CHAPTER

71

Power Plant

(CFM56 ENGINES (CFM56-7))

CHAPTER 71
POWER PLANT

Subject/Page	Date	COC
71-EFFECTIVE PAGES		
1	Jun 15/2016	
2	BLANK	
71-CONTENTS		
1	Feb 15/2015	
2	BLANK	
71-00-00		
1	Feb 15/2015	
2	Feb 15/2015	
3	Feb 15/2015	
4	Feb 15/2015	
5	Feb 15/2015	
6	Feb 15/2015	
7	Feb 15/2015	
8	Feb 15/2015	
9	Feb 15/2015	
10	Feb 15/2015	
11	Feb 15/2015	
12	Feb 15/2015	
13	Feb 15/2015	
14	Feb 15/2015	
71-11-00		
1	Feb 15/2015	
2	Feb 15/2015	
71-11-00 (cont.)		
3	Feb 15/2015	
R 4	Jun 15/2016	
5	Feb 15/2015	
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A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

71-EFFECTIVE PAGES

CHAPTER 71
POWER PLANT

71-CONTENTS

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POWER PLANT - INTRODUCTION

General

Two CFM56-7B engines supply thrust for the airplane. The engines also supply power for these systems:

- Electric
- Hydraulic
- Pneumatic.

The CFM56-7B is a high bypass ratio, dual rotor, turbo fan engine.

Power Plant

The power plant has these parts:

- Engine mounts
- Engine cowling
- Wire harnesses
- Engine vents and drains.

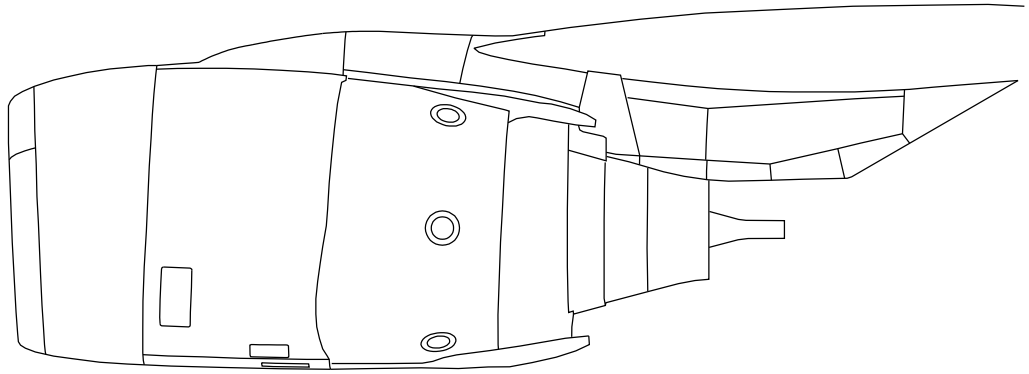
Acronyms and Abbreviations

AKS ALL PRE SB CFM56-7B 73-44

- BSV - burner staging valve

AKS ALL

- C - celsius
- cm - centimeters
- ft - feet
- HMU - hydromechanical unit
- HPTACC - high pressure turbine active clearance control
- LPTACC -low pressure turbine active clearance control
- IDG - integrated drive generator
- in - inches
- kg - kilograms
- lbs - pounds
- m - meters
- RPM - revolutions per minute
- TBV - transient bleed valve
- VBV - variable bleed valve
- VSV - variable stator vanes



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POWER PLANT - INTRODUCTION

POWER PLANT - SPECIFICATIONS

General

General engine data for the CFM56-7B engine is shown.

These items show on the engine nameplate:

- Regulatory agency data
- Engine manufacture data
- Engine performance data.

The regulatory agency data blocks used depend upon where the engine was assembled. For engines assembled by G.E. the two upper right blocks will be used. For engines assembled by SNECMA, the two upper left blocks will be used. The serial number will be filled every time.

The first line of seven blocks will be filled at the assemble plant. The version of the engine will be in the CONFIG space. The second and third blocks show takeoff and Max continuous thrust in Metric (daN) thrust ratings. The fourth and fifth blocks show takeoff thrust and the Max continuous thrust in pounds (LB). Block six shows the N1 trim applied to that engine. The last block is for service bulletins applied to this engine.

The lower three blocks show the manufacturer data. The second block shows the manufacturer of the engine. For engines assemble by General Electric, the block shows G.E. CO. Engines assembled by SNECMA, the block shows SNECMA.

Six additional rows are available to show changes to the engine. This permits six different thrust rating changes before you must replace the nameplate. The nameplate also shows the thrust rating history of the engine.

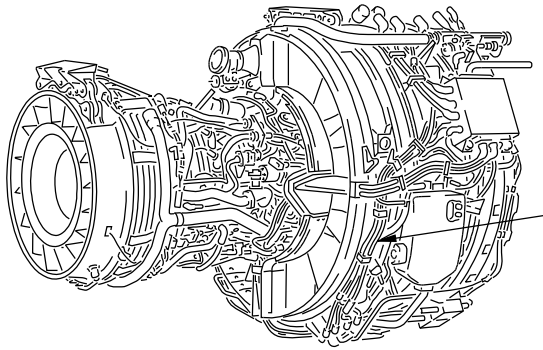
The engine nameplate is on the right fan case aft of the oil tank.

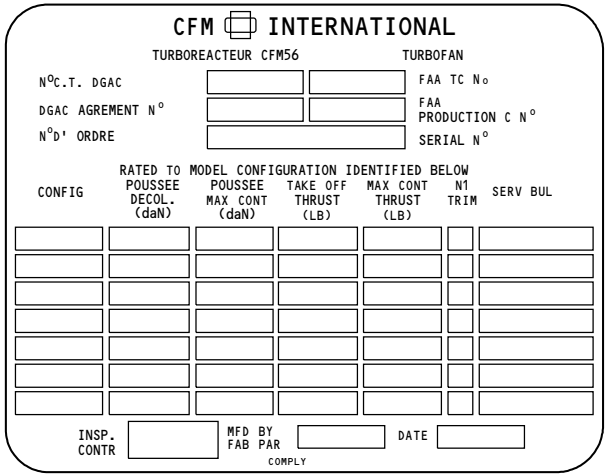
Engine Thrust Ratings and Aircraft Model Application

A limited number of the six engine thrust rating configurations are applicable to a 737 model. The different engine thrust ratings are based upon airplane weight and elevator/rudder control limits. The longer-body 737-800 and 737-900 models can operate at the maximum thrust capability of the CFM56-7B engine. Also, the lowest thrust rating is not sufficient for the 737-700, 737-800, 737-900. The table below shows the relationship of the engine thrust ratings to the aircraft model.

Aircraft Models

The normal models are 737-600, 700, 800, and 900. Some other variations can be 737-700 IGW (increased gross weight), and 737-700 BBJ (Boeing business jet).





ENGINE NAMEPLATE

A

ENGINE VERSION	ENGINE CONFIGURATIONS					
	B18	B20	B22	B24	B26	B27
T/O THRUST	19500	20600	22700	24200	26400	27300
AIRPLANE MODELS						
600	X	X	X			
700		X	X	X		
800/900				X	X	X
700 IGW		X	X	X		
700 BBJ					X	

ENGINE THRUST AND USAGE CHART

GENERAL ENGINE DATA	
MODEL	CFM56-7B
ENGINE WEIGHT	5,205 LBS (2,361 KG)
FAN DIAMETER	61 IN (155 CM)
EGT REDLINE	950C
N1 REDLINE	5,380 RPM (104 PERCENT)
N2 REDLINE	15,183 RPM (105 PERCENT)
BYPASS RATIO	5.6:1
EGT START LIMIT	725C

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POWER PLANT - SPECIFICATIONS

POWER PLANT - ENGINE HAZARDS

General

It is dangerous to work around engines. Use the entry/exit corridor when the engine is in operation. Also, stay out of the inlet and exhaust areas when the engine is in operation.

CAUTION: PERFORM FOD WALK IN FRONT OF AND AROUND ENGINE INGESTION AREA PRIOR TO ENGINE START.

These are the hazards around an engine in operation:

- Inlet suction
- Exhaust heat
- Exhaust velocity
- Engine noise.

Inlet Suction

Engine inlet suction can pull people and large objects into the engine. At idle power, the inlet hazard area is a 10 ft (3.1 m) radius around the inlet.

WARNING: IF THE WIND IS OVER 25 KNOTS, INCREASE THE INLET HAZARD AREA BY 20 PERCENT.

Exhaust Heat

The engine exhaust is very hot for long distances behind the engine. This can cause damage to personnel and equipment.

Exhaust Velocity

Exhaust velocity is very high for long distances behind the engine. This can cause damage to personnel and equipment.

Engine Noise

Engine noise can cause temporary and permanent loss of hearing. You must wear ear protection when near an engine in operation.

Engine Entry/Exit Corridor

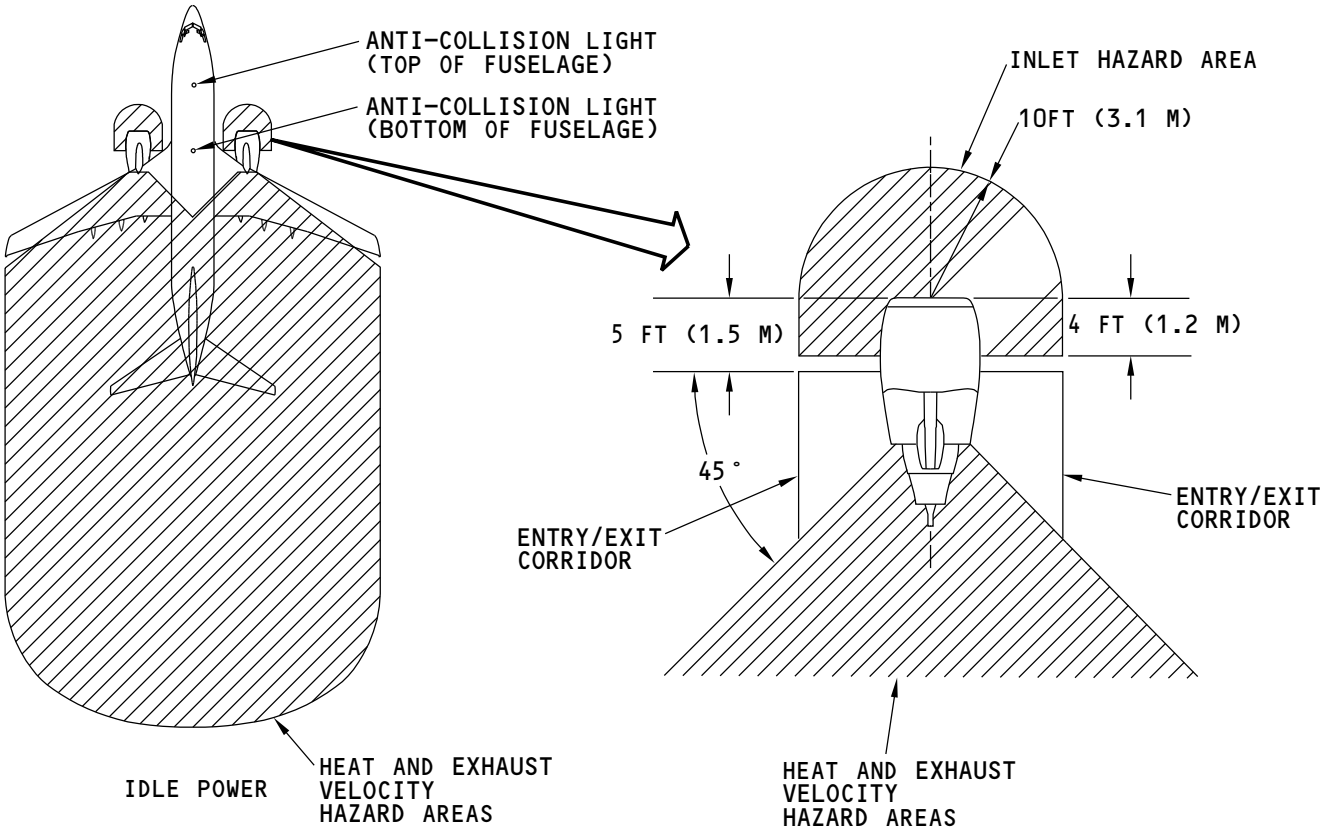
Engine entry corridors are between the inlet hazard areas and the exhaust hazard areas. You should go near an engine in operation only when:

- Engine is at idle
- You can speak with people in the flight compartment.

For additional safety, wear a safety harness when the engine is in operation.

Training Information Point

The beacon light must be on while the engines are on.



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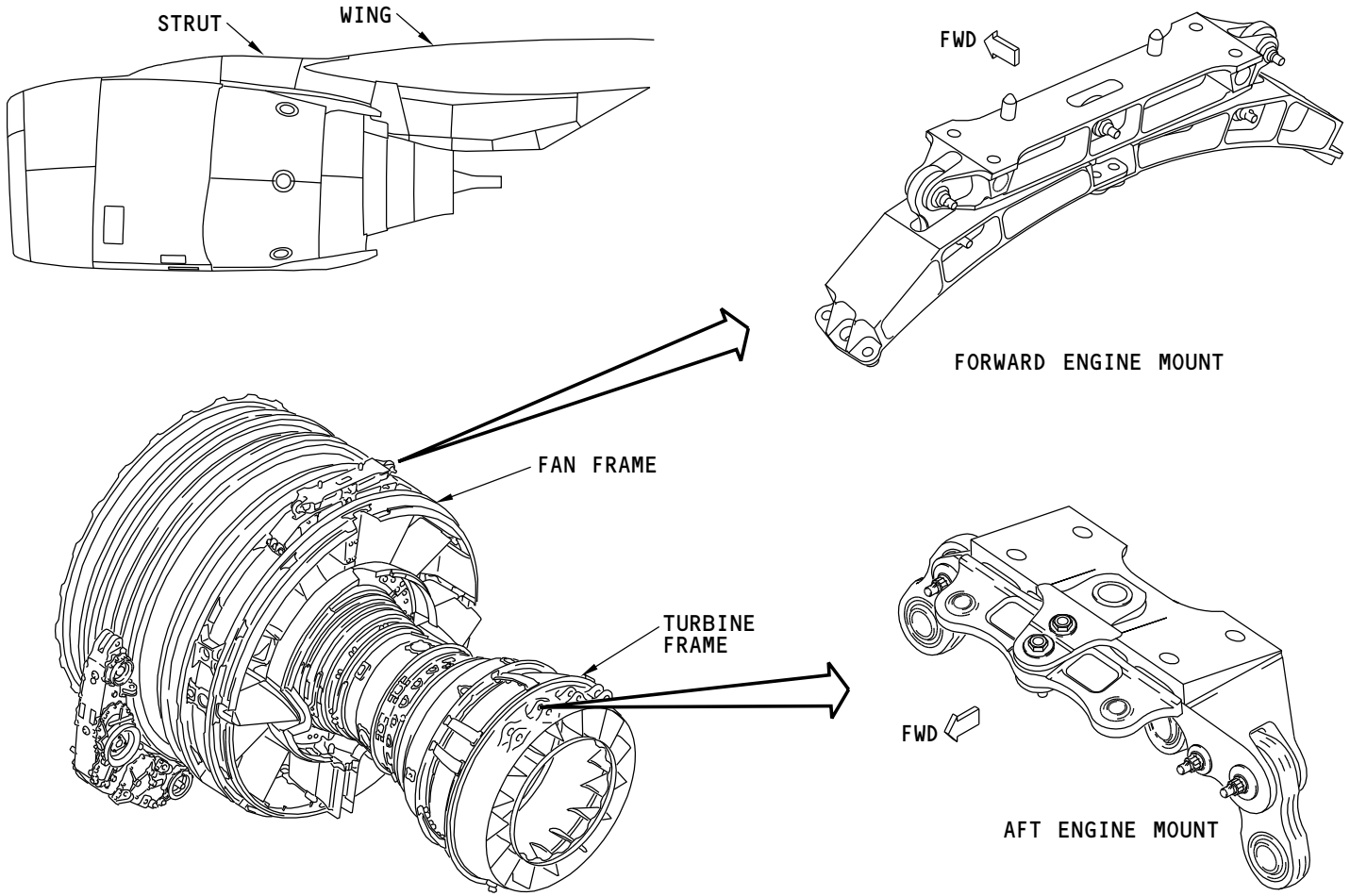
POWER PLANT - ENGINE HAZARDS

POWER PLANT - ENGINE MOUNTS

General

There is a forward and aft engine mount. Each engine mount attaches the engine to the strut. The forward engine mount attaches to the fan frame. The aft engine mount attaches to the turbine frame.



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POWER PLANT - ENGINE MOUNTS

POWER PLANT - ELECTRICAL HARNESSES

General

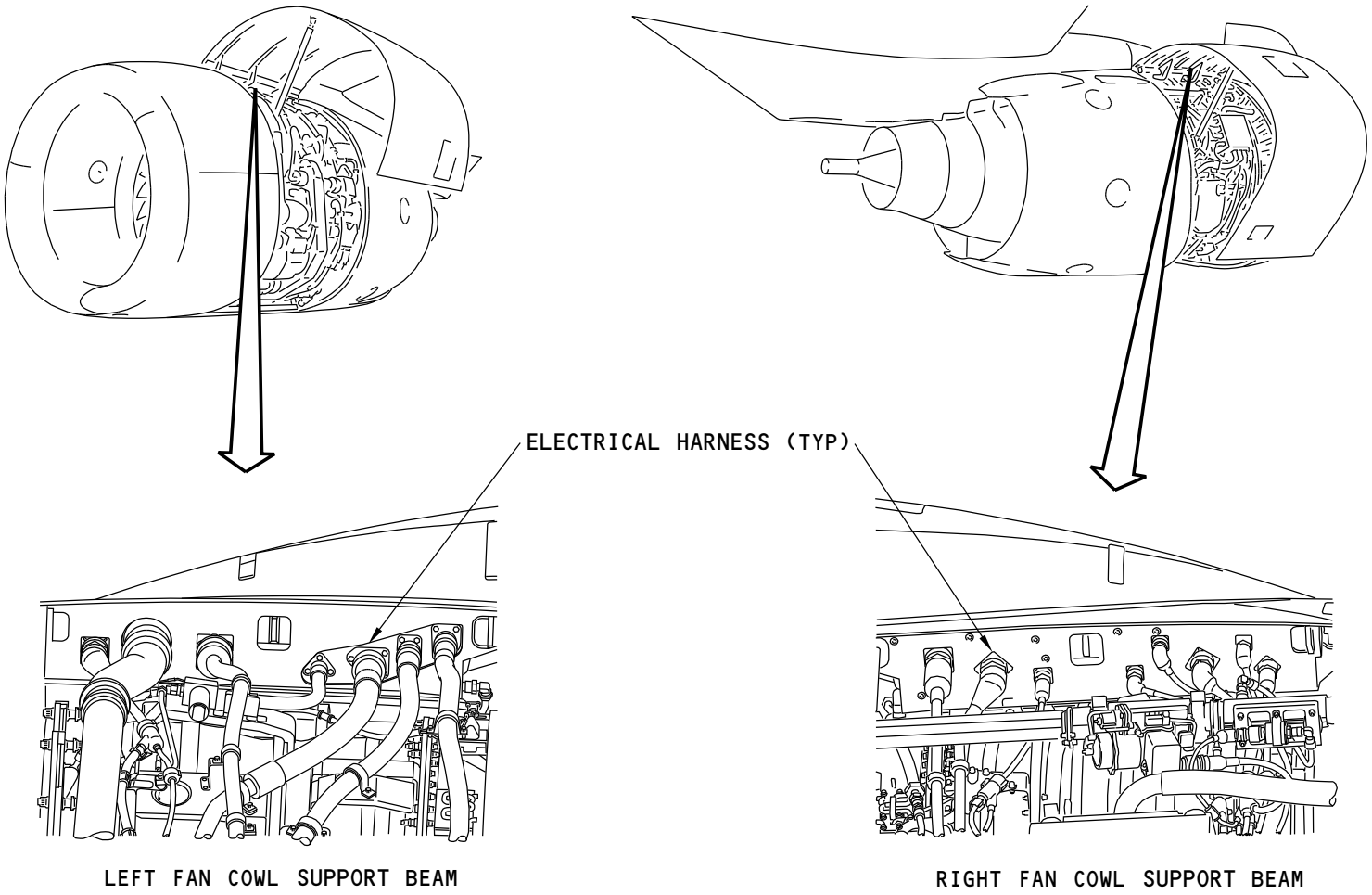
The engine electrical harnesses connect at the fan cowl support beam.

The electrical harnesses that connect on the right side of the fan cowl support beam come from these components:

- Electronic engine control
- N1 speed sensor
- Oil tank (oil quantity transmitter)
- Inlet cowl thermal anti-ice valve
- Ignition exciters
- Fan frame compressor case vibration (FFCCV) sensor
- Bleed air regulator
- Ground wing thermal anti-ice solenoid valve
- Overheat/fire detector loop A and B.

The electrical harnesses that connect on the left side of the fan cowl support beam come from these components:

- Start valve
- N2 speed sensor
- Integrated drive generator (IDG)
- Hydraulic system engine-driven pump
- Hydromechanical unit (HMU).



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POWER PLANT - ELECTRICAL HARNESSES

General

Engine drains prevent fluid contact with hot engine areas. You use engine drains to detect component failures. Engine drains direct these items overboard:

- Oil
- Fuel
- Hydraulic fluid
- Water
- Vapor.

These components drain fluids through the starter air discharge duct in the right fan cowl:

- Strut
- Main oil/fuel heat exchanger
- Hydromechanical unit (HMU)

AKS ALL PRE SB CFM56-7B 73-44

- Burner staging valve (BSV)

AKS ALL

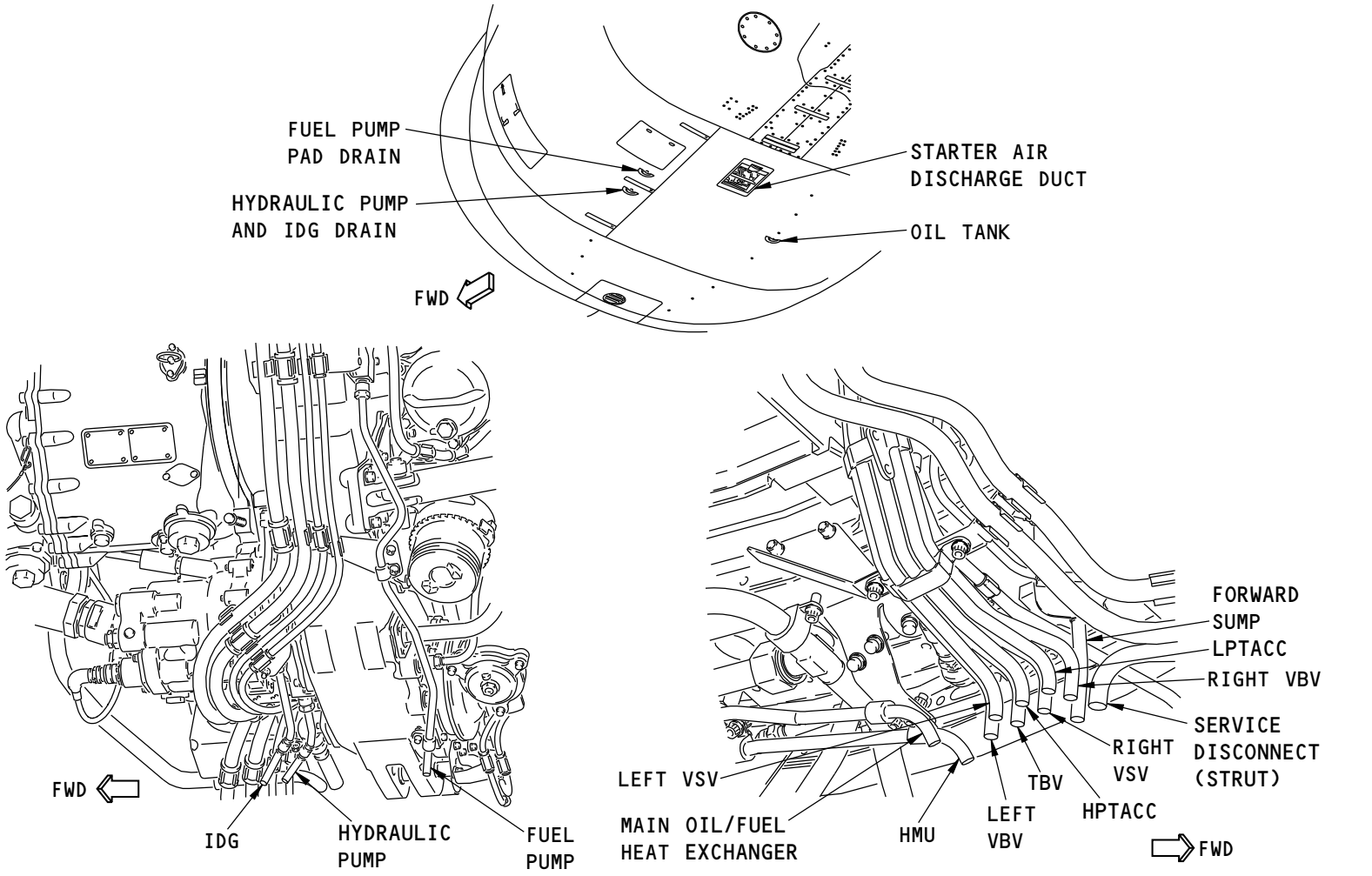
- High pressure turbine active clearance control (HPTACC) valve
- Low pressure turbine active clearance control (LPTACC) valve
- Left and right variable stator vane (VSV) actuators
- Left and right variable bleed valve (VBV) actuators
- Transient bleed valve (TBV).

Fluids drain through a hole in the left fan cowl panel from these components:

- Fuel pump
- Integrated drive generator (IDG)
- Hydraulic pump.

The oil tank drains fluid through a hole in the right fan cowl panel.

See the AMM for more information about allowable leakage limits. (AMM PART II 71-71)



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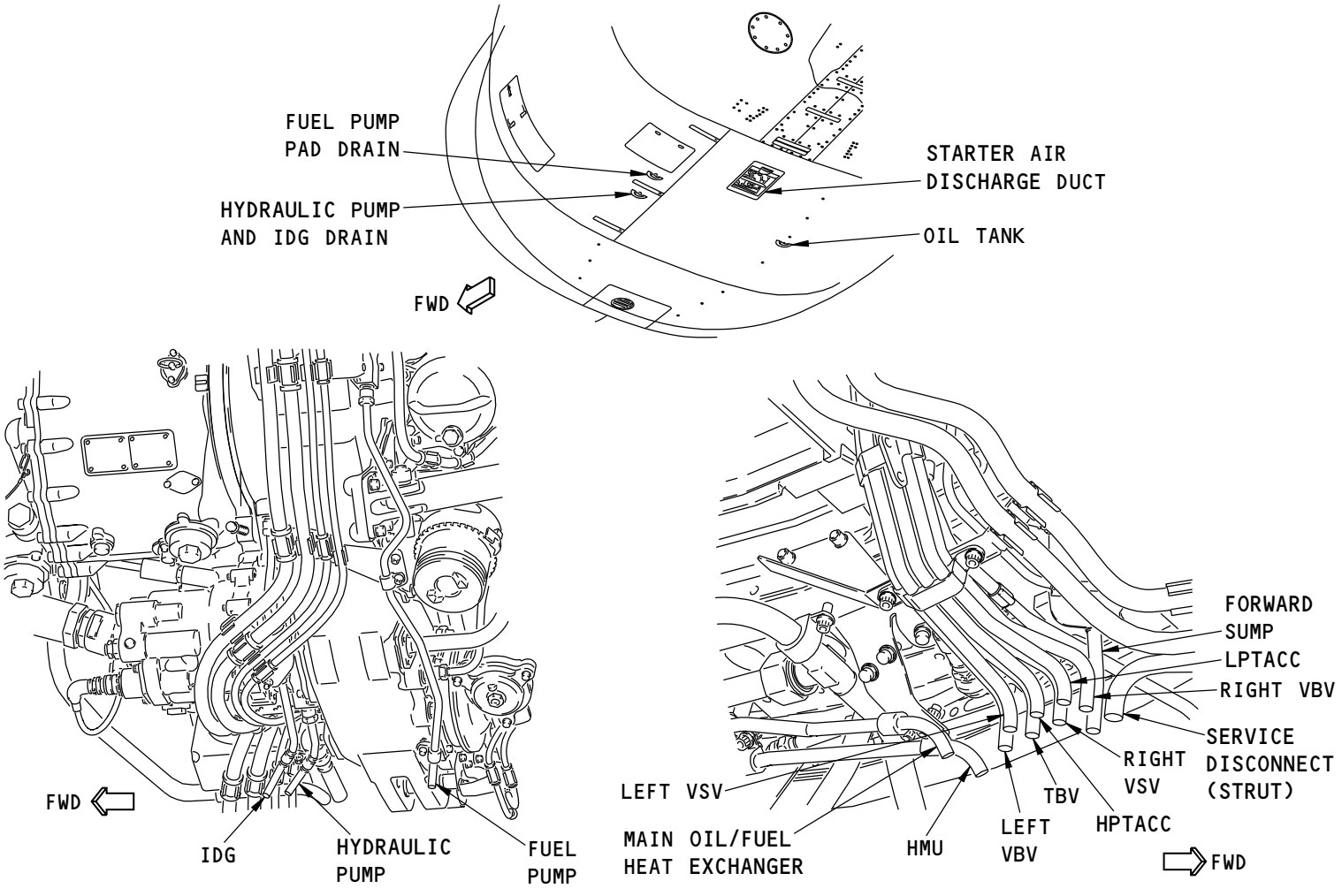
POWER PLANT - ENGINE DRAINS



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POWER PLANT - ENGINE DRAINS

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POWER PLANT - ENGINE COWLING

General

The engine cowling gives an aerodynamically smooth surface into and over the engine. It also gives a protective area for engine components and accessories.

These are the parts of the engine cowling:

- Inlet cowl
- Fan cowl
- Thrust reverser.

See the exhaust chapter for more information on the thrust reverser. (CHAPTER 78)

Inlet Cowl

The inlet cowl sends air into the engine. The inlet cowl attaches to the engine.

The T12 access/pressure relief door is on the inlet cowl. The T12 access/pressure relief door permits access to the T12 sensor. It is also a pressure relief door.

Fan Cowls

The fan cowls give an aerodynamically smooth surface over the fan case. The fan cowls attach to the fan cowl support beam. The fan cowls open for maintenance.

These items are on the fan cowls:

- IDG access door
- Chip detector/pressure relief door
- Vortex control device
- Oil tank access door.

IDG Access Door

The IDG access door permits access to the IDG for servicing. It is on the left fan cowl panel.

Chip Detector/Pressure Relief Door

The chip detector access door permits access to the chip detectors. It also is a pressure relief door. It is on the left fan cowl.

Vortex Control Device

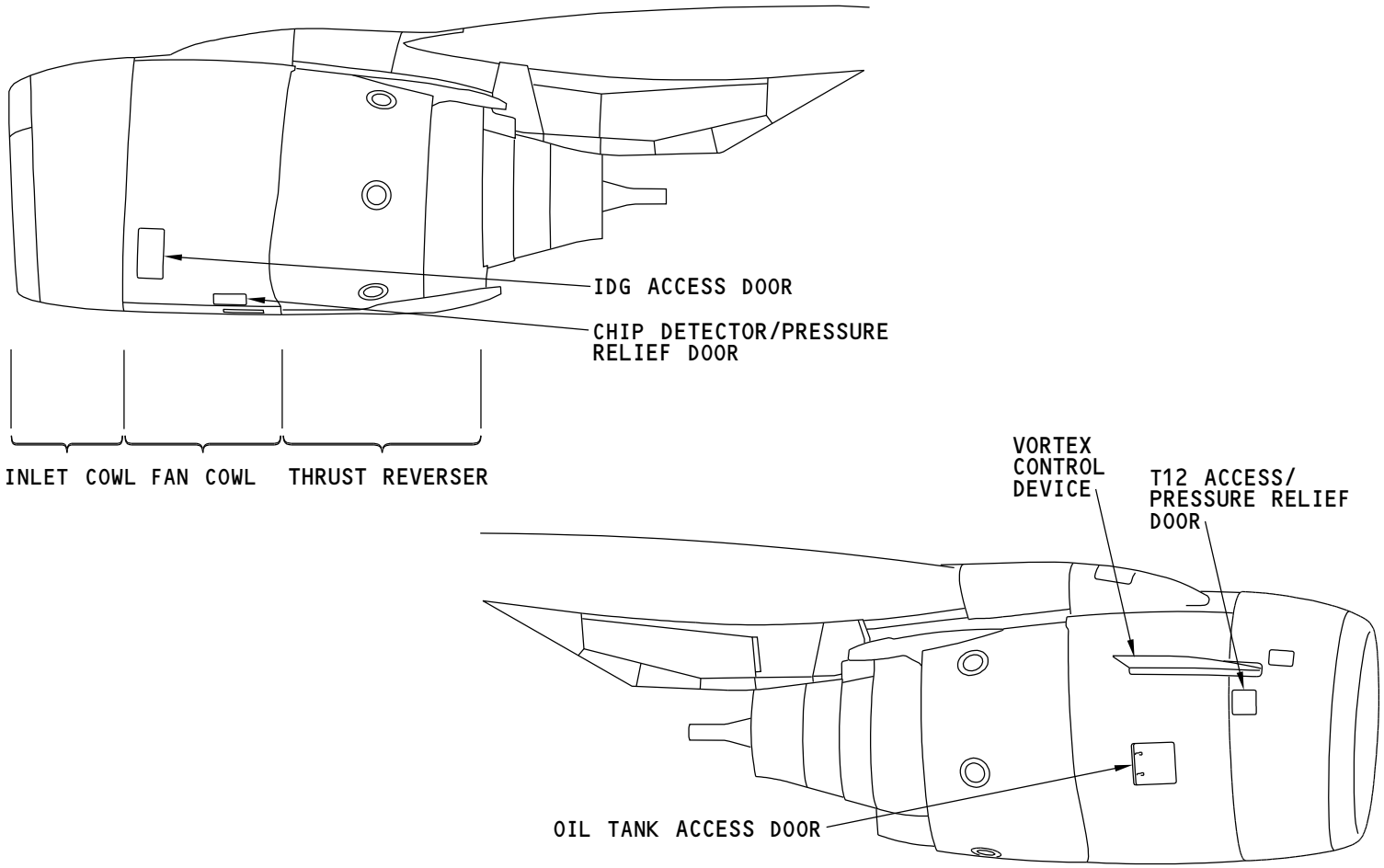
The vortex control device smooths airflow around the wing. It is on the inboard fan cowl.

Oil Tank Access Door

The oil tank access door permits access to the oil tank for servicing. It is on the right fan cowl.

T12 Access/Pressure Relief Door

The T12 access/pressure relief door permits access to the T12 sensor. It is also a pressure relief door. It is on the right fan cowl.



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POWER PLANT - ENGINE COWLING

General

There are two fan cowls for each engine. Each fan cowl attaches to the strut with three hinges.

The fan cowls are made of aluminum. The left fan cowl weighs 80 lbs (36 kg). The right fan cowl weighs 96 lbs (44 kgs).

Each fan cowl has two fan cowl hold open rods.

Fan Cowl Latches

Three fan cowl latches secure the left and right fan cowls together. All latches are along the bottom of the fan cowls.

Fan Cowl Hold Open Rods

One end of each hold open rod attaches to the fan cowl. When the cowl is closed, the other end attaches to a receiver on the fan cowl. When the cowl is open, the other end attaches to a receiver on the engine. Each hold open rod is telescopic.

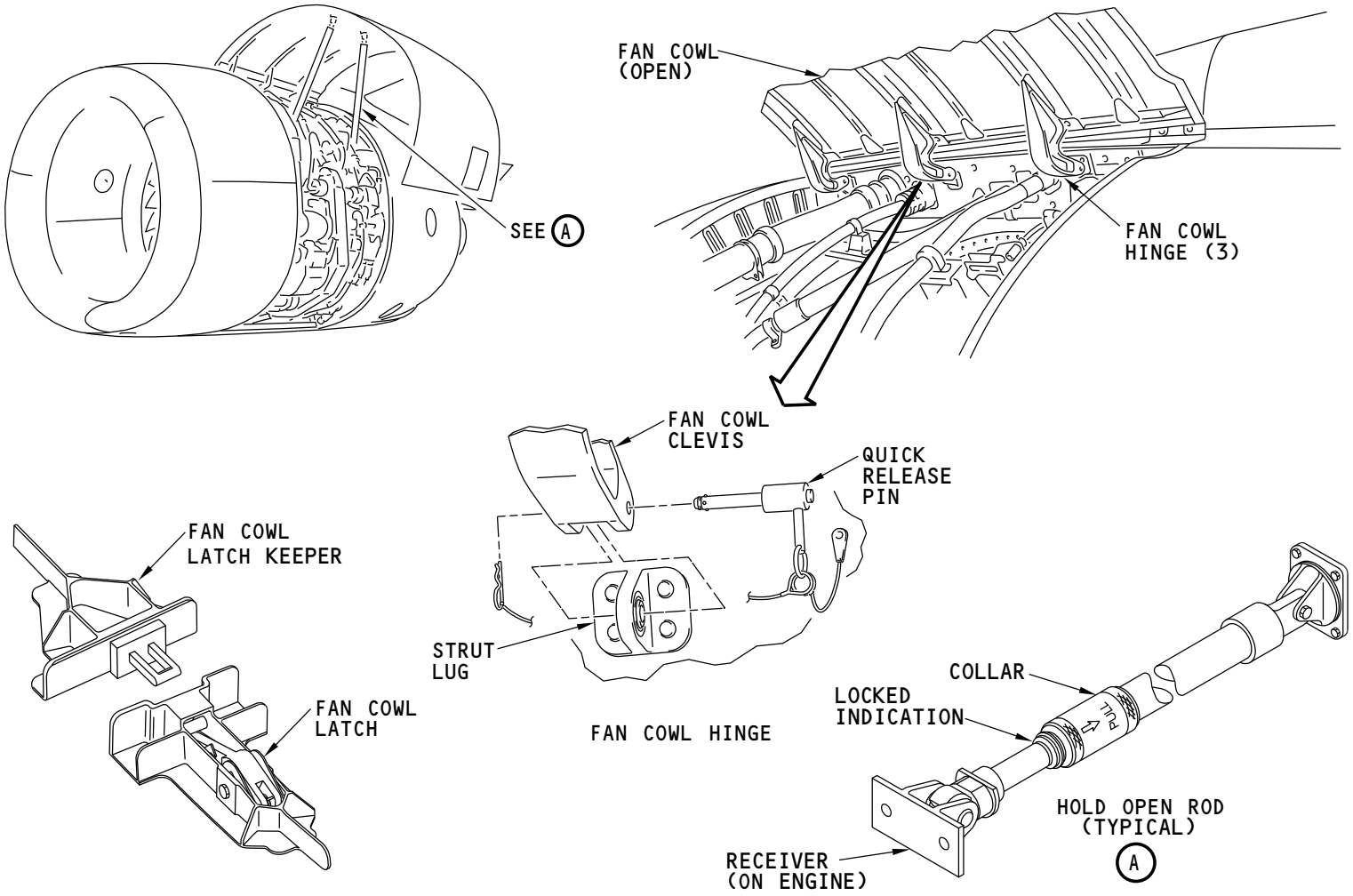
Each hold open rod has a collar that locks the hold open rod in place. A yellow lock indication shows when the hold open rod is in the locked position.

Fan Cowl Hinges

Each fan cowl hinge has these components:

- Fan cowl clevis
- Quick release pin
- Strut lug.

Each fan cowl clevis is on the fan cowl. All strut lugs are on the strut. The quick release pins make it easy to remove a fan cowl.



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POWER PLANT - FAN COWL