

DOWTY

SERVICE BULLETIN

This Service Bulletin complies
with British Civil Airworthiness
Requirements, Sect. 6, Chap. A6-2

Signed *L. Kendall.*

CAA Approval No. DAI/1501/39

SERVICE BULLETIN No. 6647-32-3

LANDING GEAR - EXTENSION AND RETRACTION - CONTROL AND INTERFACE

INTRODUCTION OF LGCIU Pt. No. 664700500A4A

1. Planning Information

A. Effectivity

Airbus Industrie A320, all models.

Landing Gear Control and Interface Unit (LGCIU), part numbers :-

664700400C3C, all Serial Numbers.

664700400C3D, all Serial Numbers.

B. Reason

- (1) The presence of a ripple voltage on the incoming 28V d.c. supply can cause the LGCIU internal 5V d.c. supply to exceed its tolerance limits. This, in turn, can lead to the creation of corrupted data within the microprocessor, resulting in a microprocessor failure.
- (2) The occurrence of power interrupts of between 17 msec and 27 msec can cause abnormal LGCIU behaviour, due to failure of the reset circuits on the microprocessor and proximity boards.
- (3) The aircraft manufacturer has requested a reduction in the pre-programmed solenoid disable time following power-up from 2 seconds to 200 msec. This is to prevent loss of nosewheel steering.

DOWTY

SERVICE BULLETIN

- (4) Ground testing to confirm the effect of the modifications made as a result of in-service findings outlined above highlighted a further power interrupt case.

It was found that following some power interrupts between 70 msec and 200 msec the LGCIU stopped transmitting ARINC data, although the unit was otherwise functioning correctly.

- (5) Normal mode failure message transmissions from the LGCIU are not in the correct order and contain a spelling mistake.
- (6) The following LGCIU/CFDIU findings :-

During BITE tests, proximity sensor circuit faults result in the message "LGCIU FAULT" being displayed.

When any fault is detected, bit 21 in the STX word during ARINC transmissions is not set.

During flight, disconnection of the CFDS results in the LGCIU ignoring further CFDS data until the LGCIU is reset on the ground. Faults occurring during flight are not logged even when the CFDS is reconnected. In addition, with the CFDS disconnected, shock absorber status (which should be used to determine if the aircraft is flying or on the ground) is not used.

All previous and last flight faults are displayed in the previous flight menu.

When the ARINC link is disconnected, flight status is indicated by the shock absorbers. Additionally, the current recording command is stored in a local variable which is incorrect.

- (7) The fixing method employed for the power transistors TR1, 6, 11, 16 and 21 on the output board may give rise to intermittent connections.
- (8) The fixing screws for the ground block connector may chafe the unit wiring.
- (9) The earthing method of the filter and power supply assembly may affect long-term reliability.

DOWTY

SERVICE BULLETIN

C. Description

This Service Bulletin introduces a series of hardware and software modifications as outlined in para. B. The incorporation of these modifications creates LGCIU Part Number 664700500A4A.

The following paragraphs give brief details of the modifications. The paragraph numbers correspond with those used in para. B, Reason.

- (1) The ripple on the 28V d.c. supply was found to be caused by the lack of a rectifying diode on the 28V input line to the proprietary power supply module used in the LGCIU as an alternative to the Dowty-manufactured module.

This modification introduces a power supply module having a series diode in the 28V input line.

- (2) The power interrupt was caused by a proprietary power supply module holding up the 5V d.c. supply rail too long to enable the generation of a microprocessor reset pulse.

This Service Bulletin introduces a modification to the microprocessor board to enable the reset to be generated either when the 28V d.c. input or the 5V d.c. rail voltages fall below predetermined limits.

The new microprocessor reset pulse is now inverted and used for resetting the proximity boards, thus ensuring that when the unit powers up after an interrupt, the proximity boards are not in BITE mode. This solution adds two wires to the unit wiring loom.

- (3) As a result of tests carried out by the aircraft manufacturer, it was found that a solenoid disable time could be set to a maximum of 550 msec without affecting the nosewheel steering system. However, other LGCIU timing considerations dictated a final choice of 375 msec. for LGCIU 1 and 432 msec for LGCIU 2.

This new delay time was achieved by hardware changes in the 'enable valves' circuit on the microprocessor board, the changes consisting of different R/C values.

- (4) The failure of some units to transmit ARINC data after a power interrupt was found to be due to failure of the ARINC wraparound facility. This, in turn, was traced to a malfunction of the ARINC chip.

A software change restores this wraparound without a requirement for any hardware change.

DOWTY

SERVICE BULLETIN

- (5) Errors in the normal failure mode messages have been eliminated by software changes.
- (6) The LGCIU/CFDIU changes have been introduced by the following software changes :-

The message numbers in the fault attribute tables have been changed to point to the correct fault messages.

An additional qualifier has been inserted to make bit 21 a real time indicator of any fault. This bit is set during ARINC bus transmissions. Two new variables have been introduced to count the number of faults detected during any monitoring cycle. They are always reset to 0 on entry into the modules invoked. Bit 21 is always set when any faults are detected on the ground or in flight.

A new variable has been introduced to give real time indication of CFDS disconnection and an additional condition qualifier has been introduced to ensure that when in flight the recording command is DC1, which is to record all faults detected both internal and external to the LGCIU.

An additional condition has been introduced to skip all faults logged in the current/last flight leg until the previous flight leg is encountered. From then on, all the fault accessing and displaying is normal.

In condition C1, the fault status flag is not always set when the FLIST module is invoked, hence C1 is not always set correctly. C1 has been changed with only one condition qualifier. Additionally, the current recording command, when shocks are sensed for flight status, is stored in the global current recording command.

- (7) The power transistor fixing method has been changed from a screw/nut/washer combination to a fixed stud used in conjunction with a washer and a nut.
- (8) The wire chafing possibility has been eliminated by fitting protective caps over two ground block connector fixing screws. In addition, the internal wiring has been re-routed.
- (9) Earth wiring has been re-directed to a single earth point.

DOWTY

SERVICE BULLETIN

D. Compliance

Compliance with this Service Bulletin is recommended. The manufacturer will incorporate this Service Bulletin into all units returned for investigation and/or repair.

Operators need not return units specifically for this Service Bulletin to be incorporated.

E. Approval

The technical content of this Service Bulletin is approved under the authority of CAA Approval No. DAI/1501/39.

F. Manpower

Not applicable. Operator accomplishment of this Service Bulletin is by unit substitution.

G. Material Cost and Availability

The changes introduced by this Service Bulletin will be incorporated by the manufacturer into returned units at no charge to the Operators.

H. Tooling - Price and Availability

Not applicable.

J. Weight and Balance

Weight and balance are not affected.

K. Electrical Load Data

Incorporation of this Service Bulletin has no effect on the aircraft electrical loads.

DOWTY SERVICE BULLETIN

L. References

Dowty Component Maintenance Manual, Ref. No. 32-31-71.

M. Other Publications Affected

Not applicable.

2. Accomplishment Instructions

Accomplishment of this Service Bulletin is by unit substitution.

The manufacturer will incorporate this Service Bulletin into all LGCIUs returned for investigation or repair or for any other reason.

Pre-SB 6647-32-3 units cannot be converted by Operators to post-SB 6647-32-3 units.

3. Material Information

Incorporation of this Service Bulletin changes the manufacturer's part number of the LGCIU from 664700400C3C and 664700400C3D to 664700500A4A.

The part number legend on the front panel of the unit will be changed by the manufacturer to reflect the new number.