HELICOPTER ENGINES

TURBOSHAFT

ARRIEL 2 C2

MAINTENANCE MANUAL

TROUBLE SHOOTING

No. X 292 N6 450 2 -

Original issue: Dec. 10/2001 Update No. 50: Dec. 30/2023



LETTER

This covering letter is not part of the MAINTENANCE MANUAL.

Do not keep it on the MAINTENANCE MANUAL.

Bordes, Dec. 30/2023

Dear Sir / Madam,

The ARRIEL 2 C2 MAINTENANCE MANUAL No. X 292 N6 450 2 has been subject to normal update No. 50 on Dec. 30/2023.

A description of the update (description, pages to be removed or inserted) is provided below.

We remain at your disposal for any further information you may require. Very truly yours

Technical Publications

Task Number	Description	Pages to be removed	Pages to be inserted
Title Page	Integration	ALL	1
LAP - 71	Integration	ALL	1 to 6
71-00-06-814-801-B01	Integration	ALL	101 to 104

CHAPTER 71 - LIST OF EFFECTIVE PAGES

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71		LIST OF EFFECTIVE PAGES	* 1 - 6	Dec. 30/2023
71		TABLE OF CONTENTS	1 - 6	June 15/2023
71-00-06	INT-802-A01	TROUBLESHOOTING - INTRODUCTION	1 - 24	Dec. 30/2021
71-00-06	RPU-801-A01	FAILURES FOUND DURING OPERATION - LIST OF FAILURES OBSERVED DURING ENGINE OPERATION	101 - 104	Dec. 30/2021
71-00-06	RPM-802-A01	LIST OF FAILURES FOUND DURING MAINTENANCE - LIST OF FAILURES OBSERVED DURING MAINTENANCE	101 - 102	June 15/2023
71-00-06	RPA-803-A01	FAILURES CODES - LIST OF FAILURE CODES	101 - 102	June 15/2019
71-00-06	811-801-A01	FUEL FILT ON - PRE-BLOCKAGE SIGNAL OF THE FUEL FILTERING ELEMENT - TROUBLESHOOTING	101 - 102	May 30/2010
71-00-06	811-802-A01	FUEL P OFF - NO LOW FUEL PRESSURE SIGNAL - TROUBLESHOOTING	101 - 104	May 30/2010
71-00-06	811-803-A01	ENG P OFF - NO LOW OIL PRESSURE SIGNAL - TROUBLESHOOTING	101 - 104	May 30/2010
71-00-06	811-804-A01	RED GOV OR AMBER GOV OR FLASHING GOV ON - LIGHTING OF GOV WARNING LIGHT - TROUBLESHOOTING	101 - 102	May 30/2010
71-00-06	811-806-A01	NO ILLUMINATION OF FADEC AND GOV LIGHTS DURING EECU SELF TEST - TROUBLESHOOTING	101 - 104	Dec. 30/2021
71-00-06	811-808-A01	FADEC FAIL AT POWER UP - TROUBLESHOOTING	101 - 104	Dec. 30/2021
71-00-06	812-802-A01	FUEL P ON - NO EXTINGUISHING OF THE LOW FUEL PRESSURE SIGNAL - TROUBLESHOOTING	101 - 104	May 30/2010
71-00-06	812-804-A01	ENGINE PARAMETER OUT OF LIMIT - T4.5 LIMITATIONS EXCEEDED - TROUBLESHOOTING	101 - 106	Nov. 30/2017
71-00-06	812-805-A01	ABORTED START - GAS GENERATOR NOT DRIVEN - TROUBLESHOOTING	101 - 108	June 15/2020
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71-00-06	812-807-A01	ABORTED START - NO IGNITION - TROUBLESHOOTING	101 - 112	Dec. 30/2021
71-00-06	812-808-A01	ABORTED START - SLOW START OR STAGNATION - TROUBLESHOOTING	101 - 108	Dec. 30/2020
71-00-06	812-810-A01	ABORTED START - FLAME OUT - TROUBLESHOOTING	101 - 104	June 15/2020
71-00-06	812-811-A01	ABORTED START - FIRST START ABORTED - TROUBLESHOOTING	101 - 104	June 15/2021
71-00-06	812-812-A01	ABORTED START - FLAMES AT THE EXHAUST PIPE - TROUBLESHOOTING	101 - 104	Dec. 30/2020
71-00-06	812-813-A01	NO OIL PRESSURE RISE AT STARTING - TROUBLESHOOTING	101 - 104	June 15/2020
71-00-06	812-816-A01	HELICOPTER ROTOR MOVEMENT THAT OCCURS AFTER THE USUAL TIME DURING ENGINE START - TROUBLESHOOTING	101 - 104	Dec. 30/2019
71-00-06	813-801-A01	SURGE - TROUBLESHOOTING	101 - 106	June 15/2021
71-00-06	814-801-B01	ENG CHIP ON - INDICATOR LIGHT OF THE ELECTRICAL MAGNETIC PLUG ON - TROUBLESHOOTING	* 101 - 104	Dec. 30/2023
71-00-06	814-802-A01	FUEL FILT ON - PRE-BLOCKAGE SIGNAL OF THE FUEL FILTERING ELEMENT - TROUBLESHOOTING	101 - 104	June 15/2023
71-00-06	814-803-A01	FUEL P ON - LOW FUEL PRESSURE SIGNAL - TROUBLESHOOTING	101 - 104	May 30/2010
71-00-06	814-805-A01	ENGINE PARAMETER OUT OF LIMIT - TORQUE LIMITATIONS EXCEEDED - TROUBLESHOOTING	101 - 102	Dec. 30/2020
71-00-06	814-805-C01	ENGINE PARAMETER OUT OF LIMIT - TORQUE LIMITATIONS EXCEEDED - TROUBLESHOOTING	101 - 102	Dec. 30/2020
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71-00-06	814-809-A01	ENG P ON - LOW OIL PRESSURE SIGNAL - TROUBLESHOOTING	101 - 104	May 30/2010
71-00-06	814-810-A01	ENGINE PARAMETER OUT OF LIMIT - OIL OVERTEMPERATURE - TROUBLESHOOTING	101 - 104	July 30/2012
71-00-06	814-812-A01	PARAMETER INSTABILITY - TORQUE - TROUBLESHOOTING	101 - 102	Nov. 30/2015
71-00-06	815-801-A01	UNUSUAL NOISES DURING RUNDOWN PHASE - TROUBLESHOOTING	101 - 108	Dec. 30/2022
71-00-06	815-802-A01	RUNDOWN TIME OUT OF LIMIT - TROUBLESHOOTING	101 - 112	Dec. 30/2022
71-00-06	815-804-A01	FUEL P OFF - NO LOW FUEL PRESSURE SIGNAL - TROUBLESHOOTING	101 - 102	May 30/2010
71-00-06	815-805-A01	ENG P OFF - NO LOW OIL PRESSURE SIGNAL - TROUBLESHOOTING	101 - 102	May 30/2010
71-00-06	815-806-A01	POWER TURBINE BLOCKED - TROUBLESHOOTING	101 - 102	Dec. 30/2019
71-00-06	816-801-A01	SMOKE FROM EXHAUST PIPE - TROUBLESHOOTING	101 - 106	Dec. 30/2021
71-00-06	816-803-A01	PARTICLES IN THE OIL FILTERING ELEMENT - TROUBLESHOOTING	101 - 102	May 30/2011
71-00-06	816-804-B01	LEAK AT THE AIRCRAFT DRAIN CLUSTER - TROUBLESHOOTING	101 - 104	June 15/2019
71-00-06	816-805-A01	ABNORMAL FUEL LEAKAGE AT THE TANK RETURN FUEL TUBE - TROUBLESHOOTING	101 - 102	Dec. 30/2018
71-00-06	816-806-A01	FUEL FILTER CLOGGING INDICATOR POPPED OUT - TROUBLESHOOTING	101 - 104	June 15/2023
71-00-06	816-807-A01	FUEL DILUTION RATE IN OIL NOT COMPLIANT - TROUBLESHOOTING	101 - 102	Dec. 30/2021
71-00-06	816-808-A01	INCORRECT OPERATION OF ONE OF THE IGNITION DEVICE LINES - TROUBLESHOOTING	101 - 102	Nov. 30/2009

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71-00-06	816-814-A01	OIL LEAKAGE BETWEEN M03 AND M04 - TROUBLESHOOTING	101 - 104	June 15/2021
71-00-06	816-819-A01	ENGINE POWER CHECK - INCORRECT MARGIN - TROUBLESHOOTING	101 - 128	June 15/2022
71-00-06	816-819-C01	ENGINE POWER CHECK - INCORRECT MARGIN - TROUBLESHOOTING	101 - 128	June 15/2022
71-00-06	816-821-A01	FUEL ODOR IN THE CABIN - TROUBLESHOOTING	101 - 102	Dec. 30/2021
71-00-06	816-825-A01	OIL LEAK AT BLEED VALVE OR AIR INTAKE - TROUBLESHOOTING	101 - 102	June 15/2023
71-00-06	816-827-A01	OIL LEAKAGE OF THE POWER DRIVE OF THE STARTER - TROUBLESHOOTING	101 - 102	June 15/2021
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71-00-06	817-801-A01	WATCHDOG TRIP - TROUBLESHOOTING	101 - 104	Dec. 30/2021
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71-00-06	817-804-A01	N2 TRIM FAILURE, CHANNEL B - TROUBLESHOOTING	101 - 102	May 30/2010
71-00-06	817-805-A01	TRAINING SELECTOR FAILURE - TROUBLESHOOTING	101 - 104	Dec. 30/2021
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71-00-06	817-920-A01	N1 FAILURE ON THE ALTERNATOR ELECTRICAL CONNECTOR (A ALTERNATOR ON THE HARNESS AND B ALTERNATOR ON THE HARNESS) - TROUBLESHOOTING	101 - 104	Dec. 30/2021
71-00-06	817-928-A01	HELICOPTER P0 FAILURE - TROUBLESHOOTING	101 - 102	Dec. 30/2019
71-00-06	817-929-A01	NO HELICOPTER ARINC MESSAGE - TROUBLESHOOTING	101 - 104	Dec. 30/2021
71-00-06	817-931-A01	ALTERNATOR FAILURE CHANNEL A AND CHANNEL B - TROUBLESHOOTING	101 - 104	Dec. 30/2021
71-00-06	817-932-A01	ALTERNATOR FAILURE A - TROUBLESHOOTING	101 - 104	Dec. 30/2021
71-00-06	817-933-A01	ALTERNATOR FAILURE B - TROUBLESHOOTING	101 - 104	Dec. 30/2021
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71-00-06	817-939-A01	28V FAILURE B - TROUBLESHOOTING	101 - 104	Dec. 30/2021
71-00-06	817-948-A01	P0 INCONSISTENCY - TROUBLESHOOTING	101 - 102	Dec. 30/2021
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 TOT (T4) CONFORMATION FAIL - TROUBLESHOOTING 	71-00-06	817-844-A01	
 TORQUE CONFORMATION FAIL - TROUBLESHOOTING 	71-00-06	817-847-A01	
 EECU INTERNAL FAILURE - TROUBLESHOOTING 	71-00-06	817-861-A01	
 P3 DRIFT - TROUBLESHOOTING 	71-00-06	817-864-A01	
 P0 EECU - TROUBLESHOOTING 	71-00-06	817-869-A01	
 FUEL VALVE RESOLVER FAILURE - TROUBLESHOOTING 	71-00-06	817-878-A01	
 STEPPER MOTOR FAILURE A - TROUBLESHOOTING 	71-00-06	817-880-A01	
 STEPPER MOTOR FAILURE B - TROUBLESHOOTING 	71-00-06	817-881-A01	
 STEPPER MOTOR FAILURE - TROUBLESHOOTING 	71-00-06	817-882-A01	
 BLEED VALVE POSITION INCONSISTENCY OR BLEED VALVE ANOMALY OBSERVED - TROUBLESHOOTING 	71-00-06	817-884-A01	
 HELICOPTER T4.5 FAILURE - TROUBLESHOOTING 	71-00-06	817-889-A01	
 CROSS TALK ARINC - TROUBLESHOOTING 	71-00-06	817-890-A01	
 DECU CONFIGURATION/AIRCRAFT CONFIGURATION INCONSISTENCY - TROUBLESHOOTING 	71-00-06	817-906-A01	

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<u>Title</u>	Chapter Section Subject	<u>Task</u>	Effectivity
 N2 FAILURE (B ON THE HARNESS) - TROUBLESHOOTING 	71-00-06	817-907-A01	
 INTERCHANNEL RECEPTION FAILURE - TROUBLESHOOTING 	71-00-06	817-910-A01	
 N2 FAILURE (C ON THE HARNESS) - TROUBLESHOOTING 	71-00-06	817-913-A01	
 N1 FAILURE (A ALTERNATOR ON THE HARNESS) - TROUBLESHOOTING 	71-00-06	817-918-A01	
 N1 FAILURE (B ALTERNATOR ON THE HARNESS) - TROUBLESHOOTING 	71-00-06	817-919-A01	
 N1 FAILURE ON THE ALTERNATOR ELECTRICAL CONNECTOR (A ALTERNATOR ON THE HARNESS AND B ALTERNATOR ON THE HARNESS) - TROUBLESHOOTING 	71-00-06	817-920-A01	
 HELICOPTER P0 FAILURE - TROUBLESHOOTING 	71-00-06	817-928-A01	
 NO HELICOPTER ARINC MESSAGE - TROUBLESHOOTING 	71-00-06	817-929-A01	
 ALTERNATOR FAILURE CHANNEL A AND CHANNEL B - TROUBLESHOOTING 	71-00-06	817-931-A01	
 ALTERNATOR FAILURE A - TROUBLESHOOTING 	71-00-06	817-932-A01	
 ALTERNATOR FAILURE B - TROUBLESHOOTING 	71-00-06	817-933-A01	
 28V FAILURE A - TROUBLESHOOTING 	71-00-06	817-938-A01	
 28V FAILURE B - TROUBLESHOOTING 	71-00-06	817-939-A01	
 P0 INCONSISTENCY - TROUBLESHOOTING 	71-00-06	817-948-A01	
 STOP ELECTRO-VALVE FAILURE - TROUBLESHOOTING 	71-00-06	817-949-A01	
 OVERSPEED PROTECTION FAILURE - TROUBLESHOOTING 	71-00-06	817-955-A01	
 REAL TIME SOFTWARE FAILURE - TROUBLESHOOTING 	71-00-06	817-959-A01	
 HMU OUT OF NEUTRAL POSITION - TROUBLESHOOTING 	71-00-06	817-966-A01	

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TROUBLESHOOTING - INTRODUCTION

1. GENERAL

This document contains some data extracted from the ARRIEL Maintenance Manual, chapter 71-00-06 - Trouble shooting.

It is devoted to the engine maintenance personnel for finding possible failures.

For Legibility purpose, this manual is divided up into 6 sections:

- Section 1: List of effective pages, contents
- Section 2: introduction, this section gives the manual Lay-out and the general
- Section 3: list of failures observed during use
- Section 4: List of failures observed during maintenance
- Section 5: List of VEMD failure messages
- Section 6: maintenance tasks from the above lists.

These non exhaustive Lists and trouble shootings are drawn up and completed as experience is gained on the engine.

2. INTRODUCTION

A. Description

Refer to Figure 001

There are two main indicating devices in the cockpit: the CPDS (Central Panel Display System) and the warning panel.

The CPDS includes the VEMD (Vehicle and Engine Multifunction Display) and CAD (Caution and Advisories Display).

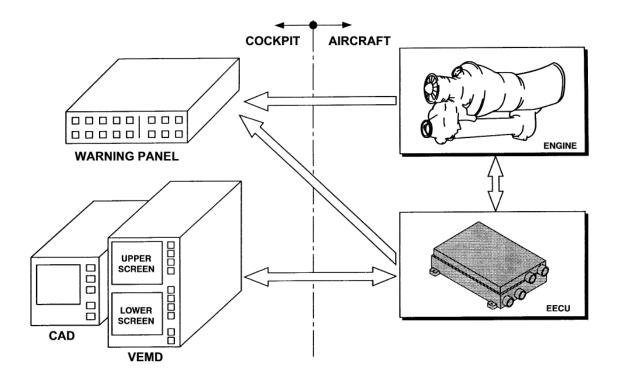
The VEMD displays all the necessary vehicle and engine parameters. It can also display maintenance information when the aircraft is on the ground. It has an upper and lower screen for selecting the various functions.

The CAD records and displays the cautions and advisories to the pilot relating to the main systems of the engine and the aircraft. It is used as the VEMD back-up when failures occur on screens or modules. It has a screen with pushbuttons enabling selection of the different functions.

The Central Warning Panel has a set of warning lights to alert the pilot in case of operation anomaly.

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Engine indication in the cockpit - Description

Figure 001

B. CPDS

The CPDS has 3 operating modes:

- The operational mode ("FLIGHT" mode)
- The maintenance mode ("MAINT" mode)
- The configuration mode ("CONFIG" mode).
- (1) Operational mode ("FLIGHT" mode)

This mode has several screen pages:

- The initial configuration that the pilot can use in flight to check the aircraft performance (FLI/ELEC/VEH on the VEMD and CAU/FUEL on the CAD).
- The pages accessible on the VEMD lower screen pressing the "SCROLL" key (EPC, PERFO and SYSTEM STATUS).
- The automatic reconfiguration at the end of the flight on the VEMD lower screen (FLIGHT REPORT page).
- A page on the CAD when both VEMD screens are not available (CAU/DELTA N1 page).

In these pages, the displays are as follows:

- (a) Initial configuration Refer to Figure 002
 - 1 Upper screen (FLI page):

High information zone for each engine:

- Bleed valve flag
- P2 (sand filter)
- Engine normal limitations: MPC (PMC) MTOP (PMD)
- OEI indications (LO, HI)
- Training mode indication.

FLI zone, for each engine:

- Numeric torque
- Numeric T4.5
- Numeric N1.

FLI means First Limit Indication, it is a graduated analog indicator.

The indicator needle is positioned as a function of the parameter which is nearest to its limits.

The parameters used are N1, T4.5 and Torque.

When the needle reaches the MTOP (PMD) indication, one of the paramaters has reached its take-off limit. There is a numeric indication of each parameter for each engine and on both sides of the FLI indicator.

When a parameter approaches its limits, a yellow line flashes under the numerical display; when it reaches the limit, the line becomes red and an aural alarm sounds.

Low information zone for each engine:

- Start indication
- Display of "FLI DEGR" and "FLI FAIL" messages corresponding to a sensor loss or FLI loss.

Message zone: Display of some messages devoted to the crew members (one message at a time on one line).

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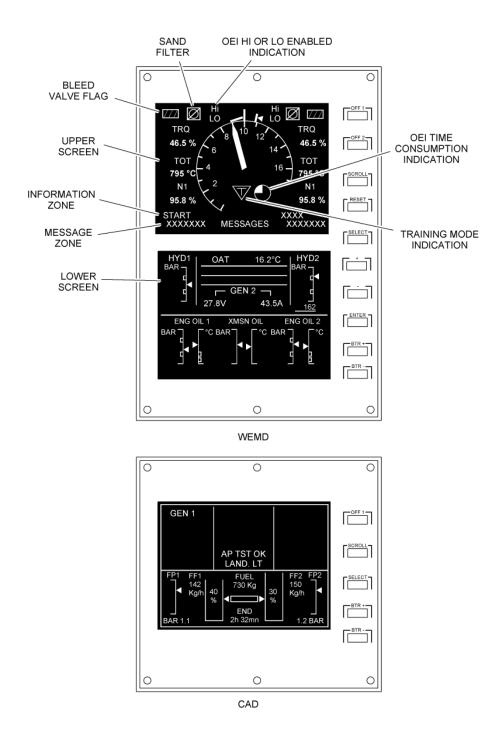
NOTE: Safran Helicopter Engines uses the terminology defined in the

ARP 755a document, such as T4.5 and P3, nevertheless ECF uses

TOT and P2 for this same value.

NOTE: FLI (First Limit Indication) can be replaced in french with IPL

(Indicateur de Première Limite).



Operational mode - Operation
Figure 002

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2 Lower screen (ELEC/VEH page):

- Numeric OAT
- Numeric main bus voltage
- Numeric starter current
- Numeric MGB oil temperature and bargraph animation
- pMGB oil pressure and bargraph animation
- VNE (Never exceeded Speed)
- Sling load.

For each engine:

- Numeric engine oil temperature and bargraph animation
- Numeric engine oil pressure and bargraph animation
- Numeric hydraulic pressure and bargraph animation.
- 3 CAD screen (CAU/FUEL page):
 - Remaining numeric flight time
 - Numeric fuel quantity and bargraph.

For each engine:

- Cautions and advisories
- Numeric fuel flow
- Numeric engine fuel pressure and bargraph animation.
- (b) Pages accessible on the VEMD bargraph pressing the "SCROLL" key Refer to Figure 003
 - <u>1</u> EPC page (Engine Power Check)

The Engine Power Check is activated automatically when the pilot depresses the "SCROLL" key. The results are displayed on another page and recorded to be accessible in the maintenance mode.

2 PERFO page (Performance)

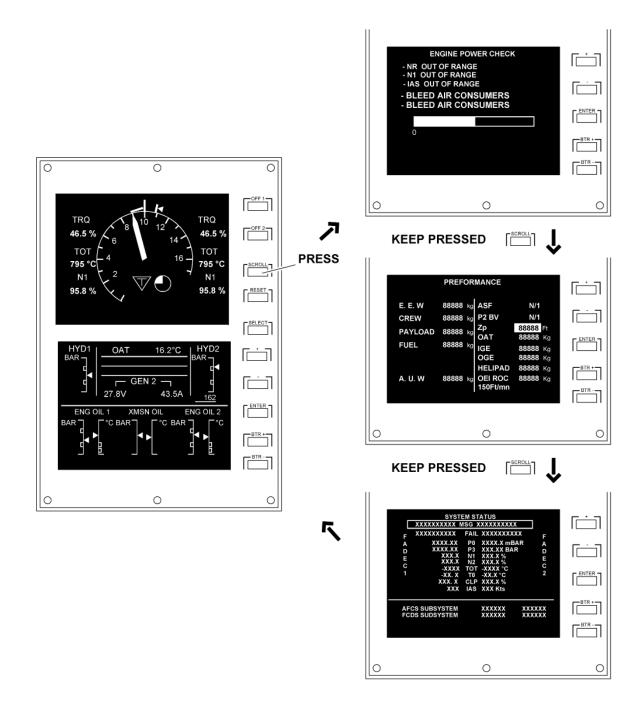
This page shows the performance accessible as a function of the weight breakdown.

3 SYSTEM STATUS page

This is an alphanumeric page which includes the information transmitted by the EECU of each engine:

- A "MESS" line which corresponds to the state word
- A "FAIL" line which corresponds to the failure word
- The numeric values, names and measuring units of 9 parameters.

To select and move from one line to the other, use the "SELECT" key. A white frame surrounds the selected line. "+/-" keys are used to make the different messages of each line scroll.



Operational mode - Operation
Figure 003

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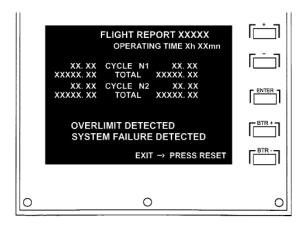
MAINTENANCE MANUAL

- (c) Automatic reconfiguration at the end of the flight on the lower screen of the VEMD Refer to Figure 004
 - 1 FLIGHT REPORT page

The Flight Report is automatically displayed at the end of the flight. It supplies the information below:

- The flight number
- The flight time
- N1 and N2 cycles, those of the flight and all cycles
- Over Limit flag in case of exceedance
- Failure flag (failure) in case of failure.

This page is memorized and is only accessible in the maintenance mode.



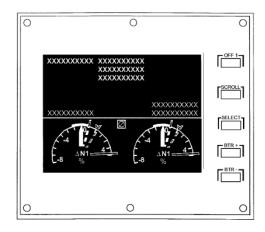
Operational mode - Operation
Figure 004

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- (d) When both VEMD screens are not available Refer to Figure 005
 - CAD screen (CAU/DELTA N1 page)
 - Cautions and advisories.

For each engine: Analog delta N1



Operational mode - Operation
Figure 005

(2) Maintenance mode ("MAINT" mode) Refer to Figure 006

This mode can only be activated when the engine is detected in the "shutdown" state and the VEMD is set to OFF.

To get access to the maintenance pages, depress the "SCROLL" and "RESET" keys simultaneously, keeping them depressed, turn on the VEMD using the OFF 1 and OFF 2 keys.

On the Maintenance Menu page, use the "SELECT" key to select the line and the "ENTER" key to go to the selected line.

In the maintenance mode, the pages below are displayed: Refer to Figure 007

- FLIGHT REPORT,
- FAILURE,
- OVER LIMIT,
- ENGINE POWER CHECK.
- TRANS, DATA,
- FUNCT. TIMES.

FLIGHT REPORT: this page is automatically displayed at the end of the flight on the lower screen and is identical to the operational mode ("FLIGHT" mode).

(a) Flight Report

This page displays the last 16 recorded flights.

(b) Failure

The failures are displayed on four pages:

- Failure Diagnosis
- Subsystem Sélection
- Complet Diagnosis
- Parameters (6 pages).

"+/-" keys are used to select the flights from the Failure Diagnosis page or the failures from the Complete Diagnosis page. The "SELECT" key is used to select the VEMD or CAD sub-system from the Subsystem Selection page. The "ENTER" key is used to move from one page to another.

(c) Over Limit

This page displays the limits exceedance recorded during the last flights.

(d) Engine Power Check

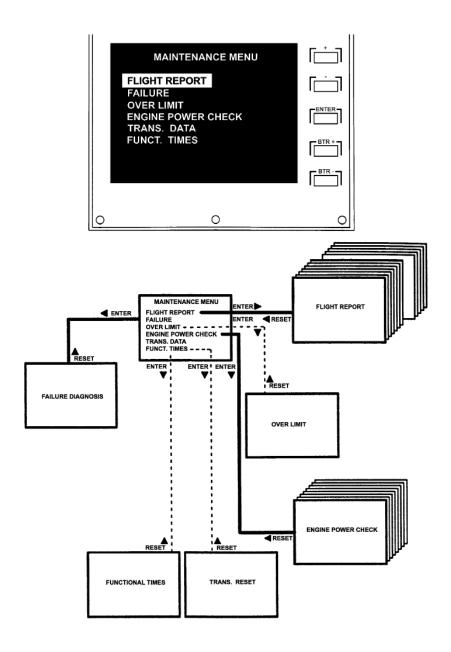
The last 8 results of the Power Check are displayed.

(e) Trans. Data

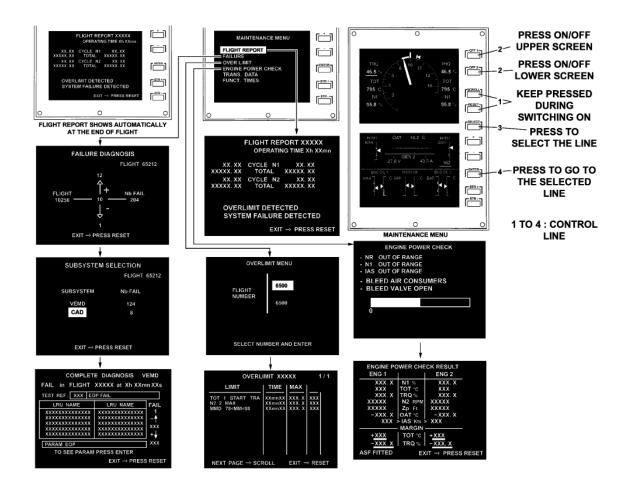
This function is used to transfer the information between both modules of the VEMD.

(f) Func. Times

This page displays the total operating hours of the VEMD and of the engine.



Maintenance mode - Description Figure 006



Maintenance mode - Menus

Figure 007

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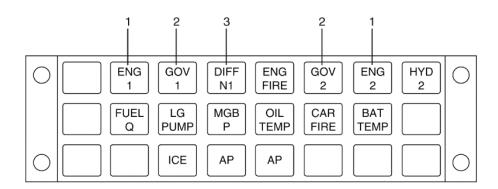
C. Warning light table

Three central warning panel lights indicate an engine operating anomaly. The engine indicating system supplies such information Refer to Figure 008

Indicator light	Designation	Color	Definition	Data from
1	ENG 1 et ENG 2	Red	Min. engine oil pressure	Engine sensor
2	GOV 1 et GOV 2	Red	Major failure or engine power anomaly	EECU
3	Diff. N1	Red	N1 deviation	"Power loss" board

<u>NOTE</u>: The minor failure is indicated by an amber GOV warning light when N1 < 20 %.

The redundancy failure is indicated by the flashing of the amber GOV warning light when N1 < 20 %.



Warning Lights of the Central Warning Panel Figure 008

3. FAILURES OBSERVED DURING USE

The 3rd section of this manual gives the failures observed during use.

These are the failures detected by the flight crew. These failures either correspond to a flight incident without indication to the cockpit (surge for example), or an indication to the CPDS or to the showing an exceedance of the flight parameters (exceedance of N2 limitations for example) or an anomaly indicated by the control systems (lighting up of the magnetic plug warning light for example).

The contents are divided up as follows:

- 1. Operation phase: power up, start, operation, shutdown.
- Identification of the helicopter indication means: CDS, engine indicating instruments (see general).
- 3. Failure designation.
- 4. Task number of the trouble shooting procedure corresponding to the last section of the manual. Example :

A. At power up (a)

INDI	CATION (b)	DESCRIPTION (c)	TASK No.(d)
VEMD	Warning lights		
	Fuel tank	Pre-blockage signal of the fuel filtering element	71-00-06-811-801

4. FAILURES OBSERVED DURING MAINTENANCE

The 4th section of this manual gives the failures observed during maintenance.

The maintenance personnel detects them after periodic inspection or after a test procedure.

The contents includes:

- 1. Failure designation
- 2. Task number of the related trouble shooting procedure in the last section of the manual. Example:

DESIGNATION (a)	TASK No.(b)	
Exhaust fumes	71-00-06-816-801	

5. VEMD FAILURE CODES

The 5th section of this manual gives the VEMD failure messages pertaining to the engine.

The VEMD has a maintenance aid to help with trouble shooting.

The VEMD displays the failures indicated by the EECU.

A. Failures indicated by the EECU: Operational mode, System Status page

Refer to Figure 009

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The failures are displayed in flight when they are detected. During engine shutdown, there is no recording.

The failures detected by the EECU are transmitted to the VEMD which displays them on the System Status page, "FAIL" line. These are simple failure messages.

This display is alphanumeric.

Example of failure word:

- W/DOG.A,
- ALTER.B.

To this indication is linked the lighting up of a GOV warning light which shows the effect of the failure on the EECU operation.

If a failure affects the main control law, the system uses the back-up law.

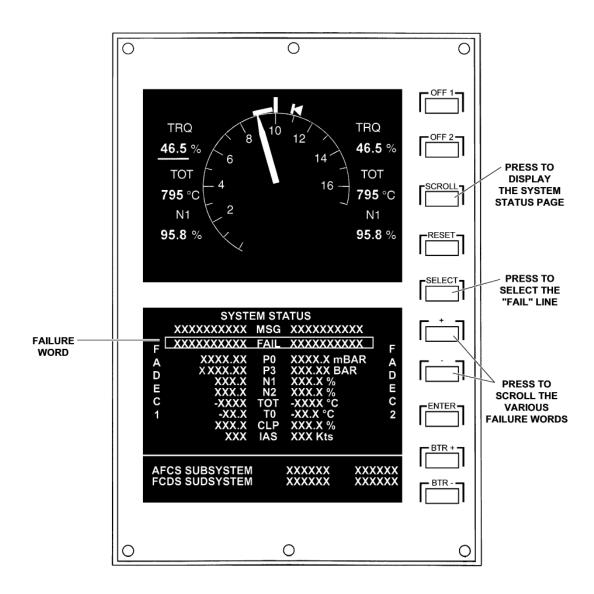
The main functions (N1 and N2 regulation, acceleration and deceleration control) are still ensured.

If a failure affects at the same time the main control law and the back-up law, the system changes the channel automatically.

If one or several failures affect the main regulation law and the back-up law of each channel, the system can no longer regulate and automatically freezes the stepper motor.

For each input signal, the EECU uses the criteria to make a decision on the validity signal.

Troubleshooting - Introduction



Operational mode - In flight
Figure 009

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Three levels are indicated: Refer to Figure 010

- Level 3: Major failure (stepper motor frozen)
- Level 2: Minor failure (the system operation is degraded but the main functions are still ensured)
- Level 1: Minor anomaly (loss of redundancy or of a related function and no effect on the engine operation).

Two warning lights indicate the failures: Red GOV and Amber GOV

- A red GOV light indicates the total failure of the regulation system
- An amber GOV light indicates the degraded operation of the regulation system. If this light flashes at starting, idle or shutdown, it also indicates a minor failure.

NOTE: The letter at the end of a failure word (A or B) corresponds to channel A or channel B of the EECU.

The architecture of the EECU is of the double channel type. The system includes two channels (channel A and channel B).

Each channel monitors all the data resources to which it gets access and provides information on its ability to ensure engine control.

According to the information supplied by both channels, the selection logic gives the control to the preferential channel if both channels are able to regulate the engine, gives the control to the channel able to regulate if only one channel is able to regulate, freezes the fuel flow if both channels cannot regulate;

During normal operation, channel A is the preferential channel, i.e. in control. Channel B is the pending channel.

For the VEMD failure messages, the trouble shooting processing is based on an operation with the preferential channel A.

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Control system failure	Consequences		Channel	А
Failure affecting the main control law and the back-up law	Automatic channel change-over		Channel	(Red)
Failure affecting the main control law and the back-up law of each channel	Stepper motor freeze	Detection / Failure indication	GOV	Major failure Level 3 (stepper motor frozen) (Amber) Minor failure
Failure affecting the main control law	The control system uses the back-up law			Level 2 (degraded operation)
Failure not affecting the main control law	The system remains on the main control law			(Flashing amber when N1 < 20 %) Minor anomaly Level 1 (no effect on the engine
	- TOLEDANOE			operation)

FAILURE TOLERANCE

FAILURE INDICATION

Tolerance and failure indication
Figure 010

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B. Contents of the failure messages in the operational mode, Status System page

CAUTION: FOR THE VEMD FAILURE MESSAGES, THE PROCESSING OF THE TROUBLE SHOOTING IS BASED ON AN OPERATION WITH THE PREFERENTIAL CHANNEL A.

The contents includes:

- The identification of the helicopter indication means: VEMD failure word and related GOV warning light.
- 2. The failure designation.
- 3. The task number of the related trouble shooting procedure in the last section of the manual.

INDICATION (a)		DESIGNATION (b)	TASK No. (c)
VEMD codes	GOV warning light		
W/DOG. A	Flashing amber	Watchdog trip	71-00-06-817-801

6. TROUBLE SHOOTING

The 6th section of this manual gives, in the form of trouble shooting, the tasks from the contents.

The descriptive part of the trouble shooting procedure is function of:

- The helicopter indication means: CWP, CPDS
- The operation phase, power up, starting, operation, shutdown for the failures observed during
 use
- The reference to the check, inspection or test tasks for the failures observed during maintenance
- The failure effects on the engine use for VEMD failure messages
- A reminder of the normal operating condition
- The components list.

The failure handling, in the form of a tree, is done by comparing the reliability data, accessibility criteria and complexity of check or test tasks of the applicable components.

- <u>NOTE</u>: The trouble shooting given in this manual only concern the engine part of the applicable systems.
- <u>NOTE</u>: Before you start the trouble shooting, make sure that all the ckecks and instructions have been applied.
- <u>NOTE</u>: Before you start the trouble shooting, make sure that all the procedures described in the flight manual are correctly applied.
- <u>NOTE</u>: Before you start the trouble shooting, make sure that the warning light or indicator is serviceable before you make a decision on the failure of the related system.

7. TASK NUMBERING

The standardized numbering of the task is an extension of the three-digit A.T.A. system.

In this chapter, the numbering system has 5 groups of characters.

Example:

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Task No.	71	00	06	811	801
Group	1	2	3	4	5

A. The group 1, 2, 3 gives the chapter, section, subject:

71: turboshaft engine

00 : general

06: subject order

B. The group 4 gives the type of maintenance function

The first two digit 81 are the code number of the maintenance program (trouble shooting).

The third digit in this group gives the engine operating phase when the failure is detected or its detection mode:

- 1: Power on
- 2 : Start
- 3: Transient rating
- 4: During operation
- 6: Check and inspection
- 7 : Failure message
- C. The group 5 gives, to each group 4, a serial number from 801

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Troubleshooting - Introduction

FAILURES FOUND DURING OPERATION

CAUTION: BEFORE THE REMOVAL OF THE ENGINE FROM THE AIRFRAME,

(REFER TO TASK 71-02-16-280-801) "TREATMENT OF AN ENGINE/MODULE BEFORE

RETURN TO A MAINTENANCE CENTER".

1. LIST

A. At power up

Indication			
Alarms VEMD	Warning indicator lights	Failure indentification	Task No.
	Fuel tank	Pre-blockage signal of the fuel filtering element	71-00-06-811-801
	Fuel tank	No low fuel pressure signal	71-00-06-811-802
	Red ENG 1 or ENG 2 off	No low oil pressure signal	71-00-06-811-803
	Red GOV Amber GOV Flashing amber GOV	Lighting up of the GOV warning light	71-00-06-811-804
	FADEC and GOV not lit	No illumination of FADEC and GOV lights during EECU self test	71-00-06-811-806
	FADEC FAIL message	FADEC FAIL AT POWER UP	71-00-06-811-808

B. At starting

Indication			
Alarms VEMD	Warning indicator lights	Failure indentification	Task No.
	Fuel tank	No extinguishing of the low fuel pressure signal	71-00-06-812-802
Red flash under TOT and Over Limit detected		T4.5 overtemperature	71-00-06-812-804
		Gas generator not driven	71-00-06-812-805
	Red ENG 1 or ENG 2 on	No extinguishing of the low oil pressure signal	71-00-06-812-806
		Aborted start - No ignition	71-00-06-812-807
		Aborted start - Flame out	71-00-06-812-810
		Aborted start - Flames at the exhaust pipe	71-00-06-812-812

List of failures observed during engine operation

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Indication			
Alarms VEMD	Warning indicator lights	Failure indentification	Task No.
		No oil pressure rise at starting	71-00-06-812-813
		Helicopter rotor movement that occurs after the usual time during engine start	71-00-06-812-816

C. **Engine running**

Indication			
Alarms VEMD	Alarms VEMD Warning indicator lights		Task No.
		Surge	71-00-06-813-801
	ENG CHIP on	Indicator light of the electrical magnetic plug on	71-00-06-814-801
	Fuel tank	Pre-blockage signal of the fuel filtering element	71-00-06-814-802
	Fuel tank	Low fuel pressure signal	71-00-06-814-803
Red flash under TRQ and Over Limit detected		Torque limitations exceeded	71-00-06-814-805
Red flash under N1 and Over Limit detected		N1 limitations exceeded	71-00-06-814-806
Over Limit detected	NR/2 NTL indicator	N2 limitations exceeded	71-00-06-814-807
ENGINE OIL PRESSURE indicator		Abnormal evolution of the oil pressure	71-00-06-814-808
	Red ENG 1 or ENG 2 on	Low oil pressure signal	71-00-06-814-809
Red line under ENGINE OIL TEMPERATURE		Oil overtemperature	71-00-06-814-810

D. **Engine shutdown**

Indication			
Alarms VEMD	Warning indicator lights	Failure indentification	Task No.
		Abnormal noise during the rundown phase	71-00-06-815-801
		Rundown time less than 25s	71-00-06-815-802
	Fuel tank	No low fuel pressure signal	71-00-06-815-804

List of failures observed during engine operation

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Indication			
Alarms VEMD	Warning indicator lights	Failure indentification	Task No.
	Red ENG 1 or ENG 2 off	No low oil pressure signal	71-00-06-815-805
		Power turbine blocked	71-00-06-815-806

List of failures observed during engine operation

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List of failures observed during engine operation

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LIST OF FAILURES FOUND DURING MAINTENANCE

CAUTION: BEFORE THE REMOVAL OF THE ENGINE FROM THE AIRFRAME,

(REFER TO TASK 71-02-16-280-801) "TREATMENT OF AN ENGINE/MODULE BEFORE

RETURN TO A MAINTENANCE CENTER".

1. LIST

A. Failures observed during maintenance

DESCRIPTION	TASK No.
Abnormal noise during the rundown phase	71-00-06-815-801
Rundown time out of limit	71-00-06-815-802
Fumes at the exhaust pipe	71-00-06-816-801
Particles in the oil filtering element	71-00-06-816-803
Oil or fuel leakage	71-00-06-816-804
Abnormal fuel leakage at the tank return fuel tube	71-00-06-816-805
Fuel filter clogging indicator popped out	71-00-06-816-806
Fuel dilution rate in oil not compliant	71-00-06-816-807
Incorrect operation of one of the ignition device lines	71-00-06-816-808
Bleed valve anomaly observed	71-00-06-817-884
Non conform oil consumption	71-00-06-816-811
Oil pressure check out of tolerance	71-00-06-816-812
Popping out of the pre-blockage visual indicator of the oil filter	71-00-06-816-813
Oil leakage between M03 and M04	71-00-06-816-814
Engine power check - incorrect margin	71-00-06-816-819
Fuel odor in the cabin	71-00-06-816-821
Oil tank level slowly decreases after engine shut- down	71-00-06-816-833

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List of failures observed during maintenance

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FAILURES CODES

1. <u>LIST OF VEMD FAILURE CODES</u>

A. Operational mode, System Status page

Indic	ation		
Alarms VEMD	Warning indicator lights	Failure indentification	Task No.
W/DOG. A or W/DOG. B	Flashing GOV/FADEC	Watchdog trip	71-00-06-817-801
TRIM.POS. A	GOV	N2 trim failure, channel A	71-00-06-817-803
TRIM.POS. B	GOV	N2 trim failure, channel B	71-00-06-817-804
T/SEL. A or T/SEL. B	Flashing GOV	TNG selector failure	71-00-06-817-805
SELECT. A or SELECT. B	GOV/Flashing GOV/ FADEC	OFF/IDLE/FLIGHT selector failure	71-00-06-817-808
T0.DISC. A	Flashing GOV	T1 inconsistency	71-00-06-817-810
PITCH. A or PITCH. B	GOV/Flashing GOV	Collective pitch failure	71-00-06-817-823
TOT. A or TOT. B	GOV/Flashing GOV	Raw T4.5 failure	71-00-06-817-825
T1. A or T1. B	GOV/Flashing GOV	T1 (T0 engine) failure	71-00-06-817-828
P3. A or P3. B	GOV/Flashing GOV	P3 failure	71-00-06-817-833
TRQ. A or TRQ. B	GOV/Flashing GOV	Raw torque failure	71-00-06-817-842
TOT M. A or TOT M. B	GOV/Flashing GOV	T4.5 conformation failure	71-00-06-817-844
TRQ CL. A or TRQ CL. B	GOV/Flashing GOV	Torque conformation failure	71-00-06-817-847
PROCES. A or PROCES. B	Flashing GOV	EECU internal failure	71-00-06-817-861
P3/FLA. A or P3/FLA. B	GOV/Flashing GOV	P3	71-00-06-817-864
P0. A or P0. B	GOV/Flashing GOV	Engine P0 failure	71-00-06-817-869
RESOL. A or RESOL. B	GOV/Flashing GOV/ FADEC	Resolver failure	71-00-06-817-878
STEP M. A (and STEP M. B not displayed)	Flashing GOV	Stepper motor failure channel A	71-00-06-817-880
STEP M. B (and STEP M. A not displayed)	Flashing GOV	Stepper motor failure channel B	71-00-06-817-881
STEP M. A and STEP M. B	FADEC	Stepper motor failure channel A and B	71-00-06-817-882
BV. A or BV. B	GOV/Flashing GOV	Bleed valve failure	71-00-06-817-884

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Indication			
Alarms VEMD	Warning indicator lights	Failure indentification	Task No.
Н ТОТ. А	Flashing GOV	Helicopter T4.5 failure	71-00-06-817-889
BALANC. A	GOV	Cross talk ARINC	71-00-06-817-890
VERSION. A or VERSION. B	GOV/Flashing GOV	EECU configuration/ aircraft configuration inconsistency	71-00-06-817-906
NF. B	Flashing GOV/FADEC	N2 failure (B on harness)	71-00-06-817-907
A/B RE. A or A/B RE. B	GOV/Flashing GOV	Interchannel reception failure	71-00-06-817-910
NF. A	Flashing GOV/FADEC	N2 failure (C on harness)	71-00-06-817-913
NG. A	Flashing GOV	N1 failure (ALT. A/ALT. A on harness)	71-00-06-817-918
NG. B	Flashing GOV/FADEC	N1 failure (ALT. B/ALT. B on harness)	71-00-06-817-919
NG. A and NG. B	FADEC	N1 failure (ALT. A/ALT. A and ALT. B/ALT. B on harness)	71-00-06-817-920
H PO. A	GOV/Flashing GOV	Helicopter P0 failure	71-00-06-817-928
H LINK. A	GOV	No helicopter ARINC	71-00-06-817-929
ALTER. A and ALTER. B	Flashing GOV	Alternator failure channel A and channel B	71-00-06-817-931
ALTER. A	Flashing GOV	Alternator failure channel A	71-00-06-817-932
ALTER. B	Flashing GOV	Alternator failure channel B	71-00-06-817-933
28V. A	Flashing GOV/FADEC	28V failure channel A	71-00-06-817-938
28V. B	Flashing GOV/FADEC	28V failure channel B	71-00-06-817-939
P0 MIS. A	GOV/Flashing GOV	P0 inconsistency	71-00-06-817-948
EL.V. A or EL.V. B	GOV	Stop electro-valve failure	71-00-06-817-949
OV/SP. A	Flashing GOV	Overspeed protection failure	71-00-06-817-955
SOFT. A or SOFT. B	Flashing GOV/FADEC	Real time software failure	71-00-06-817-959
OUT NEUTRL and DEGRADE on MSG line no failure displayed on FAIL line	GOV	HMU out of neutral position	71-00-06-817-966

MAINTENANCE MANUAL

TASK 71-00-06-811-801-A01

FUEL FILT ON - PRE-BLOCKAGE SIGNAL OF THE FUEL FILTERING ELEMENT TROUBLESHOOTING

1. **GENERAL**

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms VEMD	Warning indicator lights
AT POWER UP		Fuel tank

B. REMINDER OF THE NORMAL OPERATING CONDITION

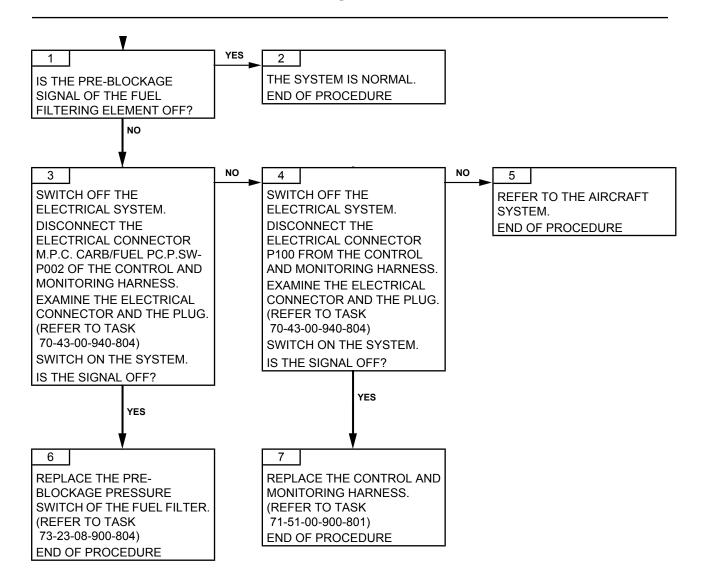
At power up, the pre-blockage signal of the fuel filtering element must remain off.

C. POSSIBLE CAUSES

- Pre-blockage pressure switch of the fuel filter
- Control and monitoring harness
- Aircraft

2. PROCEDURE

MAINTENANCE MANUAL



TASK 71-00-06-811-802-A01

FUEL P OFF - NO LOW FUEL PRESSURE SIGNAL TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms VEMD	Warning indicator lights
AT POWER UP		Fuel tank

B. REMINDER OF THE NORMAL OPERATING CONDITION

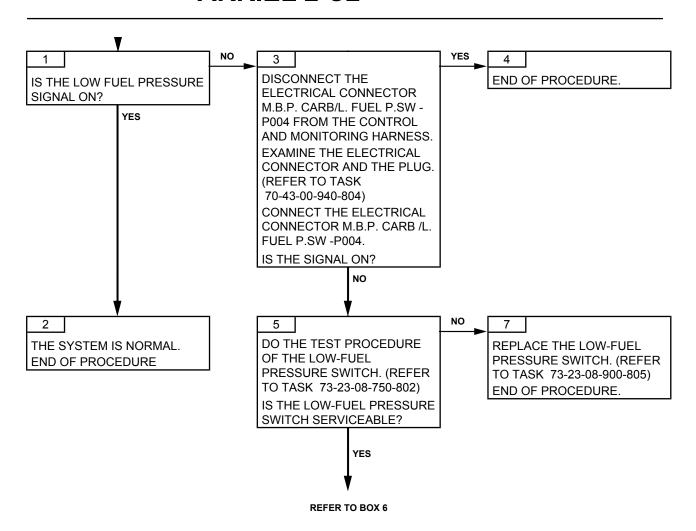
At power up, the low fuel pressure signal must be on.

C. POSSIBLE CAUSES

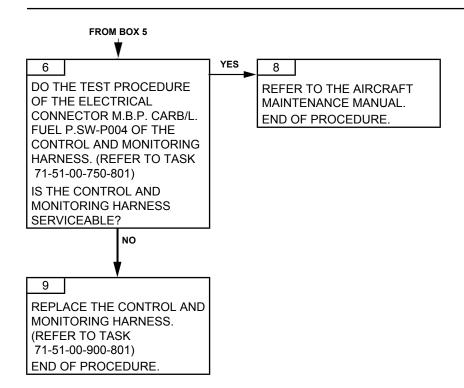
- Low-fuel pressure switch
- Control and monitoring harness
- Aircraft

2. PROCEDURE

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TASK 71-00-06-811-803-A01

ENG P OFF - NO LOW OIL PRESSURE SIGNAL TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms VEMD	Warning indicator lights
AT POWER UP		Red ENG 1 or ENG 2 off

B. REMINDER OF THE NORMAL OPERATING CONDITION

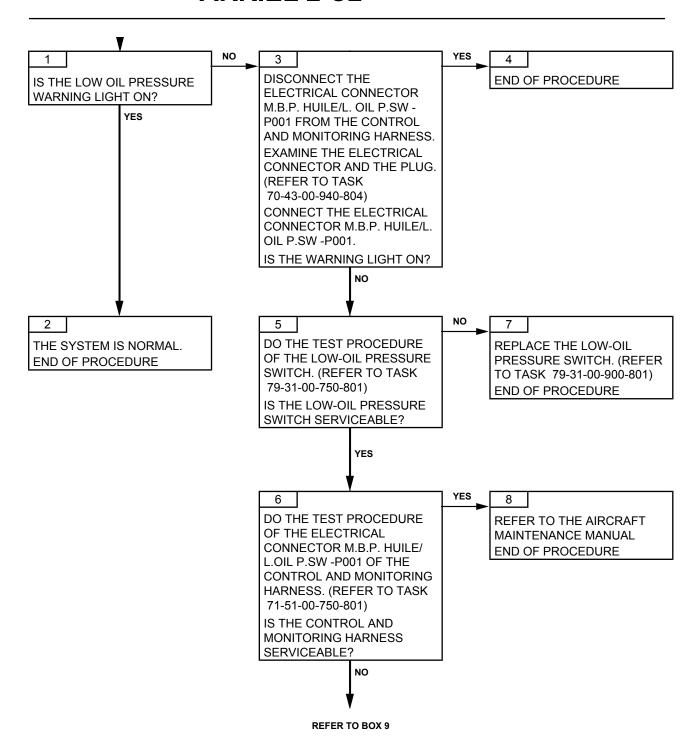
At power up, the red ENG 1 or ENG 2 warning light must be on.

C. POSSIBLE CAUSES

- Low-oil pressure switch
- Control and monitoring harness
- Aircraft

2. PROCEDURE

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FROM BOX 6



9

REPLACE THE CONTROL AND MONITORING HARNESS. (REFER TO TASK 71-51-00-900-801) END OF PROCEDURE

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TASK 71-00-06-811-804-A01

RED GOV OR AMBER GOV OR FLASHING GOV ON -LIGHTING OF GOV WARNING LIGHT TROUBLESHOOTING

1. **GENERAL**

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms VEMD	Warning indicator lights
AT POWER UP		Red, amber and flashing amber GOV warning light

B. REMINDER OF THE NORMAL OPERATING CONDITION

At power up, the GOV warning lights must be off.

C. POSSIBLE CAUSES

Failures detected by the EECU

2. PROCEDURE

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V

LOOK FOR THE FAILURE CODE CORRESPONDING TO THE LIGHTING UP OF A GOV WARNING LIGHT IN THE OPERATIONAL MODE, SYSTEM STATUS PAGE. REFER TO THE LIST OF VEMD FAILURE CODES IN THIS MANUAL TO DO THE RELATED TASK.

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TASK 71-00-06-811-806-A01

NO ILLUMINATION OF FADEC AND GOV LIGHTS DURING EECU SELF TEST TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms on the VEMD	CAD MESSAGE
AT POWER UP		FADEC and GOV not lit

B. REMINDER OF THE NORMAL OPERATING CONDITION

At EECU Power ON, during the EECU self-test, the EECU powers the following warning lights: GOV, FADEC. At the end of the EECU self-test, the warning lights GOV and FADEC are extinguished.

C. POSSIBLE CAUSES

- EECU
- 28V supply to the EECU (Aircraft side)

2. PROCEDURE

NOTE: The EECU has three power supplies: one dedicated to channel A, one dedicated to channel B and one dedicated to EECU discrete outputs (which includes the GOV and FADEC lights).

The power supply interfaces at the EECU are:

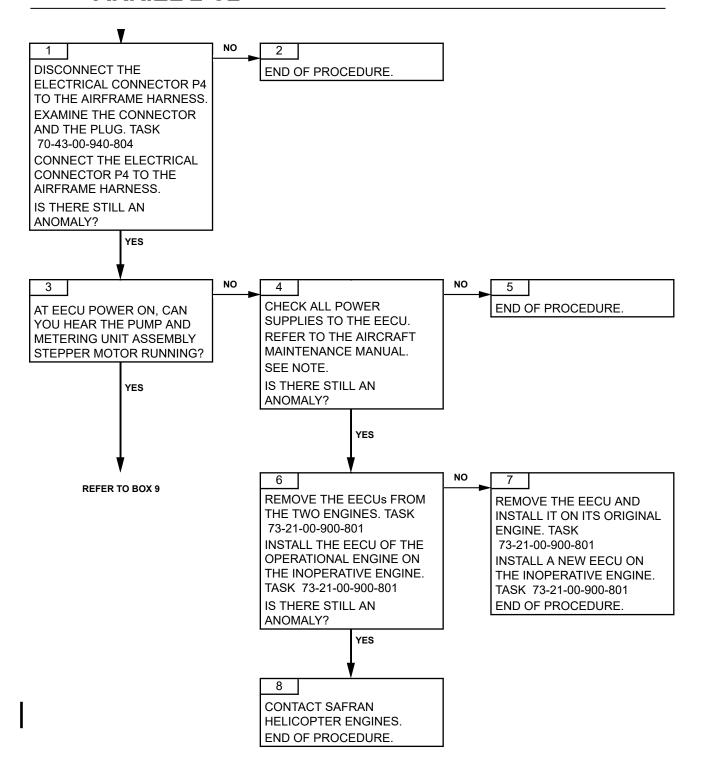
- Discrete outputs: connector P4 pins 2 (+) and 3 (-)
- Channel A: connector P2 pins 54 (+) and 55 (-)
- Channel B: connector P4 pins 63 (+) and 62 (-).

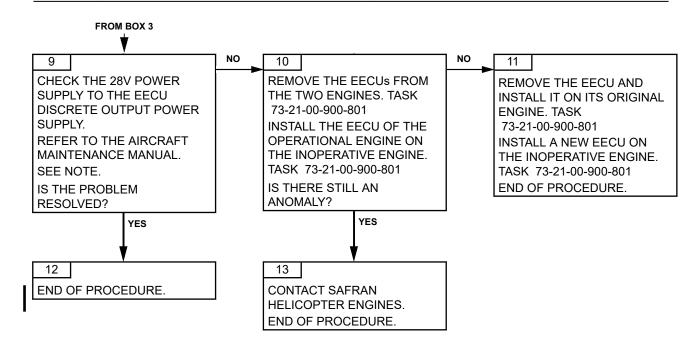
With battery power ON, +28 Vdc power supply should always be present at these interfaces.

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Failures observed during engine operation

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Effectivity: C2

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Effectivity: C2

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TASK 71-00-06-811-808-A01

FADEC FAIL AT POWER UP TROUBLESHOOTING

1. **GENERALITY**

A. PHASE AND FAILURE DETECTION

Phase	OTHER AVIONIC INDICATION		
Filase	Alarms VEMD	Warning indicator lights	
AT POWER UP		FADEC FAIL message	

Phase	MH65E INDICATION		
Filase	MFD EICAS page	CDU TDL page	ECMS page
AT POWER UP		Yellow FADEC 1 FAIL or FADEC 2 FAIL	

B. REMINDER OF THE OPERATING NORMAL CONDITION OR FAILURE DETECTION

At power on, the EECU desactivate the FADEC FAIL message and performs its power on built in tests

The FADEC FAIL message remains activated at power up when either the EECU is not correctly supplyed or EECU starting selector input is different from STOP.

C. POSSIBLE CAUSES

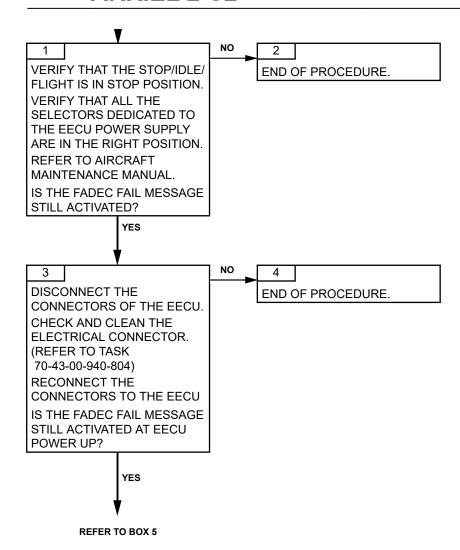
- AIRCRAFT
- EECU

2. PROCEDURE

Effectivity: C2

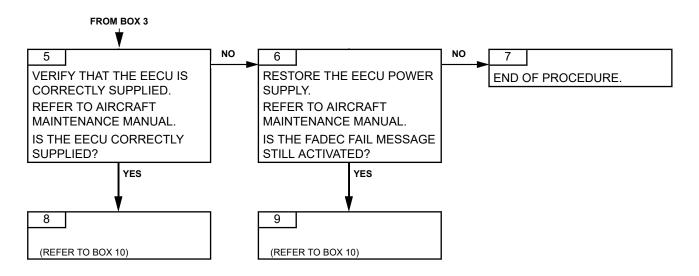
Failures observed during engine operation

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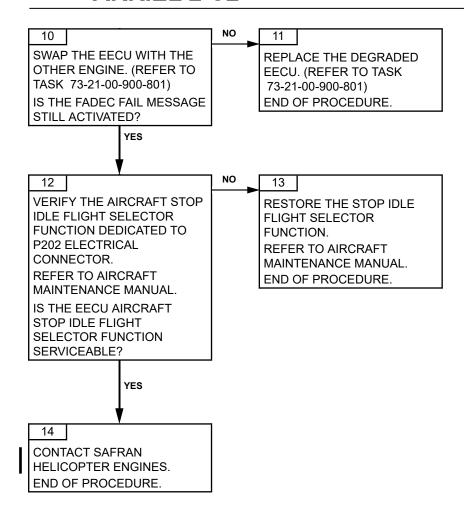
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TASK 71-00-06-812-802-A01

FUEL P ON - NO EXTINGUISHING OF THE LOW FUEL PRESSURE SIGNAL TROUBLESHOOTING

1. **GENERAL**

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms VEMD	Warning indicator lights
AT STARTING		Fuel tank

B. REMINDER OF THE NORMAL OPERATING CONDITION

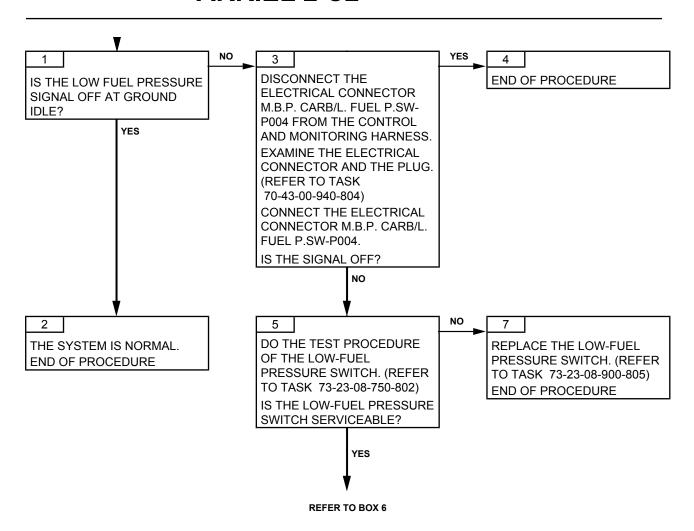
The start is normal and the low fuel pressure signal is off at ground idle.

C. POSSIBLE CAUSES

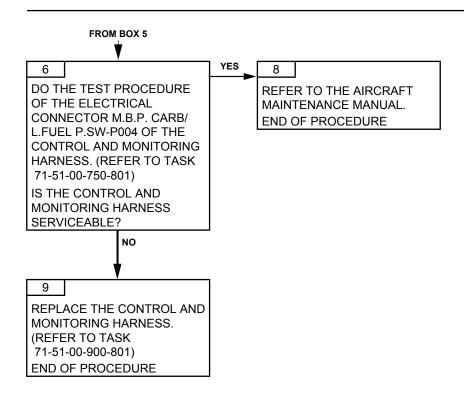
- Low-fuel pressure switch
- Control and monitoring harness
- Aircraft

2. PROCEDURE

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TASK 71-00-06-812-804-A01

ENGINE PARAMETER OUT OF LIMIT - T4.5 LIMITATIONS EXCEEDED TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

Phase	OTHER AVIONIC INDICATION		
	Alarms VEMD	Warning indicator lights	
AT STARTING	Flashing red dash under the indi- cation T45	N/A	

Phase	MH65E INDICATION		
	MFD EICAS page	CDU TDL page	ECMS page
AT STARTING	Yellow ENG EXCEED and TOT ZN EXCEED	N/A	ENGINE TOT

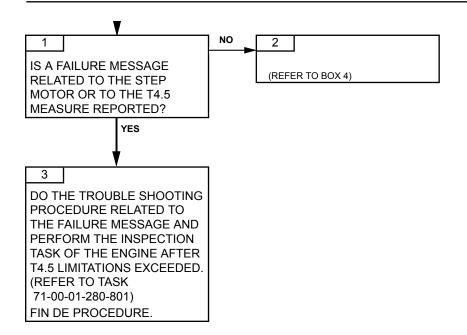
B. REMINDER OF THE NORMAL OPERATING CONDITION

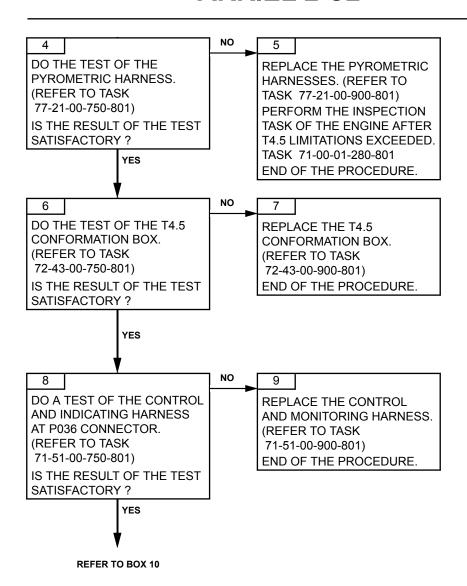
T4.5 limitations, (Refer to Task 71-00-01-940-801).

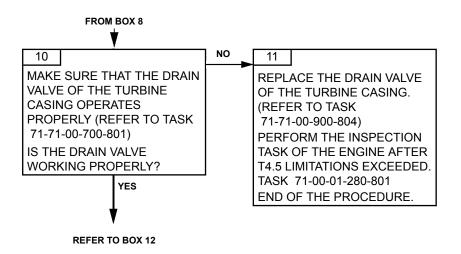
C. POSSIBLE CAUSES

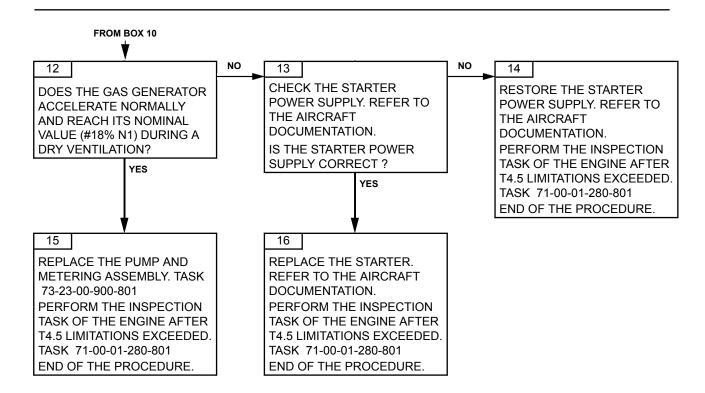
- Pump and metering unit
- T4.5 measurement system
- Drain valve of the turbine casing
- Starter
- Starter power supply

2. PROCEDURE









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TASK 71-00-06-812-805-A01

ABORTED START - GAS GENERATOR NOT DRIVEN TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

In the troubleshooting book, there are different troubleshooting tasks concerning aborted start. Titles are:

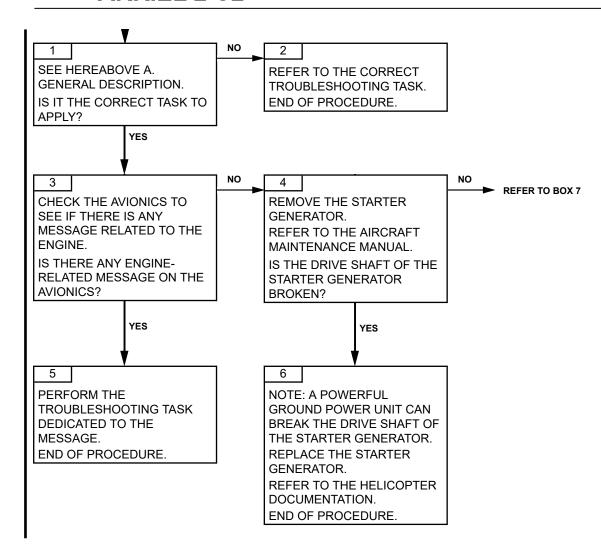
- "Aborted start: gas generator not driven": Do this troubleshooting task if the gas generator is not driven at all (N1 = 0 %) at the engine start selection or during cranking.
- "Aborted start: no ignition": When the pilot turns the main selector STOP/IDLE/FLIGHT
 to IDLE or FLIGHT, the EECU launches the starting sequence. At starting, the gas
 generator is driven but no ignition of the combustion chamber (T4 does not increase).
- "Aborted start: first start aborted": Do this preventive task when there are starting
 difficulties only at the first start of the day, or after the aircraft has been sitting for several
 hours, i.e. the engine is at ambient temperature.
- "Aborted start: slow start or stagnation": Do this troubleshooting task when the ignition
 in the combustion chamber is observed, but the N1 speed increases more slowly than
 usual, or the N1 speed stops increasing during start (and the pilot has to abort manually
 the starting sequence).
- "Aborted start: flames at the exhaust pipe": Do this troubleshooting task when the starting sequence generates abnormal flames at the exhaust pipe.
- "Aborted start: flame out": Do this troubleshooting task when ignition is observed, the N1 speed increases but the combustion chamber flames out without any action by the pilot.
- "T4.5 limitations exceeded": Do this troubleshooting task when a T4.5 overtemperature is observed during engine running or during starting sequence.

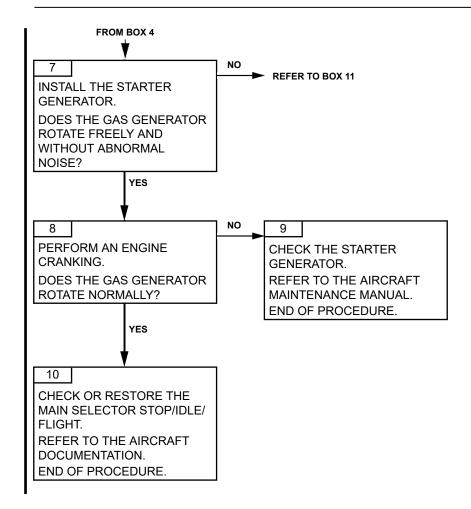
B. POSSIBLE CAUSES

- Starter generator
- Alternator
- Oil pump
- Fuel pump and metering unit
- Module 01 (Transmission shaft and accessory gearbox)
- Module 02 (Axial compressor)
- Module 03 (Gas generator)
- Aircraft

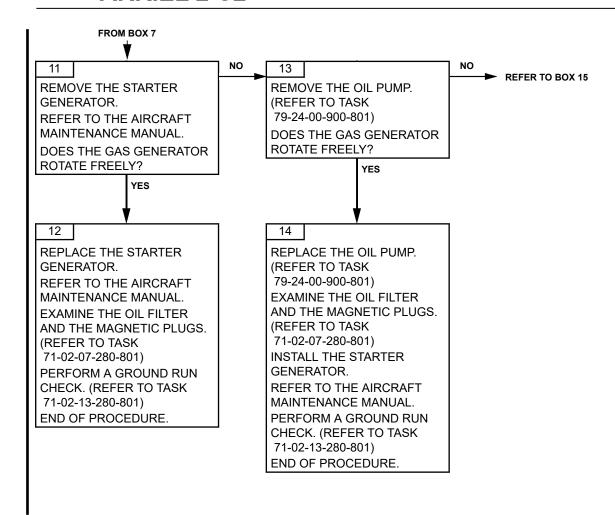
2. PROCEDURE

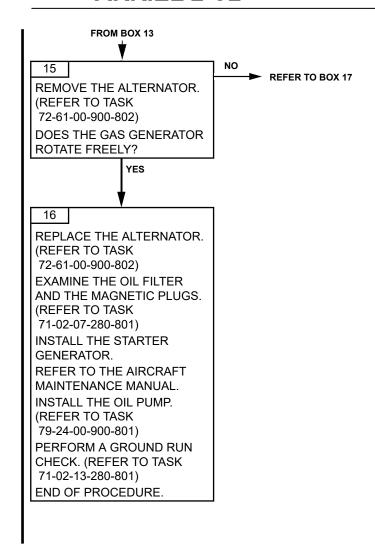
OTE: In case of a recent maintenance operation performed on this engine or on the aircraft starting system (starter, battery, fuse, selector, harness...), check first the subassembly concerned by this maintenance operation, in particular the plug and connectors.





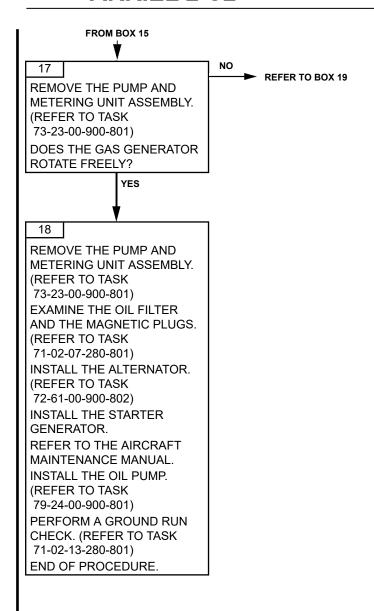
June 15/2020

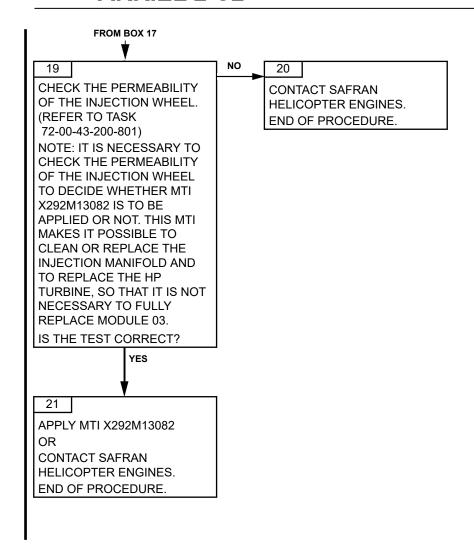




Effectivity: C2

June 15/2020





June 15/2020

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TASK 71-00-06-812-806-A01

ENG P ON - NO EXTINGUISHING OF THE LOW OIL PRESSURE SIGNAL TROUBLESHOOTING

1. **GENERAL**

A. PHASE AND FAILURE DETECTION

	Indication		
Phase	Alarms VEMD	Warning indicator lights	
AT STARTING		Red ENG 1 or ENG 2 on	

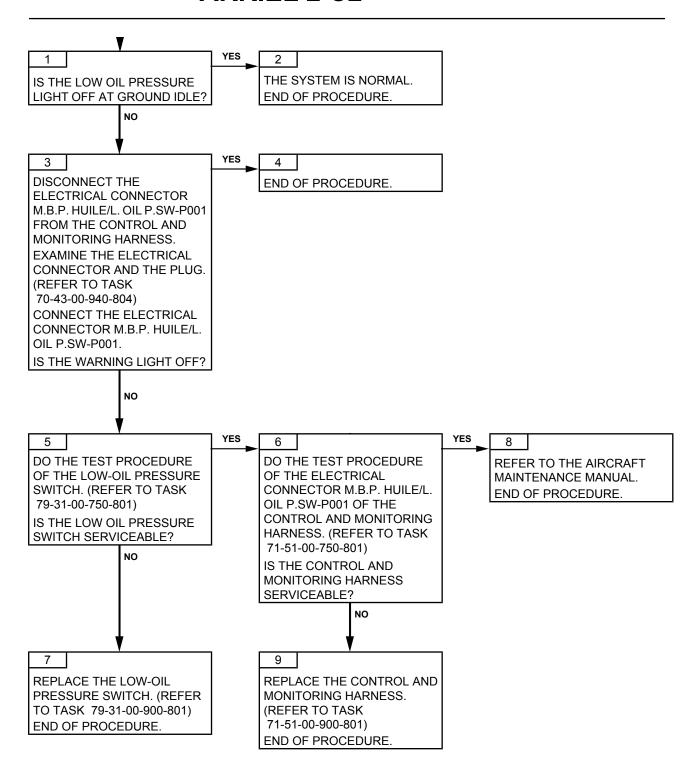
B. REMINDER OF THE NORMAL OPERATING CONDITION

The oil pressure indication is normal and the ENG1 or ENG2 lights are off at ground idle.

C. POSSIBLE CAUSES

- Low-oil pressure switch
- Control and monitoring harness
- Aircraft

2. PROCEDURE



TASK 71-00-06-812-807-A01

ABORTED START - NO IGNITION TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

In the troubleshooting book, there are different troubleshooting tasks concerning aborted start. Titles are:

- "Aborted start: gas generator not driven": Do this troubleshooting task if the gas generator is not driven at all (N1 = 0 %) at the engine start selection or during cranking.
- "Aborted start: no ignition": When the pilot turns the main selector STOP/IDLE/FLIGHT
 to IDLE or FLIGHT, the EECU launches the starting sequence. At starting, the gas
 generator is driven but no ignition of the combustion chamber (T4 does not increase).
- "Aborted start: first start aborted": Do this preventive task when there are starting
 difficulties only at the first start of the day, or after the aircraft has been sitting for several
 hours, i.e. the engine is at ambient temperature.
- "Aborted start: slow start or stagnation": Do this troubleshooting task when the ignition in the combustion chamber is observed, but the N1 speed increases more slowly than usual, or the N1 speed stops increasing during start (and the pilot has to abort manually the starting sequence).
- "Aborted start: flames at the exhaust pipe": Do this troubleshooting task when the starting sequence generates abnormal flames at the exhaust pipe.
- "Aborted start: flame out": Do this troubleshooting task when ignition is observed, the N1 speed increases but the combustion chamber flames out without any action by the pilot.
- "T4.5 limitations exceeded": Do this troubleshooting task when a T4.5 overtemperature is observed during engine running or during starting sequence.

B. POSSIBLE CAUSES

- Igniters plugs
- Ignition unit
- Ignition cable
- Fuel valve assembly
- Start injectors
- Control and monitoring harness
- Pump and metering unit assembly
- Start air purge valve
- EECU
- Aircraft.

2. PROCEDURE

NOTE:

1. In case of a recent maintenance operation performed on this engine or on the aircraft starting system (starter, battery, fuse, selector, harness...), check first the sub-assembly concerned by this maintenance operation, in particular the plug and connectors.

NOTE: 2. It is possible to interchange an equipment item with another engine.

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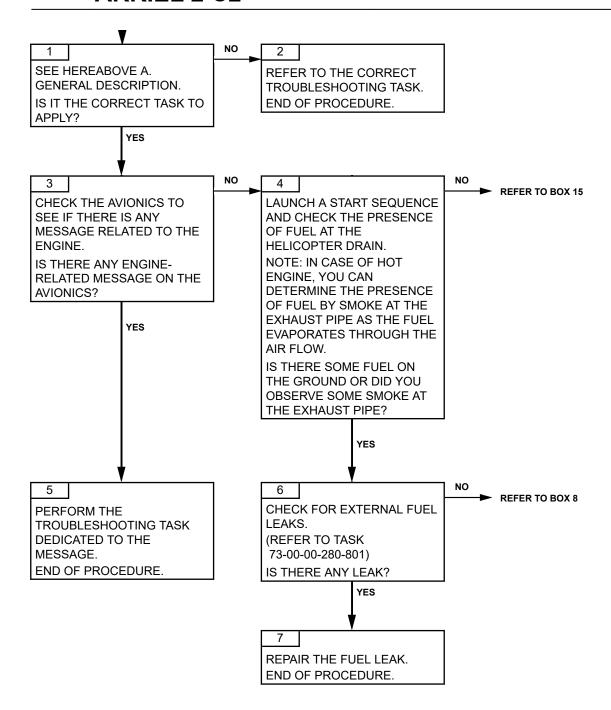
MAINTENANCE MANUAL

- If the engine starts normally, both equipment items should be reinstalled in their original location in order to confirm the anomaly. If the anomaly is confirmed, then the unserviceable equipment item has to be replaced.
- If the engine does not start normally, both the equipment items should be reinstalled in their original location and you should perform the next step of the troubleshooting tree.

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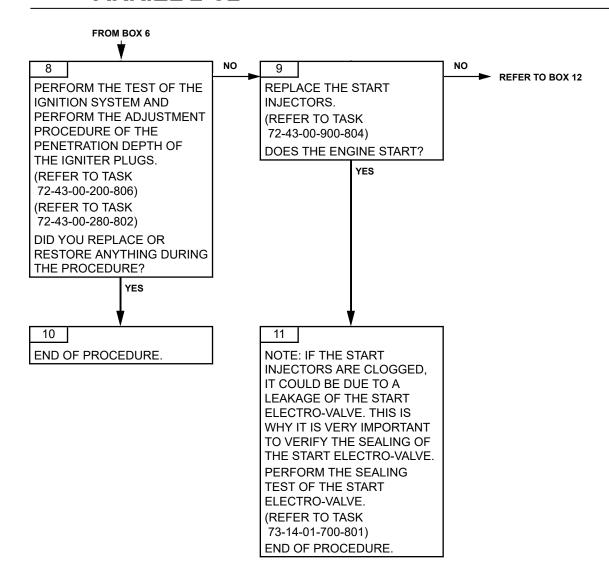
Failures observed during engine operation

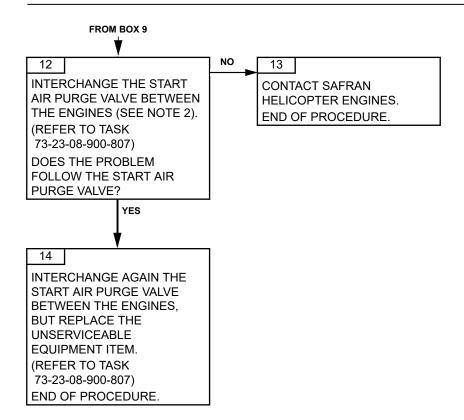
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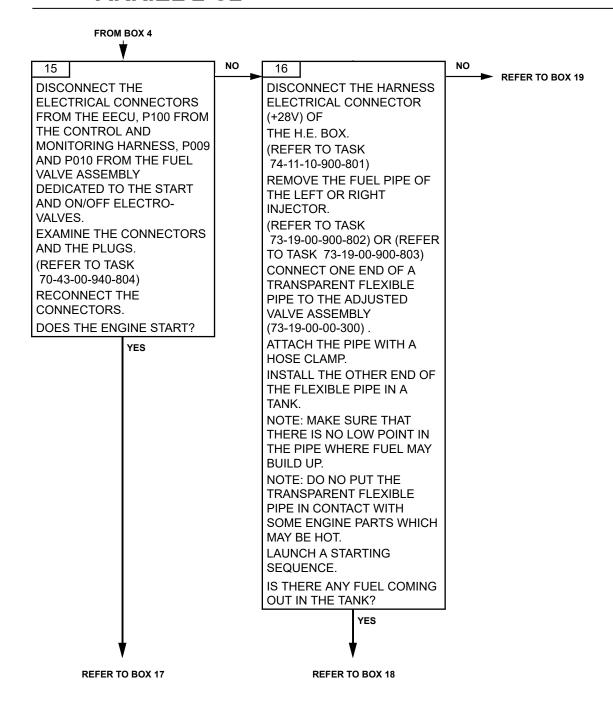


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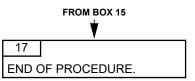




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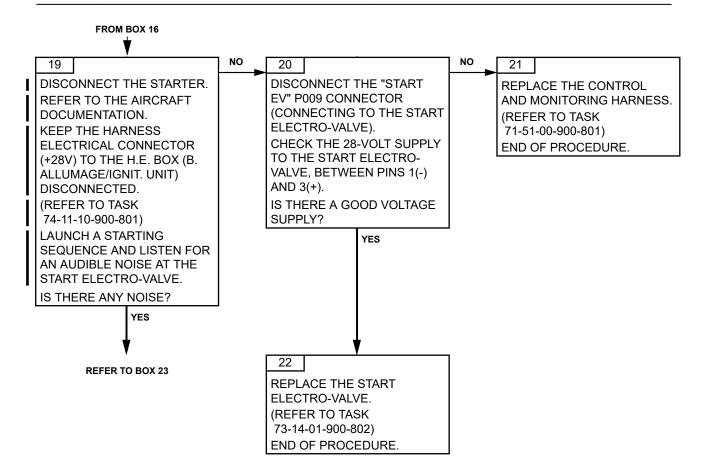
18

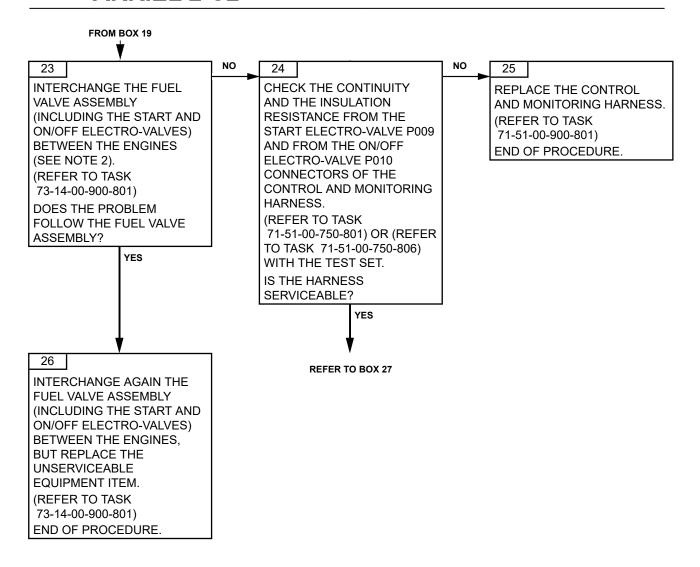
REPLACE THE START INJECTORS. (REFER TO TASK 72-43-00-900-804) NOTE: IF THE START INJECTORS ARE CLOGGED, IT COULD BE DUE TO A LEAKAGE OF THE START ELECTRO-VALVE. THIS IS WHY IT IS VERY IMPORTANT TO VERIFY THE SEALING OF THE START ELECTRO-VALVE. PERFORM THE SEALING TEST OF THE START ELECTRO-VALVE. (REFER TO TASK 73-14-01-700-801) END OF PROCEDURE.

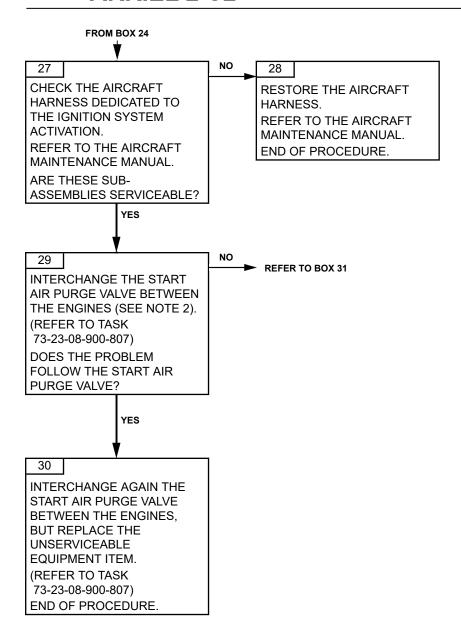
Effectivity: C2

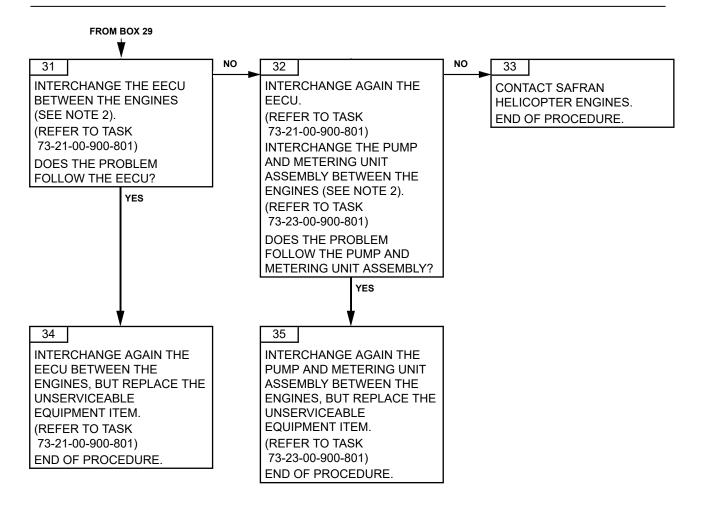
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TASK 71-00-06-812-808-A01

ABORTED START - SLOW START OR STAGNATION TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

In the troubleshooting book, there are different troubleshooting tasks concerning aborted start. Titles are:

- "Aborted start: gas generator not driven": Do this troubleshooting task if the gas generator is not driven at all (N1 = 0 %) at the engine start selection or during cranking.
- "Aborted start: no ignition": When the pilot turns the main selector STOP/IDLE/FLIGHT
 to IDLE or FLIGHT, the EECU launches the starting sequence. At starting, the gas
 generator is driven but no ignition of the combustion chamber (T4 does not increase).
- "Aborted start: first start aborted": Do this preventive task when there are starting difficulties only at the first start of the day, or after the aircraft has been sitting for several hours, i.e. the engine is at ambient temperature.
- "Aborted start: slow start or stagnation": Do this troubleshooting task when the ignition in the combustion chamber is observed, but the N1 speed increases more slowly than usual, or the N1 speed stops increasing during start (and the pilot has to abort manually the starting sequence).
- "Aborted start: flames at the exhaust pipe": Do this troubleshooting task when the starting sequence generates abnormal flames at the exhaust pipe.
- "Aborted start: flame out": Do this troubleshooting task when ignition is observed, the N1 speed increases but the combustion chamber flames out without any action by the pilot.
- "T4.5 limitations exceeded": Do this troubleshooting task when a T4.5 overtemperature is observed during engine running or during starting sequence.

B. POSSIBLE CAUSES

- Pyrometric harness
- Fuel valve assembly (Pressurizing valve not LRU)
- Start electro-valve
- Start air bleed valve
- Junction and T4.5 conformation box

2. PROCEDURE

NOTE: 1. In case of a recent maintenance operation performed on this engine or on the aircraft starting system (starter, battery, fuse, selector, harness...), check first the sub-assembly concerned by this maintenance operation, in particular the plug and connectors.

NOTE: 2. It is possible to interchange an equipment item with another engine.

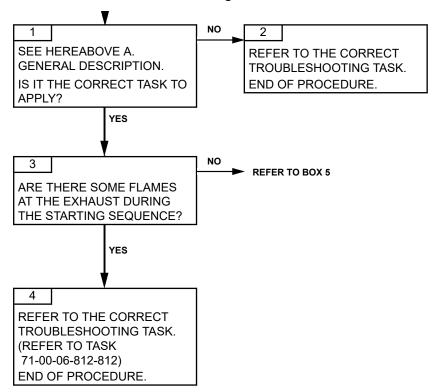
 If the engine starts normally, both equipment items should be reinstalled in their original location in order to confirm the anomaly. If the anomaly is confirmed, then the unserviceable equipment item has to be replaced.

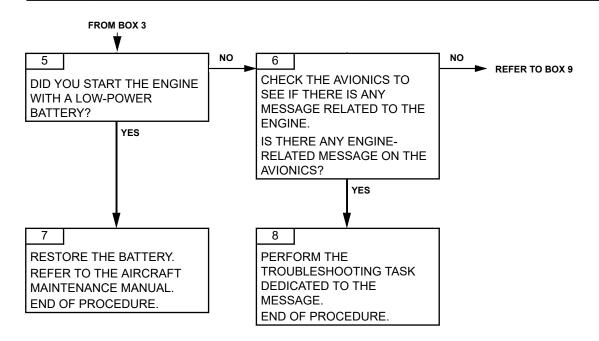
Effectivity: C2

Failures observed during engine operation

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 If the engine does not start normally, both the equipment items should be reinstalled in their original location and you should perform the next step of the troubleshooting tree.

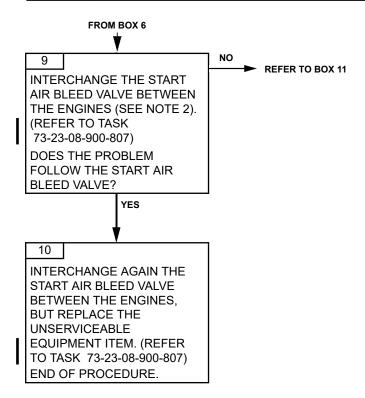


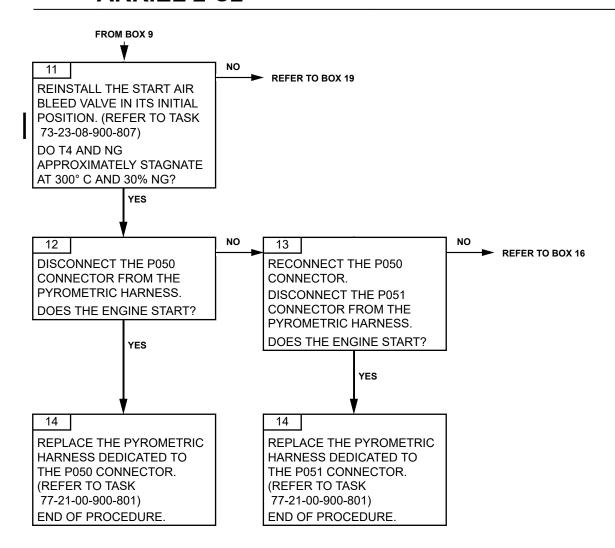


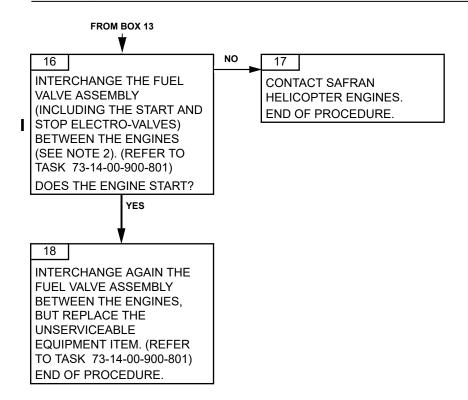
Effectivity: C2

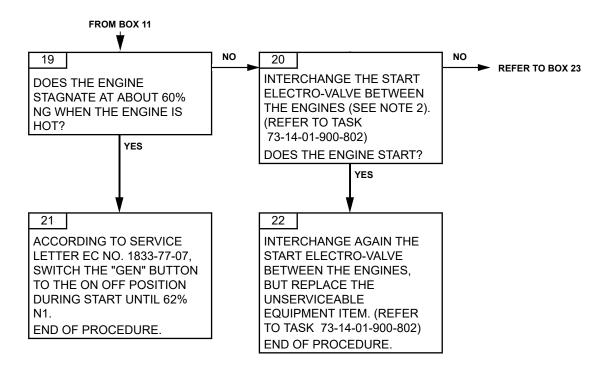
Failures observed during engine operation

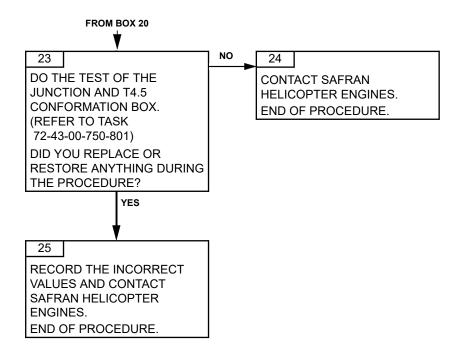
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TASK 71-00-06-812-810-A01

ABORTED START - FLAME OUT TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

In the troubleshooting book, there are different troubleshooting tasks concerning aborted start. Titles are:

- "Aborted start: gas generator not driven": Do this troubleshooting task if the gas generator is not driven at all (N1 = 0 %) at the engine start selection or during cranking.
- "Aborted start: no ignition": When the pilot turns the main selector STOP/IDLE/FLIGHT
 to IDLE or FLIGHT, the EECU launches the starting sequence. At starting, the gas
 generator is driven but no ignition of the combustion chamber (T4 does not increase).
- "Aborted start: first start aborted": Do this preventive task when there are starting
 difficulties only at the first start of the day, or after the aircraft has been sitting for several
 hours, i.e. the engine is at ambient temperature.
- "Aborted start: slow start or stagnation": Do this troubleshooting task when the ignition
 in the combustion chamber is observed, but the N1 speed increases more slowly than
 usual, or the N1 speed stops increasing during start (and the pilot has to abort manually
 the starting sequence).
- "Aborted start: flames at the exhaust pipe": Do this troubleshooting task when the starting sequence generates abnormal flames at the exhaust pipe.
- "Aborted start: flame out": Do this troubleshooting task when ignition is observed, the N1 speed increases but the combustion chamber flames out without any action by the pilot.
- "T4.5 limitations exceeded": Do this troubleshooting task when a T4.5 overtemperature is observed during engine running or during starting sequence.

B. POSSIBLE CAUSES

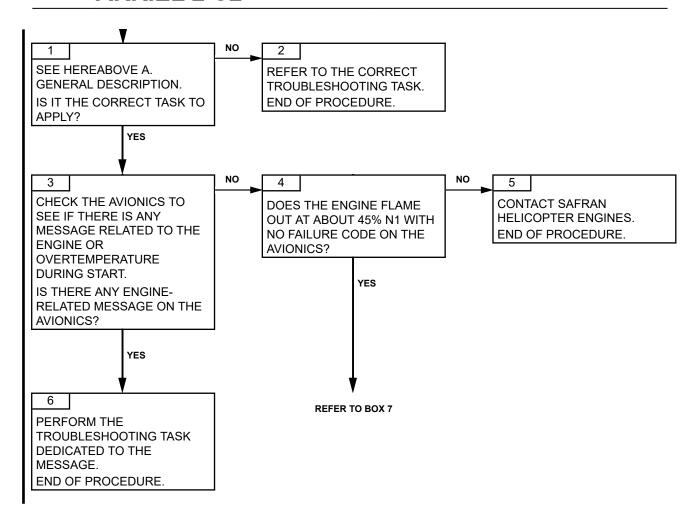
Fuel valve assembly

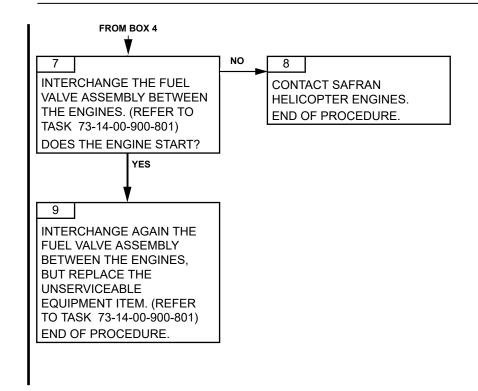
2. PROCEDURE

NOTE: 1. In case of a recent maintenance operation performed on this engine or on the aircraft starting system (starter, battery, fuse, selector, harness...), check first the sub-assembly concerned by this maintenance operation, in particular the plug and connectors.

NOTE: 2. It is possible to interchange an equipment item with another engine.

- If the engine starts normally, both equipment items should be reinstalled in their original location in order to confirm the anomaly. If the anomaly is confirmed, then the unserviceable equipment item has to be replaced.
- If the engine does not start normally, both the equipment items should be reinstalled in their original location and you should perform the next step of the troubleshooting tree.





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MAINTENANCE MANUAL

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TASK 71-00-06-812-811-A01

ABORTED START - FIRST START ABORTED TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

In the troubleshooting book, there are different troubleshooting tasks concerning aborted start. Titles are:

- <u>"Aborted start: gas generator not driven":</u> Do this troubleshooting task if the gas generator is not driven at all (N1 = 0%) at the engine start selection or during cranking.
- <u>"Aborted start: no ignition":</u> When the pilot turns the main selector STOP/IDLE/FLIGHT to IDLE or FLIGHT, the EECU launches the starting sequence. At starting, the gas generator is driven but no ignition of the combustion chamber (T4 does not increase).
- <u>"Aborted start: first start aborted":</u> Do this preventive task when there are starting difficulties only at the first start of the day, or after the aircraft has been sitting for several hours, i.e. the engine is at ambient temperature.
- <u>"Aborted start: slow start or stagnation":</u> Do this troubleshooting task when ignition in the combustion chamber is observed, but the N1 speed increases more slowly than usual, or the N1 speed stops increasing during start (and the pilot has to abort manually the starting sequence).
- <u>"Aborted start: flames at the exhaust pipe":</u> Do this troubleshooting task when the starting sequence generates abnormal flames at the exhaust pipe.
- <u>"Aborted start: flame out":</u> Do this troubleshooting task when ignition is observed, the N1 speed increases but the combustion chamber flames go out without any action by the pilot.
- <u>"T4.5 limitations exceeded":</u> Do this troubleshooting task when a T4.5 overtemperature is observed during engine running or during starting sequence.

B. POSSIBLE CAUSES

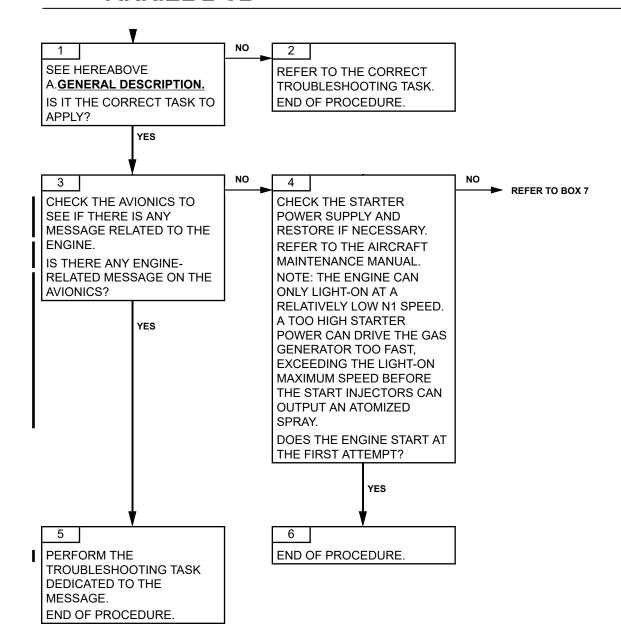
- Start air purge valve
- VARILIP seal from the pump and metering unit
- Aircraft (boost pump)

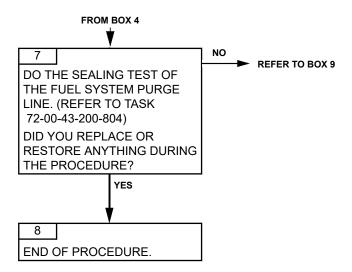
2. PROCEDURE

NOTE: 1. In case of a recent maintenance operation performed on this engine or on the aircraft starting system (starter, battery, fuse, selector, harness...), check first the sub-assembly concerned by this maintenance operation, in particular the plug and connectors.

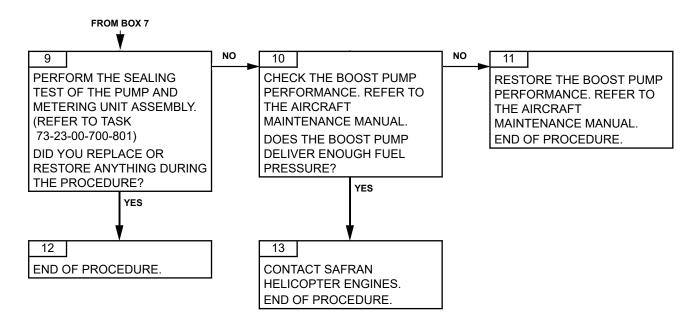
NOTE: It is possible to interchange an equipment item with another engine.

- If the engine starts normally, both equipment items should be reinstalled in their original location in order to confirm the anomaly. If the anomaly is confirmed, then the unserviceable equipment has to be replaced.
- If the engine does not start normally, both the equipment items should be reinstalled in their original location and you should perform the next step of the troubleshooting tree.





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TASK 71-00-06-812-812-A01

ABORTED START - FLAMES AT THE EXHAUST PIPE TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

In the troubleshooting book, there are different troubleshooting tasks concerning aborted start. Titles are:

- <u>"Aborted start: gas generator not driven":</u> Do this troubleshooting task if the gas generator is not driven at all (N1 = 0%) at the engine start selection or during cranking.
- <u>"Aborted start: no ignition":</u> When the pilot turns the main selector STOP/IDLE/FLIGHT to IDLE or FLIGHT, the EECU launches the starting sequence. At starting, the gas generator is driven but no ignition of the combustion chamber (T4 does not increase).
- <u>"Aborted start: first start aborted":</u> Do this preventive task when there are starting difficulties only at the first start of the day, or after the aircraft has been sitting for several hours, i.e. the engine is at ambient temperature.
- "Aborted start: slow start or stagnation": Do this troubleshooting task when ignition in the combustion chamber is observed, but the N1 speed increases more slowly than usual, or the N1 speed stops increasing during start (and the pilot has to abort manually the starting sequence).
- <u>"Aborted start: flames at the exhaust pipe":</u> Do this troubleshooting task when the starting sequence generates abnormal flames at the exhaust pipe.
- <u>"Aborted start: flame out":</u> Do this troubleshooting task when ignition is observed, the N1 speed increases but the combustion chamber flames out without any action by the pilot.
- <u>"T4.5 limitations exceeded":</u> Do this troubleshooting task when a T4.5 overtemperature is observed during engine running or during starting sequence.

B. POSSIBLE CAUSES

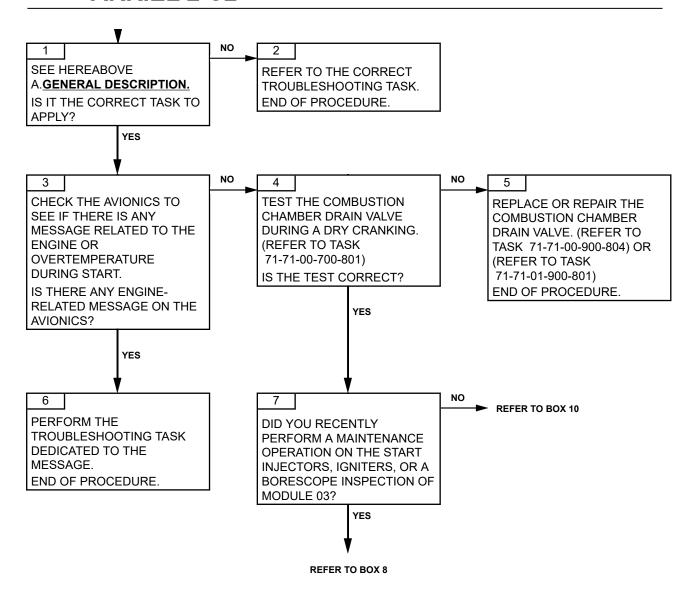
- Start injectors
- Combustion chamber drain valve

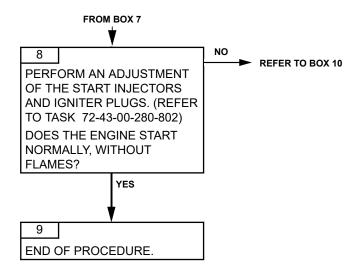
2. PROCEDURE

<u>NOTE</u>: 1. In case of a recent maintenance operation performed on this engine or on the aircraft starting system (starter, battery, fuse, selector, harness...), check first the sub-assembly concerned by this maintenance operation, in particular the plug and connectors.

NOTE: It is possible to interchange an equipment item with another engine.

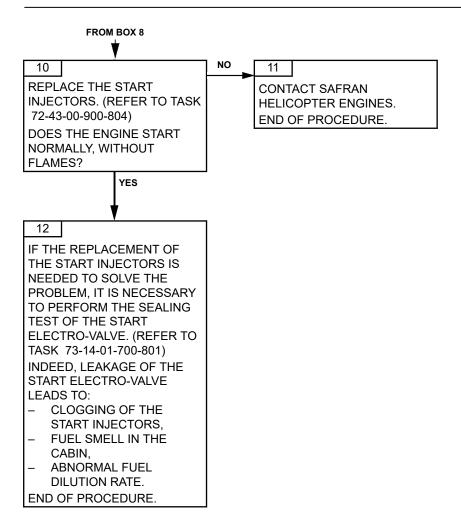
- If the engine starts normally, both equipment items should be reinstalled in their original location in order to confirm the anomaly. If the anomaly is confirmed, then the unserviceable equipment has to be replaced.
- If the engine does not start normally, both the equipment items should be reinstalled in their original location and you should perform the next step of the troubleshooting tree.





Effectivity: C2

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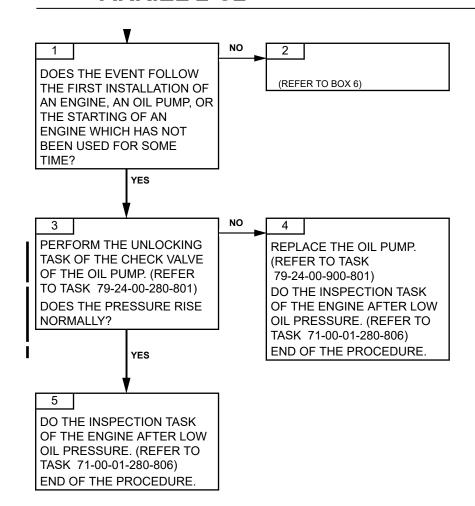
TASK 71-00-06-812-813-A01

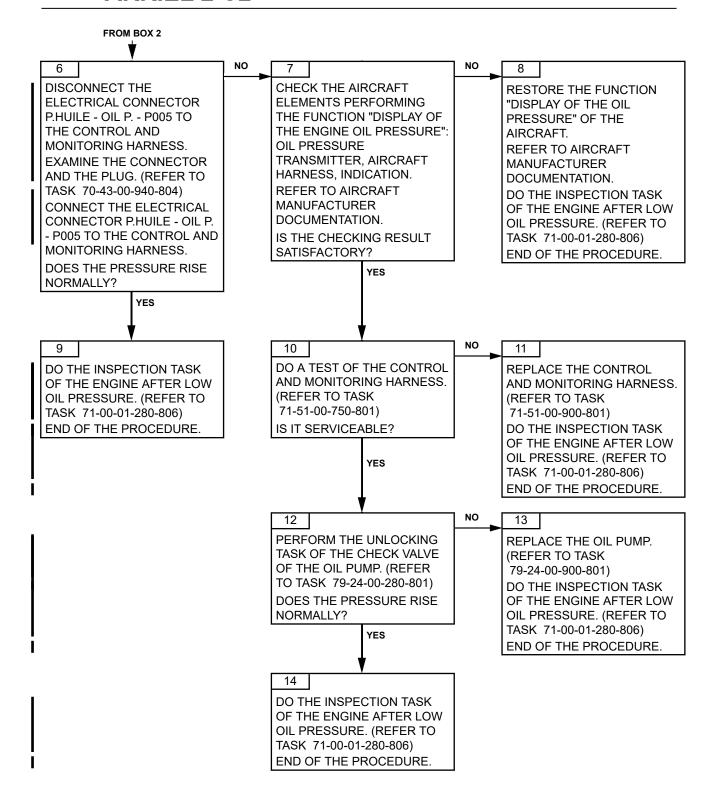
NO OIL PRESSURE RISE AT STARTING TROUBLESHOOTING

1. GENERAL

- A. GENERAL DESCRIPTION
- In normal operation, at engine start, the oil pressure must rise.
- B. POSSIBLE CAUSES
 - Oil pump
 - Control and monitoring harness
 - Aircraft (oil pressure transmitter, harnesses, indication)

2. PROCEDURE





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Effectivity: C2

The information in this manual is subject to the warning given on the information page.

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TASK 71-00-06-812-816-A01 HELICOPTER ROTOR MOVEMENT THAT OCCURS

AFTER THE USUAL TIME DURING ENGINE START

TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	INDICATION	
PHASE	ALARMS VEMD	WARNING INDICATOR LIGHTS
Start		

B. REMINDER OF THE NORMAL OPERATING CONDITION OR FAILURE DETECTION

Refer to the rotor movement criteria in the Flight Manual (chapter "Engine starting")

C. POSSIBLE CAUSES

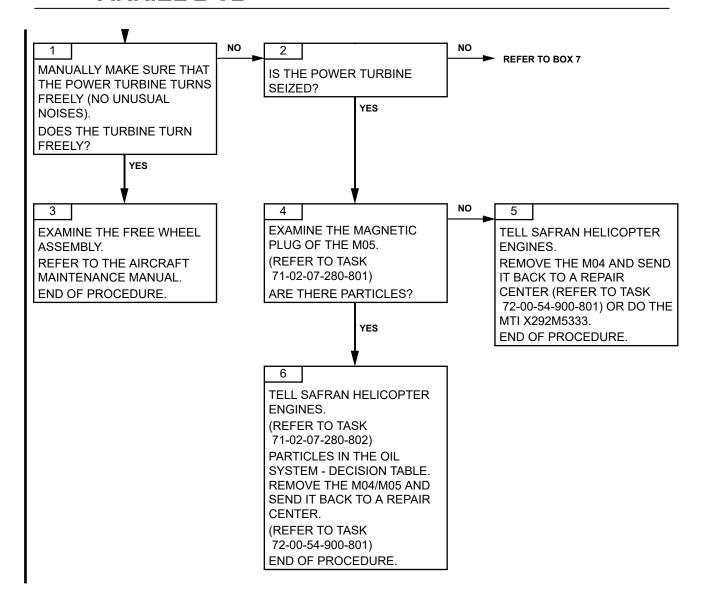
- Signs of rub of the PT blade tip against the PT shroud (M04)
- Free wheel assembly sliding
- Labyrinth ring

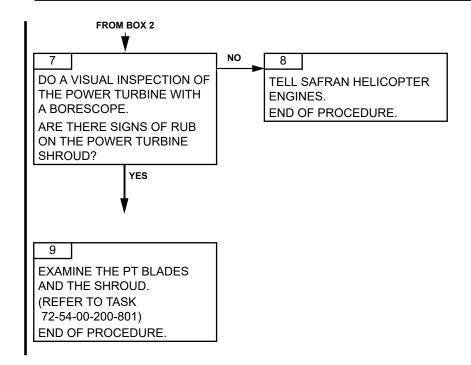
2. PROCEDURE

Effectivity: C2

Failures observed during engine operation

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MAINTENANCE MANUAL

TASK 71-00-06-813-801-A01

SURGE TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

The engine surge is an abnormal phenomenon.

It is important to understand and to treat the root cause before treating the engine after surge.

B. POSSIBLE CAUSES

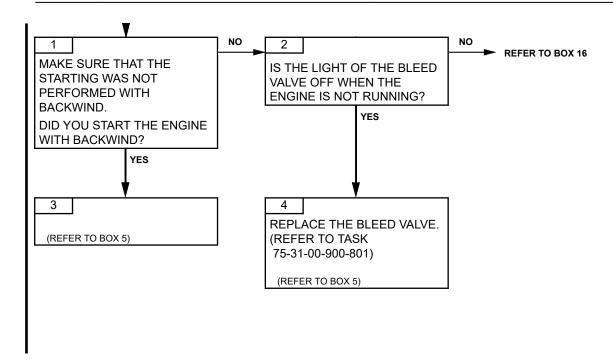
- Air intake
- Bleed valve

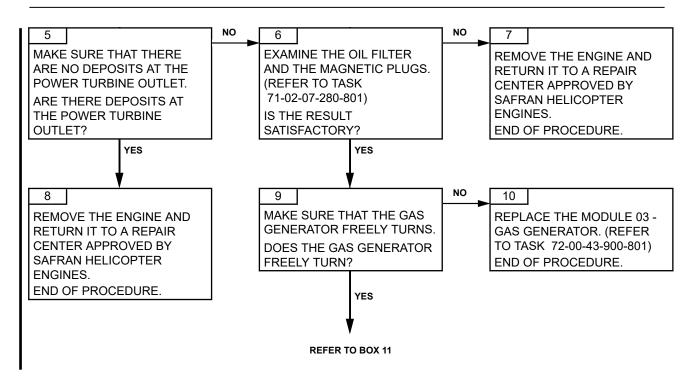
2. PROCEDURE

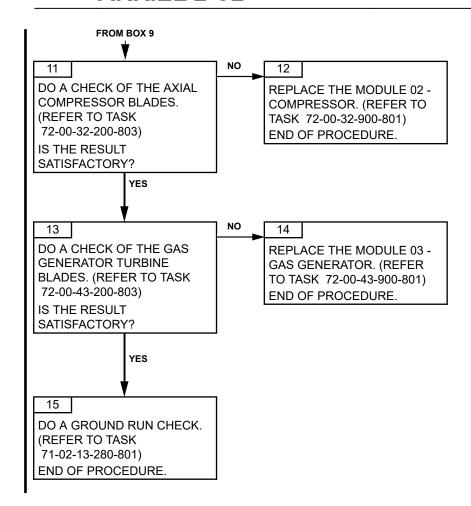
<u>NOTE</u>: First, the fault isolation procedure helps you to find the root cause and to repair the engine part related to that root cause. After that, the troubleshooting procedure gives the checks and repairs of the event consequences on the engine.

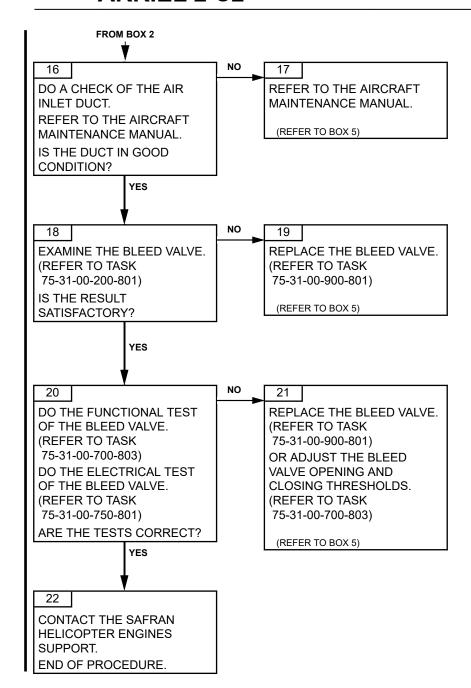
Effectivity: C2

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TASK 71-00-06-814-801-B01

ENG CHIP ON - INDICATOR LIGHT OF THE ELECTRICAL MAGNETIC PLUG ON TROUBLESHOOTING

1. **GENERAL**

A. INDICATION ON THE AVIONICS

	Indication		
Phase	Alarms VEMD	Warning indicator lights	
ENGINE RUNNING		Amber ENG CHIP	

B. GENERAL DESCRIPTION

During operation, the amber ENG CHIP messages must not show. The use of the particle burner must not have switched them off.

C. POSSIBLE CAUSES

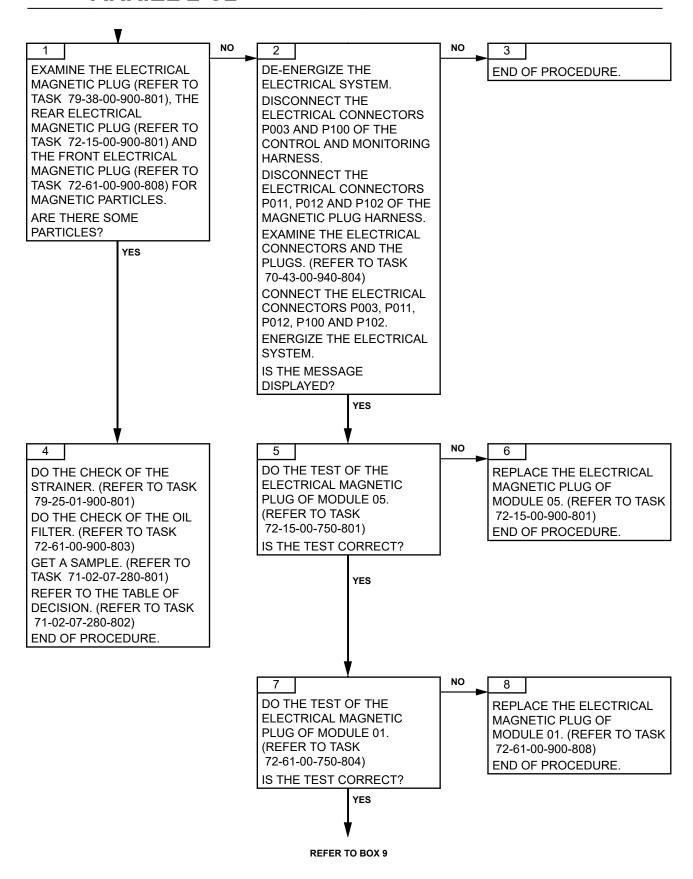
- Modules M01, M02, M03, M04, M05
- Electrical magnetic plugs
- Control and monitoring harness
- Magnetic plug harness

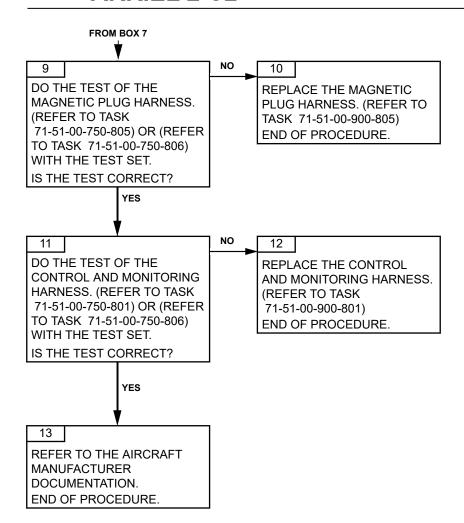
2. PROCEDURE

Effectivity: C2

Failures observed during engine operation

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Effectivity: C2

Failures observed during engine operation

TASK 71-00-06-814-802-A01 FUEL FILT ON - PRE-BLOCKAGE SIGNAL OF THE

FUEL FILTERING ELEMENT

TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms VEMD	Warning indicator lights
ENGINE		FUEL
RUNNING		+
		FILT

B. GENERAL DESCRIPTION

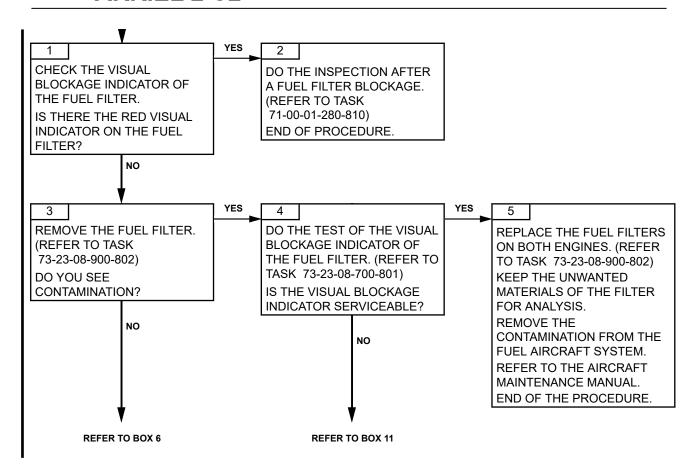
The engine is equipped of:

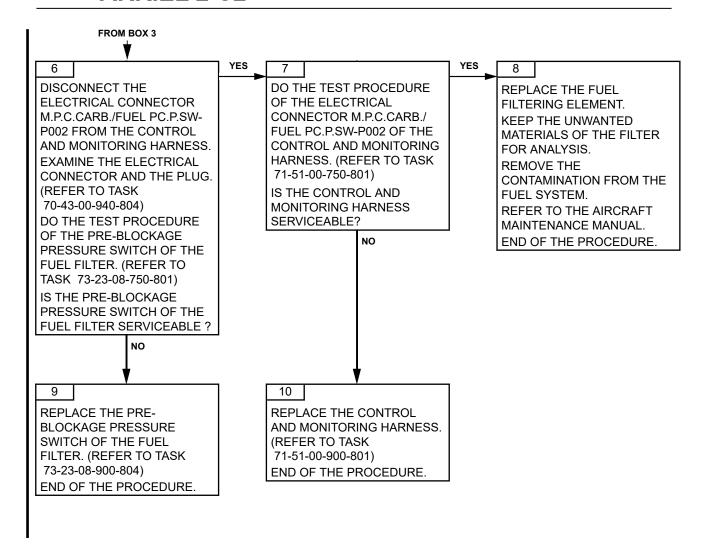
- one fuel filter pre-blockage pressure switch connected to the aircraft.
- one red fuel filter mechanical blockage indicator.

C. POSSIBLE CAUSES

- Pre-blockage pressure switch of the fuel filter
- Control and monitoring harness
- Visual blockage indicator of the fuel filter
- Fuel contamination.

2. PROCEDURE





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FROM BOX 4



DO THE INSPECTION AFTER A FUEL FILTER BLOCKAGE. (REFER TO TASK 71-00-01-280-810) END OF PROCEDURE. TASK 71-00-06-814-803-A01

FUEL P ON - LOW FUEL PRESSURE SIGNAL TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	Indication		
Phase	Alarms VEMD	Warning indicator lights	
ENGINE RUNNING		Fuel tank	

B. REMINDER OF THE NORMAL OPERATING CONDITION

During operation, the low fuel pressure signal must be off.

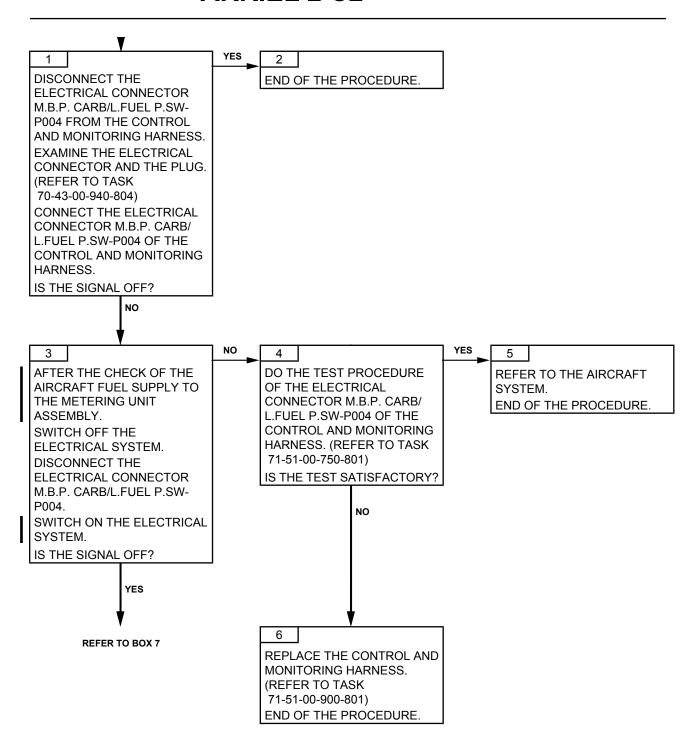
C. POSSIBLE CAUSES

- Low-fuel pressure switch
- Control and monitoring harness
- Aircraft electrical harness
- Pump and metering unit assembly
- Aircraft fuel supply system

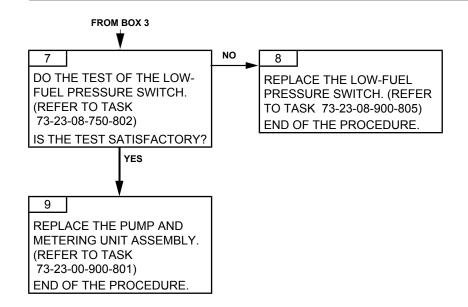
2. PROCEDURE

TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL



MAINTENANCE MANUAL



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SAFRAN HELICOPTER ENGINES

ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-814-805-A01

ENGINE PARAMETER OUT OF LIMIT - TORQUE LIMITATIONS EXCEEDED **TROUBLESHOOTING**

1. **GENERAL**

PHASE AND FAILURE DETECTION Α.

	MH65D INDICATION	
Phase	Alarms VEMD Warning indication lights	
ENGINE RUN- NING	Red flash under TRQ and Over Limit de- tected	

	MH65E INDICATION		
Phase	MFD EICAS page	CDU TDL page	ECMS page
ENGINE RUN- NING	Yellow ENG EXCEED		ENGINE QT

REMINDER OF THE NORMAL OPERATING CONDITION B.

Torque limitations exceeded (Refer to Task 71-00-01-940-801).

CAUTION:

IF THE TORQUE LIMITATIONS ARE EXCEEDED, NOTE THE VALUE RECORDED IN THE OVER LIMIT DETECTED FUNCTION OF THE VEMD ON THE ENGINE LOG BOOK.

C. **POSSIBLE CAUSES**

- Module 01
- Module 03
- Module 04
- Module 05

NOTE: Make sure that the torque measurement system operates correctly; to do so, make sure that the messages below are not displayed on the VEMD: TRQ.A, TRQ.B, TRQ CL. A, TRQ CL. B.

2. **PROCEDURE**

■ Effectivity: C2 BASE

Failures observed during engine operation

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SAFRAN HELICOPTER ENGINES

ARRIEL 2 C2

MAINTENANCE MANUAL

V

DO THE PROCEDURE. (REFER TO TASK 71-00-01-940-801 (SUB-TASK 71-00-01-940-015-A01))

■ Effectivity: C2 BASE

TASK 71-00-06-814-805-C01 ENGINE PARAMETER OUT OF LIMIT - TORQUE

LIMITATIONS EXCEEDED TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	MH65D INDICATION	
Phase	Alarms VEMD Warning indication lights	
ENGINE RUN- NING	Red flash under TRQ and Over Limit de- tected	

	MH65E INDICATION		
Phase	MFD EICAS page	CDU TDL page	ECMS page
ENGINE RUN- NING	Yellow ENG EXCEED		ENGINE QT

B. REMINDER OF THE NORMAL OPERATING CONDITION

Torque limitations exceeded (Refer to Task 71-00-01-940-801).

<u>CAUTION</u>: IF THE TORQUE LIMITATIONS ARE EXCEEDED, NOTE THE VALUE RECORDED

IN THE OVER LIMIT DETECTED FUNCTION OF THE VEMD ON THE ENGINE

LOG BOOK.

C. POSSIBLE CAUSES

- Non-compliant torquemeter sensor (TU219 not applied)
- Module 01
- Module 03
- Module 04
- Module 05

NOTE: Make sure that the torque measurement system operates correctly; to do so, make sure that the messages below are not displayed on the VEMD:

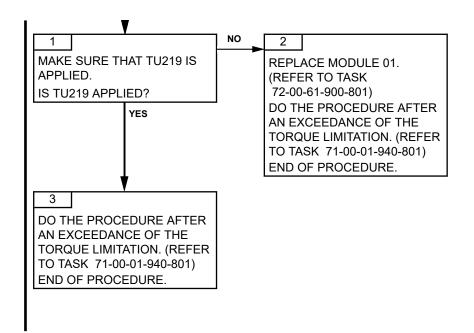
TRQ.A, TRQ.B, TRQ CL. A, TRQ CL. B.

2. PROCEDURE

Effectivity: C2 TU 209

Failures observed during engine operation

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Effectivity: C2 TU 209

TASK 71-00-06-814-806-A01

ENGINE PARAMETER OUT OF LIMIT - N1 LIMITATIONS EXCEEDED TROUBLESHOOTING

1. **GENERAL**

A. PHASE AND FAILURE DETECTION

Phase	OTHER AVIONIC INDICATION	
Filase	Alarms VEMD	Warning indicator lights
ENGINE RUNNING	Flashing Red line under the N1 indication	

ſ	Phase	MH65E INDICATION		
	Filase	MFD EICAS page	CDU TDL page	ECMS page
Γ	ENGINE RUNNING	Yellow ENG EXCEED		ENGINE N1

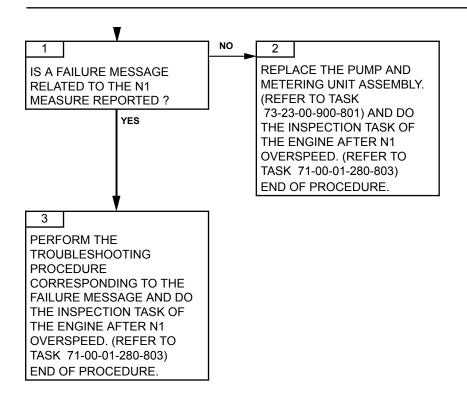
B. REMINDER OF THE NORMAL OPERATING CONDITION

N1 limitations (Refer to Task 71-00-01-940-801).

C. POSSIBLE CAUSES

- Pump and metering Unit assembly
- N1 measurement system.

2. PROCEDURE



MAINTENANCE MANUAL

TASK 71-00-06-814-807-A01

ENGINE PARAMETER OUT OF LIMIT - N2 LIMITATIONS EXCEEDED TROUBLESHOOTING

1. **GENERAL**

A. PHASE AND FAILURE DETECTION

Phase	OTHER AVIONIC INDICATION	
Filase	Alarms VEMD	Warning indicator lights
ENGINE RUNNING	Over Limit detected	NR/2 NTL indicator

Phase	MH65E INDICATION		
Filase	MFD EICAS page	CDU TDL page	ECMS page
ENGINE RUNNING	Yellow ENG EXCEED		ENGINE N2

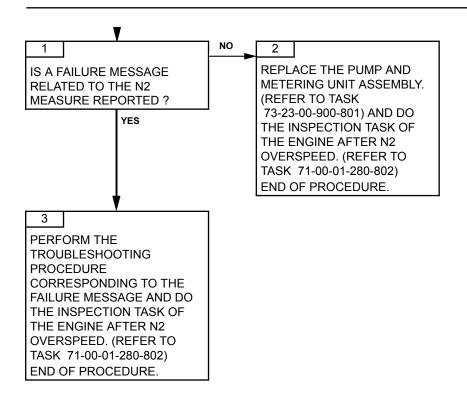
B. REMINDER OF THE NORMAL OPERATING CONDITION

N2 limitations (Refer to Task 71-00-01-940-801)

C. POSSIBLE CAUSES

- Pump and metering Unit assembly
- N2 measurement system.

2. PROCEDURE



TASK 71-00-06-814-808-A01

PARAMETER INSTABILITY - OIL PRESSURE TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	OTHER AVIONIC INDICATION	
Phase	Alarms VEMD	Warning indication lights
ENGINE RUN- NING	ENGINE OIL PRESSURE indicator	

	MH65E INDICATION		
Phase	MFD EICAS page	CDU TDL page	ECMS page
ENGINE RUN- NING	ENGINE OIL PRESSURE indicator	N/A	N/A

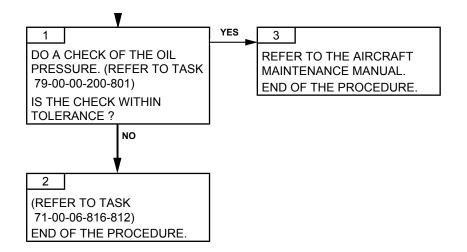
B. FAILURE DETECTION CONDITIONS

Evolution of the oil pressure during the flight.

C. POSSIBLE CAUSES

- Leakage
- Oil system contamination
- Oil pump
- Reduction gearbox module (M05)

2. PROCEDURE



TASK 71-00-06-814-809-A01

ENG P ON - LOW OIL PRESSURE SIGNAL TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	Indication		
Phase	Alarms VEMD	Warning indicator lights	
ENGINE RUNNING		Red ENG 1 or ENG 2 on	

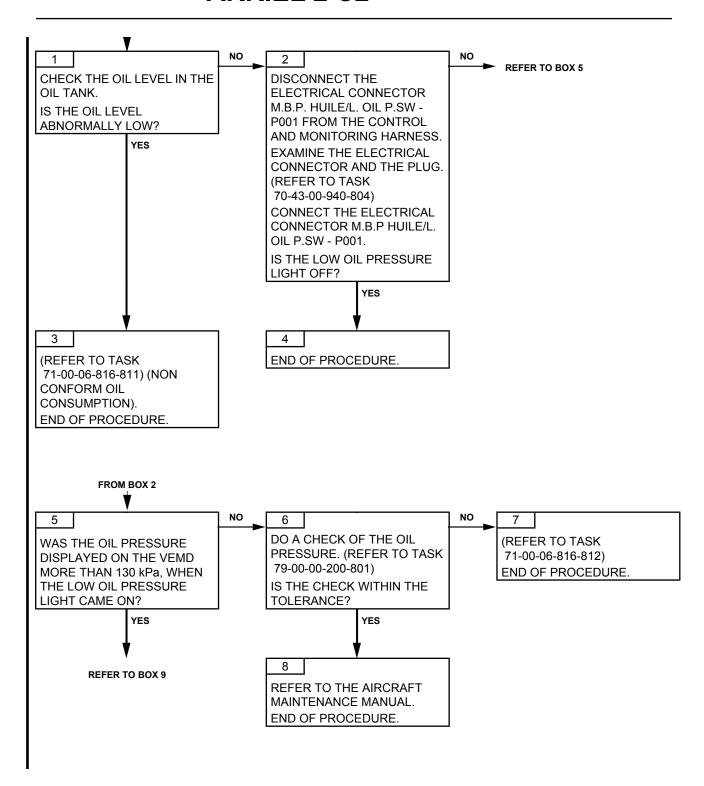
B. REMINDER OF THE NORMAL OPERATING CONDITION

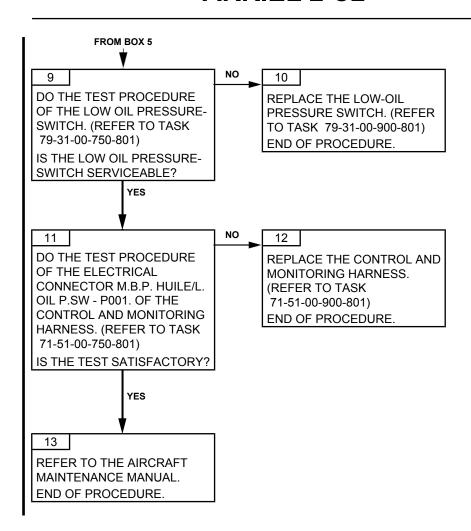
During operation, the ENG 1 or ENG 2 light must be off for an oil pressure P > 130 kPa (18.9 PSI).

C. POSSIBLE CAUSES

- Low-oil pressure switch
- Control and monitoring harness

2. PROCEDURE





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TASK 71-00-06-814-810-A01

ENGINE PARAMETER OUT OF LIMIT - OIL OVERTEMPERATURE TROUBLESHOOTING

1. **GENERAL**

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms Warning lights	
RUNNING		

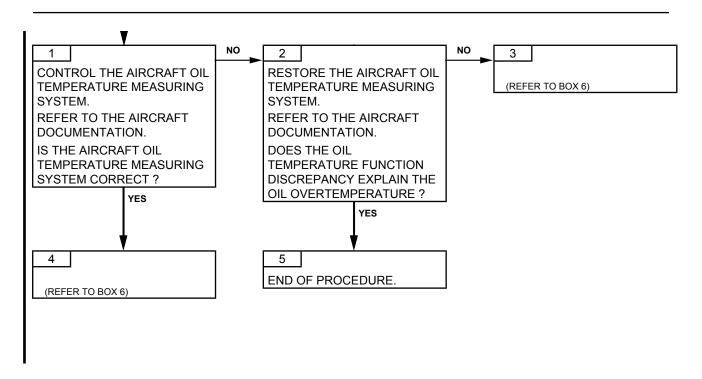
B. REMINDER OF THE OPERATING NORMAL CONDITION OR FAILURE DETECTION

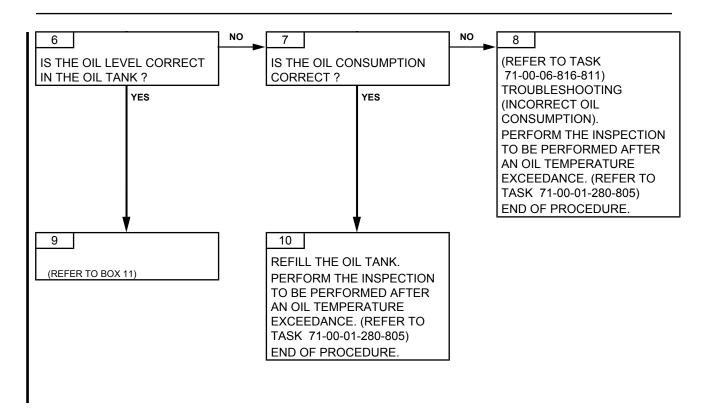
Refer to limitations. (Refer to Task 71-00-01-940-801)

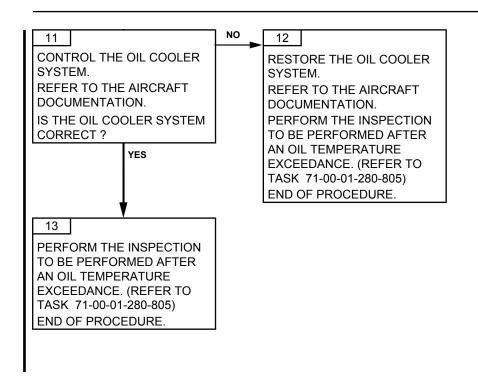
C. POSSIBLE CAUSES

- Aircraft oil temperature measuring system
- Oil quantity
- Aircraft oil cooling system

2. PROCEDURE







TASK 71-00-06-814-812-A01

PARAMETER INSTABILITY - TORQUE TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

١	Phase	OTHER AVIONIC INDICATION	
		Alarms VEMD	Warning indicator lights
	ENGINE RUNNING	Torque "FLI" indication	

Phase	MH65E INDICATION		
	MFD EICAS page	CDU TDL page	ECMS page
ENGINE RUNNING	N/A	N/A	N/A

B. REMINDER OF THE NORMAL OPERATING CONDITION

Normal torque indication

C. POSSIBLE CAUSES

- Control harness
- Torquemeter shaft
- Torque conformation box
- Torque indication -IIDS Aircraft manufacturer responsibility
- Torquemeter sensor
- DECU

<u>NOTE</u>: Before proceeding with the troubleshooting, make sure that there is no failure message related to the torque measurement system on the avionic.

2. PROCEDURE

MAINTENANCE MANUAL

V

REPLACE THE MODULE 01. (REFER TO TASK 72-00-61-900-801) END OF THE PROCEDURE

TASK 71-00-06-815-801-A01

UNUSUAL NOISES DURING RUNDOWN PHASE TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

Phase	OTHER AVIONIC INDICATION		
	Alarms VEMD	Warning indicator lights	
SHUTDOWN	N/A	N/A	

Phase	MH65E INDICATION		
Filase	MFD EICAS page	CDU TDL page	ECMS page
SHUTDOWN	N/A	N/A	N/A

B. REMINDER OF THE OPERATING NORMAL CONDITION

At engine shutdown (after stabilization at 30-second idle rating).

C. POSSIBLE CAUSES

- Compressor module (M02)
- Starter
- Pump and metering unit assembly
- Alternator
- Oil pump
- Gas generator module (M03)
- Reduction gearbox module (M05)
- Power turbine module (M04)

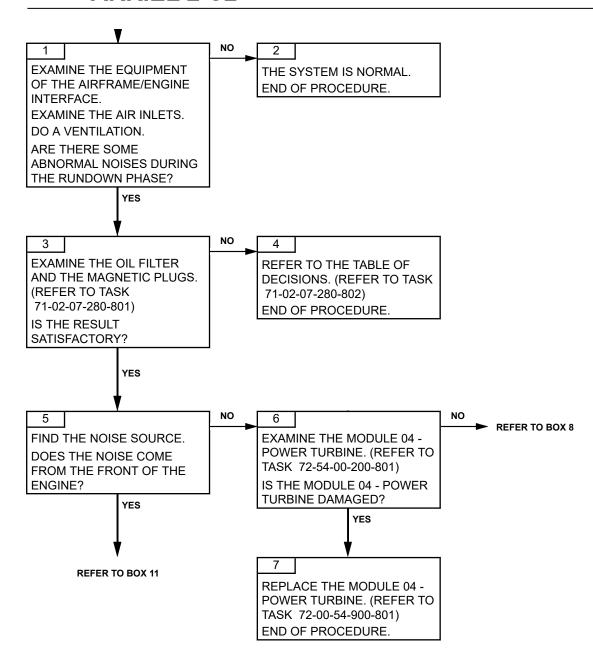
2. PROCEDURE

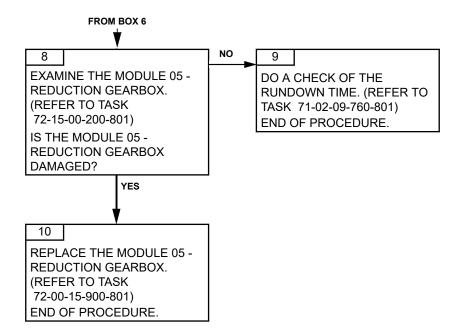
<u>NOTE</u>: It is necessary to check the permeability of the injection wheel so as to rule on the effectivity of the MTI X292M1308. This MTI makes it possible to clean or replace the injection manifold and to replace the HP turbine. It makes it possible to free from the full replacement of the module 03.

Effectivity: C2

Failures observed during engine operation

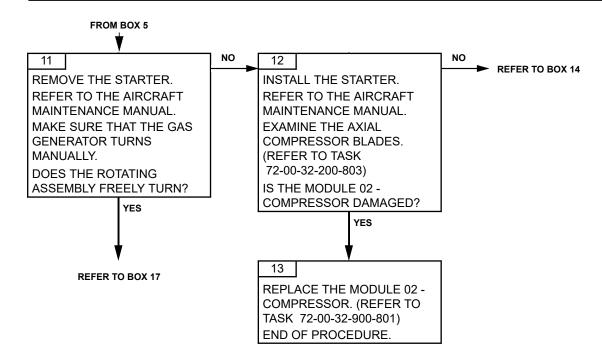
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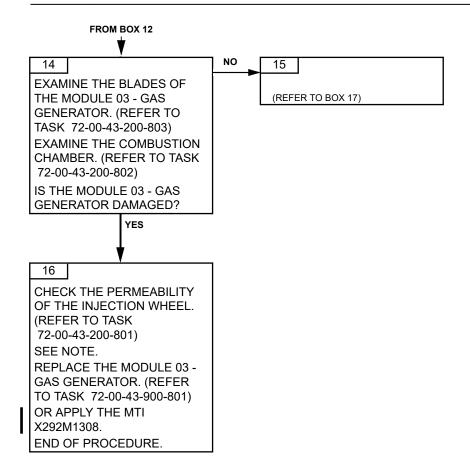


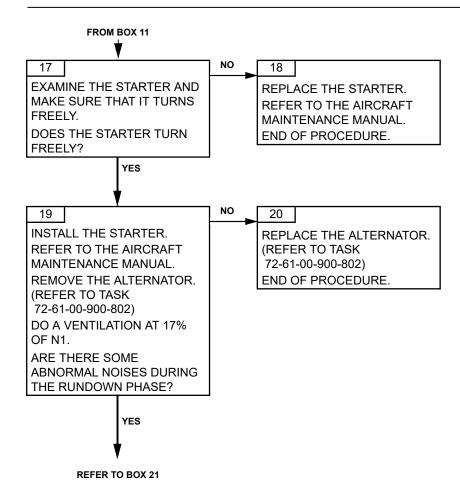


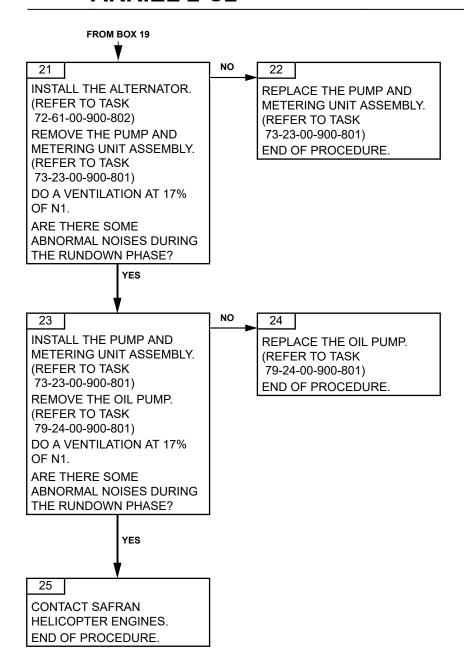
Effectivity: C2

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SAFRAN HELICOPTER ENGINES

ARRIEL 2 C2

MAINTENANCE MANUAL

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TASK 71-00-06-815-802-A01

RUNDOWN TIME OUT OF LIMIT TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

Phase	OTHER AVIONIC INDICATION		
	Alarms VEMD	Warning indicator lights	
SHUTDOWN	N/A	N/A	

Phase	MH65E INDICATION		
Filase	MFD EICAS page	CDU TDL page	ECMS page
SHUTDOWN	N/A	N/A	N/A

B. REMINDER OF THE NORMAL OPERATING CONDITION

In normal condition, the rundown time of the gas generator must be higher than the criteria given in Maintenance Manual task. (Refer to Task 71-02-09-760-801).

C. POSSIBLE CAUSES

- Module 01 Accessory gearbox and transmission shaft
- Module 02 Compressor
- Module 03 Gas generator
- Starter generator
- Oil pump
- HMU
- Alternator

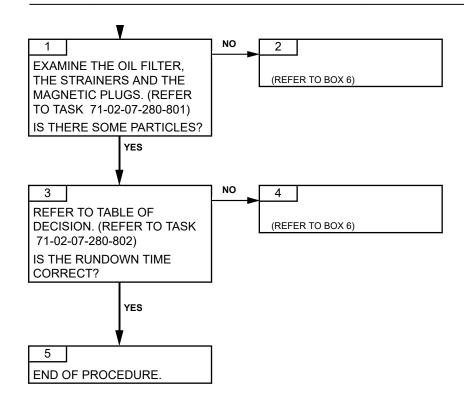
2. PROCEDURE

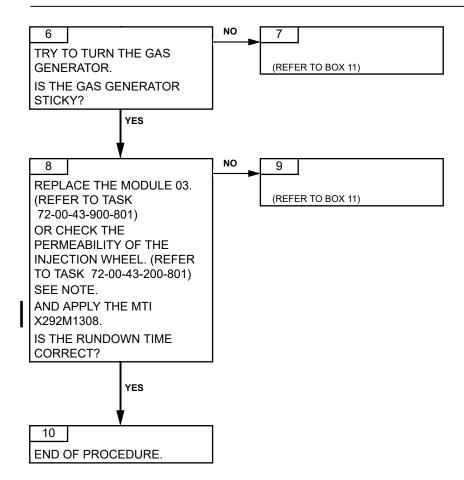
<u>NOTE</u>: It is necessary to check the permeability of the injection wheel so as to rule on the effectivity of the MTI X292M1308. This MTI makes it possible to clean or replace the injection manifold and to replace the HP turbine. It makes it possible to free from the full replacement of the module 03.

Effectivity: C2

Failures observed during engine operation

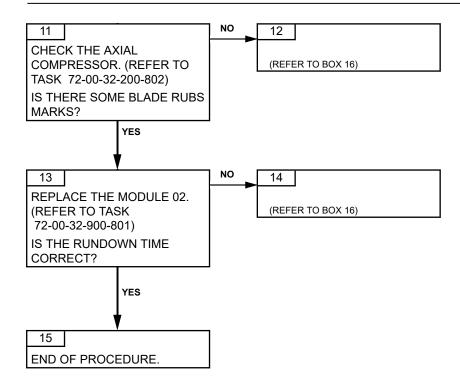
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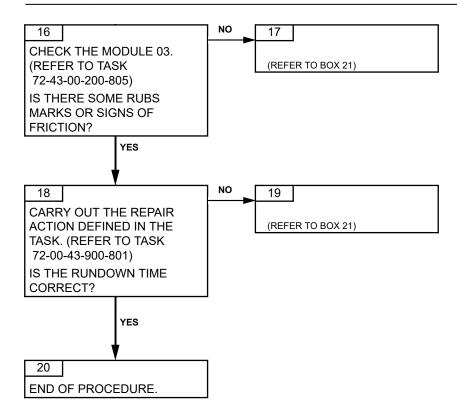




Effectivity: C2

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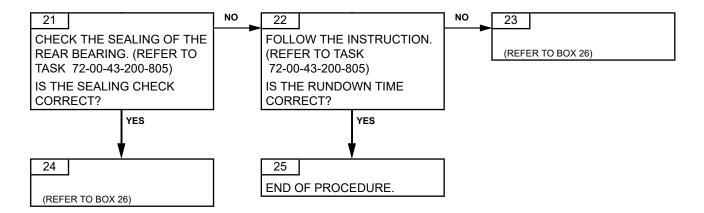




SAFRAN HELICOPTER ENGINES

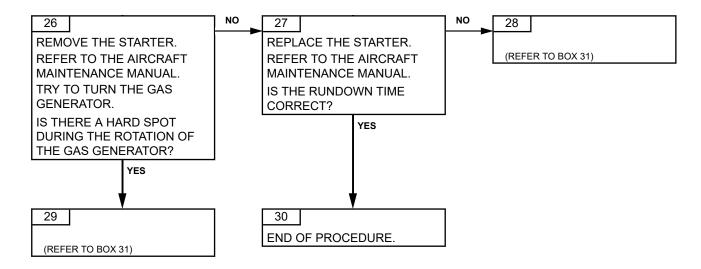
ARRIEL 2 C2

MAINTENANCE MANUAL



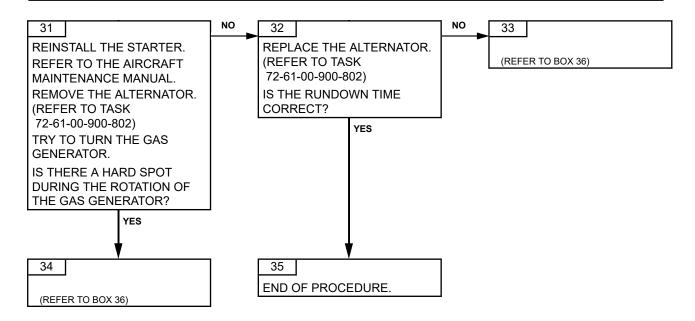
ARRIEL 2 C2

MAINTENANCE MANUAL



ARRIEL 2 C2

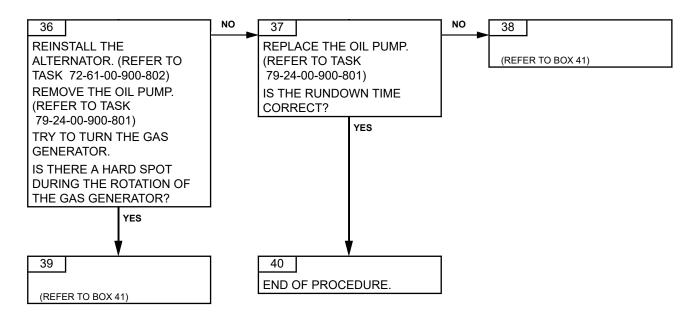
MAINTENANCE MANUAL



Effectivity: C2

ARRIEL 2 C2

MAINTENANCE MANUAL

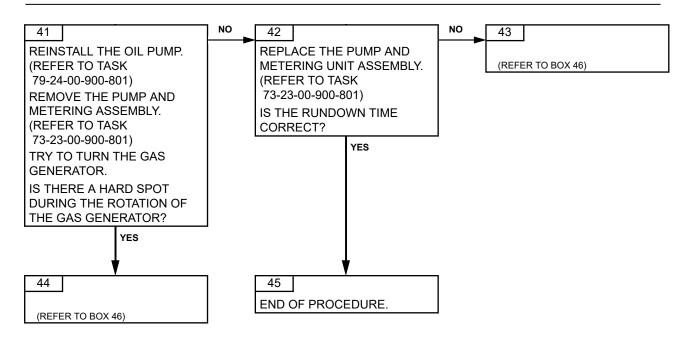


Effectivity: C2

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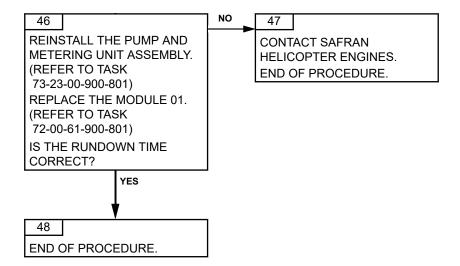
ARRIEL 2 C2

MAINTENANCE MANUAL



ARRIEL 2 C2

MAINTENANCE MANUAL



Effectivity: C2

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ARRIEL 2 C2

MAINTENANCE MANUAL

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Effectivity: C2

TASK 71-00-06-815-804-A01

FUEL P OFF - NO LOW FUEL PRESSURE SIGNAL TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms VEMD	Warning indicator lights
ENGINE SHUTDOWN		Fuel tank

B. REMINDER OF THE NORMAL OPERATING CONDITION

At engine shutdown, the low fuel pressure signal must be on.

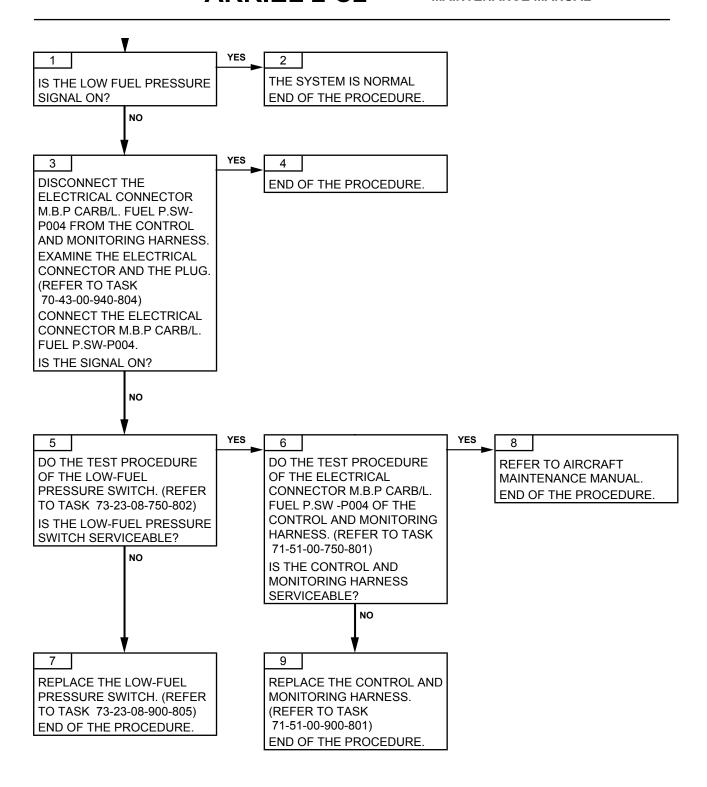
C. POSSIBLE CAUSES

- Low-fuel pressure switch
- Control and monitoring harness
- Aircraft

2. PROCEDURE

TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL



TASK 71-00-06-815-805-A01

ENG P OFF - NO LOW OIL PRESSURE SIGNAL TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

	Indication	
Phase	Alarms VEMD	Warning indicator lights
ENGINE SHUTDOWN		Red ENG 1 or ENG 2 off

B. REMINDER OF THE NORMAL OPERATING CONDITION

At engine shutdown, the ENG 1 or ENG 2 Lights must be on.

C. POSSIBLE CAUSES

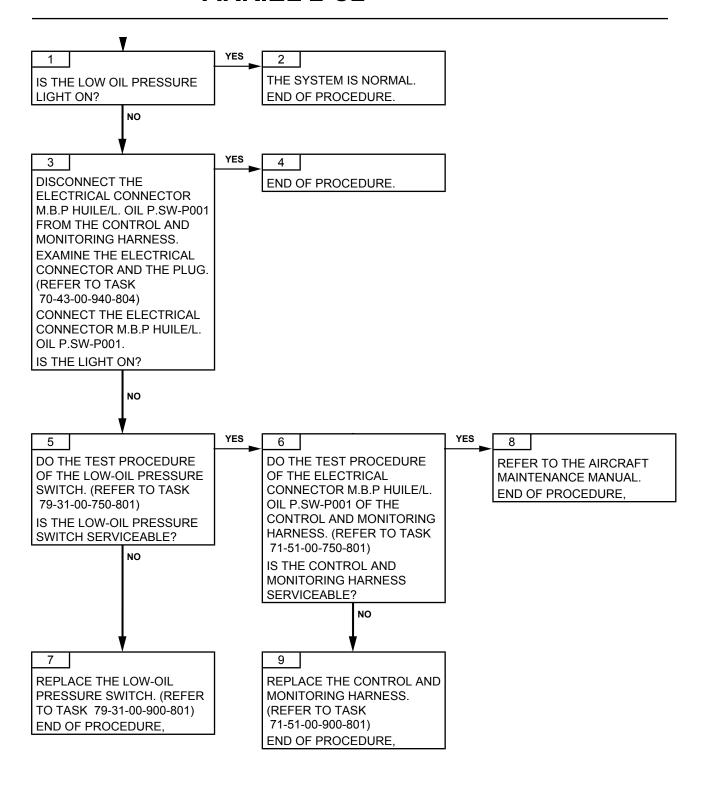
- Low-oil pressure switch
- Control and monitoring harness
- Aircraft

2. PROCEDURE

May 30/2010

TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL



ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-815-806-A01

POWER TURBINE BLOCKED TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

At engine shutdown, the power turbine must turn freely.

B. POSSIBLE CAUSES

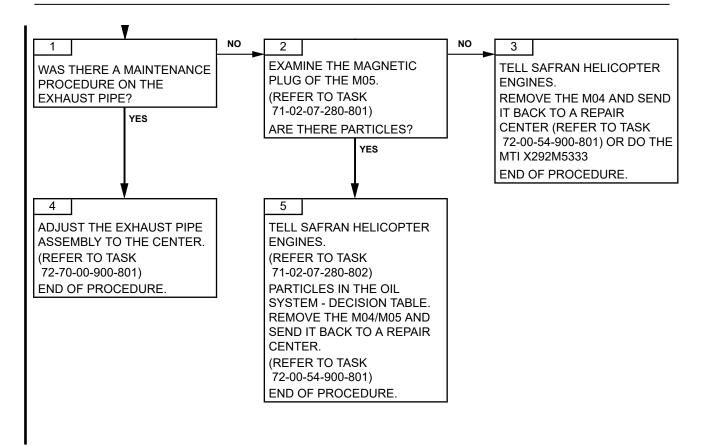
- Exhaust pipe assembly
- Labyrinth ring

2. PROCEDURE

Effectivity: C2

Failures observed during engine operation

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ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-801-A01

SMOKE FROM EXHAUST PIPE TROUBLESHOOTING

1. GENERAL

A. REMINDER OF THE NORMAL OPERATING CONDITION

 In normal operating condition, no white smoke at the exhaust pipe outlet and no important oil consumption.

B. POSSIBLE CAUSES

- Clogging of the rear bearing
- Breather sealing ring
- Module 03
- P3 tube of module 05
- Module 04
- Module 03 breather pipe
- Vent line
- Start electro-valve

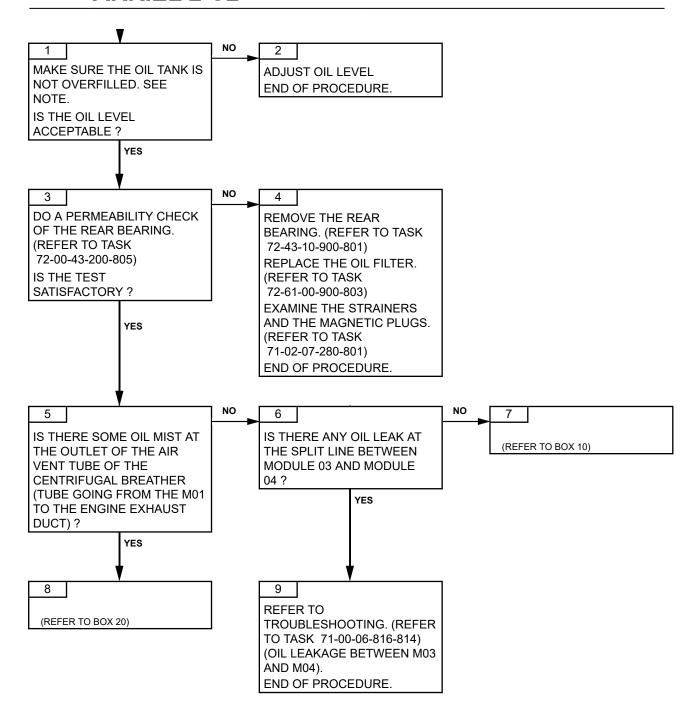
2. PROCEDURE

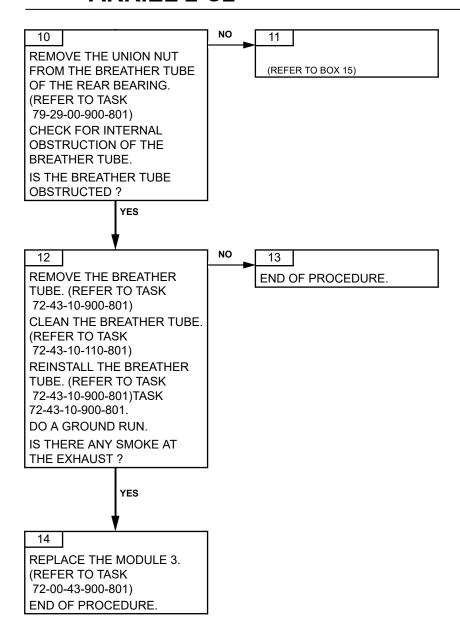
NOTE: If the oil tank is overfilled, excess oil will be consumed via the vent line until optimum oil tank level is reached. This may cause some oil smoke at the exhaust.

Effectivity: C2

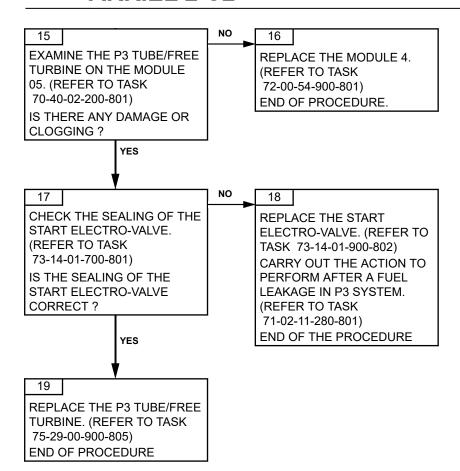
Failures observed during maintenance

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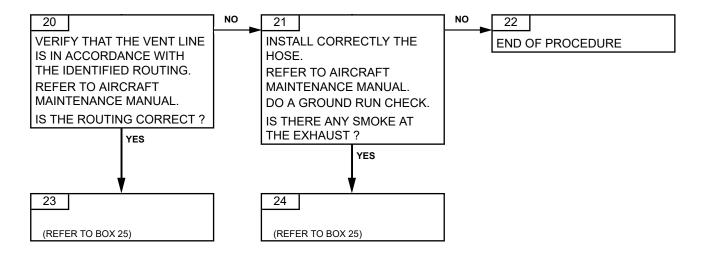


Effectivity: C2



ARRIEL 2 C2

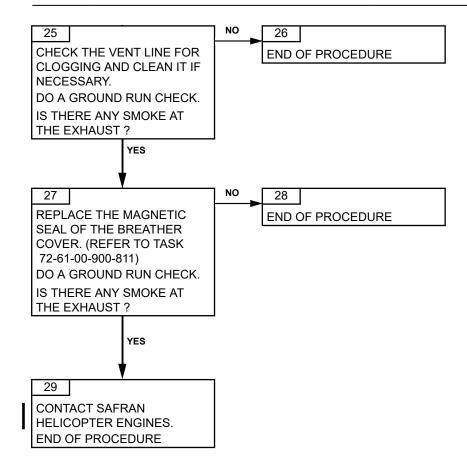
MAINTENANCE MANUAL



Effectivity: C2

Failures observed during maintenance

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Effectivity: C2

TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-803-A01

PARTICLES IN THE OIL FILTERING ELEMENT TROUBLESHOOTING

1. GENERAL

A. REMINDER OF THE NORMAL OPERATING CONDITION

 Findings made from the application of the removal procedure of the oil filtering element (Refer to Task 72-61-00-900-803)

CAUTION: ACCEPT THE PRESENCE OF SOME CUTTING CHIPS ONLY DURING THE 20

FIRST HOURS OF THE ENGINE OPERATION.

CAUTION: SEND THE PARTICLES TO A SPECIALIZED LABORATORY FOR ANALYSIS.

ONLY A SPECIALIZED LABORATORY CAN MAKE AN ACCURATE DIAGNOSIS.

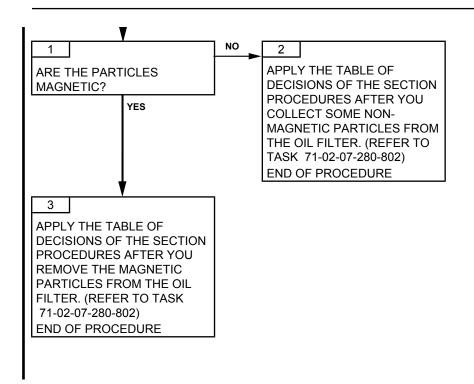
B. POSSIBLE CAUSES

- Damage of a rotating assembly
- Damage of a seal, etc
- Clogging of the rear bearing.

2. PROCEDURE

TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL



MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-816-804-B01

LEAK AT THE AIRCRAFT DRAIN CLUSTER TROUBLESHOOTING

1. GENERAL

A. REMINDER OF THE NORMAL OPERATING CONDITION OR FAILURE DETECTION

This troubleshooting task is relevant in case of abnormal leak noticed at the helicopter drain under the engine deck.

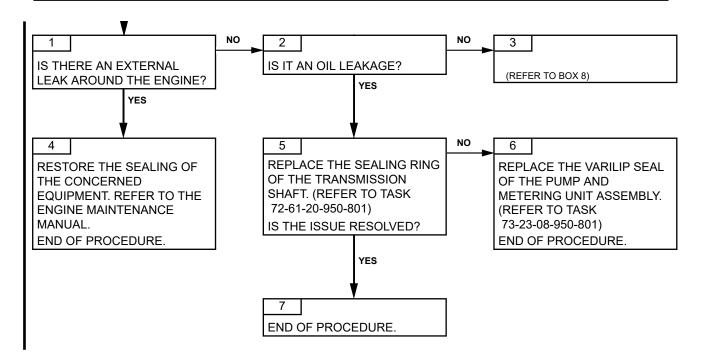
- If there is an oil leakage, this one must meet the criteria defined on the Task 79-00-00-280-801.
- If there is a fuel leakage, this one must meet the criteria defined on the Task 73-23-00-700-801.

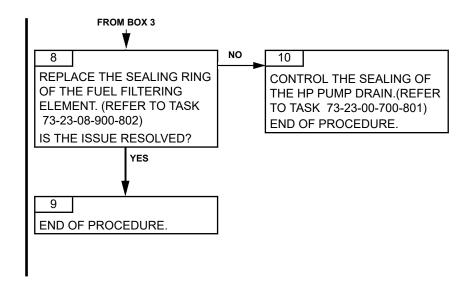
B. POSSIBLE CAUSES

- Magnetic seal of the transmission shaft
- Sealing ring of the fuel filtering element
- Varilip seal of the pump and metering unit assembly.
- Engine or equipment external leakage

2. PROCEDURE

Effectivity: C2 TU 043A





Effectivity: C2 TU 043A

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ARRIEL 2 C2

MAINTENANCE MANUAL

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Effectivity: C2 TU 043A

ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-805-A01

ABNORMAL FUEL LEAKAGE AT THE TANK RETURN FUEL TUBE TROUBLESHOOTING

1. **GENERAL**

A. FAILURE DETECTION CONDITIONS

 Findings made after the application of the inspection procedure of the fuel system bleedsystem(Refer to Task 72-00-43-200-804)

B. POSSIBLE CAUSES

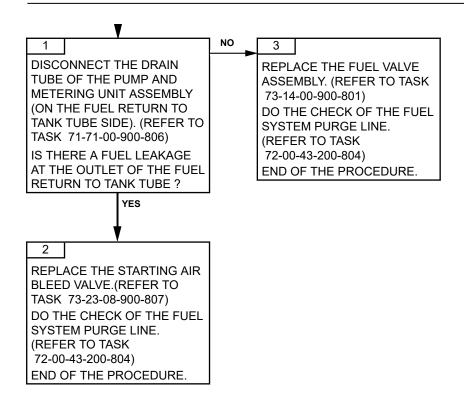
- Starting air bleed valve
- Fuel valve assembly

2. PROCEDURE

Effectivity: C2

Failures observed during maintenance

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ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-806-A01

FUEL FILTER CLOGGING INDICATOR POPPED OUT TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

The red fuel filter mechanical blockage indicator is popped out.

B. GENERAL DESCRIPTION

The engine is equipped of:

- one fuel filter pre-blockage pressure switch connected to the aircraft.
- one red fuel filter mechanical blockage indicator.

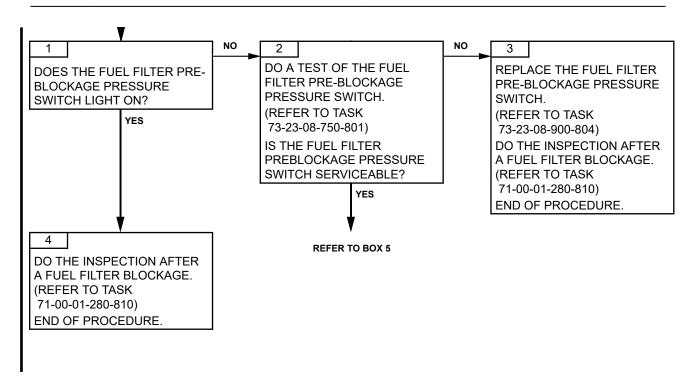
C. POSSIBLE CAUSES

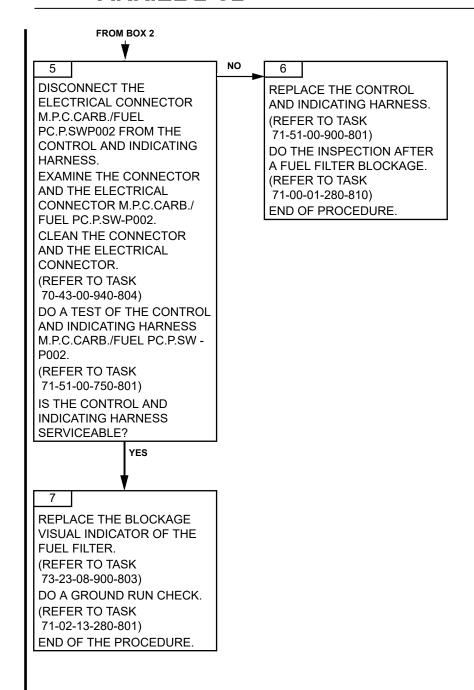
- Pre-blockage pressure switch of the fuel filtering element
- Control and indicating harness
- Blockage visual indicator of the fuel filter
- Fuel contamination

2. PROCEDURE

Effectivity: C2

71-00-06-816-806-A01





June 15/2023

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MAINTENANCE MANUAL

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Effectivity: C2

ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-807-A01

FUEL DILUTION RATE IN OIL NOT COMPLIANT TROUBLESHOOTING

1. GENERAL

A. REMINDER OF THE NORMAL OPERATING CONDITION

This troubleshooting task is applicable when the result of the control of the fuel dilution in oil defined in Task 70-02-00-940-801 is not compliant.

B. POSSIBLE CAUSES

- Oil filter
- Start electrovalve

NOTE: A failure at the start electrovalve can come along with a smell of fuel in the cockpit and/or of smoke at the exhaust pipe.

2. PROCEDURE

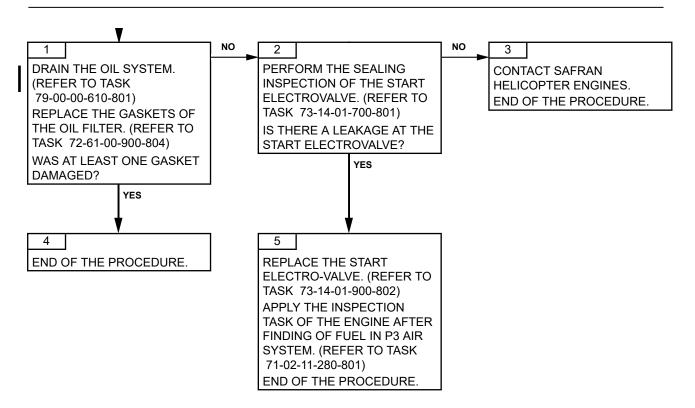
Effectivity: C2

Failures observed during maintenance

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MAINTENANCE MANUAL



TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-808-A01

INCORRECT OPERATION OF ONE OF THE IGNITION DEVICE LINES
TROUBLESHOOTING

1. **GENERAL**

A. FAILURE DETECTION CONDITIONS

- Finding after the application of the check and inspection procedure of the ignition system (Refer to Task 72-43-00-200-806)
- The second ignition SYSTEM is serviceable after the application of task (Refer to Task 72-43-00-200-806)

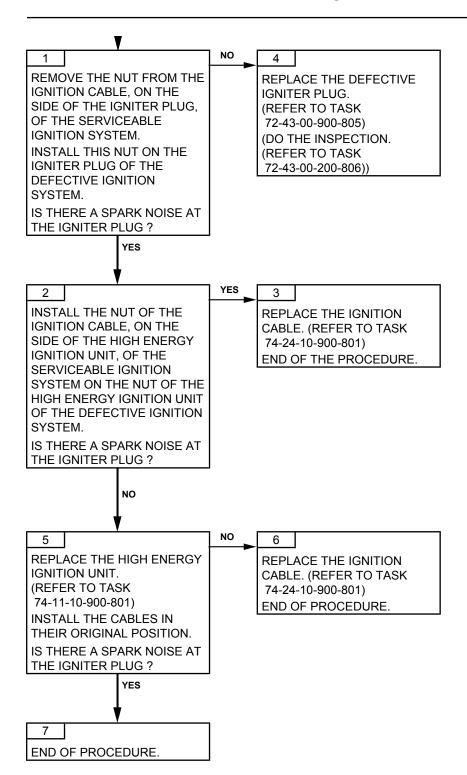
B. POSSIBLE CAUSES

- High energy ignition unit
- Ignition cable
- Igniter plug

2. PROCEDURE

TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL



ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-811-A01

NON CONFORM OIL CONSUMPTION TROUBLESHOOTING

1. GENERAL

A. REMINDER OF THE NORMAL OPERATING CONDITION

 During operation, the oil consumption must be less than the limit defined. (Refer to Task 79-00-00-200-801).

B. POSSIBLE CAUSES

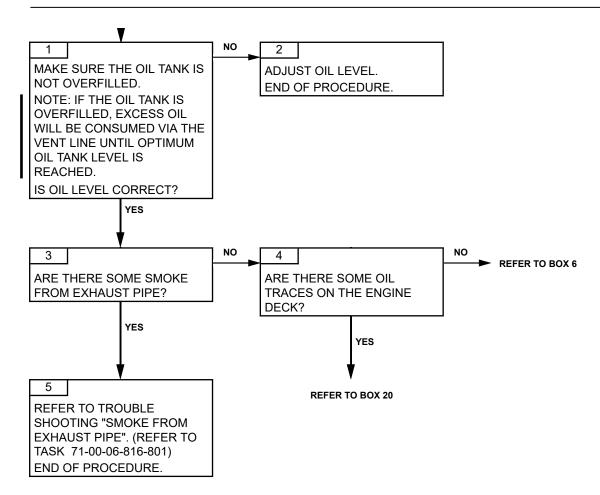
- Rear bearing (clogging of duct)
- Module 04 (bad sealing of labyrinth seal)
- Magnetic seal of the drive shaft
- Aircraft (vent pipe, hose)
- Magnetic seal of the breather
- P3 tube of the module 05 (bad sealing of M04 labyrinth seal)
- Preformed packing of the breather cover
- Oil tubes and unions.

2. PROCEDURE

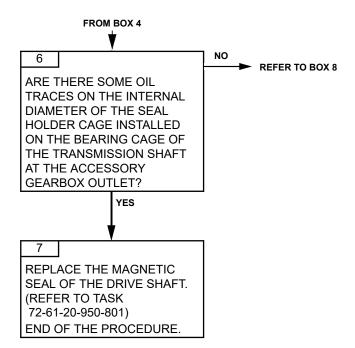
Effectivity: C2

Failures observed during maintenance

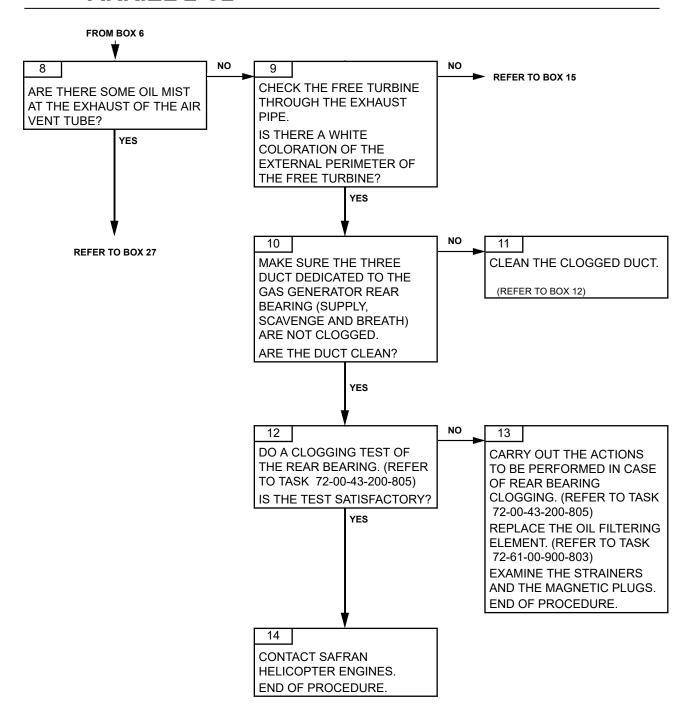
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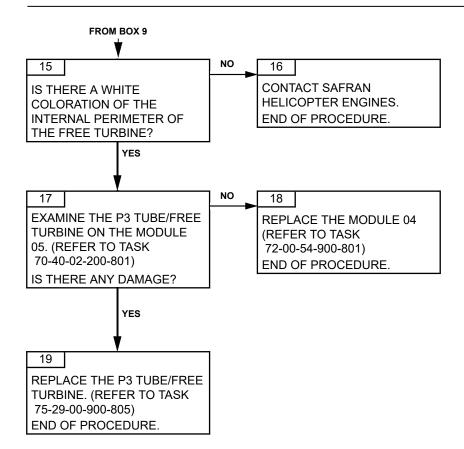


Effectivity: C2

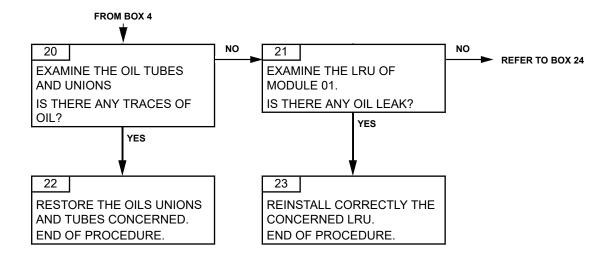


Effectivity: C2





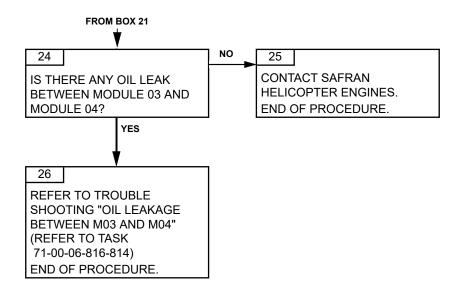
Effectivity: C2



Effectivity: C2

Failures observed during maintenance

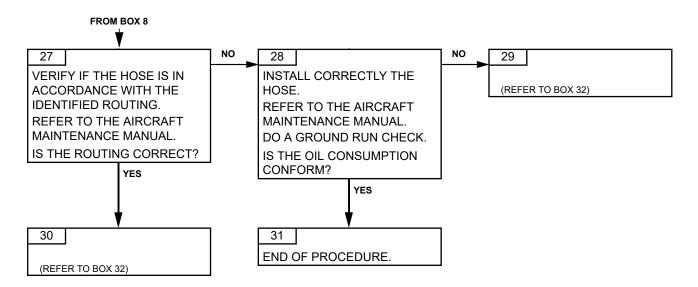
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Effectivity: C2

Failures observed during maintenance

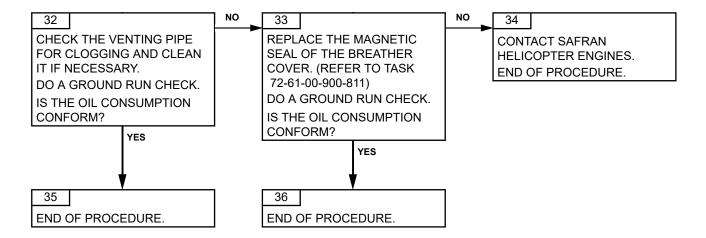
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Effectivity: C2

Failures observed during maintenance

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MAINTENANCE MANUAL

TASK 71-00-06-816-812-A01

CHECK OF ABNORMAL OIL PRESSURE TROUBLESHOOTING

1. GENERAL

A. PHASE AND FAILURE DETECTION

After a check of the oil pressure (Refer to Task 79-00-00-200-801).

B. POSSIBLE CAUSES

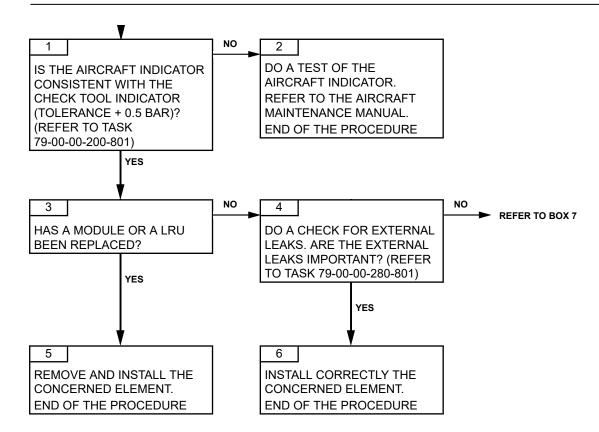
- Clogging of the rear bearing
- Leaks
- Oil system contamination
- Oil pump
- Reduction gearbox module (M05).

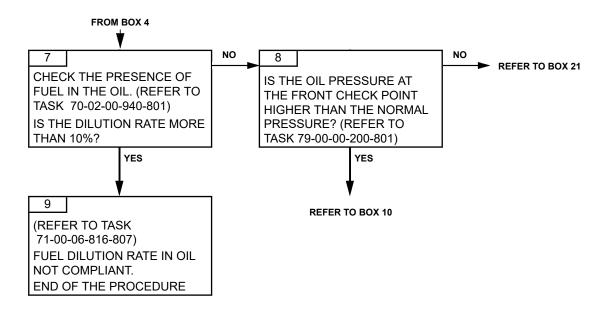
2. PROCEDURE

Effectivity: C2

Failures observed during maintenance

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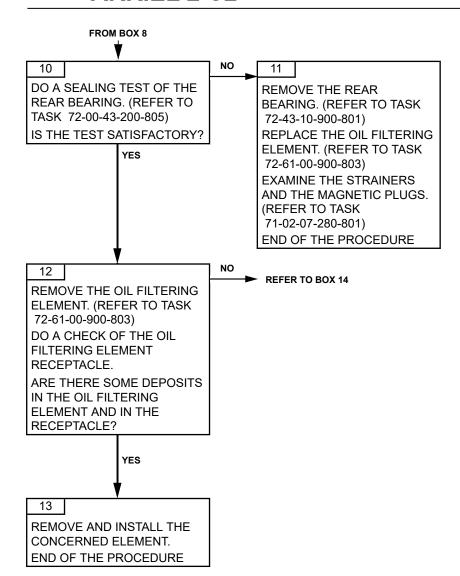




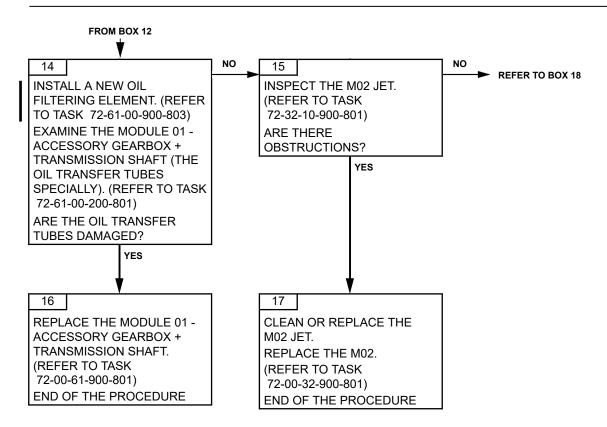
Effectivity: C2

Failures observed during maintenance

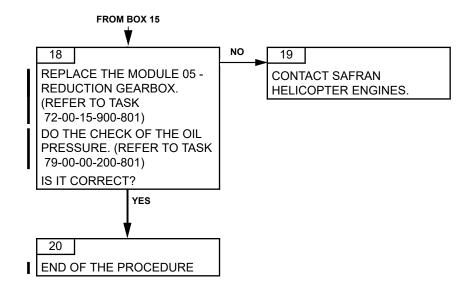
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Effectivity: C2



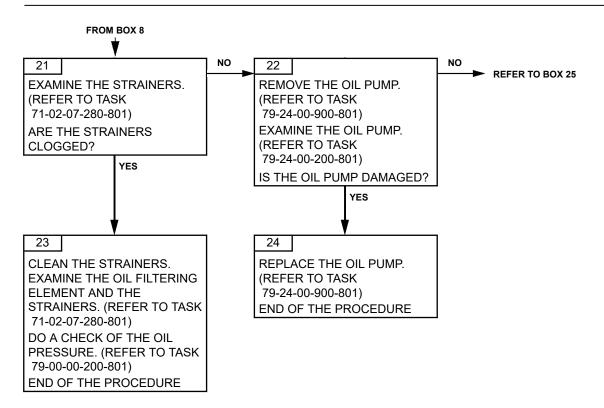
Effectivity: C2



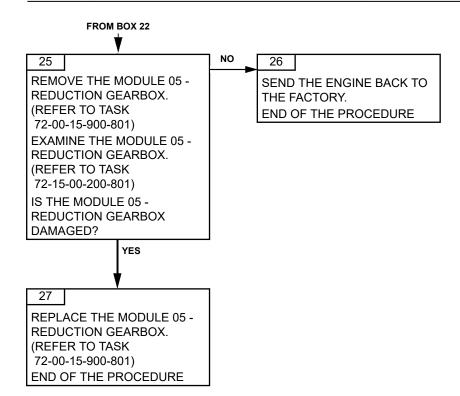
Effectivity: C2

Failures observed during maintenance

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Effectivity: C2



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MAINTENANCE MANUAL

TASK 71-00-06-816-813-A01 POPPING OUT OF THE PRE-BLOCKAGE INDICATOR

OF THE OIL FILTER TROUBLESHOOTING

1. **GENERAL**

A. GENERAL DESCRIPTION

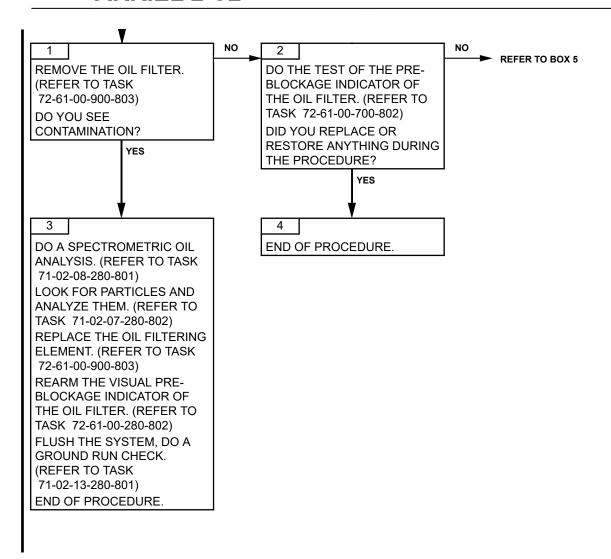
- The pre-blockage indicator of the oil filter must always be ARMED (not apparent).

B. POSSIBLE CAUSES

- Pre-blockage indicator of the oil filter
- Oil system contamination.

2. PROCEDURE

Effectivity: C2



FROM BOX 2



5

DO A SPECTROMETRIC OIL ANALYSIS. (REFER TO TASK 71-02-08-280-801) LOOK FOR PARTICLES AND ANALYZE THEM. (REFER TO TASK 71-02-07-280-802) REPLACE THE OIL FILTERING ELEMENT. (REFER TO TASK 72-61-00-900-803) REARM THE VISUAL PRE-**BLOCKAGE INDICATOR OF** THE OIL FILTER. (REFER TO TASK 72-61-00-280-802) FLUSH THE SYSTEM, DO A GROUND RUN CHECK. (REFER TO TASK 71-02-13-280-801) END OF PROCEDURE.

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MAINTENANCE MANUAL

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Effectivity: C2

ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-814-A01

OIL LEAKAGE BETWEEN M03 AND M04 TROUBLESHOOTING

1. GENERAL

A. GENERAL DESCRIPTION

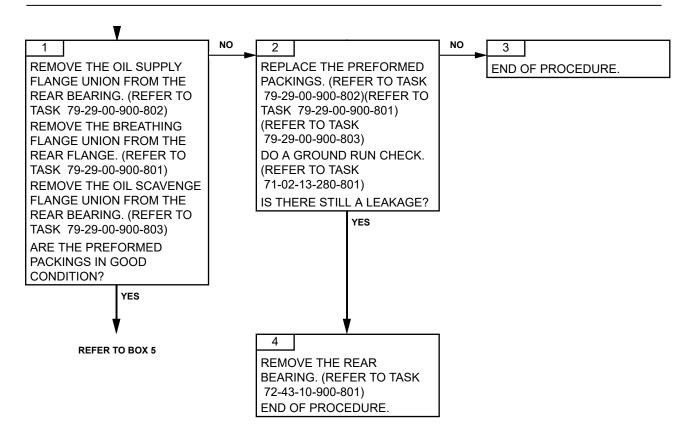
 No leakage finding after visual inspection and the engine compartment floor. Refer to chapter 05.

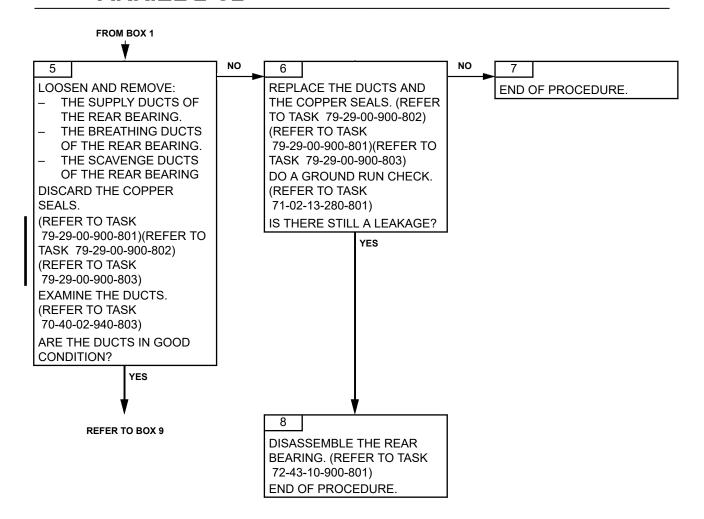
B. POSSIBLE CAUSES

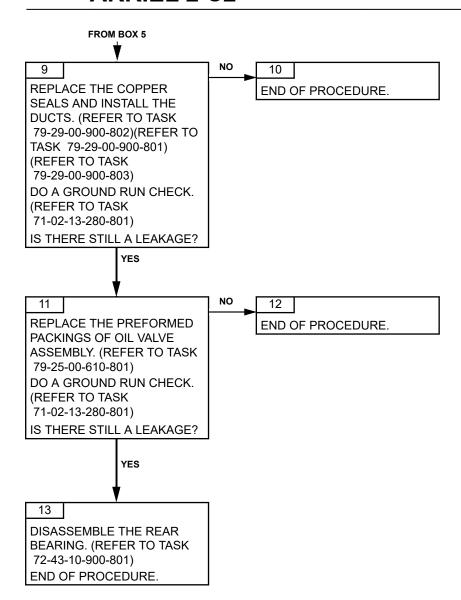
- Wear on the preformed packing at the top of the oil inlet duct
- Defective sealing at the copper seal of the duct at the rear bearing box
- Defective sealing of the preformed packings of the oil valve assembly

2. PROCEDURE

Effectivity: C2







ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-819-A01

ENGINE POWER CHECK - INCORRECT MARGIN TROUBLESHOOTING

1. GENERAL

A. INDICATION ON THE AVIONIC

The engine power check is incorrect.

B. GENERAL DESCRIPTION

Monitoring of in-service performance is a great help for engine health assessment. Trend monitoring improves troubleshooting through interpretation of performance and degradation localization. (Refer to Task 71-02-14-940-801).

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE BEFORE ANY INTERVENTION ON THE ENGINE.

C. POSSIBLE CAUSES

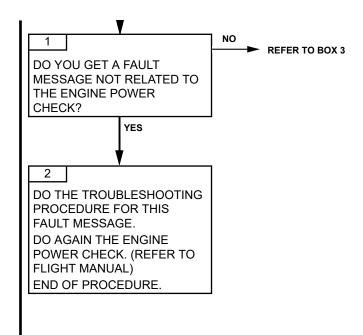
- T45 conformation
- Torque conformation
- Torque sensor
- Control harness
- Pyrometric harness
- Module 02 Axial Compressor
- Module 03 Gas Generator (Centrifugal compressor and HP Turbine)
- Module 04 Power Turbine
- Air path fouling
- Air leakage
- Air intake
- P0 aircraft measuring system
- T0 aircraft measuring system

2. PROCEDURE

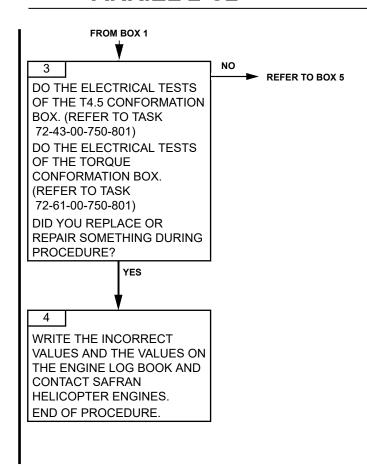
NOTE: If the EECU is pre TU93C, apply the correction on the VEMD results. Refer to flight

manual.

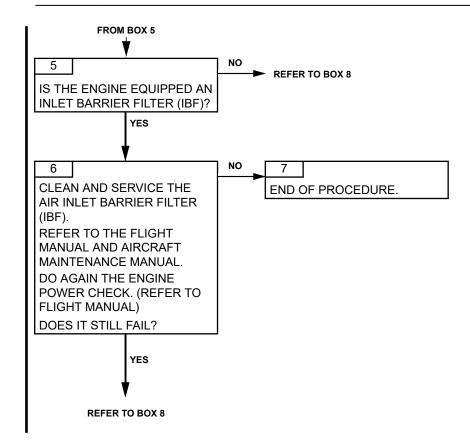
Effectivity: C2 BASE



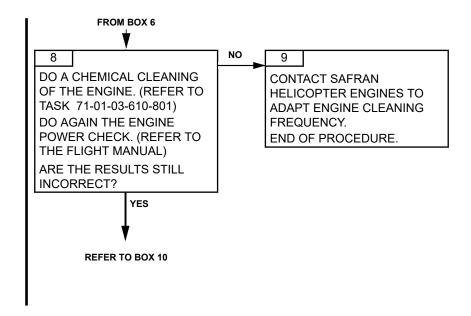
Effectivity: C2 BASE



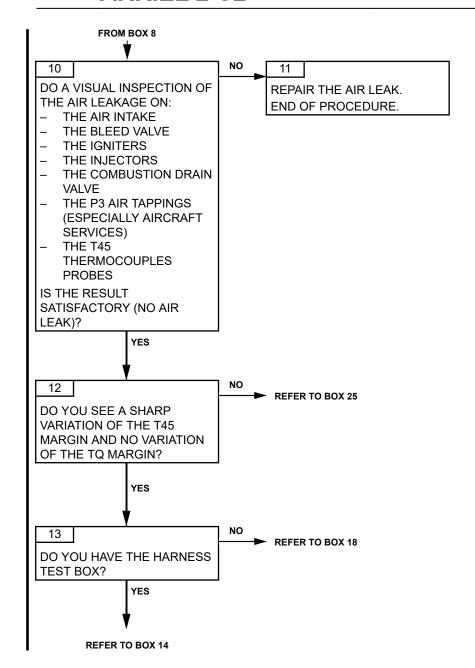
Effectivity: C2 BASE

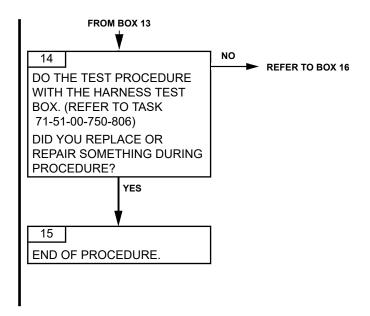


Effectivity: C2 BASE

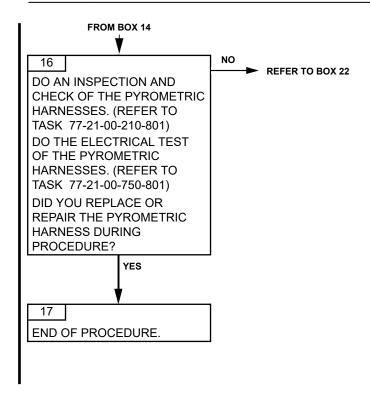


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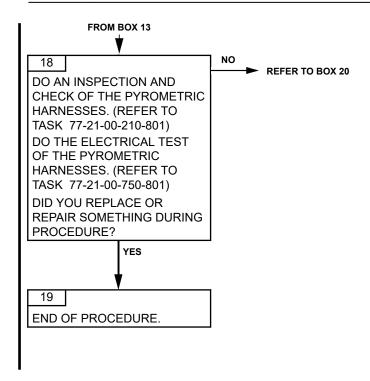




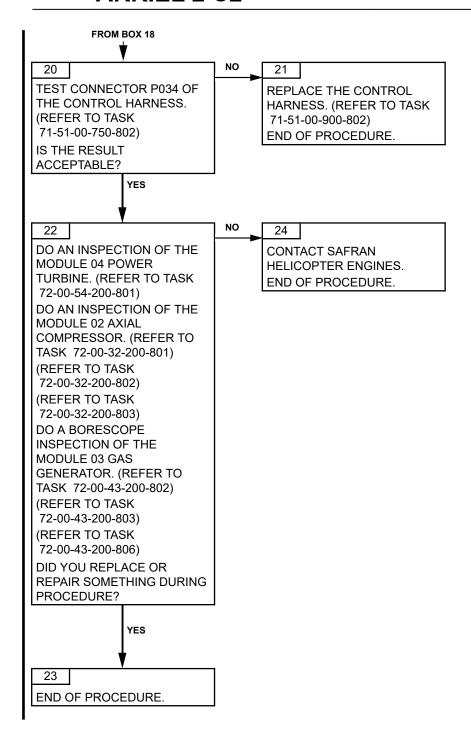
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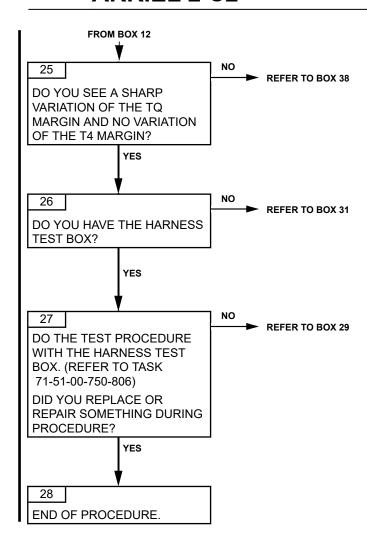


Effectivity: C2 BASE

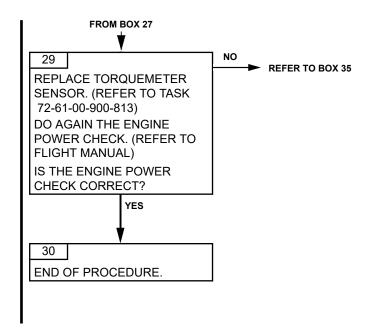


Effectivity: C2 BASE

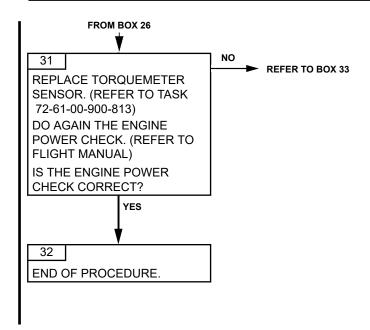


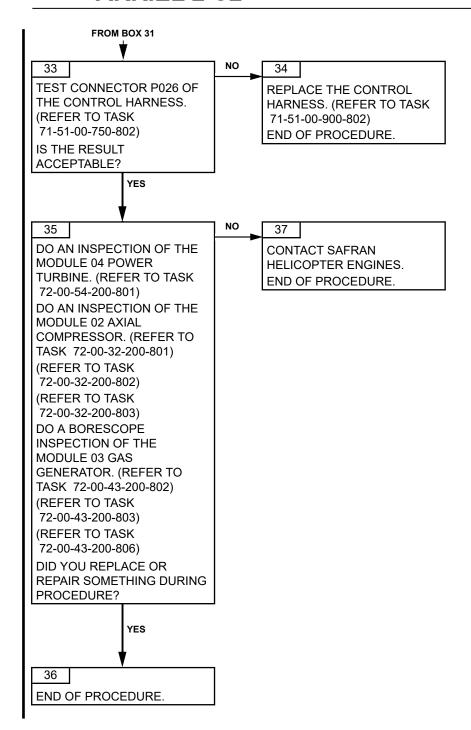


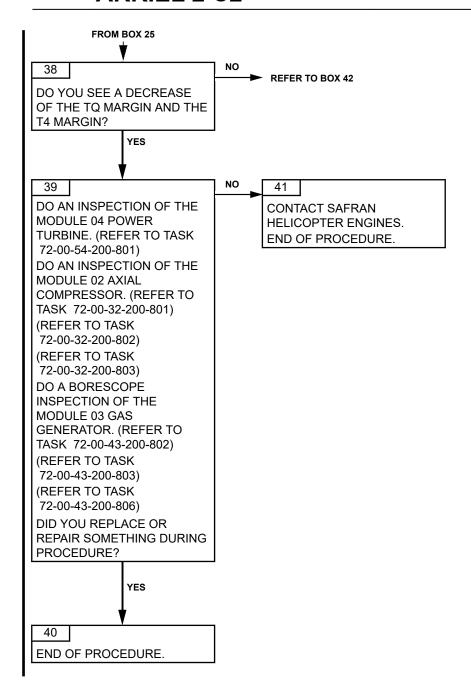
Effectivity: C2 BASE



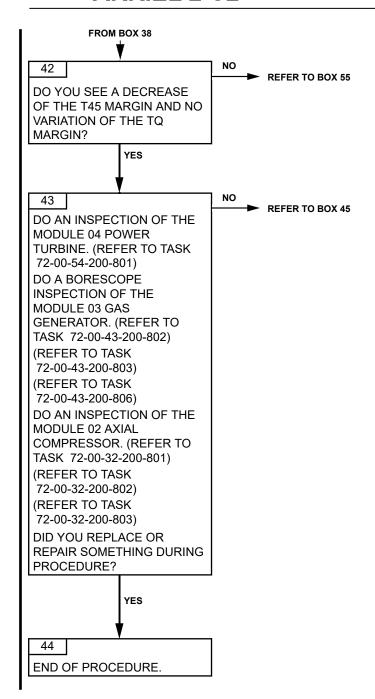
Effectivity: C2 BASE

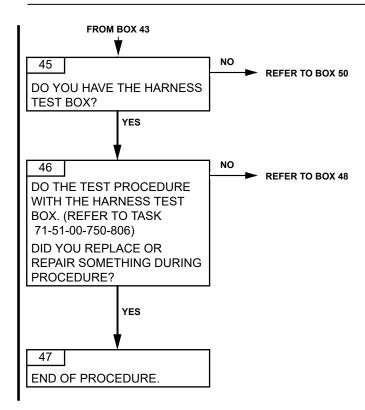




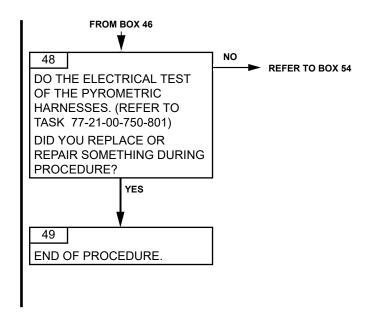


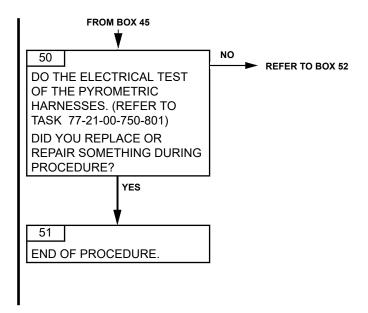
Effectivity: C2 BASE



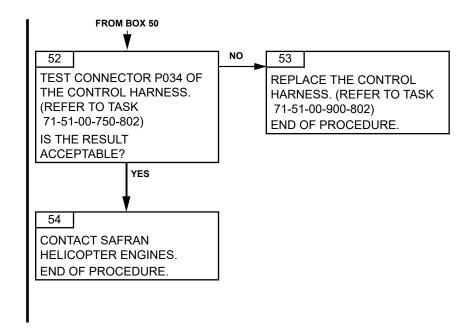


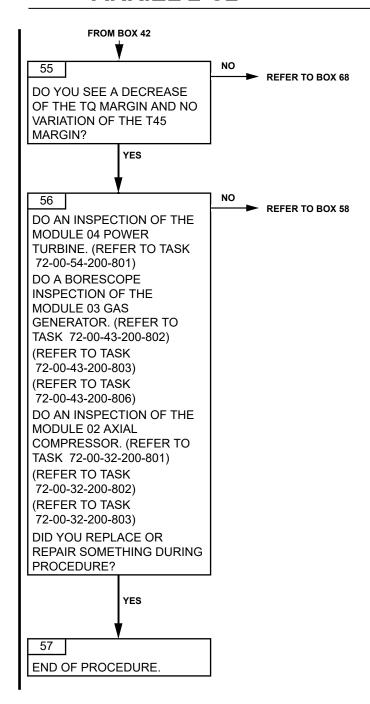
Effectivity: C2 BASE

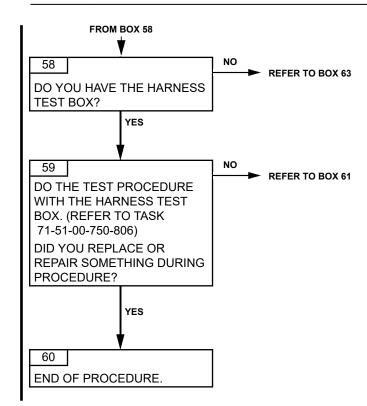


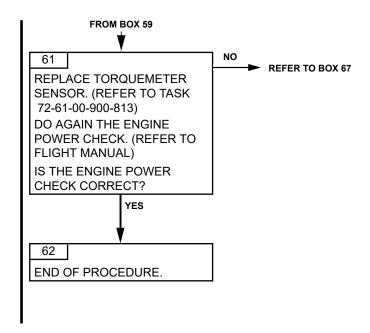


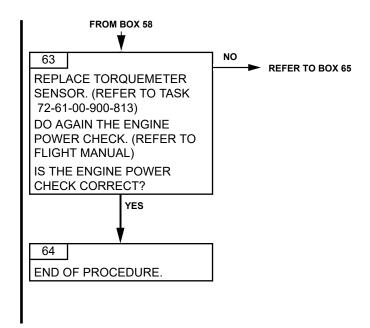
Effectivity: C2 BASE

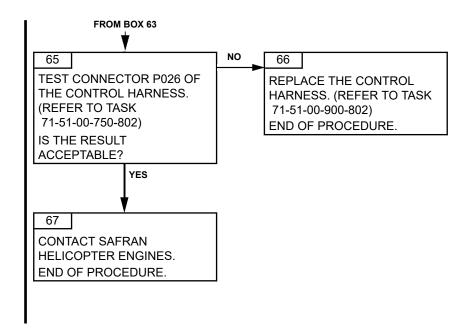




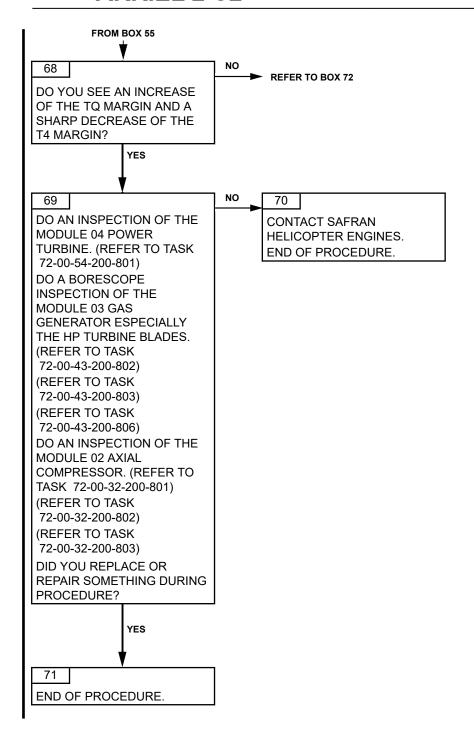


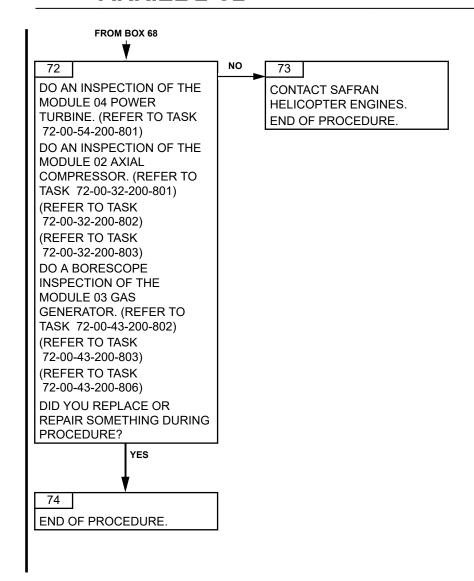






Effectivity: C2 BASE





SAFRAN HELICOPTER ENGINES

ARRIEL 2 C2

MAINTENANCE MANUAL

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SAFRAN HELICOPTER ENGINES

ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-819-C01

ENGINE POWER CHECK - INCORRECT MARGIN TROUBLESHOOTING

1. GENERAL

A. INDICATION ON THE AVIONIC

The engine power check is incorrect.

B. GENERAL DESCRIPTION

Monitoring of in-service performance is a great help for engine health assessment. Trend monitoring improves troubleshooting through interpretation of performance and degradation localization. (Refer to Task 71-02-14-940-801).

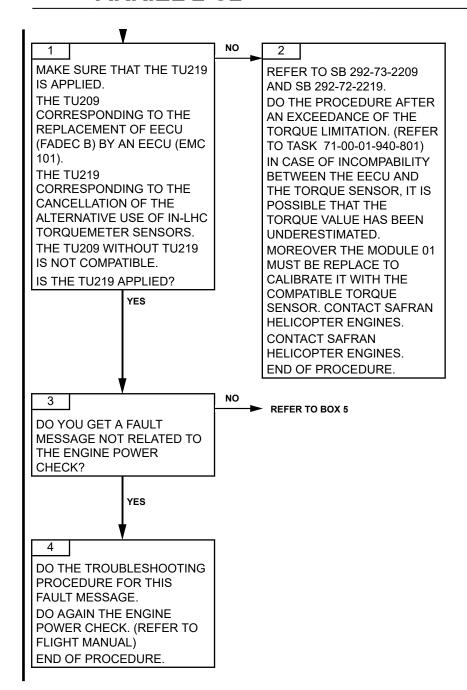
<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE BEFORE ANY INTERVENTION ON THE ENGINE.

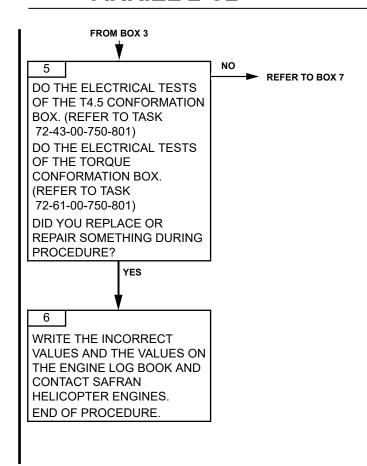
C. POSSIBLE CAUSES

- Non-compliant torquemeter sensor (TU219 not applied)
- T45 conformation
- Torque conformation
- Torque sensor
- Control harness
- Pyrometric harness
- Module 02 Axial Compressor
- Module 03 Gas Generator (Centrifugal compressor and HP Turbine)
- Module 04 Power Turbine
- Air path fouling
- Air leakage
- Air intake
- P0 aircraft measuring system
- T0 aircraft measuring system

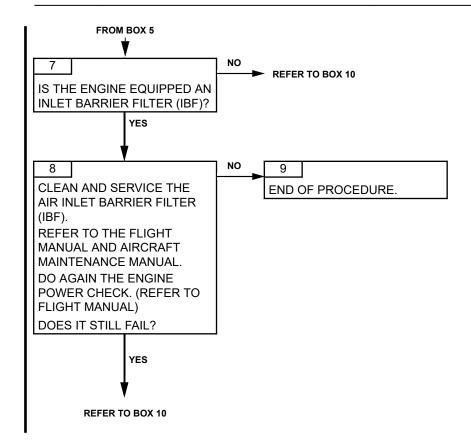
2. PROCEDURE

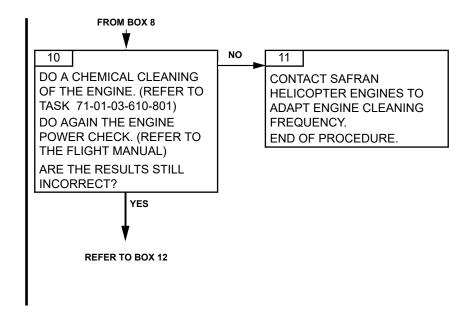
NOTE: If the EECU is pre TU93C, apply the correction on the VEMD results. Refer to flight manual.



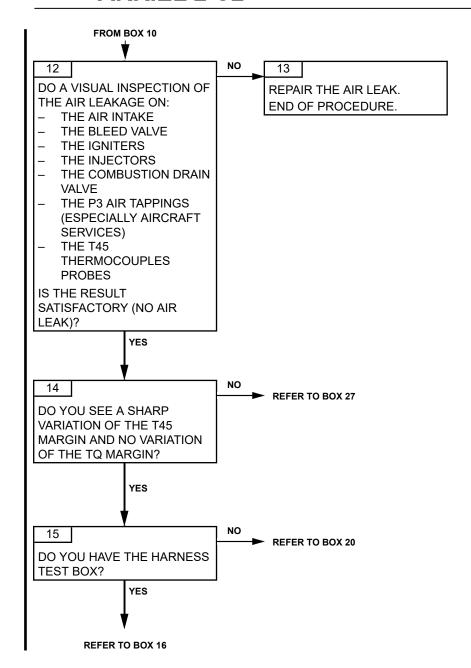


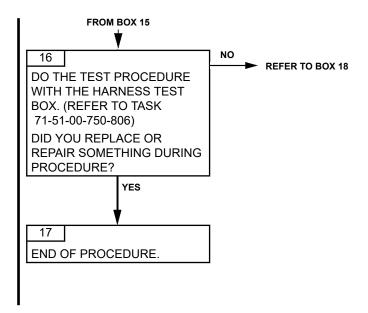
Effectivity: C2 TU 209



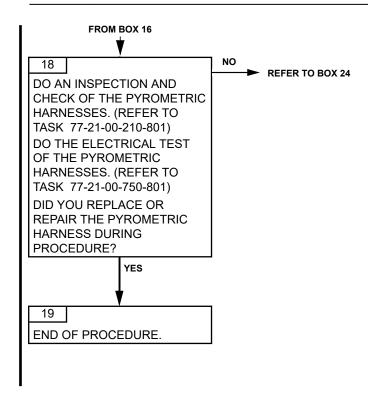


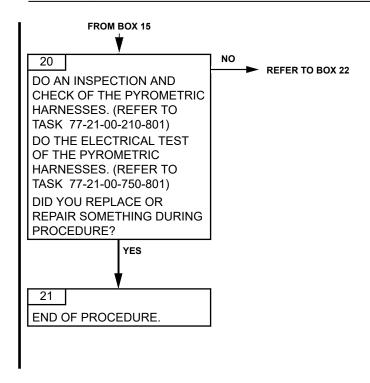
Effectivity: C2 TU 209

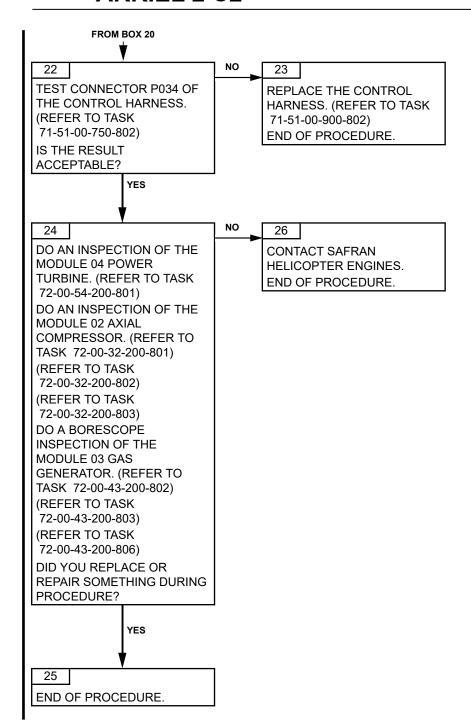


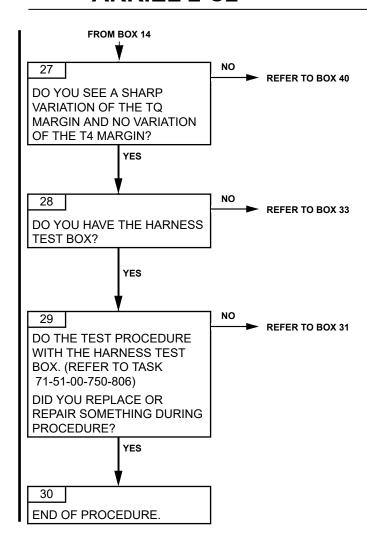


Effectivity: C2 TU 209

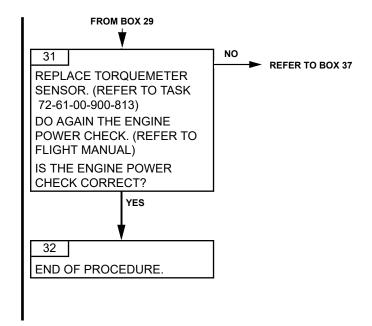


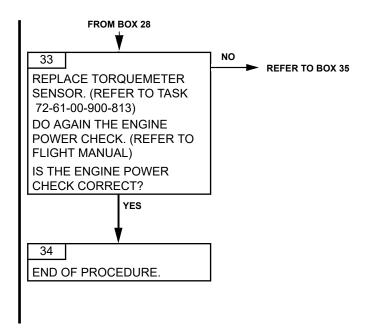


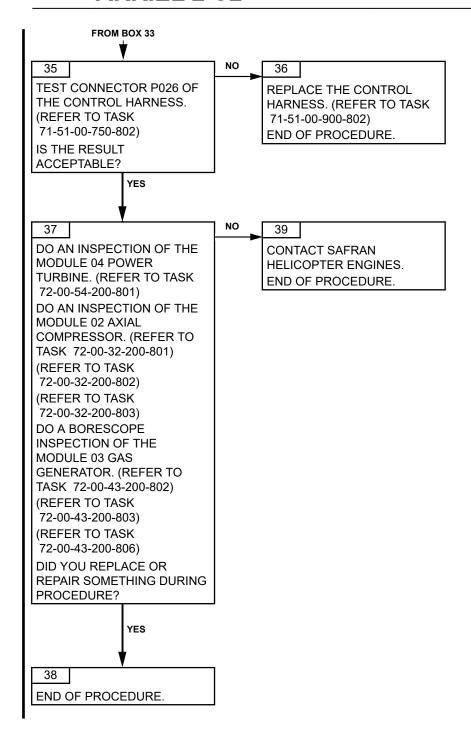


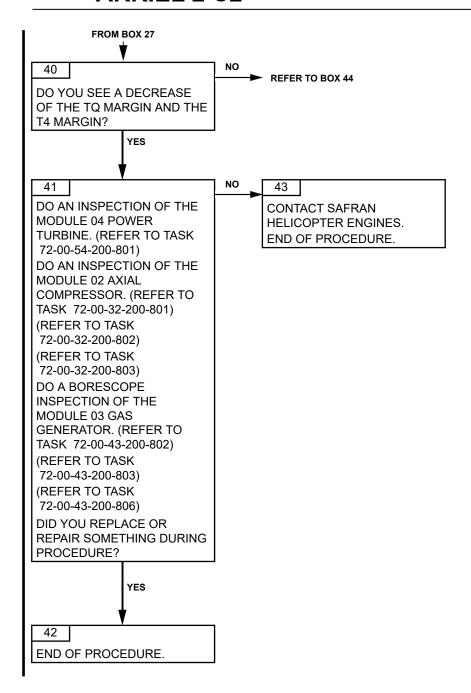


Effectivity: C2 TU 209

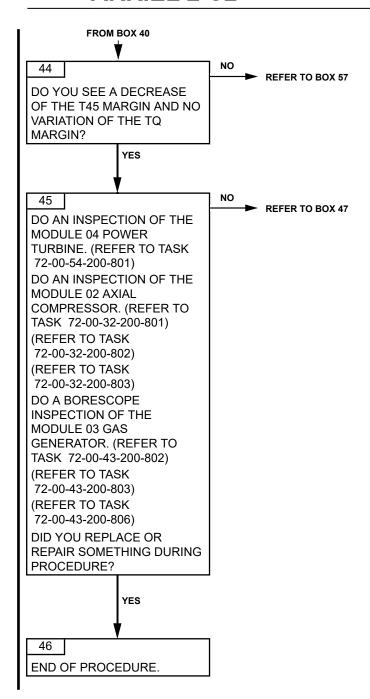


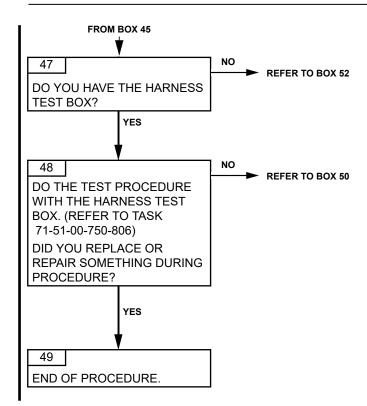




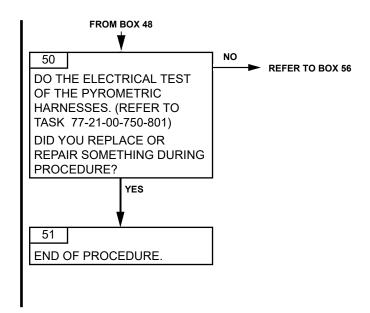


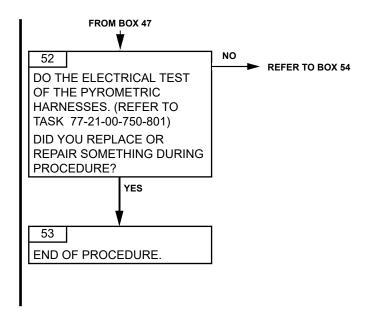
Effectivity: C2 TU 209

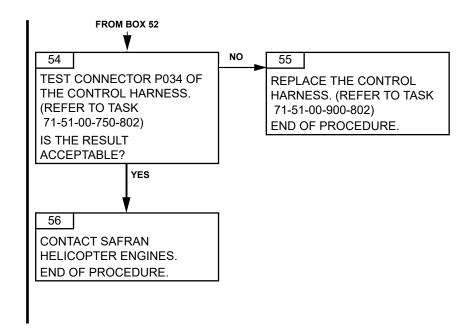


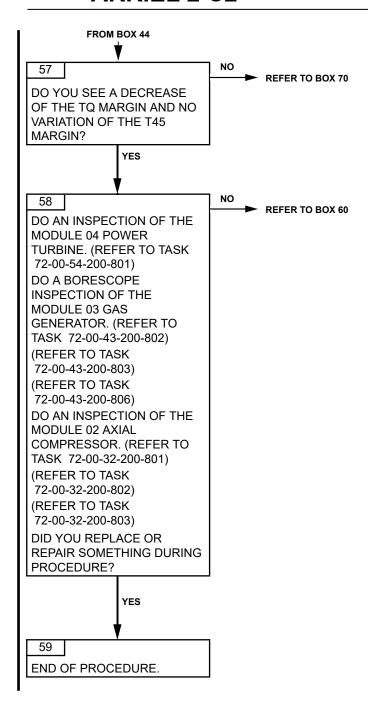


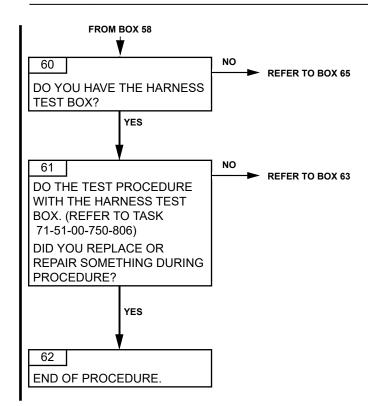
Effectivity: C2 TU 209

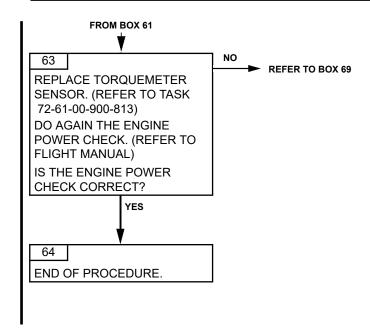


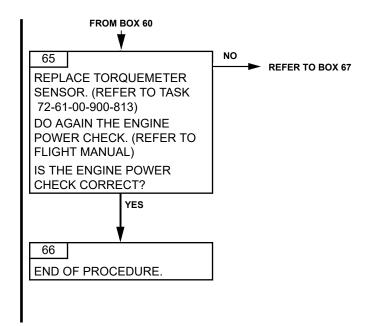


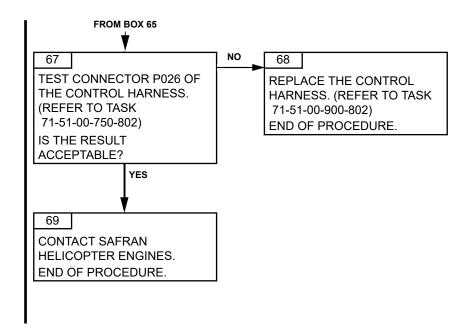


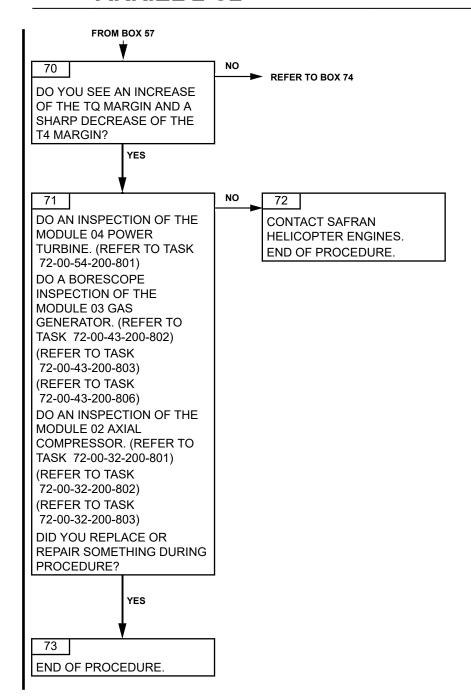


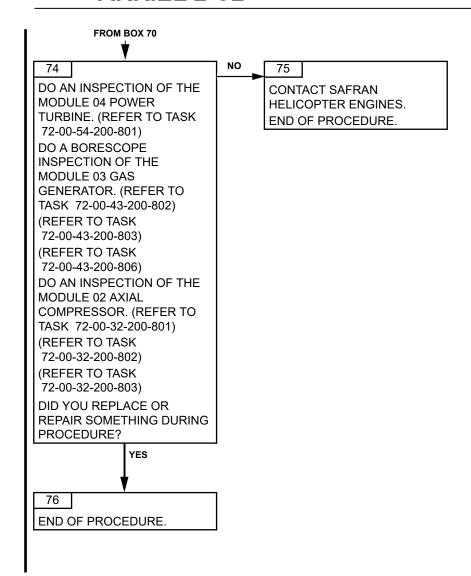












ARRIEL 2 C2

MAINTENANCE MANUAL

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ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-821-A01

FUEL ODOR IN THE CABIN TROUBLESHOOTING

1. **GENERAL**

- A. FAILURE DETECTION CONDITIONS
 - Fuel odor in cabin
- **B. POSSIBLE CAUSES**
 - Start electro-valve
 - Module 03
 - Aircraft

2. PROCEDURE

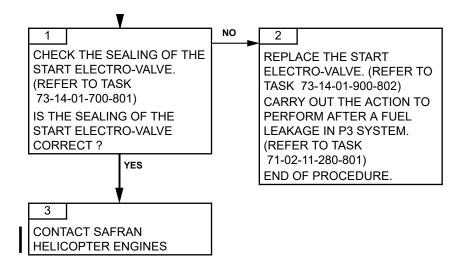
Effectivity: C2

Failures observed during maintenance

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MAINTENANCE MANUAL



ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-825-A01

OIL LEAK AT BLEED VALVE OR AIR INTAKE TROUBLESHOOTING

1. GENERAL

A. REMINDER OF THE NORMAL OPERATING CONDITION

 In normal operation, while the engine is running there is no oil leak at the bleed valve or the air intake.

B. POSSIBLE CAUSES

- Blockage form the oil vent system (Airframe parts)
- Module 02
- Wrong assembly of the M01 strainers

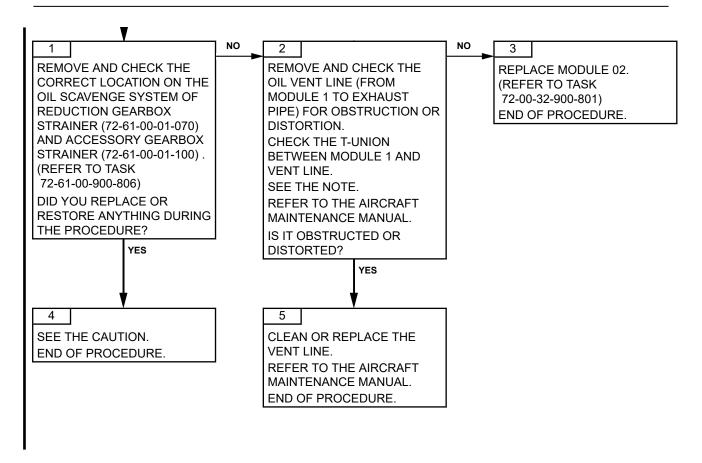
CAUTION:

AN INVERSION OF THE STRAINERS (72-61-00-01-070) AND (72-61-00-01-100) (REFER TO TASK 72-61-00-900-806) COULD LEAD TO AN INCORRECT OIL RETURN TO THE TANK. THAT WILL GENERATE AN OIL OVERFLOW THROUGH BEARING, ALLOWING OIL TO ESCAPE TO THE BLEED VALVE OR THE AIR TAPPINGS DURING NEXT ENGINE RUN.

2. PROCEDURE

NOTE:

Distortion or partial obstruction of the vent line can cause back pressure into the vent system that may increase oil leak from the vent line and also cause oil leak from the bleed valve or the air intake. Pay particular attention to distortion at the tip of the vent line in the exhaust pipe.



ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-827-A01

OIL LEAKAGE OF THE POWER DRIVE OF THE STARTER TROUBLESHOOTING

1. **GENERAL**

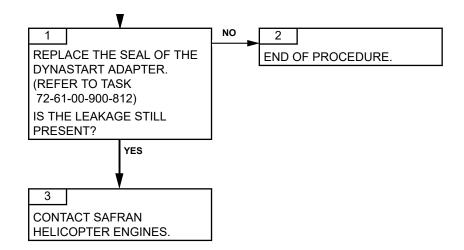
A. GENERAL DESCRIPTION

In the event of an oil leakage at the starter power drive, this one must meet the criteria defined on the Task 79-00-00-280-801 (Lubrication system-external leakage/ Special procedure).

B. POSSIBLE CAUSES

- Seal of the Dynastart Adapter.

2. PROCEDURE



ARRIEL 2 C2

MAINTENANCE MANUAL

TASK 71-00-06-816-833-A01 OIL TANK LEVEL SLOWLY DECREASES AFTER

ENGINE SHUTDOWN TROUBLESHOOTING

1. GENERAL

A. FAILURE DETECTION CONDITIONS

After an engine is stopped for one day or more, it is possible that the oil level does not return to normal. An internal leak of the oil pump slowly occurs by gravity due to the check valve leakage.

B. POSSIBLE CAUSES

- Oil pump

2. PROCEDURE

Effectivity: C2

Failures observed during maintenance

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MAINTENANCE MANUAL

V

1

REPLACE THE OIL PUMP. (REFER TO TASK 79-24-00-900-801)

NOTE: AFTER AN ENGINE IS STOPPED FOR ONE DAY OR MORE, IT IS POSSIBLE THAT THE OIL LEVEL DOES NOT RETURN TO NORMAL. AN INTERNAL LEAK OF THE OIL PUMP SLOWLY OCCURS BY GRAVITY DUE TO THE CHECK VALVE LEAKAGE.
END OF PROCEDURE.

Effectivity: C2

Failures observed during maintenance

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-801-A01

WATCHDOG TRIP TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
W/DOG. A or W/DOG. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If W/DOG. A only	
Total Failure of Channel A.	
If total failure of channel B: stepper motor frozen, EBCAU actuated	FADEC
Otherwise: automatic reversion to channel B.	flashing GOV
If W/DOG. B	
Total Failure of Channel B.	
If total failure of channel A: stepper motor frozen, EBCAU actuated	FADEC
 Otherwise: No effect, except impossible reversion to channel B in case of channel A total failure. 	flashing GOV
If W/DOG. A and W/DOG. B	
Stepper motor frozen, EBCAU actuated.	FADEC

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- EECU
- Off/Idle/Flight selector function (Aircraft system)

2. PROCEDURE

ARRIEL 2 C2

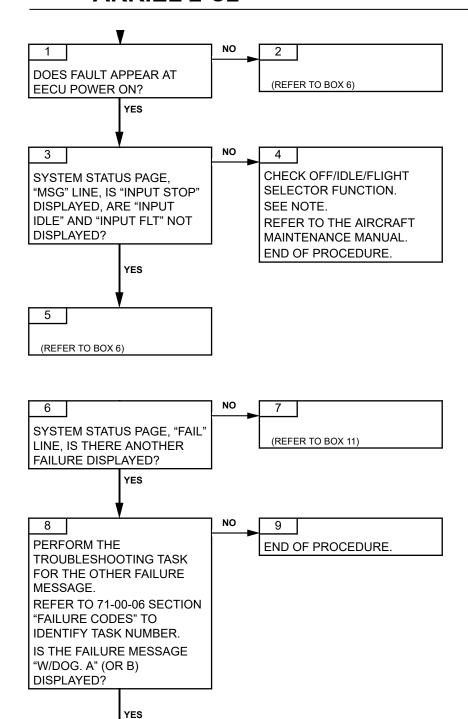
MAINTENANCE MANUAL

<u>NOTE</u>: In normal operation of the selector, at connector P2, at EECU power ON, only the OFF input should be active. The other 2 inputs, IDLE and FLIGHT, should be inactive:

- OFF input is active if there is electrical continuity between pins 37 and 38
- IDLE input is inactive if there is open circuit between pins 37 and 45
- FLIGHT input is inactive if there is open circuit between pins 37 and 39.

Effectivity: C2

Failure codes
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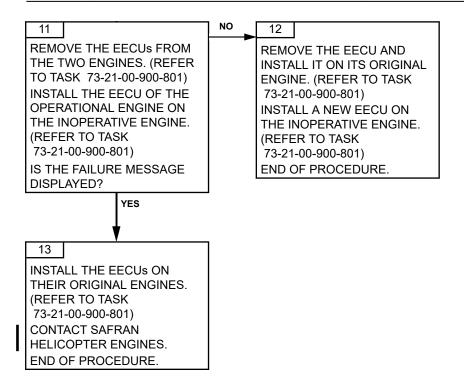


10

(REFER TO BOX 11)

ARRIEL 2 C2

MAINTENANCE MANUAL



TASK 71-00-06-817-803-A01

N2 TRIM FAILURE, CHANNEL A TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
TRIM.POS. A	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Use of the back-up value.	GOV
When the "N2 trim datum" discrete input is activated, a fixed N2 datum is	
obtained.	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL MESSAGES

ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND THE

"MSG" LINE BEFORE TURNING BATTERY POWER OFF.

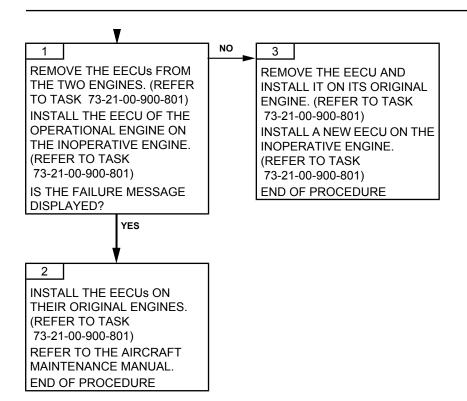
C. POSSIBLE CAUSES

EECU.

2. PROCEDURE

TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL



TASK 71-00-06-817-804-A01

N2 TRIM FAILURE, CHANNEL B TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
TRIM.POS. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Use of the back-up value.	GOV
When the "N2 trim datum" discrete input is activated, a fixed N2 datum is	
obtained.	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL MESSAGES

ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND THE

"MSG" LINE BEFORE TURNING BATTERY POWER OFF.

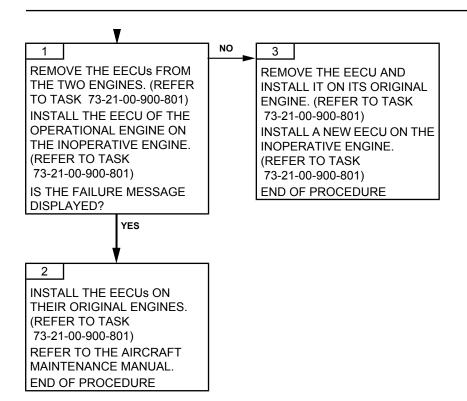
C. POSSIBLE CAUSES

EECU.

2. PROCEDURE

TURBOMECA ARRIEL 2 C2

MAINTENANCE MANUAL



MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-805-A01

TRAINING SELECTOR FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
VEND MESSAGE
T/SEL. A or T/SEL. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If T/SEL. A only or if T/SEL. A + T/SEL. B	
 Impossible to use the training mode. 	flashing GOV
If T/SEL. B	
If channel A in control: no effect	flashing GOV
 If channel B in control after total failure of channel A: impossible to use the training mode. 	flashing GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- EECU
- Training Selector function (Aircraft system)

2. PROCEDURE

NOTE: In normal operation of the selector, at connector P2 engine 1:

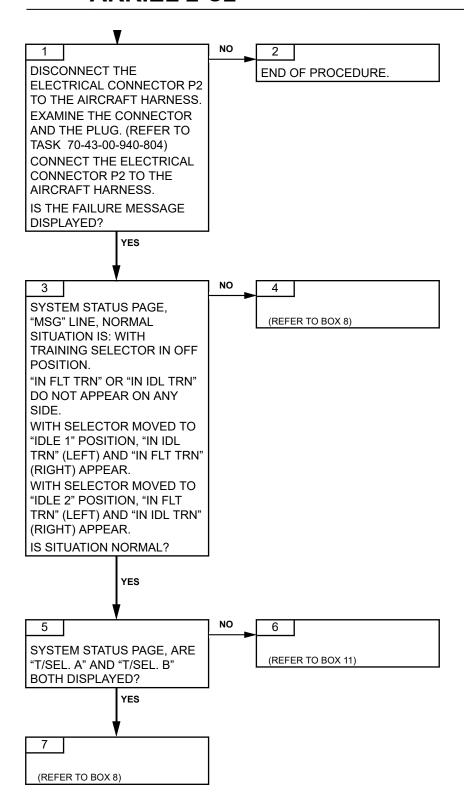
- In IDLE 1 position, pins 37 and 44 are connected, pins 37 and 43 are disconnected
- In IDLE 2 position, pins 37 and 43 are connected, pins 37 and 44 are disconnected
- In OFF position, pins 37, 43 and 44 are disconnected.

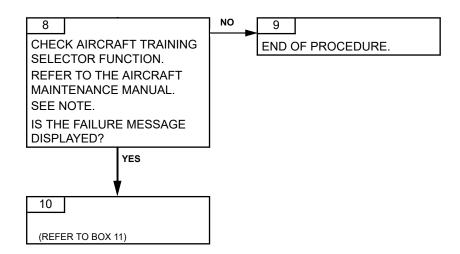
ARRIEL 2 C2

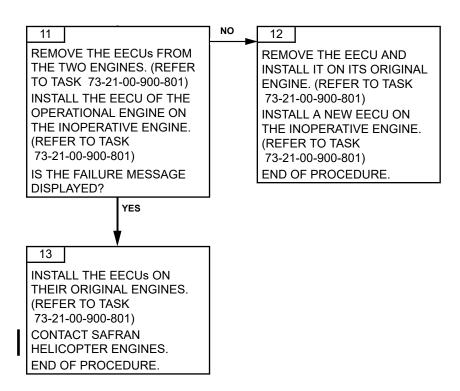
MAINTENANCE MANUAL

At connector P2 engine 2:

- In IDLE 1 position, pins 37 and 43 are connected, pins 37 and 44 are disconnected
- In IDLE 2 position, pins 37 and 44 are connected, pins 37 and 43 are disconnected
- In OFF position, pins 37, 43 and 44 are disconnected.







TASK 71-00-06-817-808-A01

OFF/IDLE/FLIGHT SELECTOR FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
SELECT. A or SELECT. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If SELECT. A only	
 At power up or when engine is stopped: total failure of the channel. Reversion to channel B. 	flashing GOV
Engine running in flight state: the state is frozen in flight mode.	flashing GOV
 Engine running in idle or stop: the state is frozen in mode (idle or stop) at time of failure. 	GOV
If SELECT. B only	
 If no total failure of channel A: channel A remains in control, no effect on system. 	flashing GOV
 If total failure of channel A: same effect as if SELECT. A and SELECT. B at same time (see below). 	
If SELECT. A and SELECT. B	
 At power up or when engine is stopped: total failure of both channels. Start impossible. 	FADEC
Engine running in flight state: the state is frozen in flight mode.	flashing GOV
 Engine running in idle or stop: the state is frozen in mode (idle or stop) at time of failure. 	GOV

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

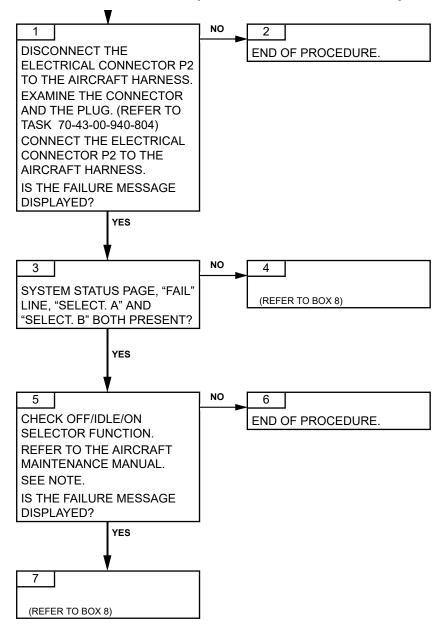
C. POSSIBLE CAUSES

- EECU
- Off/Idle/Flight selector function (Aircraft system)

2. PROCEDURE

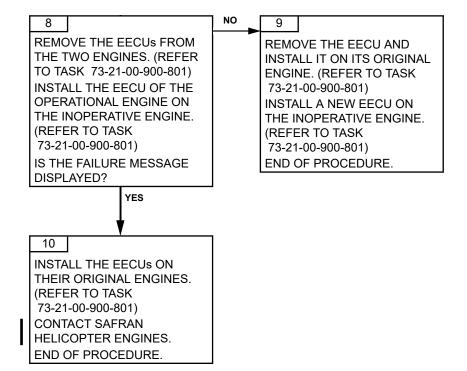
NOTE: In normal operation of the selector, at connector P2, one and only one out of the three inputs (OFF, IDLE or FLIGHT) should be active. The active input corresponds to the selector position:

- OFF input is active if there is electrical continuity between pins 37 and 38
- IDLE input is active if there is electrical continuity between pins 37 and 45
- FLIGHT input is active if there is continuity between pins 37 and 39.



ARRIEL 2 C2

MAINTENANCE MANUAL



ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-810-A01

T1 INCONSISTENCY TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
TO DISC. A	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
No effect, except indication of maintenance need. This fault can be detected only when both engines are stopped.	flashing GOV

NOTE: This failure will be declared if there is a difference greater than 15°C between

the T1 values received by each EECU. This test is done only when both

engines are stopped.

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

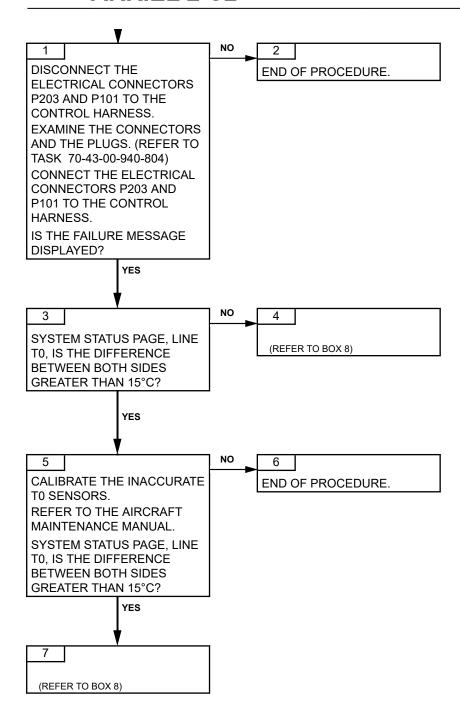
C. POSSIBLE CAUSES

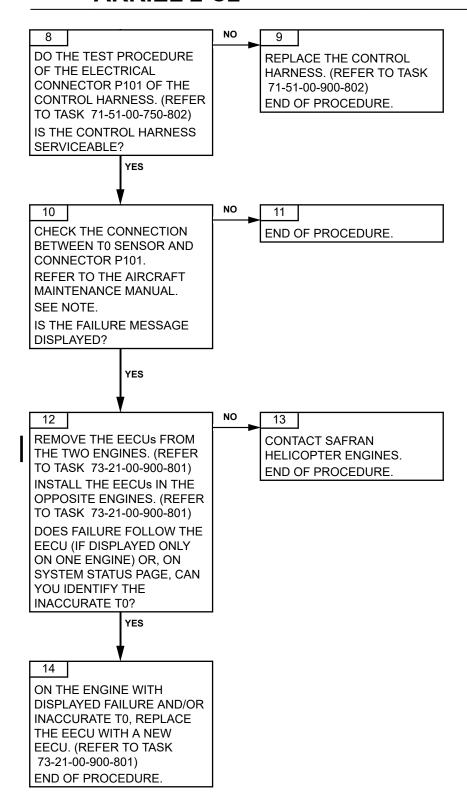
- EECU
- Control harness
- T1 Sensing function (Aircraft system)

2. PROCEDURE

NOTE: Normal T1 sensing interface at plug J101 (interfacing with connector P101):

- Between pins 3 and 4: short circuit
- Between pins 1 and 2: short circuit
- Between Pins 1/2 and 3/4: T0 sensor resistance.





ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-823-A01

COLLECTIVE PITCH FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
PITCH. A or PITCH. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If PITCH. A only or if PITCH. A + PITCH. B	
 If XPC valid value available on cross-talk ARINC: use of this value as back-up. No effect 	flashing GOV
 If XPC valid value not available in reception of the balancing ARINC: degraded transients. Use of a fixed back-up value. 	GOV
If PITCH. B only	
If channel A in control: no effect	flashing GOV
 If channel B in control following channel A total failure: degraded transients. Use of a fixed back-up value. 	GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

EECU

Collective pitch sensing function (Potentiometer, wiring, connections - Aircraft system)

2. PROCEDURE

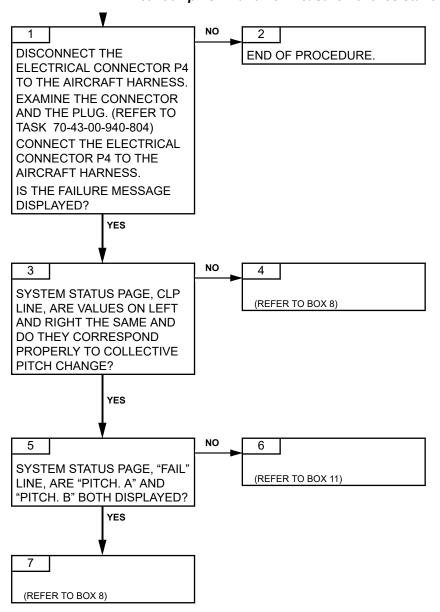
<u>NOTE</u>: At the EECU interface, connector P4, with normal connection to the collective pitch potentiometer, there should be:

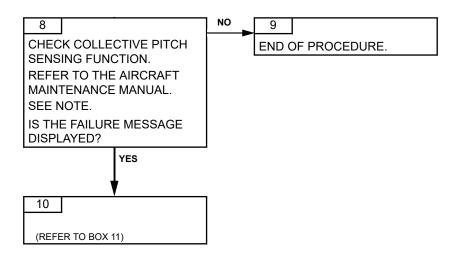
- Between pins 48 and 55: short circuit

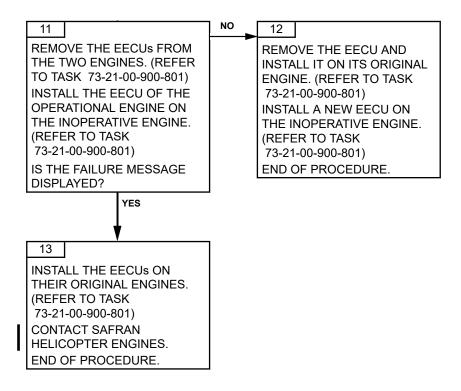
Effectivity: C2

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- Between pins 47 and 56: resistance 5 k Ω +/- 10%
- Between pins 47 and 49: measurement resistance (< 5 k Ω).







ARRIEL 2 C2

MAINTENANCE MANUAL

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TASK 71-00-06-817-825-A01

TOT (T4) FAIL TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

	VEMD MESSAGE
l	TOT. A or TOT. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If TOT. A only or if TOT. A + TOT. B	
 If no T4.5 conformation failure and helicopter T4.5 available on ARINC link: use of these values as back-up, after having "de-conformed" the helicopter T4.5. No effect 	flashing GOV
- Otherwise:	
Before end of start: start interrupted	GOV
After end of start: backup T4.5 value. No effect.	flashing GOV
If TOT. B only	
If channel A in control: no effect	flashing GOV
If channel B in control after total failure of channel A:	
Before end of start: start interrupted	GOV
After end of start: backup T4.5 value. No effect.	flashing GOV

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.

THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

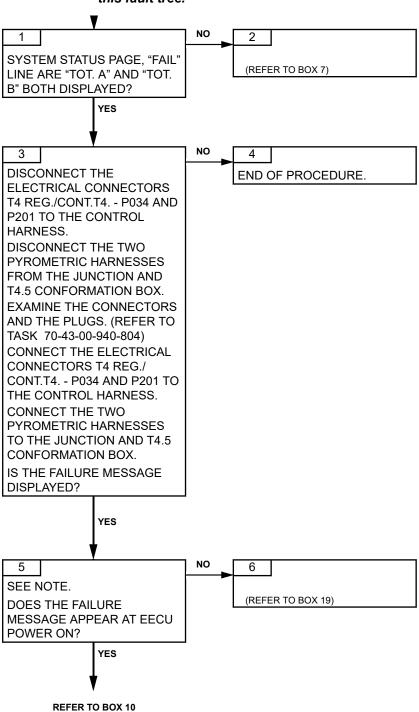
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

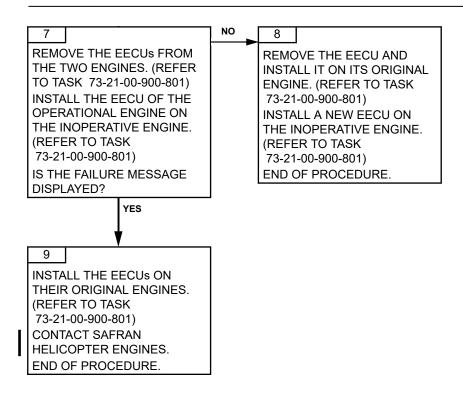
C. POSSIBLE CAUSES

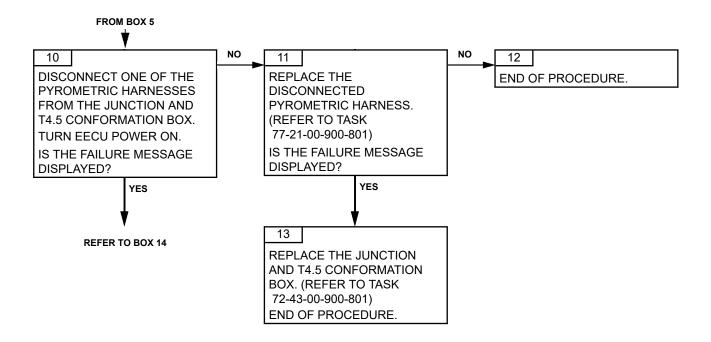
- Junction and T4.5 conformation box
- Pyrometric harness
- EECU
- Control harness

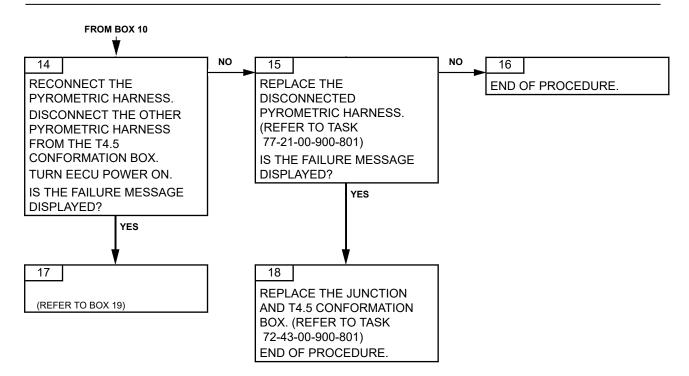
2. PROCEDURE

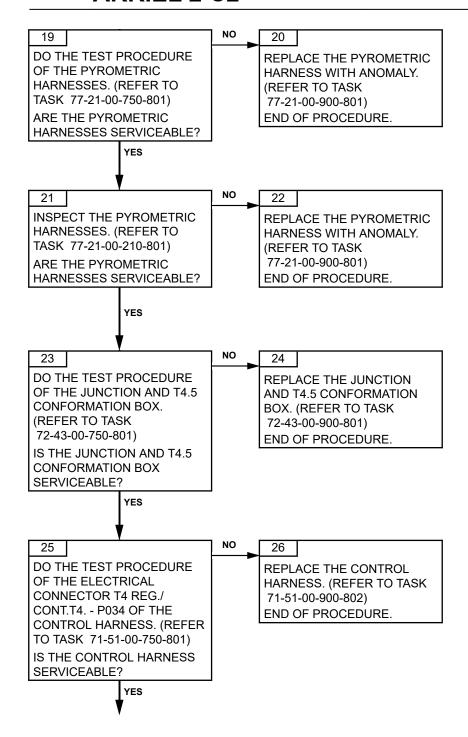
NOTE: This failure may happen only when the pyrometric probes are hot. In this case, it will normally not be present at EECU power on. However, if the check is done right after an engine run, when the probes are still hot, the failure may occur at EECU power on and you will be able to troubleshoot the faulty pyrometric harness on ground, as per this fault tree.

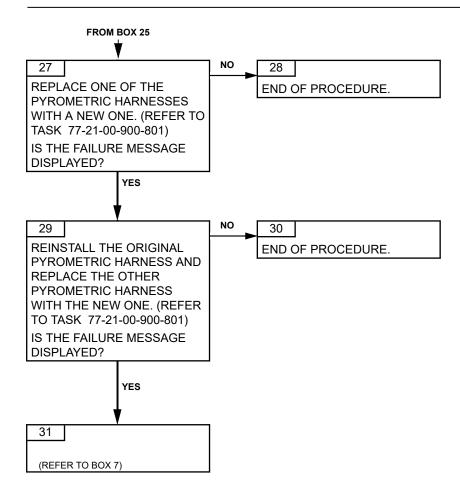












MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-828-A01

T0 FAIL TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
T1. A or T1. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
<u>If T1. A only or if T1. A + d T1. B</u>	
 If T1 valid value available from cross-talk ARINC: use of this value as backup, no effect 	flashing GOV
 If T1 valid value not available from cross-talk ARINC: transients are degraded but the engine remains protected against surge and flame-out. 	GOV
If T1. B only	
If channel A in control: no effect	flashing GOV
 If channel B in control following a channel A total control failure: transients are degraded but the engine remains protected against surge and flame-out. 	GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- EECU
- Control harness
- T1 sensing function (Aircraft system)

2. PROCEDURE

NOTE: Normal T1 sensing interface at plug J101 (interfacing with connector P101):

- Between pins 3 and 4: short circuit

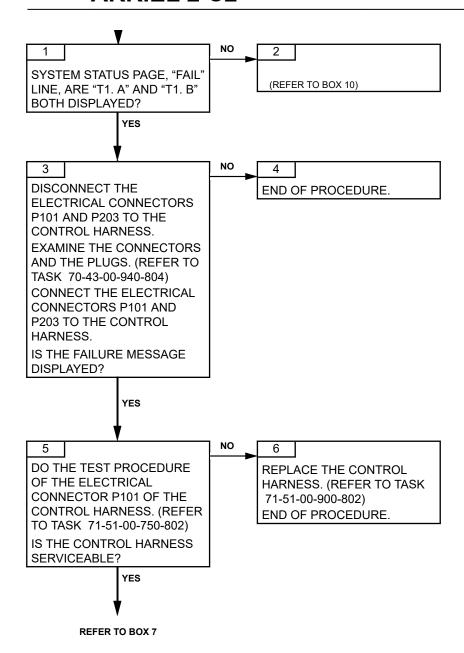
Effectivity: C2

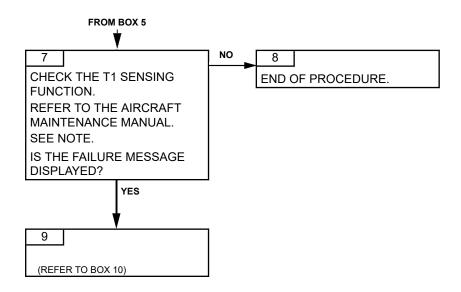
Failure codes
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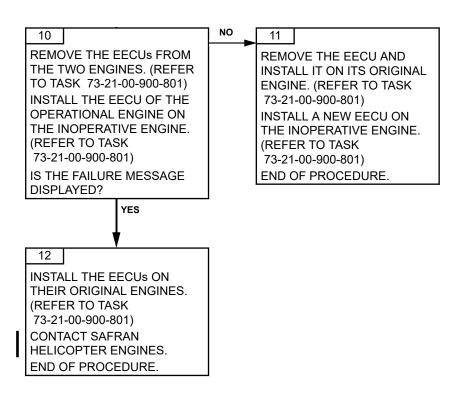
ARRIEL 2 C2

MAINTENANCE MANUAL

- Between pins 1 and 2: short circuit
- Between Pins 1/2 and 3/4: T0 sensor resistance.







TASK 71-00-06-817-833-A01

P3 FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
P3. A or P3. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
<u>If P3. A only or if P3. A + P3. B</u>	
 Transients are degraded but the engine remains protected against surge and flame-out. In case of accidental surge, risk of not managing it. 	GOV
If P3. B only	
If channel A in control: no effect	flashing GOV
 If channel B in control following a channel A total control failure: transients are degraded but the engine remains protected against surge and flame-out. In case of accidental surge, risk of not managing it. 	GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.

THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

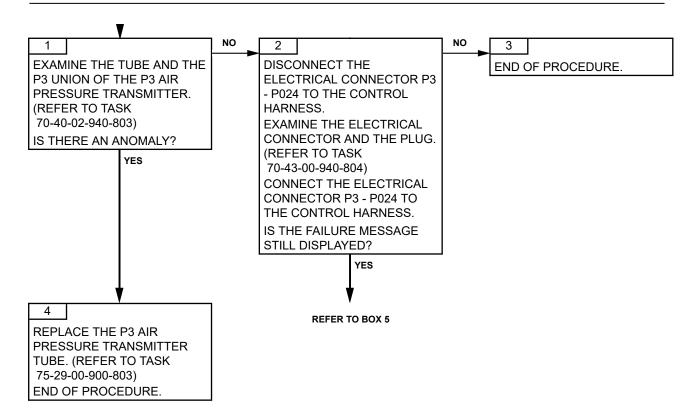
C. POSSIBLE CAUSES

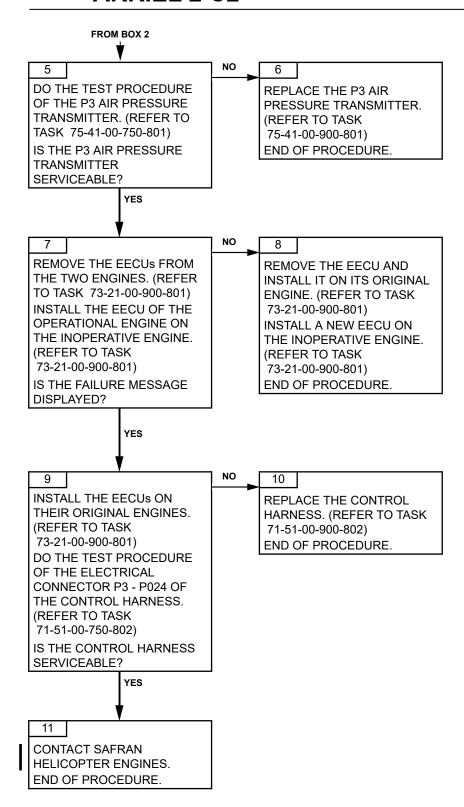
- P3 air transmitter tube
- P3 air pressure transmitter
- Control harness
- EECU

2. PROCEDURE

ARRIEL 2 C2

MAINTENANCE MANUAL





ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-842-A01

RAW TORQUE FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
TRQ. A or TRQ. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If TRQ. A only or if TRQ. A + TRQ. B	
 Inhibition of the torque limitation function. The pilot ensures the MGB protection as a function of the torque indication of the other engine and/or the N1 indication. 	GOV
If TRQ. B only	
If channel A in control: no effect	flashing GOV
 If channel B in control following a total failure of channel A: inhibition of the torque limitation function. The pilot ensures the MGB protection as a function of the torque indication of the other engine and/or the N1 indication. 	GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.

THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

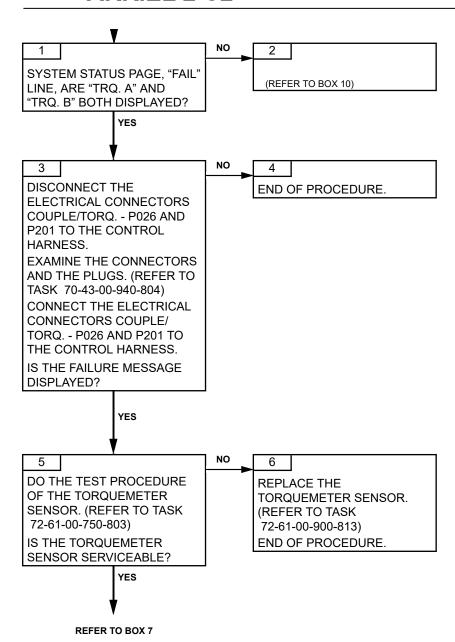
C. POSSIBLE CAUSES

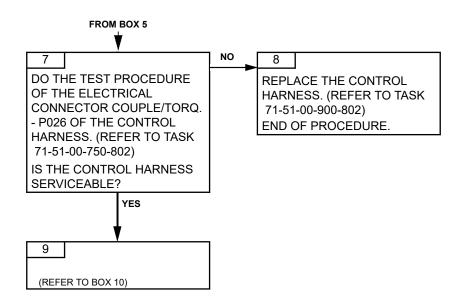
EECU

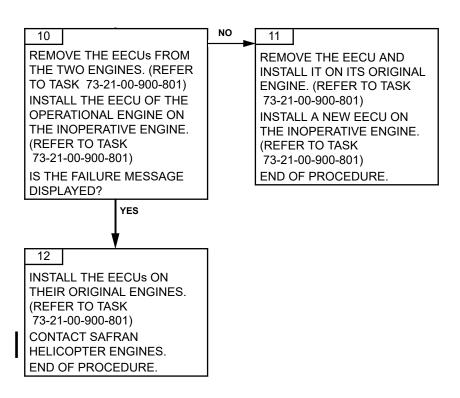
Torquemeter sensor

Control harness

2. PROCEDURE







ARRIEL 2 C2

MAINTENANCE MANUAL

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TASK 71-00-06-817-844-A01

TOT (T4) CONFORMATION FAIL TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
TOT M. A or TOT M. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If TOT M. A only or if TOT M. A + TOT M. B	
 If failure present at power-on: Before end of start: engine still protected for overtemperature during start but start performance degraded After end of start: no effect. 	GOV flashing GOV
 If failure happens after power-on: EECU uses the conformation value before the failure. No effect. 	flashing GOV
If TOT M. B only	
If channel A in control: no effect	flashing GOV
 If channel B in control following total failure of channel A: same effect as "If TOT M. A only or if TOT M. A + TOT M. B". 	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

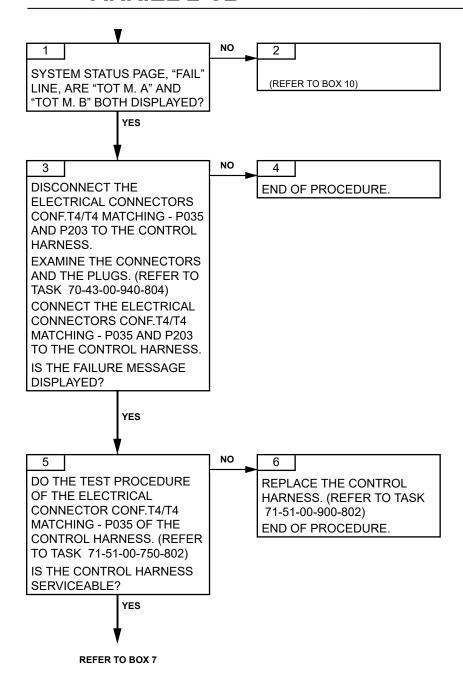
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

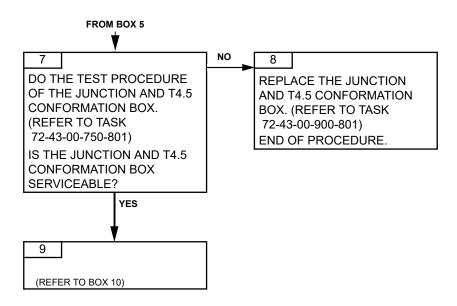
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

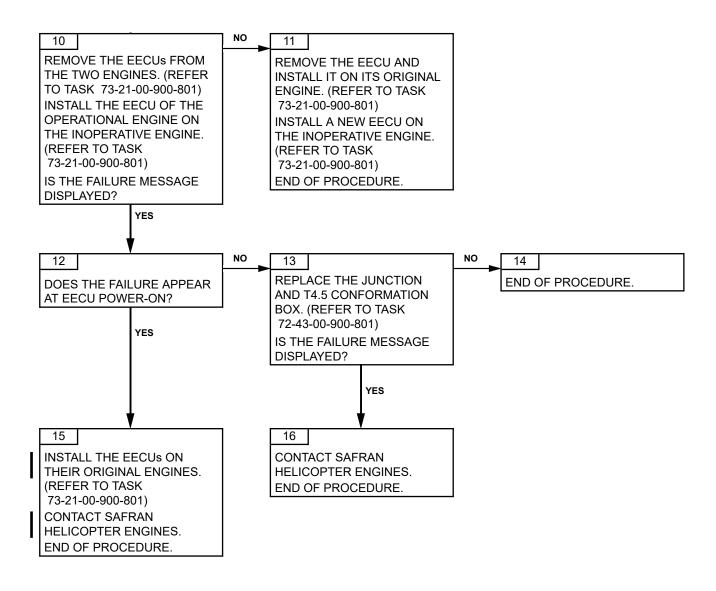
C. POSSIBLE CAUSES

- EECU
- Junction and T4.5 conformation box
- Control harness

2. PROCEDURE







ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-847-A01

TORQUE CONFORMATION FAIL TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
TRQ CL. A or TRQ CL. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If TRQ CL. A only or if TRQ CL. A + TRQ CL. B	
 If failure present at power-on: use of a backup value to ensure that the engine is still able to provide the minimum torque; the pilot ensures the MGB protec- tion as a function of the N1 and/or the torque of the other engine 	GOV
 If failure happens after power-on: EECU uses the conformation value before the failure. No effect. 	flashing GOV
If TRQ CL. B only	
If channel A in control: no effect	flashing GOV
 If channel B in control following total failure of channel A: same effect as "If TRQ CL. A only or if TRQ CL. A + TRQ CL. B". 	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

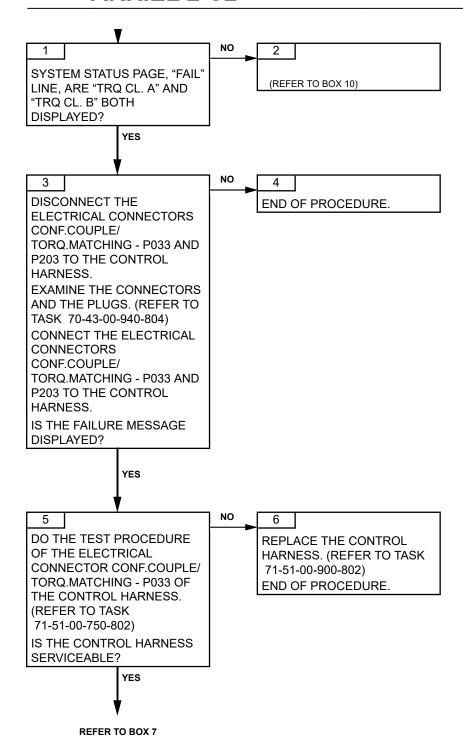
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

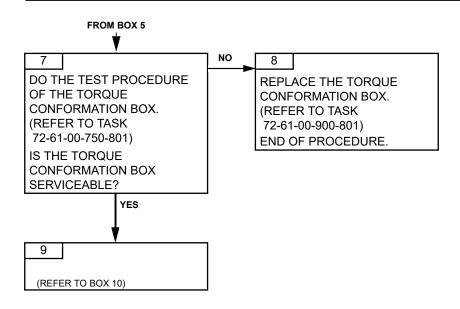
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

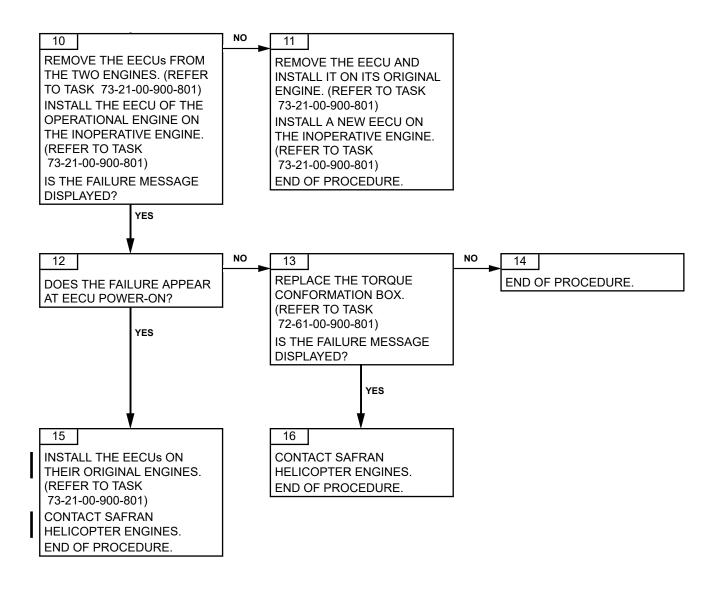
C. POSSIBLE CAUSES

- EECU
- Torque conformation box
- Control harness

2. PROCEDURE







ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-861-A01

EECU INTERNAL FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
PROCES. A or PROCES. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
No effect on engine control in automatic mode.	flashing GOV
Manual mode selection no longer available.	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

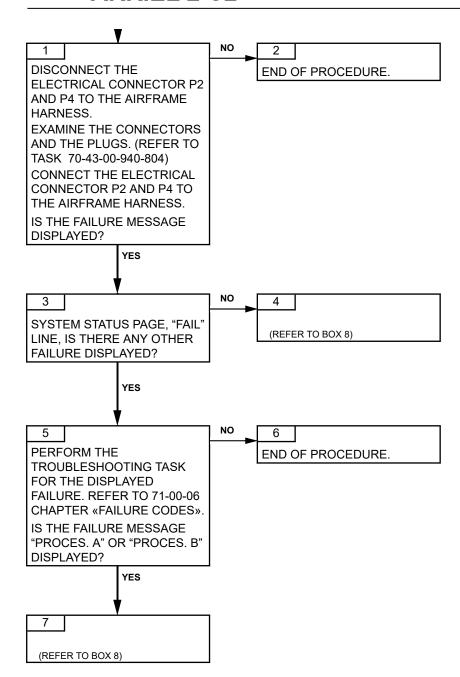
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

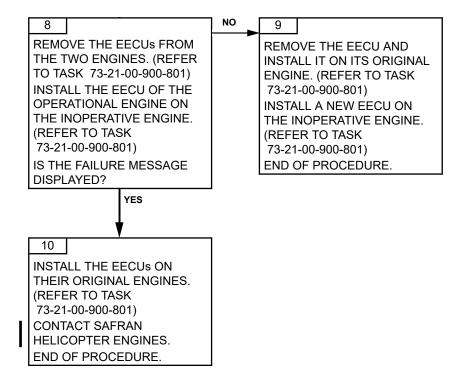
EECU

2. PROCEDURE



ARRIEL 2 C2

MAINTENANCE MANUAL



ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-864-A01

P3 DRIFT TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
P3/FLA. A or P3/FLA. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If P3/FLA. A only or if P3/FLA. A + P3/FLA. B	
 Degraded transients. 	GOV
If P3/FLA. B only	
- No effect.	flashing GOV

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.

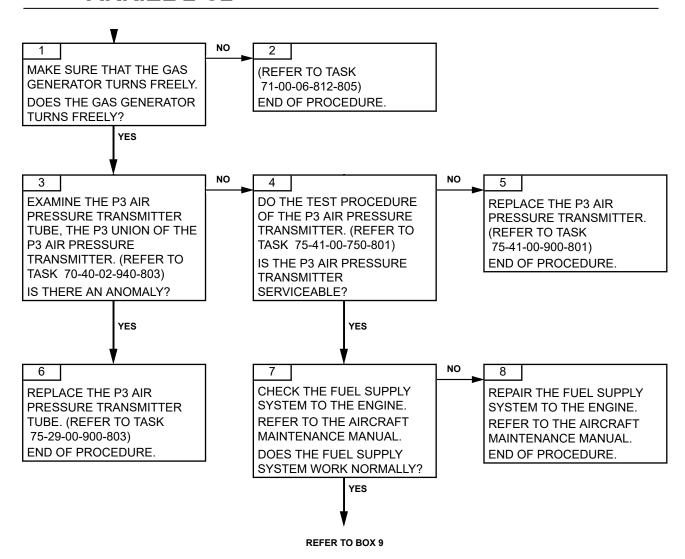
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

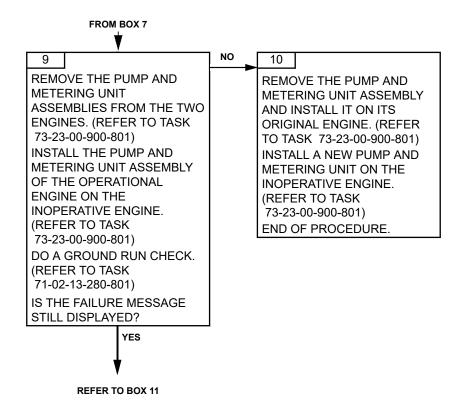
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

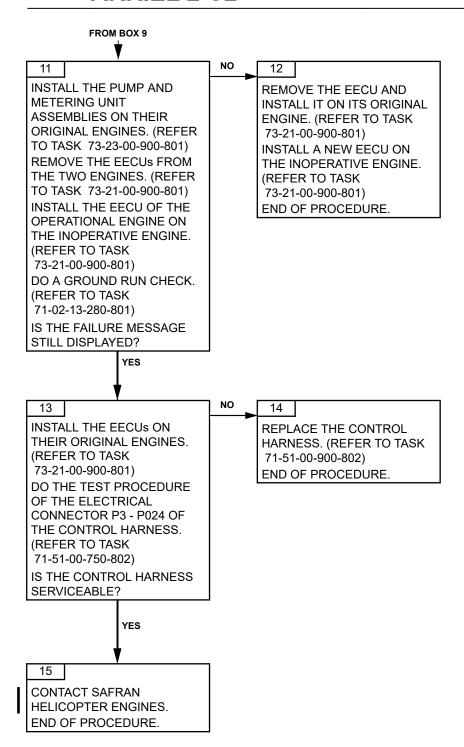
C. POSSIBLE CAUSES

- P3 air pressure transmitter tube
- P3 air transmitter
- Pump and metering unit assembly
- EECU
- Control harness
- Engine
- Fuel supply to the engine (aircraft side)

2. PROCEDURE







MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-869-A01

P0 EECU TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
P0. A or P0. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If P0. A only or if P0. A + P0. B	
If valid P0 available from cross-talk ARINC: no effect	flashing GOV
 If valid P0 not available from cross-talk ARINC: back-up P0 value to have max NG available in the complete flight envelope. Degraded transients, but control laws adaptated to avoid surge and flameout in the complete flight envelope. 	GOV
If P0. B only	
- No effect.	flashing GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.

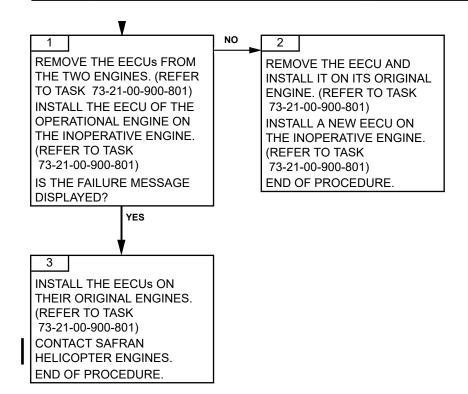
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

EECU

2. PROCEDURE



TASK 71-00-06-817-878-A01

FUEL VALVE RESOLVER FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
RESOL. A or RESOL. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If RESOL. A only	
 If failure whereas the resolver measurement is required to determine the step- per motor position (power-on self test, channel not in control, manual mode). Total failure. Reversion to channel B 	flashing GOV
Otherwise: no effect on automatic control.	GOV
If RESOL. A + RESOL. B	
 If failure whereas the resolver measurement is required to determine the step- per motor position (power-on self test, channel not in control, manual mode) 	FADEC
Otherwise: no effect on automatic control.	GOV
If RESOL. B only	
If channel A in control: no effect	flashing GOV
 If channel B in control after total failure of channel A: same effect as "If RE-SOL. A + RESOL. B". 	

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

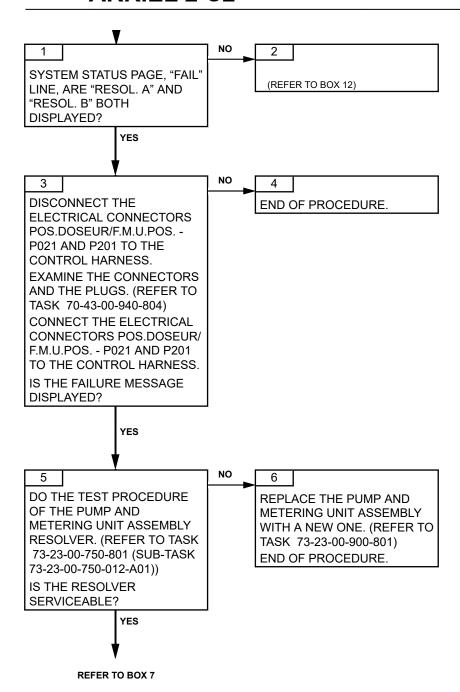
C. POSSIBLE CAUSES

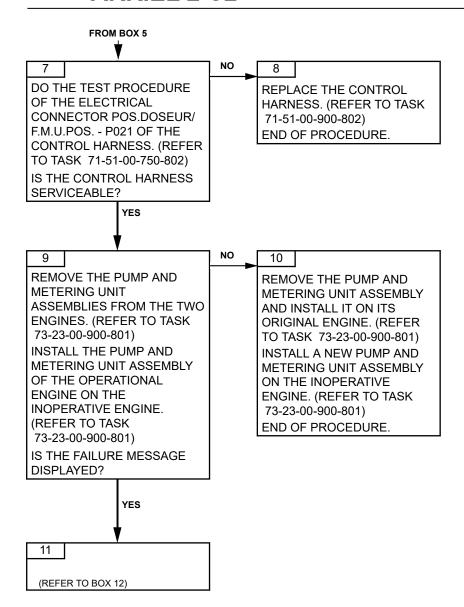
- EECU
- Pump and metering unit assembly
- Control harness

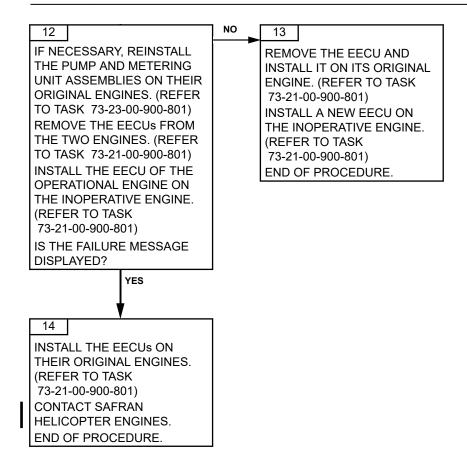
ARRIEL 2 C2

MAINTENANCE MANUAL

2. PROCEDURE







ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-880-A01

STEPPER MOTOR FAILURE A TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
STEP M. A (and STEP M. B not displayed)

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Total failure of channel A. Automatic reversion to channel B.	flashing GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

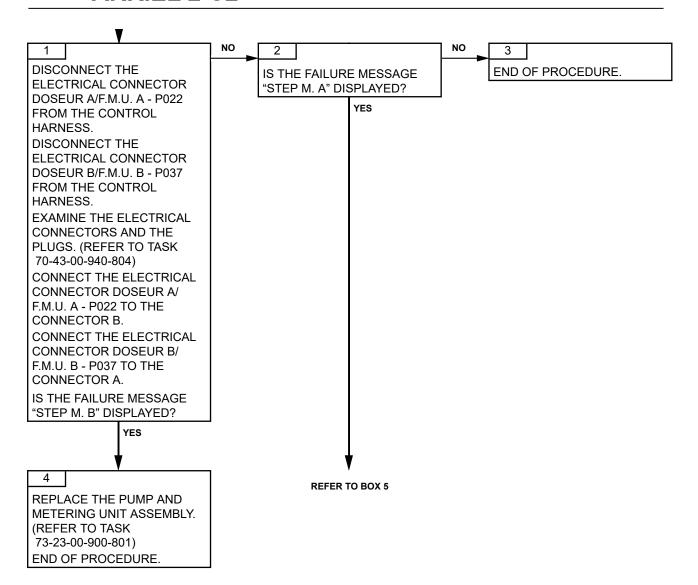
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

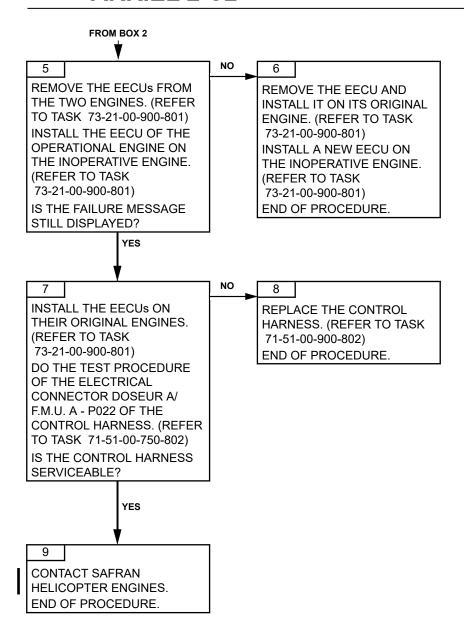
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Pump and metering unit assembly
- EECU
- Control harness

2. PROCEDURE





ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-881-A01

STEPPER MOTOR FAILURE B TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
STEP M. B (and STEP M. A not displayed)

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Total failure of channel B. No effect, as long as channel A is in control.	flashing GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

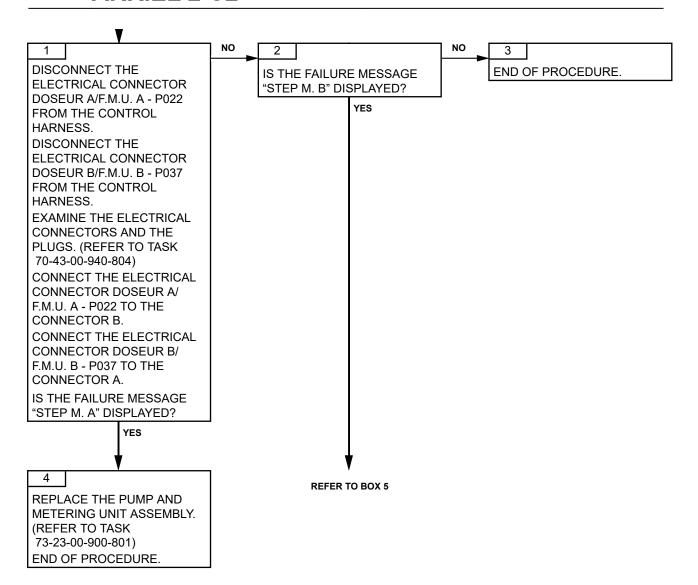
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO

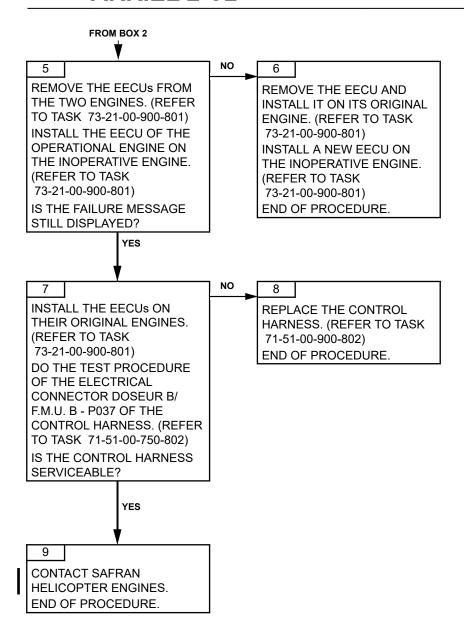
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Pump and metering unit assembly
- EECU
- Control harness

2. PROCEDURE





ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-882-A01

STEPPER MOTOR FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
STEP M. A and STEP M. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Total failure of both channels A and B. Stepper motor	FADEC
freezing.	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

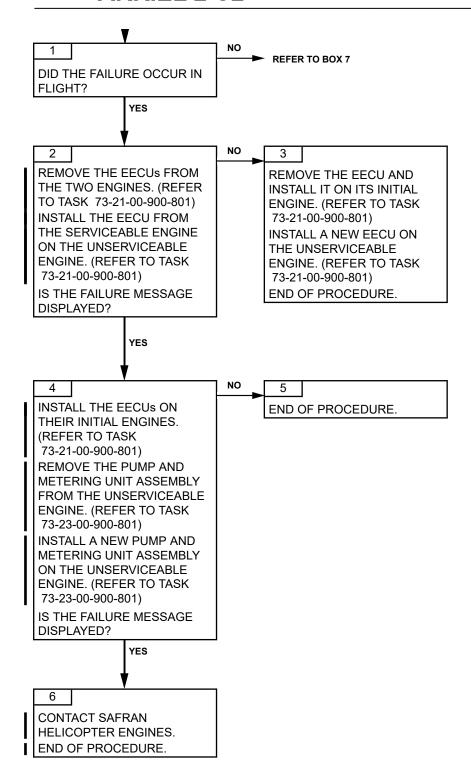
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

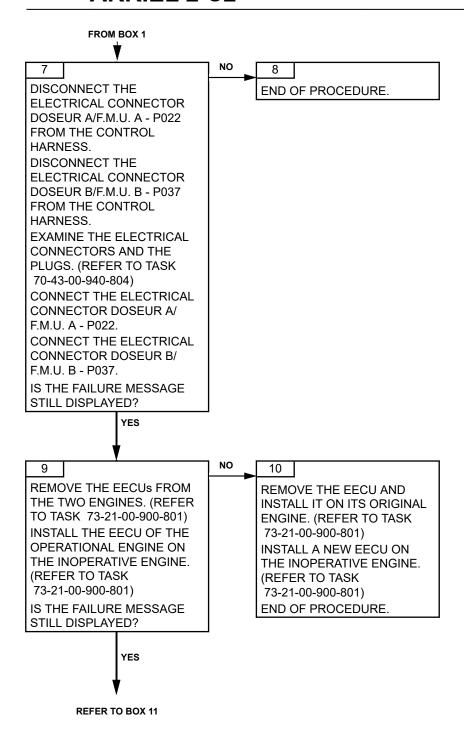
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

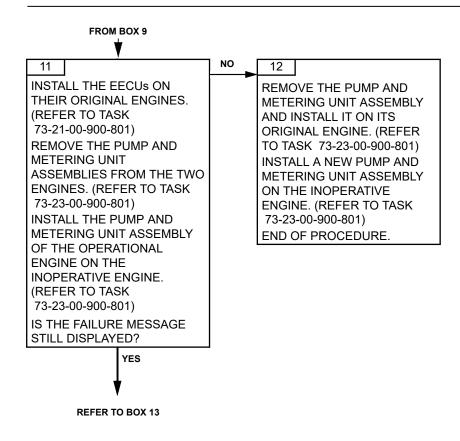
C. POSSIBLE CAUSES

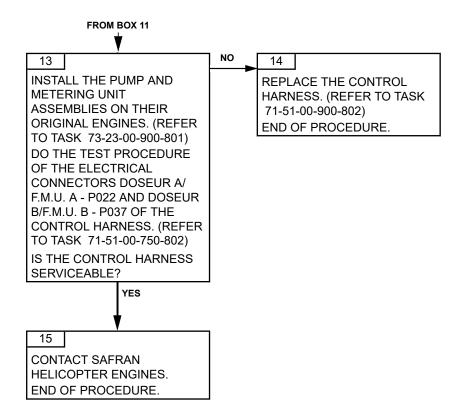
- Pump and metering unit assembly
- EECU
- Control harness

2. PROCEDURE









MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-884-A01 BLEED VALVE POSITION INCONSISTENCY OR

BLEED VALVE ANOMALY OBSERVED

TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
BV. A or BV. B	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

B. GENERAL DESCRIPTION

The bleed valve opening and closing are not controlled by the EECU. The P3/P0 ratio controls the bleed valve opening and closing. A position detector (microswitch) sends the position signal of the bleed valve to the EECU.

During the starting phase, the bleed valve is open until a sufficient P3/P0 ratio is obtained to close the bleed valve. During the rundown phase, the bleed valve is closed until P0/P3 ratio becomes sufficiently low to open the bleed valve.

The failure message "BV.A and/or BV.B" is displayed when the position data received by the EECU is inconsistent with the bleed valve position calculated by the EECU.

This troubleshooting task can be applied when either the failure message "BV.A or BV.B" is displayed or a bleed valve anomaly is observed.

There is a risk of surge if the bleed valve is stuck closed or the maximum power is not available if the bleed valve is stuck open.

C. POSSIBLE CAUSES

- Bleed valve
- Bleed valve filter
- P3 air tube
- EECU
- Control harness

ARRIEL 2 C2

MAINTENANCE MANUAL

- Microswitch (position detector) of the bleed valve

2. PROCEDURE

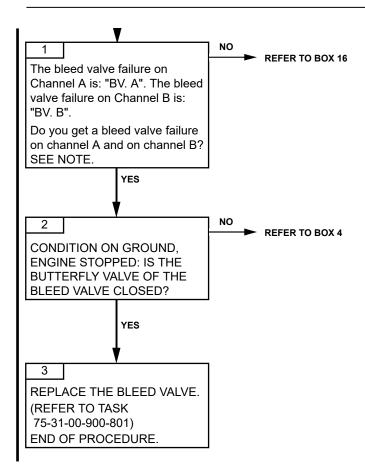
<u>NOTE</u>: If the failure is recorded by both EECU channels A and B, the failure is likely to be

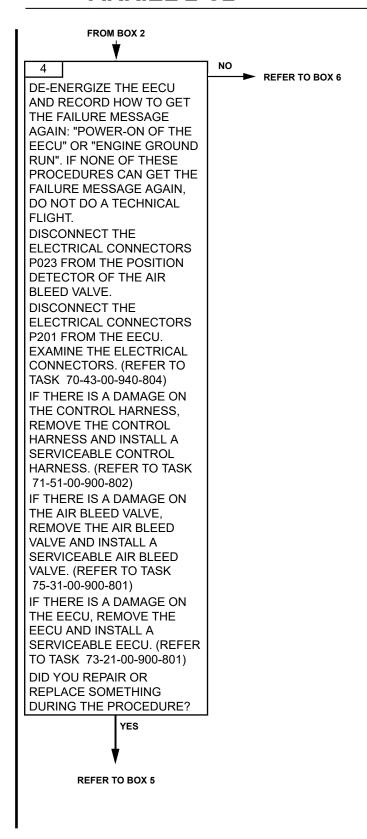
external to the EECU. If the failure is seen only by channel A or channel B, the failure

is likely to be internal to the EECU.

Effectivity: C2

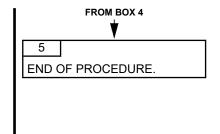
Failure codes
Page 102
Dec. 30/2021

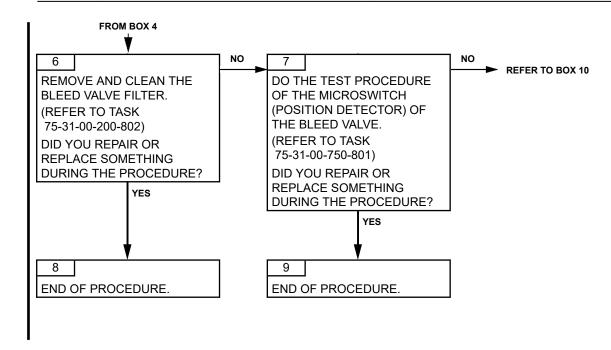


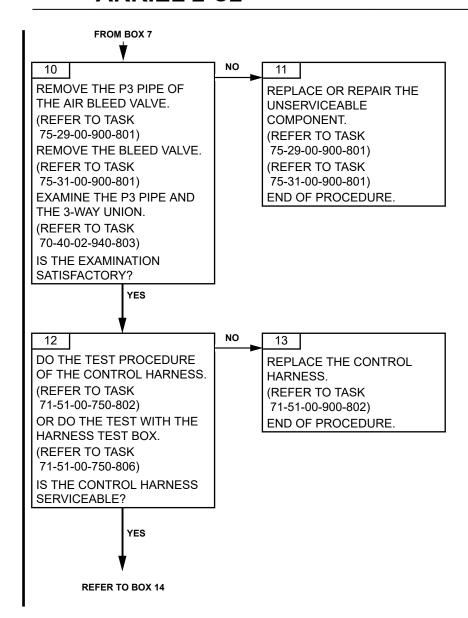


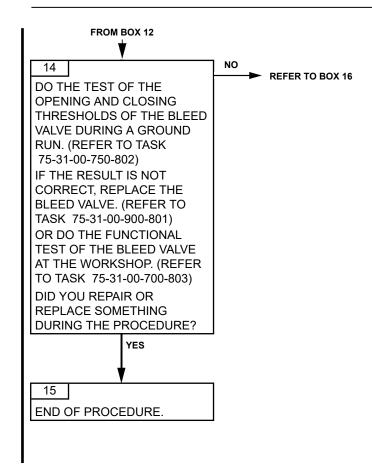
ARRIEL 2 C2

MAINTENANCE MANUAL



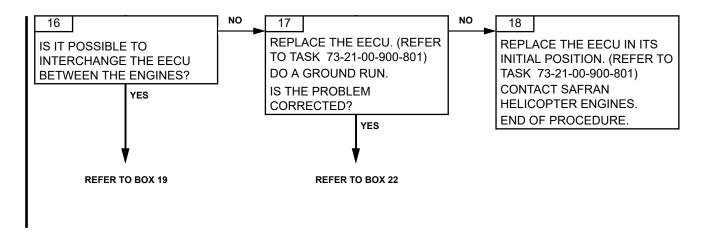


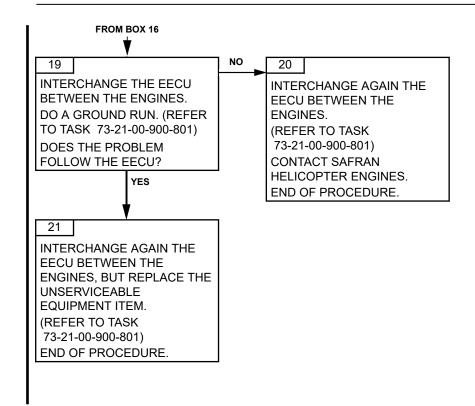


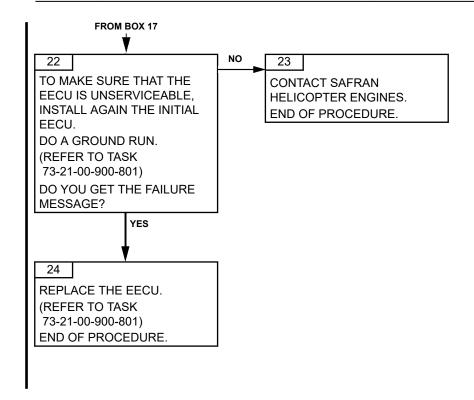


ARRIEL 2 C2

MAINTENANCE MANUAL







ARRIEL 2 C2

MAINTENANCE MANUAL

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MAINTENANCE MANUAL

ARRIEL 2 C2

TASK 71-00-06-817-889-A01

HELICOPTER T4.5 FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
H TOT. A

The helicopter T4.5 is sent to the EECU through the ARINC link label 132.

This message shows that the EECU operates correctly: an incorrect communication between the aircraft and the EECU can cause a "H. LINK A" or ARINC failure message.

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Impossible to use the helicopter T45 as backup value. No effect on the engine operation.	flashing GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

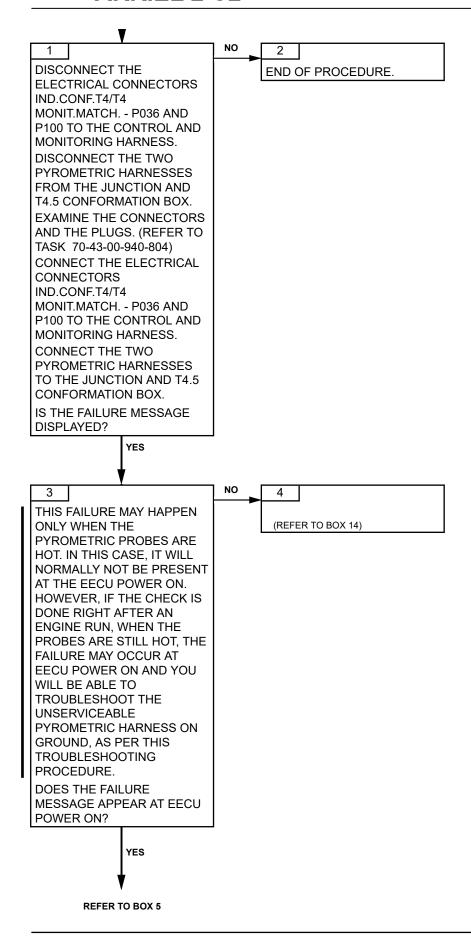
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

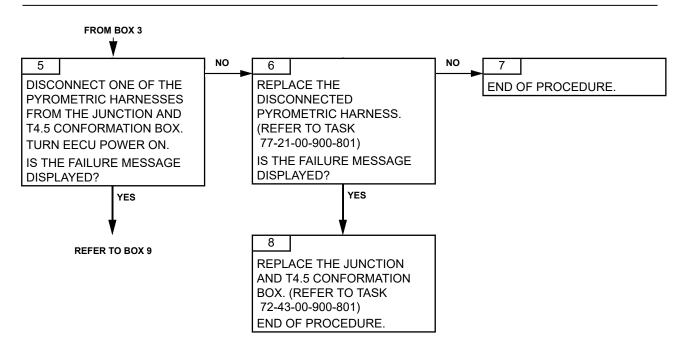
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

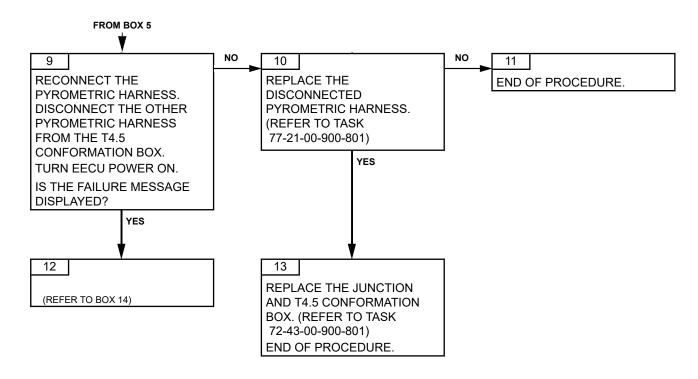
C. POSSIBLE CAUSES

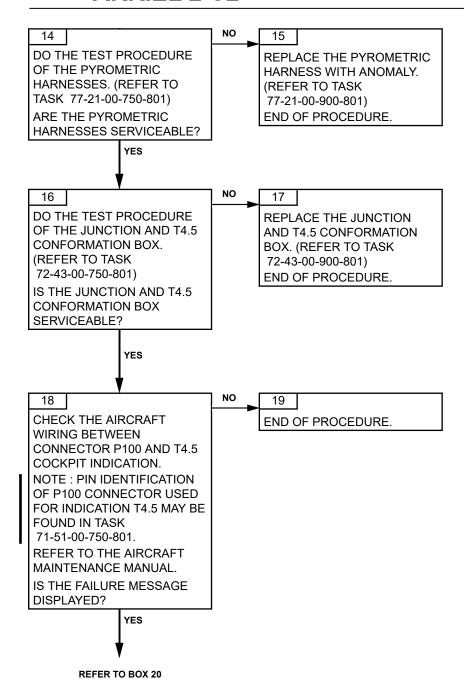
- Junction and T4.5 conformation box
- Pyrometric harness
- Control and monitoring harness
- Aircraft wiring from P100 to T4.5 indication (Aircraft system)

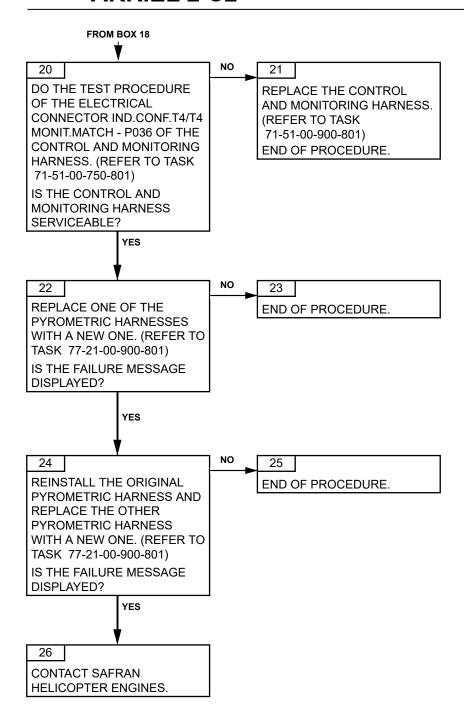
2. PROCEDURE











ARRIEL 2 C2

MAINTENANCE MANUAL

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ARRIEL 2 C2

TASK 71-00-06-817-890-A01

CROSS TALK ARINC TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
BALANC. A

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
N2 regulation in proportional mode (loss of NR revolution). Both EECUs display simultaneously the failure message. Accuracy of N2 is degraded.	GOV

<u>NOTE</u>: This failure is reversible if the engine is in OFF, START or IDLE mode

(meaning that if the fault condition disappears, the fault message and effect

will also disappear). In FLIGHT mode, the failure is not reversible.

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- EECU
- EECU cross link function (Aircraft system)

2. PROCEDURE

<u>NOTE</u>: Cross-talk connection from connector P2 EECU 1 to connector P2 EECU 2: ARINC transmission:

- Pin 6 EECU 1 connects to pin 8 EECU 2
- Pin 2 EECU 1 connects to pin 9 EECU 2.

ARINC reception:

- Pin 8 EECU 1 connects to pin 6 EECU 2
 Pin 9 EECU 1 connects to pin 2 EECU 2
- DISCONNECT THE
 ELECTRICAL CONNECTOR P2
 TO THE AIRCRAFT HARNESS.
 EXAMINE THE CONNECTORS
 AND THE PLUGS. (REFER TO
 TASK 70-43-00-940-804)
 CONNECT THE ELECTRICAL

NO

NO

4

6

END OF PROCEDURE.

END OF PROCEDURE.

3 CHECK THE AIRCRAFT WIRING AND CONNECTIONS BETWEEN THE TWO EECUS. REFER TO THE AIRCRAFT

YES

CONNECTOR P2 TO THE AIRCRAFT HARNESS.
IS THE FAILURE MESSAGE

DISPLAYED?

SEE NOTE.
IS THE FAILURE MESSAGE DISPLAYED?

YES

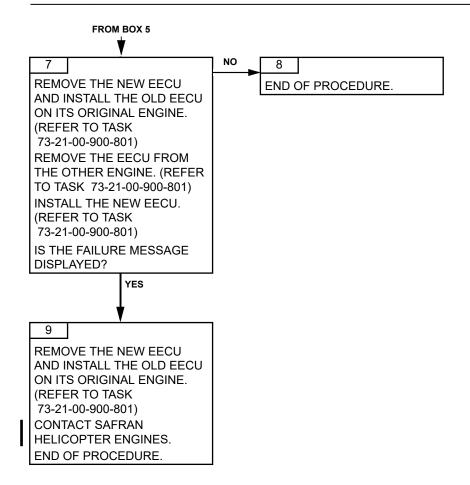
MAINTENANCE MANUAL.

REMOVE THE EECU FROM ONE OF THE ENGINES. (REFER TO TASK 73-21-00-900-801) INSTALL A NEW EECU. (REFER TO TASK

IS THE FAILURE MESSAGE DISPLAYED?

73-21-00-900-801)

REFER TO BOX 7



ARRIEL 2 C2

MAINTENANCE MANUAL

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TASK 71-00-06-817-906-A01

DECU CONFIGURATION/AIRCRAFT CONFIGURATION INCONSISTENCY TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
VERSION. A or VERSION. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If VERSION. A only or if VERSION. A + VERSION.	
<u>B</u>	
 The helicopter configuration received via the ARINC message is not recognized by the EECU. Display of degraded operation. 	GOV
If VERSION. B only	
No effect.	flashing GOV

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

EECU

This failure message means that the incorrect EECU is installed on the airframe.

2. PROCEDURE

ARRIEL 2 C2

MAINTENANCE MANUAL

V

DO THE CHECK OF THE EECU PART NUMBER BETWEEN THE IDENTIFICATION PLATE AND THE EECU LOG CARD.

ARRIEL 2 C2

TASK 71-00-06-817-907-A01

N2 FAILURE (B ON THE HARNESS) TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
NF. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Total failure of channel B	
If channel A in control: no effect	flashing GOV
If channel B in control after total failure of channel A: stepper motor freezing.	FADEC

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: THE EECU CAN DETECT THIS FAILURE IF THE DIFFERENCE BETWEEN THE 2

SIGNALS IS GREATER THAN 3%. IF EACH N2 SIGNAL IS WITHIN ACCEPTABLE VALUES, THE EECU MAY NOT FIND THE ACCURATE CAUSE OF THE FAILURE AND DECLARE THE LOSS OF THE TWO N2 SPEED SENSORS INFORMATION (FOR CHANNEL A AND CHANNEL B), LEADING TO A STEPPER MOTOR

FREEZING.

<u>CAUTION</u>: IN CASE OF N2 DOUBLE FAILURE. IF AT THE NEXT POWER ON THE

MESSAGES "NF. A" AND "NF. B" ARE NOT DISPLAYED, THERE IS STILL A HIGH CHANCE FOR ONE OF THE TWO SENSORS TO FAIL DURING THE

ENGINE RUN. DO THE TROUBLESHOOTING TASK PROCEDURE.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

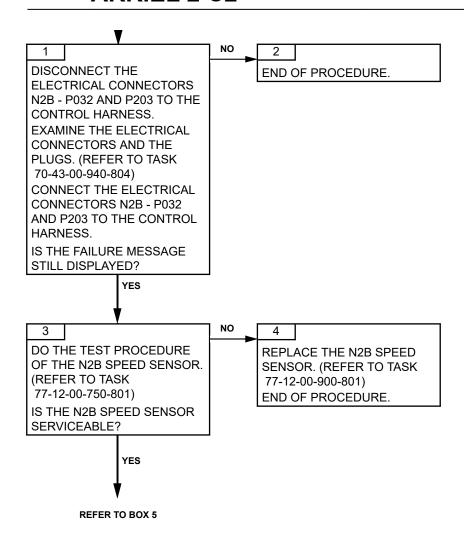
C. POSSIBLE CAUSES

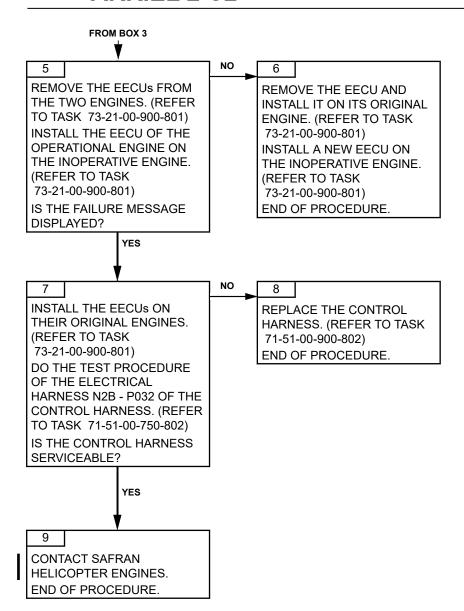
- N2B speed sensor
- EECU
- Control harness

ARRIEL 2 C2

MAINTENANCE MANUAL

2. PROCEDURE





ARRIEL 2 C2

TASK 71-00-06-817-910-A01

INTERCHANNEL RECEPTION FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
A/B RE. A or A/B RE. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If A/B RE. A	
– No effect.	flashing GOV
If A/B RE. B	
If channel A in control: no effect	flashing GOV
 If channel B in control following a channel A total failure: degraded engine per- formance. Loss of cross talk ARINC message. N2 in proportional mode (Loss of NR revolution, NR accuracy degraded). 	GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

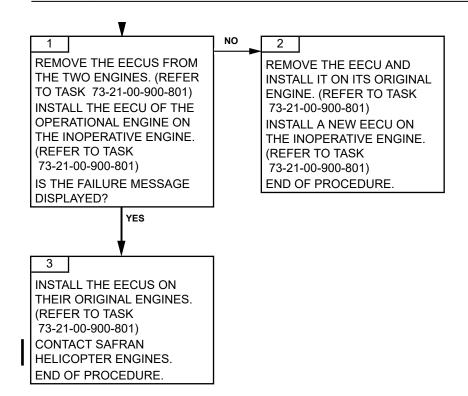
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

EECU

2. PROCEDURE



ARRIEL 2 C2

TASK 71-00-06-817-913-A01

N2 FAILURE (C ON THE HARNESS) TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
NF. A	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Total failure of channel A	
If non total failure of channel B: automatic reversion to channel B. No effect	flashing GOV
 If total failure of channel B: stepper motor freezing. 	FADEC

NOTE: If NF. A present at EECU power ON, PROCES. A, SELECT. B, T/SEL. B may

also appear. Do the troubleshooting procedure of NF. A first.

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: THE EECU CAN DETECT THIS FAILURE IF THE DIFFERENCE BETWEEN THE 2

SIGNALS IS GREATER THAN 3%. IF EACH N2 SIGNAL IS WITHIN ACCEPTABLE VALUES, THE EECU MAY NOT FIND THE ACCURATE CAUSE OF THE FAILURE AND DECLARE THE LOSS OF THE TWO N2 SPEED SENSORS INFORMATION (FOR CHANNEL A AND CHANNEL B), LEADING TO A STEPPER MOTOR

FREEZING.

CAUTION: IN CASE OF N2 DOUBLE FAILURE. IF AT THE NEXT POWER ON THE

MESSAGES "NF. A" AND "NF. B" ARE NOT DISPLAYED, THERE IS STILL A HIGH CHANCE FOR ONE OF THE TWO SENSORS TO FAIL DURING THE

ENGINE RUN. DO THE TROUBLESHOOTING TASK PROCEDURE.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

ARRIEL 2 C2

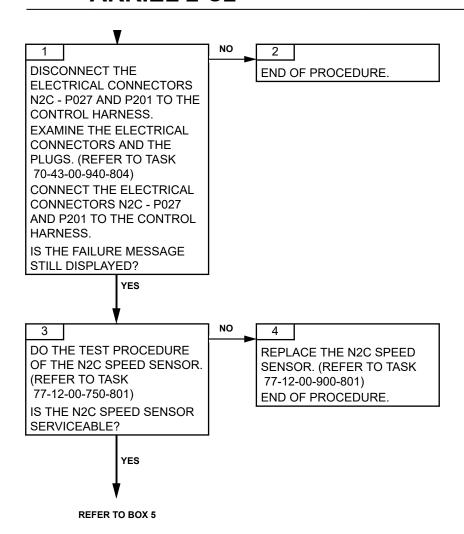
MAINTENANCE MANUAL

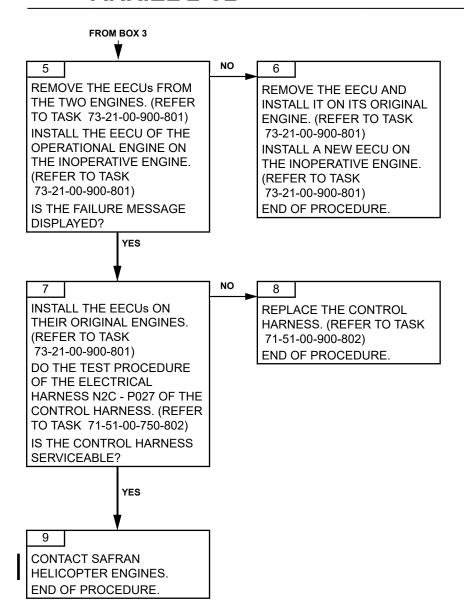
- N2C speed sensor
- EECU
- Control harness

2. PROCEDURE

Effectivity: C2

Failure codes
Page 102
Dec. 30/2021





ARRIEL 2 C2

TASK 71-00-06-817-918-A01

N1 FAILURE (A ALTERNATOR ON THE HARNESS) TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
NG. A

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Total failure of channel A. Automatic reversion to channel B.	flashing GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

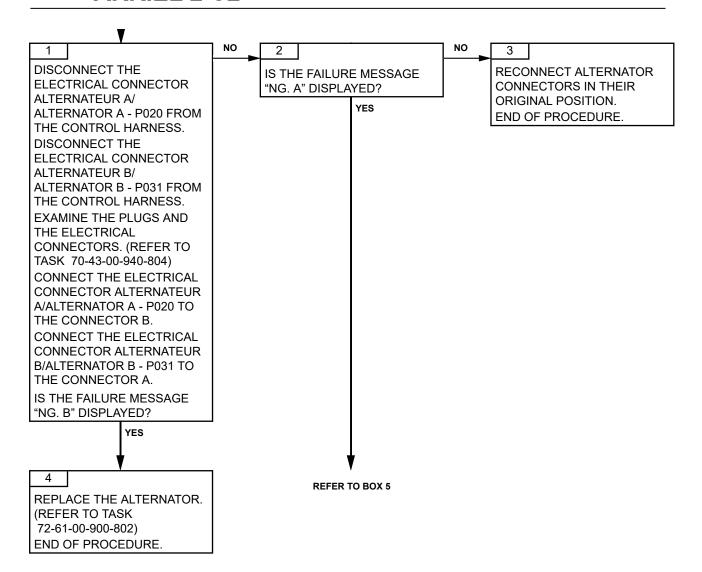
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO

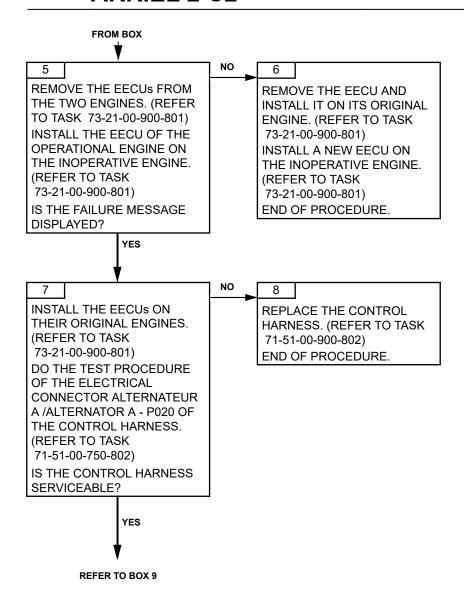
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Alternator
- EECU
- Control harness
- Module 01 Accessory gearbox and transmission shaft

2. PROCEDURE

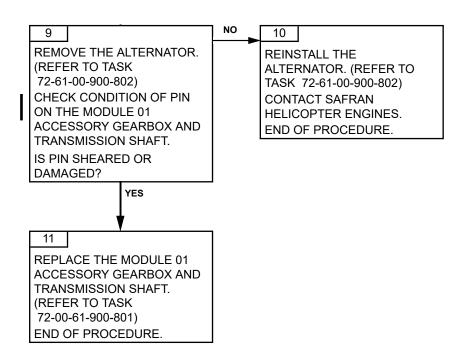




ARRIEL 2 C2

MAINTENANCE MANUAL





ARRIEL 2 C2

TASK 71-00-06-817-919-A01

N1 FAILURE (B ALTERNATOR ON THE HARNESS) TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
NG. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Total failure of channel B	
If channel A in control: no effect	flashing GOV
If channel B in control after total failure of channel A: stepper motor freezing.	FADEC

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

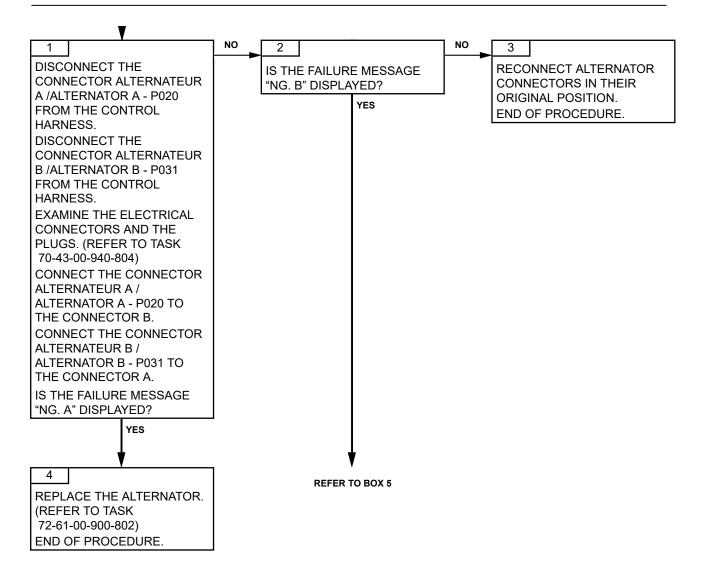
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

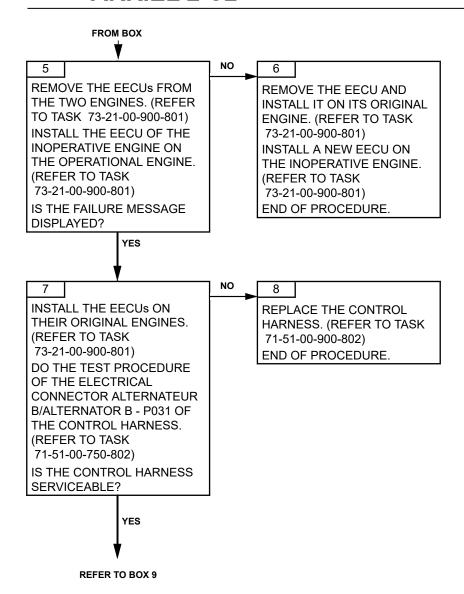
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Alternator
- EECU
- Control harness
- Module 01 Accessory gearbox and transmission shaft

2. PROCEDURE

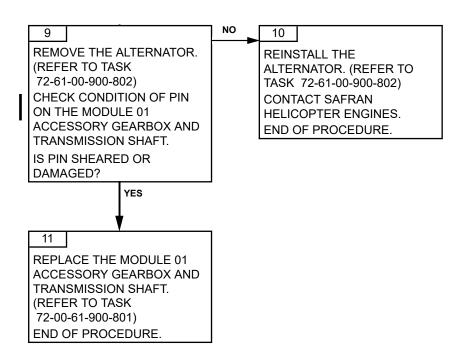




ARRIEL 2 C2

MAINTENANCE MANUAL





ARRIEL 2 C2

TASK 71-00-06-817-920-A01

N1 FAILURE ON THE ALTERNATOR ELECTRICAL CONNECTOR (A ALTERNATOR ON THE HARNESS AND B ALTERNATOR ON THE HARNESS)
TROUBLESHOOTING

1. **GENERAL**

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
NG. A and NG. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Total failure of channel A and B	
Stepper motor freezing.	FADEC

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: THE EECU CAN DETECT THIS FAILURE IF THE DIFFERENCE BETWEEN THE 2

SIGNALS IS GREATER THAN 3%. IF EACH N1 SIGNAL IS WITHIN ACCEPTABLE VALUES, THE EECU MAY NOT FIND THE ACCURATE CAUSE OF THE FAILURE AND DECLARE THE LOSS OF THE TWO N1 SPEED SENSORS INFORMATION (FOR CHANNEL A AND CHANNEL B), LEADING TO A STEPPER MOTOR

FREEZING.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

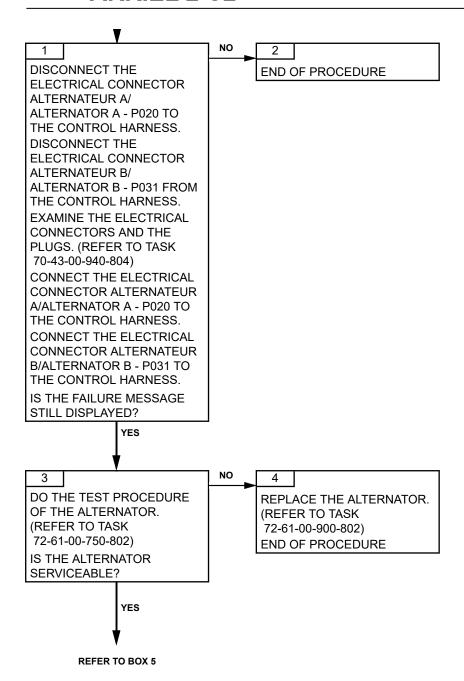
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

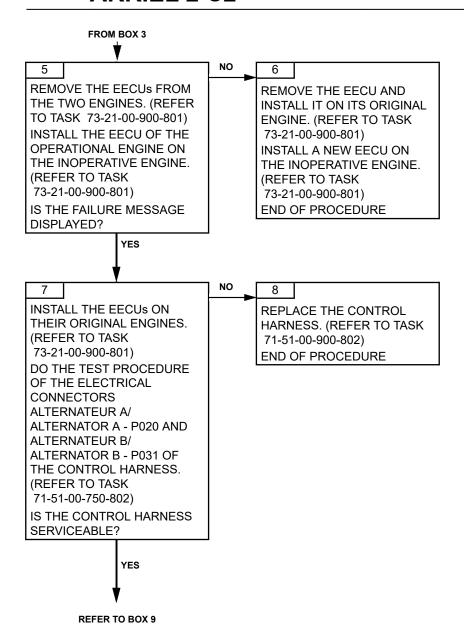
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Alternator
- EECU
- Control harness.
- Module 01 Accessory gearbox and transmission shaft

2. PROCEDURE

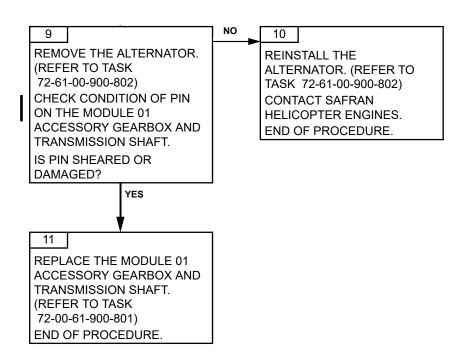




ARRIEL 2 C2

MAINTENANCE MANUAL





ARRIEL 2 C2

TASK 71-00-06-817-928-A01

HELICOPTER P0 FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
H PO. A

B. FAILURE EFFECTS

	EFFECTS	CAD MESSAGE
	If engine P0 is available: use of this value as backup. No effect except accuracy of the P0 used	flashing GOV
-	If engine P0 not available: use of a backup value. No more P0 effect on N2 datum.	GOV

The helicopter P0 is sent to the EECU through the ARINC link label 215.

This message shows that the EECU operates correctly: an incorrect communication between the aircraft and the EECU can cause a "H. LINK A" or ARINC failure message.

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

Helicopter P0 function (Aircraft system)

2. PROCEDURE

ARRIEL 2 C2

MAINTENANCE MANUAL

V

CHECK HELICOPTER PO FUNCTION/ACCURACY ON THE AIRCRAFT SYSTEM. REFER TO THE AIRCRAFT MAINTENANCE MANUAL.

I END OF PROCEDURE.

Effectivity: C2

Failure codes
Page 102
Dec. 30/2019

ARRIEL 2 C2

TASK 71-00-06-817-929-A01

NO HELICOPTER ARINC MESSAGE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
H LINK. A	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Same effect as "Helicopter P0 failure" and "Helicopter T4.5 failure". Impossible to	GOV
perform engine health check.	

NOTE: On ground, with engine switch in OFF position, when the VEMD is in the

MAINTENANCE MODE, the VEMD stops sending the ARINC message to the EECU. In consequence, the EECU declares a HELICOPTER ARINC failure and the GOV light illuminates. This condition is reversible and the failure

condition and GOV light will disappear as soon as the VEMD returns to the

NORMAL mode.

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.

THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

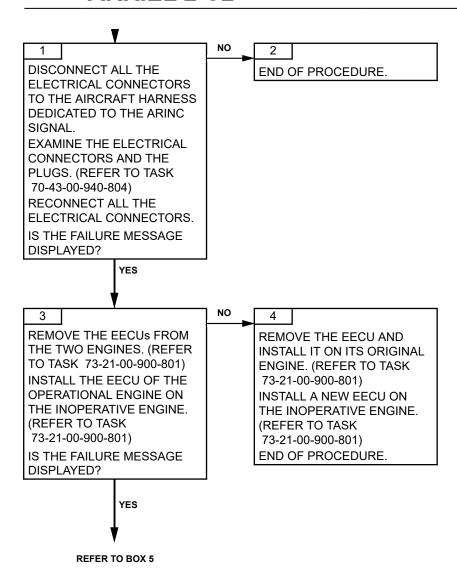
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

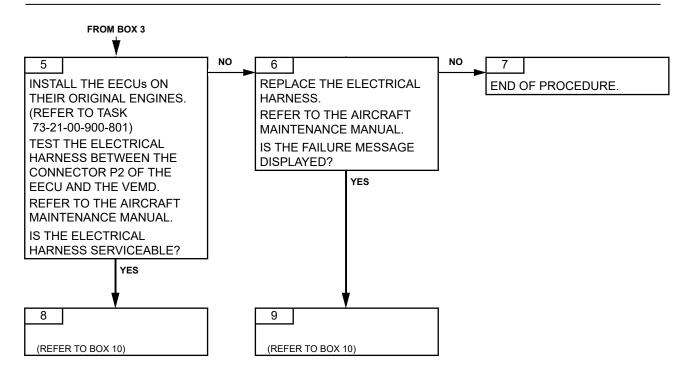
C. POSSIBLE CAUSES

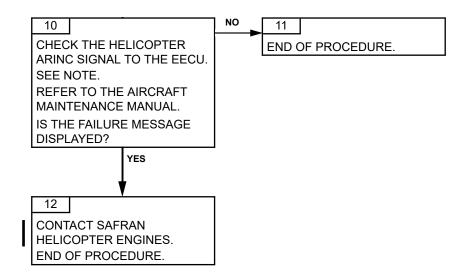
- EECU
- Helicopter ARINC message function (Aircraft system)
- Electrical harness

2. PROCEDURE

<u>NOTE</u>: The EECU receives the helicopter ARINC signal at connector P2, pin 7 (high) and pin 3 (low).







ARRIEL 2 C2

MAINTENANCE MANUAL

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ARRIEL 2 C2

TASK 71-00-06-817-931-A01

ALTERNATOR FAILURE CHANNEL A AND CHANNEL B
TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

Γ	VEMD MESSAGE
Г	ALTER. A and ALTER. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Loss of alternator power supply on both channels. Use of aircraft 28VDC power supply. No effect.	flashing GOV
This failure will occur only engine running, with NG greater than 70%.	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

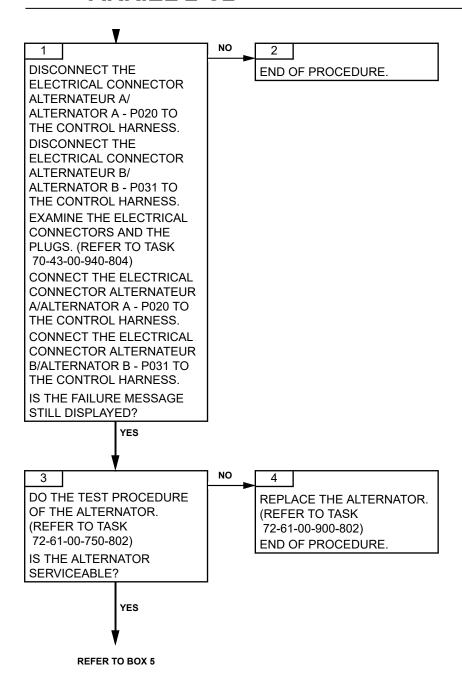
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

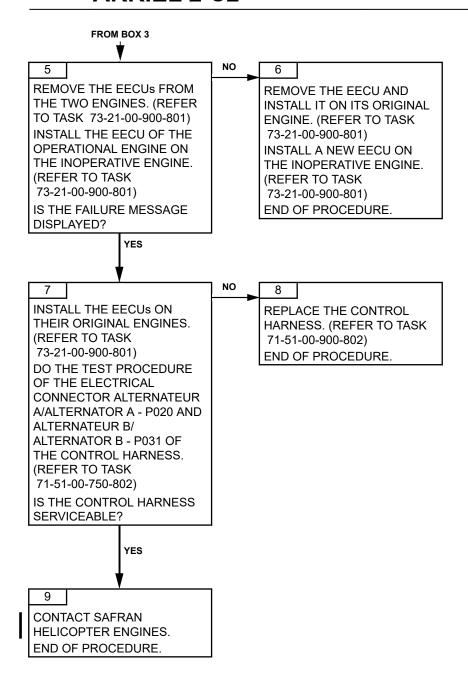
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Alternator
- EECU
- Control harness

2. PROCEDURE





ARRIEL 2 C2

MAINTENANCE MANUAL

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ARRIEL 2 C2

TASK 71-00-06-817-932-A01

ALTERNATOR FAILURE A TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
ALTER. A

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Loss of alternator power supply on channel A. Use of aircraft 28VDC power supply. No effect.	flashing GOV
This failure will occur only engine running, with NG greater than 70%.	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

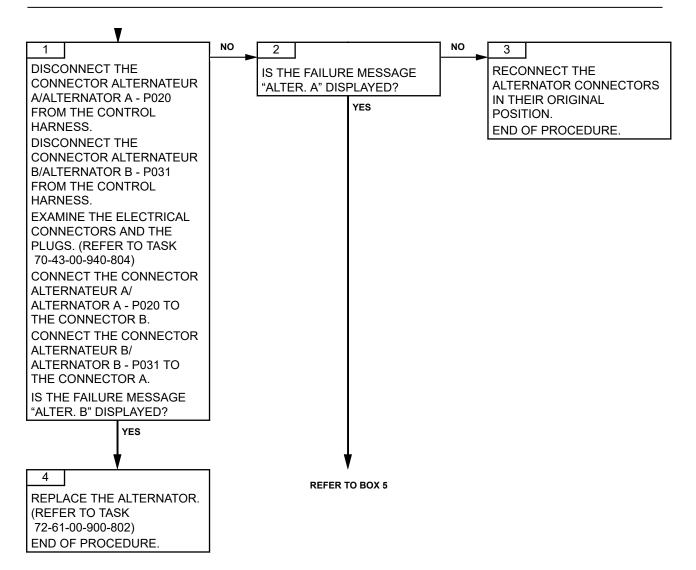
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

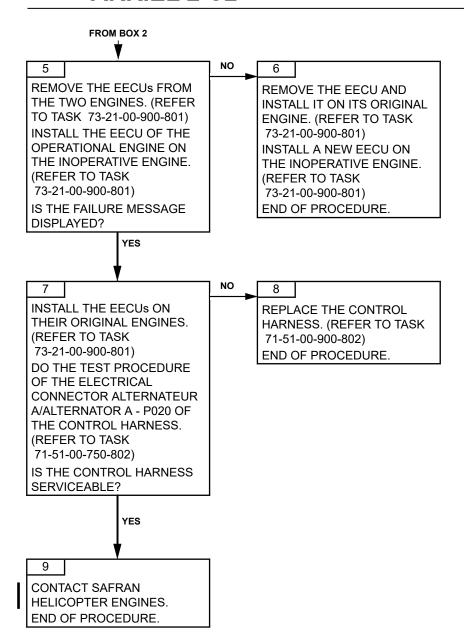
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Alternator
- EECU
- Control harness

2. PROCEDURE





ARRIEL 2 C2

MAINTENANCE MANUAL

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ARRIEL 2 C2

TASK 71-00-06-817-933-A01

ALTERNATOR FAILURE B TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
ALTER. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
Loss of alternator power supply on channel B. Use of aircraft 28VDC power supply.	flashing GOV
No effect.	
This failure will occur only engine running, with NG greater than 70%.	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

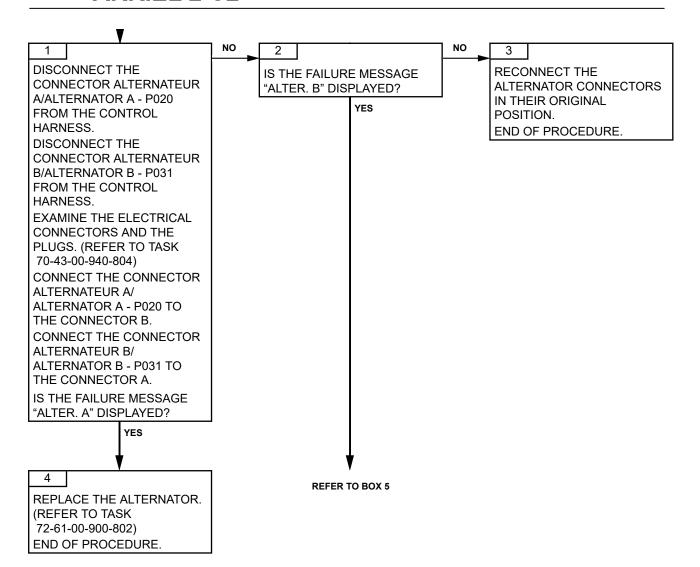
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

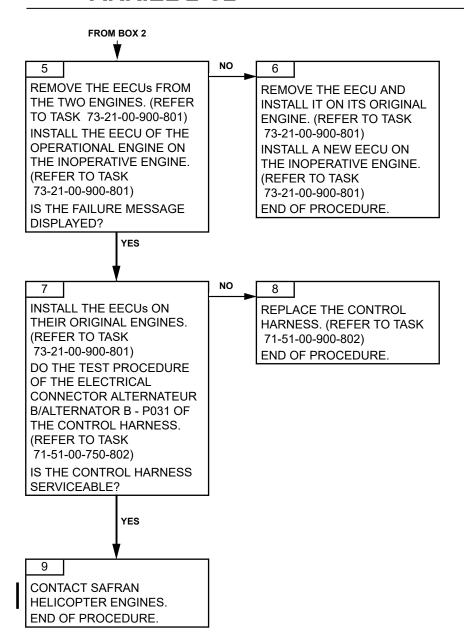
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Alternator
- EECU
- Control harness

2. PROCEDURE





ARRIEL 2 C2

MAINTENANCE MANUAL

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ARRIEL 2 C2

TASK 71-00-06-817-938-A01

28V FAILURE A TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
28V. A

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
At starting:	
Total failure of channel A	
If no total failure of channel B: reversion to channel B	flashing GOV
If total failure of channel B: start impossible.	FADEC
Engine running:	
Use of alternator power supply. No effect.	flashing GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

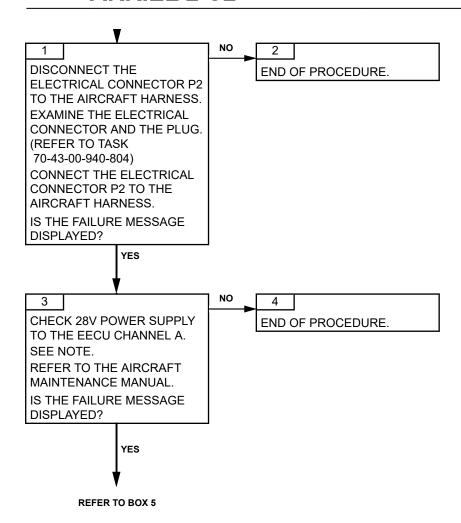
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

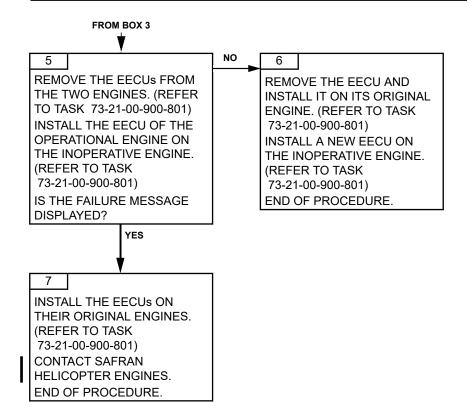
C. POSSIBLE CAUSES

- EECU
- 28V Power supply to channel A (Aircraft system)

2. PROCEDURE

NOTE: The EECU channel A receives the 28V aircraft power supply at connectorP2, pin 54 (+) and pin 55 (-).





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TASK 71-00-06-817-939-A01

28V FAILURE B TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
28V. B

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
At starting:	
Total failure of channel B	
If channel A in control: no effect	flashing GOV
If channel B in control after total failure of channel A: start impossible.	FADEC
Engine running:	
Use of alternator power supply. No effect.	flashing GOV

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

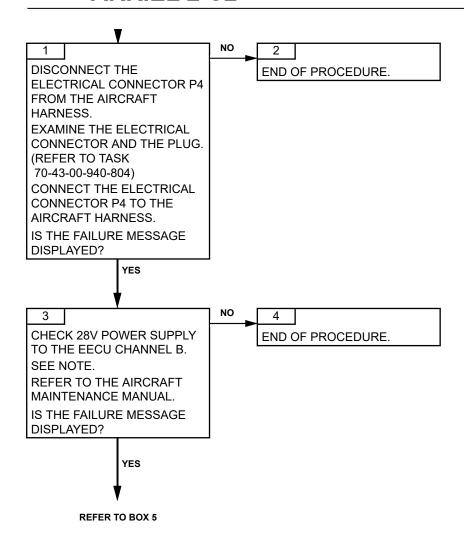
THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

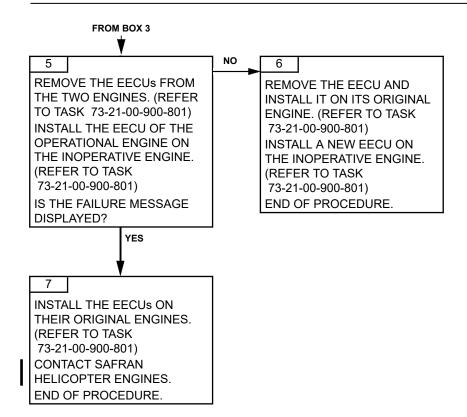
C. POSSIBLE CAUSES

- EECU
- 28V Power supply to channel B (Aircraft system)

2. PROCEDURE

<u>NOTE</u>: The EECU channel B receives the 28V aircraft power supply at connector P4, pin 63(+) and pin 62 (-).





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TASK 71-00-06-817-948-A01

P0 INCONSISTENCY TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE
P0 MIS. A

B. FAILURE EFFECTS

	EFFECTS	CAD MESSAGE
-	 If engine P0 is available: use of this value as backup. No effect except accuracy of the P0 used 	flashing GOV
ŀ	 If engine P0 not available: use of a backup value. No more P0 effect on N2 datum. 	GOV

NOTE: P0 MIS. A will appear if the difference between the helicopter P0 and the EECU P0 is greater than 28 mbars. Helicopter P0 is received by the EECU via

the ARINC link.

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO

CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

EECU

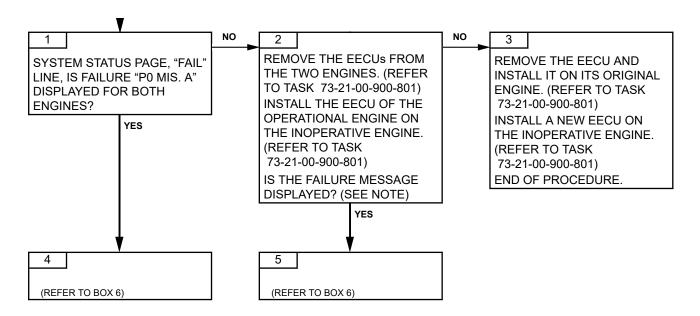
Helicopter P0 function (Aircraft system)

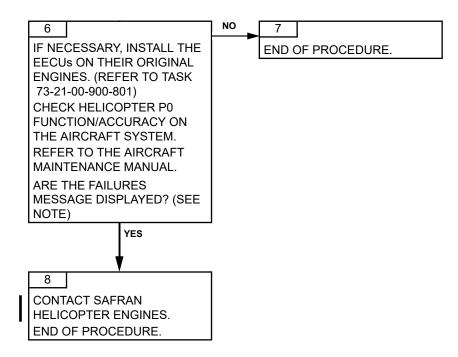
2. PROCEDURE

<u>NOTE</u>: This failure may occur during rapid change of ambiant pressure. Please confirm that the failure disappear also in flight and not only on ground.

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TASK 71-00-06-817-949-A01

STOP ELECTRO-VALVE FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
EL.V. A or EL.V. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
At engine shutdown, the engine will not shut down immediately. After a few seconds, engine shutdown by stepper motor closing.	GOV
Loss of overspeed protection function.	

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

<u>CAUTION</u>: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- EECU
- Stop electro-valve
- Control and monitoring harness
- Stop electro-valve control function (Aircraft system)

2. PROCEDURE

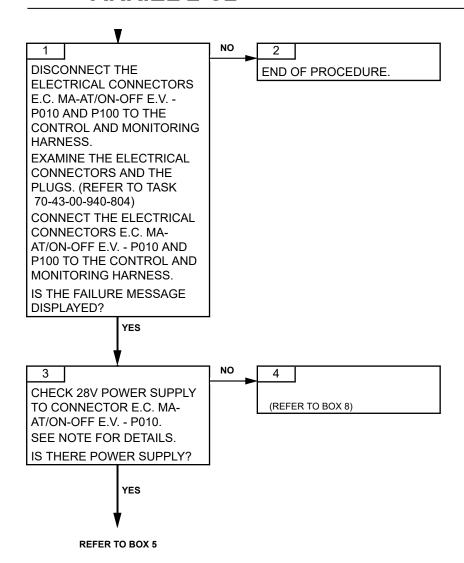
NOTE:

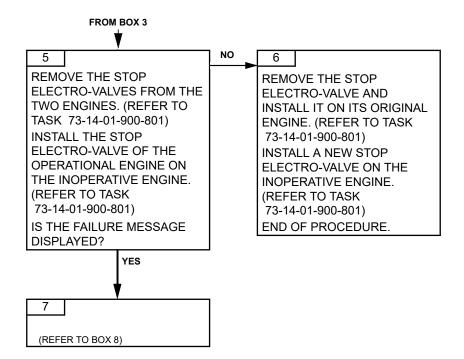
In normal operation, with the off/idle/flight switch on "off" position and battery power on, there should be a 28V power supply power to the "stop" solenoid of the stop electrovalve, at connector E.C. MA-AT/ON-OFF E.V. – P010, between pin 4 (+) and pin 2 (-).

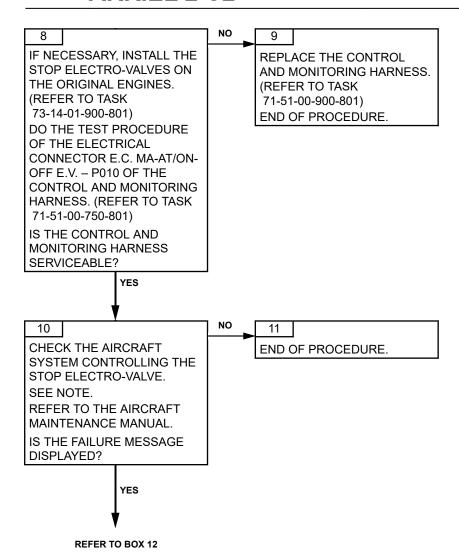
At the aircraft interface, at plug J100 (interfacing with connector P100), with the off/idle/flight switch on "off" position there should be a 28 V power supply between pins 39 (+) and 8 (-).

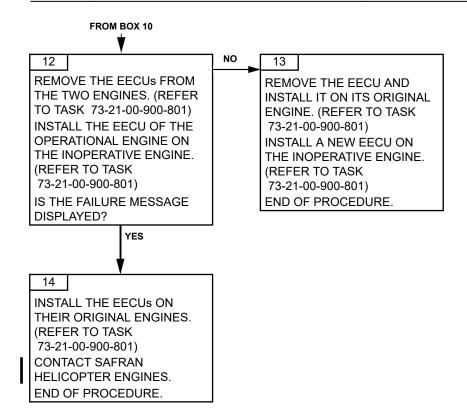
Effectivity: C2

Failure codes
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TASK 71-00-06-817-955-A01

OVERSPEED PROTECTION FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
OV/SP. A	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
The overspeed protection is no longer available.	flashing GOV

<u>CAUTION</u>: DO NOT SWAP THE ENGINE INTERFACE BOX (AIRCRAFT MANUFACTURER

RESPONSIBILITY) BETWEEN THE ENGINES FOR TROUBLESHOOTING. THIS MAY CAUSE ADDITIONAL DAMAGE TO THE ELECTRICAL CIRCUIT. INSTEAD,

TEST THE COMPONENTS AS DESCRIBED IN THE PROCEDURE.

<u>CAUTION</u>: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.

THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- Stop electro-valve
- N2 speed sensors
- Control harness
- Control and monitoring harness
- EECU
- EECU to control and monitoring harness wiring (Aircraft system).

2. PROCEDURE

<u>NOTE</u>: For the EECU to operate the stop electro-valve in case of overspeed, there must be continuity between:

Connector P4 pin 64 and connector P010 pin 4

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Connector P4 pin 65 and connector P010 pin 2.
 Make sure to check both ways as there as some diodes in the wiring.

NOTE: Control harness wires used for the overspeed functions:

- Wire from P203 pin 41 to P201 pin 6
- Wire from P203 pin 47 to P201 pin 7.

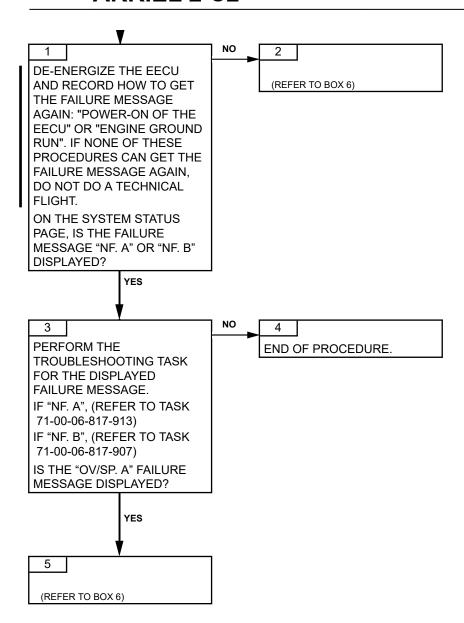
NOTE: There should be continuity between:

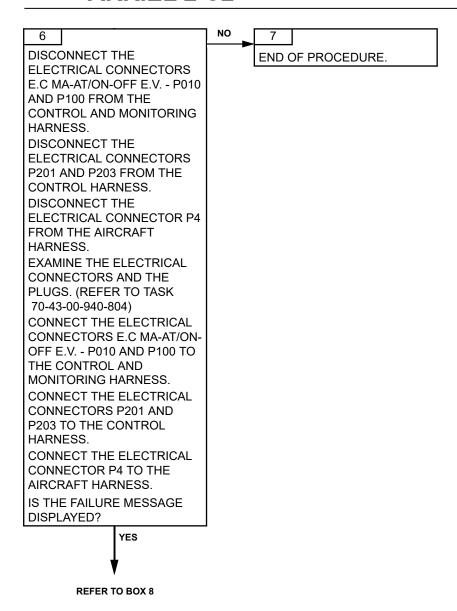
- Connector P4 pin 64 (+) and plug J100 pin 39 (+)
- Connector P4 pin 65 (-) and plug J100 pin 8 (-).

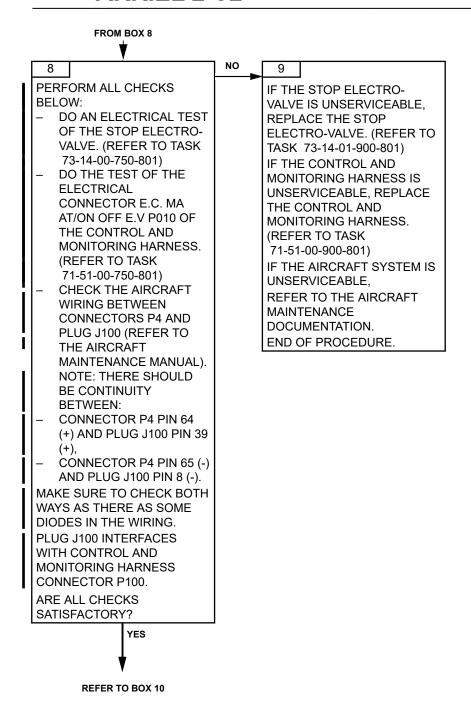
Make sure to check both ways as there as some diodes in the wiring. Plug J100 interfaces with control and monitoring harness connector P100.

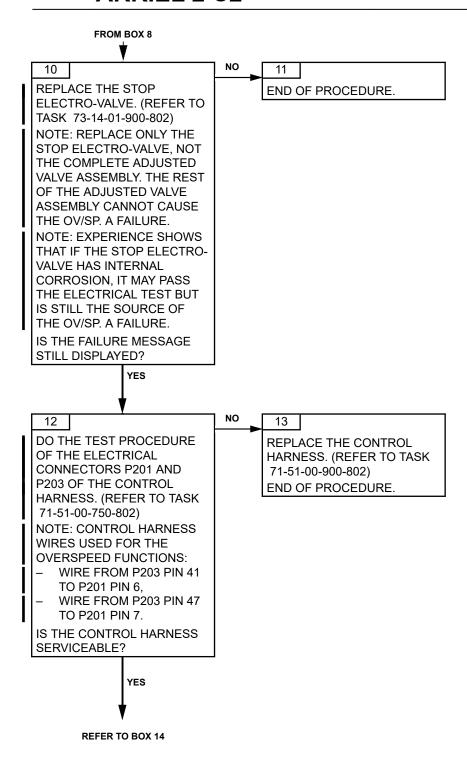
NOTE: Replace only the stop electro-valve, not the complete adjusted valve assembly. The rest of the adjusted valve assembly cannot cause the OV/SP. A failure.

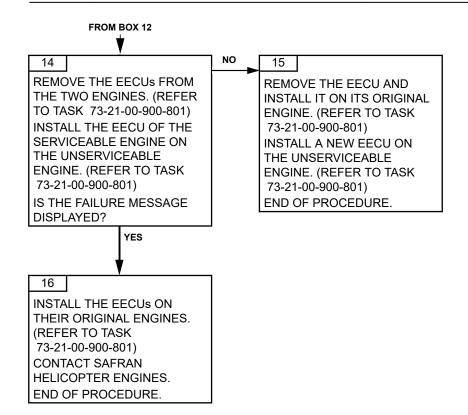
NOTE: Experience shows that if the stop electro-valve has internal corrosion, it may pass the electrical test as per box 7 but is still the source of the OV/SP. A failure. If you suspect exposure to water or moisture, replace the stop electro-valve. Continue at box 15 only if the failure message is still present after stop electro-valve replacement.











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TASK 71-00-06-817-959-A01

REAL TIME SOFTWARE FAILURE TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
SOFT. A or SOFT. B	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
If SOFT. A	
Total failure of channel A. Automatic reversion to channel B.	flashing GOV
If SOFT. B	
Total failure of channel B	
If channel A in control: no effect	flashing GOV
If channel B in control after a channel A total failure: stepper motor freezing.	FADEC

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

<u>CAUTION</u>: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

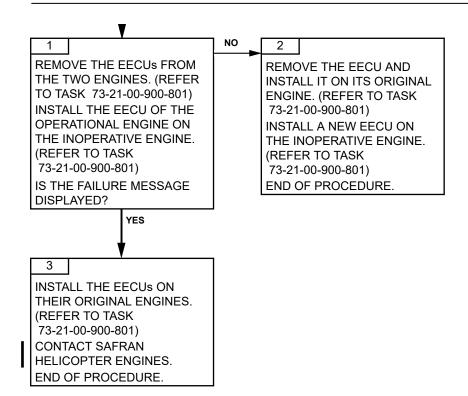
LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

EECU

2. PROCEDURE



TASK 71-00-06-817-966-A01

HMU OUT OF NEUTRAL POSITION TROUBLESHOOTING

1. GENERAL

A. VEMD FAILURE MESSAGE

VEMD MESSAGE	
"OUT NEUTRL" and "DEGRADE" on "MSG" line	
no failure displayed on "FAIL" line	

B. FAILURE EFFECTS

EFFECTS	CAD MESSAGE
At Power ON	
Start impossible.	GOV
ENGINE RUNNING	
The HMU is out of neutral while the EECU is in control. In normal operation, the HMU is out of neutral position only when the manual mode (EBCAU) is selected. Degraded operation, with slower engine acceleration and deceleration.	GOV

CAUTION: MAKE SURE THAT THE CONCERNED AIRCRAFT SYSTEM IS SERVICEABLE

BEFORE YOU SWAP THE ENGINE ELECTRONIC CONTROL UNITS.

CAUTION: WHEN CHECKING THE "FAIL" LINE ON THE VEMD SYSTEM STATUS PAGE,

MAKE SURE TO CHECK ALL FAILURES. TO DO SO, PRESS THE SELECT KEY UNTIL A WHITE FRAME SURROUNDS THE "FAIL" LINE. THEN, USE "+/-" KEY

TO VIEW ALL FAILURES. PROCEED THE SAME WAY TO CHECK ALL

MESSAGES ON THE "MSG" LINE.

CAUTION: THE FAILURE INFORMATION ON THE VEMD SYSTEM STATUS PAGE MAY NO

LONGER BE AVAILABLE AFTER BATTERY POWER IS TURNED OFF.
THEREFORE, AFTER A FAILURE OCCURRED, IT IS VERY IMPORTANT TO
CHECK AND WRITE DOWN ALL INFORMATION FROM THE "FAIL" LINE AND

THE "MSG" LINE BEFORE TURNING BATTERY POWER OFF.

C. POSSIBLE CAUSES

- HMU
- EECU
- Control harness
- EBCAU function (Aircraft system)

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NOTE: This message also indicates potential malfunction of the EBCAU system, which is part of the aircraft supply. Make sure that the related aircraft system is serviceable before replacing engine accessories.

2. PROCEDURE

