International Aero Engines

SERVICE BULLETIN

Aug. 21/98

Subject: Transmittal of Revision 1 to Service Bulletin V2500-ENG-75-0061

Service Bulletin Revision History:

Event	Date
Basic Issue	June 28/96.
Revision 1	Aug. 21/98.

Reason for Revision:

(1) Changes to Material Information at 3. B.

(2) Editorial changes to bring SB up to latest standards.

Effect on Past Compliance:

None.

List of Effective Pages:

Page No.	Revision No.	Effective Date
1 to 10	Revision 1	Aug. 21/98.

International Aero Engines

SERVICE BULLETIN

AIR - HP COMPRESSOR VARIABLE STATOR VANE ACTUATOR - INTRODUCTION OF LINEAR VARIABLE DIFFERENTIAL TRANSFORMER WITH REVISED SOLDERED TERMINATION JOINTS AND SLEEVE MATERIAL

MODEL APPLICATION

V2500-A1
V2522-A5
V2524-A5
V2527-A5
V2527E-A5
V2530-A5
V2533-A5
V2525-D5
V2528-D5

BULLETIN INDEX LOCATOR

75-32-00

Compliance Category Code

4

Internal Reference No.

EC95VR016

June 28/96
R Revision 1 Aug. 21/98

V2500-ENG-75-0061

AIR - HP COMPRESSOR VARIABLE STATOR VANE ACTUATOR - INTRODUCTION OF LINEAR VARIABLE DIFFERENTIAL TRANSFORMER WITH REVISED SOLDERED TERMINATION JOINTS AND SLEEVE MATERIAL

1. Planning Information

A. Effectivity

(1) Aircraft:

(a) Airbus A319.

(b) Airbus A320.

(c) Airbus A321.

R (d) Boeing-Douglas MD90.

(2) Engine:

(a) V2500-A1 Engines prior to serial No. V0362.

(b) V2522-A5 Engines prior to serial No. V10190.

(c) V2524-A5 Engines prior to serial No. V10190.

(d) V2527-A5 Engines prior to serial No. V10190.

(e) V2527E-A5 Engines prior to serial No. V10190.

(f) V2530-A5 Engines prior to serial No. V10190.

(g) V2525-D5 Engines prior to serial No. V20067.

(h) V2528-D5 Engines prior to serial No. V20067.

B. Concurrent Requirement:

None.

C. Reason

(1) Problem

R An open circuit condition of the windings of the Variable Stator-Vane Actuator (VSVA)
R Linear-Variable Differential Transformer (LVDT) can occur.

R The problem is caused by Halide-free flux remaining on the soldered joints after manufacturing.
R At temperatures above 80°C, the Halide-free flux releases azeloic acid.

(2) Evidence

The problem has been found on several in-service engines. In extreme cases of dual channel failure this can result in an in-flight shut down.

Examination of the affected LVDT's has shown solder degredation at the units temperature compensation bobbins.

(3) Substantiation

Extensive rig tests and a detailed engineering assessment have been done on the changes introduced by this Service Bulletin.

(4) Objective

The purpose of this Service Bulletin is to improve unit reliability.

(5) Effect of Service Bulletin on:

R (a) Operation

Not affected.

R (b) Maintenance

Not affected.

R (c) Overhaul

Not affected.

R (d) Repair Schemes

Not affected.

R (e) Interchangeability

Not affected.

R (f) Fits and Clearances

Not affected.

(6) Supplemental Information

R None.

D. Description

(1) This Service Bulletin includes the installation of a VSVA that incorporates Lucas Aerospace Modification DTV055. The changes are as follows:

R (a) The flux used on the LVDT temperature compensation bobbin and electrical connector joins
R has been changed from Halide-free to a flux core (BS441 grade 3)/multicore HMP solder
R combination.

R (b) The material for the shrink sleeving of the wire lead-out has changed from Viton to Kynar.

R (c) The Viton sleeving on the temperature compensation bobbin has been replaced with two layers of glass fibre thread, brush coated with varnish.

R (d) The introduction of a new two-stage flux cleaning system which removes the residual flux
R from the soldered joints of the bobbin and connector.

(2) The existing VSVA's can be reworked. Refer to the vendor Service Bulletin at 1. (L)..

(3) Units that incorporate this Service Bulletin will be identified by a new type number (Refer to 3. B.).

E. Approval

R The part number changes and/or part modifications are given in Section 2 and 3 of this Service
R Bulletin. They comply with the applicable Federal Aviation Regulations and are
R FAA-APPROVED for the engine model listed.

F. Compliance

R Category code 4.

This Service Bulletin can be accomplished at the first visit of an engine or module to a maintenance
R base that can comply with the accomplishment instructions. This Service Bulletin must be
R accomplished regardless of the planned maintenance or the reason for engine removal.

G. Manpower

Estimate of man hours necessary to embody this Service Bulletin in full:

Venue	Estimated Man-Hours
(1) In Service	
(a) To gain access	
(i) Open fan cowl doors	7 Minutes
(ii) Open C-ducts	9 Minutes
TOTAL	16 Minutes
(b) To embody	
(i) By unit rework	Refer to Lucas Service Bulletin 1685-75-007 or 2607-75-001
(ii) By unit replacement	Refer to Lucas Service Bulletin 1685-75-007 or 2607-75-001

(c) To return engine to serviceable status

(i) Close C-ducts	12 Minutes
(ii) Close fan cowl doors	8 Minutes
TOTAL	20 Minutes

(2) At Overhaul — Not applicable

H. Material - Price and Availability

(1) A modification kit is not necessary.

(2) Refer to 3. Material Information for prices and availability of future spares.

I. Tooling - Price and Availability

Special tools are not necessary.

R J. Weight and Balance

(1) Weight change

None.

(2) Moment arm

Not affected.

(3) Datum

Engine front mount centreline (Power Plant Station (PPS) 100).

K. Electrical Load Data

The aircraft electrical load is not affected by this Service Bulletin.

L. References

(1) A320 Aircraft Maintenance Manual (AMM).

(2) MD-90 Aircraft Maintenance Manual (AMM).

(3) Dowty and Smiths Industries Controls Limited, Component Maintenance Manual (CMM), Chapter/Section 75-32-41.

R (4) Refer to the vendor Service Bulletins that follow:

R (a) 1685-75-007 ENGINE COMPRESSOR CONTROL - VARIABLE STATOR VANE
R ACTUATOR - INTRODUCTION OF NEW LINEAR VARIABLE
R DIFFERENTIAL TRANSFORMER (LVDT) WITH REVISED
R TERMINATION JOINTS AND SLEEVING MATERIAL TO PREVENT
R JOINT DEGREDATION.

R or

R (a) 2607-75-001 ENGINE COMPRESSOR CONTROL - VARIABLE STATOR VANE
R ACTUATOR - INTRODUCTION OF NEW LINEAR VARIABLE
R DIFFERENTIAL TRANSFORMER (LVDT) WITH REVISED
R TERMINATION JOINTS AND SLEEVING MATERIAL TO PREVENT
R JOINT DEGREDATION.

R (5) Airbus Aircraft Modification No. 25874.

M. Other Publications Affected

(1) Illustrated Parts Catalogue (IPC), Chapter/Section 75-32-41.

(2) The A320 Aircraft Maintenance Manual (AMM), Chapter/Section 75-32-41.

(3) The MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 75-32-41.

2. Accomplishment Instructions

A. Job Set-Up Instructions

(1) On the aircraft panel 115VD, attach a warning notice to tell persons not to start the engine.

(2) Make sure that the engine has been stopped for at least 5 minutes.

(3) On the aircraft panel 50VU, make sure that the legend of the ENG FADEC GND PWR push button switch reads OFF and install a warning notice.

R (4) Get access to the engine

R R (a) Open the left and right fan cowl doors. (Refer to the A320/A321 Aircraft Maintenance Manual (AMM), Chapter/Section 71-13-00, TASK 71-13-00-010-010).

R or

R R (b) Open the upper and lower fan cowl doors. (Refer to the MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 71-13-00, Maintenance Practices.

R (5) Open the thrust reverser halves

R R (a) Open the left and right thrust reverser halves. (Refer to the A320/A321 Aircraft Maintenance Manual (AMM), Chapter/Section 78-32-00, TASK 78-32-00-010-010).

R or

R R (b) Open the upper and lower thrust reverser halves. (Refer to the MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 78-32-00, Maintenance Practices).

B. Removal Instructions

(1) Remove the Variable Stator Vane Actuator (VSVA) Mk6 standard. (Refer to the A320/A321 Aircraft Maintenance Manual (AMM), Chapter/Section 75-32-41, TASK 75-32-41-000-010 or the MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 75-33-41, Removal/Installation).

C. Rework Instructions

(1) Rework the VSVA. (Refer to the vendor Service Bulletins at 1. L. (4).

D. Installation Instructions

(1) Install the Variable Stator Vane Actuator (VSVA) Mk6 standard. (Refer to the A320/A321 Aircraft Maintenance Manual (AMM), Chapter/Section 75-32-41, TASK 75-32-41-400-010 or the MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 75-33-41, Removal/Installation).

E. Close-Out Instructions

R (1) Close the thrust reverser halves

R (a) Close the left and right thrust reverser halves. (Refer to the A320/A321 Aircraft Maintenance
R Manual (AMM), Chapter/Section 78-32-00, TASK 78-32-00-410-010).

R or

R (b) Open the upper and lower thrust reverser halves. (Refer to the MD-90 Aircraft Maintenance
R Manual (AMM), Chapter/Section 78-32-00, Maintenance Practices).

R (2) Close the access to the engine

R (a) Close the left and right fan cowl doors. (Refer to the A320/A321 Aircraft Maintenance
R Manual (AMM), Chapter/Section 71-13-00, TASK 71-13-00-410-010).

R or

R (b) Open the upper and lower fan cowl doors. (Refer to the MD-90 Aircraft Maintenance
R Manual (AMM), Chapter/Section 71-13-00, Maintenance Practices.

(3) Remove the warning notices from the aircraft panels 115VU and 50VU.

F. Test

Do a test of the VSVA. (Refer to the A320/A321 Aircraft Maintenance Manual (AMM), Chapter/Section 71-00-00, TASK 71-00-00-710-010 or the MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 71-00-00, Adjustment/Test).

C. Recording Instructions

(1) A record of accomplishment is necessary. (Refer to the vendor Service Bulletin at 1. L. (4).

3. Material Information

Applicability: For each V2500 engine for which this Service Bulletin is applicable.

A. Kits necessary for this Service Bulletin:

None.

B. Vendor units affected by this Service Bulletin:

	NEW PART No. (ATA No.)	QTY	EST'D UNIT PRICE ($)	PART TITLE	OLD PART No. (IPC No.)	INSTR DISP
R	A1, A5 and D5 Models					
	1685MK7 (75-32-41)	1		Actuator-variable stator Vane	1685MK6 (01-100)	(A)(B)(S1) (1D)
R	A5 and D5 Models					
R	2607MK2 (75-32-41)	1		Actuator-variable stator Vane	2607MK1 (01-100)	(A)(B)(S1) (1D)

NOTE: The unit prices, if shown, are an estimate and they are given for the purpose of planning only. For information about actual prices, refer to IAE Price Catalog or contact IAE's spare parts sales department.

C. Instruction/disposition codes:

(A) New part is available.
(B) Old part will be discontinued.
(S1) Old and new parts are freely and fully interchangeable.
(1D) For rework of old part, refer to the vendor Service Bulletin at 1. L. (4).

Lucas Aerospace
SERVICE BULLETIN

2607-75-001

ENGINE COMPRESSOR CONTROL - VARIABLE STATOR VANE ACTUATOR. INTRODUCTION OF NEW LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT), WITH REVISED TERMINATION JOINTS AND SLEEVING MATERIAL TO PREVENT JOINT DEGRADATION.

(IAE SB V2500-ENG-75-0061)
(LAECS MOD. D.TV.055)

1. Planning Information

A. Effectivity

(1) Airbus - A321

V2500-A5. All 2607 Mk1 Units.

(2) McDonnel Douglas MD90

V2500-D5. All 2607 Mk1 Units.

(3) Variable Stator Vane Actuator Units

This bulletin applies to new manufacture: the point of embodiment is unit serial number 2607128.

B. Reason

(1) Condition

The current standard of Linear Variable Differential Transformer (LVDT), (in the Variable Stator Vane Actuator Unit), is prone to failure of the coil winding termination joints due to the release of azeleic acid from the halide-free flux. This reacts with fluorine out gassing from the viton heat shrink sleeving around the lead out wires. The result is a corrosive degradation of the high temperature solder which leads to the LVDT going open circuit on the affected channel.

(2) Background

The condition was identified during the investigation of a unit which malfunctioned in service.

(3) Objective

Incorporation of the changes introduced by this Service Bulletin (Modification), are designed to introduce a solder process using a flux free of azeleic acid. The viton sleeving has been removed from the LVDT and replaced with kynar sleeving.

(4) Substantiation

The changes introduced by this Service Bulletin (Modification), have been shown by testing, to alleviate the condition.

C. Description

(1) This Service Bulletin (Modification) introduces an LVDT with a revised termination, solder process and lead out wire sleeving of a revised material. The solder process uses HMP multi-core solder with a flux which contains no azeleic acid. The lead out wire sleeving material has been changed from viton to kynar.

(2) This Service Bulletin is in three parts. Part 1 is to accomplish this Service Bulletin at the
R Operator's facility. Part 2 is to accomplish this Service Bulletin by unit replacement. Part 3
R is to accomplish this Service Bulletin by an overhaul facility.

D. Compliance

Category Code 4.

Accomplish at the first visit of an engine or module to a maintenance base, capable of compliance with the accomplishment instructions, regardless of the planned maintenance action or the reason for engine removal.

E. Approval

Service Bulletin No. 2607-75-001 (Mod. D.TV.055), (IAE SB V2500-ENG-75-0061), was technically approved by IAE on Jun 3/96. The part number changes and/or part modifications described in this Service Bulletin have been shown to comply with the appropriate Federal Aviation (FAA) Regulations and are FAA approved for those units listed in this Bulletin.

F. Manpower

2.25 man hours are necessary to accomplish this Service Bulletin (Modification), at Engine Maintenance Level (Part 1). 1.73 man hours are necessary to accomplish this Service Bulletin (Modification), by unit replacement (Part 2).

G. Material - Price and Availability

See the supplement to this Bulletin.

H. Tooling - Price and Availability

(1) Additional tools

See the supplement to this Bulletin.

(2) Tools made redundant

None.

I. Weight and Balance

(1) Weight change . . . . . Nil

(2) Moment arm . . . . . .No effect

(3) Datum . . . . . Engine front mount centerline (Power Plant Station (PPS)100)

J. References

(1) Lucas Aerospace, component maintenance manual (CMM) 75-32-61.

(2) IAE Service Bulletin V2500-ENG-75-0061.

(3) Lucas Aerospace, Mod. D.TV.055.

K. Other Publications Affected

Nil.

2. Accomplishment Instructions

This Service Bulletin can be accomplished at Engine maintenance level, Overhaul facility or by unit replacement. 2.A are the engine maintenance accomplishment instructions. 2.B are the unit
R replacement instructions. 2.C. are the Overhaul facility accomplishment instructions.

A. The engine maintenance level accomplishment instructions (Part 1), of this Service Bulletin are as follows:

(1) Remove the Variable Stator Vane Actuator Unit (VSVA), as instructed by IAE Service Bulletin V2500-ENG-75-0061.

(2) Allow the fuel to drain from the actuator and install the transport blanks called up in 75-32-41.

CAUTION: KEEP THE UNIT AND COMPONENTS CLEAN. COMPLETE THE WORK IN AN AREA WHICH IS CLEAR OF DIRT AND OTHER UNWANTED MATERIAL/ CONTAMINATION.

R (3) Check the local electrical supply voltage (120v or 240v). Refer to Figure 2 and set the
R voltage selector switch on the LVDT indicator unit EL4049 to equal the supply voltage.

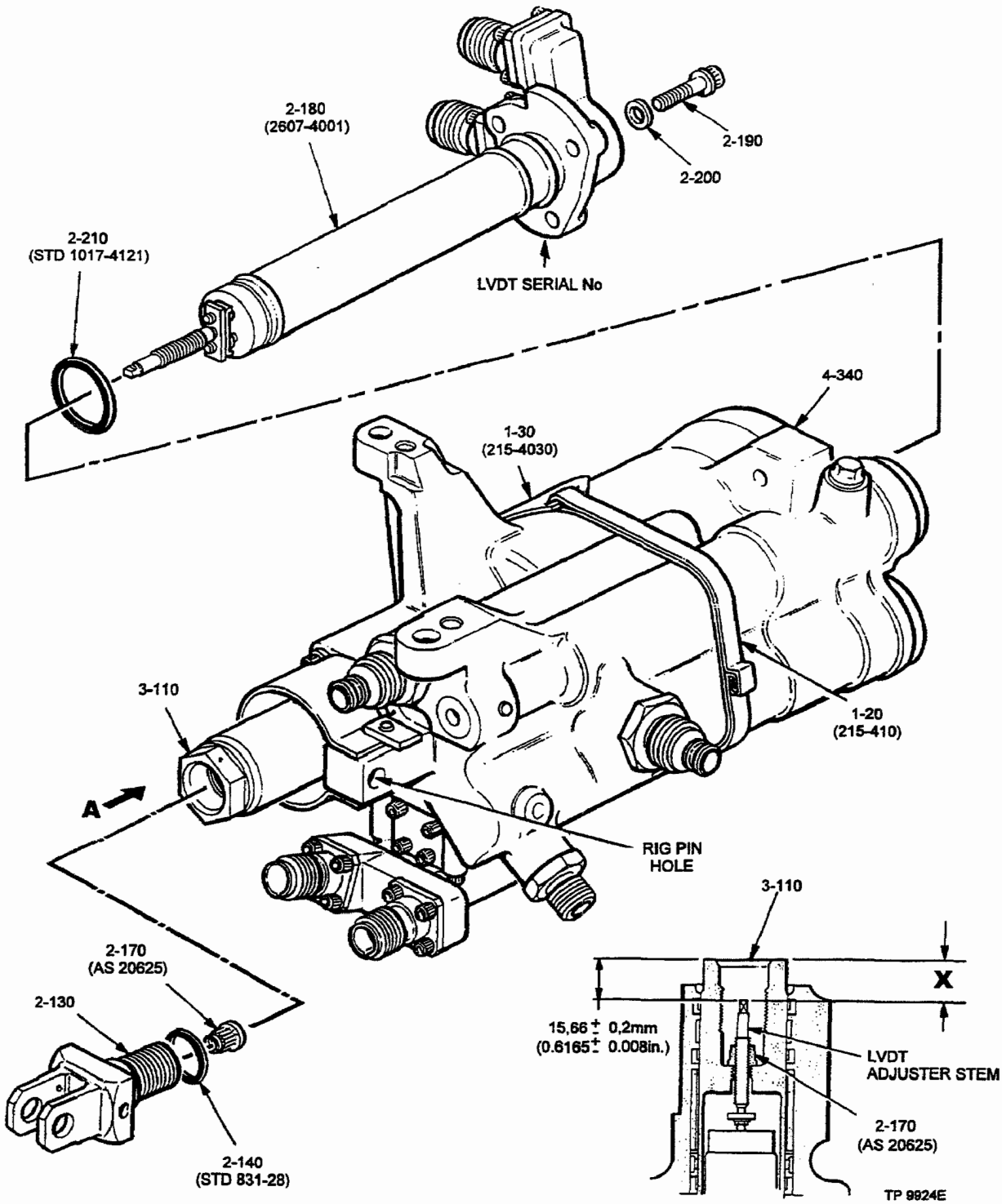
R Connect the indicator unit to the mains supply and switch the on/off switch to the ON
R (down) position.

R Note: The EL 6023 LVDT indicator unit automaticaly sets the supply voltage to
R 85-264V AC.

R (4) Set the winding selector switch to the PRIMARY position and adjust the energising
R voltage to 6.000 ± 0.005v by means of the 6v adjustment potentiometer on the front
R panel of the indicator unit.

R Note: The Prim postion on the LVDT test unit EL6023 has the same function
R as PRIMARY position on the LVDT test unit EL4049 or EL6023.

R *Jun 26/96*
R *Revision 1 Jul 8/97*



Removal and Installation of the LVDT
Figure 1

R R *Jun 26/96*
Revision 1 Jul 8/97

Note: Keep the indicator unit switched on while the change of LVDT is completed; this will permit the energising voltage to become stable.

R (5) Remove the LVDT, Figure 1

R (a) Install the VSVA on the workholder A043236 and attach the workholder to a R hydraclamp or hold it in a vice.

R (b) Extend the ram piston (piston assembly) (3-110) by hand to the fully extended R position. Use the reaction tool (of tool A043321), to hold the ram piston and R unscrew the fork end with the torque adapter.

R (c) Remove the fork end (2-130) together with the toroidal sealing ring (2-140) from R the ram piston (3-110). Remove the toroidal sealing ring (2-140) from the fork R end (2-130); discard the toroidal sealing ring.

R (d) Unscrew and remove the self-locking nut (2-170) from the adjuster stem of the R LVDT (2-180). Use the adjusting tool A043222 to hold the LVDT adjuster stem R while the self-locking nut (2-170) is unscrewed at the same time. Discard the R self-locking nut (2-170).

Note: Use the adjuster part of the tool to hold the LVDT adjuster stem; use he sleeve socket to turn the nut.

R (e) Unscrew the LVDT adjuster stem from the ram piston (3-110) (clockwise when R viewed from arrow A); use the adjuster part of the tool A043222.

R (f) Unscrew and remove the three machine bolts (2-190) and the countersunk R washers (2-200); these components secure the LVDT (2-180) to the body R assembly (4-340).

R (g) Remove the LVDT (2-180) from the body assembly (4-340). Remove the toroidal R sealing ring (2-210) from the LVDT; discard the toroidal sealing ring.

R (h) Attach a label to the removed LVDT; the label must contain this data:

REMOVED FROM UNIT SERIAL No. 2607***
UNIT HOURS RUN:

Note: 2607*** as shown on the data plate (1-30). The unit hours run should be added if this is known or can be got from the operator.

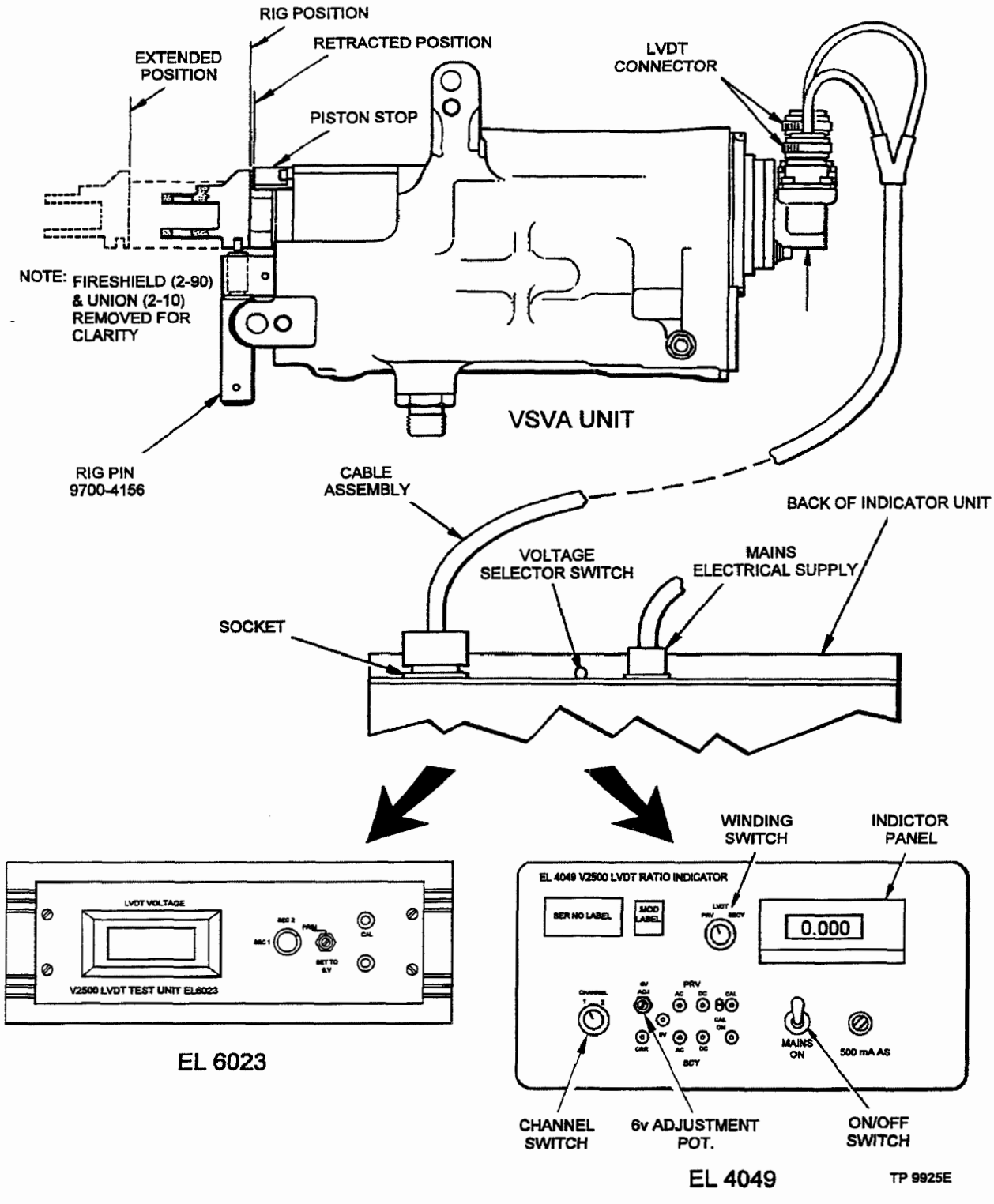
R (6) Install the Replacement LVDT, Figure 1

R (a) Carefully remove the replacement LVDT (2607-4000) or (2607-4001) from the R protective package. If the Supplier's Certificate is with the LVDT, make sure that R the Serial Number on the Certificate is the same as that on the flange of the R LVDT.

R CAUTION: KEEP THE SUPPLIER'S CERTIFICATE AVAILABLE THROUGHOUT R THE REMAINDER OF THESE INSTRUCTIONS.

R (b) Write on the Supplier's Certificate (if available), the serial number of the VSVA R unit into which the LVDT is to be installed (2607*** - see the Note at sub. para. R (5),(h)).

R (c) Remove the LVDT from the polythene bag and clean all the surfaces with a dry, R lint-free cloth.



LVDT Output Voltage Checks
Figure 2

R R *Jun 26/96*
Revision 1 Jul 8/97

(d) Get the replacement toroidal sealing ring (2-140); remove the sealing ring from the protective package and assemble it to the LVDT. Make sure the seal is not twisted in the groove.

(e) Position the ram piston (3-110) to the mid stroke position. Extend the stem of the LVDT and install the LVDT to the body assembly (4-340), through the ram piston (piston assembly) (3-110).

Hold the VSVA unit in a vertical downward position so that the LVDT stem stays positively fully engaged in the ram piston shoulder. Use a pair of long nose pliers to carefully turn the stem (counter-clockwise viewed from arrow A) to initially engage the thread 2 turns in the shoulder of the ram piston (3-110).

(f) Then use the adjuster part of the tool A043222 to screw the adjuster stem of the LVDT into the shoulder of the ram piston (3-110) (counterclockwise when viewed from arrow A). Make sure that the thread of the adjuster stem is fully engaged.

(g) Align the three holes in the flange of the LVDT with the three holes in the LVDT housing (body assembly (4-340)). Install the three flat, countersunk washers (2-200) and the three machine bolts (2-190) to secure the LVDT.

(h) Check, when the bolts are tightened, that there is a minimum of 0,23 Nm (2 lbf.in.) inbuilt torque in each of the inserts. If the inbuilt torque is less than this figure, reject the unit for Repair. Torque tighten the machine bolts to 4,5 Nm (40 lbf.in.).

(i) Use the adjuster part of the tool A043222 to set the LVDT adjuster stem to a dimension of 15,66 ± 0,2 mm (0.6165 ± 0.008 in.) from the end of the piston as shown. Check with a vernier depth gauge.

(j) Get the replacement self-locking nut (2-170) and assemble the nut to the adjuster stem of the LVDT. Use the adjuster part of the tool A043222 to hold the adjuster stem in the set position. At the same time, use the sleeve socket to tighten the nut but do not torque tighten at this stage. Remove the tool A043222.

(k) Make sure that the fork end (2-130) is clean; if necessary, clean it with a dry, lint-free cloth.

(l) Get the replacement toroidal sealing ring (2-140); remove the sealing ring from the protective package and assemble it to the fork end (2-130).

(m) Install the fork end (2-130) into the end of the ram piston (3-110). Hold the ram piston with the reaction tool (of tool A043321) and torque tighten the fork end to 50 Nm (440 lbf.in.); use the torque adapter.

(7) Check the LVDT adjustment, Figure 2.

(a) Connect the cable assembly to the socket on the LVDT indicator unit EL4049 or EL6023, and the Channel 1 and Channel 2 connectors on the VSVA unit.

Note: Channels 1 and 2 are marked on the cable assembly and the connector keyways make sure of correct assembly.

CAUTION: THROUGHOUT THE PROCEDURE, MAKE SURE THAT THE ENERGISING VOLTAGE REMAINS WITHIN THE LIMIT OF 6.000 ± 0.005v; RE-ADJUST THE VOLTAGE AS NECESSARY.

(b) If necessary, adjust the energising voltage to 6.000 ± 0.005v by means of the 6v adjustment potentiometer on the indicator unit; check that the winding switch is in the PRIMARY position.

Note: The Prim position on the LVDT test unit EL6023 has the same function as PRIMARY position on the LVDT test unit EL4049.

(c) Move the ram piston (3-110) to the 'rig' position and put the rig pin 9700-4156 through the fireshield mounting block to engage the hole in the fork end (2-130).

(d) Turn the winding switch to the SECONDARY position and read the LVDT output voltage on the indicator panel. Write the indicated voltage down under the heading 'Channel 1 - Rig Position'.

Note: SEC 1 and SEC 2 positions on the LVDT test unit EL6023 is the same function as CHANNEL 1 and 2 positions on the LVDT test unit EL4049.

(e) Turn the channel switch to the CHANNEL 2 position and repeat sub. para. (d). Write the indicated voltage down under the heading 'Channel 2 - Rig Position'.

(f) If the LVDT Supplier's Certificate is available, continue from sub. para. (g). If no Certificate is available, continue from sub. para. (j).

(g) Get the LVDT Supplier's Certificate and compare the Channel 1 and Channel 2 Rig Position, output voltages (as recorded), with those on the Certificate. For the LVDT to be accepted at the current setting, the voltages must be as follows:

Channel 1 output voltage must equal that stated on the Supplier's Certificate ± 0.002v.

Channel 2 output voltage must equal that stated on the Supplier's Certificate ± 0.003v.

(h) If the output voltages are within the limits given in sub. para. (g), check the output voltages at the retracted and extended positions (sub. paras. (8) (i) and (l)).

(i) If the output voltages are outside the limits given in sub. para. (g), calculate the difference between the voltages as follows (use the Channel 1 voltages only):

e.g.	Channel 1 voltage as recorded:	2.681v
	Channel 1 voltage stated on Supplier's Certificate:	2.667v
	Difference:	+0.014v

This shows that the LVDT output voltage must be reduced by 0.014v at the rig position.

R R (j) If the LVDT Supplier's Certificate is not available, compare the Channel 1 and 2 voltages recorded at sub. paras. (d) and (e) with the nominal voltages as follows:

Channel 1 voltage: 2.650±0.002v
Channel 2 voltage: 2.650±0.003v

R R (k) If the output voltages are within the limits given in sub. para. (j), check the output voltages at the retracted and extended positions (sub. paras. (8) (i) and (l)).

R R (l) If the output voltages are outside the limits given in sub. para. (j), calculate the difference between the voltages as follows (use the Channel 1 voltages only):

e.g. Channel 1 voltage as recorded: 2.675v
Channel 1 nominal voltage: 2.650.

Difference: +0.025v

This shows that the LVDT output voltage must be reduced by 0.025v at the rig position.

R (8) Adjust the LVDT output voltage, Figures 1 and 2.

R R R R (a) Remove the rig pin 9700-4156. Move the ram piston (3-110) to approximately the extended position and remove the fork end (2-130) as described in sub. para. (5),(b) and (c). Turn the channel switch to the CHANNEL 1 position and read the new indicated Channel 1 output voltage.

CAUTION: DO NOT MOVE THE RAM PISTON, IN THE STROKE MODE, DURING THE ADJUSTMENT PROCEDURE.

R R R (b) Slacken the self-locking nut (2-170) and turn the stem of the LVDT to adjust the output voltage; use the tool A043222. Use the reaction tool of tool A043321 to prevent rotation of the ram piston.

Note: Counterclockwise rotation of the LVDT adjuster stem (when viewed from arrow A), REDUCES the LVDT, indicated output voltage. Clockwise rotation INCREASES the indicated voltage.

R R R R (c) Adjust the stem of the LVDT to increase or reduce the indicated voltage by the value calculated at sub. para. (7),(i) or (7) (l) as applicable. Monitor the output voltage as the adjuster stem is turned. When the required voltage is indicated, torque tighten the self-locking nut (2-170) to 11,5 Nm (102 lbf. in.).

R R R (d) Measure the depth of the adjuster stem from the end face of the ram piston (3-110) (dimension X, Figure 1). Write this dimension down in case no further adjustment is required.

R R R (e) Re-assemble and torque tighten the fork end (2-130), as described in sub. para. (6),(m). Return the ram piston (3-110) to the 'rig' position and re-insert the rig pin 9700-4156.

R (f) Turn the winding switch to the PRIMARY position and the channel switch to the CHANNEL 1 position; check the energising voltage as given in sub. para. (7),(b). Return the winding switch to the SECONDARY position.

R (g) Re-check the Channel 1 and Channel 2 Rig Position, output voltages which must be within the limits given in sub. para. (7),(g) or (7),(j) as applicable. If the voltages are still outside of the limits stated, re-adjust the LVDT adjuster stem as given in sub. paras. (a) through (e).

R (h) Repeat sub. para. (f).

R (i) Remove the rig pin 9700-4156 and move the ram piston to the fully retracted position (with the fork end against the piston stop). Check the indicated output voltage for both Channel 1 and Channel 2 at this position. The indicated output voltage is to be within the limit of 2.689v minimum and 2.736v maximum.

R (j) If the indicated output voltage (for either Channel), is outside of the limit given in sub. para. (i), it is possible to adjust the voltage only within the tolerance available at the 'rig' position. If necessary, repeat the adjustment procedure given in sub. paras. (a) through (g) and write down the indicated voltages for the 'rig' position.

R (k) Repeat sub. para. (f).

R (l) Move the ram piston (3-110) to the fully extended position. Check the indicated output voltage for both Channel 1 and Channel 2 at this position. The indicated output voltage for each Channel is to be within the limit of 0.261v minimum and 0.362v maximum. If the output voltage (for either Channel), is outside of the limit, the same adjustment conditions as for sub. para. (j) apply.

R (m) Repeat the checks at the retracted and extended positions after any adjustment. Make sure that the self-locking nut (2-170) and the fork end (2-130) are correctly torque tightened, once adjustment is complete. Before the fork end is installed, re-measure dimension X, if any adjustment has been made since sub. para. (d).

R (n) Where the LVDT Supplier's Certificate is available and is to be returned with the first LVDT, write on the Supplier's Certificate the final values of indicated voltage and adjuster stem depth as follows:

	Channel 1	Channel 2
	Rig:	Rig:
Retracted:		
Extended:		
Adjuster stem depth:		

R (o) Disconnect the cable assembly from the Channel 1 and Channel 2 connectors of the VSVA unit.

R Note: If the EL4049 or EL6023 LVDT indicator unit is to be used to accomplish another VSVA unit, within the next two hours it is advisable to keep the unit switched ON.

R (9) Complete the Assembly of the Unit, Figure 1.

R (a) Remove the VSVA from the holding fixture and apply Ardrox 3302 to the areas of
R the joint faces of the LVDT and the unit body, as given in 75-32-61, Assembly.

R (10) Re-identify the VSVA unit, Figure 1.

R TYPE No. - Use a vibro-engraving tool and delete the mark of the
R unit as shown ~~MK/N~~ and insert Mk 2

R (11) Install the VSVA and do the necessary leakage tests as instructed by IAE Service Bulletin
R V2500-ENG-75-0061.

R (12) A record of accomplishment is required.

R (13) Place the removed LVDT, in a clean polythene bag and, if possible, heat seal the bag.
R Pack the LVDT, together with the Supplier's Certificate (for the replacement LVDT, if it
R was available), in the package material from which the replacement LVDT was removed.

R (14) Return the LVDT package to:

Penny and Giles
Electronic Components Ltd.,
36 Nine Mile Point Industrial Estate
Cwmfelinfach
Gwent NP1 7HZ
UK
(For the attention of the Repair Coordinator).

B. Unit Replacement Only (Part 2)

(1) Remove the Variable Stator Vane Actuator (VSVA), Unit as instructed by IAE Service Bulletin V2500-ENG-75-0061.

Note: Removed VSVA units should be returned to one of the Repair Bases listed below:

Lucas Aerospace Customer Support Europe
The Radleys,
Marston Green,
Birmingham B33 0HZ
England.

Lucas Aerospace Customer Support Americas
30 Van Nostrand Avenue
Englewood
New Jersey 07631
USA.

(2) Install the replacement VSVA unit as instructed by IAE Service Bulletin V2500-ENG-75-0061. The part number identification, 2607 Mk2, will show that this Service Bulletin (Modification) has been incorporated.

(3) A record of accomplishment is required.

R C. Overhaull facility accomplishment instructions (Part 3)

R (1) Remove the transport components in accordance with Page Block 301, Disassembly
R procedure the Lucas Aerospace Variable Stator Vane Actuator, TYPE 2607 Component
R Maintenance Manual.

R (2) Remove the LVDT in accordance with Page Block 301, Disassembly procedure of the
R Lucas Aerospace Variable Stator Vane Actuator, TYPE 2607 Component Maintenance
R Manual.

R (3) Install the LVDT in accordance with Page Block 701, Assembly procedure of the Lucas
R Aerospace Variable Stator Vane Actuator, TYPE 2607 Component Maintenance Manual.

R (4) Do a Check of the LVDT Adjustment in accordance with Page Block 101, Assembly
R procedure of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 2607
R Component Maintenance Manual.

(5) Attach a label to the removed LVDT; the label must contain this data:

REMOVED FROM UNIT SERIAL No. 2607***
UNIT HOURS RUN:

Note: 2607*** as shown on the data plate (1-30), The unit hours run should be added if this is known or can be got from the operator.

R (6) Remove the label retaining strap (1-20) and the data plate (1-30) from the VSVA. in
R accordance with Page Block 301, Disassembly procedue of the Lucas Aerospace
R Variable Stator Vane Actuator, TYPE 2607 Component Maintenance Manual.

R Discard the label retaining strap (1-20) but keep the data plate (1-30) until the Service
R Bulletin is accomplished.

R (7) Re-identify the VSVA unit, Figure 1.

R (a) Get the new data plate (1-30) (supplied with the Mod. kit).

R (b) Refer to the information marked on the first data plate (1-30) and mark the new
R data plate as follows (use 1/16in. (1,6mm), letter/number stamps). Use the
R stamps with the data plate held on a flat surface:

R	TYPE No.	-Mark: 2607 Mk2
R	SERIAL No.	-Mark as on the original plate.
R	MOD No.	-Mark as on the original plate.
R	INSP.	-Keep blank.
R	TEST	-Keep blank.

R (c) Where possible, fill in the stamped letters and numbers with black paint and wipe
R away the surplus.

R (d) Destroy the first data plate.

R (e) Install the new data plate on the VSVA unit with a new label retaining strap (1-20)
R (supplied with the Mod. kit) in accordance with Page Block 701, Assembly
R procedure of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 2607
R Component Maintenance Manual.

R (f) Store the assembled unit in accordance with Page Block 701, Assembly
R procedure of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 2607
R Component Maintenance Manual.

3. Material Information

A. Modification Kit

Modification kit D.TV.055 (comprises the parts given in Para. C.).

B. Parts to be Re-worked

None.

C. New Production Parts

The following new parts will be available as spares:

New Part No.	Qty.	Keyword	Old Part No.	
2607-4000) alt. 2607-4001)	1	LVDT	1685-4053	
STD1017-4121	1	Ring, sealing	STD1017-4121	
STD831-28	1	Ring, sealing	STD831-28	
AS20625	1	Nut, self-locking	AS20625	
215-410	1	Strap, label retaining	215-410	Part 3 Only
215-4030	1	Plate, data	215-4012	Part 3 Only

D. Identification of Units

The type of equipment affected by this Service Bulletin (Modification), is:

Unit	Type No.
Variable Stator Vane Actuator	2607 Mk1 (Becomes 2607 Mk2).

R *Jun 26/96*
R *Revision 1 Jul 8/97*

Lucas Aerospace
SERVICE BULLETIN

1685-75-007 (SUPPLEMENT)

ENGINE COMPRESSOR CONTROL - VARIABLE STATOR VANE ACTUATOR. INTRODUCTION OF NEW LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT), WITH REVISED TERMINATION JOINTS AND SLEEVING MATERIAL TO PREVENT JOINT DEGRADATION.

(IAE SB V2500-ENG-75-0061)
(LAECS MOD. D.TV.055)

1. Modification Kit

Modification kit D.TV.055 comprises the parts given in Para. 2.

2. New Production Parts

Part No.	Qty per unit	Keyword	Gross World List Price (Dollars)	Availability on Receipt of Order
2607-4000)				
2607-4001) Alt.	1	LVDT	$6800.51	30 days
STD1017-4121	1	Ring, sealing	$ 181.09	30 days
STD831-28	1	Ring, sealing	$ 26.27	30 days
AS20625	1	Nut, self-locking	$ 22.91	15 days
215-410	1	Strap, label retaining	$ 6.11	15 days
215-4030	1	Plate, data	$ 17.48	15 days

3. New Tooling

	EL4049	1	Unit, indicator, LVDT	Price on application
R	EL6023 (alt to EL4049)	1	Unit, indicator, LVDT	Price on application
R	A43321	1	Tool, reaction/Adapter	Price on application
R	A43222	1	Tool, adjusting	Price on application
R	9700-4156	1	Pin, rig	Price on application

4. Spare Parts Supply

Spares distribution and Customer Service is available from the following Lucas Aerospace Customer Support Centres:

	REGION	ADDRESS	COMMUNICATION	
R	AMERICAS	LUCAS AEROSPACE	PHONE	(1) 201 567 6400
R		CUSTOMER SUPPORT	AOG	(1) 201 567 6411
R		AMERICAS	FAX	(1) 201 894 1965
R		30 VAN NOSTRAND AVENUE	SITA/ARINC	EWRLU7X
R		ENGLEWOOD		
R		NEW JERSEY 07631		
R		USA		

REGION	ADDRESS	COMMUNICATION	
EUROPE/MIDDLE -EAST/ AFRICA	LUCAS AEROSPACE CUSTOMER SUPPORT EUROPE BRUETON HOUSE NEW ROAD SOLIHULL B91 3TX ENGLAND	PHONE/AOG TELEX FAX SITA/ARINC	(44) 0121 627 6767 334174 (44) 121 500 6405 BHXLW7X
ASIA-PACIFIC	LUCAS AEROSPACE CUSTOMER SUPPORT ASIA 35/37 LOYANG WAY SINGAPORE 1750	PHONE FAX SITA/ARINC AOG	(65) 545 9975 (65) 545 9965 SINLU7X (65) 545 6253

Lucas Aerospace

SERVICE BULLETIN

1685-75-007

ENGINE COMPRESSOR CONTROL - VARIABLE STATOR VANE ACTUATOR. INTRODUCTION OF NEW LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT), WITH REVISED TERMINATION JOINTS AND SLEEVING MATERIAL TO PREVENT JOINT DEGRADATION.

(IAE SB V2500-ENG-75-0061)
(LAECS MOD. D.TV.055)

1. Planning Information

A. Effectivity

(1) Airbus - A320

V2500-A1100000. All 1685 Mk6 Units.

(2) Variable Stator Vane Actuator Units

This bulletin applies retrospectively to all units in service.

B. Reason

(1) Condition

The current standard of Linear Variable Differential Transformer (LVDT), (in the Variable Stator Vane Actuator Unit), is prone to failure of the coil winding termination joints due to the release of azeleic acid from the halide-free flux. This reacts with fluorine out gassing from the viton heat shrink sleeving around the lead out wires. The result is a corrosive degradation of the high temperature solder which leads to the LVDT going open circuit on the affected channel.

(2) Background

The condition was identified during the investigation of a unit which malfunctioned in service.

(3) Objective

Incorporation of the changes introduced by this Service Bulletin (Modification), are designed to introduce a solder process using a flux free of azeleic acid. The viton sleeving has been removed from the LVDT and replaced with kynar sleeving.

(4) Substantiation

The changes introduced by this Service Bulletin (Modification), have been shown by testing, to alleviate the condition.

C. Description

(1) This Service Bulletin (Modification) introduces an LVDT with a revised termination, solder process and lead out wire sleeving of a revised material. The solder process uses HMP multi-core solder with a flux which contains no azeleic acid. The lead out wire sleeving material has been changed from viton to kynar.

R R (2) This Service Bulletin is in three parts. Part 1 is to accomplish this Service Bulletin at the Operator's facility. Part 2 is to accomplish this Service Bulletin by unit replacement. Part 3 is to accomplish this Service Bulletin by an overhaul facility.

D. Compliance

Category Code 4.

Accomplish at the first visit of an engine or module to a maintenance base, capable of compliance with the accomplishment instructions, regardless of the planned maintenance action or the reason for engine removal.

E. Approval

Service Bulletin No. 1685-75-007 (Mod. D.TV.055), (IAE SB V2500-ENG-75-0061), was technically approved by IAE on Jun 3/96. The part number changes and/or part modifications described in this Service Bulletin have been shown to comply with the appropriate Federal Aviation (FAA) Regulations and are FAA approved for those units listed in this Bulletin.

F. Manpower

2.25 man hours are necessary to accomplish this Service Bulletin (Modification), at Engine Maintenance Level (Part 1). 1.73 man hours are necessary to accomplish this Service Bulletin (Modification), by unit replacement (Part 2).

G. Material - Price and Availability

See the supplement to this Bulletin.

H. Tooling - Price and Availability

(1) Additional tools

See the supplement to this Bulletin.

(2) Tools made redundant

None.

I. Weight and Balance

(1) Weight change . . . . . Nil

(2) Moment arm . . . . . .No effect

(3) Datum . . . . . Engine front mount centerline (Power Plant Station (PPS)100)

J. References

R (1) Lucas Aerospace, component maintenance manual (CMM) 75-32-41.

(2) IAE Service Bulletin V2500-ENG-75-0061.

(3) Lucas Aerospace, Mod. D.TV.055.

K. Other Publications Affected

Nil.

2. Accomplishment Instructions

This Service Bulletin can be accomplished at Engine maintenance level, Overhaul facility or by unit replacement. 2.A are the engine maintenance accomplishment instructions. 2.B are the unit
R replacement instructions. 2.C. are the Overhaul facility accomplishment instructions.

A. The engine maintenance level accomplishment instructions (Part 1), of this Service Bulletin are as follows:

(1) Remove the Variable Stator Vane Actuator Unit (VSVA), as instructed by IAE Service Bulletin V2500-ENG-75-0061.

(2) Allow the fuel to drain from the actuator and install the transport blanks called up in 75-32-41.

R CAUTION: KEEP THE UNIT AND COMPONENTS CLEAN. COMPLETE THE WORK IN AN
R AREA WHICH IS CLEAR OF DIRT AND OTHER UNWANTED MATERIAL/
R CONTAMINATION.

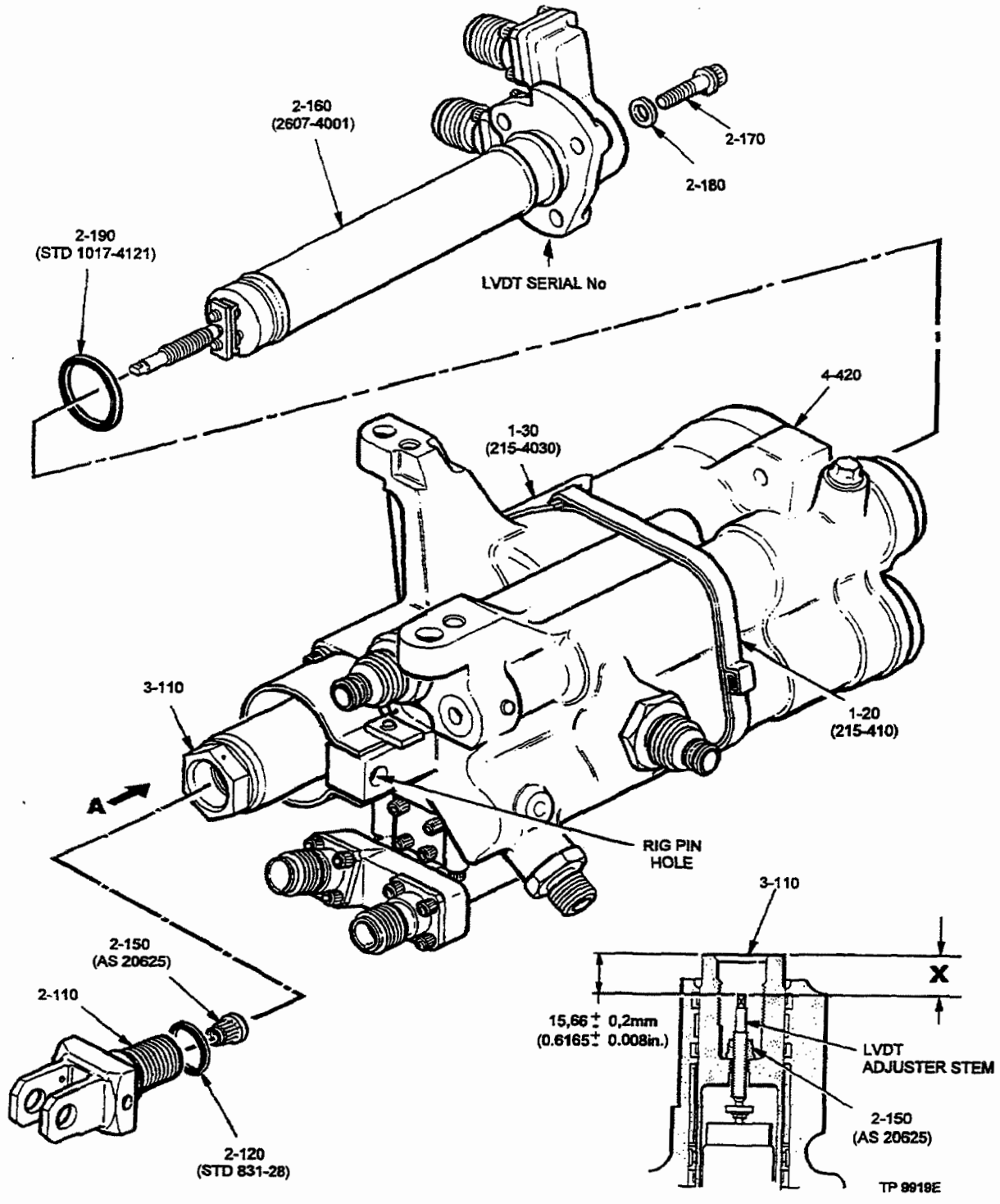
R (3) Check the local electrical supply voltage (120v or 240v). Refer to Figure 2 and set the
R voltage selector switch on the LVDT indicator unit EL4049 to equal the supply voltage.

R Connect the indicator unit to the mains supply and switch the on/off switch to the ON
R (down) position.

R Note: The EL 6023 LVDT indicator unit automaticaly sets the supply voltage to
R 85-264V AC.

R (4) Set the winding selector switch to the PRIMARY position and adjust the energising
R voltage to 6.000 ± 0.005v by means of the 6v adjustment potentiometer on the front
R panel of the indicator unit.

R Note: The Prim postion on the LVDT test unit EL6023 has the same function
R as PRIMARY position on the LVDT test unit EL4049 or EL6023.



Removal and Installation of the LVDT
Figure 1

R R *Jun 26/96*
Revision 1 Jul 8/97

R R Note: Keep the indicator unit switched on while the change of LVDT is completed; this will permit the energising voltage to become stable.

R (5) Remove the LVDT, Figure 1

R R (a) Install the VSVA on the workholder A43236 and attach the workholder to a hydraclamp or hold it in a vice.

R R R (b) Extend the ram piston (piston assembly) (3-110) by hand to the fully extended position. Use the reaction tool (of tool A43321), to hold the ram piston and unscrew the fork end with the torque adapter.

R R R (c) Remove the fork end (2-110) together with the toroidal sealing ring (2-120) from the ram piston (3-110). Remove the toroidal sealing ring (2-120) from the fork end (2-110); discard the toroidal sealing ring.

R R R R (d) Unscrew and remove the self-locking nut (2-150) from the adjuster stem of the LVDT (2-160). Use the adjusting tool A43222 to hold the LVDT adjuster stem while the self-locking nut (2-150) is unscrewed at the same time. Discard the self-locking nut (2-150).

R R Note: Use the adjuster part of the tool to hold the LVDT adjuster stem; use he sleeve socket to turn the nut.

R R (e) Unscrew the LVDT adjuster stem from the ram piston (3-110) (clockwise when viewed from arrow A); use the adjuster part of the tool A43222.

R R R (f) Unscrew and remove the three machine bolts (2-170) and the countersunk washers (2-180); these components secure the LVDT (2-160) to the body assembly (4-420).

R R (g) Remove the LVDT (2-160) from the body assembly (4-420). Remove the toroidal sealing ring (2-190/2-190A) from the LVDT; discard the toroidal sealing ring.

R (h) Attach a label to the removed LVDT; the label must contain this data:

REMOVED FROM UNIT SERIAL No. 1685***
UNIT HOURS RUN:

R R Note: 1685*** as shown on the data plate (1-30). The unit hours run should be added if this is known or can be got from the operator.

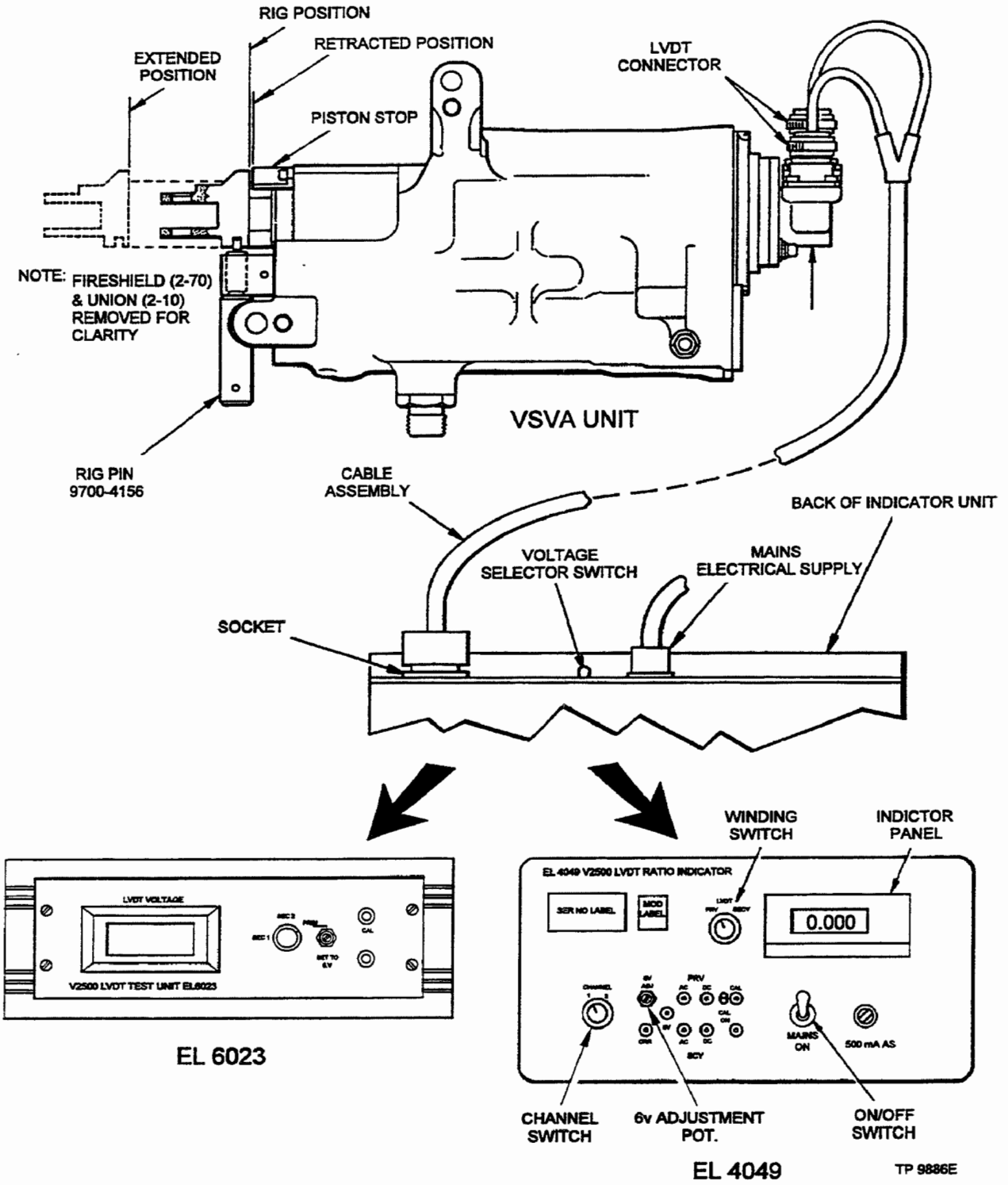
R (6) Install the Replacement LVDT, Figure 1

R R R R (a) Carefully remove the replacement LVDT (2607-4000) or (2607-4001) from the protective package. If the Supplier's Certificate is with the LVDT, make sure that the Serial Number on the Certificate is the same as that on the flange of the LVDT.

CAUTION: KEEP THE SUPPLIER'S CERTIFICATE AVAILABLE THROUGHOUT THE REMAINDER OF THESE INSTRUCTIONS.

R R R (b) Write on the Supplier's Certificate (if available), the serial number of the VSVA unit into which the LVDT is to be installed (1685*** - see the Note at sub. para. (5),(h)).

R R (c) Remove the LVDT from the polythene bag and clean all the surfaces with a dry, lint-free cloth.



LVDT Output Voltage Checks
Figure 2

R R *Jun 26/96*
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R (d) Get the replacement toroidal sealing ring (2-190); remove the sealing ring from the protective package and assemble it to the LVDT. Make sure the seal is not twisted in the groove.

R (e) Position the ram piston (3-110) to the mid stroke position. Extend the stem of the LVDT and install the LVDT to the body assembly (4-420), through the ram piston (piston assembly) (3-110).

Hold the VSVA unit in a vertical downward position so that the LVDT stem stays positively fully engaged in the ram piston shoulder. Use a pair of long nose pliers to carefully turn the stem (counter-clockwise viewed from arrow A) to initially engage the thread 2 turns in the shoulder of the ram piston (3-110).

R (f) Then use the adjuster part of the tool A43222 to screw the adjuster stem of the LVDT into the shoulder of the ram piston (3-110) (counterclockwise when viewed from arrow A). Make sure that the thread of the adjuster stem is fully engaged.

R (g) Align the three holes in the flange of the LVDT with the three holes in the LVDT housing (body assembly (4-420)). Install the three flat, countersunk washers (2-180) and the three machine bolts (2-170) to secure the LVDT.

R (h) Check, when the bolts are tightened, that there is a minimum of 0,23 Nm (2 lbf.in.) inbuilt torque in each of the inserts. If the inbuilt torque is less than this figure, reject the unit for Repair. Torque tighten the machine bolts to 4,5 Nm (40 lbf.in.).

R (i) Use the adjuster part of the tool A43222 to set the LVDT adjuster stem to a dimension of 15,66 ± 0,2 mm (0.6165 ± 0.008 in.) from the end of the piston as shown. Check with a vernier depth gauge.

R (j) Get the replacement self-locking nut (2-150) and assemble the nut to the adjuster stem of the LVDT. Use the adjuster part of the tool A43222 to hold the adjuster stem in the set position. At the same time, use the sleeve socket to tighten the nut but do not torque tighten at this stage. Remove the tool A43222.

R (k) Make sure that the fork end (2-110) is clean; if necessary, clean it with a dry, lint-free cloth.

R (l) Get the replacement toroidal sealing ring (2-120); remove the sealing ring from the protective package and assemble it to the fork end (2-110).

R (m) Install the fork end (2-110) into the end of the ram piston (3-110). Hold the ram piston with the reaction tool (of tool A43321) and torque tighten the fork end to 50 Nm (440 lbf.in.); use the torque adapter.

R (7) Check the LVDT adjustment, Figure 2.

R (a) Connect the cable assembly to the socket on the LVDT indicator unit EL4049 or EL6023, and the Channel 1 and Channel 2 connectors on the VSVA unit.

R Note: Channels 1 and 2 are marked on the cable assembly and the connector keyways make sure of correct assembly.

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R CAUTION: THROUGHOUT THE PROCEDURE, MAKE SURE THAT THE
R ENERGISING VOLTAGE REMAINS WITHIN THE LIMIT OF 6.000 ± 0.005v; RE-ADJUST THE VOLTAGE AS NECESSARY.

R (b) If necessary, adjust the energising voltage to 6.000 ± 0.005v by means of the 6v adjustment potentiometer on the indicator unit; check that the winding switch is in the PRIMARY position.

R Note: The Prim position on the LVDT test unit EL6023 has the same function as PRIMARY position on the LVDT test unit EL4049.

R (c) Move the ram piston (3-110) to the 'rig' position and put the rig pin 9700-4156 through the fireshield mounting block to engage the hole in the fork end (2-110).

R (d) Turn the winding switch to the SECONDARY position and read the LVDT output voltage on the indicator panel. Write the indicated voltage down under the heading 'Channel 1 - Rig Position'.

R Note: SEC 1 and SEC 2 positions on the LVDT test unit EL6023 is the same function as CHANNEL 1 and 2 positions on the LVDT test unit EL4049.

R (e) Turn the channel switch to the CHANNEL 2 position and repeat sub. para. (d). Write the indicated voltage down under the heading 'Channel 2 - Rig Position'.

R (f) If the LVDT Supplier's Certificate is available, continue from sub. para. (g). If no Certificate is available, continue from sub. para. (j).

R (g) Get the LVDT Supplier's Certificate and compare the Channel 1 and Channel 2 Rig Position, output voltages (as recorded), with those on the Certificate. For the LVDT to be accepted at the current setting, the voltages must be as follows:

R Channel 1 output voltage must equal that stated on the Supplier's Certificate ± 0.002v.

R Channel 2 output voltage must equal that stated on the Supplier's Certificate ± 0.003v.

R (h) If the output voltages are within the limits given in sub. para. (g), check the output voltages at the retracted and extended positions (sub. paras. (8) (i) and (l)).

R (i) If the output voltages are outside the limits given in sub. para. (g), calculate the difference between the voltages as follows (use the Channel 1 voltages only):

R e.g.	Channel 1 voltage as recorded:	2.681v
R	Channel 1 voltage stated on Supplier's Certificate:	2.667v
R	Difference:	+0.014v

R This shows that the LVDT output voltage must be reduced by 0.014v at the rig position.

R (j) If the LVDT Supplier's Certificate is not available, compare the Channel 1 and 2
R voltages recorded at sub. paras. (d) and (e) with the nominal voltages as follows:

R Channel 1 voltage: 2.650±0.002v
R Channel 2 voltage: 2.650±0.003v

R (k) If the output voltages are within the limits given in sub. para. (j), check the output
R voltages at the retracted and extended positions (sub. paras. (8) (i) and (l)).

R (l) If the output voltages are outside the limits given in sub. para. (j), calculate the
R difference between the voltages as follows (use the Channel 1 voltages only):

R e.g. Channel 1 voltage as recorded: 2.675v
R Channel 1 nominal voltage: 2.650.

R Difference: +0.025v

R This shows that the LVDT output voltage must be reduced by 0.025v at the rig
R position.

R (8) Adjust the LVDT output voltage, Figures 1 and 2.

R (a) Remove the rig pin 9700-4156. Move the ram piston (3-110) to approximately the
R extended position and remove the fork end (2-110) as described in sub. para.
R (5),(b) and (c). Turn the channel switch to the CHANNEL 1 position and read the
R new indicated Channel 1 output voltage.

R CAUTION: DO NOT MOVE THE RAM PISTON, IN THE STROKE MODE, DURING
R THE ADJUSTMENT PROCEDURE.

R (b) Slacken the self-locking nut (2-150) and turn the stem of the LVDT to adjust the
R output voltage; use the tool A43222. Use the reaction tool of tool A43321 to
R prevent rotation of the ram piston.

R Note: Counterclockwise rotation of the LVDT adjuster stem (when viewed from arrow
R A), REDUCES the LVDT, indicated output voltage. Clockwise rotation
R INCREASES the indicated voltage.

R (c) Adjust the stem of the LVDT to increase or reduce the indicated voltage by the
R value calculated at sub. para. (7),(i) or (7) (l) as applicable. Monitor the output
R voltage as the adjuster stem is turned. When the required voltage is indicated,
R torque tighten the self-locking nut (2-150) to 11,5 Nm (102 lbf. in.).

R (d) Measure the depth of the adjuster stem from the end face of the ram piston
R (3-110) (dimension X, Figure 1). Write this dimension down in case no further
R adjustment is required.

R (e) Re-assemble and torque tighten the fork end (2-110), as described in sub. para.
R (6),(m). Return the ram piston (3-110) to the 'rig' position and re-insert the rig pin
R 9700-4156.

R (f) Turn the winding switch to the PRIMARY position and the channel switch to the
R CHANNEL 1 position; check the energising voltage as given in sub. para. (7),(b).
R Return the winding switch to the SECONDARY position.

R (g) Re-check the Channel 1 and Channel 2 Rig Position, output voltages which must
R be within the limits given in sub. para. (7),(g) or (7),(j) as applicable. If the
R voltages are still outside of the limits stated, re-adjust the LVDT adjuster stem as
R given in sub. paras. (a) through (e).

R (h) Repeat sub. para. (f).

R (i) Remove the rig pin 9700-4156 and move the ram piston to the fully retracted
R position (with the fork end against the piston stop). Check the indicated output
R voltage for both Channel 1 and Channel 2 at this position. The indicated output
R voltage is to be within the limit of 2.689v minimum and 2.736v maximum.

R (j) If the indicated output voltage (for either Channel), is outside of the limit given in
R sub. para. (i), it is possible to adjust the voltage only within the tolerance available
R at the 'rig' position. If necessary, repeat the adjustment procedure given in sub.
R paras. (a) through (g) and write down the indicated voltages for the 'rig' position.

R (k) Repeat sub. para. (f).

R (l) Move the ram piston (3-110) to the fully extended position. Check the indicated
R output voltage for both Channel 1 and Channel 2 at this position. The indicated
R output voltage for each Channel is to be within the limit of 0.385v minimum and
R 0.417v maximum. If the output voltage (for either Channel), is outside of the limit,
R the same adjustment conditions as for sub. para. (j) apply.

R (m) Repeat the checks at the retracted and extended positions after any adjustment.
R Make sure that the self-locking nut (2-150) and the fork end (2-110) are correctly
R torque tightened, once adjustment is complete. Before the fork end is installed,
R re-measure dimension X, if any adjustment has been made since sub. para. (d).

R (n) Where the LVDT Supplier's Certificate is available and is to be returned with the
R first LVDT, write on the Supplier's Certificate the final values of indicated voltage
R and adjuster stem depth as follows:

	Channel 1	Channel 2
R	Rig:	Rig:
R	Retracted:	Retracted:
R	Extended:	Extended:
R	Adjuster stem depth:	

R (o) Disconnect the cable assembly from the Channel 1 and Channel 2 connectors of
R the VSVA unit.

R Note: If the EL4049 or EL6023 LVDT indicator unit is to be used to accomplish another
R VSVA unit, within the next two hours it is advisable to keep the unit switched ON.

R (9) Complete the Assembly of the Unit, Figure 1.

(a) Remove the VSVA from the holding fixture and apply Ardrox 3302 to the areas of the joint faces of the LVDT and the unit body, as given in 75-32-41, Assembly.

R
R (10) Re-identify the VSVA unit, Figure 1.

R TYPE No. - Use a vibro-engraving tool and delete the mark of the
R unit as shown ~~Mk/6~~/ and insert Mk 7

R (11) Install the VSVA and do the necessary leakage tests as instructed by IAE Service Bulletin
R V2500-ENG-75-0061.

R (12) A record of accomplishment is required.

R (13) Place the removed LVDT, in a clean polythene bag and, if possible, heat seal the bag.
R Pack the LVDT, together with the Supplier's Certificate (for the replacement LVDT, if it
R was available), in the package material from which the replacement LVDT was removed.

R (14) Return the LVDT package to:

R Penny and Giles
R Electronic Components Ltd.,
R 36 Nine Mile Point Industrial Estate
R Cwmfelinfach
R Gwent NP1 7HZ
R UK
R (For the attention of the Repair Coordinator).

R B. Unit Replacement Only (Part 2)

R (1) Remove the Variable Stator Vane Actuator (VSVA), Unit as instructed by IAE Service
R Bulletin V2500-ENG-75-0061.

Note: Removed VSVA units should be returned to one of the Repair Bases listed below:

Lucas Aerospace Customer Support Europe
The Radleys,
Marston Green,
Birmingham B33 0HZ
England.

Lucas Aerospace Customer Support Americas
30 Van Nostrand Avenue
Englewood
New Jersey 07631
USA.

R (2) Install the replacement VSVA unit as instructed by IAE Service Bulletin V2500-ENG-75-
R 0061. The part number identification, 1685 Mk7, will show that this Service Bulletin
R (Modification) has been incorporated.

R (3) A record of accomplishment is required.

C. Overhaull facility accomplishment instructions (Part 3)

(1) Remove the transport components in accordance with Page Block 301, Disassembly procedure the Lucas Aerospace Variable Stator Vane Actuator, TYPE 1685 Component Maintenance Manual.

(2) Remove the LVDT in accordance with Page Block 301, Disassembly procedure of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 1685 Component Maintenance Manual.

(3) Install the LVDT in accordance with Page Block 701, Assembly procedure of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 1685 Component Maintenance Manual.

(4) Do a Check of the LVDT Adjustment in accordance with Page Block 101, Assembly procedure of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 1685 Component Maintenance Manual.

(5) Attach a label to the removed LVDT; the label must contain this data:

REMOVED FROM UNIT SERIAL No. 1685***
UNIT HOURS RUN:

Note: 1685*** as shown on the data plate (1-30), The unit hours run should be added if this is known or can be got from the operator.

(6) Remove the label retaining strap (1-20) and the data plate (1-30) from the VSVA. in accordance with Page Block 301, Disassembly procedue of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 1685 Component Maintenance Manual.

Discard the label retaining strap (1-20) but keep the data plate (1-30) until the Service Bulletin is accomplished.

(7) Re-identify the VSVA unit, Figure 1.

(a) Get the new data plate (1-30) (supplied with the Mod. kit).

(b) Refer to the information marked on the first data plate (1-30) and mark the new data plate as follows (use 1/16in. (1,6mm), letter/number stamps). Use the stamps with the data plate held on a flat surface:

TYPE No.	-Mark: 1685 Mk7
SERIAL No.	-Mark as on the original plate.
MOD No.	-Mark as on the original plate.
INSP.	-Keep blank.
TEST	-Keep blank.

(c) Where possible, fill in the stamped letters and numbers with black paint and wipe away the surplus.

(d) Destroy the first data plate.

R (e) Install the new data plate on the VSVA unit with a new label retaining strap (1-20)
R (supplied with the Mod. kit) in accordance with Page Block 701, Assembly
R procedure of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 1685
R Component Maintenance Manual.

R (f) Store the assembled unit in accordance with Page Block 701, Assembly
R procedure of the Lucas Aerospace Variable Stator Vane Actuator, TYPE 1685
R Component Maintenance Manual.

3. Material Information

A. Modification Kit

Modification kit D.TV.055 (comprises the parts given in Para. C.).

B. Parts to be Re-worked

None.

C. New Production Parts

The following new parts will be available as spares:

New Part No.	Qty.	Keyword	Old Part No.	
2607-4000) alt. 2607-4001)	1	LVDT	1685-4044)SB 1685-75-003, Pre SB 1685-4050)1685-75-004. 1685-4046 SB 1685-75-004.	
STD1017-4121	1	Ring, sealing	STD1017-4121	
STD831-28	1	Ring, sealing	STD831-28	
AS20625	1	Nut, self-locking	AS20625	
215-410	1	Strap, label retaining	215-410	Part 3 Only
215-4030	1	Plate, data	215-4012	Part 3 Only

D. Identification of Units

The type of equipment affected by this Service Bulletin (Modification), is:

Unit	Type No.
Variable Stator Vane Actuator	1685 Mk6 (Becomes 1685 Mk7).

Lucas Aerospace

SERVICE BULLETIN

1685-75-007 (SUPPLEMENT)

ENGINE COMPRESSOR CONTROL - VARIABLE STATOR VANE ACTUATOR. INTRODUCTION OF NEW LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT), WITH REVISED TERMINATION JOINTS AND SLEEVING MATERIAL TO PREVENT JOINT DEGRADATION.

(IAE SB V2500-ENG-75-0061)
(LAECS MOD. D.TV.055)

1. Modification Kit

Modification kit D.TV.055 comprises the parts given in Para. 2.

2. New Production Parts

	Part No.	Qty per unit	Keyword	Gross World List Price (Dollars)	Availability on Receipt of Order
	2607-4000)				
	2607-4001) Alt.	1	LVDT	$6800.51	30 days
	STD1017-4121	1	Ring, sealing	$ 181.09	30 days
	STD831-28	1	Ring, sealing	$ 26.27	30 days
	AS20625	1	Nut, self-locking	$ 22.91	15 days
	215-410	1	Strap, label retaining	$ 6.11	15 days
	215-4030	1	Plate, data	$ 17.48	15 days

3. New Tooling

	EL4049	1	Unit, indicator, LVDT	Price on application
R	EL6023 (alt to EL4049)	1	Unit, indicator, LVDT	Price on application
R	A43321	1	Tool, reaction/Adapter	Price on application
R	A43222	1	Tool, adjusting	Price on application
R	9700-4156	1	Pin, rig	Price on application

4. Spare Parts Supply

Spares distribution and Customer Service is available from the following Lucas Aerospace Customer Support Centres:

	REGION	ADDRESS	COMMUNICATION	
R	AMERICAS	LUCAS AEROSPACE	PHONE	(1) 201 567 6400
R		CUSTOMER SUPPORT	AOG	(1) 201 567 6411
R		AMERICAS	FAX	(1) 201 894 1965
R		30 VAN NOSTRAND AVENUE	SITA/ARINC	EWRLU7X
R		ENGLEWOOD		
R		NEW JERSEY 07631		
R		USA		

EDL 205876- V2500

REGION	ADDRESS	COMMUNICATION	
EUROPE/MIDDLE -EAST/ AFRICA	LUCAS AEROSPACE CUSTOMER SUPPORT EUROPE BRUETON HOUSE NEW ROAD SOLIHULL B91 3TX ENGLAND	PHONE/AOG TELEX FAX SITA/ARINC	(44) 0121 627 6767 334174 (44) 121 500 6405 BHXLW7X
ASIA-PACIFIC	LUCAS AEROSPACE CUSTOMER SUPPORT ASIA 35/37 LOYANG WAY SINGAPORE 1750	PHONE FAX SITA/ARINC AOG	(65) 545 9975 (65) 545 9965 SINLU7X (65) 545 6253