**ON A/C ALL

TASK 21−60−00−810−802
FLT COMPT PACK HOT (Caution) − Fault Isolation

1. General

A. This fault isolation procedure is for when the FLT COMPT PACK HOT caution light on the caution and warning panel (CAWP) is on. It is also for when the FLT COMPT PACK HOT caution light has come on one time or came on more than one time .

NOTE: The acronyms FD (flight deck) and FLT COMPT (flight compartment) are interchangeable. Also, the acronym CAB is interchangeable with the term CABIN.

B. The caution light comes on when either a flight compartment compressor over temperature event is detected or there is a sensed degradation of the flight compartment ACM's performance.

C. The central diagnostic system (CDS) can show the related messages that follow:

– 7102 − FD TSOV
– 7103 − FD ACM PERF
– 7104 − FD ACM CMP OT1
– 7105 − FD ACM CMP OT2
– 3A01 − FD TSOV
– 3A05 − FD TSOV
– 4404 − ECU DIG CH 2
– 3F01 − FD ACM
– 3603 − FD BYP VLV
– 3502 − L (R) SEC HX PERF
– 1202 − L (R) P2.2 SOV
– 1203 − L (R) P2.2 SOV
– 440A − ECU DIG CH 1 (CH 2)
– 3401 − TEMP RED VLV
– 3402 − TEMP RED VLV
– 3007 − L (R) PACK FCV
– 4422 − ECU DIG CH 1 (CH 2)
– 3701 − CAB CMP OLT TMP
– 3801 − CMP OVRTMP SW.

D. The fault logic definitions for the system monitor faults and the related component faults are as follows:

(1) The system Fault Code 7102 FD TSOV is set when the system finds that the compressor outlet and the pack outlet temperatures did not change after the ACM was shut down. This is part of the fault isolation logic of the ECU when the system fault 7103 FD ACM PERF is sensed and has persisted for 30 seconds or more. When the 7102 system fault is set, the

FLT COMPT PACK HOT caution light comes on.

This is an indication that the ACM may have been shut down due to a failed closed TSOV.

(2) The system Fault Code 7103 FD ACM PERF is set when the conditions that follow occur together for more than 30 seconds:

- The FD ACM compressor outlet temperature is 80.0°F (26.7°C) colder than the CAB ACM compressor outlet temperature
- None of the two compressor outlet temperature sensors have failed out of range.

When this system fault is set, the CAB turbine shutoff valve (TSOV) is commanded closed to find the cause of the lower compressor outlet temperature.

(3) The system Fault Code 7104 CAB ACM CMP OT1 is set when the conditions that follow occur together for more than 10 seconds:

- The CAB ACM compressor outlet temperature sensor is hotter than 430.0°F (221.1°C) or it has failed out of range (Fault Code 3701)
- The compressor over temperature switch is open (points to an over temperature condition).

This system fault will not be set if the conditions that follow occur together:

- The compressor over temperature switch is declared to be failed open (Fault Code 3801)
- The aircraft is on the ground and the packs are OFF.

(4) The system Fault Code 7105 CAB ACM CMP OT2 is set when the CAB ACM compressor outlet temperature sensor is hotter than 450.0°F (232.2°C) for more than 10 seconds. This system fault will not be set if the component Fault Code 3701 (CAB CMP OLT TMP) is active.

(5) The component fault code 3502 L (R) SEC HX PERF is set if the heat exchanger effectiveness is less than the expected value. This test is run when the packs are on with the conditions that follow:

- The static air temperature is more than the standard day air temperature
- The actual pack flow is between 37.9 and 100 ppm
- The heat exchanger effectiveness and the altitude are in a steady state for 5 minutes.

(6) If any of the component fault codes 1202 L (R) P2.2 SOV, 1203 L (R) P2.2 SOV or 440A ECU DIG CH 1 (CH 2) are set, the conditions that follow occurred:

- The P2.2 shutoff valve (SOV) was commanded open
- The closed position switch of the valve showed that the valve did not open for more than 20 seconds.

When the system fault 7104 or 7105 is sensed, the controller does some fault isolation tasks to find if the P2.2 SOV did not go open because of one of the faults that follow:

- 1202 L (R) P2.2 SOV or 1203 L (R) P2.2 SOV
- 440A ECU DIG CH 1 (CH 2).

(7) If any of the component fault codes 3401 TEMP RED VLV, 3402 TEMP RED VLV or 4423 ECU DIG CH 1 (CH 2) are set, the conditions that follow occurred:

- The temperature reduction valve was commanded open
- The pack inlet temperature stayed more than 580.0°F (26.7°C)

The temperature reduction switch showed that the temperature at the primary heat exchanger stayed too high for more than 30 seconds.

(There are two causes for this condition to occur. The temperature reduction valve (valve) did not open or there is a blockage of the heat exchanger. If there is a blockage of the heat exchanger, the fault code 3502 − SEC OLT MISCMP can be set. If so, do the FIM procedures for the fault code 3502 − SEC OLT MISCMP.)

When one of these component faults is sensed, the controller does some fault isolation tasks to find if the valve did not go open because of one of the faults that follow:

- 3401 TEMP RED VLV or 3402 TEMP RED VLV
- 4423 ECU DIG CH 1 (CH 2).

(8) If any of the two component fault codes 3007 L (R) PACK FCV or 4422 ECU DIG CH 1 (CH 2) are set, the conditions that follow occurred:

- The pack flow control and shutoff valve (PFCSOV) was commanded fully closed
- The pack flow stayed more than 10 ppm higher than the pack flow reference for a minimum of 30 seconds.

When the system fault 7104 or 7105 is sensed, the controller does some fault isolation tasks to find if the PFCSOV did not correctly regulate the pack flow because of one of the faults that follow:

- 3007 L (R) PACK FCV
- 4422 ECU DIG CH 1 (CH 2).

(9) If the component fault code 3701 FD CMP OLT TMP L CH (R CH) is set, the compressor outlet−temperature sensor failed out of range or detected a wire fault. This fault is a non−latching fault if any of the conditions that follow occur the fault will not be shown on the applicable ECS PRESENT FLT display:

- The compressor outlet−temperature sensor went back in range
- The wire fault went inactive (intermittent short or open).

If this fault is above the fault code 7106 or 7107, it is usually it goes out of range because of an over temperature event, not a failure of the resistance temperature device (RTD) sensor.

(10) The component fault code 3801 CMP OVRTMP SW monitor is done only after the packs have been off for 5 minutes. The component fault code 3801 is set when the conditions that follow occur together:

- The compressor outlet−temperature sensors sense a temperature that is less than the temperature that the compressor over−temperature switch is set to close at
- The compressor over−temperature switch is open.

The component fault code 3801 is a latched fault. To reset the fault, you must do the maintenance reset or cycle the power to the ECU channels.

2. Job Set−Up Information

Subtask 21−60−00−946−095

REFERENCE	DESIGNATION
AMM TASK 21−51−01−000−801	Removal of the Dual Heat Exchanger
AMM TASK 21−51−01−400−801	Installation of the Dual Heat Exchanger
AMM TASK 21−51−21−000−801	Removal of the Air Cycle Machine
AMM TASK 21−51−21−400−801	Installation of the Air Cycle Machine
AMM TASK 21−51−31−000−801	Removal of the Pack Bypass Valve
AMM TASK 21−51−31−400−801	Installation of the Pack Bypass Valve
AMM TASK 21−51−81−000−801	Removal of the Temperature Reduction Valve Switch
AMM TASK 21−51−81−400−801	Installation of the Temperature Reduction Valve Switch
AMM TASK 21−51−86−000−801	Removal of the Compressor Overtemperature Switch
AMM TASK 21−51−86−400−801	Installation of the Compressor Overtemperature Switch
AMM TASK 21−52−01−000−801	Removal of the Pack Flow Control and Shut−off Valve
AMM TASK 21−52−01−400−801	Installation of the Pack Flow Control and Shut−off Valve
AMM TASK 21−61−00−710−803	Operational Test of the ECS Temperature Control
AMM TASK 21−61−01−000−801	Removal of the Environmental Control System Electronic Control Unit
AMM TASK 21−61−01−400−801	Installation of the Environmental Control System Electronic Control Unit
AMM TASK 36−11−00−710−802	Operational Test of the Bleed Air System
AMM TASK 36−11−31−000−801	Removal of the P2.2 Shutoff Valve
AMM TASK 36−11−31−400−801	Installation of the P2.2 Shutoff Valve
AMM TASK 45−00−21−742−801	Retrieval of Data from the Central Diagnostic System − Environmental Control System (ECS) Air Conditioning
AMM TASK 45−00−21−743−801	Erase the Data from the Central Diagnostic System − Environmental Control System (ECS) Air Conditioning
FIM TASK 21−60−00−810−846	SEC HX PERF (Status) − Fault Isolation
FIM TASK 21−60−00−810−858	FD (CAB) ACM CMP OT2, 7105 (Status) − Fault Isolation
FIM TASK 21−60−00−810−867	FD (CAB) ACM CMP OT1, 7104 (Status) − Fault Isolation
FIM TASK 21−60−00−810−868	FD ACM PERF, 7103 (Status) − Fault Isolation
FIM TASK 21−60−00−810−874	FD TSOV, 7102 (Status) − Fault Isolation
WM 21−11−00−1	Bleed Air Control and Indication System
WM 21−51−00−1	Cooling System

REFERENCE	DESIGNATION
WM 21−61−00−1	Temperature Control and Indication System

3. Fault Confirmation

Subtask 21−60−00−810−003

A. Confirm the fault as follows:

(1) Do the retrieval of the CDS fault indications for the environmental control system (ECS) (Refer to AMM TASK 45−00−21−742−801).

(2) Record present and historical faults linked to the event in the appropriate maintenance log book. Include the operational hours for historical faults.

(3) Erase the data from the CDS (Refer to AMM TASK 45−00−21−743−801).

(4) Do the operational test of the environmental control system (ECS) temperature control (Refer to AMM TASK 21−61−00−710−803).

(a) If the FLT COMPT PACK HOT caution light does not come on, no maintenance procedure is necessary. Do the Close Out.

(b) If the FLT COMPT PACK HOT caution light does come on, or came on more than one time, do the retrieval of the CDS fault indications again (Refer to AMM TASK 45−00−21−742−801 . Do the fault isolation.

4. Fault Isolation

Subtask 21−60−00−810−004

A. Isolate the fault as follows:

(1) Refer to the fault isolation procedures given in the fault isolation flowchart (Refer toFIM21−60−00−997−802).

(2) If the message shown is 7102 − FD TSOV, do the fault isolation for this message (Refer to FIM TASK 21−60−00−810−874) .

(3) If the message shown is 7103 − FD ACM PERF, do the fault isolation for this message (Refer to FIM TASK 21−60−00−810−868) .

(4) If the message shown is 7104 − FD ACM CMP OT1, do the fault isolation for this message (Refer to FIM TASK 21−60−00−810−867) .

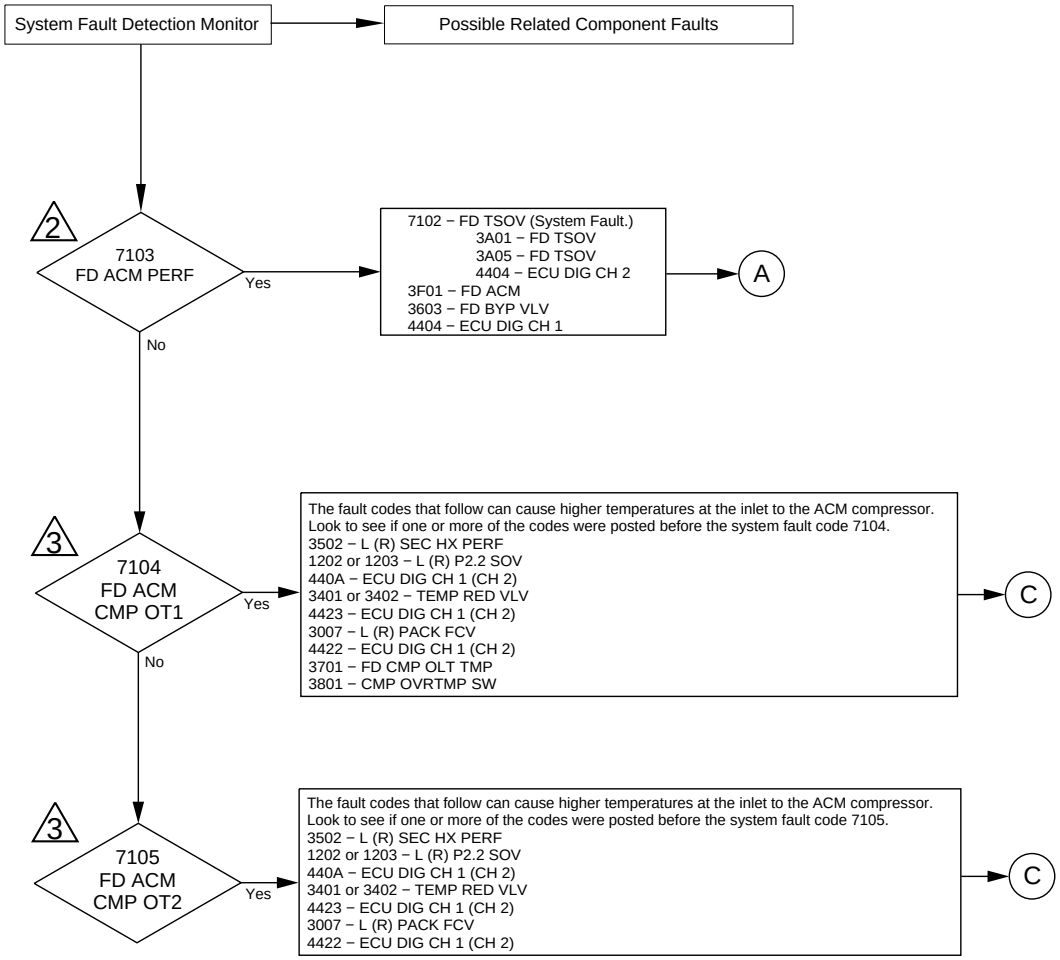
(5) If the message shown is 7105 − FD ACM CMP OT2, do the fault isolation for this message (Refer to FIM TASK 21−60−00−810−858) .

5. Close Out

Subtask 21−60−00−941−003

A. Make sure that the FLT COMPT PACK HOT caution light is not on.

B. Remove all tools, equipment and unwanted materials from the work area.



NOTES

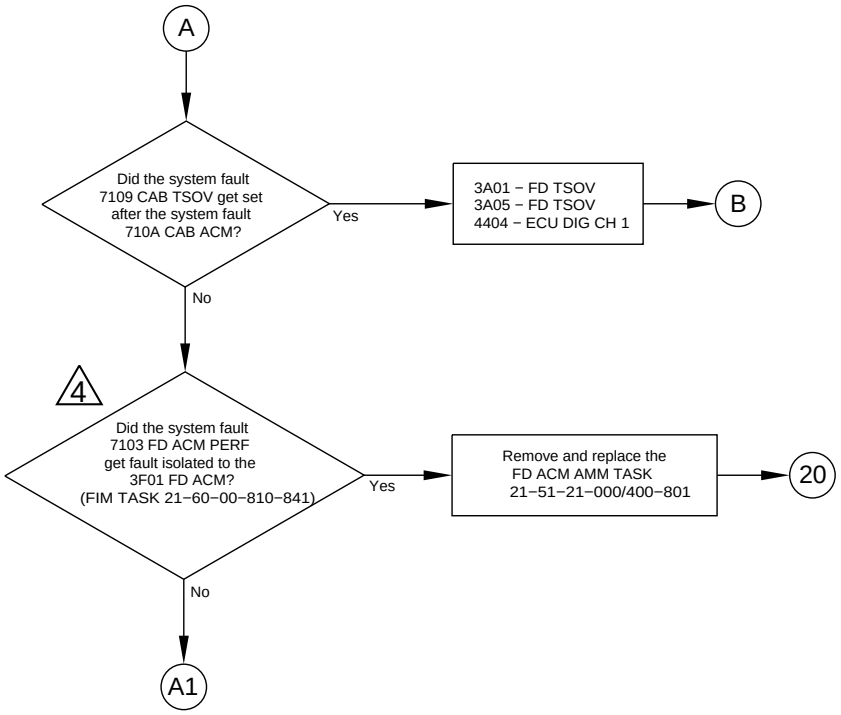
1. Examine the ECS PRESENT FLT and ECS FLT HISTORY pages for the system monitor and the related component faults listed above. If the FLT COMPT PACK HOT caution light is not ON, the applicable CDS faults for this event will be on the ECS FLT HISTORY pages.

2 7103 system fault detection monitor will be displayed with any of the fault codes 7102, 3F01, 3603 or 4404.

3 There are no component faults that are used by the electronic control unit (ECU) to set these two system fault detection monitors (7104/7105). Also, the ECU does not do any fault isolation to report the most likely contributor to this system event.

hs142a01.dg, nl, oct25/2013

FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 1 of 13)



NOTES

4 After the FD TSOV is commanded closed, the FD ACM is thought to have failed if the conditions that follow occur:
- The FD pack outlet temperature decreases
- The FD compressor outlet temperature does not change.

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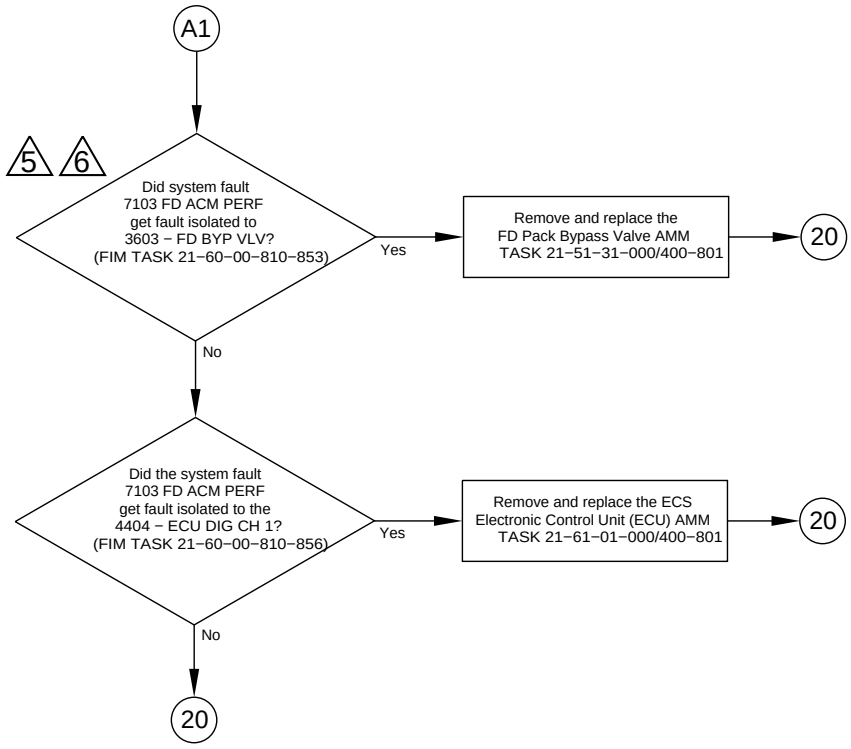
FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 2 of 13)



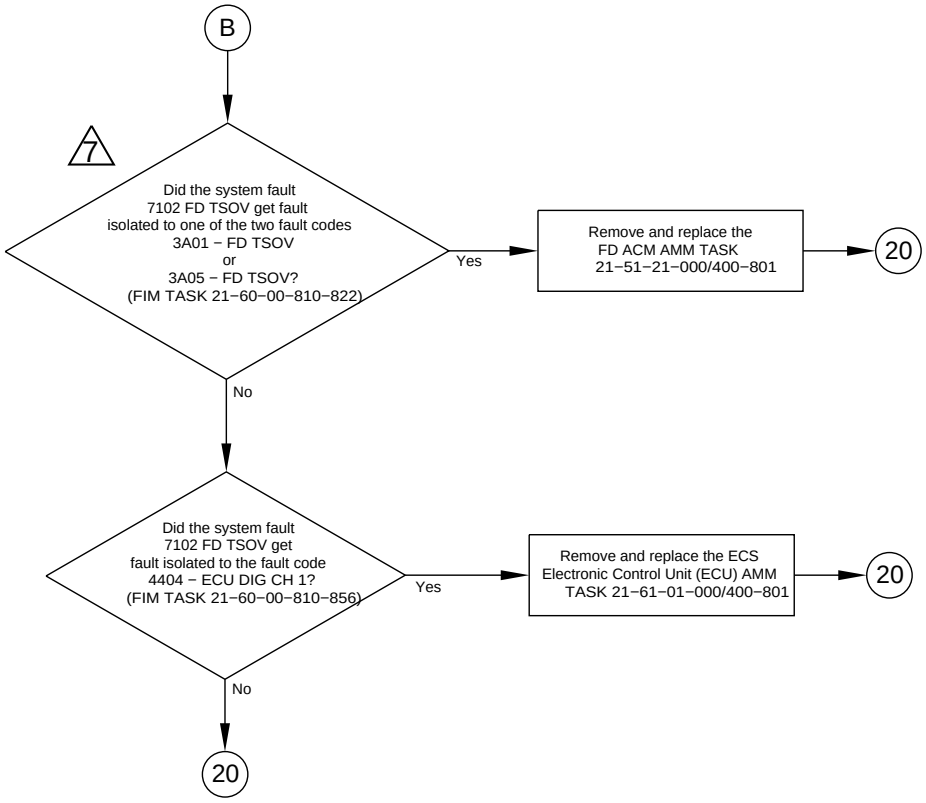
NOTES

5 The FD pack bypass valve is thought to have failed open if the conditions that follow occur:
- None of the two fault codes 7103 − FD TSOV or 3F02 − FD ACM are set
- The flight crew did not select the FD pack OFF before the fault isolation logic had time to complete.

6 A check of the current and voltage wrap around signals is done to find if the FD TSOV or the ECU controller caused the FD pack bypass valve open failure.

hs142a03.dg, nl, oct25/2013

FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 3 of 13)



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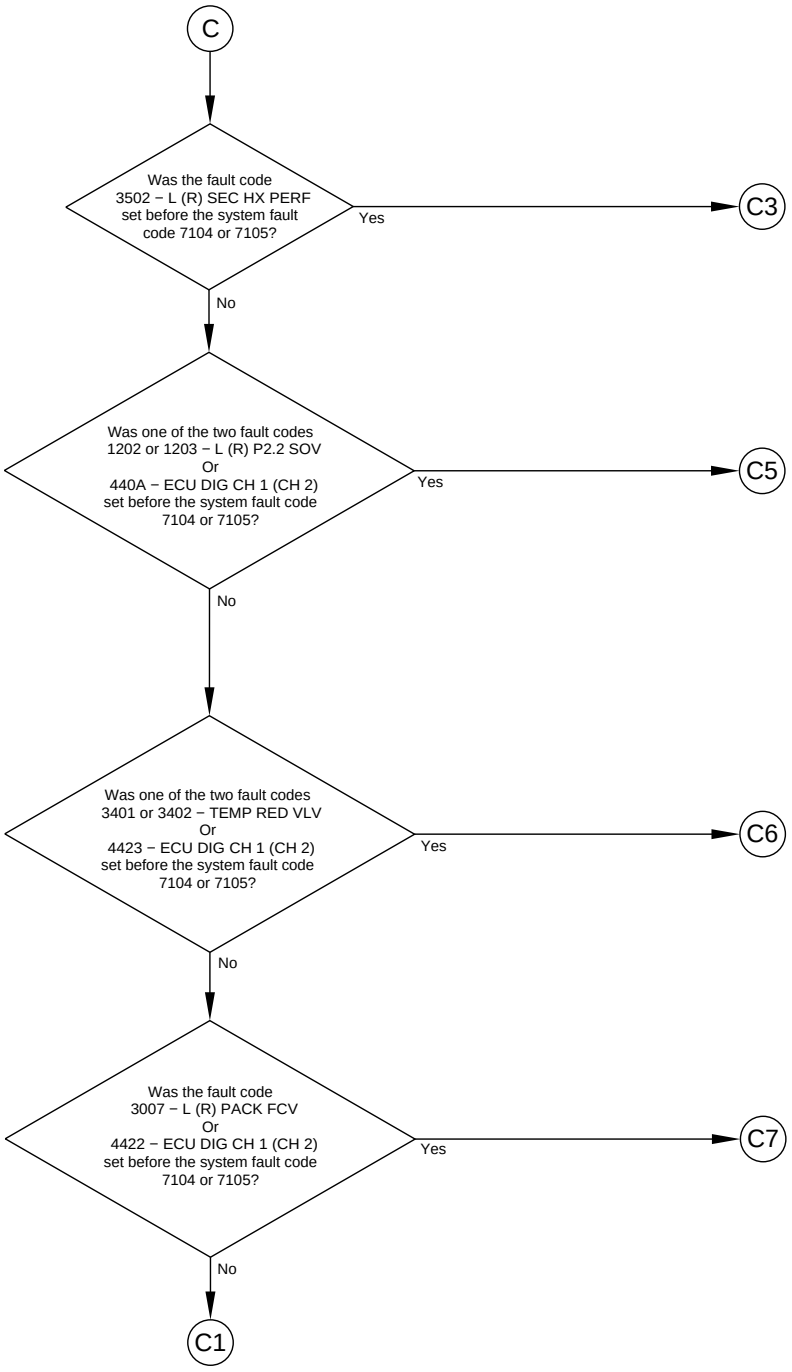
NOTES

7 A check of the current and voltage wrap around signals is done to find if the valve or the ECU controller caused the FD TSOV closed failure.

FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 4 of 13)

Fault Isolation for System Level Fault Code 7104 − FD ACM CMP OT1 (FIM TASK 21−60−00−810−867)
Or
Fault Isolation for System Level Fault Code 7105 − FD ACM CMP OT2 (FIM TASK 21−60−00−810−858)



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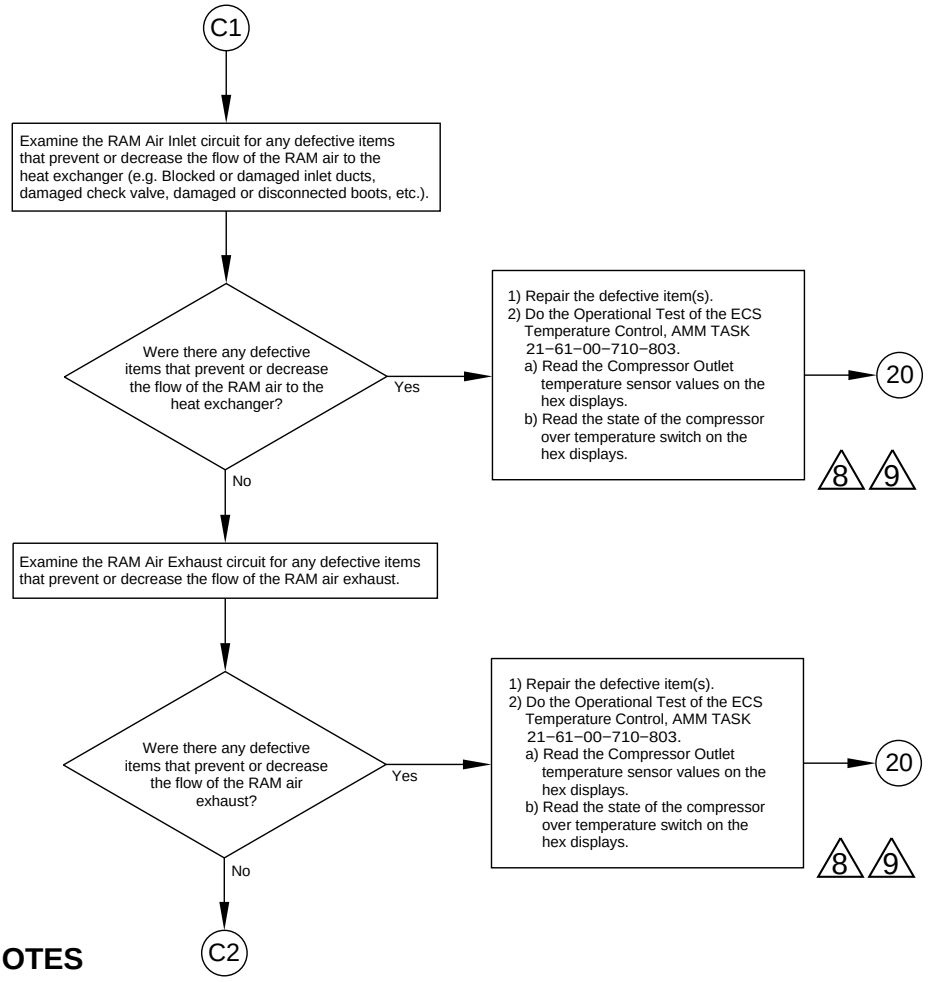
FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 5 of 13)



NOTES

8 Read the compressor outlet temperature−sensor values and the state of the compressor over−temperature switch on the hex displays
- − If R2L and R2R < 2BC0 hex
- − Then I1L and I1R = XXX0, XXX2, XXX4, XXX6, XXX8, XXXA, XXXC or XXXE
- − Or determine cause of open circuit at the ECU input
- − Repair either aircraft wiring, replace the compressor−outlet over−temperature switch or replace the compressor outlet temperature−sensor.

9 Alternate options to convert hexadecimal values to temperature and switch positions.
- − Service Letter (SIL) DH8−400−SL−21−006A, Environmental Control System (ECS) and Pneumatics Troubleshooting
- − De Havilland Aircraft of Canada Limited (De Havilland Canada) Hex Program may be used as a tool to assist.
- − Refer to AMM TASK 45−00−21−742−801, Retrieval of Data from the Central Diagnostic System (CDS) − Environmental Control System (ECS).

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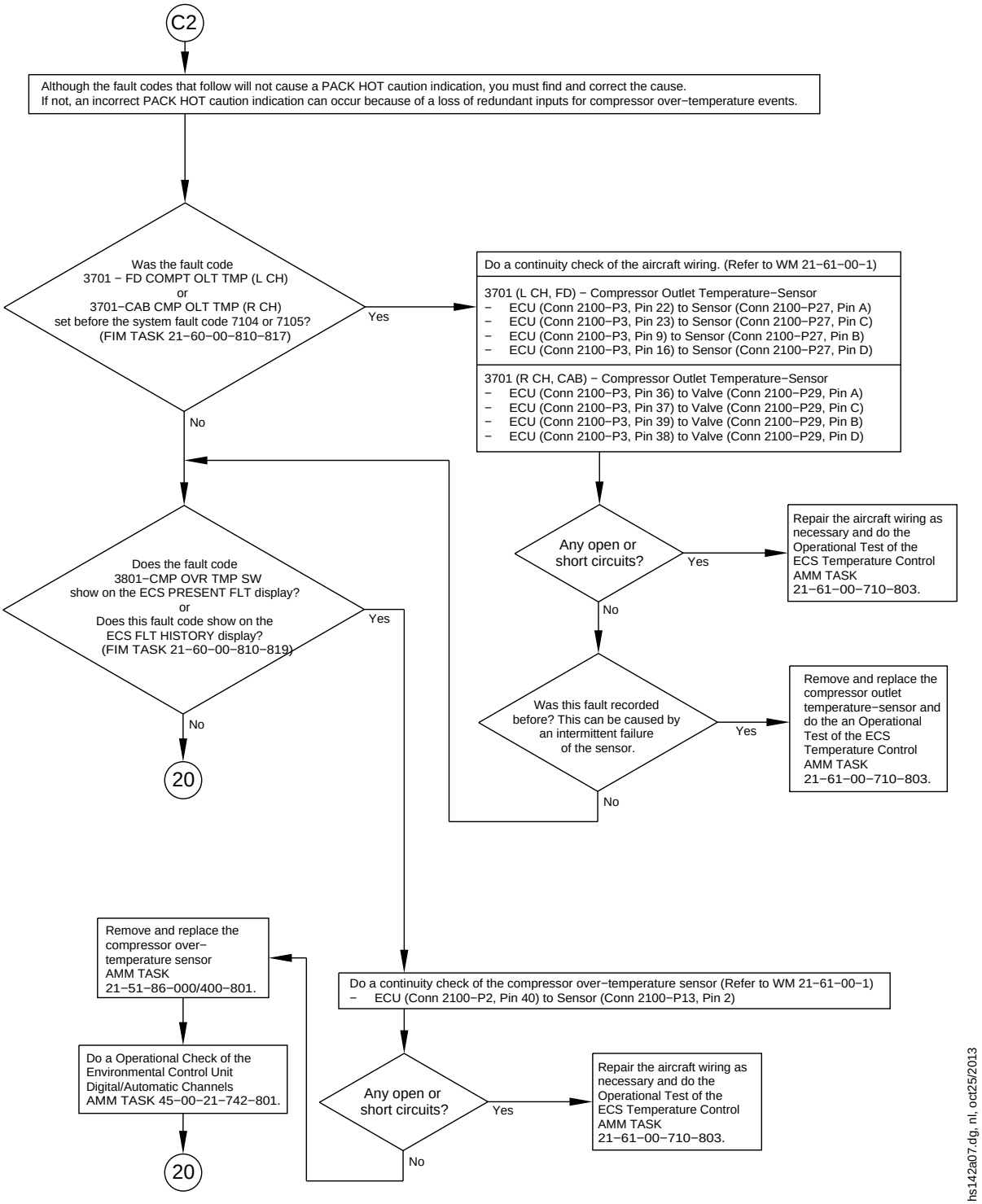
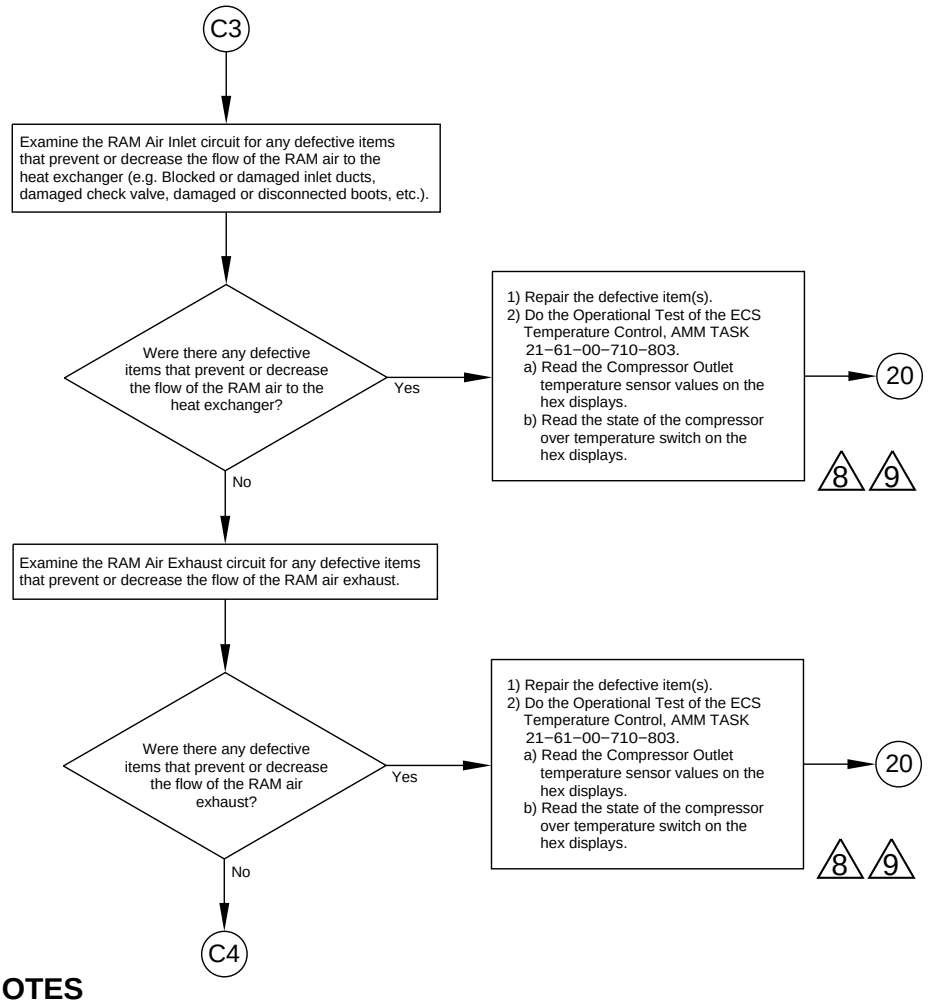
FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 6 of 13)



FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 7 of 13)



NOTES

8 Read the compressor outlet temperature−sensor values and the state of the compressor over−temperature switch on the hex displays
- − If R2L and R2R < 2BC0 hex
- − Then I1L and I1R = XXX0, XXX2, XXX4, XXX6, XXX8, XXXA, XXXC or XXXE
- − Or determine cause of open circuit at the ECU input
- − Repair either aircraft wiring, replace the compressor−outlet over−temperature switch or replace the compressor outlet temperature−sensor.

9 Alternate options to convert hexadecimal values to temperature and switch positions.
- − Service Letter (SIL) DH8−400−SL−21−006A, Environmental Control System (ECS) and Pneumatics Troubleshooting
- − De Havilland Canada Hex Program may be used as a tool to assist.
- − Refer to AMM TASK 45−00−21−742−801, Retrieval of Data from the Central Diagnostic System (CDS) − Environmental Control System (ECS).

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FLT COMPT PACK HOT (Caution) − Fault Isolation
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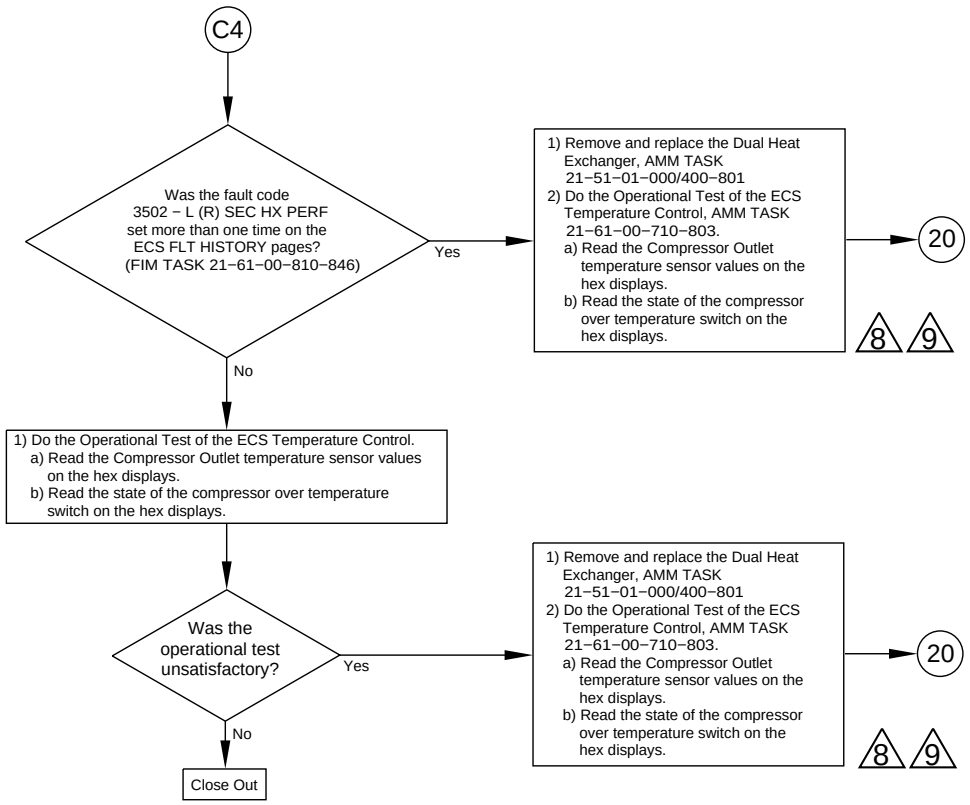

NOTES

8 Read the compressor outlet temperature−sensor values and the state of the compressor over−temperature switch on the hex displays
- If R2L and R2R < 2BC0 hex
- Then I1L and I1R = XXX0, XXX2, XXX4, XXX6, XXX8, XXXA, XXXC or XXXE
- Or determine cause of open circuit at the ECU input
- Repair either aircraft wiring, replace the compressor−outlet over−temperature switch or replace the compressor outlet temperature−sensor.

9 Alternate options to convert hexadecimal values to temperature and switch positions.
- Service Letter (SIL) DH8−400−SL−21−006A, Environmental Control System (ECS) and Pneumatics Troubleshooting
- De Havilland Canada Hex Program may be used as a tool to assist.
- Refer to AMM TASK 45−00−21−742−801, Retrieval of Data from the Central Diagnostic System (CDS) − Environmental Control System (ECS).

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FLT COMPT PACK HOT (Caution) − Fault Isolation
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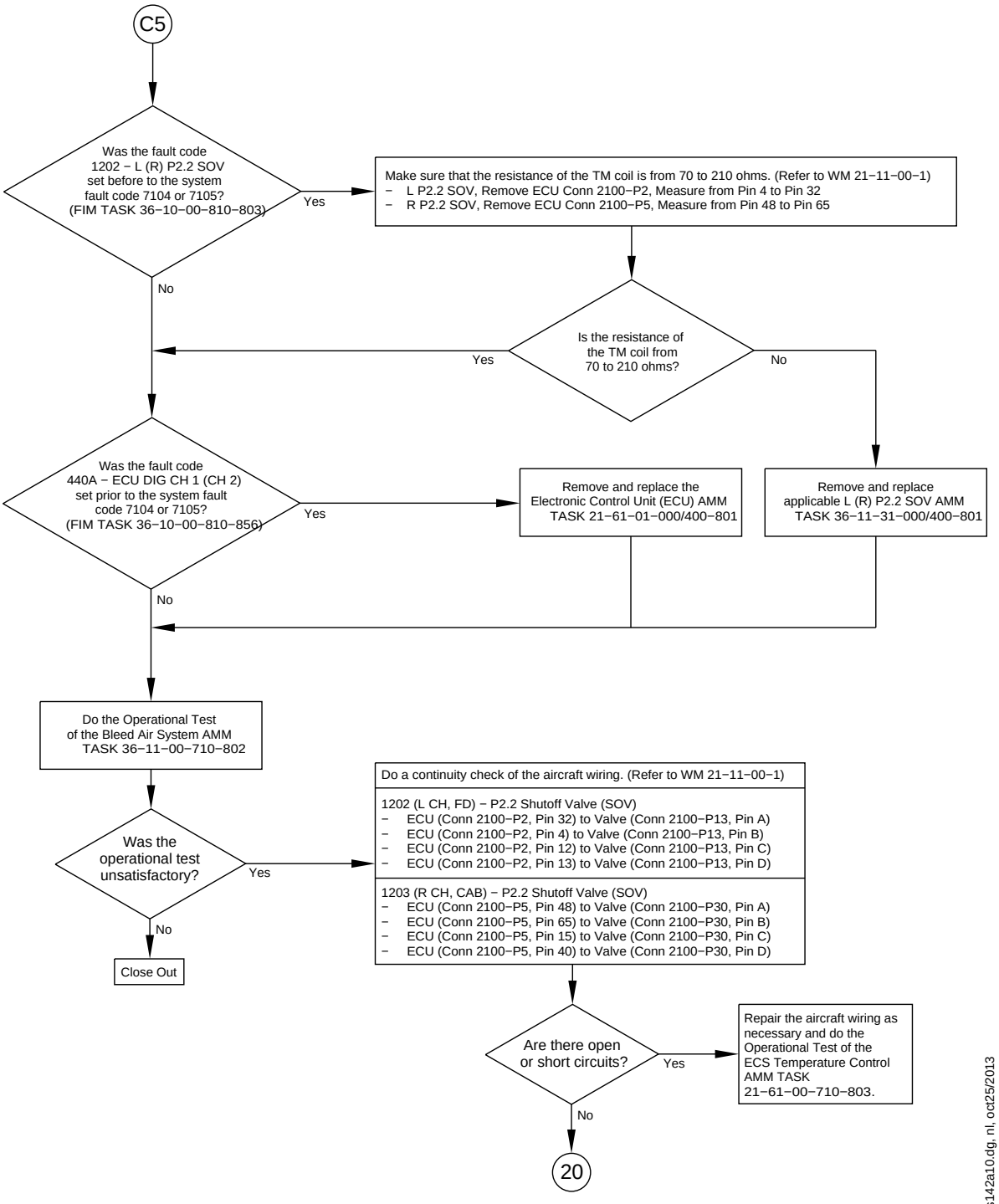
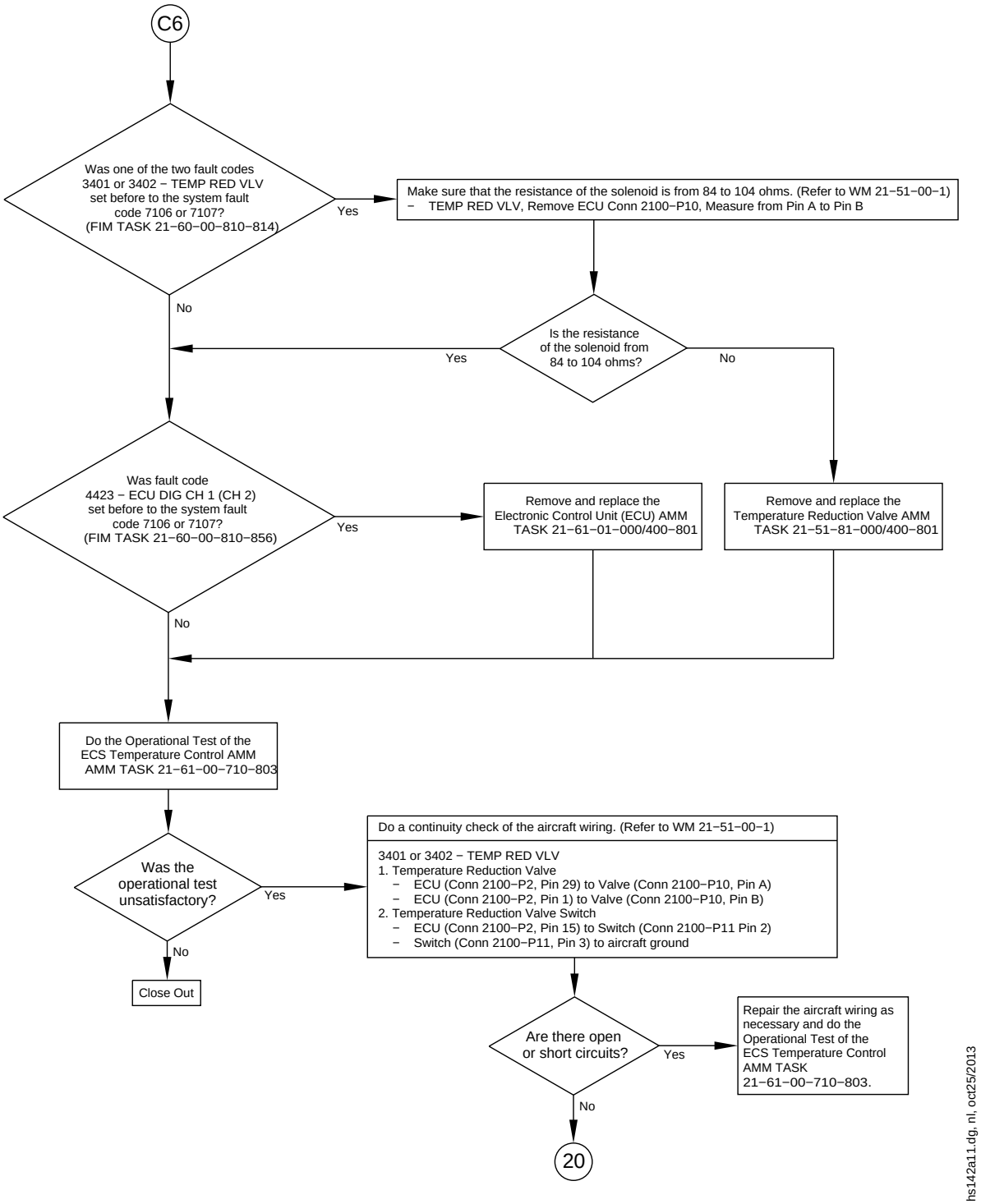


FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 10 of 13)



FLT COMPT PACK HOT (Caution) − Fault Isolation
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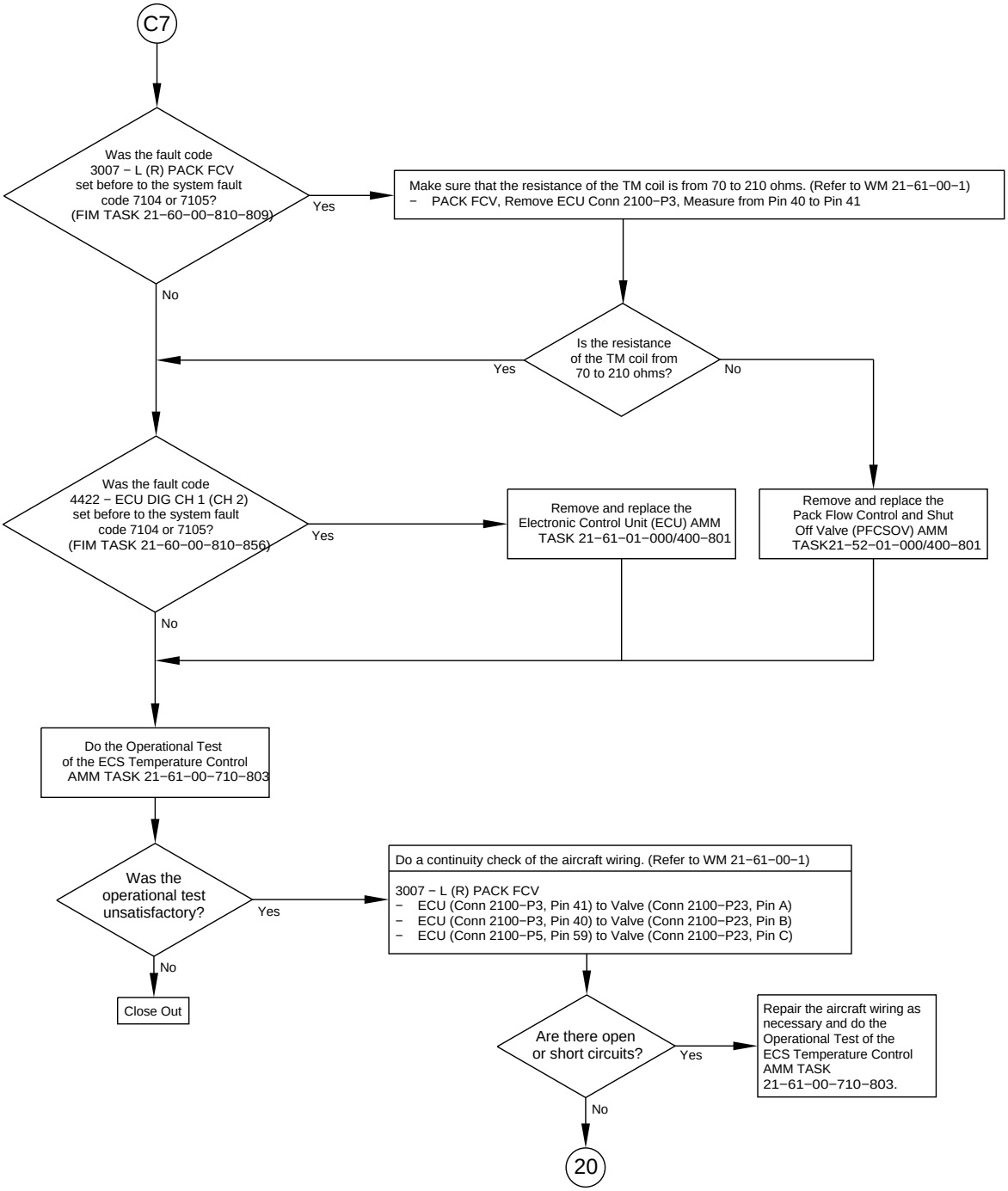
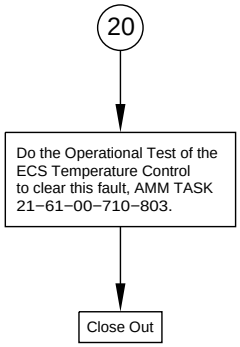


FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 12 of 13)



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FLT COMPT PACK HOT (Caution) − Fault Isolation
Figure 202 (Sheet 13 of 13)