



B. U. T.
SERVICE BULLETINS

BRITISH RAILWAYS

TELEPHONE
MAYFAIR 8561-2



TELEGRAPHIC ADDRESS:
"BRITROL", LONDON

BRITISH UNITED TRACTION LIMITED
HANOVER HOUSE, HANOVER SQUARE, LONDON, W.1

NO.1.....

DATE...5.1.56....

SHEET.....1.....OF.....1.....

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 'L' TYPE ENGINES

VISCOSITY OF ENGINE LUBRICATING OIL

W I N T E R	N O R M A L	T R O P I C A L
0 to 30° F Minus 20 to 0° C	30 to 90° F 0 to 30° C	Above 90° F Above 30° C
SAE 20 W	SAE 30	SAE 40

NOTE. When engines are operating under extremes of temperature, or when difficulty is being experienced with cold starting, the manufacturers should be consulted with regard to the correct grades of lubricants to be used.

DETERGENT OILS:

The use of detergent oils is desirable in engines operating under arduous conditions, particularly when the sulphur content of the fuel exceeds 0.5%. Such detergent oils should comply with any of the following specifications:

British Defence Specification DEF/2101
U.S. Defence Specification MIL-O-2104
U.S. Defence Specification 2-104B. Supplement 1.

WARNING:

It should be noted that within the atmospheric temperature range 30° to 90° F (0 to 30° C), B.U.T. 'L' Type engines, if in good condition, can be lubricated satisfactorily with S.A.E. 20W oil.

It has come to our notice, however, that some operators of B.U.T. 'L' Type engines are using oils of lower viscosity than those we recommend.

We wish to make it clear that we cannot accept responsibility for trouble arising from the use of oils other than those approved.

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No. 2

DATE 12.3.56

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 'L' TYPE ENGINES

CYLINDER-HEAD GASKETS

THE ATTENTION OF ALL PERSONNEL SHOULD BE DRAWN TO THE FACT THAT CYLINDER-HEAD GASKETS FOR THE 0.600 AND 0.680 ENGINES ARE NOT INTER-CHANGEABLE.

SERIOUS DAMAGE CAN RESULT IF AN INCORRECT GASKET IS FITTED.

THE DISTINGUISHING FEATURES ARE AS FOLLOWS:—

(a) 0.600 ENGINE ⁺

Gasket Part No. 227916 (Gasket Bore diameter 5")

(b) 0.680 ENGINE

Gasket Part No. 281321 (Gasket Bore diameter 5.2")

⁺ As used with B.R. cars Nos. E.79000-7 and E.79500-7.

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No. 3

DATE... 12.3.56.

SHEET... 1 OF 2

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 'A' TYPE HORIZONTAL
ENGINES (SERIES A.219 & A.220)

LUBRICATING OIL LEVEL

Due to the lubrication system differing somewhat from that usually employed on vertical engines, a number of queries have arisen, particularly concerning a procedure by which it can be determined that the correct amount of lubricant is present in the engine.

Dipping should be made:—

- (a) with the engine cold, before any attempt has been made to start it (when the level should be approximately $\frac{3}{4}$ inch below the full mark) or:
- (b) with the engine hot, immediately following shut-down (when the level should be at full mark).

In both instances the diesel car to be on level ground to prevent inaccurate readings.

The following additional notes are provided for guidance, in view of the differences in the lubrication system.

In addition to the main sump, the engine has a crankcase intermediate section, incorporating a further sump, from which oil is continually scavenged when the power unit is in motion. For ease of reference, we refer to this latter sump as the "dry sump" in these notes.

A tandem oil pump is fitted, comprising two pairs of gears - one pair for scavenging from the "dry sump" and pumping oil to the main sump via the external filter and the other pair for feeding lubricant under pressure from the main sump to the main and big end bearings, etc.

As soon as the engine is started from cold, the oil level in the main sump will drop as oil is fed to the main bearings etc., but will immediately rise as transfer of oil takes place from the "dry sump" where it has collected overnight. This transfer is completed usually in the first 15

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HANOVER HOUSE, HANOVER SQUARE, LONDON, W.1

No. 3

DATE.....

SHEET..... 2 OF..... 2

SERVICE BULLETIN

CONTINUED

seconds and involves about one gallon of lubricant.

Until the oil reaches a temperature of approximately 45°C. it will tend to cling to the walls of the crankcase with the result that the level in the main sump will drop still further.

As the oil becomes warmer and more fluid an increasingly greater proportion will be drained to the "dry sump" and transferred to the main sump until after about 40 minutes running (depending on ambient temperatures etc.) The oil level will become stabilised at the full mark.

Due to the construction of the engine in a horizontal plane, considerably more lubricating oil will always be held in suspension than in a vertical engine, also it will be seen that appreciable fluctuations of oil level, as recorded by the dipstick, are present for some time after the engine is started. It is for these reasons that dipping is to be recommended only at the times stated, if an accurate reading is to be obtained.

Although the level is at the full mark with the engine hot, the temperature change during standing overnight, results in a cooling of the air trapped in the suction box surrounding the internal gauze filter in the main sump with consequent raising of the oil level inside and a reduction outside of the suction box. This feature, coupled with the draining of the oil into the "dry sump", accounts for the level being approximately $\frac{3}{4}$ " below the full mark when the engine is cold.

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No. 4

DATE 28.2.56.

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

'A' TYPE ENGINE CYLINDER HEADS

The cylinder head in use on British Railway Railcars fitted with 'A' type engines will for the future be fitted with tubes inserted under the holding down stud nuts.

The existing type of head is Part No. A1/9290
The modified " " " " " " A2/9206

Into the latter are fitted 12 high tensile steel tubes:

Part No. Z8/44866	8 off
Part No. Z8/44864	4 off

As designed, these tubes when in position stand just proud of the head and are a loose fit.

On no account should these tubes be shortened, neither should attempts be made to deform the tubes in any manner whatsoever in an effort to tighten them in the head.

These tubes are manufactured to the correct sizes for the purpose for which they are designed.

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NO. **4a**

DATE..... 28. 2. 57

SHEET..... **1** ..OF..... **3**

SERVICE BULLETIN

APPLICABLE TO:—

'A' TYPE ENGINE CYLINDER HEADS

The cylinder head in use on British Railway Railcars fitted with 'A' type engines will for the future be fitted with tubes inserted under the holding down stud nuts.

The existing type of head is Part No. A1/9290
The modified " " " " " " A2/9225

Into the latter are fitted 12 high tensile steel tubes:

Part No. Z8/44866	8 off
Part No. Z8/44864	4 off

As designed, these tubes when in position stand just proud of the head and are a loose fit.

On no account should these tubes be shortened, neither should attempts be made to deform the tubes in any manner whatsoever in an effort to tighten them in the head.

These tubes are manufactured to the correct sizes for the purpose for which they are designed.

When using these tubes, it is essential that a harder and more closely fitting washer is used on the top of the tubes. The Part No. is Z6/30685.

Cylinder heads, type A1/9290, may not be modified to take the tubes, owing to there being insufficient material to allow for machining a hole of sufficient size to take the tubes.

The two jacknuts have already tubes and washers inserted beneath them.

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DATE.....

SHEET **2** OF **3**

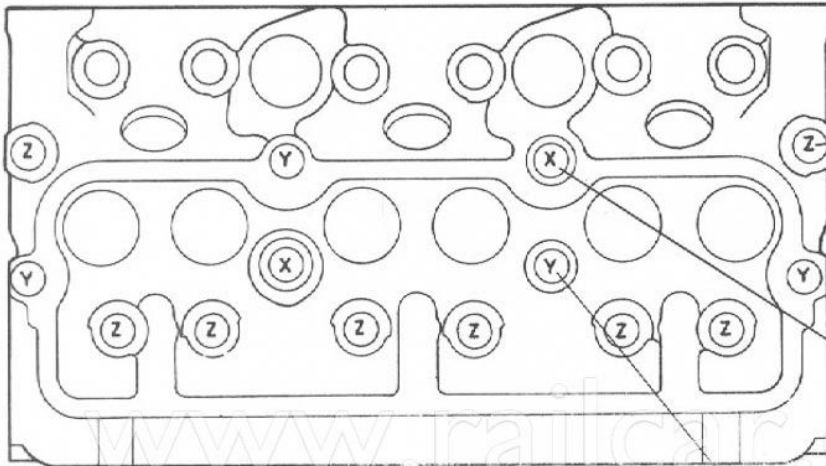
SERVICE BULLETIN

CONTINUED

CYLINDER HEADS

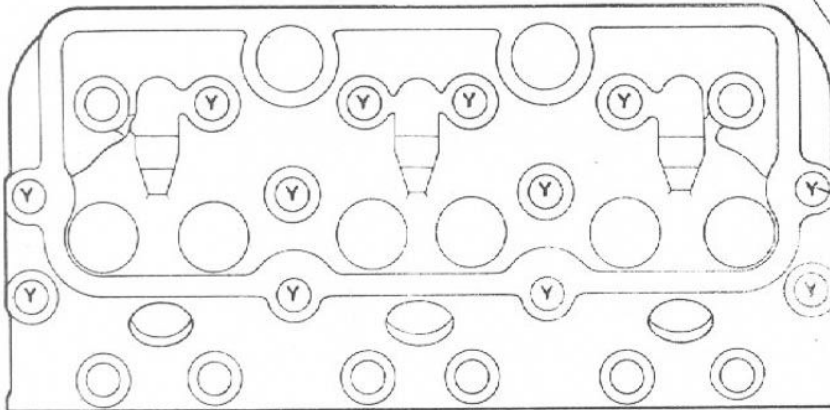
9-6 AND 11-3 VERTICAL AND HORIZONTAL OIL ENGINES

HORIZONTAL ENGINES

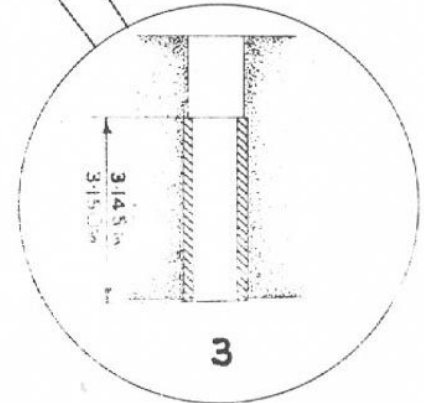
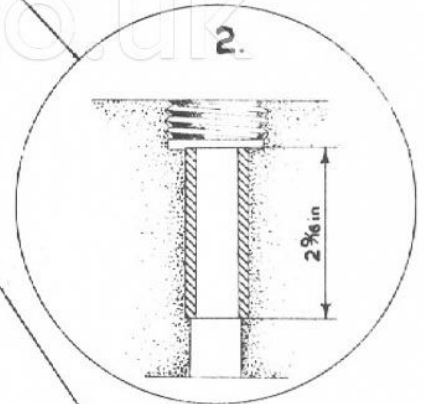
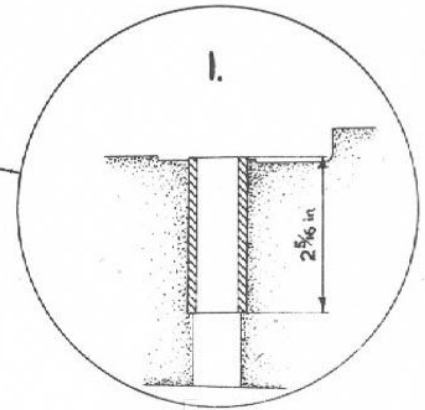


CASTING PART NOS. A1/70418 OR A1/70419

VERTICAL ENGINES



CASTING PART NOS A1/70420 OR A1/70421



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No. **4a**

DATE.....

SHEET **3** OF **3**

SERVICE BULLETIN

CONTINUED

PART NO.	STUD TUBES		STUD WASHER	CYL. HEAD CASTING	TYPE OF ENGINE
	NO	PER HEAD			
28/44866	8		26/30685	A1/70418	9.6 HORIZONTAL
	8			A1/70419	11.3 HORIZONTAL

28/44865	2 (FITTED)		26/30685	A1 70418	9.6 HORIZONTAL
	2 (FITTED)			A1 70419	11.3 HORIZONTAL

28/44864	4		26/30685	A1 70418	9.6 HORIZONTAL
	4			A1 70419	11.3 HORIZONTAL
	12			A1 70420	9.6 VERTICAL
	12			A1/70421	11.3 VERTICAL

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NO. 5

DATE 12.3.56.

SHEET 1 OF 2

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 'A' TYPE HORIZONTAL
ENGINES (A.219 and A.220 SERIES)

LUBRICATING OIL PUMP IDLER WHEEL & SPINDLE MODIFICATION

On engines operating under particularly arduous conditions a more robust idler wheel spindle has been introduced.

The front part of the spindle, instead of being parallel and fitted with a keyway as hitherto, is now tapered and the keyway is omitted. A corresponding internal taper in the gear wheel secures it to the spindle when pulled up tight by means of the front nut, which is in turn split pinned in the usual way.

Whilst it will not be necessary to change the existing wheels and spindles in all engines, it is suggested where units operate under very arduous conditions, that the new design is introduced as and when the opportunity occurs.

Obviously, to facilitate production, this alteration has been made standard for all future engines of the type referred to in the above heading.

The attached sketch shows both old and new types of wheels and spindles, together with respective part numbers.

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No. 6

DATE 1.5.56.

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 'L' TYPE ENGINES

CYLINDER HEAD NUTS MAIN BEARING NUTS
BIG END BOLTS

THE ATTENTION OF ALL PERSONNEL SHOULD BE DRAWN TO THE FOLLOWING DATA IN CONNECTION WITH 0600 & 0680 'L' TYPE ENGINES. SERIOUS RESULTS MAY OCCUR IF THESE FIGURES ARE EXCEEDED, OR DEVIATED FROM:—

7/16" BSF CYLINDER HEAD - TORSION SPANNER SETTING - 80/85 lbs. ft.

9/16" " " " " " " - 150/160 lbs. ft.

$\frac{3}{4}$ " " MAIN BEARING NUTS " " " - 215/225 lbs. ft.

BIG END BOLTS - TOTAL ELONGATION .006"/.008"

IMPORTANT

IT IS ESSENTIAL THAT THE ELONGATION OF THE BIG-END BOLTS SHOULD BE MEASURED BY MICHRMETER.



SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 'A' TYPE ENGINES

45° ANGLE EXHAUST VALVES - 9.6 AND 11.3 LITRE VERTICAL AND HORIZONTAL OIL ENGINES

It has been decided to equip all 9.6 litre and 11.3 litre vertical and horizontal engines produced from now on with exhaust valves having a seating angle of 45° instead of the 30° seat which is at present normal. This improvement aims at longer life for the exhaust valve and gains this advantage by virtue of increased strength in the head of the valve, which is possible with the new seating angle. However, no advantage is anticipated if the existing 30° valves have their seat altered to a new angle, so that it is important to use new valves of the latest type in all cases.

No alteration to the existing inlet valve is contemplated.

All operators are advised to take advantage of the new exhaust valves at the first opportunity and the new part numbers for these 45° valves and valve seat inserts are shown on page 2.

It must be pointed out that some little while ago, production engines of the types under consideration were not produced with valve seat inserts as original equipment, so that the following remarks will be helpful to operators making this change to engines of the earlier and later types.

(a) Current production cylinder heads are fitted with a "pressed-in" insert of the Valmet type and to alter the seating angle to receive the new valves will require the use of a conical grinding stone with pilot attachment, since it is not possible to cut this material with ordinary valve seat cutters.

(b) Cylinder heads which were produced originally without an insert of any kind may still be running without an insert, or may have been subsequently fitted with a "screwed-in" insert as a maintenance alteration. In either case the seating angle may be altered to receive the new valves by re-cutting the seat with an ordinary valve seat cutting tool of the correct angle.

We would stress that for the obvious reason of economy in production, 45° exhaust valves will shortly be the only type available as spares, so

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No. 7

DATE.....

SHEET 2 OF 2

SERVICE BULLETIN

CONTINUED

that operators are advised to make this alteration at the earliest opportunity.

Part Number	Designation
A.10470	45° Exhaust Valve } Suitable for engines 9.6 vertical and 11.3 vertical and horizontal
A.85069	
A.10471	45° Exhaust Valve } Suitable for engine 9.6 horizontal
A.85094	



SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 'A' TYPE ENGINES

VALMET "PRESS-IN" VALVE SEAT INSERTS - 9.6 AND 11.3 LITRE VERTICAL AND HORIZONTAL ENGINES

It is now a standard procedure for all 9.6 and 11.3 litre vertical and horizontal engines to be fitted with the Valmet type of valve seat inserts. These inserts have been introduced to increase seat life and to facilitate insert renewal.

Production engines of the types under review were not previously produced with valve seat inserts as original equipment, so it is most important that operators, when servicing cylinder heads, take note of the following differences associated with insert renewal.

(a) 9.6 AND 11.3 LITRE VERTICAL ENGINES

Cylinder heads which were originally produced without valve seat inserts are only suitable to receive the "screw-in" type. Such cylinder heads, which have subsequently been fitted with "screw-in" inserts, must only have these inserts replaced by others of a similar type.

No attempt must be made to fit the "press-in" type of insert.

(b) 9.6 AND 11.3 LITRE HORIZONTAL ENGINES

All cylinder heads originally produced without inserts should be fitted with the "press-in" type. However, where "screw-in" inserts have been fitted as a re-conditioning feature, no attempt must be made to utilize the "press-in" type.

Reference is made in Bulletin No. 7 dealing with the operation for converting the seating from 30° to 45° on existing cylinder heads to accommodate the improved 45° exhaust valves. Should it be necessary, however, at some future date to replace the existing valve seat inserts, then replacement inserts will be available as spares in the standard sizes and in respect of the "press-in" type of inserts two over-sizes on the outside diameter. These over-size inserts are produced to cater for any wear that may occur within the cylinder head counter bores and will be available as standard size + .010" and standard size + .020".

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No. 8

DATE.....

SHEET 2 OF 3

SERVICE BULLETIN

CONTINUED

We have developed special tools which will allow simple extraction of "press-in" inserts and all A.E.C. Depots will be equipped with these tools.

May we suggest, therefore, that operators take advantage of these facilities when their cylinder heads require the fitting or renewal of inserts.

Operators with the necessary workshop facilities for carrying out various machining operations may, if they wish, obtain full details by applying to the B.U.T. organisation, quoting type of engine and if the cylinder heads are already fitted with either "screw-in" or "press-in" inserts.

To assist operators in identifying the different types of cylinder heads, and the inserts which may be fitted to them, the following lists have been compiled.

Engine Type	Cylinder Part No.	Type of Valve Seat Insert
9.6 Vertical	A.70498	No inserts fitted. Fit "screw-in" type only.
" "	A1/70412	"Press-in" type fitted originally.
" "	A1/70420	" " " " " "
11.3	A1/70402	No inserts fitted. Fit "screw-in" type only.
" "	A1/70415	"Press-in" type fitted originally.
" "	A1/70421	" " " " " "
9.6 Horizontal	A1/70403	No insert fitted. Suitable for "press-in" type
" "	A1/70413	"Press-in" type fitted originally
" "	A1/70418	" " " " " "
11.3	A1/70406	No inserts fitted. Suitable for "press-in" type.
" "	A1/70414	"Press-in" type fitted originally.
" "	A1/70419	" " " " " "

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No. 8

DATE.....

SHEET 3 OF 3

SERVICE BULLETIN

CONTINUED

Eng. Type	Cylinder Head Part Number	"Screw-in" Inserts Cut Seats to required angle Ex. 45° Inlet 30°		"Press-in" Inserts					
				Exhaust 45°			Inlet 30°		
				Std	+ .010"	+ .020"	Std	+010"	+ .020"
9.6 V.	A. 70498	A85046	A85046	----	----	----	----	----	----
" "	A1/70412	-	-	A85069	A85093	A85071	A85064	A85079	A85080
" "	A1/70420	-	-	"	"	"	"	"	"
11.3"	A1/70402	A85046	A85047	----	----	----	----	----	----
" "	A1/70415	-	-	A85069	A85093	A85071	A85066	A85085	A85086
" "	A1/70421	-	-	"	"	"	"	"	"
9.6 H.	A1/70403	A85048	A85046	A85094	A85096	A85097	A85064	A85079	A85080
" "	A1/70413	-	-	"	"	"	"	"	"
" "	A1/70418	-	-	"	"	"	"	"	"
11.3"	A1/70406	A85046	A85047	A85069	A85093	A85071	A85062	A85073	A85074
" "	A1/70414	-	-	"	"	"	"	"	"
" "	A1/70419	-	-	"	"	"	"	"	"

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No. 9

DATE 29.6.56.

SHEET 1 OF 2

SERVICE BULLETIN

APPLICABLE TO:—

'A' TYPE ENGINES LISTED IN
SCHEDULE NO. 8, PAGES 2&3

INSTRUCTIONS FOR REMOVAL & FITTING OF PRESS-IN INSERTS

Procedure for removal of Insert

Position the appropriate jig plate over the insert to be removed, locating the register in the counter bore of the valve pocket. Place the guide bush for the centering tool (the bush with the larger hole), into one of the holes in the jig plate, and with the centering tool machine through the hardened surface of the insert. Repeat this in a spot diametrically opposite after moving the guide bush into the second hole in the jig plate. Exchange the guide bush for the one with the smaller hole, and drill through the insert with the Stellite drill in the same two spots, taking care not to drill through the cylinder head casting.

Remove the jig plate and by means of a hammer and chisel split out the insert at the drilled holes.

Machining for oversize Inserts

Remove the valve guide, and using the bore of the valve guide housing as a register for the cutter Pilot, machine the valve seat recess to the standard required with the appropriate cutter. After machining check the recess with the plug and Depth Gauges.

Note.

It is important that the interference fit of 0.003" - 0.005" between the insert and recess is maintained.

Pressing in the Insert

Two types of tool are available for this process:—

- (a) Dolly
- (b) Punch

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No. 9

DATE.....

SHEET 2 OF 2

SERVICE BULLETIN

CONTINUED

It is recommended that if the facilities of a small press are available the inserts are pressed in, using the Dolly.

Procedure

Place the insert on the Dolly and locate the Pilot in the bore of the valve guide housing, then press the insert in, ensuring that the insert is right home in the recess.

After this operation the valve seating may require refacing to true it up. This may be done with a rotary stone and Pilot.

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No. 10

DATE 9.8.56

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

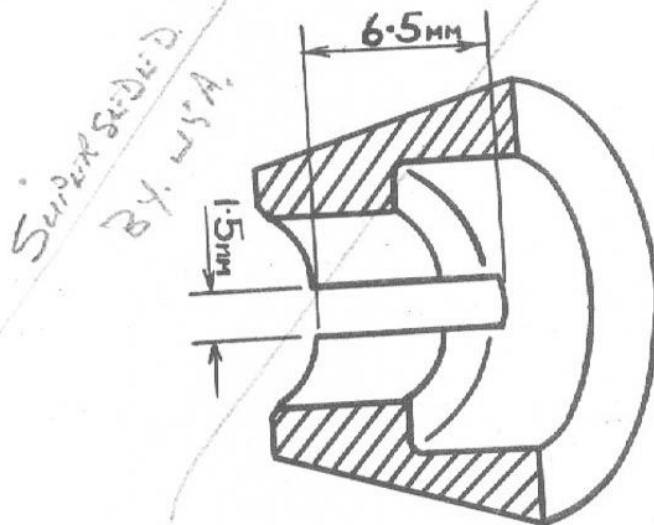
ALL 'A' TYPE ENGINES

VALVE COTTERS

The existing type of valve cotter has now been superseded by one of an improved design, to ensure a more uniform fit on the valve stem.

The new cotter, part number A.75204, will replace the existing type, part number A.75202, on all 'A' type oil engines without alteration to other parts.

It will be seen from the sketch that the new cotter is similar to the existing type, except that it has a slot, 1.5 mm. wide by 6.5 mm. deep. As the cotters are hardened after machining, existing types cannot be altered.



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No. **10a**

DATE.....

SHEET.....

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. 'A' TYPE ENGINES

VALVE COTTERS

B.U.T. Service Bulletin No. 10 is hereby cancelled and superseded by Bulletin No. 10A.

An improved design of valve spring cup and cotter has been introduced and these must be fitted in place of the existing cup and cotter.

The part numbers of the cups and cotters are as follows:—

	<u>New Type Part No.</u>	<u>B.R. Cat. No.</u>	<u>Old Type Part No.</u>	<u>B.R. Cat. No.</u>
Valve Spring Cup.	A.75310	9/15/40163	A.75301	9/15/40163
Valve Cotter (in halves)	A.75205	9/15/40162	A.75204	9/15/40162

Existing stocks of the old type cups and cotters (slotted type) should be scrapped when stocks of the improved type cups and cotters (without slots) are available.

*Superseded
By 10A*

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No. 11

DATE 9.8.56.

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

'A' TYPE ENGINE

GASKET & JOINT KITS

There are now available, as a spares supply, sets of gasket and joint kits for decoking, etc. These kits may be obtained by ordering to the following kit part number:—

Engine Capacity	Engine Type	Joint Kit No.
9.6 litre	Vertical	AB 0610
9.6 litre	Horizontal	AB 0613
11.3 litre	Horizontal	AB 0616

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No. 14

DATE 20.9.56.

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

'L' TYPE ENGINES

FITTING OF CYLINDER LINERS

Attention is drawn to the correct fitting of cylinder liners on 0600 and 0680 'L' type engines, and the following instructions should be observed, which supersede any instructions prior to the date of this bulletin:

1. The cylinder liners are pre-finished, ready for inserting into the cylinder block. A special tool has been designed both to extract the old liners and to insert new ones.
2. The projection of cylinder liners above the top face of the engine block must be within the limits of .000 in. and .002 in. (.0508 mm.)
3. Before fitting new liners, thoroughly clean out the cylinder bores and invert the liners, placing the liner flange in the recess of the cylinder and, using a straight-edge and feelers, check that the projection figures are within the limits stated. If necessary, shims (.002 in.) are available to ensure that the liners are correctly positioned within these limits. The shims are available from Service Depots and will appear in spare parts lists issued after this date. The part numbers are as follows:

Shim (.002") for 0600 Engines - Part No. 508418
Shim (.002") for 0680 Engines - Part No. 538054

4. When installing the liners, lightly smear the bores of the block with thin oil. This will facilitate subsequent removal.



SERVICE BULLETIN

APPLICABLE TO:—

79000 SERIES CARS. DERBY & MET. CAM.
BUILD EXCEPT NOS. 79000-79007 &
79500-79507 INCLUSIVE.

SETTING OF THROTTLE MOTORS

1. Disconnect the control linkage end, start the engine holding the fuel pump lever by hand. Move the lever back slowly until the engine stops, and use a temporary screw to locate this STOP position. This action limits the total angle through which the fuel pump lever will have to operate. (The full throttle stop having already been set and sealed on engine test).
2. Extend the throttle motor to its maximum position, i.e. FULL THROTTLE. In this position adjust the vertical pillar setting so that the links between motor and pillar are horizontal.
3. Still with the throttle motor extended, adjust the fuel pump control rod to give FULL THROTTLE at the pump. (This should be set with a .005" feeler in position to avoid damaging the fuel pump stop).
4. Release the throttle motor to the STOP position, and check that the fuel pump lever is now against the temporary stop, (which was set in the STOP position as in paragraph 1). In the event of the lever not reaching the STOP position, the pillar should be adjusted to alter the angle of movement of the lever. Lowering the adjustable pillar will increase the total angular movement of the fuel pump lever. Raising the pillar will decrease the total angular movement.

NOTE

Movement of the adjustable pillar affects only the angle of travel, and the angle is increased or decreased an equal amount at both ends of the fuel pump lever travel. Any adjustment of, say, 10° total is, in fact, an increase of 5° travel at either end of the total movement. Thus to bring the fuel pump lever back to the original setting point, say, FULL THROTTLE, the control rod must be lengthened to take off the 5° angle at the full throttle end of the travel, making a total of 10° increase at the STOP end of the travel.

5. The throttle motor is now correctly set for FULL THROTTLE and STOP positions. Now put the throttle motor into the IDLING position and

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No. 15

DATE.....

SHEET 2 OF 3

SERVICE BULLETIN

CONTINUED

check that the engine idles correctly. In the event of it not doing so, the engine should be adjusted by means of the idling damper screw until a satisfactory idling position is obtained.

6. With adjustment completed, the temporary stop should be removed.
7. Before finally leaving the car, check visually on both engines that movement of the cab controller, notch by notch, gives the correct movements of the fuel pump lever, and also check that the engine emergency shut down solenoid operates correctly.

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No. DTM/10

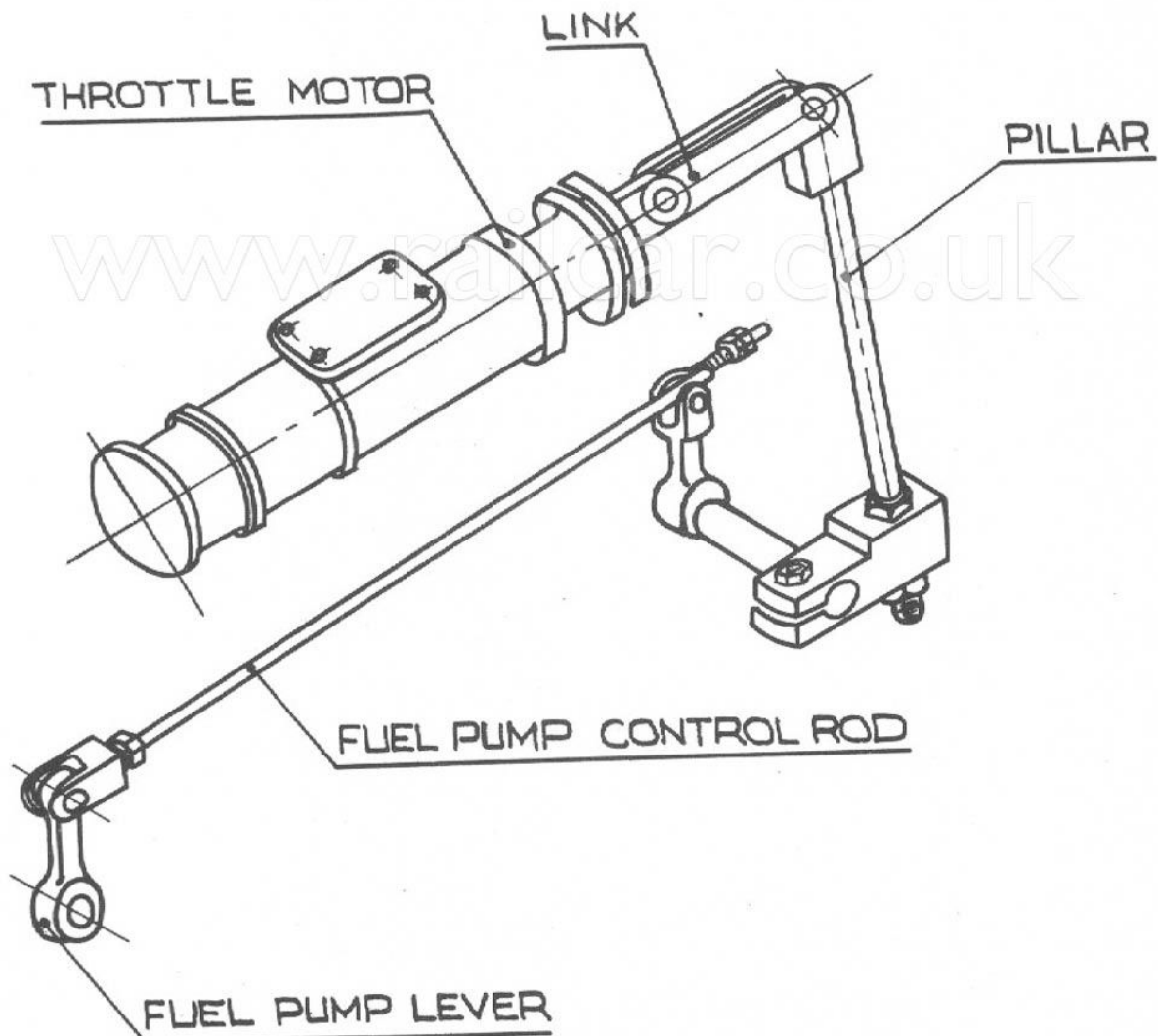
DA BULLETIN N°5

15 & 16
SHEET.....OF.....

SERVICE BULLETIN

CONTINUED

THROTTLE MOTOR & LINKAGE
AS FITTED TO 79000 SERIES CARS,
EXCEPT CARS N° 79000-79007 AND
79500-79507 INCLUSIVE.



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DATE 20.9.1956.

SHEET 1 3

SERVICE BULLETIN

APPLICABLE TO:—

INTER CITY CARS ONLY
CARS NOS. 79083-79111 & 79155-
79168 INCLUSIVE.

SETTINGS OF THROTTLE MOTOR

1. With the engine warm ensure that the engine idles correctly before any linkage is connected. This is to be set by means of the fuel pump idling screw which, when the IDLING is satisfactory, should be securely locked. This then limits the total angle through which the fuel pump lever must travel, as the full throttle stop has already been set and sealed on engine test.
2. Check that the shut down solenoid will STOP the engine. Adjust, if necessary, by means of the adjustable fork end, and also ensure that the auxiliary contact in the solenoid operates correctly to break the main operating current.
3. Extend the throttle motor to its maximum position, i.e. FULL THROTTLE, and in this position adjust the pillar setting so that the links between motor and pillar are horizontal.
4. Still with the throttle motor extended, adjust the fuel pump control rod to give FULL THROTTLE on the fuel pump. (This should be set with a .005" feeler in position to avoid damaging the fuel pump stop.)
5. Release the throttle motor to the IDLING position and check whether the fuel pump lever is now against the idling stop. In the event of its not reaching the idling stop, the pillar should be adjusted to alter the angle of movement. Lowering the adjustable pillar will increase the total angular movement of the fuel pump lever, raising the pillar will decrease the total angular movement.

NOTE

Movement of the adjustable pillar affects only the angle of travel, and the angle is increased or decreased an equal amount at both ends of the fuel pump lever travel. Any adjustment to the fuel pump control rod, for example an increase of, say, 10° total is, in fact, an increase of 5° travel at either end of the total movement. Thus to bring the fuel pump lever back to the original setting point,

.../2...

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No. 16

DATE.....

SHEET 2 OF 3

SERVICE BULLETIN

CONTINUED

- 2 -

say, FULL THROTTLE, the control rod must be lengthened to take off the 5° angle at the full throttle end of the travel, making a total of 10° increase at the IDLING end.

6. The adjustment should be made so that the fuel pump stop, not the throttle motor, controls engine IDLING, i.e. the throttle motor linkage should over travel approximately 1/16".

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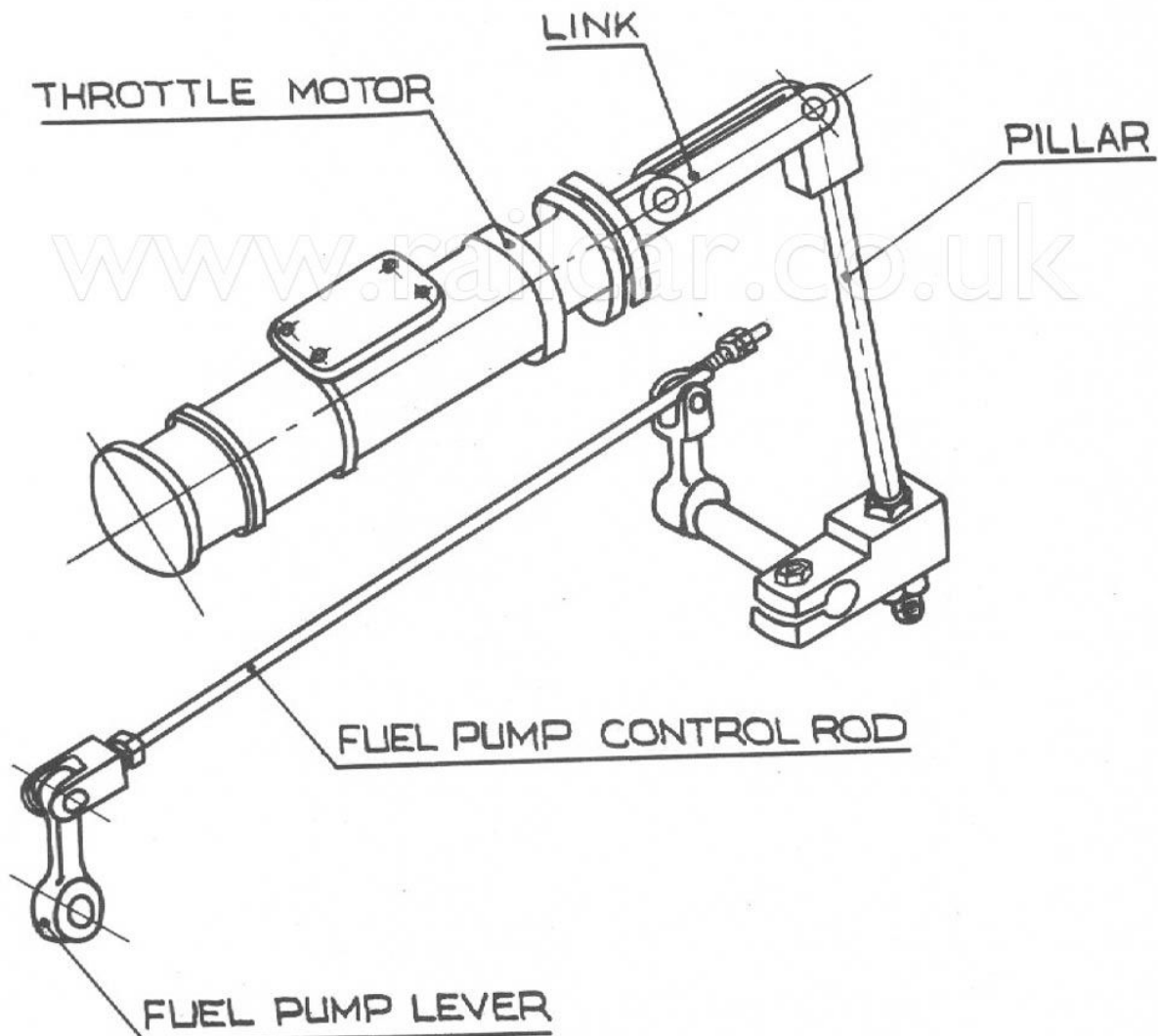
DA BULLETIN N°5

15 & 16
SHEET.....OF.....

SERVICE BULLETIN

CONTINUED

THROTTLE MOTOR & LINKAGE
AS FITTED TO 79000 SERIES CARS,
EXCEPT CARS N° 79000-79007 AND
79500-79507 INCLUSIVE.



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No. 17

DATE

SHEET 1 2

SERVICE BULLETIN

APPLICABLE TO:—

SETTING INSTRUCTIONS FOR THROTTLE
MOTOR FITTED TO ALL 50,000 SERIES CARS

1. With the engine warm ensure that the engine idles correctly before any linkage is connected. This is to be set by means of the fuel pump idling screw which, when the IDLING is satisfactory, should be securely locked. This then limits the total angle through which the fuel pump lever must travel, as the full throttle stop has already been set and sealed on engine test.
2. Check that the shut down solenoid will STOP the engine. Adjust, if necessary, by means of the adjustable fork end, and also ensure that the auxiliary contact in the solenoid operates correctly to break the main operating current.
3. With throttle motor in the IDLING position adjust the fuel pump control rod to give IDLING position on the fuel pump.

NOTE:- The fuel pump IDLING STOP should locate the idling position - not the throttle motor.
4. With the throttle motor in the FULL THROTTLE position adjust the maximum fuel adjusting screw in the motor so that fuel pump lever is at FULL THROTTLE.

NOTE:- This should be done with a .005" feeler in position to avoid damaging the fuel pump stop.
5. Now set the remaining three adjusting screws to divide equally the angle of travel of the fuel pump lever between IDLING AND FULL THROTTLE positions. Having set all adjusting screws they should be securely locked.

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No. 17

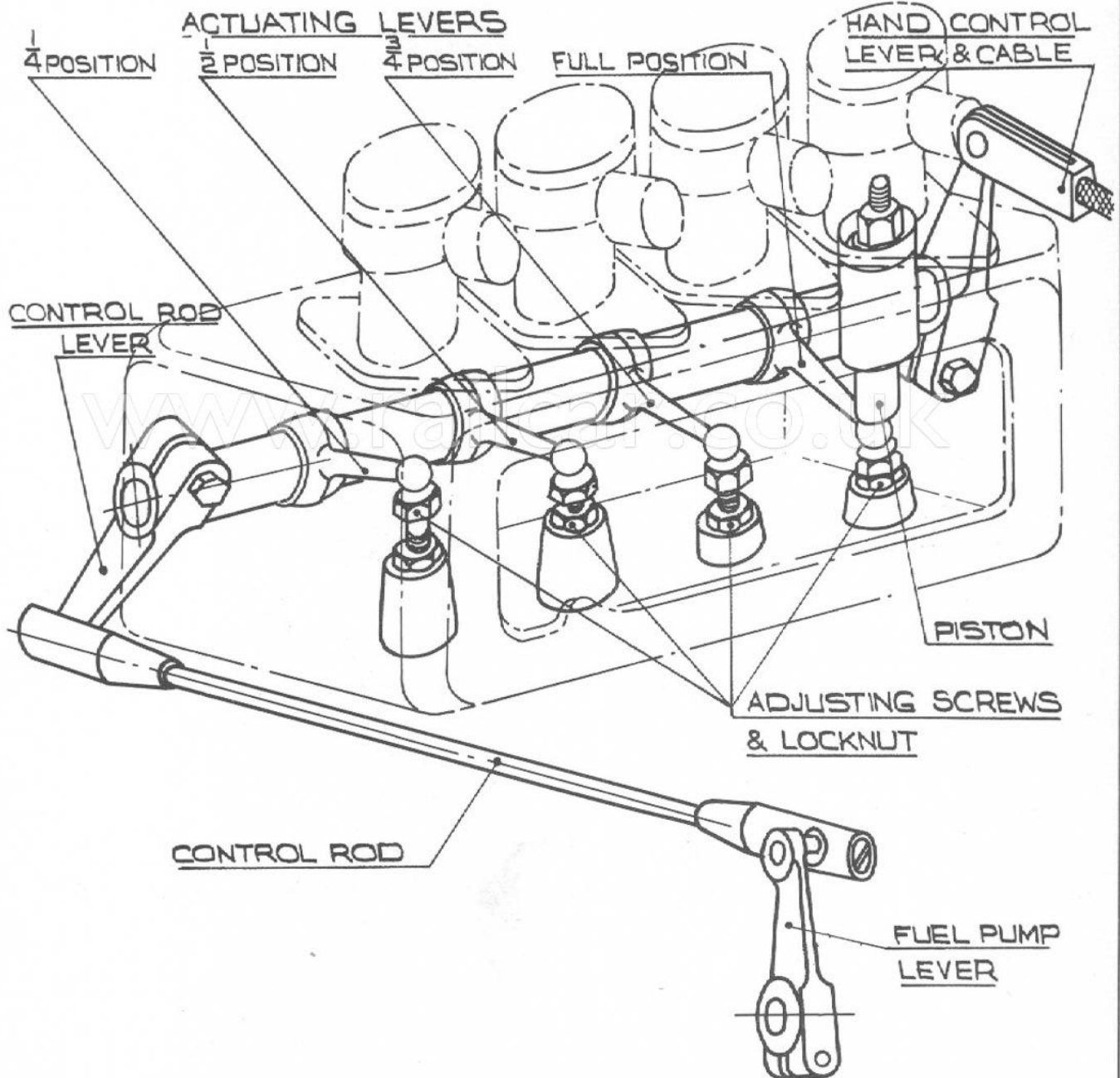
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2 2
SHEET OF

SERVICE BULLETIN

CONTINUED

THROTTLE MOTOR & LINKAGE AS FITTED
TO 50,000 SERIES CARS



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No. **17a**

DATE...8.5.57...

SHEET...1...OF...2...

SERVICE BULLETIN

APPLICABLE TO:— Setting Instructions for Throttle Motor fitted to all 50,000 Series Cars.

SUPERSEDES BULLETIN NO. 17.

1. With the engine warm, ensure that the engine idles correctly before any linkage is connected. This is to be set by means of the fuel pump idling screw which, when the IDLING is satisfactory, should be securely locked. This then limits the total angle through which the fuel pump lever must travel, as the full throttle stop has already been set and sealed on the engine test.
2. Check that the shut down solenoid will STOP the engine. Adjust, if necessary, by means of the adjustable fork end, and also ensure that the auxiliary contact in the solenoid operates correctly to break the main operating current.
3. With throttle motor in the IDLING position, adjust the fuel pump control rod to give IDLING on the fuel pump. (Check that engine does not stall on engaging gear).

NOTE:— The fuel pump IDLING STOP should locate the IDLING position - not the throttle motor.

4. With air applied and the throttle motor in $\frac{1}{4}$ position, adjust $\frac{1}{4}$ position adjusting screw until the engine just starts to increase to full speed.

NOTE:— The adjustment will first increase the engine speed slightly, to about 550-600 r.p.m., at which position it will remain during further adjustment until it suddenly speeds up and accelerates to full speed. The required setting is at a steady speed just below this run-away position.

5. With the throttle motor at FULL THROTTLE adjust the full position adjusting screw in the motor so that the fuel pump lever is at FULL THROTTLE.

Continued.

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No. **17a**

DATE **8.5.57**

SHEET **2** OF **2**

SERVICE BULLETIN

CONTINUED

NOTE:- This should be done with a .005" feeler in position to avoid damaging the fuel pump stop.

6. Now set the remaining two adjusting screws to divide the arc of travel of the fuel pump lever into three equal segments.

Having set all adjusting screws, they should be securely locked.

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SUPPLEMENT TO SERVICE BULLETIN - No. 17a.

APPLICABLE TO:- Scottish Region 50, 000 Series
Inter-City Cars ONLY.

The setting of the Throttle Motor on Scottish Region 50,000 series Inter-City Cars has been modified to enable multiple operation of these units with 79,000 series Inter-City Cars.

In accordance with this, instructions given in SERVICE BULLETIN No. 17a. should be as follows:-

ADD TO ITEM 4:-

Adjust the second screw to give the same throttle opening as obtained in the $\frac{1}{4}$ position as set by the first adjusting screw.

AMEND ITEM 6 TO READ:-

Now set the remaining adjusting screw (No.3) to divide the arc of travel of the fuel pump lever into two equal segments.

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No. 18

DATE 7.11.56

SHEET 1 2

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 'A' TYPE FINAL DRIVES

DRIVING SHAFT

There have been instances whereby failure of the Final Drive driving shaft has occurred due to breaking at the spigot race end.

In order to prevent such failures the shaft has been redesigned. This is shown in the sketch of the old and new type shafts.

The modification also incurs the use of a different distance piece to locate the inner track of the spigot race.

The new part numbers of the modified shaft and distance piece are tabulated below.

It is imperative that on the overhaul of a final drive, the driving shaft be removed and modified to the latest dimensions. This may be done by form grinding and the shaft must be magnetic tested after grinding to ensure that there are no cracks. The latest part number should be stamped on the shaft to avoid confusion.

Old Part Number	Quantity	Description	New Part No.	Quantity
F1/15214	1	Driving Shaft	F1/15238	1
Z7/44859	1	Distance Washer	Z9/44813	1
-		" "	Z9/44815	as
-		" "	Z9/44816	required

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No.18

DATE: 7-11-56

2 2
SHEET.....OF.....

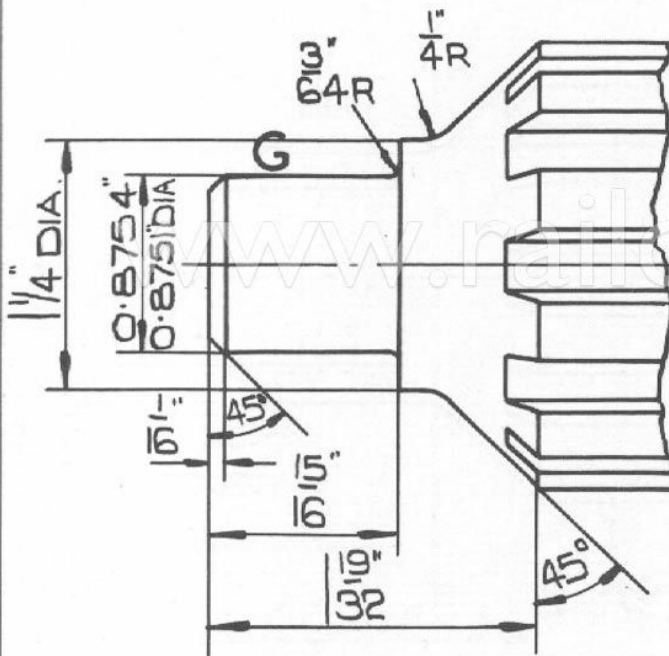
SERVICE BULLETIN

CONTINUED

MODIFICATION REQUIRED TO CONVERT AXLE
DRIVING SHAFT IN ACCORDANCE WITH LR6964

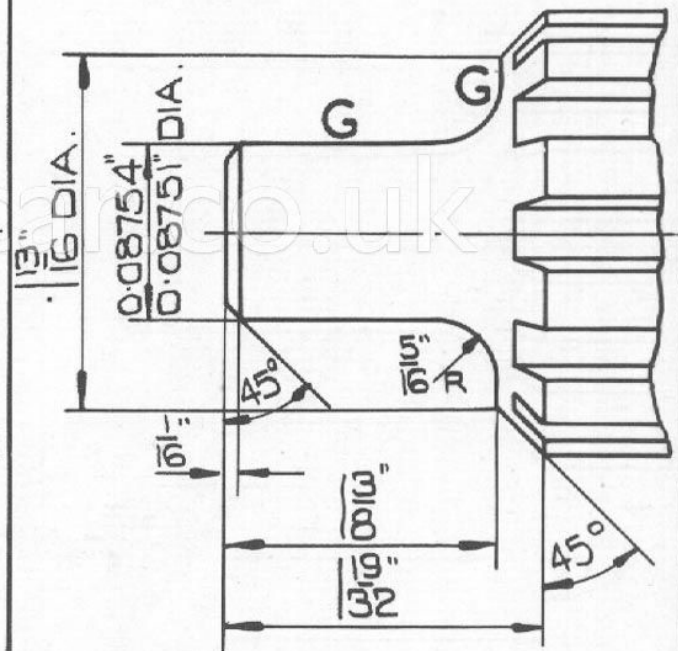
BEFORE ALTERATION

F/15214



AFTER ALTERATION

F/15238



AFTER ALTERATIONS REPLACE DISTANCE
PIECE Z7/44859 WITH ONE OF THE
FOLLOWING ALTERNATIVES Z9/44813,
Z9/44815 OR Z9/44816.

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No. 19

DATE.....

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. D 173 and R 14 TYPE
GEARBOXES.

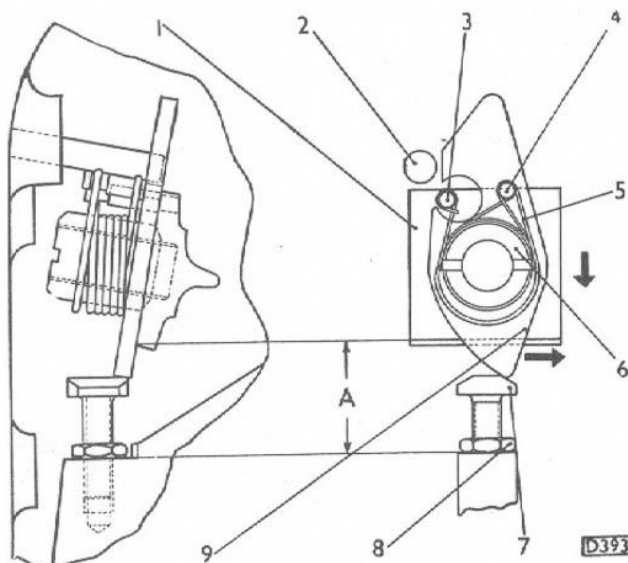
BRAKE BAND SETTINGS.

The following tolerances should be used for the Brake Band settings of the gearboxes mentioned above:—

1 st.	speed	1.3"
2 nd.	"	1.3"
3 rd.	"	1.45"

HOLDERS OF B.U.T. MAINTENANCE AND OVERHAUL MANUALS SHOULD AMEND THE SETTINGS GIVEN ON PAGE C5 AS ABOVE.

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Key to Numbers:—

- | | |
|----------------------------------|-----------------------------|
| 1. ADJUSTER PLATFORM. | 7. ADJUSTING SCREW. |
| 2. TAIL PIN. | 8. ADJUSTING SCREW LOCKNUT. |
| 3. ADJUSTER PLATFORM SPRING PIN. | 9. ADJUSTER RING. |
| 4. ADJUSTER RING SPRING PIN. | A. 1st SPEED = 1.3 |
| 5. ADJUSTER SPRING. | 2nd SPEED = 1.3 |
| 6. ADJUSTER NUT. | 3rd SPEED = 1.45 |

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No. 20

DATE 19.10.56.

SHEET.....

SERVICE BULLETIN

APPLICABLE TO:—

INSTRUCTIONS FOR THE SETTING OF AIR
EQUIPMENT ON MULTIPLE UNIT DIESEL CARS
FITTED WITH AXLE DIRECTION INDICATOR
EQUIPMENT, EXCEPT SWINDON INTER-CITY
RAILCARS.

The settings of the various air equipment should be as follows:—

Unloader valve for compressor:

cut-in 75 lbs - 0 + 5 lbs. per sq. inch.
cut-out 95 lbs. per sq. inch approximately.

Diverter Valve:

Cut-in 50 lbs. per sq. inch \pm 2½ lbs. per sq. inch.

Safety Valve:

Set to blow off 3 to 5 lbs. per sq. inch above maximum unloader pressure.

Reducing Valve Gearbox:

65 lbs. per square inch \pm 2½ lbs. per sq. inch.

Air Pressure Switch:

Cut-in 75 lbs. per sq. inch
Cut-out 60 lbs. per sq. inch (This range not to be exceeded)

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No. **21**

DATE **14.6.57.**

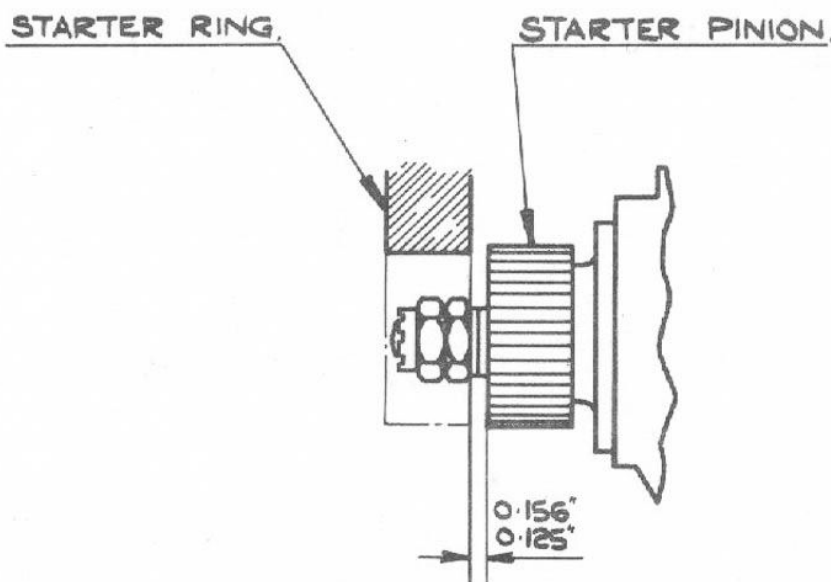
SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— 0600 and 0680 HORIZONTAL DIESEL ENGINES ('L' TYPE)
Starter Motors

To ensure smooth engagement of the starter motor and to prevent excessive wear of the starter-pinion and starter-ring teeth, it is important that the starter motor is correctly positioned. When disengaged, the starter-pinion should be set at a distance of $.125''/.156''$ from the starter-ring face, as illustrated below.

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No. **22**

DATE **29.3.57.**

SHEET **1** OF **2**

SERVICE BULLETIN

APPLICABLE TO:— 150 h.p. 'A' Type Engine No. A 220 A.C.

Method of Converting Rear Engine Mounting Plate AB.3513
to make it interchangeable with the latest design AB.3517

It has been found necessary to modify the rear engine mounting plate and a new type is now fitted to all production engines.

In cases where the new type is not fitted, the existing plate may be modified to make it interchangeable with the new version.

It is suggested that this change should be carried out as and when convenient during engine overhaul.

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No. **22**

DATE.....

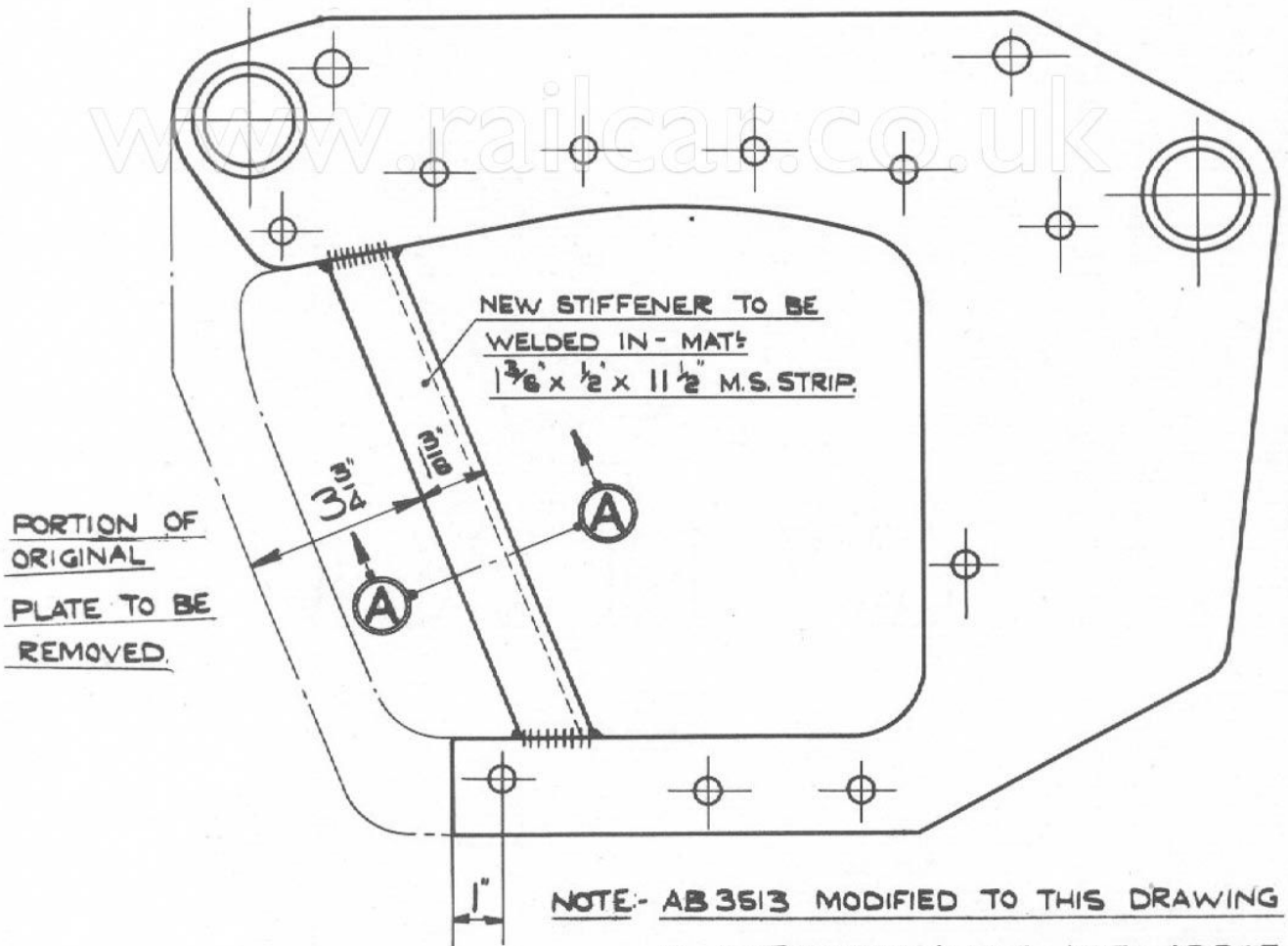
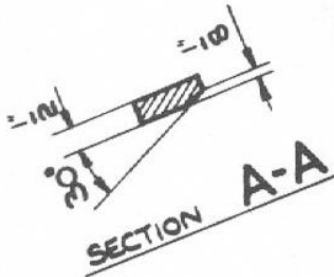
SHEET **2** OF **2**

SERVICE BULLETIN

CONTINUED

SKETCH SHOWING METHOD OF CONVERTING ENGINE MOUNTING PLATE AB 3513 TO ENABLE SUMP TO BE REMOVED - 150 H.P. "A" TYPE ENGINE.

FOR NEW MOUNTING PLATE SEE AB 3517



NOTE - AB 3513 MODIFIED TO THIS DRAWING IS INTERCHANGEABLE WITH AB 3517.

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NO. 23

DATE 24.5.57

SHEET 1 OF 2

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. Standard Gear and Throttle Controllers

A small amount of end float is possible on the operating spindle of the gear and throttle controllers, this being due to the locking arrangement loosening.

In order that this float may be taken up and relocked, the following instructions should be worked to:—

- 1) GEAR CONTROLLER: Move the brass direction selection lever to the off position and operating handle to neutral.
THROTTLE CONTROLLER: Engage deadmans and move handle to the idling position.
- 2) Slacken off the bearing adjusting screw at the bottom of either controller and marked BAS in sketch.
- 3) Slacken clamp retaining screws marked S in the sketch.
- 4) Push handle down hard in direction of arrow P.
- 5) Insert a suitable lever L as shown in sketch and force clamp upwards.
- 6) Tighten up screws marked S and lock securely in position.
- 7) Adjust bearing screw BAS and lock.

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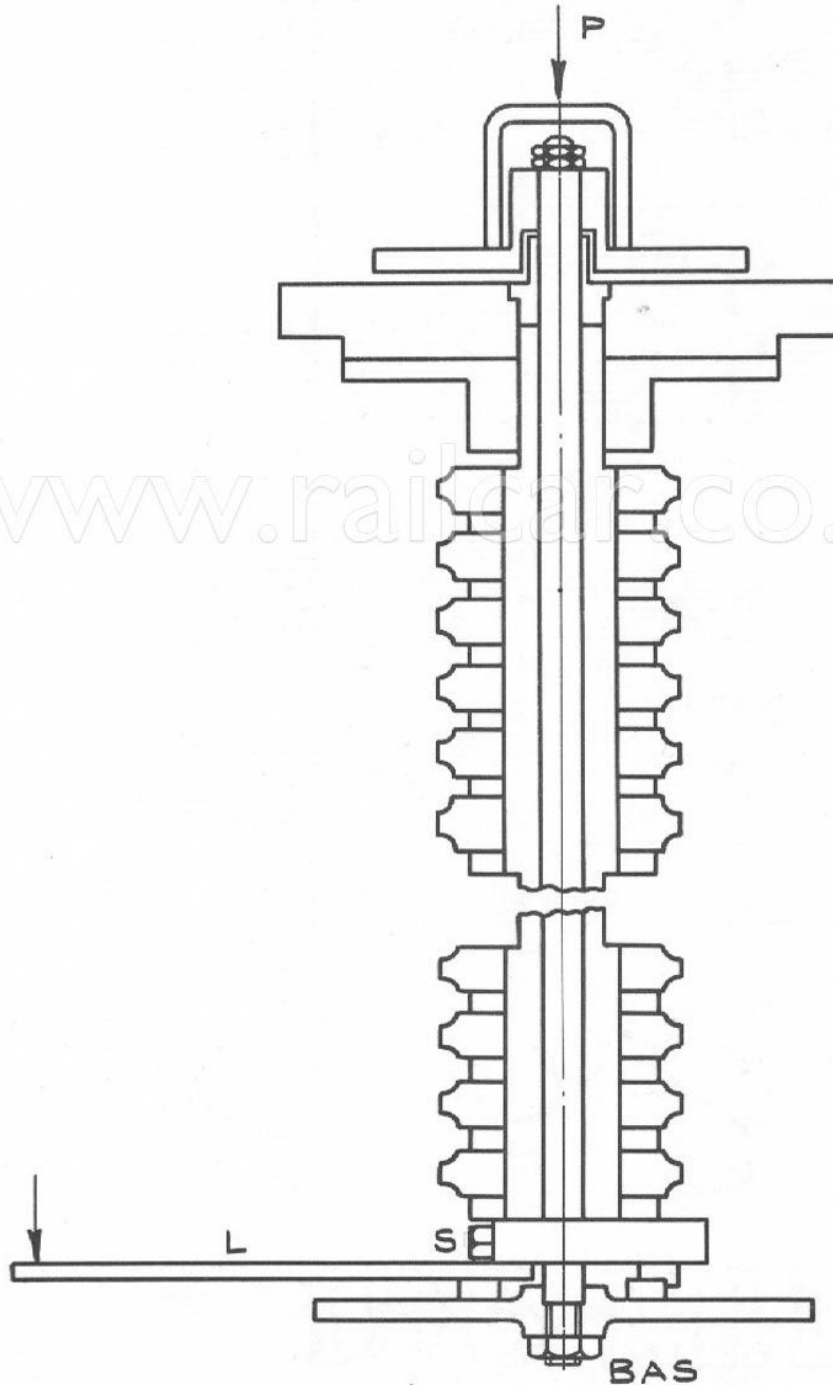
No. **23**

DATE.....

SHEET **2** OF **2**

SERVICE BULLETIN

CONTINUED



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NO. **24**

DATE.....

SHEET **1**.....**1**.....

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. 'A' TYPE ENGINES

OIL PRESSURES

Because of fluctuations in oil pressure and comparisons which have from time to time given rise to misunderstandings as to the exact oil pressure to be expected in a new engine, it has now been decided that in future the more satisfactory reference is to say that the **MINIMUM** oil pressure of a hot engine in good condition, running at approximately 1,800 RPM, should be 30 lbs per sq. inch.

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No. **25**

DATE.....

SHEET..... 1 2

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. 'A' Type 9.6 and 11.3 Horizontal Engines.

CRANKSHAFT REAR OIL SEAL

A new rubbing strip which incorporates a double flange fitting and eliminates the use of dowels has now been introduced and is being fitted to all new engines of the above types.

Existing engines are to be brought into line with this improvement at the next overhaul and sketch TSB.2826 attached shows clearly the necessary alterations to the crankcase and extension casing.

The part numbers of the rubbing strips are as follows:—

<u>Old Type</u> <u>Part No.</u>	<u>B.R. Cat. No.</u>	<u>New Type</u> <u>Part No.</u>	<u>B.R. Cat. No.</u>
AB.0706	9/15/35667	A.74845	9/15/35668

Stocks of the rubbing strip AB.0706 will be held in order to cover the conversion period.

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DATE.....

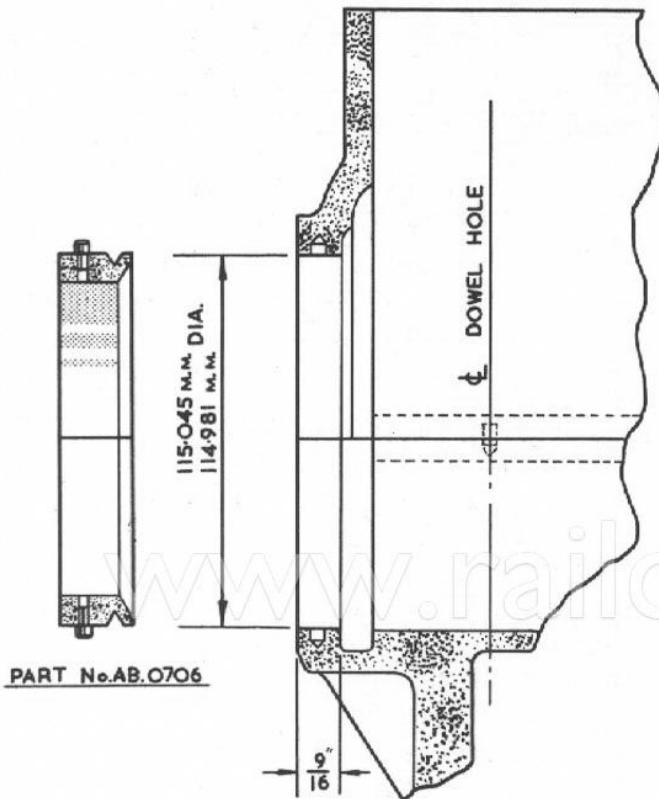
SHEET..... 2...OF....2..

SERVICE BULLETIN

CONTINUED

EXTENSION-ENGINE CASING

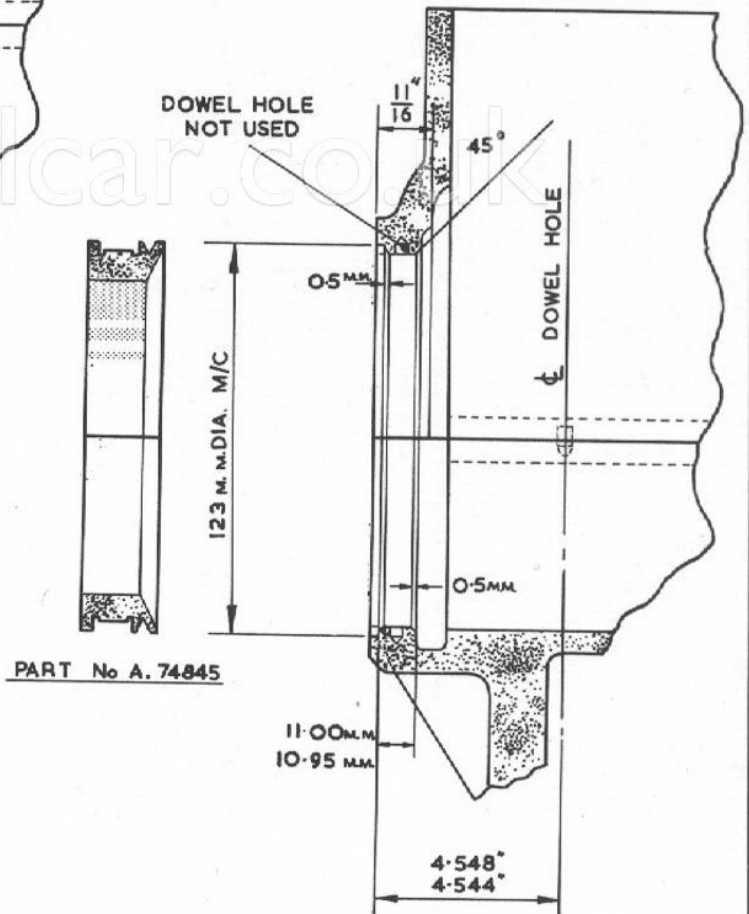
9.6 AND 11.3 LITRE HORIZONTAL ENGINES



PART No. AB.0706

ENGINE CASING

BEFORE ALTERATION



PART No A. 74845

AFTER ALTERATION

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No. **26**

DATE **4.11.57.**

SHEET **1 1**

SERVICE BULLETIN

APPLICABLE TO:—

INSTRUCTIONS FOR REPLACEMENT OF PISTON SEALS
DURING SERVICING OF THE R.14 GEARBOX.

When new seals are being fitted or the pistons are removed for examination, cylinder liners, seals and pistons should be oiled before being replaced, preferably with Colloidal Graphite. If the gearbox has been standing without use for some months, the pistons should be withdrawn and the parts oiled as described above.

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No. **27**

DATE...17.12.57.

SHEET...1...3

SERVICE BULLETIN

APPLICABLE TO:— ALL B.U.T. UNITS

ANTI-FREEZE

Operation:-

The anti-freezer consists of a reservoir above which a venturi tube is mounted: the reservoir communicates with the extremes of the venturi tube by means of two drillings.

A proportion of the air, drawn through the venturi tube by the compressor, by-passes (down the first drilling) into the reservoir, there mixing with the alcohol vapour present. The mixture then passes up the second drilling to mix with the main air stream.

Instructions:-

In cold weather the reservoir of the anti-freezer should be filled to the level of the filler plug hole with ~~METHYL ALCOHOL~~ METHYLATED SPIRIT MINERALIZED. L.M.CAT N^o 27/1358.

Note:-

~~Methyl alcohol is toxic in both the liquid and vapour state and has a very low flash point. The following precautions should, therefore, be observed:-~~

- ~~(1) Do not fill the anti-freezer in an enclosed space, unless a good and free circulation of air is available.~~
- ~~(2) The use of naked lights and smoking must be strictly forbidden.~~

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SHEET.....**2**.....OF.....**3**

SERVICE BULLETIN

CONTINUED

All alcohol contains a small percentage of water which does not evaporate as quickly as the alcohol, and therefore as the alcohol is consumed the percentage of water increases, and this decreases the efficiency of the anti-freezer. To prevent the water content reaching too high a value it is therefore advisable to run the anti-freezer until it requires refilling and drain away the residual alcohol and water by removing the drain plug, rather than to keep topping up the anti-freezer with fresh alcohol.

Ensure that the two drillings between the venturi tube and the reservoir are clear.

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No. **27**

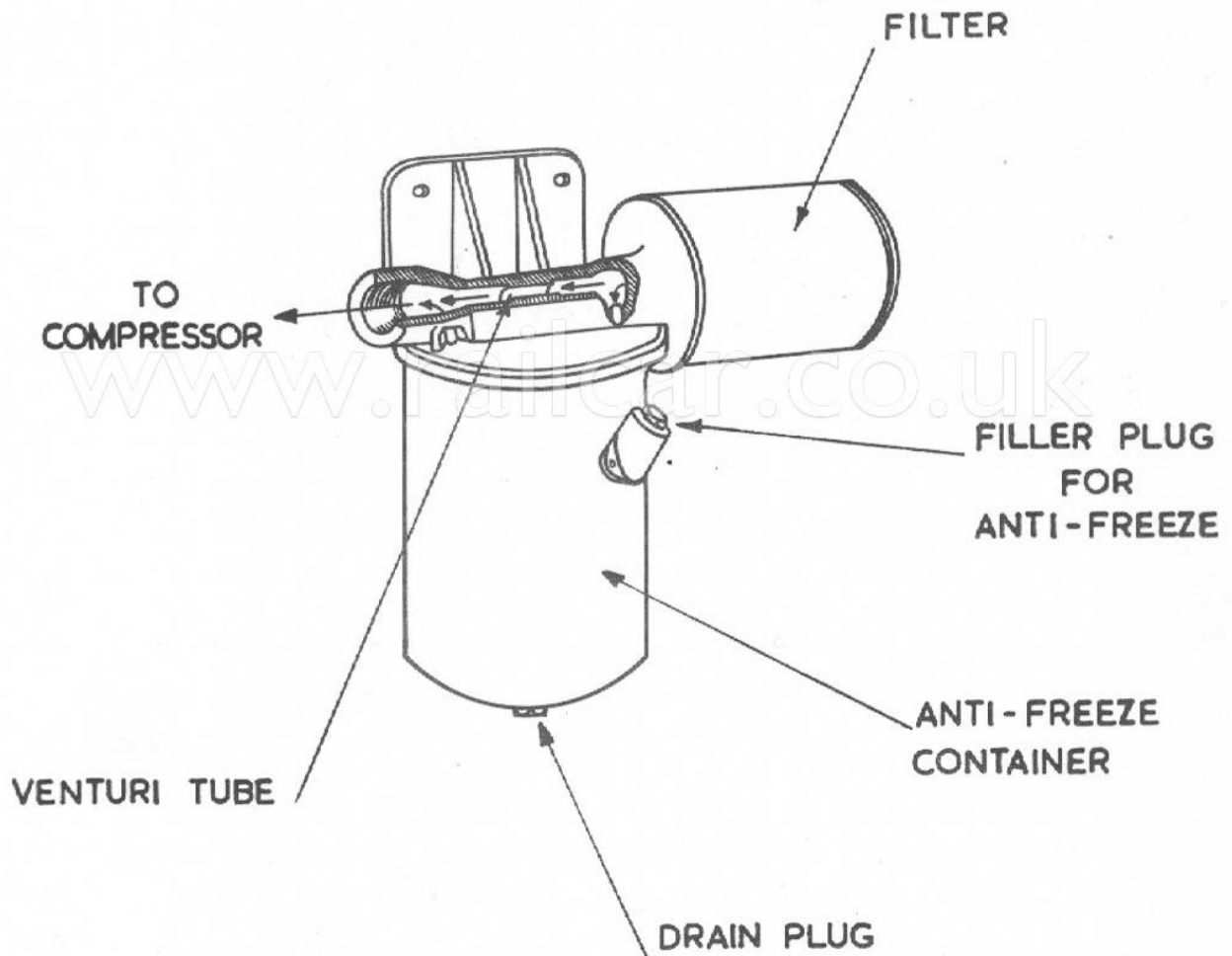
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SHEET.....3...OF...3.

SERVICE BULLETIN

CONTINUED

SKETCH SHOWING ANTI-FREEZE UNIT



CAPACITY = 2.87 PINTS

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No. **29**

DATE **20.12.57**

SHEET.....

SERVICE BULLETIN

BRITISH RAILWAYS ONLY

APPLICABLE TO:— B.U.T. 'A' TYPE 9.6 & 11.3 LITRE HORIZONTAL ENGINES.

REVISED FUEL PUMP SETTINGS

In order to obtain the utmost efficiency from power units of our manufacture, the fuel pump settings covering the whole range of current production engines have again been examined and revised accordingly.

The following settings have been extracted from A.E.C. Bulletin 169 P.G., being applicable to railcars.

Injection pump delivery from each
element on a Hartridge type test.

Rig per 200 pump revolutions at 600 r.p.m.

Altitude	9.6 litre horizontal engines	11.3 litre horizontal engines
Sea Level	21.8 ccs.	22.2 ccs.
2,000 ft.	20.7 ccs.	21.2 ccs.
4,000 ft.	19.6 ccs.	20.3 ccs.
6,000 ft.	18.6 ccs.	19.3 ccs.

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SHEET...1...1

SERVICE BULLETIN

APPLICABLE TO:— 0600 and 0680 'L' TYPE ENGINES

VALVE GUIDES

It should be noted that there is a difference in length between the valve guides fitted in the 0680 and 0600 engines, the guides in the 0680 being 0.100" shorter than those in the 0600.

The overall lengths of the valve guides are:

0680 Engine

2.67"

0600 Engine

2.77"

When fitted in the engine, both types project 0.52" above the face of the cylinder head.

It is not advisable to utilise the 0680 guides in the 0600 engine, or vice versa, and, therefore, when reconditioning cylinder heads, care should be taken to ensure that the correct valve guides are fitted.

The part numbers involved are:

	<u>Part No.</u>	<u>B.R. Cat. No.</u>
Valve guide for the 0680 engine	281325A	9/15/40535
Valve guide for the 0600 engine	227958D	9/15/40007

These part numbers are current at 14.11.57.

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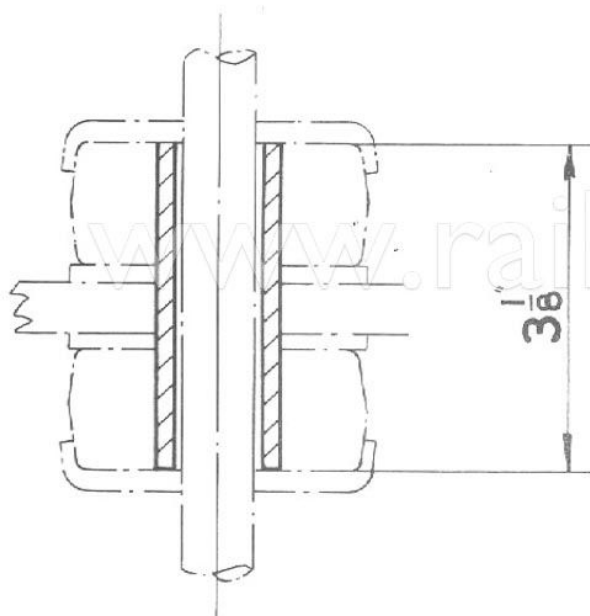
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SERVICE BULLETIN

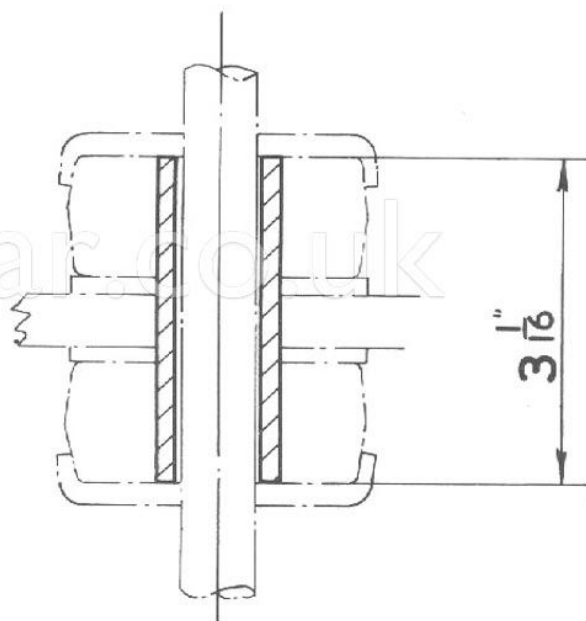
APPLICABLE TO:— B.U.T. R14 D173 & SE4 GEARBOX
FRONT MOUNTINGS.

MODIFICATION TO GEARBOX FRONT
MOUNTING BRACKET.

BEFORE ALTERATION



AFTER ALTERATION



THE MODIFICATION CONSISTS OF FITTING A $3\frac{1}{16}$ " IN LIEU
OF A $3\frac{1}{8}$ " LONG FERRULE AND SHOULD BE CARRIED OUT AT
THE FIRST AVAILABLE OPPORTUNITY WHEN A GEARBOX IS
REMOVED FROM A VEHICLE AT THE MAINTAINING DEPOT
OR MAIN WORKS.

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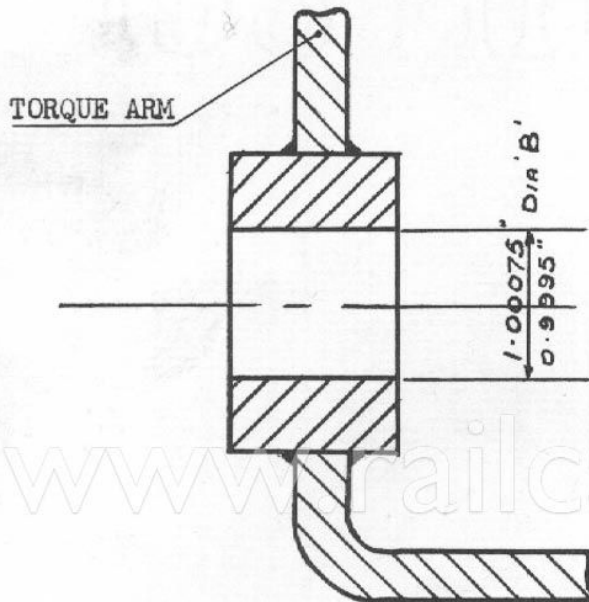
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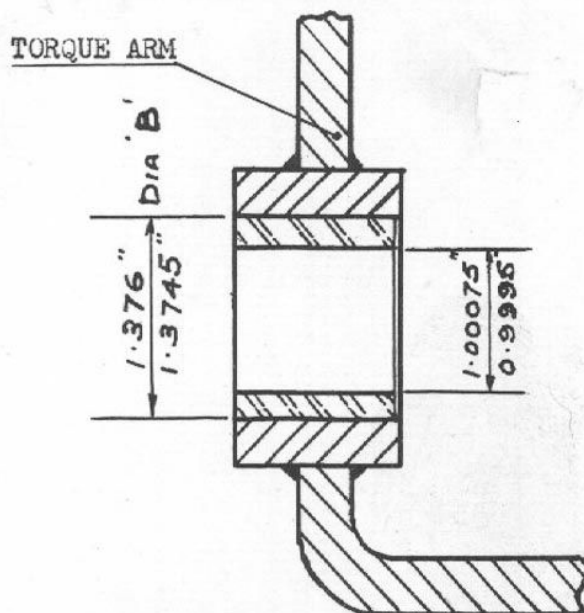
SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— ALL B.U.T. FINAL DRIVE TORQUE ARMS



BEFORE ALTERATION



AFTER ALTERATION

Hole in boss opened out to 1.376" - 1.3745" (Dia. "B") 1/32" chamfer x 45° added to one end.

Bush to Part No. Z4/10216 (A.E.C.)
Bush to Part No. 42648 (S.C.G.)
pressed in and reamed to 1.00075" - 0.9995" after assembly.

Torque Arm Pin material altered and Part No. changes from Z1/47035 to Z1/47092.

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No. **34**

DATE.....

SHEET **1** OF **3**

SERVICE BULLETIN

APPLICABLE TO:— 'A' TYPE 9.6 & 11.3 LITRE HORIZONTAL ENGINES

CRANKSHAFT DOWEL (REAR THRUST RING)

On original crankshafts the short stepped dowel Part No. Z1/44003 (Fig. 1) locating the rear thrust ring has been found to be loose in the front crankshaft web, and in some instances caused fretting, resulting in elongation of the dowel hole.

In cases where elongation has taken place it has been overcome by fitment of a service dowel Part No. Z2/44018 which is a tight fit in the crankshaft and a loose fit in the thrust ring. It was however necessary to extend the existing hole right through the web to the dimension shown in Fig. 2.

Later production crankshafts had the dowel hole extended through the web to a diameter of $17/64$ " and reamed to $.2815$ ". $.281$ " diameter x $\frac{5}{8}$ " deep in order to accommodate a longer stepped dowel Part No. Z2/44010 (See Fig. 3.)

A further improvement has now been incorporated in production crankshafts by replacing the stepped dowel (Z2/44010) with a silver steel parallel dowel Part No. Z2/44021 B.R. Cat No. 9/15/30587 (See Fig. 5.) this necessitated a modification to the rear thrust ring and the old and revised Part Numbers are as follows:—

<u>OLD PART NO.</u>	<u>DESCRIPTION</u>	<u>NEW PART NO.</u>	<u>B.R. CAT NO.</u>	<u>QUANTITY</u>
Z2/44010	Dowel	Z2/44021	9/15/30587	1
A56704	Rear Thrust Ring	A56709	9/15/30603	1

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SHEET **2** OF **3**

SERVICE BULLETIN

CONTINUED

The alteration can be effected during complete overhaul of an engine if the existing thrust ring (A56704) is suitable for further service it can be utilised with the larger diameter dowel by machining the dowel hole to 0.296"/0.297" ensuring it is square with the face ring.

For crankshafts which have already been fitted with a service dowel or where it is desired to fit as a replacement of a dowel Z2/44010 due to elongation of the hole in the crankshaft the Part No. of the dowel to be used is Z2/44030 B.R. 9/15/44030 (See Fig. 4.) which has superseded Z2/44018.

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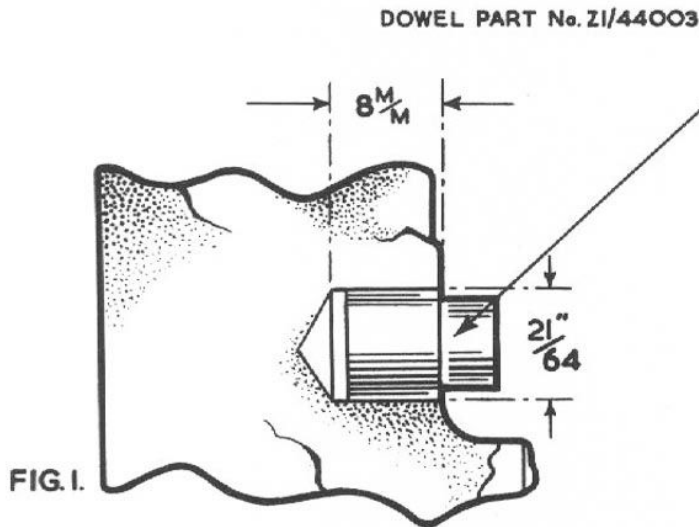
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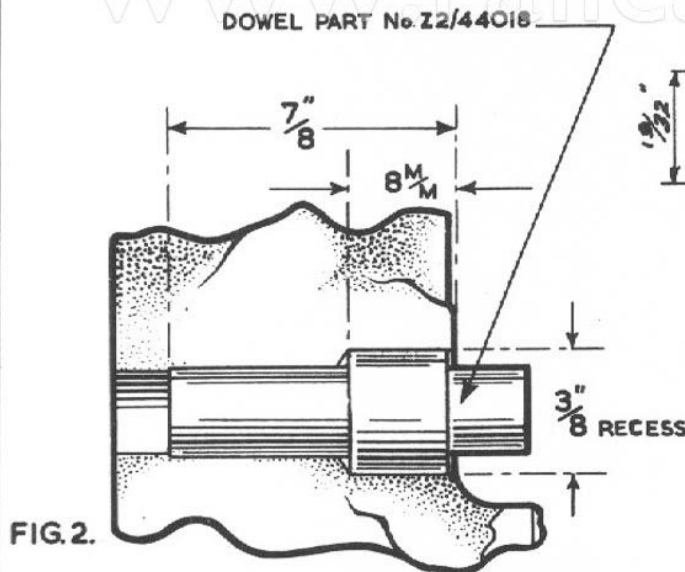
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SHEET..... 3 OF 3

CONTINUED



ORIGINAL CRANKSHAFTS

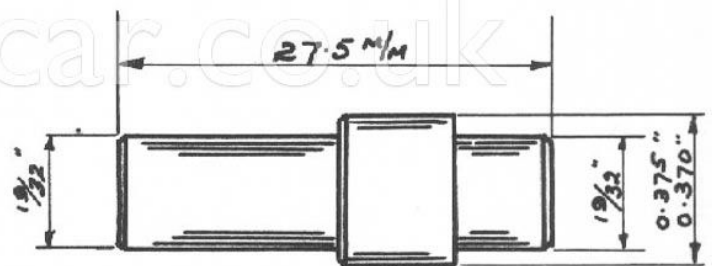
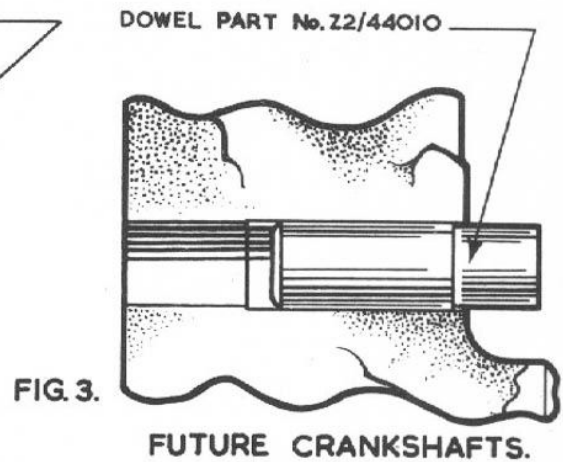


SERVICE MOD. TO CRANKSHAFT

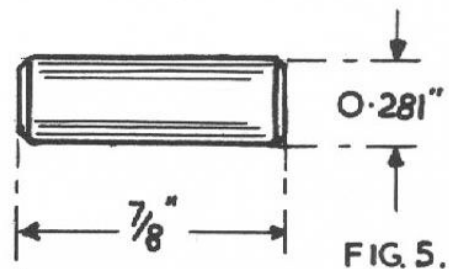
DRILL $1\frac{1}{64}$ " RIGHT THROUGH.

RECESS $\frac{3}{8}$ " DIA. X $8\frac{1}{4}$ " DEEP.

REAM $.28175$ "-X $\frac{7}{8}$ " DEEP.



NEW DOWEL PART No. Z2/44021



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No. 35

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SHEET.....1...OF...1...

SERVICE BULLETIN

APPLICABLE TO:—

'A' TYPE 9.6 & 11.3 LITRE HORIZONTAL
ENGINES

FUEL INJECTOR SECURING STUD NUTS

Following cylinder head fractures in the region of injector orifices which have been traced to overtightening of the fuel injection holding down nuts the attention of all concerned is drawn to the safe loading that may be applied to the injector securing studs.

The maximum load that may be applied with the use of a torque spanner is 11 lbs.ft. but it is equally important to ensure that the two securing nuts are evenly tightened to distribute the load equally between the studs.

The Torque Spanner Loading Table, Page A88 Sect. 84 in the manual for the 79,000 series cars and Page K84 Sect. 79 in the manual for the 50,000 series cars should be extended to include the following:—

Fuel Injector Securing Stud Nuts... Torque 11 lbs.ft.

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No. 36

DATE.....

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

B.U.T. 'A' TYPE 11.3 LITRE HORIZONTAL
ENGINE

CONNECTING ROD SMALL END BEARING DIAMETERAL CLEARANCE

It has been found in certain cases that the Connecting Rod Small End Bearing has a tendency to "Grow" under service conditions, resulting in loss of clearance between the gudgeon pin and small end bearing.

To obviate this the clearance between the gudgeon pin and small end bearings has been increased from 0.00025/0.00125 to 0.001/0.002. The increased clearance is obtained by machining the small end bearing to the limits below:—

1.77275"
1.77350"

It is most important to ensure that the small end bearing is bored parallel to the big end bearing and the dimension between small and big end bearing centres maintained.

The additional clearance has been provided on production engines in the A 220 series from engine number A 220 2500 onwards.

Attention is drawn to the fact that the latest tolerances should be employed when overhauling engines of this type and that the latest dimensions are given on page K.80 of the B.U.T. 50,000 Series Overhaul Manuals. Information tabulated on page A.34 of the B.U.T. 79,000 Series Manual should be amended accordingly.



SERVICE BULLETIN

APPLICABLE TO:— RL4 GEARBOX - MAIN WORKS ONLY

FITTING OF TRIST TYPE MOULDED LININGS TO BRAKE BANDS

The lining of RL4 gearbox brake bands has been altered from bonded material to moulded pattern and the latter type must be fitted as replacements are required.

These moulded linings were introduced with production gearbox serial Nos.50684 & 50494 (List Nos.5753 & 5752). On initial production of brake bands with this type of lining a flat-headed solid rivet was used, however, due to production difficulties the rivets were changed to flat-headed hollow ended copper type and the operation carried out by the "clench riveting" method. Brake bands riveted in this manner are fitted from production gearbox serial No.51706 (List No.6321) onwards.

To enable fitting of moulded linings to brake bands previously fitted with the bonded-type it is necessary to modify the internal and external steel bands to provide a surface square to the rivet centre line and also bring the thickness of material riveted to within reasonably close tolerances.

The dimensional details of the modification are depicted in Fig.1 for external bands and in Fig.2 for internal bands.

Listed below are details of the old and new part numbers applicable to this conversion:-

B.R.CAT.NO.	OLD PART NO.	DESCRIPTION	QUANTITY PER BAND	NEW PART NO.
9/15/95791	505460	External Lining.	1	42539
9/15/95792	500082	Rivet.	14	-
9/15/95793	505457	Rivet.	3	-
9/15/95794	505458	Rivet.	2	-
	-	Rivet, 27/64" X 5/32"	8	41385
	-	Rivet, 1/2" X 5/32"	8	41394
	-	Rivet, 9/16" X 5/32"	1	41387
	-	Rivet, 1.3/64" X 5/32"	1	41388
	-	Rivet, 7/8" X 5/32"	1	41399
9/15/95807	505459	Internal Lining.	1	42538
9/15/95808	505456	Rivet, 9/32" X 5/32"	26	41386

The alteration also changes the assembly Part Nos. but the B.R.Cat. Nos. will remain as at present and are as follows:-

OLD PART NO.	DESCRIPTION	NEW PART NO.	B.R.CAT.NO.
508968	Complete Brake Band Assembly	A.5704	9/15/95780
508969	External Brake Band Assembly	A.5703	9/15/95786
508970	Internal Brake Band Assembly	A.5702	9/15/95800

Cont....

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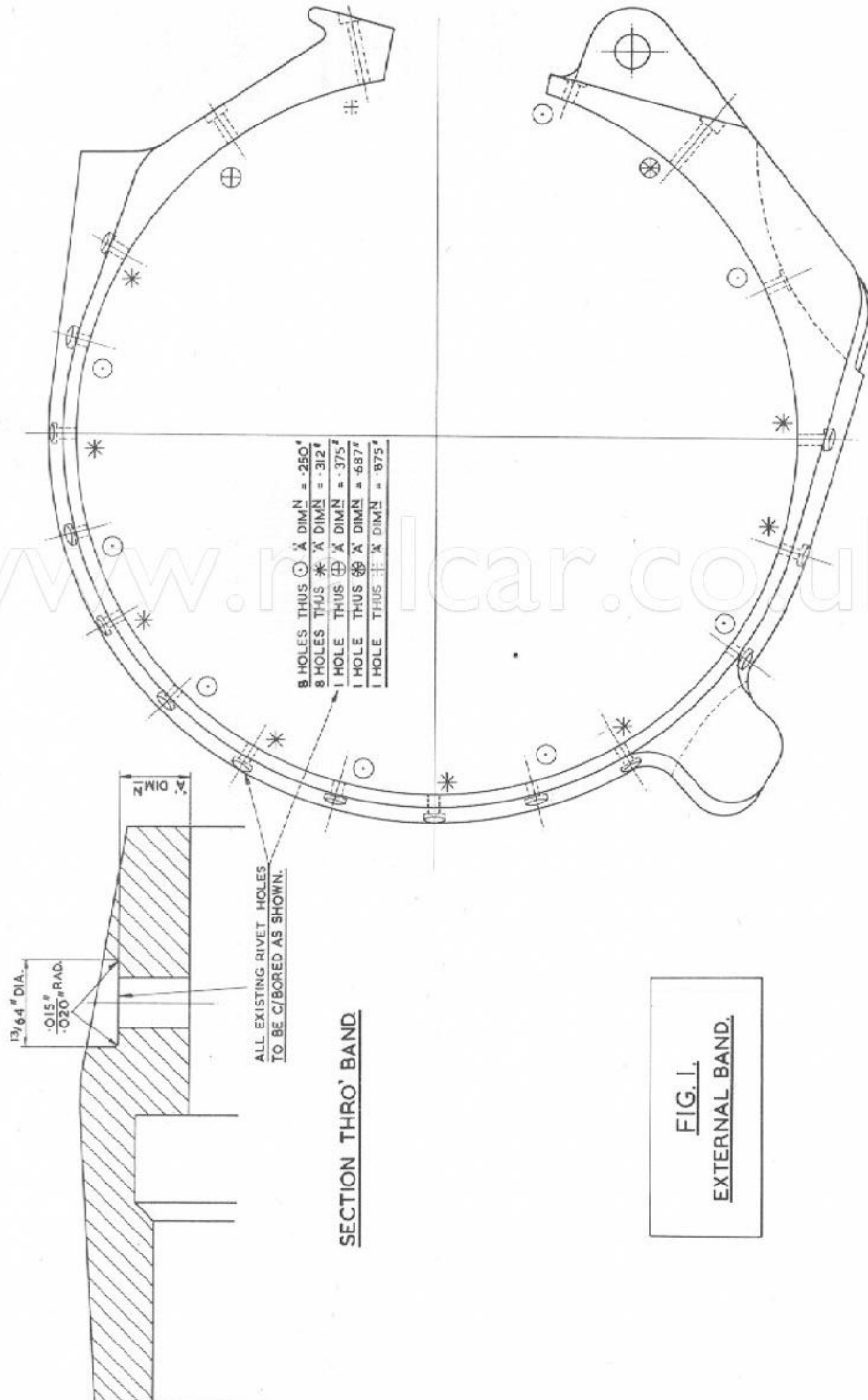
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SHEET **2** OF **5**

SERVICE BULLETIN

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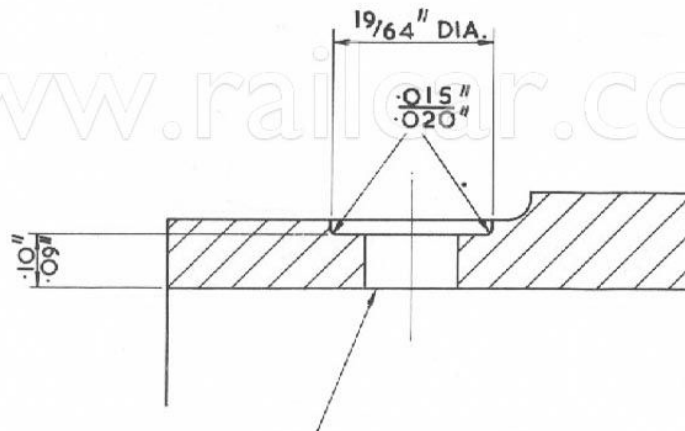


SERVICE BULLETIN

CONTINUED

The new linings are supplied pre-drilled and great care must be taken in their handling and storage to prevent breakage. Fig.(3) indicates the positioning of the different length rivets for the external band and the relative positioning of the slots which are required to be cut in the lining after riveting to the external band. The positioning of the slots in the internal band is shown in Fig.(4)

Riveting of the linings should be carried out on a simple form of manually-operated machine or hand-riveting may be resorted to providing a special punch is used. After assembly of the internal band to the external band it is necessary to machine the linings in accordance with standard procedure.



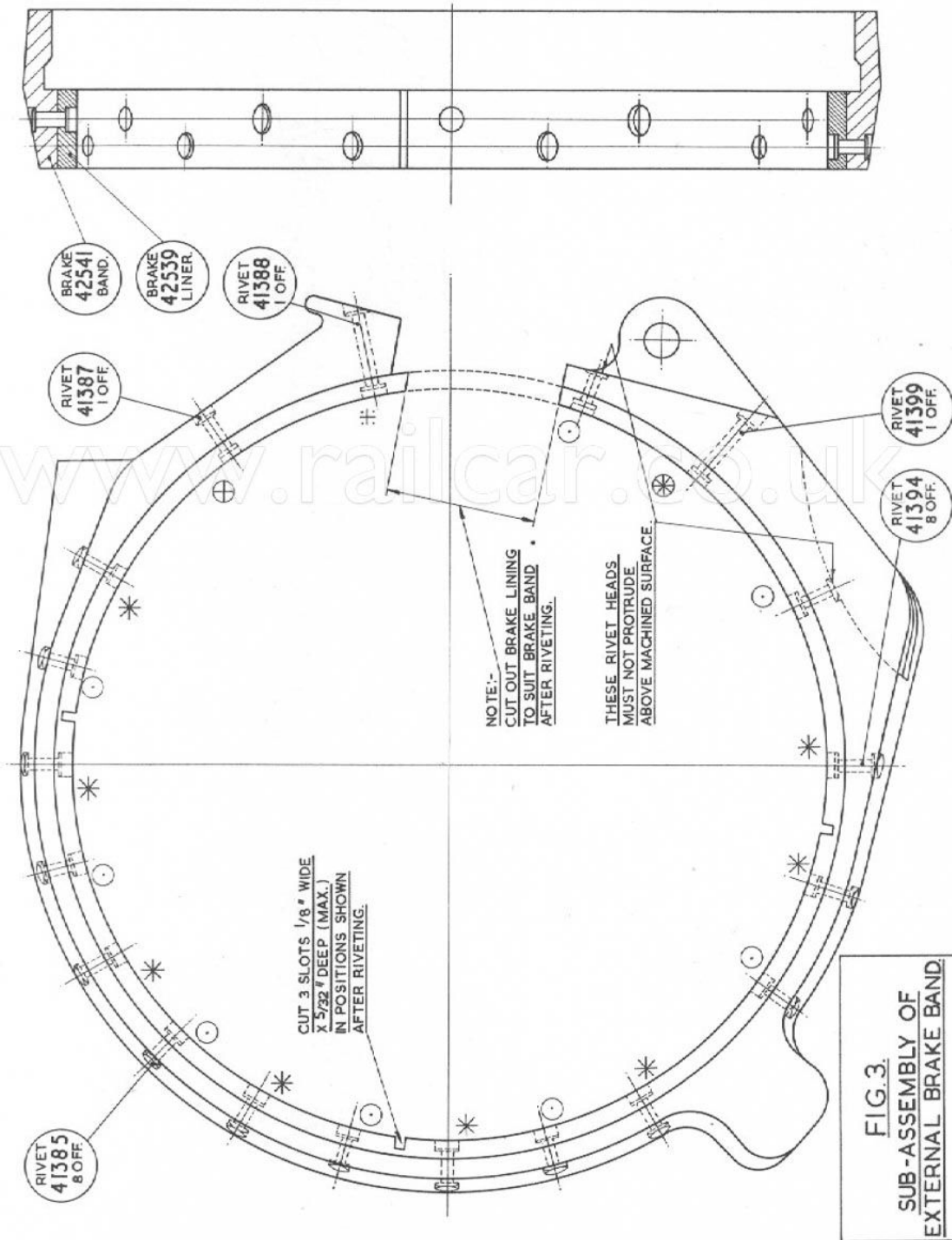
ALL EXISTING RIVET HOLES
TO BE C/BORED AS SHOWN.

FIG.2.
INTERNAL BAND.



SERVICE BULLETIN

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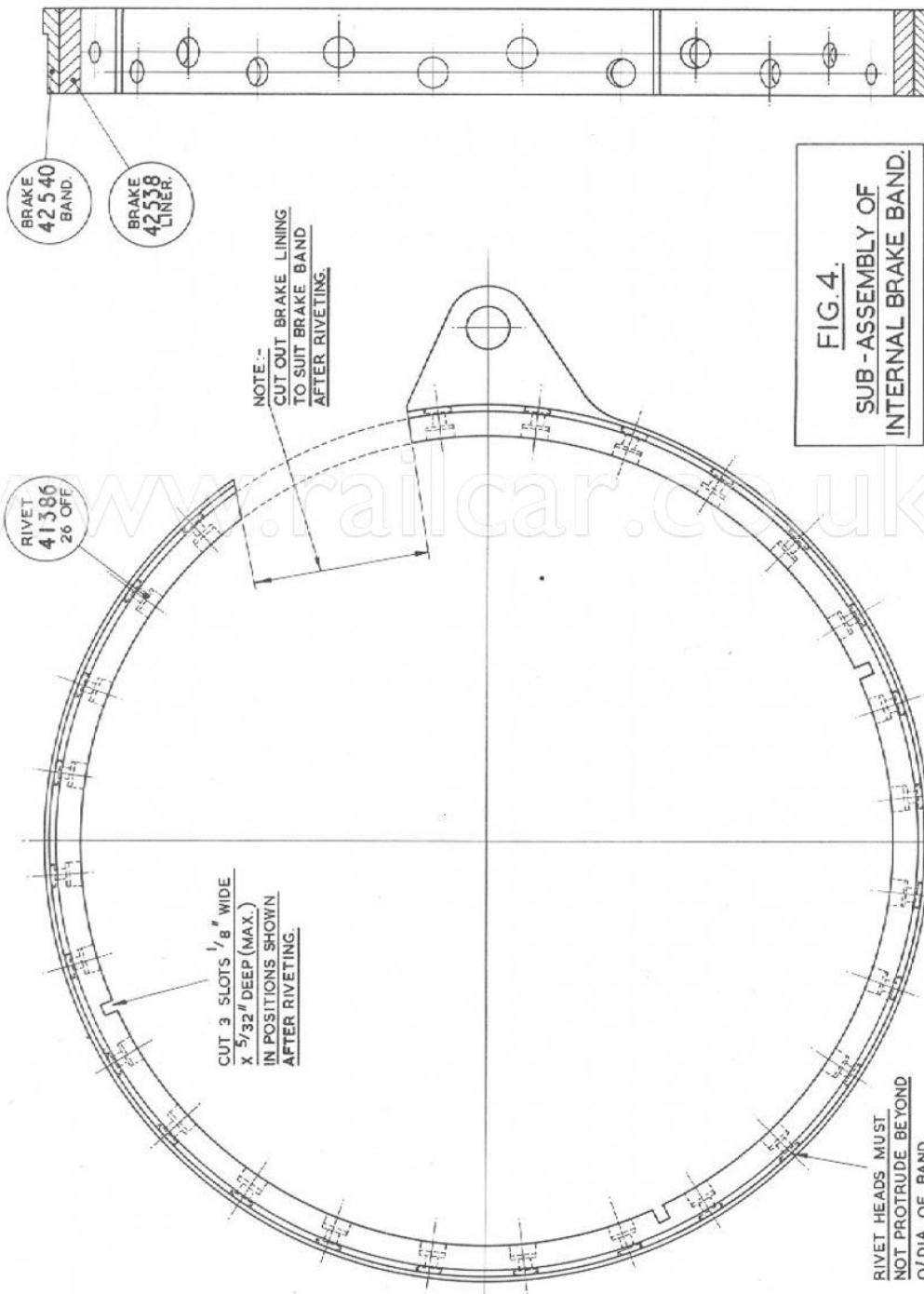
No. **37**

DATE.....

SHEET.....**5**...OF...**5**..

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No. 38

DATE.....

SHEET 1 OF 2

SERVICE BULLETIN

APPLICABLE TO:—

B.U.T. 'A' TYPE HORIZONTAL ENGINES

GASKET AND JOINT KITS (TOP OVERHAUL)

The gasket and joint kits listed in Bulletin No. 11 consist of every gasket and joint required for carrying out complete engine overhauls.

In order to facilitate ease of ordering and stores procedure, kits are now available comprising cylinder head gaskets and joints required when carrying out engine top overhaul only (i.e. Cylinder head overhaul).

Below details are given of the appropriate kit, Part Numbers for 'A' type horizontal engines followed by a breakdown of the kits quoting individual Part Numbers, description, and quantities:—

MULTIPLE UNIT RAILCARS

KIT PART NO. A.B. 0620 ENGINE TYPE A220 (11.3 LITRE HORIZONTAL)

B.R. CAT NO.

<u>Part No.</u>	<u>B.R. Cat. No.</u>	<u>Description</u>	<u>Qty</u>
A 70753	9/15/40210	Gasket Cylinder Head	2 off
A 72632	9/15/40212	Joint Cylinder Head Cover	2 off
A4/19410	9/15/40217	Joint Water Connection	3 off
A3/19496	9/15/40213	Joint Cover Plate	2 off
A 31016	9/15/40215	Rubber Ring	1 off
A3/19495	9/15/40214	Joint Exhaust Manifold	4 off

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No. 38

DATE.....

SHEET.....2...OF...2..

SERVICE BULLETIN

CONTINUED

2-AXLE RAILCARS

KIT PART NO. A.B. 0619 ENGINE TYPE A219 (9.6 LITRE HORIZONTAL)

B.R. CAT. NO.

<u>Part No.</u>	<u>B.R. Cat. No.</u>	<u>Description</u>	<u>Qty</u>
A 70752	9/15/40211	Gasket Cylinder Head	2 off
A 72632	9/15/40212	Joint Cylinder Head Cover	2 off
A4/19410	9/15/40217	Joint Water Connection	3 off
A3/19496	9/15/40213	Joint Cover Plate	2 off
A3/1016	9/15/40215	Rubber Ring	1 off
A3/19495	9/15/40214	Joint Exhaust Manifold	4 off

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SERVICE BULLETIN

No. **39**
SER. n^o. 62
DATE.....
SHEET 1 OF 2

APPLICABLE TO:— **FREEWHEEL AND CARDAN SHAFT**

GREASE LUBRICATION OF UNIVERSAL COUPLINGS

Before changing the universal coupling lubricant from oil to grease it is necessary to change the lubricator nipples. It is essential that cardan and freewheel shafts fitted with universal couplings which require replacement are modified by fitting of unit packages to bring them to the latest standard.

Freewheel Shaft (See Fig.1)

If the universal assembly requires replacement, unit package part number K2707 must be used, otherwise it will only be necessary to replace the existing oil nipple (Part No.81-2022: B.R.Cat.No.9/15/99043) with a grease type lubricator (Part No.81-985: B.R.Cat.No.9/15/98075) in the same position. The extension already fitted does not require changing.

Cardan Shafts (See Fig.2)

Should the universal assembly require replacement this can be effected by fitting unit package Part No.K2709 for cardan shafts type K6/0164 (fitted to 150 b.h.p. engined railcars) or unit package K2708 for cardan shafts type K7/0112 (230 b.h.p. engined cars). It is essential that the grease lubricator Part No.81-985 be fitted in the centre of the starpiece facing the yoke (i.e. not facing the coupling flange). This may involve changing the position of the air relief valve and in some cases the journal assembly will require dismantling in order to reverse the starpiece and bring the tapped hole into correct position - facing the yoke. This modification should be carried out at the first available opportunity.

Main Works to Note

Existing stocks of Freewheel and Cardan Shafts should be modified in accordance with the foregoing.

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SERVICE BULLETIN

CONTINUED

No. **39**
SEE. No. 62.

DATE.....

SHEET 2 OF 2

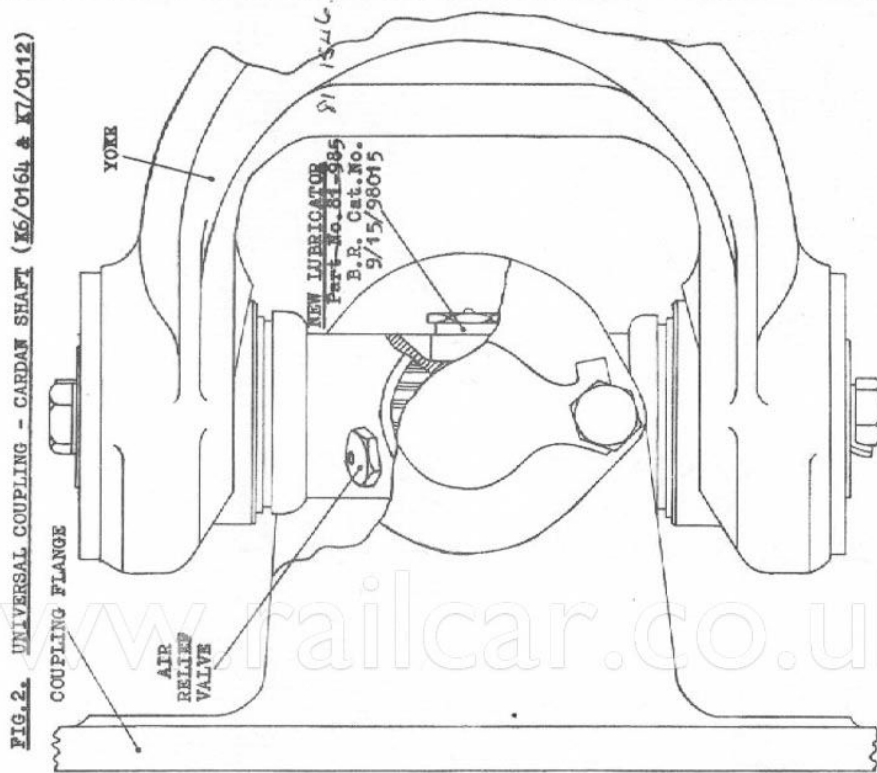


FIG. 2. UNIVERSAL COUPLING - CARDAN SHAFT (K6/0164 & K7/0112)

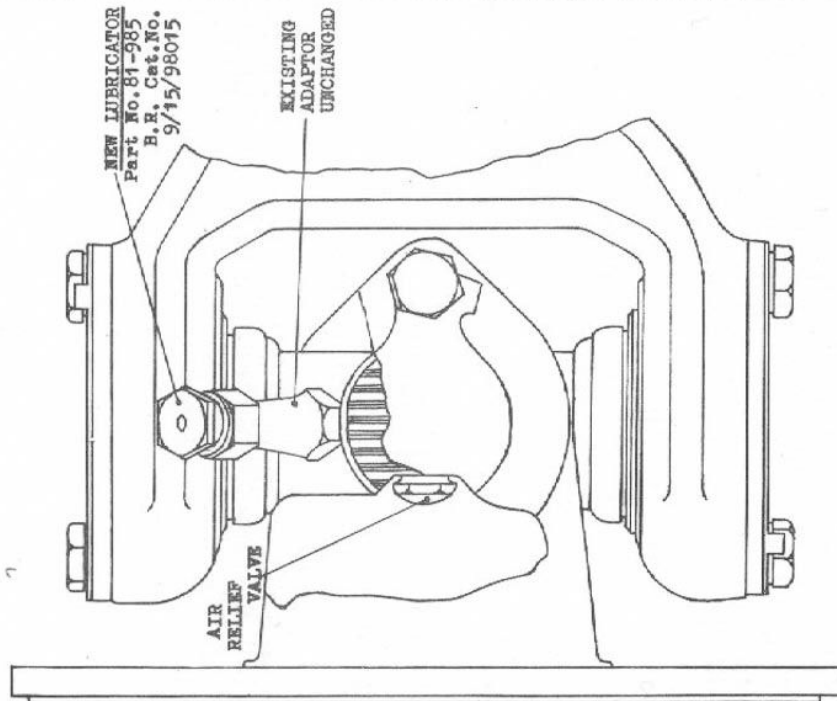


FIG. 1. UNIVERSAL COUPLING - FREEWHEEL SHAFT (K6/0150)

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No. **40**

DATE.....

SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— 'L' TYPE RE 680 ENGINES ONLY

ENGINE LUBRICATING OIL, SUCTION PIPE AND FILTER

In order to ensure that the lubricating oil suction pipe is below the level of the lubricant in the engine the length of the suction pipe has been increased on 'L' type R.E.680 engines.

This modification in addition to changing the oil suction pipe also necessitates the replacement of the wire mesh filter, and filter securing screws. Details of the new and displaced part numbers are tabulated below.

The modification has been incorporated on Production from Engine Serial number RE680/1-979 onwards, and engines already in service will be modified during overhaul at Main Works.

<u>OLD</u> <u>PART NO.</u>	<u>B.R.</u> <u>CAT NO.</u>	<u>QTY.</u>	<u>DESCRIPTION</u>	<u>NEW</u> <u>PART NO.</u>	<u>QTY.</u>	<u>B.R.</u> <u>CAT NO.</u>
511351	9/15/56209	1	Suction Pipe	315154	1	9/15/56209
227452	9/15/56207	1	Filter	315155	1	9/15/56207
233755	9/15/30810	2	Setscrew	309892	3	to be allocated.

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SHEET **1** OF **2**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. 'A' TYPE FINAL DRIVES

DRIVING SHAFT - SPIGOT RACE CLEARANCE

In order to facilitate correct positioning of the driving shaft spigot race inner track relative to the outer track and roller cage assembly situated in the reverse pinion, it is necessary to ensure that the clearance between the shoulder of the inner track and the roller bearing cage is not less than $1/16''$ nor greater than $3/32''$. See illustration.

The clearance is obtained by selective fitting of the distance piece, the thicknesses of which are tabulated below:—

<u>B.R. CAT NO.</u>	<u>PART NO.</u>	<u>DIMENSION</u>
9/15/90147	Z9/44813	0.5625
9/15/90148	Z9/44815	0.5425
9/15/90149	Z9/44816	0.5225
9/15/90150	Z9/44828	0.5285
9/15/90151	Z9/44829	0.6025
9/15/90153	Z9/44854	0.491

The procedure to be adopted in fitting the driving shaft is as follows:—

Establish that the backlash between the bevel wheel and bevel pinions is correct, as any subsequent adjustment effects the position of the spigot race. Locate the spigot race outer track assembly in the reverse pinion. Assemble the coupling flange, bearing, bearing housing, etc. to the input end of the driving shaft. Fit a distance piece and the spigot race inner track at the spigot end of the shaft. Assemble in the final drive casing and check the amount of clearance available, if this is not within the limits quoted, dismantle the driving shaft from the final drive. Replace the distance piece with another of different thickness and repeat the above procedure until the correct clearance is obtained.

Gauges for main works are available to Part Nos. 357-2735 and 357-2736.

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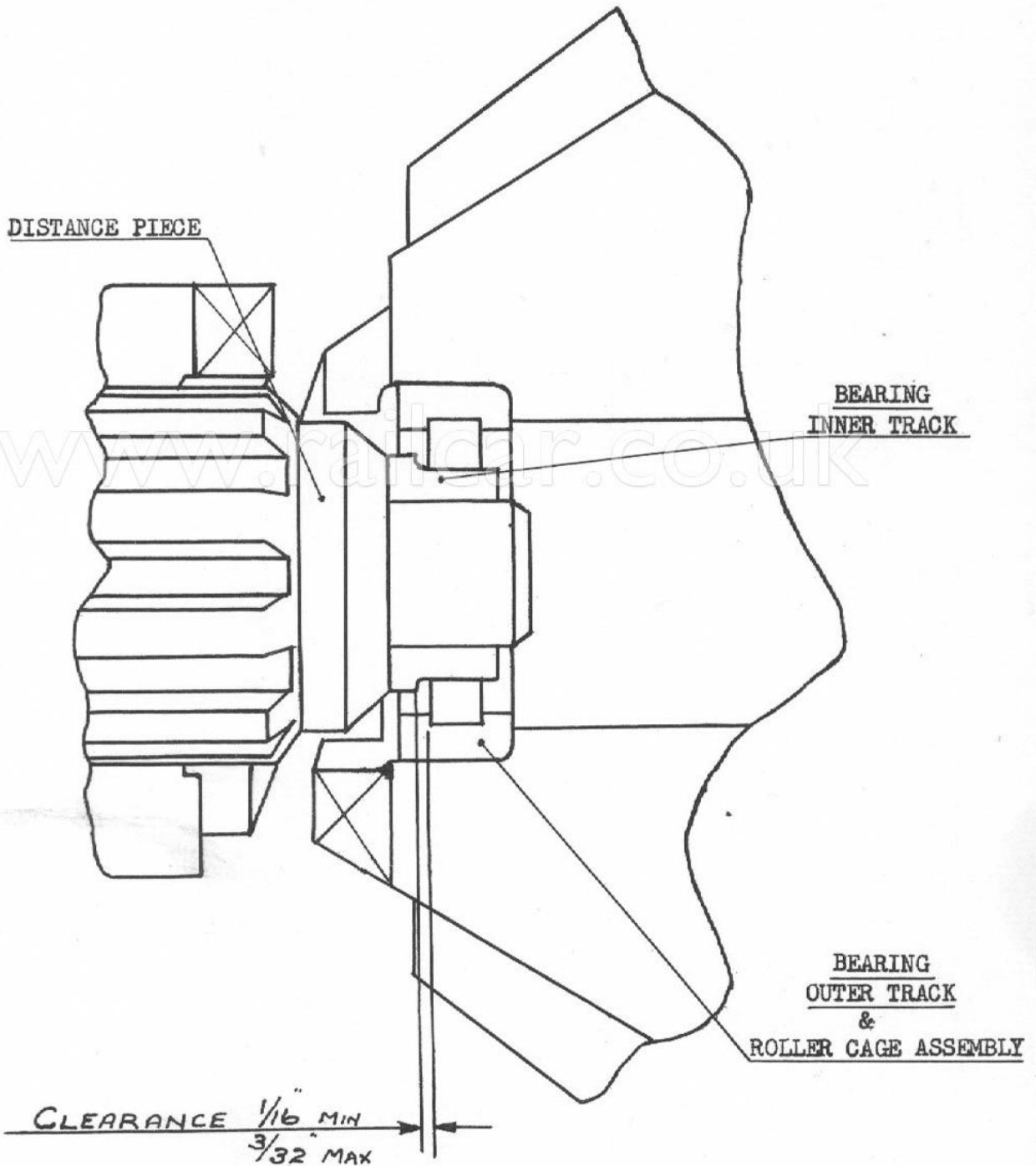
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SHEET **2** OF **2**

SERVICE BULLETIN

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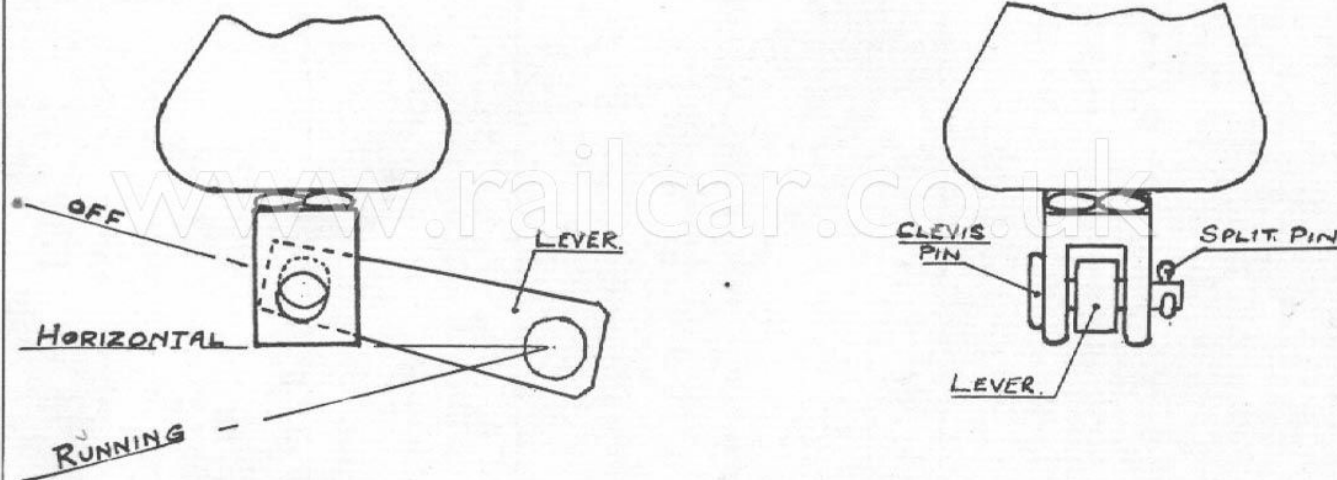
SHEET **1** OF **2**.....

SERVICE BULLETIN

APPLICABLE TO:— B.U.T.—A.E.C. & B.U.T.—LEYLAND ENGINES

ADJUSTMENT OF ENGINE STOP SOLENOID.

In order to ensure correct operation of the Stop Solenoid it is essential that adjustment be carried out in the following manner:—



1. Ensure that the Stop Solenoid mounting bracket is secure on the pump governor housing (A.E.C.) or engine sump (Leyland)
2. Remove split pin and withdraw clevis pin from fork.
3. Energise Solenoid (Armature should move to 'Stop' position).
4. Operate lever to 'Stop' position by hand.
5. Slack-off lock nut and adjust fork until lower portion of lever hole shows 1 m/m in eye of fork (as shown in left-hand illustration above).
6. Lower lever to bring holes in line. Refit clevis and split pins and tighten lock nut.

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DATE.....

SHEET...**2**.....OF...**2**..

SERVICE BULLETIN

CONTINUED

7. Test Stop Solenoid by ensuring that engine ^{will} ~~is~~ shut-down at Full Throttle.
8. Readjust where necessary.

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SERVICE BULLETIN

APPLICABLE TO:— ALL B.T.H. TYPE MAGNET VALVES

MAINTENANCE OF MAGNET (E.P.) VALVES

The illustration (Sheet 3) shows a typical 'ON' type magnet valve. The valve consists of an L-shaped frame (15) valve body (16) and cover (14). A core (6) carrying the operating coil (7) is screwed into the valve body and an armature (8) is mounted with a loose hinge, in the cover. The valve body contains three air passages separated by means of two valves which seat on Monel metal inserts. A spindle (13) passes through the centre of the core, one end is shaped to form the exhaust valve (5) which is normally open. The other end of the spindle engages with the armature so that when the coil is energised the spindle is moved until the valve closes. A push-button (9) is incorporated in the cover in order to provide for manual operation when testing. The inlet valve (3) is normally held on its seat by means of a spring (2) as well as by air pressure. The inlet valve stem (17) is engaged by the end of the spindle in such a way as to open the inlet valve when the exhaust valve is closed by the energising of the coil. Air is then admitted through the passage (10) connected to the air supply, passes through the valve and enters the passage (11) connected to the operating cylinder of the equipment controlled by the magnet valve. When the coil is de-energised the inlet valve closes, cutting off the supply, the exhaust valve opens, and air in the operating cylinder is allowed to pass back through the valve and out of the exhaust port (12) to atmosphere.

The 'OFF' magnet valve is generally similar to the 'ON' type but has its valves arranged so that the air pressure is cut off and the operating cylinder opened to atmosphere when the coil is energised.

INSPECTION

Magnet valves should be inspected for leakage and sluggish operation at least every three months. Valve leakage is usually due to dirt on the valve seat but may be caused by wear on the valve and seat. Sluggishness may be due to a sticky valve stem or to insufficient travel.

Any valve found to be defective will be sent to main works for rectification.

The valves and valve seats may be cleaned with carbon-tetrachloride making sure that each valve is replaced on its own seat. New spindles are supplied oversized to permit adjustment which is made by filing the lower

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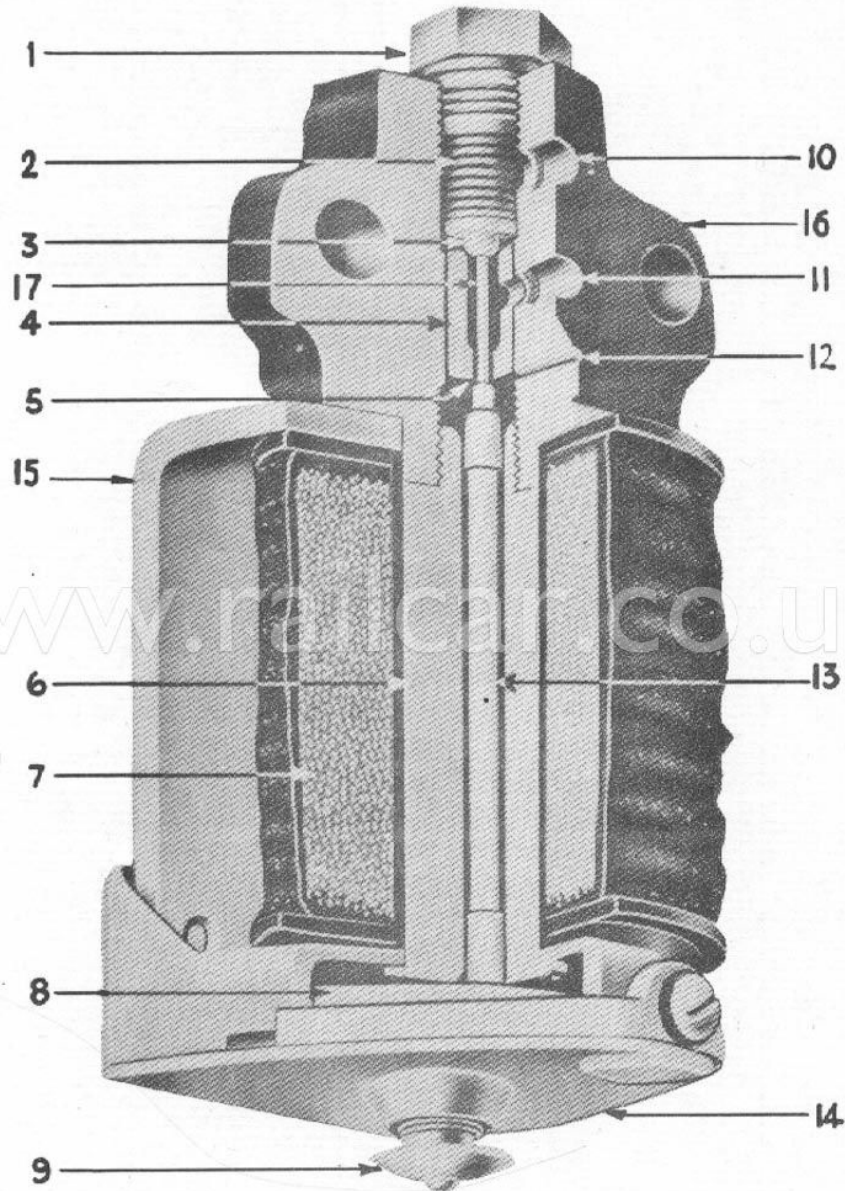
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DATE.....

SHEET **3** OF **3**

SERVICE BULLETIN

CONTINUED



TYPICAL 'ON' TYPE MAGNET VALVE

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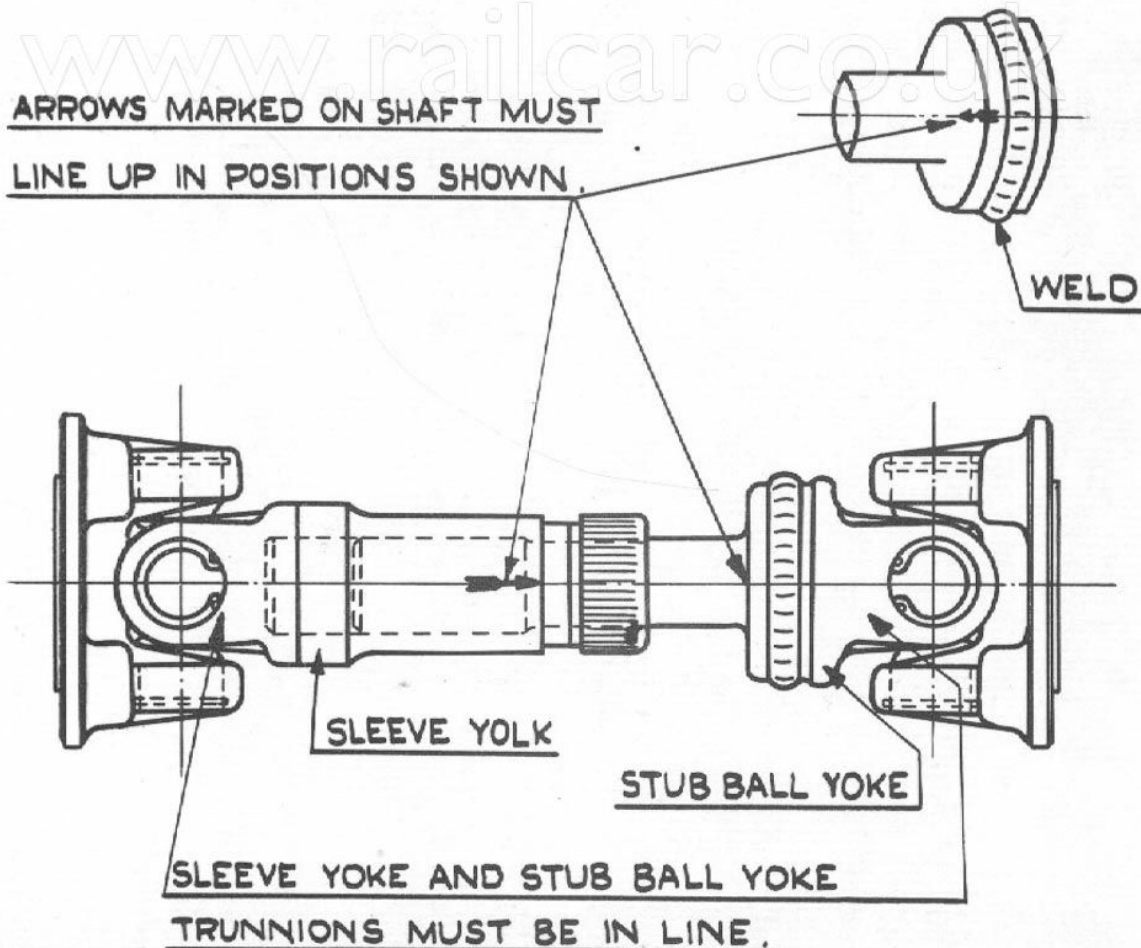
SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— FAN DRIVE SHAFTS

ALIGNMENT OF FAN DRIVE SHAFTS

When assembling fan drive shafts it is essential to ensure that the two halves of the shaft are in alignment as indicated in the sketch below:-



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SERVICE BULLETIN

No. **45**

DATE.....

SHEET **1** OF **1**

APPLICABLE TO:— B.U.T. - A.E.C. A219 & A220 SERIES ENGINES

VALVE SPRING CUP AND COTTERS

Due to a slight modification to the design of the Valve Spring Cup and revision of the material and processing of the 10° cotter it has been necessary to alter the Part Numbers of these components as follows:-

<u>OLD PART NO.</u>	<u>DESCRIPTION</u>	<u>NEW PART NO.</u>	<u>B.R. CAT NO.</u>
A.75205	Valve Cotter	A.75207	9/15/40162
A.75310	Valve Spring Cup	A.75313	9/15/40163

This information supersedes details given in Bulletins 10, and 10a. which are now cancelled.

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T.- A.E.C. ENGINES

SECURING OF SHUT-DOWN SOLENOID BRACKET

In order to prevent the shut-down solenoid bracket becoming loose the countersunk setscrews located on the lever side of the fuel-injection pump governor housing must be replaced by Allen type setscrews and washers at the first available opportunity. The part numbers of the components have been revised as follows:-

B.R.Cat.No.	Old Part No.	Description	New Part No.	B.R.Cat.No.	Qty.
9/15/45557	117-74	Setscrew	117-241		2
-	-	Washer	135-122		2

This alteration became effective on production engines from engine serial No.A220AC-4416.

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No. **47**
SERIAL
No. 83

DATE.....

SHEET 1 OF 2

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. A220 SERIES ENGINES

FACING OF ENGINE CASINGS & RENEWAL OF CYLINDER LINERS

Modifications to the flange of cylinder liners and to the flange recesses in engine casings were introduced in June, 1958, as shown below:—

Period	Cylinder Liner Flange Thickness	Flange Recess in Engine Casing	Position of Liner Flange relative to face of Engine Casing.
Before June 1958	.177" max. .175" min.	.1775" max. .1745" min.	.0025" above or below.
After June 1958	.178" max. .177" min.	.176" max. .174" min.	.001" - .004" above.

Fitting of the latest type of liners into the earlier type casings will result in the liner flange being from .0005" below to .0035" above the face of the casing providing no grinding of the casing face has taken place.

Opportunity should be taken at major engine overhauls to bring the liner flange condition into line with the latest practice and the following action should be adopted.

1. Remove cylinder head studs and cylinder liners.
2. Correct any distortion of pressure face by surface grinding, removing the minimum amount to give a true face.
3. Check depth of flange recess.

The appropriate liner should be reversed and the flange only placed into the recess and a ring bored to a diameter of 5.358" max. 5.357" min. placed over the liner. Readings should then be taken with feeler gauges to ascertain the height of the flange above the casing face.

4. Re-cut flange recesses. (Note: This operation is advisable even if the casing face does not require grinding). A special cutter bar assembly must be used for this work consisting of:—

Location Plug.	Part No. A1/17165-27B.
Cutter Bar Assembly.	" " A1/17163-27A.
Cutter.	" " A1/17165-27C.

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See p 83

DATE.....

SHEET 2 OF 2

SERVICE BULLETIN

CONTINUED

Procedure:-

- (a) Insert location plug in bore. Cylinder bore should be cleaned up and if necessary honed to a diameter of 5.352" to 5.353".
- (b) Place a suitable block under the bore to support the plug.
- (c) Insert cutter and bar into location plug.
- (d) Ensure cutter and arch support are well seated and adjust stop to the required depth, this being the reading obtained with feeler gauges, as described in (3) above, less the amount required for the sleeve to project above the casing face. The cutter should be taken down gently to the stop and revolved smoothly to ensure a good finish.
- (e) Re-check for projection of liner flange as before. It is essential that the projection of the three liners under each cylinder head shall not vary by more than .002", and that there must not be more than .001" variation around the flange of each liner when finally fitted.

Note: Shims Part No. Z4/46572 B.R. Cat. No. (.003" thick) are available to facilitate obtaining correct liner flange projection.

5. Press in cylinder liners. Use special dolly, Part No. A1/17173-24A, and ensure that the pressure does not exceed six tons. Check that liners project the required amount i.e. .001" to .004".
- 6.hone new liner bores to size (5.1196" max. 5.1186" min.)

Note:- Attention is drawn to the shims which are available to compensate for material removed in surface grinding engine casing pressure faces. Part numbers and thicknesses of shims are:-

<u>Part No.</u>	<u>Thickness.</u>	<u>B.R. Cat. No.</u>
A62524 A 62521	.005"	
A62525 A 62522	.010"	
A62526 A. 62523	.020"	

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SHEET.....1.....OF.....1.....

SERVICE BULLETIN

APPLICABLE TO:—

D173A, B, and C TYPE GEARBOXES
MAIN WORKS ONLY

NITRIDED 1st SPEED ANNULUS

Replacements for the 1st speed annulii fitted to D173 gearboxes are now available in nitride-hardened material and should be fitted to gearboxes which are overhauled at main works.

This component is part of the 2nd speed train assembly and when fitted alters the complete part number from D3216 (B.R. Cat. 9/15/94245) to U189598.

Conversion of the existing assembly is effected by using the following components:—

B.R.CAT.NO.	OLD PART NO.	DESCRIPTION	NEW PART NO.	QTY.
9/15/94247	D29434	1st Speed Annulus	U189599	1
9/15/94280	Z1/10177	Bush, 1st Speed Brake Drum	U189595	1
9/15/94251	D30424	Rivet, 2nd Speed Planet	U189596	3
9/15/94250	D30423	Rivet, 2nd Speed Distance Piece	U189597	6

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SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 & RE900 ENGINES

FUEL-INJECTOR SECURING CLAMP NUTS

Attention is drawn to the safe loading that may be applied to the injector clamp nuts of the RE680 and RE900 type engines.

The load that may be applied (through the medium of a torque spanner) is 40 lb. ft.

The following should be inserted on page L16 of 50,000 Series Service Manuals under "Injectors":—

"Fuel injector clamp nuts.....Torque 40 lb. ft."

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SHEET 1 OF 2

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. FINAL DRIVES

MODIFIED AIR CYLINDERS, PISTONS AND STRIKING FORK ADJUSTMENT

Modifications to final drive air cylinders, pistons, seals and piston shaft stops are incorporated in the type F9724 and type F9725 final drives. The piston accommodates twin opposed seals, and the piston shaft stop is now located on the air cylinder adaptor instead of the banjo bolt as previously. The end of the adaptor is of hardened material to prevent deformation of the stop and subsequent loss of striking fork clearance.

The F9724 series of final drives have a cast iron cylinder with a bore dimension of 2.37625" - 2.37425" whilst the F9725 series have a cylinder of the same bore manufactured as a hot brass stamping which is now standard production. The cast iron cylinders on F9724 series final drives are to be replaced with the brass stamping type cylinder (see sheet 2).

Final drives serial numbers F9706, F9712, F9714 and F9715, which were originally fitted with cast iron cylinders of smaller bore than the F9724 series and which had pistons with a single seal are to be completely modified to bring them into line with the F9725 series on all Regions.

These modifications must be carried out as a campaign change in all Depots.

Following the above modifications the method of obtaining clearance between the striking fork, and the sliding dog groove has been revised as follows:-

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DATE **JUNE, 1960**

SHEET **2** OF **2**

SERVICE BULLETIN

CONTINUED

Fit the piston shaft assembly and striking fork to the final drive, then fit the air cylinders less adaptors ensuring that the air cylinders securing nuts are tight. Place shims behind the head of the adaptor and insert the adaptor in the cylinder and tighten. Check that the clearance between the striking fork and sliding dog is between 0.020" - 0.030" when the teeth are correctly meshed with those of the bevel pinion. If necessary add or subtract shims to give the desired clearance.

B.R. Catalogue Nos. for the old components will be cancelled when all final drives are modified.

NOTE All new air cylinders for this modification will be supplied "Free Issue" by B.U.T.

Material Schedules

1. Final Drives, Serial No. F9724

<u>Old A.E.C. Part No.</u>	<u>Description of Part</u>	<u>New A.E.C. Part No.</u>	<u>Qty.</u>
F31640	Air Cylinder	F31641	2

2. Final Drives, Serial Nos. F9706, F9712, F9714 and F9715

<u>Old Parts</u>			<u>Replacement Parts</u>		
<u>B.R.Cat.No.</u>	<u>AEC Part No.</u>	<u>Description of Part</u>	<u>AEC Part No.</u>	<u>B.R.Cat.No.</u>	<u>Qty.</u>
9/15/90105	(F31606	Air Cylinder	F31641		2
90106	(F31605	Adaptor	F31638		2
56270	(Z44040	Dowel	-		2
90179	G33703	Piston	G33707		2
-	-	Piston Head	G33703		2
90210	81-2045	Seal	5091-122		4
90144	Z3/32007	Nut	86-36		2
90112	F31604	Banjo Pin	F31639		2
-	-	Shim	Z4/46553		As reqd.
-	-	Shim	Z4/46554		As reqd.

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SHEET **1** OF **3**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. A219 and A220 SERIES ENGINES
MAIN WORKS ONLY

REVISED FUEL INJECTION PIPE CLIPPING

Fuel injection pipes and clips on the above engines have been modified to prevent chaffing. The alteration to the fuel injection pipes ensures greater spacing between adjacent pipes. Rubber dampers are provided for each injection pipe being retained in brackets secured to the cylinder heads.

New and displaced items are:—

Displaced Items

<u>B.R.Cat.No.</u>	<u>Old Part No.</u>	<u>Description</u>	<u>Qty.</u>
9/15/46563	Z7/30575	Stud-Fuel Injection Pipe Clip	4
9/15/46550	Z1/31362	Clip	4
9/15/46552	Z1/31358	Clip	2
9/15/46553	Z4/31392	Clip	2
9/15/46541	Z4/31393	Bracket	1
9/15/46542	Z4/31394	Bracket	1
9/15/46529	Z14/30742	Clip Bolt	4
9/15/46570	Z4/30698	Clip Bolt Washer	8
9/15/46559	Z2/32056	Clip Bolt Nut	8
9/15/46557	A4/19489	Lining Fuel Pipe Clip	8
9/15/46590	A7/2246	Fuel Injection Pipe No.1 Cylinder	1
9/15/46591	A7/2247	Fuel Injection Pipe No.2 Cylinder	1
9/15/46592	A7/2248	Fuel Injection Pipe No.3 Cylinder	1
9/15/46593	A7/2249	Fuel Injection Pipe No.4 Cylinder	1
9/15/46594	A7/2250	Fuel Injection Pipe No.5 Cylinder	1
9/15/46595	A7/2251	Fuel Injection Pipe No.6 Cylinder	1

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DATE.....

SHEET **2** OF **3**

SERVICE BULLETIN

CONTINUED

New Items

<u>B.R.Cat.No.</u>	<u>New Part No.</u>	<u>Description</u>	<u>Qty.</u>
	Z5/31322	Clip	6
	Z5/31323	Clamp Plate	1
	Z6/31394	Bracket	5
	Z13/30782	Clip-Bolt	6
	Z20/30713	Clip-Bolt	6
	Z4/30698	Clip-Bolt Washer	12
	Z2/32056	Clip-Bolt Nut	12
	Z6/31395	Insulating Plate	3
	Z10661	Damper	18
	A11/2270	Fuel Injection Pipe No.1 Cylinder	1
	A11/2271	Fuel Injection Pipe No.2 Cylinder	1
	A11/2272	Fuel Injection Pipe No.3 Cylinder	1
	A11/2273	Fuel Injection Pipe No.4 Cylinder	1
	A11/2256	Fuel Injection Pipe No.5 Cylinder	1
	A11/2257	Fuel Injection Pipe No.6 Cylinder	1

The assembly of the brackets and clamp plate is illustrated on sheet 3. It is essential that an insulation plate (4) is fitted to the three brackets nearest the exhaust manifold in order to protect the rubber damper bushes from heat.

B.R. catalogue numbers for old parts must be cancelled when all engines are modified.

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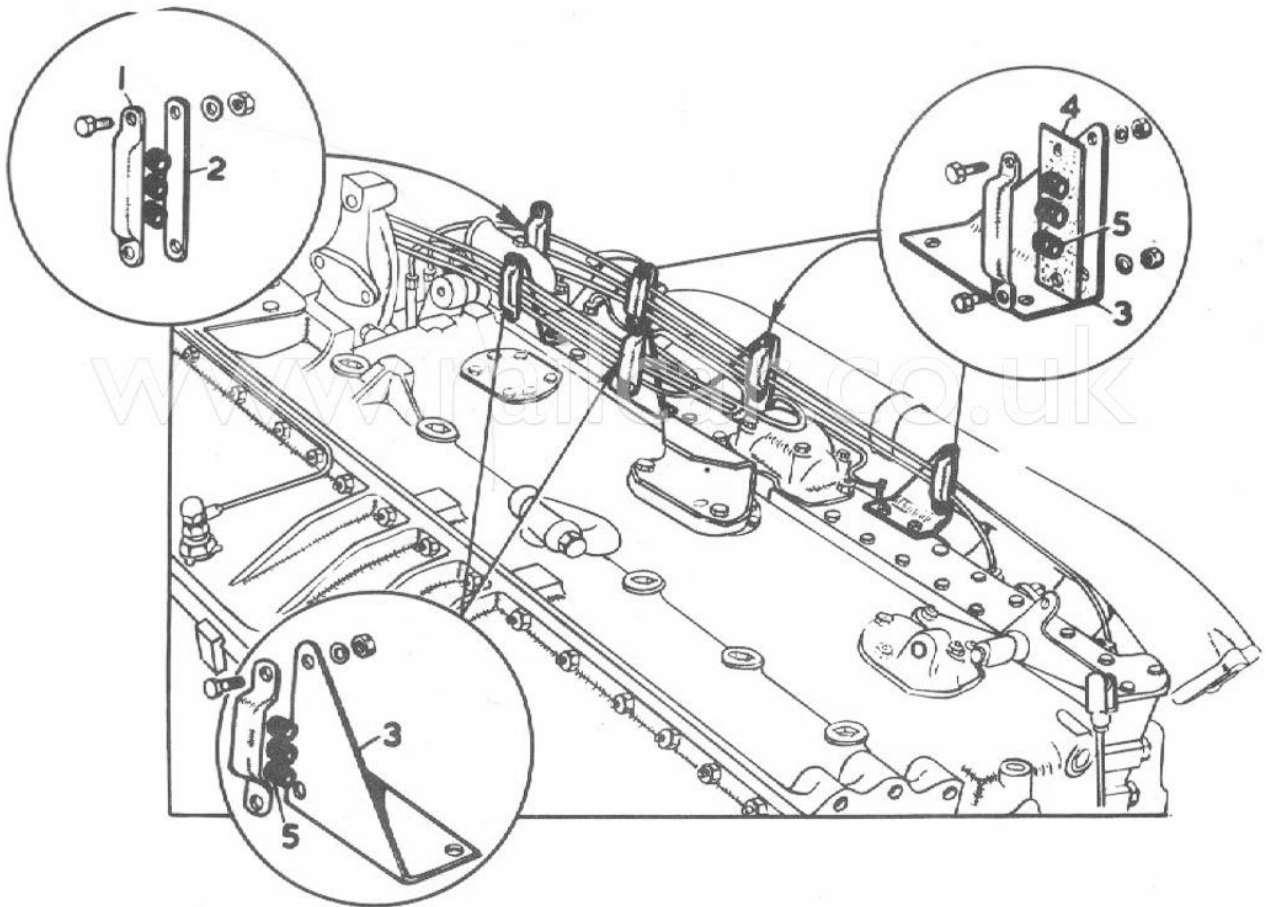
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SHEET **3** OF **3**

SERVICE BULLETIN

CONTINUED

REVISED CLIPPING ARRANGEMENT FOR FUEL INJECTION PIPES - A219 & A220 ENGINES.



1. Z5/31322 3. Z6/31394

2. Z5/31323 4. Z6/31395

5. Z10661

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DATE.....

SHEET 1 OF 1.....

SERVICE BULLETIN

APPLICABLE TO:— ALL B.U.T. - A.E.C. ENGINES

FUEL INJECTOR - RUBBER SEALING WASHER PART NO.Z10681

Attention is drawn to the fact that the rubber sealing washers fitted on new engines between the fuel-injectors and cylinder-head are only provided to prevent ingress of water between the injectors and the injector sleeves during storage or transit of engines prior to installation.

Immediately an engine is placed into service the seals may be removed, if so desired, but in any case rapid deterioration will probably take place as they are not intended to withstand service conditions.

It is not necessary to renew these sealing washers whilst the engines are in service, but they must be fitted when engines are overhauled at main works.

The following note on page K33 (Section K24) of the 50,000 Series Manual should be deleted:-

"A rubber sealing washer, inserted in the top of the injector sleeve, has been introduced to obviate the possibility of corrosion; remove and retain the washer when lifting out the injector".



SERVICE BULLETIN

APPLICABLE TO:—

B.U.T. A220, RE680 AND RE900 ENGINES
MAIN WORKS ONLY

FUEL PUMP GOVERNOR - STOP SPINDLE AND PAWL

To overcome failures of the Grover lock pin (C.A.V. Part No. 7115 - 114. B.R. Cat. No. 9/75/4975) which secures the pawl to the stop spindle, the Grover lock pin is now being replaced by a solid tapered setscrew (C.A.V. Part No. 5335 - 569. B.R. Cat. No.) The existing spindle and pawl can be modified to accept the tapered setscrew and it is essential that fuel pump governors are modified when overhauled at main works.

The modification should be carried out in the following manner:—

1. Drill the boss on the pawl (C.A.V. Part No. 7023 - 937. B.R. Cat. No. 9/75/4770) using a 21 drill (0.159") and tap 5 m.m. x 0.8 (Drill through one side of the pawl only).
2. Fit pawl to spindle and using a hand taper reamer. (nominal diameter 3 m.m., 1 in 50 taper) ream hole in spindle and pawl to fit tapered setscrew. Correct fit is obtained when the underside of the screw head is approximately 0.03937" - 0.059" clear of the spindle (pawl removed) as illustrated in fig.1.
3. Assemble spindle and pawl into governor housing and fit tapered setscrew, caulk the head of the screw, fig.2 to prevent it working loose.

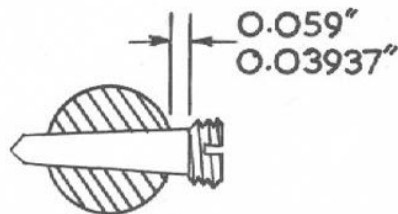


FIG: 1.

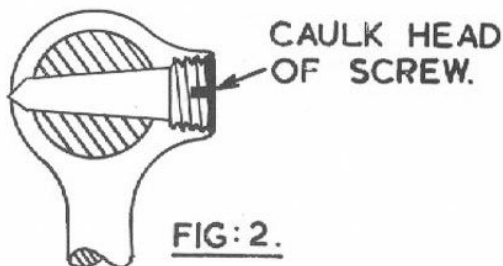


FIG: 2.

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SERVICE BULLETIN

CONTINUED

Attention is drawn to the fact that it is essential that the setting of the fuel pump stop solenoid linkage on pumps that are modified is carried out in accordance with Service Bulletin No.42. Failure to do this could lead to extensive damage to the fuel pump housing and/or stop solenoid.

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SERVICE BULLETIN

APPLICABLE TO:—

ENGINE TYPES A220AC, AJ, AL, AK.
RE680 AND RE900

ENGINE SHUTDOWN SOLENOID

"A modified type of engine shut-down solenoid C.A.V. Part No. 263-37M B.R. Cat. No..... incorporating a removable solenoid coil is being introduced on all new engine units in future.

The modified solenoid must also be fitted to existing engines, when replacements are required and when existing stocks of the old type solenoid C.A.V. Part No.263-10 B.R. Cat. No.9/15/84100 are exhausted. It is not possible for the old type solenoids to be converted to the latest standard."

The new unit will be introduced in two stages:

- (1) With removable coil only.
- (2) With removable coil and also a stop pin situated in the solenoid end plate to prevent overtravel of the solenoid plunger.

Note: A core having a slot to accommodate the stop pin may be used on solenoids not possessing the core stop pin.

The following procedure should be adopted for changing the coil:

To Dismantle

- (a) Remove bellows securing clip (1) bellows (2) and stop pin. The core (3) and link (4) can be removed as one unit.
- (b) Remove circlip (5) solenoid end plate (6) and rubber washer (7).
- (c) Remove terminal cover clip (8) and terminal cover (9). The contacts and bridge piece will then be exposed.
- (d) Remove the two screws (10) together with spring washers and also bridge piece (11) taking care not to loose contact spring (12).



SERVICE BULLETIN

CONTINUED

- (e) Remove moving contact (13).
- (f) The terminal block (14) can now be removed sufficient to unsolder leads (15).
- (g) Remove terminal block and insulating washer (16). The solenoid coil can now be withdrawn taking care not to lose rubber washer (18) situated between the coil and solenoid body.

Test Data

Pull-in winding resistance 1.9 - 2.1 ohms.
Hold-in winding resistance 44 ohms.

To Assemble

Coil

- (a) Fit solenoid coil (17) to body (ensure tag in coil fits appropriate slot in body), passing leads through rubber washer (18), solenoid body and insulating washer (16).
- (b) Solder leads and tags (15) to terminal block (14).
- (c) Fit contact (13), spring (12), and bridge piece (11) and secure to terminal block and solenoid body with two screws and washers (10). (Make certain moving contact is free and fixed contacts are not fractured).
- (d) Fit rubber washer (7), solenoid end plate (6) and secure with circlip (5).
- (e) Assemble bellows (2) to core (3) and link (4). (The hole in the bellows must be positioned on the same side as fixing feet).
- (f) Enter core in solenoid body and fit stop pin, ensure stop pin is located in keyway on the core (3).

Cont....



SERVICE BULLETIN

CONTINUED

- (g) Secure bellows (2) to solenoid body with bellows securing clip (1).

Installation

The 263-37M solenoid switch should be mounted so that when the coils are energised the core plunger travels a maximum of 0.787" (20 m.m.).

- (a) To ensure that the pull-in winding is open circuited when the plunger is in the fully drawn in position, there must be a minimum clearance (air gap) of 0.0393" (1.0 m.m.) between the moving and fixed spring contacts.

This measurement should be checked when the solenoid is energised and the core is bearing against its stop.

- (b) In the de-energised position a minimum clearance of $\frac{1}{8}$ " (3.175 m.m.) must be maintained between the end of the moving contact stem and the core plunger. Failure to produce this clearance will result in the contacts opening prematurely thus cutting off the current to the pull-in winding before the core has moved.

The best method of checking this clearance is to observe the distance travelled by the link end after the moving and fixed contacts have closed.



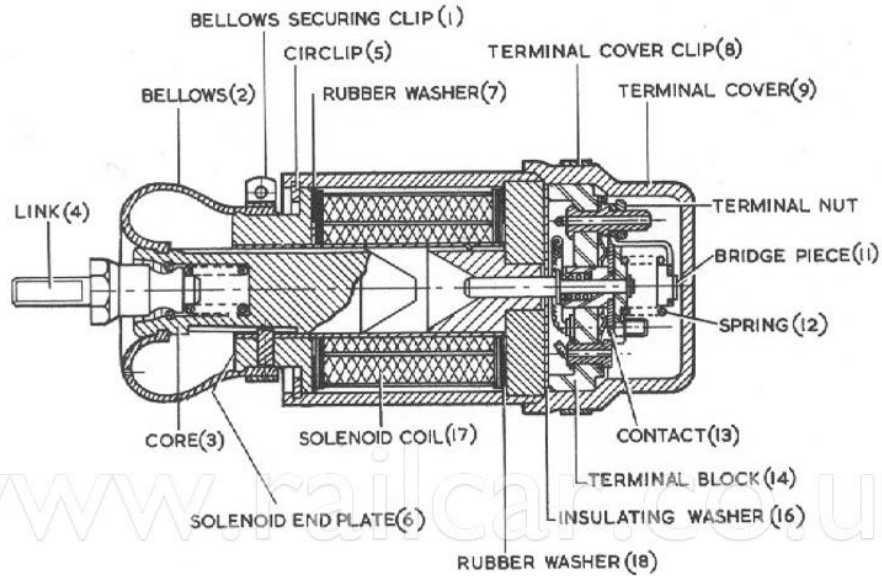
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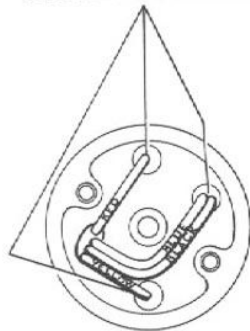
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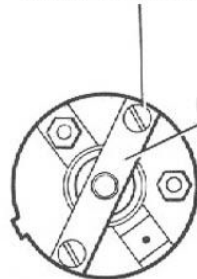
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8 SOLDERED AS SHOWN (15)



SCREW & SPRING WASHER (10)



BRIDGE PIECE (11)

BLACK (START PULL IN)
RED (FINISH PULL IN)
BLUE (START HOLD IN)
YELLOW (FINISH HOLD IN)

FLEX TAKEN THROUGH TERMINAL

TELEPHONE:
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SHEET.....**1** OF...**1**...

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. FINAL DRIVES (F239C & F280)

AXLE BEARING CLAMPING RING

To prevent the axle bearing clamping ring moving away from the bearings when subjected to side thrust the method of assembly of the ring has been amended and the slotted nuts for the clamp bolts replaced by plain high tensile nuts and tab washers also slightly longer bolts are required.

The method of assembly is:

- (a) Degrease the portion of the axle required to accommodate the clamp ring with suitable degreasing agent.
- (b) Scrape the bore of the clamp ring to ensure full surface contact with the axle.
- (c) Fit a tab washer under the head of the two clamp bolts and assemble the clamp to the axle, fit tab washers and high tensile nuts.
- (d) Ensure clamp is forced tightly against the inner track of the roller bearing then tighten the nuts equally to a torque spanner loading of 70 lbs/ft.
- (e) Check with 0.0015" feeler gauge to ensure there is no clearance between the side of the clamp ring and bearing inner race, also between the axle and bore of the clamp ring.
- (f) Lock the bolt heads and nuts with the tab washers.

The components altered by this modification are:

B.R.CAT.NO.	OLD AEC PART NO.	QTY.	DESCRIPTION	NEW AEC PART NO.	QTY.	B.R.CAT.NO.
	86-65	2	Nut	85-155	2	
	100-9	2	Split Pin	-	-	
	-	-	Tab Washer	Z8/30605	4	
	Z16/30775	2	Bolt	59-91	2	

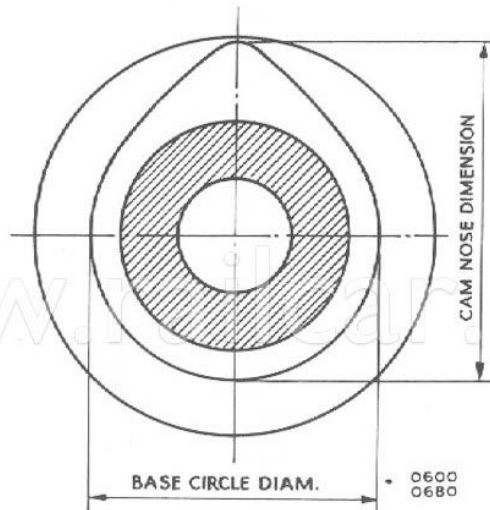


SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINES

CAMSHAFT WEAR DIMENSIONS

A revised method of assessing scrapping dimensions for engine camshafts has now been introduced as shown below:—



THE CAMSHAFT SHOULD BE RENEWED WHEN THE DIFFERENCE BETWEEN THE BASE CIRCLE DIAMETER AND THE NOSE DIMENSION IS .358 in. (9.1m.m.) OR LESS

50,000 Series Service Manuals (Chapter L) should be amended as follows:—

- Page L.11:— Delete:— Last two lines.
Insert:— "Refer to Service Bulletin No.56".
- Page L.12:— Delete:— First two lines.
Insert:— "Refer to Service Bulletin No.56".
- Page L.41:— Delete:— Fig.35.
Insert:— "Refer to Service Bulletin No.56".

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SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINES

VALVE TAPPETS - DIAMETRAL CLEARANCE

Tappets should be renewed when the diametral clearance in the engine block exceeds .005 inches (.127 m.m.)

50,000 Series Service Manuals (Chapter L) should be amended as follows:-

Page L.14:- Delete:- ".004 in. (.1016 m.m.)"

Insert:- ".005 in. (.127 m.m.)"

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SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINES

CRANKCASE BREATHER - CLEANING

The correct method of cleaning the crankcase breather on the above engines is as follows:—

Do not remove breather or breather cap whilst the engine is running.

1. Remove breather from inner sump.
2. Release clips holding the cap down on the bowl.
3. Remove cap. The wire mesh element is attached to the inside of the cap.
4. Thoroughly wash the wire mesh element in paraffin.
5. When cleaned re-oil the element with engine oil.

N.B.:— On no account should the bowl be filled with oil.

50,000 Series Service Manuals (Chapter L)
should be amended as follows:—

Delete:— Contents of Page L.30.

Insert:— "Refer to Service Bulletin No.58".

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SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINES

FUEL INJECTORS - CHECKING & ADJUSTMENT

When setting and testing B.U.T. - Leyland injectors it is essential that the time taken for the pressure to fall from 90 to 40 atmospheres (1,323 to 588 p.s.i.) be within the limits $4\frac{1}{2}$ to 14 seconds, using fuel oil and with a room temperature of 40 - 70°F (5 - 21°C).

50,000 Series Service Manuals (Chapter L) should be amended as follows:-

Page L.74 (Paragraph 6):- Delete:- "50 atmospheres"

Insert:- "40 atmospheres"

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No. **60**

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— R14 AND SE4 TYPE GEARBOXES

LUBRICATING-OIL FILTER ELEMENT

To ensure efficient filtering of lubricating oil in the R14 and SE4 type gearboxes at low oil temperatures the paper element has now been replaced on initial production by a metal-edge type filter element.

The new type element is interchangeable with the paper element and must be fitted to all gearboxes when stocks of the paper element are exhausted.

This modification alters the part numbers of the following components:—

<u>Old Part No.</u>	<u>B.R.Cat.No.</u>	<u>Description</u>	<u>Qty.</u>	<u>New Part No.</u>	<u>B.R.Cat.No.</u>
4257	9/15/95640	Filter Complete	1	A6295	9/15/95640
36420	9/15/95647	Filter Element	1	A6413	9/15/95647

The new element is not an expendable component and must be cleaned in paraffin or other suitable cleaning agent, and allowed to drain before refitting.

The method of dismantling the filter as detailed in the 50,000 Series Manual (page S13) remains unaltered.

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SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

B.U.T. - LEYLAND ENGINES - RE680 SERIES
(MAIN WORKS ONLY)

RECLAMATION OF NITRIDED CRANKSHAFTS

The following procedure must be followed whenever nitrided crankshafts are re-conditioned.

- (1) After removing the crankshaft from the engine, clean and crack detect. If any cracks are present the shaft must be discarded.
- (2) All shafts proved to be sound and suitable for further service should be re-ground with a soft free cutting stone, Norton Grade 19A 60 K5 VG or equivalent, taking every care during this operation.
- (3) When crankshafts are re-ground without re-nitriding, care must be taken to ensure that an excessive amount of case is not removed from the fillets by using a grinding wheel with a corner radius less than that of the crankshafts. The correct radius of the grinding wheel is 0.15" to 0.17" (3.810 to 4.318 m.m.)
- (4) If any doubt exists regarding (3), the crankshafts must be re-nitrided after re-grinding, irrespective of the amount of case removed from the pin or journal.
- (5) All shafts must be crack-detected after re-grinding, and also after re-nitriding.
- (6) For details of grinding dimensions refer to the Service Manual, Section L32, Pages L53 and L54.

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No. **62**

DATE.....

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

CARDAN SHAFTS

GREASE LUBRICATION OF UNIVERSAL COUPLINGS

Attention is drawn to the fact that the grease lubricator to be fitted to universal assemblies of cardan shafts (type K6/0164 and K7/0112) should be to Part No.81-1546 and not 81-985 as quoted and illustrated in Fig 2 of Service Bulletin No.39.

Grease lubricator 81-1546 facilitates application of the grease gun.

Service Bulletin No.39 should be amended accordingly.

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63.

No.

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SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T.—A.E.C. FINAL DRIVES
MAIN WORKS

FORWARD AND REVERSE BEVEL PINION ASSEMBLES PREPACKING WITH GREASE

It has been found necessary to prepack the final drive bevel pinion housings with grease to avoid the possibility of taper roller race failures during initial service.

It is essential when overhauling complete final drive units or spare bevel pinion assemblies, that the pinion housings are completely filled with lithium-base grease, B.R.Cat.No. 962/154/87.

Assembly of the bevel pinion and roller races in the housing should be carried out in the normal manner and the correct end-float between the two bearings obtained, following which the position of the locking nut can be indicated by centre pops on the face of the nut and shaft. This will enable the locking nut to be again tightened to the same position following dismantling of the assembly for packing with grease.

To apply the grease, remove the housing together with the two race outer tracks and the inner track assembly of the outer roller race, from the pinion shaft. Ensure that all shims fitted on top of the distance piece between the two races are retained in position. Liberally apply grease to the roller bearings of the inner race (on bevel pinion shaft) and also apply grease to the bore of the housing. Refit the housing and outer race to the shaft and ensure that there is sufficient grease to completely surround the roller bearings. Tighten the locking nut to the position previously indicated, fit the two small lock bolts, nuts, and split pins, and remove any surplus grease.

No further application of grease is required while in service.

NOTE:—

It is essential that spare bevel pinion assemblies held in storage be adequately protected to prevent the ingress of foreign matter.

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No. **64**

DATE.....

SHEET.....**1**.....OF.....**2**

SERVICE BULLETIN

APPLICABLE TO:—

**B.U.T. - LEYLAND RE680 ENGINE UNITS
(MAIN WORKS)**

**CENTRIFUGAL OIL FILTER
LEYLAND PART NO. 519002 B.R.CAT.NO....
CUT OFF VALVE**

To ensure adequate oil pressure at engine idling speeds cut-off valve with a release pressure of 18-20 lbs/sq. in. is now being incorporated in the centrifugal oil filter fitted to RE680 engines on production.

Existing filters should be modified as they pass through works for repairs as follows:—

- (a) Completely dismantle the filter and drill one hole 0.5615" - 0.5630" x 2.4375" deep to join the two existing drillings as shown in fig. 1. Spot face 0.9375" dia. to clean up and tap $\frac{3}{8}$ " b.s.p. x 0.50" deep.

Also drill one $\frac{1}{8}$ " dia. hole through the interior base of the bowl to break into the drilling for the cut-off valve. The position of the $\frac{1}{8}$ " dia. hole is indicated in the filter body by a "cast-in" centre.

- (b) Re-assemble the filter introducing the cut-off valve as shown in fig.2.
- (c) Additional components required are:—

Description	Glacier Part No.	Qty.	B.R. Cat. No.
Plunger	1-014	1	
Plunger Spring	1-016	1	
Setscrew	1-015	1	
Washer	1-012	1	

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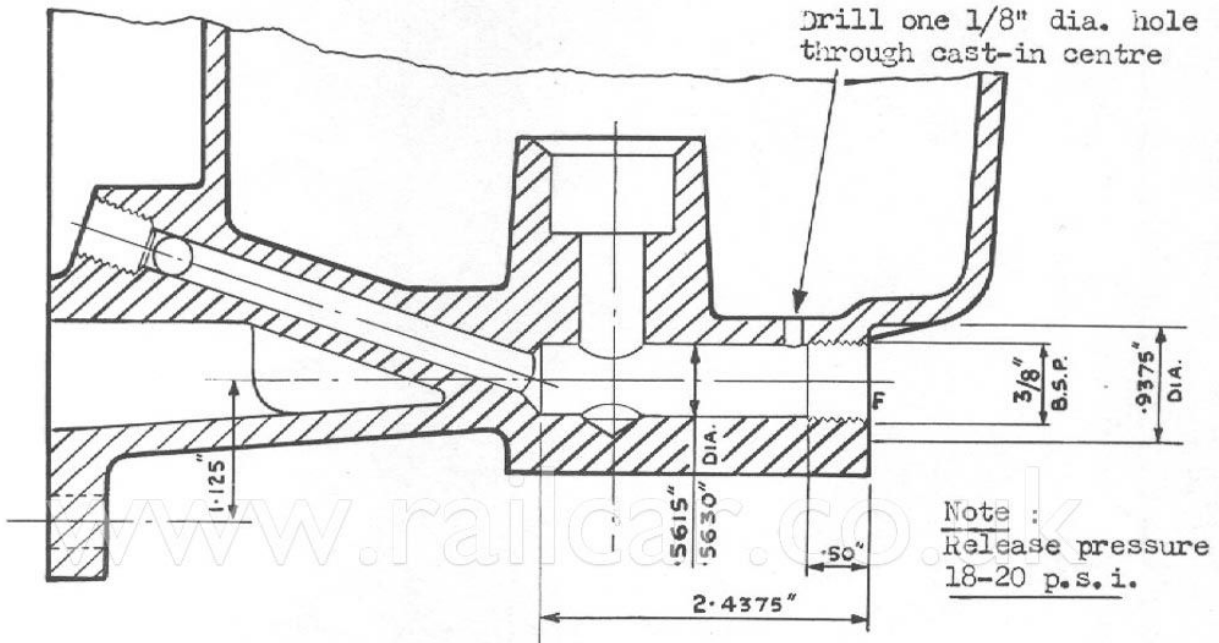
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SHEET...2...OF...2...

SERVICE BULLETIN

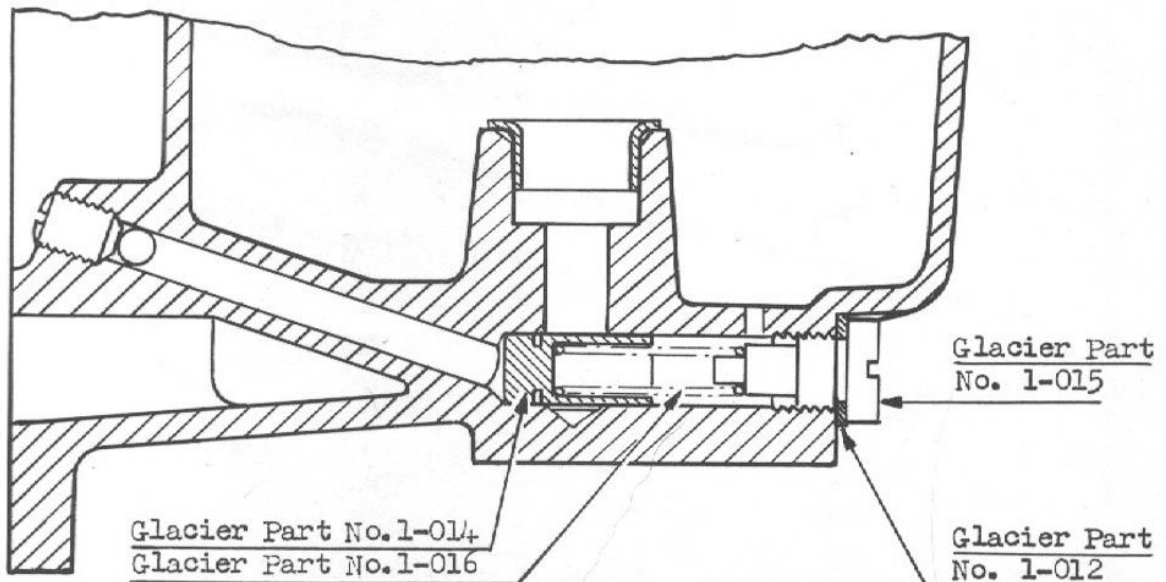
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FIG. 1



MACHINING REQUIRED TO EXISTING CASING

FIG. 2



ASSEMBLY OF CUT-OFF VALVE

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SHEET 1 OF 2

SERVICE BULLETIN

APPLICABLE TO:—

B.U.T. - A.E.C. A220 SERIES ENGINES
MAIN WORKS ONLY

NEW CONNECTING RODS & PRE-FINISHED BEARINGS

A new design of connecting rod has been introduced on the above engines with effect from engine Serial No.A220/3325.

The new connecting rod incorporates pre-finished big-end bearings of the steel shell copper-lined type, the bearing surface being tin-flashed to facilitate running in. The bearings are located by dowels thus disposing of shims between rod and cap.

The modification does not effect the small end bush it still being necessary to bore this bush to finish size after pressing it into the connecting rod eye.

Pre-finished big-end bearings are not suitable for use with the original design of connecting rod, but are interchangeable between new type connecting rods, thus facilitating, if necessary, the replacement of bearing shells without removal of connecting rods from the engine.

The new connecting rods include also a new design big-end bolt, the bolt head being slightly eccentric in relation to its shank and as the recess in the rod is also eccentric relative to the bolt hole the bolt is prevented from turning when the nut is tightened.

The diametral clearance between the bearing and crankpin on initial fitting of pre-finished bearings should be:—

0.00475" max.

0.0025" min.

NOTE: For purposes of replacement it is permissible to use both old and new type connecting rods in the same engine.

.../2...

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DATE.....

SHEET **2** OF **2**

SERVICE BULLETIN

CONTINUED

Details of the new part numbers are quoted below and it should be noted that big-end bearings and bearing dowels are supplied separately. All future orders on A.E.C. (Sales) Limited for connecting rods should be for the new type.

<u>Description of New Items</u>	<u>Part No.</u>	<u>B.R.Cat.No.</u>	<u>Qty.</u>
Connecting rod and cap complete) with small end bush, bolts and) nuts.	A2/5609S		1
Connecting rod, small end) bush and cap.	A2/5621		1
Big-end bolt.	A12322		2
Big-end nut.	A54606		2
Big-end bearing 1st standard.	A1/12106		2 per rod
Big-end bearing 2nd standard.	A1/12107		2 per rod
Big-end bearing 3rd standard.	A1/12108		2 per rod
Big-end bearing 4th standard.	A1/12109		2 per rod
Big-end bearing - Dowel.	Z2/44002		2
Big-end split pin.	Z1/47007		2

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SHEET **1** OF **2**

SERVICE BULLETIN

APPLICABLE TO:— A220 SERIES ENGINES

OVERWIDTH COMPRESSION RINGS MAIN WORKS ONLY

Piston compression rings 0.020" overwidth are available for fitting to pistons that have worn ring grooves.

To enable the rings to be fitted and ensure correct clearance between piston ring and groove it is necessary to machine the piston grooves to the following widths:-

Top ring groove	- (0.1505" 0.1495"
2nd & 3rd ring groove	- (0.150" 0.149"

The diameter of the piston at the base of the grooves must be within the dimensions:-

4.662"
4.654"

Machining of the grooves must be carried out at a speed of 400 ft. per min. with a tool feed of 0.002"/0.003" per revolution. It is essential that the major portion of the material should be removed from the lower face of the piston groove, only sufficient material to give a square face being removed from the top face of the groove.

Part Nos. of the oversize rings are as follows:-

Part No.	Ring Groove	Periphery	B.R.Cat. No.
A4/11675	Top	Chrome	
A4/11697	2nd and 3rd	Non-chrome	

.../2...

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No. **66**

DATE.....

SHEET **2** OF **2**

SERVICE BULLETIN

CONTINUED

NOTE: Pistons having chrome-plated top compression rings (A4/11675) must only be fitted to new cylinder bores. When fitting re-ringed pistons to worn cylinder bores non-chrome rings (A4/11697) must be fitted to all compression ring grooves.

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No. **67.**

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— D173A, B AND C TYPE GEARBOXES

THIRD SPEED PISTON AND PISTON SEALS

In order to obtain longer life from the piston seals fitted in the above gearboxes, improved types have now been introduced.

Details of the part number alterations are as follows and the new type only should be ordered from A.E.C. (Sales) Limited when replacements are required.

<u>B.R.Cat.No.</u>	<u>Old Part No.</u>	<u>Description</u>	<u>Qty.</u>	<u>New Part No.</u>
9/15/94202	5091 - 93	Seal - 1st Speed	2	5093 - 2
9/15/94203	5091 - 94	Seal - 2nd Speed	2	5093 - 3
9/15/94204	5091 - 95	Seal - 3rd Speed	2	5093 - 4
9/15/94203	5091 - 94	Seal - 4th Speed	2	5093 - 5

Due to the internal bore of seal to Part No. 5093 - 4 being smaller than seal Part No. 5091 - 95 the diameter of the seal grooves on all third speed pistons (Part No. D40617) must be reduced from $1\frac{5}{8}$ " dia. to $1\frac{9}{16}$ " dia. at the earliest opportunity.

Until all pistons have been modified, care must be taken to ensure that the correct seals are fitted when replacements are required.

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NO. **68**

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. FINAL DRIVES
B.U.T. - S.C.G. FINAL DRIVES * (See Below)

TORQUE ARM REACTION PIN

When replacements are required a chromium plated torque arm pin, A.E.C. Part No. Z2/47009 of slightly smaller diameter, and having a threaded portion at one end must be fitted. This replaces the existing pin A.E.C. Part No. Z1/47092.

The modified pin is retained in the fork end of the reaction link by a slotted nut and split pin, thus giving a more positive method of securing the pin.

The smaller diameter of the pin ensures greater clearance between the torque arm bush and pin, the maximum and minimum clearance being 0.00325" and 0.0015" respectively.

Details of the new and displaced components are as follows:—

<u>B.R.Cat.No.</u>	<u>Old A.E.C. Part No.</u>	<u>Qty.</u>	<u>Description</u>	<u>New A.E.C. Part No.</u>	<u>Qty.</u>	<u>B.R.Cat. No.</u>
9/14/30276	Z1/47092	1	Torque Arm Pin	Z2/47009	1	
	134-11	1	Washer	-	-	
	100-25	1	Split Pin	100-17	1	
	-	-	Nut	Z3/32099	1	

* Only B.U.T.-S.C.G. final drives fitted to cars E50001 - E50024
E50026 - E50031
E50033 - E50049
M55987 - M55990
W55991 - W55996

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No. 69.

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SHEET.....1 OF 1.....

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINE

LUBRICATING OIL PRESSURE

The lubricating oil pressure of RE680 engines should be adjusted to 55-60 p.s.i. at 1800 r.p.m. when the engine is warm.

50,000 Series Service Manuals (Chapter L) should be amended as follows:-

Page L7 Lubrication Oil Pressure

Delete:- 60 p.s.i. (4.2 kg/s c.m.) at 1,000 r.p.m. or higher speeds.

Insert:- 55-60 p.s.i. (3.86 kg/s c.m.) at 1,800 r.p.m.

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SHEET **1** OF **3**

SERVICE BULLETIN

APPLICABLE TO:—

**1700 AND 1800 SERIES UNIVERSALS
MAIN WORKS ONLY**

CARDAN SHAFT - BALANCING:

The method of balancing cardan shafts by inserting balance weights inside the shaft tube has now been superseded, and for balance correcting purposes balance plates are fitted when necessary on the ear yokes, these plates being fitted between the top of the bearing cap and the bearing screw locking strap.

There are four sizes of balance plates, differing from each other in thickness only and are numbered 1 to 4 consecutively. It is essential when dismantling universal assemblies to ensure that the ear yoke is stamped with a number corresponding to the thickness of balance plate used. On later shafts this will have been carried out on production but earlier shafts do not have this identification on the ear yoke or balance plate and it is essential that the correct number is stamped on these components in order to ensure correct balancing when the universal joint is reassembled.

Where balance plate No.1 or 2 is used the standard bearing cap screws should be fitted. Where it is necessary to fit the thicker balance plates Nos.3 or 4 a slightly longer screw must be used.

Tabulated on page 2 are details of the balance plate thickness and part number co-related to the correct screw part number for 1700 and 1800 series shafts.

.../2...



SERVICE BULLETIN

CONTINUED

1700 SERIES UNIVERSALS

BALANCE PLATE

SCREW

Hardy-Spicer Part No.	Thickness	B.P.Cat.No.	Identification No.	Hardy-Spicer Part No.	Length	B.R.Cat.No.
94-GB3203/1	0.031"		1	5-73-GB210	5/8"	
94-GB3203/2	0.064"		2	5-73-GB210	5/8"	
94-GB3203/3	0.093"		3	5-73-GB709	9/16"	
94-GB3203/4	0.125"		4	5-73-GB709	9/16"	

1800 SERIES UNIVERSALS

BALANCE PLATE

SCREW

Hardy-Spicer Part No.	Thickness	B.P.Cat.No.	Identification No.	Hardy-Spicer Part No.	Length	B.R.Cat.No.
94-GB3204/1	0.031"		1	6-73-GB112	3/4"	
94-GB3204/2	0.064"		2	6-73-GB112	3/4"	
94-GB3204/3	0.093"		3	6-73-GB213	13/16"	
94-GB3204/4	0.125"		4	6-73-GB213	13/16"	

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No. **70**

DATE.....

SHEET...**3**...OF...**3**...

SERVICE BULLETIN

CONTINUED

When fitting a new universal assembly unit package the following points must be strictly observed.

1. The new star piece must be placed in the yokes in exactly the same position as the defective one, i.e. with the air relief valve in the same plane and position as on the original star piece.
2. The balance plates when re assembled under the bearing cap screws must bear the same number as that stamped on the ear yokes.
3. The flange units must be placed in the same position as they were on the original shaft i.e. flange yoke marked V.C.F. opposite the fixed joint.
4. To ensure correct relationship between the various components the sliding end flange is marked V.C.S. the fixed end flange V.C.F. The sliding sleeve has an arrow at the spline end to indicate the relationship between the yoke ears and the spline and similar arrows are stamped on both ends of the tube.

These markings must all be in line when the shaft is finally assembled to ensure correct balancing.

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No. **71.**

DATE.....

SHEET..... **1** ..OF..... **2**

SERVICE BULLETIN

APPLICABLE TO:— R14 TYPE GEARBOXES

PISTON SEAL RETAINING RINGS

To overcome the possibility of the rubber seals on the R14 type gearbox air pistons being forced out of the ring groove, retaining rings are now being fitted to the pistons on production units (see sheet 2 fig. 1) and it is essential that all R14 gearbox pistons are modified to accept retaining rings when gearboxes are overhauled at Main Works. Any pistons in stock should also be modified.

Modification of existing pistons to accommodate the retaining rings is carried out by machining the sides of the grooves indicated 'F' in fig.2 to obtain the desired groove width tabled under dimension 'A'. In addition the diameters of the pistons must be machined to dimensions indicated on sheet 2 to enable the retaining rings to be fitted.

Replacement pistons already machined to accept seal retaining rings are given the following part numbers, and should be ordered in future.

<u>Description</u>	<u>S.C.G. Part No.</u>	<u>B.R. Cat No.</u>
1st Speed Piston	43841	
2nd Speed Piston	43842	
3rd Speed Piston	43843	
4th Speed Piston	43844	

Part Numbers of the retaining rings are as follows:-

<u>Description</u>	<u>S.C.G. Part No.</u>	<u>B.R. Cat No.</u>	<u>Qty.</u>
Retaining Ring 1st Speed Piston	43845		2
Retaining Ring 2nd Speed Piston	43846		2
Retaining Ring 3rd Speed Piston	43847		2
Retaining Ring 4th Speed Piston	43848		2

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No. **71.**.....

DATE.....

SHEET **2** OF **2**

SERVICE BULLETIN

CONTINUED

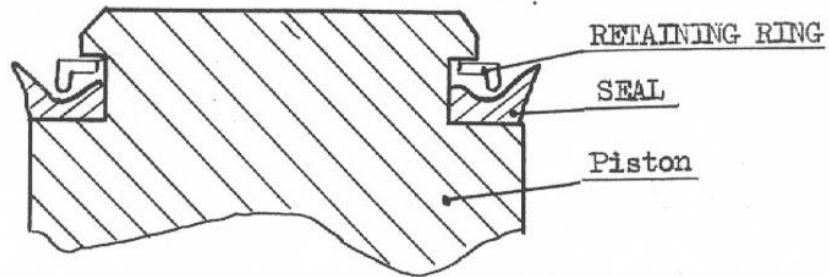


FIG. 1

PISTON MACHINING DETAILS

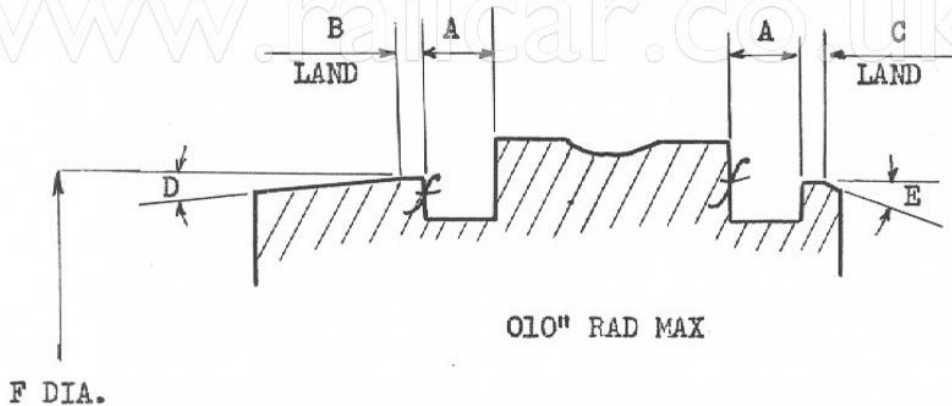


FIG. 2

<u>Piston</u>		<u>Dimension</u>					
<u>Part No.</u>	<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
521108	4th Speed Piston	425" 415"	.031"	.031"	15°	15°	Not Affected
521107	3rd Speed Piston	395" 385"	.050"	.031"	5°	15°	1.687"
521106	2nd Speed Piston	365" 355"	.075"	.031"	5°	15°	2.000"
521105	1st Speed Piston	395" 385"	.100"	.031"	5°	15°	2.937"

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No. **72**

SER. 32.

DATE.....

SHEET **1** OF **2**

SERVICE BULLETIN

APPLICABLE TO:—

R14 AND SE4 GEARBOXES
WITH 3 POINT MOUNTING

FRONT MOUNTING

The assembly of the front mounting bolt and suspension rubbers has been revised to include two covers, one either side of the mounting bracket, to provide a better location for the rubbers on the mounting bracket.

It is necessary to ensure that the diameter of the bolt hole in the mounting bracket is maintained to 1.510" - 1.508" to enable the fitting of a location distance piece which is integral with the upper cover as shown in the sketch on page 2.

The length of the bolt distance tube has been revised and only tubes 3 $\frac{1}{2}$ " long (45409) can be used with this revised assembly. Details of the new and displaced parts are as follows:—

Displaced Items

<u>B.R.CAT.NO.</u>	<u>S.C.G. PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
	36997	Washer	2
	36998	Distance Tube	1

New Items

<u>B.R.CAT.NO.</u>	<u>S.C.G. PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
	A7257	Combined cover and Distance Piece	1
	45835	Cover	1
	45409	Distance Tube	1

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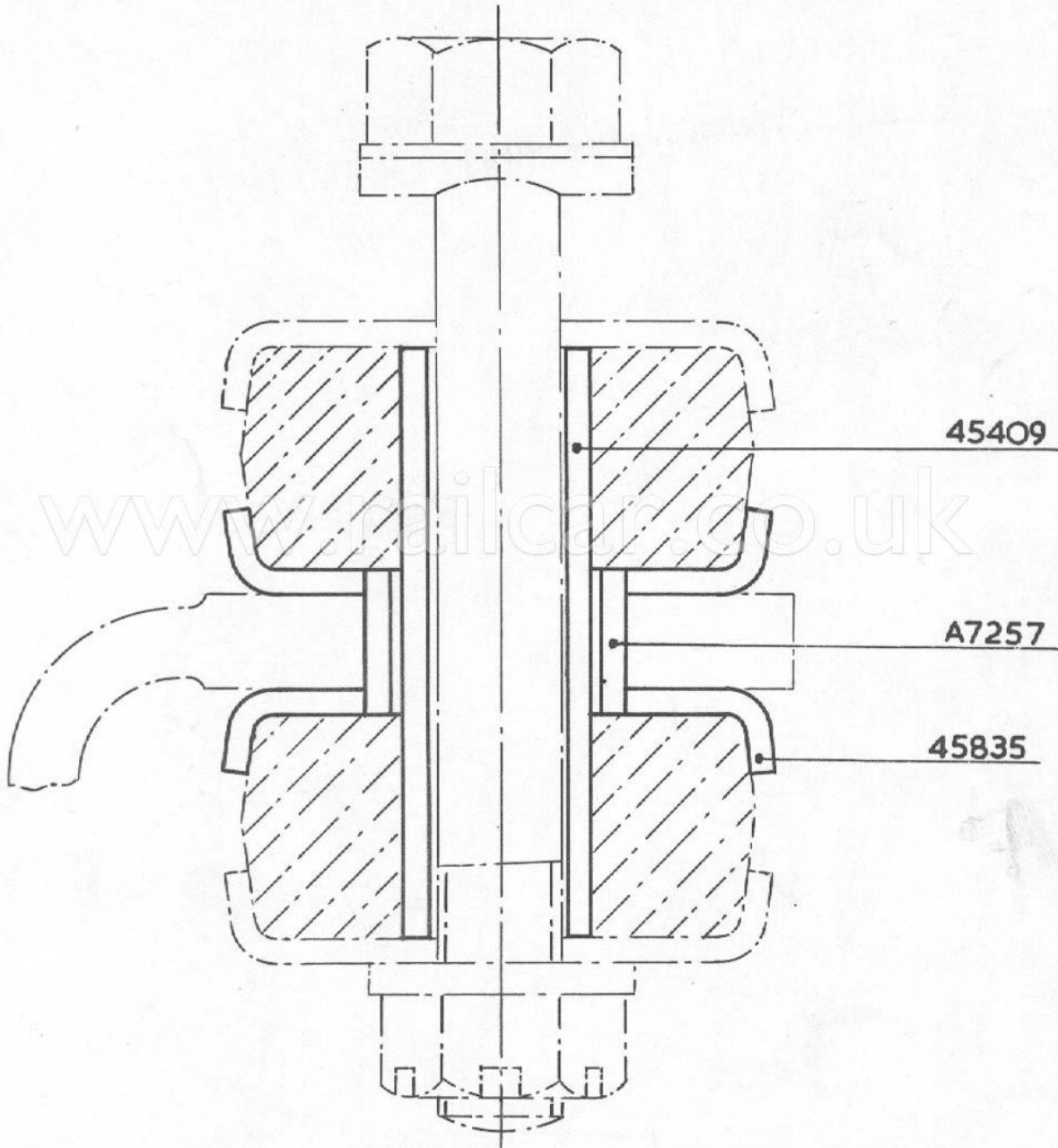
No. **72**

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SHEET **2** OF **2**

SERVICE BULLETIN

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:—

ALL B.U.T. 230 B.H.P. ENGINES

TORQUE SPANNER SETTINGS

The torque spanner settings for the nuts listed below have been revised and it is essential that the new torque loadings are adhered to.

<u>Description</u>	<u>Torque Spanner Setting</u>
$\frac{5}{8}$ " dia. cylinder head nut	200 lb. ft.
Connecting rod big-end nuts	Tighten to 150 lb. ft. minimum and then on to the first split pin hole.
Main bearing bolts	Tighten to 230 lb. ft. minimum and then further if necessary to ensure correct fitting of lock plate tab.

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DATE.....

SHEET **1** OF **4**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. A220 SERIES ENGINES
MAIN WORKS ONLY

CRANKSHAFT OILWAY DRILLINGS

To ensure that the centre main bearings, which carries a greater load than the intermediate bearing, is provided with the maximum amount of oil, the drilling from the centre main journal to number 3 crankpin on crankshaft Part No.A14953 has now been omitted from production crankshafts.

The oil feed to number 3 crankpin being through additional drillings from No.3 main bearing (intermediate). No.2 main journal also being drilled to provide oil feed to No.2 crankpin. The part number of crankshafts produced to this design is A14964 (B.R.Cat.No.....) and any new shafts required in future should be ordered accordingly.

There are two types of crankshaft in service on A220 engine units, one to Part No.A14949 (B.R.Cat.No.....) the main bearing journals of which are bored out, the other crankshaft Part No.A14953 (B.R.Cat.No.....) having solid main journals. Both types of crankshaft must be modified to provide the same control of lubricant to the centre main bearing as latest type crankshafts when engines pass through main works for overhaul. Crankshafts in stock must also be modified.

MODIFICATION TO CRANKSHAFT A14949 (HOLLW MAIN JOURNALS) FIG.1.

- (a) Plug 7 existing oil drillings in bores and journals with $\frac{1}{4}$ " dia. mild steel bar as follows:-
- (1) No.1 crankpin - No.2 main journal through rear web No.1 big-end pin.
 - (2) No.2 crankpin - No.3 main journal through rear web No.2 big-end pin.
 - (3) No.3 crankpin - No.4 (centre) main journal through rear web No.3 crankpin.
 - (4) Two holes in centre No.4 main journal.

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No. **74**

DATE.....

SHEET **2** OF **4**

SERVICE BULLETIN

CONTINUED

- (5) Centre main journal - No.4 crankpin through front web No.4 big-end pin.
- (6) No.5 main journal - No.4 crankpin through front web No.5 crankpin.
- (b) Drill $\frac{1}{4}$ " dia. hole at 3° from vertical 8 m/m from rear face No.3 main journal through rear web to connect internal bores No.3 main journal and No.3 crankpin.
- (c) Drill $\frac{1}{4}$ " dia. hole through front web No.5 main journal centre line 8 m/m from front face of journal inclined 3° from vertical to connect internal bores No.4 crankpin and No.5 main journal.
- (d) Plug the external holes (i.e. from outside of web to internal bore of journal) drilled as in (b) and (c) with aluminium rivets either Part No. I06-14 ($\frac{1}{4}$ " x $1\frac{1}{4}$ ") - I06-23 ($\frac{1}{4}$ " x $1\frac{1}{2}$ ").

MODIFICATION TO CRANKSHAFT A14953 (SOLID JOURNALS) FIG.2.

- (a) Plug with $\frac{1}{4}$ " dia. mild steel bar:-
- (1) Existing drilling - rear web No.2 crankpin to No.3 main journal.
 - (2) Existing drilling - rear web No.3 crankpin to No.4 (centre) main journal.
- (b) Counter bore both drillings plugged in (a) above $5/16$ " dia. x $1/4$ " deep, countersink $1/32$ " all round at 90° .
- (c) No.2 and 3 main journals - drill $\frac{1}{4}$ " dia. hole from centre of journal at $22\frac{1}{2}^{\circ}$ into crankpin bore of No.2 and 3 crankpin respectively.
- (d) Drill $\frac{1}{4}$ " dia. hole in Nos. 2 and 3 main journals diametrically opposite holes machined in (c) at $22\frac{1}{2}^{\circ}$ to intersect new drillings.
- (e) Countersink $\frac{1}{4}$ " dia. holes $1/32$ " dia. all round at 90° .

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No. **74**

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SHEET **3** OF **4**

SERVICE BULLETIN

CONTINUED

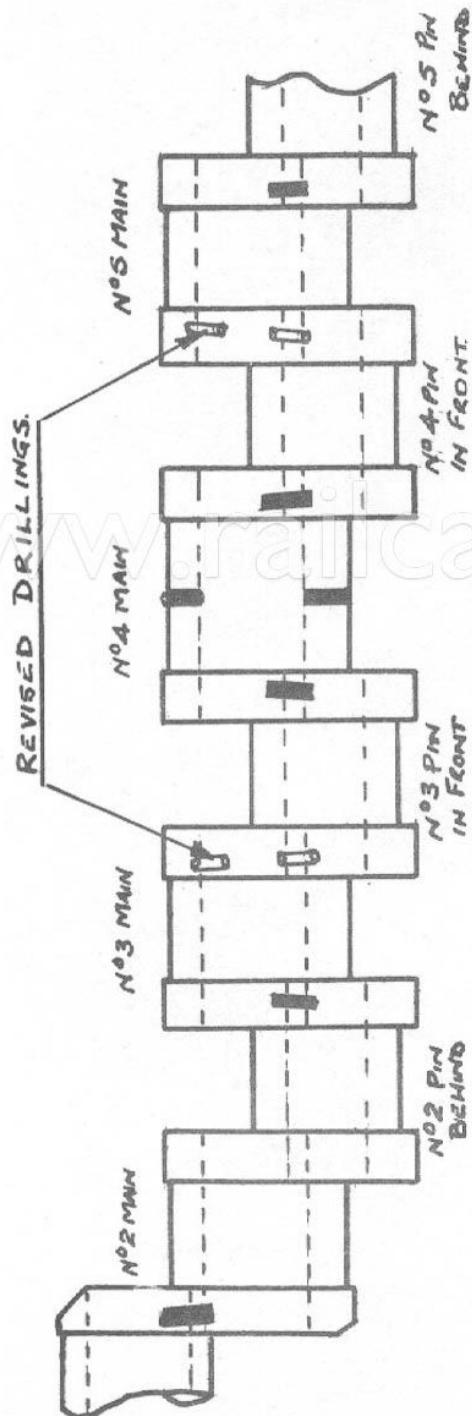
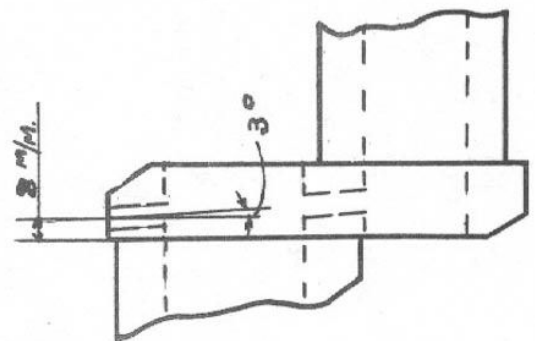


FIG. 1

SCRAP SECTION SHOWING
REVISED DRILLING OF
NO3 AND 5 MAIN WEBS.



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DATE.....

SHEET **4**.....OF **4**.....

SERVICE BULLETIN

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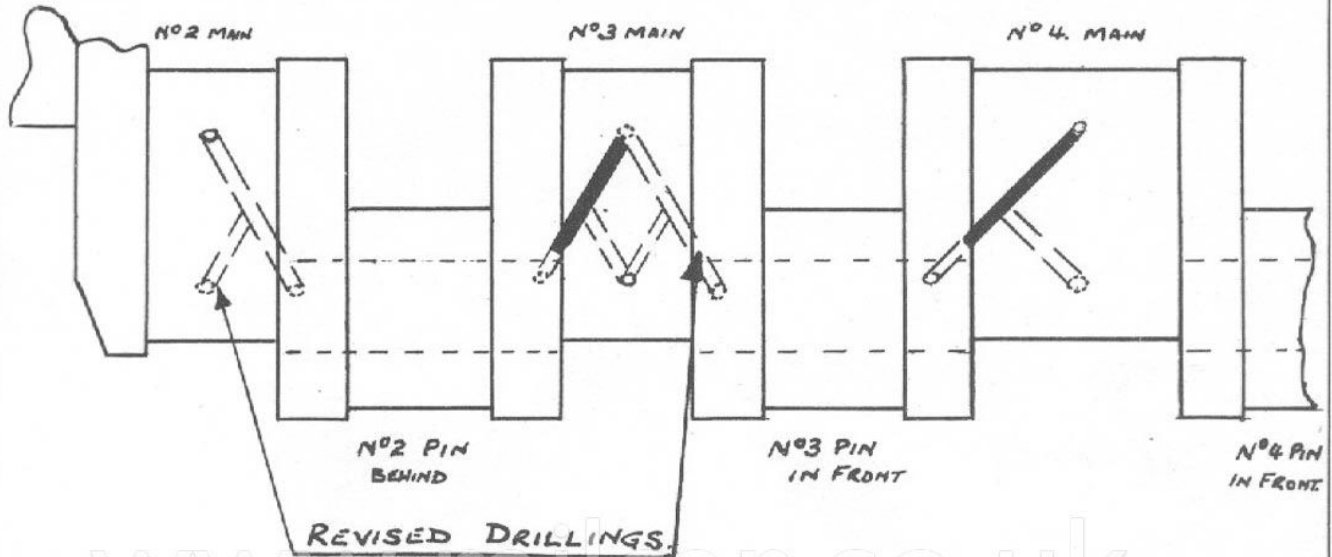
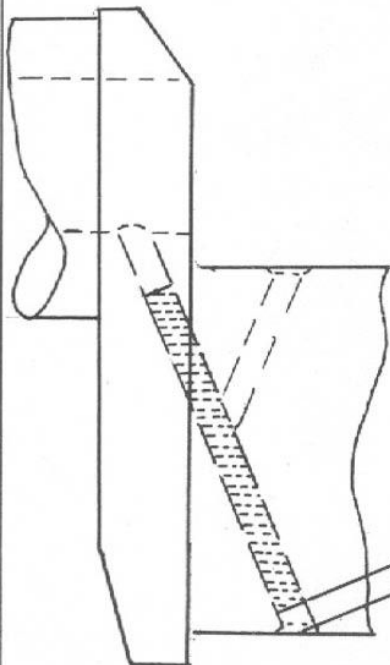


FIG. 2.



SCRAP SECTION SHOWING PLUGGING
EXISTING DRILLINGS N°3 AND 4 MAINS.

C'BORE $\frac{5}{16}$ " DIA X $\frac{1}{4}$ " DEEP
C'S'K $\frac{1}{32}$ " ALL ROUND AT 90°

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. A220 TYPE ENGINES

OIL PRESSURE SWITCH SETTING

To obviate engine shutdown when engines are hot and the viscosity of the lubricating oil is low the pressure setting of oil pressure switches for A220 type engines has been reduced from 10 lb/sq. in. to 6 lb/sq. in.

Existing oil pressure switches Part No.81-2385 can be reset to this latest operating pressure.

For production and new spares a switch Part No.81-2525 set to 6 lb/sq. in. is obtainable but as the mounting thread of this component is $\frac{1}{4}$ " b.s.p. it is not directly interchangeable with existing switches. Therefore, when the latest type oil pressure switches are to be fitted the existing adaptors must be replaced or modified as follows:-

- (1) Engine A220AC, A220AK, A220AL and A220AZ. Replace existing adaptor A93728 with adaptor Part No.A93732.
- (2) Engines A220L, A220G, A220W, A220Y and A220AJ. Plug the $\frac{1}{2}$ " b.s.f. hole in existing adaptors and machine as follows:-

Drill $29/64$ " x $5/8$ " deep.
Tap $\frac{1}{4}$ " b.s.p. (free) x $\frac{1}{2}$ " deep.
Effective diameter 0.4915".
0.4925".

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DATE.....

SHEET **1** OF **1**

SERVICE BULLETIN

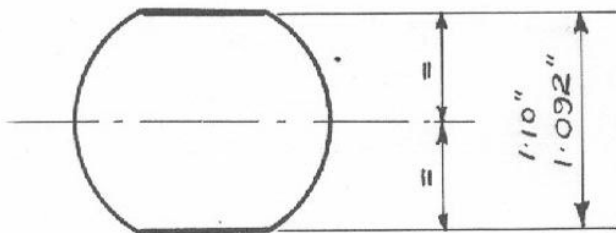
APPLICABLE TO:— B.U.T. - A.E.C. FINAL DRIVES
B.U.T. - S.C.G. FINAL DRIVES * (See Below)

TORQUE ARM REACTION PIN

Difficulties have been reported in tightening the nut on the torque arm pin, A.E.C. Part No. 22/47009 B.R. Cat. No..... (see Service Bulletin No.68) due to the pin turning in the fork end.

To overcome this flats should be machined on the head of the pin to dimensions shown in the sketch to enable it to be held by a spanner when tightening the nut.

Torque arm pins with hexagon heads A.E.C. Part No. 22/47013 B.R. Cat. No..... should be fitted when new pins are required.



* Only B.U.T. - S.C.G. final drives fitted to cars:

E50001 - E50024
E50026 - E50031
E50033 - E50049
M55987 - M55990
W55991 - W55996

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DATE.....

SHEET 1 OF 3

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. FINAL DRIVES

DIFFERENCES BETWEEN F239C AND F280 TYPE FINAL DRIVES

A number of modifications were found necessary on the F239C type final drive and it was decided that a redesigned drive be incorporated within the confines of the existing casing and produced under type number F280. However, the modifications to the air cylinders, pistons, seals, shaft stop etc. and also striking forks and sliding dogs are being made retrospectively on the F239C type units. When completed the only variation between F239C drives fitted with lip type axle oil seals and F280 drives will be as illustrated in the sketches on page 3. Listed below are the part numbers of non-identical parts on the drives:—

<u>F239C</u>	<u>Qty.</u>	<u>Description</u>	<u>F280</u>	<u>Qty.</u>
F11830	1	Bevel Pinion - Reverse	F11843	1
-	-	Circlip	D12718	1
F1/15238	1	Driving Shaft	F1/15249	1
5091-72	2	Oil Seal	5091-136	1
F16547	1	Oil Seal Housing	F16573	1
-	-	Oil Seal Lubricator	81-312	1
15-59	1	Spigot Bearing	15-106	1
Z9/44813)				
Z9/44815)				
Z9/44816)	As	Distance Piece	Z10/44809	1
Z9/44828)	Reqd.			
Z9/44829)				
Z9/44859)				
-	-	Spigot Bearing Nut	Z2/32092	1
-	-	Split Pin	100-14	1

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No. **77**

DATE.....

SHEET **2** OF **3**

SERVICE BULLETIN

CONTINUED

The major difference is in the location of the driving shaft spigot bearing which instead of having rollers fitted to the outer track and a shouldered inner track, the roller cage assembly is intergral with the inner track, the outer track being retained in the reverse bevel pinion by a circlip. The inner track assembly is positioned on the driving shaft spigot by a fixed size distance piece and secured by slotted nut and split pin.

This modification necessitated an alteration to the bore of the reverse bevel pinion and the part number, therefore, changes to F11843 but assembly of the pinion to the housing is not altered in anyway.

The first type of circlip used to retain the outer track of the spigot bearing had "ears" to facilitate its removal, but these obstruct the rollers of the bearing when fitted or removing the driving shaft. It is most essential, therefore, that excessive force must not be used assembling or dismantling this shaft. If obstruction is felt the shaft must be rotated to bring a roller in line with the gap between the ears of the circlip to allow the shaft to be moved.

This difficulty has been overcome on later production by the use of a ~~circular~~ section circlip without ears.
SQUARE.

Modification of the seal arrangement at the input end of the driving shaft has also been made, and in place of the two leather seals a single rubber seal, double lipped, is used. This seal requires periodical lubrication with grease and a grease nipple is provided on the modified oil seal housing for this purpose.

Existing servicable old type parts can still be utilized, but as far as possible, modified parts only should be ordered from A.E.C. (Sales) Ltd., as this will assist in bringing all final drives up to the latest standard.

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No. **77**

DATE.....

SHEET **3** OF **3**

SERVICE BULLETIN

CONTINUED

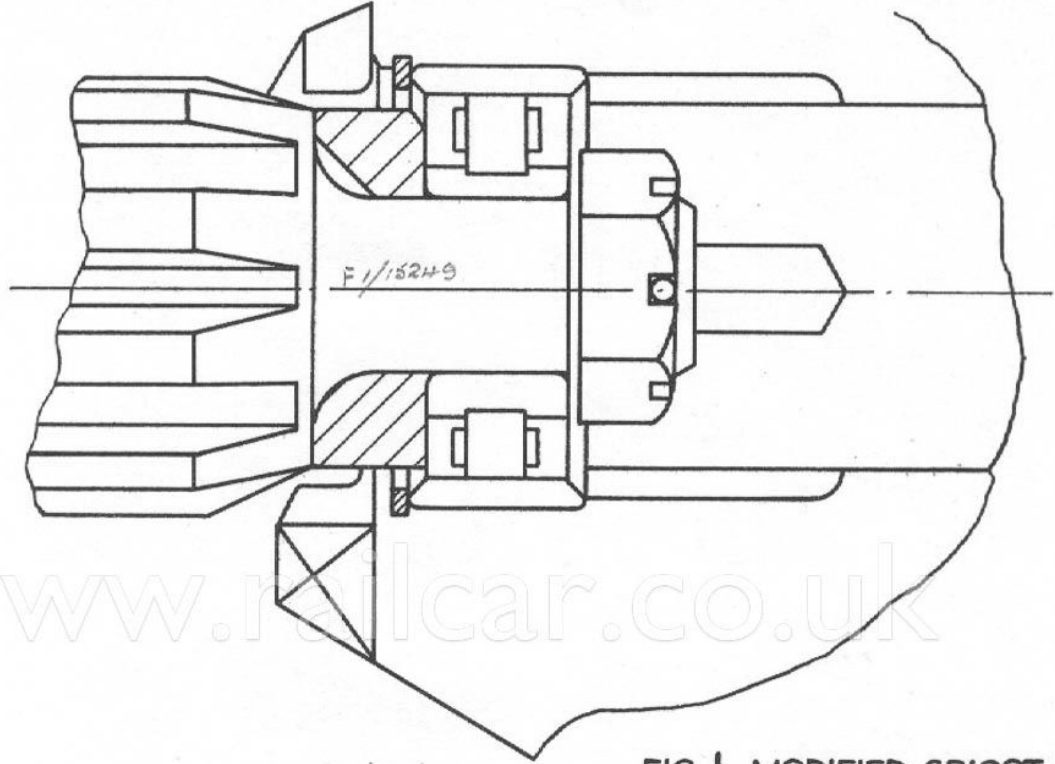


FIG 1 MODIFIED SPIGOT
RACE ASSEMBLY

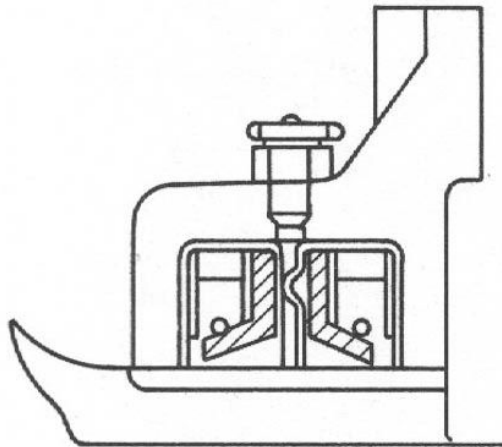


FIG 2 INPUT SHAFT SEAL

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No. **78.**

DATE.....

SHEET..... **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— RF28 FINAL DRIVES

MODIFIED DOG TEETH FORM

To ensure correct dog teeth engagement should the teeth meet "end on end" when changing the direction of the final drive a modification has been incorporated whereby the leading edges of the dog teeth on the sliding dog and bevel wheels are machined to an inclined plane.

Old and modified components must not be fitted in the same final drive, consequently when either the bevel wheel or sliding dog require replacing, modified components, which are directly interchangeable with existing old type components, should be fitted.

These modified components will not be obtainable from Self Changing Gears Ltd. until July, 1961.

S.C.G. Part Nos. of the components concerned are:-

<u>B.R.CAT.NO.</u>	<u>OLD ITEM</u>	<u>DESCRIPTION</u>	<u>NEW ITEMS</u>	<u>QTY.</u>
	31550	Bevel Wheel	45923	2
	31551	Sliding Dog	45924	1

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No. 79.

DATE.....

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:—

B.U.T. 230 B.H.P. ENGINES
(MAIN WORKS ONLY)

CYLINDER HEAD VALVE SEAT INSERTS

Variations exist in the size of valve seat inserts fitted to the 230 b.h.p. engine cylinder heads. To assist the servicing of these components details are given below of the valve seat insert part numbers, also machining dimensions for the recesses in the cylinder heads for standard and oversize inserts relative to the cylinder head part numbers:

Cylinder Head Part No.	Valve	Recess Dia.	Insert Part No. and Dia.	Recess Dia.	Insert Part No. and Dia.
101K19A,B,C.	Inlet	2.798"- 2.800"	114K17 2.8035"-2.804"	2.814"- 2.816"	114K20 2.8235"-2.824"
101K19A,B,C.	Exhaust	2.448"- 2.450"	114K16 2.453"-2.4535"	2.464"- 2.466"	114K19 2.473"-2.4735"
101K19E,F,H.	Inlet	2.694"- 2.696"	114K18 2.7035"-2.704"	2.714"- 2.716"	114K21 2.7235"-2.724"
101K19E,F,H.	Exhaust	2.444"- 2.446"	114K16 2.453"-2.4535"	2.464"- 2.466"	114K19 2.473"-2.4735"

NOTE: The cylinder head part number quoted above is the bare casting number and suffix.

After fitting a new valve insert it is essential that the seat is ground with a suitable stone located by a pilot in the valve guide to ensure that the seating is square to the centre line of the valve guide.

Following assembly of the valve the height of the valve above the pressure face of the cylinder head must be checked to ensure that the amount of projection does not exceed 0.089" for inlet valves or 0.051" for exhaust valves.

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No. **80**.....

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SHEET **1** OF **1**...

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. RE680 ENGINES

MODIFIED LIFTING BAR ATTACHMENT

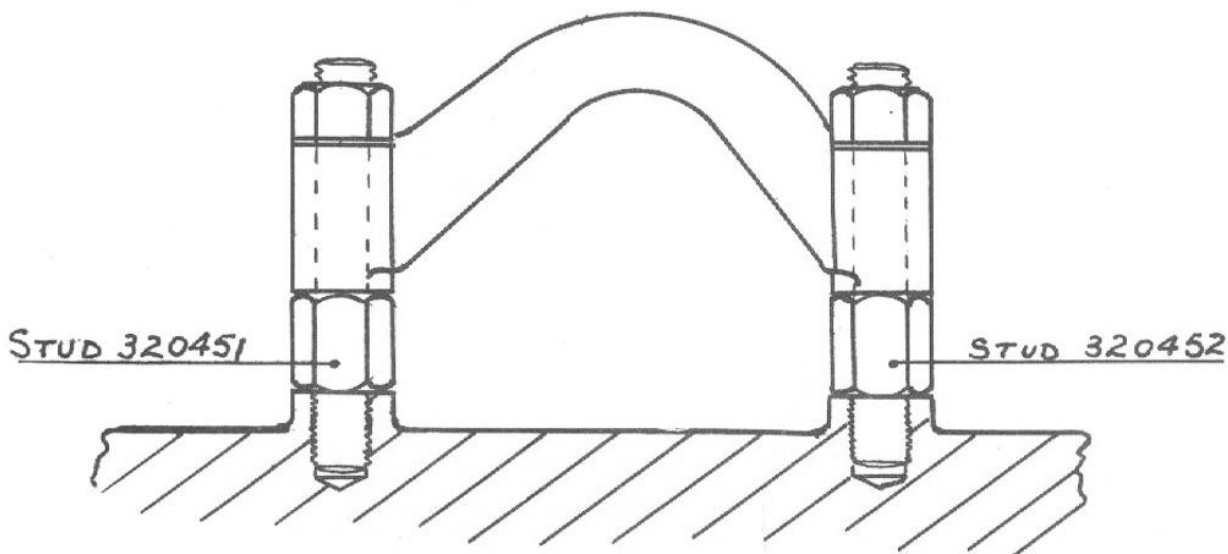
To provide additional clearance between the underside of the lifting bar and crankcase the lifting bar securing bolts are replaced by collared studs as shown below.

The alteration to the part numbers of the components are:

Old Items

New Items

<u>Part No.</u>	<u>Description</u>	<u>Qty.</u>	<u>Part No.</u>	<u>Description</u>	<u>Qty.</u>	<u>B.R.Cat.No.</u>
FB109/18	Bolt	1	320451	Collared Stud	1	
FB109/20	Bolt	1	320452	Collared Stud	1	



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SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINE UNITS
MAIN WORKS ONLY

CONNECTING RODS AND CAPS

Current production connecting rods and caps for the above type engine unit differ from the original components in that the oil spray hole has been deleted from the rod and the cap does not have a balancing boss on the lower side.

These modified components will be supplied as spare replacements and are directly interchangeable with existing items, but when replacements are required it is essential that all connecting rods fitted to individual engines should be of the one type.

The part numbers of these components are not affected by this modification.

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SERVICE BULLETIN

APPLICABLE TO:— SE4 TYPE GEARBOXES
MAIN WORKS ONLY

DIRECT DRIVE CLUTCH & 1ST SPEED BRAKE DRUM

The materials specified for the direct drive clutch and 1st speed annulus and brake drum of the SE4 type gearboxes have been amended as detailed below to give increased life to these items. Components produced from these latest materials will be supplied in all future production gearboxes and spare replacements.

1. Direct Drive Clutch (Top Speed)

Sintered bronze clutch plates replace the existing aluminium bronze type. The relevant part numbers being:-

<u>B.R.Cat.No.</u>	<u>Old SCG Part No.</u>	<u>Description</u>	<u>New SCG Part No.</u>	<u>Qty.</u>
	18535	Outer Clutch Plate	34777	3
	18560	Clutch Pressure Plate	41398	1

2. 1st Speed Annulus & Brake Drum

This component is now supplied in a nitrided condition to overcome excessive wear on the 1st speed annulus teeth. Details of the revised part numbers are:-

<u>B.R.Cat.No.</u>	<u>Old SCG Part No.</u>	<u>Description</u>	<u>New SCG Part No.</u>
	38959	1st Speed Annulus & Brake Drum	45332

These modified parts are completely interchangeable with the existing components.

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— SERVICE BULLETINS NOS. 47 & 49

SERVICE BULLETIN NO.47

The Part Nos. of the shims quoted in the note of sheet 2 of this bulletin should be amended as follows:-

Delete

<u>Part No.</u>	<u>Thickness</u>
A62524	.005"
A62525	.010"
A62526	.020"

Insert

<u>Part No.</u>	<u>Thickness</u>
A62521	.005"
A62522	.010"
A62523	.020"

SERVICE BULLETIN NO.49

The torque spanner setting specified in this bulletin has now been reduced to 30/35 lb/ft. and this revised loading should be inserted in Service Bulletin No.49 in place of 40 lb/ft. Page L16 of 50,000 Series Service Manual should also be further amended accordingly.

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SHEET...1...OF...2...

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND ALBION RE902 ENGINES
(MAIN WORKS)

CYLINDER LINERS AND PISTON RINGS

To overcome scuffing of pistons on Leyland Albion RE902 engines modifications to cylinder liner dimensions and alteration of piston ring material have been made as follows:-

(a) Cylinder Liners

The outside diameter of the liner reduced 0.014" in the area locating on the lower weir land of the cylinder block and the bore diameter increased by 0.003" from 5.501" to 5.504".

Existing cylinder liners Part No.105K21G can be modified by machining the portion of the outside diameter indicated in the sketch (sheet 2) to 6.382" - 6.385" dia. also honing the liner bore to 5.504" - 5.50475" dia.

(b) Piston Rings

The material of the second and third compression rings and also scraper rings altered from hardened and tempered to as cast.

These modifications must be incorporated in engines when returned to main works for overhaul or repair and the old and new part numbers are:-

B.R.CAT.NO.	OLD PART NO.	DESCRIPTION	NEW PART NO.	QTY. PER ENGINE
	106K21G	Cylinder Liner	106K21H	6
	227K13B	Piston Ring 2nd & 3rd Compression	227K13C	12
	227K14	Piston Ring Scraper	227K14B	12

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DATE.....

SHEET.....**1** OF.....**1**

SERVICE BULLETIN

APPLICABLE TO:— SE4 TYPE GEARBOXES
(LIST NOS. 6721 & 7027)

INPUT COUPLING

To obviate slackness and wear of the input coupling on gearbox list numbers 6721 and 7027 a modification has been introduced to harden the coupling splines and also alter the input shaft nut, washer and distance piece.

The shaft washer is now integral with the nut and the distance piece located between the roller and ball bearings has been modified to give more positive location.

The part numbers of the details affected by these modifications are as follows and modified details must be fitted when replacements are required:—

<u>B.R.CAT.NO.</u>	<u>OLD SCG PART NO.</u>	<u>DESCRIPTION</u>	<u>NEW SCG PART NO.</u>	<u>QTY.</u>
	44014	Distance Piece	48504	1
	37757	Input Shaft Nut	48503	1
	38536	Input Shaft Washer	-	1

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SERVICE BULLETIN

No. **86.**

DATE.....

SHEET **1** OF **1**

APPLICABLE TO:— B.U.T. - LEYLAND 230 B.H.P. ENGINES

INTERMEDIATE IDLER GEARS FUEL PUMP AND CAMSHAFT DRIVE

It has been found that the idler gears between the crankshaft pinion and fuel pump driving gear and also between crankshaft pinion and camshaft driving gear can slacken off due to insufficient draw on the spindle bolt.

The bolt has been redesigned and is assembled to the spindle in the reverse manner to the original bolt (i.e. with the head of the bolt in front of the idler gear) and an additional shouldered bush is fitted under the unit. Details to new part numbers must be fitted when replacements are required.

The torque setting for the new nut is 175 lb./ft.

Details of the new and displaced components are:-

<u>B.R.CAT.NO.</u>	<u>OLD PART NO.</u>	<u>DESCRIPTION</u>	<u>NEW PART NO.</u>	<u>B.R.CAT.NO.</u>	<u>QTY.</u>
	1032Z16	Bolt	103-Z-29A		
	-	Washer	1041-Z-25A		
	299965	Nut	UFN412/P		

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SERVICE BULLETIN

No. **87**

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APPLICABLE TO:—

B.U.T. - A220 SERIES ENGINES
(MAIN WORKS)

CRANKSHAFT REGRINDING

Regrinding of A220 Series engine crankshafts is not permitted below 3rd standard on either main journals or big-end pins.

The details given on page K81 of the 50,000 Series Service Manual referring to 4th, 5th and 6th standard crankshaft dimensions, crankshaft main bearings and connecting rod replacement bearings, should be deleted.

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. A220 ENGINE
(50,000 SERIES CARS)

RIGHT ANGLE DRIVE PULLEY

A smaller diameter pulley has been provided for the right angle drive input shaft in order to increase the speed of the radiator fan. This pulley is directly interchangeable with the existing component and should be fitted when replacements are required and existing stocks exhausted.

Details of new and displaced components are:-

B.R.CAT.NO.	OLD AEC PART NO.	DESCRIPTION	NEW AEC PART NO.	QTY.	B.R.CAT.NO.
	A1/21721	Pulley	A1/21792	1	

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINES
(MAIN WORKS ONLY)

PISTON AND PISTON RINGS

Pistons with parallel sided piston rings are now available as replacements for the original tapered ring pistons and may be fitted when replacements are required.

Special attention is drawn to the 2nd and 3rd compression rings as these have a face angle of $1/1\frac{1}{2}^{\circ}$ and it is imperative that they are fitted correctly as indicated by the word "Top" etched on the upper face of the ring.

Details of the old and modified parts are:-

<u>B.R.CAT.NO.</u>	<u>OLD PART NO.</u>	<u>DESCRIPTION</u>	<u>NEW PART NO.</u>	<u>B.R.CAT.NO.</u>	<u>QTY.</u>
	281281	Piston	602890		1
	289382	Piston Ring Top	602242		1
	281282	Piston Ring 2nd & 3rd	602243		2
	281283	Piston Ring Scraper	281283		2

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SHEET **1** OF **2**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINES

WATER PUMP IMPELLOR

A keyed impellor, secured to the driving shaft by a locknut and tab washer is now available for the water pump fitted to the RE680 engine and is designed to facilitate removal, additionally a large type seal is provided with the new type impellor.

Provision of the larger seal necessitates alteration to the existing water pump casing Part No.511337 and is effected by increasing the diameter of the bore which accommodates the seal housing from 0.8755"/0.87475" to 1.06325"/1.06225". The part number of the casing then becomes 601574.

This modification to be carried out when new parts become available and when replacements are required or engines pass through main works for repairs.

Details of the old and new components are as follows (the new components can be obtained from Leyland Motors, Chorley Works, in conversion kit form by ordering Conversion No.211):-

<u>B.R.CAT.NO.</u>	<u>OLD LEYLAND PART NO.</u>	<u>DESCRIPTION</u>	<u>NEW LEYLAND PART NO.</u>	<u>QTY.</u>	<u>B.R.CAT.NO.</u>
	538693	Impellor	321548	1	
	511344	Driving Shaft	601577	1	
	-	Seal Housing	601578	1	
	-	Tab Washer	600727	1	
	-	Locknut	600751	1	
	266394	Water Pump Seal	163421	1	
	-	Insert	601158	1	
	-	'O' Ring	601159	1	
	-	Woodruff Key	60042	1	
	600058	Setscrew	-	1	
	287174	Sleeve	-	1	
	511337	Casing *	601574	1	

* Not included in conversion No.211.

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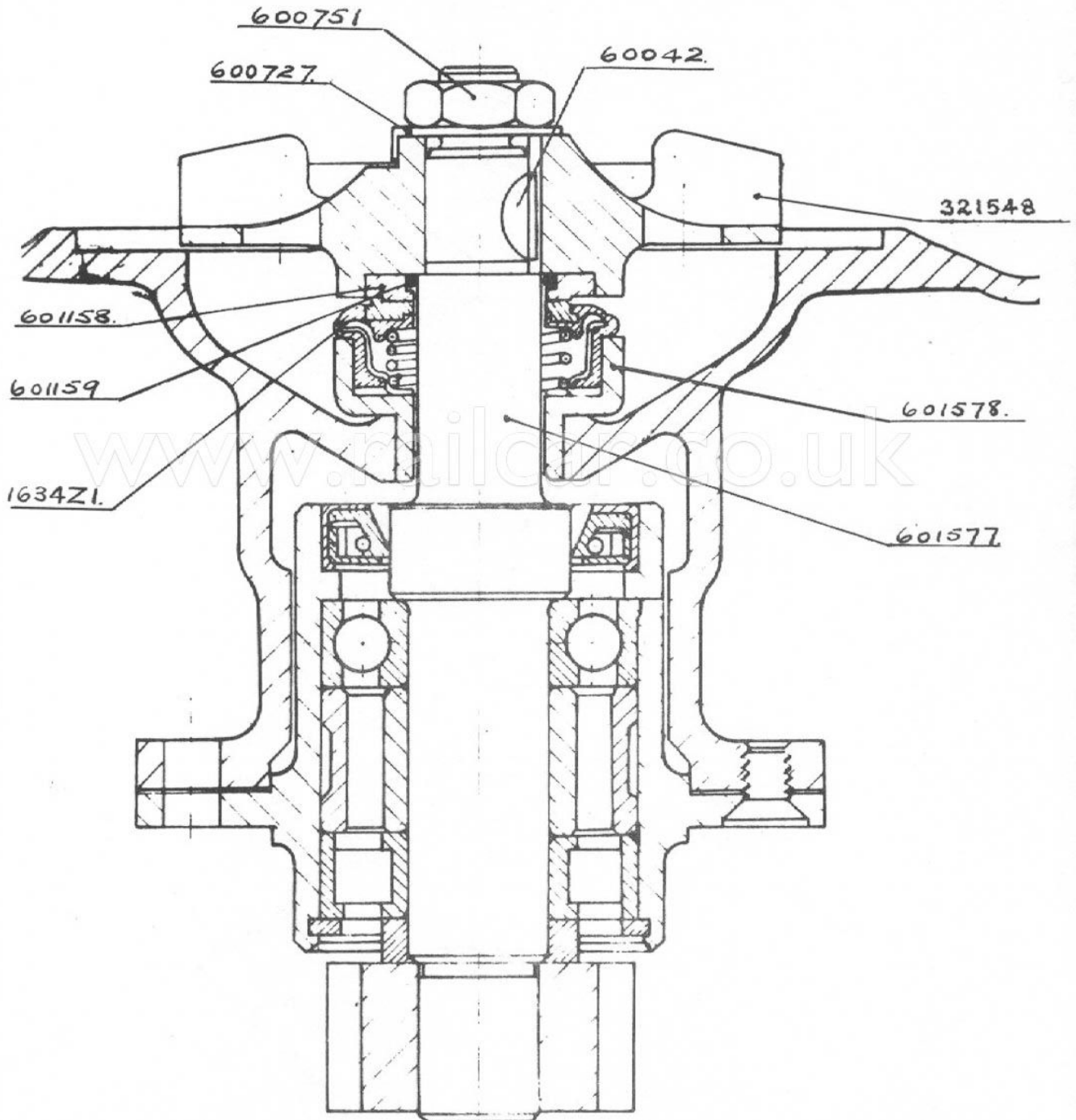
No. **90**

DATE.....

SHEET **2** OF **2**

SERVICE BULLETIN

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DATE.....

SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND RE680 ENGINES

CYLINDER LINERS

B.U.T. Service Manual, Chapter L, Page L7

Attention is drawn to the dimension given for the initial bore of liner before fitting to engine block. (push fit or light press fit).

This should read 5.0017" to 5.0025" and not 5.0010" to 5.0018".

Service Manuals must be amended accordingly.

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SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND 901 & 902 SERIES ENGINES

INJECTION TIMING

The injection advance setting on the above Leyland - Albion 230 b.h.p. engines should be altered from 30° to 36° before T.D.C.

When resetting the pump timing the timing marks on the crankshaft flywheel must be altered so that the change becomes permanently established.

The 36° before T.D.C. is a standard setting mainly for use when changing fuel injection pumps in service. Slight variations from this timing are permissible when turning engines during bench test.

NOTE:-

Retiming and alteration of flywheel marks on engines must be carried out during overhaul/repair in Main works. It may be done at Motive Power Depots only with assistance of B.U.T. field staff.

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SHEET **1** OF **1**

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - A.E.C. FINAL DRIVES (MAIN WORKS)

To avoid possible damage to the bevel wheel bearing on assembly and to ensure a better lead-in for the bevel wheel shaft assembly, the final drive top-half casing should be machined in accordance with the dimensions given in Fig.2 below as final drives pass through main works for repairs.

BEFORE ALTERATION

AFTER ALTERATION

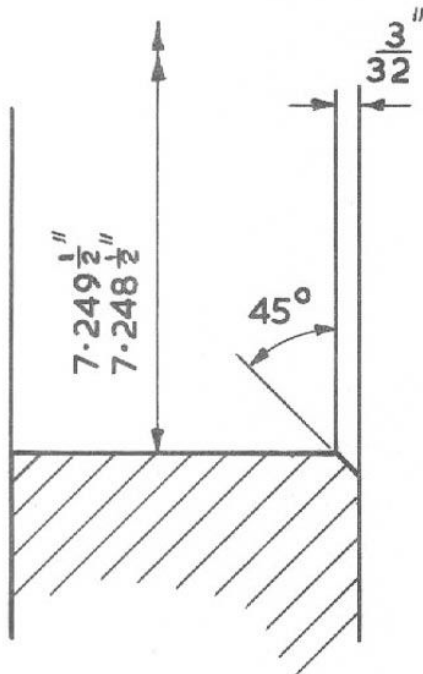


FIG. 1

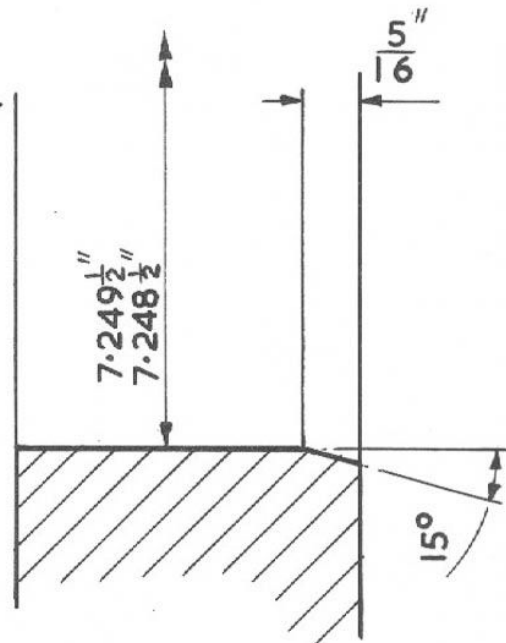


FIG. 2

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SERVICE BULLETIN

NO. **94**

DATE.....

SHEET.....1.....OF.....1

APPLICABLE TO:— 50000 SERIES CARS WITH B.U.T. CONTROL SYSTEM

UNLOADER VALVE & AIR PRESSURE SWITCH SETTINGS

Attention is drawn to the importance of maintaining settings of the above valves and switches in conformity with the data given on page P.17 of the 50000 Series B.U.T. Service Manual.

Difficulties can be experienced due to incorrect settings and it is most essential that the Unloader Valve cut-in pressure be maintained within the range 75-80 lbs. p.s.i.

Final drive Air Pressure Switch cut-in pressure must be 75 lbs. p.s.i. Settings below this figure can create difficulty in obtaining air-axle light indication when changing direction, particularly at terminal points.

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SERVICE BULLETIN

APPLICABLE TO:— B.U.T.-LEYLAND 680, 901 & 902 SERIES ENGINES

FLYWHEEL - CRANKSHAFT BOLTS - TORQUE LOADING

When tightening the nuts of the bolts securing engine flywheel to crankshaft flange the following torque loadings must be adhered to:—

B.U.T.-Leyland RE680 (150 h.p.) Engines:— 130 - 140 lb. ft.

B.U.T.-Albion RE901-902 (230 h.p.) Engines:— 150 - 166 lb. ft.

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DATE.....

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:— R14 TYPE GEARBOXES

MOUNTING BRACKET STUDS - TORQUE LOADING

When tightening the nuts which secure the three mounting brackets to the casings of R14 type gearboxes the following torque loading must be adhered to:-

28 - 42 lb. ft.

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SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND 902 SERIES ENGINES (MAIN WORKS)

CRANKSHAFT THRUST WASHERS

Oversize thrust washers are now available for the crankshafts of the 230 h.p. 902 engines and details are given below:—

<u>B.R.CAT.NO.</u>	<u>DESCRIPTION</u>	<u>PART NO.</u>
	Thrust Washer.Top Half.Oversize .005" on thickness	611K41
"	" " " " " .010" " "	611K42
"	" " " " " .020" " "	611K43
	Thrust Washer.Bottom Half.Oversize .005" on thickness	611K44
"	" " " " " .010" " "	611K45
"	" " " " " .020" " "	611K46

NOTE:— For normal service regrinding of 902 crankshafts the thrust faces should not be machined unless scoring or exceptional wear has taken place.

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DATE.....

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND 901 SERIES ENGINES (MAIN WORKS)

CRANKSHAFT THRUST BEARINGS

On the 901 series 230 h.p. engines the crankshaft thrust bearing faces are integral with the centre main bearings and .020" oversize (width) thrust bearings are now available with various undersize bores as listed below :-

<u>BR.CAT.NO.</u>	<u>DESCRIPTION</u>	<u>PART NO.</u>
	(+ .020" Oversize Thrust)	
	Top Half with .010" Undersize Bore	121K.149
"	" " .030" " "	121K.150
"	" " .050" " "	121K.151
Bottom	" " .010" " "	121K.152
"	" " .030" " "	121K.153
"	" " .050" " "	121K.154

NOTE:— For normal service regrinding of 901 crankshafts the thrust faces must not be machined unless scoring or exceptional wear has taken place.

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SHEET 1 OF 1

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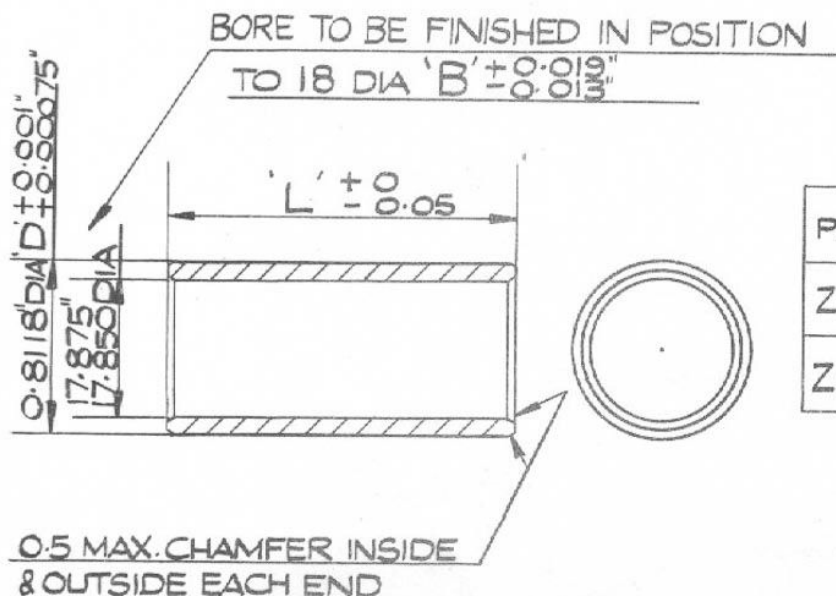
APPLICABLE TO:— B.U.T./ A.E.C. A220 ENGINES (MAIN WORKS)

LUBRICATING - OIL PUMP GEARS & BUSHES

The overall finished lengths of the oil pump driven wheel bushes (Part Nos. Z1/10125 and Z1/10114) have been reduced from 28 and 33 to 27 and 32 millimetres respectively.

In addition, it is necessary to ensure that the bore of the bush at each end is chamfered $0.5 \text{ mm} \times 90^\circ$ and that the end face of the bush is 0.5 mm below the surface of the gear face. (The bush to be pressed into the gear in a central position so as to ensure that the ends are below the finished face of the gear. (See sketch below)

These modifications must be carried out on all the oil pump assemblies on 150 h.p. A.E.C. engines passing through main works. All bushes in stock, including those fitted to pumps and gear wheels must also be modified.



PART N ^o	DIM "L"
Z1/10125	27 M/M.
Z1/10114	32 M/M

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SHEET...1...OF...2...

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND 901 & 902 SERIES ENGINES
(MAIN WORKS)

CONNECTING ROD SMALL END MODIFICATIONS

The connecting rods of all Leyland - Albion 230 h.p. engines passing through Main Works for reconditioning must be modified by the provision of a locating screw for the small end bush to prevent turning of the bush in the eye of the rod. The 2 B.A. locating screw (Part NO. 9300Z.358 - B.R.Cat.NO.....) must be secured as shown on page 2 of this Bulletin.

Where the standard small end bush (Part No.254K11 - B.R. Cat.No.....) has turned and wear taken place in the bore of the connecting rod, a .010" oversize bush must be fitted (Part No.254K13 - B.R. Cat. No.).

To accommodate the oversize bush the connecting rod must be bored out to $2.099\frac{1}{2}/2.111$ " dia., and the bore of the bush finished in position to $1.876/1.876\frac{1}{2}$ " dia.

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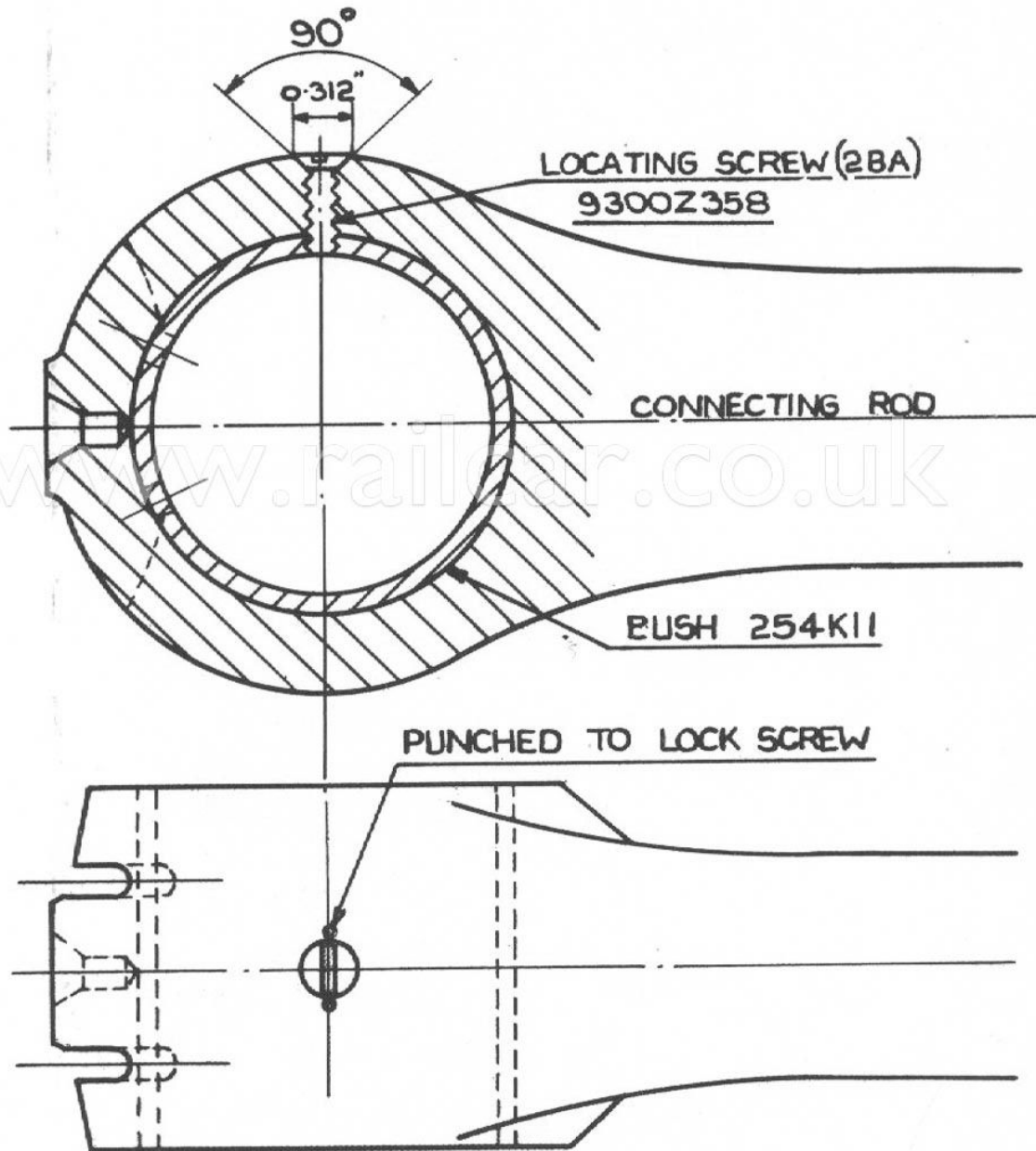
No. 100

DATE.....

SHEET 2 OF 2

SERVICE BULLETIN

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DATE.....

SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND 230 B.H.P. ENGINES.

C.A.V. SP6. STARTER MOTORS

BRUSHES

New type brushes are to be fitted to the above starter motors when replacements are required. These are direct replacements for the old type but it is important that brushes of one grade only be fitted to any particular motor - old and new brushes must not be mixed.

<u>B.R.CAT.NO.</u>	<u>OLD C.A.V. PART NO.</u>	<u>DESCRIPTION</u>	<u>NEW C.A.V. PART NO.</u>	<u>QTY.</u>
	Y.5549-177B	Brush & Tag (Short)	X.6029-38A	
	Y.5549-178B	Brush & Tag (Long)	X.6029-38	
	X.5549-170A	Assembly, Brush Holder.	X.5549-170D	
	X.5549-171A	Assembly, Brush Holder.	X.5549-171D	

Brushes should be bedded to the commutator periphery as described on page 4 of section 22 in chapter "V" of the B.U.T. 460 BHP Service Manual.

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SHEET 1 OF 1

SERVICE BULLETIN

APPLICABLE TO:— B.U.T. - LEYLAND R.E. 600 & 680 ENGINES.

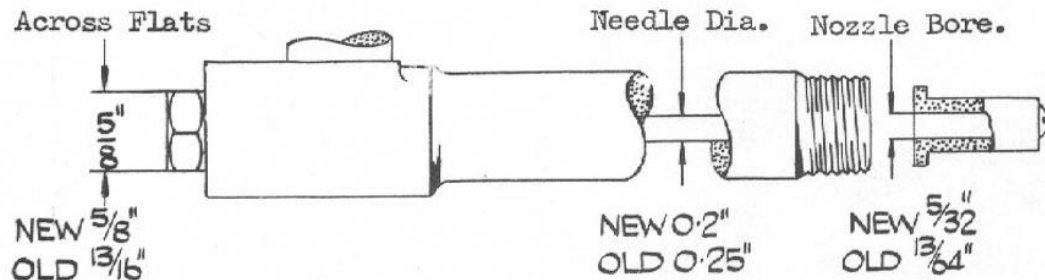
When existing stocks of Injectors and Nozzles for Leyland 0.600 and 0.680 engines are exhausted, new type Nozzles and Injectors should be fitted as indicated below.

The new type items are completely interchangeable with the present type as assemblies, but it should be clearly understood that they must be fitted in complete engine sets only. Improved injector body drilling and spring location, also a smaller needle are now incorporated.

The needle lift on the new types of injectors is .011"/.013" which compares with .016"/.018" applicable to the earlier units.

The pressure setting is now 145/150 atmospheres.

Two new service tools are introduced with the latest injectors as follows:- Needle Valve Extractor 575959 and Needle Lift Washer Assembly Tool 571349.



ENGINE TYPE	INJECTOR PART NO	NOZZLE PART NO	NOZZLE HOLE SIZE	IDENTIFICATION
0.600	602370 NEW 287289 OLD	601850 NEW 227563 OLD	0.010"	 5/32" BORE
0.680	602209 NEW 293540 OLD	601878 NEW 293961 OLD	0.012"	 5/32" BORE

TELEPHONE
GROSVENOR 7121



TELEGRAPHIC ADDRESS:
"BRITROL", LONDON

BRITISH UNITED TRACTION LIMITED
49 BERKELEY SQUARE.
LONDON, W.1.

NO. 108

DATE 19.2.07

SHEET 1 OF 1

SERVICE BULLETIN

H.A.S.D. ARCHIVE COPY ONLY

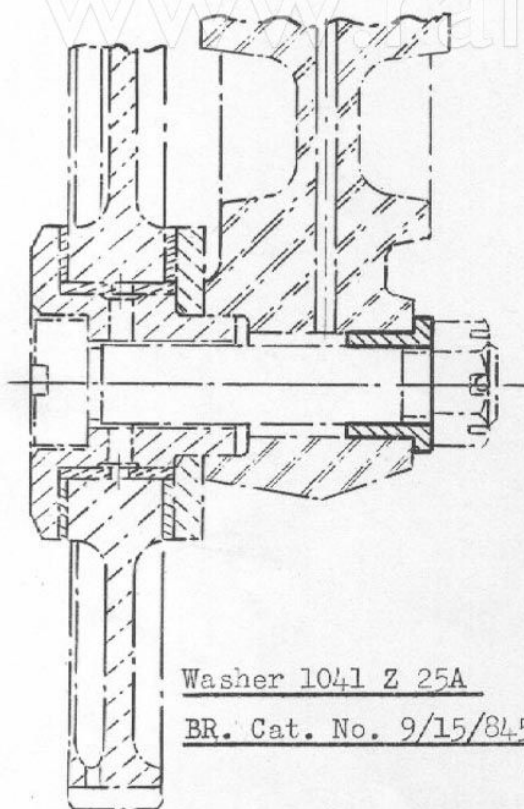
APPLICABLE TO:—

B.U.T. LEYLAND 250 B.H.P. ENGINES

Intermediate Idler Gear

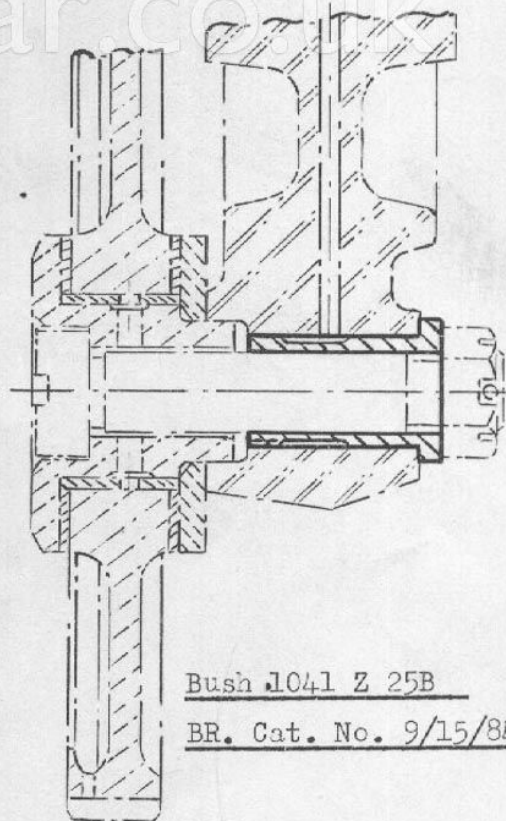
A further modification has been introduced to the bush in the front main bearing cap as shown below, to provide an improved mounting for the idler gear spindle.

This bush supersedes the washer shown on Bulletin No. 86 and must be fitted when replacements are required.



Washer 1041 Z 25A
BR. Cat. No. 9/15/84533

Before Alteration



Bush 1041 Z 25B
BR. Cat. No. 9/15/84609

After Alteration