Dowty Controls

SERVICE BULLETIN

This Service Bulletin complies with British Civil Airworthiness Requirements, Sect.A, Chap.A5-3.

Signed . . . . . K. Kendall . . . . . .

CAA Approval No. DAI 1501/39

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SERVICE BULLETIN No. 6647-32-5

LANDING GEAR - EXTENSION AND RETRACTION - CONTROL AND INTERFACE

INTRODUCTION OF LGCIU Pt. No. 664700500A4B

and

CLARIFICATION OF LGCIU PART NUMBERING

1. Planning Information

A. Effectivity

Airbus Industrie A320, all models.

Landing Gear Control and Interface Unit (LGCIU), part number 664700500A4A, all Serial Numbers up to and including 1015.

B. Reason

Some LGCIUs have entered service with an incorrect Part Number written on the unit identification label on the front panel. These units have the legend '664700500A4A' written in the PN space on the unit label. The correct legend is '664700500A', the final two digits of the LGCIU Part Number being obtained from the label on the relevant OBRM.

Seven anomalies have been found in the BITE system of the 664700500A4A standard of LGCIU. These are :-

(1) Spurious non-acquisition of date and systematic 'NO DATA FROM CFDS' during ground scan.

These two problems are related. The fault message 'NO DATA FROM CFDS' is always seen in the ground scan report. In addition, the date associated with some faults, especially this one, is occasionally seen as '????31', which is the default date.

(2) 'NO DATA FROM CFDS' in the last leg report.

(3) Spurious 'LGCIU 1 (2)' fault message in the last leg report.

(4) No message in the last leg report if no fault was reported.

(5) Entry into menu mode is possible in flight.

(6) Flap disconnect sensor faults are classified as internal to the LGCIU.

(7) Failure of the cargo door proximity sensor is flagged on the ECAM screen as LGCIU 1 (2) FAULT.

C. Description

This Service Bulletin contains a procedure for identifying and correcting wrong Part Number information on the LGCIU front panel label.

This Service Bulletin introduces LGCIU, Pt. No. 664700500A4B, containing a modified OBRM, Pt. No. 66500020048. The new OBRM incorporates revised software which eliminates the anomalies listed in paragraph 1.B.

The sub-paragraph numbers in the following descriptions correspond with those used in paragraph 1.B, Reason.

(1) The LGCIU powers up in 210 msec and the default initial recording command is 'DC1' (record all faults). The LGCIU is programmed to log the 'NO DATA FROM CFDS' fault after two seconds of not receiving data from the CFDIU. However, the CFDIU powers up approximately 45 seconds after a cold start (ie after a large interrupt or a power down).

The result is that when the two units are powering up after power has been applied to the aircraft, the LGCIU will always log the CFDIU fault before receiving any time and date information from the CFDIU. The fault will then be stored in the ground memory, since this is selected by the shock absorber status.

These factors combine to give the systematic presence of the fault message 'NO DATA FROM CFDS' in the ground scan, together with the default date '???31'. In addition, any other fault logged before the CFDIU has powered up will also have the default date associated with it.

A software change in the new OBRM cures both problems by using the shock absorber status to set the recording command in the initialisation module. If the shock absorbers are compressed, the recording command is 'NUL'; if the shock absorbers are extended, the recording command is 'DC1'.

(2) If the CFDIU should power down in flight for longer than one second, it may take three seconds to recover after powering up again. During this time, the LGCIU logs the 'NO DATA FROM CFDS' fault message because the fault confirmation time is only two seconds.

The new OBRM contains revised software which increases the fault confirmation time and thus eliminates a spurious fault message arising from the reason given above.

(3) During normal operation, one LGCIU only will be in control of the landing gear, and will set its select line (SO) high. The other LGCIU will be on standby and will set its select line low. If the LGCIU in control fails or powers down, its select line goes low and this causes the standby LGCIU to assume control of the landing gear and to log the fact that the first LGCIU has failed.

If the LGCIU in control is subjected to a power interrupt, its select line will briefly go low. If this is seen by the standby LGCIU, which reads the select line once every 100 msec, then the standby LGCIU will log an LGCIU failure even though the controlling LGCIU has only suffered a power interrupt.

A true failure is associated both with an ECAM warning 'LGCIU 1 (2) FAULT' and with a failure message in the failed LGCIU, therefore making the above power interrupt circumstances superfluous. The new OBRM incorporates revised software which prevents spurious fault logging during power interrupts.

(4) The software within the new OBRM creates a 'NO FAILURES' message after a fault-free flight. This replaces the present blank screen and applies to the last leg report, the previous legs report and to ground scanning.

(5) With the LGCIU in the flight condition, ie. with shock absorbers extended, and the CFDS in flight phase 1, ie. ground condition, recording command NUL, LGCIU 1 was selected from the CFDS menus and the unit entered menu mode. In addition, it was found to be possible to select the BITE condition. Neither of these selections should be possible with the unit in the flight condition.

The new OBRM contains software which ensures that the unit cannot enter the menu mode or select the BITE test unless :-

All three shock absorbers are compressed

OR

Ground power is connected

AND Wheel speed is less than 70 kt

(6) In the present standard of LGCIU, flap disconnect sensor faults are classified as internal to the LGCIU. This leads to a conflict with the SFCC, which also classifies these faults as internal.

Since the sensor is not functionally part of the landing gear system, it has been decided to classify it as external to the LGCIU.

In the new OBRM, the software has been revised so that the fault attributes table classifies all flap system faults as external.

(7) In the present standard of LGCIU, a failure of a cargo door proximity sensor is flagged on the ECAM main screen as LGCIU 1 (2) FAULT. In the new OBRM, the software has been revised to direct cargo door information to appropriate ECAM screen.

D. Compliance

Compliance with this Service Bulletin is recommended.

The manufacturer will make modified OBRMs available to Operators by exchange, on request. The manufacturer will also incorporate this Service Bulletin, on request, into all units returned for investigation and/or repair. Operators need not return units specifically for this Service Bulletin to be incorporated.

Operators who wish to re-program their own OBRMs will be provided with one master OBRM for use with a recommended firmware data loader (See para. 2 of this Service Bulletin).

E. Approval

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

F. Manpower

Manpower requirement for accomplishment of this Service Bulletin are as follows :-

Label change and fitting of exchange OBRM	0.5 manhours
Label change and reprogramming existing OBRM	1.5 manhours

G. Material Cost and Availability

OBRM Pt. No. 66500020048 will be made available to Operators by exchange, on request. Alternatively, a master OBRM will be provided to Operators who wish to reprogram their own OBRMs. Price and delivery data for these items is available on application to the manufacturer. Sets of new OBRM identification labels will also be supplied for use with the reprogrammed OBRMs - Operators must inform Dowty Controls of the quantities required.

Material requirements for the LGCIU part number correction are commonly available consumables, as follows :-

Black enamel lacquer to AFS307, or equivalent.

Iso-propyl alcohol (standard shop grade).

H. Tooling - Price and Availability

Operators who wish to reprogram their own OBRMs must have access to an Aerospatiale Firmware Data Loader, Type RMR PRECIS B, Pt. No. 37A0D0-3000-000. Data on price and availability of this device can be obtained from Aerospatiale Avionics and Systems Division.

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 load.

L. References

Dowty Component Maintenance Manual Ref. No. 32-31-39.

2. Accomplishment Instructions

A. Part Number Correction

Refer to Fig. 1. If the PN space on the LGCIU identification label carries the legend shown in Fig. 1(b), no action is required. If, however, the legend is '664700500A4A', as shown in Fig. 1(a), proceed as follows :-

(1) Using a lint-free cloth moistened with iso-propyl alcohol, wipe away any dirt and finger-marks from the LGCIU front panel label.

(2) Using a small brush loaded with black enamel lacquer to AFS307 (or the equivalent), obliterate the digits '4A', as shown in Fig. 1(b).

B. OBRM Change

Accomplishment of this section of the Service Bulletin is achieved by removing OBRM Pt. No. 6650002004A and replacing it with OBRM Pt. No. 66500020048.

Refer to Dowty Component Maintenance Manual 32-31-39, Page 301, para. 2.A for OBRM removal instructions.

Refer to Dowty Component Maintenance Manual 32-31-39, Page 701, para. 2.A for OBRM installation instructions.

Correct functioning of the new OBRM will be checked during the start-up BITE tests when the unit is next powered up.

C. OBRM Reprogramming

Remove the original identification labels from the OBRM.

Refer to the Aerospatiale Instruction Manual for the RMR PRECIS B firmware data loader and carry out the erasing, reprogramming and test procedures as directed, using the 6650002004B master OBRM supplied by Dowty Controls.

Engrave the OBRM part number (6650002004B) and serial number details onto the new labels, ensuring that the software standard legend is shown as '4B' on the front label. Fit the new labels.

Fit the reprogrammed OBRM as described in para. B above.

D. Notification

After accomplishment of this Service Bulletin, the Operator must advise the manufacturer of the following details :-

(1) Service Bulletin Number.

(2) Serial Number(s) of the LGCIU unit(s) modified.

(3) Date of accomplishment.

These details must be sent to :-

Project Support Manager (Flight Systems),
Dowty Controls,
Knaves Beech Business Centre,
Loudwater,
High Wycombe, HP10 9UT,
United Kingdom

The Operator must record the accomplishment of this Service Bulletin within the appropriate equipment documentation system.

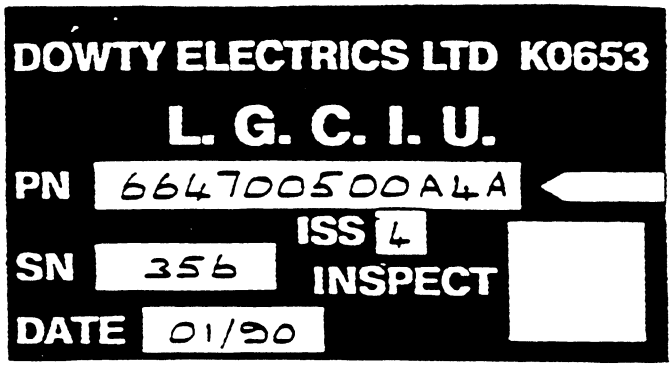
3. Material Information

Incorporation of this Service Bulletin changes the manufacturer's part number of the LGCIU from 664700500A4A to 664700500A4B.

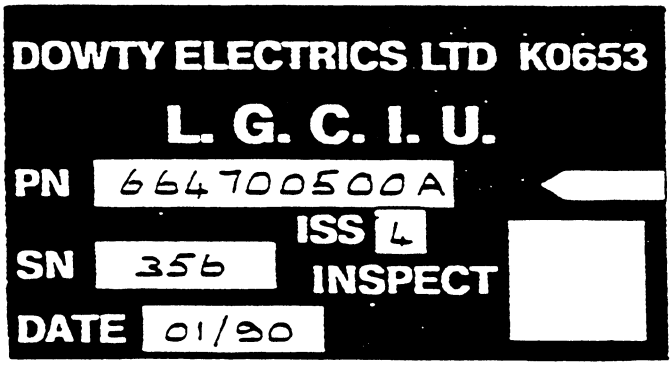
The front face of the new OBRM will carry the legend '4B'.

Existing holdings of OBRM Pt. No. 6650002004A may be returned to the manufacturer in exchange for Pt. No. 6650002004B.

Alternatively, Operators may reprogramme their own OBRMs (see Para. 2 of this Service Bulletin).



(a) LGCIU Label showing incorrect Part Number



(b) LGCIU Label showing correct Part Number

LGCIU Label

Figure 1