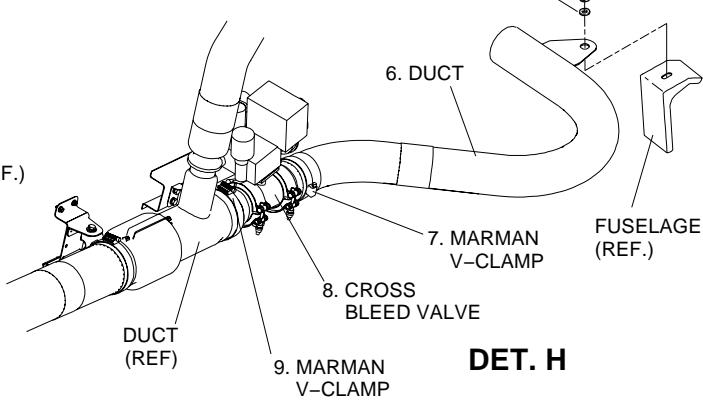
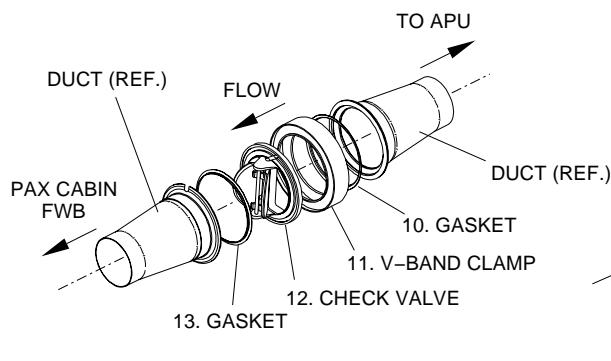
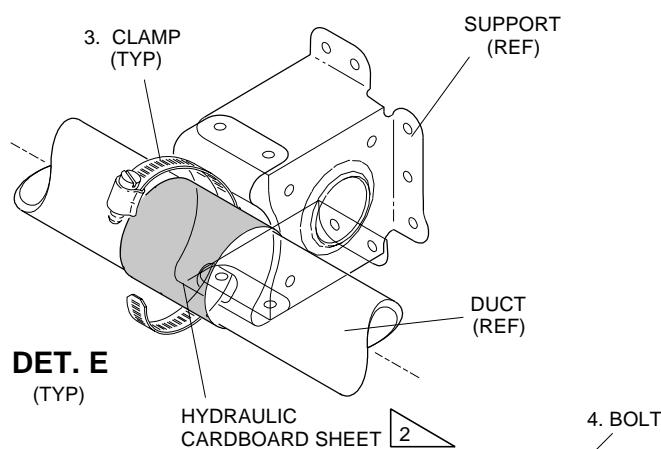
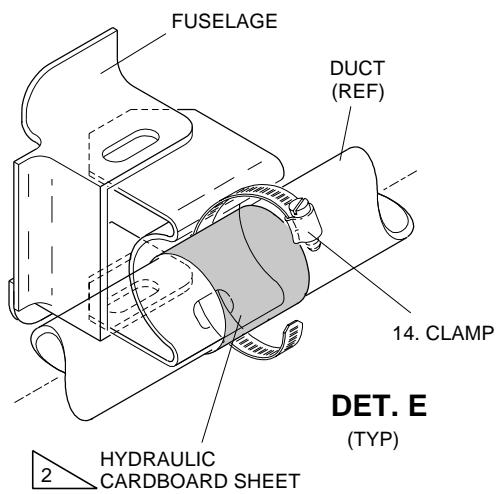
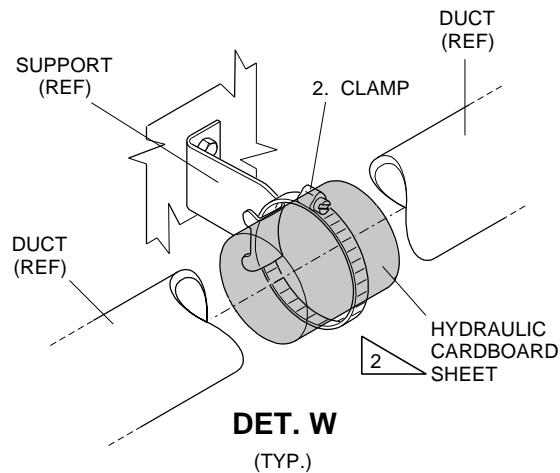
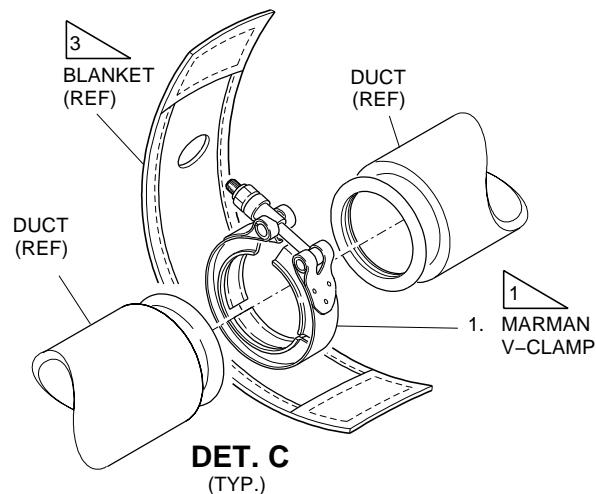


EM145AMM360342C.DGN  
 000-801-A/400  
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**EFFECTIVITY: ALL**

Fuselage Duct Lines - Typical Removal/Installation

Figure 402 - Sheet 1



**1** REFER TO TASK 20-10-10-910-801-A FOR CORRECT INSTALLATION OF V-CLAMP

**2** REFER TO TASK 36-11-09-200-802-A TAN AN AID IN THE CORRECT INSTALLATION.

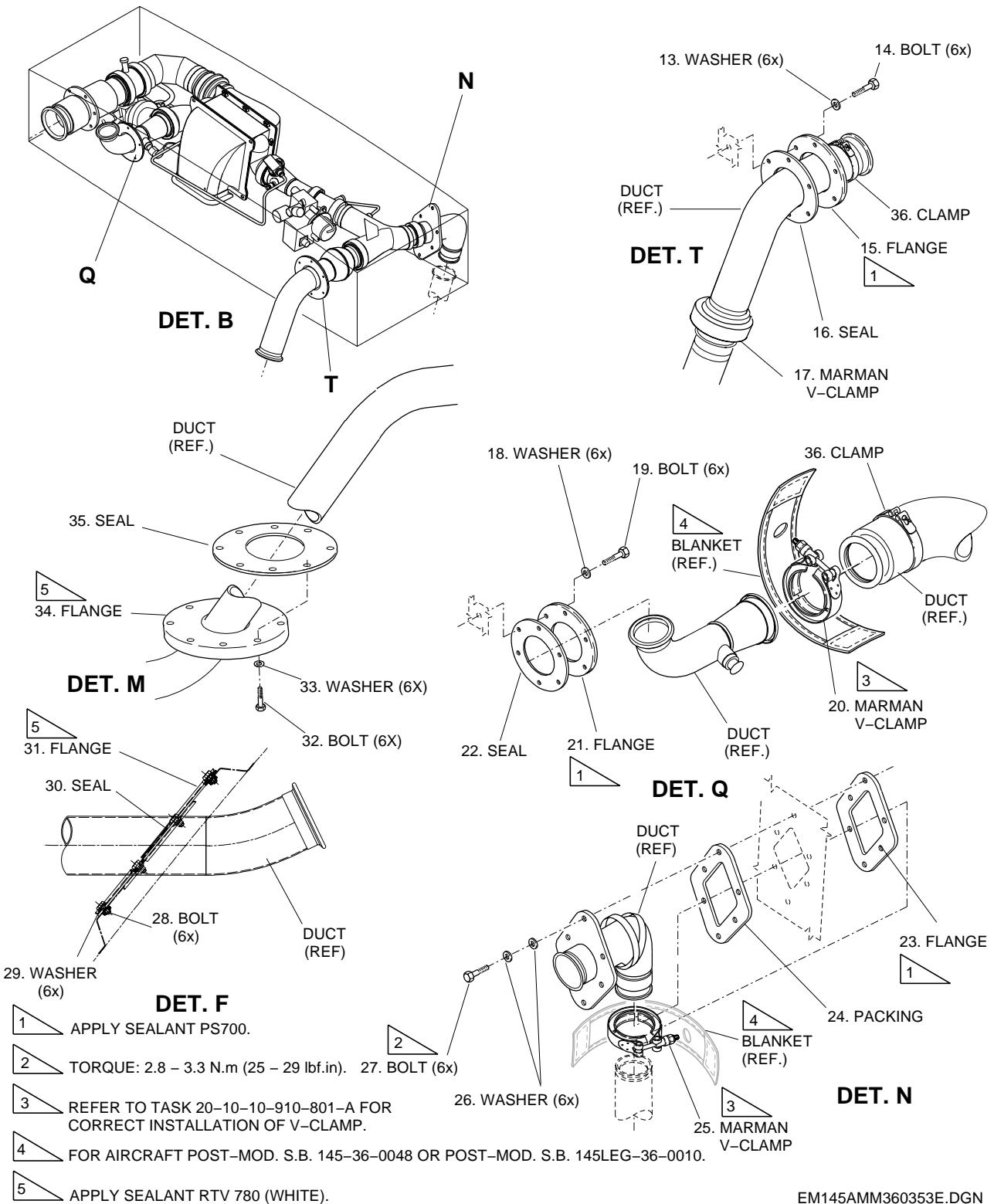
**3** FOR AIRCRAFT POST-MOD. S.B. 145-36-0048.

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**EFFECTIVITY: ALL**

Fuselage Duct Lines - Typical Removal/Installation

Figure 402 - Sheet 2

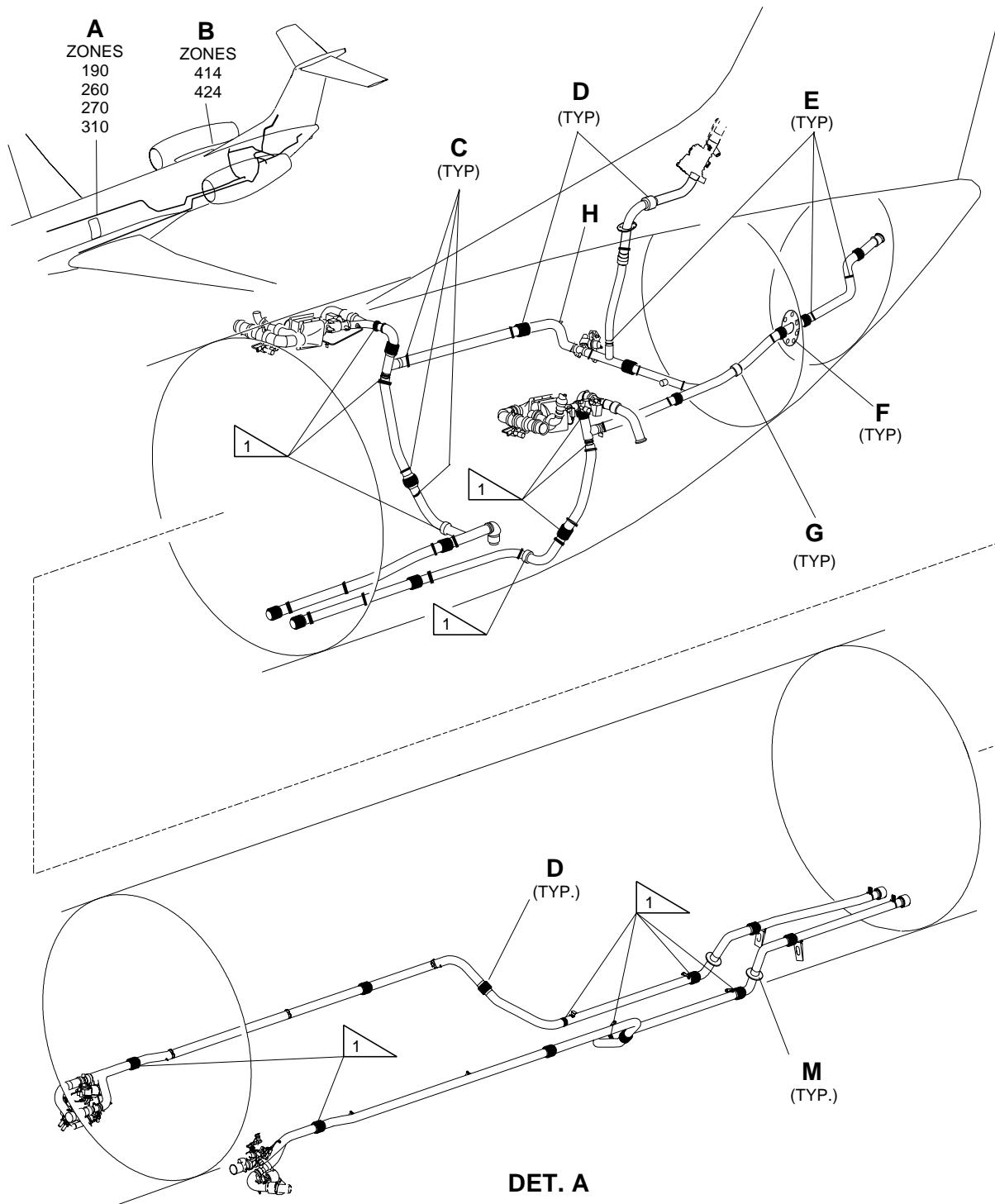


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**EFFECTIVITY: ASSEMBLAGE WITH GAMAH THREADED COUPLING**

Fuselage Duct Lines - Removal/Installation

Figure 403 - Sheet 1



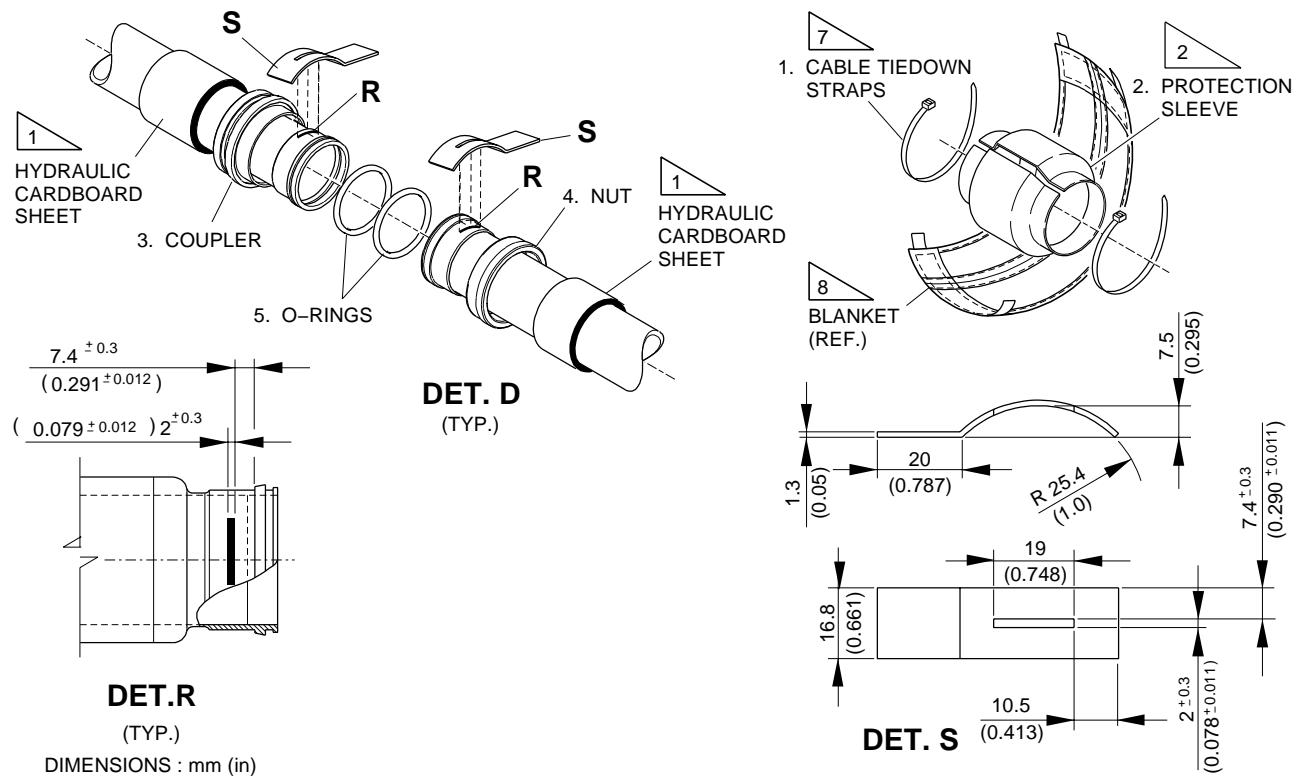
 FOR AIRCRAFT POST-MOD. S.B. 145-36-0048.

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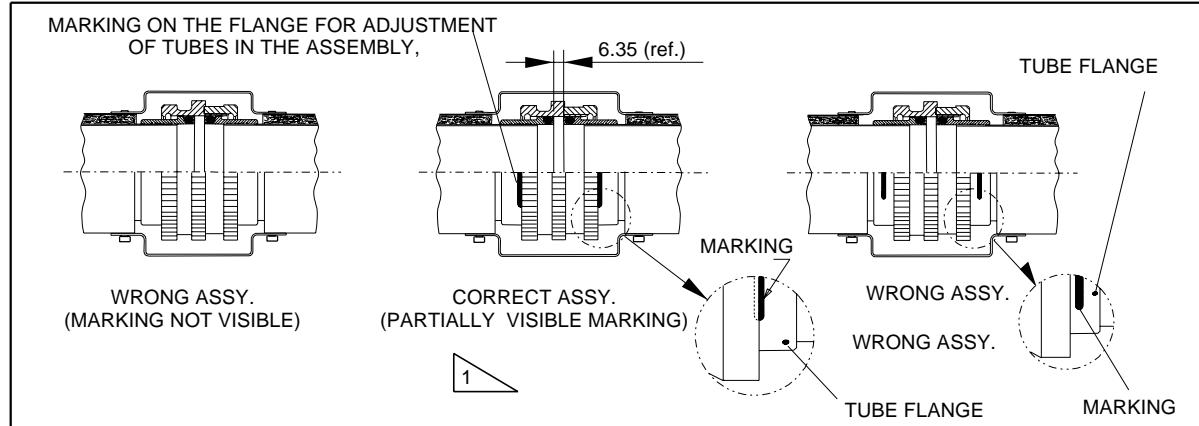
**EFFECTIVITY: ASSEMBLAGE WITH GAMAH THREADED COUPLING**

Fuselage Duct Lines - Removal/Installation

Figure 403 - Sheet 2



DIMENSIONS : mm (in)



**1** NOT ALIGNED. TO CORRECT A SMALL MISMATCH IN THE ASSEMBLY, ADD INSULATION FIBER LAYERS UNDER THE HYDRAULIC-CARDBOARD SHEET (TASK 36-11-09-300-801-A) UNTIL THE ALIGNMENT IS CORRECT.

**2** MAKE SURE THAT THE OPENING OF THE PROTECTION SLEEVE OVERLAPPING IS TURNED TO THE THERMAL SWITCHES USED TO DETECT BLEED-AIR LEAKAGE.

**7** MAKE SURE THAT THE TIE DOW STRAPS AREN'T ATTACHED ABOVE THE DUCTING OF BLEED SYSTEM. THE ACCESSED WARM OF DUCT WHEN IN OPERATION, CAN CAUSE DAMAGE AND TO BREAK OUT THE STRAPS.

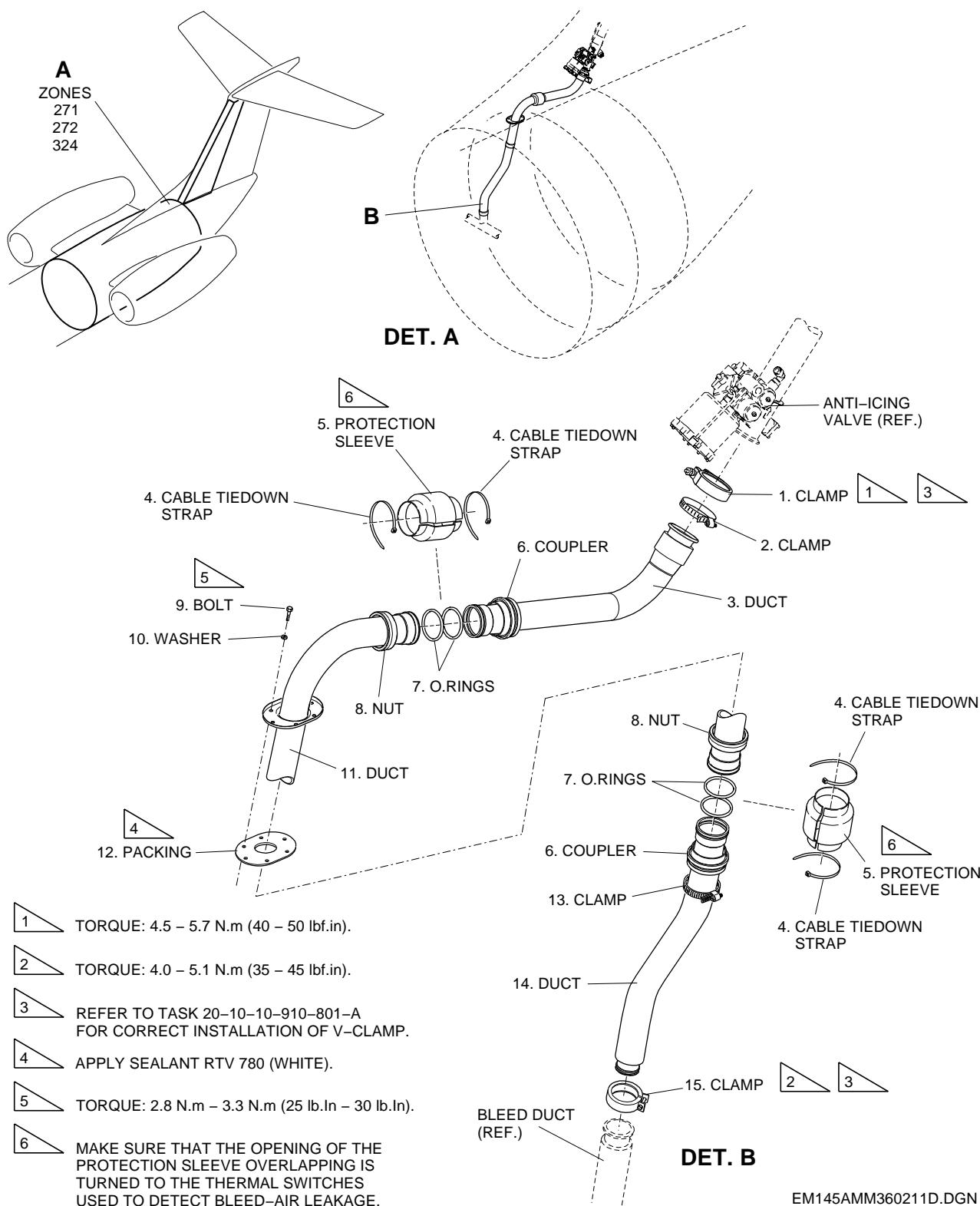
**8** FOR A/C POST-MOD. S.B. 145-36-0048. MAKE SURE THAT THE TIEDOWN STRAPS ARE NOT ATTACHED ABOVE THE DUCTING OF BLEED SYSTEM. THE HEAT FROM DUCT DURING OPERATION CAN CAUSE DAMAGE TO AND BREAK THE STRAPS.

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**EFFECTIVITY: ASSEMBLAGE WITH GAMAH THREADED COUPLING**

Fuselage Duct Lines - Removal/Installation

Figure 403 - Sheet 3

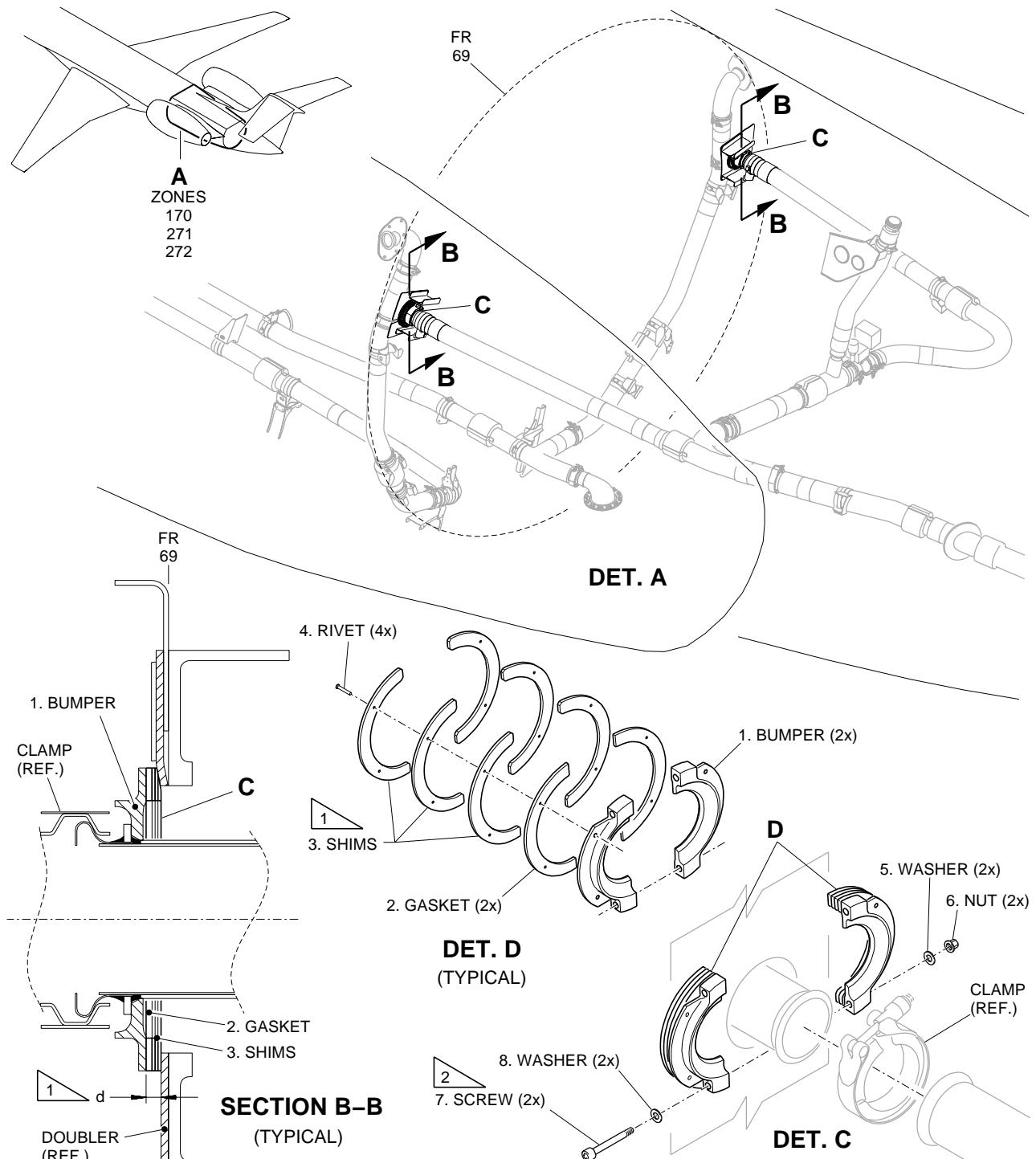


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**EFFECTIVITY: ON ACFT WITH SHIMS ASSEMBLY**

Fuselage Duct Lines - Removal/Installation

Figure 404



EM145AMM360589A.DGN



AIRCRAFT  
MAINTENANCE MANUAL

EMB145 – EMB135

TASK 36-11-09-400-801-A

EFFECTIVITY: ALL

3. FUSELAGE DUCT LINES - TYPICAL INSTALLATION

A. General

(1) This task gives the instructions for the typical installation of the fuselage duct lines.

B. References

REFERENCE	DESIGNATION
36-16-00	-
36-17-00	-
36-18-00	-
AMM MPP 06-30-00/100	-
AMM MPP 06-41-01/100	-
AMM MPP 06-43-00/100	- COMPONENT LOCATION
AMM TASK 20-10-10-910-801-A/200	V-BAND CLAMPS - INSTALLATION
AMM TASK 25-23-01-400-801-A/400	-
AMM TASK 25-23-01-400-802-A/400	-
AMM TASK 36-00-00-700-801-A/500	LH AIR BLEED SYSTEM DUCTS - LEAKAGE TEST
AMM TASK 36-00-00-700-804-A/500	LH FUSELAGE AIR BLEED DUCTS - LEAKAGE TEST
AMM TASK 36-00-00-700-805-A/500	RH FUSELAGE AIR BLEED DUCTS - LEAKAGE TEST
AMM TASK 36-11-09-200-802-A/600	DUCT LINES OF THE AIR-BLEED SYSTEM - ALIGNMENT INSPECTION
AMM TASK 36-11-09-300-801-A/200	THERMAL INSULATION OF THE DUCT LINES OF AIR BLEED SYSTEM - REPAIR
AMM TASK 36-11-10-400-801-A/400	AIR-BLEED LINE PAIRS OF O-RINGS - INSTALLATION
AMM TASK 53-01-02-400-801-A/400	-
AMM TASK 53-01-02-400-802-A/400	-
AMM TASK 53-01-03-400-801-A/400	BAGGAGE-COMPARTMENT FLOOR PANELS - INSTALLATION
S.B. 145-36-0048	-
S.B. 145-36-0049	-
SRM 51-40-02	-

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
193	193	Aft wing-to-fuselage fairing
194	194	RH side of wing-to-fuselage fairing
195	195	LH side of wing-to-fuselage fairing
261	261BF	Passenger floor panel
261	261DF	Passenger floor panel

(Continued)

ZONE	PANEL/DOOR	LOCATION
262	262AF	Passenger floor panel
262	262BF	Passenger floor panel
262	262CF	Passenger floor panel
271	271AF	Floor panel of the baggage compartment
271	271BF	Floor panel of the baggage compartment
271	271BLW	Inside baggage compartment
272	272DR	In the aft electronic compartment
272	272AF	Floor panel of the baggage compartment
272	272BF	Floor panel of the baggage compartment
272	272CRW	Inside baggage compartment
320	322	Dorsal Fin
320	323	Vertical-Stabilizer Leading Edge
414	414CB	LH pylon
424	423CB	RH pylon
813	813	Baggage compartment

**D. Tools and Equipment**

ITEM	DESCRIPTION	PURPOSE	QTY
P/N GS2B or similar (commercially available and according to MS90387-1)	Hand banding tool	To join protective sleeves with tie-down straps	
Commercially available	Torque wrench (For the torque range, refer to the figures)	To torque the fasteners correctly	

**E. Auxiliary Items**

ITEM	DESCRIPTION	PURPOSE	QTY
Commercially available	Porous-point marker	To make marks on the flanges	1

**F. Consumable Materials**

SPECIFICATION (BRAND)	DESCRIPTION	QTY
MS20995C020	Lockwire	AR
ASTM-C-920 Type II Class A	Sealant RTV 780 (WHITE)	AR
MIL-S-38249, TYPE I	Sealant PS700	AR

**G. Expendable Parts**

<i>ITEM</i>	<i>IPC REFERENCE (VENDOR REFERENCE)</i>	<i>QTY</i>
Cable Tie-down Strap	36-16-00	AR
Cable Tie-down Strap	36-17-00	AR
Cable Tie-down Strap	36-18-00	AR

**H. Persons Recommended**

<i>QTY</i>	<i>FUNCTION</i>	<i>PLACE</i>
1	Does the task	In and outside the aircraft

**I. Preparation**
**SUBTASK 841-003-A**

- (1) Make sure that the duct flanges are clean, without dust, sealant, solids or grease.
- (2) Make sure that the ducts are correctly aligned and not under tension ([AMM TASK 36-11-09-200-802-A/600](#)).
- (3) Remove the plastic plugs, if applicable.

**J. Installation (Figure 401) (Figure 402) (Figure 404)**
**SUBTASK 420-002-A**

*EFFECTIVITY: ASSEMBLAGE WITH GAMAH FLANGE/CLAMP JOINT*

**WARNING: SOLVENTS AND CLEANING PRODUCTS ARE TOXIC AND FLAMMABLE. A GOOD AIRFLOW MUST BE AVAILABLE WHEN YOU DO THE WORK IN CLOSED AREAS. PUT ON FACE MASKS AND PROTECTIVE CLOTHING.**

- NOTE:**
- It is permitted to correct a small mismatch in the assembly. To do this, add insulation fiber layers under the hydraulic-cardboard sheet ([AMM TASK 36-11-09-300-801-A/200](#)) until the alignment is correct. (Refer to (Figure 401), sheet 2, DET. D and DETAIL - CORRECT ASSY).
  - Make sure that the V-clamps are correctly installed. (Refer to [AMM TASK 20-10-10-910-801-A/200](#)).

- (1) In an assembly where a Gamah flange/clamp joint is used, refer to (Figure 401), sheet 2, DET. D and do as follows:
  - (a) With the aid of a marking tool (Refer to (Figure 401), sheet 2, DET. S), mark the duct flanges with a porous-point marker (Refer to (Figure 401), sheet 2, DET. M).
  - (b) Install the clamp(s) that attach(es) the duct (REF.) to the fuselage. Refer to (Figure 402), sheet 1, DET. E.
  - (c) Install the new O-rings (5) and (6). Refer to [AMM TASK 36-11-10-400-801-A/400](#).
  - (d) Install the ducts with the Gamah joint (4) in position.

- (e) Install the Gamah joint (4) over the sleeve (3), engage the latch mechanism on the joint, and snap it shut.

NOTE: Make sure that the flange marks are visible under the Gamah joint edges. Refer to (Figure 401), sheet 2, as applicable.

- (f) Lockwire the clamp of the Gamah joint. Refer to (Figure 401), sheet 2, DET. J.

- (g) Lockwire the Gamah joint. Refer to (Figure 401), sheet 2, DET. J and DET. K.

**CAUTION:** BEFORE YOU INSTALL THE BLANKET, IT IS NECESSARY TO MAKE SURE THAT THE SLEEVES AND TIE-DOWN STRAPS ARE INSTALLED CORRECTLY.

- (h) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) to the Gamah joint (4).

- 1 Put the blanket in position as shown in (Figure 401), sheet 2. Adjust the opening of the blanket that overlaps the opening of the sleeve.

- 2 NOTE: Make sure that the blanket rim is fully over the thermal insulation.

Apply the velcro fastener as shown in (Figure 401), sheet 2.

- 3 After blanket installation

NOTE:

- Make sure that the opening of the blanket overlapping is turned to the thermal switches used to detect bleed air leakage.
- Make sure that the blanket rim is fully in contact with the thermal insulation.

- (2) in AN assembly where a Marman V-clamp is used, refer to (Figure 402), sheet 1, DET. C.

- (a) For correct installation of V-clamps, ref. to [AMM TASK 20-10-10-910-801-A/200](#). Install the ducts with the Marman V-clamp as follows:

- 1 Install the duct with the Marman V-clamp in position.

- 2 Install the Marman V-clamp (1).

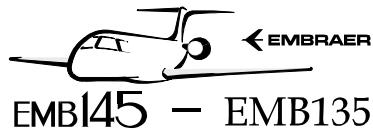
**CAUTION:** BEFORE YOU INSTALL THE BLANKET, IT IS NECESSARY TO MAKE SURE THAT THE SLEEVES AND TIE-DOWN STRAPS ARE INSTALLED CORRECTLY.

- (b) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) to the Gamah joint (4).

- 1 Put the blanket in position as shown in (Figure 401), sheet 2. Adjust the opening of the blanket that overlaps the opening of the sleeve.

- 2 NOTE: Make sure that the blanket rim covers the thermal insulation fully.

Apply the velcro fastener as shown in (Figure 401), sheet 2.



## 3 After blanket installation

NOTE: • Make sure that the opening of the blanket overlapping is turned to the thermal switches used to detect bleed air leakage.

• Make sure that the blanket rim is fully in contact with the thermal insulation.

- (c) Install the clamp(s) that attach(es) the duct (REF.) to the fuselage. Refer to (Figure 402), sheet 1, DET. E and W.

NOTE: • You can use hydraulic-carboard sheets to correct misalignment in the duct assemblies. Refer to (Figure 402) sheet 1, DET. E .

• Make sure that the ducts are aligned and assembled without tension.

- (3) In assemblies where a Marman V-clamp is used to join the cross bleed valve, refer to (Figure 402), sheet 1, DET. H and do as follows:

(a) Remove the plastic protective caps from the ducts.

(b) Put the duct (6) in position.

(c) Install the duct (6).

(d) Install the bolt (4) and washers (5) to the support (REF.).

(e) Tighten the bolt (4).

(f) Install the Marman V-clamp (7) between the duct (6) and the cross bleed valve (8).

(g) Install the cross bleed valve (8).

(h) Install the Marman V-clamp (9) to the duct (REF.).

(i) Install the clamp(s) (2) and (14) that attach(es) the duct to the fuselage (Refer to (Figure 402), sheet 1, DET. W and E).

- (4) In an assembly where a check valve is used, refer to (Figure 402), sheet 1, DET. G and do as follows:

(a) Remove plastic protective caps from the ducts.

(b) Install the gasket (10) to the duct (REF.) that goes to the APU.

(c) Install the gasket (13) to the pax cabin forward ducts (REF.).

(d) Install the check valve (12).

(e) Install the V-band clamp (11).

(f) Install the clamp(s) (3) or (14) that attach(es) the duct to the fuselage (Refer to (Figure 402), sheet 1, DET. E).

- (5) In an assembly where a flange is used, refer to (Figure 402), sheet 2, DET. T.
- (a) Install the flange and the duct (REF.) that comes from the pylons to the engine. and do as follows:
- 1 Remove the plastic protective caps from the ducts.
  - 2 Clean the seal (16), flange (15) and pylon place with METHYL-ETHYL-KETONE.
  - 3 Put the seal (16) on the flange (15) and duct (REF.).
  - 4 Attach the duct (REF.) to the pylon.
  - 5 Install the bolts (14) and washers (13).
  - 6 Tighten the bolts (14) to the torque shown in (Figure 402), sheet 2.
  - 7 Install the Marman V-Clamp (17).
  - 8 Apply sealant along the contour of the duct (REF.) and flange (15).
- (b) Install the flange and the duct (REF.) that goes from the engines to the pylons. Refer to (Figure 402), sheet 2, DET. Q, and do as follows:
- 1 Remove the plastic protective caps from the ducts.
  - 2 Clean the seal (22), flange (21), and the pylon related area with METHYL-ETHYL-KETONE.
  - 3 Put the seal (22) on the flange (21) and duct (REF.).
  - 4 Attach the duct (REF.) to the pylon.
  - 5 Install the bolts (19) and washers (18).
  - 6 Tighten the bolts (19).
  - 7 Install the Marman V-Clamp (20), shown in (Figure 402), sheet 1, DET. C.
- (c) (For A/C POST-MOD. S.B. 145-36-0048 or/and A/C POST-MOD. S.B. 145-36-0049) Install the blanket (REF.) to the Gamah joint (4).
- 1 Put the blanket in position as shown in (Figure 401), sheet 2. Adjust the opening of the blanket that overlaps the opening of the sleeve.
  - 2 Apply the velcro fastener as shown in (Figure 401), sheet 2.
  - 3 After blanket installation
- NOTE:
- Make sure that the opening of the blanket overlapping is turned to the thermal switches used to detect bleed air leakage.
  - Make sure that the blanket rim is fully in contact with the thermal insulation.

- (d) Apply sealant along the contour of the duct (REF.) and flange (21).
- (e) Install the flange and the duct (REF.) from the fuselage to the pylons. Refer to (Figure 402), sheet 2, DET. N, and do as follows:
  - 1 Remove the plastic protective caps from the ducts.
  - 2 Clean the packing (24), flange (23) and the pylon related area with METHYL-ETHYL-KETONE.
  - 3 Put the flange (23) and seal (24) on the duct (REF.).
  - 4 Attach the duct (REF.) to the pylon.
  - 5 Install the bolts (27) and washers (26).
  - 6 Tighten the bolts (19).
  - 7 Install the Marman V-Clamp (25).
- (f) (For A/C POST-MOD. S.B. 145-36-0048 or/and A/C POST-MOD. S.B. 145-36-0049). Install the blanket (REF.) to the Gamah joint (4).
  - 1 Put the blanket in position as shown in (Figure 402), sheet 2. Adjust the opening of the blanket that overlaps the opening of the sleeve.
  - 2 Apply the velcro fastener as shown in (Figure 401), sheet 2.
  - 3 After blanket installation
 

**NOTE:**

    - Make sure that the opening of the blanket overlapping is turned to the thermal switches used to detect bleed air leakage.
    - Make sure that the blanket rim is fully in contact with the thermal insulation.
- (g) Apply sealant to the contour of the duct (REF.) and packing (24).
- (h) Install the duct (REF.) from the APU to the fuselage. Refer to (Figure 402), sheet 2, DET. F, and do as follows:
  - 1 Remove the plastic protective caps from the ducts.
  - 2 Clean the seal (30), flange (31) and the fuselage related area with METHYL-ETHYL-KETONE.
  - 3 Put the seal (30) on the flange (31).
  - 4 Attach the duct (REF.) to the fuselage structure.
  - 5 Install the bolts (28) and washers (29).
  - 6 Tighten the bolts (28).
  - 7 Apply sealant to the contour of the duct (REF.) and flange (31).

- (i) Install the duct (REF.) from the external fuselage to the internal fuselage. Refer to (Figure 402), sheet 2, DET. M, and do as follows:
    - 1 Remove the plastic protective caps from the ducts.
    - 2 Clean the seal (35), flange (34) and fuselage area with METHYL-ETHYL-KETONE.
    - 3 Put the seal (35) on the fuselage flange (34).
    - 4 Attach the duct (REF.) to the fuselage (REF.).
    - 5 Install the bolts (32) and washers (33).
    - 6 Tighten the bolts (32).
  - (j) Apply sealant to the contour of the flange duct (6) and packing (5).
- (6) (ON ACFT WITH SHIMS ASSEMBLY) Install the shims assembly as follows (Refer to (Figure 404)):
- (a) Put the shims assembly to the position on the duct. Make sure that the assembly do not rotate at the duct. If necessary, put more shims to the shims assembly as follows:
    - 1 Remove the rivets (4) from the bumper (1). To do this, refer to SRM 51-40-02.
    - 2 Put the bumper (1) and gasket (2) to the position on the duct and measure the distance  $<d>$  from bumper (1) to doubler on frame 69. The number of shim (3) to install is:  $N = <d> - 2$  (min of 1 shim and max of 5 shims).
    - 3 Install the rivets (4) that attach the shims (3) and gasket (2) to the bumpers (1). To do this, refer to SRM 51-40-02.
  - (b) Install the shims assembly on the duct with the screws (7), washers (8) (5) and nuts (6).
  - (c) Use the torque wrench to torque each screw (7) to 11.3 N.m (100 lbf.in).
- (7) Install the ducts to the vertical stabilizer as follows (Refer to (Figure 401), sheet 3).
- (a) Do as follows:

- 1    Install the duct (2) as follows:
  - a   Remove the plastic protective caps from the ducts.
  - b   Install new O-rings and install the clamp (1).
  - c   Install the clamp (1). Tighten the clamp (1) to the torque shown in Figure 403, sheet 1.
  - d   Install the Gamah joint (4) with new O-rings and safety it with lockwire (Refer to (Figure 401), sheet 2, DET. D).
 

NOTE: Make sure that the flange marks are visible under the Gamah joint (4) edges. Refer to (Figure 401), sheet 3, as applicable.
  
- 2    Install the duct (6) as follows:
  - a   Remove the plastic protective caps from the ducts.
  - b   Clean the packing (5) and the fuselage related area with METHYL-ETHYL-KETONE.
  - c   Put the packing (5) on the duct (6).
  - d   Connect the duct (6) to the duct (2) with the Gamah joint (10) with new O-rings and safety it with lockwire (Refer to (Figure 401), sheet 2, DET. D).
 

NOTE: Make sure that the flange marks are visible under the Gamah joint edges. Refer to (Figure 401), sheet 2, as applicable.
  - e   Connect the duct (6) to the duct (11) with the Gamah joint (4) with new O-rings and safety it with the lockwire (Refer to (Figure 401), sheet 2, DET. D).
 

NOTE: Make sure that the flange marks are visible under the Gamah joint edges. Refer to (Figure 401), sheet 2, as applicable.
  - f   Attach the duct (6) to the fuselage with the bolts (8) and washers (7). Tighten the bolts (8) to the torque shown in Figure 403, sheet 1.
  - g   Apply sealant to the contour of the duct (6) and the packing (5).
  
- 3    Install the duct (11) as follows:
  - a   Remove the plastic protective caps from the ducts.
  - b   Install new O-rings and attach the duct (11) to the anti-icing valve with the clamp (12). Tighten the clamp (12) to the torque shown in Figure 403, sheet 1.
  - c   Install the Gamah joint (10) with new O-rings and safety it with lockwire (Refer to (Figure 401), sheet 2, DET. D).
 

NOTE: Make sure that the flange marks are visible under the Gamah joint edges. Refer to (Figure 401), sheet 2, as applicable.

K. Installation (Figure 402) Figure 403 (Figure 404)

**SUBTASK 420-002-B**

**EFFECTIVITY: ASSEMBLAGE WITH GAMAH THREADED COUPLING**

**WARNING: SOLVENTS AND CLEANING PRODUCTS ARE TOXIC AND FLAMMABLE. A GOOD AIRFLOW MUST BE AVAILABLE WHEN YOU DO THE WORK IN CLOSED AREAS. PUT ON FACE MASKS AND PROTECTIVE CLOTHING.**

- NOTE:** • It is permitted to correct a small mismatch in the assembly. To do this, add insulation fiber layers under the hydraulic-cardboard sheet ( [AMM TASK 36-11-09-300-801-A/200](#) ) until the alignment is correct. (Refer to (Figure 401), sheet 2, DET. D and DETAIL - CORRECT ASSY).

- Make sure that the V-clamps are correctly installed. (Refer to [AMM TASK 20-10-10-910-801-A/200](#)).

- (1) In assemblies where a Gamah threaded coupling assembly is used, refer to Figure 403, sheet 2, DET. D, and do as follows:

- (a) With the aid of a marking tool, (Refer to Figure 403, sheet 2, DET. S), mark the duct flanges with a porous-point marker (Refer to Figure 403, sheet 2, DET. R)
- (b) Install the clamp(s) that attach(es) the duct to the fuselage (Refer to (Figure 402), sheet 1, DET. E and W).
- (c) Install the new O-rings (5). Refer to [AMM TASK 36-11-10-400-801-A/400](#).
- (d) Tighten the nut (4) onto the coupler (3) until you hear a click. The locking collar on the coupler (3) will move towards the nut (4) and the indicator mark on the coupler (3) will out of view.

**NOTE:** Make sure that the flange marks are visible under the Gamah coupling assembly edges. Refer to Figure 403, sheet 2, as applicable.

- (e) Install the protective sleeve (2) and tie-down straps (1).

**CAUTION: BEFORE YOU INSTALL THE BLANKET, IT IS NECESSARY TO VERIFY SLEEVE (2) AND TIE-DOWN STRAP (1) ARE INSTALLED CORRECTLY.**

- (f) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) to the protective sleeve (2).

- 1 Put the blanket in position as shown in Figure 403, sheet 2. Adjust the opening of the blanket that overlaps the opening of the sleeve.

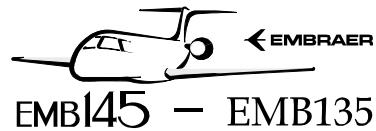
- 2 **NOTE:** Make sure that the blanket rim covers the thermal insulation  
Apply the velcro fasteners as shown in Figure 403, sheet 2.

**3 After blanket installation:**

**NOTE:** • Make sure that the opening of the blanket overlapping is turned to the thermal switches used to detect bleed air leakage.

• Make sure that the blanket rim is fully in contact with the thermal insulation.

- (2) In an assembly where a Marman V-clamp is used, refer to (Figure 402), sheet 1, DET. C.
- (a) For correct installation of V-clamps, ref. to [AMM TASK 20-10-10-910-801-A/200](#). Install the ducts with the Marman V-clamp as follows:
- 1 Install the duct with the Marman V-clamp in position.
  - 2 Install the Marman V-clamp (1).
- (b) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) over the Marman V-clamp (1).
- 1 **NOTE:** Make sure that the blanket rim involves entirely the Marman V-Clamp (1).
- Attach Velcro tape as per referred to (Figure 402), sheet 1, DET. C.
- (c) Install the clamp(s) that attach(es) the duct (REF.) to the fuselage. Refer to (Figure 402), sheet 1, DET. E and W.
- (3) For assemblage where a Marman V-clamp is used to join the cross bleed valve, refer to (Figure 402), sheet 1, DET. H and do as follows:
- (a) Remove the plastic protective caps from the ducts.
  - (b) Put the duct (6) in position.
  - (c) Install the duct (6).
  - (d) Install the bolt (4) and washers (5) to the support (REF.) at the fuselage.
  - (e) Tighten the bolt (4).
  - (f) Install the Marman V-clamp (7) between the duct (6) and the cross bleed valve (8).
  - (g) Install the cross bleed valve (8).
  - (h) Install the Marman V-clamp (9) to the duct (REF.) and cross bleed valve (8).
  - (i) Install the clamp(s) (2) and (14) that attach(es) the duct to the fuselage (Refer to (Figure 402), sheet 1, DET. W and E).
- (4) In an assembly where a check valve is used, refer to (Figure 402), sheet 1, DET. G and do as follows:



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- (a) Remove the plastic protective caps from the ducts.
  - (b) Install the gasket (10) to the duct (REF.) that goes to the APU.
  - (c) Install the gasket (13) to the pax cabin forward ducts (REF.).
  - (d) Install the check valve (12).
  - (e) Install the V-band clamp (11).
  - (f) Install the clamp(s) (3) or (14) that attach(es) the duct to the fuselage (Refer to (Figure 402), sheet 1, DET. E).
- (5) In an assembly where a flange is used, refer to (Figure 402), sheet 2 and do as follows:
- (a) Install the flange and the duct (REF.) that comes from the pylons to the engine. Refer to (Figure 402), sheet 2, DET. T.
    - 1 Remove the plastic protective caps from the ducts.
    - 2 Clean the seal (16), flange (15) and the pylon related area with METHYL-ETHYL-KETONE.
    - 3 Put the seal (16) on the flange (15) and duct (REF.).
    - 4 Attach the duct (REF.) to the pylon.
    - 5 Install the bolts (14) and washers (13).
    - 6 Tighten the bolts (14).
    - 7 Install the Marman V-Clamp (17).
    - 8 Apply sealant to the contour of the duct (REF.) and flange (15).
  - (b) Install the flange and the duct (REF.) that goes from the engines to the pylons. Refer to (Figure 402), sheet 2, DET. Q, and do as follows:
    - 1 Remove the plastic protective caps from the ducts.
    - 2 Clean the seal (22), flange (21), and the pylon related area with METHYL-ETHYL-KETONE.
    - 3 Put the seal (22) on the flange (21) and duct (REF.).
    - 4 Attach the duct (REF.) to the pylon.
    - 5 Install the bolts (19) and washers (18).
    - 6 Tighten the bolts (19).
    - 7 Install the Marman V-Clamp (20).
  - (c) (For A/C POST-MOD. S.B. 145-36-0048 or/and A/C POST-MOD. S.B. 145-36-0049) Install the blanket (REF.) over the Marman V-Clamp (20).

1 Install the blanket as shown in (Figure 402), sheet 2 and adjust the opening of the blanket that overlaps the opening of the sleeve.

2 **NOTE:** Make sure that the blanket rim involves entirely the Marman V-Clamp.

Attach Velcro tape as given in (Figure 402), sheet 2.

(d) Apply sealant to the contour of the duct (REF.) and flange (21).

(e) Install the flange and the duct (REF.) from the fuselage to the pylons. Refer to (Figure 402), sheet 2, DET. N, and do as follows:

1 Remove the plastic protective caps from the ducts.

2 Clean the packing (24), flange (23) and the pylon related area with METHYL-ETHYL-KETONE.

3 Put the flange (23) and packing (24) on the duct (REF.).

4 Attach the duct (REF.) to the pylon.

5 Install the bolts (27) and washers (26).

6 Tighten the bolts (19).

7 Install the Marman V-Clamp (25).

(f) (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) over the Marman V-Clamp (25).

1 Install the blanket as shown in (Figure 402), sheet 2, to adjust the opening of the blanket that overlaps the opening of the sleeve.

2 **NOTE:** Make sure that the blanket rim involves entirely the Marman V-Clamp (25).

Attach Velcro tape as given in (Figure 402), sheet 2.

(g) Install the duct (REF.) from the APU to the fuselage. Refer to (Figure 402), sheet 2, DET. F, and do as follows:

1 Remove the plastic protective caps from the ducts.

2 Clean the seal (30), flange (31) and the fuselage related area with METHYL-ETHYL-KETONE.

3 Put the seal (30) on the flange (31).

4 Attach the duct (REF.) to the fuselage structure.

5 Install the bolts (28) and washers (29).

6 Tighten the bolts (28).

7 Apply sealant to the contour of the duct (REF.) and flange (31).

- (h) Install the duct (REF.) from the external fuselage to the internal fuselage. Refer to (Figure 402), sheet 2, DET. M, and do as follows:
- 1 Remove the plastic protective caps from the ducts.
  - 2 Clean the seal (35), flange (34) and fuselage area with METHYL-ETHYL-KETONE.
  - 3 Put the seal (35) on the flange (34).
  - 4 Attach the duct (REF.) to the fuselage.
  - 5 Install the bolts (32) and washers (33).
  - 6 Tighten the bolts (32).
  - 7 Apply sealant to the contour of the duct (REF.) and flange (34).
- (6) (ON ACFT WITH SHIMS ASSEMBLY) Install the shims assembly as follows (Refer to (Figure 404):
- (a) Put the shims assembly to the position on the duct. Make sure that the assembly do not rotate at the duct. If necessary, put more shims to the shims assembly as follows:
    - 1 Remove the rivets (4) from the bumper (1). To do this, refer to SRM 51-40-02.
    - 2 Put the bumper (1) and gasket (2) to the position on the duct and measure the distance  $\langle d \rangle$  from bumper (1) to doubler on frame 69. The number of shim (3) to install is:  $N = \langle d \rangle - 2$  (min of 1 shim and max of 5 shims).
    - 3 Install the rivets (4) that attach the shims (3) and gasket (2) to the bumpers (1). To do this, refer to SRM 51-40-02.
  - (b) Install the shims assembly on the duct with the screws (7), washers (8) (5) and nuts (6).
  - (c) Use the torque wrench to torque each screw (7) to 11.3 N.m (100 lbf.in).
- (7) Install the ducts to the vertical stabilizer as follows (Refer to Figure 403, sheet 3), DET. L.
- (a) Do as follows:

- 1** Install the duct (17).
  - a** Remove plastic protective caps from the ducts.
  - b** With the aid of a marking tool (Refer to Figure 403, sheet 2, DET. S), mark the duct flanges with a porous-point marker (Refer to Figure 403, sheet 2, DET. R).
  - c** Install the new O-rings (5). Refer to [AMM TASK 36-11-10-400-801-A/400](#).
  - d** Put the duct (17) in position.
  - e** Install the clamp (15) that attaches the duct (17) to the fuselage (Refer to (Figure 402), sheet 1, DET. E and W).
  - f** Install the clamp (15). Tighten the clamp (15) to the torque shown in Figure 403, sheet 3.
  - g** Tighten the nut (4) onto the coupler (6) until you hear a click. The locking collar on the coupler (6) will move towards the nut (4) and the indicator mark on the coupler (6) will go out of view.

**NOTE:** Make sure that the flange marks are visible under the Gamah coupling assembly edges. Refer to Figure 403, sheet 2, as applicable.
  - h** Install the protective sleeve (3) and tie-down straps (2).

- 2 Install the duct (18) as follows:
  - a Remove the plastic protective caps from the ducts.
  - b With the aid of a marking tool, (Refer to Figure 403, sheet 2, DET. S), mark the duct flanges with a porous-point marker (Refer to Figure 403, sheet 2, DET. R).
  - c Clean the packing (12) and the fuselage place with METHYL-ETHYL-KETONE.
  - d Put the packing (19) on the duct (18).
  - e Install the new O-rings (7). Refer to [AMM TASK 36-11-10-400-801-A/400](#).
  - f Put the duct (18) in position.
  - g Attach the duct (20) to the fuselage with the bolts (21) and washers (20). Tighten the bolts (21) to the torque shown in Figure 403, sheet 3.
  - h Apply sealant to the contour of the duct (18) and the packing (19).
  - i Tighten the nut (4) onto the coupler (6) until you hear a click. The locking collar on the coupler (6) will move towards the nut (4) and the indicator mark on the coupler (6) will go out of view.

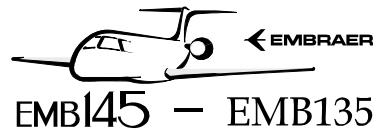
**NOTE:** Make sure that the flange marks are visible under the Gamah coupling assembly edges. Refer to Figure 403, sheet 3, as applicable.
  - j Install the protective sleeve (5) and tie-down straps (4).

- 3 Install the duct (23) as follows:
- a Remove the plastic protective caps from the ducts.
  - b With the aid of a marking tool (Refer to Figure 403, sheet 2, DET. S), mark the duct flanges with a porous-point marker (Refer to Figure 403, sheet 2, DET. R).
  - c Install new O-rings (5). Refer to [AMM TASK 36-11-10-400-801-A/400](#).
  - d Put the duct (23) in position.
  - e Install the clamp (22) that attaches the duct (23) to the fuselage (Refer to Figure 403, sheet 2, DET. C).
  - f Tighten the nut (4) onto the coupler (6) until you hear a click. The locking collar on the coupler (6) will move towards the nut (4) and the indicator mark on the coupler (6) will go out of view.
- NOTE:** Make sure that the flange marks are visible under the Gamah coupling assembly edges. Refer to Figure 403, sheet 2, as applicable.
- g Install the protective sleeve (3) and tie-down straps (2).
- CAUTION:** BEFORE YOU INSTALL THE BLANKET, IT IS NECESSARY TO VERIFY IF THE SLEEVES AND TIE-DOWN STRAPS ARE INSTALLED CORRECTLY.
- h (For A/C POST-MOD. [S.B. 145-36-0048](#) or/and A/C POST-MOD. [S.B. 145-36-0049](#)) Install the blanket (REF.) to the protective sleeve (3).
  - i Put the blanket in shown in (Figure 401), sheet 3. Adjust opening of the blanket that overlaps the opening of the sleeve.
  - j **NOTE:** Make sure that the blanket rim covers the thermal insulation fully.  
Apply the velcro fastener as shown in Figure 403, sheet 3.
  - k After blanket installation:
- NOTE:**
- Make sure that the opening of the blanket overlapping is turned to the thermal switches used to detect bleed air leakage.
  - Make sure that the blanket rim is fully in contact with the thermal insulation.

#### L. Follow-on

##### SUBTASK 842-002-A

- (1) Do a leakage test in the bleed-air system ducts ( [AMM TASK 36-00-00-700-801-A/500](#), [AMM TASK 36-00-00-700-804-A/500](#) and [AMM TASK 36-00-00-700-805-A/500](#)).



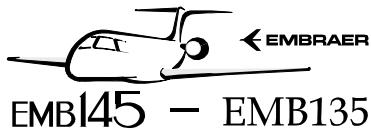
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- (2) Install the protective sleeves and the new cable tie-down straps where applicable. Use the hand banding tool.

**NOTE:** • Make sure that the opening of the protective sleeve overlapping is turned to the thermal switches used to detect bleed-air leakage.

  - Make sure that the tie-down strap and the sleeve are assembled on the thermal insulation to prevent damage because of the high temperature.
- (3) Install the bonding jumpers where applicable.
- (4) Install sidewall linings 271BLW and 272CRW (AMM TASK 25-23-01-400-801-A/400 for EMB-145 () models and AMM TASK 25-23-01-400-802-A/400 only for EMB-135 () models).
- (5) On the EMB-145 () models install floor panels 271AF, 271BF, 272AF, and 272BF ( [AMM TASK 53-01-03-400-801-A/400](#)), 261BF, 261DF, 262AF, 262BF, and 262CF (AMM TASK 53-01-02-400-801-A/400), as applicable.
- (6) On the EMB-135 () models install floor panels 271AF, 271BF, 272AF, and 272BF ( [AMM TASK 53-01-03-400-801-A/400](#)), 261DF, 262BF, and 262CF, (AMM TASK 53-01-02-400-802-A/400), as applicable.
- (7) Install access panel 272DR (AMM MPP 06-41-01/100).
- (8) Close baggage compartment door 813 (AMM MPP 06-30-00/100)
- (9) Install panels 193, 194 and 195 (AMM MPP 06-30-00/100).
- (10) Install the Dorsal Fin access panel 322 and the Vertical-Stabilizer Leading-Edge access panel 323 (AMM MPP 06-30-00/100), as applicable.
- (11) Install access panels 414CB and 424CB ( [AMM MPP 06-43-00/100](#)).



# AIRCRAFT MAINTENANCE MANUAL

TASK 36-11-09-000-802-A

EFFECTIVITY: ALL

## 4. ENGINE DUCT - TYPICAL REMOVAL

### A. General

- (1) This task gives the instructions for the typical removal of the engine duct.

### B. References

REFERENCE	DESIGNATION
AMM TASK 36-11-01-000-801-A/400	ENGINE BLEED-AIR CHECK VALVE - REMOVAL
AMM TASK 36-11-02-000-801-A/400	HIGH-STAGE VALVE - REMOVAL
AMM TASK 36-11-07-000-801-A/400	HIGH-STAGE PRESSURE SWITCH - REMOVAL
AMM TASK 71-11-01-000-801-A/400	ENGINE UPPER COWLING - REMOVAL

### C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
412	412 - Upper cowling	LH engine
422	422 - Upper cowling	RH engine

### D. Tools and Equipment

Not Applicable

### E. Auxiliary Items

Not Applicable

### F. Consumable Materials

Not Applicable

### G. Expandable Parts

Not Applicable

### H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	In and outside the aircraft

### I. Preparation

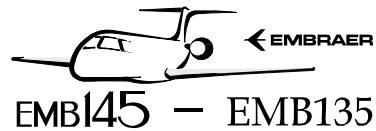
#### SUBTASK 841-004-A

- (1) Remove upper cowlings 412 and 422 ([AMM TASK 71-11-01-000-801-A/400](#)).

### J. Removal ([Figure 405](#)) ([Figure 406](#))

#### SUBTASK 020-003-A

**WARNING:** DO NOT TOUCH THE BLEED-AIR SYSTEM DUCTS OR COMPONENTS IMMEDIATELY AFTER THE ENGINE OR APU STOPS, BECAUSE OF THE HIGH BLEED-AIR TEMPERATURE.



## AIRCRAFT MAINTENANCE MANUAL

- (1) Refer to [Figure 405](#), DET. B or [Figure 406](#), DET. B.

Remove the ducts of 14th Stage, as follows: Refer to QEC SUBKIT in the POWER PLANT BUILD MANUALS CHAPTER 71-00-00.

- (a) Remove the Marman V-Clamp and the bleed-air check valve ( [AMM TASK 36-11-01-000-801-A/400](#)) from between the duct (16) and the duct (6).
- (b) Remove the tube (16), clamp and Marman V-Clamp from the High Stage Valve (7).
- (c) Remove the tube (8) from between duct (4) and the High Stage Pressure Switch (Ref.).
- (d) Remove the connection (1) and O-ring (11) from High Stage Pressure Switch (Ref.).
- (e) Remove the High Stage Pressure Switch ([AMM TASK 36-11-07-000-801-A/400](#)).
- (f) Remove the clamp from between the support (15) and the High Stage Valve (7).
- (g) Remove the High Stage Valve ([AMM TASK 36-11-02-000-801-A/400](#)).
- (h) Remove the bolts (17) and the support (15).
- (i) Remove the Marman V-Clamp from between the duct (4) and the High-Stage Valve (7).
- (j) Remove the Marman V-Clamp from between the duct (4) and the Engine Anti-Icing Valve (9).
- (k) Remove the Marman V-Clamp from between the duct (6) and the pylon tube (Ref.).
- (l) Remove the bolts (12).
- (m) Remove the duct (4) with the gasket (5).
- (n) Put plastic protective plugs in the ducts and valves.

- (2) Refer to [Figure 405](#), DET. B or [Figure 406](#), DET. B.

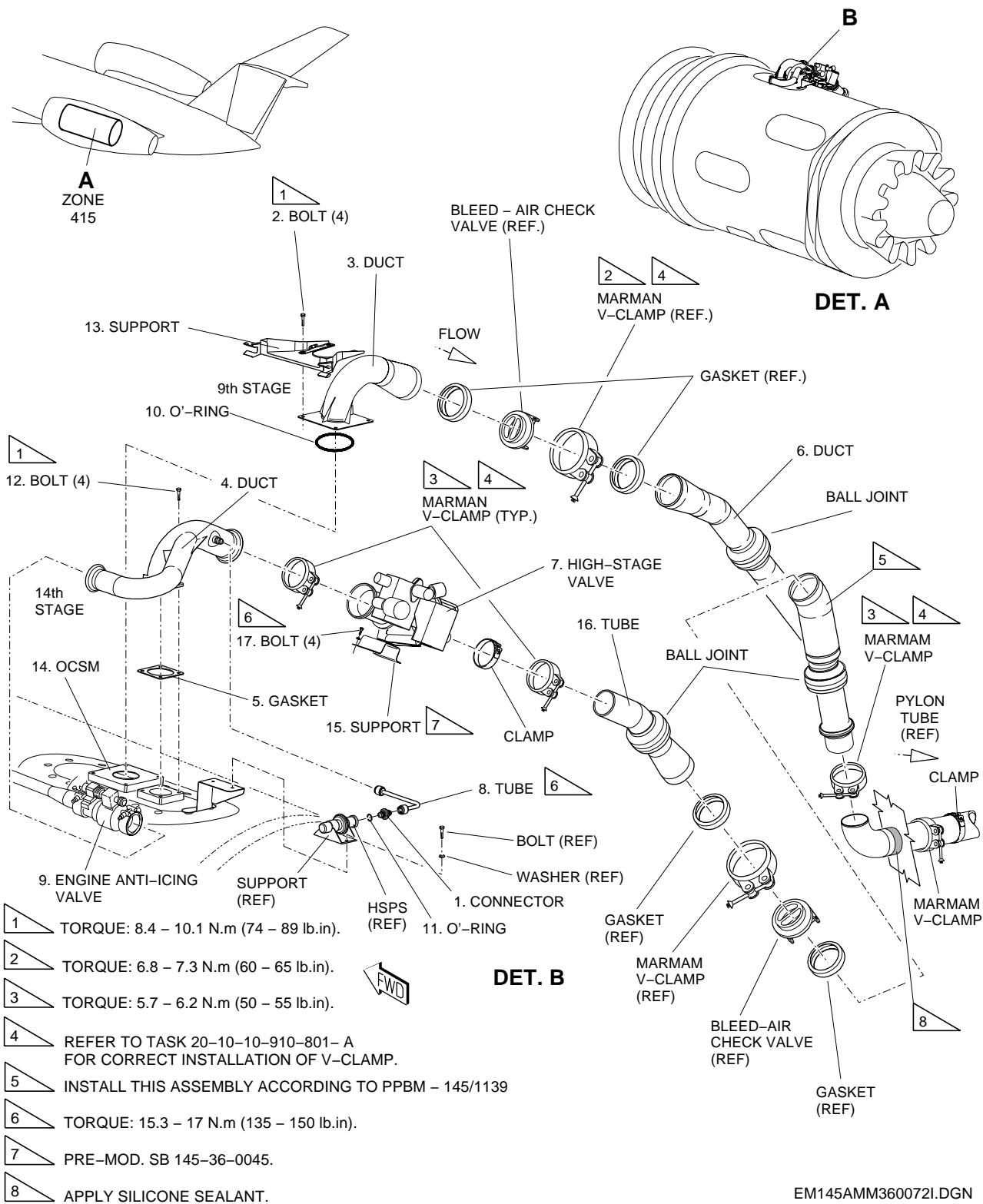
Remove the ducts of 9th Stage, as follows:

- (a) Remove the Marman V-Clamp and the bleed-air check valve ( [AMM TASK 36-11-01-000-801-A/400](#)) from between the duct (3) and the duct (6).
- (b) Remove the duct (6).
- (c) Remove the bolts (2).
- (d) Remove the support (13).
- (e) Remove the duct (3) with the O-ring (10) from the OCSM (14).
- (f) Put plastic protective plugs in the ducts and valves.

**EFFECTIVITY: ALL**

Engine Duct - Typical Removal/Installation

Figure 405

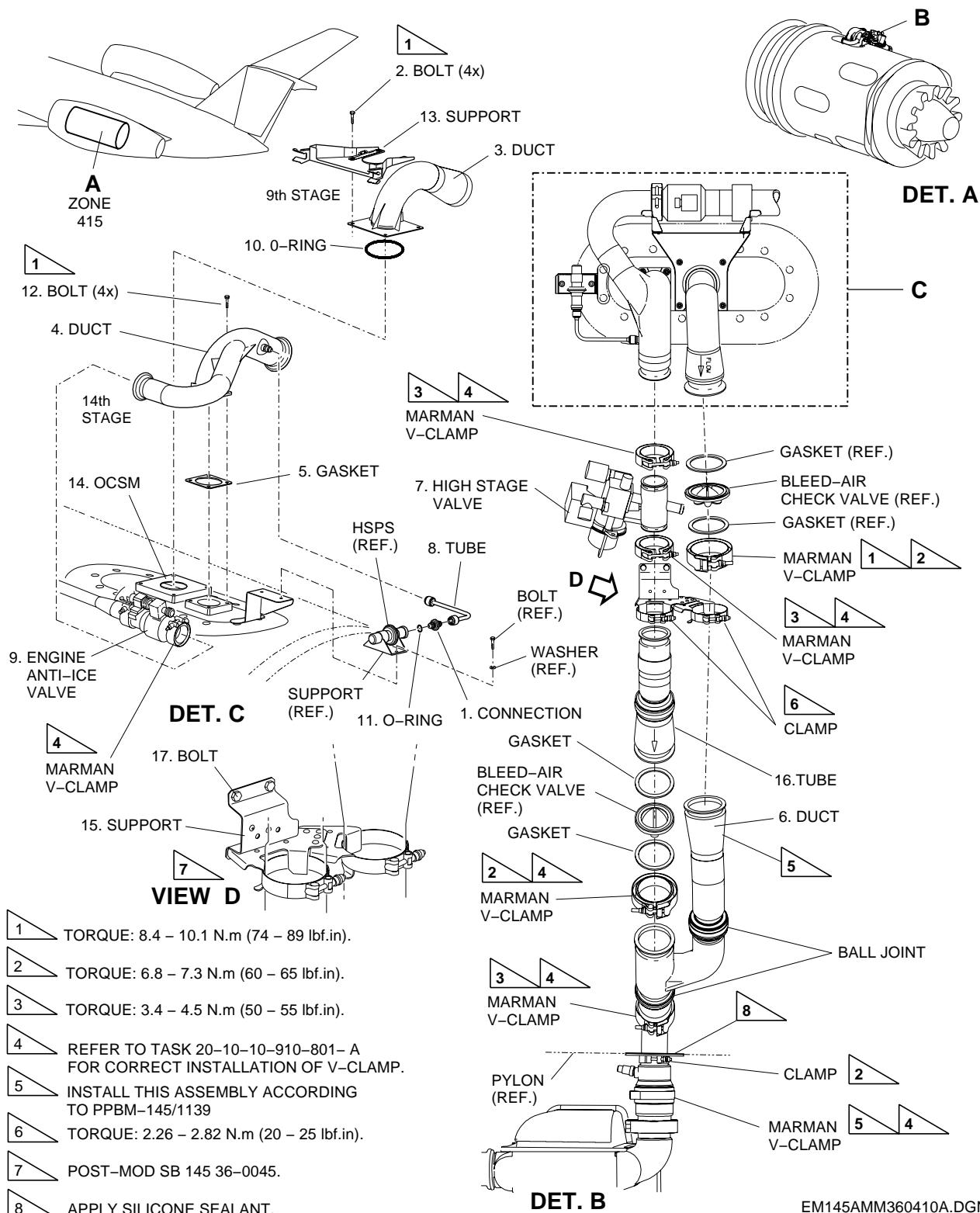


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**EFFECTIVITY: ALL**

Engine Duct - Typical Removal/Installation

Figure 406

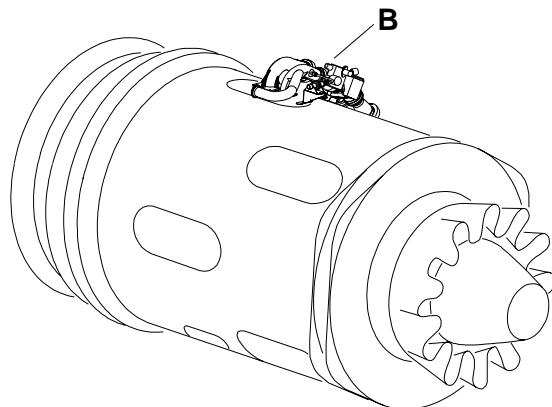
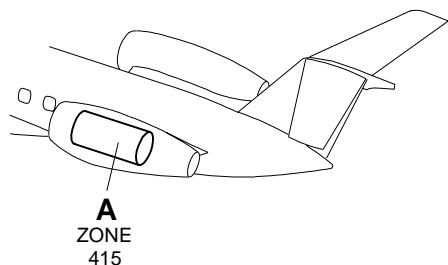


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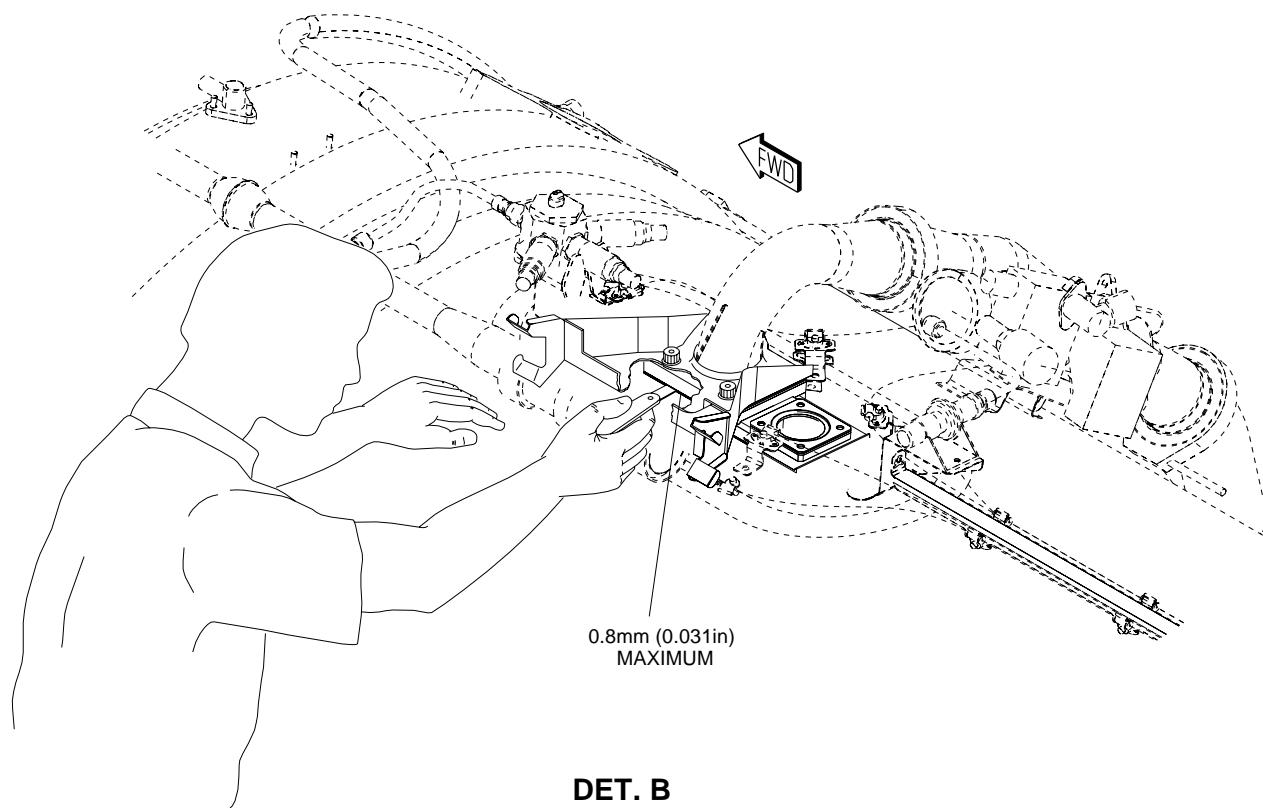
**EFFECTIVITY: ALL**

Engine Duct - Typical Removal/Installation

Figure 407

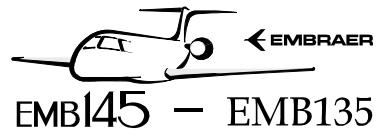


**DET. A**



**DET. B**

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MAINTENANCE MANUAL

TASK 36-11-09-400-802-A

EFFECTIVITY: ALL

5. ENGINE DUCT - TYPICAL INSTALLATION

A. General

(1) This task gives the instructions for the typical installation of the engine duct.

B. References

REFERENCE	DESIGNATION
36-11-00	-
36-11-01	-
AMM MPP 06-43-00/100	- COMPONENT LOCATION
AMM TASK 20-10-10-910-801-A/200	V-BAND CLAMPS - INSTALLATION
AMM TASK 36-00-00-700-803-A/500	AIR BLEED SYSTEM - OPERATIONAL TEST
AMM TASK 36-11-01-400-801-A/400	ENGINE BLEED-AIR CHECK VALVE - INSTALLATION
AMM TASK 36-11-02-400-801-A/400	HIGH-STAGE VALVE - INSTALLATION
AMM TASK 36-11-07-400-801-A/400	HIGH-STAGE PRESSURE SWITCH - INSTALLATION
AMM TASK 36-11-09-820-801-A/200	ENGINE-BLEED SYSTEM DUCT LINES - ADJUSTMENT
AMM TASK 71-11-01-400-801-A/400	ENGINE UPPER COWLING - INSTALLATION
PPBM-145/1139	-

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
412	412 - Upper cowling	LH engine
422	422 - Upper cowling	RH engine
414	414 - Upper cowling	LH pylon
424	424 - Upper cowling	RH pylon

D. Tools and Equipment

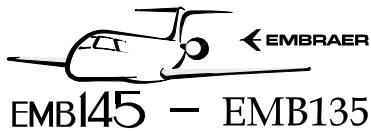
ITEM	DESCRIPTION	PURPOSE	QTY
Commercially available	Torque wrench	To tighten the clamp and bolts	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

SPECIFICATION (BRAND)	DESCRIPTION	QTY
Krytox XHT-BDX	Lubricant	AR



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MAINTENANCE MANUAL

(Continued)

SPECIFICATION (BRAND)	DESCRIPTION	QTY
MIL-S-38249, TYPE I	Sealant PS700	AR

## G. Expendable Parts

ITEM	IPC REFERENCE (VENDOR REFERENCE)	QTY
O-ring	36-11-00	AR
Gasket	36-11-01	AR

## H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	In and outside the aircraft

## I. Installation (Figure 405) (Figure 406) (Figure 407)

## SUBTASK 420-003-A

**WARNING: MAKE SURE THAT THE O-RINGS AND THE GASKET ARE CORRECTLY INSTALLED, AND BE CAREFUL NOT TO LET THEM FALL INSIDE THE OUTER BYPASS DUCT.**

**CAUTION: USE THE POWERPLANT BUILD-UP MANUAL (PPBM-145/1139) TO MAKE SURE THAT NO COMPONENT OF THE ENGINE DUCTS IS MISSING.**

- (1) Refer to DET. B and install the ducts of 14th STAGE as follows:

**NOTE:** Before the final assembly, tighten all the Marman V-Clamp to approximately 70% of the specified torque given in (Figure 405), sheet 1.

- (a) Remove access panels 414CB, 424CB, 414DB and 424DB ( [AMM MPP 06-43-00/100](#)).
- (b) Before the installation of ducts, loosen the Marman V-Clamp and the Clamp inside pylon compartment.
- (c) Remove the plastic plugs.
- (d) Put the duct (4) with the gasket (5) and Marman V-Clamps in the correct position.
- (e) Install the washers (11) and bolts (12).
- (f) Install the support (15) and bolts (17).
- (g) Put the Marman V-Clamp between the duct (4) and the High-Stage Valve (7) in the correct position.
- (h) Install the Clamp of the High Stage Valve (7).
- (i) Install the High Stage Valve (7) ( [AMM TASK 36-11-02-400-801-A/400](#)).

- (j) Install the bolts (17) at the support (15).
- (k) **NOTE:** Make sure that the ducts are correctly aligned and not under tension ([AMM TASK 36-11-09-820-801-A/200](#)).  
Tighten the bolts (17) to the torque given in (Figure 405).
- (l) Tighten the bolts (12) to the torque given in (Figure 405), or (Figure 406).
- (m) Install the tube (8) to the duct (4).
- (n) Install the High Stage Pressure Switch ([AMM TASK 36-11-07-400-801-A/400](#)).
- (o) Install the connection (1) and O-ring (11) to High Stage Pressure Switch (Ref.).
- (p) Install the Marman V-Clamp between the duct (4) and the Engine Anti-Icing Valve (9).
- (q) Tighten the tube (8). Tighten the tube to the torque given in Figure 404 or (Figure 406) ([AMM TASK 36-11-07-400-801-A/400](#)).

**CAUTION:** MAKE SURE THAT ALL THE COMPONENTS, ESPECIALLY THE BALL JOINTS, ARE CORRECTLY ASSEMBLED IN THE NEUTRAL POSITION.

- (r) Put the Marman V-Clamp between the duct (16) and the High-Stage Valve (7) in the correct position.
- (s) **NOTE:** Make sure that the ducts are correctly aligned and not under tension ([AMM TASK 36-11-09-820-801-A/200](#)).  
Install the Marman V-Clamp and the bleed air check valve ([AMM TASK 36-11-01-400-801-A/400](#)) between the duct (16) and the duct (6).

**WARNING:** MAKE SURE THAT THE O-RINGS AND THE GASKET ARE CORRECTLY INSTALLED, AND BE CAREFUL NOT TO LET THEM FALL INSIDE THE OUTER BYPASS DUCT.

**CAUTION:** USE THE POWERPLANT BUILD-UP MANUAL (PPBM-145/1139) TO MAKE SURE THAT NO COMPONENT OF THE ENGINE DUCTS IS MISSING.

- (2) Refer to DET. B and install the ducts of 9th STAGE, as follows:

**NOTE:** Before the final assembly, tighten all the Marman V-Clamp to approximately 70% of the specified torque given in (Figure 405) or (Figure 406).

- (a) Apply Krytox XHT-BDX lubricant to the O-ring (10).

**WARNING:** THE GREASE CONTAINS POISONOUS AGENTS. WEAR GLOVES WHEN YOU USE IT AND DO NOT LET IT TOUCH YOUR SKIN OR EYES. HAVE A SUFFICIENT FLOW OF AIR OR USE RESPIRATORS.

- (b) Push the O-ring (10) against the duct (3) groove to bond it.
- (c) Put the duct (3) and O-ring (10) in the correct position.
- (d) Install the support (13) and bolts (2).

**CAUTION: MAKE SURE THAT ALL THE COMPONENTS, ESPECIALLY THE BALL JOINTS, ARE CORRECTLY ASSEMBLED IN THE NEUTRAL POSITION.**

- (e) Put the Marman V-Clamp and the bleed air check valve ([AMM TASK 36-11-01-400-801-A/400](#)) between the duct (6) and the duct (3) in correct position.
- (f) Put the duct (6) in correct position.
- (g) Tighten the bolts (2) to the torque given in (Figure 405) or (Figure 406).
- (h) Install the Marman V-Clamp between the pylon tube (Ref.) and the duct (6). (Refer to Power Powerplant Build-Up Manual PPBM-145/1139).
- (i) Apply sealant between pylon structure and pylon tube (Ref.).

**CAUTION: MAKE SURE THAT ALL THE COMPONENTS, ESPECIALLY THE BALL JOINTS, ARE CORRECTLY ASSEMBLED IN THE NEUTRAL POSITION.**

- (j) **NOTE:** Make sure that the ducts are correctly aligned and not under tension ([AMM TASK 36-11-09-820-801-A/200](#)).

Tight the Marman V-Clamp (Ref.) and Clamp (Ref.) inside the pylon compartment and make sure that are correctly tight and there is no leakage.

- (k) **NOTE:**
  - After all, interpolate the torque in all V-Clamps to 100% of the specified torque ([AMM TASK 20-10-10-910-801-A/200](#)).
  - Lightly tap again around the band and torque once more to the specified value.

Do a check of the maximum clearance between the flange of the support (13) and the OCSM (14). Refer to (Figure 406).

**J. Follow-on**

**SUBTASK 842-003-A**

- (1) Do a test in the bleed-air system ([AMM TASK 36-00-00-700-803-A/500](#)).
- (2) Install upper cowlings 412 and 422 ([AMM TASK 71-11-01-400-801-A/400](#)).