Rolls-Royce®

Trent XWB / Airbus A350 UNDER COWL POCKET GUIDE

Trent XWB/Airbus A350

Under Cowl Pocket Guide

Notice to Holders

This document is designed as a visual guide to Trent XWB. The information and instructions contained in this booklet are prepared for general information purposes only. The data contained herein shall be considered in no way to supersede or replace the information contained in the Rolls-Royce Trent XWB series Engine Manual or the Airbus A350 Maintenance Procedures.

A portion of the material in this document covers the property of Airbus Companies and has been included with their permission. This includes primarily the Intake, Thrust Reverser, Common Nozzle Assembly and Engine Bleed Air System.

Positional Referencing

It is to be noted that throughout this document any reference to a position or unit location is referred to presuming the user is standing at the rear of the engine and looking forward.

All maintenance must be carried out in accordance with the relevant Aircraft Maintenance Publications.

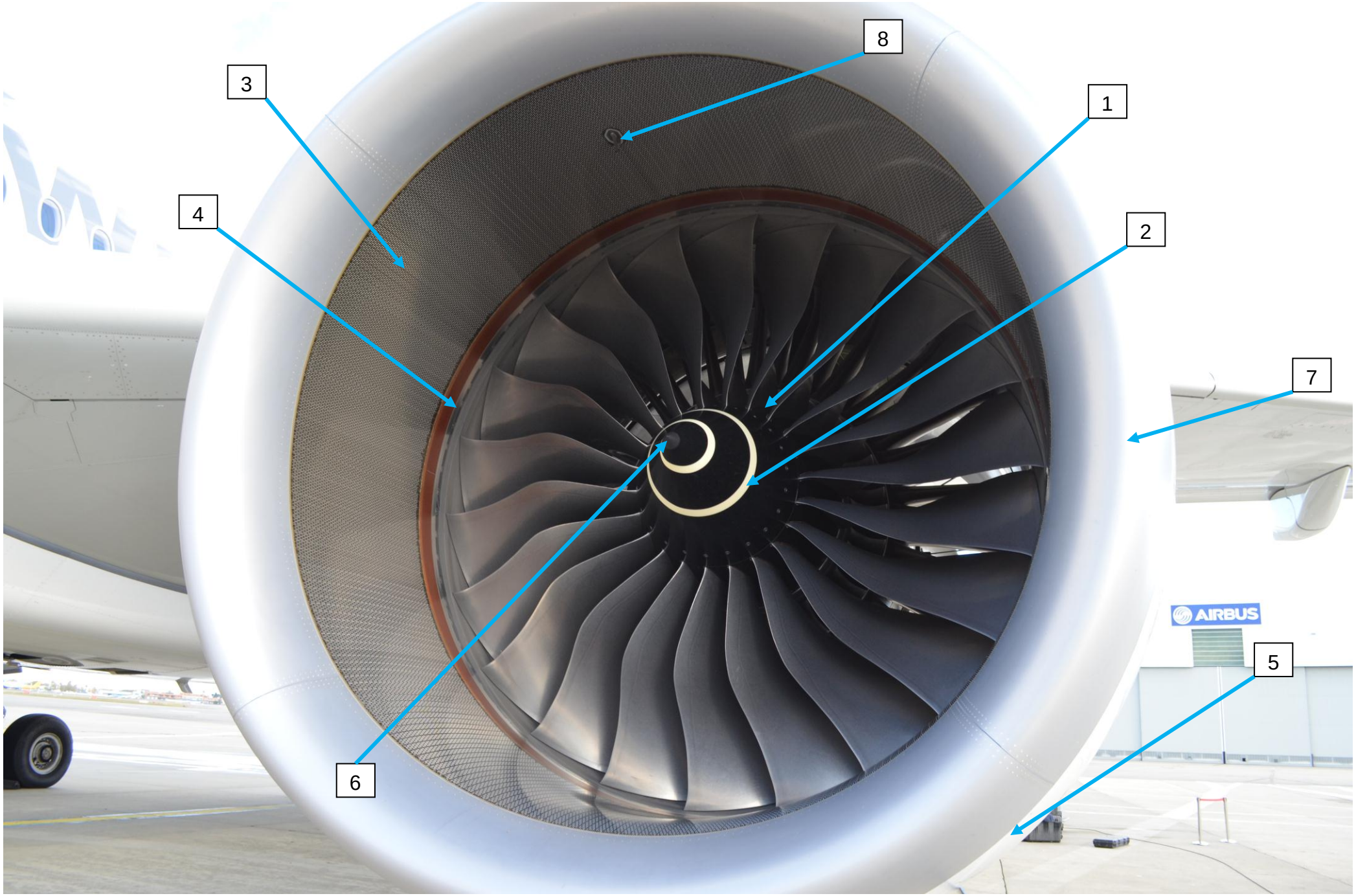
Contents

1. Intake

Area, Visual Inspection:

- Check the LP Compressor (Fan) Blades aerofoils for damage.
- Check LP Compressor for freedom of rotation.
- Check the LP Compressor blade tip attrition liner for damage.
- Check the blade root annulus fillers for cracks.
- Check the T20 probe for damage, security and blockage.
- Check the Inlet Cowl for damage.
- Check the LP Compressor Nose Cone for damage and security of the anti-ice rubber Nose Cap.
- Check the Inner Barrel Acoustic panels for damage.

Item	Description
1	Blade Root Annulus Filler
2	LP Compressor Spinner
3	Inner Barrel Acoustic Panel
4	Attrition Liner
5	Anti-Ice Access Panel
6	Nose Cap
7	Inlet Cowl
8	T20 Probe

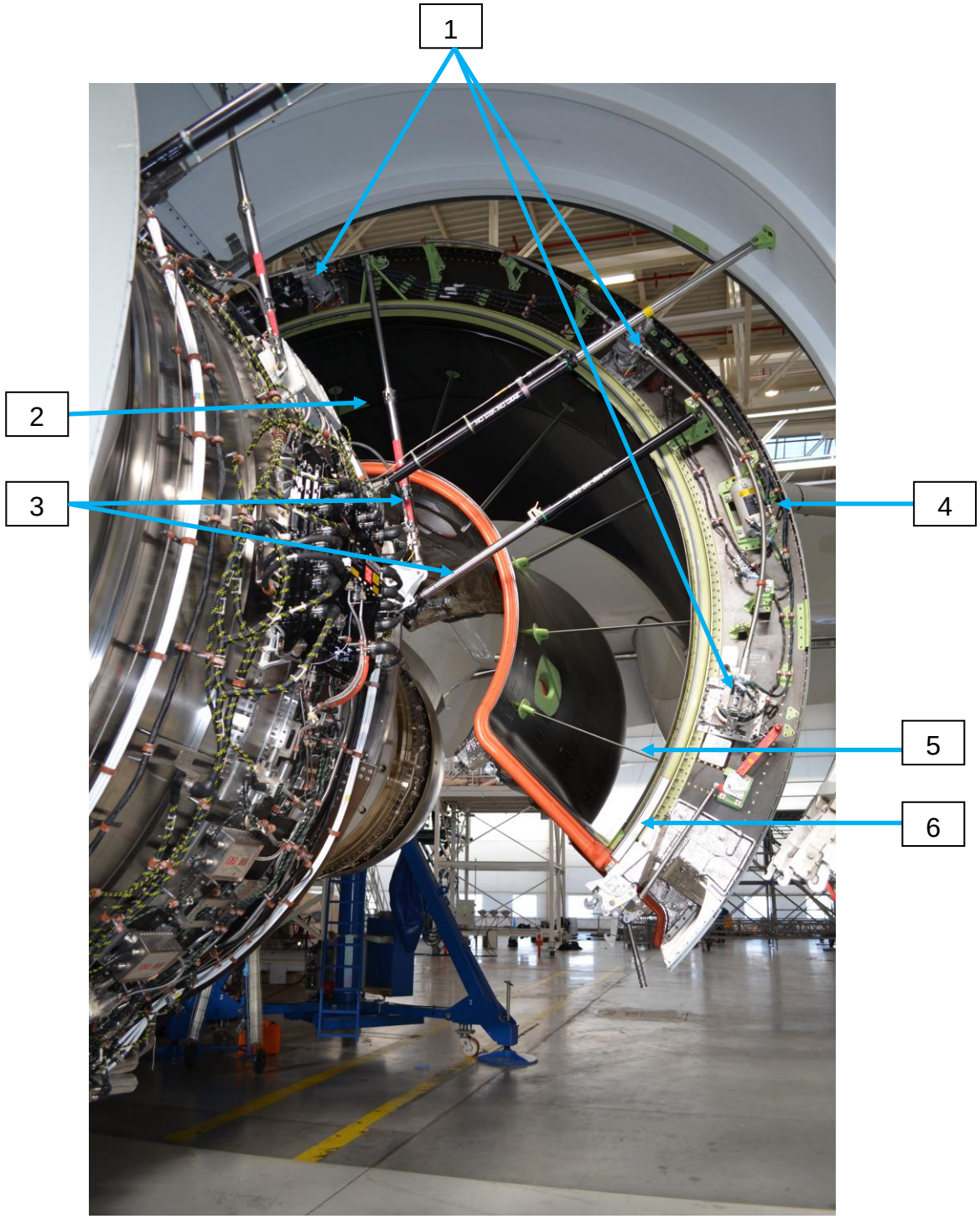

8
3
1
4
2
7
6
5
AIRBUS

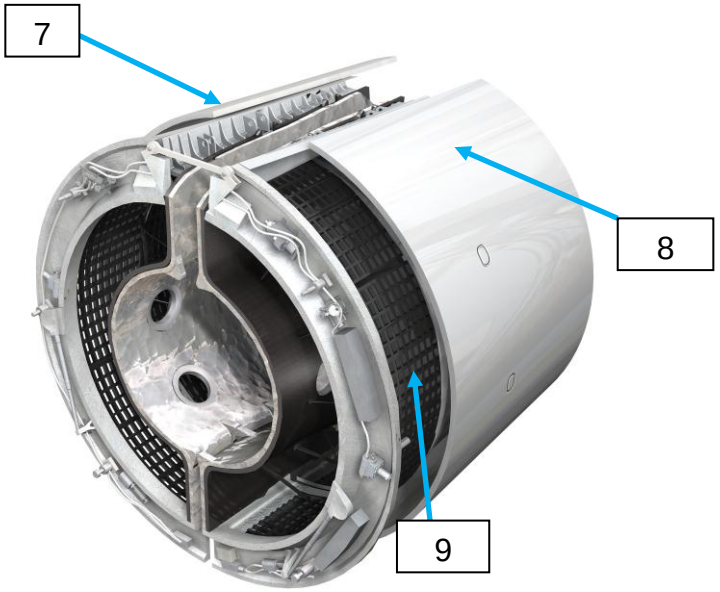
2. Thrust Reverser – Left C-Duct (Front)

Area, Visual Inspection:

- Check harnesses for chafing, cuts and security of connectors.
- Check the area for fuel/hydraulic oil leaks.
- Check pipes and harness clamps for chafing and damage.
- Check the general area for damage, corrosion, seal condition and cracks.
- Check the C-Duct V-Blade for damage.
- Check all the thrust reverser installations are attached securely.
- Check the blocker doors for damage and hinge wear.
- Check the Drag Links for damage.

Item	Description
1	Thrust Reverser Actuators
2	Blocker Doors
3	Opening Actuator
4	Electric Motor
5	Drag Links
6	V-blade
7	Right Translating Cowl
8	Left Translating Cowl
9	Cascade Segments


1
2
3
4
5
6

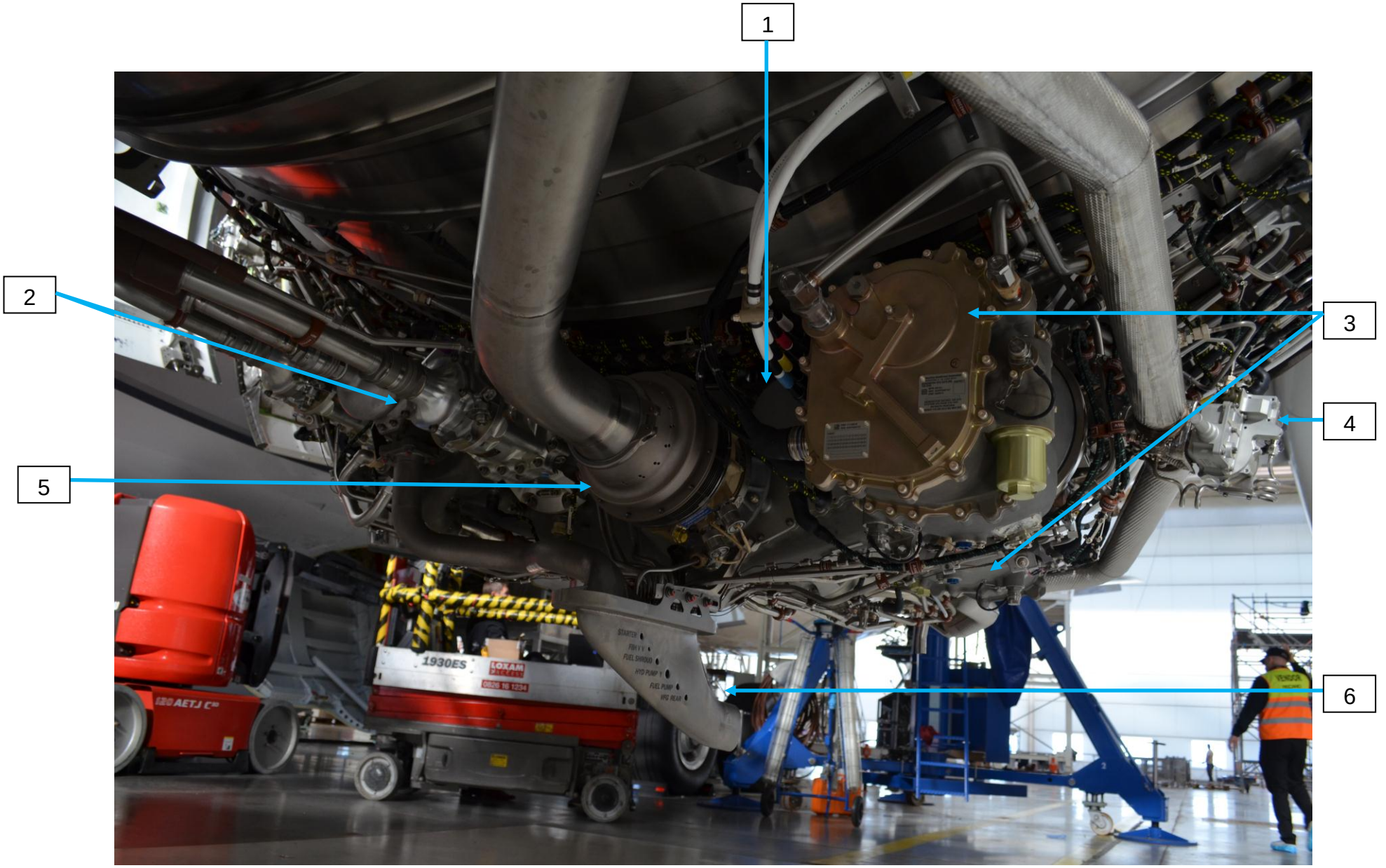

7
8
9

3. Left Fan Case Underside

Area, Visual Inspection:

- Check the area for fuel/oil leaks.
- Check the security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Examine the external gearbox for damage.

Item	Description
1	Permanent Magnetic Alternator (PMA)
2	Engine Driven Pumps (EDP) x2
3	Variable Frequency Generator (VFG) x2
4	Nacelle Anti-icing pressure regulating valve (NAIPRV)
5	Air Turbine Starter (ATS)
6	Drains Mast

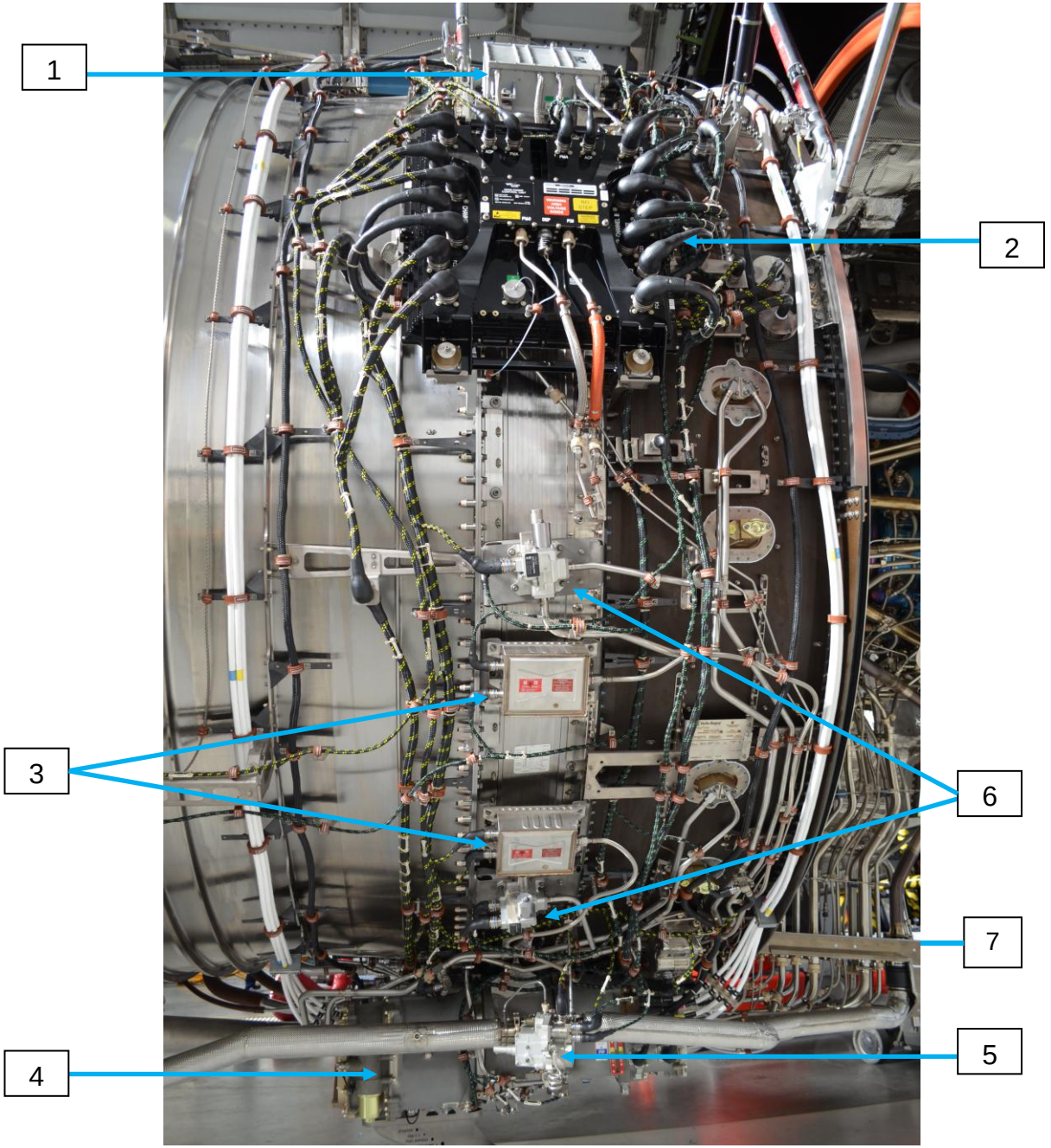

1
2
3
4
5
6

4. Left Fan Case

Area, Visual Inspection:

- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check pipes and harness clamps for chafing and general condition.
- Check the security of all pipe connections.

Item	Description
1	Engine Monitoring Unit (EMU)
2	Engine Electronic Controller (EEC)
3	High Energy Ignition Units (HEIU) x2
4	Front Variable Frequency Generator (VFG) x2
5	Nacelle Anti-icing pressure regulating valve (NAIPRV)
6	Variable Frequency Generator (VFG) thermal bypass valve x2
7	IP Turbine Case Cooling (TCC) Actuator

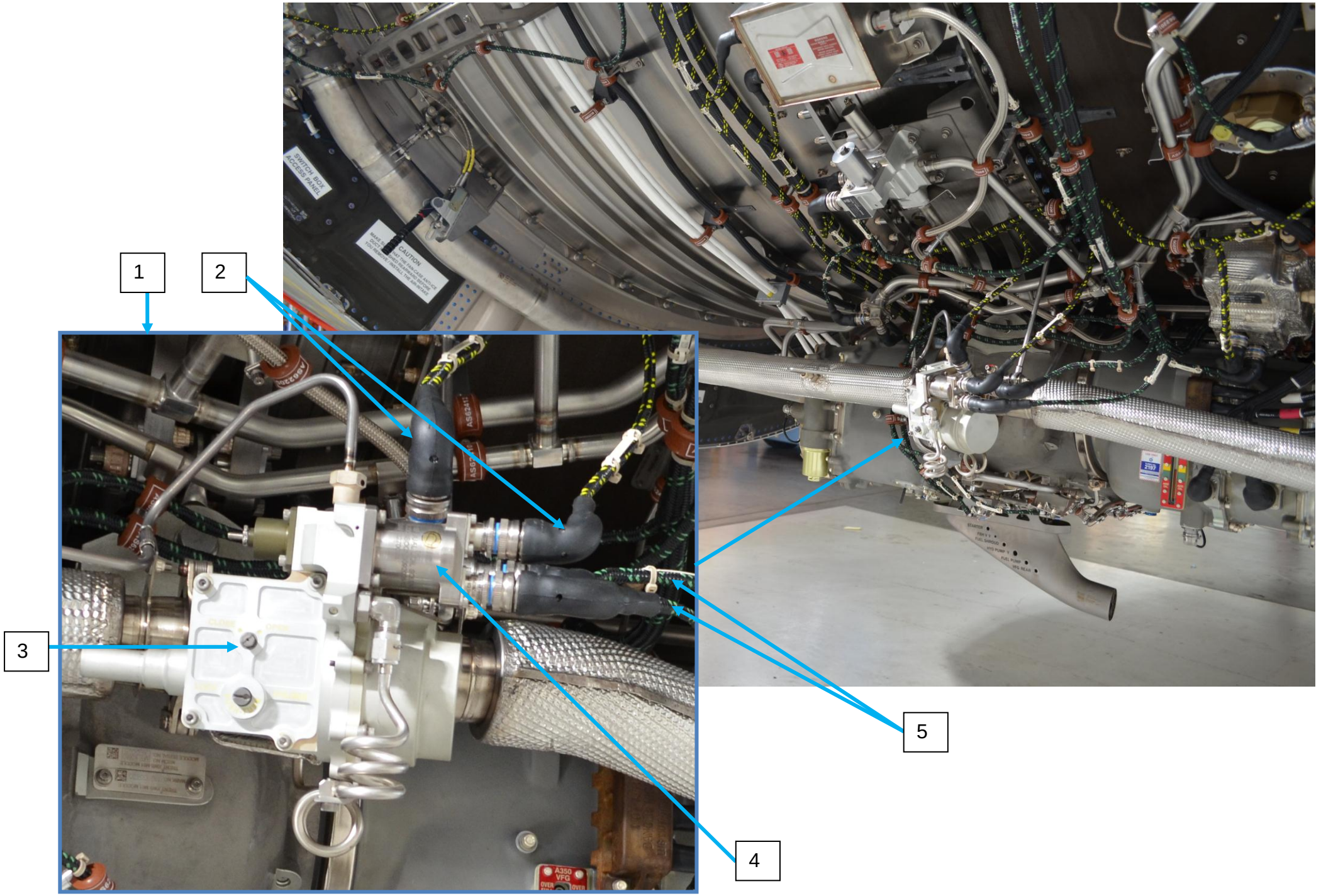

1
2
3
4
5
6
7

5. Nacelle Anti-Icing Pressure Regulating Valve (NAIPRV)

Area, Visual Inspection:

- Check harness for chafing, cuts, abrasion and security of connectors.
- Check the security of all clamps.
- Check pipes and harness clamps for chafing and general condition.

Item	Description
1	NAIPRV
2	EEC connectors (Yellow)
3	Manual Lock Mechanism
4	Solenoid
5	EEC connectors (Green)

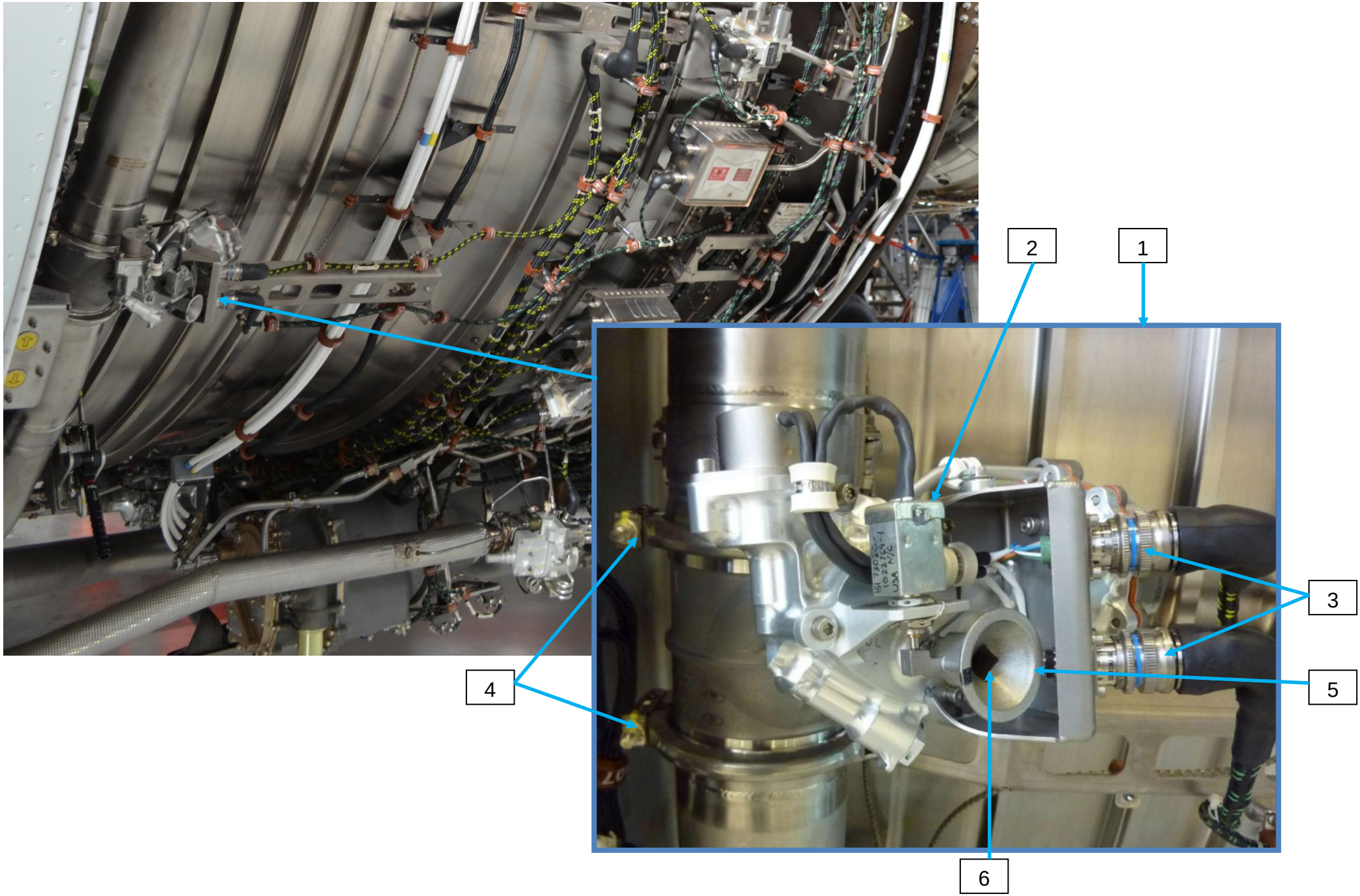

1
2
3
4
5

6. Starter Control Valve

Area, Visual Inspection:

- Check harness for chafing, cuts, abrasion and security of connectors.
- Check the security of all clamps.
- Check pipes and harness clamps for chafing and general condition.

Item	Description
1	Air Starter Control Valve
2	Valve Position Micro Switch
3	EEC Connections
4	Clamps
5	Guide Funnel
6	Manual Override Location

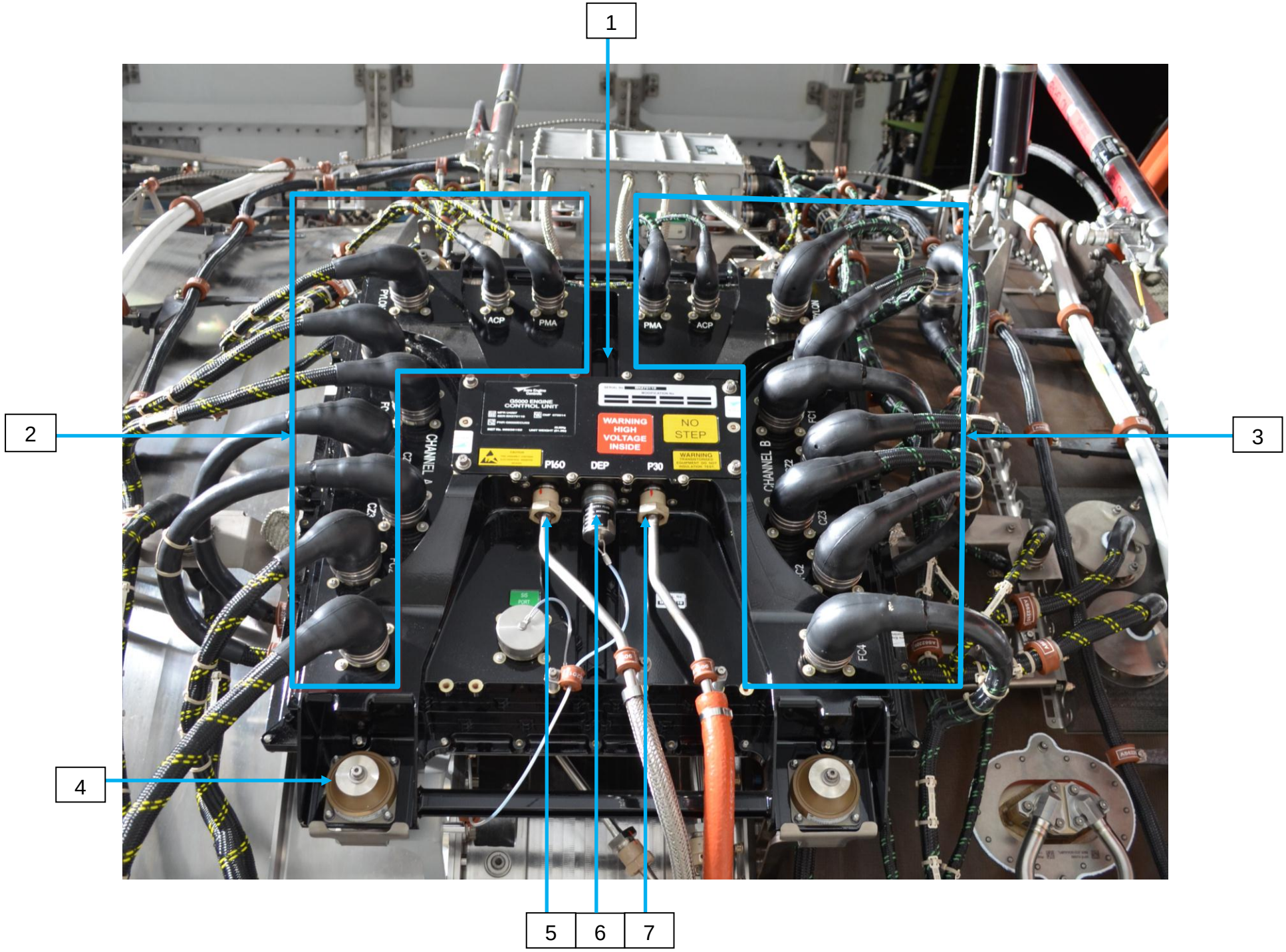

2
1
3
4
5
6

7. Engine Electronic Controller (EEC)

Area, Visual Inspection:

- Check the EEC mounts for security.
- Check harness for chafing, cuts, abrasion and security of connections.
- Check harness clamps for chafing and general condition.
- Check all pressure tubes for damage, security and tightness of connections.
- Check the security of the Data Entry Plug and integrity of lanyard.

Item	Description
1	EEC
2	Channel A Connectors (Yellow)
3	Channel B Connectors (Green)
4	Vibration Mounts x4
5	P160 Pressure Connector
6	Data Entry Plug (DEP)
7	P30 Pressure Connector

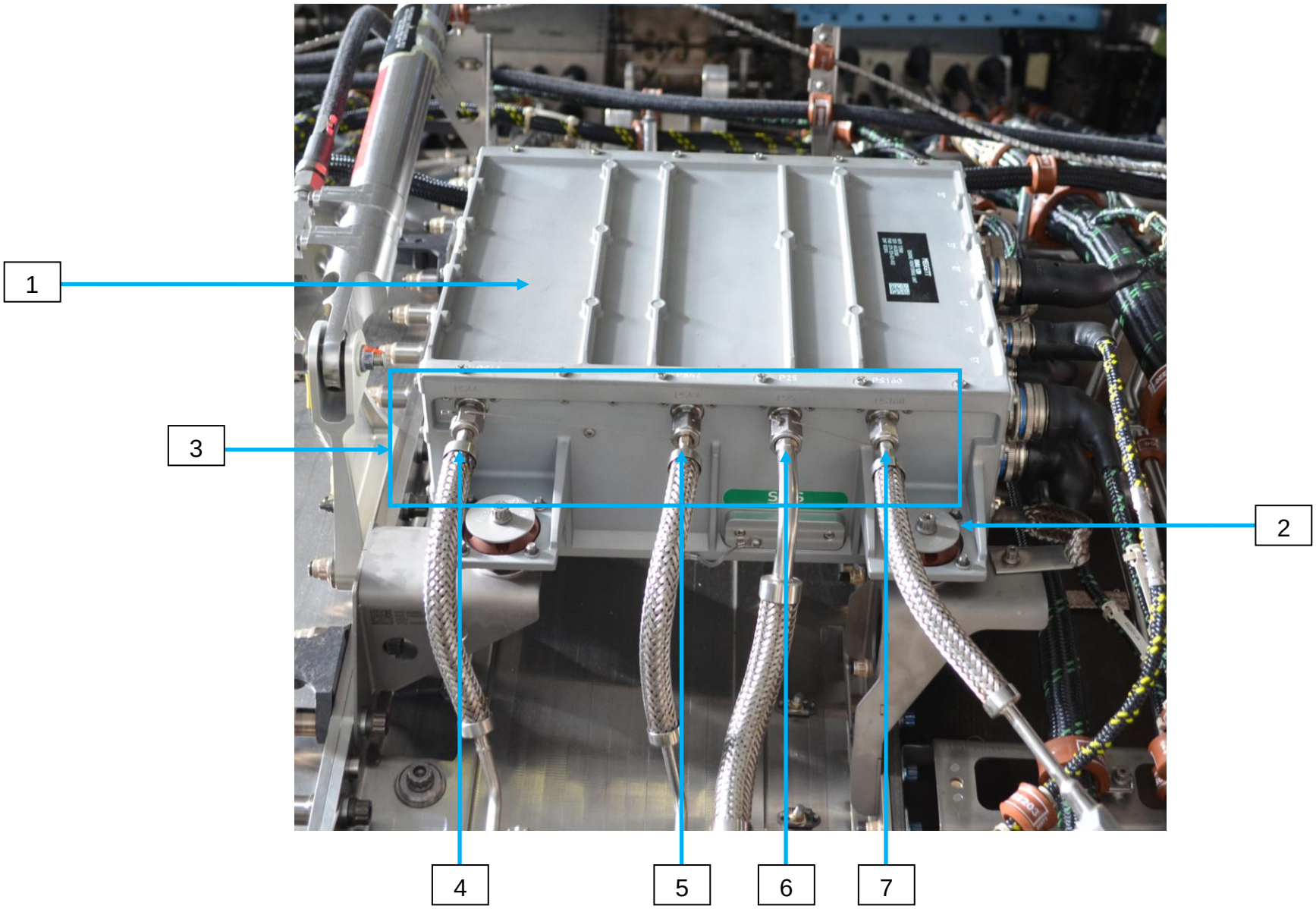

1
2
3
4
5
6
7
ACP
PMA
PMA
ACP
G5000 ENGINE CONTROL UNIT
WARNING HIGH VOLTAGE INSIDE
NO STEP
P160
DEP
P30
CHANNEL A
CHANNEL B

8. Engine Monitoring Unit (EMU)

Area, Visual Inspection:

- Check the EMU is mounted securely.
- Check all pressure tubes for damage, security and tightness of connectors.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check harness clamps for chafing and general condition.

Item	Description
1	EMU
2	Anti-Vibration Mounts x4
3	Engine Health Monitoring Pressure Connectors
4	PS42 Connector (EHM)
5	PS44 Connector (EHM)
6	P25 Connector (EHM)
7	PS160 Connector (EHM)

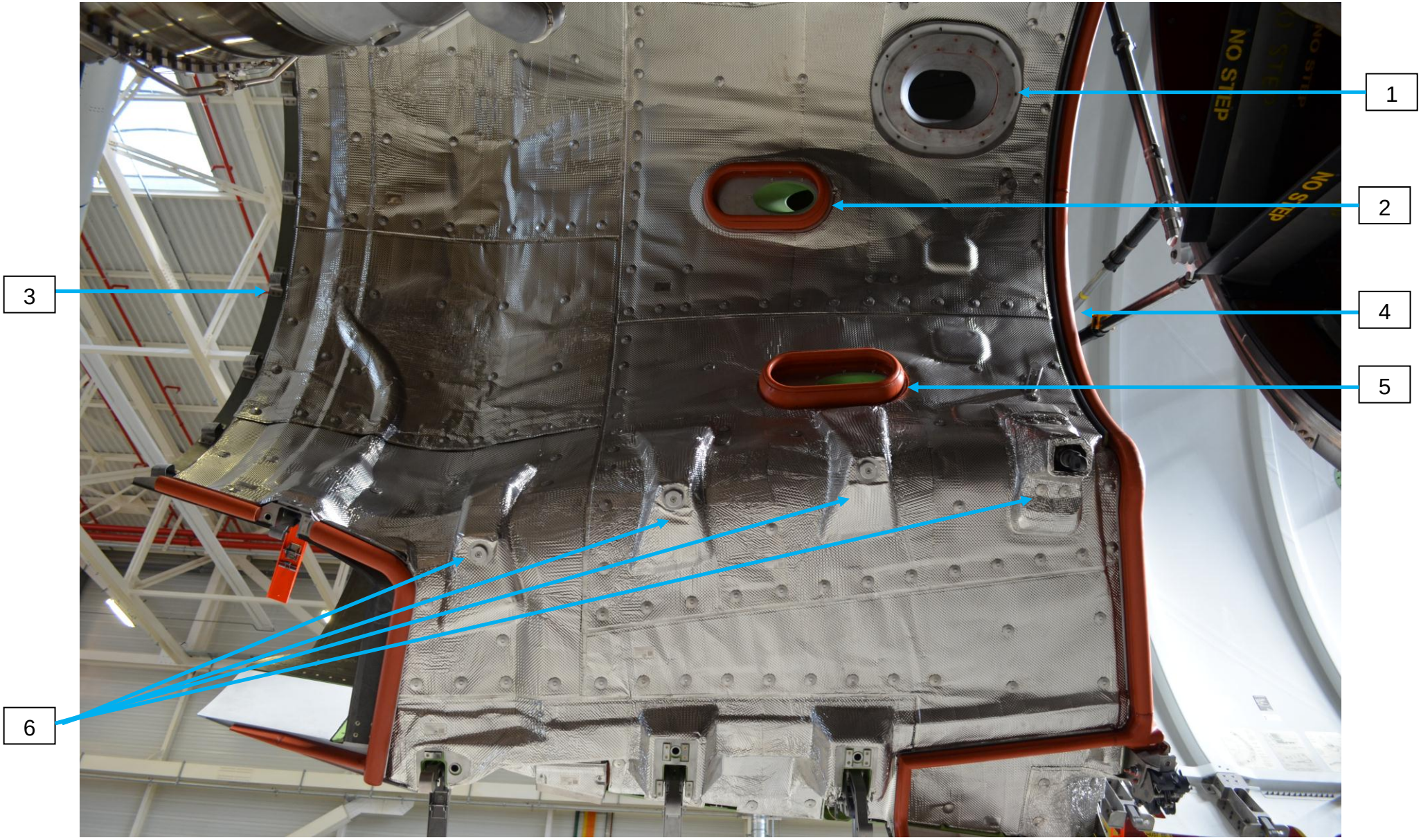

1
3
2
4
5
6
7

9. Thrust Reverser – Left C-Duct (Inner)

Area, Visual Inspection:

- Check the fire seals for damage and security of attachment.
- Check the Thermal Blanket for damage and security of attachment.
- Inspect the Thermal Blanket for evidence of contact with core.
- Check the condition of the Turbine Case Cooling scoops and blow off valve interface seals for damage.
- Check C-Duct Bumpers for wear.
- Check C-Duct Latches for security.
- Check finger seals for wear.

Item	Description
1	HP3 Bleed Valve Exhaust
2	LP Turbine Case Cooling (TCC) Intake Scoop
3	Finger Seals
4	Fire Seal
5	IP Turbine Case Cooling (TCC) Intake Scoop
6	Lower Bumpers


1
2
3
4
5
6
NO STEP

10. Left Variable Stator Vane (VSV) Actuator

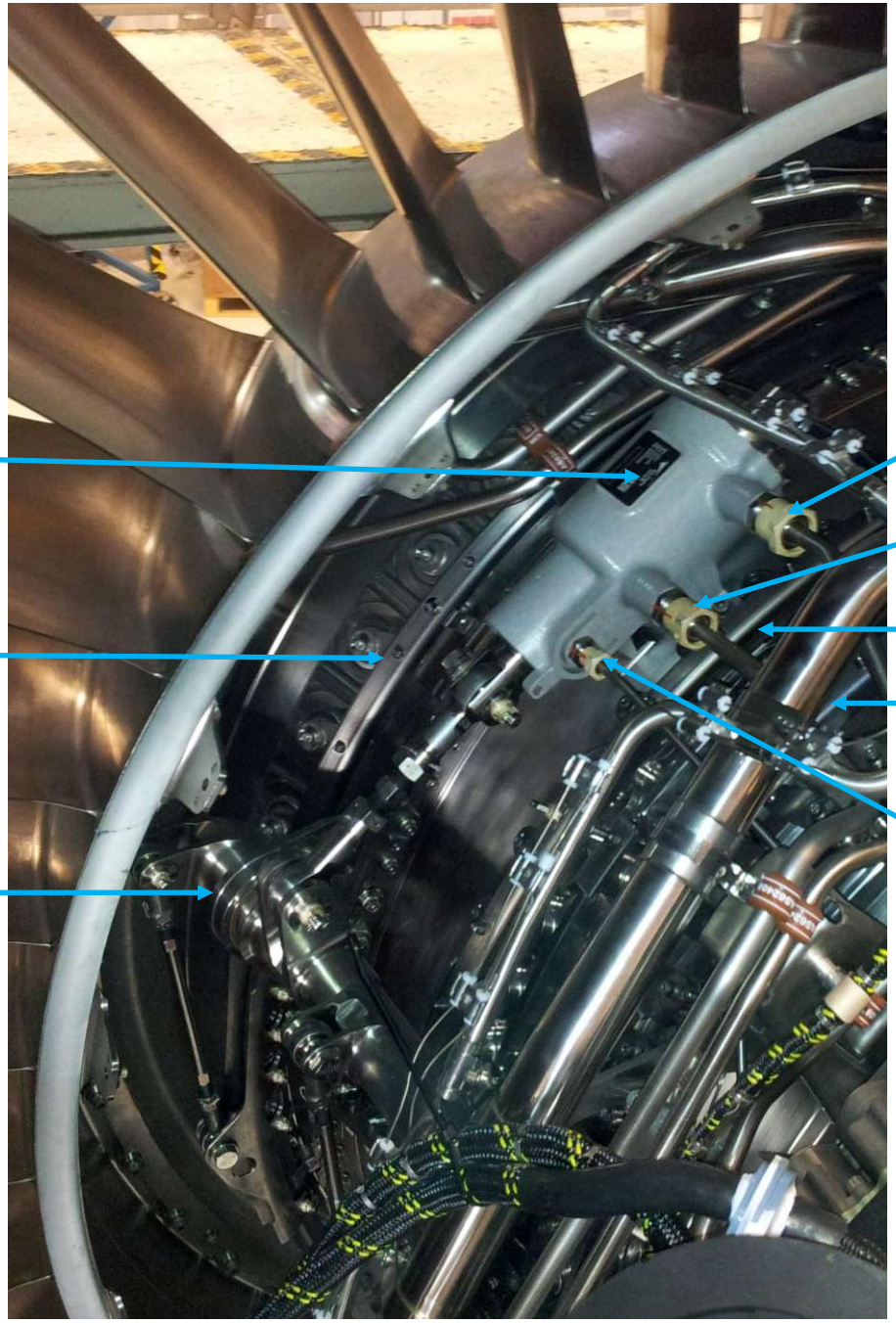
Area, Visual Inspection (Core Fairings Removed):

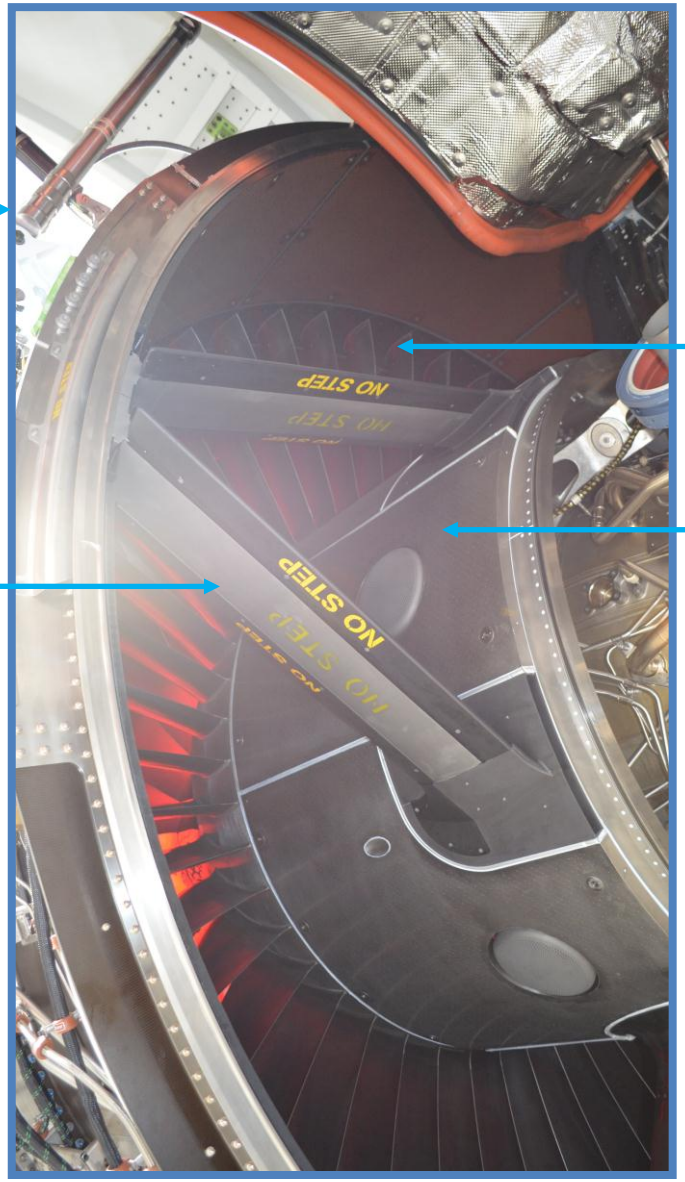
- Check the area for fuel/oil leaks.
- Check the security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Examine all the mechanical components of the VSV system for tightness and security.
- Check the VSV actuating mechanism for loose/missing bushes and pin hole wear.

Area, Visual Inspection (Core Fairings In-place):

- Check area for fuel/oil leaks.
- Check the security of the Core Fairings.
- Check the Bypass area for damage, particularly OGVs and Fan Case Supports (A-frame struts).

Item	Description
1	Variable Stator Vane (VSV) Actuator
2	Extend Line
3	Retract Line
4	Variable Inlet Guide Vane (VIGV) Unison Ring
5	VSV Stage 1 Unison Ring
6	VSV Stage 2 Unison Ring
7	Crankshaft
8	Drain Tube
9	Core Fairings In-place
10	LPC Outlet Guide Vanes (OGVs)
11	Core Fairings
12	A-frame strut


1
2
3
4
5
6
7
8

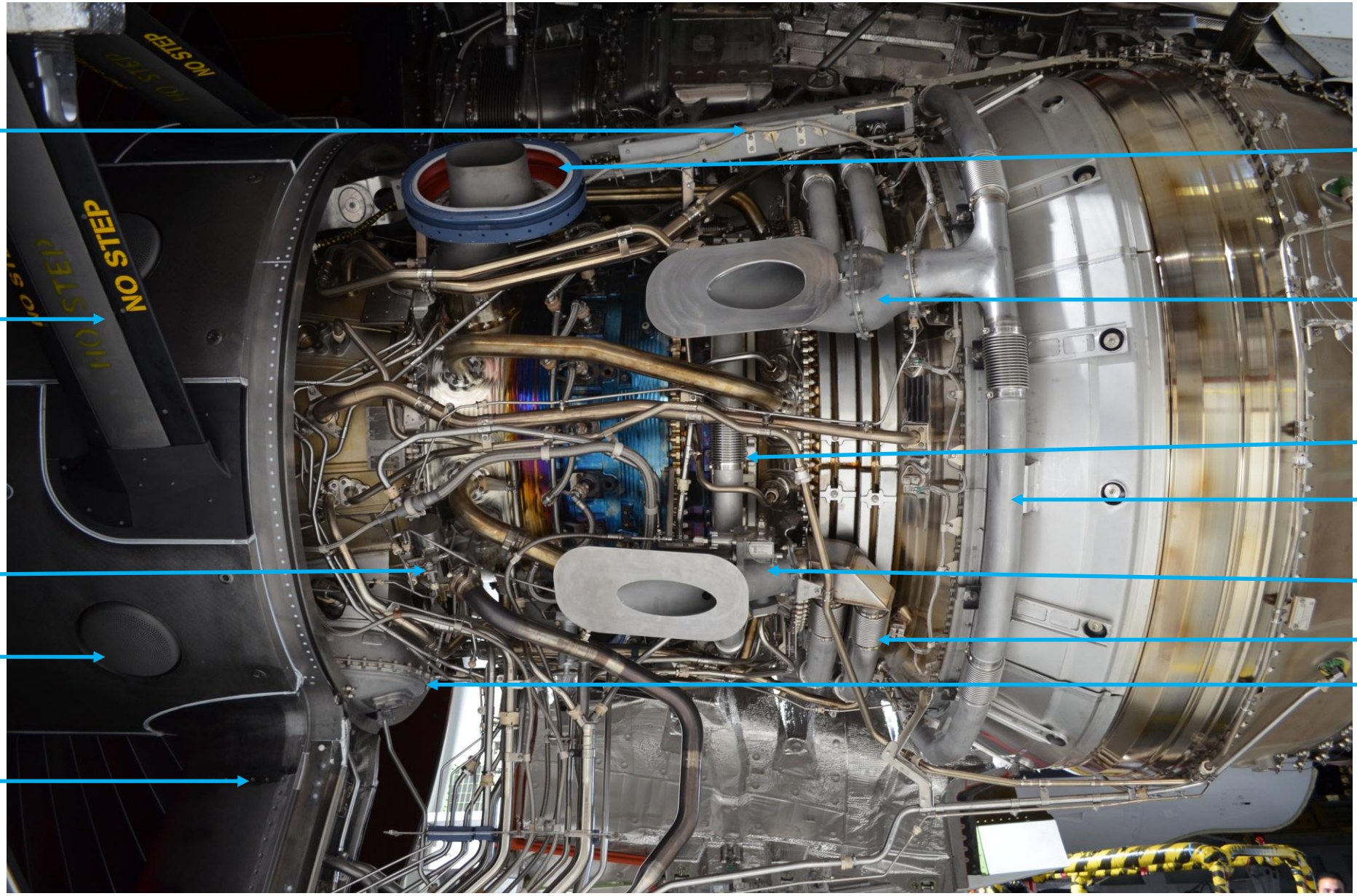

9
10
11
12
NO STEP

11. Left Side Engine Core

Area, Visual Inspection:

- Check the area for fuel/oil leaks.
- Check the security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Inspect the intermediate gearbox housing for damage.
- Check the bleed valve ducts for cracks and seals for condition and security.
- Check Turbine Case Cooling Manifolds and Ducts for cracks and damage.
- Check upper and lower splitter fairings for damage.
- Check Outlet Guide Vanes (OGVs) and LP Fan Case Supports (A-frame struts) for damage.

Item	Description
1	HP3 Bleed Valve
2	A-frame Strut
3	LP Turbine Case Cooling Valve Assembly
4	TCC HPT Cooling Manifold
5	TCC LPT Cooling Manifold
6	IP Turbine Case Cooling Valve Assembly
7	IP8 Bleed Valve
8	TCC IPT Cooling Manifold
9	Intermediate Gearbox
10	Lower Splitter Fairing
11	Harness Tray
12	Nacelle Anit-Icing Pressure Regulating Shut-off valve (NAI PRSOV)

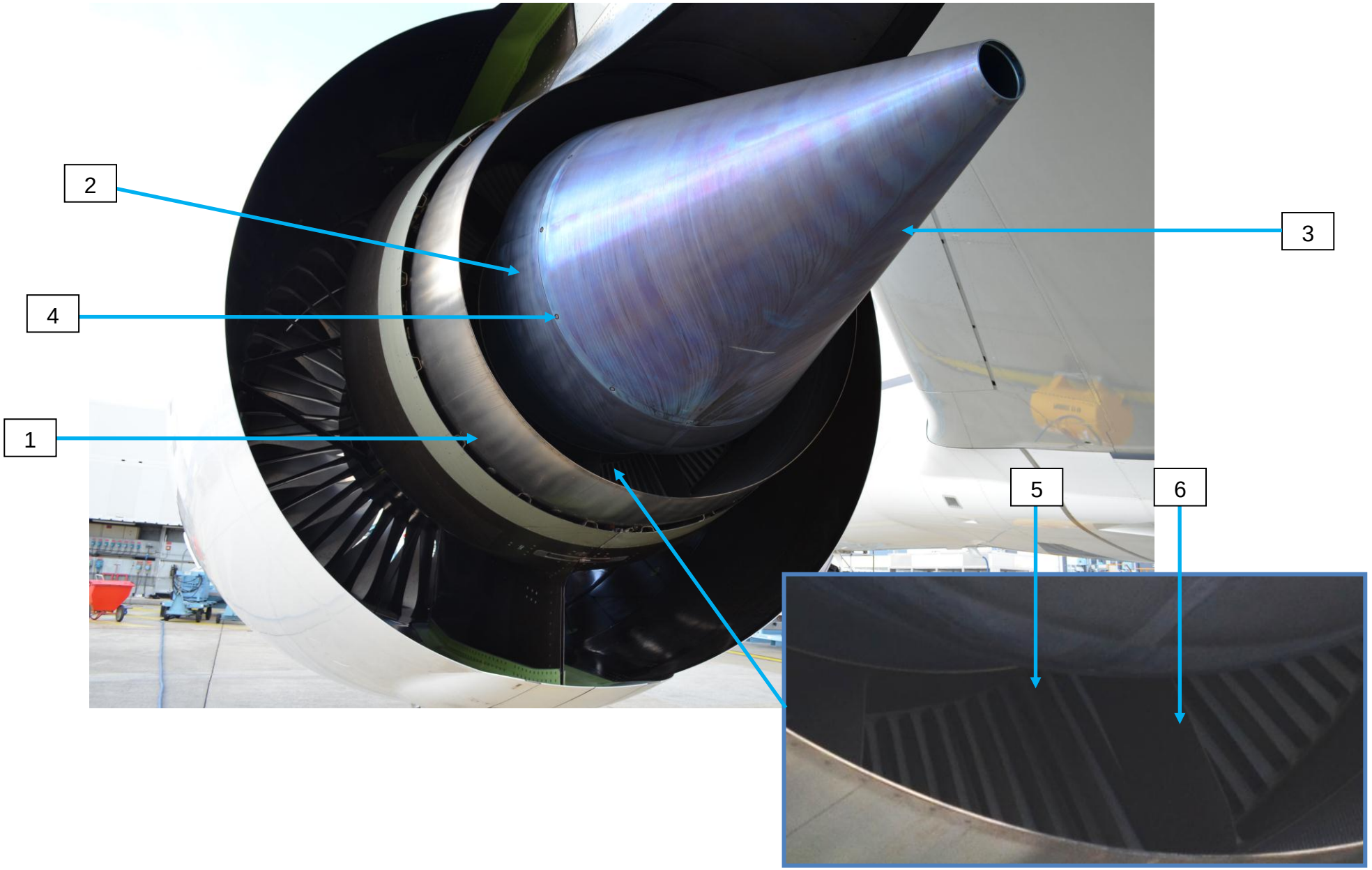

NO STEP
11
1
2
3
4
5
12
6
7
8
9
10

12. Common Nozzle Assembly

Area, Visual Inspection:

- Check LP Turbine Blades and LPT Outlet Guide Vanes (OGVs) for damage.
- Check the area for evidence of oil/fuel leakage.
- Check the seals and joints for the security of attachment, wear and/or damage.
- Check the attachment links x12 for wear at the attachment points.

Item	Description
1	Exhaust Sleeve
2	Forward Plug Assembly
3	Rear Plug Assembly
4	Rear Plug Attachment Bolts
5	LPT Stage 6 Blades
6	LPT Outlet Guide Vanes (OGVs)


2
3
4
1
5
6

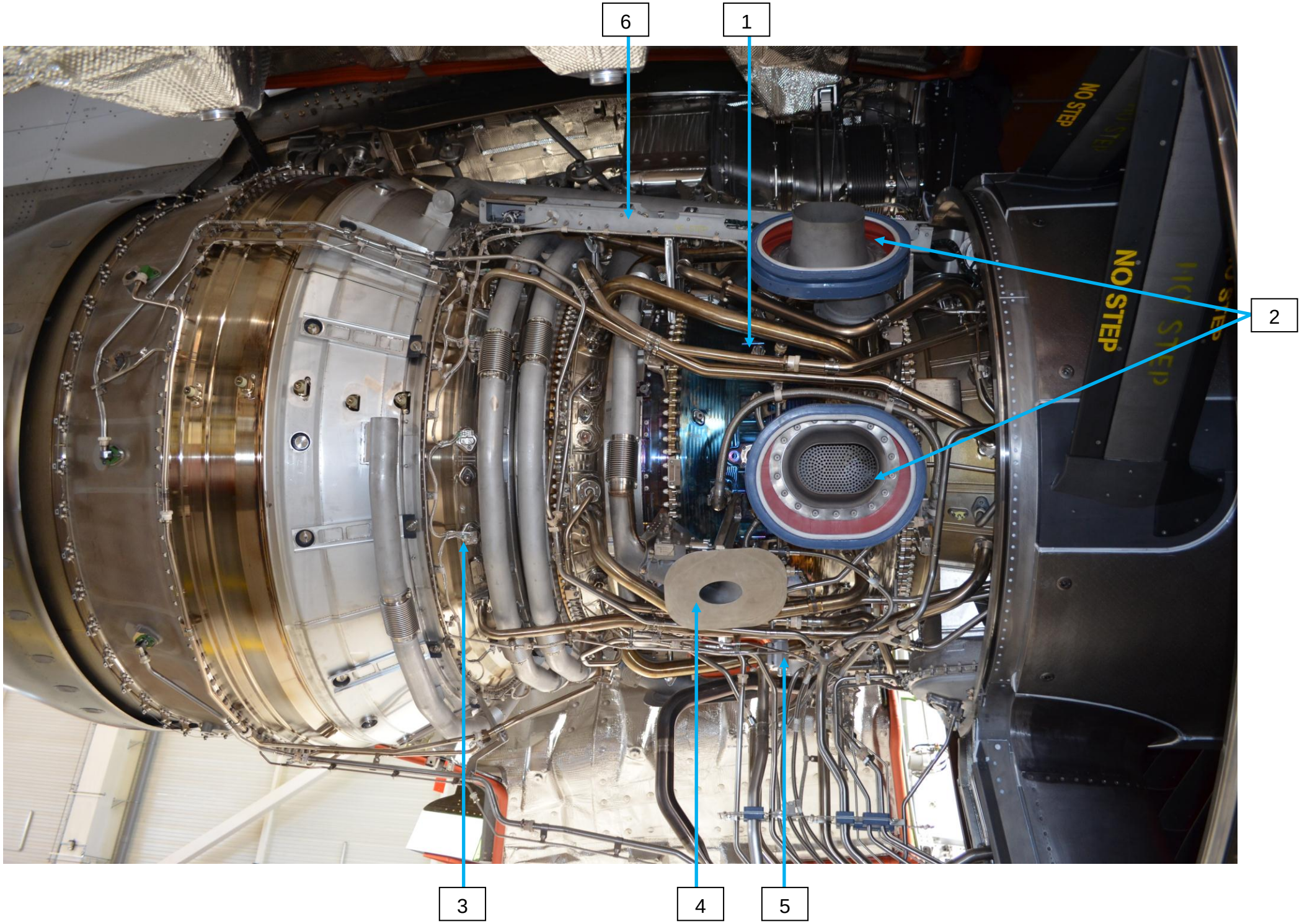
13. Right Side Engine Core

Area, Visual Inspection:

- Check the area for fuel/oil leaks.
- Check the security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.
- Check harness for chafing, cuts, abrasion and security of connectors.

Item	Description
1	Fuel Spray Nozzles (x 20)
2	HP3 Bleed Valves
3	Turbine Gas Temperature (TGT) Thermocouples (12-off)
4	HP Turbine Case Cooling (TCC) Valve
5	HP Fuel Filter and Manifold
6	Harness Tray

- Check Bleed Valve ducts for cracks and seal for condition and security.
- Check Outlet Guide Vanes (OGVs) and LP Fan Case Supports (A-frame strut) for damage.

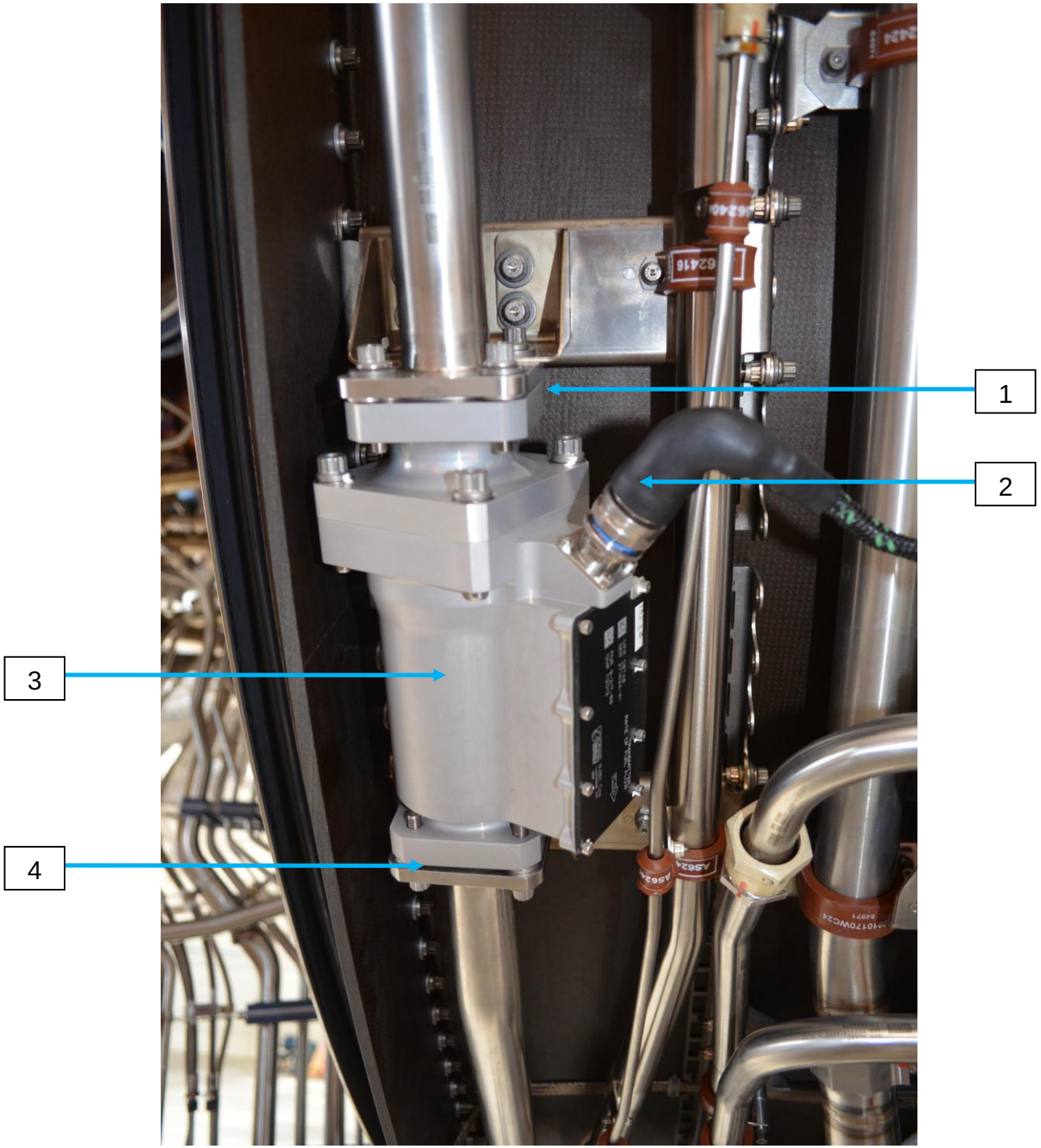

6
1
2
3
4
5
NO STEP

14. Fuel Flow Transmitter

Area, Visual Inspection:

- Check the area for fuel/oil leaks.
- Check the security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.
- Check harnesses for chafing, cuts, abrasion and security of connectors.

Item	Description
1	Fuel Flow Transmitter
2	Connection to EEC
3	Fuel Inlet from HMU
4	Fuel Outlet to Manifold


1
2
3
4

15. Right Variable Stator Vane (VSV) Actuator

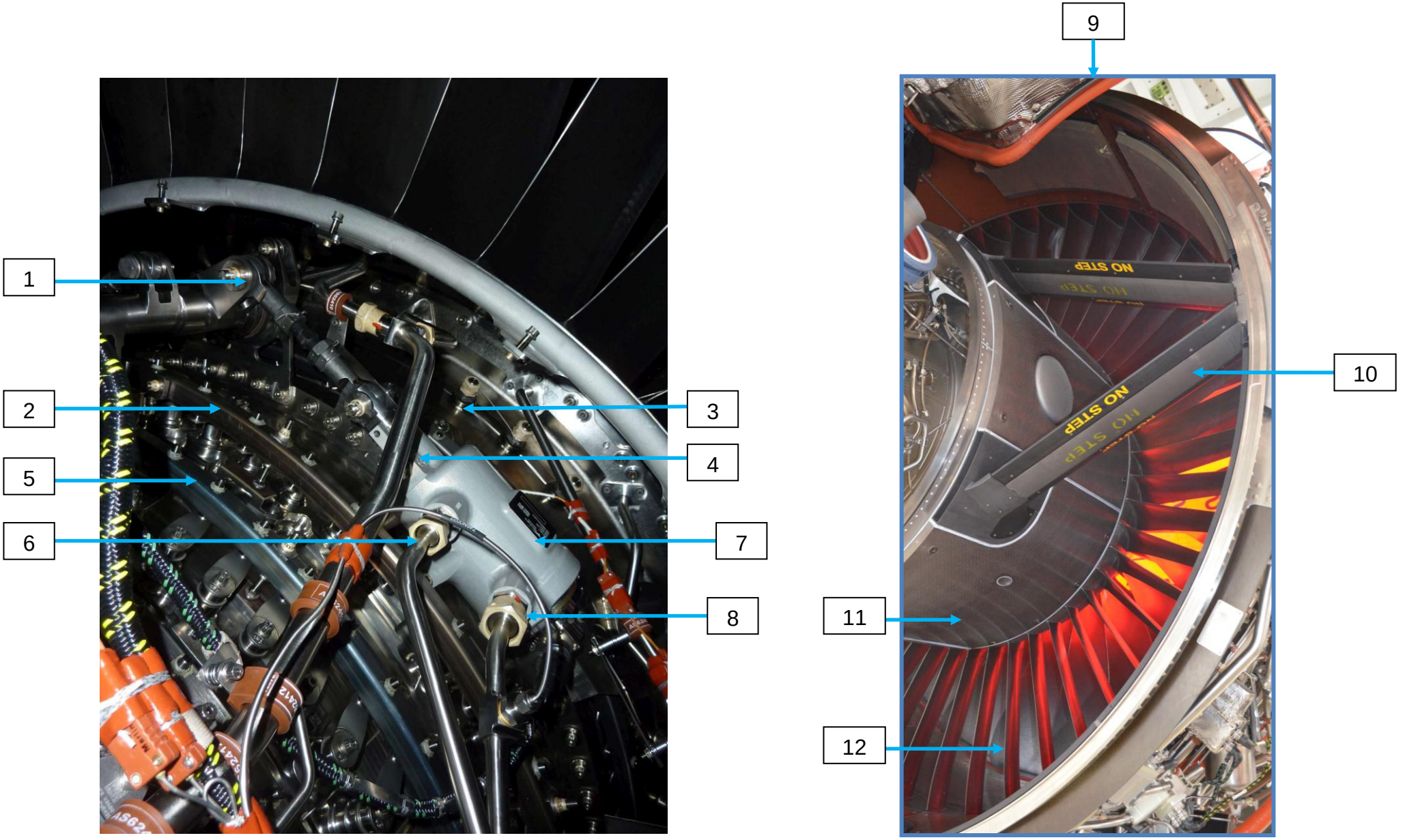
Area, Visual Inspection (Core Fairings Removed):

- Check area for fuel/oil leaks.
- Check security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Examine all the mechanical components of the VSV system for tightness, security of attachment and damage.
- Check the VSV actuating mechanism for loose/missing bushes and pin hole wear.

Item	Description
1	Crankshaft
2	VSV Stage 1 Unison Rings
3	Variable Inlet Guide Vane (VIGV) Unison Ring
4	Drain Line
5	VSV Stage 2 Unison Rings
6	Retract Line
7	VSV Actuator
8	Extend Line
9	Core Fairings In-place
10	A-frame strut
11	Core Fairings
12	LPC Outlet Guide Vanes (OGVs)

Area, Visual Inspection (Core Fairings In-place):

- Check area for fuel/oil leaks.
- Check the security of the Core Fairings.
- Check the Bypass area for damage, particularly OGVs and Fan Case Supports (A-frame struts).

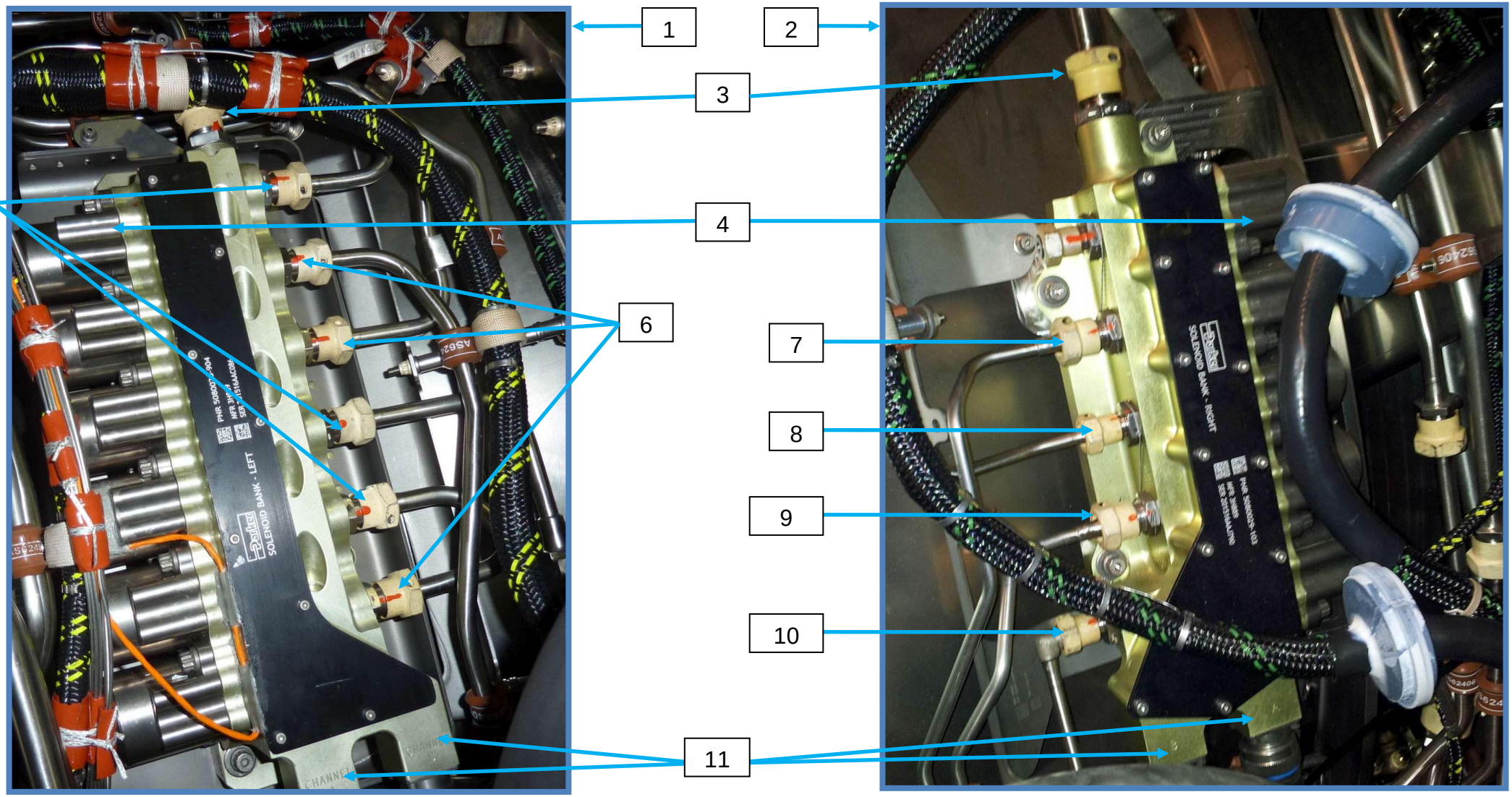

1
2
3
4
5
6
7
8
9
10
11
12
NO STEP

16. Engine Bleed Solenoid Blocks

Area, Visual Inspection (Core Fairings Removed):

- Check security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.
- Check components for damage and security of attachment.
- Check harnesses for chafing, cuts, abrasion and security of connectors.

Item	Description
1	Left Hand Bleed Valve Solenoids
2	Right Hand Solenoids
3	HP3 Servo Air Supply
4	Solenoid Valves x11
5	HP3 Bleed Valve Duct Supply
6	IP8 Bleed Valve Duct Supply
7	Supply to LP Turbine Case Cooling (LPTCC)
8	Supply to Engine Section Stator Anti-Icing Valve (ESSAIV)
9	Supply for shut-off capability to Nacelle Anti-ice Pressure Regulating Shut-Off Valve (NAI PRSOV)
10	Supply for regulation capability of Nacelle Anti-ice Pressure Regulating Shut-Off Valve (NAI PRSOV)
11	Channel A and B Connectors

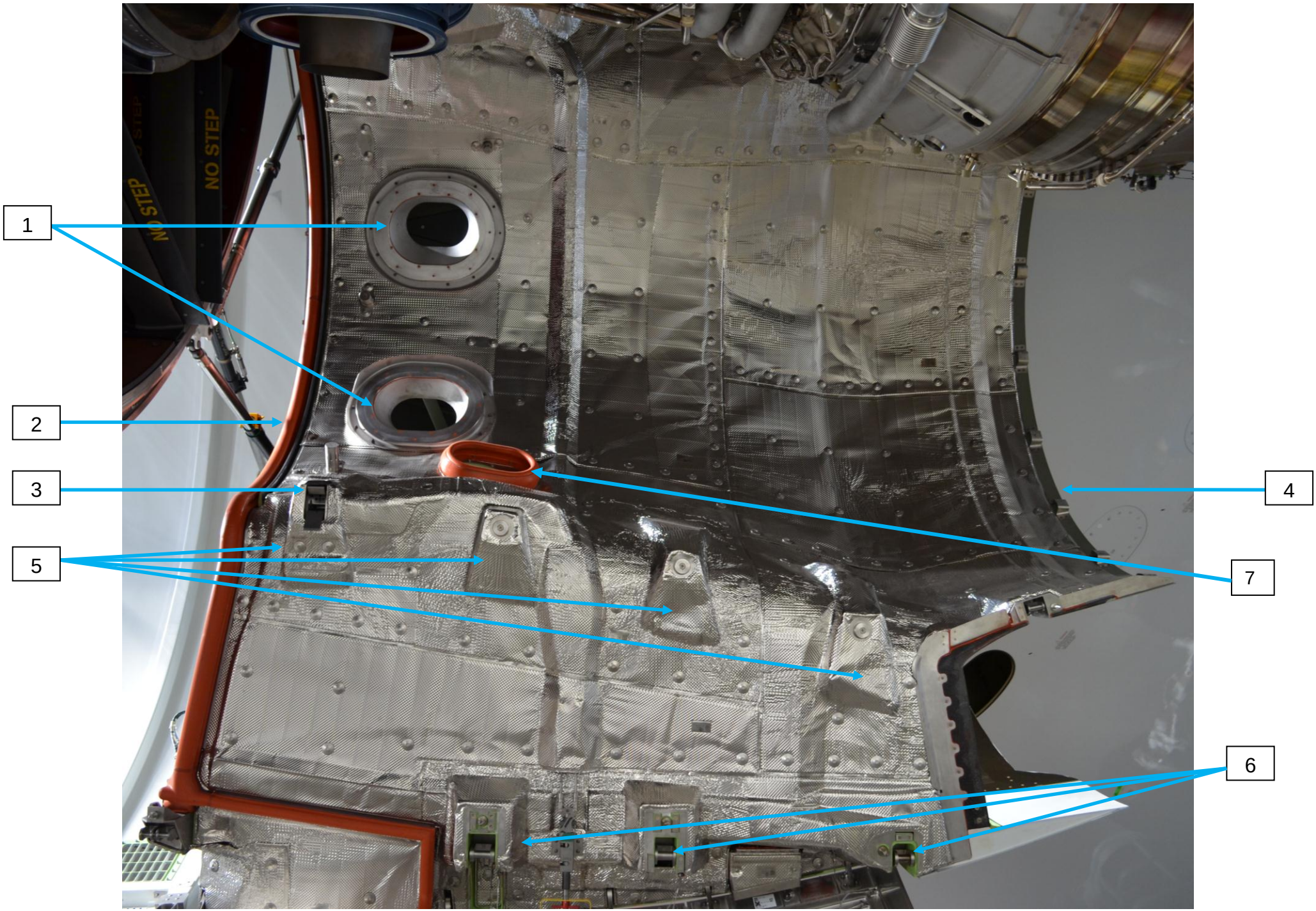

1
2
3
4
5
6
7
8
9
10
11
SOLENOID BANK - LEFT
SOLENOID BANK - RIGHT

17. Thrust Reverser - Right C-Duct (Inner)

Area, Visual Inspection:

- Check the fire seals for damage and security of attachment.
- Check the Thermal Blankets for damage and security of attachment.
- Inspect the thermal Blanket for evidence of contact with the core.
- Check C-Duct Bumpers for wear.
- Check C-Duct Latches for security.
- Check Finger seals for wear.

Item	Description
1	HP3 Bleed Valve Exhaust
2	Fire Seal
3	6 o’clock Hook
4	Finger Seals
5	Lower Bumpers
6	Latches (x8)
7	HP Turbine Case Cooling (HPTCC) Inlet

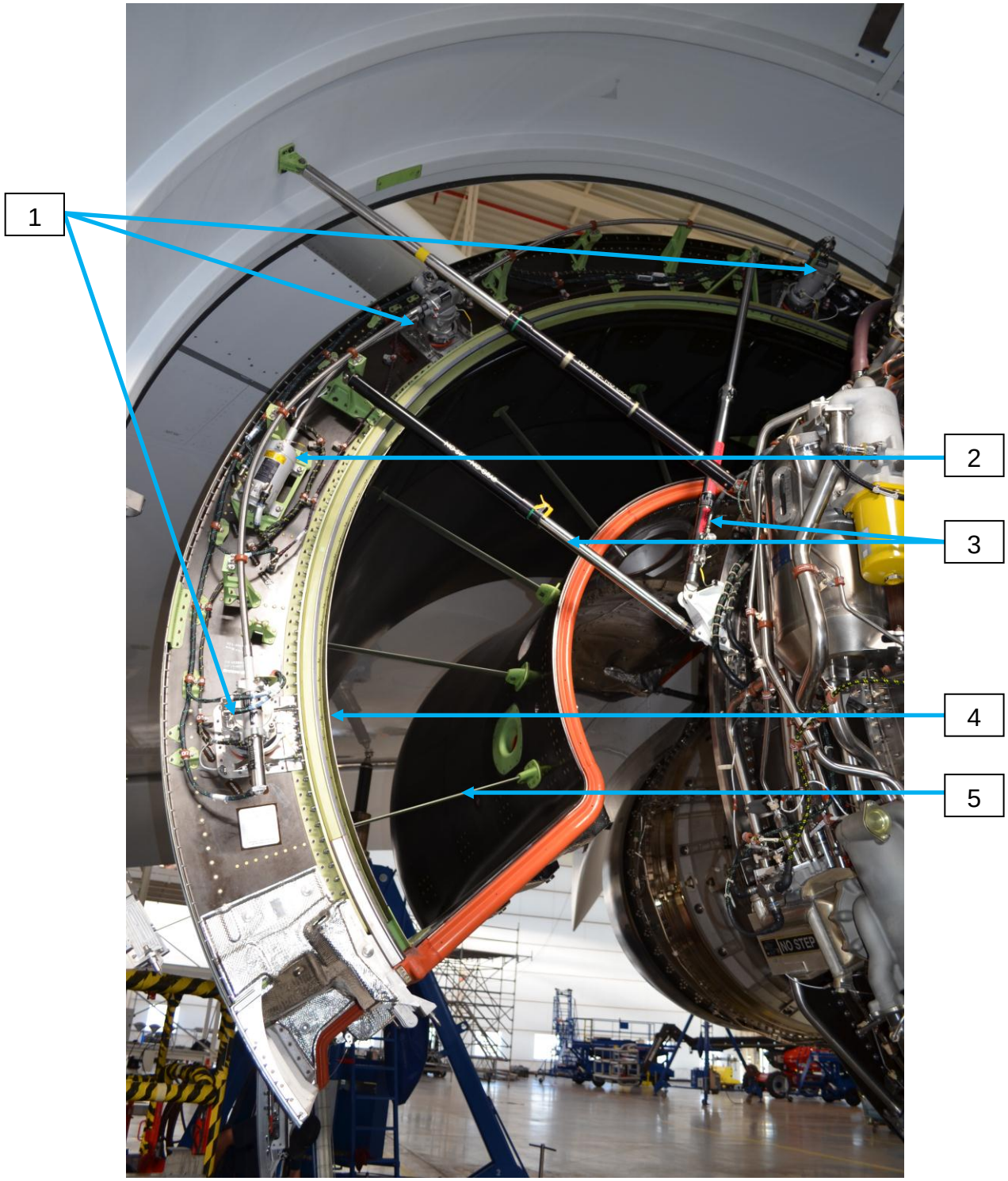

1
2
3
4
5
6
7
NO STEP
NO STEP

18. Thrust Reverser – Right C-Duct (Front)

Area, Visual Inspection:

- Check harnesses for chafing, cuts, and security of connectors.
- Check the area for fuel/hydraulic oil leaks.
- Check pipes and harness clamps for chafing and damage.
- Check the general area for damage, corrosion, seal condition and cracks.
- Check the C-Duct V-Blade for damage.
- Check all the Thrust Reverser installations are attached securely.
- Check the drag links for damage.

Item	Description
1	Translating Cowl Actuators x3
2	Electric Motor
3	Hold Open Rods
4	V-Blade
5	Drag Links

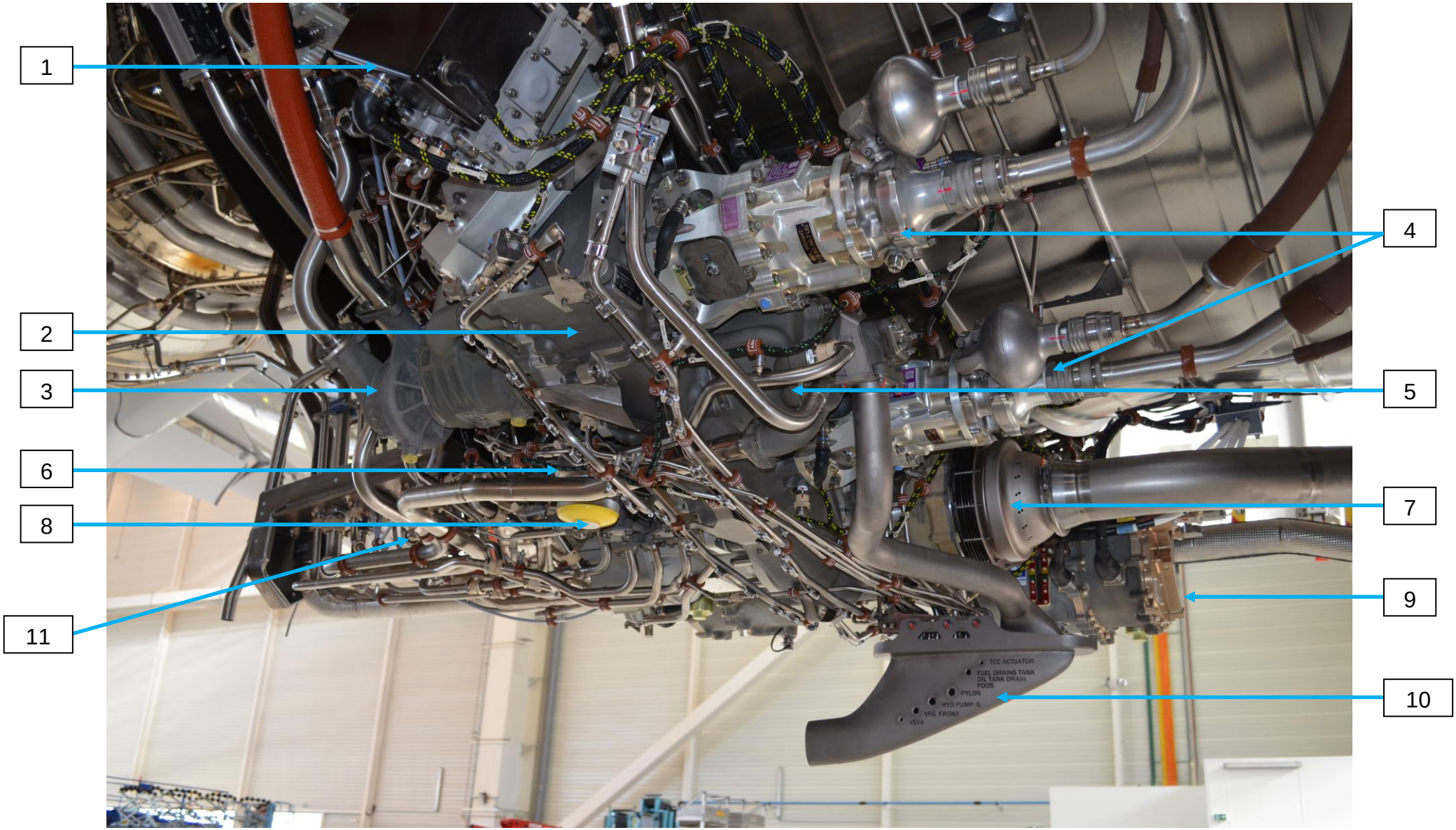

1
2
3
4
5
NO STEP

19. Right Fan Case Underside

Area, Visual Inspection:

- Check area for fuel/oil leaks.
- Check the security of all pipe connections.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check pipes and harness clamps for chafing and general condition.
- Check security of all components.

Item	Description
1	Hydro Mechanical Unit (HMU)
2	External Gearbox
3	Main Engine Fuel Pump (MEFP)
4	Engine Driven Pumps (Green and Yellow)
5	Centrifugal Breather
6	Engine Oil Pump
7	Air Turbine Starter (ATS)
8	Oil Pressure Filter Assembly
9	Variable Frequency Generator (VFG)
10	Drains Mast
11	VSV Fuel Supply Drain Ports

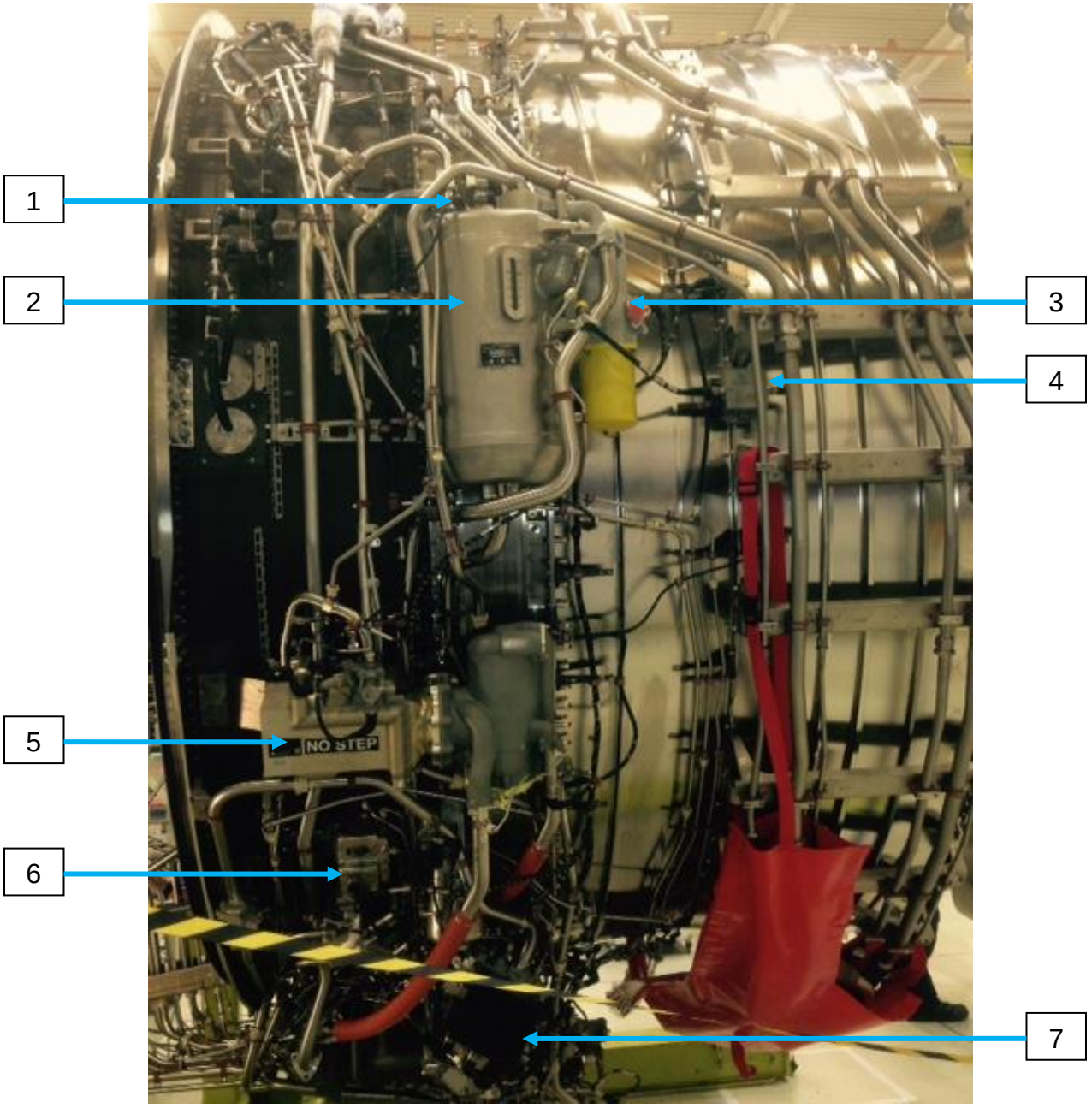

1
2
3
4
5
6
7
8
9
10
11
TCC ACTUATOR
FUEL DRAINS TANK
OIL TANK DRAIN
PDOS
PYLON
HYD PUMP G
VFG FRONT
VSVA

20. Right Fan Case

Area, Visual Inspection:

- Check area for fuel/oil leaks.
- Check security of all pipe connections.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check pipes and harness clamps for chafing and general condition.

Item	Description
1	Front Bearing Housing Vent Valve
2	Oil Tank
3	Oil Debris Monitoring System (ODMS)
4	Oil Debris Signal Conditioner
5	Fuel Oil Heat Exchanger (FOHE)
6	HP Tip Clearance Control (HPTCC) Actuator
7	Hydro Mechanical Unit (HMU)

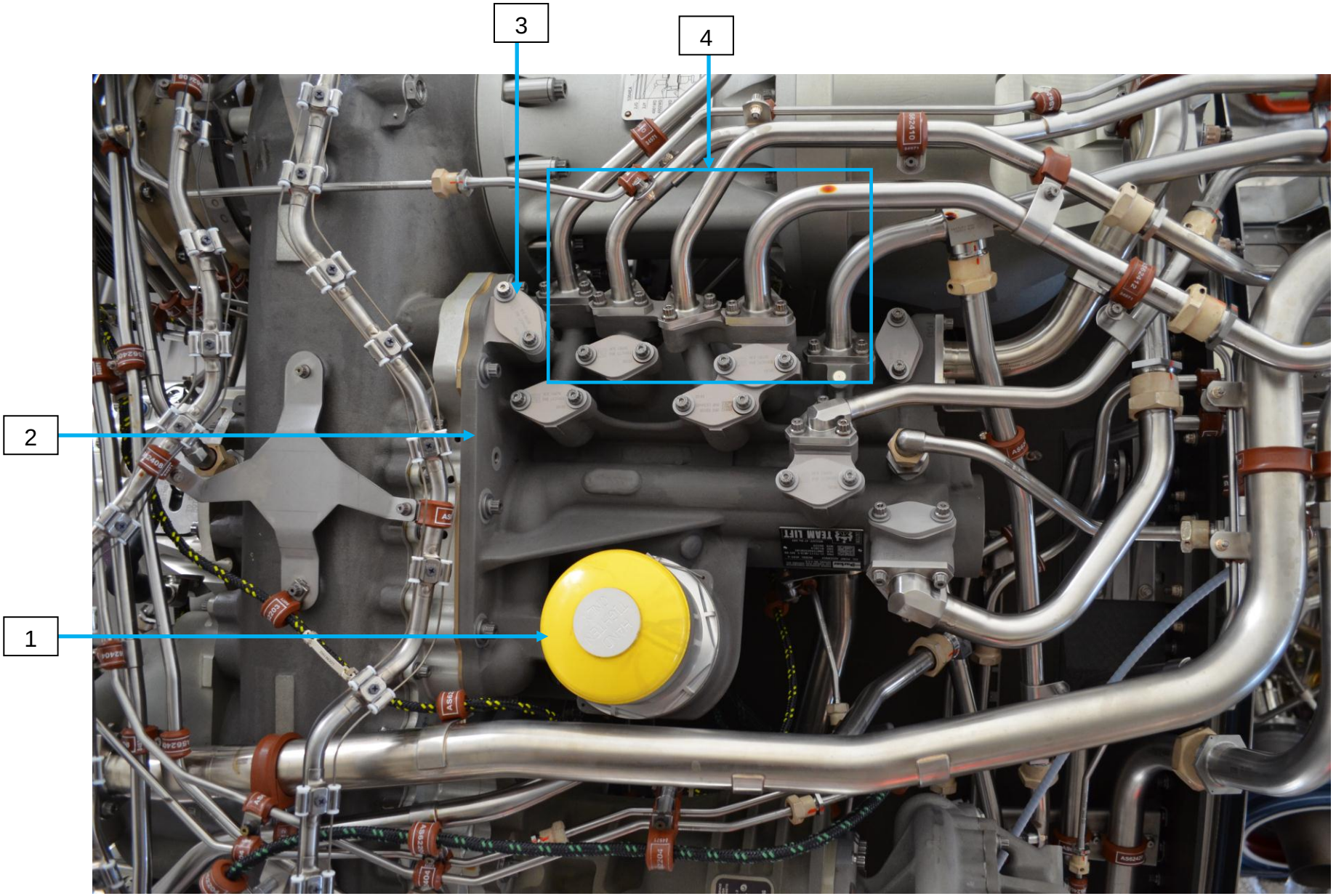

1
2
3
4
5
6
7
NO STEP

21. Oil Pump

Area, Visual Inspection:

- Check area for fuel/oil leaks.
- Check security of all pipe connections.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check pipes and harness clamps for chafing and general condition.
- Check the security of the Magnetic Chip Detectors (MCDs) if fitted.

Item	Description
1	Oil Pressure Filter Assembly
2	Oil Pump Assembly
3	Magnetic Chip Detectors (MCDs) (x9)
4	Scavenge Return Tubes

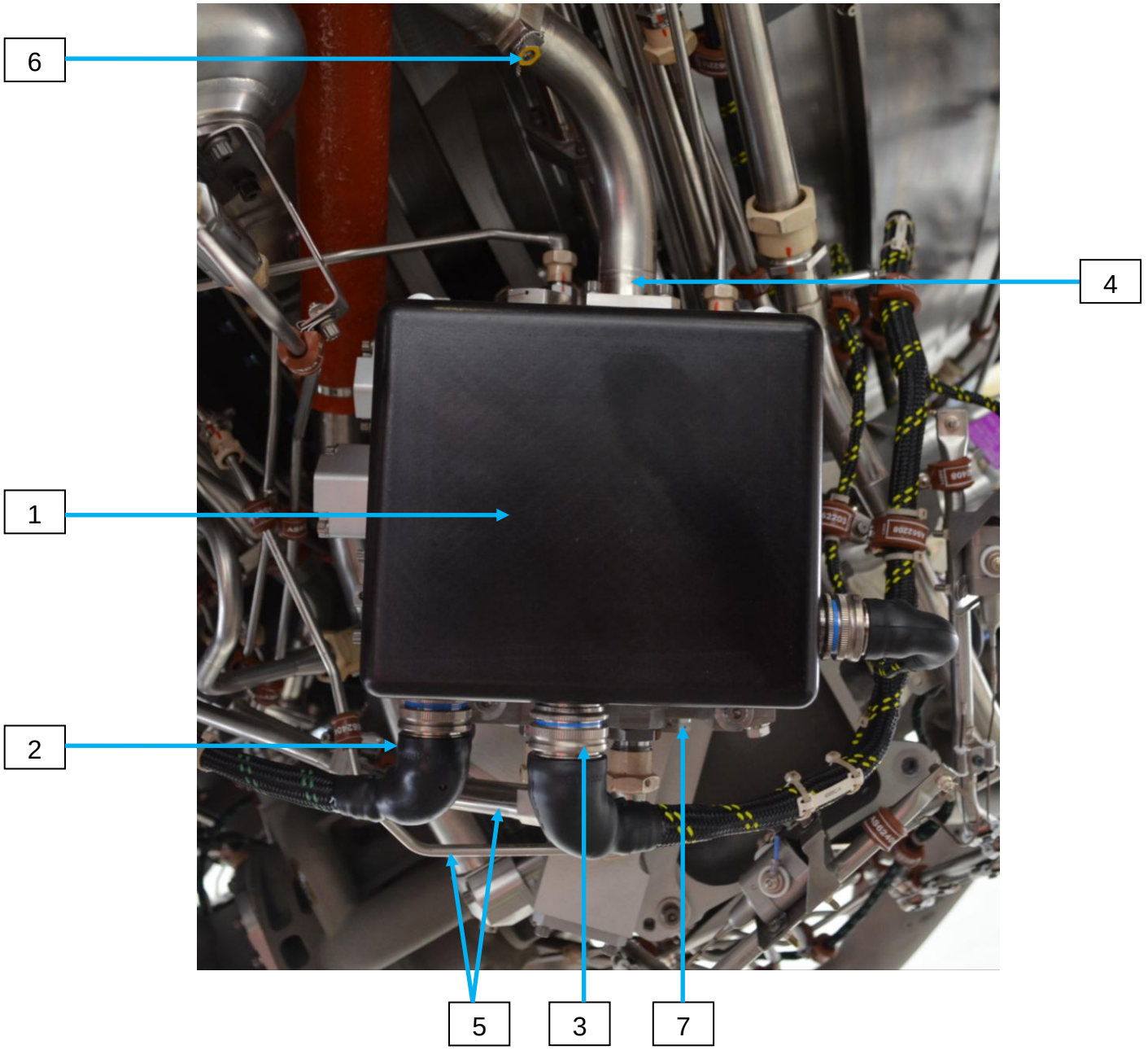

3
4
2
1

22. Hydro Mechanical Unit (HMU)

Area, Visual Inspection:

- Check area for fuel leaks.
- Check security of all pipe connections.
- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check pipes and harness clamps for chafing and general condition.

Item	Description
1	Hydro Mechanical Unit (HMU)
2	Channel B Connector
3	Channel A Connector
4	Metered fuel to the fuel spray Nozzles (FSN)
5	VSV fuel feed lines x2
6	Fuel Drain Port
7	HMU Drain Port


6
4
1
2
5
3
7

23. Surface Air Cooled Oil Cooler (SACOC)

Area, Visual Inspection:

- Check the condition of the Surface Air Oil Cooled Oil Cooler (SACOC).
- Check area for fuel/oil leaks.
- Check SACOC vanes for damage.
- Check acoustic liner for any obvious damage

Item	Description
1	Low Pressure Compressor (LPC) Outlet Guide Vane (OGV)
2	Acoustic Liner
3	Core Fairing
4	Surface Air Cooled Oil Cooler (SACOC) x2

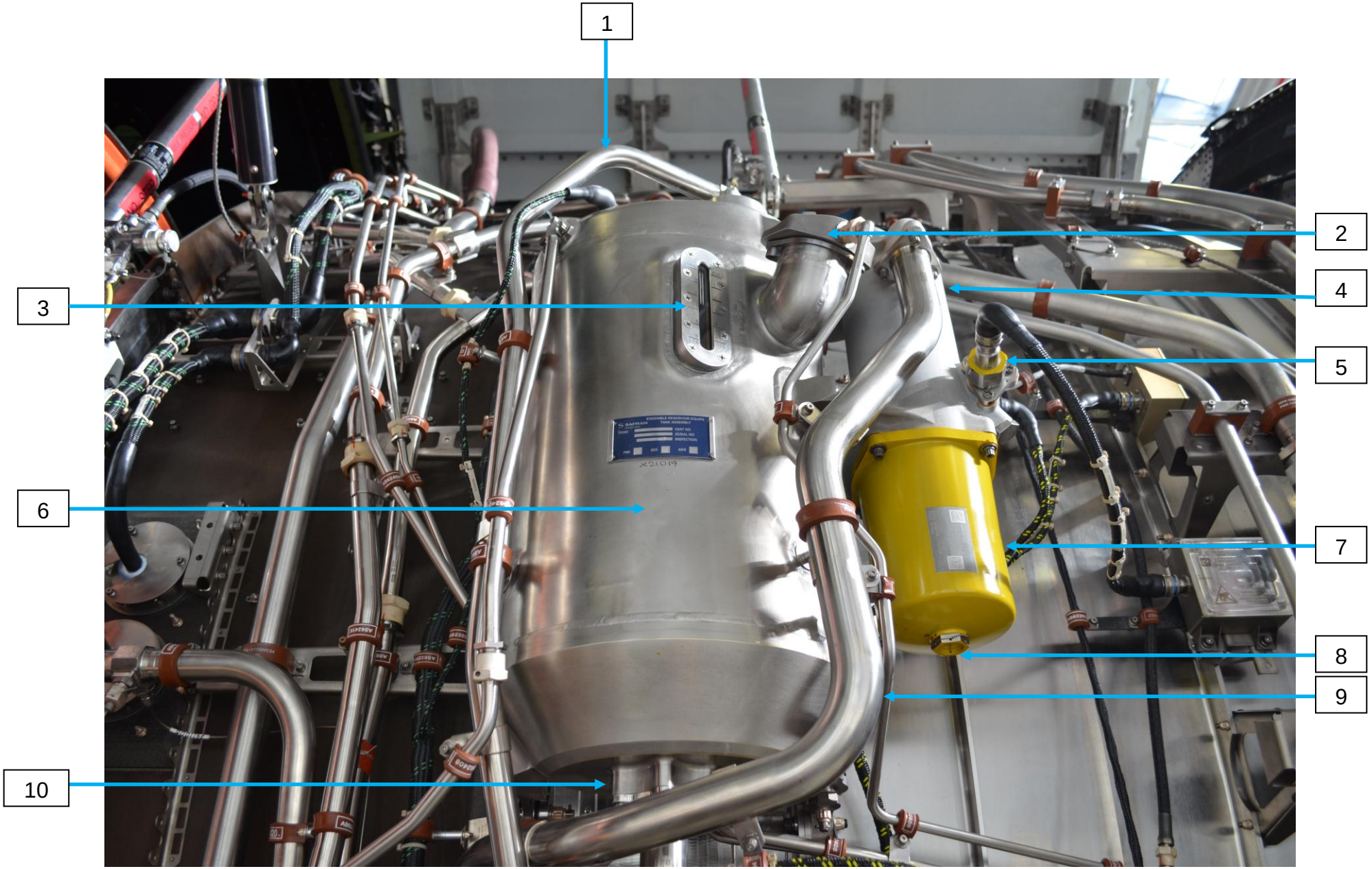

1
2
3
4
NO STEP

24. Oil Tank

Area, Visual Inspection:

- Check oil filler cap and O-ring for security and damage.
- Check oil tank for security and damage.
- Check area for fuel/oil leaks.
- Check security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.
- Check harnesses for chafing, cuts, abrasion and security of connectors.

Item	Description
1	Oil Vent Tube
2	Oil Filler Cap and Scupper Assembly
3	Oil Level Sight Glass
4	Oil Debris Monitoring System (ODMS)
5	Oil Debris Sensor (ODS)
6	Oil Tank
7	Scavenge Filter Assembly
8	Oil Drain Plug
9	Oil Return Tube
10	Oil Supply Tube

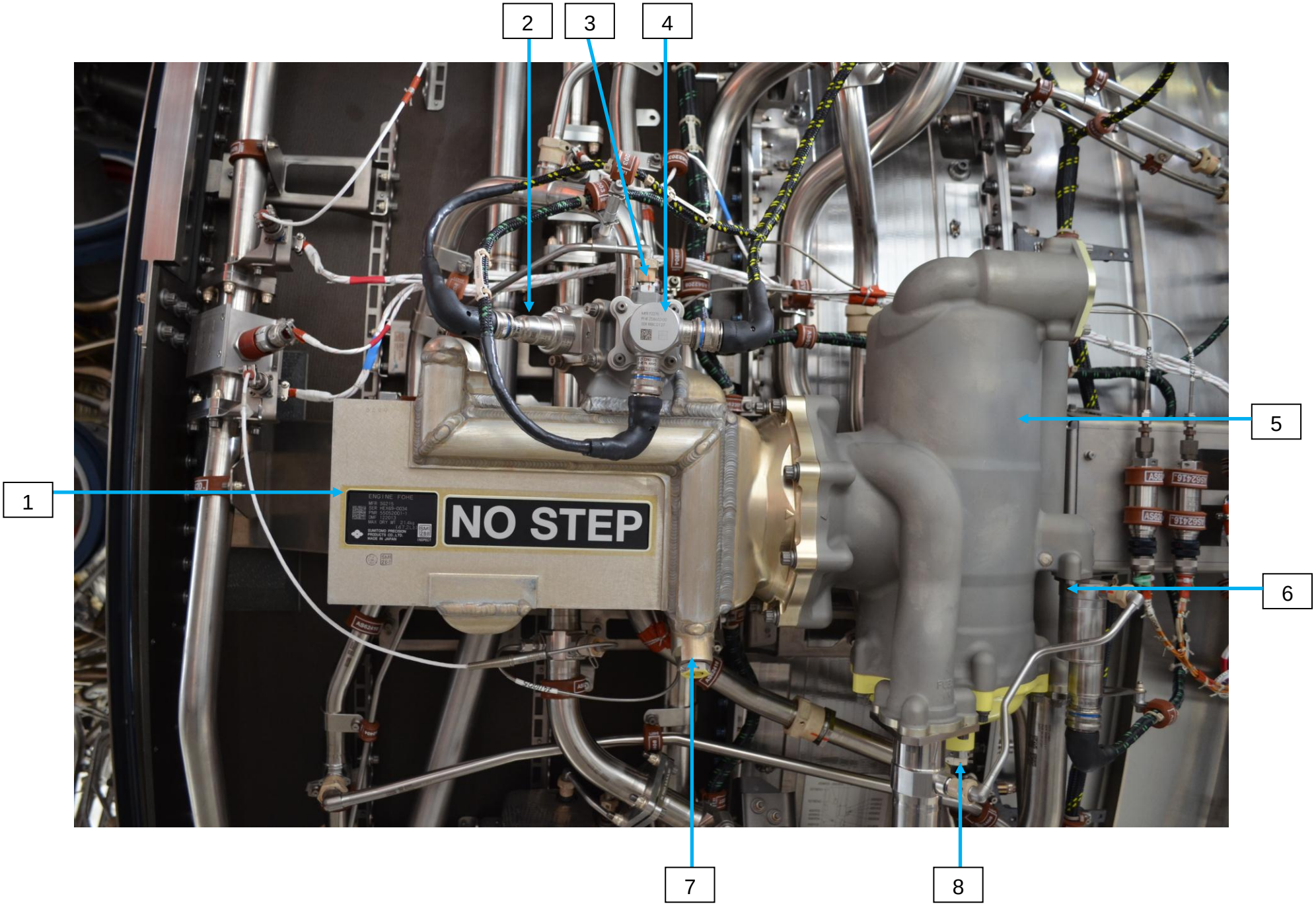

1
2
3
4
5
6
7
8
9
10

25. Fuel/Oil Heat Exchanger (FOHE)

Area, Visual Inspection:

- Check the security of pressure switches/transducers.
- Check the security of the FOHE mountings.
- Check the area for fuel/oil leaks.
- Check the security of all pipe connections.
- Checks pipes and harness clamps for chafing and general condition.
- Check harnesses for chafing, cuts, abrasion and security of connectors.

Item	Description
1	Fuel Oil Heat Exchanger (FOHE)
2	Low Oil Pressure Switch
3	Anti-syphon Tube
4	Oil Pressure Transducer
5	LP Fuel Filter
6	LP Fuel Filter Differential Pressure Transducer
7	Oil Drain Plug
8	Fuel Drain Plug

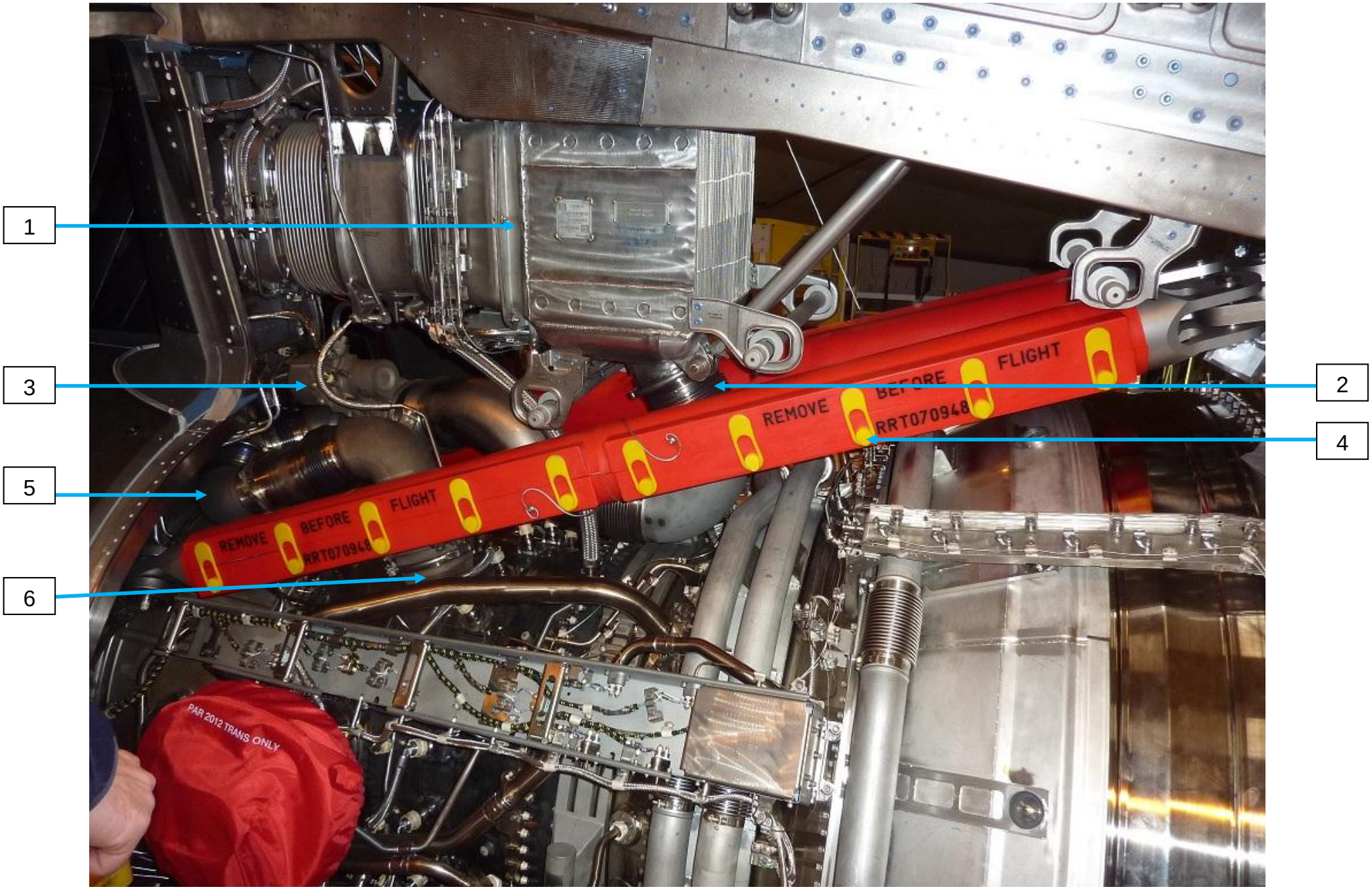

2
3
4
5
1
NO STEP
6
7
8

26. Engine Bleed Air System (EBAS)

Area, Visual Inspection:

- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check area for fuel/oil leaks.
- Check security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.

Item	Description
1	Pre-cooler
2	Aircraft Interface
3	Manifold Pressure Valve (MPV)
4	Thrust Struts
5	Intermediate Pressure Check Valve
6	High Pressure Valve (HPV)

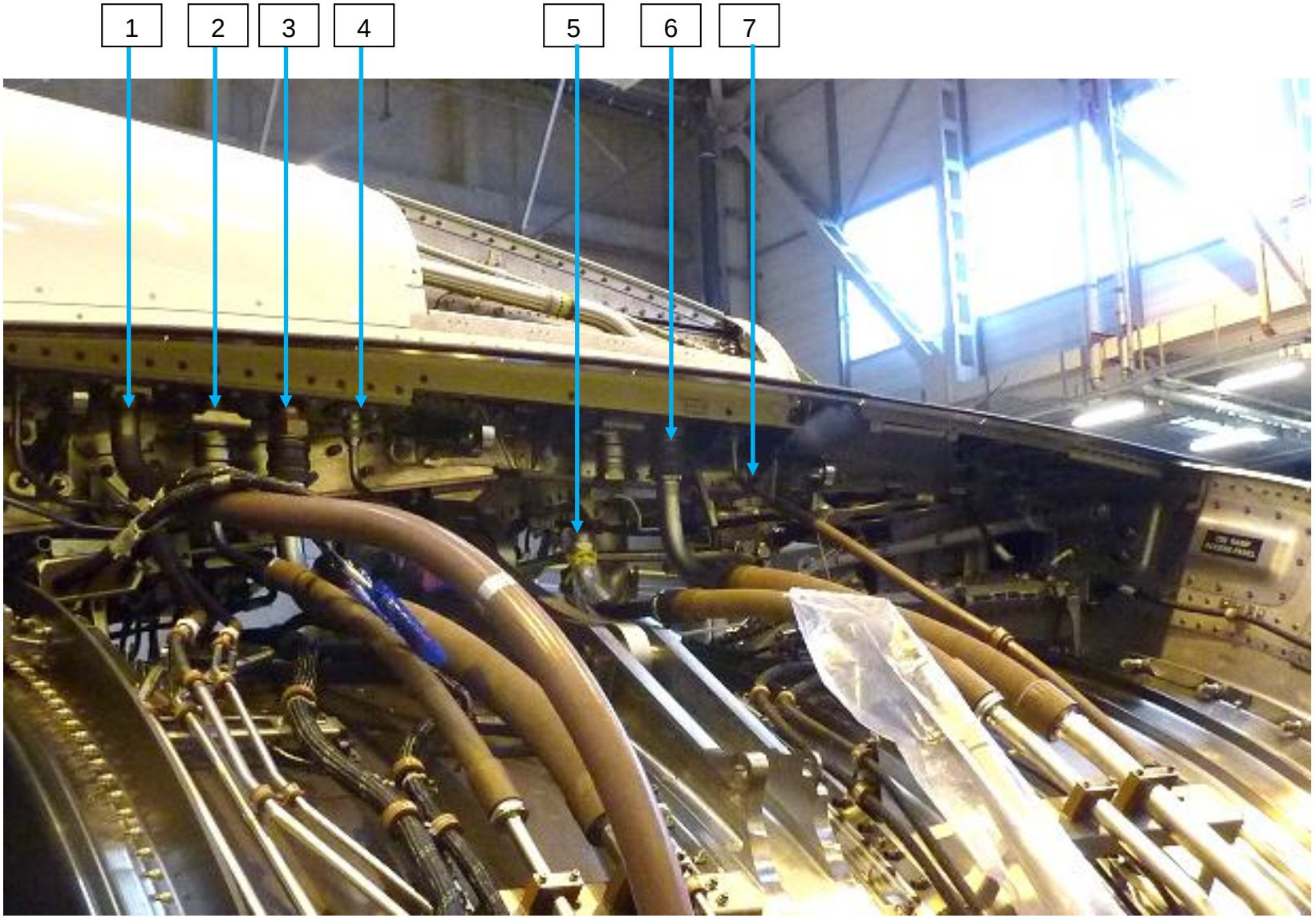

1
2
3
4
5
6
REMOVE
BEFORE
FLIGHT
RRT070948
PAR 2012 TRANS ONLY

27. Pylon Disconnect Right Side

Area, Visual Inspection:

- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check area for fuel/oil leaks.
- Check security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.

Item	Description
1	Fuel Tube from Aircraft Tanks
2	Hydraulic Pressure Tube Yellow System
3	Hydraulic Suction Tube Yellow System
4	Hydraulic Drain Tube Yellow System
5	Hydraulic Pressure Tube Green System
6	Hydraulic Suction Tube Green System
7	Hydraulic Drain Tube Green System

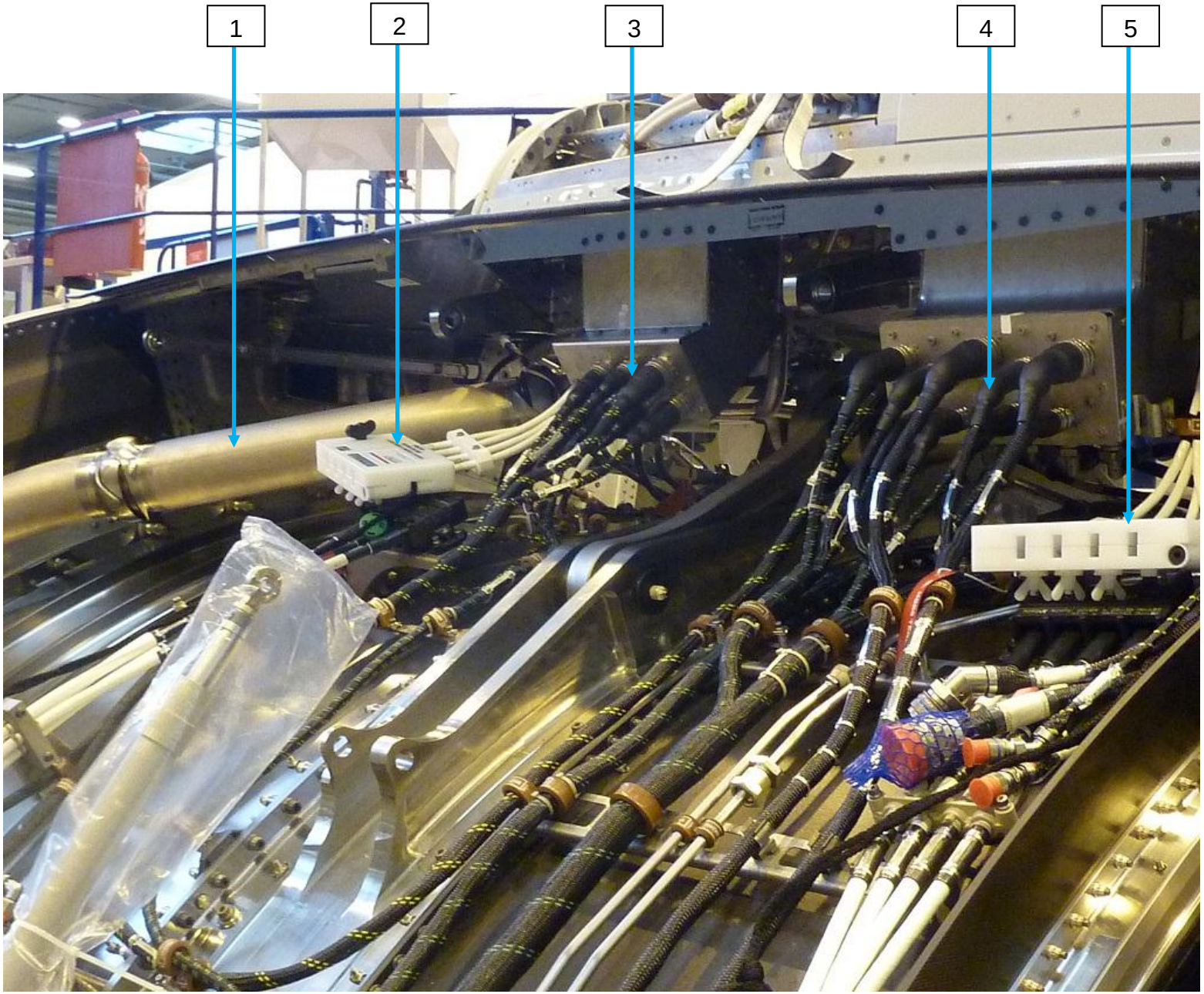

1
2
3
4
5
6
7

28. Pylon Disconnect Left Side

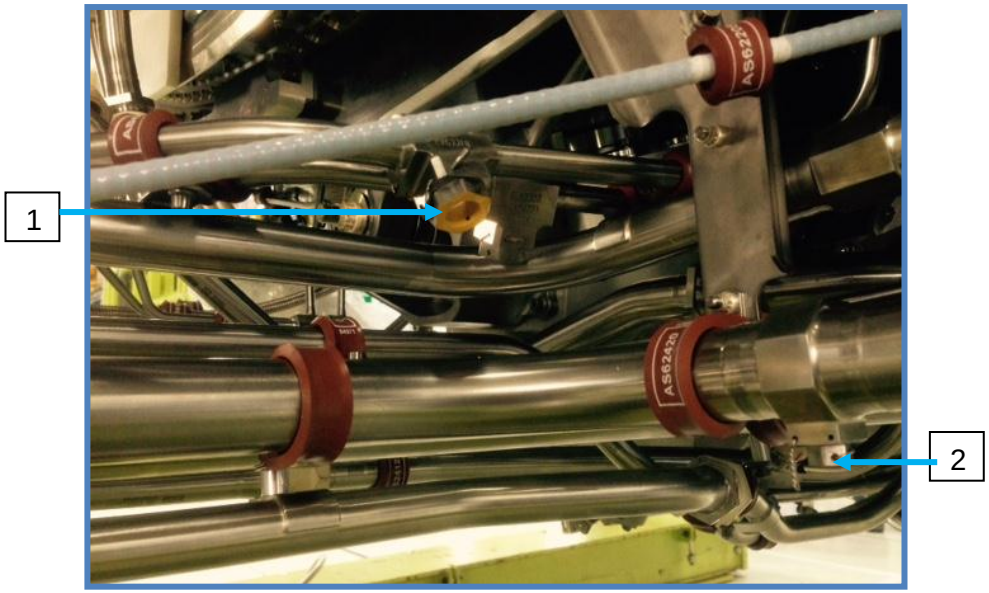
Area, Visual Inspection:

- Check harnesses for chafing, cuts, abrasion and security of connectors.
- Check area for fuel/oil leaks.
- Check security of all pipe connections.
- Check pipes and harness clamps for chafing and general condition.

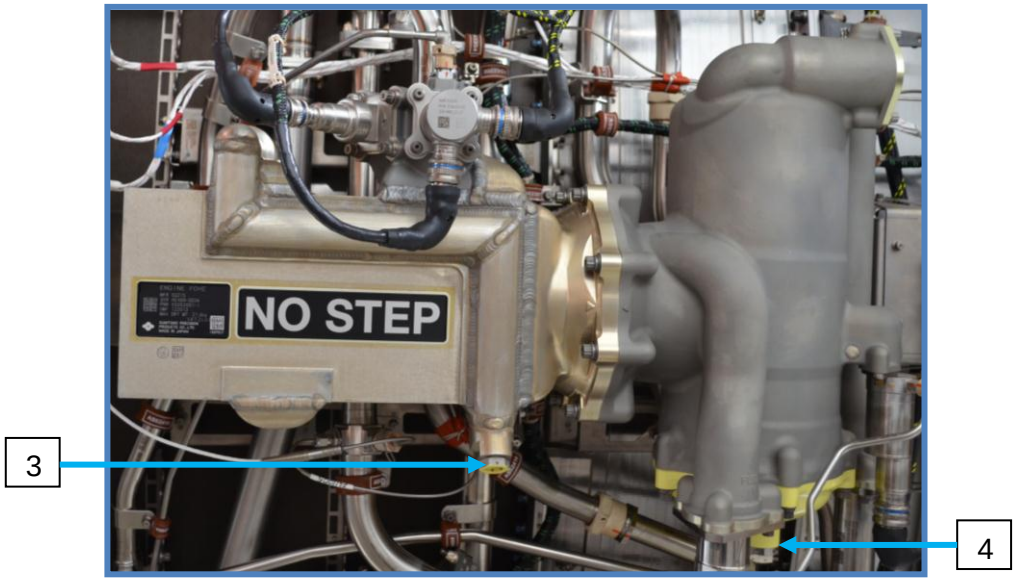
Item	Description
1	Upper starter duct
2	VFG (Front) Power Lead
3	EEC pylon disconnect
4	EEC pylon disconnect
5	VFG (Rear) Power Lead

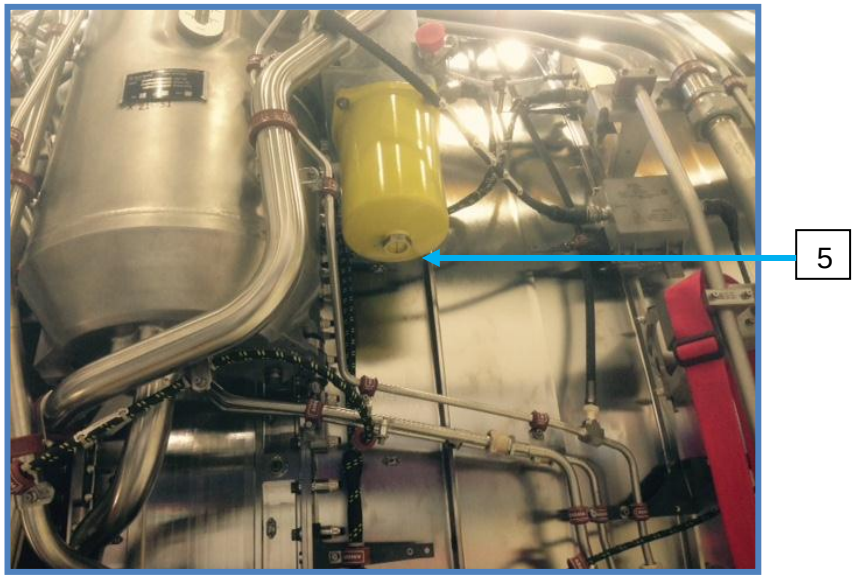

1
2
3
4
5

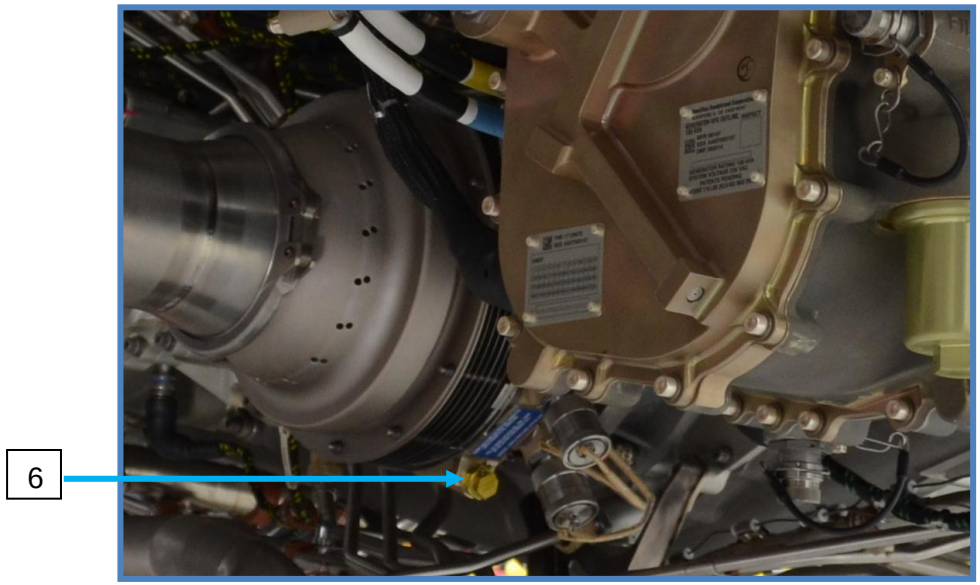
29. Drain Ports



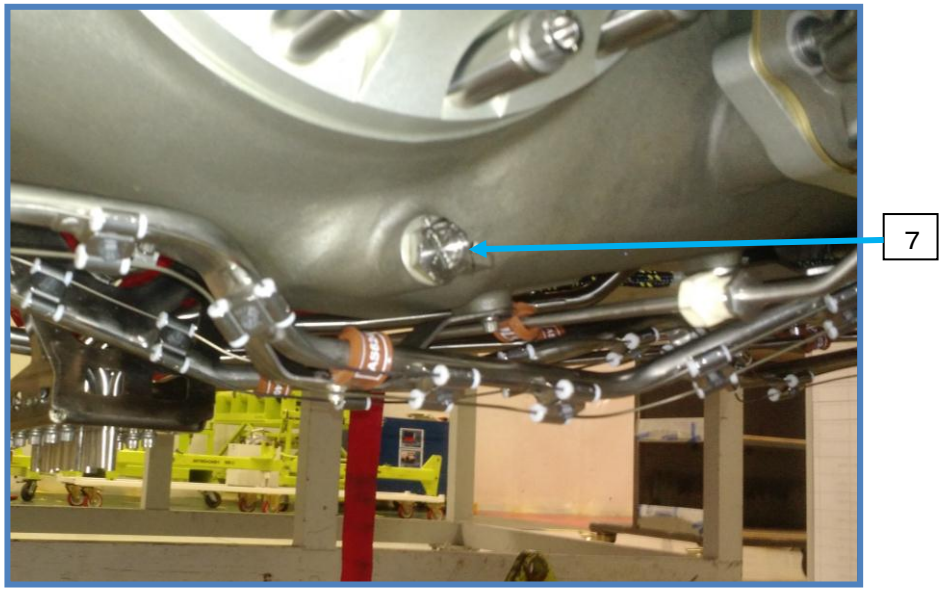
Item	Description
1	VSV Actuator fuel drain port (x2)
2	HP fuel drain port
3	FOHE oil drain port
4	FOHE fuel drain port
5	Scavenge filter oil drain port

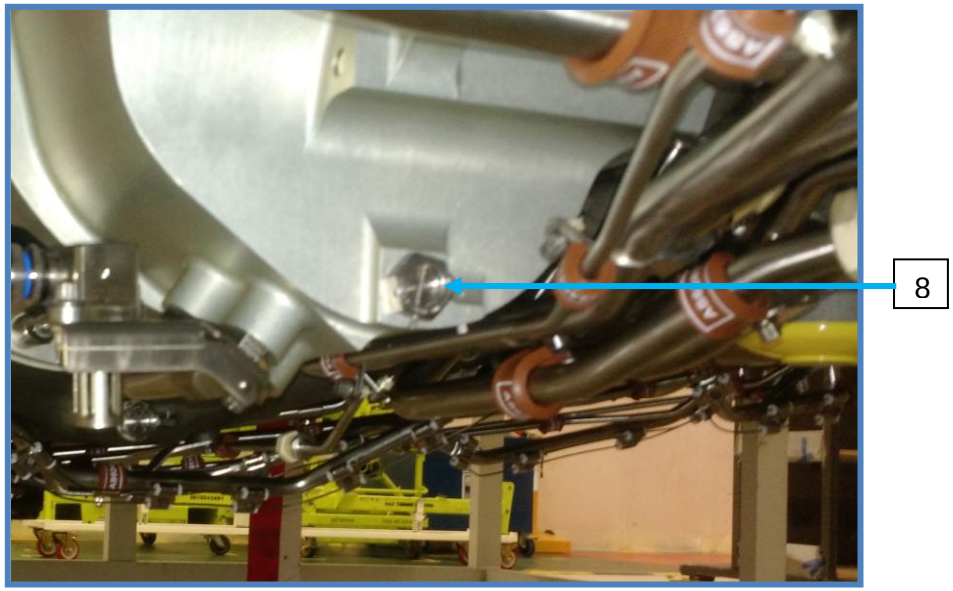


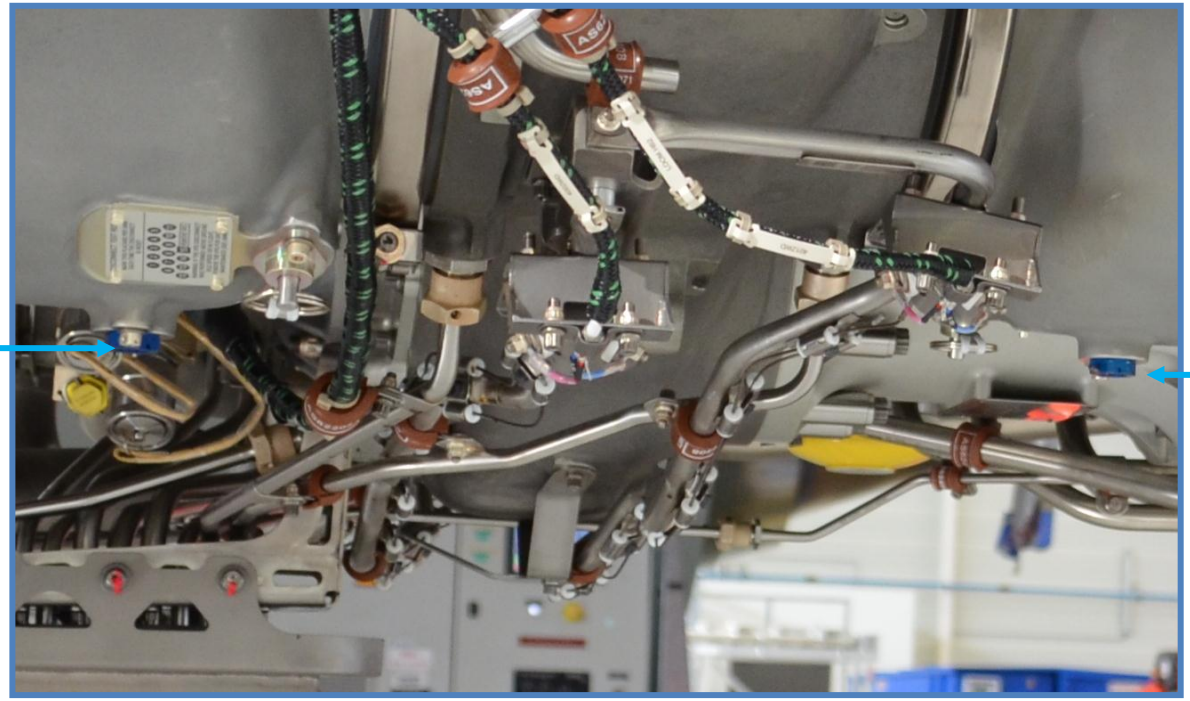




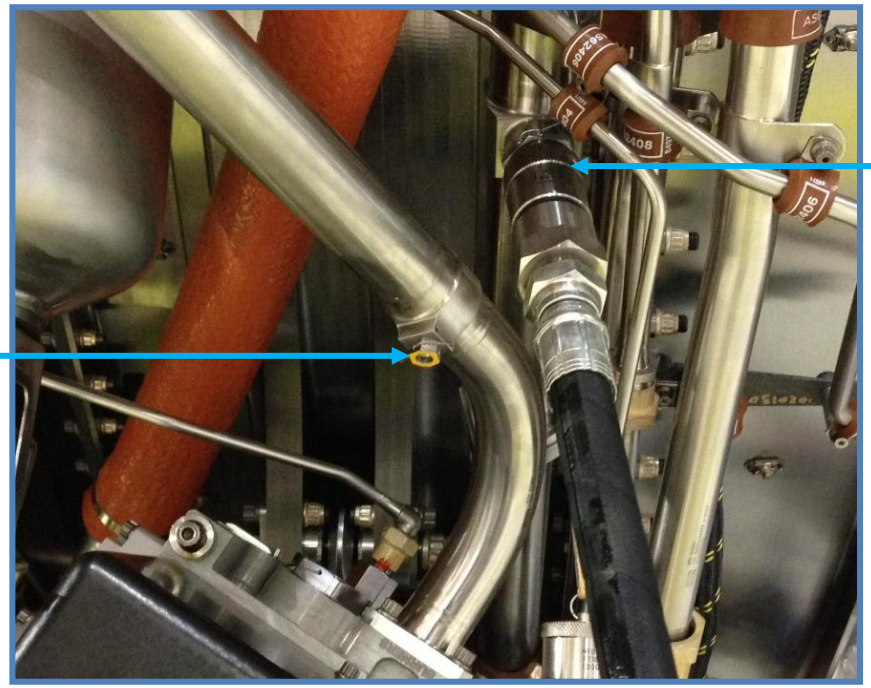
Item	Description
6	Air Turbine Starter (ATS) drain port and Magnetic Chip Detector (MCD)
7	External Gearbox front drain port
8	External Gearbox rear drain port

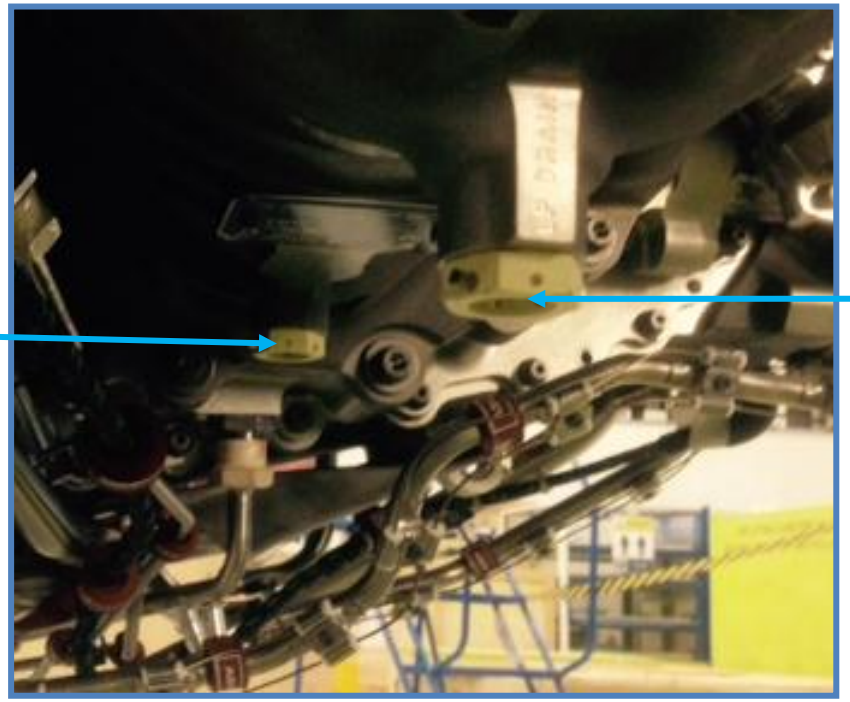






Item	Description
9	Front VFG drain port
10	Rear VFG drain port
11	Oil Tank drain port
12	HMU Fuel drain port
13	LP Fuel pump drain port
14	HP Fuel pump drain port





Notes:

Notes:

Notes:

Rolls-Royce®

Note: The images used in this document are for reference use only and may differ from current standards and components being inspected.

This document **does not** amend, replace or supersede any information contained in the Aircraft Maintenance Manual. All maintenance **must** be carried out in accordance with the relevant Aircraft Maintenance Publications.

Rolls-Royce plc

PO Box 31,

Derby DE24 8BJ

www.rolls-royce.com