International Aero Engines

SERVICE BULLETIN

STARTING – PNEUMATIC STARTER – INTRODUCTION OF A STARTER FEATURING A SYNCHRONOUS ENGAGEMENT CLUTCH AND AN OIL PRESSURE FILL FACILITY – CATEGORY CODE 4 – MOD.ENG-80-0009

1. Planning Information

A. Effectivity

(1) Aircraft: McDonnell Douglas MD-90

(2) Engine: V2525-D5 Engines prior to serial No.V20014
V2528-D5 Engines prior to serial No.V20014

B. Concurrent Requirements

None

C. Reason

(1) Condition

Several incidents have occured where starter output drive shafts have sheared in service due to the excessive torque produced when starter re-engagement is performed at high subidle speeds.

(2) Background

The existing pawl and ratchet type clutch is supceptible to damage when the starter is re-engaged outside of its operating limitations. Re-engagement at high speeds results in damage to the starter clutch mechanism and shearing of the output shaft. An operator has requested that starters be supplied with an oil pressure fill facility.

(3) Objective

Incorporation of the changes introduced by this Service Bulletin are designed to allow the starter to withstand running engagement at all speeds up to ground idle and give operators an oil pressure fill facility in preference to an oil sight glass.

(4) Substantiation

An extensive programme of testing has been satisfactorily carried out on synchronous engagement clutch starter motors with the oil pressure fill facility fitted. This testing successfully demonstrated the function, performance and reliability of the new clutch design on engine and aircraft.

(5) Effects of Bulletin on Workshop Procedures:

Removal/Installation	Not affected
Disassembly/Assembly	Not affected
Cleaning	Not affected
Inspection/Check	Not affected
Repair	Not affected
Testing	Not affected

(6) Supplemental Information

None

D. Description

(1) This Service Bulletin covers the installation of a pneumatic starter motor with the introduction of a synchronous engagement clutch and oil pressure fill facility. A jaw-faced clutch transmits full starter torque when the starter and output shaft (engine) are at a synchronised speed.

(2) This Service Bulletin introduces a change to the configuration of the starter assembly part number, divorcing the adaptor and quick detach clamp in order to improve the unit maintainability.

(3) Units incorporating this Service Bulletin will be identified by the type number 790425A3.

E. Approval

The part number changes and/or part modifications described in section 2 and 3 of this Bulletin have been shown to comply with the Applicable Federal Aviation regulations and are FAA-approved for the Engine Model listed.

F. 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

G. Manpower

Estimated manhours to incorporate the full intent of this Bulletin:

Venue	Estimated Manhours
(1) In Service	1 hour 4 minutes
(2) At Overhaul	No additional time is necessary to do this Service Bulletin

It is possible to get access to the parts affected by this Service Bulletin at overhaul.

H. Material - Price and Availability

(1) Modification kit is not required.

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

I. Tooling - Price and Availability

Special tools are not required.

J. Weight and Balance

(1) Weight change .. .. .. None

(2) Moment arm .. .. No effect

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

K. Electrical Load Data

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

L. References

(1) Internal Reference No.

EC93VR070A

EC94VR028A

ECM94VR028A-02

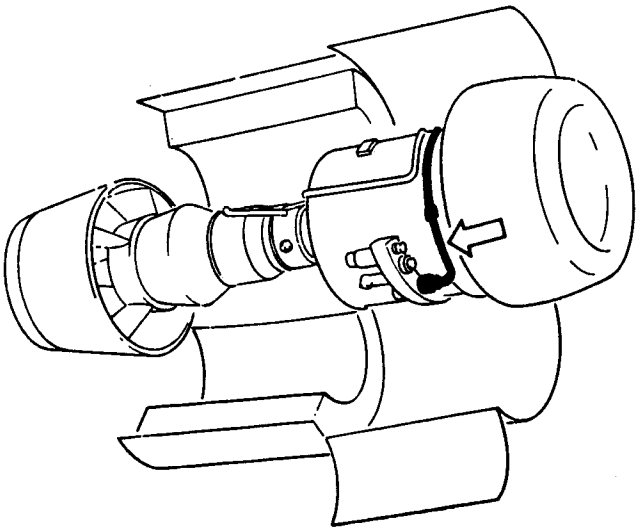
(2) Other References

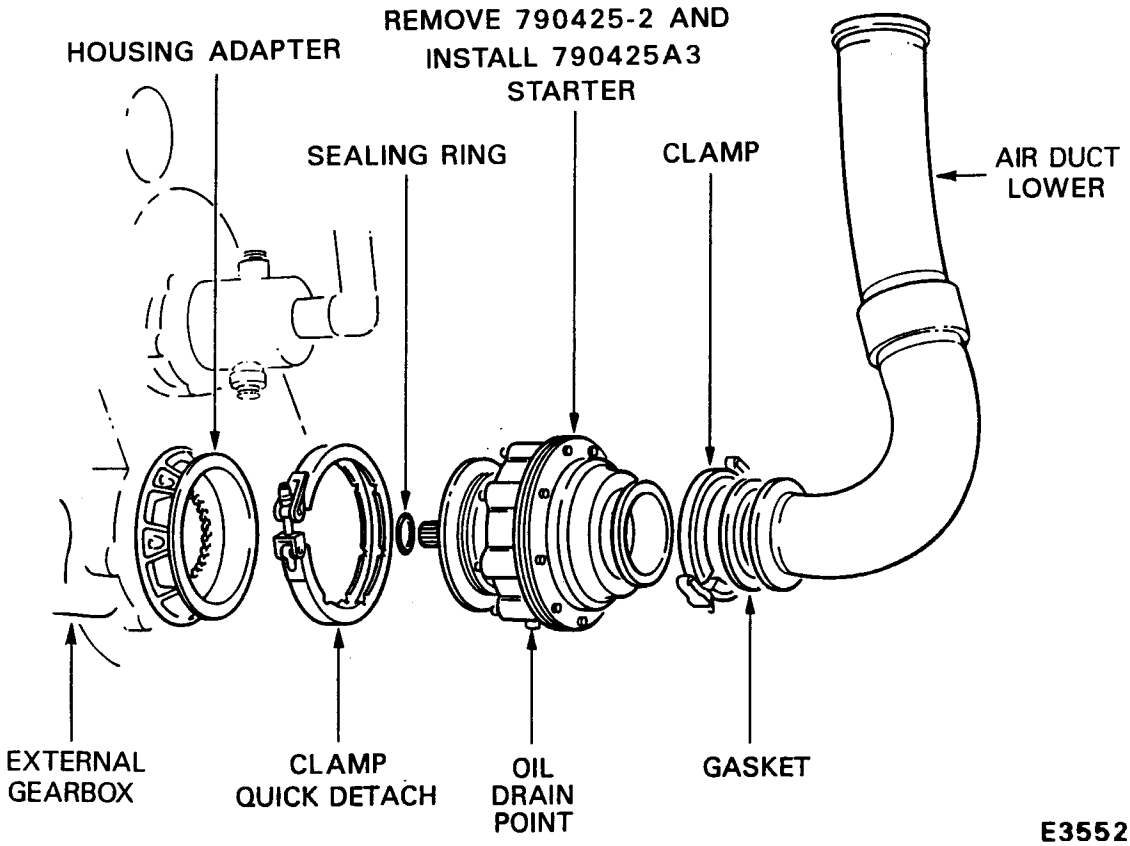
MD90 Aircraft Maintenance Manual

M. Other Publications Affected

(1) V2500 Engine Illustrated Parts Catalog (S-V2500-3IA), Chapter/Section 80-13-41.

(2) V2500 Engine Manual (E-V2500-3IA), 72-00-60 Removal -13 and Installation -13 will be revised.





Location of pneumatic starter
Fig.1

2. Accomplishment Instructions

A. Pre-requisite Instructions

WARNING: YOU MUST OPEN, SAFETY AND TAG THE CIRCUIT BREAKERS BEFORE YOU DO WORK ON THE SYSTEM. IF CIRCUIT BREAKERS ARE NOT SAFETIED, THEY CAN BE CLOSED AND THE SYSTEM CAN OPERATE. THIS CAN CAUSE AN INJURY AND/OR DAMAGE.

(1) Tag throttle/thrust lever, and open tag the circuit breakers.

(2) Open the fan cowls by the use of the approved procedures, open the lower cowl door (See 71-13-00) MD90 Aircraft Maintenance Manual.

B. Removal Instructions

(1) Remove the 790425-2 starter. Refer to Figure 1.

(2) Disconnect the air duct from the starter. Disconnect the clamp and swivel the duct and remove the gasket. Retain the gasket.

(3) Disconnect the quick detach clamp from the adaptor housing. Move the starter forward to disengage the adapter splines and the starter splines. Remove the starter.

(4) Remove the sealing ring from the starter drive shaft. Discard the sealing ring.

(5) Install caps to all openings.

C. Rework Instructions

(1) There are no rework instructions necessary to accomplish this Service Bulletin.

D. Assembly Instructions

(1) Install the 790425A3 starter. Refer to Figure 1.

(2) Remove caps from all openings.

(3) Lubricate the new 69490D216 sealing ring with clean V10-077 engine oil.

(4) Install the sealing ring on the 790425A3 starter drive shaft.

(5) Make sure that the oil drain point is at the lowest position. Align the master spline on the starter and the adapter housing. Install the starter in the adapter housing.

(6) Install the quick detach clamp. Torque the clamp to 60 to 65 inch-pounds (6.78 to 7.34 Nm).

(7) Install existing gasket on to the air duct. Put the duct in position and install the clamp. Torque the clamp to between 115 to 120 inch-pounds (13.0 to 13.56 Nm).

(8) Add oil to the starter (See 12-12-80) MD90 Aircraft Maintenance Manual.

E. Post-Requisite Instructions

(1) Close the fan cowls by the use of approved procedures, close the cowl doors (See 71-13-00) MD90 Aircraft Maintenance Manual.

(2) Remove the tag from the throttle/thrust lever and remove the tags and close the circuit breakers.

(3) Do an operational test of the engine starter system (See 71-00-00) MD90 Aircraft Maintenance Manual.

F. Recording Instructions

(1) A record of accomplishment is necessary.

3. Material Information

Applicability: For each V2500 Engine to incorporate this Bulletin.

A. Kits associated with this Bulletin:

None

B. Parts affected by this Bulletin:

New Part No. (ATA No.)	Qty	Est'd Unit Price ($)	Keyword	Old Part No. (IPC No.)	Instructions Disposition
728805-6 (80-13-41)	1		Housing, Adaptor	- (01-102)	(A)(F)
790425A3 (80-13-41)	1		Starter	790425-2 (01-200)	(A)(B) (S1)
43176AC (80-13-41)	1		Clamp	- (01-210)	(A)(F)
- (80-13-41)	1		Clamp	43176AC (01-250)	(C)(F)
- (80-13-41)	1		Housing, Adaptor	728805-6 (01-260)	(C)(F)
797845-1 (80-13-41)	1		Adaptor	738277-3 (01-340)	(A)(C) (S2)
720752-14 (80-13-41)	1		Sealing Ring	- (01-342)	(A)(E)
MS9954-06 (80-13-41)	1		Plug	- (01-344)	(A)(E)

C. Instruction/Disposition Code Statements

(A) New part is currently available
(B) Old part will be discontinued
(C) Old part will continue to be available
(E) Additional part (F) parts re-itemised to make them spareable
(S1) Old and new parts coded (S1) are freely interchangeable, both physically and functionally.
(S2) Old part may be installed in place of old parts but not vice-versa.

NOTE: The estimated 1994 unit prices shown are provided for planning purposes only and do not constitute a firm quotation. Consult the IAE Price Catalog or contact IAE's Spare Parts Sales Department for information concerning firm prices.

D. Expendable Parts

Part No.	ATA/IPC No.	Qty	Keyword
6949OD216	8O-13-41, O1-24O	1	Sealing Ring

E. Consumable Materials

CoMat 1O-O77 Approved Engine Oils.