



EMB145 – EMB135

AIRCRAFT
MAINTENANCE MANUAL

RUDDER FORWARD TORQUE TUBE - REMOVAL/INSTALLATION

EFFECTIVITY: ALL

1. General

- A. This section gives the procedures to remove and install the forward torque tubes of the rudder control system.
- B. These procedures are applicable to the LH and RH forward torque tubes.
- C. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

<i>TASK NUMBER</i>	<i>DESCRIPTION</i>	<i>EFFECTIVITY</i>
27-21-05-000-801-A	FORWARD TORQUE TUBE - REMOVAL	ALL
27-21-05-400-801-A	FORWARD TORQUE TUBE - INSTALLATION	ALL



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TASK 27-21-05-000-801-A

EFFECTIVITY: ALL

2. FORWARD TORQUE TUBE - REMOVAL

A. General

- (1) This procedure gives the instructions to remove the forward torque tube of the rudder control system.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-02/100	-
AMM TASK 25-11-01-000-801-A/400	PILOT SEAT - REMOVAL
AMM TASK 31-31-04-000-803-A/400	FDR RUDDER POTENTIOMETER - REMOVAL

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
123		Below the cockpit floor
124		Below the cockpit floor

D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 058	Kit, rig pins, flight controls	To lock the rudder control system in the neutral position	

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	Below the cockpit floor
1	Helps the other technician	Cockpit

I. Preparation

SUBTASK 841-002-A

- (1) Remove cockpit underfloor access hatch 123BL (AMM MPP 06-41-02/100).
- (2) Remove the pilot seats ([AMM TASK 25-11-01-000-801-A/400](#)).



- (3) Remove access panels 221EF, 222BF, and 222FF (AMM MPP 06-41-02/100).
- (4) Install the rig pins to the rudder control system to lock it in the neutral position.
- (5) Remove the potentiometer of the FDR system from the RH forward torque tube quadrant ([AMM TASK 31-31-04-000-803-A/400](#)).

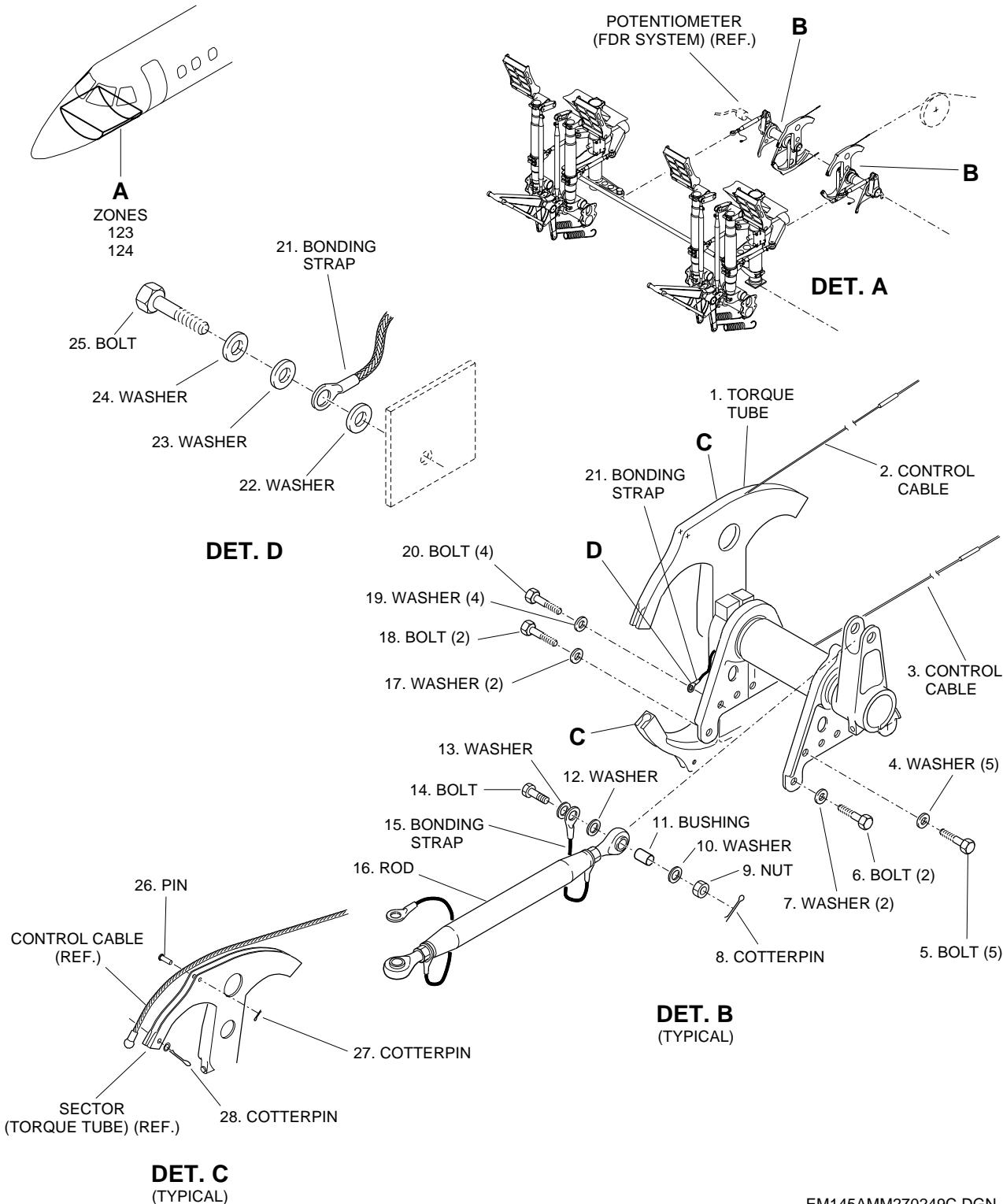
J. Removal ([Figure 401](#))

SUBTASK 020-002-A

- (1) Disconnect the end of the rod (16) from the bellcrank at the torque tube (1). For this, remove the cotter pin (8), nut (9), washers (10), (12), and (13), bonding strap (15), and bolt (14).
- (2) Disconnect the end of the bonding strap (21) from the fuselage structure. For this, remove the bolt (25) and washers (24), (23), and (22) (refer to DET. D).
- (3) Release the tension on the control cables (2) and (3), and disconnect them from the sector at the torque tube (1). For this, remove the cotter pin (27), pin (26), and cotter pin (28) (refer to DET. C).

NOTE: Identify the positions of the control cables (2) and (3) to install them again in the same positions.

- (4) Remove the bolts (6) (2 positions) and (5) (5 positions), and washers (7) (2 positions) and (4) (5 positions).
- (5) Remove the bolts (18) (2 positions) and (20) (4 positions), and washers (17) (2 positions) and (19) (4 positions).
- (6) Remove the torque tube (1).

EFFECTIVITY: ALL
Forward Torque Tube - Removal/Installation
Figure 401




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TASK 27-21-05-400-801-A

EFFECTIVITY: ALL

3. FORWARD TORQUE TUBE - INSTALLATION

A. General

- (1) This procedure gives the instructions to install the forward torque tube of the rudder control system.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-02/100	-
AMM TASK 20-13-21-910-801-A/200	TYPES OF ELECTRICAL BONDING AND SURFACE PREPARATION - STANDARD PROCEDURES
AMM TASK 25-11-01-400-801-A/400	PILOT SEAT - INSTALLATION
AMM TASK 27-21-01-700-801-A/500	-
AMM TASK 27-25-00-700-801-A/500	RUDDER PEDALS AUTOSHUTOFF AND RUDDER MANUAL SHUTOFF FUNCTIONS- OPERATIONAL CHECK
AMM TASK 28-41-00-200-801-A/600	-
AMM TASK 31-31-04-400-803-A/400	FDR RUDDER POTENTIOMETER - INSTALLATION
IPC 27-21-00	RUDDER PRIMARY MECHANICAL CONTROL

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
123		Below the cockpit floor
124		Below the cockpit floor

D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 058	Kit, rig pins, flight controls	To lock the rudder control system in the neutral position	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

SPECIFICATION (BRAND)	DESCRIPTION	QTY
MS24665-134	Cotter pin	2
MS24665-170	Cotter pin	2



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G. Expendable Parts

ITEM	IPC REFERENCE (VENDOR REFERENCE)	QTY
Cotter pin	IPC 27-21-00	1

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Below the cockpit floor
1	Helps the other technician	Cockpit

I. Installation (Figure 401)

SUBTASK 420-002-A

- (1) Put the torque tube (1) in its installation position.
- (2) Install the bolts (6) (2 positions) and (5) (5 positions), and washers (7) (2 positions) and (4) (5 positions).
- (3) Install the bolts (18) (2 positions) and (20) (4 positions), and washers (17) (2 positions) and (19) (4 positions).
- (4) Connect the control cables (2) and (3) to the sector at the torque tube (1). Install the cotter pin (28), pin (26), and cotter pin (27) (refer to DET. C).

NOTE: The control cables (2) and (3) must be installed in the same positions as those from which they were removed. Refer to their position identification.

- (5) Connect the end of the bonding strap (21) to the fuselage structure. For this, install the bolt (25) and washers (24), (23), and (22).

NOTE: Refer to [AMM TASK 20-13-21-910-801-A/200](#) for the correct installation of the bonding strap (21).

- (6) Connect the end of the rod (16) to the bellcrank at the torque tube (1). For this, install the bolt (14), washers (13), (12), and (10), bonding strap (15), bushing (11), nut (9), and cotter pin (8).

NOTE: Refer to [AMM TASK 20-13-21-910-801-A/200](#) for the correct installation of the bonding strap (15).

J. Follow-on

SUBTASK 842-002-A

- (1) Install the potentiometer of the FDR system to the RH forward torque tube quadrant ([AMM TASK 31-31-04-400-803-A/400](#)).
- (2) Apply tension to the control cables of the rudder control system (AMM TASK 27-21-01-700-801-A/500).
- (3) Remove the rig pins from the rudder control system.
- (4) Do a check on the rudder control system ([AMM TASK 27-25-00-700-801-A/500](#)).



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- (5) Do an inspection on the fuel quantity indication harness (AMM TASK 28-41-00-200-801-A/600).

NOTE: The inspection of fuel quantity indication harness is part of Critical Design Configuration Control Limitations (CDCCL) in the Airworthiness Limitations of the Aircraft Maintenance Program.

- (6) Install floor panels 221EF, 222BF, and 222FF (AMM MPP 06-41-02/100).
(7) Install the pilot seats ([AMM TASK 25-11-01-400-801-A/400](#)).
(8) Install cockpit underfloor access hatch 123BL (AMM MPP 06-41-02/100).

