



CL-350

Bombardier
CHALLENGER 350



CL-350 SUPPLEMENTAL MANUAL

EMERGENCY PROCEDURES

06

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GENERAL

Procedures given in this chapter of the Airplane Flight Manual are concerned with foreseeable but unusual situations in which immediate and precise crew action is taken consistent with controlling the aircraft on the desired flight path, as indicated by the items within the "boxed" area at the beginning of each procedure, will substantially reduce the risk of disaster. These "boxed" items are considered immediate action items.

TERMINOLOGY

Land as soon as possible – A landing should be accomplished at the nearest suitable airfield considering the severity of the emergency, weather conditions, field facilities, ambient lighting, and aircraft gross weight.

Land as soon as practical – Emergency conditions are less urgent, and landing at the nearest suitable airfield may not be necessary.

AIR CONDITIONING & PRESSURIZATION

CABIN ALTITUDE (W)



“CABIN ALTITUDE”

1. Crew Oxygen Masks Don
 2. Pilot and Copilot O2 MASK/NORM switches O2 MASK
 3. Autothrottle (if installed) Disengage
 4. Thrust levers IDLE
 5. Autopilot..... Disconnect
 6. FLIGHT SPOILERS lever..... EMER
 7. Descend at M_{MO}/V_{MO} , but not below minimum safe altitude.

WARNING: – If structural failure is evident, limit speeds and maneuvering loads as much as possible in descent.

– Operation above 20,000 ft cabin altitude may result in decompression sickness.

NOTE: Descent from 45,000 ft to 15,000 ft requires approximately 4 minutes.

8. Pilot and Copilot INPH switches..... INPH

If time and conditions permit:

9. Controlling Agency Notify
10. Transponder Emergency 7700
11. Passengers Check condition and provide assistance

————— **END** —————

**AIR CONDITIONING & PRESSURIZATION****Effectivity:***For aircraft 20501 to 20886:***CABIN DELTA P (W)****Cabin Delta P is greater than 9.2 psid:** **Yes**

1. MANUAL PRESSURIZATION switch ON
2. MAN RATE control UP,
as required to reduce differential pressure.

Refer to the Pressurization Schedule in the following
page.

CABIN DELTA P (W) remains on: **Yes**

3. One L or R BLEED switch OFF
4. Adjust N_1 on opposite engine to control cabin
pressurization.

If still unable to regulate the over pressurization:

5. AIR SOURCE switch OFF
6. Descend, but not below minimum safe altitude.

– END –

 **No**

– END –

 **No****Cabin Delta P is less than –0.5 psid:**

1. MANUAL PRESSURIZATION switch ON
2. MAN RATE control DN,
as required to increase differential pressure.

Refer to the Pressurization Schedule in the following page.

CABIN DELTA P (W) remains on:

3. Decrease aircraft descent rate.

————— **END** —————

AIR CONDITIONING & PRESSURIZATION

Effectivity:*For aircraft 20501 to 20886:***PRESSURIZATION SCHEDULE — CLIMB AND CRUISE**

Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)	Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)	Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)
-1500	-1786	0.2	15 000	1379	5.7	33 000	4955	8.5
-1000	-1273	0.2	16 000	1504	6.0	34 000	5272	8.5
0	-245	0.1	17 000	1637	6.2	35 000	5612	8.5
1000	-135	0.6	18 000	1778	6.4	36 000	5877	8.5
1500	-81	0.8	19 000	1926	6.7	37 000	6076	8.6
2000	-26	1.0	20 000	2091	6.9	38 000	6331	8.6
3000	81	1.5	21 000	2258	7.1	39 000	6586	8.7
4000	187	1.9	22 000	2429	7.2	40 000	6827	8.7
5000	294	2.3	23 000	2608	7.4	41 000	7056	8.7
6000	399	2.7	24 000	2795	7.6	42 000	7272	8.8
7000	504	3.1	25 000	2984	7.7	43 000	7476	8.8
8000	610	3.5	26 000	3189	7.9	44 000	7669	8.8
9000	716	3.8	27 000	3404	8.0	45 000	7850	8.8
10 000	816	4.2	28 000	3628	8.1	-	-	-
11 000	925	4.5	29 000	3864	8.2	-	-	-
12 000	1036	4.8	30 000	4111	8.3	-	-	-
13 000	1150	5.1	31 000	4375	8.4	-	-	-
14 000	1268	5.4	32 000	4653	8.4	-	-	-

PRESSURIZATION SCHEDULE — DESCENT AND HOLD (<25 000 FT)

Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)	Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)	Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)
-1500	-1786	0.2	15 000	1118	5.8	33 000	4699	8.6
-1000	-1291	0.2	16 000	1229	6.1	34 000	5098	8.6
0	-299	0.2	17 000	1347	6.3	35 000	5487	8.6
1000	-202	0.6	18 000	1473	6.6	36 000	5782	8.6
1500	-155	0.9	19 000	1606	6.8	37 000	6064	8.6
2000	-107	1.1	20 000	1756	7.0	38 000	6332	8.6
3000	-13	1.5	21 000	1907	7.2	39 000	6587	8.7
4000	80	2.0	22 000	2063	7.4	40 000	6828	8.7
5000	173	2.4	23 000	2226	7.6	41 000	7057	8.7
6000	264	2.8	24 000	2396	7.8	42 000	7273	8.8
7000	356	3.2	25 000	2569	7.9	43 000	7477	8.8
8000	448	3.5	26 000	2754	8.1	44 000	7670	8.8
9000	540	3.9	27 000	2948	8.2	45 000	7850	8.8
10 000	626	4.3	28 000	3151	8.3	-	-	-
11 000	721	4.6	29 000	3366	8.4	-	-	-
12 000	818	4.9	30 000	3591	8.5	-	-	-
13 000	918	5.2	31 000	3873	8.6	-	-	-
14 000	1022	5.5	32 000	4291	8.6	-	-	-

**AIR CONDITIONING & PRESSURIZATION****Effectivity:***For aircraft 20887 to 22999:***CABIN DELTA P (W)****Cabin Delta P is greater than 10.1 psid:** **Yes**

1. MANUAL PRESSURIZATION switch ON
2. MAN RATE control UP,
as required to reduce differential pressure.

Refer to the Pressurization Schedule in the following
page.

CABIN DELTA P (W) remains on: **Yes**

3. One L or R BLEED switch OFF
4. Adjust N_1 on opposite engine to control cabin
pressurization.

If still unable to regulate the over pressurization:

5. AIR SOURCE switch OFF
6. Descend, but not below minimum safe altitude.

– END –

 **No**

– END –

 **No****Cabin Delta P is less than –0.5 psid:**

1. MANUAL PRESSURIZATION switch ON
2. MAN RATE control DN,
as required to increase differential pressure.

Refer to the Pressurization Schedule in the following page.

CABIN DELTA P (W) remains on:

3. Decrease aircraft descent rate.

————— **END** —————

AIR CONDITIONING & PRESSURIZATION

Effectivity:*For aircraft 20887 to 22999:***PRESSURIZATION SCHEDULE – CLIMB AND CRUISE**

Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)	Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)	Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)
-1,500	-1,786	0.2	15,000	756	6.0	33,000	3,300	9.2
-1,000	-1,273	0.1	16,000	845	6.3	34,000	3,525	9.3
0	-245	0.1	17,000	933	6.6	35,000	3,742	9.3
1,000	-180	0.6	18,000	1,022	6.8	36,000	3,926	9.4
1,500	-148	0.9	19,000	1,111	7.1	37,000	4,111	9.5
2,000	-116	1.1	20,000	1,201	7.3	38,000	4,295	9.5
3,000	-53	1.6	21,000	1,311	7.5	39,000	4,479	9.6
4,000	11	2.0	22,000	1,422	7.7	40,000	4,650	9.7
5,000	75	2.4	23,000	1,534	7.9	41,000	4,848	9.7
6,000	139	2.8	24,000	1,646	8.1	42,000	5,114	9.7
7,000	203	3.2	25,000	1,775	8.3	43,000	5,369	9.7
8,000	268	3.6	26,000	1,920	8.5	44,000	5,614	9.7
9,000	333	4.0	27,000	2,099	8.6	45,000	5,850	9.7
10,000	397	4.4	28,000	2,271	8.7	—	—	—
11,000	469	4.7	29,000	2,443	8.9	—	—	—
12,000	540	5.1	30,000	2,625	9.0	—	—	—
13,000	612	5.4	31,000	2,830	9.1	—	—	—
14,000	684	5.7	32,000	3,050	9.2	—	—	—

PRESSURIZATION SCHEDULE – DESCENT AND HOLD

Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)	Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)	Aircraft Altitude (ft)	Cabin Altitude (ft)	Cabin Delta P (PSID)
-1,500	-1,786	0.2	15,000	712	6.0	33,000	2,989	9.4
-1,000	-1,290	0.2	16,000	801	6.3	34,000	3,206	9.4
0	-299	0.2	17,000	891	6.6	35,000	3,423	9.5
1,000	-235	0.6	18,000	980	6.8	36,000	3,629	9.6
1,500	-202	0.9	19,000	1,070	7.1	37,000	3,837	9.6
2,000	-170	1.1	20,000	1,161	7.3	38,000	4,064	9.7
3,000	-106	1.6	21,000	1,273	7.6	39,000	4,294	9.7
4,000	-42	2.0	22,000	1,385	7.8	40,000	4,572	9.7
5,000	23	2.5	23,000	1,498	8.0	41,000	4,848	9.7
6,000	88	2.9	24,000	1,611	8.2	42,000	5,114	9.7
7,000	153	3.3	25,000	1,726	8.3	43,000	5,369	9.7
8,000	218	3.7	26,000	1,867	8.5	44,000	5,614	9.7
9,000	283	4.0	27,000	2,011	8.7	45,000	5,850	9.7
10,000	349	4.4	28,000	2,155	8.8	—	—	—
11,000	421	4.8	29,000	2,299	8.9	—	—	—
12,000	494	5.1	30,000	2,445	9.1	—	—	—
13,000	566	5.4	31,000	2,625	9.2	—	—	—
14,000	639	5.7	32,000	2,807	9.3	—	—	—

**AIR CONDITIONING & PRESSURIZATION****L (R) BLEED LEAK (W)**

1. XBLEED switch Closed
 2. Affected BLEED switch OFF

If R BLEED LEAK (W) is on:

 3. L BLEED switch On
 4. APU BLEED switch OFF

— END —

PACK LEAK (W)

1. AIR SOURCE switch TRIM AIR ONLY

PACK LEAK (W) remains on after 90 seconds:

**Yes**

2. AIR SOURCE switch OFF
3. Altitude 9,000 ft maximum, but
not below minimum
safe altitude.
4. EMER DEPRESS switch ON
5. RAM AIR switch ON

— END —

No

PACK LEAK (W) extinguishes:

2. Altitude 35,000 ft maximum
3. COCKPIT COLD-HOT knob (for cockpit &
cabin) As Desired

On approach below 9000 ft but not below minimum safe altitude:

4. AIR SOURCE switch OFF
5. EMER DEPRESS switch ON
6. RAM AIR switch ON

— END —

AIR CONDITIONING & PRESSURIZATION**L (R) PYLON BLEED LEAK (W)**

- | | |
|--------------------------------------|-----------|
| 1. Autothrottle (if installed) | Disengage |
| Affected Engine: | |
| 2. Thrust lever | IDLE |

CAUTION: If caution persists, do not engage Autothrottle.

If PYLON BLEED LEAK (W) remains on:

- Affected engine RUN switch OFF
- Refer to Engine Shutdown In Flight procedure in the NON-NORMAL PROCEDURES Chapter.

————— **END** —————

TRIM AIR LEAK (W)

- | | |
|----------------------------|-----------|
| 1. AIR SOURCE switch | PACK ONLY |
|----------------------------|-----------|

TRIM AIR LEAK (W) remains on after 90 seconds:

- | | | |
|--|------------------------------|--|
|  | Yes | |
| | 2. AIR SOURCE switch | OFF |
| | 3. Altitude | 9,000 ft maximum, but
not below minimum
safe altitude. |
| | 4. EMER DEPRESS switch | ON |
| | 5. RAM AIR switch | ON |

— **END** —

No

TRIM AIR LEAK (W) extinguishes:

- COCKPIT COLD-HOT knob (for cockpit & cabin) As Desired

————— **END** —————

**AUTO FLIGHT****AP STAB TRIM FAIL (C)**

1. Airspeed **Stabilize**
and return to speed when AP STAB TRIM FAIL posted or
when AP HOLDING message goes out.

WARNING: – An abrupt change in control force up to approximately 50 lbs, or an out of trim situation may be experienced when disconnecting the autopilot especially if combined with AP HOLDING NOSE DOWN. NOSE UP.

- SMKG/BELTS should be selected on.
- Minimize changes to airspeed and configuration prior to autopilot disconnect to minimize control forces and out of trim situation.

2. Flight controls Hold firmly
3. Autopilot Use control wheel MSW
switch to disconnect
4. Autopilot Do not use
5. Retrim airplane if necessary.

Stabilizer trim unresponsive in one or both directions, trim moving slower than normal or inconsistently, trim moving opposite to command.



6. Refer to Chapter 5, CAUTIONS PROCEDURES, FLIGHT
CONTROLS, Stabilizer Trim Malfunction

– END –



END

AUXILIARY POWER UNIT

APU FIRE (W)



"APU FIRE"

- | | |
|----------------------------|------------|
| 1. APU FIRE switch | FIRE push |
| 2. FIRE EXT 2 switch | ARMED push |

APU is supplying bleed air for air conditioning



Yes

3. XBLEED switch Closed
4. L BLEED switch ON
5. APU BLEED switch OFF
6. R BLEED switch ON
7. APU switch OFF
8. Land as soon as possible.

— END —

No

3. APU switch OFF
4. Land as soon as possible.

— END —

APU OVERTEMP (W)

- | | |
|---------------------|-----|
| 1. APU switch | OFF |
|---------------------|-----|
2. XBLEED switch Closed
 3. L BLEED switch ON
 4. APU BLEED switch OFF
 5. R BLEED switch ON

— END —



AVIONICS

MULTI-FUNCTION DISPLAY (MFD) ANNUNCIATIONS

The following messages will indicate in red.

HDG

If HDG is displayed on left MFD:

1. ATT/HDG REVERSION switch 2

If HDG is displayed on right MFD:

1. ATT/HDG REVERSION switch 1

Following reversion, if HDG is displayed on both MFDs:

2. Monitor standby compass.
3. Land as soon as possible.

————— **END** —————

PRIMARY FLIGHT DISPLAY (PFD) ANNUNCIATIONS

ALT

1. Monitor standby instrument.

If ALT is displayed on left PFD:

2. AIR DATA REVERSION switch 2

If ALT is displayed on right PFD:

2. AIR DATA REVERSION switch 1

Effectivity:

For aircraft on the Russian Federation (RF) and Commonwealth of Independent States (CIS) countries' registry:

3. Cross check standby instrument.

NOTE: If any of the following occurs, refer to Chapter 3, EMERGENCY PROCEDURES, AVIONICS, Unreliable Airspeed:

- Pitch attitude, thrust setting or external noise not consistent with indicated airspeed,
- Large airspeed differences between PFDs and/or ISI,
- Loss of multiple airspeed indications.

————— **END** —————

AVIONICS**PRIMARY FLIGHT DISPLAY (PFD) ANNUNCIATIONS****AP**

1. Control wheel MSW switch Depress and release

NOTE: – An autopilot monitored disconnect is not always accompanied by a yaw damper failure/disconnect.

– Depressing the MSW will cancel the AP disconnect aural warning.

————— **END** —————

ATT

1. Monitor standby instrument.

If ATT is displayed on the left PFD:

2. ATT/HDG REVERSION switch 2

If ATT is displayed on the right PFD:

2. ATT/HDG REVERSION switch 1

Effectivity:

For airplanes on the Russian Federation (RF) and Commonwealth of Independent States (CIS) countries' registry:

3. Cross check standby instrument.

Following reversion, if ATT is displayed on both PFDs:

4. Monitor standby instrument.
5. Land as soon as possible.

————— **END** —————

FD

If the FD flag is displayed on the side the transfer arrow is pointing to:

1. Flight Guidance Panel XFR button Select opposite side

NOTE: If a red FD flag is displayed during an LPV approach with indications of an air data or attitude/heading failure, refer to IAS Failure or ATT/HDG Failure in this chapter.

————— **END** —————



AVIONICS

PRIMARY FLIGHT DISPLAY (PFD) ANNUNCIATIONS

FMS 1 FMS 2

LOC 1 LOC 2

VOR 1 VOR 2

1. NAVSRC button Select cross-side source

NOTE: If a red FMS flag is displayed during an LPV approach with indications of an air data or attitude/heading failure, refer to IAS Failure or ATT/HDG Failure in this chapter.

2. LNDG ALT SOURCE SELECT Select cross-side source
(when FMS flag is shown)

————— **END** —————

HDG

If HDG is displayed on the left PFD:

1. ATT/HDG REVERSION switch 2

If HDG is displayed on the right PFD:

1. ATT/HDG REVERSION switch 1

Following reversion, if HDG is displayed on both PFDs:

2. Monitor standby compass.
3. Land as soon as possible.

————— **END** —————

IAS

1. Monitor standby instrument.

If IAS is displayed on the left PFD:

2. AIR DATA REVERSION switch 2

If IAS is displayed on the right PFD:

2. AIR DATA REVERSION switch 1



AVIONICS**PRIMARY FLIGHT DISPLAY (PFD) ANNUNCIATIONS****IAS (Cont)*****Effectivity:***

For airplanes on the Russian Federation (RF) and Commonwealth of Independent States (CIS) countries' registry:

3. Cross check standby instrument.

NOTE: If any of the following occurs, refer to Chapter 3, EMERGENCY PROCEDURES, AVIONICS, Unreliable Airspeed:

- Pitch attitude, thrust setting or external noise not consistent with indicated airspeed,
- Large airspeed differences between PFDs and/or ISI,
- Loss of multiple airspeed indications.

————— **END** —————

MACH

1. Monitor standby instrument.

If MACH is displayed on the left PFD:

2. AIR DATA REVERSION switch 2

If MACH is displayed on the right PFD:

2. AIR DATA REVERSION switch 1

Effectivity:

For airplanes on the Russian Federation (RF) and Commonwealth of Independent States (CIS) countries' registry:

3. Cross check standby instrument.

NOTE: If any of the following occurs, refer to Chapter 3, EMERGENCY PROCEDURES, AVIONICS, Unreliable Airspeed:

- Pitch attitude, thrust setting or external noise not consistent with indicated airspeed,
- Large airspeed differences between PFDs and/or ISI,
- Loss of multiple airspeed indications.

————— **END** —————

**AVIONICS****PRIMARY FLIGHT DISPLAY (PFD) ANNUNCIATIONS****RA****Effectivity:***If Autothrottle installed:*

CAUTION: Autothrottle will not arm RETARD mode at 200 feet AGL with a failed radio altimeter. AT RETARD INHIBIT (C) will post, and Autothrottle will not retard thrust levers at 50 feet AGL.

1. Autothrottle (if installed) Disengage
prior to 200 feet AGL
2. Do not conduct Cat II approaches.
3. Normal actual landing distance Multiply by:
1.20 without thrust reversers
1.15 with thrust reversers

After Touchdown:

4. FLIGHT SPOILERS lever EMER

————— **END** —————

VNV

1. Use alternate means of vertical navigation.

————— **END** —————

VS**If VS is displayed on the left PFD:**

1. AIR DATA REVERSION switch 2

If VS is displayed on the right PFD:

1. AIR DATA REVERSION switch 1

————— **END** —————

AVIONICS

TCAS Aural



"TCAS Aural"

"CLEAR OF CONFLICT"

Resume normal flight.

Resolution Advisory (RA)

For a Resolution Advisory (RA), Autopilot and Autothrottle (if installed) should be disengaged to adjust flight path and thrust manually.

"CLIMB, CLIMB"

Change vertical speed to 1,500 feet/min. climbing or as indicated on the VSI.

"CLIMB, CROSSING, CLIMB – CLIMB, CROSSING, CLIMB"

Change vertical speed to 1,500 feet/min. climbing or as indicated on the VSI. The converging flight paths will cross at some altitude.

"DESCEND, DESCEND, DESCEND"

Change vertical speed to 1,500 feet/min. descending or as indicated on the VSI.

"DESCEND, CROSSING, DESCEND – DESCEND, CROSSING, DESCEND"

Change vertical speed to 1,500 feet/min. descending or as indicated on the VSI. The converging flight paths will cross at some altitude.

"LEVEL-OFF, LEVEL-OFF"

Bring the airplane to level flight.

"INCREASE CLIMB – INCREASE CLIMB"

This follows a CLIMB advisory. The climb vertical speed should be increased, typically to 2,500 feet/min., as shown on the VSI.

"INCREASE DESCENT – INCREASE DESCENT"

This follows a DESCEND advisory. The descent vertical speed should be increased, typically to 2,500 feet/min., as shown on the VSI.

"CLIMB, CLIMB NOW"

This follows a DESCEND advisory. This advisory indicates that a reversal of vertical speed from descent to climb is needed to provide adequate separation.

"DESCEND, DESCEND NOW"

This follows a CLIMB advisory. This advisory indicates that a reversal of vertical speed from climb to descent is needed to provide adequate separation.

"MAINTAIN VERTICAL SPEED, MAINTAIN"

Maintain present vertical speed and direction.





AVIONICS

TCAS Aural (Cont)

"MAINTAIN VERTICAL SPEED, CROSSING, MAINTAIN"

A flight path crossing is predicted, but being monitored by TCAS. Maintain present vertical speed and direction.

Traffic Advisory (TA)

"MONITOR VERTICAL SPEED"

Be alert for approaching traffic.

"TRAFFIC, TRAFFIC"

Gain visual contact with traffic. Check TCAS display for traffic bearing and range if necessary.

— END —

TAWS Aural



"TAWS Aural"

"PULL UP" or

"TERRAIN, TERRAIN, PULL UP" or

"OBSTACLE, OBSTACLE, PULL UP"

- | | |
|--------------------------------------|------------|
| 1. Autopilot..... | Disconnect |
| 2. Autothrottle (if installed) | Disengage |
| 3. Thrust levers | APR |
| 4. FLIGHT SPOILERS | RETRACT |
| 5. Climb at maximum practical rate. | |
| 6. LANDING GEAR switch | UP |
7. Maintain climb until the warning ceases.

— END —

"WINDSHEAR, WINDSHEAR"

- | | |
|---|------------|
| 1. Autopilot..... | Disconnect |
| 2. Autothrottle (if installed) | Disengage |
| 3. Thrust levers | APR |
| 4. FLIGHT SPOILERS | RETRACT |
| 5. Rotate smoothly to the takeoff/go around pitch attitude, allowing
airspeed to decrease if necessary. Maintain wings level. Do not
retract flaps or landing gear. | |



AVIONICS

TAWS Aural (Cont)

6. If the airplane continues to descend, increase pitch attitude smoothly and in small increments, bleeding airspeed as necessary to stop descent. Use stall warning onset (stick shaker) as the upper limit of pitch attitude.
7. Maintain escape attitude and thrust and delay retracting flaps or landing gear until safe climb out is assured.

————— **END** —————

ROAAS (If Installed)

**RWY LENGTH (Red
annunciation on PFD)**



**“RUNWAY LENGTH,
RUNWAY LENGTH”**

1. Execute a go-around.

NOTE: Contact with the ground may be unavoidable if go-around is initiated from a low altitude or high sink rate. If the airplane contacts the ground during the go-around, maintain the normal landing attitude or slightly higher. Airplane configuration (landing gear/flaps) should not be changed until the airplane is climbing if ground contact is made or not.

— **END** —

**DECELERATE (Red
annunciation on PFD)**



“DECELERATE NOW”

1. Brakes **Maximum**
 2. Thrust reversers **MAX REV**

————— **END** —————

RADIO ALTIMETER FAILURE

False or intermittent radio altimeter height and/or amber RA miscompare flag and/or red RA fail flag on PFD.

Effectivity:

If Autothrottle installed:

CAUTION: Autothrottle will not arm RETARD mode at 200 feet AGL with a failed radio altimeter. AT RETARD INHIBIT (C) will post, and Autothrottle will not retard thrust levers at 50 feet AGL.

1. Autothrottle (if installed) Disengage
prior to 200 feet AGL



AVIONICS

RADIO ALTIMETER FAILURE

2. ROAAS (if installed) OFF
3. Do not conduct Cat II approaches.
4. Normal actual landing distance Multiply by:
1.20 without thrust reversers
1.15 with thrust reversers

After Touchdown:

5. FLIGHT SPOILERS lever EMER

- NOTE:**
1. Do not rely on affected radio altitude displays.
 2. TCAS and TAWS are inoperative. TCAS FAIL message on PFD or MFD and TAWS BASIC FAIL advisory message on.
 3. Windshear detection and guidance is inoperative. TAWS WINDSHEAR FAIL advisory message on.
 4. For an intermittent or undetected radio altimeter error, the following may be incorrect/inaccurate or inactive:
 - Displayed radio altitudes
 - LOC/GS comparators
 - Excessive deviation alerts
 - Expanded lateral deviation scale
 - Approach minimums annunciation.
 5. For an intermittent or undetected radio altimeter error, localizer and/or glideslope AP/FD commands could be adversely affected.

————— **END** —————

AVIONICS

UNRELIABLE AIRSPEED

Indication:

- Pitch attitude, thrust setting or external noise not consistent with indicated airspeed.
- Loss of multiple airspeed indications.
- Multiple airspeed indications remain constant regardless of pitch or thrust adjustments.
- Airspeed difference between primary flight displays is more than 10 KIAS and/or more than 15 KIAS between any primary flight display and ISI and no reliable airspeed source can be determined.

- NOTE:**
1. If doubt exists about the reliability of aircraft speed indications, aircraft control must be established and maintained by the use of pitch and thrust settings.
 2. Autopilot may not be available.
 3. No crew action is required for the following procedures:
 - Caution messages: EFIS MISCOMPARE, EFIS COMPARATOR INOP, ADC Failure – Single, ADC Failure – Dual, ALT flag, IAS flag, MACH Flag, RUDDER LIMITER FAIL, SPOILERS FAIL, SPOILERS FAULT.

- | | |
|--------------------------------------|--------------------------|
| 1. Autothrottle (if installed) | Disengage |
| 2. Autopilot | Disconnect |
| 3. FDs | Deselect |
| 4. Airplane Altitude | Maintain a safe altitude |

If Climb or Go-Around is required:

- | | |
|---------------------------------|--|
| 5. Pitch/ N_1 | 15 degrees/TO from
SL to 15,000 ft
10 degrees / CLB
above 15,000 ft |
| 6. Airplane Configuration | Flaps 10/ Gear Up
for Go-Around
Flaps 0 / Gear Up
once Climbing |

CAUTION: Respect stall warning/stick shaker and stick pusher.



AVIONICS

UNRELIABLE AIRSPEED

At desired altitude:

7. Autopilot or Flight Director (if required and available) Engage basic PTCH/ROLL

NOTE: 1. Using the FD/autopilot in PTCH, ALT, HDG and ROLL modes will help reduce workload.
2. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

CAUTION: 1. Do not use FLC mode or Autothrottle (if installed).
2. Rudder travel limits may be inappropriate for phase of flight. For cruise and descent flight, excessive rudder input may result in unacceptable handling characteristics or exceedance of structural limits. For approach, landing and go-around flight, rudder authority may be limited. Differential thrust and aileron input may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.

8. Pitch/ N_1 Set
as per Table A.

NOTE: Leave current environmental conditions if they are considered to be a reason for unreliable airspeed. Refer to Tables B or C as required for climb or descent.

9. L and R ENG ANTI-ICE switches As required
10. WING ANTI-ICE switch As required

AVIONICS**UNRELIABLE AIRSPEED**

- NOTE:**
1. SAT and TAT (if installed) indications may be unreliable. Wing and engine anti-ice systems must be ON when the ICE DETECTED CAS message is on, or when visible moisture in any form is encountered (such as clouds, rain, snow, sleet or ice crystals).
 2. Autopilot/yaw damper should only be engaged once N₁ is set.
 3. AOA indication (if equipped) is unreliable for flaps 0.
 4. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Adjust pitch to stop climb/descent.
 5. Disregard low speed cue, flight path vector and airspeed trend vector as these may be erroneous.
 6. If overspeed warning sounds, select the affected AURAL WARNING switch off to mute aural and disregard.
 7. A nuisance ELEVATOR SPLIT caution message can be disregarded.
 8. Altitude, Mode C and TCAS may be in error by up to 600 feet. Vertical speed indications may also be unreliable.
 9. Groundspeed indication may be unreliable.
 10. FMS cruise time and fuel predictions may be incorrect.
 11. Pri Stab Trim may be inoperative or operate erratically. Disengage autopilot and select Stab Trim to SEC if erratic stabilizer motion is observed.
 12. Rudder Travel Limiter (RTL) display on EICAS synoptic will display actual RTL limits even if RTL goal posts are amber. These limits may be inappropriate for the phase of flight.
 13. L (R) THRUST FAULT advisory message may post. Thrust lever adjustments may be required to keep engine parameters within limits.

Evaluate indicated airspeed sources in level flight as follows:

CAUTION: Airspeed should be considered reliable only if the following two conditions both exist:

1. Airspeed indication is consistent with pitch, thrust and airspeed range from Table A, and
2. Airspeed indication changes and speed trend vector are consistent with pitch and thrust adjustments.

11. AIR DATA reversion switch Select to NORM



AVIONICS

UNRELIABLE AIRSPEED

12. Both PFDs and ISI Compare airspeed
to expected speed range from Table A.
13. Determine which of the following conditions apply:
- If no indicated airspeed is considered reliable from Table A, proceed to step (13).
 - If one or more airspeed source is considered reliable from Table A, proceed to step (17).

NO RELIABLE AIRSPEED SOURCE

14. Airspeed Indications Disregard
15. Pitch/ N_1 Set
using Table A, B, C, D 1, D 2, D 3, or E as appropriate for
phase of flight.
16. Land at the nearest suitable airport.
17. When ready to start descent, proceed to step (22)

ONE OR MORE AIRSPEED SOURCE IS CONSIDERED RELIABLE

18. AIR DATA reversion switch Confirm NORM
19. Reliable airspeed source MONITOR WITH CAUTION
20. Pitch/ N_1 Set
using Table A, B, C, D 1, D 2, D 3 or E as appropriate for
phase of flight and continue to monitor reliable airspeed source
and airspeed range.

- CAUTION:**
1. Disregard airspeed indication if at any time it becomes unreliable.
 2. AIR DATA reversion switch must remain in NORM position.

21. Land at the nearest suitable airport.
22. When ready to start descent, proceed to step (22)

Recovery to an airfield

23. Descent Initiate when ready

AVIONICS

UNRELIABLE AIRSPEED

CAUTION: Rudder travel limits may be inappropriate for phase of flight. For cruise and descent flight, excessive rudder input may result in unacceptable handling characteristics or exceedance of structural limits. For approach, landing and go-around flight, rudder authority may be limited. Differential thrust and aileron input may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.

To avoid significant flap overspeed and flap damage:

1. Transition from FLAPS 0 to FLAPS 20 must be accomplished in level flight (Table D 1, D 2 or D 3).
2. Select FLAPS 30 at the start of final descent on the glideslope/glidepath (Table E).

NOTE: 1. Plan to intercept a long final to allow time to re-configure for approach/landing and set pitch/ N_1 .

2. Plan to recover to an airfield with an ILS, LNAV or VNAV under Visual Meteorological Conditions on a wide runway of sufficient length with minimum turbulence and crosswind.

24. Unreliable aircraft systems Review

- Ground proximity warning
- Windshear detection
- Landing gear warning horn
- Flap overspeed

25. Actual landing distance Increase

WITHOUT THRUST REVERSERS	WITH THRUST REVERSERS
1.25 (25%)	1.20 (20%)

26. ROAAS (If installed) OFF

NOTE: In the event of a go-around, refer to the immediate actions at the beginning of this procedure.

**AVIONICS****UNRELIABLE AIRSPEED**

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected speed range by delta KIAS/delta Mach.
 4. If pitch is decreased, INCREASE expected speed range by delta KIAS/delta Mach.

TABLE A – LEVEL FLIGHT CRUISE – FLAPS 0

TABLE A – LEVEL FLIGHT CRUISE – FLAPS 0										
	WEIGHT (LB)								EXPECTED SPD RANGE	EXPECTED SPD CHANGE FOR 0.5° CHANGE IN PITCH ΔKIAS/ ΔMACH
	24000		26000		28000		30000			
ALT (1000 FT)	PTCH (°)	N1 (%)	PTCH (°)	N1 (%)	PTCH (°)	N1 (%)	PTCH (°)	N1 (%)	KIAS/ MACH	
45	0.5	81.2*	1.0	82.0*	1.0	82.8*	1.0	83.9*	195–215/ .73–.79	5/0.01
40	0.5	78.0	0.5	78.7	1.0	79.3	1.0	79.9*	210–230/ .70–.76	5/0.01
35	–0.5	77.1	0.0	77.5	0.5	78.0	0.5	78.5	235–255/ .70–.75	10/0.02
30	–0.5	76.7	–0.5	77.0	0.0	77.4	0.0	77.8	260–280	10
25	–0.5	73.7	–0.5	74.0	–0.5	74.4	0.0	74.7	260–280	10
20	–0.5	70.6	–0.5	70.9	–0.5	71.2	0.0	71.5	260–280	10
15	–0.5	67.3	–0.5	67.7	–0.5	68.0	0.0	68.3	260–280	10
10	1.0	52.8	1.5	53.6	1.5	54.2	2.0	54.7	190–210	5
5	1.0	49.4	1.5	50.2	1.5	50.8	2.0	51.2	190–210	5
*At higher altitudes, it may not be possible to achieve the target N1 value with wing anti-ice ON. Initiate a descent to a lower altitude. If any indicated speed is outside the expected indicated airspeed range, it should be considered UNRELIABLE.										

AVIONICS

UNRELIABLE AIRSPEED

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected speed range by delta KIAS/delta Mach.
 4. If pitch is decreased, INCREASE expected speed range by delta KIAS/delta Mach.

TABLE A – LEVEL FLIGHT CRUISE – FLAPS 0 (CONT'D)								
	WEIGHT (LB)						EXPECTED SPD RANGE	EXPECTED SPD CHANGE FOR 0.5° CHANGE IN PITCH ΔKIAS/ ΔMACH
	32000		34000		36000			
ALT (1000 FT)	PTCH (°)	N1 (%)	PTCH (°)	N1 (%)	PTCH (°)	N1 (%)		
45	2.0	84.5*	2.0	85.1*	2.5	85.2*	195–215/ .73–.79	5/0.01
40	1.0	80.7*	1.5	81.5*	1.5	82.2*	210–230/ .70–.76	5/0.01
35	0.5	79.0	0.5	79.5	1.0	80.0	235–255/ .70–.75	10/0.02
30	0.0	78.0	0.5	78.6	0.5	79.0	260–280	10
25	0.0	75.0	0.5	75.3	0.5	75.6	260–280	10
20	0.0	71.8	0.5	72.1	0.5	72.4	260–280	10
15	0.0	68.6	0.5	69.0	0.5	69.3	260–280	10
10	2.5	55.5	2.5	56.5	3.0	57.3	190–210	5
5	2.5	52.0	2.5	52.8	3.0	53.6	190–210	5
*At higher altitudes, it may not be possible to achieve the target N1 value with wing anti-ice ON. Initiate a descent to a lower altitude. If any indicated speed is outside the expected indicated airspeed range, it should be considered UNRELIABLE.								

**AVIONICS****UNRELIABLE AIRSPEED**

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected speed range by delta KIAS/delta Mach.
 4. If pitch is decreased, INCREASE expected speed range by delta KIAS/delta Mach.

TABLE A – LEVEL FLIGHT CRUISE – FLAPS 0 (CONT'D)								
	WEIGHT (LB)						EXPECTED SPD RANGE KIAS/ MACH	EXPECTED SPD CHANGE FOR 0.5° CHANGE IN PITCH ΔKIAS/ ΔMACH
	38000		40000		40600			
ALT (1000 FT)	PTCH (°)	N1 (%)	PTCH (°)	N1 (%)	PTCH (°)	N1 (%)		
45	NA	NA	NA	NA	NA	NA	195–215/ .73–.79	5/0.01
40	2.0	82.8*	2.0	83.5*	2.0	83.7*	210–230/ .70–.76	5/0.01
35	1.0	80.5	1.0	81.1	1.0	81.3	235–255/ .70–.75	10/0.02
30	0.5	79.4	0.5	79.8	0.5	79.9	260–280	10
25	0.5	75.9	0.5	76.2	0.5	76.3	260–280	10
20	0.5	72.7	0.5	73.0	0.5	73.1	260–280	10
15	0.5	69.6	0.5	69.9	0.5	70.0	260–280	10
10	3.0	58.2	3.5	59.1	3.5	59.3	190–210	5
5	3.0	54.4	3.5	55.3	3.5	55.5	190–210	5
*At higher altitudes, it may not be possible to achieve the target N1 value with wing anti-ice ON. Initiate a descent to a lower altitude. If any indicated speed is outside the expected indicated airspeed range, it should be considered UNRELIABLE.								

AVIONICS**UNRELIABLE AIRSPEED**

- NOTE:**
1. Use FD in PTCH, ALT, HDG or ROLL modes only.
 2. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

- CAUTION:**
1. Rudder travel limits may be inappropriate for phase of flight. For cruise flight, excessive rudder input may result in unacceptable handling characteristics or exceedance of structural limits.
 2. Do not use FLC mode.

Table B – Climb – FLAPS 0				
ALT (ft)	Pitch (°)	N ₁ (%)	Expected SPD Range	
			KIAS	MACH
0	14.5	TO	225–275	
5000	15.5	TO	205–255	
10000	14.0	TO	210–280	
15000	10.0	CLB	235–290	
20000	9.5	CLB	215–250	
25000	8.5	CLB	205–235	0.50–0.57
30000	7.0	CLB	205–225	0.55–0.61
35000	4.5	CLB	225–245	0.67–0.73



AVIONICS

UNRELIABLE AIRSPEED

- NOTE:**
1. Use FD in PTCH, ALT, HDG or ROLL modes only.
 2. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

- CAUTION:**
1. Rudder travel limits may be inappropriate for phase of flight. For cruise and descent flight, excessive rudder input may result in unacceptable handling characteristics or exceedance of structural limits. For approach, landing and go-around flight, rudder authority may be limited. Differential thrust and aileron input may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.
 2. Do not use FLC mode.

Table C – Descent – FLAPS 0				
ALT (ft)	Pitch (°)	N ₁ (%)	Expected SPD Range	
			KIAS	MACH
45000	–1.5	IDLE	200–220	0.75–0.81
40000	–2.5	IDLE	220–240	0.73–0.79
35000	–3.5	IDLE	240–260	0.71–0.77
30000	–4.5	IDLE	255–275	0.68–0.73
25000	–3.5	IDLE	240–260	0.58–0.63
20000	–3.5	IDLE	235–255	
15000	–1.5	IDLE	200–220	
10000	–1.5	IDLE	200–220	
5000	–2.0	IDLE	205–225	
0	–2.0	IDLE	200–220	

AVIONICS

UNRELIABLE AIRSPEED

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected speed range by delta KIAS.
 4. If pitch is decreased, INCREASE expected speed range by delta KIAS.
 5. Use FD in PTCH, ALT, HDG or ROLL modes only.
 6. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

- CAUTION:**
1. Do not use FLC mode.
 2. Rudder travel limits may be inappropriate for phase of flight. For descent excessive rudder input may result in unacceptable handling characteristics or exceedance of structural limits. For approach, landing and go-around, rudder authority may be limited. Differential thrust and aileron may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.

To avoid significant flap overspeed and flap damage:

Transition from FLAPS 0 to 20 must be done in level flight.

Select FLAPS 30 at the start of final descent on the GS/GP.

Table D 1 – Approach – Level Flight – FLAPS 0 – GEAR UP									
			WEIGHT (LB)					Expectd SPD Range KIAS	Expectd ΔKIAS per 0.5°Δ pitch
			24000	26000	28000	30000	32000		
ALT (1,000ft)	10	Pitch(°)	1.0	1.5	1.5	2.0	2.5	190– 210	5
		N1 (%)	52.8	53.6	54.2	54.7	55.5		
	5	Pitch(°)	1.0	1.5	1.5	2.0	2.5	190– 210	5
		N1 (%)	49.4	50.2	50.8	51.2	52.0		
	0	Pitch(°)	1.0	1.5	1.5	2.0	2.5	190– 210	5
		N1 (%)	46.6	47.3	47.8	48.2	48.9		

**AVIONICS****UNRELIABLE AIRSPEED**

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected speed range by delta KIAS.
 4. If pitch is decreased, INCREASE expected speed range by delta KIAS.
 5. Use FD in PTCH, ALT, HDG or ROLL modes only.
 6. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

- CAUTION:**
1. Do not use FLC mode.
 2. Rudder travel limits may be inappropriate for phase of flight. For descent excessive rudder input may result in unacceptable handling characteristics or exceedance of structural limits. For approach, landing and go-around, rudder authority may be limited. Differential thrust and aileron input may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.

To avoid significant flap overspeed and flap damage:

Transition from FLAPS 0 to 20 must be done in level flight.

Select FLAPS 30 at the start of final descent on the GS/GP.

Table D 1 – Approach – Level Flight – FLAPS 0 – GEAR UP (CONT'D)

			WEIGHT (LB)					Expected SPD Range KIAS	Expected Δ KIAS per 0.5° Δ pitch
			34000	36000	38000	40000	40600		
ALT (1,000ft)	10	Pitch(°)	2.5	3.0	3.0	3.5	3.5	190–210	5
		N1 (%)	56.5	57.3	58.2	59.1	59.3		
	5	Pitch(°)	2.5	3.0	3.0	3.5	3.5	190–210	5
		N1 (%)	52.8	53.6	54.4	55.3	55.5		
	0	Pitch(°)	2.5	3.0	3.0	3.5	3.5	190–210	5
		N1 (%)	49.7	50.5	51.2	52.0	52.2		

AVIONICS

UNRELIABLE AIRSPEED

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected SPD range by delta KIAS.
 4. If pitch is decreased, INCREASE expected SPD range by delta KIAS.
 5. Use FD in PTCH, ALT, HDG or ROLL modes only.
 6. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

- CAUTION:**
1. Do not use FLC mode.
 2. Rudder travel limits may be inappropriate for phase of flight. For approach, landing and go-around, rudder authority may be limited. Differential thrust and aileron input may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.

To avoid significant flap overspeed and flap damage:

Transition from FLAPS 0 to 20 must be done in level flight.

Select FLAPS 30 at the start of final descent on the GS/GP.

Table D 2 – Approach – Level Flight – FLAPS 10 – GEAR UP									
			WEIGHT (LB)					Expected SPD Range KIAS	Expected Δ KIAS per 0.5° pitch
			24000	26000	28000	30000	32000		
ALT (1,000ft)	10	Pitch(°)	–1.0	–0.5	0.0	0.0	0.5	180–200	5
		N1 (%)	56.9	57.7	58.4	59.1	59.7		
		AoA (°)	0.2	0.2	0.3	0.3	0.3		
	5	Pitch(°)	–1.0	–0.5	0.0	0.0	0.5	180–200	5
		N1 (%)	55.4	56.3	57.0	57.7	58.4		
		AoA (°)	0.2	0.2	0.2	0.2	0.3		
	0	Pitch(°)	–1.0	–0.5	0.0	0.0	0.5	190–210	5
		N1 (%)	55.4	56.3	57.0	57.7	58.4		
		AoA (°)	0.2	0.2	0.2	0.2	0.2		

**AVIONICS****UNRELIABLE AIRSPEED**

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected speed range by delta KIAS.
 4. If pitch is decreased, INCREASE expected speed range by delta KIAS.
 5. Use FD in PTCH, ALT, HDG or ROLL modes only.
 6. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

- CAUTION:**
1. Do not use FLC mode.
 2. Rudder travel limits may be inappropriate for phase of flight. For approach, landing and go-around, rudder authority may be limited. Differential thrust and aileron input may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.

To avoid significant flap overspeed and flap damage:

Transition from FLAPS 0 to 20 must be done in level flight.

Select FLAPS 30 at the start of final descent on the GS/GP.

Table D 2 – Approach – Level Flight – FLAPS 10 – GEAR UP (CONT'D)									
			WEIGHT (LB)					Expected SPD Range KIAS	Expected Δ KIAS per 0.5° Δ pitch
			34000	36000	38000	40000	40600		
ALT (1,000ft)	10	Pitch(°)	1.0	1.0	1.5	NA	NA	180–200	5
		N1 (%)	60.4	61.0	61.6	NA	NA		
		AoA (°)	0.3	0.3	0.4	NA	NA		
	5	Pitch(°)	1.0	1.0	1.5	2.0	2.0	180–200	5
		N1 (%)	59.1	59.7	60.3	61.0	61.2		
		AoA (°)	0.3	0.3	0.3	0.4	0.4		
	0	Pitch(°)	1.0	1.0	1.5	2.0	2.0	190–210	5
		N1 (%)	59.1	59.7	60.3	61.0	61.2		
		AoA (°)	0.3	0.3	0.3	0.3	0.3		

AVIONICS

UNRELIABLE AIRSPEED

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected speed range by delta KIAS.
 4. If pitch is decreased, INCREASE expected speed range by delta KIAS.
 5. Use FD in PTCH, ALT, HDG or ROLL modes only.
 6. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

- CAUTION:**
1. Do not use FLC mode.
 2. Rudder travel limits may be inappropriate for phase of flight. For approach, landing and go-around, rudder authority may be limited. Differential thrust and aileron input may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.

To avoid significant flap overspeed and flap damage:

Transition from FLAPS 0 to 20 must be done in level flight.

Select FLAPS 30 at the start of final descent on the GS/GP.

Table D 3 – Approach – Level Flight – FLAPS 20 – GEAR DN									
			WEIGHT (LB)					Expected SPD Range KIAS	Expected Δ KIAS per 0.5° pitch
			24000	26000	28000	30000	32000		
ALT (1,000ft)	10	Pitch(°)	–1.5	–1.0	–0.5	0.0	0.5	150–170	5
		N1 (%)	63.6	63.8	64.4	65.0	65.6		
		AoA (°)	0.3	0.3	0.3	0.3	0.3		
	5	Pitch(°)	–1.5	–1.0	–0.5	0.0	0.5	150–170	5
		N1 (%)	63.6	63.8	64.4	65.0	65.6		
		AoA (°)	0.2	0.3	0.3	0.3	0.3		
	0	Pitch(°)	–2.0	–1.5	–1.0	–0.5	0.0	150–170	5
		N1 (%)	57.5	57.7	58.1	58.9	59.7		
		AoA (°)	0.2	0.3	0.3	0.3	0.3		

**AVIONICS****UNRELIABLE AIRSPEED**

- NOTE:**
1. Pitch/Thrust settings will give approximate level flight, and may result in slight climb or descent. Interpolation is acceptable.
 2. Adjust pitch to stop climb/descent.
 3. If pitch is increased, REDUCE expected speed range by delta KIAS.
 4. If pitch is decreased, INCREASE expected speed range by delta KIAS.
 5. Use FD in PTCH, ALT, HDG or ROLL modes only.
 6. If FD/autopilot engaged in PTCH mode, one click of PTCH wheel results in 0.5 degrees of pitch change.

- CAUTION:**
1. Do not use FLC mode.
 2. Rudder travel limits may be inappropriate for phase of flight. For approach, landing and go-around, rudder authority may be limited. Differential thrust and aileron input may be required to assist in maintaining directional control. Select a runway with minimum cross-wind.

To avoid significant flap overspeed and flap damage:

Transition from FLAPS 0 to 20 must be done in level flight.

Select FLAPS 30 at the start of final descent on the GS/GP.

Table D 3 – Approach – Level Flight – FLAPS 20 – GEAR DN (CONT'D)									
			WEIGHT (LB)					Expected SPD Range KIAS	Expected ΔKIAS per 0.5°Δ pitch
			34000	36000	38000	40000	40600		
ALT (1,000ft)	10	Pitch(°)	1.0	1.5	2.0	2.5	2.5	150–170	5
		N1 (%)	66.3	67.3	67.7	68.6	68.8		
		AoA (°)	0.3	0.4	0.4	0.4	0.4		
	5	Pitch(°)	1.0	1.5	2.0	2.5	2.5	150–170	5
		N1 (%)	66.3	67.3	67.7	68.6	68.8		
		AoA (°)	0.3	0.3	0.3	0.4	0.4		
	0	Pitch(°)	0.5	1.0	1.5	2.5	2.5	150–170	5
		N1 (%)	60.5	61.3	62.1	65.8	66.9		
		AoA (°)	0.3	0.3	0.3	0.4	0.4		

AVIONICS

UNRELIABLE AIRSPEED

- NOTE:**
1. Set N_1 to maintain AOA.
 2. Adjust pitch as necessary to maintain required glideslope guidance/glidepath.

CAUTION: Select FLAPS 30 at the start of final descent on the glideslope/glidepath.

Table E – Approach – FLAPS 30 – GEAR DN – 3° G/S									
			WEIGHT (LB)					Expected SPD Range KIAS	Expected Δ KIAS per 0.5° Δ pitch
			24000	26000	28000	30000	32000		
ALT (1,000ft)	10	Pitch(°)	–1.5	–0.5	0.5	0.5	0.5	V_{REF} +/- 10	5
		N1 (%)	46.5	47.2	48.0	49.5	51.1		
		AoA (°)	0.5	0.5	0.6	0.6	0.6		
	5	Pitch(°)	–1.5	–0.5	0.5	0.5	0.5		5
		N1 (%)	43.9	44.5	45.2	46.3	47.6		
		AoA (°)	0.5	0.5	0.6	0.6	0.6		
	0	Pitch(°)	–1.5	–0.5	0.5	0.5	0.5		5
		N1 (%)	41.9	42.4	43.0	44.1	45.2		
		AoA (°)	0.5	0.5	0.6	0.6	0.6		

**AVIONICS****UNRELIABLE AIRSPEED**

- NOTE:**
1. Set N_1 to maintain AOA.
 2. Adjust pitch as necessary to maintain required glideslope guidance/glidepath.

CAUTION: Select FLAPS 30 at the start of final descent on the glideslope/glidepath.

Table E – Approach – FLAPS 30 – GEAR DN – 3° G/S (CONT'D)									
			WEIGHT (LB)					Expectd SPD Range KIAS	Expectd Δ KIAS per 0.5° Δ pitch
			34000	36000	38000	40000	40600		
ALT (1,000ft)	10	Pitch(°)	0.5	0.5	0.5	0.5	0.5	VREF +/- 10	5
		N1 (%)	52.8	54.3	55.7	57.4	57.8		
		AoA (°)	0.6	0.6	0.6	0.6	0.6		
	5	Pitch(°)	0.5	0.5	0.5	0.5	0.5		5
		N1 (%)	49.1	50.5	51.7	53.2	53.5		
		AoA (°)	0.6	0.6	0.6	0.6	0.6		
	0	Pitch(°)	0.5	0.5	0.5	0.5	0.5		5
		N1 (%)	46.4	47.5	48.4	49.8	50.1		
		AoA (°)	0.6	0.6	0.6	0.6	0.6		

————— **END** —————

ELECTRICAL**L (R) BATT OVERHEAT (W)**

1. Affected BATT switch **OFF**

2. Battery temperature Monitor

If battery temperature increases:

3. Land as soon as possible.

———— **END** ————

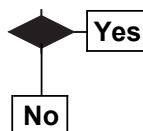
ESSENTIAL POWER ONLY (W)

The essential buses are powered by the batteries only. AUX and MAIN buses are automatically deactivated in flight.

NOTE: Should electrical system indication be flickering, cycling intermittently or behaving unexpectedly, accomplish the "Unexpected electrical indications" procedure at page 05-19-6.

1. DOME light switch BRT for night operations
2. L and R GEN switches One at a time, select ON

If a generator comes online:



— **END** —

3. HYD GEN (If installed) ON

NOTE: The applicable procedures for the following CAS messages are consolidated within this procedure and do not need to be conducted separately:

L (R) GEN FAIL (C), L (R) PITOT HEAT FAIL (C), STALL PROTECT FAIL (C), R WING ANTI-ICE FAIL (C), HYD PTU FAIL (C), L (R) MAIN BUS OFF (A), L (R) AUX BUS OFF (A)

4. LEFT DISPLAYS REVERSION switch MFD REV
5. TUNE REVERSION switch CDU ONLY
6. Use the standby instrument for airspeed, attitude, and altitude.
7. Airspeed 0.75 M_I/250 KIAS maximum
8. STAB TRIM switch SEC



ELECTRICAL

ESSENTIAL POWER ONLY (W) (Cont)

9. AIR SOURCE switch PACK ONLY
10. R BLEED switch OFF
11. XBLEED switch Closed
12. Altitude 31,000 ft maximum
13. WING SOURCE switch FROM L
14. AUX HYDRAULIC PUMP switch OFF
15. EMER LTS switch OFF
16. Leave icing conditions as soon as possible.
17. L and R WSHLD/WINDOW switches Off
18. MAN TEMP switch ON

NOTE: – If a generator does not come online, battery duration (with two 44 amp hour batteries) with the generators off is one hour. The integrated standby instrument (ISI) will be powered for a duration of 3.5 hours following loss of generated power.

Time duration predicated upon the following conditions:

- L WSHLD/WINDOW switch – On for no more than 15 minutes.
- No more than 3 APU start attempts.
- Any deviation from these conditions will significantly reduce the battery duration. Each additional APU start attempt will reduce battery endurance by approximately 2 minutes.

At 30,000 ft and below:

19. APU switch START and release

The APU starts:

- 

Yes
20. APU GEN Verify ON
 21. HYD GEN (If installed) OFF
 22. LEFT DISPLAYS REVERSION switch NORM
 23. TUNE REVERSION switch NORM
 24. STAB TRIM switch PRI
 25. AUX HYDRAULIC PUMP switch AUTO
 26. L and R WSHLD/WINDOW switches On
 27. MAN TEMP switch Off
 28. EMER LTS switch ARM
 29. Land as soon as practical.

– END –

No

ELECTRICAL**ESSENTIAL POWER ONLY (W) (Cont)**

20. Land as soon as possible.

NOTE: Landing on a wide runway of sufficient length with minimum turbulence and crosswind is recommended.

Descent checks:

21. Pressurization LNDG ALT set
(LNDG ALT display is available on summary page using FRMT switch on display control panel).

22. Standby Altimeter Set

23. Passenger Brief/Cabin Check Complete

Approach checks:

24. Final approach speed $V_{REF} + 10$

25. Normal actual landing distance Multiply by:
1.80 without thrust reversers
1.55 with thrust reversers

26. L WSHLD/WINDOW switch As required (to defog left window)

27. Approach setup and crew briefing Complete

28. RA MIN or BARO MIN Set

29. MIN ALERT Set

30. L and R HYDRAULIC PUMP switches AUTO

Before landing checks:

31. HYD GEN (If installed) OFF

32. LANDING GEAR switch DN

33. FLAPS selector 30

34. EMER LTS switch ON

————— **END** —————



EVACUATION

Emergency Evacuation

1. PARK/EMER BRAKE Set
2. EMER DEPRESS switch ON
3. L and R ENG, and APU FIRE switches Push
4. Evacuation Command
5. Controlling Agency Notify
6. STBY INST switch OFF
7. L and R BATT switches OFF

8. Evacuate the airplane using the passenger door and/or the emergency exit.

————— **END** —————

FLIGHT CONTROLS

Effectivity:

For aircraft 20595–22999 and aircraft incorporating SB 350–34–011.

Overspeed



“overspeed clacker
tone”

1. Autothrottle (if installed) Disengage

2. Thrust levers IDLE

3. Autopilot Disconnect

4. FLIGHT SPOILERS lever EMER

5. Level wings, then pitch up.
6. Stab Trim As required to raise the nose
- END

Overspeed



“OVERSPEED”

1. Autothrottle (if installed) Disengage

2. Thrust levers IDLE

3. Autopilot Disconnect

4. FLIGHT SPOILERS lever EMER

5. Level wings, then pitch up.
6. Stab Trim As required to raise the nose
- END



FLIGHT CONTROLS

STALL on PFD



“STALL”

1. Autopilot Disconnect
2. Lower the pitch attitude to reduce angle-of-attack.
3. Autothrottle (if installed) Disengage
4. Thrust levers APR
5. FLIGHT SPOILERS lever RETRACT
6. Level the wings.

After airspeed increases and stall warning is extinguished:

7. Pitch attitude Adjust
to minimize altitude loss.
8. Thrust levers and aircraft configuration Adjust as required

NOTE: If the aircraft is allowed to decelerate below stall warning angle-of-attack, priority must be given to immediately reducing the angle-of-attack rather than attempting to maintain altitude. Stall recovery from typical cruise altitudes and other relatively low thrust conditions will require a significant loss of altitude.

————— **END** —————

FLIGHT CONTROLS

Pitch Axis Uncommanded
Motion or "Trim Clacker Tone"

"trim clacker tone"

1. Master disconnect switch (MSW) Depress and hold

NOTE: The following conditions will exist when the MSW switch is depressed:

- The autopilot will disengage.
- Stabilizer, configuration, Mach, aileron, and rudder trims will be inoperative while the switch is depressed.
- The stall pusher is inoperative while the switch is depressed.

Control force is relieved with MSW depressed:

- Yes**
2. STALL PUSHER switch OFF
 3. Flight Guidance Panel AP/YD DISC bar Pull Down
 4. Master disconnect switch (MSW) Release
 5. Altitude 31,000 ft maximum

Uncommanded motion reoccurs

- Yes**
6. MSW Depress and hold

- END -

No

- END -

No

Control force continues with MSW depressed:

The malfunction is most likely a trim malfunction.

2. STAB TRIM switch OFF
3. Master disconnect switch (MSW) Release
4. Refer to Pri Stab Trim Fail procedure in the NON-NORMAL PROCEDURES Chapter.

END



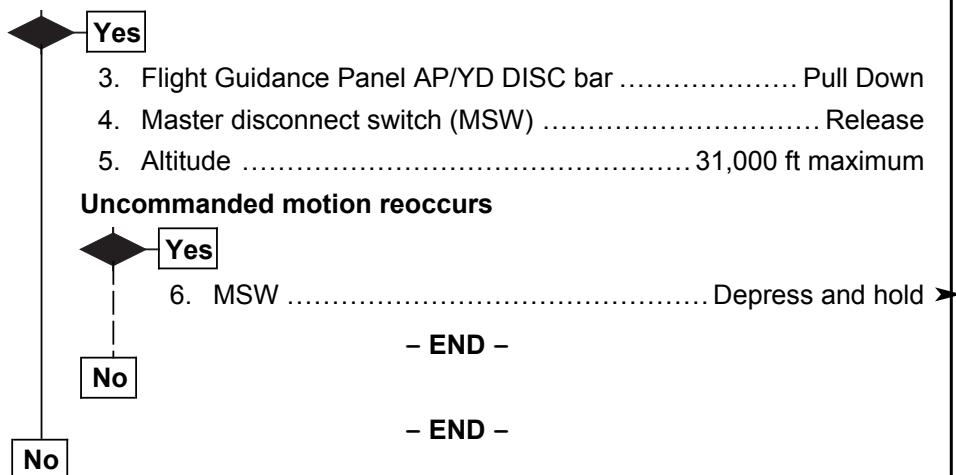
FLIGHT CONTROLS

Effectivity:*EASA registered aircraft only.***Pitch Axis Uncommanded
Motion or “Trim Clacker Tone”****“trim clacker tone”**

1. Master disconnect switch (MSW) Depress and hold
 2. STALL PUSHER switch OFF

NOTE: The following conditions will exist when the MSW switch is depressed:

- The autopilot will disengage.
- Stabilizer, configuration, Mach, aileron, and rudder trims will be inoperative while the switch is depressed.

Control force is relieved with MSW depressed or Stall Pusher OFF:**Control force continues:**

The malfunction is most likely a trim malfunction.

3. STAB TRIM switch OFF
4. Master disconnect switch (MSW) Release
5. Refer to Pri Stab Trim Fail procedure in the NON-NORMAL PROCEDURES Chapter.

————— **END** —————

FLIGHT CONTROLS

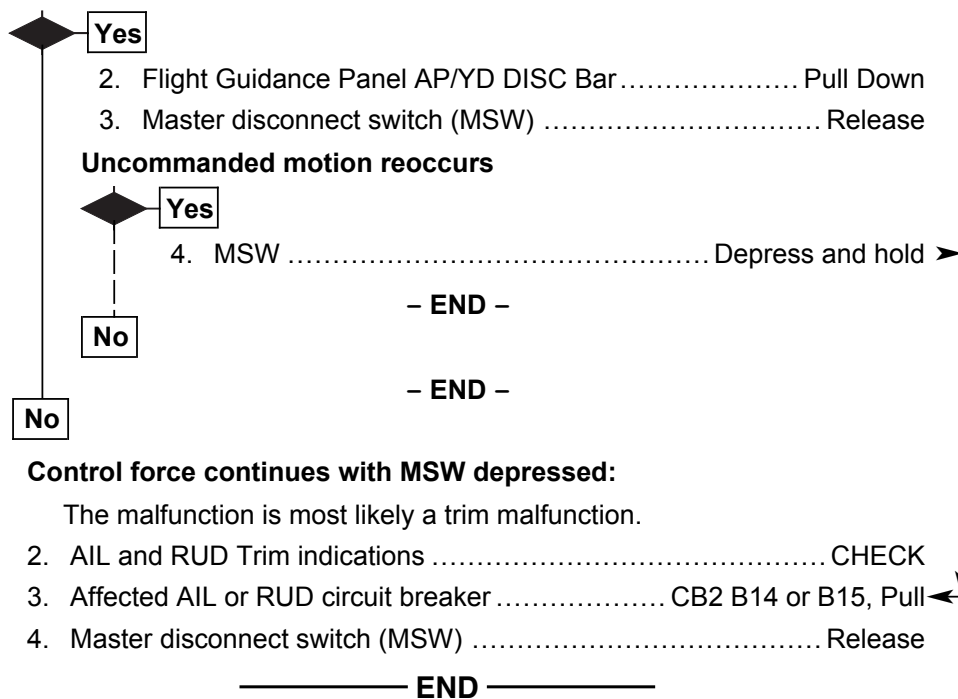
Roll or Yaw Axis Uncommanded Motion

1. Master disconnect switch (MSW) Depress and hold

NOTE: The following conditions will exist when the MSW switch is depressed:

- The autopilot will disengage.
- Stabilizer, configuration, Mach, aileron, and rudder trims will be inoperative while the switch is depressed.
- *The stall pusher is inoperative while the switch is depressed.
*(Not applicable to JAA aircraft).

Control force is relieved with MSW depressed:





FLIGHT CONTROLS

Pitch Control Jam

1. **PITCH DISC handle** **PULL & TURN**

The pilot will control the left elevator and the copilot will control the right elevator.

2. **Determine the side without the jam and transfer control to that pilot.**

- a. **Do not** apply additional control force to a jammed control.
- b. **Do not** reconnect.

3. **Airspeed** Airspeed at which the jam occurred or 200 KIAS maximum, whichever is greater.

4. Land as soon as possible.

NOTE: – Avoid excessive elevator inputs. The ELEVATOR SPLIT (C) may be displayed if elevator use is aggressive.

– Use pitch trim as necessary to minimize elevator deflection.

– Use aileron control as necessary to stabilize the aircraft.

Descent Checks:

5. Pressurization LNDG ALT set
6. WING ANTI-ICE switch As required
7. L and R ENG ANTI-ICE switches As required

Transition Level (or FL 180) Checks:

8. Altimeters Set
9. L and R LANDING light switches On
10. Passenger Brief/Cabin Check Complete
11. SMKG/BELTS switch SMKG/BELTS
12. Fuel quantities and balance Check

Approach Checks:

13. APU and Bleeds Set
14. Final approach speed V_{REF}
15. Normal actual landing distance Multiply by:
1.15 without thrust reversers
1.10 with thrust reversers

FLIGHT CONTROLS

Pitch Control Jam (Cont)

16. ROAAS (if installed) As required

- NOTE:** – For aircraft with ROAAS installed, ROAAS should be selected OFF when landing on an RCC 6 runway with a length shorter than the increased actual landing distance plus 2,000 ft (600 m).
- ROAAS should be selected OFF when landing on a runway with RCC less than 6.

17. Approach setup and crew briefing Complete

18. RA MIN or BARO MIN Set

19. MIN ALERT Set

20. L and R HYDRAULIC PUMP switches AUTO

Before Landing Checks:

21. LANDING GEAR switch DN

22. L LANDING, N LDG/TAXI, and R LANDING
light switches On

23. FLAPS 30

————— **END** —————

Roll Control Jam

1. ROLL DISC lever **PULL TO ACTUATE**
 2. Determine the side without the jam and transfer control to that pilot.

The jam is on the copilot's side:



Yes

3. **Do not** use the copilot's controls.
4. **Do not** use aileron trim.
5. **Do not** reconnect.

No

(The jam is on the pilot's side)

3. ROLL SPOILERS switch OFF
4. **Do not** reconnect.
5. Land as soon as possible.

NOTE: Landing on a wide runway of sufficient length with minimum turbulence and crosswind is recommended.

Descent Checks:

6. Pressurization LNDG ALT set

**FLIGHT CONTROLS****Roll Control Jam (Cont)**

7. WING ANTI-ICE switch As required
 8. L and R ENG ANTI-ICE switches As required

Transition Level (or FL 180) Checks:

9. Altimeters Set
 10. L and R LANDING light switches On
 11. Passenger Brief/Cabin Check Complete
 12. SMKG/BELTS switch SMKG/BELTS
 13. Fuel quantities and balance Check

Approach Checks:

14. APU and Bleeds Set
 15. Final approach speed $V_{REF} + 5$
 16. Normal actual landing distance Multiply by:
 1.20 without thrust reversers
 1.15 with thrust reversers
 17. ROAAS (if installed) As required

NOTE: – For aircraft with ROAAS installed, ROAAS should be selected OFF when landing on an RCC 6 runway with a length shorter than the increased actual landing distance plus 2,000 ft (600 m).
 – ROAAS should be selected OFF when landing on a runway with RCC less than 6.

18. Approach setup and crew briefing Complete
 19. RA MIN or BARO MIN Set
 20. MIN ALERT Set
 21. L and R HYDRAULIC PUMP switches AUTO

Before Landing Checks

22. LANDING GEAR switch DN
 23. L LANDING, N LDG/TAXI, and R LANDING
 light switches On
 24. FLAPS 30

————— **END** —————

FLIGHT CONTROLS

Yaw Control Jam

1. Use ailerons and asymmetric thrust as required.
2. Land as soon as possible.

NOTE:

- Limited travel may be available through the use of rudder trim.
- Landing on a wide runway of sufficient length with minimum turbulence and crosswind is recommended.
- Use asymmetric power if required to minimize sideslip.
- Flying the approach with minimum control and thrust inputs will help maintain directional control.

Effectivity:

For aircraft on the Russian Federation (RF) and Commonwealth of Independent States (CIS) countries' registry:

- Crosswind not to exceed 10 knots (5 meters/sec).

Descent Checks:

3. Pressurization LNDG ALT set
4. WING ANTI-ICE switch As required
5. L and R ENG ANTI-ICE switches As required

Transition Level (or FL 180) Checks:

6. Altimeters Set
7. L and R LANDING light switches On
8. Passenger Brief/Cabin Check Complete
9. SMKG/BELTS switch SMKG/BELTS
10. Fuel quantities and balance Check

Approach Checks:

11. APU and Bleeds Set
12. Final approach speed $V_{REF} + 5$
13. Normal actual landing distance Multiply by:
 - 1.20 without thrust reversers
 - 1.15 with thrust reversers
14. ROAAS (if installed) As required

NOTE:

- For aircraft with ROAAS installed, ROAAS should be selected OFF when landing on an RCC 6 runway with a length shorter than the increased actual landing distance plus 2,000 ft (600 m).

- ROAAS should be selected OFF when landing on a runway with RCC less than 6.

15. NWS switch OFF
16. Approach setup and crew briefing Complete



FLIGHT CONTROLS

Yaw Control Jam (Cont)

- 17. RA MIN or BARO MIN Set
- 18. MIN ALERT Set
- 19. L and R HYDRAULIC PUMP switches AUTO

Before Landing Checks:

- 20. LANDING GEAR switch DN
- 21. L LANDING, N LDG/TAXI, and R LANDING
light switches On
- 22. FLAPS 30
- 23. Carry power down to touchdown to aid in directional control.

NOTE: Thrust reversers may be used. Stow the thrust reversers if directional control is in doubt.

————— **END** —————

HYDRAULICS**HYD PRESS LOW (W)****Inoperative equipment:**

- Elevator hydraulic power (pitch forces will be high)
- Rudder hydraulic power may be lost
- All spoiler functions
- Normal brakes supplied by the accumulators only
- Thrust reversers
- Flaps
- Normal landing gear control
- Nose wheel steering.

1. L and R HYDRAULIC PUMP switches OFF
2. Autopilot Disconnect
3. L and R HYDRAULIC SOV switches Closed

NOTE: – The MLG downlock assist accumulator will retain pressure for 30 minutes after a complete hydraulic failure. The landing gear must be down prior to this time if the flaps are not at 0°.

– Avoid icing conditions for a prolonged period of time.

4. Altitude 41,000 ft maximum
5. Land as soon as possible.

WARNING: Flaps 0 and Flaps 10 landing condition: Maximum brake energy may be exceeded for a landing weight above MLW and when landing at an airport pressure altitude of 4000 ft and above.

NOTE: Landing on a wide runway of sufficient length with minimum turbulence and crosswind is recommended. If flaps are at any angle other than 30, divert to a suitable landing field with a glidepath angle of 3.5 degrees or less.

Descent Checks:

6. Pressurization LNDG ALT set
7. WING ANTI-ICE switch As required
8. L and R ENG ANTI-ICE switches As required

Transition Level (or FL 180) Checks:

9. Altimeters Set
10. L and R LANDING light switches On
11. Passenger Brief/Cabin Check Complete
12. SMKG/BELTS switch SMKG/BELTS
13. Fuel quantities and balance Check

**HYDRAULICS****HYD PRESS LOW (W) (Cont)****Approach Checks:**

14. APU and Bleeds Set
15. Final approach speed As listed for flaps attained:
- | | |
|----------------|----------------|
| Flaps 0 | $V_{REF} + 25$ |
| Flaps 10 | $V_{REF} + 20$ |
| Flaps 20 | $V_{REF} + 10$ |
| Flaps 30 | $V_{REF} + 5$ |
16. Normal actual landing distance Multiply by:
- | | |
|----------------|------|
| Flaps 0 | 2.00 |
| Flaps 10 | 2.05 |
| Flaps 20 | 1.90 |
| Flaps 30 | 1.80 |

Effectivity:*If Autothrottle installed:*

CAUTION: Autothrottle will not arm RETARD mode at 200 feet AGL if FLAPS are not at 30 degrees, AT RETARD INHIBIT (C) will post, and Autothrottle will not retard thrust levers at 50 feet AGL.

17. ROAAS (if installed) As required

NOTE: ROAAS should be selected OFF when landing on a runway with RCC less than 6.

18. FLAPS TAWS WARN OFF
19. Approach setup and crew briefing Complete
20. RA MIN or BARO MIN Set
21. MIN ALERT Set
22. L and R HYDRAULIC PUMP switches AUTO
23. Autothrottle (if installed) Disengage
prior to 200 feet AGL

Before Landing Checks:

24. LANDING GEAR switch DN

CAUTION: Do not push PUSH TO STOW button while pulling handle.

25. LG PULL handle PULL

NOTE: Performing a sideslip, to each side, may help achieve MLG downlock. Increased airspeed may be required to ensure downlock during sideslip.

HYDRAULICS

HYD PRESS LOW (W) (Cont)

26. GEAR Indication Check,
for three green DN indications

CAUTION: Do not stow handle until gear pins are installed.

27. L LANDING, N LDG/TAXI, and R LANDING
light switches On

28. NWS switch OFF,
maintain directional control using differential braking

After Touchdown:

29. Normal brakes Apply,
using one continuous application to a full stop

————— **END** —————



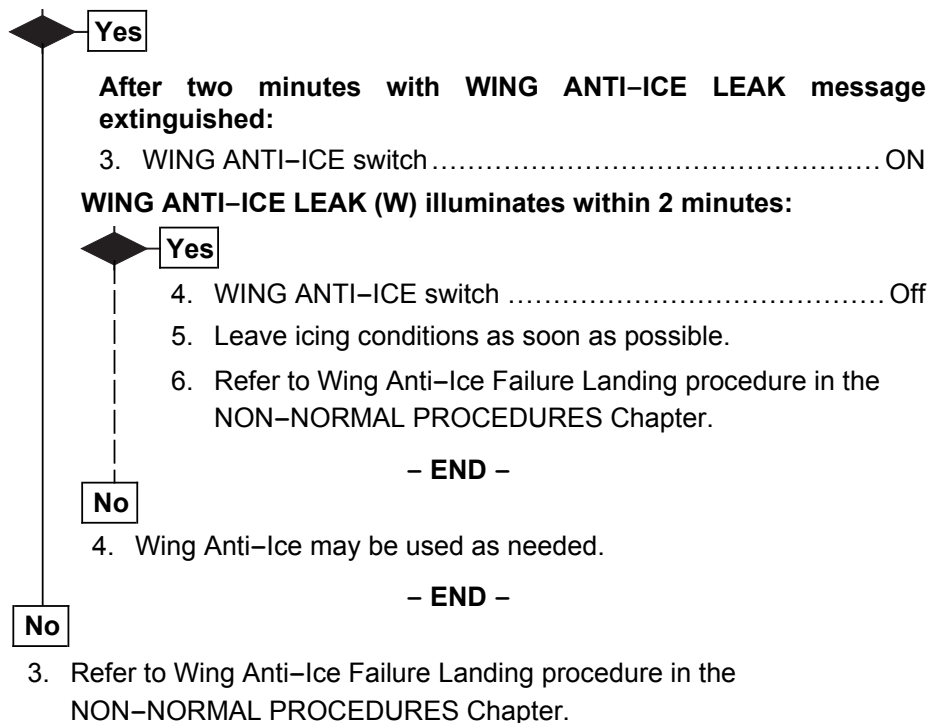
ICE AND RAIN PROTECTION

WING ANTI-ICE LEAK (W)

1. WING ANTI-ICE switch Off

2. Leave icing conditions as soon as possible.

WING ANTI-ICE LEAK (W) occurred with CLB or TO thrust set:



WARNING: Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed, and possibly a degradation in stall characteristics.

— END —

ICE AND RAIN PROTECTION

L (R) WING OVERHEAT (W)

1. WING ANTI-ICE switch Off

L WING OVERHEAT (W) is displayed:



Yes

2. WING SOURCE switch FROM R
 3. AUTO SYNC switch OFF
 4. WING ANTI-ICE switch ON

No

R WING OVERHEAT (W) is displayed:

2. WING SOURCE switch FROM L
 3. AUTO SYNC switch OFF
 4. WING ANTI-ICE switch ON

If the message reappears:

5. WING ANTI-ICE switch Off
 6. Leave icing conditions as soon as possible.
 7. Refer to Wing Anti-Ice Failure Landing procedure in the
 NON-NORMAL PROCEDURES Chapter.

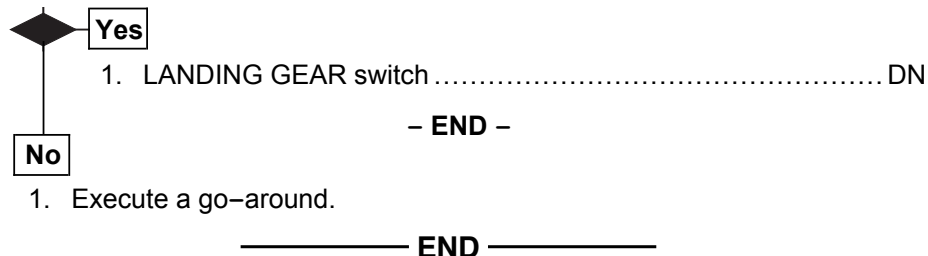
WARNING: Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed, and possibly a degradation in stall characteristics.

————— **END** —————

**LANDING GEAR, WHEELS & BRAKES****GEAR (W)****“GEAR”**

NOTE: If the radio altimeter is inoperative, the “GEAR” aural may be muted via the Master WARNING/CAUTION switch.

Is adequate time available to extend gear:

**GEAR BAY OVHT (W)**

1. AIRSPEED 250 KIAS maximum
 2. LANDING GEAR switch DN

Wait 10 minutes:

3. LANDING GEAR switch UP

If GEAR BAY OVHT occurs again:

4. LANDING GEAR switch DN
5. Land as soon as possible.

— END —

Landing Gear Up/Unsafe Landing

1. Airspeed 250 KIAS maximum
2. LANDING GEAR switch DN

NOTE: Ensure landing gear switch is firmly in the “DN” position.

CAUTION: Do not push PUSH TO STOW button while pulling handle.

3. LG PULL handle PULL

NOTE: Performing a sideslip to each side may help achieve MLG downlock. Increased airspeed may be required to ensure downlock during sideslip.

4. GEAR Indication Check,
for three DN indications

LANDING GEAR, WHEELS & BRAKES**Landing Gear Up/Unsafe Landing (Cont)****All landing gear are down (three DN indications):****Yes**

5. Land as soon as practical.

CAUTION: Do not stow the handle until the gear pins are installed.**– END –****No****All landing gear are not down:**

NOTE: If a gear up landing must be made, select a long, wide runway with as little crosswind as possible. If time and conditions permit, plan the descent to ensure minimum fuel remaining on the aircraft. Ensure sufficient fuel for a controlled, power-on approach.

Brief the passengers as required:

- 5. Location and operation of emergency exits Indicate
- 6. All loose items Secure
- 7. Seat belts and shoulder harnesses Secure
- 8. Emergency landing brace position Assume

Descent Checks:

- 9. Pressurization LNDG ALT set
- 10. WING ANTI-ICE switch As required
- 11. L and R ENG ANTI-ICE switches As required

Transition Level (or FL 180) Checks:

- 12. Altimeters Set
- 13. L and R LANDING light switches On
- 14. Passenger Brief/Cabin Check Complete
- 15. SMKG/BELTS switch SMKG/BELTS
- 16. Fuel quantities and balance Check

Approach Checks:

- 17. APU and Bleeds Set

CAUTION: Autothrottle will not arm RETARD mode at 200 ft AGL if landing gear is not indicating down. AT RETARD INHIBIT (C) will post, and Autothrottle will not retard thrust levers at 50 feet AGL.

- 18. ROAAS (if installed) OFF
- 19. Approach setup and crew briefing Complete
- 20. RA MIN or BARO MIN Set
- 21. MIN ALERT Set

**LANDING GEAR, WHEELS & BRAKES****Landing Gear Up/Unsafe Landing (Cont)**

22. L and R HYDRAULIC PUMP switches AUTO

Before Landing Checks:

23. L LANDING, N LDG/TAXI, and R LANDING
light switches On

24. AURAL WARNING DCU A and DCU B
switches OFF,
this will disable **all** aural warnings

25. FLAPS selector 30

26. Autothrottle (if installed) Disengage
prior to 200 feet AGL

No landing gear is extended:**Yes**

27. Plan to land slightly nose high. Perform normal power-on
approach at V_{REF} and touchdown at the lowest possible airspeed
with minimum sink rate. Do not decelerate below shaker speed. →

No**Partial Gear extended:****The nose gear fails to extend:****Yes**

27. Relocate passengers aft to obtain aft C.G., if possible.
28. Hold the nose off the runway as long as elevator control is
available. →

No**One main gear fails to extend:**

27. Plan to land on the same side of the runway as the extended gear.

28. Hold the applicable wing up as long as possible. Maintain directional
control with the rudder and the nose wheel steering.

At touchdown: ←

29. L and R ENG FIRE switches PUSH

30. Normal braking may be used and spoilers deployed. Use the rudder
and/or the brakes for directional control.

After aircraft stops:

31. PARK/EMER BRAKE Set

32. APU switch OFF

33. L and R BATT switches OFF

34. STBY INST switch OFF

Landing Gear Up/Unsafe Landing (Cont)

- END**

1. **FLIGHT SPOILERS lever**..... **EMER**
2. **PARK/EMER BRAKE handle** **Pull smoothly**

END



LANDING PROCEDURES

Ditching

Time and conditions permit:



Yes

1. Proceed to nearest land or vessel.
2. Notify controlling agency.
3. Transponder Emergency 7700
4. ELT switch ON
5. Life Vests On

NOTE: Inform passengers not to inflate life vests while inside aircraft.

6. Shoulder harnesses Locked
7. Passenger Brief/Cabin Check Complete
8. SMKG/BELTS switch SMKG/BELTS

No

1. AURAL WARNING DCU A and DCU B switches OFF
This will disable **all** aural warnings.
2. TAWS circuit breaker (CB2 A6) Pull
3. DITCHING switch ON

At approximately 2,000 ft:

4. Plan landing direction as follows:
Calm Sea Into wind
Moderate Swells Parallel to swells
High Wind Into wind, attempting to land on
upwind (far) side of swell
5. L and R HYDRAULIC PUMP switches AUTO
6. LANDING GEAR switch UP
7. FLAPS selector 30
8. EMER LIGHTS switch ON

Just before contact:

9. Perform normal power-on approach at V_{REF} and touchdown at the lowest possible airspeed with minimum sink rate. Do not decelerate below shaker speed.
10. Thrust levers IDLE at touchdown

After contact:

11. L and R ENG, and APU FIRE switches Push
12. L and R BATT switches OFF
13. STBY INST switch OFF

LANDING PROCEDURES

Ditching (Cont)

14. Emergency exit(s) Open
after airplane comes to a complete stop.
Evacuate the aircraft using the passenger door and/or the
emergency exit.

Effectivity:

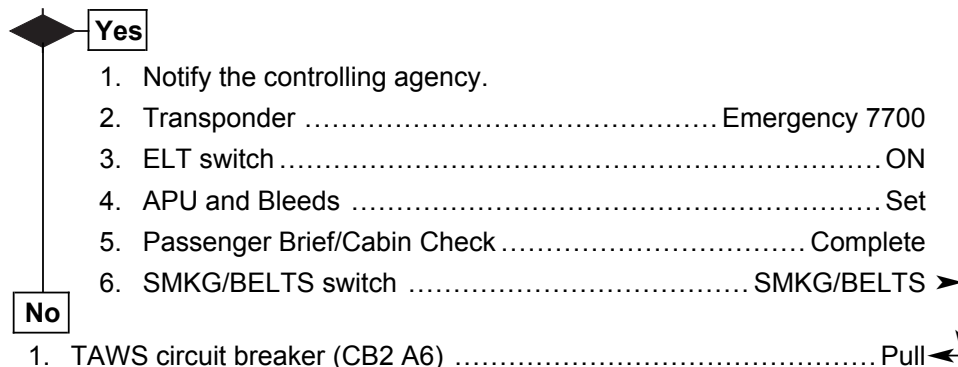
For aircraft on the Russian Federation (RF) and Commonwealth of Independent States (CIS) countries' registry:

15. Outside the aircraft, the Russian-made portable emergency VHF radio P855A1 should be used in accordance with the instructions attached to the unit.

————— **END** —————

Forced Landing – Both Engines Inoperative

Time and conditions permit:



Before landing checks:

2. L and R HYDRAULIC PUMP switches AUTO
3. LANDING GEAR switch DN

CAUTION: Do not push PUSH TO STOW button while pulling handle.

4. LG PULL handle PULL
5. FLAPS selector 30
6. EMER DEPRESS switch ON
7. Shoulder harnesses Locked
8. EMER LIGHTS switch ON
9. L and R ENG FIRE switches FIRE push
10. Touchdown at the lowest possible airspeed with minimum sink rate. Do not decelerate below shaker speed.

After airplane comes to a complete stop:

11. APU switch OFF



LANDING PROCEDURES

Forced Landing – Both Engines Inoperative (Cont)

12. PARK/EMER BRAKE Set
13. L and R ENG, and APU FIRE switches Push
14. L and R BATT switches OFF
15. STBY INST switch OFF
16. Evacuate the aircraft using the passenger door and/or the emergency exit.

Effectivity:

For aircraft on the Russian Federation (RF) and Commonwealth of Independent States (CIS) countries' registry:

17. Outside the aircraft, the Russian-made portable emergency VHF radio P855A1 should be used in accordance with the instructions attached to the unit.

————— **END** —————

POWERPLANT

L (R) ENGINE EXCEEDANCE (W)

1. Autothrottle (if installed) Disengage

Affected Engine:

2. Thrust lever Retard

Engine responds:



Yes

3. Continue flight.

– END –

No

3. Affected engine RUN switch OFF

Engine shuts down:



Yes

4. Refer to Engine Shutdown In Flight procedure in the
NON-NORMAL PROCEDURES chapter.

– END –

No

4. Affected ENG FIRE switch Push

5. Refer to Engine Shutdown In Flight procedure in the NON-NORMAL
PROCEDURES chapter.

Effectivity:

For aircraft on the Russian Federation (RF) and Commonwealth of Independent States (CIS) countries' registry:

NOTE: If thrust exceedance occurs while flying on the glideslope for final approach:

- a. Perform a go-around.
- b. Follow the procedures for L(R) ENGINE EXCEEDANCE (W) for the affected engine.

— END —



POWERPLANT

L (R) ENGINE FIRE (W)

“LEFT (RIGHT) ENGINE
FIRE”

DURING TAKEOFF

Below V_1 Speed:

1. Autothrottle (if installed) Disengage
2. Thrust levers IDLE
3. Brakes Maximum, or as required
4. Thrust reversers MAX REV or as required

After Stopping:

5. PARK/EMER BRAKE Set
6. Affected ENG FIRE switch FIRE push
7. FIRE EXT 1 and 2 switches ARMED push
8. EMER DEPRESS switch ON
9. Non-affected ENG and APU FIRE switches Push
10. Evacuation Command
11. Controlling Agency Notify
12. STBY INST switch OFF
13. L and R BATT switches OFF

14. Evacuate the airplane using the passenger door and/or the emergency exit.

– END –

POWERPLANT**L (R) ENGINE FIRE (W) (Cont)****Above V_1 Speed:**

1. Rotate at V_R .
2. Pitch attitude **Adjust as required**
to achieve V_2 .

NOTE: Initially rotate toward the flight director pitch guidance command.
Adjust pitch as required to maintain V_2 .

3. **LANDING GEAR switch** **UP**
after positive rate of climb.
4. Autothrottle (if installed) **Disengage**
5. Affected engine thrust lever **IDLE**
unless a critical thrust situation exists.
6. Affected ENG FIRE switch **FIRE push**

After 10 seconds if L (R) ENGINE FIRE CAS persists or there are other indications of fire:

7. FIRE EXT 1 switch **ARMED push**

After 30 seconds if L (R) ENGINE FIRE CAS persists or there are other indications of fire:

8. FIRE EXT 2 switch **ARMED push**

9. Affected engine RUN switch OFF
10. Affected FUEL PUMP switch OFF, if not required
11. Climb at V_2 until clear of obstacles, accelerate to $V_2 + 15$ (Flaps 10)
[$V_2 + 25$ (Flaps 20)].

WARNING: It is prohibited to engage the Autothrottle until flaps are retracted and the aircraft has accelerated to en route climb speed.

12. Flaps Retract to 0
13. Climb At en route climb speed
14. Rudder trim As required
15. N LDG/TAXI light switch OFF
16. ANTI/ICE panel As required
17. Monitor fuel balance. Transfer as required. Fuel PUMP may be used.
18. Land as soon as possible.
19. Refer to Single Engine Landing procedure in the NON-NORMAL PROCEDURES chapter.

– END –

**POWERPLANT****L (R) ENGINE FIRE (W) (Cont)****IN FLIGHT**

1. Autothrottle (if installed) **Disengage**

Affected Engine:

2. Thrust lever **IDLE**
unless a critical thrust situation exists.

3. Affected ENG FIRE switch **FIRE push**

After 10 seconds if L (R) ENGINE FIRE CAS persists or there are other indications of fire:

4. FIRE EXT 1 switch **ARMED push**

After 30 seconds if L (R) ENGINE FIRE CAS persists or there are other indications of fire:

5. FIRE EXT 2 switch **ARMED push**

6. Affected engine RUN switch **OFF**

7. Affected FUEL PUMP switch **OFF**, if not required

8. Rudder trim **As required**

9. Monitor fuel balance. Transfer as required. Fuel PUMP may be used.

10. Land as soon as possible.

11. Refer to Single Engine Landing procedure in the NON-NORMAL
PROCEDURES chapter.

———— **END** ————

POWERPLANT**L (R) ENG OIL PRESS LOW (W)**

ENG OIL PRESS LOW (W) CAS is displayed and L (R) OIL PRESS digits are red:

**Yes**

1. Autothrottle (if installed) Disengage
2. Affected engine thrust lever IDLE
3. Affected engine RUN switch OFF
4. Refer to Engine Shutdown In Flight procedure in the
NON-NORMAL PROCEDURES chapter.

- END -**No**

Only the L (R) OIL PRESS digits are red:

1. Affected engine OIL TEMP Check

OIL TEMP is high:

**Yes**

2. Autothrottle (if installed) Disengage
3. Affected engine thrust lever IDLE
4. Affected engine RUN switch OFF
5. Refer to Engine Shutdown In Flight procedure in the
NON-NORMAL PROCEDURES chapter.

- END -**No**

2. OIL PRESS and OIL TEMP Monitor
The most likely problem is a single pressure sensor failure.

END

**POWERPLANT****L (R) REVERSER UNSAFE (W)****REV (EI icon)****DURING TAKEOFF****Below V_1 Speed:**

- | | |
|--------------------------------------|-------------------------|
| 1. Autothrottle (if installed) | Disengage |
| 2. Thrust levers | IDLE |
| 3. Brakes | Maximum, or as required |
| 4. Thrust reversers | MAX REV or as required |

– END –**Above V_1 Speed:**

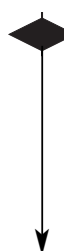
- | | |
|--|-------------------------------------|
| 1. Rotate at V_R . | |
| 2. Pitch attitude | Adjust as required to achieve V_2 |
| NOTE: Initially rotate toward the flight director pitch guidance command. Adjust pitch as required to maintain V_2 . Flight director pitch guidance command may indicate high for conditions. | |
| 3. LANDING GEAR switch | UP after positive rate of climb |
| 4. Autothrottle (if installed) | Disengage |
| 5. Affected engine thrust lever | IDLE |

CAUTION: If condition persists, do not engage Autothrottle.

6. Climb at V_2 until clear of obstacles, accelerate to $V_2 + 15$ (Flaps 10) [$V_2 + 25$ (Flaps 20)].

WARNING: It is prohibited to engage the Autothrottle until flaps are retracted and the aircraft has accelerated to en route climb speed.

7. Flaps Retract to 0
8. Climb At en route climb speed

Other indications of thrust reverser deployment are present (buffeting or excessive pitch, roll or yaw):**Yes**

9. ENGINE RUN switch (deployed engine) OFF
10. Rudder Trim As required
11. Affected BLEED switch OFF
12. XBLEED switch Open

POWERPLANT

**L (R) REVERSER UNSAFE (W)
REV (EI icon) (Cont)**

13. Affected ENG ANTI-ICE switch OFF
 14. N LDG/TAXI light switch OFF
 15. Monitor fuel balance. Transfer as required.
 16. Land as soon as possible.
 17. Go to Thrust Reverser Deployed Landing procedure in this section.

- END -

No

9. Thrust levers As required

- END -

IN FLIGHT

1. Autothrottle (if installed) Disengage
 2. Affected thrust lever IDLE

CAUTION: If condition persists, do not engage Autothrottle.

3. Airspeed 190 KIAS maximum

**Other indications of thrust reverser deployment are present
(buffeting or excessive pitch, roll or yaw):****Yes**

4. ENGINE RUN switch (deployed engine) OFF
 5. Rudder Trim As required
 6. Affected BLEED switch OFF
 7. XBLEED switch Open
 8. Affected ENG ANTI-ICE switch OFF
 9. Monitor fuel balance. Transfer as required.
 10. Land as soon as possible.
 11. Go to Thrust Reverser Deployed Landing procedure in this section.

- END -

No

4. Thrust levers As required

- END -



POWERPLANT

Thrust Reverser Deployed Landing

WARNING: Go-around may not be possible with a deployed thrust reverser.

NOTE: Landing on a wide runway of sufficient length with minimum turbulence and crosswind is recommended.

Descent Checks:

1. Pressurization LNDG ALT set
2. WING ANTI-ICE switch As required
3. L and R ENG ANTI-ICE switches As required
4. Transponder TA Only

Transition Level (or FL 180) Checks:

5. Altimeters Set
6. L and R LANDING light switches On
7. Passenger Brief/Cabin Check Complete
8. SMKG/BELTS switch SMKG/BELTS
9. Fuel quantities and balance Check

Approach Checks:

10. APU and Bleeds Set
11. Final approach speed V_{REF}
12. Normal actual landing distance Multiply by:
1.15 without thrust reversers
1.10 with thrust reversers
13. ROAAS (if installed) As required

NOTE: – For aircraft with ROAAS installed, ROAAS should be selected OFF when landing on an RCC 6 runway with a length shorter than the increased actual landing distance plus 2,000 ft (600 m).

- ROAAS should be selected OFF when landing on a runway with RCC less than 6.

14. Approach setup and crew briefing Complete
15. RA MIN or BARO MIN Set
16. MIN ALERT Set
17. L and R HYDRAULIC PUMP switches AUTO

POWERPLANT**Thrust Reverser Deployed Landing (Cont)****Before Landing Checks:**

18. LANDING GEAR switch DN
 19. N LDG/TAXI light switch On
 20. FLAPS 30

NOTE: After landing, use of the operative thrust reverser is allowable.

————— **END** —————

Dual Engine Flameout

1. Crew oxygen masks (if above 14,000 ft) Don
 2. Pilot and Copilot O2 MASK/NORM switches O2 MASK
 3. Airspeed Establish 185 KIAS

Relight feasible:

Yes

4. Maintain 185 KIAS to ensure continued N2 rotation.

CAUTION: Failure to observe the minimum airspeed of 185 KIAS may result in engine core lock and the inability to restart engines in a timely manner.

5. Thrust levers IDLE
 6. ENGINE RUN switches OFF
 7. Pilot and Copilot INPH switches INPH

No

4. Establish best glide speed.

AIRPLANE WEIGHT	BEST GLIDE SPEED
28,000 lb (12,701 kg)	160 KIAS
33,000 lb (14,969 kg)	174 KIAS
40,000 lb (18,144 kg)	185 KIAS

NOTE: – Glide speed interpolation between weights is acceptable.
 – Target glide speed provides a range of approximately 2.5 NM for each 1000 feet altitude.

5. Thrust levers IDLE
 6. ENGINE RUN switches OFF
 7. Pilot and Copilot INPH switches INPH

**POWERPLANT****Dual Engine Flameout (Cont)**

8. Refer to Ditching or Forced Landing – Both Engines Inoperative procedure, this section.

– END –

Aircraft is above 20,000 ft:

Yes

8. Descend to below 30,000 ft.
9. APU switch START and release
10. L and R BLEED switches OFF
11. APU BLEED switch (above 20,000 ft) OFF
12. Airspeed Increase to 250 KIAS or greater
13. FUEL panel XFER switch Closed
14. FUEL panel L and R PUMP switches AUTO
15. ENG ANTI-ICE switches Off
16. ENGINE RUN switch RUN

Light off occurs within 45 seconds:

Yes

17. Other engine Start
18. If only one engine is operating, refer to Engine Shutdown In Flight procedure in the NON-NORMAL PROCEDURES chapter.

– END –

No

17. ENGINE RUN switches OFF
18. Attempt another windmill relight at a lower altitude or higher airspeed, or re-establish 185 KIAS to ensure continued N2 rotation and descend below 20,000 ft for starter assisted airstart.

CAUTION: Failure to observe the minimum airspeed of 185 KIAS may result in engine core lock and the inability to restart engines in a timely manner.

No

Aircraft is below 20,000 ft:

8. APU switch START and release
9. L and R BLEED switches OFF
10. APU BLEED switch ON
11. XBLEED switch OPEN

POWERPLANT**Dual Engine Flameout (Cont)**

- 12. FUEL panel XFER switch Closed
- 13. FUEL panel L and R PUMP switches AUTO
- 14. ENG ANTI-ICE switches Off
- 15. ENGINE RUN switch RUN
- 16. STARTER switch START

Light off occurs within 45 seconds:

- Yes**
- 17. Other engine Start
 - 18. If only one engine is operating, refer to Engine Shutdown In Flight procedure in the NON-NORMAL PROCEDURES chapter.

– END –

- No**
- 17. ENGINE RUN switches OFF
 - 18. Attempt another starter assisted airstart at a lower altitude or higher airspeed, or establish best glide speed and refer to Ditching or Forced Landing – Both Engines Inoperative procedure, this section.

END**Engine Failure****DURING TAKEOFF****Below V_1 Speed:**

- 1. Autothrottle (if installed) Disengage
- 2. Thrust levers IDLE
- 3. Brakes Maximum or as required
- 4. Thrust reversers MAX REV or as required

– END –**Above V_1 Speed:**

- 1. Rotate at V_R .
 - 2. Pitch attitude Adjust as required to achieve V_2 .
- NOTE:** Initially rotate toward the flight director pitch guidance command. Adjust pitch as required to maintain V_2 .
- 3. **LANDING GEAR switch** **UP** after positive rate of climb.



POWERPLANT

Engine Failure (Cont)

4. Autothrottle (if installed) Disengage
5. Climb at V_2 until clear of obstacles, accelerate to $V_2 + 15$ (Flaps 10) [$V_2 + 25$ (Flaps 20)].

NOTE: If engine failure occurs above V_2 , maintain airspeed at current value (not more than $V_2 + 10$ KIAS).

WARNING: It is prohibited to engage the Autothrottle until flaps are retracted and the aircraft has accelerated to en route climb speed.

6. Flaps Retract to 0
7. Climb At en route climb speed
8. N LDG/TAXI light switch OFF
9. ANTI/ICE panel As required
10. Refer to Engine Shutdown In Flight procedure in the NON-NORMAL PROCEDURES chapter.

– END –

IN FLIGHT

1. Autopilot Disconnect
2. Autothrottle (if installed) Disengage
3. Thrust lever (operative engine) Increase as required
4. Rudder Trim As required
5. Refer to the following procedures in the NON-NORMAL PROCEDURES chapter as applicable:
 - a. Engine Shutdown In Flight
 - b. Single Engine Landing
 - c. Single Engine Go-Around.

————— END —————

POWERPLANT

Engine Failure in Climb During (V) ALTS CAP or (V) ALTV CAP

WARNING: If an engine failure occurs during a climb while in any (V) ALTS CAP or (V) ALTV CAP vertical FD mode, crew intervention may be required to ensure that the aircraft maintains the safe single engine operating speed.

- 1. Autopilot/FD Disconnect
- 2. Autothrottle (if installed) Disengage
- 3. Thrust levers APR
- 4. Pitch attitude Adjust
to maintain the required single engine operating airspeed.

NOTE: Vertical FD commands may be used and autopilot re-engaged after FCC mode changes to (V) ALTS or (V) ALTV at desired altitude.

- 5. Engine Shutdown In Flight..... Accomplish
- 6. Refer to Engine Shutdown In Flight procedure in the NON-NORMAL PROCEDURES chapter.

————— **END** —————

**REJECTED TAKEOFF****Rejected Takeoff**

- | | |
|--------------------------------------|------------------------|
| 1. Autothrottle (if installed) | Disengage |
| 2. Thrust levers | IDLE |
| 3. Brakes | Maximum or as required |
| 4. Thrust reversers | MAX REV or as required |

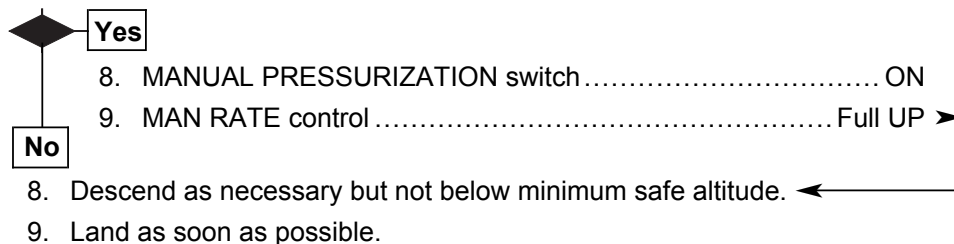
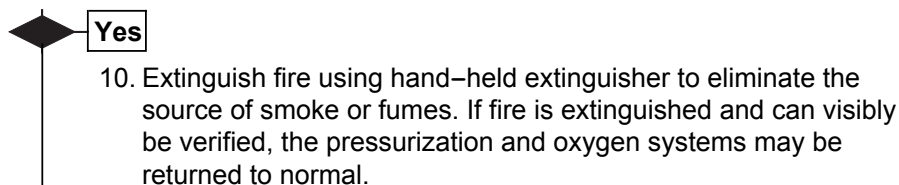
————— **END** —————

SMOKE OR FIRE**Cabin/Cockpit Fire, Smoke or Fumes**

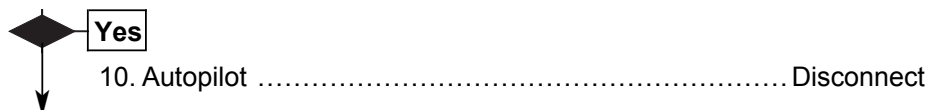
WARNING: In the event of smoke or fire, prepare to land without delay while completing fire suppression and/or smoke evacuation procedures. Whether or not smoke has dissipated, if it can not be visibly verified that the fire has been extinguished following fire suppression and/or smoke evacuation procedures, land immediately at the nearest suitable airport.

- | | |
|--|-----------------------|
| 1. Crew oxygen masks | Don, select EMERGENCY |
| 2. Smoke goggles | Don |
| 3. Pilot and copilot O2 MASK/NORM switches | O2 MASK |
4. Pilot and copilot INPH switches INPH
 5. PAX OXYGEN switch OFF
 6. OXYGEN THERAPEUTIC switch Off
 7. EMER DEPRESS switch ON

NOTE: During EMER DEPRESS operation in manual mode, the cabin rate digital value may be replaced with magenta dashes momentarily. The cabin rate will still be controlled within safe limits.

Cabin pressure remains unchanged:**Source is Known:**

– END –

Source is not known:**Electrical system is suspected source:**

**SMOKE OR FIRE****Cabin/Cockpit Fire, Smoke or Fumes (Cont)**

11. Autothrottle (if installed) Disengage

12. EMER LTS switch OFF

L GEN is operative:**Yes**

13. APU GEN switch OFF

**No**

13. APU GEN switch ON

14. R GEN switch OFF

15. R BATT switch OFF

16. BUS TIE switch Open

Smoke or fumes dissipate:**Yes**

17. AIR SOURCE switch PACK ONLY

18. WING SOURCE ANTI-ICE switch FROM L

19. R BLEED switch OFF

20. TUNE REVERSION switch CDU ONLY

21. Transponder Select ATC1

22. Flight Guidance Panel XFR switch Select FD1

23. Airspeed 0.75 M_I/250 KIAS
maximum24. Altitude 25,000 ft
maximum

25. Leave icing conditions as soon as possible.

26. STALL PUSHER OFF

NOTE: Standby probes will not be anti-iced.**NOTE:** The applicable procedures for the following CAS messages are consolidated within this procedure and do not need to be conducted separately:

OUTBD BRAKES FAIL (C), STALL PROTECT FAIL (C), R WING ANTI-ICE FAIL (C), R PITOT HEAT FAIL (C), STBY PITOT HEAT FAIL (C), R ESS BUS OFF (A), R MAIN BUS OFF (A), L (R) AUX BUS OFF (A)

Descent Checks:

27. Pressurization LNDG ALT set

28. WING ANTI-ICE switch As required

29. L and R ENG ANTI-ICE switches As required

SMOKE OR FIRE**Cabin/Cockpit Fire, Smoke or Fumes (Cont)****Transition Level (or FL 180) Checks:**

- 30. Altimeters Set
- 31. L and R LANDING light switches On
- 32. Passenger Brief/Cabin Check Complete
- 33. SMKG/BELTS switch SMKG/BELTS
- 34. Fuel quantities and balance Check

Approach Checks:

- 35. Final approach speed $V_{REF} + 10$
- 36. Normal actual landing distance Multiply by 1.95

NOTE: Extend gear as soon as possible during approach (to ensure cool brakes).

WARNING: Maximum brake energy may be exceeded for a landing weight above MLW or when landing at an airport pressure altitude of 4000 ft and above.

CAUTION: Reducing weight below MLW or landing at an alternate airport shall only be attempted at pilot discretion and only if this can be achieved in a safe manner and within a reasonable time period.

- 37. ROAAS (if installed) OFF
- 38. Approach setup and crew briefing Complete
- 39. RA MIN or BARO MIN Set
- 40. MIN ALERT Set

Before Landing Checks:

- 41. LANDING GEAR switch DN
- 42. N LDG/TAXI switch On
- 43. R HYDRAULIC PUMP switch ON
- 44. FLAPS 30
- 45. EMER LIGHTS switch ON

– END –

No

Smoke or fumes DO NOT dissipate:

- 17. R BATT switch ON

R GEN is operative:

Yes

- 18. R GEN switch ON

Transition to the standby instrument and magnetic compass until the AHRS realigns.

**SMOKE OR FIRE****Cabin/Cockpit Fire, Smoke or Fumes (Cont)**

- NOTE:** L and R WSHLD/WINDOW switches must be temporarily selected OFF while the standby compass is being read.
- No** 19. APU GEN switch OFF
18. APU GEN switch ON
Transition to the standby instrument and magnetic compass until the AHRS realigns.
- NOTE:** L and R WSHLD/WINDOW switches must be temporarily selected OFF while the standby compass is being read.
19. L GEN switch OFF
20. L BATT switch OFF
21. Airspeed 0.75 M_I/250 KIAS maximum
22. STAB TRIM switch SEC
23. AIR SOURCE switch TRIM AIR ONLY
24. L BLEED switch OFF
25. XBLEED switch Closed
26. Leaving icing conditions as soon as possible.
27. WING SOURCE ANTI-ICE switch FROM R
28. Airspeed 185 KIAS/0.75 M_I maximum
29. TUNE REVERSION switch MFD ONLY
30. Transponder Select ATC2
31. Altitude 25,000 ft maximum
32. Avoid excessive rudder inputs.
- Descent Checks:**
33. Pressurization LNDG ALT set
34. WING ANTI-ICE switch As required
35. L and R ENG ANTI-ICE switches As required
- Transition Level (or FL 180) Checks:**
36. Altimeters Set
37. L and R LANDING light switches On
38. Passenger Brief/Cabin Check Complete
39. Fuel quantities and balance Check
- Approach Checks:**
40. Final approach speed V_{REF} + 10
41. Normal actual landing distance Multiply by 1.95

SMOKE OR FIRE**Cabin/Cockpit Fire, Smoke or Fumes (Cont)**

NOTE: Extend gear as soon as possible during approach (to ensure cool brakes).

WARNING: Maximum brake energy may be exceeded for a landing weight above MLW or when landing at an airport pressure altitude of 4000 ft and above.

CAUTION: Reducing weight below MLW or landing at an alternate airport shall only be attempted at pilot discretion and only if this can be achieved in a safe manner and within a reasonable time period.

42. Approach setup and crew briefing Complete

43. RA MIN or BARO MIN Set

44. MIN ALERT Set

NOTE: The applicable procedures for the following CAS messages are consolidated within this procedure and do not need to be conducted separately:

STALL PROTECT FAIL (C), L WING ANTI-ICE FAIL (C),
INBD BRAKES FAIL (C), L PITOT HEAT FAIL (C), L ESS
BUS OFF (A), L MAIN BUS OFF (A), L (R) AUX BUS OFF
(A)

Before Landing Checks:

45. LANDING GEAR switch DN

46. N LDG/TAXI light switch On

47. L HYDRAULIC PUMP switch ON

48. FLAPS 30

49. EMER LIGHTS switch ON

– END –

No

Bleed air system is suspected source:

APU supplies bleed air:

Yes

10. XBLEED switch Closed

11. L BLEED switch ON

12. APU BLEED switch OFF

13. R BLEED switch ON

**SMOKE OR FIRE****Cabin/Cockpit Fire, Smoke or Fumes (Cont)**

Smoke or fumes are eliminated:



Yes

– END –

No

14. AIR SOURCE switch TRIM AIR ONLY

Smoke or fumes are eliminated:



Yes

– END –

No

15. AIR SOURCE switch PACK ONLY

– END –

No

If engines supply bleed air:

10. R BLEED switch OFF

11. XBLEED switch Closed

Smoke or fumes are eliminated:



Yes

– END –

No

12. R BLEED switch ON

13. L BLEED switch OFF

Smoke or fumes are eliminated:



Yes

– END –

No

14. AIR SOURCE switch TRIM AIR ONLY

Smoke or fumes are eliminated:



Yes

– END –

No

15. AIR SOURCE switch PACK ONLY

16. L BLEED switch ON

————— **END** —————

SMOKE OR FIRE**CARGO SMOKE (W)**

WARNING: In the event of smoke or fire, prepare to land without delay while completing fire suppression and/or smoke evacuation procedures. Whether or not smoke has dissipated, if it cannot be visibly verified that the fire has been extinguished following fire suppression and/or smoke evacuation procedures, land immediately at the nearest suitable airport.

1. Crew oxygen masks Don, select EMERGENCY
2. Smoke goggles Don
3. Pilot and copilot O2 MASK/NORM switches O2 MASK
4. Pilot and copilot INPH switches INPH (enabled)
5. PAX OXYGEN switch OFF
6. OXYGEN THERAPEUTIC switch Off
7. CABIN DC and AC PWR OFF
8. EMER DEPRESS switch ON
9. Descend as necessary but not below minimum safe altitude.
10. ROAAS (if installed) OFF
11. Land as soon as possible.

Designated Crewmember:

12. Protective breathing equipment Don
13. Fire extinguishing Prepare for use
14. If conditions allow, close lavatory door to control smoke migration.
15. Fire or smoke source Extinguish

————— **END** —————

TAKEOFF CONFIGURATION WARNINGS**Configuration Warning****“CONFIGURATION”****CONFIG AILERON TRIM (W)****CONFIG AUTOPILOT (W)****CONFIG FLAPS (W)****CONFIG RUDDER TRIM (W)****CONFIG SPOILERS (W)****CONFIG STAB TRIM (W)****PARK/EMER BRAKE ON (W)**

1. Autothrottle (if installed) Disengage
2. Thrust levers IDLE
3. Brakes Maximum or as required
4. Thrust reversers MAX REV or as required
5. After stopping, takeoff configuration Check
6. For CONFIG STAB TRIM (W) perform the following:

WARNING: If any anomalies occur during the stab trim check below, the indicated stabilizer position may be grossly incorrect. Do not fly the aircraft until resolved.

- (a) Stab Trim Set to 1.0

NOTE: Monitor STAB indicated position from 1.0 to 3.0 units. Trim digits and pointer should move continuously with no skips, hesitations or reversals.

- (b) Stab Trim Set to 3.0

- (c) Stab Trim Set for takeoff

————— **END** —————

TAKEOFF CONFIGURATION WARNINGS**PITCH DISCONNECT (W)**

1. Thrust levers IDLE
2. Brakes Maximum or as required
3. Thrust reversers MAX REV or as required
4. After stopping, align control columns.
5. PULL & TURN the PITCH DISC handle to release, and push to full stow position.
6. Verify PITCH DISCONNECT (W) CAS extinguishes. Slight movement of the control columns may be required to reconnect the controls.

————— **END** —————

ROLL DISCONNECT (W)

1. Thrust levers IDLE
2. Brakes Maximum or as required
3. Thrust reversers MAX REV or as required
4. After stopping, align control wheels.
5. Release the small locking lever and push the ROLL DISC lever forward.
6. Verify ROLL DISCONNECT (W) CAS extinguishes. Slight movement of the control wheels may be required to reconnect the controls.

————— **END** —————



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GENERAL

The procedures in this section of the manual have been developed by Bombardier Inc. for the certification of this aircraft. This section contains those procedures which may be considered routine in day-to-day operations. The presentation includes, but is not limited to, detailed checklist procedures by flight phase.

FIRST FLIGHT OF THE DAY

The "  " symbol in the procedure means that the associated procedure is accomplished only on the first flight of the day.

THROUGH-FLIGHT PROCEDURES (BOTH ENGINES SHUT DOWN)

Normal preflight procedures (all checklist line items) must be accomplished prior to takeoff at the original departure point of a flight. At each intermediate stop of flight where both engines are shut down, the Through-Flight Checklist may be used for preflight, provided certain criteria are met. In the following procedures (Exterior Preflight, Cabin Preflight, and Before Starting Engines), steps marked with this symbol (♦) denote Through-Flight Checklist items. When permitted, accomplishment of all Through-Flight Checklist items fulfills a minimum preflight requirement.

The Through-Flight Checklist may be used following an intermediate stop with both engines shut down, provided the following criteria have been satisfied during that stop:

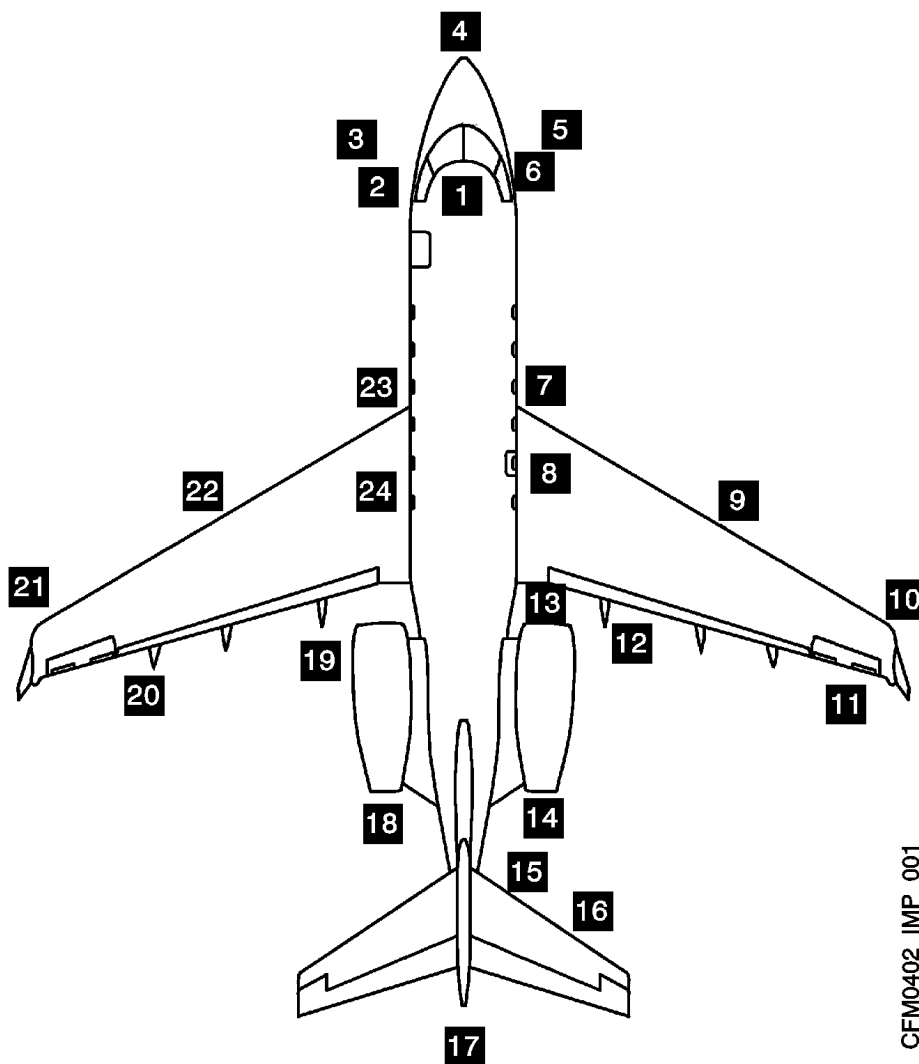
- There has been no change in flight crew personnel.
- No maintenance has been performed on the aircraft. Routine line servicing is not considered maintenance.
- No more than three (3) hours have elapsed between engine shutdown and engine start.
- Extreme weather conditions (heavy precipitation, ice, snow, extreme cold, etc.) have not occurred which would change the preflight status of the aircraft.

For intermediate stops with no engine shut down, completion of the Quick Turn-Around procedure in this section provides the minimum preflight requirements.



EXTERIOR PREFLIGHT

Walk-Around Inspection



CFM0402_IMP_001

EXTERIOR PREFLIGHT (CONT)**EXTERIOR SAFETY CHECK/WALKAROUND**

1. Exterior Safety Check/Walkaround Accomplish

- ◆ During Exterior Preflight, check all vents clear, check access doors for security, and all aircraft surfaces for condition.

- 1** ◆ a. LANDING GEAR switch DN

- ◆ b. L, R, and AUX HYDRAULIC PUMP switches OFF

- c. R BATT switch On

NOTE: R BATT switch is selected first to prevent uncommanded APU starts.

- d. L BATT switch On

- e. Clock Check

Set to correct local time.

- f. Fuel quantities Check

- g. Oxygen quantity Check

- h. PARK/EMER BRAKE:

If PARK/EMER BRAKE not set:

- (1) L and R HYDRAULIC PUMP switches ON

Check hydraulic systems fully pressurized.

- (2) Brake pedals Depress fully

- (3) PARK/EMER BRAKE handle Set

- (4) Brake pedals Release

- (5) L and R HYDRAULIC PUMP switches OFF

If PARK/EMER BRAKE set:

- (1) L HYDRAULIC PUMP switch ON

Check left hydraulic system fully pressurized.

- (2) L HYDRAULIC PUMP switch OFF

- i. If night flight is anticipated, check exterior lighting.

- All exterior light switches On

Check proper illumination, then all

- exterior light switches Off

- j. L and R BATT switches OFF

- k. GUST LOCK OFF

- 2** a. Passenger door operating switch door Closed

- b. Left standby static port Clear of obstructions

**EXTERIOR PREFLIGHT (CONT)**

- c. Left stall warning vane Freedom of movement
- d. Left pitot-static probe Cover removed, clear of obstructions
- e. Standby pitot probe Cover removed, clear of obstructions
- f. Left ice detector Check
- g. Ground communication door Closed
- h. L windshield/window Condition
- 3** ♦ a. Nose gear check:
 - (1) Wheel well and gear Condition
 - (2) Doors Condition
 - (3) Wheels and tires Condition
 - (4) Gear pin and chocks Removed
 - (5) N LDG/TAXI lights Condition
- 4** a. Radome Condition
- b. Windshields/windows Condition
- 5** a. Right ice detector Check
- b. Right pitot-static probe Cover removed, clear of obstructions
- 6** a. R windshield/window Condition
- b. R stall warning vane Freedom of movement
- c. Total air temperature probe Check
- d. Right standby static port Clear of obstructions
- 7** ♦ a. Outflow valve access door Closed
- b. L and R engine oil level Check, green
- c. Fuel access doors Closed
- 8** a. Wing inspection and emergency exit lights and lenses Condition
- ♦ b. Emergency exit Closed
- ♦ c. Right engine inlet and fan Clear of obstructions and condition
- d. Upper fuselage antennas, and dorsal inlets Condition
- e. Lower fuselage antennas, landing light fairing and lens Condition
- 1** f. Fuel water drains Drain

EXTERIOR PREFLIGHT (CONT)

NOTE: The fuel sump drains are low points in the fuel system. Fuel will drain from these when opened.

- ♦ g. Fuel and hydraulic drain masts Check for leakage
- 9** a. Right wing check:
 - (1) Leading edge and vortilons Condition
 - (2) Access panels Fuel/Hydraulic leakage
 - (3) Fuel cap Secure
- CAUTION:** The wing and flight control surfaces must be free of frost, snow, and ice. Ice can form on the surfaces of the wing even on very warm days if the fuel temperature will support it. The leading edge and lower surface of the flaps must be free of ice.
- 10** a. Right winglet navigation light/lens and static wicks Condition
- 11** a. Right aileron Check free motion, balance tab linkage, bent tab and brush seal condition
- b. Right spoilers and flap Condition
- c. NACA scoop Clear of obstructions
- 12** ♦ a. Right main gear check:
 - (1) Wheel well and gear Hydraulic/fuel leakage and condition
 - (2) Doors Condition
 - (3) Wheels, brakes and brake wear indicators, and tires Condition
- NOTE:** The wear pins should be exposed with the PARKING BRAKE set.
- (4) Gear pin and chocks Removed
- 13** a. Oxygen overpressure relief indicator and service door Check and close
- b. Lav waste access door Closed
- c. Ground power supply access door Closed
- 14** ♦ a. Right generator scoop Clear
- b. Right engine cowl latches Closed
- c. Right engine turbine exhaust area Condition, clear of obstructions

**EXTERIOR PREFLIGHT (CONT)**

- d. Right thrust reverser Stowed
- 15** a. High pressure pneumatic supply door Closed
- 16** a. APU inlet Clear of obstructions
- b. APU generator and compartment scoops .. Clear of obstructions
- c. APU exhaust Clear of obstructions
- d. Vertical stabilizer and rudder Condition
- e. Horizontal stabilizer and elevator Condition
- WARNING:** The vertical and horizontal stabilizer, and flight control surfaces must be free of frost, snow, and ice.
- f. Static discharge wicks Condition
- g. PACK exhaust vent Clear
- 17** a. Aft equipment bay door Open,
check for fluid leaks, security and condition of installed
equipment, remote circuit breakers set.
- b. Aft equipment bay door Close
- 18** ♦ a. Left engine turbine exhaust area Condition,
clear of obstructions
- b. Left thrust reverser Stowed
- 19** ♦ a. Cargo door Closed
- ♦ b. Battery bay door Closed
- c. Battery vents Check
- d. Left engine cowl latches Closed
- e. Left main gear check:
 - (1) Wheel well and gear Hydraulic/fuel
leakage and condition
 - (2) Doors Condition
 - (3) Wheels, brakes and brake wear
indicators, and tires Condition
 - NOTE:** The wear pins should be exposed with the PARKING
BRAKE set.
 - (4) Gear pin and chocks Removed
- f. Left generator scoop Clear
- 20** a. Left spoilers and flap Condition
- b. Left aileron Check free motion,
balance, bent tabs and trim tab linkage and brush seal
condition

EXTERIOR PREFLIGHT (CONT)

- c. NACA scoop Clear of obstructions
- 21** a. Left winglet navigation light/lens and static wicks Condition
- 22** a. Left wing check:
 - (1) Leading edge and vortilons Condition
 - (2) Access panels Fuel/hydraulic leakage
 - (3) Fuel cap Secure
- CAUTION:** The wing and flight control surfaces must be free of frost, snow, and ice. Ice can form on the surfaces of the wing even on very warm days if the fuel temperature will support it. The leading edge and lower surface of the flaps must be free of ice.
- 23** **1** a. Fuel water drains Drain
- NOTE:** The fuel sump drains are low points in the fuel system. Fuel will drain from these when opened.
- 24** ♦ a. Left engine inlet and fan Clear of obstructions and condition
- b. Upper fuselage Condition

CABIN PREFLIGHT

- ♦ 1. Cabin furnishings Secure
- ♦ 2. Emergency exit Aisle clear and handle unobstructed.

Remove and stow aft emergency exit door security pin.

BEFORE STARTING ENGINES

NOTE: All flight deck switches will be extinguished, except as noted in the following procedures.

- 1. Circuit breakers (CB1 and CB2) Set
- ♦ 2. Seats, safety harnesses Secure
- 3. Crew oxygen masks and smoke goggles Check
- ♦ 4. LANDING GEAR switch DN
- ♦ 5. L, R, and AUX HYDRAULIC PUMP switches OFF
- ♦ 6. AIR SOURCE switch OFF

**BEFORE STARTING ENGINES (CONT)**

- ♦ 7. Electrical system:
 - a. STBY INST switch On
 - b. EXT PWR switch (if connected) Check AVAIL
then select ON
 - c. R BATT switch On

NOTE: R BATT switch is selected first to prevent uncommanded APU starts.

 - d. L BATT switch On
- ♦ 8. L and R PROBES OFF
- 9. L and R COCKPIT LIGHTS As desired
- ♦ 10. APU Start:
 - a. CAS Check,
no APU or AIR COND FAULT messages
 - b. L and R BLEED switches OFF
 - c. NAV lights NAV
 - d. R FUEL PUMP switch AUTO
 - e. APU switch START,
(hold for 3 seconds) and release
 - f. EXT PWR switch (if applicable) AVAIL and disconnect
 - g. APU BLEED switch ON
 - h. XBLEED switch Open
 - i. AIR SOURCE switch NORM
- 11. SYSTEMS TEST panel:
 - a. ANNUN A Test
 - b. ANNUN B Test
 - c. PROBES Test
 - PROBE HEAT TEST OK (S) CAS illuminates.
 - d. STALL/RUD LIM Test
 - The STALL icon on both PFDs illuminates.
 - Flashing AOA red illuminates briefly.
 - "STALL" voice sounds.
 - Left stick shaker activates.
 - Right stick shaker activates.
 - Pusher activates.
 - RUDDER LIMITER IN TEST (S) illuminates.

BEFORE STARTING ENGINES (CONT)

- e. ICE DET Test
 - ICE DETECTED (C) and **ICE** icon on PFD illuminates.
- 12. L and R rudder pedals Adjust
- 13. L and R audio panels Set
- ♦ 14. Fuel quantity Check
- ♦ 15. Standby Instrument Check
- 16. Clock Zero flight time

Effectivity:

On airplanes 20501 to 20758 incorporating SB 350–34–018 and airplanes 20759 and subsequent incorporating SB 350–34–017:

- 17. STEEP APPR Off
Check ON light out.

- 18. NWS switch OFF
- ♦ 19. L and R FUEL PUMP switches AUTO
- ♦ 20. FMS Program
- 21. REVERSION panel NORM
- 22. AIR COND/BLEED panel Check
 - 1 a. RAM AIR switch ON
 - RAM AIR ON (S) illuminates
 - b. RAM AIR switch OFF
- 23. ANTI-ICE panel:
 - a. WING SOURCE switch NORM
 - b. L and R PROBES switches OFF
 - ♦ c. L and R WSHLD/WINDOW switches ON
- ♦ 24. PRESSURIZATION panel Check
 - a. LNDG ALT Set
- 25. LIGHTING panel As desired
 - 1 a. Emergency lights Check:

**BEFORE STARTING ENGINES (CONT)**

- (1) EMER LTS switch OFF
(EMER LIGHTS OFF (C) CAS)
- (2) EMER LTS switch ON
(EMER LIGHTS ON (C) CAS),
check emergency lights displayed
- ♦ (3) EMER LTS switch ARM
- 26. GUST LOCK OFF
- ♦ 27. HYDRAULIC panel:
 - a. L and R PUMP switches ON
 - b. AUX pump switch AUTO
 - c. PARK/EMER BRAKE handle Confirm set
 - d. L and R PUMP and PTU switches AUTO
 - e. R HYDRAULIC PRESS Verify less than 1800 psi
 - f. AUX pump switch OFF
- 28. Trim system:
 - a. STAB TRIM switch SEC
 - b. Pilot's trim switch NUP and NDN
Verify movement
 - c. Copilot's trim switch NUP and NDN
Verify movement
 - d. STAB TRIM switch PRI
 - e. Pilot's trim switch NUP and NDN
Verify movement
 - f. Pilot's trim switch housing only NUP or NDN
Verify no movement
 - g. Pilot's trim switch arm button only Depress
Verify no movement
 - h. Pilot's trim switch NUP or NDN & hold
Verify movement
 - i. Pilot's master disconnect switch Depress
Verify movement stops
 - j. Pilot's trim switch and master disconnect
switch Release

BEFORE STARTING ENGINES (CONT)

- k. Copilot's trim switch NUP and NDN
Verify movement
 - l. Copilot's trim switch housing only NUP or NDN
Verify no movement
 - m. Copilot's trim switch arm button only Depress
Verify no movement
 - n. Copilot's trim switch NUP or NDN & hold
Verify movement
 - o. Copilot's master disconnect switch Depress
Verify movement stops
 - p. Copilot's trim switch and master disconnect
switch Release
- WARNING:** If any anomalies occur during the stab trim check below, the indicated stabilizer position may be grossly incorrect and the aircraft must not be flown until resolved.
- q. Stab Trim Set to 1.0
- NOTE:** Monitor STAB indicated position from 1.0 to 3.0 units. Trim digits and pointer should move continuously with no skips, hesitations or reversals.
- r. Stab Trim Set to 3.0
 - s. Stab Trim Set for takeoff
 - t. AIL and RUD Trim Check operation and set
for takeoff
- 29. ELT ARM
 - 30. CABIN DC and AC PWR switches On
 - 31. PAX OXYGEN switch AUTO
 - 32. THERAPEUTIC OXYGEN switch ON
(Only required for flights requiring a mission completion altitude
above 10,000 ft following a pressurization failure.)
– Switch ON light illuminates
 - a. THERAPEUTIC OXYGEN switch OFF
- ♦ 33. Altimeters (3) Set

**BEFORE STARTING ENGINES (CONT)****Effectivity:**

On airplanes 20584 and subsequent, and airplanes incorporating SB 350-22-001:

CAUTION: Reduced vertical separation with terrain may be encountered in mountainous terrain if altimeter is incorrectly set and LNV is armed for departure.

- ♦ 34. Avionics Set for departure

NOTE: For any SBAS covered airspace (US RNAV routes, SIDs, and STARs), it is not required to run a pre-flight prediction of RAIM availability along the intended route if no satellites are NOTAM'd as out of service over the intended route.

For non-SBAS covered airspace, certain operations may require that an appropriate prediction program be used prior to departure for RAIM availability along the intended route.

- ♦ 35. Takeoff data (V_1 , V_R , V_2 , and distance) Computed,
and speeds set .

Effectivity:

On airplanes 20578 and subsequent, and airplanes incorporating SB 350-34-013:

36. Takeoff data Check displayed.

Crosscheck input data on PERF INIT 1/3, TAKEOFF REF 1/4
and 2/4 CDU pages:

RWY data, Wind, OAT, QNH, PALT, CG, T/O FLAPS, Weight,
ENG BLEED, THRUST REV.

CAUTION: Ensure input data matches airplane configuration and environmental conditions.

37. CAS messages Check

- NOTE:**
1. The IRS automatically aligns using GNSS position (normal IRS alignment time varies depending on location, typically not exceeding 10 minutes). If GNSS is not available, it will align using the position entered to initialize the FMS.
 2. Following a successful initial alignment, do not manually re-enter the position in the FMS CDU either immediately before, or immediately after airplane motion. If this has occurred, a complete normal shutdown and restart of the airplane and IRSs must be completed. Failure to do so may lead to a total IRU loss during subsequent flight legs.

STARTING ENGINES

Engine starts may be made by using the APU, an external air source, or crossbleed from the other engine.

WARNING: Maintain a safe distance from the engine outlets at all times during engine operation. Airflow into the turbofan engine is sufficient to draw personnel and equipment into the engine inlet.

NOTE: Ensuring ITT is below 350 °C (cranking if necessary) will reduce the possibility of a hot start.

1. Passenger door Closed
 - a. Green flag Check
2. PARK/EMER BRAKE handle Confirm set
3. Thrust levers IDLE
4. STROBE switch BCN
5. Engine Start (APU bleed source)
 - a. ENGINE RUN switch RUN
 - b. STARTER START and release
 - c. Engine Instruments Check
 - d. Start other engine by repeating steps 5 a through c. (Optional)
5. Engine Start (External bleed source)
 - a. External air source Verify connected
 - b. Bleed pressure 32 psi minimum
 - c. ENGINE RUN switch RUN
 - d. STARTER START and release
 - e. Engine Instruments Check
 - f. Start other engine by repeating steps 5 c through f. (Optional)
 - g. External air source Disconnect
 - h. XBLEED switch Closed
 - i. L and R BLEED switches ON
 - j. EXT PWR switch (if applicable) AVAIL, Disconnect
5. Engine Start (Crossbleed source)
 - a. APU BLEED switch OFF
 - b. Operating engine BLEED switch On
 - c. Operating engine thrust lever Advance
 - d. Bleed pressure 32 psi minimum
 - e. ENGINE RUN switch RUN

NOTE: Starting with a tailwind may require a higher bleed pressure than 32 psi.

**STARTING ENGINES (CONT)**

- f. STARTER START and release
- g. Engine Instruments Check normal
- h. XBLEED switch Closed
- i. L and R BLEED switches ON
- j. EXT PWR switch (if applicable) AVAIL, Disconnect
- 6. Generators Check on line

BEFORE TAXI

NOTE: If anti-icing fluids have been applied to the aircraft, the anti-ice system checks in steps 1 and 9 below may be accomplished upon completion of the first flight of the day prior to engine shutdown.

- 1** 1. WING ANTI-ICE switch ON
 - WING ANTI-ICE (S) illuminates.
- 2. FLAPS 10 or 20
- 3. AUX PUMP switch AUTO
- 4. Flight controls:
 - a. Select FLIGHT CONTROLS synoptic page.
 - b. Apply full range of motion to pitch, roll and yaw while checking for elevator, aileron, roll spoilers, and rudder motion.
- 5. FLIGHT SPOILERS lever Check extension
all positions 0–MAX and EMER.
- 6. GND SPOILERS:
 - a. MANUAL ARM Check extended
 - b. AUTO Check stowed
- 7. YD On
- 8. EICAS Check
- 9. Passenger brief/cabin check Complete
- 1** 10. ANTI-ICE panel:
 - a. Wing anti-ice flow lines green after 2 minutes
ON Check
 - b. WING SOURCE switch FROM L
 - WING SOURCE XBLEED (S) illuminates
 - c. WING SOURCE switch FROM R
 - WING SOURCE XBLEED (S) illuminates

BEFORE TAXI (CONT)

NOTE: If L(R) WING A/I LOW TEMP (C) illuminates, it may be necessary to increase the thrust lever slightly.

- d. WING SOURCE switch NORM
- e. WING ANTI-ICE switch As required
- 11. Airplane lighting As required
- 12. SMKG/BELTS switch SMKG/BELTS
- 13. NWS switch On
- 14. PARK/EMER BRAKE Release:
 - a. Brake pedals Depress fully
 - b. PARK/EMER BRAKE handle Stow
 - c. Brake pedals Release

TAXI AND BEFORE TAKEOFF

- 1. XPDR/TCAS Set
- 2. Brakes and nose wheel steering Check

If conditions exist that could result in water saturated brakes, perform 7 consecutive brake applications from 20 kt to 5 kt. Perform the brake applications during the last mile/kilometer of taxi prior to and not including the final stop or snub before takeoff.

DO NOT DRAG THE BRAKES.

Warming of the brakes will preclude the chance of water saturated brakes freezing at altitude and being locked for landing touchdown.

- 3. Flight instruments Check
- 4. Thrust reversers:

CAUTION: Use of reverse thrust on poorly cleaned or maintained runway, taxiway, or ramp surfaces may cause foreign object damage to engine fan blades.

- a. Thrust levers REV
(REV [white] EI, then REV [green] EI)
- b. Thrust levers IDLE
(REV [white] EI, then extinguishes)

- 5. Engine instruments and N_1 bugs Check, verify that the left and right bugs agree within 1%.
- 6. Takeoff data (V_1 , V_R , V_2 , and distance) Check displayed

**TAXI AND BEFORE TAKEOFF (CONT)****Effectivity:**

On airplanes 20578 and subsequent, and airplanes incorporating SB 350-34-013:

7. Takeoff data (V_1 , V_R , V_2 , and distance) Check displayed.

Crosscheck input data on PERF INIT 1/3, TAKEOFF REF 1/4
and 2/4 CDU pages:

RWY data, Wind, OAT, QNH, PALT, CG, T/O FLAPS, Weight,
ENG BLEED, THRUST REV.

CAUTION: Ensure input data matches airplane configuration and
environmental conditions.

8. Nav equipment Check

9. Crew takeoff briefing Complete

10. Radar/terrain As required

WARNING: Do not transmit radar energy if personnel are within 9 feet (3
meters) radially from the nose of the airplane, within 100 feet
(30 meters) of large metallic objects including airplanes, or
during refueling.

11. ANTI-ICE panel:

- a. WING switch As required

- b. L and R ENG switch As required

RUNWAY LINEUP

1. L and R PROBES switches On

2. L and R LANDING, N LDG/TAXI light switches As required

3. STROBE switch STROBE

4. CAS Checked and cleared

TAKEOFF

1. Thrust Levers TO

At V_R :

2. Smoothly rotate toward flight director pitch guidance command. Adjust
pitch as required to accelerate to a speed of not less than $V_2 + 10$ at
35 ft above the runway.

AFTER TAKEOFF

NOTE: If taxi and/or takeoff were on ice, snow, or slush, unless weather conditions or performance requirements prohibit, delay retraction of the landing gear until excess water, snow or slush is thrown off by wheel rotation and/or slipstream force.

1. LANDING GEAR UP after positive rate of climb
2. FLAPS 0 at $V_2 + 15$ (flaps 10); $V_2 + 25$ (flaps 20)
3. N LDG/TAXI light switch OFF
4. ANTI-ICE panel As required
5. L and R HYDRAULIC PUMP switches AUTO

CLIMB

1. Thrust levers CLB

10,000 ft Checks:

2. SMKG/BELTS switch As required
3. APU and BLEEDS Set
4. Pressurization Check

Transition Altitude (or 18,000 ft) Checks:

5. Altimeters Set
6. L and R LANDING light switches As required

CRUISE

1. Fuel balance Check
2. Engine power settings for cruise Confirm
Cruise tables are found in the Flight Planning and Cruise Control Manual.

NOTE: The VOR and FMS bearing pointers may differ by up to 7 degrees when the VOR is being used as a waypoint.

DESCENT

1. WING ANTI-ICE switch As required
2. L and R ENG ANTI-ICE switches As required
3. Pressurization Check/Set



DESCENT (CONT)

Transition Level (or FL 180) Checks:

4. Altimeters Set
5. L and R LANDING light switches As required
6. Passenger Brief/Cabin Check Complete
7. SMKG/BELTS switch SMKG/BELTS
8. Fuel Quantities and Balance Check

APPROACH

NOTE: Intermittent operation at idle when wing anti-ice and/or engine anti-ice is ON is acceptable during final approach provided the following CAS messages are not annunciated: L (R) WING ANTI-ICE FAIL (C) or L (R) WING A/I LOW TEMP (C) and/or L (R) ENG ANTI-ICE FAIL (C).

1. APU and BLEEDS Set
2. Landing data (V_{REF} , V_{GA} , Distance) Set

Effectivity:

On aircraft 20578 and subsequent, and aircraft incorporating SB 350-34-013:

3. Landing data (V_{REF} , V_{GA} , Distance) Check displayed.

Crosscheck input data on APPROACH REF 1/4 and 2/4 CDU pages:

RWY data, Wind, OAT, QNH, PALT, LDG FACTOR (if applicable), Weight, ENG BLEED, THRUST REV, DELTA V_{REF} (if applicable).

CAUTION: Ensure input data matches aircraft configuration and environmental conditions.

4. Approach setup and crew briefing Complete
5. RA MIN or BARO MIN Set
6. MIN ALERT Set
7. ROAAS RCC 5 switch (if installed) As required
8. L and R HYDRAULIC PUMP switches AUTO

BEFORE LANDING

1. LANDING GEAR DN
2. L LANDING, N LDG/TAXI and R LANDING light switches On
3. FLAPS 30

GO-AROUND

CAUTION: If unreliable airspeed is suspected, refer to Chapter 3, EMERGENCY PROCEDURES, AVIONICS, Unreliable Airspeed.

1. Autopilot Disengage with the TO/GA button
2. Thrust levers TO
3. FLIGHT SPOILERS (if extended) RETRACT
4. Pitch attitude Increase rapidly but smoothly to initiate pitch attitude of 8 degrees at a speed of not less than V_{REF} , then adjust pitch attitude to maintain V_{2GA} speed.
5. FLAPS 10
6. LANDING GEAR UP
after positive rate of climb is established.
7. Climb at V_{2GA} or above.

NOTE: The flight director guidance only represents an initial target to rotate toward and does not guarantee that the climb speed will be achieved under all conditions.

8. When clear of obstacles, accelerate to $V_{2GA} + 15$ and retract flaps.
9. Pressurization LNDG ALT set



LANDING

NOTE: Carry out a positive touchdown to ensure initial wheel spin up and breakout of frozen brakes if icing accumulation on the wheels and brakes is suspected.

1. Brakes As required
2. Thrust reversers As desired
 - a. With nose wheel on runway, move both thrust levers to REV, a REV [white] EI will illuminate.
 - b. The thrust reversers are deployed when the REV [green] EI illuminates. Smoothly pull thrust levers to the desired reverse thrust.

WARNING: When landing on snow covered runways, apply reverse thrust with caution as visibility may be impaired.

- c. By 40 KIAS return the thrust levers to REV.

CAUTION: – Do not use reverse thrust on poorly cleaned or poorly maintained surfaces. This may cause foreign object damage to engine fan blades.

- If full reverse thrust is maintained below 40 KIAS, reingestion of exhaust gases in the engine and foreign object damage may occur.

- d. When reverse thrust is no longer required, return thrust levers to IDLE. The REV [green] EI will change to a REV [white] EI. Once the thrust reversers are stowed, the REV [white] EI will extinguish.

AFTER LANDING/CLEARING RUNWAY

1. L and R PROBES OFF

NOTE: If anti-icing fluids have been applied to the airplane, the anti-ice system checks may be accomplished upon completion of the first flight of the day prior to engine shutdown. Refer to the first flight of the day anti-ice system checks in BEFORE TAXI, this chapter.

2. WING ANTI-ICE switch As required
3. L and R ENG ANTI-ICE switches As required
4. Lighting As desired
 - a. STROBE switch BCN
5. FLAPS As desired
6. XPDR/TCAS As required

SHUTDOWN

1. PARK/EMER BRAKE Set:
 - a. Brake pedals Depress fully
 - b. PARK/EMER BRAKE handle Set
 - c. Brake pedals Release
2. Chocks Insert

NOTE: Do not rely on parking brake for overnight or unattended use.

3. NWS switch OFF
4. L and R WSHLD/WINDOW switches OFF
5. EMER LTS switch OFF
6. ENGINE RUN switches OFF
7. XPDR STBY
8. STROBE switch OFF
9. Gear pins Insert
10. HYDRAULIC panel:
 - a. L, R PUMPS and PTU switches OFF
 - b. R HYDRAULIC PRESS Verify less than 1,800
psi
 - c. AUX switch OFF
11. GUST LOCK Set
12. L and R COCKPIT LIGHTS As desired
13. CABIN DC and AC PWR switches OFF
14. APU switch OFF
15. NAV lights OFF
16. STBY INST switch OFF

Effectivity:

For airplanes incorporating SB 350-23-010.

17. ATN log OFF

18. L and R BATT switches OFF



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