MAIN HYDRAULIC SYSTEM - MAINTENANCE PRACTICES

EFFECTIVITY: ALL

1. General

   A. This section gives the procedures to pressurize and bleed the air from hydraulic systems 1 and 2.

   B. You can use three different sources to pressurize the hydraulic systems:

      (1) Hydraulic test stand (HTS).

      (2) Electrical-motor driven pump (EMDP).

      (3) Engine-driven pump (EDP).

   C. This task gives the instructions to pressurize the hydraulic system with the HTS and EMDP. To pressurize the hydraulic system with the EDP, start the engine (AMM TASK 71-00-01-910-801-A/200).

   D. Hydraulic system 1 supplies hydraulic power to the systems below:

      (1) Rudder.

      (2) Aileron.

      (3) LH thrust reverser (optional).

      (4) INBD GND spoiler.

      (5) OUTBD brakes.

      (6) Landing gear.

      (7) Nosewheel steering.

      (8) NLG doors.

      (9) Airstairs door.

   E. Hydraulic system 2 supplies hydraulic power to the systems below:

      (1) Rudder.

      (2) Aileron.

      (3) RH thrust reverser (optional).

      (4) Speed brake/OUTBD GND spoiler.

      (5) INBD brakes.

      (6) Emergency/parking brake.

   F. The two hydraulic systems pressurize the rudder and aileron.

   G. Turn off the hydraulic power source (EDP, EMDP or HTS) to release pressure from the hydraulic system.

H. 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*
29-10-00-860-801-A	HYDRAULIC SYSTEM - PRESSURIZATION WITH HTS	ALL
29-10-00-860-802-A	HYDRAULIC SYSTEM - PRESSURIZATION WITH EMDP	ALL
29-10-00-860-803-A	HYDRAULIC SYSTEM - BLEED OF AIR	ALL

TASK 29-10-00-860-801-A
EFFECTIVITY: ALL

2. HYDRAULIC SYSTEM - PRESSURIZATION WITH HTS

A. General

(1) This procedure gives the instructions to pressurize the hydraulic system with the HTS.

NOTE: If there is no HTS available, you can pressurize the hydraulic system with the EMDP (AMM TASK 29-10-00-860-802-A/200).

(2) The HTS has output lines (pressure and return) to pressurize only one hydraulic system.

(3) The person who will use the HTS must know how to operate it correctly.

B. References

REFERENCE	*DESIGNATION*
AMM MPP 06-41-01/100	-
AMM TASK 12-13-01-600-801-A/300	HYDRAULIC SYSTEM RESERVOIR - FLUID LEVEL CHECK
AMM TASK 12-13-01-600-802-A/300	HYDRAULIC SYSTEM RESERVOIR - REPLENISHMENT
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE
AMM TASK 29-10-00-860-802-A/200	HYDRAULIC SYSTEM - PRESSURIZATION WITH EMDP

C. Zones and Accesses

ZONE	*PANEL/DOOR*	*LOCATION*
193	193FL	Hydraulic compartment 1
193	193JR	Hydraulic compartment 2

D. Tools and Equipment

ITEM	*DESCRIPTION*	*PURPOSE*	*QTY*
GSE 088	Hydraulic Test Stand (HTS) (60 Hz)	To pressurize the hydraulic system	
GSE 089	Hydraulic Test Stand (HTS) (50 Hz)	To pressurize the hydraulic system	
GSE 090	HTS coupling kit	To connect the HTS to the external couplings	

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	Hydraulic compartment and HTS

I. Preparation

SUBTASK 841-002-A

(1) Remove access panel 193FL (SYS 1) or 193JR (SYS 2) (AMM MPP 06-41-01/100).

J. Pressurization (Figure 201)

SUBTASK 861-002-A

WARNING: BEFORE YOU PRESSURIZE HYDRAULIC SYSTEM 1 OR 2, MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT NEAR THE COMPONENTS ACTUATED WITH HYDRAULIC POWER. THIS WILL PREVENT INJURY TO PERSONS AND DAMAGE TO THE AIRCRAFT.

CAUTION:
- BEFORE THE HYDRAULIC SYSTEM IS PRESSURIZED, MAKE SURE THAT THE NOSEWHEEL STEERING SYSTEM IS IN THE ACTIVE STEERING RANGE (± 55°).
- BEFORE YOU PRESSURIZE HYDRAULIC SYSTEM 1, MAKE SURE THAT THE LANDING GEAR SAFETY PINS ARE INSTALLED, IF YOU WILL NOT OPERATE THE LANDING GEARS.

(1) Remove the caps from the external suction and pressure couplings.

(2) Connect the HTS suction and pressure hoses, with GSE 090, to the external couplings of the aircraft.

(3) Energize the aircraft (AMM TASK 20-40-01-860-801-A/200).

(4) Energize the HTS.

(5) Turn on the HTS.

(6) Set the HTS to 2900 ± 200 psi and 6.5 GPM.

NOTE: The GPM value is a reference flow. If necessary, adjust it to the value necessary for the test.

(7) Operate the HTS to increase the pressure to 2900 ± 200 psi.

(8) Make sure that the MFD shows a pressure of 2900 ± 200 psi.

(9) You must monitor the temperature of the hydraulic fluid frequently. If the temperature is of more than 90°C, turn off the HTS.

K. Depressurization

SUBTASK 862-002-A

(1) Turn off the HTS.

(2) Deenergize the HTS.

(3) Deenergize the aircraft (AMM TASK 20-40-01-860-801-A/200).

(4) With GSE 090, disconnect the HTS suction and pressure hoses from the external couplings of the aircraft.

(5) Install the caps of the external suction and pressure couplings.

L. Follow-on

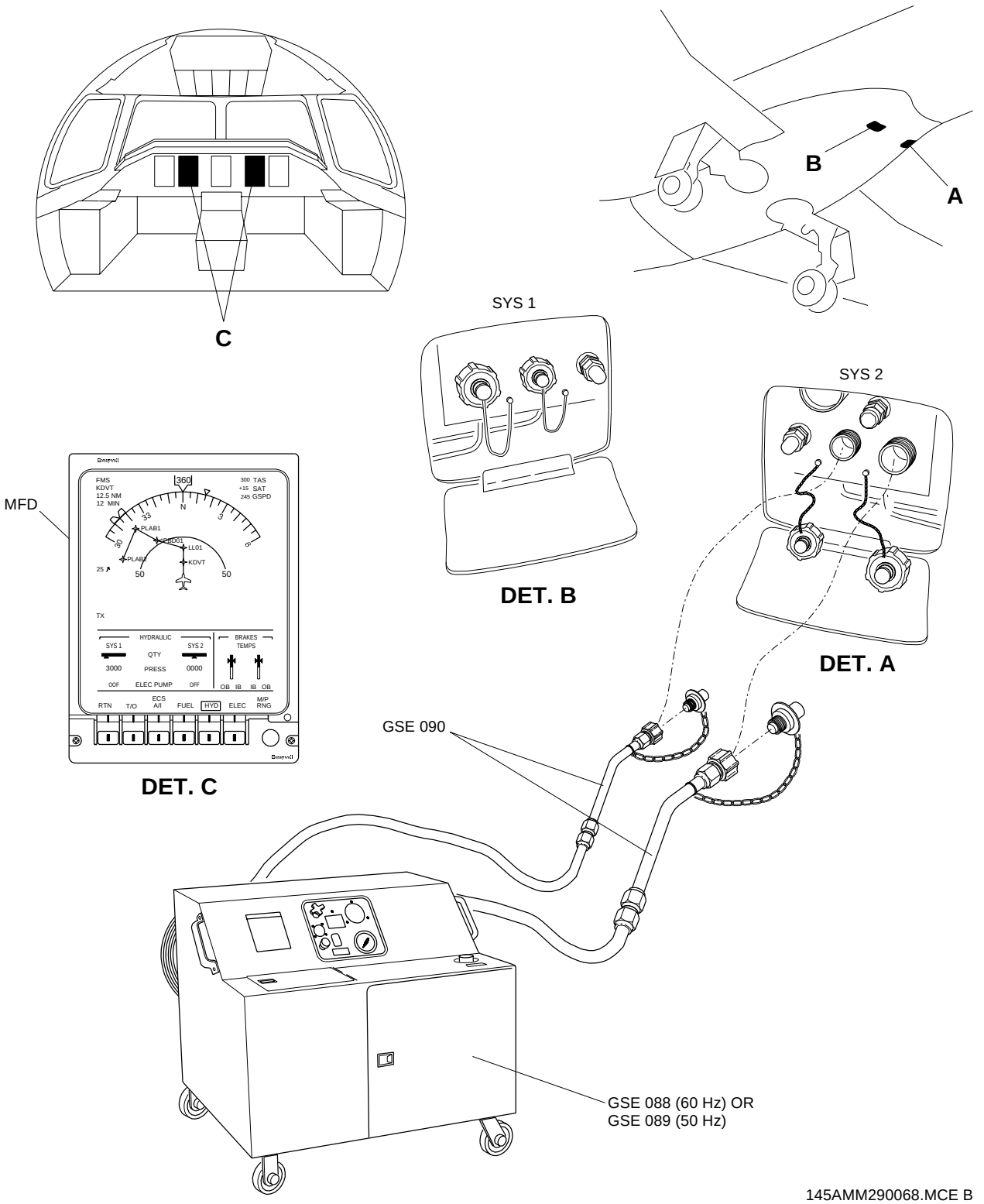
SUBTASK 842-002-A

(1) Do a check of the hydraulic reservoir level (AMM TASK 12-13-01-600-801-A/300). If necessary, fill it (AMM TASK 12-13-01-600-802-A/300).

(2) Install access panel 193FL (SYS 1) or 193JR (SYS 2) (AMM MPP 06-41-01/100).

EFFECTIVITY: ALL

Hydraulic System - Pressurization with HTS
Figure 201



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TASK 29-10-00-860-802-A
EFFECTIVITY: ALL

3. HYDRAULIC SYSTEM - PRESSURIZATION WITH EMDP

A. General

(1) This procedure gives the instructions to pressurize the hydraulic system with the EMDP.

B. References

REFERENCE	*DESIGNATION*
AMM TASK 12-13-01-600-801-A/300	HYDRAULIC SYSTEM RESERVOIR - FLUID LEVEL CHECK
AMM TASK 12-13-01-600-802-A/300	HYDRAULIC SYSTEM RESERVOIR - REPLENISHMENT
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE

C. Zones and Accesses

Not Applicable

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	Cockpit

I. Preparation

SUBTASK 841-003-A

(1) Energize the aircraft (AMM TASK 20-40-01-860-801-A/200).

J. Pressurization (Figure 202)

SUBTASK 861-003-A

WARNING: BEFORE YOU PRESSURIZE HYDRAULIC SYSTEM 1 OR 2, MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT NEAR THE COMPONENTS ACTUATED WITH HYDRAULIC POWER. THIS WILL PREVENT INJURY TO PERSONS AND DAMAGE TO THE AIRCRAFT.

CAUTION: • BEFORE THE HYDRAULIC SYSTEM IS PRESSURIZED, MAKE SURE THAT THE NOSEWHEEL STEERING SYSTEM IS IN THE ACTIVE STEERING RANGE (± 55°).

• BEFORE YOU PRESSURIZE HYDRAULIC SYSTEM 1, MAKE SURE THAT THE LANDING GEAR SAFETY PINS ARE INSTALLED, IF YOU WILL NOT OPERATE THE LANDING GEARS.

(1) Do a check of the hydraulic reservoir level (AMM TASK 12-13-01-600-801-A/300). If necessary, fill it (AMM TASK 12-13-01-600-802-A/300).

(2) Set the EMDP switch to ON.

(3) Make sure that the MFD shows a pressure of 2900 ± 200 psi.

K. Depressurization

SUBTASK 862-003-A

(1) System 1:

(a) Set the EMDP switch to the OFF position.

(b) Open the oil discharge valve to fully release the hydraulic accumulator.

(2) System 2:

(a) Set the EMDP switch to the OFF position.

(b) Slowly push and pull the Emergency/Parking Brake handle (approximately 10 complete cycles), until the caution message EMERG BRK LO PRESS comes into view on the EICAS.

NOTE: • Make sure that there is no pressure in the hydraulic system.

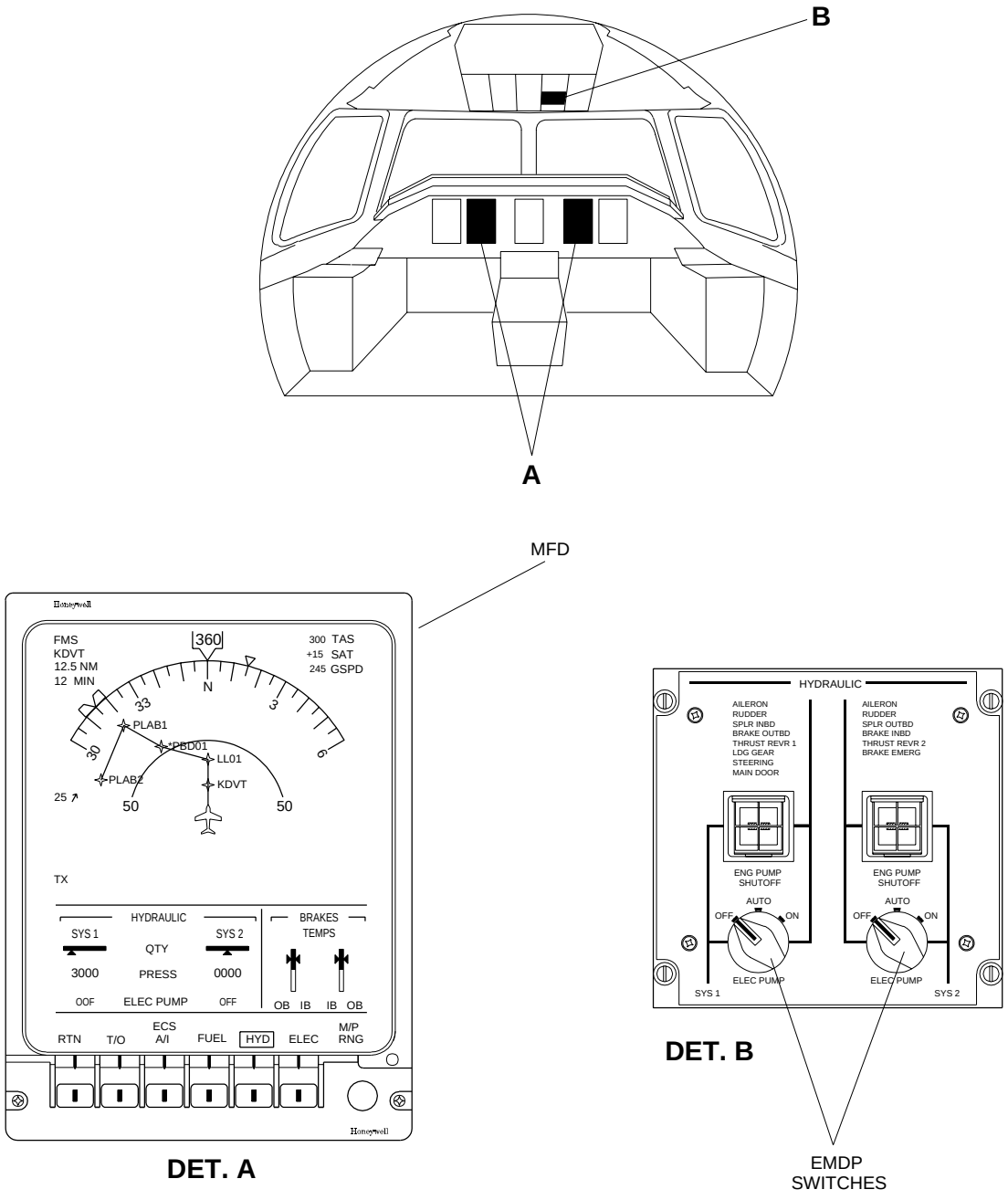
• To prevent hydraulic fluid transference from system 1 to system 2 or vice versa, first apply brakes with the pedals and then pull or release the emergency/parking brake handle.

L. Follow-on

SUBTASK 842-003-A

(1) Deenergize the aircraft (AMM TASK 20-40-01-860-801-A/200).

EFFECTIVITY: ALL
Hydraulic System - Pressurization with EMDP
Figure 202



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TASK 29-10-00-860-803-A
EFFECTIVITY: ALL

4. HYDRAULIC SYSTEM - BLEED OF AIR

A. General

(1) This procedure gives the instructions to bleed hydraulic systems 1 and 2.

(2) The bleed is necessary when:

- A repair is done in hydraulic systems 1 and (or) 2.
- A TASK for removal/installation of a component of hydraulic systems 1 and (or) 2 is done.
- A hydraulic system line is disconnected.

B. References

REFERENCE	*DESIGNATION*
AMM TASK 12-13-01-600-801-A/300	HYDRAULIC SYSTEM RESERVOIR - FLUID LEVEL CHECK
AMM TASK 12-13-01-600-802-A/300	HYDRAULIC SYSTEM RESERVOIR - REPLENISHMENT
AMM TASK 29-10-00-860-801-A/200	HYDRAULIC SYSTEM - PRESSURIZATION WITH HTS
AMM TASK 29-10-00-860-802-A/200	HYDRAULIC SYSTEM - PRESSURIZATION WITH EMDP
AMM TASK 29-10-06-700-801-A/500	RESERVOIR RELIEF/BLEED VALVE - OPERATIONAL CHECK
AMM TASK 32-40-00-800-801-A/200	NORMAL BRAKE AND EMERGENCY PARKING BRAKE SYSTEMS - BLEEDING
AMM TASK 71-12-01-000-801-A/400	ENGINE LOWER COWLING - OPENING
AMM TASK 71-12-01-400-801-A/400	ENGINE LOWER COWLING - CLOSING

C. Zones and Accesses

ZONE	*PANEL/DOOR*	*LOCATION*
193	193BL	Hydraulic compartment of system 1
193	193CR	Hydraulic compartment of system 2
413	413	LH Lower cowling
413	413	RH Lower cowling

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

ITEM	*DESCRIPTION*	*PURPOSE*	*QTY*
Commercially available	Rubber Gloves, Phosphate Ester-Base, Fluid-Resistant	Protection for the hands	1
Commercially available	Rubber Goggles, Phosphate Ester-Base, Fluid-Resistant	Protection for the eyes	1
Commercially available	Drip Pan	To collect the hydraulic fluid when you disconnect a hydraulic line	1

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	*FUNCTION*	*PLACE*
1	Does the task	Hydraulic system compartment (system 1 and (or) system 2) and engine (LH and (or) RH)

I. Preparation

SUBTASK 841-004-A

(1) Open the lower cowling (AMM TASK 71-12-01-000-801-A/400) to get access to the EDP (applicable to bleed the air from the suction hydraulic lines of the EDP and EMDP).

(2) Do a check of the hydraulic reservoir level (AMM TASK 12-13-01-600-801-A/300). If necessary, fill it (AMM TASK 12-13-01-600-802-A/300).

(3) Pressurize the related hydraulic system with EMDP (AMM TASK 29-10-00-860-801-A/200).

J. Bleed of Air of the Hydraulic System Lines (Figure 203)

SUBTASK 861-004-A

WARNING: THE HYDRAULIC SYSTEM CONTAINS PHOSPHATE-ESTER HYDRAULIC FLUID. THE FLUID CAN CAUSE IRRITATION IN YOUR SKIN OR INJURY TO YOUR EYES. USE THE APPLICABLE GOGGLES AND RUBBER GLOVES. IF THE FLUID TOUCHES YOU, FLUSH YOUR SKIN WITH WATER. IF IT GETS IN YOUR EYES, FLUSH THEM WITH WATER AND GET MEDICAL HELP.

(1) Do the bleed of air from the hydraulic system lines as written in the steps below. Do one of these procedures to do the bleed, as applicable.

(a) Bleed of the air from the suction hydraulic lines of the EDP and EMDP.

1 Loosen the connection of the suction hydraulic line in the EDP and bleed the air from the hydraulic system line.

2 Torque 75.13 to 83.04 N.m (665 to 735 lb.in) the connections of the suction hydraulic line.

3 Bleed the air from the reservoir through the bleed/relief valve (AMM TASK 29-10-06-700-801-A/500).

(b) Bleed of the air from the hydraulic system lines of the brake.

1 Bleed the air from the hydraulic system lines of the brake (AMM TASK 32-40-00-800-801-A/200).

(c) Bleed of the air from the hydraulic system lines (except the suction hydraulic lines of the EDP and EMDP and hydraulic system lines of the brake).

1 Actuate some systems that are supplied by the related hydraulic system (rudder, aileron, brake, etc.).

2 Bleed the air from the reservoir through the bleed/relief valve (AMM TASK 29-10-06-700-801-A/500).

K. Follow-on

SUBTASK 862-004-A

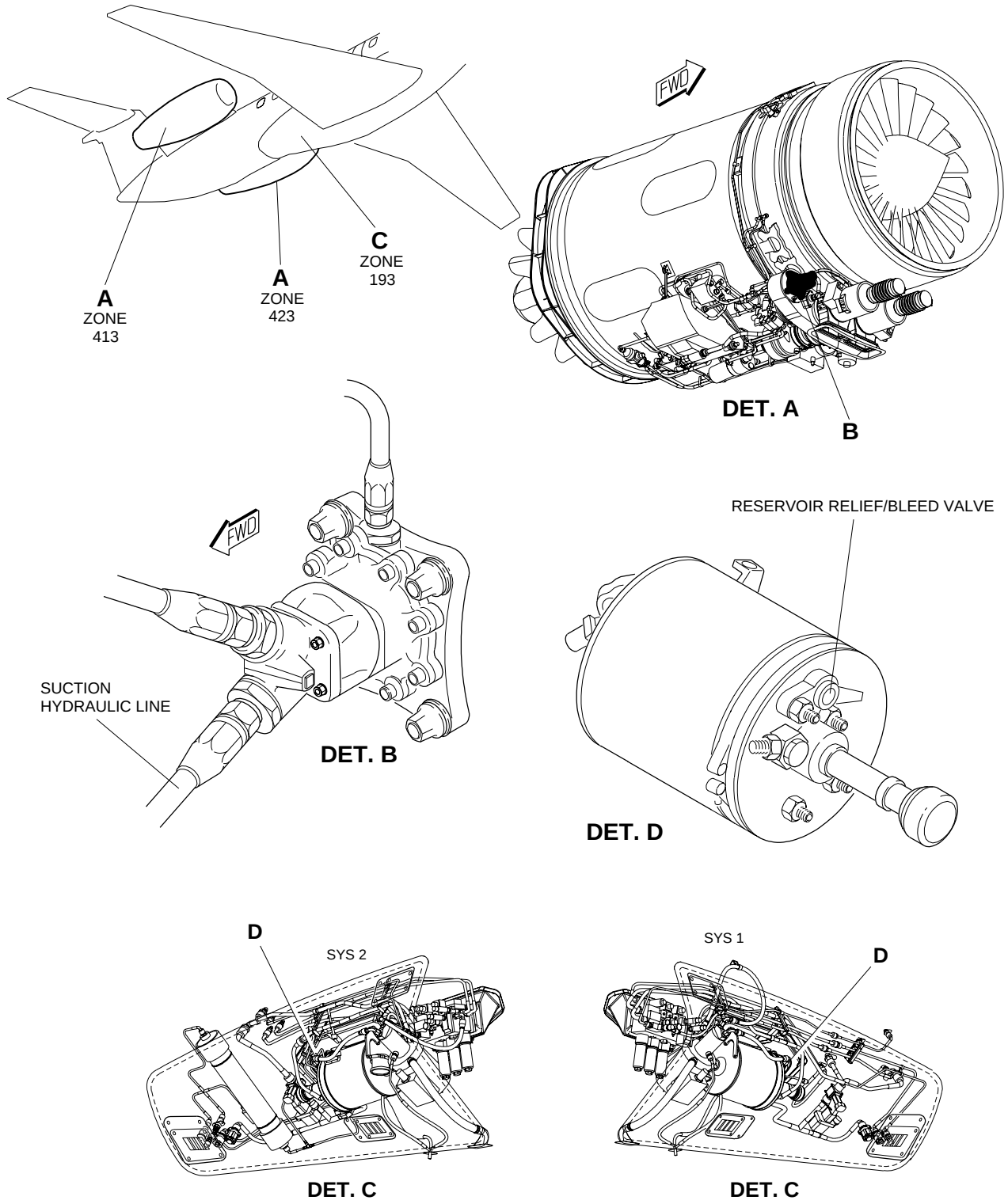
(1) Do a check of the hydraulic reservoir level (AMM TASK 12-13-01-600-801-A/300). If necessary, fill it (AMM TASK 12-13-01-600-802-A/300).

(2) Pressurize the related hydraulic system (AMM TASK 29-10-00-860-802-A/200).

(3) Close the lower cowling (AMM TASK 71-12-01-400-801-A/400) (as applicable for the bleed of air from the suction hydraulic lines of the EDP and EMDP).

EFFECTIVITY: ALL

Hydraulic System - Bleed of Air
Figure 203



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