CANADAIR CHALLENGER SERVICE CENTER

Procedure No. 3260-01-09

Rev. A

OPERATING GUIDE

For Landing Gear Control Unit

Breakout Box

P/N CCSC3260-01 Mod Status NC

WARNING!

To prevent possible damage to equipment

or injury to personnel,

familiarize yourself with these procedures

and the operation of the Landing Gear System.

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N O T A U T H O R I Z E D

F O R

I N F L I G H T U S E

The CANADAIR LANDING GEAR CONTROL UNIT (LGCU) BREAKOUT BOX (or BOB) p/n CCSC3260-01 provides many features to assist you in fully checking or troubleshooting a Landing Gear system.

The main enhancements that this unit includes are as follows:

1. Separate fuses on all 28VDC input lines to LGCU.

2. Separate fuses on all 28VDC power lines exiting the LGCU and feeding the landing gear proximity switches, protecting the LGCU from failure due to shorted gear harnesses.

3. Substitution of the cockpit landing gear control handle for troubleshooting.

4. Operation of all landing gear with or without the LGCU in circuit.

5. Switch operated simulation of "weight on wheels" when aircraft is jacked with the landing gear fully extended.

6. Active testing of proximity switches in the "weight on wheels", downlock, and uplock circuits.

Additional Support Tooling Required:

1. Digital Multimeter, 3-1/2 digits minimum.

2. "TARGETS", 4 each for the main gear Weight-on-wheels proximity switches if the system will be operated with the aircraft jacked.

3. A/C jacks, jack pads, and tail stand.

Notes:

a. Color Code Chart for Test Jacks

   1. black - grounds
   2. red - power, steady state
   3. white - signals, high when active
   4. blue or gray - signals, low when active

Precautions:

a. Do not connect/disconnect BOB to/from system with power applied.

b. Check aircraft/BOB connections for pushed/bent pins before connecting.

c. DO NOT USE INFLIGHT. This BOB can be dangerous if used by inexperienced personnel during flight.

d. Use caution when aircraft is "weight off wheels". Many systems' safety lockout features are bypassed or deactivated (ie ADG auto deploy, stall warning, hydraulics, utility bus, etc).

e. Assure all landing gear safety pins are removed prior to retracting the landing gear.

f. Assure that landing gear is free of all obstructions and that personnel are kept clear during retraction and extension.

References:

a. Maint. Manual Chap. 32 for operation of the landing gear system.

a. Maint. Manual Chap. 12 for application of aircraft power.

b. Maint. Manual Chap. 6 for panel access locations.

c. Maint. Manual Chap. 7 for aircraft jacking

d. Maint. Manual Chap. 29 for operation of hydraulicd system.

I. NORMAL Procedures:

Except for INITIAL SYSTEM SETUP, the following numbered sections are designed as separate checkout modules which can be performed independently of each other.

1. INITIAL SYSTEM SETUP

The following setup produces normal system operation. With the BOB installed in line, monitoring of all available test points is obtained, with no alteration of system operation.

a. Connection of BOB

1. Ensure that aircraft power is OFF.

2. Connect BOB between connectors P/J2GA, P/J3GA, and P/J6GA at the Landing Gear Control Unit, located in the Avionics Bay under the floor.

b. Initial setup of BOB :

1. WOW Simulator switch NORMAL position

c. Jack aircraft as per Maint. Manual Chapter 7, to proper height for landing gear retraction.

d. Check that all Landing Gear system circuit breakers are engaged.

e. Apply aircraft power as per Maint. Manual Chapter 12.

Note: Aircraft will now be in a "weight off wheels" configuration. Selecting "weight on wheels" position of the WOW SIMULATION switch will bypass the signals of the landing gear proximity switches and apply all six "weight on wheels" signals to the LGCU.

f. The system may now be operated from the cockpit normally, and monitored on the BOB.

2. MAINTENANCE MANUAL FUNCTIONAL/OPERATIONAL TESTS

Landing Gear Control Unit - Check for Zero Output to Selector Valves.

The maintenance manual calls out for All Systems Breakout Box, GSE Ref. No. 24-00-67. This procedure and BOB can also be used as follows:

Maint. Manual Callout	BOB Legend
Remove/install RM LG wheel bin.	Take no action.
Remove/install access panel 113-AL.	Take no action.
Remove jumpers 13 and 14 from connector P1A/P2A points on the breakout box.	Take no action.
Check for no or low voltage on pins 11 and 12 with reference to pin 3 (ground).	Check for no or low voltage on MLG and NLG EXT test jacks with reference to a ground test jack.
Install jumpers 13 and 14 on the breakout box.	Take no action.

The above five (5) items are the only difference.

3. TEST/RIG PROCEDURES - Landing Gear Control Unit Simulation - Retraction.

Note: The following setup produces an ALTERED SYSTEM mode of operation.

a. With aircraft power off, disconnect BOB connectors P2GA, P3GA, and P6GA from LGCU.

b. Install a jumper between the test jack for CB-B298 and the test jack for the NLG uplock prox switch.

c. Install a jumper between the test jack for CB-B230 and the test jack for the leg downlock relay.

d. Install a jumper between the test jack for MLG VALVE RET and the test jack for NLG CIRCUIT RET.

e. Jack aircraft, maintaining clearance for gear retraction.

f. Remove all landing gear safety pins.

g. Apply aircraft power.

h. Apply hydraulic pressure using 3A and 3B pumps.

i. Select gear handle to the "UP" position on the cockpit landing gear control panel, manually releasing the handle hook.

j. Note: The following step will activate aircraft systems to RETRACT all 3 landing gear.

Install one end of a jumper into the MLG VALVE RET test jack (along with jumper previously installed in step 3d). Install the other end of the jumper into the CB-A78 test jack. The main and nose landing gear should immediately begin and complete a full retraction, including opening and closing of the nose doors. Cockpit indications will not function.

k. After the main and nose landing gear have fully completed the retract sequence, remove hydraulic power and release pressure on #3 system.

l. Landing gear retraction complete - remove aircraft power, remove jumpers previously installed in steps 3d and 3j.

m. To continue with extension simulation of LGCU, proceed with step 4d.

4. TEST/RIG PROCEDURES - Landing Gear Control Unit Simulation - Extension.

Note: The following setup produces an ALTERED SYSTEM mode of operation.

a. With aircraft power off, disconnect BOB connectors P2GA, P3GA, and P6GA from LGCU.

b. Install a jumper between the test jack for CB-B298 and the test jack for the NLG uplock prox switch.

c. Install a jumper between the test jack for CB-B230 and the test jack for the leg downlock relay.

d. Install a jumper between the test jack for MLG VALVE EXT and the test jack for NLG CIRCUIT EXT.

e. Apply aircraft power.

f. Apply hydraulic pressure using 3A and 3B pumps.

g. Select gear handle to the "DOWN" position on the cockpit landing gear control panel.

h. Note: The following step will activate aircraft systems to EXTEND all 3 landing gear.

Install one end of a jumper into the MLG VALVE EXT test jack (along with jumper previously installed in step 4d). Install the other end of the jumper into the CB-A78 test jack. The main and nose landing gear should immediately begin and complete a full extension, including opening and closing of the nose doors. Cockpit indications will not function.

i. After the main and nose landing gear have fully completed the extension sequence, remove hydraulic power and release pressure on #3 system.

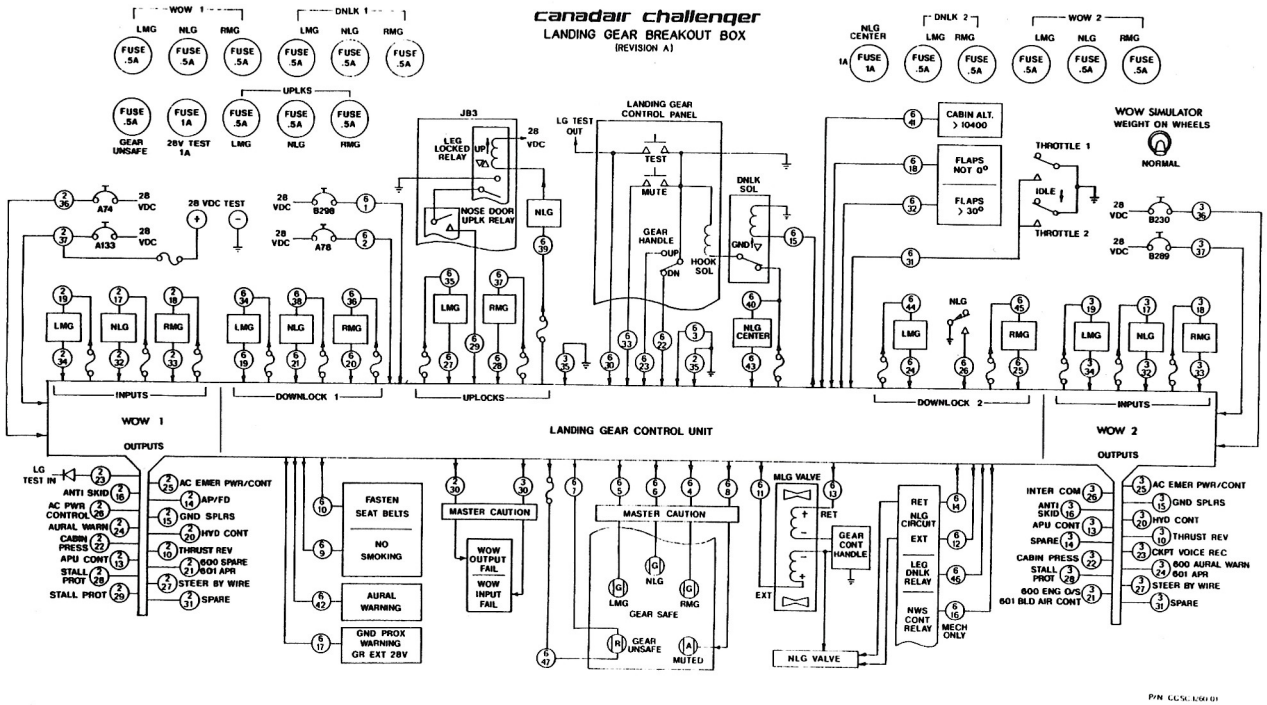
j. Landing gear extension complete - remove aircraft power, remove jumpers previously installed in steps 3d and 3j.

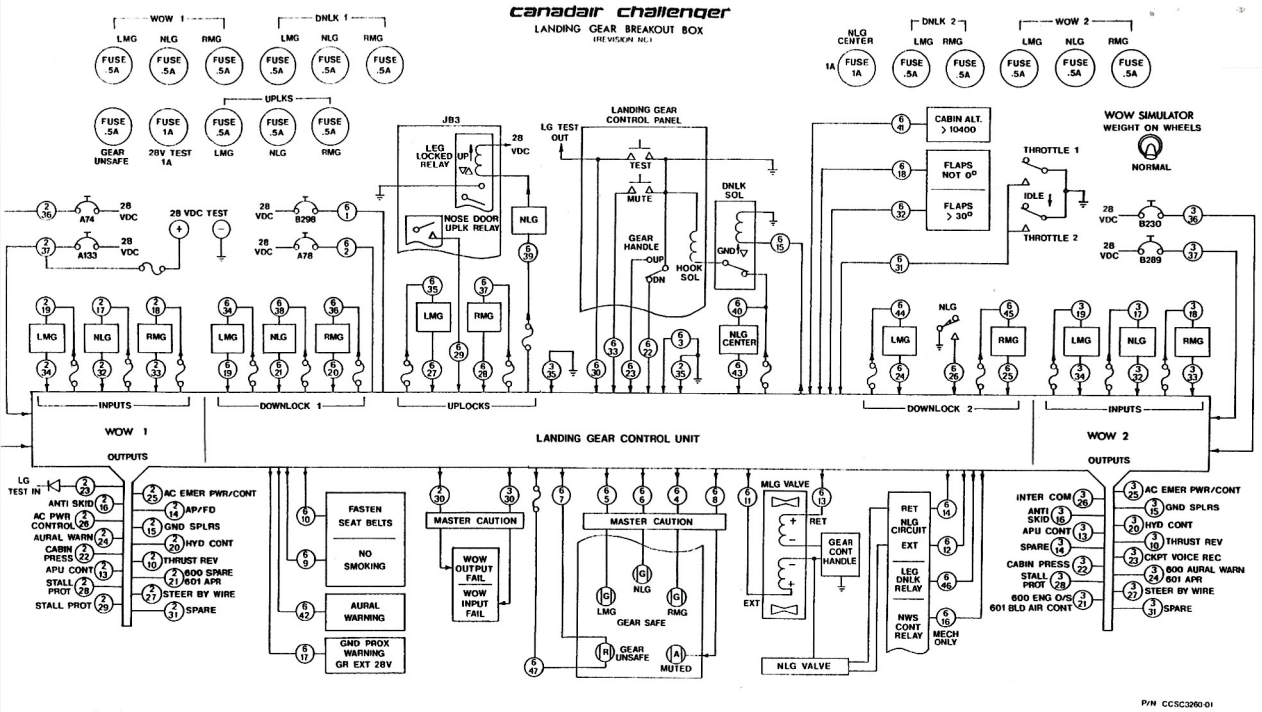
5. PROXIMITY SWITCH TESTING

With BOB installed as in INITIAL SYSTEM SETUP, the following may be checked:

a. Proximity switch testing may be done by monitoring each proximity switch input to LGCU with WOW SIMULATOR switch in the NORMAL position, and installing targets on proximity switches.

b. With system power applied, all red test jacks on BOB should read + 28VDC to ground. If any + 28VDC coming out of the LGCU is missing, the wiring harness asociated with it should be checked for short circuits, and the associated fuse in the BOB ohm checked, before replacing the LGCU. (Note: Most 28VDC supplies from the LGCU are fuse protected in the BOB).


canadair challenger
LANDING GEAR BREAKOUT BOX
(REVISION A)
WOW 1
DNLK 1
UPLKS
LMG
NLG
RMG
FUSE .5A
FUSE 1A
GEAR UNSAFE
28V TEST 1A
NLG CENTER
DNLK 2
WOW 2
JB3
LEG LOCKED UP RELAY
NOSE DOOR UPLK RELAY
28 VDC
LG TEST OUT
LANDING GEAR CONTROL PANEL
TEST
MUTE
GEAR HANDLE
UP
DN
HOOK SOL
DNLK SOL
GND
CABIN ALT. > 10400
FLAPS NOT 0°
FLAPS > 30°
THROTTLE 1
IDLE
THROTTLE 2
WOW SIMULATOR
WEIGHT ON WHEELS
NORMAL
A74
A133
B298
A78
B230
B289
28 VDC TEST
INPUTS
DOWNLOCK 1
UPLOCKS
DOWNLOCK 2
LANDING GEAR CONTROL UNIT
WOW 1
WOW 2
OUTPUTS
LG TEST IN
ANTI SKID
AC PWR CONTROL
AURAL WARN
CABIN PRESS
APU CONT
STALL PROT
AC EMER PWR/CONT
AP/FD
GND SPLRS
HYD CONT
THRUST REV
600 SPARE
601 APR
STEER BY WIRE
SPARE
FASTEN SEAT BELTS
NO SMOKING
AURAL WARNING
GND PROX WARNING
GR EXT 28V
MASTER CAUTION
WOW OUTPUT FAIL
WOW INPUT FAIL
GEAR SAFE
GEAR UNSAFE
MUTED
MLG VALVE
RET
EXT
GEAR CONT HANDLE
NLG CIRCUIT
LEG DNLK RELAY
NWS CONT RELAY
MECH ONLY
INTER COM
600 ENG O/S
601 BLD AIR CONT
P/N 6056L66-01



P/N CCSC3260-01

Landing Gear Troubleshooting Procedure

1. For use with landing gear control unit breakout box (BOB) P/N CCSC3260-01.

2. Precautions:

   a. Do not connect/disconnect BOB to/from system with aircraft power applied.

   b. Check aircraft/BOB connections for pushed/bent pins before connecting.

   c. Do not apply 28 Vdc or ground to any test point when landing gear control unit (LGCU) is connected. Damage to LGCU may result.

   d. Reference Maintenance Manual Chapter 7 for aircraft jacking procedures.

   e. Reference Maintenance Manual Chapter 12 for application of aircraft power.

   f. Reference Maintenance Manual Chapter 29 for application of hydraulic power.

WARNING - with aircraft jacked, some systems are affected by a weight-off-wheels configuration (i.e. ADG auto deploy, stall warning, hydraulics, utility buss load shedding, ADS heater's fail-on, etc.)

3. Normal use - System monitoring

   a. Connect BOB to system at LGCU connectors P/J2GA, P/J3GA and P/J6GA.

   b. Jack aircraft.

   c. Apply aircraft power with all landing gear circuit breakers engaged.

   d. System monitoring may now be done.

   e. Weight-on-wheels may be simulated by placing "WOW Simulator" switch in "weight on wheels" position. This substitutes the prox. switch (WOW) signals.

4. Landing Gear Control Unit Simulation - Retract

   a. With power off, disconnect LGCU.

   b. Install jumper between CB-B298 Jack and NLG uplock prox. switch red jack on BOB.

   c. Install jumper between CB-B230 jack and leg downlock relay red jack on BOB

d. Install jumper between MLG Ret white jack and NLG Ret white jack on BOB.

e. With aircraft jacked, apply power.

f. Apply hydraulic power using 3A or 3B pump.

g. Select gear handle "UP" on landing gear control panel by manually releasing handle hook.

h. Install jumper from CB-A78 to MLG ret jack on BOB. Main and nose gear should now go through normal "retract" sequencing, including nose gear doors opening and closing. (Note: cockpit indications will not function correctly).

i. When MLG and NLG retract sequence has been completed, remove hydraulic power.

j. Remove aircraft power.

k. Disconnect all jumpers installed above - gear cycle complete.

l. Reconnect LGCU.

5. Landing Gear Control Unit Simulation - Extend

a. Same as step 4a.

b. Same as step 4b.

c. Same as step 4c.

d. Install jumper between MLG ext. white jack and NLG ext. white jack on BOB.

e. With aircraft jacked, apply power.

f. Apply hydrualic power using 3A or 3B pump.

g. Select gear handle "DOWN" on landing gear control panel.

h. Install jumper from CB-A78 to MLG ext. jack on BOB. Main and nose gear should now go through normal "EXTEND" sequencing, including nose gear doors opening and closing. (Note: cockpit indications will not function correctly).

i. When MLG and NLG extend sequence has been completed, remove hydraulic power.

j. Remove aircraft power.

k. Disconnect all jumpers installed above - gear cycle complete.

l. Reconnect LGCU.

6. Landing Gear System Troubleshooting

a. With step 3a through 3e completed, the following may be checked:

b. Proximity switch testing may be done by monitoring each prox. switch input to LGCU with "WOW SIMULATOR" switch in "NORMAL" position, and installing targets on prox. switches.

c. With system power applied, all red jacks on BOB should read ± 28vdc to ground. If any + 28vdc is missing coming from the LGCU, the wiring harness associated with it should be checked for short circuits before replacing the LGCU. (Note: most 28vdc supplies from the LGCU are fuse protected in the BOB).