P U B L I C A T I O N T R A N S M I T T A L

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DATER Jun.16/00

V2500-A5/D5 SERIES PROPULSION SYSTEMS SERVICE BULLETIN

This document transmits Revision 2 to Service Bulletin EV2500-72-0186

Document History

Service Bulletin Revision Status		Supplement Revision Status
Initial Issue	Mar.7/97	
Revision 1	Jul.24/98	

Bulletin Revision 2

Remove	Incorporate	Reason for change
All pages of the Service Bulletin	Pages 1 to 19 of the Service Bulletin	To correct Part Number in Section 3. Accomplishment Instructions

V2500-ENG-72-0186

CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
If any have not been received please advise Publication Services, Rolls-Royce plc, Derby, England

LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 2 are as follows:

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MODIFICATION SERVICE BULLETIN - ENGINE - HP COMPRESSOR - NEW VARIABLE INLET GUIDE VANES AND STAGE 3 AND STAGE 4 VARIABLE STATOR VANES WITH INCREASED ANGULAR MOVEMENT

1. Planning Information

A. Effectivity

(1) Airbus A319

V2522-A5, V2524-A5 Engines prior to Serial No.V10046

(2) Airbus A320

V2527-A5, V2527E-A5 Engines prior to Serial No.V10046

(3) Airbus A321

V2530-A5 Engines prior to Serial No.V10046

(4) Boeing Long Beach Division MD-90

V2525-D5, V2528-D5 Engines prior to Serial No.V20007

(5) ATA Location

72-41-00

B. Concurrent Requirements

R None.

C. Reason

(1) Problem

The variable inlet guide vanes and Stage 3 and 4 variable stator vanes of the HP Compressor, have to close an additional 4 degrees.

(2) Evidence

During engine tests it was found that the variable inlet guide vanes (VIGV's) and Stage 3 and 4 variable stator vanes (VSV's) had to close an additional 4 degrees. This is to make sure that the engine can comply with all starting specifications.

(3) Substantiation

An engineering analysis has shown that minor changes to the vane aerofoils will not affect their integrity. There is little effect on the efficiency of the compressor.

(4) Objective

The purpose of this Service Bulletin is to make sure that the engine can start with minimum starter air pressure.

(5) Effect of Bulletin on Workshop Procedures:

(a) Operation

Not affected

(b) Maintenance

Not affected

(c) Overhaul

Not affected

(d) Repair Schemes

Not affected

(e) Interchangeability

Not affected

(f) Fits and Clearances

Not affected

D. Description

(1) This Service Bulletin introduces revised VIGV's and Stage 3 and Stage 4 VSV's for the HP Compressor, the changes are as follows:

(a) To avoid fouls under adverse tolerance conditions, material has been removed from the corners of the aerofoils adjacent to the inner shrouds and outer annulus of the front case.

(2) The spindle thread form of existing Stages 3, 4 and 5 VSV's must be inspected with a special thread form graticule. This inspection is applicable to engines with serial numbers V10006 thru to V10045 (A5) and V20001 thru to V20006 (D5). This inspection must be carried out before rework.

(a) The vanes must be rejected if the thread form does not comply with the inspection standards.

(3) A batch of vanes with malformed threads was identified. To make sure that the nut retention was satisfactory, an additional sealing compound was instructed.

(4) Existing vanes can be reworked by machining.

E. Compliance

Category Code 6

This Service Bulletin can be accomplished when the sub-assembly (That is modules, accessories, components, build groups) is disassembled sufficiently to get access to all affected parts.

F. Approval

The part number changes and/or part modifications described in Section 2 and 3 of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the Engine Models listed.

G. Manpower

Estimated manhours to incorporate the full intent of this bulletin:

(1) In Service

Not applicable

(2) At Overhaul

(a) To inspect Stages 3, 4 and 5 VSV's spindle thread form

2 hours 11 minutes

(b) To rework VIGV's and Stage 3 and 4 VSV's

33 hours 24 minutes

(c) Total: 35 hours 35 minutes

NOTE: It is possible to get access to the parts affected by this Service Bulletin at Overhaul.

H. Material - Price and Availability

(1) Modification Kit not required.

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

I. Tooling - Price and Availability

Tool No.	Qty	Description	Function	Availability
2R19198	1	Graticule	Inspect Stages 3, 4 and 5 VSV threads	(1)
3R19110	1	Filing fixture	Hold IGV	(1)
3R19184	1	Lock nut	Retain IGV	(1)
3R19111	1	Filing fixture	Hold Stage 3 VSV	(1)
3R19114	1	Timing piece	Set Stage 3 VSV	(1)
3R19185	1	Lock nut	Retain Stage 3 VSV	(1)
3R19112	1	Filing fixture	Hold Stage 4 VSV	(1)
3R19115	1	Timing piece	Set Stage 4 VSV	(1)
3R19186	1	Lock nut	Retain Stage 4 VSV	(1)

Availability Code:

(1) Tool drawings are available

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

This Service Bulletin has no effect on the aircraft electrical load.

L. References

(1) A1/A5/D5 Engine Manual (EM).

(2) Standard Practices Manual (SPM).

(3) Internal Reference No.

IAE Engineering Change Number 93VR026 and 93VR068

M. Other Publications Affected

(1) Illustrated Parts Catalogue (IPC), Chapter/Section 72-41-32.

(2) Engine Manual (EM), Chapter/Section 72-41-30, Removal/Installation.

2. Material Information

A. Kits associated with this Bulletin:

None.

B. New production parts:

PART NO.	QTY	UNIT PRICE
6A5653	38	553.00
6A5655	2	553.00
6A5677	30	477.00
6A5678	2	477.00
6A5679	50	418.00
6A5762	60	418.00
6A5763	4	418.00

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

C. Parts affected by this Bulletin:

Applicability: For each V2500 engine to incorporate this Bulletin:

72-41-32

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	OLD PART NO.	INSTR DISP
01-500	6A5653	38	Vane assy, variable inlet guide - long spindle	6A4201	(A)(B)(S1)(1D)
01-600	6A5655	2	Vane assy, variable inlet guide - short spindle	6A4203	(A)(B)(S1)(1D)
02-500	6A5677	30	Vane, variable stator - long spindle - Stage 3	6A4401	(A)(B)(S1)(1D)
02-600	6A5678	2	Vane, variable stator - short spindle - Stage 3	6A4402	(A)(B)(S1)(1D)
03-500	6A5679	50	Vane, variable stator - Stage 4	6A4370	(A)(B)(S1)(1D)
04-500	6A5762	60	Vane, variable stator - long spindle - Stage 5	6A4331	(A)(B)(S1)(2D)
04-600	6A5763	4	Vane, variable stator - short spindle - Stage 5	6A4332	(A)(B)(S1)(2D)

D. Instruction Disposition Codes

(A) New parts are available.

(B) Old parts are not available.

(S1) New parts must be installed as a set.

(1D) Old parts can be reworked and re-identified to the new part.

(2D) Old part can be inspected and re-identified to new part number.

3. Accomplishment Instructions

A. Rework Instructions

(1) Consumable Materials

None

(2) Standard Equipment

Chemical cleaning equipment

Standard workshop equipment

Penetrant crack test equipment

Vibro engraving equipment

CAUTION: TITANIUM COMPONENT - YOU MUST USE SILICON CARBIDE TYPE ABRASIVE WHEELS, STONES AND PAPERS TO DRESS, BLEND AND POLISH THIS COMPONENT.

CAUTION: TITANIUM COMPONENT - DO NOT USE FORCE WITH MECHANICAL CUTTERS OR THE MATERIAL WILL BECOME TOO HOT.

CAUTION: TITANIUM COMPONENT - IF THE MATERIAL SHOWS A CHANGE IN COLOR, TO DARKER THAN A LIGHT STRAW COLOR, THE COMPONENT IS TO BE REJECTED.

(3) Rework parts 6A4201 Variable Inlet Guide Vane (VIGV) Assembly, Long Spindle (72-41-32, Fig/Item 01-500 and 6A4203 Variable Inlet Guide Vane (VIGV) Assembly, Short Spindle (72-41-32, Fig/Item 01-600)

PROCEDURE	RELATED DATA
(a) With chemical cleaning equipment, clean VIGV	Refer to Standard Practices Manual (SPM), TASK 70-11-03-300-503

(b) Install VIGV in filing fixture 3R199110

(i) With 3R19184 lock nut, safety VIGV in filing fixture.

(ii) Make sure VIGV is correctly located.

PROCEDURE	RELATED DATA
(c) With standard workshop equipment, file VIGV	Refer to Figures 4 and 5

(d) With standard workshop equipment, remove any sharp edges	Refer to Figures 4 and 5
(e) With chemical cleaning equipment, clean reworked area(s)	Refer to Standard Practices Manual (SPM), TASK 70-11-08-300-503, SUBTASK 70-11-03-300-001
(f) With chemical cleaning equipment, swab etch the affected area(s)	Refer to Standard Practices Manual (SPM), TASK 70-11-08-300-503, SUBTASK 70-11-03-300-002
(g) With penetrant crack test equipment, do a penetrant crack test	Refer to Standard Practices Manual (SPM), TASK 70-23-03-230-501

(i) Reject vane if any cracks are found.

PROCEDURE	RELATED DATA
(h) Measure dimensions	Refer to Figures 4 and 5
(i) With vibro engraving equipment, cancel old part number and re-identify with new part number	Refer to Standard Practices Manual (SPM), TASK 70-09-00-400-501, SUBTASK 70-09-00-400-001

Existing	Re-number
6A4201	6A5653
6A4203	6A5655

(4) Rework parts 6A4401 Stage 3 Variable Stator Vane (VSV), Long Spindle (72-41-32, Fig/Item 02-500 and 6A4402 Stage 3 Variable Stator Vane (VSV), Short Spindle (72-41-32, Fig/Item 02-600)

PROCEDURE	RELATED DATA
(a) With chemical cleaning equipment, clean Stage 3 VSV	Refer to Standard Practices Manual (SPM), TASK 70-11-03-300-503

(b) Install Stage 3 VSV in filing fixture 3R199111

(i) With 3R19185 lock nut, safety the VSV in filing fixture.

(ii) Install 3R19114 Timing piece.

(iii) Make sure VSV is correctly located.

PROCEDURE	RELATED DATA
(c) With standard workshop equipment, file Stage 3 VSV	Refer to Figures 4, 5 and 6

PROCEDURE	RELATED DATA
(i) With standard workshop equipment, remove any sharp edges	Refer to Figures 4, 5 and 6

PROCEDURE	RELATED DATA
(d) With chemical cleaning equipment, cold ferric chloride etch reworked area(s)	Refer to Standard Practices Manual (SPM), TASK 70-11-39-300-503, SUBTASK 70-11-39-300-001
(e) With penetrant crack test equipment, do a penetrant crack test	Refer to Standard Practices Manual (SPM), TASK 70-23-03-230-501

(i) Reject vane if any cracks are found.

PROCEDURE	RELATED DATA
(f) Measure dimensions	Refer to Figures 4, 5 and 6
(g) With vibro engraving equipment, cancel old part number and re-identify with new part number	Refer to Standard Practices Manual (SPM), TASK 70-09-00-400-501, SUBTASK 70-09-00-400-001

Existing	Re-number
6A4401	6A5677
6A4402	6A5678

R

(5) Rework part 6A4370 Stage 4 Variable Stator Vane (VSV) (72-41-32, Fig/Item 03-500)

PROCEDURE	RELATED DATA
(a) With chemical cleaning equipment, clean Stage 4 VSV	Refer to Standard Practices Manual (SPM), TASK 70-11-03-300-503

(b) Install Stage 4 VSV in filing fixture 3R199112

(i) With 3R19186 lock nut, safety Stage 4 VSV in filing fixture.

(ii) Install 3R19115 Timing piece.

(iii) Make sure Stage 4 VSV is correctly located.

PROCEDURE	RELATED DATA
(c) With standard workshop equipment, file Stage 4 VSV	Refer to Figures 4 and 7
(d) With standard workshop equipment, remove any sharp edges	Refer to Figures 4 and 7
(e) With chemical cleaning equipment, cold ferric chloride etch reworked area(s)	Refer to Standard Practices Manual (SPM), TASK 70-11-39-300-503, SUBTASK 70-11-39-300-001
(f) With penetrant crack test equipment, do a penetrant crack test	Refer to Standard Practices Manual (SPM), TASK 70-23-03-230-501

(i) Reject vane if any cracks are found.

PROCEDURE	RELATED DATA
(g) Measure dimensions	Refer to Figures 4 and 7
(h) With vibro engraving equipment, cancel old part number and re-identify with new part number	Refer to Standard Practices Manual (SPM), TASK 70-09-00-400-501, SUBTASK 70-09-00-400-001

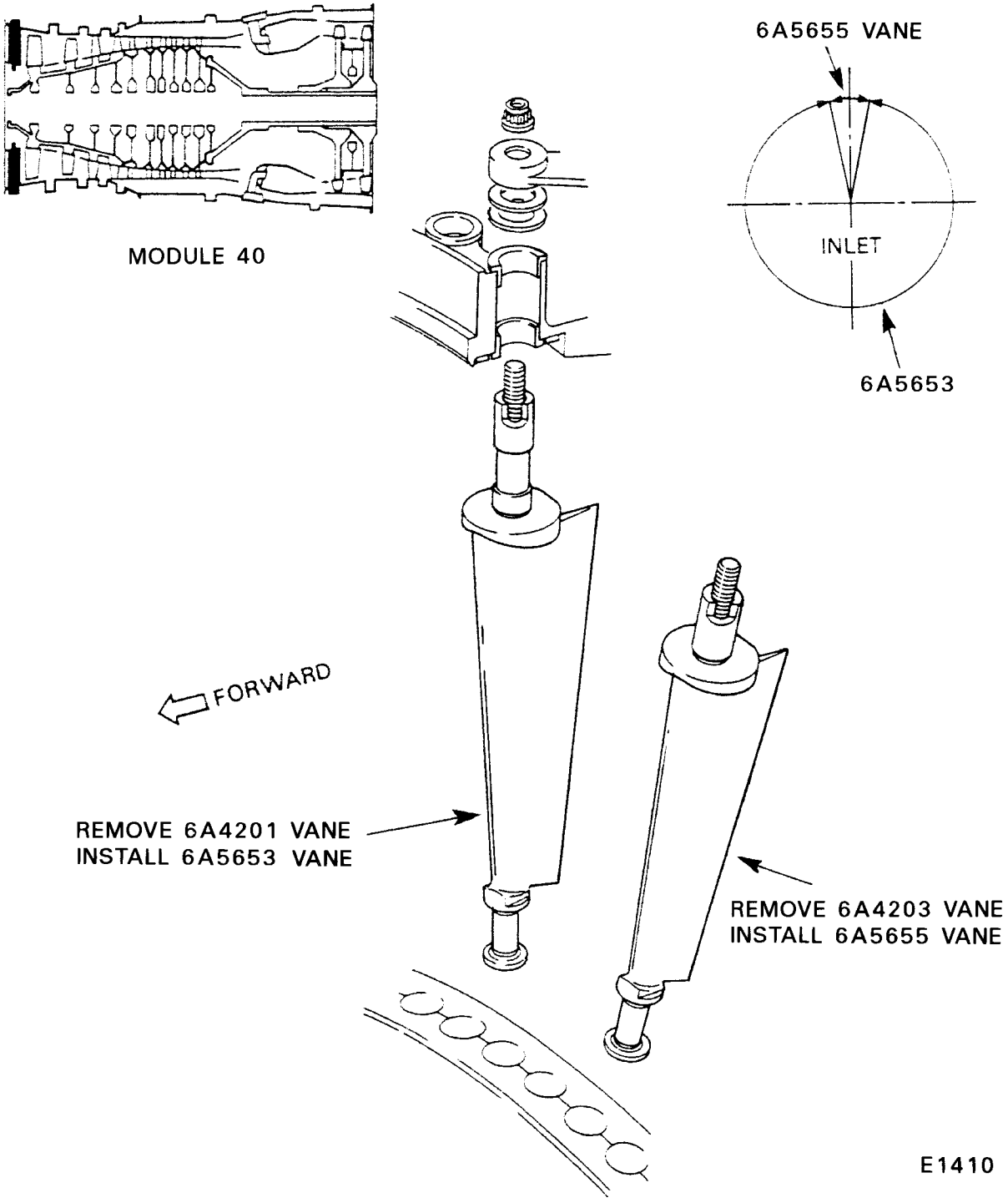
Existing	Re-number
6A4370	6A5679

B. Assembly Instructions

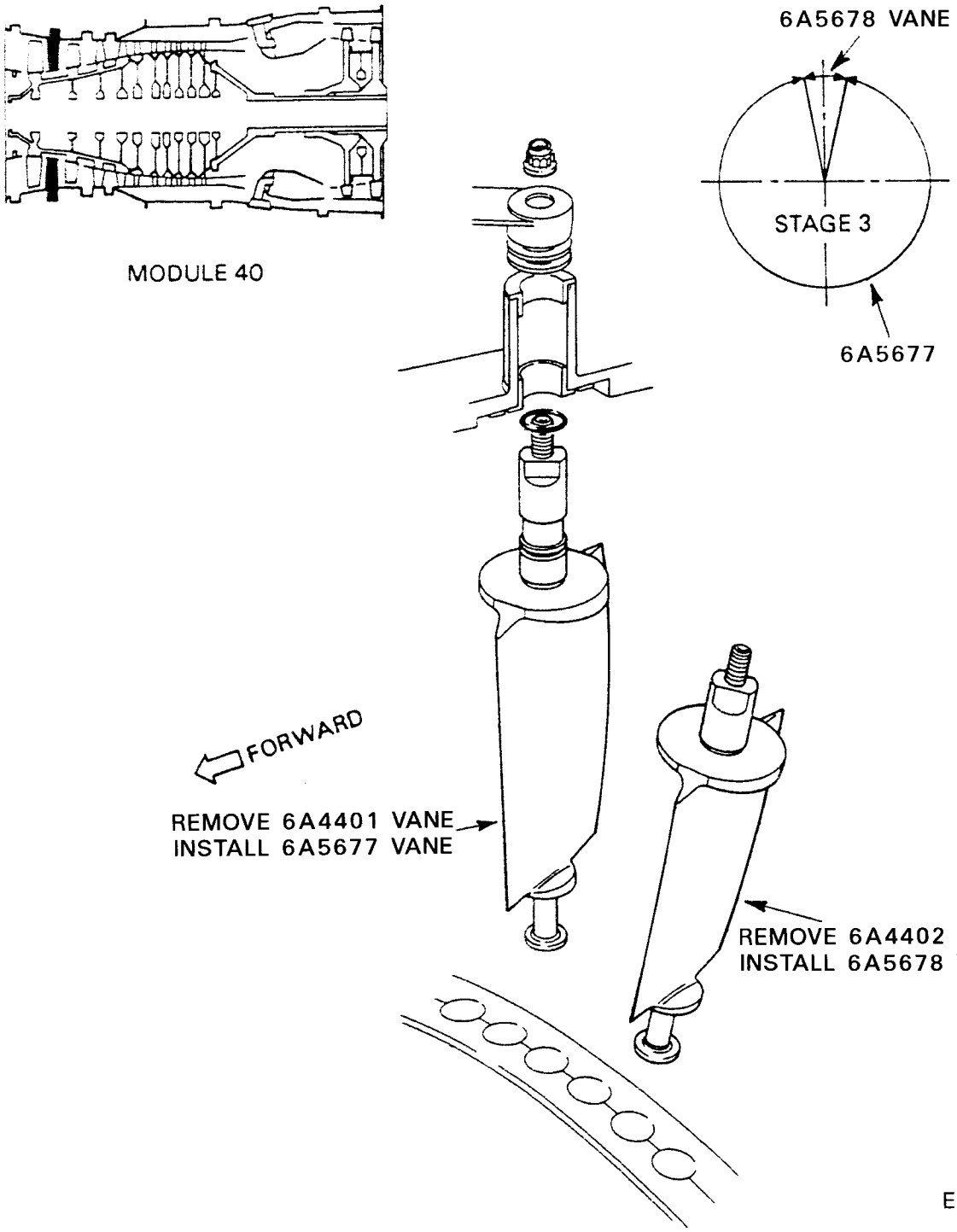
(1) For correct removal/installation procedures, refer to A5/D5 Engine Manual (EM), Chapter/Section 72-41-10, Assembly.

C. Recording Instructions

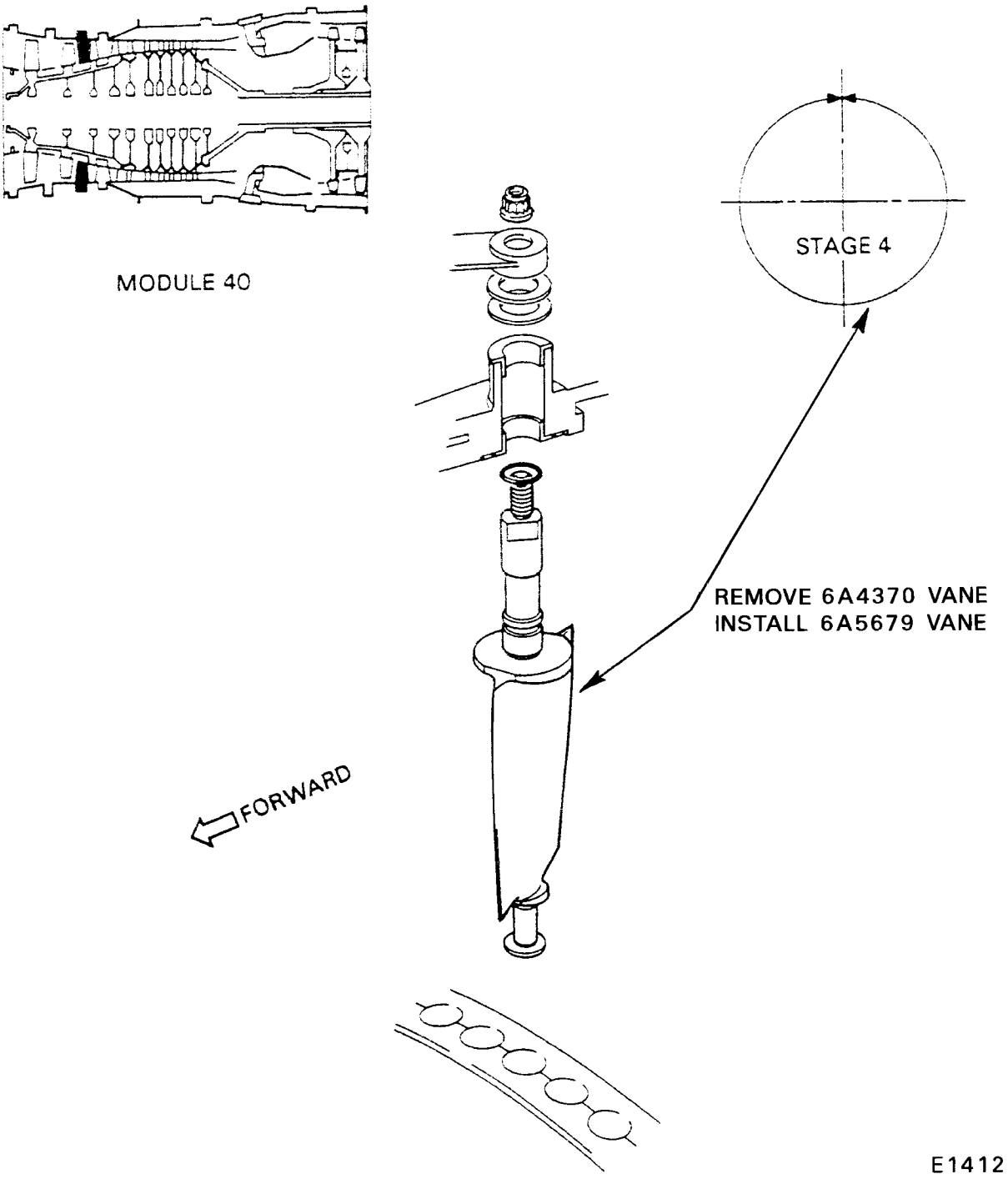
(1) A record of accomplishment is necessary.



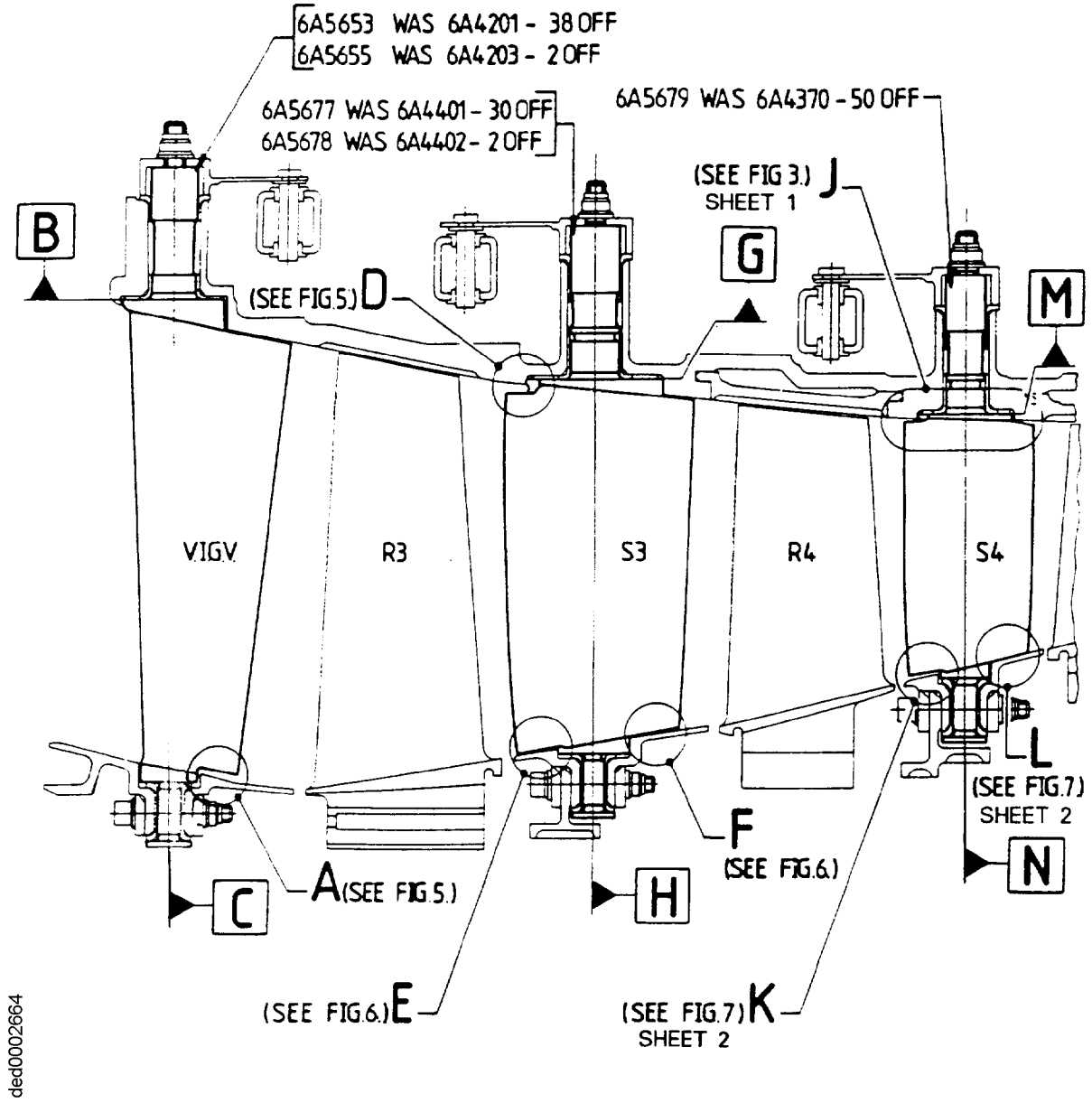
Location of VIGV's
Figure 1



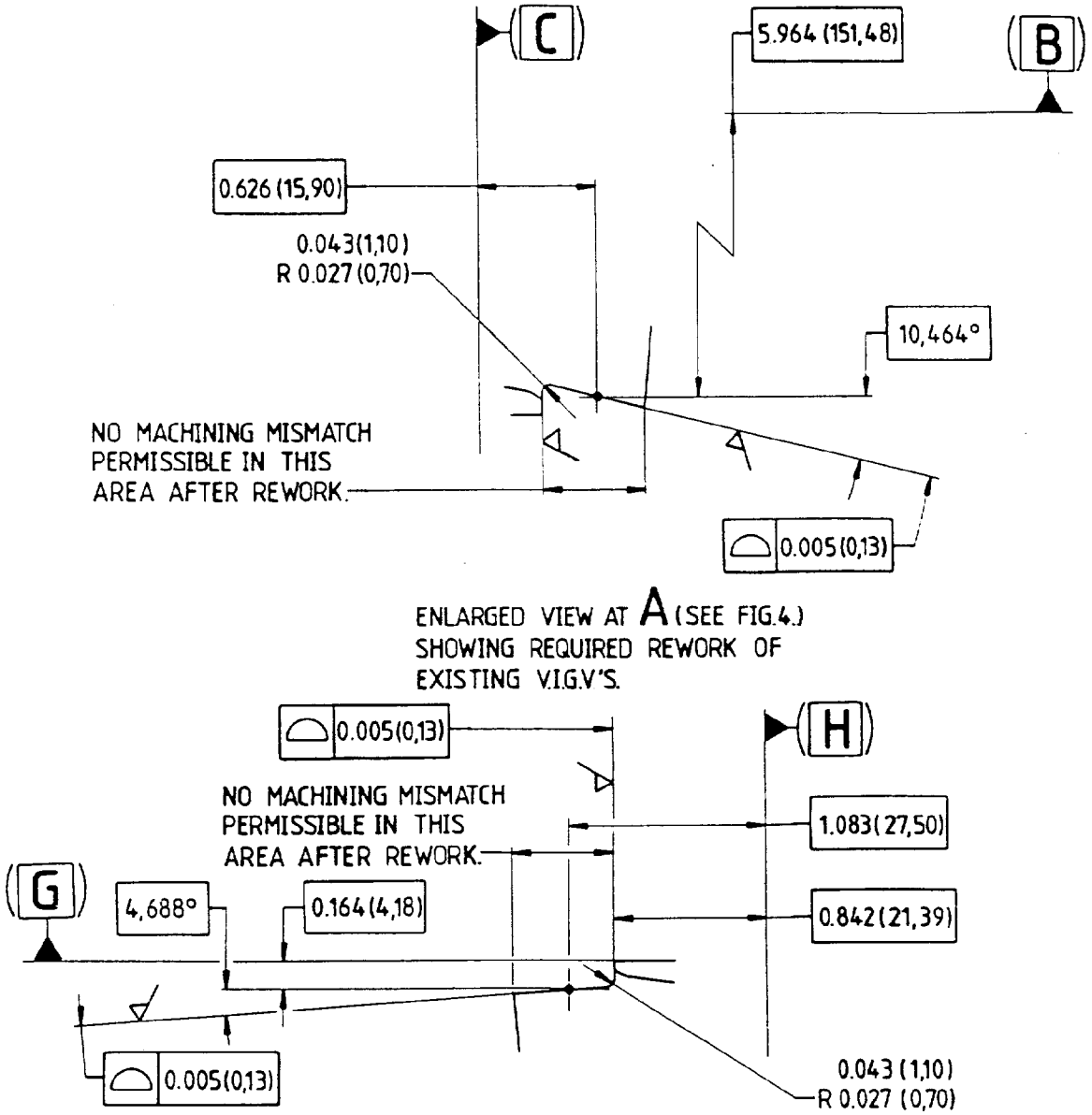
Location of Stage 3 VSV's
Figure 2



Location of Stage 4 VSV's
Figure 3



Part view of HP Compressor - Before and after alteration
Figure 4



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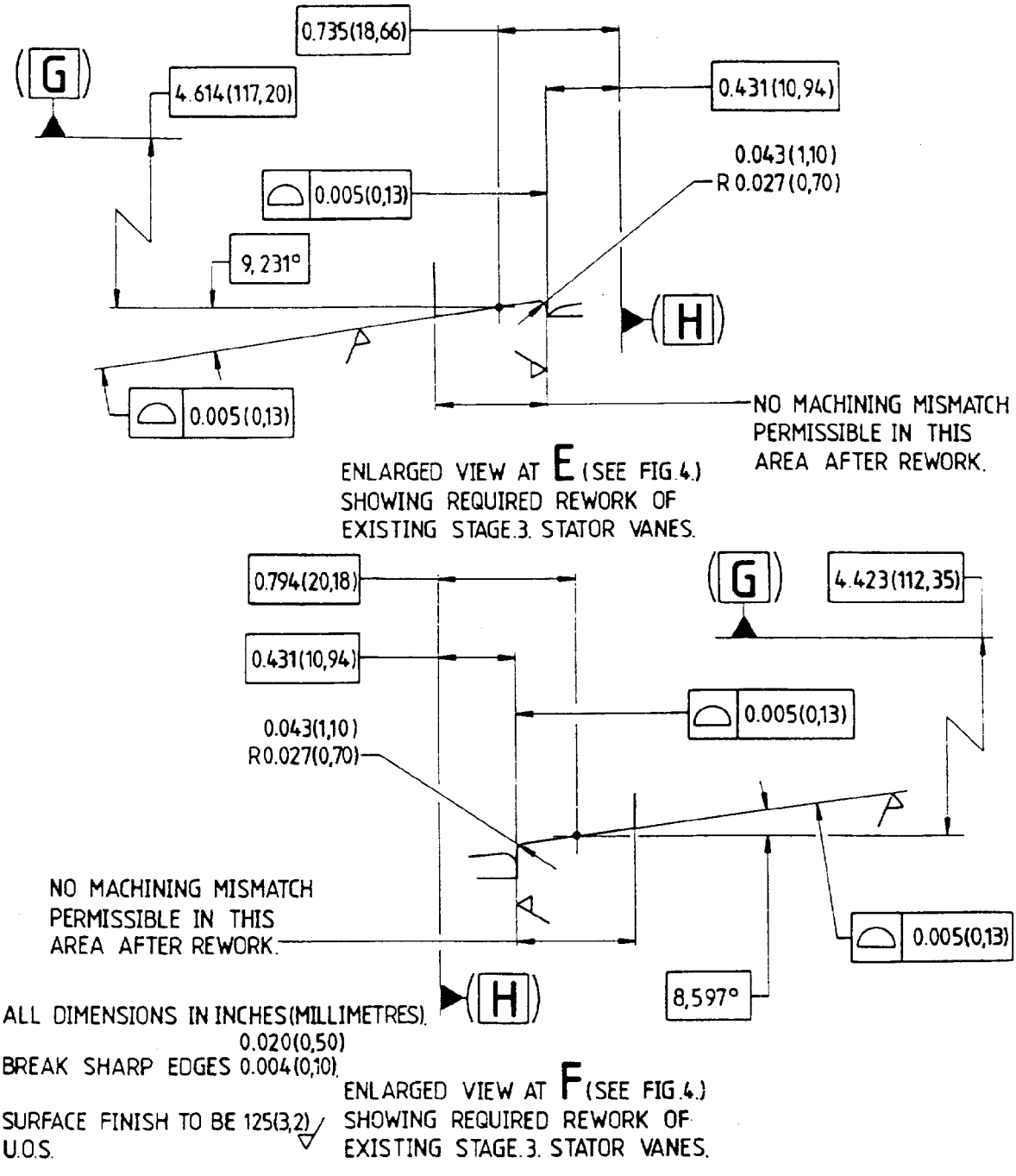
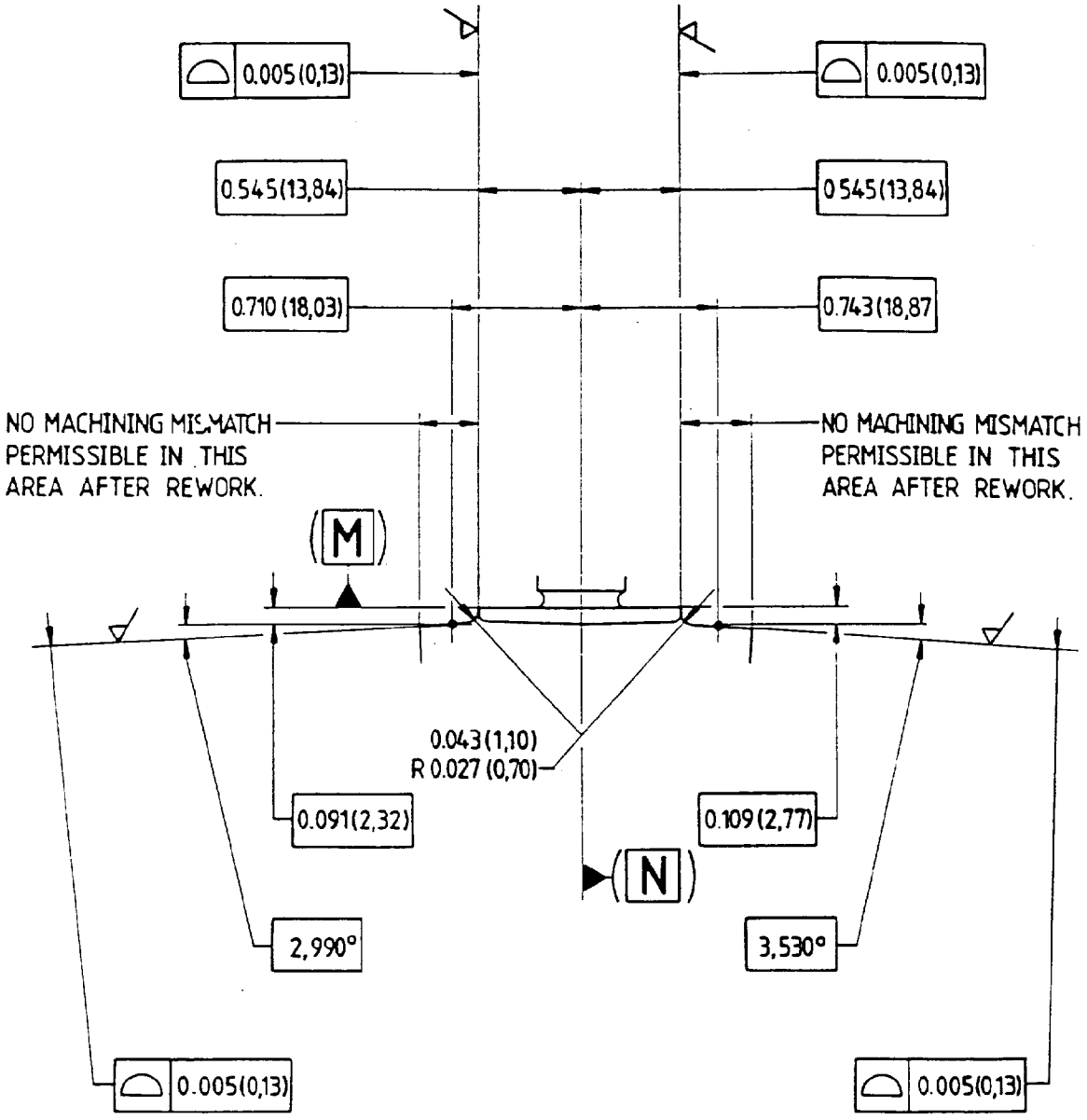
Rework of VIGV's and Stage 3 VSV's
Figure 5



Rework Stage 3 VSV's
Figure 6



ALL DIMENSIONS IN INCHES (MILLIMETRES).

BREAK SHARP EDGES 0.020(0,50) 0.004(0,10).

SURFACE FINISH TO BE 125(3,2) U.O.S.

ENLARGED VIEW AT J (SEE FIG.4.) SHOWING REQUIRED REWORK OF EXISTING STAGE 4. STATOR VANES.

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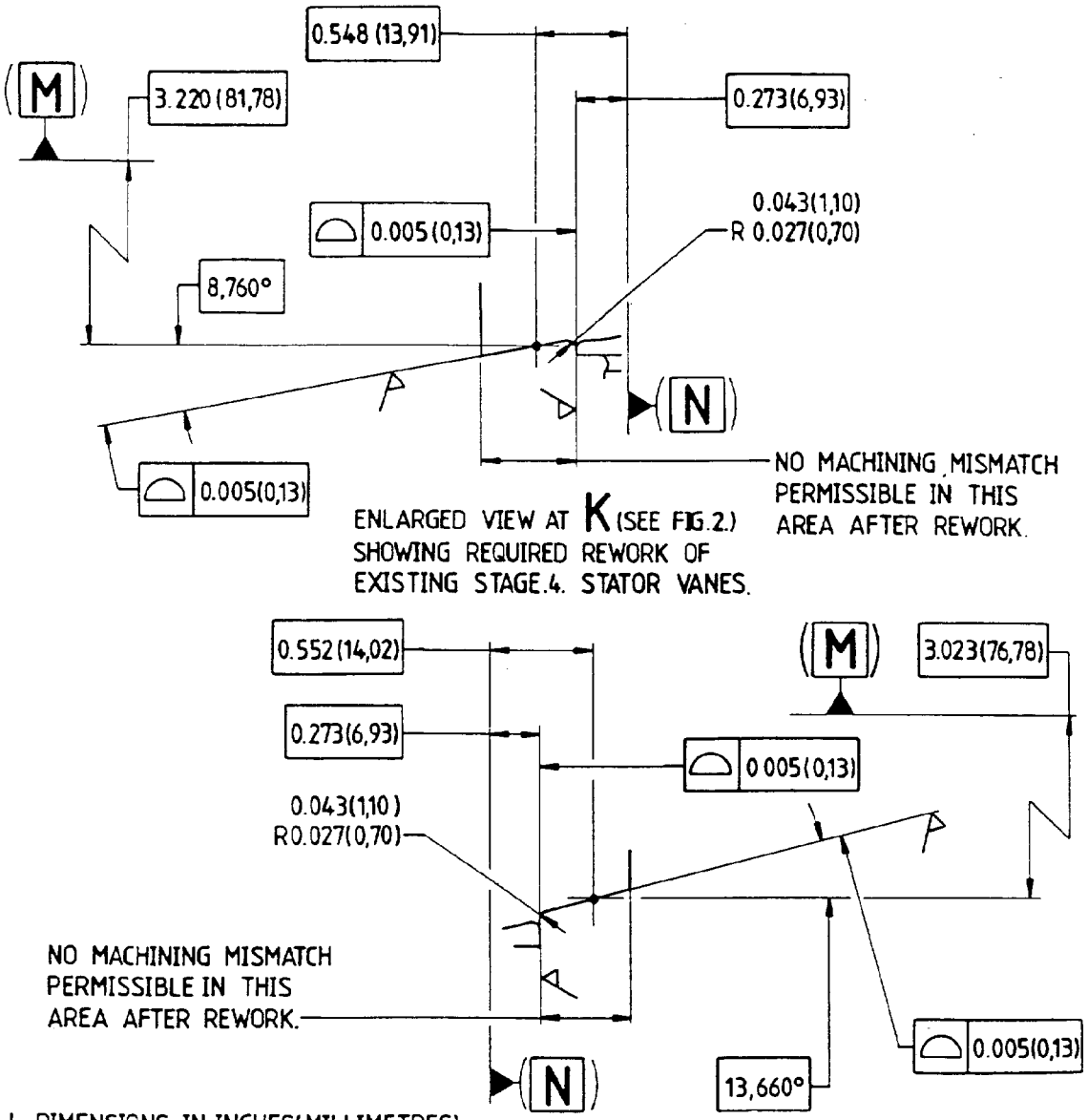
Rework Stage 4 VSV's
Figure 7 Sheet 1



Rework Stage 4 VSV's
Figure 7 Sheet 2