

SOUTHERN CROSS

TO
SOUTHERN CROSS DIESEL ENGINES -

6 H.P. - MARK EF-E
12 H.P. - MARK EF-H.

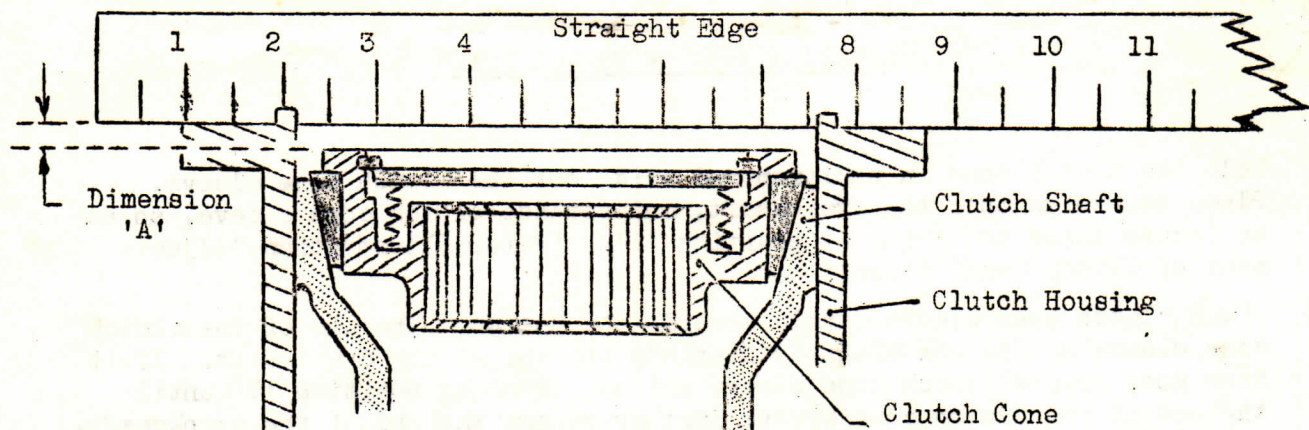
Alterations to Engine.

Before mounting the clutch, the engine must be altered as follows:

- (a) Give the starting handle clutch on the fuel tank side of the engine, a few sharp taps with a hammer, on the tapered portion, and unscrew the starting handle clutch. This part is screwed left hand thread.
- (b) Unscrew the valve rocker lubricating pipe banjo connection in the fuel pump mounting plate, and screw in the lubricating oil pipe banjo connection supplied with the clutch. This banjo connection has a screwed extension for connecting the lubricating oil pipe to the clutch. Make sure washers are replaced on each side of the banjo connection.

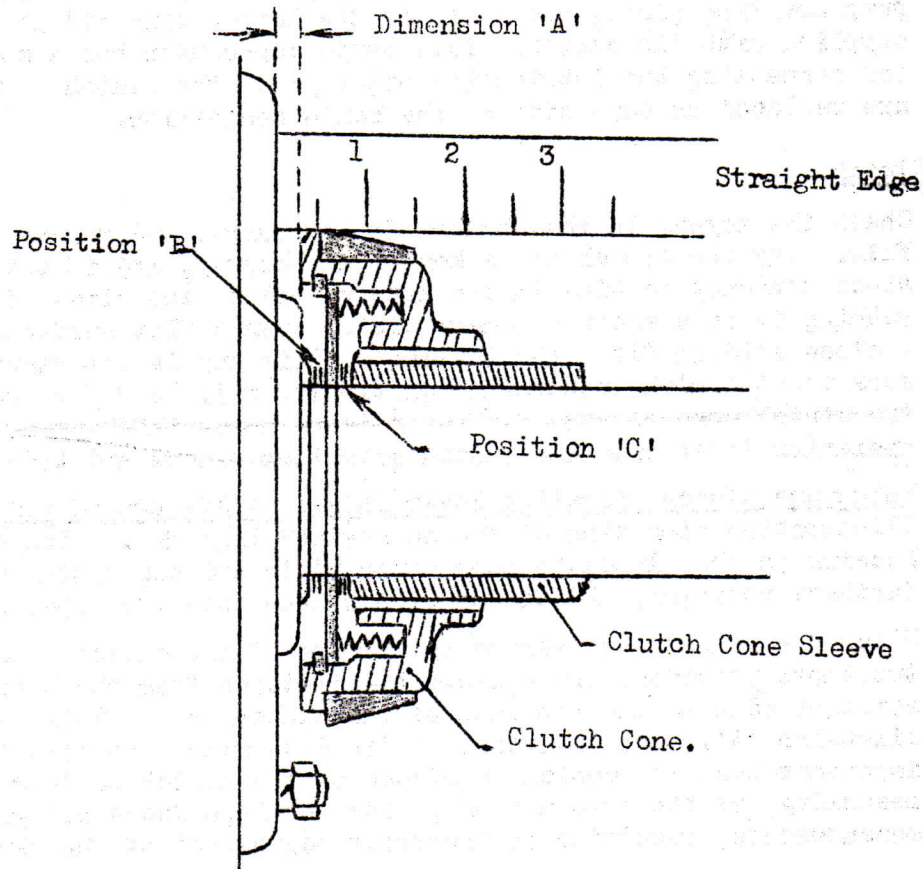
To Fit Clutch.

- (c) Check the keyway in the crankshaft for burrs, and remove these with a fine file. Try the clutch drive key in the keyway, and if the key is tight, or shows tendency to bind in the keyway, polish the sides of the key by rubbing it on a sheet of emery cloth, over a flat surface, until the key is a close sliding fit. The fitting of this key is important, as in subsequent clutch adjustment, difficulty will be experienced in removing the clutch cone sleeve if the key is tight in the keyway. Screw the operating lever into the clutch operating sleeve and tighten the locknut.
- (d) Make sure clutch operating lever is set at disengaged position. See Illustration "Locating Clutch on Engine" Page 3. Support the clutch housing on the clutch bearing cover plate and tap clutch shaft down to its furthest position. Place the clutch cone into the taper of the shaft.
- (e) Place a straight edge across the flange of the clutch housing, through the two slots provided, and measure the distance from the bottom edge of the straight edge to the top face of the clutch cone. This measurement is dimension 'A'. See illustration "To determine dimension 'A'." It is important that the conical surfaces of the clutch be de-greased before measuring, as the presence of grease on these faces may give false measurements, resulting in incorrect adjustment of the clutch.



"TO DETERMINE DIMENSION 'A'".

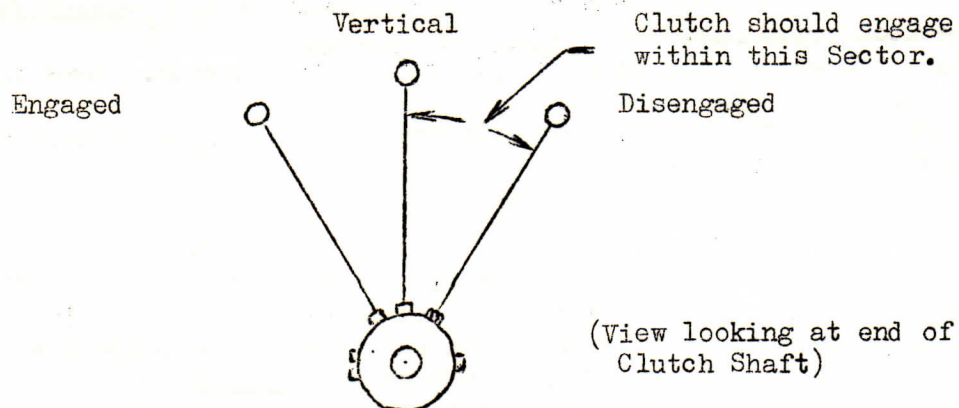
- (f) Place four shims, the clutch cone sleeve and clutch cone onto the crankshaft, and press these parts gently towards the engine. Measure the distance between the face of the clutch cone and crankshaft bearing housing. Add or remove shims on the crankshaft at position 'B' (see illustration "Adjustment of Clutch Cone" below) to make the distance from the face of the clutch cone to the face of the crankshaft bearing plate, equal to or slightly less than dimension 'A'.



"ADJUSTMENT OF CLUTCH CONE"

- (g) Hold the clutch cone in position and slide out the clutch cone sleeve. Place two shims onto the crankshaft, and replace clutch cone sleeve, so as to locate these two shims at position 'C'. (Refer illustration "Adjustment of Clutch Cone" above).
- (h) Push clutch cone sleeve firmly towards the engine. The end of the clutch cone sleeve should now slightly overhang the end of the crankshaft. If it does not, remove clutch cone sleeve and add shims at position 'C' until the end of the clutch cone sleeve just overhangs the end of the crankshaft.

- (i) Remove clutch cone, clutch cone sleeve and shims from the crankshaft. Keep shims from position 'B' and position 'C' separate, as these must be replaced in their correct positions when finally assembling clutch.
- (j) Undo the nuts from the six studs around the crankshaft bearing housing on the fuel tank side of the engine, and remove the spring washers.
- (k) Lift off the crankshaft bearing housing.
- (l) Remove the crankshaft bearing housing studs from the engine crankcase, and screw in the longer studs provided. The short thread of the stud screws into the crankcase. Tighten the studs securely, by locking two nuts together on the thread of each stud, and driving the stud in with a spanner on the top nut.
- (m) While the crankshaft bearing housing is removed from the engine, drive out the seal.
Note: If engine Number is prior to Numbers - Mark EF-E Engine No. 65542 or Mark EF-H Engine No. 65742 refer to page 6 for Alteration to be made to Crankshaft Bearing Housing.
- (n) Replace the crankshaft bearing housing on the engine.
- (o) Grease the crankshaft and place shims for position 'B' on the crankshaft. Place clutch cone onto crankshaft. Grease splines on outside of the clutch cone sleeve.
- (p) Add shims from position 'C' to the crankshaft and push these into position through the clutch cone, with the clutch cone sleeve.
- (q) Place the tab of the tab washer into the end of the keyway, so that the washer is against the clutch cone sleeve, and insert the threaded portion of the clutch cone locknut into the end of the crankshaft, and tighten. The locknut must be tightened securely, otherwise wear will occur between crankshaft and clutch cone sleeve. The thread on the locknut is left hand thread. Bend the edge of the tab washer over the flat of the clutch cone locknut.
- (r) Place the clutch to engine gasket over the studs, around the bearing housing, on the engine, and fit the clutch housing assembly over the clutch cone assembly, making sure the clutch is still fully disengaged, and the clutch operating lever is to the top. See illustration "Locating Clutch on Engine".



"LOCATING CLUTCH ON ENGINE"

Locate the housing over the studs in the engine. Fit spring washers on the studs, and tighten the nuts securely.

- (s) Check Clutch Adjustment: Place clutch operating lever in the fully disengaged position and check if the clutch shaft can be turned easily by hand. If the clutch shaft cannot be easily turned by hand, it will be necessary to adjust the number of shims between the crankshaft and the spring pressure plate. Disassemble clutch and transfer one shim from position 'B' to position 'C'. (Refer illustration "Adjustment of Clutch Cone" page 2.) When satisfied that the clutch adjustment allows full disengagement, turn clutch shaft by hand and slowly move operating lever from "disengaged" position towards "engaged" position, and feel the point at which the clutch engages. The operating lever should then be situated at a position between vertical and "disengaged" position, as shown in illustration "Locating Clutch on Engine" above.
- (t) Connect the clutch lubricating pipe between the lubricating oil pipe banjo connection on the fuel pump mounting plate of the engine, and the lubricating oil filler hole, at the top of the clutch housing.
- (u) Pour in $\frac{1}{2}$ pint of clean engine oil through the oil filler hole.
- (v) Place a sealing washer on each side of the banjo of the clutch lubricating oil pipe and screw in and tighten the banjo connection supplied with the clutch.

THE CLUTCH IS NOW READY FOR USE.

Maintenance:

After the clutch has been in operation for a considerable time, due to wear within the clutch, the position at which the clutch engages may have to be reset. This may be done, either by dis-assembling the clutch, and refitting it as in the foregoing instruction, or as follows:

- (i) Disconnect lubricating oil pipe and remove the clutch housing from the engine.
- (ii) Bend tab washer on clutch cone locknut away from the flat of the locknut.
- (iii) Remove clutch cone locknut and tab washer, slide out the clutch drive key, and remove the clutch cone and clutch cone sleeve.
- (iv) Take one shim from those between the clutch cone and spring pressure plate, at position 'C' and add it to those at the front end of the clutch at position 'B'. (Refer illustration "Adjustment of Clutch Cone" page 2)
- (v) Replace the clutch cone and clutch cone sleeve on the crankshaft, and insert the clutch drive key.
- (vi) Replace tab washer and locknut and tighten the locknut. Bend tab washer over the flat of the locknut.
- (vii) Replace the clutch housing assembly and replace spring washers and nuts. Tighten nuts securely.

Lubrication:

When the engine oil is being renewed, remove the drain plug from the bottom of the clutch housing and allow the oil to drain from the clutch. When re-filling engine and clutch with clean oil, remove the banjo connection stud at the top of the clutch housing, and pour in $\frac{1}{2}$ pint of clean engine oil. Replace banjo connection, making sure that the sealing washers are in position on each side of the banjo, and tighten.

Add oil, as specified in the engine instruction manual, to fill the engine crankcase up to the mark on the dipstick.

W A R N I N G

The clutch must be at all times correctly adjusted. If any slip is present when the clutch operating lever is in the fully engaged position, rapid deterioration of the clutch cone surfaces will follow.

P A R T S L I S T

No. Off	Symbol Number	Name of Part
1	LYD1B	Clutch Housing
1	LYD2C	Clutch Shaft
1	LYD3B	Clutch Cone
1	LYD4	Spring Pressure Plate
20	LYD5	Clutch Spring
1	LYD6	Clutch Cone Sleeve
1	EDE6	Spring Pressure Plate Retainer
1	LYD9	Clutch Operating Sleeve
1	LYD10	Clutch Operating Lever
1	LYD11B	Clutch Bearing Cover Plate
1	LYD12	Clutch Bearing Cover Plate Gasket
2	LYD13	Clutch Operating Sleeve Sealing Ring
1	LYD14B	Lub. Oil Pipe Assembly (EFE Engine)
1	LYD15B	Lub. Oil Pipe Assembly (EFH Engine)
6	KFL16	Gearbox to Engine Stud
2	LYD17	Clutch Operating Roller Spindle
2	LYD18	Clutch Operating Roller
2	LYD19	Clutch Operating Roller Spindle Washer
1	LYD20B	Lub. Oil Banjo Stud in Engine Fuel Pump Mounting Plate
As Req	LYD22	Clutch Adjustment Shim
1	LYD23	Clutch Cone Locknut Tab Washer
1	LYD24B	Clutch Cone Locknut
1	EFE25	Clutch to Engine Gasket
1	LYD28	Oil Drain Plug
1	LYD30	Lub. Oil Pipe Banjo Stud on Clutch
1	LYD32	Clutch Bearing Retaining Collar (Not Illustrated)
1	LYD33	Clutch Bearing Retaining Circlip
1	LYD34	Clutch Bearing (SKF 6312)
2	EFE56	Clutch Operating Roller Spindle Circlip
1	YC108	Clutch Shaft Core Plug
1	YC157B	Clutch Shaft Oil Seal Retaining Ring
1	YC171	Oil Drain Plug Washer
2	EDG204	Sealing Washers for Lubricating Oil Pipe Banjo Stud on Clutch
1	YC210	Clutch Shaft Oil Retainer Felt
1	EDG241	Lub. Oil Pipe Assembly Nut and Sleeve
1	A	Clutch Operating Lever Locknut (5/8" - 18 UNF)
6		Clutch Bearing Cover Plate Spring Washer - (5/16 in. x 3/32" x 3/32" Spring) (Not Illustrated)
1	C	Clutch Operating Lever Knob - (1-3/8" dia. Moulded Red Bakelite Knob Screwed 1/2" - 13 UNC)
1	D	Clutch Driving Key (2 3/4" x 1/2" x 5/16" Key)
6		Clutch Bearing Cover Plate Setscrew - (3/4" x 5/16" - 18 UNC) (Not Illustrated)
6		Crankshaft Bearing Housing Stud Nut (3/8" - 24 UNF)

LYD7 - Clutch Cone Assembly
Clutch Cone Assembly consists of
parts LYD3B, LYD4, LYD5, EDE6.

Alteration to Crankshaft bearing housing
for Engines prior to numbers -

Mark EF-E Engine - No. 65542

Mark EF-H Engine - No. 65742

While the Crankshaft bearing housing is removed from the engine, it will be necessary to have it machined at a local engineering workshop as shown at left.

Turn to 5.8755"
5.878" Dia.
3/32" - 7/64"
Back from
Face.

